CAL™ Column Array Loudspeaker

The CAL steerable column array loudspeaker incorporates over three decades of technological innovation and advanced research to achieve unprecedented accuracy in sound reproduction. The first loudspeaker to be certified for AVB interoperability by the AVnu Alliance®, the self-powered CAL is designed primarily for vocal reproduction in fixed installations, offering variable vertical beam spread (as narrow as 5 degrees and as wide as 30 degrees) that can be digitally steered up or down by 30 degrees. CAL’s beam steering takes the practice of directing sound to the next level, and with a smart, lean profile, CAL sets the standard for high-quality sound installations.

CAL is available in three models, each providing a different output level — up to a maximum peak SPL of 106 dB at 90 meters with CAL 96 — over an operating frequency range of 100 Hz to 16 kHz. Providing a horizontal coverage of 120 degrees, as well as the flexibility of vertical beam steering, a single unobtrusive CAL delivers clear vocal reproduction over a large area while minimizing undesirable reflections.

Discrete onboard class D amplifier channels, processed by sophisticated algorithms, power each driver and tweeter. The amplitude and phase response of each driver are engineered to produce interactions that yield the desired vertical spread. Controlling each element individually yields greater flexibility and precision than other beam steering systems that control modules consisting of multiple drivers.

The accuracy of CAL’s vertical steering allows system designers to pinpoint coverage, even when mounting options in a venue do not allow for physically aiming a loudspeaker toward a coverage area. CAL 96 and CAL 64 include split beams that can be configured to fit the application, for example, to avoid hitting a reflective balcony surface. To meet the high intelligibility requirement for vocal reproduction, CAL maintains accurate beam steering up to 10 kHz, well beyond the benchmark of 4 kHz used in traditional single-driver loudspeakers.

CAL loudspeakers include an AVB-enabled Ethernet port that accepts AVB audio streams as source signals, and also provides computer control of CAL via Meyer Sound’s Compass control software, which allows beam control and RMS™ real-time monitoring of each loudspeaker on the network.

CAL comes standard with adjustable mounting brackets for installation on walls or columns. The low-profile aluminum enclosure is available in white, black, and custom colors, allowing it to blend easily into any background. Weather protection permits outdoor installations in most environments.

**Features & Benefits**
- Variable vertical spread from 5° to 30°
- 60° of vertical beam steering, ±30°
- Proprietary drivers optimized for high output and low distortion
- Discrete amplifier channels and signal processing for each driver and tweeter
- AVB-enabled Ethernet port for audio streaming and computer control
- Compass control software provides control of CAL beam configurations
- Low profile enclosure and custom colors blend into any environment
- Weather protection and rain hood included for outdoor installations
- First AVnu®-certified loudspeaker
- CAL 96 - 96 channels (24) 4-inch drivers (72) 20-mm tweeters
- CAL 64 - 64 channels (16) 4-inch drivers (48) 20-mm tweeters
- CAL 32 - 32 channels (8) 4-inch drivers (24) 20-mm tweeters

**Solutions**
- Airports
- Convention centers
- Stadiums
- Places of worship
- Shopping malls and retail spaces
- Reverberant spaces requiring low-profile sound reinforcement for voice
The loudspeaker shall be a self-contained, steerable, column array system with discrete array modules, each comprised of two 4-inch cone drivers, six 20-mm tweeters, and multiple class D amplifier channels. Onboard processing shall include 5-band parametric EQ, delay, and gain. Horizontal coverage shall be 120 degrees. Vertical spread shall be variable from 5 to 30 degrees in 5-degree increments. Vertical beam steering shall be from ±30 degrees in 1-degree increments.

Performance specifications for a typical production unit shall be as follows, measured at 1/3-octave resolution: operating frequency range, 100 Hz to 16 kHz; frequency response, 105 Hz to 15 kHz ±4 dB; phase response, 230 Hz to 16.9 Hz ±45 degrees.

Three Phoenix 6-pin male connectors shall be included for balanced analog audio input and loop output. Audio input shall be electronically balanced with a 10 kOhm impedance and accept a nominal 0 dBV (1.0 V rms) signal. An additional Phoenix 6-pin male connector shall be included for AES/EBU digital input. An AVB-enabled Ethernet port shall be included for input from digital audio streams.

Power requirements shall be nominal 100, 110, or 230 V AC line current at 50 to 60 Hz. UL and CE operating voltage range shall be 100 to 240 V AC. The AC power connector shall be powerCON 20.

The loudspeaker shall include two control ports: one Phoenix 6-pin male connector for selecting onboard presets and reporting loudspeaker faults; and one Phoenix 5-pin male connector for triggering emergency mute and input override.

The two Ethernet ports shall provide computer control of the loudspeakers via Meyer Sound’s Compass control software. The Compass control software shall also include RMS remote monitoring of loudspeaker performance parameters.

Loudspeaker components shall be mounted in an extruded aluminum enclosure available in white, black, and custom colors. Weather protection and a user panel cover shall be included for outdoor installations. Brackets shall be included for fixed mounting on walls and columns.

The loudspeakers shall be the Meyer Sound CAL 96, CAL 64, and CAL 32.

### CAL 96
The loudspeaker shall include 96 amplifier channels driving (24) 4-inch cone drivers and (72) 20-mm tweeters. Maximum peak SPL shall be 106 dB peak at 90 m (295 ft). Current draw during burst (< 1 sec) shall be 14.7 A rms at 115 V, 7.3 A rms at 230 V AC, and 18.5 A peak at 100 V AC.

The loudspeaker shall provide a top split beam coverage with the top beam emanating from the top 32 drivers and the bottom beam emanating from the bottom 64 drivers. The loudspeaker shall also provide a bottom split beam coverage with the top beam emanating from the top 64 drivers and the bottom beam emanating from the bottom 32 drivers. Split beams shall be available with variable vertical spread and vertical steering.

Dimensions with mounting hardware shall be 7.75 inches wide x 121.12 inches high x 9.93 inches deep (197 mm x 3076 mm x 252 mm). Weight with mounting hardware shall be 173 lbs (78.5 kg).

The loudspeaker shall be the Meyer Sound CAL 96.

### CAL 64
The loudspeaker shall include 64 amplifier channels driving (16) 4-inch cone drivers and (48) 20-mm tweeters. Maximum peak SPL shall be 106 dB peak at 60 m (196 ft). Current draw during burst (< 1 sec) shall be 10.8 A rms at 115 V, 5.4 A rms at 230 V AC, and 13.6 A peak at 100 V AC.

The loudspeaker shall provide a center split beam coverage with the top beam emanating from the top 32 drivers and the bottom beam emanating from the bottom 32 drivers. Split beams shall be available with variable vertical spread and vertical steering.

Dimensions with mounting hardware shall be 7.75 inches wide x 87.72 inches high x 9.93 inches deep (197 mm x 2228 mm x 252 mm). Weight with mounting hardware shall be 124 lbs (56.2 kg).

The loudspeaker shall be the Meyer Sound CAL 64.

### CAL 32
The loudspeaker shall include 32 amplifier channels driving (8) 4-inch cone drivers and (24) 20-mm tweeters. Maximum peak SPL shall be 106 dB peak at 30 m (98 ft). Current draw during burst (< 1 sec) shall be 5.9 A rms at 115 V, 2.9 A rms at 230 V AC, and 7.4 A peak at 100 V AC.

The loudspeaker shall provide only single-beam coverage.

Dimensions with mounting hardware shall be 7.75 inches wide x 54.32 inches high x 9.93 inches deep (197 mm x 1380 mm x 252 mm). Weight with mounting hardware shall be 80 lbs (36.3 kg).

The loudspeaker shall be the Meyer Sound CAL 32.
**Variable Vertical Spread and Beam Steering**

CAL loudspeakers provide vertical beams with variable spread from 5 to 30 degrees in 5-degree increments. The vertical beams can also be steered ±30 degrees in 1-degree increments.

**Vertical Beam Splits**

CAL 96 and CAL 64 provide split beam coverages to aim sound toward two destinations or to avoid reflective surfaces such as a balcony. The vertical spread and steering of the split beams can also be configured.

**Compass Control Software**

Compass control software provides comprehensive control of CAL through a graphical user interface. The software enables easy access to all CAL features and even provides control of multiple units. Compass runs on a Mac® or Windows®-based computer.

With Compass, you can set the active input and override input; configure vertical beam spread, beam steering, and beam splits; assign processing to beams, including gain, delay, and parametric EQ; edit, store, recall, and organize CAL presets; test logic I/O, including input mute, input override, fault, contact, and preset selection, and monitor loudspeaker system status and performance data from the RMS tab.

The Beam Control tab displays CAL’s vertical beam spread and vertical steering, both of which can be altered by entering angle values or by dragging in the beam view area. Split beams can also be configured on the Beam Control tab (CAL 64 and CAL 96 only).
## ACoustical

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Frequency Range</td>
<td>100 Hz – 16 kHz</td>
</tr>
<tr>
<td>Frequency Response</td>
<td>105 Hz – 15 kHz ±4 dB</td>
</tr>
<tr>
<td>Phase Response</td>
<td>230 Hz – 16.9 kHz ±45 degrees</td>
</tr>
</tbody>
</table>
| Maximum Peak SPL | CAL 96: 106 dB peak at 90 m (295 ft)  
CAL 64: 106 dB peak at 60 m (196 ft)  
CAL 32: 106 dB peak at 30 m (98 ft) |

## Coverage

<table>
<thead>
<tr>
<th>Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td>120 degrees</td>
</tr>
<tr>
<td>Vertical</td>
<td>Variable, 5 to 30 degrees in 5-degree increments</td>
</tr>
<tr>
<td>Vertical Steering</td>
<td>±30 degrees in 1-degree increments</td>
</tr>
</tbody>
</table>
| Vertical Beam Splits | CAL 96: Top split, bottom split  
CAL 64: Center split  
CAL 32: None |

## Crossover

- 2 kHz

## Transducers

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAL 96</td>
<td>(34) 4-inch cone drivers, (72) 20-mm tweeters</td>
</tr>
<tr>
<td>CAL 64</td>
<td>(16) 4-inch cone drivers, (48) 20-mm tweeters</td>
</tr>
<tr>
<td>CAL 32</td>
<td>(8) 4-inch cone drivers, (24) 20-mm tweeters</td>
</tr>
</tbody>
</table>

## Audio/Control

- Analog Audio: 3 Phoenix 6-pin male connectors for balanced audio input and loop output
- Digital Audio: 1 Phoenix 6-pin male connector for AES/EBU input
- Ethernet: 1 Ethernet port for beam control and RMS monitoring via Compass control software
- AVB: 1 AVB-enabled Ethernet port for integrated audio streaming, beam control and RMS monitoring via Compass control software
- Processing: Mute, gain, 5-band parametric EQ, and delay, stored in four onboard presets
- Logic I/O: Phoenix 6-pin male connector, recalls onboard presets, reports relay closures (and openings) for fault reports; Phoenix 5-pin male connector, triggers emergency mute and input override
- Display: OLED button displays CAL’s network addresses during startup or when the button is pushed

## Amplifier

- Type: Multichannel class D, one channel per driver
- Number of Channels: 96 (CAL 96), 64 (CAL 64), 32 (CAL 32)
- Cooling: Convection

## AC Power

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Connector</td>
<td>powerCON 20</td>
</tr>
<tr>
<td>Safety Rated Voltage Range</td>
<td>100–240 V AC, 50–60 Hz</td>
</tr>
<tr>
<td>Turn-on and Turn-off Points</td>
<td>90 V AC turn-on, 264 V AC turn-off</td>
</tr>
</tbody>
</table>
| Current Draw: | 115 V AC  
CAL 96: 1.98 A rms  
CAL 64: 1.24 A rms  
CAL 32: 0.58 A rms |
| | 230 V AC  
CAL 96: 1.63 A rms  
CAL 64: 0.99 A rms  
CAL 32: 0.45 A rms |
| | 100 V AC  
CAL 96: 2.32 A rms  
CAL 64: 1.42 A rms  
CAL 32: 0.65 A rms |
| Maximum Long-Term Continuous (>10 sec) | CAL 96: 8.3 A rms  
CAL 64: 4.2 A rms  
CAL 32: 1.7 A rms |
| | CAL 96: 6.1 A rms  
CAL 64: 3.1 A rms  
CAL 32: 1.7 A rms |
| | CAL 96: 6.9 A rms  
CAL 64: 3.7 A rms  
CAL 32: 2.5 A rms |
| Maximum Instantaneous Peak | CAL 96: 33 A peak  
CAL 64: 24 A peak  
CAL 32: 13 A peak |
| | CAL 96: 7 A peak  
CAL 64: 5 A peak  
CAL 32: 3 A peak |
| | CAL 96: 16 A peak  
CAL 64: 10 A peak  
CAL 32: 6 A peak |
| Inrush | CAL 96: 90 A peak  
CAL 64: 65 A peak  
CAL 32: 20 A peak |
| | CAL 96: 75 A peak  
CAL 64: 65 A peak  
CAL 32: 23 A peak |

## Physical

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure</td>
<td>Extruded aluminum</td>
</tr>
<tr>
<td>Finish</td>
<td>White, black, and custom colors</td>
</tr>
<tr>
<td>Weather Protection</td>
<td>Suitable for outdoor installations, rain hood included</td>
</tr>
<tr>
<td>Mounting</td>
<td>Adjustable brackets included for mounting on walls or columns</td>
</tr>
</tbody>
</table>
| Dimensions (with Mounting Hardware) | CAL 96: 121.12 in H x 7.75 in W x 9.93 in D (3076 mm x 197 mm x 252 mm)  
CAL 64: 87.72 in H x 7.75 in W x 9.93 in D (2228 mm x 197 mm x 252 mm)  
CAL 32: 54.32 in H x 7.75 in W x 9.93 in D (1380 mm x 197 mm x 252 mm) |
| Weight (with Mounting Hardware) | CAL 96: 173 lbs (78.5 kg)  
CAL 64: 124 lbs (56.2 kg)  
CAL 32: 80 lbs (36.3 kg) |