C12 Line Array

CLAIR BROTHERS

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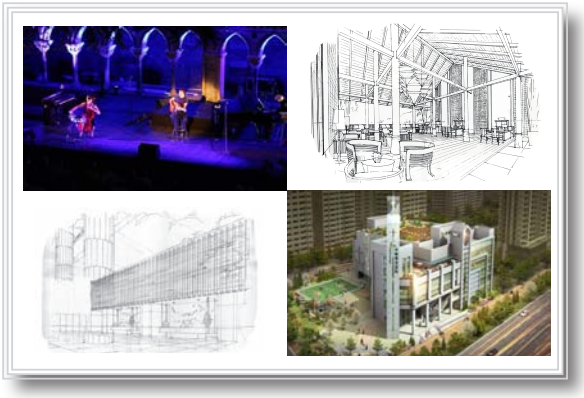
C12: Experience the Clarity

The Clair Brothers C Series represents the latest innovations in line array technology built upon our wide-ranging experience in touring and installation applications from 80,000 seat stadiums to 300 seat auditoriums.

Boldly perpetuating the Clair tradition of engineering excellence that has made the Clair name a top choice for artists and audio professionals worldwide for over fifty years.



Applications

Venues

Entertainment Venues
Auditoriums
Theaters / Cinema
Cruise Ships
Houses of Worship

Uses

Main PA
Sidefill
Delay
Front Fill
DJ Monitors

Innovations

Mid/Hi Frequency

The C12 incorporates an advanced wide-bandwidth technology that employs separate midrange and high frequency transducers, both of which join a common waveguide simultaneously at the same point in space. This results in a marked improvement in vocal intelligibility and articulation. Notably the crossover points are outside of the critical frequency regions that typically contribute to such clarity therefore the sound is remarkably forward compared with two-way or three-way designs that have crossover points within this frequency region.

Low Frequency Component

- A state-of-the-art 12-inch midbass driver combines excellent linearity with high power handling capabilities and reduced power compression with high magnetic flux density and excellent heat exchange.
- The voice coil has a sophisticated distortion reduction system using a demodulating ring for flux modulation cancellation related to voice coil excursion, and a copper ring for the reduction of intermodulation distortion. Both systems linearize the inductance in relation to the excursion and the current variation.

System Efficiency

The combination of improved efficiency in both the Mid/Hi and Low frequency components and the availbility of new amplification options that optimally match amplifier power to component demand result in system solutions that dramatically reduce overall system cost without compromising performance or system control.

Processing

Clair Brothers proprietary processing modules for Lake Controller add a new benefit that optimizes performance of the passively crossed over mid/hi section. A virtualization of the advantages of bi-amplification is employed to further enhance crossover performance between the mid's and hi's beyond what is possible with passive circuit components alone. This results in the performance of Tri-amplification in only two amp channels.

Innovations

Pattern Control

Vertical

The Mid/Hi Phase plug and waveguide assembly create a smooth wavefront using Clair Brothers Curved Array Technology which optimizes the vertical divergence for coherent summation within the range of all angular positions that are possible via inter-cabinet splay angle settings.

- **Steerable FIR**
  In challenging acoustical environments and applications where vertical pattern control is exceedingly important, the C12 System may be configured with one amplifier channel per Mid/Hi element and custom Lake Controller FIR filters may be generated using EASE Focus + FIRMaker to optimize the energy distribution.

Horizontal

- **Mid/Hi Frequency**
  The horizontal pattern may be altered to optimize coverage within the context of the application.The horizontal coverage angle may be defined symmetrically or asymmetrically by standard angles between 60° and 140° in 10° increments or may be custom configured with continuously variable Clair True Fit custom waveguides. The horn and waveguides are constructed, as all Clair waveguides are, with CNC machined Baltic birch plywood.

- **Low Frequency**
  The dual 12" low frequency section is acoustically designed with ports located in a manner that control the polar pattern of the low/mid energy in a cardioid type pattern that reduces low-mid energy on-stage and behind the system while also helping to reduce the build-up in the center area between two stereo arrays.

For those seeking the pinnacle in custom horizontal configurations, Clair True Fit waveguides are singularly configured, continuously variable waveguides designed-to-order.

CLAIR TRUEFIT

prosound Mix WINNER BEST of SHOW InfoComm 2017

Clair True Fit Technology:
A breakthrough innovation for total system customization.

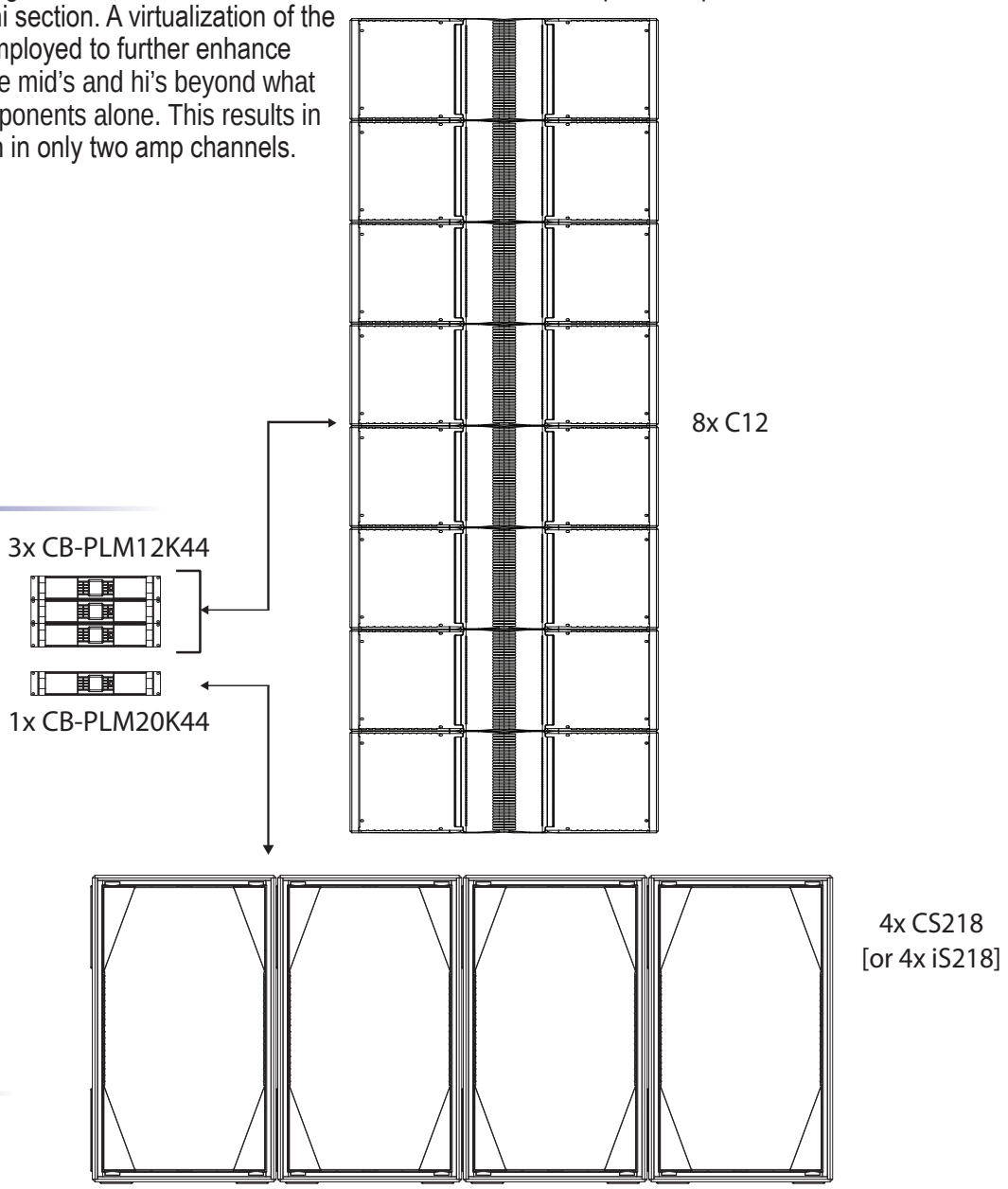
1. Room Details / Data Collection
+ 2. Unique Lens Modeling
+ 3. Translated for Manufacture
+ 4. Ideal System Design

= True Fit 100% Custom Loudspeaker Array

Amplification

- Powered by Clair Brothers/Lab.gruppen OEM amplifiers [CB-PLM12K44 or CB-D120:4L], the C12 offers advanced Lake™ control and monitoring with Clair proprietary digital signal processing, and WiFi system control. A minimum of two amplifier channels are required, one for low frequencies, and one for mid/hi which is coupled via an internal passive crossover network.
- Clair Brothers proprietary processing modules for Lake Controller add a new benefit that optimizes performance of the passively crossed over mid/hi section. A virtualization of the advantages of bi-amplification is employed to further enhance crossover performance between the mid's and hi's beyond what is possible with passive circuit components alone. This results in the performance of Tri-amplification in only two amp channels.

3x CB-PLM12K44
1x CB-PLM20K44

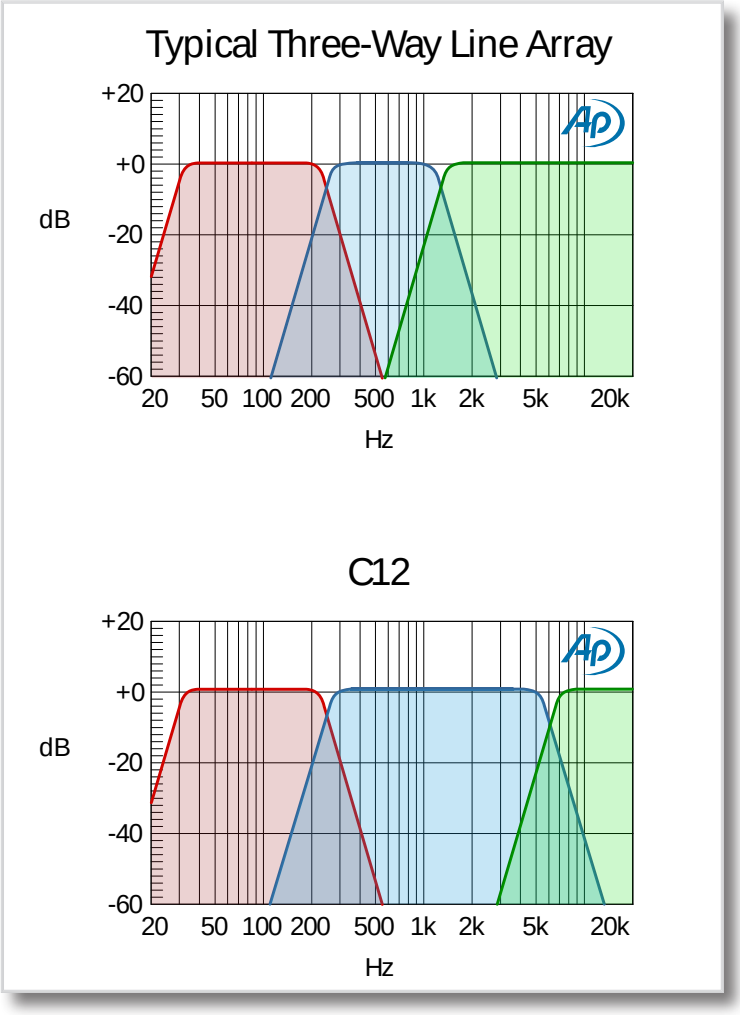


[Installation Config]

1x CB-D80:4L
2x CB-D120:4L
1x CB-D200:4L

High Intelligibility Design

- While traditional three-way systems have always offered the benefit of extended headroom, a natural consequence was often a Mid to Hi component crossover frequency that landed right in the middle of the critical region of frequencies for vocal intelligibility and harmonic content of musical instruments.
- Below are two graphs, the top graph shows a typical three-way crossover where the crossover point at approx. 1,200Hz can be see, which typically places the component frequency transition in the middle of the 'intelligibility' zone.

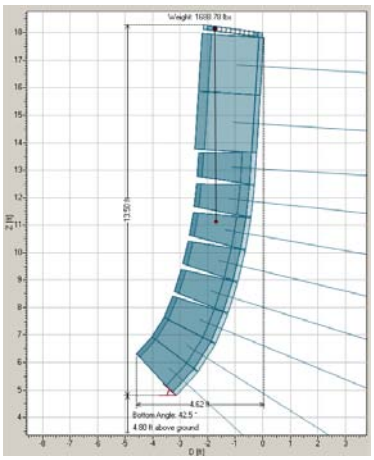


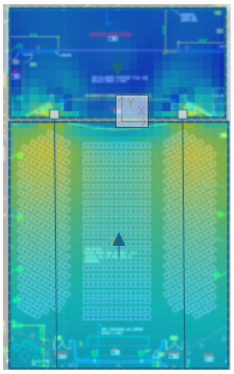
This graph shows the extended bandwidth of the midrange component that is uninterrupted by a crossover point in the critical intelligibility frequency band.

C12 Software Tools

The computing tools you need to master the art of 'driving' the fine machine that is the C12 system -- includes:

EASE Focus - Array Aiming / Prediction





Clair Brothers is pleased to offer C12 GLL files for use with EASE Focus, which is available from Ahnert Feistel Media Group, AFMG (http://focus.afmg.eu/). EASE Focus is a user-friendly and expedient array calculator tool that is useful in determining optimal array angles and array placement within the venue.

GLL Version 2 files include complex (magnitude and phase) data which has been measured at an independent testing laboratory in an anechoic chamber. While this shows how the array will behave as its length increases, the user should keep in mind that this is a purely anechoic representation of the sound field and does not account for ground plane reflections or other acoustic boundary conditions. If it is desirable to do such detailed modeling, EASE v4 must be used by a qualified acoustical engineer in order to guarantee results that reflect the actual performance of the array in its intended environment.

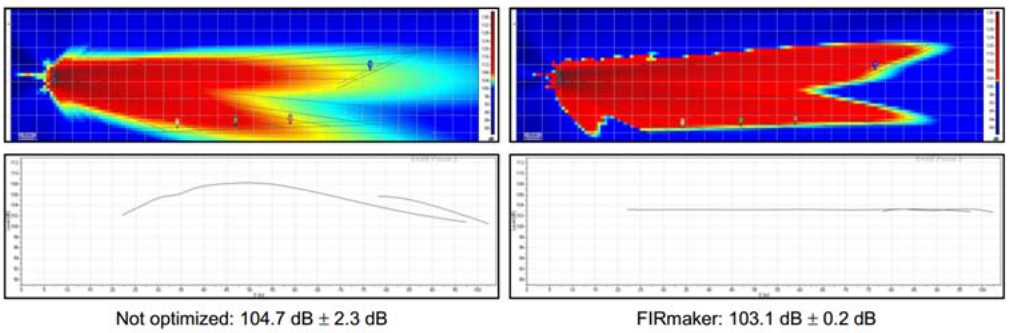
All SPL calculations in EASE Focus are limited to the direct field. Also included in the calculation are air attenuation effects according to ISO 9613. Shadowing and ground or side wall reflections are not considered. Wind effects are also not taken into account.

EASE Focus is using a simplified model of treating combinations of sound sources. Elements of a line array or column are always summed in a complex manner, which means that full signal coherence is assumed. However, multiple line arrays or columns are combined using power summation which is based on a random-phase assumption. Therefore, comb filtering between multiple arrays or sound sources will not be shown in EASE Focus mapping.

For more information on the basic operation of EASE Focus, please download the latest User's Guide directly from AFMG.

Steerable FIR

In challanging acoustical environments and applications where vertical pattern control is exceedingly important, the C12 System may be configured with one amplifier channel per Mid/Hi element and custom Lake Controller FIR filters may be generated using EASE Focus + FIRMaker to optimize the energy distribution.



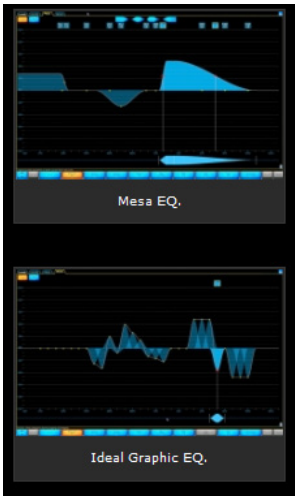
Not optimized: 104.7 dB ± 2.3 dB

FIRmaker: 103.1 dB ± 0.2 dB

Lake Processing

The advanced technology of Lake Processing provides audio professionals with unparalleled power to shape and optimize sound in a variety of environments. Regardless of the make or type of loudspeaker system, the venue size or acoustics, or the program material, Lake Processing will help you create a more consistent sound with less time and hassle in system set-up.

LM26 and PLM Series devices contain two full-featured Lake Processor modules, each offering precise settings for gain, delay, crossover slope, equalization, and limiting. Exclusive Lake Processing algorithms are included for Raised Cosine Equalization and linear phase. In addition, Lake Processing also incorporates Iso-Float™ ground isolation, a cost-effective and audibly superior alternative to isolation transformers.



Mesa EQ.

Ideal Graphic EQ.

Mesa EQ

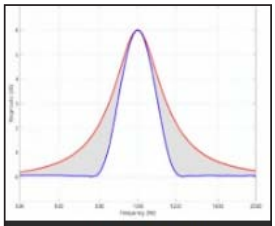
Mesa EQ gives sound engineers a faster, more effective optimization tool – one that can truly match the asymmetrical responses of loudspeakers.

Ideal Graphic EQ

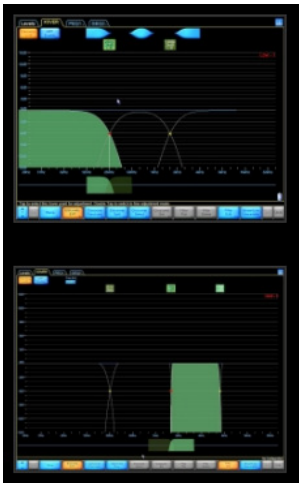
Ideal Graphic EQ is not implemented in the traditional manner, but instead uses Raised Cosine Filters that provide better selectivity than conventional filters. Ideal Graphic EQ filters sum to flat, thus providing a true response equalizer. This results in controls that provide exactly what is expected by the end user.

Raised Cosine Equalization

Raised Cosine Equalization is the foundation underlying Ideal Graphic EQ™ and Lake Mesa EQ™, the two revolutionary EQ interfaces provided by the Lake® Processor. The development of the Lake Mesa EQ was a significant advance in EQ technology. While other processors provide standard symmetrical boost and cut functions, the Mesa EQ offers asymmetric filtering, with the ability to separate the sides of a parametric section, change center frequencies, and independently adjust slopes.



The graphic above shows boost shapes typical of raised cosine (blue) and conventional (red) equalization. Note the increased selectivity of the raised cosine shape.



Classic Crossovers

Bessel, Butterworth and Linkwitz-Riley crossovers are provided, selectable up to 48 dB per octave. The crossover interface also allows you to quickly add low shelf, high shelf, and parametric filters to each output. These filters use the latest in digital signal processing technology, maintaining their symmetrical shape at high frequencies. You can also build your own custom crossover functions by enabling or disabling high pass and low pass filters on any output channel.

Linear Phase Crossovers

Linear phase crossovers are another feature separating Lake Processing technology from ordinary processors. Linear phase crossovers can match traditional crossover slopes, such as 24 dB per octave and 48 dB per octave, when desired. But they are also capable of transition slopes exceeding 180 dB per octave.

These slopes offer dramatic benefits when applied to various types of loudspeaker arrays. Off-axis lobing and cancellation between loudspeakers are dramatically reduced. Greater control over slopes means that different speaker cabinet types can be more easily mixed and matched. Also, a loudspeaker's impulse response is significantly improved, providing a time-coherent wavefront. Additionally, improvements of up to 3 dB or more in acoustic output power may be expected in some frequency ranges.

LimiterMax™ Loudspeaker Protection

LimiterMax is a significant advance in limiter technologies, combining an exclusive true-RMS limiter, an advanced peak limiter capable of instantaneous attack time (adjustable by the user), and additional sophisticated signal processing.

Iso-Float™ Ground Isolation: A Better Way to Avoid Ground Loops

Iso-Float technology combines the benefits of transformer-coupled isolation with the advantages of clean, direct-coupled inputs.

In the Lake Processor input section, the audio converters are galvanically isolated and not connected to the main ground. High-speed transformers and opto-isolators create a barrier between the processor and possible grounding aberrations from the outside electrical environment. Additionally, you can change the grounding of any input or output remotely through the Lake® Controller software interface. While isolation transformers are typically an expensive option for many processors, Iso-Float is standard in the LM26 and PLM Series units.

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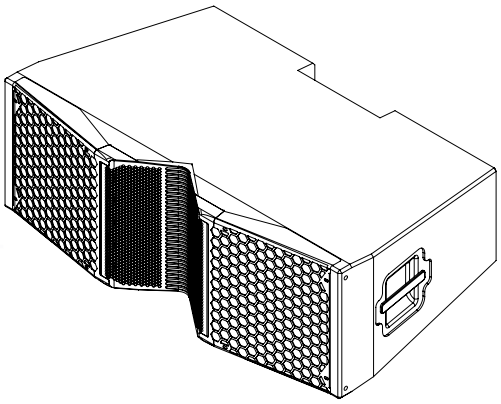
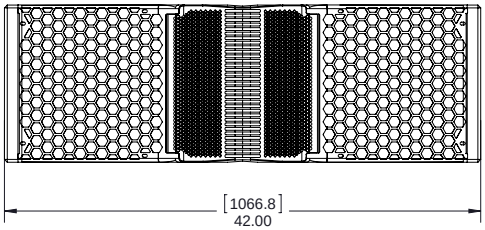


AUDIO SPECIFICATIONS

Loudspeaker Type	Line Array Element	Three-Way Active (Bi-Amp with Passive Mid/Hi)
Frequency Response	Single Cabinet	45Hz–20kHz (+/- 2dB) | (-10dB) 28Hz–22kHz
Recommended Power Amplifier		CB-PLM12K44 or CB-D120:4L
Maximum Array[1]		20 C12-i[1]
Compatible Subs		iS218-i, CS218
Prediction Software		Clair GLL/AFMG Ease Focus™ Array
Processing, Configuration & System Optimization Software		Lake Controller® with Clair DSP, WiFi System Control
Sensitivity (1 Watt @ 1 Meter)	LF	99 dB SPL
	MF/HF	121.8 dB SPL
Maximum Output		147 dB SPL @ 1M Bandpass Dependent 142 dB SPL @ 1M Full Bandwidth
Drivers	LF	(2) 12 in. (304.8mm)
	MF	(2) 3.5 in. (89mm)
	HF	(2) Exit 1.4 in. (35.6mm); VC diameter 1.75 in. (44.5mm)
Nominal Impedance	LF	2 x 8 Ohms
	MF	16 Ohms ┐ Integrated Passive
	HF	16 Ohms ┘ Crossover Network

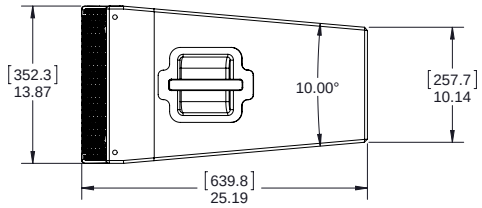
Power Handling	*AES Power*	*Peak Power*
LF	1800W	3800W
MF	300W	1000W
HF	160W	320W

Dispersion	Standard	90° H x 10° V
	Optional Horizontal	60° – 140° H (10° increments)
	Custom Horizontal	**Clair True Fit**: Custom Tailored Continuously Variable
Input Connection		(2) EP-8 Connectors (1 Male, 1 Female)



MECHANICAL SPECIFICATIONS

Enclosure	Shell	18mm Baltic Birch
	Finish	Black Epoxy Mastic
Grille		Powder Coated Steel, Foam Backed
Dimensions	Front Height	13.87 in. (352.3mm)
	Rear Height	10.14 in. (257.7mm)
	Width	42.00 in. (1066.8mm)
	Depth	25.19 in. (639.8mm)
Weight		153 lbs. (69.4kg)
Shipping Weight		171 lbs. (77.6kg)



1) Refer to C12 Rigging Manual for Configuration Limits vs. Modes of Use.

Note: All wattage figures are calculated using the rated nominal impedance.

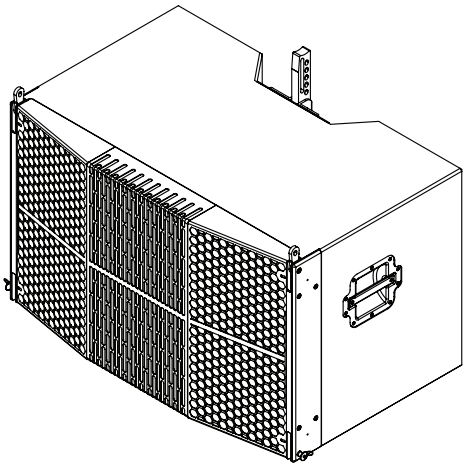
Clair Brothers products are designed to perform optimally by utilizing factory recommended proprietary DSP settings.

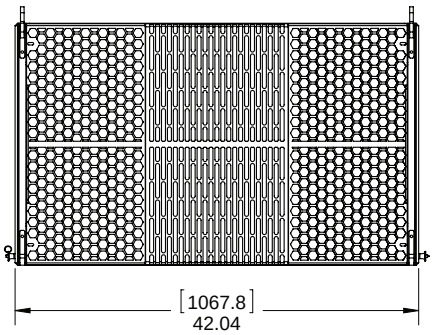
Due to constant research, development and improvements all specifications are subject to change without notice.

iS218 Subwoofer

AUDIO SPECIFICATIONS

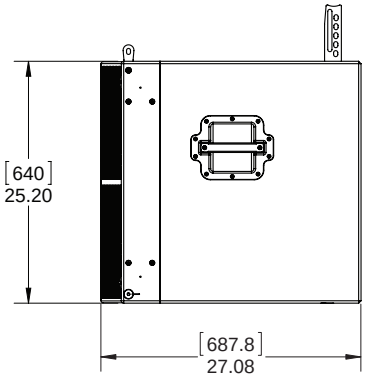
Loudspeaker Type		Dual Driver Subwoofer
Frequency Response (+/- 2dB)	Single Cabinet -10 dB Point	38Hz–180Hz 32Hz
Recommended Power Amplifier		2400–4000W @ 4 Ohms
Sensitivity (1 Watt @ 1 Meter)		103 dB SPL
Maximum Output	Cont. Peak	132.5 dB SPL 134 dB SPL
Drivers	LF	(2) 18 in. (457.2mm)
Nominal Impedance	LF	4 Ohms (2x 8 Ohms)
Power Handling	Nominal Peak	1400W 2800W
Input Connection	Standard	(2) EP-4 Connectors (1 Male, 1 Female)





MECHANICAL SPECIFICATIONS

Enclosure	Shell Finish	18mm Baltic Birch Black Epoxy Mastic
Grille		Perforated Steel, Foam Backed
Dimensions	Height Width Depth	25.20 in. (640.0mm) 42.04 in. (1067.8mm) 27.08 in. (687.8mm)
Weight		210 lbs. (95.2kg)
Shipping Weight		241 lbs. (109.3kg)



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Contact Us

At Clair Brothers, we're all about getting to know the details of your specific project in order to furnish the best advice and system design recommendations. Get in touch with us today to learn more about how a C12 system can be a great fit for your next project. info@clairbrothers.com