
JBL L110

The L110 incorporates the latest advances in bookshelf system design, offering performance characteristics that rival those of the most sophisticated full-sized JBL loudspeaker systems. Each component of the system was engineered to attain the maximum power-flat frequency response, widest sound dispersion, bandwidth and high efficiency. The result is a bookshelf system of exceptional accuracy that also recreates the spaciousness (often referred to as stereo imaging) of an original performance. The L110 realizes the sonic goals of a studio-type loudspeaker system, yet its compact form provides the flexibility of placement needed in the home.

The end product of an extensive research and development effort, the L110 began with re-evaluation of JBL state-of-the-art professional and home entertainment loudspeakers. Extensive listening tests were conducted to identify those characteristics that would be most desirable in a bookshelf loudspeaker system. Whether achieved easily or with difficulty, or thought unattainable through conventional means, each desired characteristic was meticulously pursued by JBL engineers.

The L110 is a natural evolution of JBL's history in the recording industry. The steady, qualitative advances achieved in JBL studio monitors are reflected in our products for the home; and in some cases, JBL home entertainment products have set new standards of performance for recording studio monitors. Such a case is the L110.

Technical Information

Each component of every JBL loudspeaker system is designed and produced by JBL personnel to the most rigorous standards in the industry. JBL loudspeaker frames are massive cast structures, produced to exacting tolerances. Magnetic assemblies are precisely manufactured of low-reluctance iron, energized by large, high grade magnets. Voice coils are held to within one turn of design specifications. Stamped frames and mass-produced voice coils would be less expensive; however, the resultant loss of structural integrity, magnetic force and acoustic efficiency would tend to degrade low-distortion performance and transient response—qualities that have become JBL hallmarks.

Low Frequency The very powerful 10-inch low frequency loudspeaker was designed specifically for accuracy and distortion-free performance in the L110 enclosure. A larger loudspeaker might have been more impressive visually (and many would have expected such a unit in the L110) but would have required compromising bandwidth and accuracy—a compromise that could not be accepted. The moving assembly of the loudspeaker has been optimized for mass, stiffness and density. The back of the cone is coated with an exclusive compound that increases stiffness, damps extraneous vibrations traveling within the cone material, and achieves the precise effective mass for the required efficiency and low frequency performance. The 3-inch voice coil is fabricated of wire milled to a flat ribbon, wound on edge by hand. Edgewinding places more coil material in the magnetic field, increasing efficiency and transient response. Precise machining and the closed configuration of the 7½-pound magnetic assembly concentrates all the force of the Alnico V magnet in the voice coil gap. Although used below 800 Hz in this system, the loudspeaker exhibits smooth response beyond 3 kHz for exceptional rise time, heard as improved transient performance. The result is a 10-inch loudspeaker exhibiting more linear performance and greater bandwidth than could have been obtained from a larger loudspeaker.

Midrange The 5-inch midrange transducer, housed within an isolated sub-chamber to prevent interaction with the low frequency loudspeaker, delivers clear, undistorted reproduction, even at extreme volume levels. Its ⅞-inch diameter copper voice coil is unusually large in relation to cone size for exceptional transient response and acoustic efficiency. A stiff cone is utilized to reduce the possibility of breakup, even at very high power levels. The aluminum center dome provides smooth frequency response through the upper range of the driver, as it operates through the transition frequencies to the high frequency dome radiator. Since the transducer is considerably more efficient than the low frequency loudspeaker, it operates at only a fraction of its full potential, thereby maintaining the substantial reserve dynamic range necessary to

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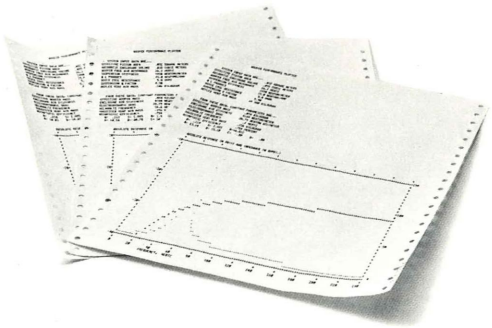
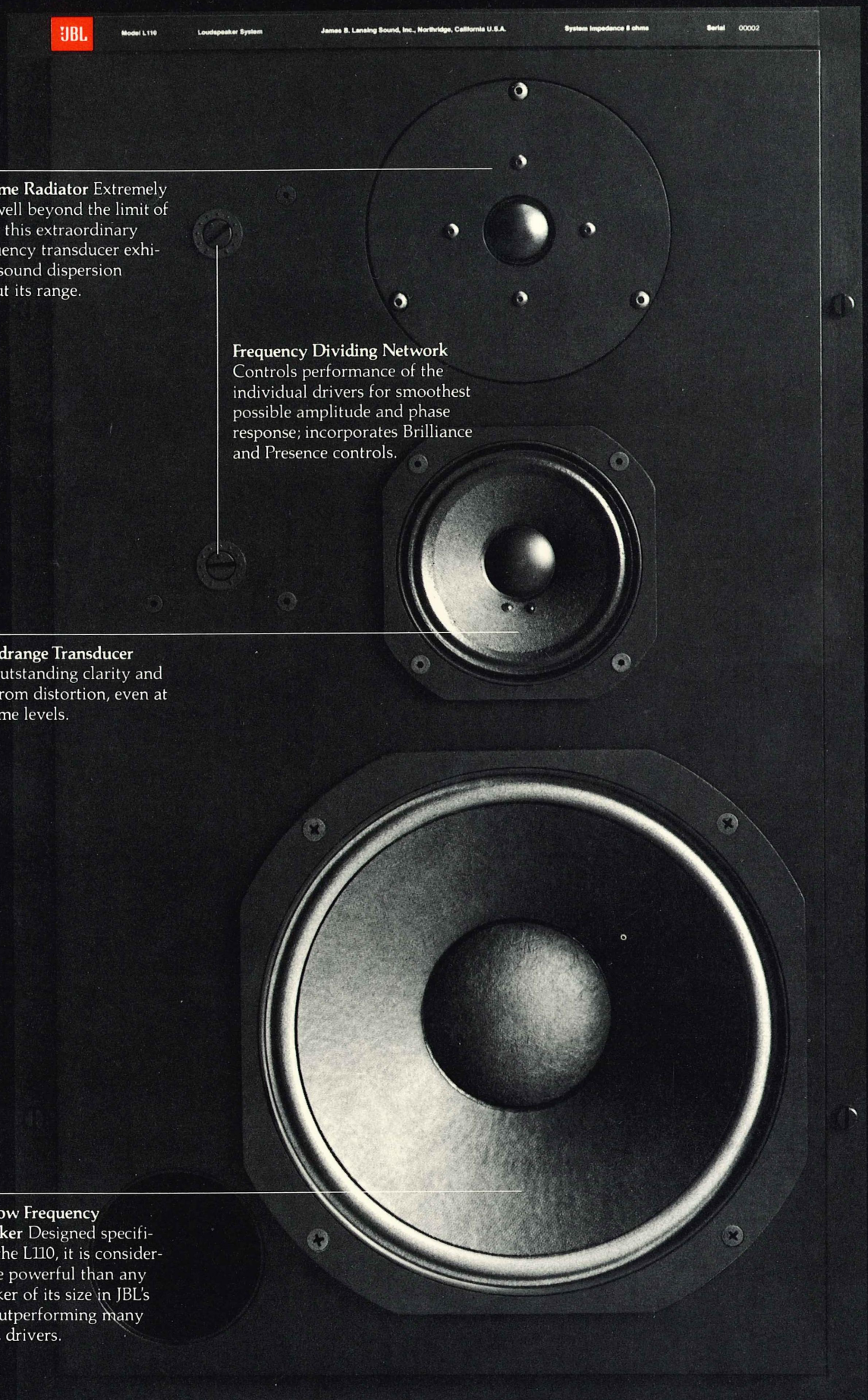
COMPUTER AS A WORKING TOOL

Computer analysis was used to investigate various possible loudspeaker and enclosure tuning configurations. The physical parameters of the low frequency loudspeaker, enclosure volume and port dimensions were entered into a program containing a mathematical analog of the interaction between a low frequency loudspeaker and its enclosure. The computer then produced a calculated plot of frequency response and impedance for each set of parameters. The best were auditioned and then selected for further refinement until an optimum choice could be made for the L110.





1-inch Dome Radiator Extremely accurate well beyond the limit of audibility, this extraordinary high frequency transducer exhibits wide sound dispersion throughout its range.

Frequency Dividing Network Controls performance of the individual drivers for smoothest possible amplitude and phase response; incorporates Brilliance and Presence controls.

5-inch Midrange Transducer Exhibits outstanding clarity and freedom from distortion, even at high volume levels.

10-inch Low Frequency Loudspeaker Designed specifically for the L110, it is considerably more powerful than any loudspeaker of its size in JBL's history, outperforming many larger JBL drivers.

reproduce high intensity program peaks without strain or distortion.

High Frequency The 1-inch dome radiator provides high acoustic output with clarity and wide dispersion. The dome is constructed of two layers of phenolic-impregnated linen bonded together so their weave patterns intersect at 45° angles, providing stiffness and dimensional stability. The dome and voice coil optimize mass, area and strength at the lightest weight possible. The result is a 1-inch dome small enough to provide excellent sound dispersion (which is a function of the relationship between the length of the sound wave reproduced and the diameter of the diaphragm reproducing it), yet light and strong enough to provide high acoustic output. The voice coil is large for a high frequency unit because it follows the circumference—rather than occupying the center—of the radiating surface, resulting in high power handling capacity and improved transient response. Special clamping rings assure linear movement and prevent extraneous reflections from the dome compliance, further contributing to distortion-free performance. The net result of these and other refinements is accurate, powerful high frequency performance extending beyond 30 kHz.

Frequency Dividing Network The basic function of a network is to receive the full-spectrum audio signal from the amplifier or receiver and allocate, or divide, it among the respective drivers of the loudspeaker system. To achieve blended performance, the drivers actually operate, at diminishing output levels, for several octaves above and below the specified nominal crossover frequencies. Final performance of the loudspeaker system is a product of how smoothly the network controls the drivers through these transitions. Variables that must be considered include acoustic and electrical performance characteristics of the individual drivers, enclosure volume and port dimensions—even placement of the drivers on the enclosure baffle panel. The network installed in the L110 utilizes sophisticated impedance-leveling and phase-correcting circuitry assuring that the drivers operate in a near-theoretical manner through the transition frequencies as well as the remainder of their respective operating ranges. This circuitry, combined with the extended frequency response of the individual drivers, results in the exceptionally smooth overall performance of the L110. The network incorporates controls that regulate output of the midrange and high frequency drivers to accommodate variations in room acoustics and personal preferences.

Power Capacity

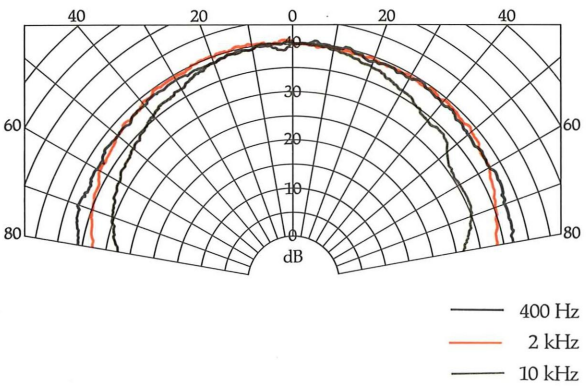
The specified power capacity indicates the continuous program power level that can be accepted by a JBL loudspeaker system without damage. Its peak power capacity is considerably greater than the continuous rated value, as indicated by the remarkable transient response of JBL loudspeaker system components. The L110 will reproduce clean sound at comfortable listening levels when driven by an amplifier having an output of as little as 10 watts continuous sine wave per channel.[1] However, for reproduction of the full dynamic range of contemporary recordings at high volume, a quality amplifier delivering up to 150 watts continuous sine wave per channel will provide optimum performance. Such an amplifier has the reserve power necessary for accurate reproduction of transients, which can reach momentary peaks equivalent to ten times the average power level. In almost all cases, the volume level generated by a JBL loudspeaker will become noticeably discomforting to the ear before the loudspeaker can be damaged by excessive power from the amplifier.

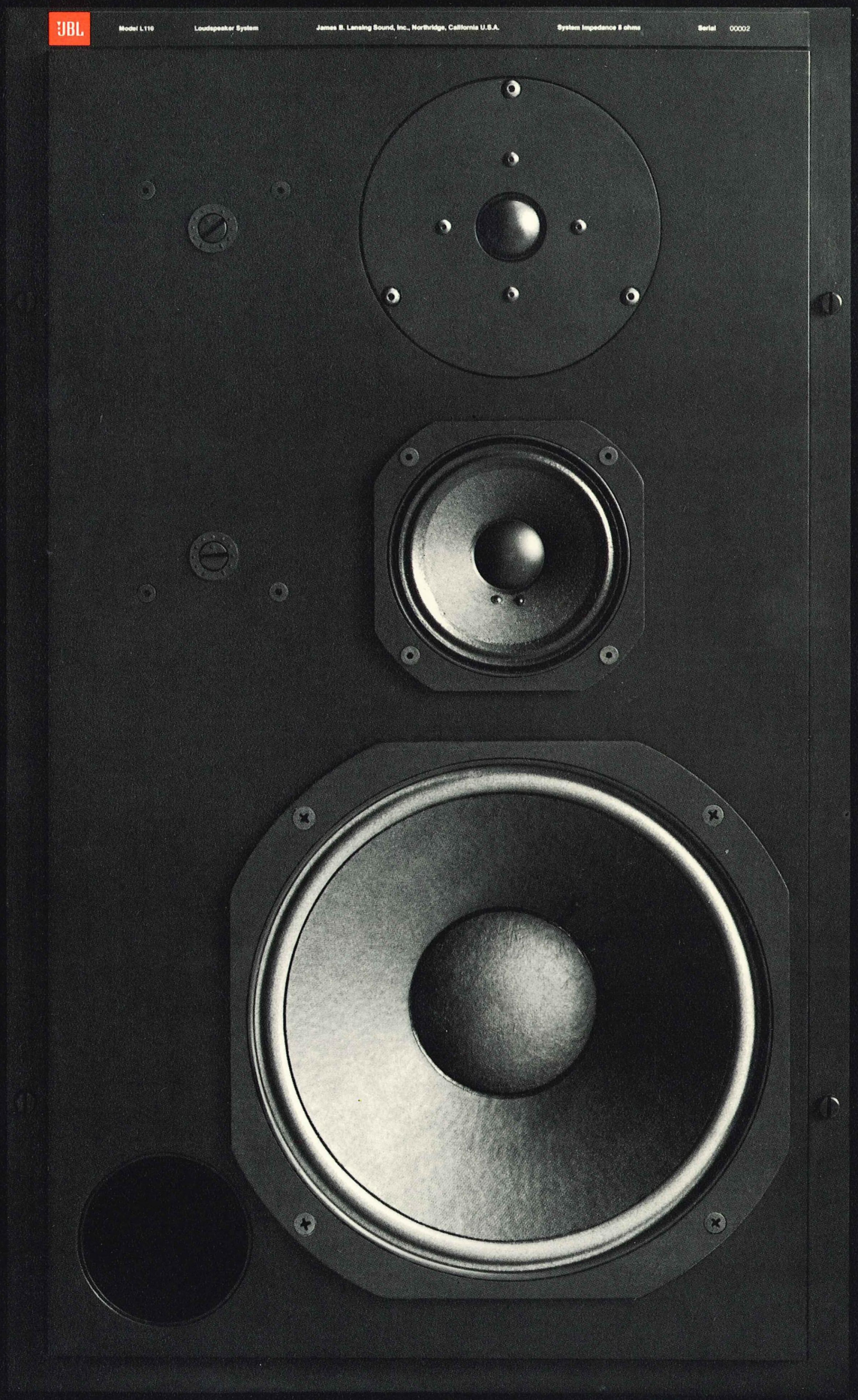
A number of loudspeaker systems can handle large amounts of power; others are highly efficient. JBL products are unique in their ability to combine both attributes. The L110, for example, will convert a 1-watt input into a sound pressure level of 76 dB measured at a distance of 15 feet. This is approximately twice as loud as ordinary conversation and represents a comfortable listening level, demonstrating that the system delivers substantial sound output from very little input power.

1. The continuous sine wave rating of amplifier power is the most stringent method currently used in the audio industry. It should be noted that many amplifier manufacturers use the term "watts rms" as a direct equivalent to the more meaningful "watts continuous sine wave."

HORIZONTAL DISPERSION

This graph demonstrates how well the L110 spreads sound into the listening room. It illustrates the output of the system at three frequencies: 400 Hz, 2 kHz and 10 kHz. These frequencies were selected as representative of system performance in the low, mid and high frequency regions of the audio spectrum. Notice that the output at each of these frequencies is nearly equal through an inclusive arc of 160°, and that there is little variation between output directly in front of the loudspeaker system and as far as 80° to either side. This uniform sound distribution pattern results in excellent stereo imaging when heard in a pair of L110's.




JBL
Model L110
Loudspeaker System
James B. Lansing Sound, Inc., Northridge, California U.S.A.
System Impedance 8 ohms
Serial 00002

Enclosure

The enclosure is a functional component of the loudspeaker system. Its internal volume complements the performance characteristics of the low frequency loudspeaker for maximum bass response while maintaining the desired efficiency. A ducted port extending through the component baffle panel provides proper acoustic loading of the low frequency loudspeaker and optimizes power handling capacity. The three drivers of the system have been positioned in a precisely spaced straight line to provide widest sound dispersion when the enclosure is placed vertically for best possible stereo imaging. The array of drivers has been deliberately placed off center to break up extraneous reflections, further contributing to the spatial accuracy of the loudspeaker system.

Aesthetically, the L110 makes a dramatic visual statement reflective of the loudspeaker system's performance. Its open grille, covered with the most acoustically transparent fabric used on any JBL loudspeaker, reveals the subtle sculptural effect of the satin black-finished components and baffle panel. The L110 enclosure embodies the principles of fine furniture design and construction that have made JBL a leader in the industry. The enclosure panels are constructed of dense compressed wood. This material, also known as particle board, is preferred to solid wood for its acoustic properties. The finish veneer on the four side panels is solid American Black Walnut. All walnut surfaces are hand rubbed to a rich, lustrous finish enhancing the natural beauty of individual grain structure and color. Detail work is obvious: materials are carefully selected and skillfully prepared; joints are expertly closed; scratches, dents, gluelines and other defects are non-existent. To achieve maximum strength and resistance to vibration, all panels are constructed of ¾- or 1-inch (19 or 25 mm) stock, and acoustic damping material is applied to the interior surfaces of side and back panels to attenuate standing waves within the enclosure.

Specifications

Rather than repeat the ambiguity of most technical specifications, JBL has traditionally refrained from listing data for which no widely accepted test procedure has been established. In the absence of such standards any well equipped laboratory can legitimately produce a variety of frequency response curves for a loudspeaker, depending on the conditions selected. At JBL the final analyses are comprised of extensive listening sessions. Although laboratory data are an integral part of the process, the trained ear is the ultimate criterion. The success of this philosophy is reflected in the enthusiastic acceptance of JBL systems by recording studio engineers, producers and performers—professionals whose artistic achievements are closely related to the equipment they use.

Power Capacity[1]	75 watts continuous program	
Nominal Impedance	8 ohms	
Dispersion[2]	150° at 15 kHz, 90° at 20 kHz	
Crossover Frequencies	800 and 4000 Hz	
System Sensitivity[3]	1 watt produces 76 dB sound pressure level at a distance of 4.6 m (15 ft)	
(Note: 75 - 80 dB is a comfortable listening level.)		
Low Frequency Loudspeaker		
Nominal Diameter	250 mm	10 in
Voice Coil	76-mm (3 in) edgewound copper ribbon	
Magnetic Assembly Weight	3.4 kg	7½ lb
Flux Density	1.1 tesla (11,000 gauss)	
Sensitivity[4]	40 dB SPL	
Midrange Transducer		
Nominal Diameter	130 mm	5 in
Voice Coil	22-mm (⅞ in) copper	
Magnetic Assembly Weight	0.74 kg	1⅝ lb
Flux Density	1.4 tesla (14,000 gauss)	
Sensitivity[5]	40 dB SPL	
High Frequency Dome Radiator		
Nominal Diameter	25 mm	1 in
Voice Coil	25-mm (1 in) aluminum	
Magnetic Assembly Weight	0.68 kg	1½ lb
Flux Density	1.4 tesla (14,000 gauss)	
Sensitivity[6]	40 dB SPL	
General		
Finish	Oiled Walnut	
Grille	Semi-transparent Black Fabric	
Dimensions	597 mm x 362 mm x 286 mm deep 23½ in x 14¼ in x 11¼ in deep	
Shipping Weight	23 kg	50 lb

1. Based on a laboratory test signal. See Power Capacity section for amplifier power recommendations.
2. The angle through which system output is diminished by no more than 6 dB relative to system output measured directly on axis.
3. System sensitivity can also be expressed as 89 dB SPL at 1 metre (3.3 ft). All sensitivities are measured under hemispherical free-field conditions. In a room, an additional 1 to 3 dB SPL would be achieved.
4. Since the major portion of the energy reproduced by the low frequency loudspeaker lies below 800 Hz, this specification represents the sensitivity, within 1 dB, at 30 feet (9.1 m) using a 1-mW test signal swept from 100 to 500 Hz, rather than the 1-kHz sine wave test signal on which the conventional EIA sensitivity rating is based.
5. Averaged sensitivity from 1 to 3kHz, within 1 dB, at 30 feet (9.1 m) with a 1-mW input.
6. Averaged sensitivity from 5 to 20 kHz, within 1 dB, at 30 feet (9.1 m) with a 1-mW input.

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 design specifications unless otherwise stated.

JBL

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