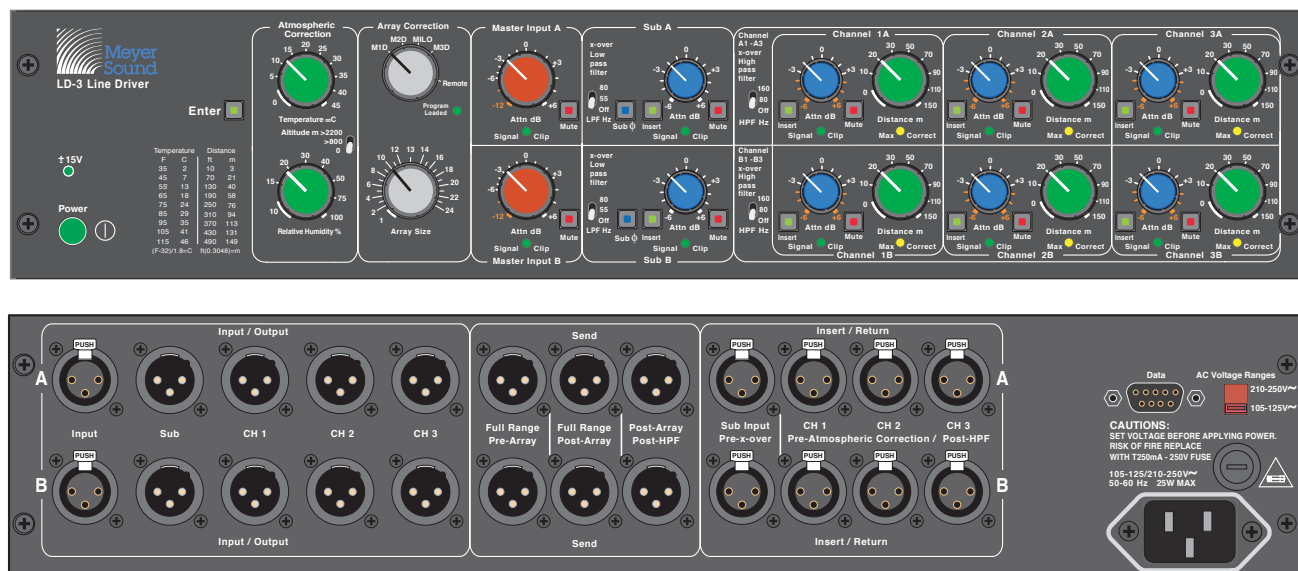




## LD-3 : Compensating Line Driver



The LD-3 compensating line driver is specifically designed for fast, accurate optimization of sound reinforcement systems based on line and curvilinear arrays of Meyer Sound's self-powered M Series. Using an on-board RISC micro-controller, the LD-3 automatically calculates optimal system response by taking into account the M Series loudspeaker type, array size, required throw distance, and the atmospheric variables of temperature, humidity and altitude.

Housed in a 2U rack-mount cabinet, the LD-3 is a digitally controlled analog system combining the wide dynamic range of advanced analog filters with the precise repeatability and computer connectivity of digital control, while exhibiting no latency.

The LD-3's two-channel master input section provides intuitive, rotary knob controls for quick entry of key variables.

The Array Compensation section precisely corrects for the low-mid frequency buildup typical of all line and curvilinear arrays, with the proper response characteristic calculated automatically by selecting the type of M Series loudspeaker and number of cabinets in the array. For atmospheric compensation, the LD-3 provides front-panel controls for entry of the temperature (0° to 45° C), relative humidity (10% to 100%) and a three-way switch for altitude (0 to 800 meters, 800 to 2200 meters and above 2200 meters). A pocket thermohygrometer is supplied. Correction on all parameters is accurate to within 1 dB up to 16 kHz.

Each of the two input channels has three independent full-range output sections to control branches within the array or ancillary delay and fill systems, plus a dedicated subwoofer output. Each output section includes gain trim, illuminated Mute switches, Signal/Clip indicators,

Insert switches, and a dedicated Distance control to optimize response of different sub-sections within the array for defined coverage areas up to 150 meters away. The dedicated subwoofer output section includes a polarity switch and Low-Pass Filter along with the gain trim, Signal/Clip indicator, Insert switch and Mute switches.

The LD-3 provides a complement of three Sends and four Returns to allow insertion of external signal processing devices such as parametric equalizers or digital delay units. The Send outputs are derived from three points prior to atmospheric correction in the signal path: full-range pre-array compensation, full-range post-array compensation, and post-array compensation/post High-Pass Filter. This provides maximum flexibility in configuring systems using mixed M Series arrays, or for employing other non-arrayed Meyer Sound loudspeakers as delays or fills.

### FEATURES & BENEFITS

- Specifically designed for fast, accurate optimization of M Series line or curvilinear arrays
- Robust drive electronics maintain signal integrity over long cable runs
- Atmospheric compensation assures consistent system performance regardless of temperature, humidity or altitude
- Precise compensation for low-mid buildup (inherent in all line or curvilinear arrays) helps ensure ultra-flat frequency response
- Premium quality analog filters for wide dynamic range and no latency
- Digital control allows for precise and repeatable calibration with automatic calculation of the optimum correction filter values
- Three main outputs for each channel allow separate atmospheric high-frequency correction for three branches within the array
- Dedicated subwoofer output section
- Insert Sends and Returns on XLR connectors allow flexible signal routing and insertion of outboard signal processing

## Atmospheric Correction

The LD-3 line driver's Atmospheric Correction section uses special atmospheric loss equations and pre-calculated Meyer Sound MAPP Online stored values from a 2 MB lookup table to correct for environmental conditions. Controls are included for:

- Temperature (0° – 45° C)
- Altitude/atmospheric pressure (three ranges: 0 – 800 meters above sea level; 800 – 2200 meters; 2200 meters and above)
- Relative Humidity (10 – 100%)
- Distance (0 – 150 meters)

Once the data has been dialed in, the LD-3's RISC microcontroller retrieves response correction coefficients and corrects the output to compensate for the air absorption occurring under those conditions.

Figures 1, 2 and 3 are example frequency attenuation curves for three temperatures at seven values of relative humidity. Depending on the atmospheric conditions and the distance the array is throwing – and achievable with the LD-3.

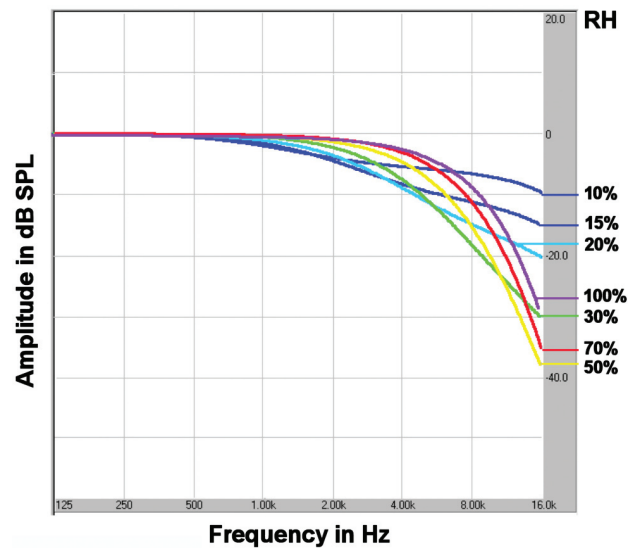


Figure 1. Air absorption for 10 degrees C at 100 meters

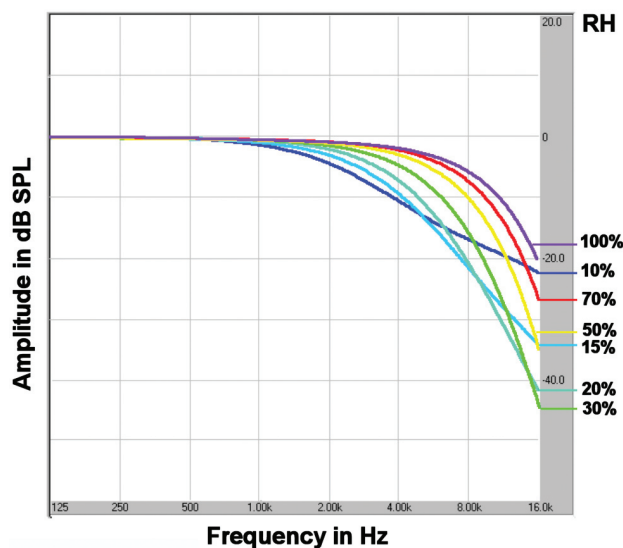


Figure 2. Air absorption for 20 degrees C at 100 meters

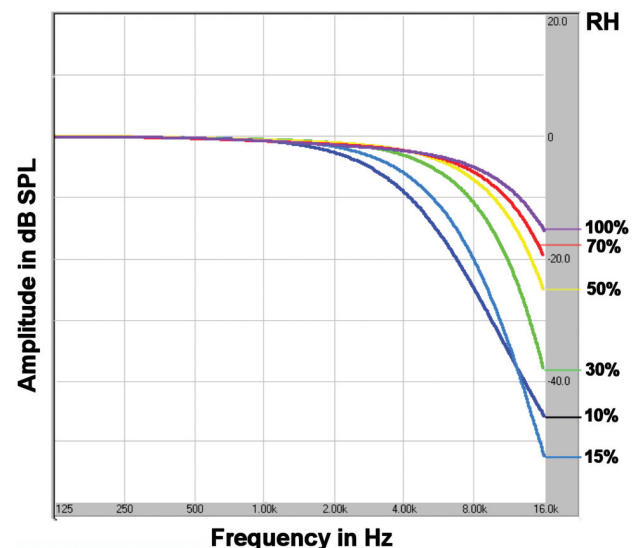


Figure 3. Air absorption for 30 degrees C at 100 meters

## ARCHITECT SPECIFICATIONS

The line driver shall be a two input channel device (A and B). Each input channel shall include a Master Input section and four output channels; three of the channel outputs shall be for full range applications, and the fourth shall be a dedicated subwoofer output. Each master input section shall include a master gain control, illuminated master Mute switch, Signal/Clip indicator, High-Pass Filter, and facilities for Array Correction and Atmospheric Correction. Array Correction shall provide two rotary controls for selecting cabinet type and number of cabinets in each array. Atmospheric Correction shall offer rotary controls for selecting Temperature and Relative Humidity, and a three-position switch for Altitude selection. Each of the six main output channels shall include gain trim, illuminated Mute switch, Signal/Clip indicators, Insert switches and a Distance switch. The dedicated subwoofer control sections shall include

gain trim, illuminated Mute switch, Signal/Clip indicator, Low-Pass Filter and an Insert switch.

The line driver's rear panel shall provide inputs and outputs on XLR connectors. Three Sends and four Insert/Returns shall be provided. Sends shall be derived at three points prior to atmospheric correction in the signal path: full-range pre-array compensation, full range post-array compensation, and post-array post high-pass filter. Returns for the three full-range output channels shall be pre-atmospheric correction and post-HPF. The subwoofer input/return shall be pre-crossover.

The line driver shall utilize analog filter circuitry, but control of filter circuitry shall be digital. The digital control system shall utilize a RISC microcontroller, and facilitate automatic calculation of optimum filter settings

to compensate for low-mid buildup in line and curvilinear arrays, air loss due to throw distance, and losses due to atmospheric variables. Frequency response correction shall be at a resolution of 1 dB to 16 kHz. A future upgrade shall include a Remote setting on the Array Correction loudspeaker selector to enable data to be downloaded from a proprietary acoustical prediction program.

The line driver shall be housed in a 2U steel cabinet for mounting in a standard equipment rack. All inputs and outputs shall be electronically balanced and utilize XLR (A3) connectors. The AC inlet shall be an IEC standard male connector protected by a 250 V/250 mA fuse, and switchable in the ranges of 105 to 125 and 210 to 250 V AC.

The line driver shall be the Meyer Sound LD-3.

## Array Correction

The LD-3 allows the user to further fine-tune each channel driving a line or curvilinear array of M Series loudspeakers. Set the type of loudspeaker being used and the number of cabinets in the array, and the LD-3 uses stored presets to compensate for natural array behavior, such as low to mid-low frequency build-up.

Figure 4 is an example of a correction made to a MILO array with eight loudspeakers. Applying this correction results in an incredibly flat system response across a wide range of frequencies.

## Channel Facilities

Each of the LD-3's two master channels consists of a Master Input section, a dedicated subwoofer output, and three outputs to control the array. Three Sends and four Insert>Returns provide the ability to route the signal and incorporate additional signal processing, such as parametric equalization. The Master Input section provides

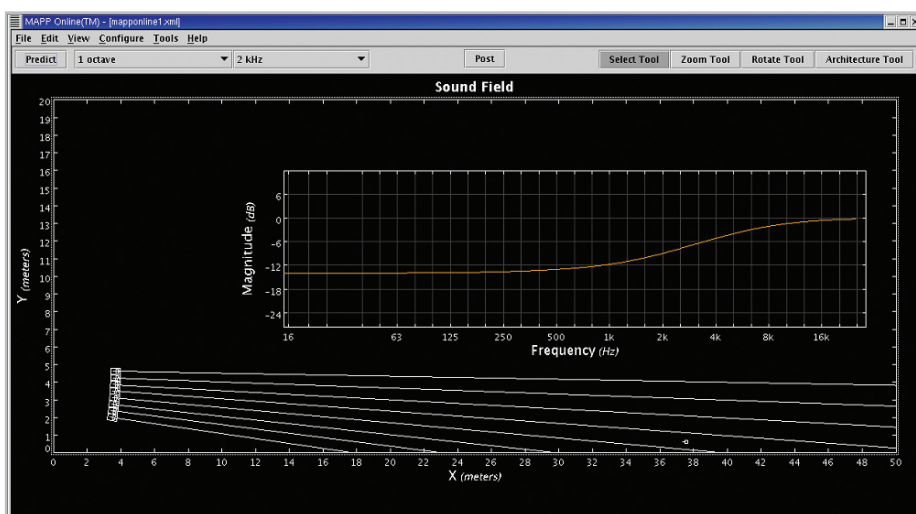
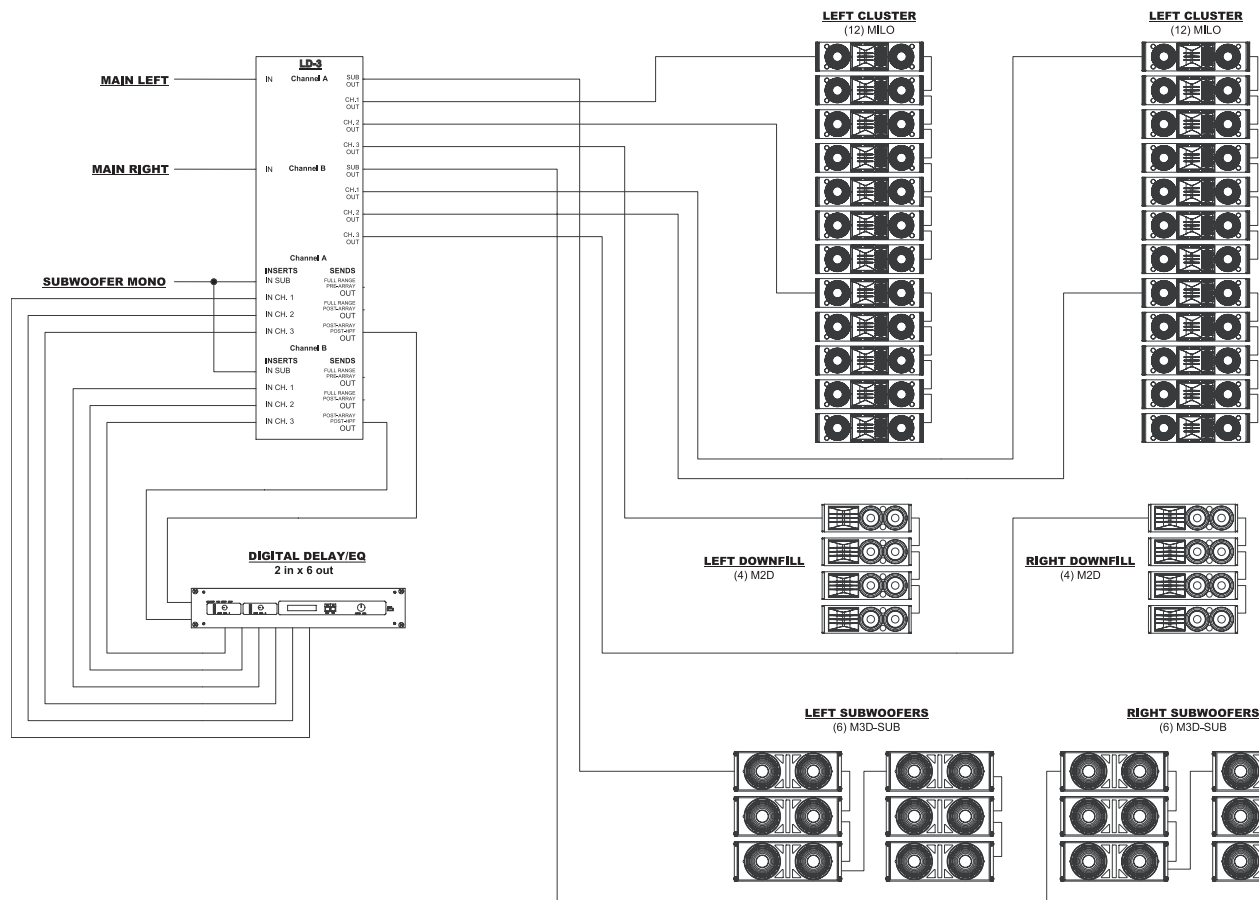


Figure 4. Correction needed shown with eight MILO loudspeakers at 35 meters

individual channel gain adjustment from -12 to +6 dB, an illuminated master Mute switch, Signal/Clip indicator, and a switchable high-pass filter (0, 80, or 160 Hz) for boundary correction or optimizing crossover to subwoofers. Individual outputs provide gain trim from -6 to +6 dB, Signal/

Clip indicator, an illuminated Mute switch, illuminated Send/Return Insert switches, and Distance controls to define the throw from each sound system branch to its audience coverage area up to 150 meters (492 feet).

## EXAMPLE CONFIGURATION



## LD-3 SPECIFICATIONS

ATMOSPHERIC CORRECTION (AFFECTS OUTPUT CHANNELS 1-3, BOTH A&B)		
	Temperature Relative Humidity Altitude Distance	0° to 45° Celsius 10 to 100% RH 3 position switch: 0 to 800, 800 to 2200, 2200 and up See "Outputs: Channels 1-3 (A&B)"
ARRAY CORRECTION	Type Array Size	M1D, M2D, MILO, M3D, upgradable Remote Setting 1 to 24 Elements in the array (If set to 1 element, bypasses array correction)
MASTER INPUTS	Attenuation Control Mute	-12 to +6 dB Master mute, controls output mutes
OUTPUTS: SUB OUT	Attenuation Control Mute Polarity Switch Low-Pass Filter/Crossover Insert Switch	-6 to +6 dB Mutes at the output stage Toggles the polarity of the sub output 3 position switch: OFF, 55 Hz and 80 Hz When switch is "in" it disconnects Master signal from Sub signal path and allows only Sub Insert/Return XLR to drive Sub signal path. When switch is "out" the Master signal and Sub Insert XLR are summed onto the Sub signal path. Master signal is muted if switch is "in" and no signal is present at Sub Insert. Sends and Inserts operate 3 dB lower than Master signal, therefore signals applied to Sub Insert XLR will have 3 dB greater gain through LD-3 Glows green with signal and red when output is in clipping
OUTPUTS: CHANNELS 1-3 (A&B)	Signal/Clip Indicator	
	High-Pass Filter/Crossover Attenuation Control Distance Mute Insert Switch Signal/Clip Indicator Maximum Correction Indicator	3 position switch: OFF, 80 Hz and 160 Hz. Affects all 3 channel outputs -6 to +6 dB (-6 to -3 and +3 to +6 settings not recommended to preserve array behavior) 1 to 150 m; works in conjunction with the Atmospheric Correction section (If set to 0 m, bypasses atmospheric correction) Mutes at the output stage Toggles the input from Master to Insert/Return. Not normalized, mutes channel when engaged if no signal is present at Insert/Return Glows green with signal and red when output is in clipping Glows when the correction has reached 16 dB at 16 kHz
AUDIO INPUTS	Type Impedance Wiring RF Filter Common Mode Rejection Ratio Signal Presence	Differential balanced input circuit 10 k $\Omega$ differential (between pins 2 and 3) Pin 1: chassis/earth ground; Pin 2: signal (+); Pin 3: signal (-) Common Mode: 425 kHz low-pass Differential Mode: 142 kHz low-pass >80 dB (typically 90 dB); measured in the range 50 Hz - 1 kHz LED (Variable intensity; monitored at the input for each channel) Threshold: -26 dBV (50 mV rms) pink noise or sine wave Full Intensity: -10 dBV (300 mV rms) pink noise or sine wave
INPUT CONNECTORS	Master A & B Insert/Return: Sub Input Channels 1-3 (A&B)	2 Female XLR; 1 per input channel 2 Female XLR; 1 per input channel 6 Female XLR; 1 per input channel; Insert is Pre-Atmospheric Correction / Post-High Pass Filter/Crossover
AUDIO OUTPUTS	Type Impedance RF Filter Wiring	Balanced, cross-coupled simulated transformer topology 50 $\Omega$ balanced (between pins 2 and 3) Pins 2 and 3 shunted to chassis via 500 pF capacitance Pin 1: chassis/earth ground; Pin 2: signal; Pin 3: signal
DRIVE CAPABILITY	Maximum Voltage Maximum Current Cables and Load	600 $\Omega$ Load: $\pm 17.8$ V pk (+22 dBV, +24.2 dBu sine wave); No Load: $\pm 19$ V pk (+22.5 dBV, +24.7 dBu sine wave) <sup>1</sup> $\pm 70$ mA pk (10 V rms into 200 $\Omega$ ) >100,000 pF (> 1000 ft cable) without instability or distortion
OUTPUT CONNECTORS	Sub Output Channels 1-3 (A&B) Send Outputs: Full Range Pre Full Range Post Post Array and HPF	2 Male XLR; 1 per output channel 6 Female XLR; 1 per output channel 2 Male XLR; 1 per output channel; Send is Pre-Array, Pre-Atmospheric correction 2 Male XLR; 1 per output channel; Send is Post-Array, Post-Atmospheric correction 2 Male XLR; 1 per output channel; Send is Post-Array, Post-Atmospheric correction and Post High-Pass filter/Crossover
AUDIO PERFORMANCE	Frequency Response Dynamic Range Noise Floor THD Gain Accuracy Mute Attenuation	$\pm 0.2$ dB 20 Hz - 20 kHz (All corrections disabled) >110 dB <sup>2</sup> >-90 dBV A-weighted; >-88 dBV un-weighted <sup>3</sup> <0.02% (typically 0.005%) < $\pm 0.15$ dB at +6 dB gain; < $\pm 0.25$ dB at 0 dB gain >88 dB
AC POWER	Connector Operating Voltage Maximum Power	IEC 320 (line, neutral/line, earth) 105 - 125 V AC, 210 - 250 V AC (selectable with rear panel switch); 50/60 Hz 25 W; Fuse: 5 x 20 mm, T 250 mA, 250 V, time-lag

### NOTES:

1. 0 dBV = 1 V rms; 0 dBu = 0.775 V rms;  
0 dBm = 1 mW rms across 600  $\Omega$ .
2. Ratio of maximum sine wave to A-weighted noise floor.
3. Level set to unity gain (0 dB).

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