VTC PRO AUDIO

Elevation Series EL210

Synergy Horn Line Array Loudspeaker Enclosure

Features:

- Paraline High Frequency Horn Element (*patent pending*)
- Highly efficient Synergy Horn Design (*patent pending*)
- 10° Vertical Directivity (*flyware adjustable In 1° Steps*)
- 90° Horizontal Directivity
- Available in Touring and Fixed Installation Versions
- Excellent for All Throw Distances
- Designed and Manufactured by Yorkville Sound

Description:
Elevation Series line array cabinets solve the limitations presented in conventional loudspeaker design using the Synergy Horn and Paraline lens technologies invented by Tom Danley and licensed to VTC Pro Audio and Yorkville Sound.

While horizontal dispersion must be wide enough to deliver effective room coverage, precise control and focusing of the vertical dispersion is essential to maintaining a well-behaved, coherent wave with a minimum of cabinet interference, comb filtering and lobing. Therefore, one of the most difficult aspects in the design of a line array loudspeaker is finding an effective way to control the vertical dispersion at high frequencies. This can be achieved if the vertical dispersion is tightly focused into a narrow, slightly curved wave front that does not interfere with the waves emanating from the cabinets immediately above and below. Ideally this wave front would be flat, but a slightly curved wave front avoids gaps in the vertical coverage when the array is articulated in the same plane.

Conventional high frequency horns used in typical point source loudspeaker design create a wave front with a pronounced curvature. If used in a vertical array this degree of curvature leads to phase cancellation between enclosures with subsequent comb-filtering in various audience areas and degradation of the overall sound quality.

This Elevation Series design concept delivers the highly effective performance of a single horn/driver system with high sensitivity (efficient power transfer), a well-defined, predictable coverage with exceptionally flat frequency response and excellent directivity control. This makes the combined Synergy Horn and Paraline lens technologies the ideal basis for a truly modular vertical line array loudspeaker enclosure.

Available in either touring array versions (EL210t) or as an install cabinet (EL210i) the Elevation Series enclosures are designed and built in North America by Yorkville Sound using B&C 10-inch drivers, and BMS compression drivers and 5/8-inch void free marine grade Baltic birch plywood.

Specifications:

Configuration	Passive Bi-amplified (processor controlled)
Driver Components (HF)	80 watt, 16 ohm driver - 1.75-inch annular polyester diaphragm w/1-inch exit - Neodymium magnet assembly (x2)
Driver Components (L/M/F)	600 watt, 16 ohm 10-inch woofer w/ 2.5-inch voice coil Neodymium magnet assembly (x2)
Continuous Power	HF: 160 Watts LF: 1200 Watts
Nominal Impedance	HF: 8 ohms LF: 8 ohms
Frequency Response	55 Hz - 20 kHz (*with recommended DSP processing*)
Sensitivity (measured 1w/1m)	HF: 113dB (*single cabinet measured in free space*) LF: 98dB (*single cabinet measured in free space*) *(LF drivers connected in parallel)*
Calculated Max Output (Average)	HF=135dB LF=128dB
Nominal Coverage	Horizontal: 90° / Vertical: 10°
Vertical:	10° per cabinet, (total system vertical coverage dependent on number of elements used and configuration *(Recommended 3 box minimum)*
Enclosure Material	5/8-inch 11-ply Baltic birch plywood
Finish	Black ultrathane paint
Grille	Perforated, formed powder coated steel
Connectors:	Neutrik Speakon® NL4 in parallel (x2)
Pin Configuration:	Bi-Amp LF: 1+/1 / HF: 2+/2-
Attachment Points:	Integral, adjustable rigging system, vertical splay adjustable in 1° increments from 0° to 10°
Dimensions (DWH x backW, inches)	19.5 x 28.4 x 15.3 x 11.9
Dimensions (DWH xbackW, cm)	49.5 x 72.1 x 38.9 x 30.2
Weight (lbs/kg)	89 / 40.5

Specifications subject to change without notice.

Elevation Series EL210

Technology Overview

Paraline Element

The Paraline element is a horn configuration that provides an effective impedance transformation while at the same time providing a way to adjust the path length in a continuously variable way, such that the high frequency dispersion pattern produced has the same characteristics as that of a much deeper conventional horn.

In order to have dispersion from two separate sources combine without interference, it is necessary to have each source produce a very specific radiation pattern. This is particularity true in a line array where the vertical dispersion angle of the high frequencies must be MUCH narrower and where a conventional horn design would be physically far too deep to be practical.

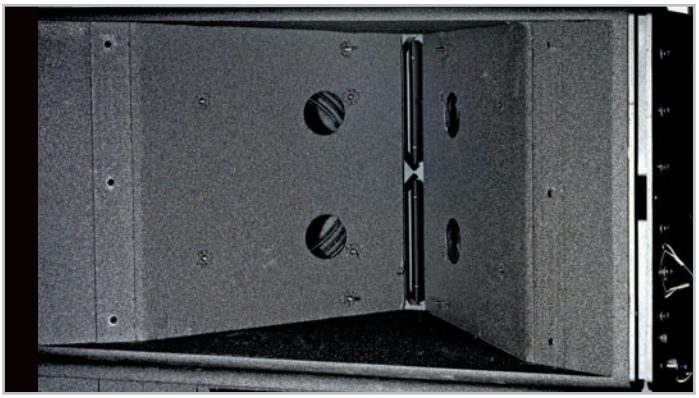
The Paraline element eliminates the impractical depth needed to make an array of conventional horns that would sum into a non-interfering source. In the case of the EL210, a vertical dispersion pattern of 10° is achieved with a Paraline element less than one inch deep, where a conventional horn would be several metres in length.

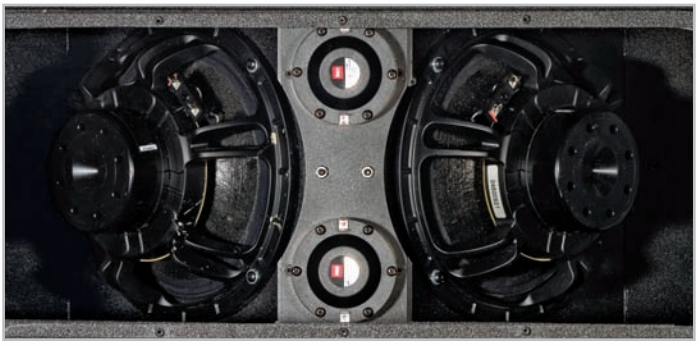
To control and maintain a well-defined horizontal dispersion pattern, the Paraline element is mounted on a conical horn.

Synergy Horn

The Synergy Horn successfully couples the radiation from multiple drivers into a single horn configuration.

In the EL210, two 10-inch low /mid frequency drivers are mounted to the Synergy Horn along with two compression drivers mounted on a Paraline horn element. This coaxial horn arrangement uses the entire front area of the enclosure as the horn mouth for both mid and high frequencies. This maximizes the horn size, improving directional control at lower frequencies (longer wavelengths) while maintaining reasonable overall enclosure size.





Elevation Series EL210

Flying Details - Touring Version (EL210t)

Rigging, Flyware & Bumpers
The custom designed Elevation Series' rigging hardware provides a rugged, extremely secure suspension system for large-scale flown arrays. Individual cabinets are attached together and angled using quick-attach pins, included with the frame.

Two optional Elevation Series flying bumpers are available for Elevation Series line array cabinets. The ELB16 bumper can handle up to 18 EL210t boxes in a flown in a vertical array, and is the ideal large format bumper for full scale touring systems and J-Arrays from trussing or roof rigging. Elevation Series ELS212t subwoofers can be flown in the same vertical array with the EL210t full range enclosures for convenient fully flown touring systems with the ELB16.

The ELB8 bumper can handle up to 12 EL210t boxes in a flown straight vertical array, or any combination of ELS212t subwoofers and EL210t cabinets not exceeding 1500lbs (681kg). Compact and more cost effective than the full sized ELB16, the ELB8 is the ideal platform for flying Elevation Series cabinets from portable or telescoping tower lifts where full scale truss rigging is not available.

Either the ELB8 or ELB16 can be used as a secure level platform for vertical ground stacking of Elevation Series cabinets in venues where a flown array is not the most cost effective practical system solution.

Flying Details – Installation Version (EL210i)

VTC Elevation Series install hardware integrated into the EL210i is the most cost-effective, safe and secure system available for building compact arrays for fixed permanent installation. Custom designed and manufactured using 10 guage (.135-inch) steel , EL210i Installation hardware allows a maximum of 4 EL210i cabinets to be quickly and easily configured and arrayed in splays from 0 to 10° per cabinet in 1° increments using 3/8th-inch hex bolts (included).

Integrated pickup points in the EL210i hardware allow the array to be easily flown using a two or four point hang.

Additional Information on Flying Systems
Use only VTC flyware and bumper for any large-scale flown arrays and do not exceed the maximum cabinet configurations listed. Correctly knowing how to use all of the suspension hardware and components is imperative in sound system rigging and deployment.

Research local codes and regulations to fully understand the requirements for suspended loads in the venue in which the equipment is to be suspended. Always calculate suspended loads before lifting array to ensure suspension components and hardware being used are well within their respective load limits.

Consult a professional mechanical or structural engineer licensed in the jurisdiction where the sound system will be used to review, verify and approve all attachments to the building or structure.

Never assume owner or third-party supplied suspension or attachment points are adequate for the loads to be suspended.

Be absolutely certain of the integrity of any structural member intended to support suspended loads. Hidden structural members can have hidden structural weakness, modifications or other defects.

Always employ the services of a professional rigger for hoisting, positioning, and attaching the equipment to any supporting structure, building or mobile trussing.

Refer to local building codes and regulations regarding flown hardware or fixtures and strictly adhere to them.

EL16B bumper should only be attached to a flying rig with Crosby 5/8th-inch shackles or approved equivalent (Crosby 1/2-inch shackle or equivalent on the ELB8). In either case, use only shackle holes in bumper for suspension of array.

Always inspect all components (enclosures, suspension brackets, pins, frames, bolts, nuts, slings, shackles, etc.) for cracks, wear, deformation, corrosion, missing, loose, or damaged parts that could reduce the strength of the assembly before lifting. Discard any worn, defective, or suspect part and replace them with the appropriate load-rated replacement part

Please Note: Elevation Series Cabinets can **ONLY** be fixed to ELB16 with custom Jergens stainless steel pins (Yorkville part #8980) included with the bumper. Cabinets used on ELB8 must be attached with custom Jergens stainless steel pins (Yorkville part #8971) included with the ELB8. Jergens pins connecting cabinets to bumpers in either case must be secured with supplied cotter pins.

Suggested Flying Configurations with ELB16 Bumper:

Maximum Cabinets:	18 x EL210t straight vertical hang
	14 x EL210t J-Array (top 7 cabinets Vertical (straight) and remaining 7 fully splayed at 10° each)
	8 x EL210t Cabinets only if fully splayed at 10° each

Ground Stack Configurations with ELB16 Bumper

Maximum Cabinets:	8 x EL210t splayed maximum 5° each
	2 x ELS212t Subwoofers / 6 x EL210t splayed maximum 5° each

Suggested Flying Configurations with ELB8 Bumper:

Maximum Cabinets:	12 x EL210t
	7 x ELS212t
	Any combination of EL210T and ELS212T cabinets not exceeding a maximum combined weight of 1500lbs.

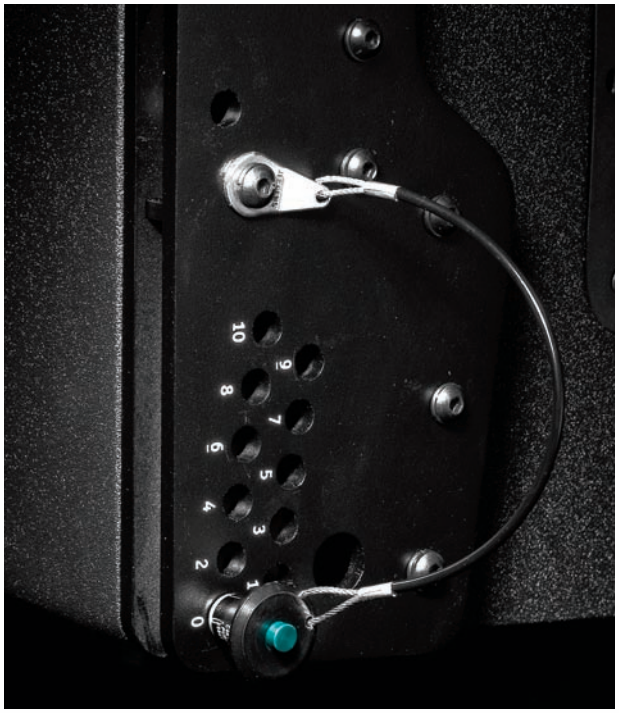
Ground Stack Configurations with ELB8 Bumper

Maximum Cabinets:	4 x EL210t splayed maximum 10° each

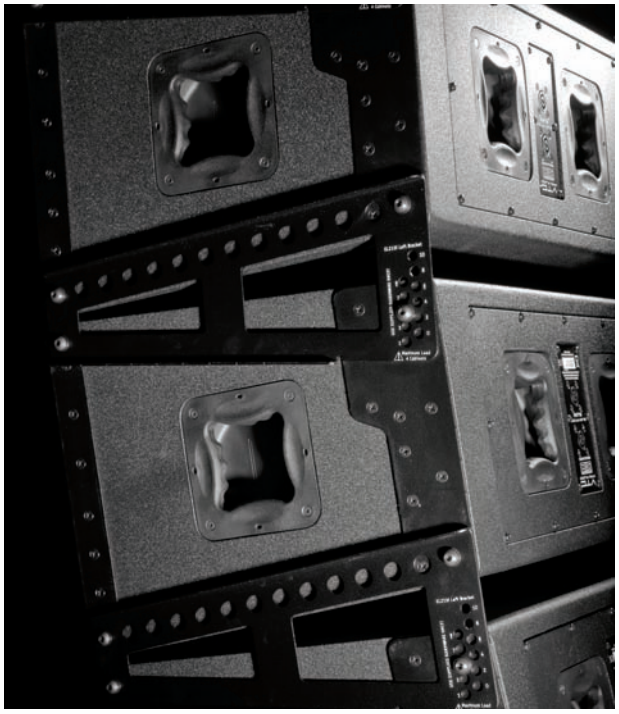
Ground Stack Configurations with No Bumper

Maximum Cabinets:	2 x ELS212t Subwoofers and 4 x EL210t splayed maximum 10° each

Do not ground stack EL210t cabinets without ELB8, ELB16 or ELS212t subwoofers as foundation.

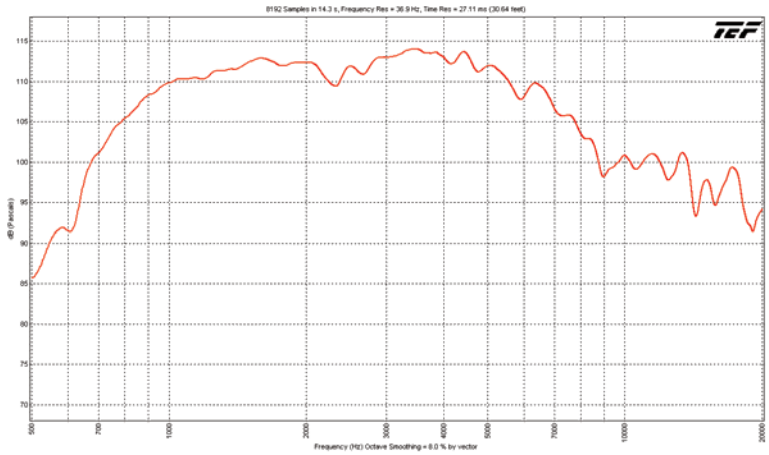


Tour Hardware Quick Pin

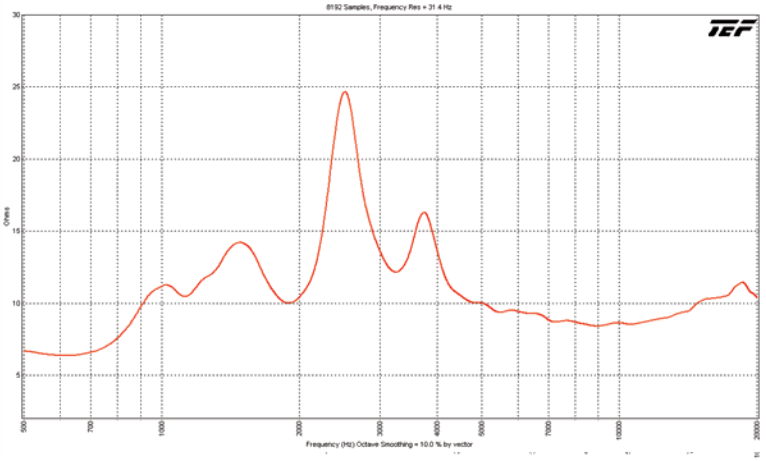


EL210i Installation hardware

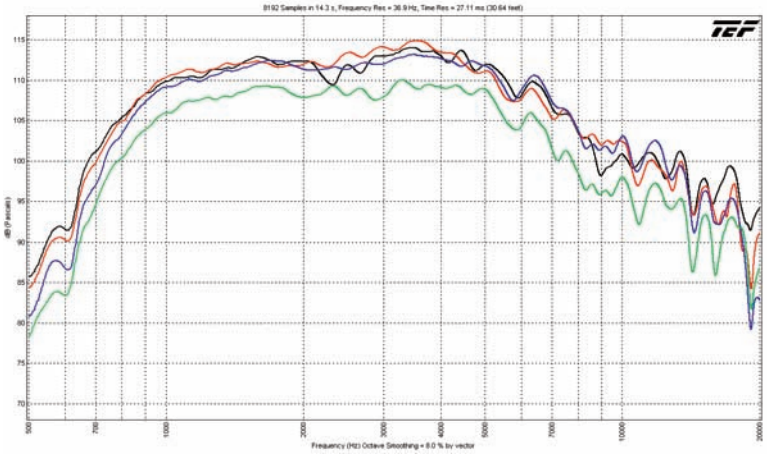
H.F Response Unprocessed
1w (2.8V) 1m Free Space



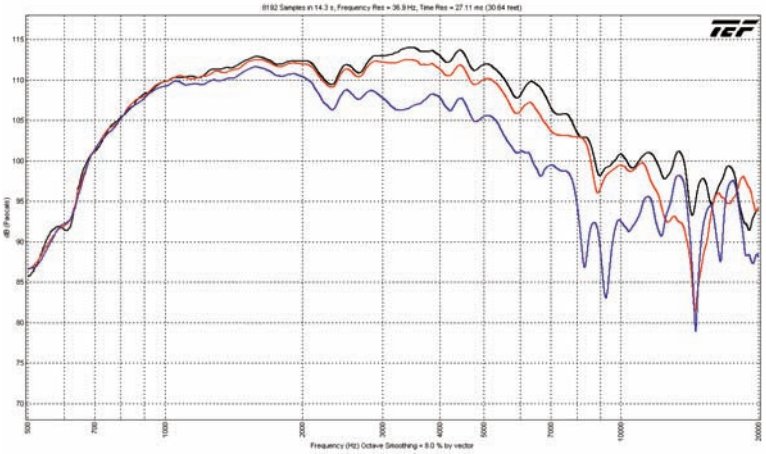
H.F Impedance
Magnitude



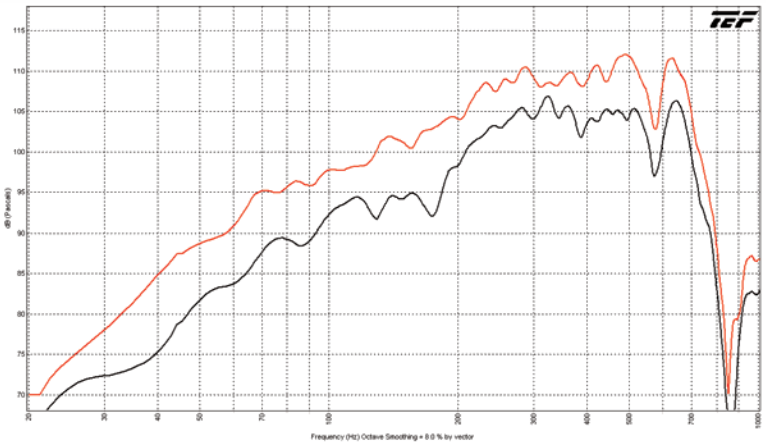
H.F Horizontal Response
Unprocessed Free Space
Blue=0°, Red=15°, Purple=30°, Green=45°



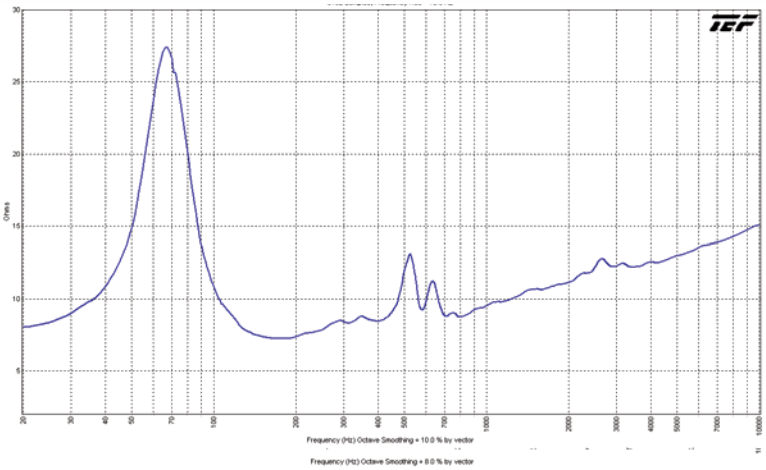
H.F Vertical Response
Unprocessed Free Space
Black=0°, Red=5°, Purple=10°



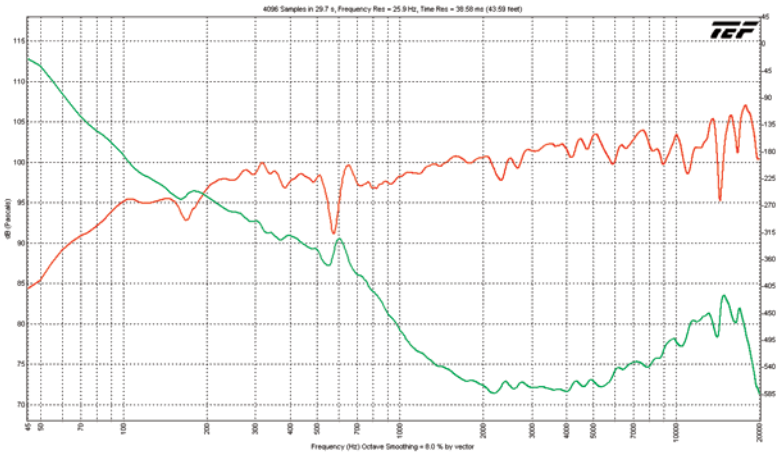
L.F Response Unprocessed
1w (2.8V) 1m Free Space (Black) & Ground Plane (Red)



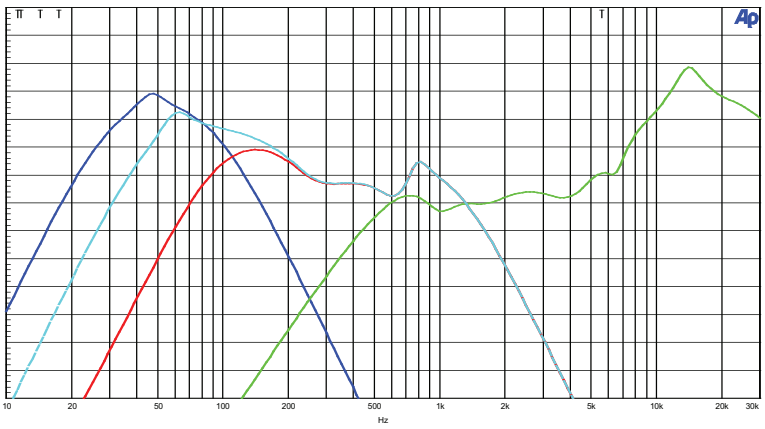
L.F Impedance
Magnitude

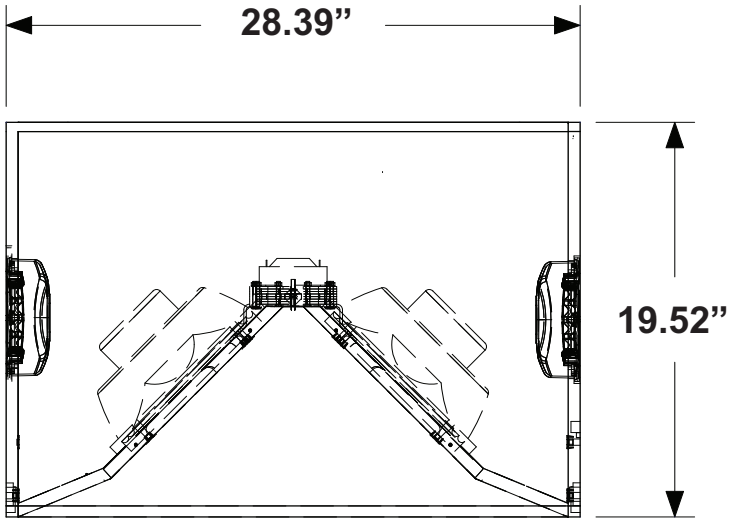


Processed Frequency Response
1 Cabinet Free Space



DLMS4080 Response
Red Curve "EL210 Low, Two-way with Sub"
Blue Curve "EL210 Low, Two-way full range"

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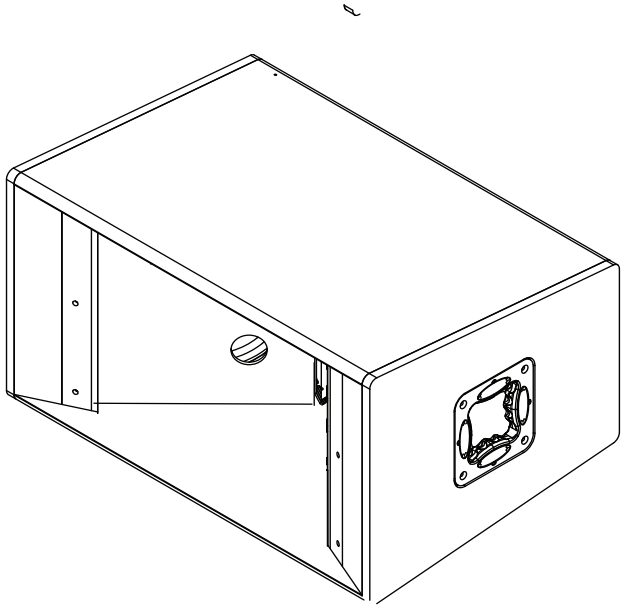
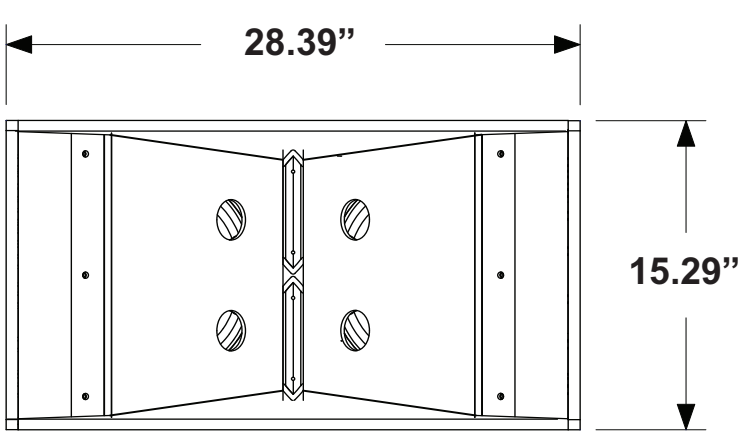
19.52”

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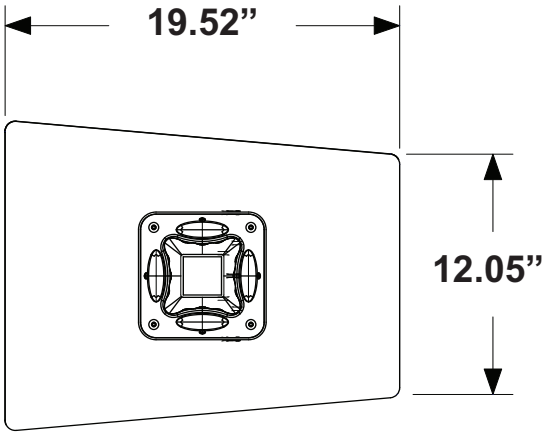
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12.05”