



MILO™ : High-Power Curvilinear Array Loudspeaker



MILO is a self-powered, four-way loudspeaker designed for vertical curvilinear arraying. It has ample power reserves (140 dB SPL peak output at 1 meter) for high output level, longer throw applications in large venues, yet its weight and cabinet dimensions allow for its use in more compact spaces.

MILO was designed to easily integrate with other Meyer Sound loudspeakers, particularly the M3D™ line array, M3D-Sub directional subwoofer, M2D compact curvilinear array and the CQ-2 full-range narrow coverage loudspeaker. Though substantially smaller than the M3D/M3D-Sub in height and depth, MILO shares the same width for seamless integration. When MILO arrays also include M3D-Subs, the combination exhibits dramatically attenuated off-axis low-frequency response. This allows system designers to configure arrays that effectively steer bass energy away from areas located behind the arrays, such as the stage and monitor mix position, where minimum levels are desired.

The MILO low/low-mid section comprises two neodymium magnet 12-inch cone drivers with 4-inch voice coils. These drivers function in a two-way arrangement, with both drivers active below 300 Hz for maximum low frequency impact. Above 300 Hz, an integral crossover rolls off one driver to maintain optimal polar and frequency response.

The mid-high section uses a 4-inch diaphragm (1.5-inch exit) compression driver

coupled to a 90° constant directivity horn through Meyer Sound's REM™ ribbon emulation manifold (patent pending). REM produces a wave front similar to that of a ribbon driver, but allows the far higher output generated by a compression driver. A dedicated very-high frequency section, with extended range to 18 kHz, employs three 2-inch diaphragm (0.75-inch exit) compression drivers coupled via a second REM to a 90° horn.

All MILO transducers are designed and manufactured in-house by Meyer Sound, and are driven by an on-board, four-channel class AB/H amplifier that provides more than 3935 watts of total output power. The integrated amplifier/processing circuitry includes TruPower* limiting to protect the drivers and hold long-term power compression to less than 1 dB. The field-replaceable electronics module incorporates Meyer Sound's Intelligent AC™ power supply, which automatically adjusts for any line voltage worldwide and provides both soft turn-on and transient protection.

Meyer Sound's RMS™ monitoring system interface is fitted as standard on MILO. RMS allows engineers to monitor and troubleshoot all key operating parameters on each MILO – as well as any other RMS-equipped Meyer Sound cabinets – from a remote Windows-based computer.

MILO systems may be deployed in either flown or ground-stacked configurations.

Captive QuickFly® rigging hardware uses rigid AlignaLinks for coupling the units, and allows nine splay angles between 0° and 5°. The rigid connections make for easy adjustment of array tilt, and often eliminate the need for a pullback strap in flown configurations. An optional MG-3D/M multipurpose grid accommodates a variety of flown or stacked configurations, including multipoint support and bridles. A single flown array can include up to 24 MILO loudspeakers, or the equivalent weight of MILOs, M3Ds, M3D-Subs, M2Ds, CQ-2s and rigging hardware. Stacking no more than six cabinets is advised.

With its unique combination of high power and compact size, MILO can serve as the key component in scalable, building block systems comprising any or all M Series products and certain other Meyer Sound models. MILO can be combined with the M3D for very large venue applications, or transition to M2D or CQ-2 loudspeakers for near field coverage where appropriate.

A weather-protected version with a folding rain hood that safeguards the electronics is optionally available.

**TruPower™ limiting protects loudspeaker components without compromising performance. TruPower monitors real-time power consumption, incorporating the impedance of the transducer into its calculation. The result is an accurate estimation of voice coil temperature, affording greater long-term protection, while eliminating excess compression.*

FEATURES & BENEFITS

- Extremely high power-to-size ratio for lower costs and flexible installation
- Exceptional fidelity and peak capability assure clean, high-impact response
- Seamless integration with other M Series models
- QuickFly rigging system simplifies use in flown or ground-stacked arrays

APPLICATIONS

- Stadiums, arenas, concert halls and theatres
- Touring sound reinforcement
- Large-scale events

ARCHITECT SPECIFICATIONS

The loudspeaker shall be a self-powered, full-range unit for deployment in line array systems. The low/low-mid frequency transducers shall consist of two 12-inch cone drivers, each rated to handle 1200 watts AES*. The mid-high frequency transducer shall be one 4-inch diaphragm (1.5-inch exit) compression driver, rated to handle 250 watts AES, coupled via a custom manifold to a 90° horizontal constant directivity horn. The very-high frequency transducers shall consist of three 2-inch diaphragm (0.75-inch exit) compression drivers, each rated to handle 100 watts AES, coupled via a custom manifold to a 90° horizontal constant directivity horn.

The loudspeaker shall incorporate internal processing electronics and a four-channel amplifier. Processing functions shall include equalization, phase correction, driver protection and signal division for the three frequency sections. The crossover points shall be 560 Hz and 4.2 kHz. An additional low-frequency crossover shall cause the two low/low-mid frequency transducers to work in combination between 60 Hz and 300 Hz, with only one working between 300 Hz and 560 Hz, to maintain optimal polar response characteristics.

Each amplifier channel shall be class AB/H with complementary MOSFET output stages. Burst capability shall be 3935 watts total (three channels 1125 watts, one channel 560 watts) with a nominal 4-ohm load for low, low-mid and very-high frequency channels and an 8-ohm load for the mid-high frequency channel. Distortion (THD, IM, TIM) shall not exceed 0.02%. Protection circuits shall include TruPower limiting. The audio input shall be electronically balanced with a 10 kOhm impedance and accept a nominal 0 dBV (1 V rms, 1.4 V pk) signal (+20 dBV to produce maximum SPL). Connectors shall be XLR (A-3) type male and female. RF filtering shall be provided. CMRR shall be greater than 50 dB (typically 80 dB 50 Hz – 500 Hz).

Performance specifications for a typical production unit shall be as follows, measured at 1/3 octave resolution: Operating frequency range shall be 60 Hz to 18 kHz. Phase response shall be ±30° from 750 Hz to 16 kHz. Maximum peak SPL shall be 140 dB at 1 meter. Beamwidth shall be 90° horizontal. Vertical coverage in multi-cabinet arrays shall be dependent on system configuration.

The internal power supply shall perform automatic voltage selection, EMI filtering, soft current turn-on and surge suppression. Powering requirements shall be nominal 100, 110 or 230 V AC line current at 50 Hz or 60 Hz. UL and CE operating voltage range shall be 100 to 240 V AC. Maximum peak current draw during burst shall be 14.4 A at 115 VAC and 7.2 A at 230 V AC. Current inrush during soft turn-on shall not exceed 7 A at 115 V AC. AC power connectors shall be locking NEMA connector, IEC male or VEAM all-in-one.

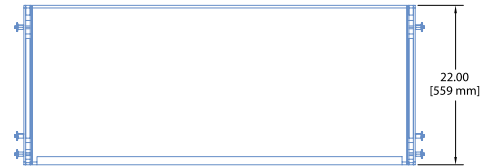
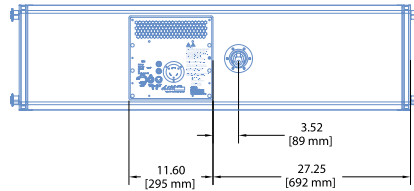
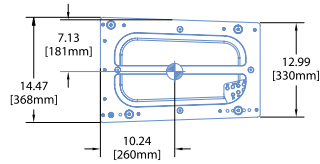
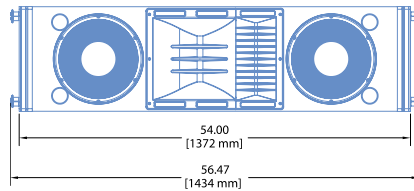
The loudspeaker system shall incorporate the electronics module for Meyer Sound's RMS remote monitoring system.

All loudspeaker components shall be mounted in an enclosure constructed of multi-ply hardwood with a hard and damage resistant black textured finish. The front protective grille shall be powder-coated, hex stamped steel.

Dimensions shall be 54.00" wide x 14.47" high (cabinet front) x 22.00" deep (1372 mm x 368 mm x 559 mm). Weight shall be 235 lbs (106.60 kg).

The loudspeaker shall be the Meyer Sound MILO.

*Loudspeaker driven with a band-limited noise signal with 6 dB peak-to-average ratio for a period of two hours.



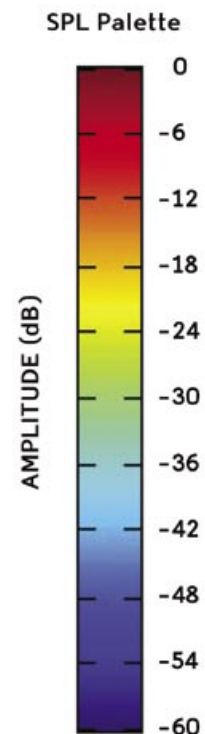
Dimensions	54.00" W x 14.47" H x 22.00" D (1372 mm x 368 mm x 559 mm)
Weight	235 lbs (106.60 kg)
Enclosure	Multi-ply hardwood
Finish	Black textured
Protective Grille	Powder-coated hex stamped steel
Rigging	MRF-MILO rigging frame, custom AlignaLink connectors and quick release pins

ABOUT THE VERTICAL DIRECTIVITY PLOTS

The color images accompanying the upper diagram on the facing page are sound intensity plots made using the Meyer Sound MAPP Online® acoustical prediction program, a unique and highly accurate visualization tool for professional sound system designers.

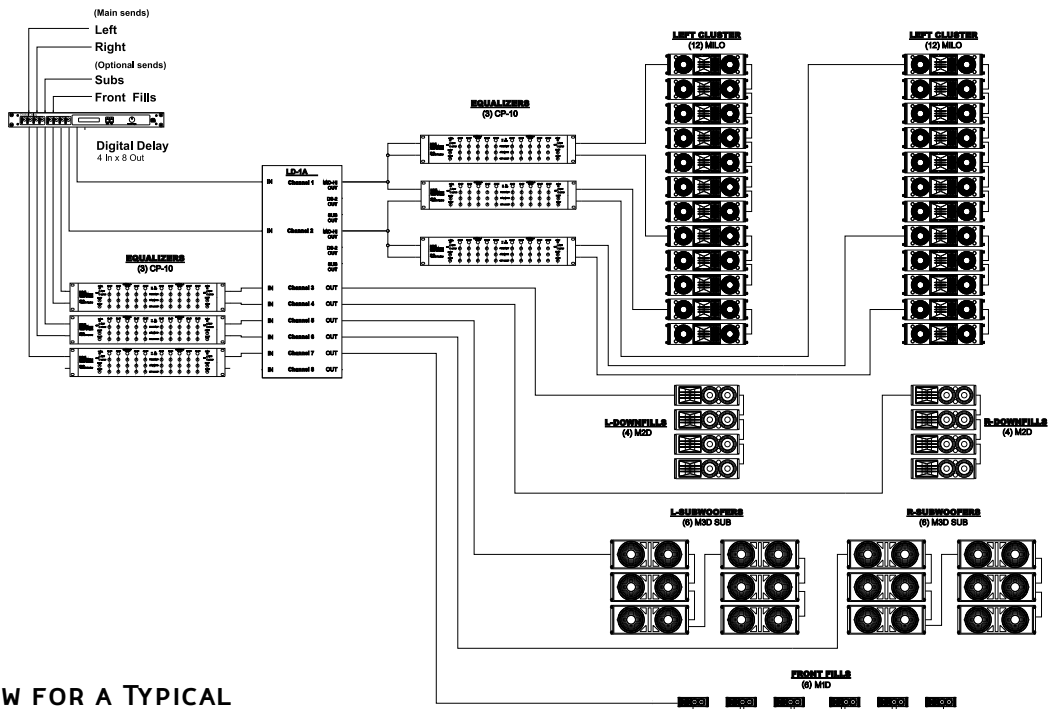
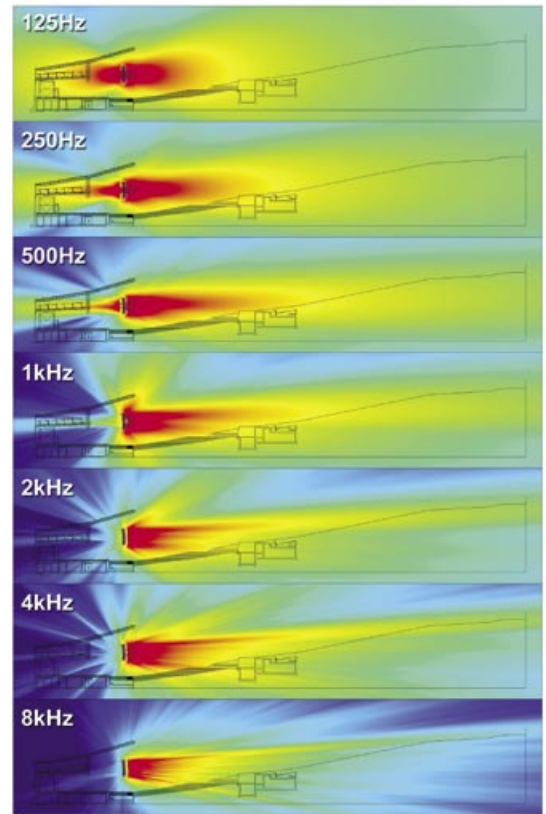
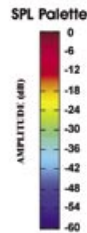
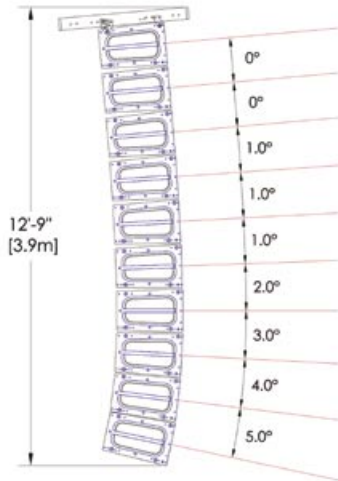
Using an Internet-connected personal computer, the designer specifies Meyer Sound loudspeaker models, their locations, how they are aimed and, optionally, the locations and composition of walls. This information travels over the Internet to a powerful server computer at Meyer Sound headquarters in Berkeley, Calif. Running a sophisticated algorithm and using highly accurate measured data that describe each loudspeaker's directional characteristics, the server predicts the sound field that the loudspeakers will produce, forms a color representation, and sends the result back for the designer's computer to display.

In these sound field plots, the color spectrum is used to represent levels of sound intensity, with red being the loudest and blue the softest, as shown in the scale to the immediate right. These examples illustrate coverage characteristics for an array whose splay angles have been tailored to the actual venue whose section view is superimposed on the MAPP Online plots.



MILO VERTICAL SPLAY AND COVERAGE

These illustrations show how the splay between adjacent cabinets in a MILO array may be adjusted to tailor coverage for a specific venue. The MAPP Online plots on the right illustrate the vertical directivity characteristics of the array on the left, with a section view of the venue superimposed.



SIGNAL FLOW FOR A TYPICAL INTEGRATED REINFORCEMENT SYSTEM

Because the MILO loudspeaker is compatible with most other Meyer Sound reinforcement loudspeakers, sound designers have maximum freedom to customize systems for their needs. This block diagram illustrates the signal flow for a typical integrated sound reinforcement system using 12 MILOs per side for the main arrays.

MILO SPECIFICATIONS

ACOUSTICAL¹		<p>Operating Frequency Range² 60 Hz – 18 kHz</p> <p>Free Field Frequency Response³ 65 Hz – 17.5 kHz ±4 dB</p> <p>Phase Response 750 Hz – 16 kHz ±30°</p> <p>Maximum Peak SPL⁴ 140 dB @ 1 m</p> <p>Dynamic Range >110 dB</p>
COVERAGE		<p>Horizontal Coverage 90°</p> <p>Vertical Coverage Varies, depending on array length and configuration</p>
CROSSOVER⁵		560 Hz, 4.2 kHz
TRANSDUCERS		<p>Low/Low-Mid Frequency⁷ Two 12" cone drivers with neodymium magnets Nominal impedance: 4 Ω Voice coil size: 4" Power-handling capability: 1200 W (AES)⁶</p> <p>Mid-High Frequency One 4" compression driver Nominal impedance: 8 Ω Voice coil size: 4" Diaphragm size: 4" Exit size: 1.5" Power handling capability: 250 W (AES)⁶ on REM</p> <p>Very-High Frequency⁸ Three 2" compression drivers Nominal impedance: 12 Ω Voice coil size: 2" Diaphragm size: 2" Exit size: 0.75" Power handling capability: 100 W (AES)⁶ on REM</p>
AUDIO INPUT		<p>Type Differential, electronically balanced</p> <p>Maximum Common Mode Range ±15 V DC, clamped to earth for voltage transient protection</p> <p>Connectors Female XLR input with male XLR loop output or VEAM all-in-one connector (integrates AC, audio and network)</p> <p>Input Impedance 10 kΩ differential between pins 2 and 3</p> <p>Wiring Pin 1: Chassis/earth through 220 kΩ, 1000 pF, 15 V clamp network to provide virtual ground lift at audio frequencies Pin 2: Signal + Pin 3: Signal – Case: Earth ground and chassis</p> <p>DC Blocking None on output, DC blocked through signal processing</p> <p>CMRR >50 dB, typically 80 dB (50 Hz–500 Hz)</p> <p>RF Filter Common mode: 425 kHz Differential mode: 142 kHz</p> <p>TIM Filter Integral to signal processing (<80 kHz)</p> <p>Nominal Input Sensitivity 0 dBV (1 V rms, 1.4 V pk) continuous is typically the onset of limiting for noise and music</p> <p>Input Level Audio source must be capable of producing a minimum of +20 dBV (10 V rms, 14 V pk) into 600 Ω in order to produce maximum peak SPL over the operating bandwidth of the loudspeaker</p>
AMPLIFIERS		<p>Type Complementary power MOSFET output stages (class AB/H)</p> <p>Output Power 3935 W (four channels; three x 1125 W, one x 560 W)⁹</p> <p>THD, IM, TIM <.02%</p> <p>Load Capacity 4 Ω low, low-mid and very-high channels; 8 Ω mid-high channel</p> <p>Cooling Forced air cooling, four fans (two ultrahigh-speed reserve fans)</p>
AC POWER		<p>Connector 250 V AC NEMA L6-20 (twistlock) inlet, IEC 309 male inlet, or VEAM</p> <p>Automatic Voltage Selection Automatic, two ranges, each with high-low voltage tap</p> <p>Safety Agency Rated Operating Range 95 V AC – 125 V AC, 208 V AC – 235 V AC; 50/60 Hz</p> <p>Turn-on and Turn-off Points 85 V AC – 134 V AC; 165 V AC – 264 V AC</p> <p>Current Draw:</p> <p>Idle Current 1.1 A rms (115 V AC); 0.55 A rms (230 V AC); 1.3 A rms (100 V AC)</p> <p>Max Long-Term Continuous Current (>10 sec) 11.2 A rms (115 V AC); 5.6 A rms (230 V AC); 12.9 A rms (100 V AC)</p> <p>Burst Current (<1 sec)¹⁰ 14.4 A rms (115 V AC); 7.2 A rms (230 V AC); 16.6 A rms (100 V AC)</p> <p>Ultimate Short-Term Peak Current Draw 32 A pk (115 V AC); 16 A pk (230 V AC); 37 A pk (100 V AC)</p> <p>Inrush Current 7 A (115 V AC and 110 V AC); 10 A (230 V AC)</p>
RMS NETWORK		Equipped for two conductor twisted-pair network, reporting all operating parameters of amplifiers to system operator's host computer.

NOTES:

- The low-frequency power response of the system will increase according to the length of the array.
- Recommended maximum operating frequency range. Response depends upon loading conditions and room acoustics.
- Measured with 1/3 octave frequency resolution at 4 meters.
- Measured with music at 1 meter.
- At these frequencies, the transducers produce equal sound pressure levels: 560 Hz for the low-mid and mid-high and 4.2 kHz for the mid-high and very-high frequency drivers.
- Power handling is measured under AES standard conditions: transducer driven continuously for two hours with band limited noise signal having a 6 dB peak-average ratio.
- To eliminate interference at short wavelengths, the two 12-inch cone drivers work in combination at low frequencies (60 Hz – 300 Hz). At mid frequencies (300 Hz – 560 Hz) only one cone driver is fed from the crossover to maintain optimal polar and frequency response characteristics. Attenuation on the other driver: -6dB at 300Hz, -12dB at 400Hz, -18db at 500Hz.
- The three drivers are coupled to a constant-directivity horn through a proprietary acoustical combining manifold (REM).
- Amplifier wattage rating is based on the maximum unclipped burst sine-wave RMS voltage the amplifier will produce in to the nominal load impedance. Low, low-mid and very-high frequency channels 67 V rms (95 V pk) into 4 ohms; mid-high frequency channel 67 V rms (95 V pk) into 8 ohms.
- AC power cabling must be of sufficient gauge so that under burst current RMS conditions, cable transmission losses do not drop voltage below specified operating range at the speaker.

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