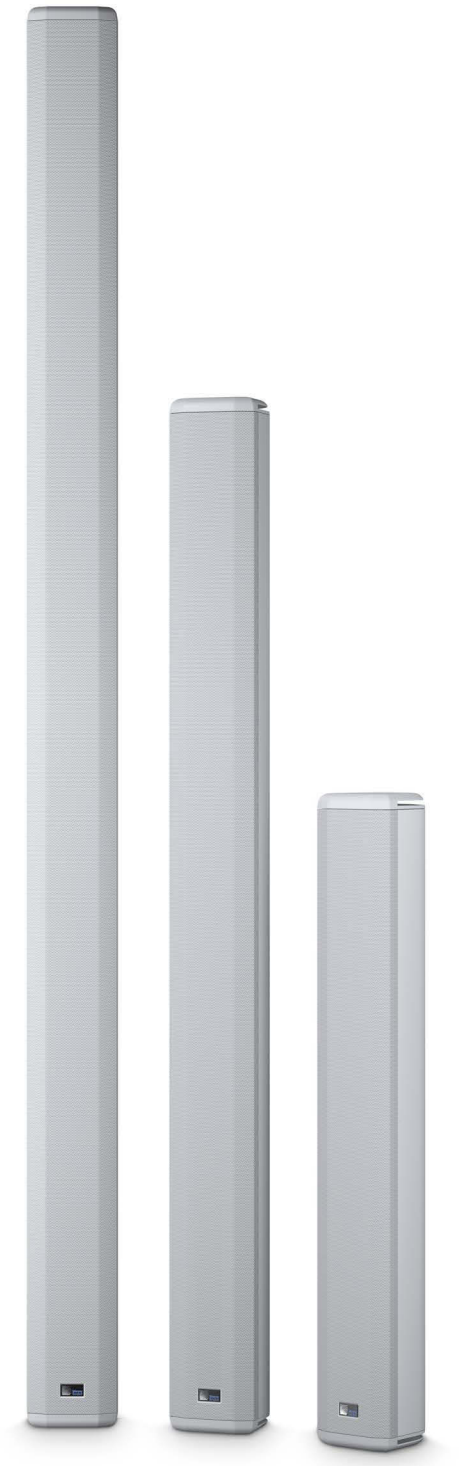
CAL™ Column Array Loudspeaker

Meyer Sound
THINKING SOUND



Keep these important operating instructions.
Check www.meyersound.com for updates.

CAL Operating Instructions, PN 05.210.087.01 D

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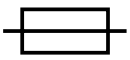
IMPORTANT SAFETY INSTRUCTIONS

These symbols indicate important safety or operating features in this booklet and on the frame or chassis:

SYMBOLS USED

					
Dangerous voltages: risk of electric shock	**Important operating instructions**	**Replaceable Fuse**	**Protective earth ground**	**Hot surface: do not touch**	**Electronic instructions for use: instruction location in QR code** 
Gefährliche Spannungen: Stromschlaggefahr	**Hinweis auf wichtige Punkte der Betriebsanleitung**	**Austauschbare Sicherung**	**Schutzerde**	**Heiße Oberfläche: nicht berühren**	**Elektronische Gebrauchsanweisung: anweisungsort im QR-Code**
Pour indiquer les risques résultant de tensions dangereuses	**Instructions d'utilisation importantes**	**Fusible remplaçable**	**Terre de protection**	**Surface chaude: ne pas toucher**	**Mode d'emploi électronique: emplacement des instructions dans le code QR**
Para indicar voltajes peligrosos	**Instrucciones importantes de funcionamiento y/o Mantenimiento**	**Fusible reemplazable**	**Toma de tierra de protección**	**Superficie caliente: no tocar**	**Instrucciones de uso electrónicas: ubicación de instrucciones en el código QR**

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with Meyer Sound's installation instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
9. Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus. The AC mains plug or appliance coupler shall remain readily accessible for operation.
11. Only use attachments/accessories specified by Meyer Sound.
12. Use only with the caster rails or rigging specified by Meyer Sound, or sold with the apparatus. Handles are for carrying only.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. If equipped with an external fuse holder, the replaceable fuse is the only user-serviceable item. When replacing the fuse, only use the same type and the same value.
15. Refer all other servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug has been damaged; liquid has been spilled or objects have fallen into the apparatus; rain or moisture has entered the apparatus; the apparatus has been dropped; or when for undetermined reasons the apparatus does not operate normally.

WARNING: For Meyer Sound IntelligentDC Power Supply models MPS-488HP and MPS-482HP, the external wiring connected to the output terminals of the units require installation by an Instructed person or the use of ready-made leads or cords.

WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. Do not install the apparatus in wet or humid locations without using weather protection equipment from Meyer Sound.

WARNING: Class I apparatus shall be connected to a mains socket outlet with a protective earthing connection.

CAUTION: Disconnect the mains plug before disconnecting the power cord from the loudspeaker.

English

- To reduce the risk of electric shock, disconnect the apparatus from the AC mains before installing audio cable. Reconnect the power cord only after making all signal connections.
- Connect the apparatus to a two-pole, three-wire grounding mains receptacle. The receptacle must be connected to a fuse or circuit breaker. Connection to any other type of receptacle poses a shock hazard and may violate local electrical codes.
- Do not install the apparatus in wet or humid locations without using weather protection equipment from Meyer Sound.
- Do not allow water or any foreign object to get inside the apparatus. Do not put objects containing liquid on or near the unit.
- To reduce the risk of overheating the apparatus, avoid exposing it to direct sunlight. Do not install the unit near heat-emitting appliances, such as a room heater or stove.
- If equipped with an external fuse holder, the replaceable fuse is the only item that can be serviced by the user. When replacing the fuse, only use the same type and value.
- This apparatus contains potentially hazardous voltages. Do not attempt to disassemble the unit. The only user-serviceable part is the fuse. All other repairs should be performed only by factory-trained service personnel.

Deutsch

- Zur Minimierung der Gefahr eines elektrischen Schlages trennen Sie das Produkt vor dem Anschluss von Audio-und/oder Steuerleitungen vom Stromnetz. Das Netzkabel darf erst nach Herstellung aller Signalverbindungen wieder eingesteckt werden.
- Das Produkt an eine vorschriftsgemäss installierte dreipolige Netzsteckdose (Phase, Neutralleiter, Schutzleiter) anschließen. Die Steckdose muss vorschriftsgemäß mit einer Sicherung oder einem Leitungsschutzschalter abgesichert sein. Das Anschließen des Produkts an eine anders ausgeführte Stromversorgung kann gegen Vorschriften verstossen und zu Stromunfällen führen.
- Das Produkt nicht an einem Ort aufstellen, an dem es direkter Wassereinwirkung oder übermäßig hoher Luftfeuchtigkeit ausgesetzt werden könnte, solange es sich nicht um ein Produkt handelt, dass mit der Meyer Sound Weather Protection Option ausgestattet ist.
- Vermeiden Sie das Eindringen von Wasser oder Fremdkörpern in das Innere des Produkts. Stellen Sie keine Objekte, die Flüssigkeit enthalten, auf oder neben dem Produkt ab.
- Um ein Überhitzen des Produkts zu verhindern, halten Sie das Gerät von direkter Sonneneinstrahlung fern und stellen Sie es nicht in der Nähe von wärmeabstrahlenden Geräten (z.B. Heizgerät oder Herd) auf.
- Bei Ausstattung mit einem externen Sicherungshalter ist die austauschbare Sicherung das einzige Gerät, das vom Benutzer gewartet werden kann. Verwenden Sie beim Austausch der Sicherung nur den gleichen Typ und Wert.
- Dieses Gerät enthält möglicherweise gefährliche Spannungen. Versuchen Sie nicht, das Gerät zu zerlegen. Der einzige vom Benutzer zu wartende Teil ist die Sicherung. Alle anderen Reparaturen dürfen nur von im Werk geschultem Servicepersonal ausgeführt werden.

Français

- Pour éviter tout risque d’électrocution, débranchez l’enceinte de la prise secteur avant de mettre en place le câble audio.Ne rebranchez le cordon secteur qu’après avoir procédé à toutes les connexions de signal audio
- Brancher l'appareil sur une prise secteur à trois fils et deux pôles avec mise à la terre. La prise doit être reliée à un fusible ou à un disjoncteur. Le branchement à tout autre type de prise présente un risque de choc électrique et peut enfreindre les codes locaux de l'électricité.
- N’installez pas l’enceinte dans des endroits humides ou en présence d’eau sans utiliser d’équipements de protection adéquats fournis par Meyer Sound.
- Ne laissez pas d’eau ou d’objet étranger, quel qu’il soit, pénétrer à l’intérieur de l’enceinte. Ne posez pas d’objet contenant du liquide sur ou à proximité de l’enceinte.
- Pour réduire les risques de surchauffe, évitez d’exposer directement l’enceinte aux rayons du soleil. Ne l’installez pas à proximité de sources de chaleur, radiateur ou four par exemple.

- S'il est équipé d'un porte-fusible externe, le fusible remplaçable est le seul élément qui peut être réparé par l'utilisateur. Lors du remplacement du fusible, n'utilisez que le même type et la même valeur.
- Cet appareil contient des tensions potentiellement dangereuses. N'essayez pas de démonter l'appareil.Le fusible est la seule pièce réparable par l'utilisateur. Toutes les autres réparations doivent être effectuées uniquement par du personnel de maintenance formé en usine.

Español

- Para reducir el riesgo de descarga eléctrica, desconecte el aparato de la red eléctrica antes de instalar el cable de audio. Vuelva a conectar el cable de alimentación sólo después de realizar todas las conexiones de señal.
- Conecte el aparato a una toma de corriente de tres hilos y dos polos con conexión a tierra. El receptáculo debe estar conectado a un fusible o disyuntor. La conexión a cualquier otro tipo de receptáculo representa un riesgo de descarga eléctrica y puede violar los códigos eléctricos locales.
- No instale el aparato en lugares húmedos o mojados sin usar el equipo de protección contra intemperie de Meyer Sound.
- No permita que penetre agua u otros objetos extraños en el interior del aparato. No coloque objetos que contengan líquido sobre o cerca de la unidad.
- Para reducir el riesgo de sobrecalentamiento del aparato, evite exponerlo a la luz solar directa. No instale la unidad cerca de aparatos que emitan calor, como un calefactor o una estufa
- Si está equipado con un portafusibles externo, el fusible reemplazable es el único elemento que puede ser reparado por el usuario. Cuando reemplace el fusible, use solamente el mismo tipo y valor.
- Este aparato contiene voltajes potencialmente peligrosos. No intente desmontar la unidad. La única pieza que el usuario puede reparar es el fusible. Todas las demás reparaciones deben ser realizadas únicamente por personal de servicio capacitado de fábrica.

CONTENTS

INTRODUCTION

HOW TO USE THIS MANUAL

Please read these instructions in their entirety before configuring a CAL loudspeaker system. In particular, pay close attention to material related to safety issues.

As you read these instructions, you will encounter the following icons for notes, tips, and cautions:

NOTE: A note identifies an important or useful piece of information relating to the topic under discussion.

TIP: A tip offers a helpful tip relevant to the topic at hand.

CAUTION: A caution gives notice that an action may have serious consequences and could cause harm to equipment or personnel, or could cause delays or other problems.

Information and specifications are subject to change. Updates and supplementary information are available at meyersound.com.

Meyer Sound Technical Support is available at:

- +1 510 486.1166
  (Monday through Friday 9:00 am to 5:00 pm PST)
- +1 510 486.0657
  (after hours support)
- meyersound.com/support

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 by the Avnu Alliance, the self-powered CAL loudspeaker is designed primarily for vocal reproduction in fixed installations, offering variable vertical beam spread (as narrow as 5° and as wide as 30°) that can be digitally steered up or down by 30°.

CAL 96, CAL 64, and CAL 32 (Shown without Grille Frames)

The CAL loudspeaker 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°, 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 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 driver individually yields greater flexibility and precision than other beam steering systems that control modules comprising multiple drivers.

The accuracy of the CAL loudspeaker'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 the option to split the acoustic output into two beams; each 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 provides computer control of CAL via Meyer Sound's Compass® Control Software. This software supports 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. Standard weather protection permits outdoor installations in most environments.

CAL INSTALLATION OVERVIEW

Below is a basic overview for installing and using the CAL loudspeaker. Meyer Sound recommends that users read this document in its entirety before proceeding.

1. Use CAL's included mounting brackets to mount the loudspeaker on a wall or column. For more information, see Chapter 6, "Mounting CAL Loudspeakers."
2. Remove CAL's user panel cover. For more information, see "User Panel Cover" on page 12.
3. Connect CAL to an appropriate power source with the included power cable. For power requirements, see Chapter 2, "Power Requirements."
4. Connect an audio source to one of CAL's three analog balanced audio inputs, to its AES/EBU digital input, or to its AVB port. For more information, see "Audio Input" on page 7.

   TIP: You can connect a second audio source to one of the audio inputs to be used as an override signal.

5. Connect to CAL's logic I/O ports any external devices you want to use for muting and overriding audio sources, detecting loudspeaker faults, and changing presets. For more information, see "Logic I/O Ports" on page 10.
6. Connect CAL to your computer's Ethernet port or to a network router or network switch using a CAT-5e (or better) cable. For more information, see "Ethernet and AVB Ports" on page 11.
7. Install Compass Control Software and download the CAL Pattern files:
   meyersound.com/product/compass/#software
   Copy them to the COMPASS/CAL folder.
8. Launch Compass Control Software and configure CAL's audio inputs, vertical beam spread, vertical beam angle, and processing.
9. Reattach CAL's user panel cover. For more information, see "User Panel Cover" on page 12.

   CAUTION: When installing CAL outdoors, the user panel cover should always be attached to protect the user panel connectors from the environmental elements.

   TIP: For more information, refer to the Compass support videos:

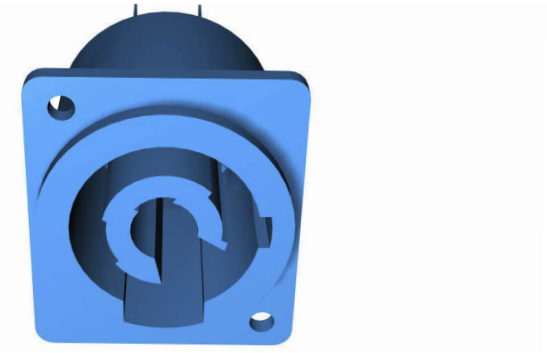
   meyersound.com/product/compass/#support-videos

POWER REQUIREMENTS

CAL loudspeakers combine advanced loudspeaker technology with equally advanced power capabilities. Understanding voltage and current requirements, as well as electrical safety issues, is critical for safe operation of the CAL loudspeaker.

AC INPUT CONNECTOR

The CAL loudspeaker receives AC power from its 3-pole, grounded powerCON 20 locking connector. Located on the unit's rear panel, the locking connector is rated for up to 20 A. A 10-foot AC power cable, rated at 15 amps, is included with each CAL loudspeaker.

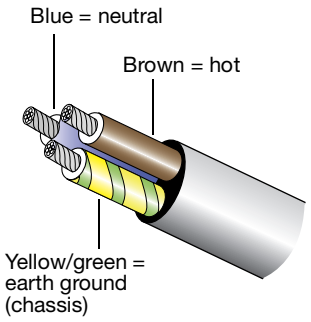


CAL AC Input Connector

If you replace the included AC power cable, make sure to use a cable that is wired correctly and equipped with the appropriate power plug (on the other end) for the area in which you will operate the unit.

WIRING FOR AC CONNECTIONS

CAL loudspeakers require a grounded outlet. To operate safely and effectively, it is extremely important that the entire system be properly grounded.



AC Cable Wiring Scheme

When wiring international or special-purpose AC power cables and connectors, use the following wiring scheme:

- Connect the blue wire to the black terminal, or the terminal marked with an N.
- Connect the brown wire to the red terminal, or the terminal marked with an L.
- Connect the yellow and green wire to the green (or green and yellow) terminal, or the terminal marked with an E.

⚠ **CAUTION:** When creating AC power cables, it is important to preserve AC line polarity and connect the earth ground on both ends of the cable. CAL requires a grounded connection. Always use a grounded outlet and plug. It is extremely important that the system be properly grounded in order to operate safely and properly. **Do not ground-lift the AC cable.**

CAL VOLTAGE REQUIREMENTS

CAL operates as intended when the AC voltage stays within the rated voltage range of 100–240 V AC ± 10% at 50–60 Hz.

If the voltage drops below 90 V, CAL uses stored power to continue operating temporarily; the power supply turns off if the voltage does not return to normal levels.

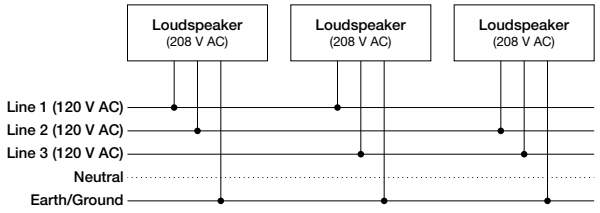
If the voltage rises above 264 V, the CAL power supply immediately turns off to prevent damage to the unit.

If CAL turns off due to either low or high voltage, its power supply automatically turns on again after 3 seconds, so long as the voltage has returned to normal levels. If CAL does not turn back on after 10 seconds, remove AC power immediately and contact Meyer Sound Technical Support.

CAUTION: The power source for CAL should always operate within the required voltage range, at least a few volts from the upper and lower ranges. This will ensure that AC voltage variations from the service entry—or peak voltage drops due to cable runs—will not cause the loudspeaker's amplifiers to cycle on and off or cause damage to the power supply.

NOTE: When voltage fluctuates within CAL's rated voltage range, automatic tap selection stabilizes the operating voltage. This tap selection is instantaneous with no audible artifacts.

NOTE: Because CAL does not require a dedicated neutral line, and it can tolerate elevated voltages from the ground line, it can be connected to line-line terminals in 120 V, 3-phase Wye systems. This results in 208 V AC between lines (nominal) and therefore draws less current than when using 120 V AC (line-neutral). Make sure that the voltage remains within CAL's recommended operating window (100–240 V AC ± 10%). The ground line must always be used for safety reasons and the line-to-ground voltage should never exceed 264 V AC (typically 120 V AC from line-to-ground).



3-Phase Wye System

POWERING ON CAL LOUDSPEAKERS

When AC power is applied to CAL, its Intelligent AC™ power supply automatically selects the correct operating voltage, allowing it to be used internationally without manually setting voltage switches. In addition, Intelligent AC provides soft-start power on (eliminating high inrush currents), suppresses high-voltage transients up to several kilovolts, filters common mode and differential mode radio frequencies (EMI), and sustains operation temporarily during low-voltage periods.

When powering on CAL, the following startup events occur over several seconds:

1. Audio output is muted.
2. Voltage is detected and the power supply mode is automatically adjusted as necessary. The power supply ramps up.
3. After the power on sequence and system check have completed, the audio output is unmuted, the ON/Status LED turns solid green, indicating the loudspeaker is ready to reproduce audio.

CAUTION: If the ON/Status LED does not turn solid green after powering on and audio is muted, the loudspeaker has encountered a failure and may need to be serviced. Contact Meyer Sound Technical Support.

CAL CURRENT REQUIREMENTS

The current draw for CAL is dynamic and fluctuates as operating levels change. Because different cables and circuit breakers heat up at varying rates, it is important to understand the following types of current ratings and how they affect circuit breaker and cable specifications.

- **Idle Current** — The maximum rms current during idle periods.
- **Maximum Long-Term Continuous Current** — The maximum rms current during a period of at least 10 seconds. The Maximum Long-Term Continuous Current is used to calculate temperature increases for cables and to ensure that cable sizes and gauges conform to electrical code standards. The current rating is also used as a rating for slow-reacting thermal breakers.
- **Burst Current** — The maximum rms current during a period of around one second. The Burst Current is used as a rating for magnetic breakers. It is also used for calculating the peak voltage drop in long AC cable runs according to the following formula:

  V pk (drop) = I pk x R (cable total)

The Burst Current can also be used to calculate the AC looping capability of CAL.

- **Ultimate Short-Term Peak Current** — A rating for fast-reacting magnetic breakers.
- **Inrush Current** — The spike of initial current encountered when powering on.

You can use the following table as a guide for selecting cable gauges and circuit breaker ratings for the system's operating voltage.

CAL Current Draw

Current Draw	Model	115 V AC	230 V AC	100 V AC
Idle	CAL 96	1.98 A rms	1.63 A rms	2.32 A rms
	CAL 64	1.24 A rms	0.99 A rms	1.42 A rms
	CAL 32	0.58 A rms	0.45 A rms	0.65 A rms
Maximum Long-Term Continuous	CAL 96	8.3 A rms	4.2 A rms	9.4 A rms
	CAL 64	6.1 A rms	3.1 A rms	6.9 A rms
	CAL 32	3.3 A rms	1.7 A rms	3.7 A rms
Burst	CAL 96	14.7 A rms	7.3 A rms	18.5 A rms
	CAL 64	10.8 A rms	5.4 A rms	13.6 A rms
	CAL 32	5.9 A rms	2.9 A rms	7.4 A rms
Maximum Instantaneous Peak	CAL 96	33 A peak	18 A peak	40 A peak
	CAL 64	24 A peak	13 A peak	29 A peak
	CAL 32	13 A peak	7 A peak	16 A peak
Inrush	CAL 96	<20 A peak		
	CAL 64	<20 A peak		
	CAL 32	<20 A peak		

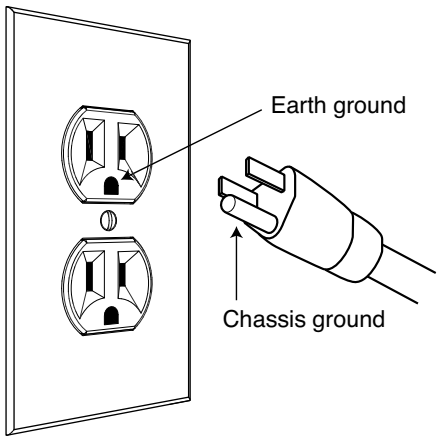
The minimum electrical service amperage required by a CAL loudspeaker system is the sum of the Maximum Long-Term Continuous Current for each loudspeaker. An additional 30 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.

NOTE: For best performance, the AC cable voltage drop should not exceed 10 V, or 10 percent at 115 V and 5 percent at 230 V. Make sure that the AC voltage always remains within the recommended operating window—including voltage drops.

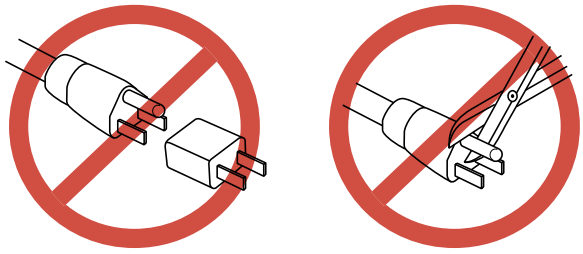
ELECTRICAL SAFETY ISSUES

Pay close attention to these important electrical and safety issues.

- CAL requires a grounded outlet. Always use a grounded outlet and plug.



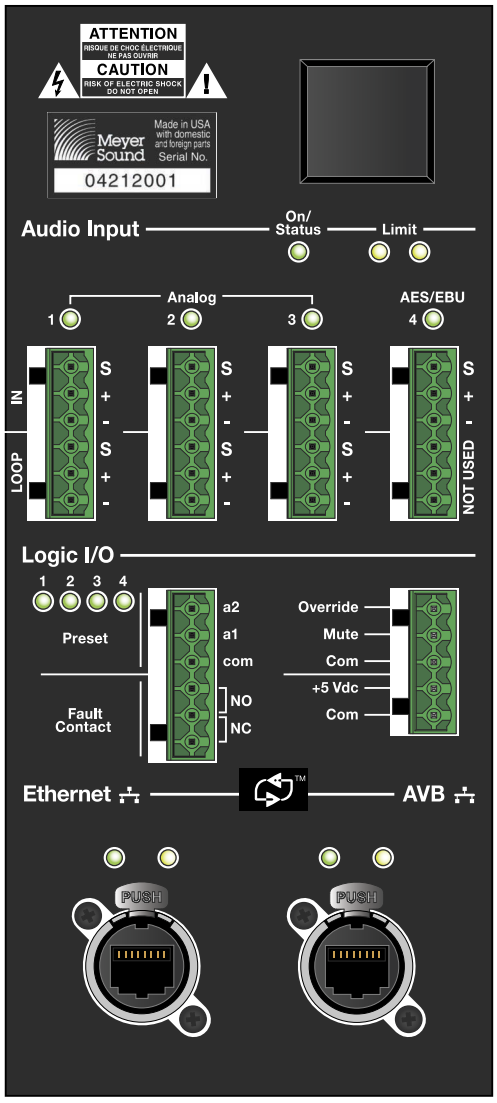
- Do not use a ground-lifting adapter or cut the AC cable ground pin.



- Make sure the AC power cable for the loudspeaker has the appropriate power plug (on the other end) for the area in which you will operate the loudspeaker. In addition, the AC power cable must be rated for the total current draw of all loudspeakers looped from the power source. The included power cable is rated for a maximum of 15 A.
- Do not operate the unit if its power cable is frayed or broken.
- Keep all liquids away from CAL loudspeakers to avoid hazards from electrical shock.

CAL USER PANEL

The CAL user panel includes audio input connectors, both analog and digital (AES/EBU), for receiving audio source signals. It also includes logic connectors for selecting presets, overriding and muting audio output, and monitoring loudspeaker faults. The Ethernet and AVB network audio ports allow interfacing with a Mac or Windows-based computer running Compass Control Software. The AVB-enabled Ethernet port can also be used for receiving AVB audio streams as audio source signals.



CAL User Panel

AUDIO INPUT

CAL includes four numbered audio inputs: three analog and one digital. The three analog inputs also provide loop output for looping multiple loudspeakers from a single audio source. In Compass control software, a single input is specified as the active input, and another input can be specified as an override input (when the installation requires CAL to function as part of a fire alarm or evacuation system).

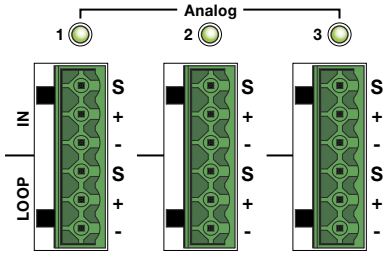
NOTE: AVB audio streams received by the AVB port can also be used as audio sources. For more information, see “OLED Button” on page 12.

NOTE: CAL ships from the factory with Analog Input 1 selected as the active input, and no input selected for the override input. These inputs can be changed with Compass Control Software.

TIP: For more information, refer to the Compass support videos:

meyersound.com/product/compass/#support-videos

Analog Inputs (1–3)



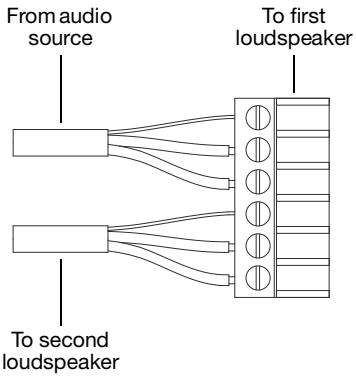
Analog Audio Input and Loop Output Connectors

The three analog inputs use Phoenix 6-pin male connectors and accept balanced audio signals with an input impedance of 10 kOhm. The analog audio source is received via the connector’s top three pins (shield, positive, and negative). The signal is looped to the connector’s bottom three pins (also shield, positive, and negative) for output when looping multiple loudspeakers from a single audio source. The pins for the analog connectors are clearly labeled on the CAL user panel.

The positive (+) and negative (–) pins carry the input as a differential signal. The shield (S) pin is connected to earth through a 1 kOhm, 1000 pF, 15 V clamped network. This circuitry provides virtual ground lift for audio frequencies while allowing unwanted signals to bleed to ground. When assembling cables, make sure all three pins are connected on both ends. Telescopic grounding is not recommended. Shorting the shield of the audio input to the chassis of the CAL may cause a ground loop, resulting in hum.

Looping CAL Loudspeakers

The Analog input connectors allow multiple CAL loudspeakers to be looped from a single audio source. Connect the loop output pins of the first loudspeaker to the input pins of the second loudspeaker, and so forth. The loop output pins are wired in parallel to the input pins and transmit the unbuffered source signal even when the loudspeaker is powered off.



Phoenix cable wired for looped audio

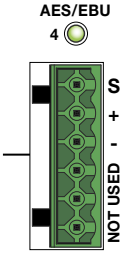
To avoid distortion when looping multiple CAL loudspeakers, make sure the source device can drive the total load impedance of the looped loudspeakers. In addition, the source device must be capable of delivering 20 dBV (10 V rms into 600 ohms) to yield the maximum peak SPL over the operating bandwidth of the loudspeaker.

To calculate the load impedance for the looped loudspeakers, divide 10 kOhms (the input impedance for a single CAL) by the number of looped loudspeakers. For example, the load impedance for 10 CAL loudspeakers is 1000 ohms (10 kOhms / 10). To drive this number of looped loudspeakers, the source device should have an output impedance of 100 ohms or less.

NOTE: Most source devices are capable of driving loads no smaller than 10 times their output impedance.

NOTE: Make sure that cabling for looped loudspeakers is wired correctly (shield to shield, positive to positive, and negative to negative) to prevent the polarity from being reversed. If one or more loudspeakers in a system have reversed polarity, frequency response and coverage can be significantly degraded.

Digital AES/EBU (4)



AES/EBU Input Connector

The digital input uses a Phoenix 6-pin male connector and accepts an AES3 digital audio signal. The digital audio source is received via the connector's top three pins (shield, positive, and negative). The connector's bottom three pins are not used. The pins for the digital connector are clearly labeled on the CAL user panel.

NOTE: The AES/EBU port accepts single-channel (mono) digital audio sources. When connecting AES/EBU audio sources to CAL, you must specify in Compass control software whether the left channel (AES L) or right channel (AES R) will be used.

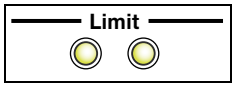
ON/STATUS LED

On/Status LED

During normal operation, CAL's On/Status LED is green. If the loudspeaker's internal temperature reaches 75° C (167° F), the LED turns solid yellow and the loudspeaker's gain is reduced by 3 dB. Though CAL will continue to operate normally with the lower gain, when the On/Status LED is yellow, this is an indication that the loudspeaker is reaching its maximum heat dissipation and a reduction of input level is recommended. When the loudspeaker's internal temperature cools to 60° C (140° F), the amplifier returns to normal operation.

TIP: When CAL is connected to a computer running Compass Control Software, the RMS tab provides additional feedback and warnings, if encountered, about the loudspeaker's operating temperature.

LIMIT LEDS



Limit LEDs

When the audio input level of a CAL would cause the amplifiers to exceed the maximum output levels for its drivers, CAL, limiting is engaged and is indicated by the two Limit LEDs on the CAL user panel. The left LED indicates limiting for low-frequency channels while the right LED indicates limiting for high-frequency channels. When engaged, limiting not only protects the drivers, but also prevents signal peaks from causing excessive distortion in the amplifier channels, thereby preserving headroom and maintaining smooth frequency responses at high levels. When source levels return to normal, below the limiter's threshold, limiting ceases.

CAL performs within its acoustical specifications when the Limit LEDs are unlit, or if the LEDs are lit for 2 seconds or less and then turn off for at least 1 second. If an LED remains lit for longer than 3 seconds, the loudspeaker enters hard limiting where:

- Increases to the input level have no effect.
- Distortion increases due to clipping and nonlinear driver operation.
- Drivers are subjected to excessive heat and excursion, which will compromise their life span and may eventually cause damage over time.

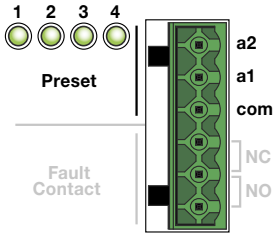
CAUTION: The Limit LEDs indicate when a safe, optimum level is exceeded. If a CAL loudspeaker begins to limit before reaching the required SPL, consider replacing it with a CAL model with more amplifier channels/drivers, or consider adding more CAL loudspeakers to the system to achieve the desired SPL without exposing the loudspeakers to excessive levels and possible overheating.

LOGIC I/O PORTS

The Logic I/O connectors provide a range of control and monitoring for CAL, including changing presets, overriding and muting the input signal, monitoring loudspeaker faults, and providing voltage output. The Logic I/O connectors are optically isolated from the CAL loudspeaker circuitry. The three COM pins are isolated from each other to set the reference voltage for their associated logic pins. A logic pin is triggered when it receives a voltage of 3 to 20 V DC greater than its associated COM voltage.

CAUTION: Do not send voltages greater than 20 V DC to the Logic I/O pins as this may damage the input circuitry.

Presets 1–4



Preset Pins

CAL presets recall loudspeaker settings for beam control and processing (5-band parametric EQ, gain, and delay). Presets are edited in Compass Control Software. An unlimited number of presets can be saved and stored on your computer but only four presets can be stored in the CAL loudspeaker. When CAL is not connected to a computer, presets can be selected by sending control voltages to the A1 and A2 pins.

Table 1 illustrates the logic for selecting presets with control voltages.

Table 1: CAL Preset Selection Logic

	A1	A2
Preset 1	0	0
Preset 2	1	0
Preset 3	0	1
Preset 4	1	1

For example, to select preset 2, a voltage of 3 V DC is sent to the A1 pin while 0 V DC is sent to the A2 and COM pins.

NOTE: The A1 and A2 pins are triggered when receiving a voltage of 3 to 20 V DC greater than their associated COM voltage.

CAL Factory Presets

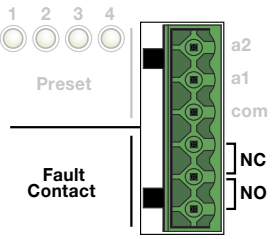
A summary of the beam settings for the CAL factory presets is shown in Table 2. CAL ships from the factory with these presets loaded into the loudspeaker. The presets can be edited and overwritten with Compass Control Software.

TIP: For more information, refer to the Compass support videos:

meyersound.com/product/compass/#support-videos

Table 2: CAL Factory Presets

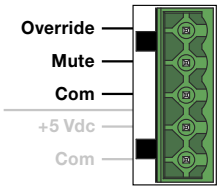
	Vertical Beam Angle	Vertical Beam Spread	Vertical Beam Split
Preset 1	0°	5°	None
Preset 2	5°	5°	None
Preset 3	-17°	25°	None
Preset 4	-30°	5°	None



Fault Contact Pins

The Fault Contact pins report when CAL shuts down or is no longer active. When CAL is powered on and working normally, the NO (normally-open) pins are open and the NC (normally-closed) pins are shorted together. When the loudspeaker is powered off, its internal relays switch so that the NO (normally-open) pins are shorted and the NC (normally-closed) pins are opened. The three Fault Contact pins are provided to accommodate monitoring for either short circuits or open circuits.

Override and Mute



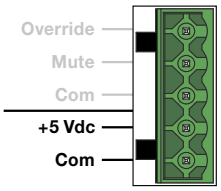
Override and Mute Pins

For installations where CAL is part of a fire alarm or evacuation system, the loudspeaker's active audio input (main program source) can be muted or replaced with an override input (alarm or emergency announcement source). The mute or override can be triggered with a relay closure attached to the Mute or Override pins.

The Mute pin is triggered when it receives a voltage of 3 to 20 V DC greater than its associated COM pin. When triggered, the Mute pin instructs CAL to mute its audio output.

The Override pin is triggered when it receives a voltage of 3 to 20 V DC greater than its associated COM pin. When triggered, the Override pin instructs CAL to override the active audio input with the override input. Both the active input and override input are specified in Compass control software.

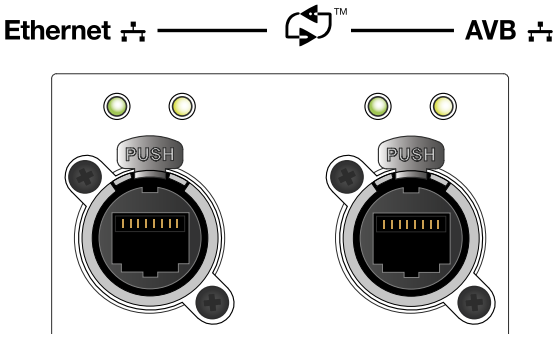
+5 V DC Power Source



+5 V DC Pins

CAL offers a local +5 V DC power source as a convenient means for controlling its Logic I/O features. The +5 V DC pins provide an isolated +5 V DC output that can be connected to any of the Logic I/O pins through an external relay or switch, eliminating the need for an external control voltage. The +5 V DC pin is fused at 0.35 A.

ETHERNET AND AVB PORTS



Ethernet and AVB Ports

CAL's Ethernet and AVB ports use RJ-45 Ethernet connectors and allow the loudspeaker to be connected to a standard computer Ethernet port, network router, or switch with a CAT-5e (or better) cable. Each port uses the IPv6 protocol for network communication and has an independent Media Access Control (MAC) address that is static and preassigned.

NOTE: The Ethernet and AVB ports do not provide loop output and do not allow looping of multiple CAL loudspeakers from a single audio source.

When CAL is connected to a Mac or Windows-based computer, Compass Control Software lets you configure beam spread and beam angle, and upload these settings as a preset to CAL. Compass Control Software also includes an RMS tab for remote monitoring of all CAL loudspeakers on the network.

The Ethernet and AVB ports accept AVB-enabled Ethernet connections for integrated AVB audio and Compass control.

AVB audio stream inputs can be used as audio sources. In Compass control software, AVB audio streams for the port can be specified as the active input or override input.

NOTE: For more information, see the AVB Networking Guide, available at https://meyersound.com/documents.

Ethernet and AVB Port LEDs

The yellow and green LEDs on each port indicate connection status and data traffic, as on standard Ethernet ports.

OLED BUTTON

The OLED button is located in the upper right of the CAL user panel. During startup, the OLED displays the CAL loudspeaker's Network port addresses. The addresses can also be viewed after startup.

Pushing the OLED button cycles through: Firmware version, MAC address/ID, Name, AVB Group/System name, Media Clock status, and AVB status.

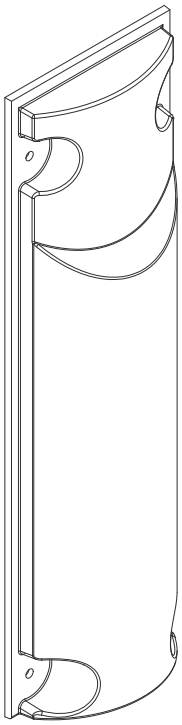
AMPLIFIER COOLING SYSTEM

CAL employs a combination of natural convection and forced air in its cooling system. The amplifier's heat sink provides natural convection cooling from the air flowing near its fins. In addition, a single-speed fan circulates air internally to ensure that CAL remains operational when exposed to high ambient temperatures or when driven continuously at high output levels.

⚠ **CAUTION:** The CAL heat sink can reach temperatures up to 85° C (185° F) during extreme operation. Use caution when approaching the rear of the loudspeaker.

USER PANEL COVER

A user panel cover is included with CAL to protect the connectors from dust in indoor installations and the environmental conditions of outdoor installations. The cover is installed by default and must be removed to gain access to the user panel.



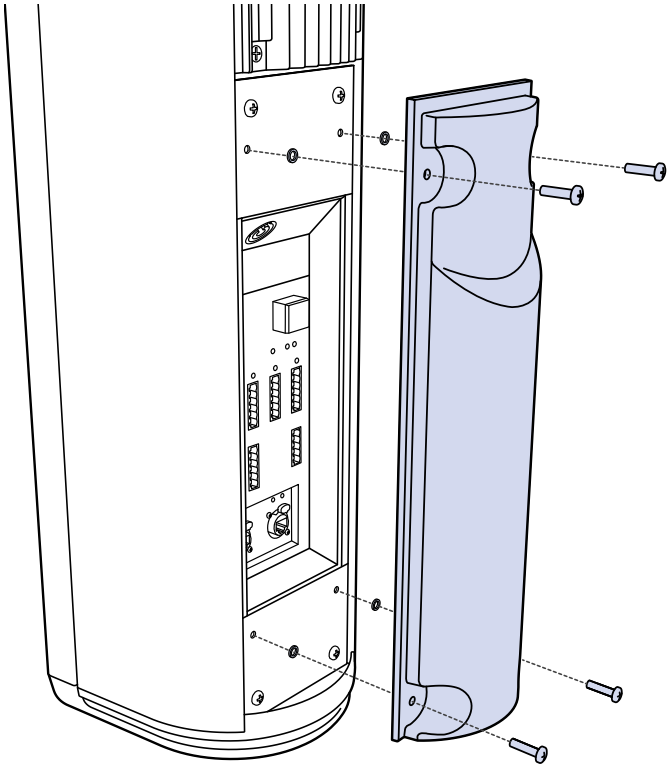
CAL User Panel Cover

⚠ **CAUTION:** When installing CAL outdoors, the user panel cover should always be attached to protect the user panel connectors from the environmental conditions.

Removing and Installing the User Panel Cover

To remove and install the user panel cover:

1. Use a screwdriver to remove the four pan head Phillips 10-32 x 0.75-inch screws, securing the user panel cover to the CAL loudspeaker. The four washers adhered to the user panel should remain in place.
2. Attach any required cables to the user panel connectors.
3. Reattach the user panel cover, securing it with the previously removed pan head Phillips 10-32 x 0.75-inch screws, ensuring that the washers remain in place between the user panel and cover.



CAL User Panel Cover Attachment

CAL COVERAGE

SUMMARY OF CAL COVERAGE

Below is a summary of the supported horizontal and vertical coverages for the three CAL loudspeaker models.

Table 3: CAL Coverage

Model	Horizontal Fixed Coverage	Vertical Beam Spread	Vertical Beam Angles	Vertical Beam Splits
CAL 96	120°	5° to 30° (in 5° increments)	±30° (in 1° increments)	Top, Bottom
CAL 64	120°	5° to 30° (in 5° increments)	±30° (in 1° increments)	Center
CAL 32	120°	5° to 30° (in 5° increments)	±30° (in 1° increments)	None

NOTE: Beams are configured in Compass control software and can be saved as part of a preset.

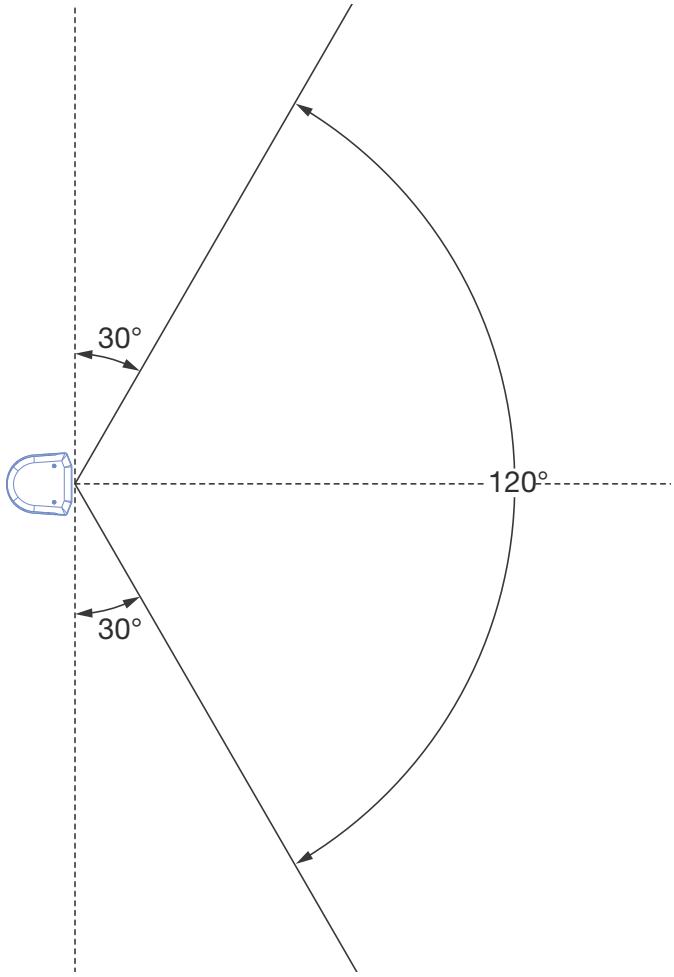
TIP: For more information, refer to the Compass support videos:

meyersound.com/product/compass/#support-videos

NOTE: For a list of the beam coverages included with the CAL factory presets, see “CAL Factory Presets” on page 10.

HORIZONTAL FIXED COVERAGE

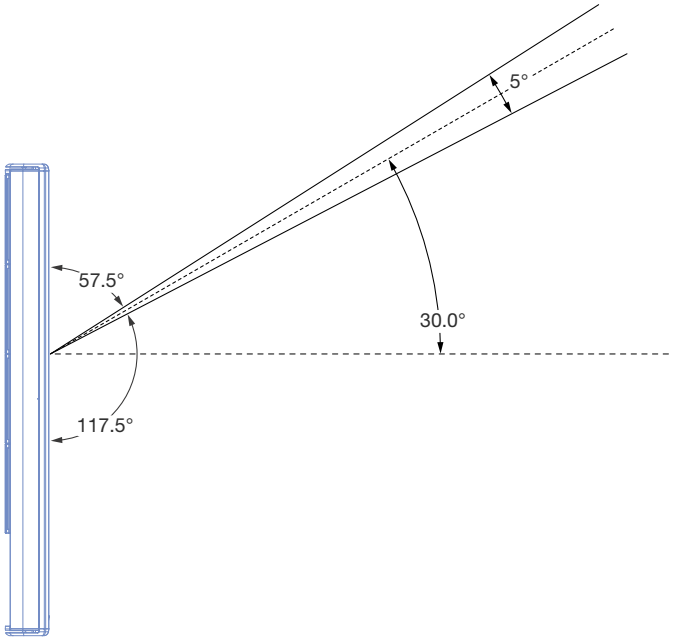
All CAL loudspeakers have fixed horizontal coverage of 120°.



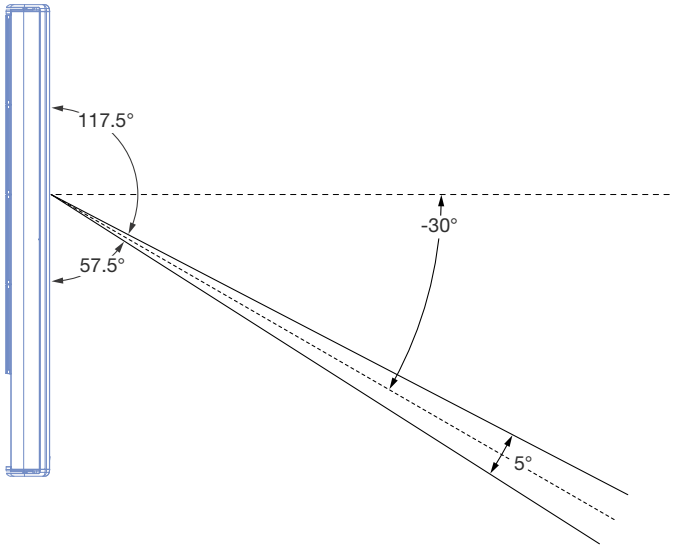
Horizontal Coverage

VERTICAL BEAM ANGLE

All CAL loudspeakers include vertical beam angles of ±30° in 1° increments. The beams can also be of any supported vertical spread (from 5° to 30°).



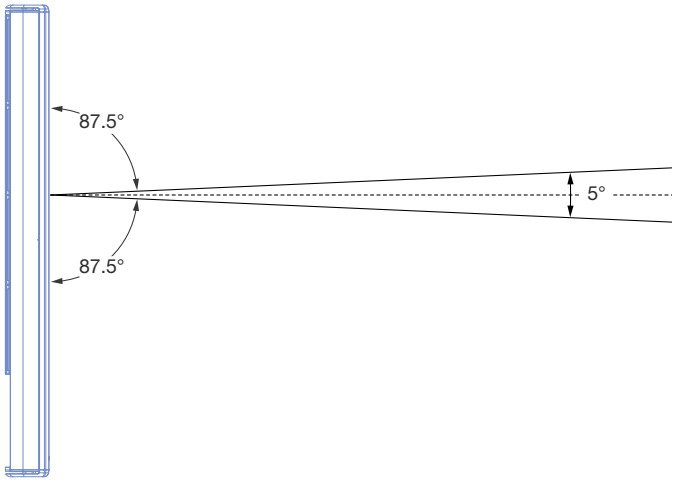
+30° Beam Angle with 5° Beam Spread



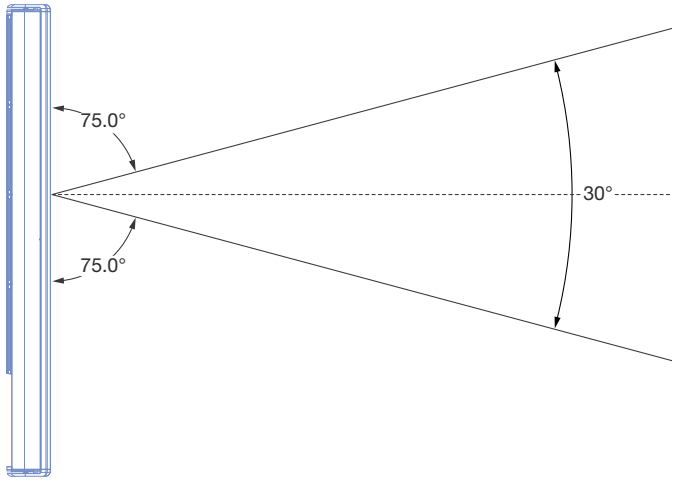
–30° Beam Angle with 5° Beam Spread

VERTICAL BEAM SPREAD

All CAL loudspeakers include vertical beams with variable spreads from 5° to 30° in 5° increments. The vertical beams can also be steered.



Minimum Vertical Beam Spread, 5°



Maximum Vertical Beam Spread, 30°

Figure 1 illustrates the vertical acoustical center points for the three CAL models, from which the beams emanate. The acoustical center points also represent the axis for beam angles.

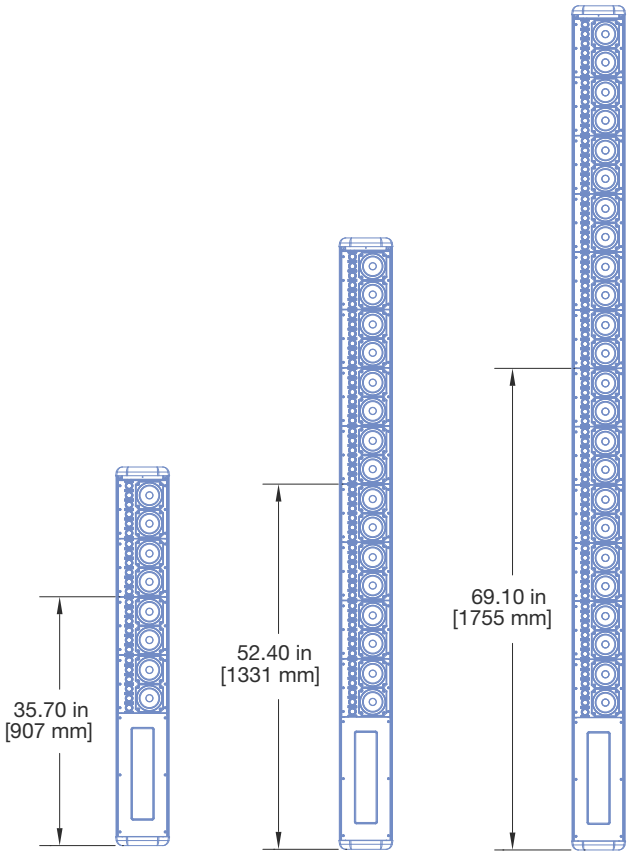


Figure 1: Acoustical Center Points for CAL 32, CAL 64, and CAL 96

NOTE: For the acoustical center points of beam split configurations, see “Vertical Beam Splits.”

VERTICAL BEAM SPLITS

The CAL 64 and CAL 96 models include beam split coverage modes to aim sound toward two destinations or to avoid reflective surfaces such as a balcony. The beam splits can also be configured with beam angles (see “Vertical Beam Angle” on page 16) and beam spreads (see “Vertical Beam Spread” on page 16).

CAL 64 Center Split Beams

The CAL 64 model includes 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. Figure 2 shows a CAL 64 with center split beams, each with 5° beam spread. Also illustrated are the beams’ acoustical center points.

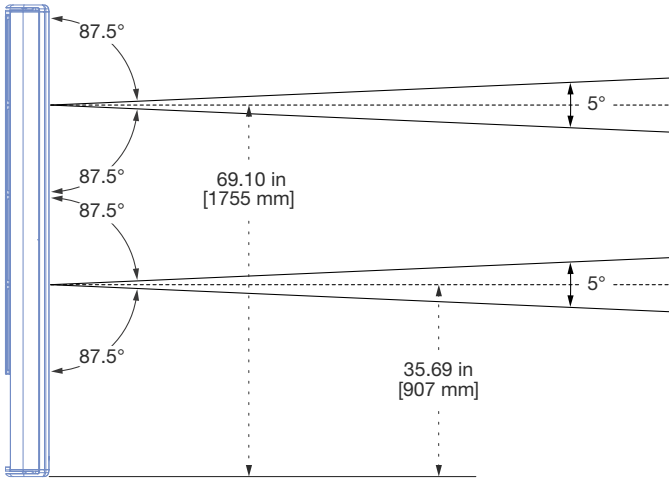


Figure 2: CAL 64 Center Split Beams with 5° Beam Spread

CAL 96 Top Split Beams

The CAL 96 model includes 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. Figure 3 shows a CAL 96 with top split beams, each with 5° beam spread. Also illustrated are the beams' acoustical center points.

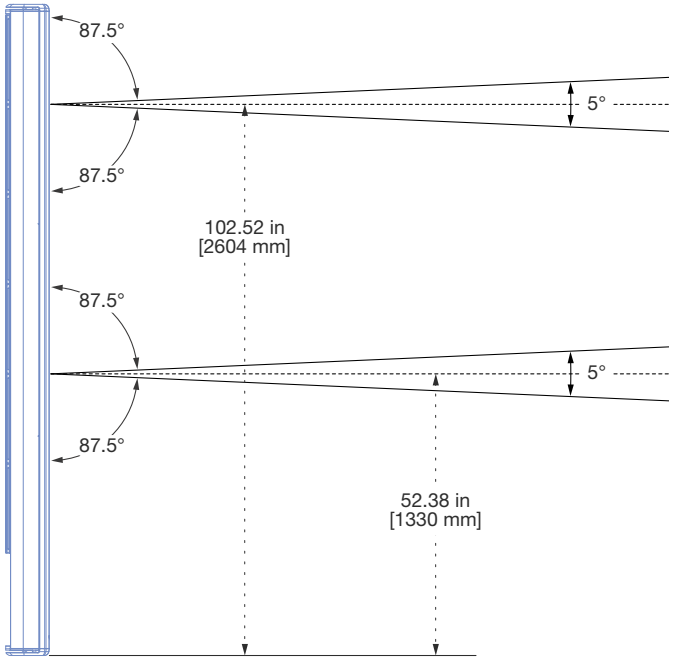


Figure 3: CAL 96 Top Beam Split with 5° Beam Spread

NOTE: When using the CAL 96 top split beam configuration, the bottom beam utilizes more driver channels and therefore yields greater SPL than the top beam.

CAL 96 Bottom Split Beams

The CAL 96 model also includes 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. Figure 4 shows a CAL 96 with bottom split beams, each with 5° beam spread. Also illustrated are the beams' acoustical center points.

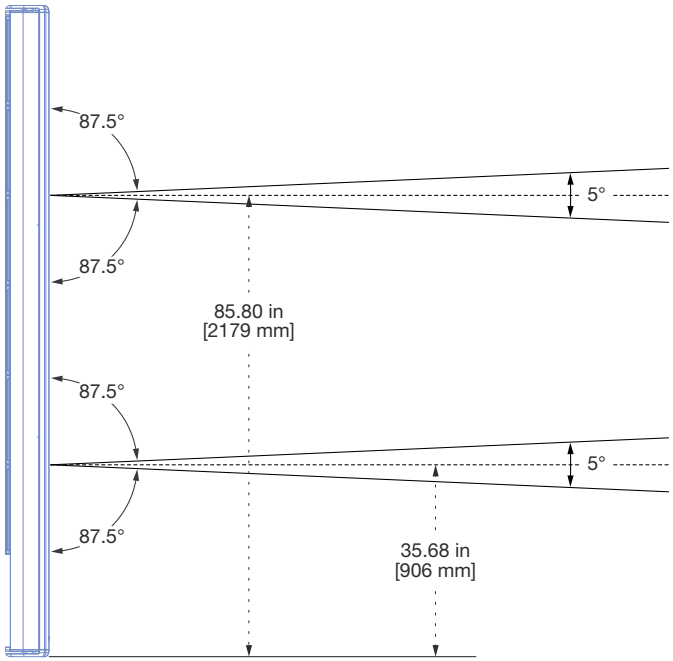


Figure 4: CAL 96 Bottom Beam Split with 5° Beam Spread

NOTE: When using the CAL 96 bottom split beam configuration, the top beam utilizes more driver channels and therefore yields greater SPL than the bottom beam.

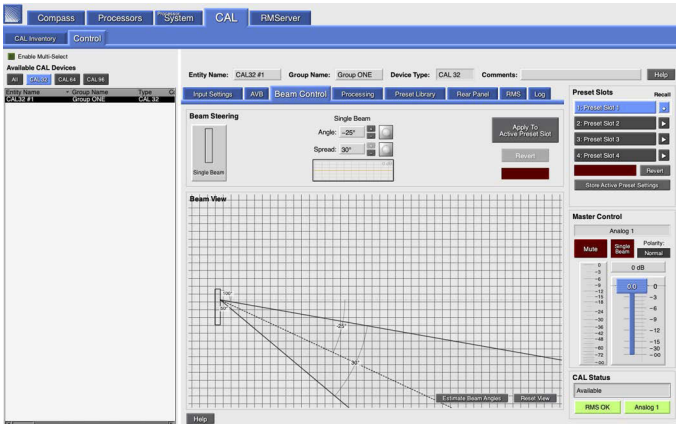
COMPASS CONTROL SOFTWARE

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

Compass enables the user to:

- Set the active input and override input
- Configure vertical beam spread, vertical beam angle, and beam split
- Assign processing to beams, including gain, delay, and parametric EQ
- Edit, store, recall, and organize CAL presets
- Test fault contact
- Monitor loudspeaker system status and performance data from the RMS tab

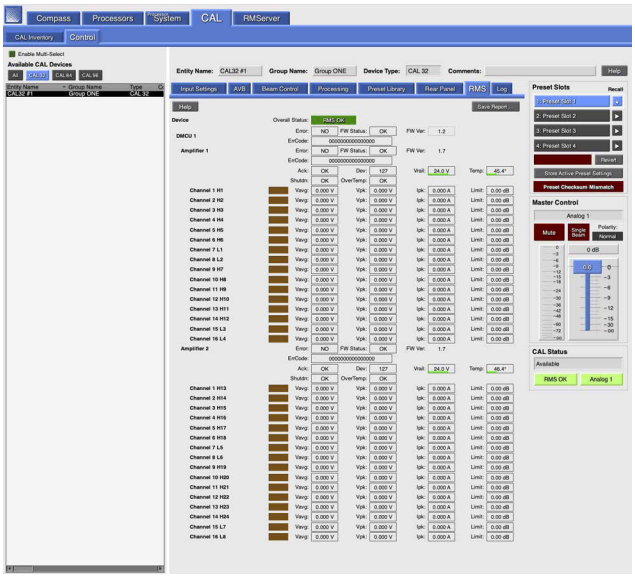
Compass includes full copy and paste of all settings, groups of settings, and multiple levels of undo. The tabbed interface is scalable to any display resolution and the colors are configurable for day or night. Compass has the same user interface, whether running on a Mac or Windows-based computer, so switching between platforms is completely transparent.



Compass Control Software, Beam Control Tab

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

The RMS tab reports extensive system status and performance data for each CAL loudspeaker on the network, including amplifier voltage, limiting activity, power output, driver status, and temperature.



Compass Control Software, RMS Overview Tab

TIP: For more information, refer to the Compass support videos:

meyersound.com/product/compass/#support-videos

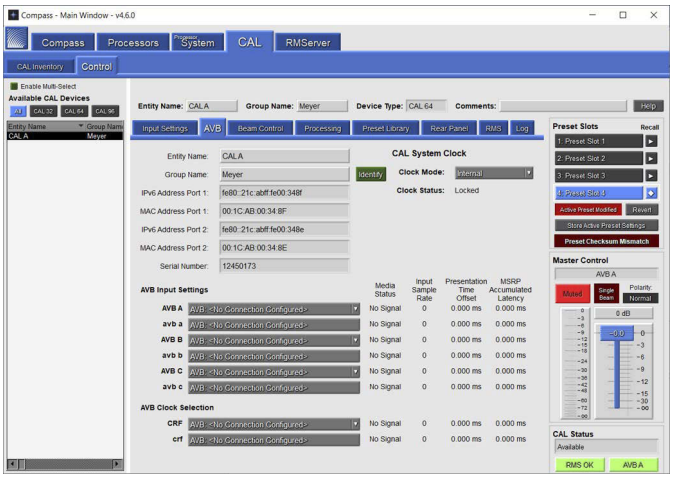
MANAGING AVB AND CAL WITH COMPASS

Compass may be used to manage CAL when AVB inputs are used.

CAL can receive AVB audio streams (AAF) and clock streams (CRF). CAL can transmit CRF streams to other devices, but cannot transmit AVB/AAF audio streams to other devices.

Configuring CAL Network Settings

When Compass is connected to a CAL, select the CAL>Control>AVB tab to manage the AVB inputs and make Clock Mode selections.

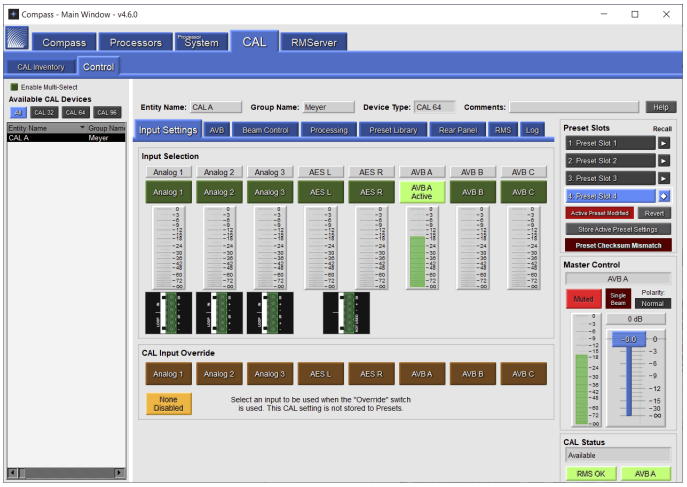


Compass CAL Control>AVB Tab

The AVB tab allows the CAL Entity and Group Names to be changed and displays the IPv6 and MAC Addresses, as well as the device's Serial Number.

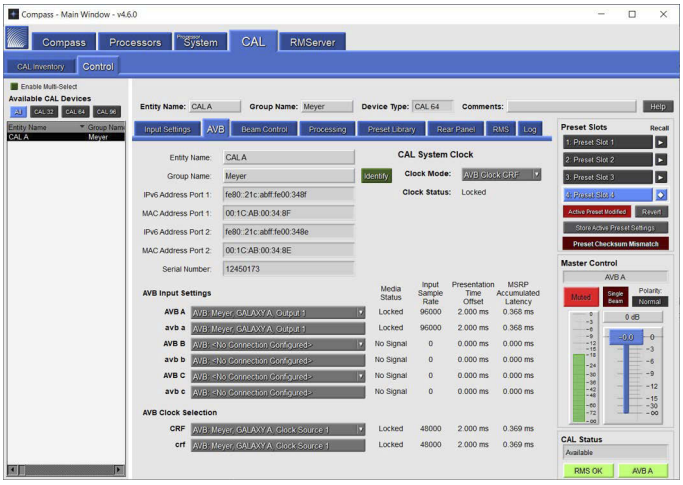
AVB Clock Selection and System Clock

As with other CAL input signal types, when the connection is made, it must be selected as the Active Input in the Input Settings tab for the signal to be reproduced.



CAL Control>Input Settings Tab in Compass

The Clock Mode also must be set, typically to the appropriate CRF stream. After the Clock Mode has been selected, ensure the Clock Status is updated to "Locked."



CAL Control>AVB Tab Showing Clock Status as Locked

AVB Input Selection

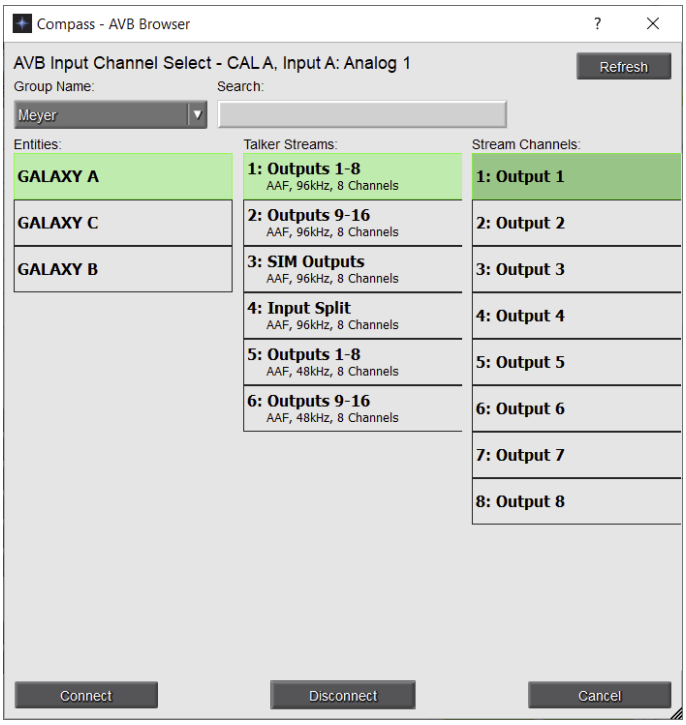
AVB Input Settings: each CAL has three audio sinks to receive AVB/AAF input signals and one clock sink to receive a CRF clock signal.

Media Clock Selection

For each AVB input, any available AVB stream from a Talker on the network can be selected as the clock stream. Media Clocks should never be cascaded. The same Media Clock should almost always be used for every device on the network.

Secondary Network Connections

There is no option to select to connect a Secondary network. If the CAL is connected to two networks, it will connect to the Secondary by default.



AVB Channel Select Pop-Up

When the AVB stream connection is established, it is displayed next to the input channel label.

MOUNTING CAL LOUDSPEAKERS

CAL comes standard with adjustable brackets that allow it to be mounted on walls or columns.

NOTE: Before mounting CAL, make sure to allow for the necessary cable runs to its audio sources, power source, host computer, and any control devices or switches you intend to use.

IMPORTANT SAFETY CONSIDERATIONS!

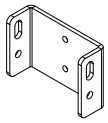
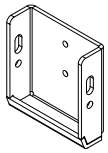
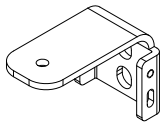
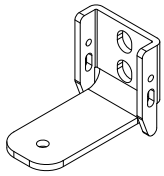
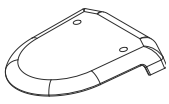
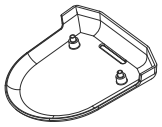
When installing Meyer Sound loudspeakers, the following precautions should always be observed:

- All Meyer Sound products must be used in accordance with local, state, federal, and industry regulations. It is the owner's and user's responsibility to evaluate the reliability of any rigging or mounting method for their application. Rigging should only be carried out by experienced professionals.
- Use mounting and rigging hardware that has been rated to meet or exceed the weight being hung.
- Make sure to attach mounting hardware to the building's structural components (studs or joists), and not just to the wall surface. Verify that the building's structure and the anchors used for the installation will safely support the total weight of the mounted loudspeakers.
- Use mounting hardware appropriate for the material where the loudspeaker will be installed.
- Make sure bolts are tightened securely. Meyer Sound recommends using Loctite® on bolt threads.
- Inspect mounting and rigging hardware regularly. Immediately replace any worn or damaged components.

CAL WALL MOUNT BRACKETS

CAL comes standard with wall mount brackets that include the following components.

CAL Wall Mount Bracket Components

Item		Part Number	Fasteners Included?
Wall Mount Plate (Top)		64.210.018.01 (Black) 64.210.018.02 (White)	No (Use fasteners appropriate for wall material)
Wall Mount Plate (Bottom)		64.210.031.01 (Black) 64.210.031.02 (White)	No (Use fasteners appropriate for wall material)
Loud-speaker Bracket (Top)		64.210.015.01 (Black) 64.210.015.02 (White)	Required Parts: 119.060, 119.059, 113.043, 116.028, 109.051, 101.349 X 2 (for ONE end) 101.522 X 2 (for ONE end), 115.025 X 2 (for ONE end)
Loud-speaker Bracket (Bottom)		64.210.032.01 (Black) 64.210.032.02 (White)	Required Parts: 119.060, 119.059, 113.043, 116.028, 109.051, 101.349 X 2 (for ONE end) 113.522 X 2 (for ONE end), 115.025 X 2 (for ONE end)
End cap (Top)		60.210.012.01 (Black) 60.210.012.02 (White)	Required Parts: 101.562 X 2 (for ONE end), 119.061 X 2 (for ONE end)
End cap (Bottom)		60.210.013.01 (Black) 60.210.013.02 (White)	Required Parts: 101.562 X 2 (for ONE end), 119.061 X 2 (for ONE end)

CAL Wall Mount Bracket Components

Item		Part Number	Fasteners Included?
5/16 x 5" Quick-release pins (2)		134.046	—

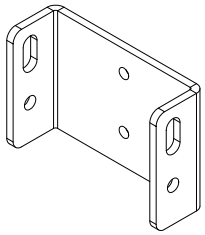
MOUNTING CAL LOUDSPEAKERS

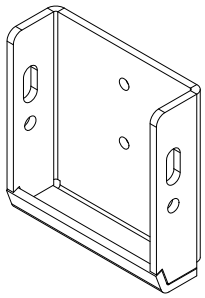
CAL loudspeakers come with their loudspeaker brackets. After installing the wall mount plates, attach the brackets to the loudspeaker, install CAL onto the wall, rotate the loudspeaker to adjust its horizontal coverage, tighten the top and bottom nuts, and attach the end caps.

To mount CAL on a wall:

1. Mount the top and bottom wall mount plates on the wall:
   - Mark two holes on the wall for each wall mount plate using their center mounting holes as a guide.
   - If you are mounting CAL on a wall with wood studs, locate the wall stud.
   - Orient the wall mount plates with the side slots up and make sure the top plate (the smaller one) is mounted the appropriate distance above the lower plate for your CAL loudspeaker.

Top wall mount plate

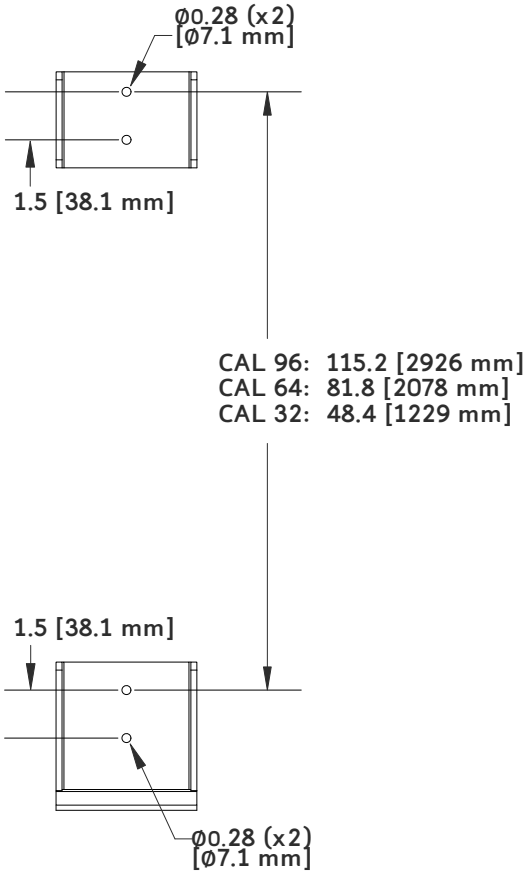




Bottom wall mount plate

NOTE: Orient the wall mount plates with the side slots up.

- Use a level and straight edge to make sure the top and bottom wall mount plates are vertically aligned.



- Drill pilot holes at the four marked locations. Make sure not to over-drill the pilot holes. The depth and diameter of the pilot holes should be around 50 percent of the length and diameter of the fasteners.

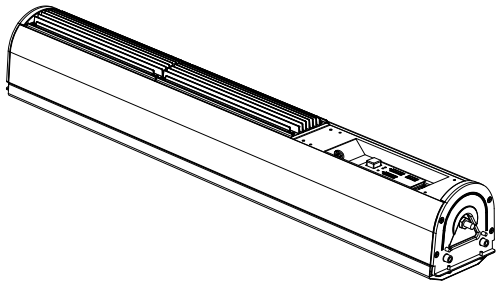
NOTE: The center mounting holes for the wall mount plates are 0.28 inches (7.1 mm) in diameter.

- If mounting CAL on a concrete or metal wall, install wall anchors (not included) in the pilot holes. Install the wall anchors so they are flush with the wall surface.
- Secure the wall mount plates to the wall with fasteners (not included) appropriate for the wall material and rated to hold the weight of the loudspeaker.

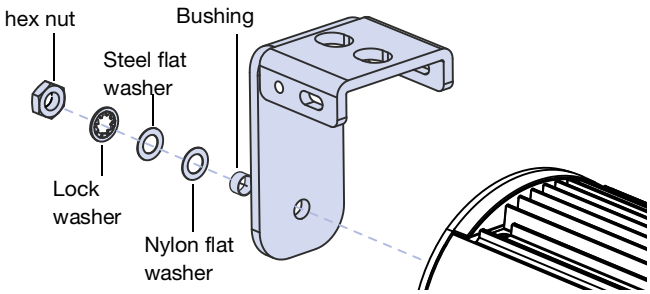
  CAL 96 weight: 173 lbs (78.5 kg)
  CAL 64 weight: 124 lbs (56.2 kg)
  CAL 32 weight: 80 lbs (36.3 kg)

NOTE: Weights include top and bottom loudspeaker brackets, top and bottom end caps.

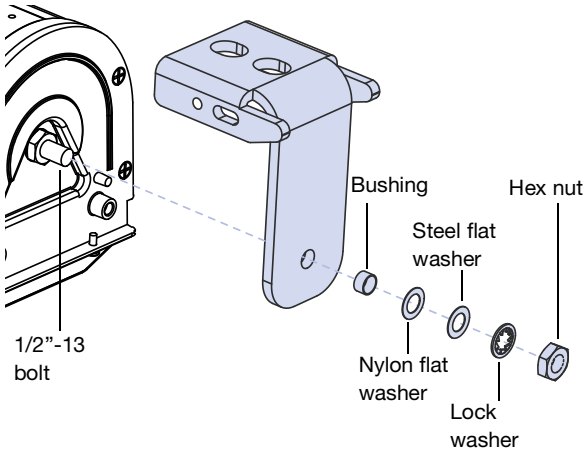
2. If they have not already been attached, attach the loudspeaker brackets to CAL:
   - Place the loudspeaker face down on a soft flat surface.



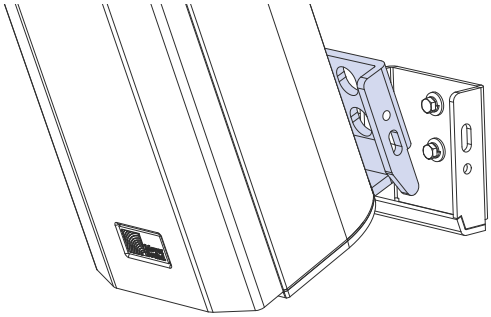
   - Attach the top loudspeaker bracket (the smaller one) to the top of the loudspeaker and secure it with the included hex nut, lock washer, steel flat washer, nylon flat washer, and spacer. Hand-tighten the hex nut.



   - Attach the bottom loudspeaker bracket (the larger one) to the bottom of the loudspeaker and secure it with the included hex nut, lock washer, steel flat washer, nylon flat washer, and bushing. Hand-tighten the hex nut.



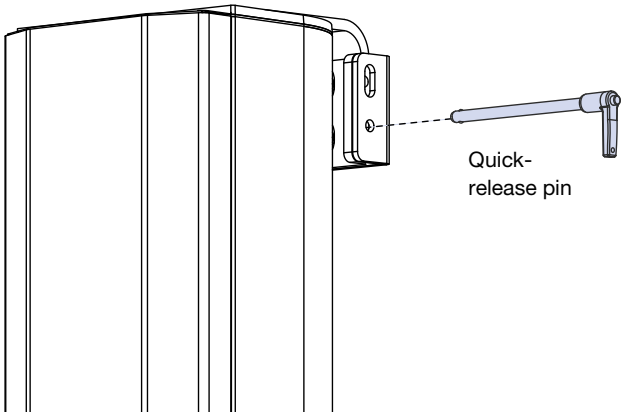
3. Mount CAL on the wall:
   - Insert the bottom of the loudspeaker into the bottom wall mount plate. The loudspeaker bracket should rest cleanly in the wall plate.



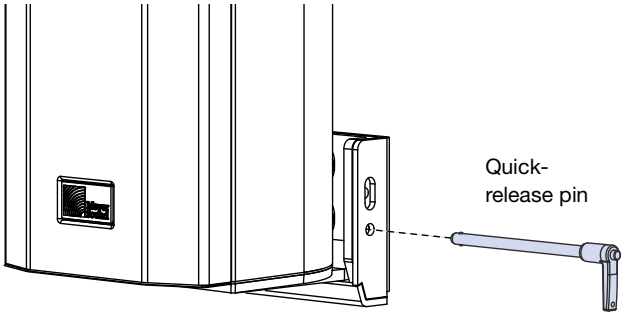
TIP: An eye nut (not included) can be temporarily attached to CAL’s 1/2-inch-13 top attachment bolt (instead of the loudspeaker plate) to lift up the unit when inserting the bottom of the loudspeaker into the bottom wall mount plate. The eye nut can then be removed and replaced with the top loudspeaker bracket.

   - While resting the bottom of the loudspeaker in the lower wall mount plate, slowly hinge the top of the loudspeaker toward the wall until it aligns with the top wall mount plate.
   - Insert the included quick-release pin into the round screw hole of the top loudspeaker bracket (either side). The quick-release pin holds the loudspeaker in

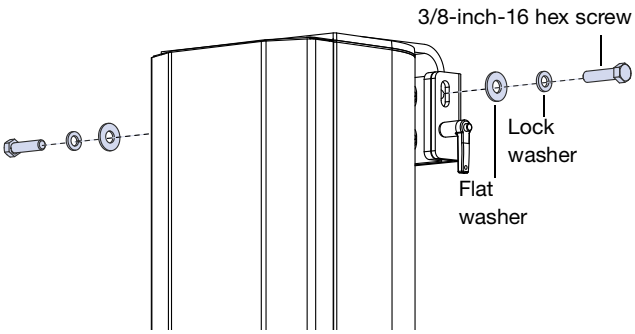
place. Ensure the quick-release pin is completely inserted and cannot be removed without depressing the release button.



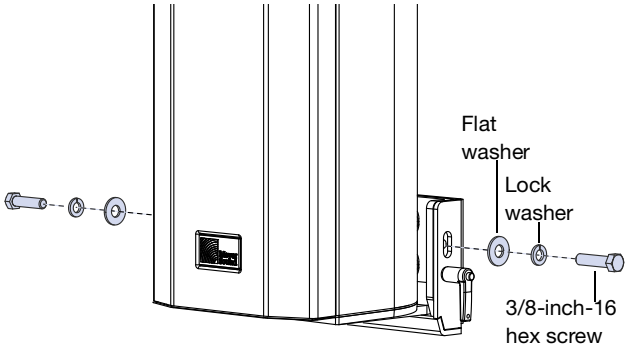
- Insert the included quick-release pin into the round screw hole of the bottom loudspeaker bracket (either side). The quick-release pin holds the loudspeaker in place. Ensure the quick-release pin is completely inserted and cannot be removed without depressing the release button.



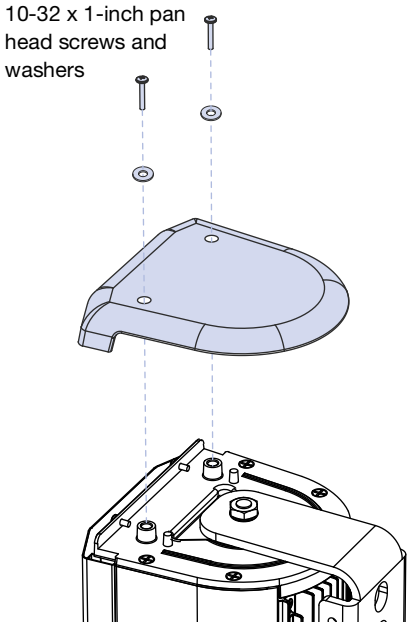
- Secure the top of the loudspeaker with the included 3/8-inch-16 hex screws, lock washers, and flat washers (both sides).



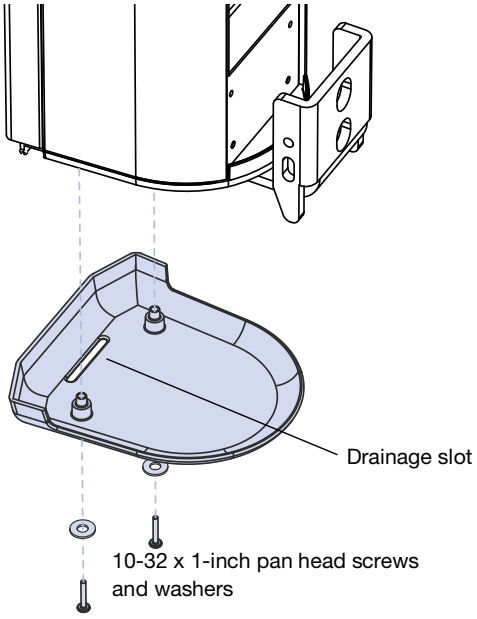
- Secure the bottom of the loudspeaker with the included 3/8"-16 hex screws, lock washers, and flat washers (both sides).

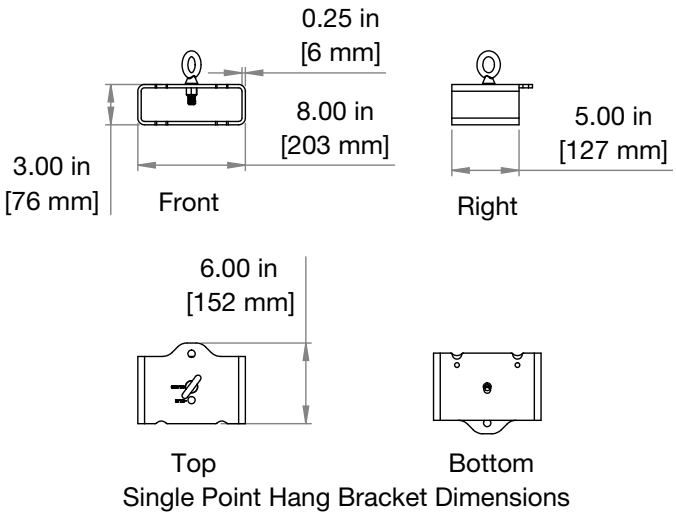


4. Rotate CAL left or right to position its horizontal dispersion for the desired coverage.
5. Fully tighten the hex nuts securing the top and bottom loudspeaker brackets. Meyer Sound recommends applying Loctite and using a torque value of 30 in-lb (40.5 N·m). Attach the end caps to CAL:
   - Align the top end cap (the one without the drainage slot) with the top screw holes and secure the end cap with the included 10-32 x 1-inch pan head screws and washers.



- Align the bottom end cap (the one with the drainage slot) with the bottom screw holes and secure the end cap with the included 10-32 x1-inch pan head screws and washers.

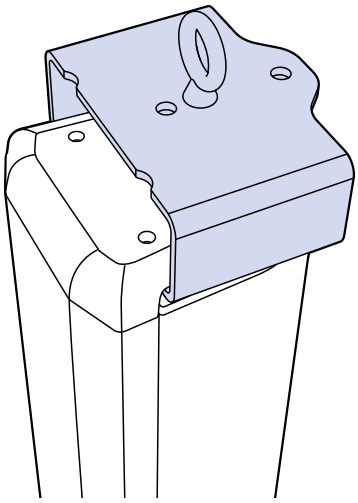


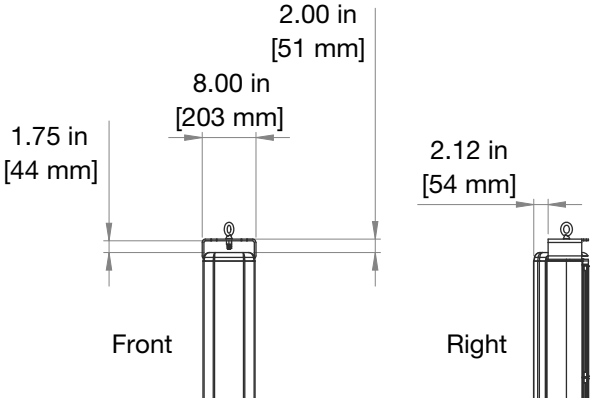


Single Point Hang Bracket Dimensions

SINGLE POINT HANG RIGGING KIT

Meyer Sound offers an optional single point hang rigging kit (PN 40.210.230.01) for applications where hanging a CAL loudspeaker is desirable.





INSTALLATION OF SINGLE POINT HANG KIT

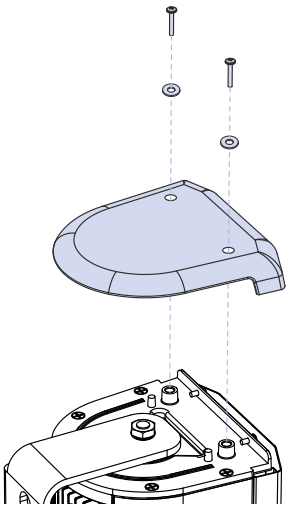
Please verify presence of all kit components (Table 4) before beginning the install procedure.

Table 4: Single Point Hang Rigging Kit Contents

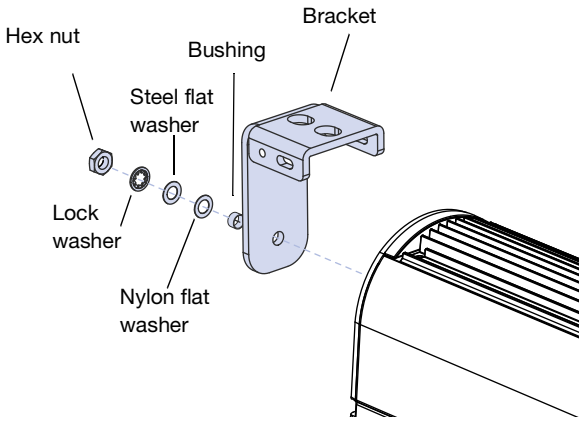
Part Number	Description	Quantity
67.210.094.01	1-inch diameter Neoprene Gasket, 3/16-inch thick for attaching single point hang (SPH) bracket to CAL	1
45.210.230.01	Single Point Hang Rigging Assembly	1
109.051	Thin Hex Nut, 1/2-inch-13, stainless steel for attaching SPH bracket to CAL	1
113.043	Washer, 0.88-inch outside diameter, 0.02-inch thick, stainless steel	2 (1 for eye bolt, 1 for attaching SPH bracket to CAL)
119.061	Washer, sealing, #10, stainless steel for attaching SPH bracket to CAL	1
119.060	Teflon Bushing, 0.50-inch x 0.56-inch to cover stud on CAL	1
124.144	Eye bolt, Shoulder, 1/2-inch-13 x 1.5-inch, 2400 WLL	1
109.053	Hex Nut, 1/2-inch-13 X 7/8-inch wide, 31/64 inches high, stainless steel for attaching eye bolt	1
124.145	Shackle, Screw, 3/8-inch, 2000 WLL	1
640.096	Thread locker, Medium Strength, Removable, for eye bolt and SPH bracket/ bolt	1

Installation Steps

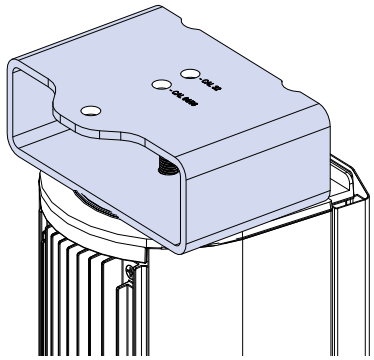
1. Remove both screws and sealing washers from the dress cap and set aside.



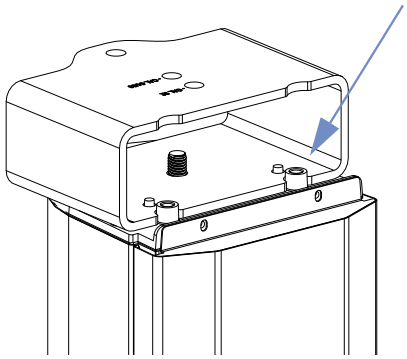
2. Remove the hex nut, washers, and bushing securing the wall bracket to the loudspeaker. Remove the bracket.



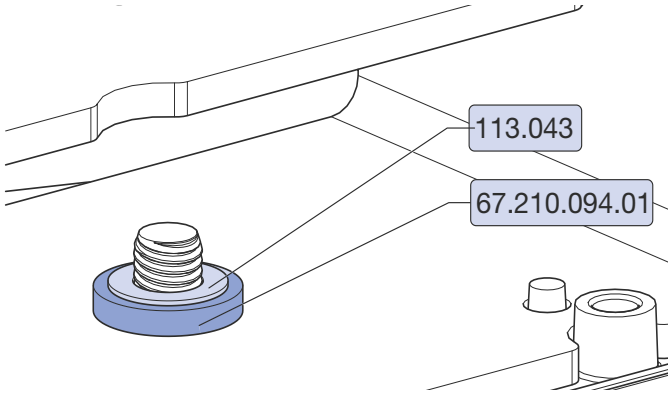
3. Slide the single point bracket onto the exposed threaded stud.



4. The front should align with the two protrusions.

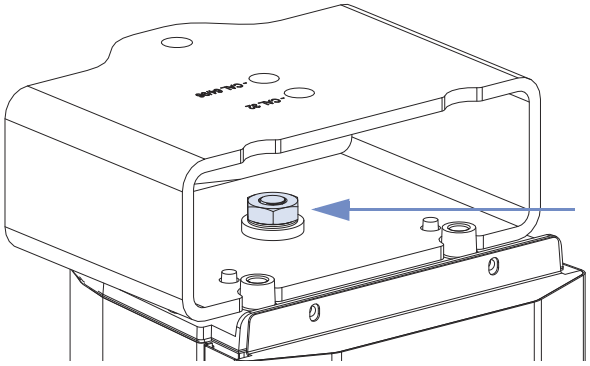


5. Slide over the exposed threads in the order indicated:
   a. rubber gasket (PN 67.210.094.01),
   b. metal washer (PN 113.043).



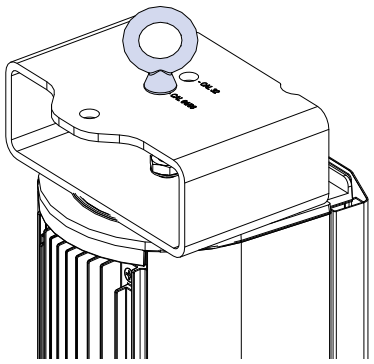
⚠ **CAUTION:** Insert the plastic bushing sleeve removed in step 1 back into place (an extra bushing (PN 119.060) is provided in the kit).

6. Reattach the nut removed in Step 2 (PN 109.051). Meyer Sound recommends applying the included Loctite and using a torque value of 30 ft-lb (40.5 N·m).

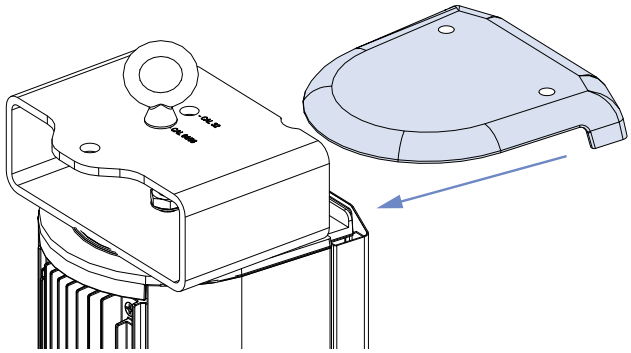


7. Install the eye bolt into the correct hole for the speaker being used. Use the washer (PN 113.043) and the nut (PN 109.053) supplied. Meyer Sound recommends applying Loctite and using a torque value of 30 ft-lb (40.5 N·m).

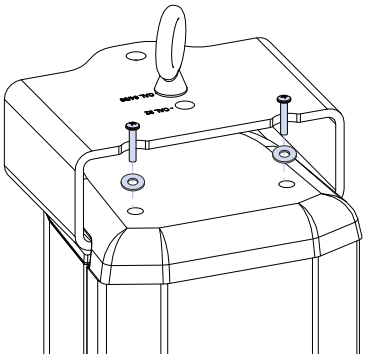
⚠ **CAUTION:** There is one hole for the CAL 32 and the other is for CAL 64 or CAL 96.



8. Slide the dress cap over the single point hang bracket.



9. Secure the dress cap with the screws and sealing washers (PN 119.061) removed in step 1. There are 2 extra washers included in the kit in case the original ones are damaged. Meyer Sound recommends applying the included Loctite and using a torque value of 22 in-lb (2.5 N·m).



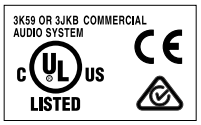
CAL SPECIFICATIONS

SPECIFICATIONS

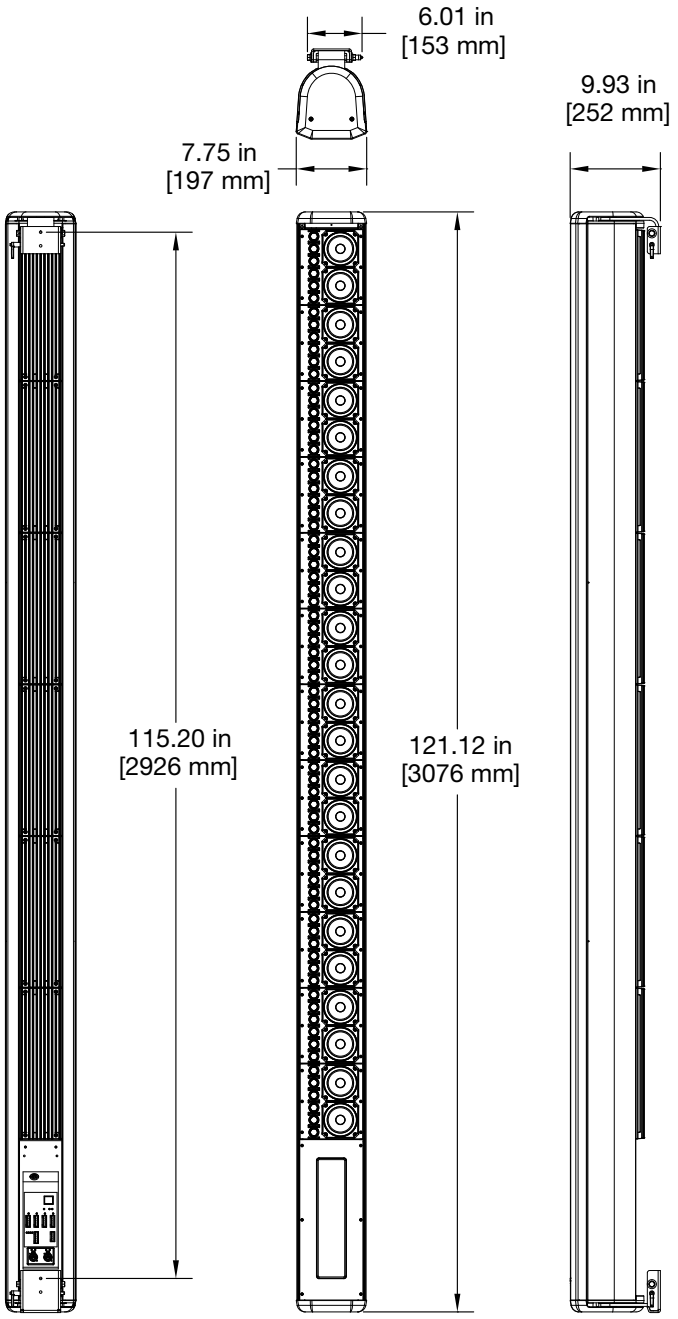
ACOUSTICAL		
Operating Frequency Range	100 Hz – 16 kHz **Note:** Recommended maximum operating frequency range. Response depends on loading conditions and room acoustics.	
Frequency Response	105 Hz – 15 kHz ±4 dB **Note:** Measured free field with 1/3-octave frequency resolution at 4 meters.	
Phase Response	230 Hz – 16.9 kHz ±45°	
Linear Peak SPL	CAL 96 (295 ft or 90 m) CAL 64 (196 ft or 60 m) CAL 32 (98 ft or 30 m)	101 dB peak with 18.5 dB crest factor (M-Noise), 98 dB (Pink Noise), 100 dB (B-Noise) **Note:** CAL set to single beam, 5° vertical spread, and no steering. Linear Peak SPL is measured in free-field at 4 m, referred to 1 m. Loudspeaker SPL compression (measured with M-Noise at the onset of limiting, 2-hr duration, and 50°C ambient temperature) is <2 dB. **M-noise** is a full bandwidth (10 Hz to 22.5 kHz) test signal developed by Meyer Sound to better measure the loudspeaker's music performance. It has a constant instantaneous peak level in octave bands, a crest factor that increases with frequency, and a full bandwidth Peak-to-RMS ratio of 18 dB. **Pink noise** is a full bandwidth test signal with a Peak-to-RMS of 12.5 dB. **B-noise** is a Meyer Sound test signal used to ensure measurements reflect system behavior when reproducing the most common input spectrum, and verify there is still headroom over pink noise.
COVERAGE		
Horizontal Coverage	120°	
Vertical Beam Spread	Variable, 5° to 30° in 5° increments	
Vertical Beam Angle	±30 ° in 1° increments	
Vertical Beam Splits	CAL 96	Top Split, Bottom split
	CAL 64	Center split
	CAL 32	None
TRANSDUCERS		
Low-frequency and high-frequency	CAL 96	(24) 4-inch cone drivers, (72) 20-mm tweeters
	CAL 64	(16) 4-inch cone drivers, (48) 20-mm tweeters
	CAL 32	(8) 4-inch cone drivers, (24) 20-mm tweeters
AMPLIFIER		
Type	Multichannel class D, one channel per driver	
Number of Channels	CAL 96	96
	CAL 64	64
	CAL 32	32
Cooling	Combination convection and forced air	

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 **Note:** The connector's bottom three pins are not used.			
Ethernet and AVB	AVB-enabled Ethernet ports for integrated audio streaming, beam control and RMS monitoring via Compass control software. Supports communication of AVB timing data and audio signals via AAF packets (AVTP Audio Format) and communication of AVB clock signals via CRF packets (Clock Reference Format).			
Processing	Mute, gain, 5-band parametric EQ, and delay, stored in four onboard presets **Note:** Processing and beam settings can be edited in Compass control software and saved 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 the CAL loudspeaker's network addresses during startup or when the button is pushed			
AC POWER				
Connector	powerCON 20			
Rated Voltage Range	100–240 V AC, 50–60 Hz			
Turn-on and Turn-off Points	90 V AC turn-on; 264 V AC turn-off			
CURRENT DRAW				
Idle	CAL 96	1.98 A rms (115 V AC)	1.63 A rms (230 V AC)	2.32 A rms (100 V AC)
	CAL 64	1.24 A rms (115 V AC)	0.99 A rms (230 V AC)	1.42 A rms (100 V AC)
	CAL 32	0.58 A rms (115 V AC)	0.45 A rms (230 V AC)	0.65 A rms (100 V AC)
Maximum Long-Term Continuous (>10 sec)	CAL 96	8.3 A rms (115 V AC)	4.2 A rms (230 V AC)	9.4 A rms (100 V AC)
	CAL 64	6.1 A rms (115 V AC)	3.1 A rms (230 V AC)	6.9 A rms (100 V AC)
	CAL 32	3.3 A rms (115 V AC)	1.7 A rms (230 V AC)	3.7 A rms (100 V AC)
Burst (<1 sec)	CAL 96	14.7 A rms (115 V AC)	7.3 A rms (230 V AC)	18.5 A rms (100 V AC)
	CAL 64	10.8 A rms (115 V AC)	5.4 A rms (230 V AC)	13.6 A rms (100 V AC)
	CAL 32	5.9 A rms (115 V AC)	2.9 A rms (230 V AC)	7.4 A rms (100 V AC)
Maximum Instantaneous Peak	CAL 96	33 A peak (115 V AC)	18 A peak (230 V AC)	40 A peak (100 V AC)
	CAL 64	24 A peak (115 V AC)	13 A peak (230 V AC)	29 A peak (100 V AC)
	CAL 32	13 A peak (115 V AC)	7 A peak (230 V AC)	16 A peak (100 V AC)

PHYSICAL		
Enclosure	Extruded aluminum	
Finish	White, black, and custom colors	
Weather Protection	Suitable for outdoor installations, rain hood included	
Rigging	Adjustable brackets included for mounting on walls or columns	
Dimensions (with mounting hardware)	CAL 96	W: 7.75 in (197 mm) x H: 121.12 in (3076 mm) x D: 9.93 in (252 mm)
	CAL 64	W: 7.75 in (197 mm) x H: 87.72 in (2228 mm) x D: 9.93 in (252 mm)
	CAL 32	7.75 in (197 mm) x H: 54.32 in (1380 mm) x D: 9.93 in (252 mm)
Weight (with mounting hardware)	CAL 96	173 lb (78.5 kg)
	CAL 64	124 lb (56.2 kg)
	CAL 32	80 lb (36.3 kg)
	Note: Weights include top and bottom loudspeaker brackets, and top and bottom end caps.	
ENVIRONMENTAL		
Operating Temperature	0° C to +45° C	
Non-Operating Temperature	–40° C to +75° C	
Humidity	To 95% at 35° C	
Operating Altitude	To 6300 m (25,000 ft)	
Non-Operating Altitude	To 6300 m (25,000 ft)	
Shock	30 g 11 msec half-sine on each of 6 sides	
Vibration	10 Hz – 55 Hz (0.010 m peak-to-peak excursion)	

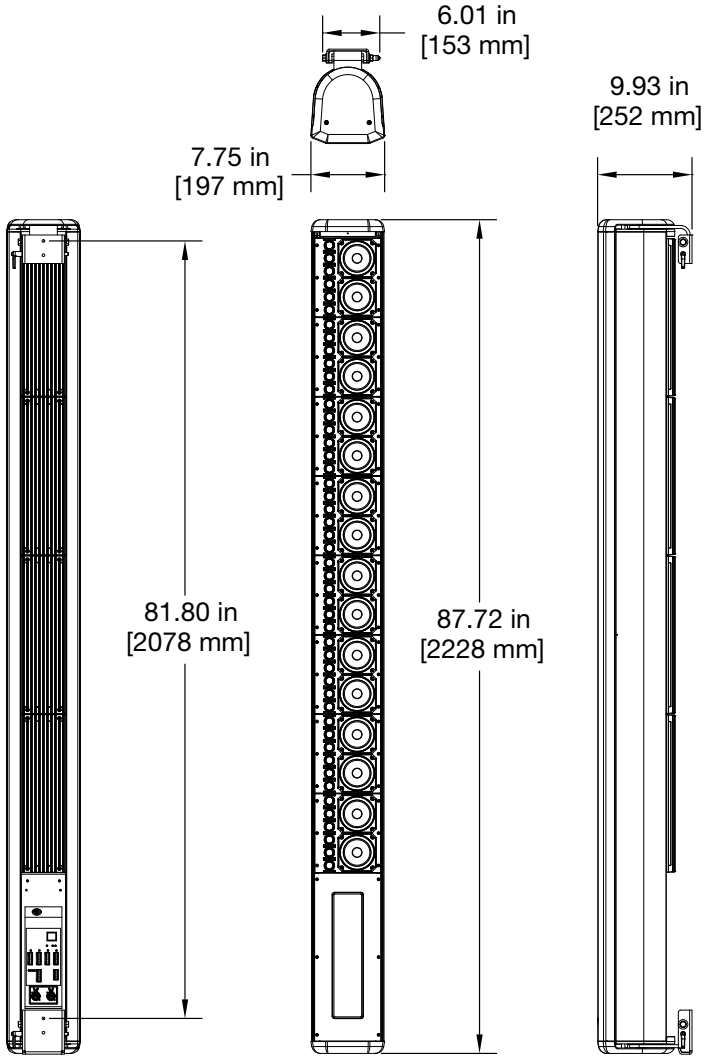


CAL 96 DIMENSIONS



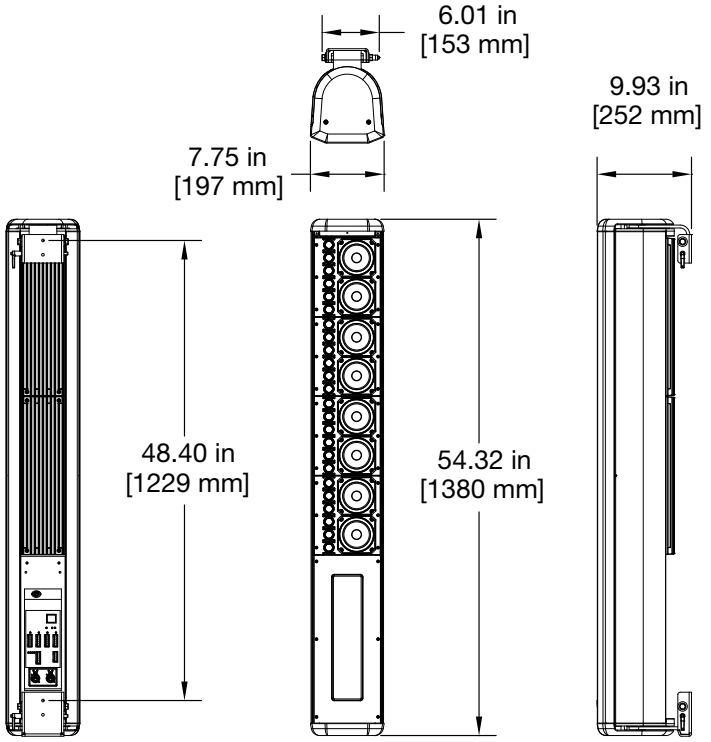
CAL 96 Dimensions (with Mounting Hardware)

CAL 64 DIMENSIONS



CAL 64 Dimensions (with Mounting Hardware)

CAL 32 DIMENSIONS



CAL 32 Dimensions (with Mounting Hardware)

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CAL Operating Instructions PN 05.210.087.01 D