Professional Series

Model 4345 Studio Monitor

Four-way system designed for full range or biamplified operation

Linear, wide range response from 32 Hz to 20 kHz

High output with controlled dispersion

Sold in pairs with mirror-image driver configuration for precise stereo imaging

JBL

The 4345 Studio Monitor

The 4345, an improved version of the popular 4343B studio monitor, has a larger 460 mm (18 in) low frequency loudspeaker, an improved 250 mm (10 in) midrange loudspeaker, and a more highly refined frequency dividing network. The new monitor speaker features increased sensitivity, extended low frequency response, and better transient response. The 4345 can be driven by a full range input, or it may be biamplified, depending on the setting of a rear panel switch. In either mode, the monitor delivers the high volume levels, wide dynamic range and low distortion necessary for precise reproduction of live and recorded sound. The 4345 is a fine monitor, ideally suited to critical recording, mixdown, and disk mastering applications.

Full-Range/Single Amp or Biamplified Operation

The 4345 can be driven by a single channel of full-range program material, or it can be biamplified with the addition of an external low-level frequency dividing network such as the JBL 5234A. The low-level (electronic) dividing network separates the full-range program into low and high frequency signals which drive two independent channels of power amplification. The "low" amplifier is connected directly to the 4345's low frequency loudspeaker, and the "high" amplifier to the mid/high section of the 4345's built-in frequency dividing network; that high-level network routes the amplified signal to the midrange loudspeaker, high frequency driver and ultra-high frequency driver. Biamplification significantly improves performance by increasing the available dynamic headroom and reducing distortion, particularly at the high volume levels that would be more likely to overload a single amplifier. Whether or not the monitor is biamplified, the user can precisely balance the relative levels of each frequency band by means of mid, high, and ultra-high frequency level controls concealed behind the snap-off grille.

Low Frequency Loudspeaker (Model 2245H)

The use of a 460 mm (18 in) low frequency loudspeaker in a 250 liter (9 ft^3) ported enclosure provides accurate reproduction, and high power handling capacity extending to very low frequencies, with excellent sensitivity. The loudspeaker's motor assembly consists of a 100 mm (4 in) diameter voice coil, fabricated of edgewound copper ribbon wire, operating in a 1.22 tesla (12,200 gauss) magnetic field. The 9.1 kg (20 lb) magnetic assembly incorporates JBL's new symmetrical field geometry (SFG) design which, along with a Flux Stabilizing Ring around the pole piece, significantly reduces second harmonic distortion and provides accurate low frequency reproduction. The suspension is carefully designed to control the voice-coil motion, ensuring tighter transient characteristics with complete freedom from dynamic instabilities. A compliant cone termination (the surround) allows long excursions and, along with the specially coated cone, damps spurious reflections traveling within the cone material.

Midrange Loudspeaker (Model 2122)

The predominant energy of musical fundamentals lies in the region from 320 Hz to 1300 Hz, the operating range of the midrange loudspeaker. Its 250 mm (10 in) diameter cone is large enough to move the volumes of air necessary to match the levels of the other components, while its size and weight are optimized for tight transient response and uniform dispersion. By virtue of its intentionally restricted operating range, this loudspeaker yields exceptional vocal clarity and precise instrumental definition. An improved cone and center dome smooths response and lowers distortion over this loudspeaker's predecessors, while an improved voice coil and coil-former construction improve power handling. The loudspeaker is isolated in its own 14 liter (0.5 ft^3) subchamber to avoid the possibility of low frequency intermodulation effects; the chamber also loads the cone for smoother response with high sensitivity. The magnetic assembly weighs 4.7 kg (10¼ lb), and utilizes JBL's SFG design for lowest second harmonic distortion. For highest efficiency, a 75 mm (3 in) edgewound copper ribbon voice coil operates in a powerful magnetic field having a flux density of 1.02 tesla (10,200 gauss). Effortless reproduction is ensured, even at extremely high volume levels with complex waveforms, thanks to an integrally stiffened cone terminated with JBL's exclusive ring compliance which allows for long excursions while maintaining linear travel.

High Frequency Compression Driver (Model 2421B)

The high frequency compression driver provides the ideal balance of high efficiency and accurate response necessary for critical monitoring applications. The driver's closed magnetic assembly is machined from cast or extruded iron and charged by an Alnico V magnet, achieving a flux density in the voice coil gap of 1.5 tesla (15,000 gauss). The pneumatically formed aluminum alloy diaphragm measures just 0.05 mm (0.002 in) thick and is extremely rigid, energized by a 44 mm (1¾ in) diameter edgewound aluminum ribbon voice coil. The combination of a small moving mass with a high Bl factor generates very high acoustic output levels with superb transient definition. An impedance controlling ring affixed to the pole piece increases efficiency at high frequencies and maintains flat response. The phasing plug, which consists of concentric exponential horns, avoids phase cancellation and ensures proper acoustic coupling to the horn for smooth reproduction throughout the driver's 1.3 kHz to 10 kHz operating range.

Horn/Lens Assembly (Model 2307/2308)

The high frequency compression driver is bolted directly to a horn/lens assembly which serves multiple functions; it acoustically loads the driver diaphragm, couples the driver to the acoustic environment, and controls the pattern of sound coverage. The assembly consists of a JBL Model

2307 horn, having an exponential taper rate, and a Model 2308 acoustic lens. The lens consists of eleven plates, each 250 mm (10 in) long, set at a precise angle of 38° to achieve an effect analogous to a divergent optical lens. The lens spreads the sound over a wider horizontal plane than could be obtained with the horn alone; nominal coverage for the horn/lens assembly is 80° horizontal by 45° vertical, a pattern well suited to the control room monitoring environment.

Ultra-High Frequency Transducer (Model 2405)

The highest octave of the audio spectrum is reproduced by a compression driver specifically designed for ultra-high frequency reproduction. The driver's ring-shaped diaphragm is affixed to a 44 mm (1¾ in) edgewound aluminum ribbon voice coil that is bonded to a heat resistant support. The coil is suspended in a powerful 1.65 tesla (16,500 gauss) field generated by the 1.5 kg (3¼ lb) magnetic assembly energized with an Alnico V magnet. Because the pneumatically formed aluminum alloy ring radiator, just 0.05 mm (0.0022 in) thick, is driven by the powerful motor assembly, the transducer is capable of generating substantial acoustic output at extremely high frequencies. JBL's integral diffraction horn distributes the sound over a broad pattern (90° horizontal by 30° vertical at 16 kHz and 65° horizontal x 25° vertical at 20 kHz), avoiding the narrow "beaming" effects that occur with conventional direct radiating (cone or dome style) loudspeakers used at ultra-high frequencies. Overall frequency response remains very uniform off axis as well as in front of the monitor where it is within 3 dB to 20 kHz, an especially important factor when taking into account the spectral content of the reverberant field.

Frequency Dividing Network

The 4345 is provided with a high level, passive frequency dividing network for the three transitions of the system, with level controls for the mid, high, and ultra-high frequency bands. The network is fitted with a rear-mounted switch and separate input terminals for biamplification. The circuitry has been designed with consideration for the various performance characteristics of the drivers and their location on the enclosure baffle panel. The network is made to operate continuously at high power levels, and incorporates high voltage non-polarized type capacitors, as well as high current capacity, low DC resistance inductors to minimize power losses within the network. Parallel wired high-resolution bypass capacitors significantly improve transient response, and each inductor is calibrated and precisely set to the optimum value using a sensitive electronic bridge.

A special circuit card providing the precise crossover characteristics for biamplification of the 4345 is available for use in the JBL 5234A Electronic Frequency Dividing Network. Conventional electronic networks can be used, but they may not have the exact frequency and filter slope characteristics required for optimum performance of the system.

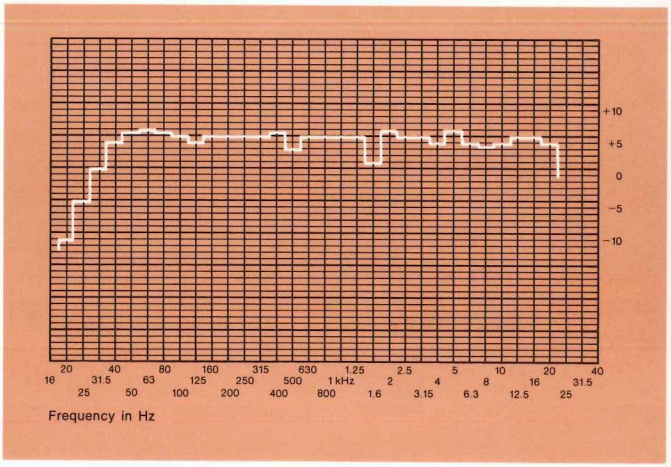
Enclosure

The enclosure of the 4345 incorporates two acoustic chambers. The low frequency loudspeaker is housed in a ported chamber which has an internal volume of 250 liters (9 ft³). Proper loading to 32 Hz is accomplished by a distributed, ducted port consisting of 3 circular openings. The midrange loudspeaker is mounted in a second, sealed subchamber, 14 liters (0.5 ft³) in volume and designed to prevent acoustical interaction with the low frequency driver. The subchamber also loads the midrange unit in such a way that it reduces unwanted response peaks. The enclosure is constructed of dense 19 mm (¾ in) and 25 mm (1 in) stock with a 15-ply baffle panel; all joints are carefully interlocked and glued; the back, side, top and bottom panels are lined with acoustic damping material and are each stiffened by multiple braces which are glued and screwed to the panel as well as to the adjacent surfaces of the enclosure. The baffle panels on a pair of 4345s are arranged so that the various transducers are mounted with mirror-image geometry for optimum stereo imaging.

Test Parameters

The accompanying graph and specifications were compiled from measurements made under standard laboratory test conditions. The complete loudspeaker system, including the enclosure, was mounted flush in the center of a large, flat baffle in an anechoic environment. Calibrated condenser microphones were suspended at a measured distance from the sound source, sufficiently out of the near field. The exception to this test setup involves measuring overall sensitivity, as described in a footnote. All associated electronic equipment was checked and calibrated before tests were run.

Response



Frequency response of the 4345 taken with 1/3-octave band pink noise. Measured response contour of a typical system averaged through an inclusive arc of 60° in the horizontal and 30° in the vertical planes does not deviate more than 2 dB from the above curve.

Specifications

Maximum Power Input[1]	
Continuous Sine Wave	
(290 Hz Biamp Crossover)	
Low Frequency	200 W below 290 Hz
High Frequency	100 W above 290 Hz (controls set at 0 dB)
Single Amplifier	120 W from 32 Hz to 20 kHz
Nominal Impedance	
Low Frequency	8 Ω (minimum 7Ω @ 200 Hz)
High Frequency	8 Ω (minimum 7Ω @ 15 kHz)
Maximum Sound Pressure Level (SPL)[2]	
Continuous Program	120 dB
Frequency Response	
Sine Wave, on-axis	32 Hz-20 kHz, +3, −6 dB
Dispersion Angle (Included between 6 dB points from on-axis)	
Horizontal	No less than 60° to 16 kHz
Vertical	No less than 30° to 16 kHz
Sensitivity[3]	
Low Frequency	95 dB SPL, test signal rolled off at 12 dB/ octave above 320 Hz
High Frequency	98 dB SPL, test signal rolled off at 12 dB/ octave below 320 Hz
Distortion (½ power, 105 dB SPL at 3 m (10 ft), single frequency)	1% or less third harmonic generation from 32 Hz to 800 Hz 2% or less third harmonic generation above 800 Hz
Crossover Frequencies	
Low	290 Hz, electrical, 12 dB per octave
Mid	1.3 kHz, 12 dB per octave
High	10 kHz, 18 dB per octave
Low Frequency Loudspeaker	(2245H)
Nominal Diameter	460 mm 18 in
Voice Coil	100 mm (4 in) edge-wound copper ribbon
Magnetic Assembly Weight	9.1 kg 20 lb
Flux Density	1.22 tesla (12,200 gauss)
Sensitivity	95 dB, 1 W, 1 m (3.3 ft)
Midrange Loudspeaker	(2122H)
Nominal Diameter	250 mm 10 in
Voice Coil	75 mm (3 in) edge-wound copper ribbon
Magnetic Assembly Weight	4.7 kg 10¼ lb
Flux Density	1.02 tesla (10,200 gauss)
Sensitivity	98 dB, 1 W, 1 m (3.3 ft)
High Frequency Compression Driver	(2421B)
Throat Diameter	25 mm 1 in
Voice Coil	44 mm (1¾ in) edge-wound aluminum ribbon
Flux Density	1.5 tesla (15,000 gauss)
Sensitivity (Averaged from 800 to 2500 Hz)	108 dB, 1 W, 1 m (3.3 ft) on 2307/2308 Horn/Lens
Ultra-High Frequency Transducer	(2405)
Horn Mouth (slot)	79x18 mm (3.125x0.725 in)
Voice Coil	44 mm (1¾ in) edge-wound aluminum ribbon
Magnetic Assembly Weight	1.5 kg 3¼ lb
Flux Density	1.65 tesla (16,500 gauss)
Sensitivity (Swept 7 kHz to 20 kHz)	105 dB, 1 W, 1 m (3.3 ft)
Finish	Oiled Walnut
Grille	Dark blue fabric
Net Weight	104 kg 229 lb
Shipping Weight	112 kg 246 lb
Accessories	5234A Dual Channel Electronic Frequency Dividing Network; 51-5145 (one card required per channel)

1. Power amplifier headroom recommendation is 3 dB minimum; i.e., for a 100-watt rating, use a 200-watt amplifier.
2. SPL in dB ref. 20 μPa measured in the reverberant field of a reference room of 85 m^3 (3000 ft^3) with an average absorption of 18.6 m^2 (200 ft^2). Continuous program rating is defined as 3 dB above continuous sine wave power.
3. Averaged from 500 Hz to 2.5 kHz. Unlike many "theater-type" loudspeaker systems that exhibit a rise in the midrange region, the 4345 is a true monitor providing substantially the same sensitivity through the full range of audible frequencies. Thus sensitivity below 500 Hz or above 2.5 kHz may be considerably greater than that of other systems with higher sensitivity ratings.

JBL continually engages in research related to product improvement. New materials, production methods and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description but will always equal or exceed the original specifications unless otherwise stated.

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