# M3D™ : Line Array Loudspeaker

The Meyer Sound M3D is an advanced line array loudspeaker system for medium- to long-throw applications. The product of over two years' intensive research and development, the M3D features BroadbandQ™ technology — a unique, integrated set of engineered advancements that optimize line array performance.

The M3D high-frequency section comprises two Meyer Sound MS-2010L 4" diaphragm compression drivers coupled to a constant-directivity horn through a proprietary REM™ (Ribbon Emulaton Manifold). The manifold closely approximates the radiation characteristic of a ribbon driver, affording very tight 10° vertical and wide 90° horizontal coverage, while providing the power capability of compression drivers.

Four 15" cone drivers in a vented enclosure comprise the M3D low-frequency section. Two high-power MS-415N drivers (4" voice coil) with neodymium magnets face forward. These newly-designed drivers are capable of a full half-inch of linear excursion. In the rear of the cabinet, two MS-815 cone drivers driven by a sophisticated phase manipulation circuit provide broadband directional control and reinforce the output of the front-facing drivers. This novel technology affords controlled 90-degree coverage to 35 Hz.

A complex mid-range phase and magnitude alignment between the two front-facing 15" cone drivers prevents destructive combing across the M3D's horizontal coverage. Active, frequency-dependent excursion limiting protects all drivers from over-excursion under high peak power conditions.

The self-powered M3D produces a maximum output of 145 dB peak SPL (@ 1 meter) within its operating frequency range of 35 Hz to 18 kHz. The amplifier, control electronics and power supply are integrated into a single, field-replaceable module mounted on the cabinet rear.

The four-channel class AB/H power amplifier with complementary power MOSFET output stages produces 4500 Watts maximum (1125 Watts per channel). TruPower™ limiting technology ensures maximum driver protection, minimizes power compression and permits high constant output. The M3D's Intelligent AC™ power supply affords automatic voltage selection, EMI filtering, soft current turn-on and surge suppression. Phase-corrected active processing circuits help maintain excellent performance and reliability, and the high common-mode rejection of the laser-trimmed differential input permits long signal runs through a simple shielded twisted pair cable.

The M3D cabinet is coated with a textured black weather-resistant finish. Integral metal grills protect the cone drivers, and a rain hood is fitted to protect the electronics from moisture intrusion. QuickFly® rigging, fitted as standard, employs entirely captive hardware and allows flying up to 16 cabinets with a 7:1 safety factor. Specially-designed caster rails facilitate moving stacks of up to four cabinets, and optional fabric covers protects the cabinets in transit.

Meyer Sound's RMS™ (Remote Monitoring System) is fitted as standard, providing comprehensive monitoring of system performance parameters over a Microsoft Windows® network.

## FEATURES & BENEFITS

- Controlled broadband directivity minimizes reverberation for greatest clarity
- Cardioid low-frequency pattern maximizes gain before feedback
- Optimized line array behavior provides consistent response over long throws
- Prodigious low-frequency capability can eliminate need for subwoofers
- Multiple vertical line arrays may be splayed horizontally to broaden coverage
- Self-powered for simplified setup and increased reliability

## APPLICATIONS

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

## Architect Specifications

The loudspeaker shall be a self-powered, full-range unit for deployment in line array systems. The low-frequency transducers shall consist of four 15" cone drivers: two front-facing units with 4" voice coil rated to handle 1200 AES Watts, and two rear-facing units with 3" voice coil rated to handle 600 AES Watts. The rear-facing 15" transducers shall be separately driven by a phase manipulation circuit so designed and tuned that the rear transducers' output reinforces forward low-frequency energy while canceling rearward mid-low energy by up to 25 dB as measured 8' distant from the enclosure's rear face. High frequency transducers shall be two 4" diaphragm (1.5" exit) compression drivers rated to handle 200 AES Watts each and 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 frequency response equalization, phase correction and signal division for the high and low frequency sections. The crossover point (equal sound pressure levels between high and low frequency transducers) shall be 580 Hz. An additional low-frequency crossover shall cause both front-facing 15" transducers to work in combination between 35 Hz and 140 Hz, and one transducer to work alone from 140 Hz to 580 Hz, so as to maintain optimal polar and frequency response characteristics.

Each amplifier channel shall be class AB/H with complementary MOSFET output stages. Burst capability shall be 1125 Watts per channel (4500 Watts total) with nominal 4 ohms resistive load. 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 k ohm impedance and accept a nominal +4 dBu (1.23 Vrms) signal (20 dBV to produce maximum peak SPL). Connectors shall be XLR (A-3) type male and female. RF filtering shall be provided, and CMRR shall be greater than 50 dB (80 dB from 50 Hz to 500 Hz).

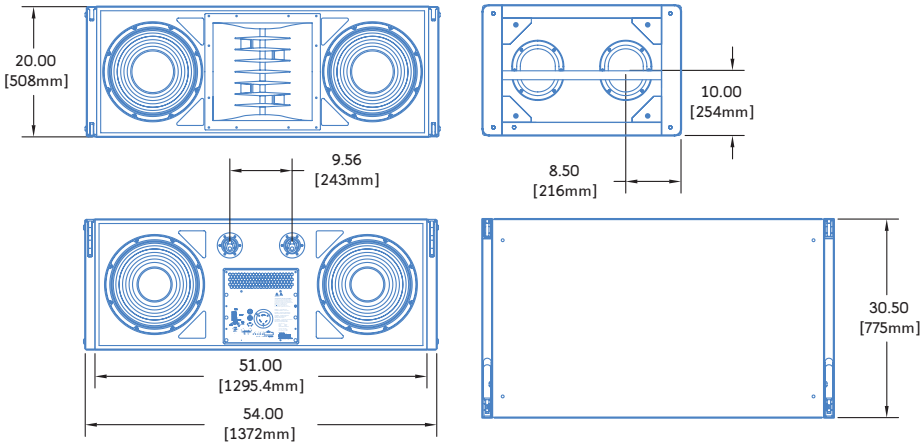
Performance specifications for a single typical production unit shall be as follows, measured at 1/3 octave resolution in fixed ISO bands: Operating frequency range shall be 35 Hz to 16 kHz (-6 dB points). Phase response shall be ± 30° from 300 Hz to 14 kHz. Maximum SPL shall be 145 dB @ 1 meter. Beamwidth shall be 90° horizontal from 35 Hz to 16 kHz, and 10° vertical from 580 Hz to 16 kHz. (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 VAC line current at 50 or 60 Hz. UL and CE rated operating voltage ranges shall be 95 to 124 VAC and 208 to 235 VAC. Maximum peak current draw during burst shall be 50 A at 115 VAC and 25 A at 230 VAC, and current inrush during soft turn-on shall not exceed 12 A at 115 VAC. 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 and control system.

All loudspeaker components shall be mounted in an enclosure constructed of multi-ply hardwood with a hard, weather and damage resistant black textured finish. The front protective grille shall be powder-coated, hex stamped steel. Dimensions shall be 54" wide x 20" high x 30.5" deep (1372 mm x 508 mm x 775 mm). Weight shall be 415 lbs (188.24 kg).

The loudspeaker shall be the Meyer Sound M3D.



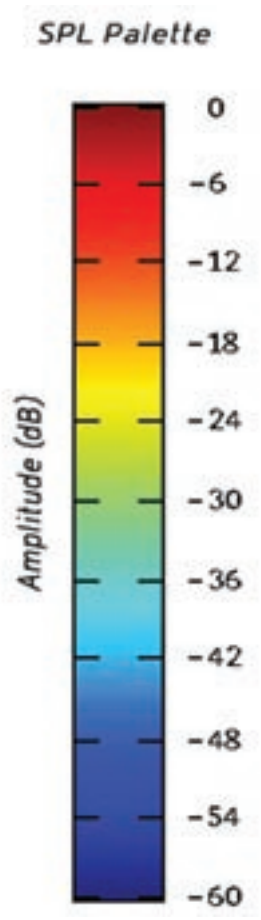

| | |
|---|---|
| **Dimensions** | 54.00" W x 20.00" H x 30.50" D (1372 mm x 508 mm x 775 mm) |
| **Weight** | 415 lbs (188.25 kg) |
| **Enclosure** | Multi-ply hardwood |
| **Finish** | Black textured (weather protected) |
| **Protective Grill** | Powder-coated Hex stamped steel |
| **Rigging** | QuickFly MRF-3D rigging frame with integral CamLinks™, rear connecting bars and captive 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 Meyer Sound's exclusive MAPP (Multipurpose Acoustical Prediction Program) Online™, a unique and highly accurate visualization tool for professional sound system designers.

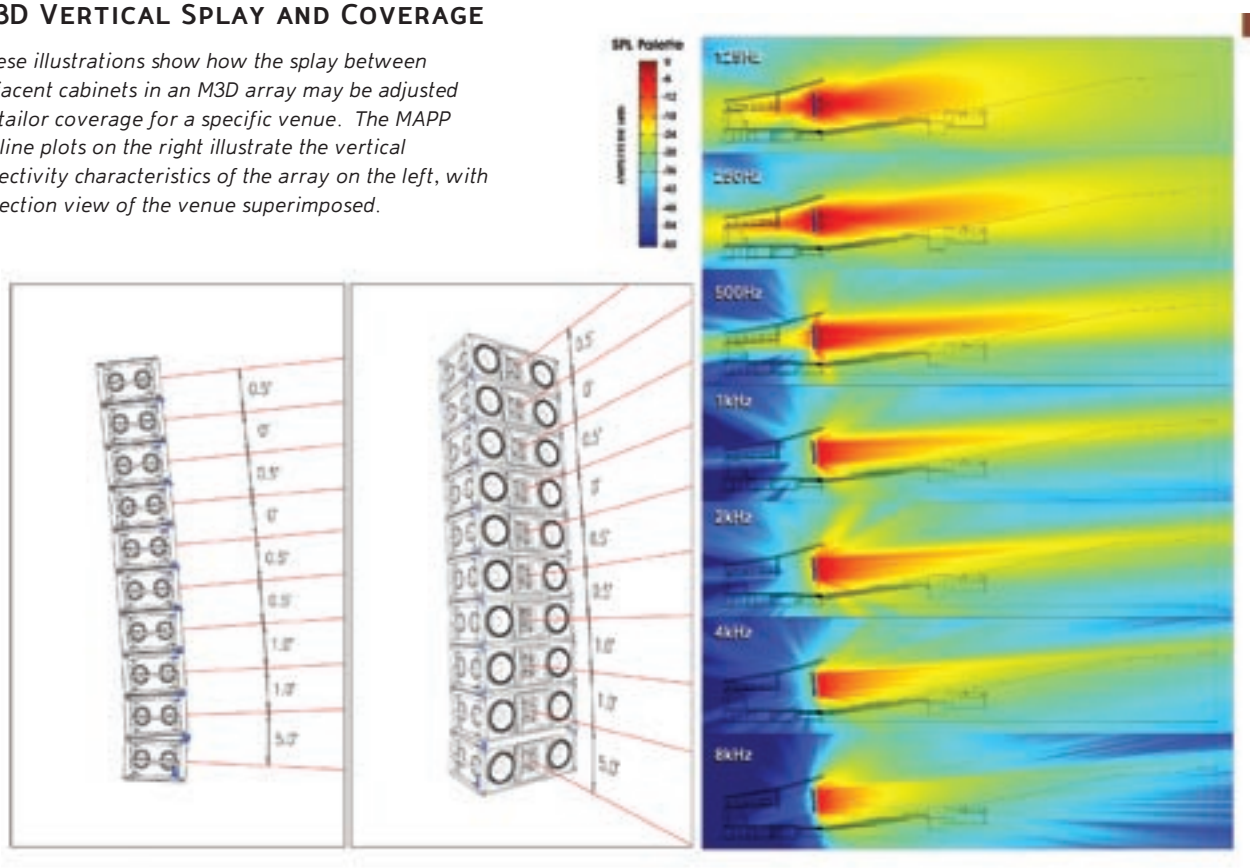
Using an Internet-connected personal computer, the designer specifies Meyer Sound loudspeaker models, their locations, how they are aimed and, optionally, the locations and composition of walls. This information travels over the Internet to a powerful server computer at Meyer Sound headquarters in Berkeley, California. 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 of the sound field, and sends the result back for the designer's computer to display.

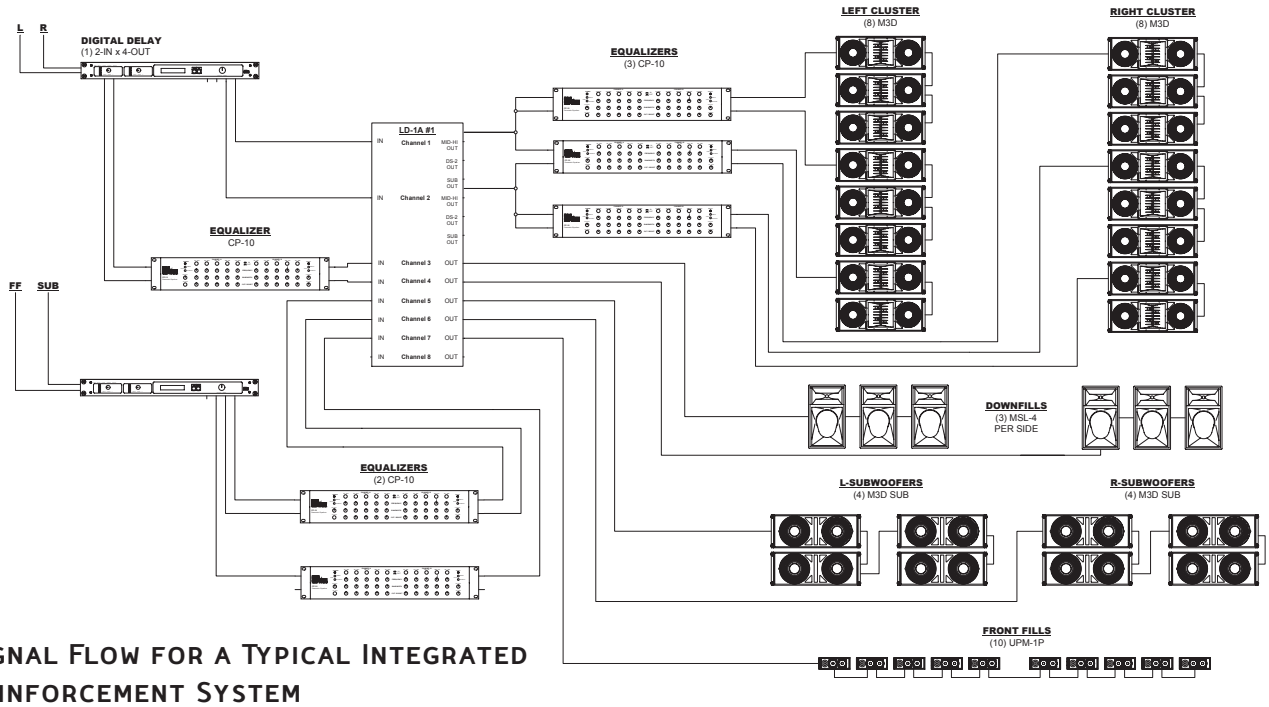
In these sound field plots, the color spectrum is used to represent levels of sound intensity, with red being the loudest and blue the softest, as shown in the scale to the immediate right. These examples illustrate coverage characteristics for an array whose splay angles have been tailored to the actual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



## M3D Vertical Splay and Coverage

*These illustrations show how the splay between adjacent cabinets in an M3D 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 M3D 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 eight M3Ds per side for the main arrays.*

# M3D SPECIFICATIONS

| | |
|---|---|
| **ACOUSTICAL**[1] | |
| Operating Frequency Range[2] | 35 Hz – 16 kHz |
| Free Field[3] | 42 Hz – 16 kHz ± 4 dB |
| Phase Response | ± 30˚ from 300 Hz to 14 kHz |
| Maximum Peak SPL | 145 dB |
| Signal to Noise Ratio | › 110 dB |
| **COVERAGE** | |
| Horizontal Coverage | Low Frequency: Cardioid, with active pattern control<br>High Frequency: 90˚ |
| Vertical Coverage | Varies, depending on array length and configuration |
| **CROSSOVER**[4] | |
| | 580 Hz |
| **TRANSDUCERS** | |
| Low/Mid Frequency (front) | Two 15" diameter cone drivers with neodymium magnets[5]<br>Nominal impedance: 4 ohms<br>Voice coil size: 4"<br>Power-handling capability: 1200 W[6] |
| Low/Mid Frequency (rear)[7] | Two 15" diameter cone drivers<br>Nominal impedance: 8 ohms<br>Voice coil size: 3"<br>Power handling capability: 600 W[6] |
| High Frequency | Two 4" diaphragm compression drivers coupled to a constant-directivity horn through a proprietary acoustical combining manifold<br>Nominal impedance: 8 ohms<br>Voice coil size: 4"<br>Diaphragm size: 4"<br>Exit size: 1.5"<br>Power handling capability: 200 W[6] |
| **AUDIO INPUT** | |
| Type | Differential, electronically balanced |
| Maximum Common Mode Range | ±15 V DC, clamped to earth for voltage transient protection |
| Connectors | Female XLR input with male XLR loop output |
| Input Impedance | 10k ohms differential between pins 2 and 3 |
| Wiring | Pin 1: Chassis/earth through 220k ohm, 1000 pF, 15 V clamp network to provide virtual ground lift at audio frequencies<br>Pin 2: Signal +<br>Pin 3: Signal –<br>Case: Earth ground and chassis |
| CMRR | › 50 dB, typically 80 dB (50 Hz–500 Hz) |
| RF Filter | Common mode: 425 kHz<br>Differential mode: 142 kHz |
| TIM Filter | Integral to signal processing (‹ 80 kHz) |
| Input Filter | Audio source must be capable of producing a minimum of +20 dBV (10 Vrms, 14 Vpk) into 600 ohms in order to produce maximum peak SPL over the operating bandwidth of the loudspeaker |
| Nominal Input Sensitivity | 0 dBV (1 Vrms, 1.4 pk) continuous is typically the onset of TPL limiting for noise and music. |
| **AMPLIFIERS** | |
| Type | Complementary power MOSFET output stages (class AB/H) based on 95 Vpk into 4 ohms |
| Output Power | 4500 Watts (1125 Watts/channel, four channels)[8] |
| THD, IM, TIM | ‹ .02% |
| Load Capacity | 4 ohms minimum impedance each channel |
| Cooling | Forced air cooling, 4 fans total (2 ultra-high-speed reserve fans) |
| **AC POWER** | |
| Connector | 250 VAC NEMA L6-20 (twistlock) inlet or IEC 309 male inlet, or VEAM all-in-one connector (integrates AC, audio and network) |
| Automatic Voltage Selection | Automatic, two ranges, each with high-low voltage tap (uninterrupted) |
| Safety Agency Rated Operating Exchange | 95 VAC–125 VAC, 208 VAC to 235 VAC, 50/60 Hz |
| Turn-on and Turn-off Points | 85 VAC–134 VAC; 165 VAC – 264 VAC |
| Current Draw: | |
| Idle Current | 1.2A RMS (115 VAC); 0.6A RMS (230 VAC); 1.3A RMS (100 VAC) |
| Max Long-Term Continuous Current (›10 sec) | 18 A RMS (115 VAC); 9 A RMS (230 VAC); 20 A RMS (100 VAC) |
| Burst Current (‹ 1 s)[9] | 32 A RMS (115 VAC); 16 A RMS (230 VAC); 36A RMS (100 VAC) |
| Ultimate Short-Term Peak Current Draw | 50 A pk (115 VAC); 25 A pk (230 VAC); 57 A pk (100 VAC) |
| Inrush Current | ‹ 12 A at 115 VAC |
| **RMS NETWORK** | |
| | Equipped for two conductor twisted-pair network, reporting all operating parameters of amplifiers to system operator's host computer. |

**NOTES:**

*1. The low-frequency power response of the system will increase according to the length of the array.*

*2. Response depends on loading conditions and room acoustics.*

*3. Measured with 1/3 octave frequency resolution in fixed ISO bands at 4 meters.*

*4. At this frequency, the high- and low-frequency transducers produce equal sound pressure levels.*

*5. To eliminate interference at short wavelengths, the two front-facing 15" cone drivers work in combination at low frequencies (35 Hz to 140 Hz). At mid frequencies (140 Hz to 580 Hz) only one cone driver is fed from the crossover to maintain optimal polar and frequency response characteristics.*

*6. Power handling is measured under AES standard conditions: transducer driven continuously for two hours with a band-limited noise signal (125 Hz to 8 kHz) having a 6 dB peak-to-average ratio.*

*7. At low/mid frequencies the two rear-facing 15" cone drivers produce a wave front that interacts with, and is additive to, the wave front produced by the two front-facing cone drivers, while reducing sonic energy directed from the rear of the cabinet. The resultant directional low-frequency output extends to 35 Hz, with a 25 dB reduction in SPL behind the cabinet.*

*8. Amplifier wattage rating is based on the maximum unclipped burst sine-wave RMS voltage the amplifier will produce into the nominal load impedance; in this case, 67 Vrms (95 Vpk) into 4 ohms.*

*9. AC power cabling must be of sufficient gauge so that under burst current conditions, cable transmission losses do not cause the voltage to drop below specified operating range at the loudspeaker.*

Made by Meyer Sound, Berkeley, CA, USA
European Office:
Meyer Sound Germany GmbH
Carl Zeiss Strasse 13
56751 Polch, Germany

LISTED 3K59 COMMERCIAL AUDIO SYSTEM

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**MEYER SOUND LABORATORIES, INC.**
2832 San Pablo Avenue
Berkeley, CA 94702

T: +1 510 486.1166
F: +1 510 486.8356

techsupport@meyersound.com
www.meyersound.com