

SA1521

■ The SA1521 is an active 2-way sound reinforcement speaker system designed for extreme accuracy, high output, and smooth dispersion across the entire audio frequency range. It integrates 500 watts of amplifier power, active control electronics, and precision components into a speaker system with 100 dB sensitivity (1 watt @ 1 meter). The resulting high resolution and clarity in the critical low-mid and mid-range frequencies are unparalleled for a 15" loaded, 2-way speaker system.

■ Several state of the art advancements in transducer technology have been incorporated in the design of the SA1521. The compression driver uses a new 1.75-inch titanium diaphragm featuring a 3-slot, optimized geometry phase plug. When coupled to the low-distortion, high-output horn, the SA1521 provides uniform power response and correct phase alignment characteristics at the crossover frequency. With the resulting 75° x 65° dispersion pattern, the SA1521 provides very open, natural sound reproduction at extreme output levels.

■ A 15-inch high-efficiency woofer produces tight, punchy bass. The woofer's magnetic structure delivers an exceptional amount of magnetic force and is responsible for the system's high sensitivity and high efficiency by providing tight control over the cone's movement. This tight control over the woofer's moving mass results in unusually smooth low-frequency response from 50Hz up to the mid-frequency crossover point at 1300Hz.

■ The amplifier for the compression driver incorporates a Class AB topology, renowned for its clarity, warmth, and high-voltage output to generate extreme SPL levels. A Class G design is used for the low-frequency amplifier, which features two power supplies for improved efficiency and more output power per pound.

■ A signal panel and a power panel are located on the amplifier assembly at the back of the cabinet, separated by a large aluminum heatsink. The signal input panel contains XLR connectors for line-level input and loop-through connections, a level control, and four status LEDs for Power ON, Signal Present, Limit, and Thermal functions. The power switch and IEC AC connector are located on the power panel.

■ The internal processor provides complete system management of all electronic and acoustic functions. These include an electronic active crossover, electronic phase alignment, electronic time correction, electronic equalization, and complete amplifier and component protection.

■ To ensure long-term reliability, the amplifiers are mounted on a massive extruded heatsink, which is convection cooled and dramatically extends the life expectancy of the heat-producing components.

(continued on page 2)

Active 2-Way Sound Reinforcement Speaker System

**SA1521**

Features

- **Active, High Output/Wide Dispersion**
- **133 dB Peak SPL**
- **Bi-amplification with 400 watts rms low-frequency and 100 watts rms high-frequency power**
- **Wide dispersion, ultra-low distortion high-frequency horn**
- **Complete electronic and component protection circuitry**
- **15-inch high efficiency, light mass woofer**
- **State-of-the-art precision 1.75-inch titanium compression driver with 3-slot, low distortion, optimized geometry phase plug**
- **Electronic equalization, time correction and phase alignment**
- **Low Frequency Dynamic Bass Protection, RMS Limiting, Power Supply and Amplifier Thermal Protection**
- **Professional trapezoidal enclosure design**
- **Correctly weight-balanced with two comfortable side handles for easy carrying and set up**
- **One top and one bottom handle for easy repositioning of speaker and built-in pole mount cup on bottom**

Applications

- Live Applications
- Playback Applications
- Portable PA Systems
- Corporate Events

SA1521 Active Speaker System

(continued from page 1)

■ The SA1521 cabinet is constructed using both multi-layered plywood and pressure injected structural resin. The combination provides a robust enclosure with useful ergonomic features. There are three-part cast aluminum handles on each side of the enclosure placed at the speaker's center of gravity for easy carrying and setup. Handles are also located on the top and bottom of the cabinet for easy movement and relocation. A built-in pole-mount cup is provided on the bottom, and a full-size, oval punched, weather-resistant steel grille protects the front of the cabinet.

SA1521 Specifications

System Acoustic

-3dB response	57Hz-18kHz
-10dB response	49Hz-20kHz
Directivity Factor; Q (DI)	14.4 (11.6), averaged 2kHz to 10kHz
System Sensitivity ¹	100 dB, 1W@1m
Max SPL long-term	130 dB
Max SPL Peak	133 dB
Crossover	Linkwitz-Riley, 24 dB/octave @ 1300Hz

Input /Output

Input	Bal./unbal. Female XLR
Loop-through (parallel w/input)	Bal./unbal. Male XLR
Level Control	Rotating knob (-15 to +5 dB), center detent @ 0 dB

Amplifiers

Total Amplifier Power	500 watts Continuous*
High Frequency	100 watts*
Type	Class AB
Rated THD	.03%
Low Frequency	400 watts*
Type	Class G Hybrid
Rated THD	0.03%

*Rated power is continuous RMS wattage into transducer's rated impedance @ 1kHz for the HF amplifier and @ 100Hz for the LF amplifier

High Frequency Section

Diaphragm Size	1.75"
Horn Exit Diameter	1.0"
Phase Plug	3-Slot Optimized Geometry
Diaphragm Material	Damped titanium
Magnet Type	Ferrite

¹ Measured on-axis in the far field, referenced back to 1 watt RMS from maximum power and to 1 meter distance using the inverse square law.

Horn Design

Horizontal Coverage	75° 1kHz to 6kHz avg.
Vertical Coverage	65° 1kHz to 6kHz avg.
Type	Constant Directivity
Mouth Size	10.6" x 10.6" (27 x 27cm)
Throat size	1.0" (2.54 cm)

Low Frequency Section

Number of Drivers	1
Woofers Size	15"
Diaphragm Material	Epoxy-reinforced Cellulose
Magnet Type	Ferrite

Construction Features

Basic Design	Trapezoidal
Material	13-ply Baltic birch/ resin end caps
Finish	Wear-resistant black PVC vinyl
Handles	Two on sides, One top, One bottom
Grille	Perforated metal with weather-resistant coating

Line Input Power

Power Consumption	190W long term with IEC pink noise and limiter on
US	120 VAC, 60Hz
Recommended amperage service	13 Amps
Europe	230 VAC, 50Hz
Recommended amperage service	7 Amps
AC connector	3-pin IEC 250 VAC

Control System Function

Electronic Crossover	
Phase Alignment	
Time Correction	
Equalization	
Parametric equalization	

Safety Features

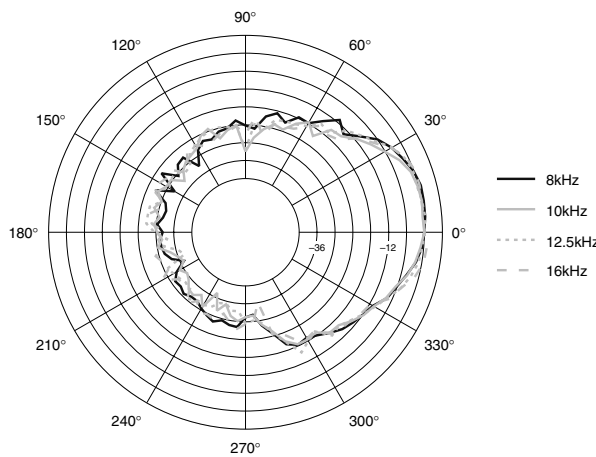
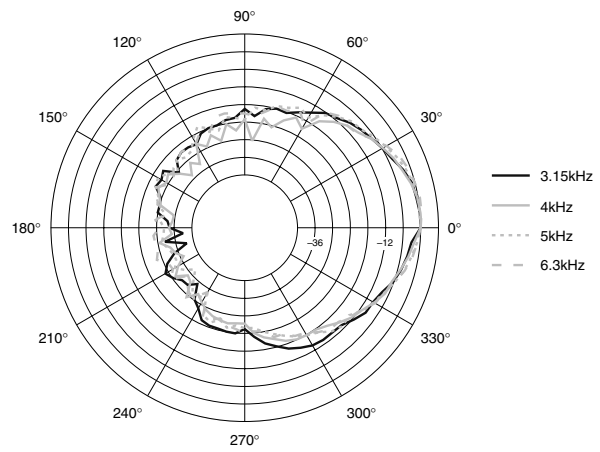
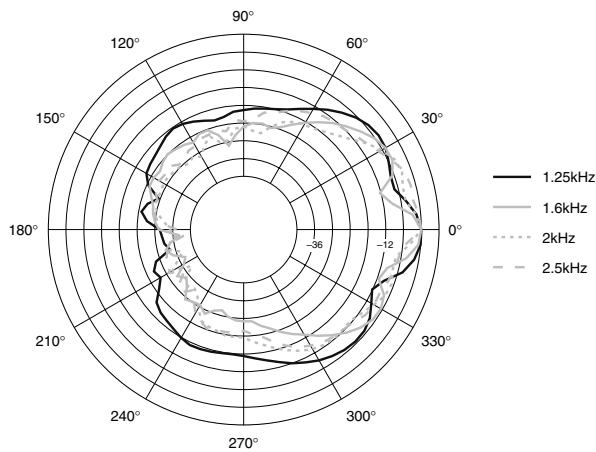
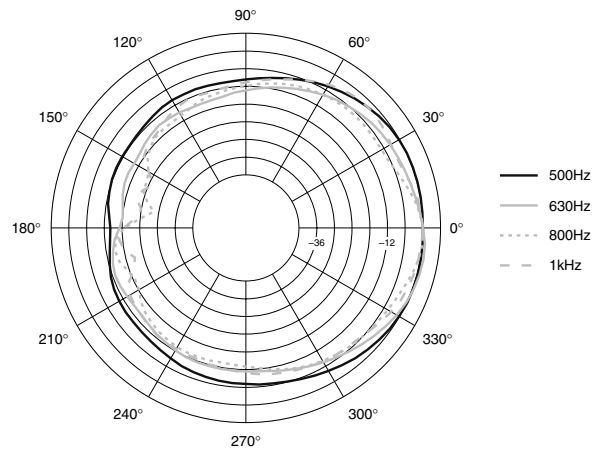
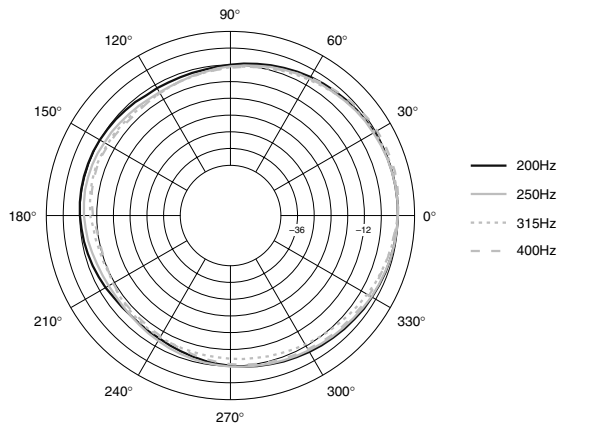
Protection	Low Frequency Dynamic Bass Protection, RMS Limiting, Power Supply and Amplifier Thermal Protection
Display LEDs	Signal Present, Limit, Power ON, and Thermal (Cool Down Auto Reset)

Physical

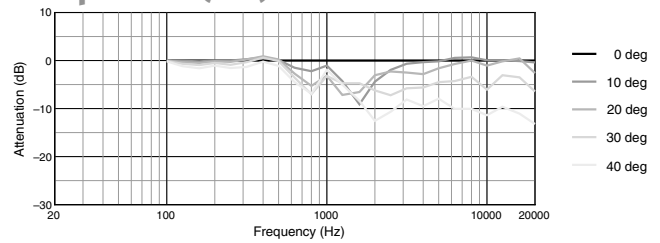
Height	32.0 in/81.3 cm
Width Front	19.1 in/48.5 cm
Width Back	13.9 in/35.3 cm
Depth	18.1 in/46.0 cm
Weight	101.0 lb/45.8 kg

SA1521 Active Speaker System

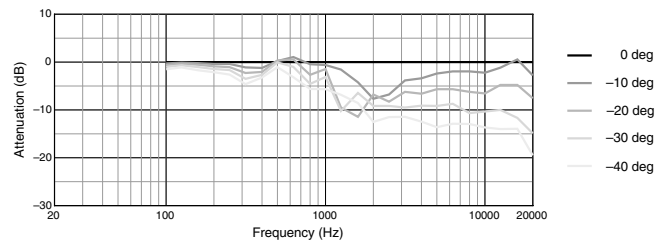
SA1521 Vertical Polars



SA1521 Vertical Off-Axis Frequency Response (UP)

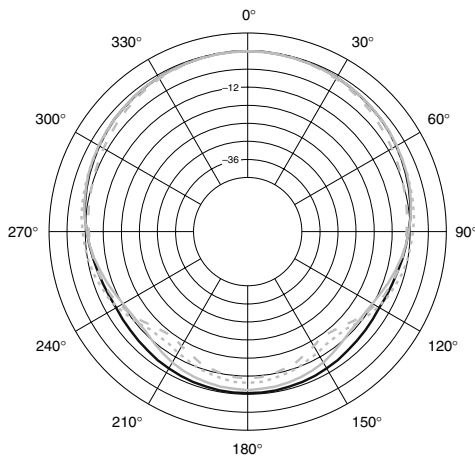


SA1521 Vertical Off-Axis Frequency Response (DOWN)

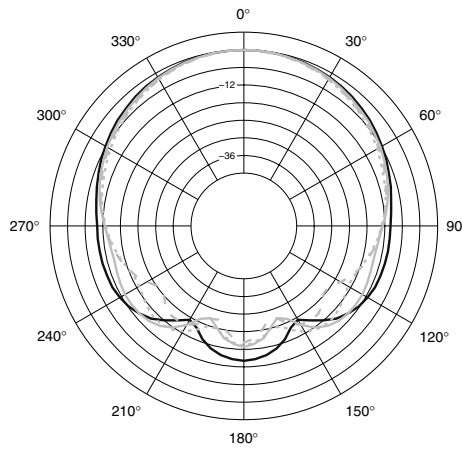


SA1521 Active Speaker System

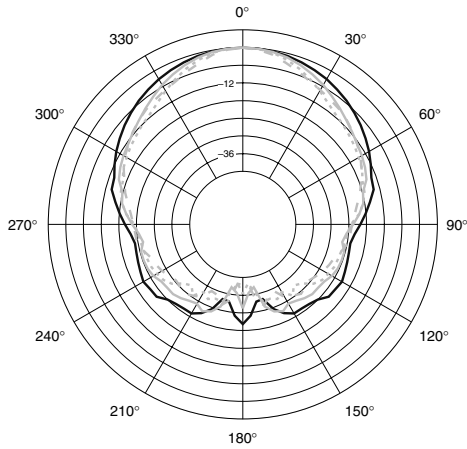
SA1521 Horizontal Polars



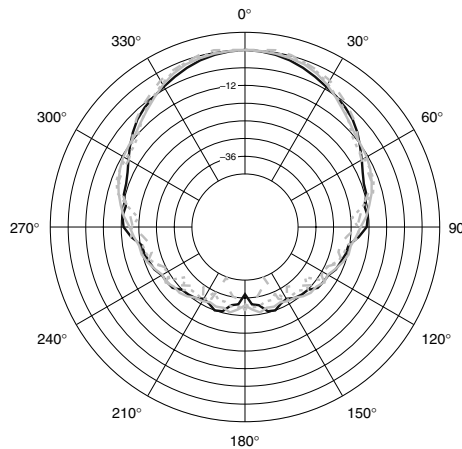
- 200Hz
- 250Hz
- - - 315Hz
- - - 400Hz



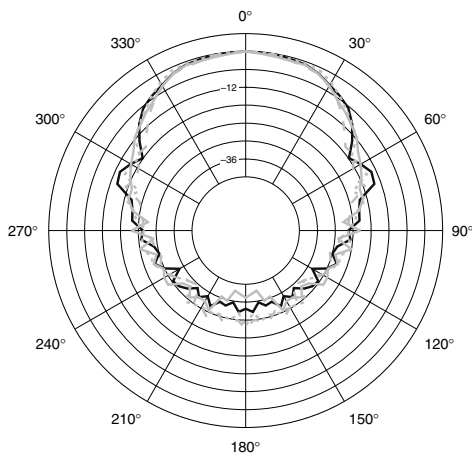
- 500Hz
- 630Hz
- - - 800Hz
- - - 1kHz



- 1.25kHz
- 1.6kHz
- - - 2kHz
- - - 2.5kHz

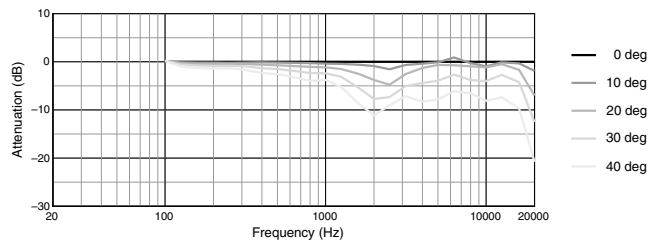


- 3.15kHz
- 4kHz
- - - 5kHz
- - - 6.3kHz



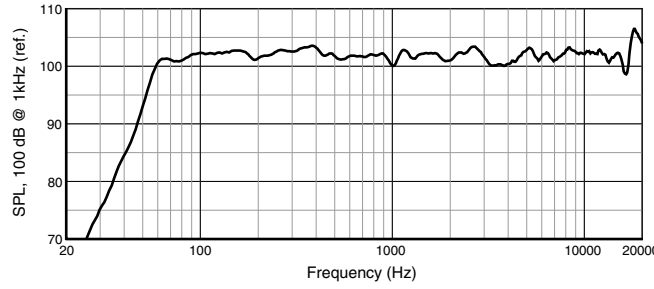
- 8kHz
- 10kHz
- - - 12.5kHz
- - - 16kHz

SA1521 Horizontal Off-Axis Frequency Response

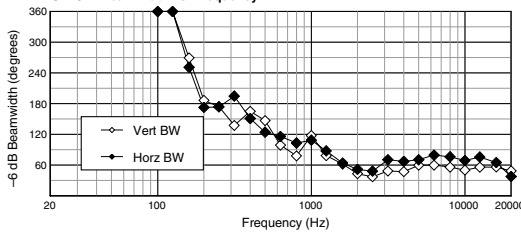


SA1521 Active Speaker System

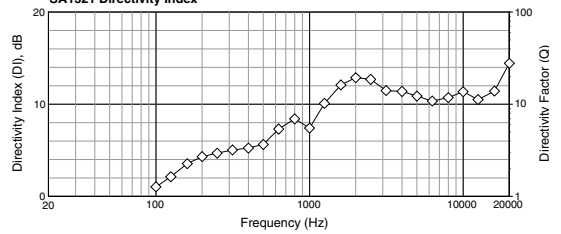
SA1521 Frequency Response On-Axis



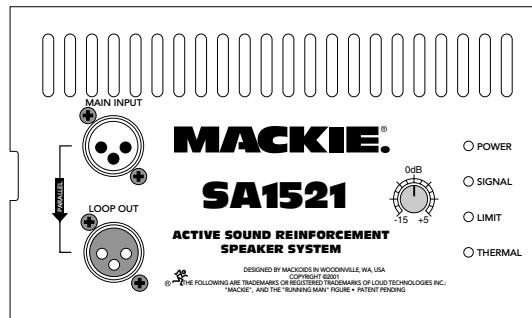
SA1521 Beamwidth vs. Frequency



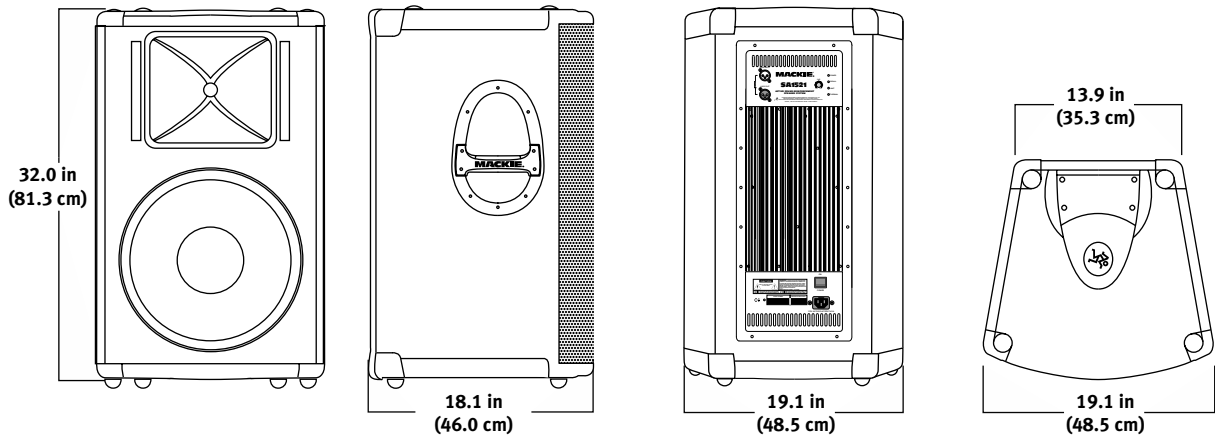
SA1521 Directivity Index



SA1521 Input Panel



SA1521 Dimensions



SA1521 Active Speaker System

Architects' and Engineers' Specifications

The active two-way, full-range loudspeaker system shall incorporate one 15-inch low-frequency (LF) transducer and a 1-inch exit compression driver high-frequency (HF) transducer. The LF driver shall be mounted in a vented enclosure tuned for optimum low-frequency response. The HF transducer shall be loaded on a symmetrical constant-directivity horn.

The system shall have a nominal coverage pattern of 75° (horizontal) x 65° (vertical). System frequency response shall vary no more than ± 3 dB from 57Hz to 18kHz measured on axis. The loudspeaker shall incorporate a Class G low-frequency amplifier capable of delivering 400 watts RMS over a frequency range of 20Hz-1300Hz. The system shall incorporate a Class AB 100 watt RMS amplifier specifically designed to power the HF driver over the range of 1300Hz-20kHz. The amplifiers shall be mounted on an aluminum heatsink, which shall be mounted on the rear of the speaker system, and shall be convection cooled.

Thermal protection shall be provided by a thermal sensor mounted on the heatsink, which monitors the heatsink temperature and triggers the thermal protection circuit should the temperature exceed 140° F (60° C). The Thermal LED shall light and the input signal shall be muted until the heatsink cools to a safe operating level, at which point the thermal protection circuit auto-resets and normal operation resumes.

Overload protection shall be provided by a limiter circuit, which monitors the low-frequency amplifier output and reduces the input level to the amplifier should the amplifier output begin to clip.

The loudspeaker enclosure shall have a trapezoidal shape and shall incorporate two side handles and a top and bottom relocation handle. The enclosure shall be constructed of a combination multi-ply wood and high-pressure injected structural resin, with a black PVC vinyl finish. The front of the loudspeaker shall be covered with a powder coated, weather-resistant perforated steel grille.

The active two-way full-range loudspeaker system shall be a Mackie SA1521.

Electronic files for this product available at:
www.mackie.com

This Specification Sheet	SA1521_SS.PDF
Owner/Operator's Manual	SA1521_OM.PDF

MACKIE®

www.mackie.com

16220 Wood-Red Road NE, Woodinville, WA 98072 USA
800.898.3211, fax 425.487.4337, sales@mackie.com

UK +44.1268.570.808, fax +44.1268.570.809, uk@mackie.com

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Part No. 0000788 Rev. D 09/04