

Patents Pending



### Features

- Wide and narrow coverage patterns for CQ-1 (low Q) and CQ-2 (high Q)
- Self-contained control electronics, amplifiers, and drivers
- Dual-channel 1240 Watt amplifier (620 Watts per channel)
- Active balanced input circuit
- Active crossover with optimized pole-zero filter combinations
- **Intelligent AC™** System
- **TruPower™ Limiting** (TPL)
- Compatible with the **Remote Monitoring System™** (RMS)

The CQ™ Series self-powered loudspeakers contain independent amplifier and control electronics for one 15" bass-reflex cone driver and one 4" diaphragm horn driver in a compact enclosure. This integrated design eliminates amplifier racks, simplifies setup and installation, and improves durability and reliability.

The CQ Series, consisting of the CQ-1 (low Q) and CQ-2 (high Q), are efficient full-range speakers and ideal companions for the PSW-2, PSW-4, and 650-P self-powered subwoofers. The CQ Series have the following acoustical specifications:

Frequency Response	±4 dB 40 Hz – 18 kHz
Phase Response	±90° 50 Hz – 16 kHz
Max Peak SPL at 1 m	CQ-1: 136 dB; CQ-2: 139 dB
Dynamic Range	> 110 dB

The CQ is phase-corrected through the crossover, which yields exceptional system impulse response and accurate signal reproduction.

The **beam width** of a horn is the angle at which the sound pressure at a given frequency decreases to half (-6 dB) its on-axis value. Most horns have a beam width that varies with respect to frequency, nonuniform frequency response within their coverage area, and significant side lobes outside their beam width. These undesirable characteristics are easily identified by viewing polar patterns plotted at various frequencies.

Meyer Sound developed the CQ Series horns in an anechoic chamber by measuring coverage patterns using angular and frequency resolutions of 1° and 1/24 octave, respectively. The CQ Series horns exhibit **Constant Q**: the beam width remains consistent across the horn's operating frequency range in both the vertical and horizontal planes. The CQ-1 has a wider horizontal beam width than the CQ-2. The CQ Series have the same vertical beam width and share the following remarkable attributes:





- uniform frequency response within the beam width
- rapid and uniform amplitude attenuation for all frequencies outside the beam width
- minimal side lobes

The CQ horns are an unprecedented development in acoustical measurement, design, and manufacturing. The CQ Series loudspeakers are ideally suited for venues requiring precise coverage with minimal interaction between subsystems but are appropriate for any acoustical environment.

The CQ can be equipped to operate with the **Remote Monitoring System™** (RMS) interface network and software application. RMS displays signal and power levels, driver and cooling fan status, limiter activity, and amplifier temperature for all speakers in the network on a Windows-based PC.

## Symbols Used

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

			
Dangerous voltages: risk of electric shock	Important operating instructions	Frame or chassis	Protective earth ground
Pour indiquer les risques résultant de tensions dangereuses	Pour indiquer important instructions	Masse, châssis	Terre de protection
Zu die gefahren von gefährliche spanning zeigen	Zu wichtige betriebs- anweisung und unter- haltsanweisung zeigen	Rahmen oder chassis	Die schutzerde
Para indicar azares provengo de peligroso voltajes	Para indicar importante funcionar y mantenimiento instrucciones	Armadura o chassis	Tierra proteccionista

## Declaration of Conformity

According to ISO/IEC Guide and EN 45014

*The Manufacturer:*

<b>Name:</b> Meyer Sound Laboratories <b>Address:</b> 2832 San Pablo Avenue Berkeley, California 94702-2204, USA
--

*declares that the product:*

<b>Product Name:</b> CQ-1, CQ-2 <b>Product Options:</b> All
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*conforms to the following Product Specifications:*

<b>Safety:</b>	EN 60065: 1994
<b>EMC:</b>	EN 55022: 1987 - Class A
	IEC 801-2: 1984 - 8 kV
	IEC 801-3: 1984 - 3 V/m
	IEC 801-4: 1984 - 0.5 kV Signal Lines, 1.0 kV Power Lines

*The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.*

**Office of Quality Manager  
Berkeley, California USA  
October 1, 1996**

### Environmental Specifications for Meyer Sound Electronics Products

<b>Operating temperature:</b>	0° C to +45° C
<b>Nonoperating temp:</b>	< -40° C or > +75° C
<b>Humidity:</b>	to 95% at 35°C
<b>Operating altitude:</b>	to 4600 m (15,000 ft)
<b>Nonoperating altitude:</b>	to 6300 m (25,000 ft)
<b>Shock:</b>	30 g 11 msec half-sine on each of 6 sides
<b>Vibration:</b>	10 - 55 Hz (0.010 m peak-to-peak excursion)



## Contact Information

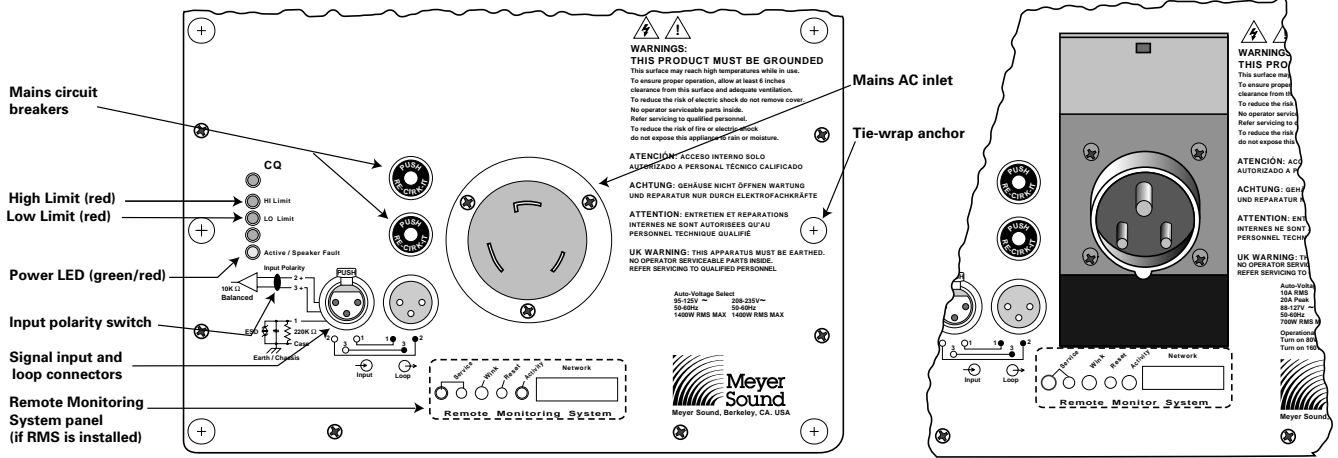
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## Controls and Connectors

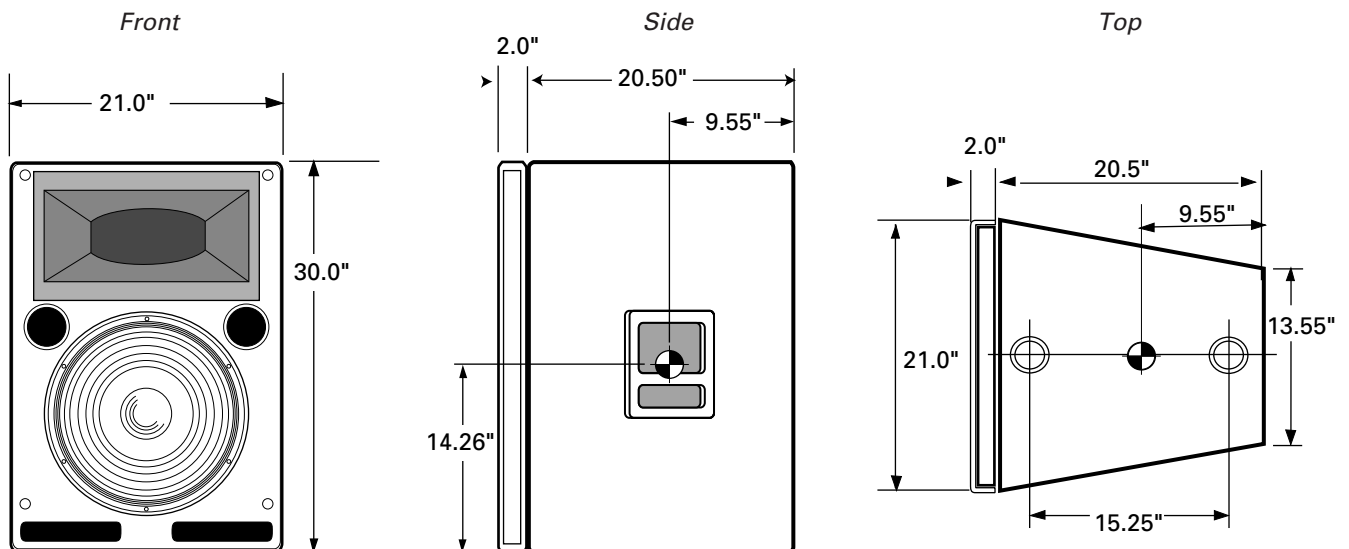


Rear User Panel shown with the optional Remote Monitoring System (RMS) panel

European Rear User Panel with IEC 309 connector


## Dimensions

All units in inches



# AC Power

The AC voltage operating ranges for the CQ Series are 85–134 V and 165–264 V, at 50 or 60 Hz. The CQ Series performs surge suppression for high voltage transients and can safely withstand voltages up to 275 VAC.

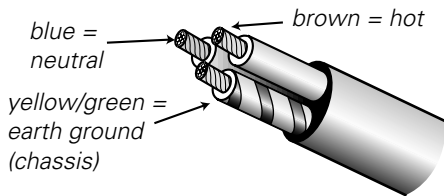
 Continuous voltages above 275 VAC may damage the unit!

The **Intelligent AC** power supply protects the drivers and amplifier components when an AC source is applied to the CQ by

- auto-selecting the voltage;
- performing surge suppression and minimizing inrush current;
- filtering EMI.

After three seconds, the main power supply is slowly ramped on. The CQ Series uses a NEMA L6-20P or IEC 309 male power inlet and satisfies UL, CSA, and EC safety standards.

Use the following AC cable wiring diagram to create international or special-purpose power connectors:



AC cable color code

If the colors referred to in the diagram don't correspond to the terminals in your plug, use the following guidelines:

- Connect the blue wire to the terminal marked with an *N* or colored black.
- Connect the brown wire to the terminal marked with an *L* or colored red.
- Connect the green and yellow wire to the terminal marked with an *E* (or  $\oplus$ ) or colored green (or green and yellow).

## Power Requirements

The CQ presents a dynamic load to the AC mains which causes the amount of current to fluctuate between quiet and loud operating levels. Since different types of cables and circuit breakers heat up at varying rates, it is essential to understand the types of current ratings and how they correspond to circuit breaker and cable specifications.

The **maximum continuous RMS** current is the maximum RMS current in a period of at least 10 seconds. It is used to calculate the temperature increase in cables, which is used to select cables that conform to electrical code standards. It is also used to select the rating for slow-reacting thermal breakers.

The **maximum burst RMS** current is the maximum RMS current in a period of approximately 1 second. It is used to select the rating for most magnetic breakers.

The **maximum peak current during burst** is used to select the rating for fast-reacting magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula

$$V_{pk\_drop} = I_{pk} \times \text{Total Cable Resistance}$$

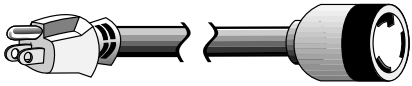
Use the table below as a guide to select cables and circuit breakers with appropriate ratings for your operating voltage.

<b>CQ Series Current Ratings</b>			
	115 V	230 V	100 V
Max. Continuous RMS	8 A <sub>RMS</sub>	4 A <sub>RMS</sub>	10 A <sub>RMS</sub>
Max. Burst RMS	15 A <sub>RMS</sub>	8 A <sub>RMS</sub>	18 A <sub>RMS</sub>
Max. Peak During Burst	22 A <sub>PEAK</sub>	11 A <sub>PEAK</sub>	25 A <sub>PEAK</sub>

The minimum electrical service amperage required by a system of CQs is the sum of the **maximum continuous RMS current** for each speaker. We recommend allowing an additional 30% above the minimum amperage to prevent peak voltage drops at the service entry.

## Safety Issues

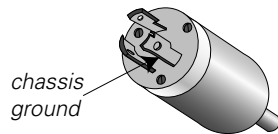
Pay close attention to these important electrical and safety issues.



Use a power cord adapter to drive the CQ from a standard 3-prong outlet (NEMA 5-15R; 125 V max).



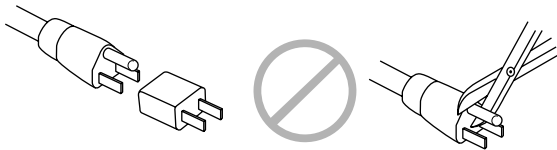
earth  
ground



chassis  
ground



The CQ requires a grounded outlet. Always use a grounding adapter when connecting to ungrounded outlets.



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



Keep all liquids away from the CQ to avoid hazards from electrical shock.

Do not operate the unit if the power cables are frayed or broken.

Tie-wrap anchors on the amplifier chassis provide strain relief for the power and signal cables. Insert the plastic tie-wraps through the anchors and wrap them around the cables.

## Audio Input

The CQ presents a 10 k $\Omega$  input impedance to a three-pin XLR connector wired with the following convention:

- Pin 1 — 220 k $\Omega$  to chassis and earth ground (ESD clamped)
  - Pin 2 — Signal
  - Pin 3 — Signal
  - Case — Earth (AC) ground and chassis
- } Differential Inputs

Pins 2 and 3 carry the input as a differential signal; their polarity can be reversed with the **input polarity switch** on the user panel. If the switch is in the up position, pin 2 is hot relative to pin 3, resulting in a positive pressure wave when a positive signal is applied to pin 2. Use standard audio cables with XLR connectors for balanced signal sources.



Shorting an input connector pin to the case can form a ground loop and cause hum.

A single source can drive multiple CQs with a paralleled input loop, creating an unbuffered hardwired loop connection. Make certain that the source equipment can drive the total load impedance presented by the paralleled input circuit. For example, since the input impedance of a single CQ is 10 k $\Omega$ , cascading 20 CQs produces a balanced input impedance of 500  $\Omega$ . If a 150  $\Omega$  source is used, the 500  $\Omega$  load results in a 2.28 dB loss.

## Troubleshooting

If the **Active** lamp does not light after connection to an AC source for three seconds, the problem is probably in the power supply. In the unlikely case that the circuit breakers trip (the white center buttons pop out), the amplifier or power supply may be malfunctioning. **Do not reset the breakers!** Contact Meyer Sound for repair information.

If abnormal noise (hum, hiss, popping) is produced from the loudspeaker, disconnect the audio source from the speaker. If the noise stops, then the problem is not within the loudspeaker; check your audio and AC power sources.

If problems persist, contact Meyer Sound. If repairs are necessary, the CQ's modular components are easy to remove and ship.



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# Limiting and Protection Circuitry

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## TruPower Limiting™ System

Conventional limiters assume that the resistance of a speaker remains constant and set the limiting threshold by measuring voltage only. This method is inaccurate because the speaker's resistance changes in response to the frequency content of the source material and thermal variations in the speaker's voice coil and magnet. Conventional limiters begin limiting prematurely, which under-utilizes system headroom and deprives the speaker of its full dynamic range.

The TruPower Limiting (TPL) system accounts for varying speaker impedance by measuring current, in addition to voltage, to compute the power dissipation and voice coil temperature. TPL

- allows the speaker to deliver its highest SPL across its entire frequency range during limiting;
- eliminates long-term power compression when operated at high levels for extended periods;
- protects the drivers and extends the lifetime of amplifier and driver components.

**Hi Limit** and **Lo Limit** LEDs on the user panel indicate TPL activity for the high and low frequency drivers, respectively. The limiters for each driver function independently and *do not* affect the signal when the LEDs are inactive. Limiting begins when the driver temperature exceeds the maximum safe level and ceases when the temperature returns to normal.

The CQ performs within its acoustical specifications and operates at a normal temperature if the limit LEDs are on for no longer than two seconds, and off for at least one second. If the LEDs remain on for longer than three seconds, the CQ is **hard limiting** with the following negative consequences:

- Increasing the input level will not increase the volume.
- The system distorts due to clipping and nonlinear driver operation.
- Unequal limiting between the low and high frequency drivers alters the frequency response.
- Driver and amplifier components are subjected to maximum heat, which shortens their life span.

## Troubleshooting with TPL

The TPL LEDs can indicate serious driver problems, if interpreted correctly. If one CQ in a system exhibits substantially more TPL activity than others receiving the same audio signal, then the driver corresponding to the excessively active LED may have a short circuit. This is a potentially dangerous condition for the electronics; shut the CQ down immediately.

The TPL circuit does not activate if there is no power dissipation in the driver, regardless of the input signal level. Therefore, if all CQs in a system receiving the same audio signal exhibit TPL activity except one, then that unit may have an open voice coil; disconnect it and contact Meyer Sound for repair information.

TPL can indicate an imbalance in a configuration of speakers by functioning like a spectrum analyzer. If the speakers in a subwoofer, mid-bass, or mid-hi subsystem begin to limit before reaching the required operating level for the entire system, then that subsystem needs to be supplemented with additional speakers.

*NOTE: Although the TPL limiters exhibit smooth sonic characteristics, we do not recommend using them for intentional compression effects. Use an outboard compressor/limiter to compress a mixed signal.*

## Fans and Cooling System

The CQ uses a forced-air cooling system with two fans to prevent the amplifiers from overheating. A variable-speed primary fan runs continuously with an inaudible operating noise of 22 dBA at 1 m at its slowest speed. The speed of the primary fan begins increasing when the temperature of the heatsinks reaches 42°C. The fan reaches full speed at 62°C and is barely audible near the cabinet, even without an audio signal.

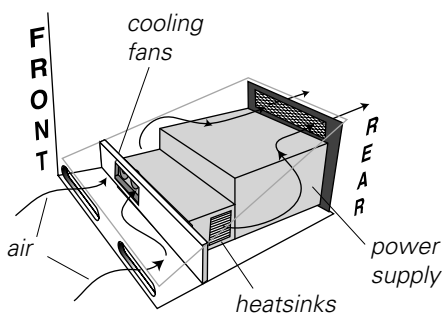
In the unusual event that the temperature reaches 74°C, the secondary fan turns on and is clearly audible. The secondary fan turns on in response to

- primary fan failure (check its status immediately);
- high source levels for a prolonged period in hot temperatures or direct sunlight;
- driver failure.

The secondary fan turns off when the temperature decreases to 68°C.

In the highly unlikely event that the secondary fan does not keep the temperature below 85°C, the CQ automatically shuts down until AC power is removed and reapplied. If the CQ shuts down again after cooling and reapplying AC power, contact Meyer Sound for repair information.

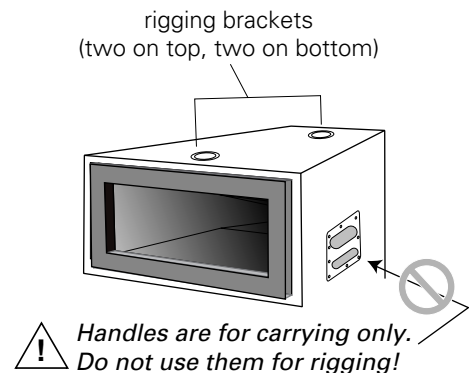
The fans draw air in through ducts on the front of the cabinet, over the heatsinks, and out the rear of the cabinet. Since dust does not accumulate in the amplifier circuitry, its life span is increased significantly. Make sure that the air ducts are clear and that there is at least 6 inches clearance for exhaust behind the cabinet.



A foam insert filter, in combination with the entire front grill surface, acts as an air filter for the cooling system. Despite the filtering, extensive use or a dusty operating environment can allow dust to accumulate along the path of the airflow, preventing normal cooling. We recommend periodically removing the grill, filter, and amplifier module and using compressed air to clear dust from the grill, filter, fans, and heatsinks.

## Rigging

The maximum recommended load for a CQ with aircraft pan fittings is 500 lb (228kg). This **working load** is one-fifth the cabinet's breaking strength. The CQ has two rigging brackets on both the top and bottom of the cabinet; each bracket is capable of supporting the full working load of the cabinet.



There are four types of interchangeable rigging brackets, each fastened by six Phillips screws:

- aircraft pan fittings (ring and stud)
- $\frac{3}{8}$ "-16 nut plates
- M-10 x 1.5 metric nut plates
- blank plates (if no rigging brackets are requested)

*NOTE: Units with nut plates are rated for the weight of one cabinet only.*

Rigging load ratings assume a straight tensile pull and that the cabinet is in new condition with aircraft pan fittings. If these conditions are not met, the load ratings can be reduced significantly. Load ratings can also be reduced by age, wear, and damage. It is important to inspect the rigging hardware regularly and replace worn or damaged components immediately.

The standard model should not be installed outdoors without weather protection. The cabinet, exposed electronic circuitry, and drivers can all receive weather protection treatment that allows the unit to be used safely in wet conditions. Contact Meyer Sound for information about weather-protected units.

*NOTE: All Meyer Sound products must be used in accordance with local, state, federal, and industry regulations. It is the owner's and/or user's responsibility to evaluate the reliability of any rigging method for their application. Rigging should be done only by experienced professionals.*

# Complete Systems

## Speaker Placement and Polarity

The cabinets in the following example configurations are in a close-proximity coplanar orientation, unless otherwise stated. Placing the mid-hi speaker more than 5 feet from the subwoofer may require setting the speakers to opposite polarities to compensate for the propagation delay between them.

In a coplanar orientation, externally amplified Meyer subwoofers require the opposite polarity setting to all Meyer self-powered speakers.

We recommend using the Meyer **SIM® System II Sound Analyzer** and **CP-10 Parametric Equalizer** to

- assist the process of configuring and placing speakers in a system;
- measure propagation delays to set the correct polarity between speakers;
- measure and equalize variations in frequency response caused by the acoustical environment and the placement and interaction of speakers.

Contact Meyer Sound for assistance with your application.

## The LD-1A Line Driver

We recommend using the Meyer **LD-1A Line Driver** to integrate different types of Meyer self-powered speakers into a full-range system. The LD-1A maintains signal integrity for long cable paths, has two channels equipped to control a main system, and six auxiliary channels for down-fill, front-fill, and delay systems. The LD-1A provides these useful functions:

- The **Lo Cut** switch activates a high-pass filter (160 Hz, -12 dB/oct, Q = 0.8) that performs a crossover function for the Mid-Hi output.
- The **Array EQ** switch activates a filter (6 dB cut at 220 Hz, 0.6 octave bandwidth) to equalize groups of 3 to 5 horizontally arrayed MSL-4s.
- The **DS-2 & Sub Crossover** switch activates a crossover network that sends frequencies below 80 Hz to the Sub output, and above 80 Hz to the DS-2 output. With the switch *out*, a full-range signal is sent to the DS-2 and Sub outputs.
- The **DS-2  $\phi$**  and **Sub  $\phi$**  switches toggle the polarity for the DS-2 and Sub outputs.
- The **Mid-Hi**, **DS-2**, and **Sub** outputs each have their own gain control and mute switch.

## Meyer Speaker Types

The following Meyer speakers will be mentioned in the example applications.

**MSL-4:** Self-powered mid-hi speaker

**DS-2P:** Self-powered mid-bass speaker

**650-P, PSW-2,**

**PSW-4:** Self-powered subwoofers

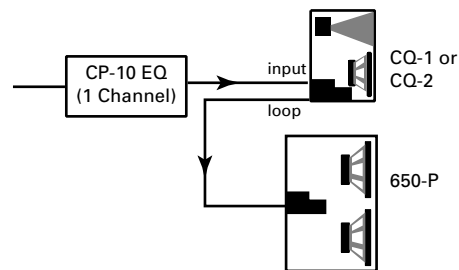
**650-R2, MSW-2,**

**USW-1:** Externally amplified subwoofers

The self-powered speakers listed above have a **loop** connection to send the input signal to another speaker.

## CQ and 650-P

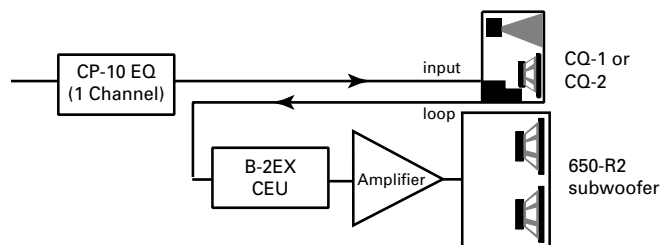
The CQ is particularly well matched with the 650-P and also performs efficiently with the PSW-2 and PSW-4. Due to the overlap in frequency response between the CQ and the subwoofer, the system frequency response contains a rise in the range 40–120 Hz. It is important to emphasize that the speakers are in phase in this region. The rise can be corrected using the Meyer CP-10 Parametric Equalizer, if desired.



Set the CQ and 650-P to the same polarity.

## CQ and 650-R2

Although it is preferable to use the CQ in a completely self-powered system, excellent results can still be achieved using the 650-R2, USW-1, and MSW-2.

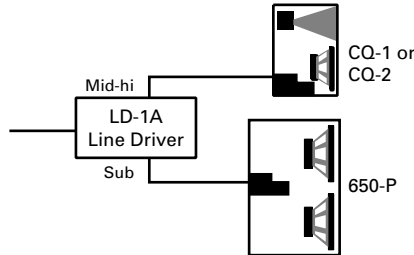


Set the CQ and the 650-R2's amplifier to opposite polarities.



### LD-1A with CQ and 650-P

Activating the Lo Cut filter on the LD-1A for the Mid-Hi output also eliminates the low frequency rise caused by the overlap between the CQ and 650-P. Although a typical CQ : 650-P ratio is 2:1, separate Sub and Mid-Hi level controls on the LD-1A allow the ratio to vary while maintaining control of the spectral balance of the system.



Set the CQ and 650-P to the same polarity.

### LD-1A with Flown MSL-4, DS-2P, and CQ; 650-P on the Floor

This example shows the LD-1A integrating a complete system of speakers appropriate for a large venue. Although channels 1, 3, and 5 constitute half of a complete system, channels 2, 4, and 6 can be used with identical connections to create the other half of the system. The MSL-4 mid-hi, DS-2P mid-bass, and CQ down-fill speakers are flown; the 650-P subwoofers are on the floor.

The Mid-Hi and CH 3 outputs drive the inner three and outer two speakers, respectively, of the MSL-4 array. These two outputs apply appropriate levels for speakers directed at audience locations at different distances from the main system. The diagram shows the additional mid-hi output created by connecting the CH 1 Loop to the CH 3 input. Using a Y-connection at the CH 1 input, as shown for the down-fills, accomplishes the same signal routing.

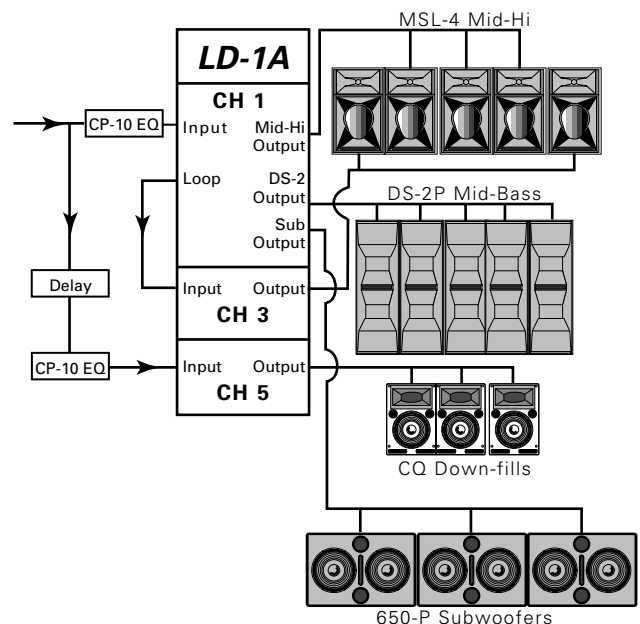
The Lo Cut and Array EQ switches for the Mid-Hi and CH 3 outputs should be *in*. The Lo Cut filter eliminates the rise caused by the overlap between the MSL-4 and DS-2P/650-P systems. The Array EQ filter minimizes the low-mid rise caused by the MSL-4 array.

The DS-2 and Sub outputs drive the DS-2P and 650-P systems with the DS-2 & Crossover switch *in*. Set the MSL-4 and DS-2P to the same polarity. The polarity of the 650-P depends on the displacement from the flown system.

CH 5 controls the CQ down-fill system. Since the main system is normally set to a higher volume than the down-fill system to project farther into the venue, the main system is audible in the down-fill's coverage area. To insure that the speakers combine properly in the overlapping coverage area:

- Set the CQ to the opposite polarity to the MSL-4 and DS-2P to phase align the mid-hi frequencies and minimize the MSL-4's low frequency down-lobe.
- Use the CH 5 Lo Cut filter to eliminate the low frequency rise caused by the overlap with the 650-P/DS-2P systems.
- Delay the down-fill to compensate for the propagation delay between the down-fill and main systems in the intersecting coverage area. (This is highly recommended, but not required.)

We recommend using the Meyer SIM System II Sound Analyzer and CP-10 Parametric Equalizer to optimize this configuration.



Set the MSL-4 and DS-2P to the same polarity; reverse the polarity for the CQ. The polarity for the 650-P depends on the displacement from the flown system.

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## Verifying Polarity

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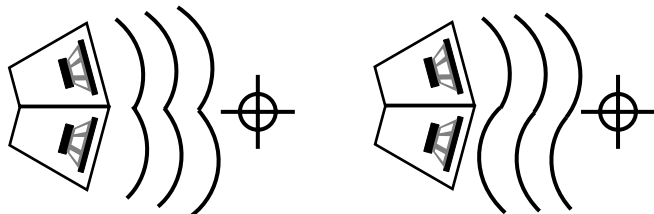
Incorrect driver polarity impairs system performance and may damage the drivers. All Meyer Sound loudspeakers are shipped with the drivers in correct alignment. However, if the driver or circuit wiring has been removed or disassembled in any loudspeaker in a system for any reason, check the polarity between adjacent loudspeakers and between drivers in the same cabinet.

### **Polarity Between Adjacent Loudspeakers**

Use the following test procedure to verify the polarity between adjacent loudspeakers *of the same type*:

1. Position two loudspeakers adjacent to each other.
2. Place a measurement microphone six ft from the speakers on the axis between them.
3. Connect a signal source to one speaker and note the frequency response and overall level.
4. Apply the same signal to the second speaker with the first speaker still connected.

*Top view of adjacent speakers with measurement microphone*



*Correct polarity causes acoustic addition*


*Opposite polarity causes acoustic cancellation*

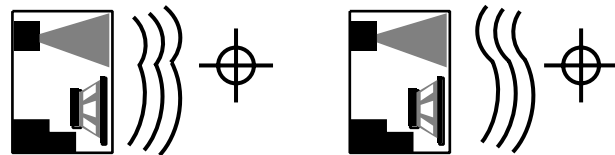
The polarity is correct if the frequency response remains constant with a significant increase in amplitude. Broadband cancellation (decreased overall level) indicates polarity reversal.

### **Driver Polarity in the Same Loudspeaker**

Use the following test procedure to verify polarity between drivers in the same loudspeaker:

1. Place a monitoring microphone three ft from the front of the loudspeaker at the midway point between the low and high frequency drivers.
2. Connect a signal source to the loudspeaker and note the frequency response.

 *Since polarity reversal causes excessive driver excursion at high source levels, use moderate levels when conducting this test.*



*Drivers with correct polarity cause acoustic addition*

*Drivers with reversed polarity cause acoustic cancellation*

The polarity is correct if the frequency response is smooth through the crossover region ( $\pm 4$  dB 600 Hz – 1 kHz). Severe cancellation in the crossover region indicates polarity reversal.

# Coverage Angles and Polar Plots

## Coverage Angles

The coverage angles for the CQ Series over a wide frequency range are summarized in the following table:

<b>CQ Series Coverage Angles</b>		
	horizontal <sup>1</sup>	vertical <sup>2</sup>
CQ-1 (-6 dB points)	80°	40°
CQ-1 (-10 dB points)	100°	50°
CQ-2 (-6 dB points)	50°	40°
CQ-2 (-10 dB points)	60°	50°

1. CQ-1: 500 Hz–16 kHz; CQ-2: 800 Hz–12 kHz
2. CQ-1 and CQ-2: 1.5–12 kHz

The -6 dB points denote the angle at which the *measured* SPL has decreased to half its on-axis value. The -10 dB points represent the angle at which the *perceived* SPL has decreased to half its on-axis value.

## Polar Plots

The data for the CQ Series polar patterns was measured in Meyer Sound's anechoic chamber (photo at right) with the SIM System II Sound Analyzer in dB SPL at a distance of 14 ft, using angular and frequency resolutions of 1° and 1/24 octave, respectively. The polar plots on the following pages have been smoothed to angular and frequency resolutions of 2° and 1 octave, and normalized to 0 dB on-axis. Each polar pattern shows the response of a 1 octave band centered at the frequency indicated on the plot; there are no gaps in the data from 125 Hz to 16 kHz.

The polar patterns reveal that the CQ-1 has a wider horizontal coverage pattern than the CQ-2 and that their vertical coverage is virtually identical. The uniform beam width that distinguishes the CQ Series is evident in their polar patterns in the horn's range (1–16 kHz); note the lack of side or back lobes.

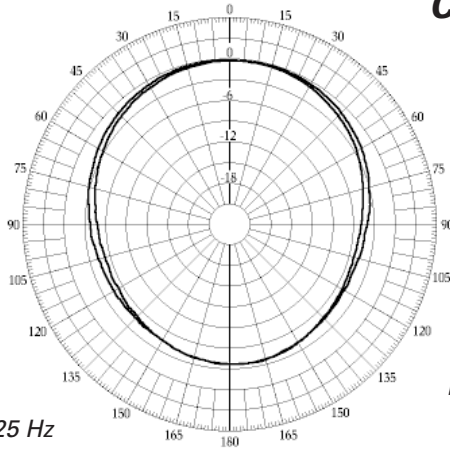
The table below lists the maximum on-axis peak dB SPL per octave measured at 1 m for the CQ-1 and CQ-2.

<b>Maximum Peak dB SPL</b>		
Frequency	CQ-1	CQ-2
125 Hz	127	127
250 Hz	130	130
500 Hz	130	130
1 kHz	132	139
2 kHz	136	139
4 kHz	136	139
8 kHz	132	134
16 kHz	122	124

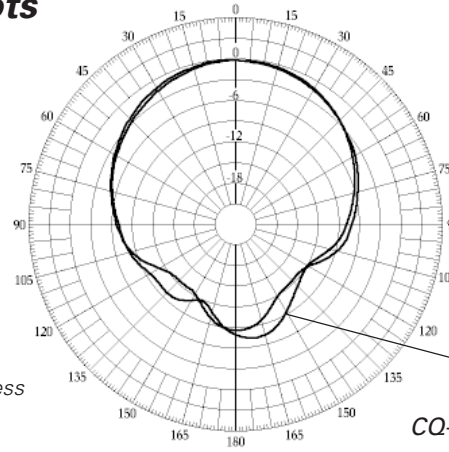


Meyer Sound's anechoic chamber

## CQ-1 Polar Plots

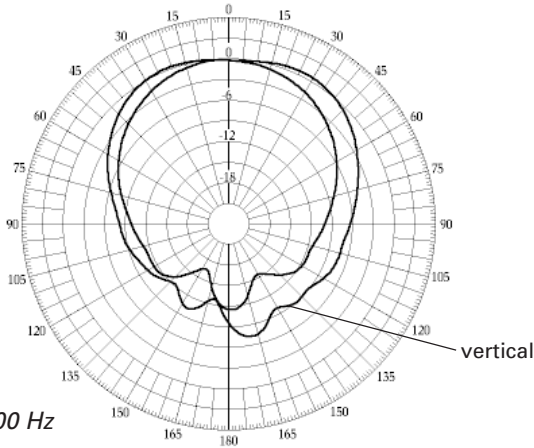


CQ-1: 125 Hz

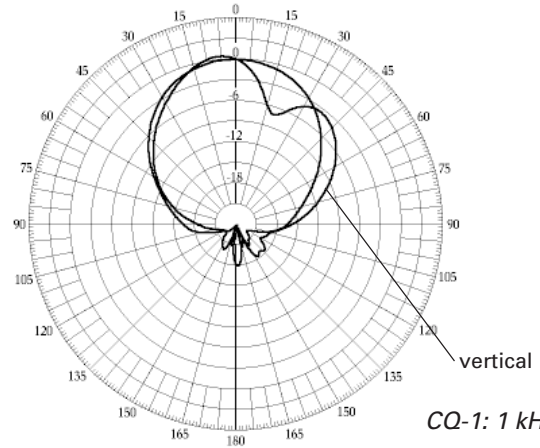


CQ-1: 250 Hz

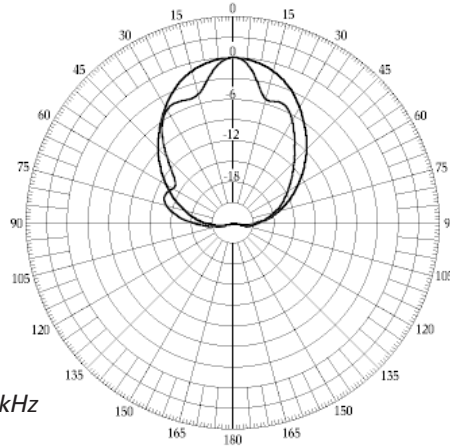
*Inner plot is vertical unless otherwise indicated.*



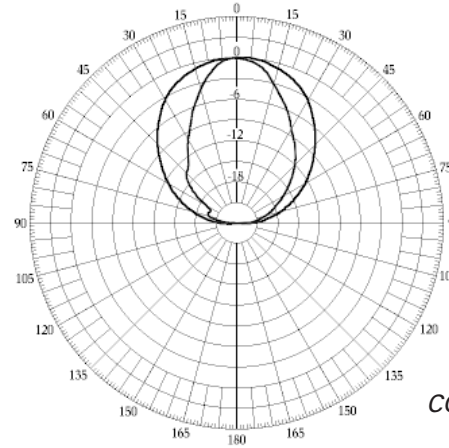
CQ-1: 500 Hz



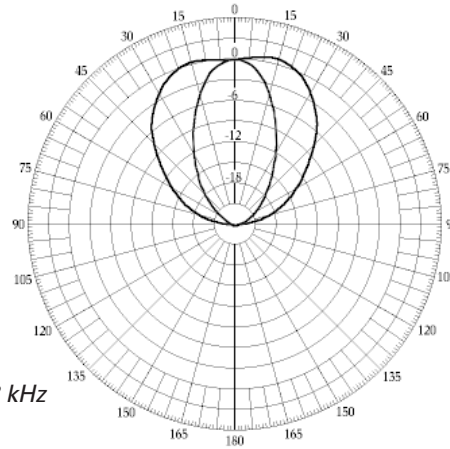
CQ-1: 1 kHz



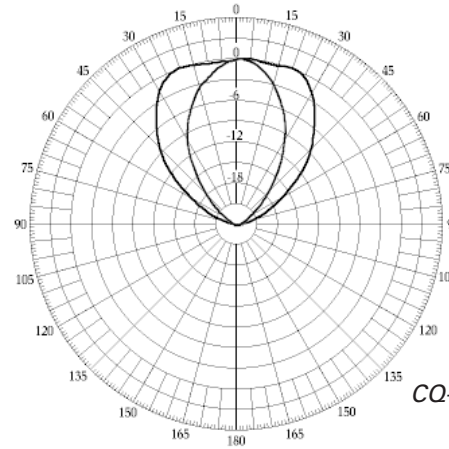
CQ-1: 2 kHz



CQ-1: 4 kHz

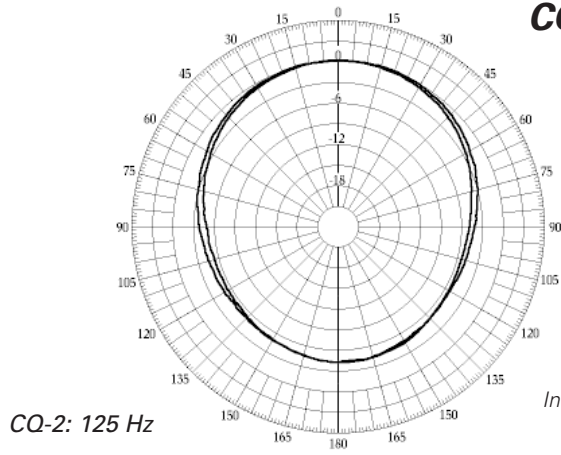


CQ-1: 8 kHz

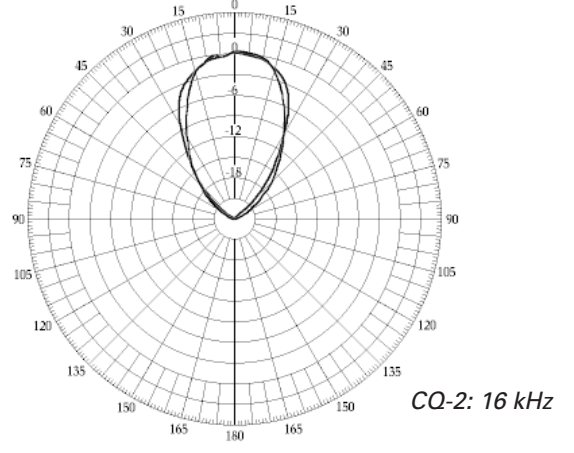
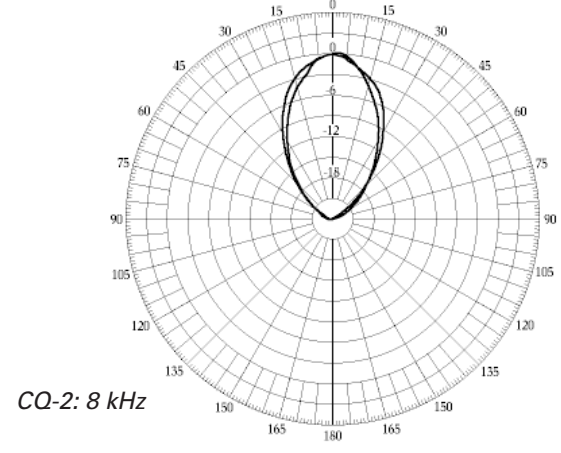
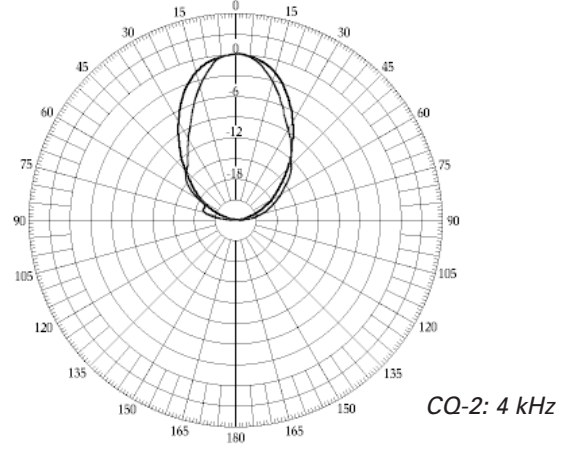
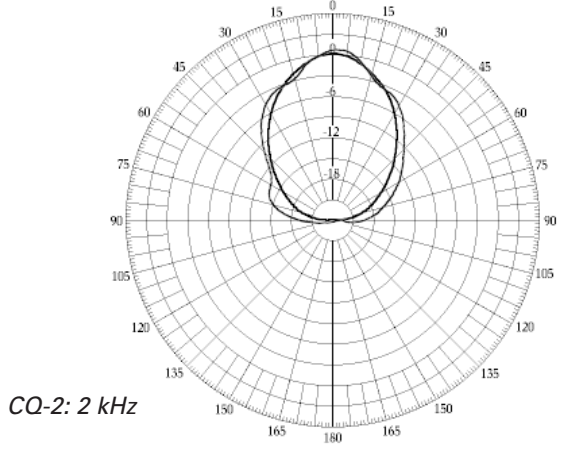
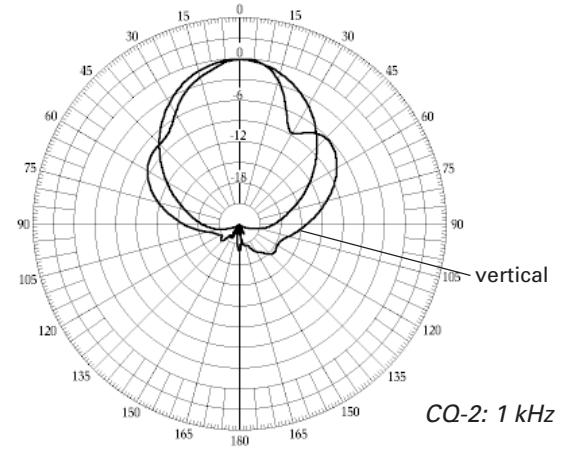
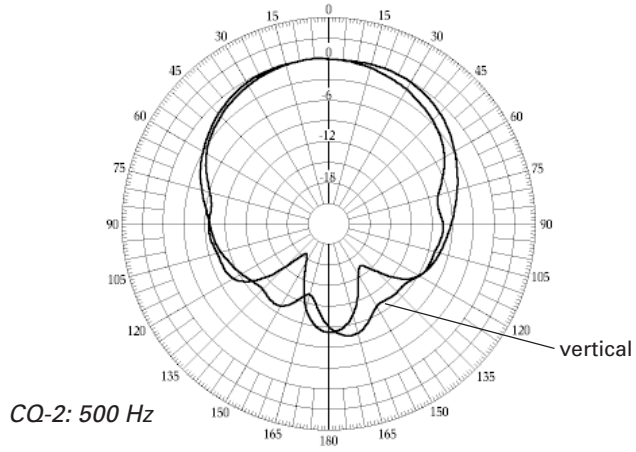
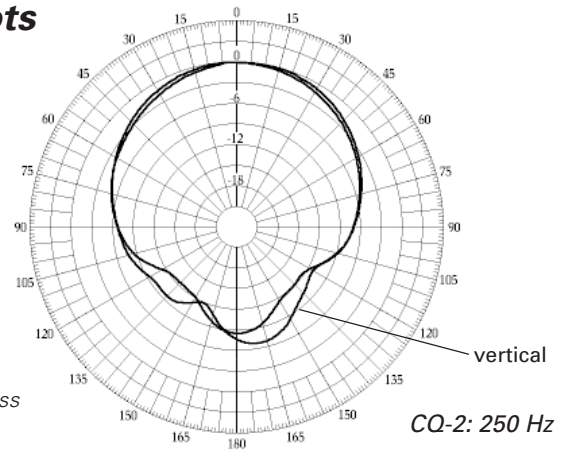


CQ-1: 16 kHz

## CQ-2 Polar Plots



*Inner plot is vertical unless otherwise indicated.*





# Array Design

Creating an effective array with the CQ requires a precise understanding of how to combine the coverage area and SPL of the individual speaker with those of adjacent speakers. Array design is a trade-off between increasing on-axis power and creating smooth transitions between the coverage areas of adjacent speakers.

As the splay angle (the angle between adjacent cabinet faces) decreases below the coverage angle of the individual speaker, the on-axis power increases, but the coverage overlap between adjacent speakers causes comb filtering and other frequency response variations.

As the splay angle increases toward the coverage angle, the on-axis power decreases, but the variations in frequency response diminish. As the splay angle increases beyond the coverage angle, noticeable gaps begin to form in the array's coverage area.

*NOTE: The trapezoidal shape of the CQ does not represent the horizontal coverage area of the speaker or the intended splay angle for horizontal arrays. The 20° angle of the CQ enclosure is narrower than the minimum recommended splay angle.*

A series of outdoor tests was conducted at Meyer Sound to determine the coverage angle and on-axis SPL for arrays with one and two horizontal rows of up to four elements each, at numerous splay angles. The measurements were conducted at a distance of 8 m with half-space loading; on-axis SPL values were interpolated from 8 m to 1 m. The coverage angle for the array is the result of averaging the -6 dB points from 125 Hz to 8 kHz.

The horizontal splay angles in the tables below represent the optimal configurations for narrow and wide coverage areas; note the different angles for the CQ-1 and CQ-2. The vertical angles represent the optimal narrow (15°), middle (30°), and wide (40°) orientations for both the CQ-1 and CQ-2. The **2@0° LT** denotes the **long throw** configuration: the two horns are coupled directly together (top speaker upside down/bottom speaker upright) to form a single narrow horn.

The following tables show the SPL and coverage areas that result from grouping the CQ-1 and CQ-2 in arrays of up to four units horizontally and two rows vertically. All splay angles refer to the angle between cabinet centers. If this information does not address your application requirements, contact Meyer Sound to obtain additional information on array design.

CQ-1 Array Coverage and Maximum SPL Chart

Number of Horizontal CQ units @ Angle	1			2 @ 50°			2 @ 70°			3 @ 50°			3 @ 70°			4 @ 50°			4 @ 70°		
	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL
	H	V		H	V		H	V		H	V		H	V		H	V		H	V	
Number of Vertical Rows of CQ @ Angle																					
1	80°	40°	136	100°	40°	140	150°	40°	139	170°	40°	140	220°	40°	138	220°	40°	141	300°	40°	139
2 @ 0° (LT)	80°	20°	142	100°	20°	146	150°	20°	145	170°	20°	146	220°	20°	144	220°	20°	147	300°	20°	145
2 @ 15°	80°	45°	140	100°	45°	144	150°	45°	143	170°	45°	144	220°	45°	142	220°	45°	145	300°	45°	143
2 @ 30°	80°	60°	139	100°	60°	143	150°	60°	142	170°	60°	143	220°	60°	141	220°	60°	144	300°	60°	142
2 @ 40°	80°	80°	138	100°	80°	142	150°	80°	141	170°	80°	142	220°	80°	140	220°	80°	143	300°	80°	141

CQ-2 Array Coverage and Maximum SPL Chart

Number of Horizontal CQ units @ Angle	1			2 @ 30°			2 @ 40°			3 @ 30°			3 @ 40°			4 @ 30°			4 @ 40°		
	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL
	H	V		H	V		H	V		H	V		H	V		H	V		H	V	
Number of Vertical Rows of CQ @ Angle																					
1	50°	40°	139	70°	40°	143	90°	40°	142	100°	40°	144	130°	40°	144	130°	40°	145	170°	40°	144
2 @ 0° (LT)	50°	20°	145	70°	20°	149	90°	20°	148	100°	20°	150	130°	20°	150	130°	20°	151	170°	20°	150
2 @ 15°	50°	45°	143	70°	45°	147	90°	45°	146	100°	45°	148	130°	45°	148	130°	45°	149	170°	45°	148
2 @ 30°	50°	60°	142	70°	60°	146	90°	60°	145	100°	60°	147	130°	60°	147	130°	60°	148	170°	60°	147
2 @ 40°	50°	80°	141	70°	80°	145	90°	80°	144	100°	80°	146	130°	80°	146	130°	80°	147	170°	80°	146



## Safety Summary



### English

- To reduce the risk of electric shock, disconnect the loudspeaker from the AC mains before installing audio cable. Reconnect the power cord only after making all signal connections.
- Connect the loudspeaker 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 loudspeaker 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 loudspeaker. Do not put objects containing liquid on, or near, the unit.
- To reduce the risk of overheating the loudspeaker, avoid exposing it to direct sunlight. Do not install the unit near heat emitting appliances, such as a room heater or stove.
- This loudspeaker contains potentially hazardous voltages. Do not attempt to disassemble the unit. The unit contains no user serviceable parts. Repairs should be performed only by factory trained service personnel.

### Français

- Pour réduire le risque d'électrocution, débranchez la prise principale de l'haut-parleur, avant d'installer le câble d'interface allant à l'audio. Ne rebranchez le bloc d'alimentation qu'après avoir effectué toutes les connections.
- Branchez l'haut-parleur dans une prise de courant à 3 dérivations (deux pôles et la terre). Cette prise doit être munie d'une protection adéquate (fusible ou coupe-circuit). Le branchement dans tout autre genre de prise pourrait entraîner un risque d'électrocution et peut constituer une infraction à la réglementation locale concernant les installations électriques.
- Ne pas installer l'haut-parleur dans un endroit où il y a de l'eau ou une humidité excessive.
- Ne pas laisser de l'eau ou tout objet pénétrer dans l'haut-parleur. Ne pas placer de récipients contenant un liquide sur cet appareil, ni à proximité de celui-ci.
- Pour éviter une surchauffe de l'haut-parleur, conservez-la à l'abri du soleil. Ne pas installer à proximité d'appareils dégageant de la chaleur tels que radiateurs ou appareils de chauffage.
- Ce haut-parleur contient des circuits haute tension présentant un danger. Ne jamais essayer de le démonter. Il n'y a aucun composant qui puisse être réparé par l'utilisateur. Toutes les réparations doivent être effectuées par du personnel qualifié et agréé par le constructeur.

### Deutsch

- Um die Gefahr eines elektrischen Schlages auf ein Minimum zu reduzieren, den Lautsprecher vom Stromnetz trennen, bevor ggf. ein Audio-Schnittstellensignalkabel angeschlossen wird. Das Netzkabel erst nach Herstellung aller Signalverbindungen wieder einstecken.
- Der Lautsprecher an eine geerdete zweipolige Dreiphasen-Netzsteckdose anschließen. Die Steckdose muß mit einem geeigneten Abzweigschutz (Sicherung oder Leistungsschalter) verbunden sein. Der Anschluß der unterbrechungsfreien Stromversorgung an einen anderen Steckdosentyp kann zu Stromschlägen führen und gegen die örtlichen Vorschriften verstoßen.
- Der Lautsprecher nicht an einem Ort aufstellen, an dem sie mit Wasser oder übermäßig hoher Luftfeuchtigkeit in Berührung kommen könnte.
- Darauf achten, daß weder Wasser noch Fremdkörper in das Innere den Lautsprecher eindringen. Keine Objekte, die Flüssigkeit enthalten, auf oder neben die unterbrechungsfreie Stromversorgung stellen.
- Um ein Überhitzen dem Lautsprecher zu verhindern, das Gerät vor direkter Sonneneinstrahlung fernhalten und nicht in der Nähe von wärmeabstrahlenden Haushaltsgeräten (z.B. Heizgerät oder Herd) aufstellen.
- Im Inneren diesem Lautsprecher herrschen potentiell gefährliche Spannungen. Nicht versuchen, das Gerät zu öffnen. Es enthält keine vom Benutzer reparierbaren Teile. Reparaturen dürfen nur von ausgebildetem Kundendienstpersonal durchgeführt werden.

### Español

- Para reducir el riesgo de descarga eléctrica, desconecte de la red el altoparlante antes de instalar el cable de señalización de interfaz de la seña. Vuelva a conectar el conductor flexible de alimentación solamente una vez efectuadas todas las interconexiones de señalización.
- Conecte el altoparlante a un tomacorriente bipolar y trifilar con neutro de puesta a tierra. El tomacorriente debe estar conectado a la protección de derivación apropiada (ya sea un fusible o un disyuntor). La conexión a cualquier otro tipo de tomacorriente puede constituir peligro de descarga eléctrica y violar los códigos eléctricos locales.
- No instale el altoparlante en lugares donde haya agua o humedad excesiva.
- No deje que en el altoparlante entre agua ni ningún objeto extraño. No ponga objetos con líquidos encima de la unidad ni cerca de ella.
- Para reducir el riesgo de sobrecalentamiento, no exponga la unidad a los rayos directos del sol ni la instale cerca de artefactos que emiten calor, como estufas o cocinas.
- Este altoparlante contiene niveles de voltaje peligrosos en potencia. No intente desarmar la unidad, pues no contiene piezas que puedan ser reparadas por el usuario. Las reparaciones deben efectuarse únicamente por parte del personal de mantenimiento capacitado en la fábrica.

# Specifications

<b>Acoustical</b>	
Frequency Response <sup>1</sup>	±4 dB 40 Hz – 18 kHz
Phase Response <sup>1</sup>	±90° 50 Hz – 16 kHz
Maximum Peak SPL <sup>1</sup>	CQ-1: 136 dB ; CQ-2: 139 dB
Dynamic Range <sup>2</sup>	> 110 dB
<b>Coverage</b>	
<b>CQ-1</b>	
–6 dB points	H: 80° (500 Hz – 16 kHz); V: 40° (1.5 kHz – 12 kHz)
–10 dB points	H: 100° (500 Hz – 16 kHz); V: 50° (1.5 kHz – 12 kHz)
<b>CQ-2</b>	
–6 dB points	H: 50° (800 Hz – 12 kHz); V: 40° (1.5 kHz – 12 kHz)
–10 dB points	H: 60° (800 Hz – 12 kHz); V: 50° (1.5 kHz – 12 kHz)
<b>Transducers</b>	
Low Frequency	15" diameter MS-15 cone
High Frequency	4" diaphragm MS-2001CQ horn compression driver
<b>Acoustical Crossover Point</b>	
CQ-1	700 Hz
CQ-2	900 Hz
<b>Amplifiers</b>	
Type	Complementary power MOSFET output stages class AB/H
Burst Capability <sup>3</sup>	1240 Watts (620 Watts/channel)
THD, IM, TIM	< .02 %
<b>Audio Input</b>	
Type	10 kΩ impedance, electronically balanced
Connector	XLR (A-3) male and female
Nominal Input Level	+4 dBu (1.23 Vrms)
<b>AC Power</b>	
Connector	250 V NEMA L6-20P / IEC 309 Twistlock male receptacle
Automatic voltage selection <sup>4</sup>	85 – 134 V / 165 – 264 V; 50 Hz / 60 Hz
Max Continuous RMS Current (> 10 s)	115 V: 8 A    230 V: 4 A    100 V: 10 A
Max Burst RMS Current (< 1 s)	115 V: 15 A    230 V: 8 A    100 V: 18 A
Max Peak Current During Burst	115 V: 22 Apk    230 V: 11 Apk    100 V: 25 Apk
Soft Current Turn-on	Inrush current < 12A @115V
<b>Physical</b>	
Dimensions	21" W x 30" H x 22 ½" D
Weight	130 lb (59 kg); shipping: 150 lb (68 kg)
Enclosure/Finish	All birch plywood/black textured
Protective Grill	Perforated steel grill, charcoal-grey foam
Rigging	Four aircraft pan fittings (two on top and bottom). Working load for each fitting is 500 lb (½ the cabinet breaking strength) with straight tensile pull.

### Notes

1. Subject to half-space loading; measured with one-third octave frequency resolution in fixed ISO bands.
2. Measured as the ratio between the peak SPL and the A-weighted noise floor.
3. Nominal 8 Ω resistive load, pink noise, 100 V peak.
4. The unit is rated at 88 – 125 VAC and 182 – 235 VAC, 50/60 Hz, to satisfy EC standards for –10% to 6% AC line voltage.

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