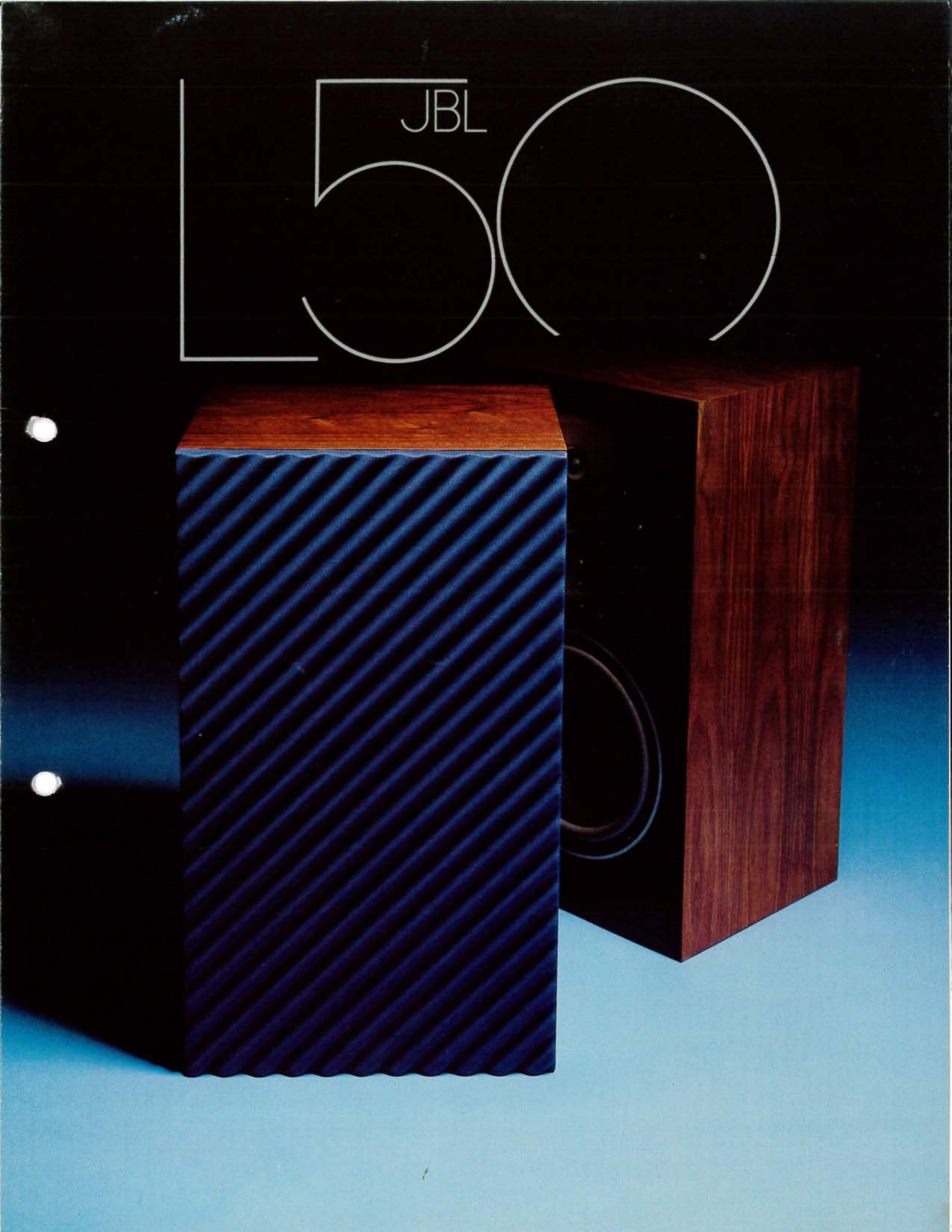
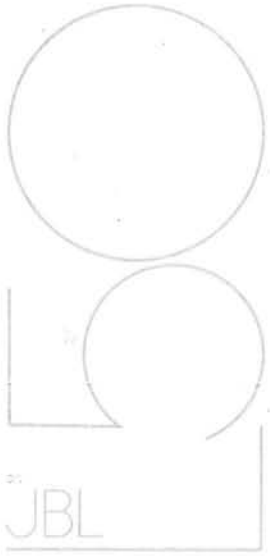
JBL

L50





High Freque

The L50 is the least expensive three-way system made by JBL, but it sounds like more. It is a direct result of the thorough, innovative engineering that produced the remarkable JBL L212 and L110 loudspeaker systems, and delivers much of their exceptional accuracy and realism at a more moderate price. In design integrity and sophistication, the L50 is the equal of its more costly predecessors. It includes one of the most advanced frequency dividing networks JBL has yet produced, and was designed using the most modern techniques available: computer analysis and laser interferometry.

JBL engineers programmed a computer with a very accurate mathematical model of a loudspeaker in its enclosure. The computer produced theoretical plots of impedance and frequency response for several sets of conditions. Laboratory samples of the most promising computer simulations were built and actual performance measurements were compared with the computer simulations. Because no computer can match the discernment of the human ear, several different prototypes were evaluated extensively by a listening panel. The final system was refined in response to these listening tests.

JBL also conducted holographic studies of the midrange loudspeaker under dynamic conditions, attempting to improve critical cone materials and design. This type of laser interferometry study provides a specific answer to the question of cone behavior throughout the frequency range of a loudspeaker, making it one of the most powerful tools available to the acoustic designer.

Components

Each component of every JBL loudspeaker system is designed and produced 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 within one turn of design specifications. Cones are designed for the best combination of stiffness, density and weight.

Low Frequency

Extensive research resulted in a new 250-mm (10-inch) loudspeaker with a 100-mm (4-inch) center dome. This driver employs a 50-mm (2-inch) voice coil and 1.1-kg (2½-pound) magnetic assembly energized by a powerful Alnico V magnet. The voice coil is large and the magnetic assembly massive in comparison to most loudspeakers of this size, resulting in increased efficiency and superior transient response. At higher frequencies, energy is coupled to the center dome. Radiation from the dome's smaller area (relative to the total area of the cone) maintains smooth response and wide dispersion to frequencies far higher than the primary operating range of the driver, essential for smooth transition to the midrange loudspeaker.

A unique fiberglass acoustic resistance shell matches the loudspeaker's characteristics to the enclosure volume. In place behind the loudspeaker, it provides damping without restricting normal cone movement. The result is a flatter impedance curve and more nearly linear frequency response throughout the bass region.

Midrange

The 130-mm (5-inch) midrange loudspeaker, housed within an isolated sub-chamber to prevent detrimental interaction with the low frequency loudspeaker, delivers undistorted reproduction even at extreme volume levels. Its 22-mm (⅞-inch) diameter copper voice coil is unusually large in relation to cone size, yielding exceptional transient response and efficiency. A very stiff cone is used to reduce the possibility of cone breakup at very high power levels. The aluminum center dome provides smooth frequency response through the transition to the high frequency loudspeaker. Because the midrange loudspeaker is considerably more efficient than the low frequency loudspeaker, it operates well below its full potential, thereby maintaining the substantial reserve dynamic range necessary to reproduce high intensity program peaks without strain or distortion.

High Frequency

The exceptionally open high frequency reproduction of the L50 is provided by a 36-mm (1.4-inch) loudspeaker. Despite its large magnetic assembly and voice coil, the diameter has been kept small to achieve excellent dispersion. The cone compliance is surrounded by a hard, sloped surface that serves as a transition to the enclosure baffle, eliminating discontinuities and diffraction effects. This method of coupling the high frequency loudspeaker to the baffle has proved to be more effective than the use of sound absorbent materials.

ncy

Midrange

Low Frequency

Frequency Dividing Network

The signal from the amplifier consists of wide range of frequencies. The frequency dividing network allocates each portion of the audio spectrum to the appropriate component of the loudspeaker system. Smooth, imperceptible operation of the network is vitally important; otherwise, the listener would perceive the performance of individual components rather than that of an integrated loudspeaker system.

To achieve blended performance, the drivers operate at diminishing output levels above and below the stated crossover frequencies. Variables that must be considered in network design include the acoustic and electrical characteristics of the individual drivers and the placement of the drivers on the baffle. The network installed in the L50 incorporates impedance-leveling and phase correcting circuitry, ensuring that the system operates in a nearly ideal manner through the transition frequencies. This circuitry, combined with the extended frequency response of the individual drivers, gives the sound of the L50 its startling transparency.

The network is equipped with controls for midrange and high frequency output to accommodate variations in room acoustics and personal preferences.

Total Energy Response

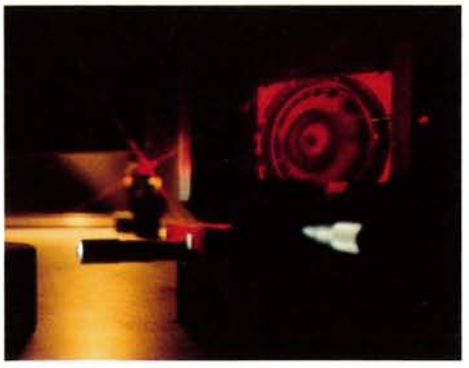
Like the L212 and L110 systems whose technology it shares, the L50 was engineered not only for wideband response and wide high frequency dispersion, but for the most consistent possible dispersion throughout the operating range of the system. Virtually every aspect of the design of the L50 contributes to this difficult achievement, such as the vertical array of the drivers, which minimizes interference in the critical horizontal plane. The L50 establishes a sonic image with precision, solidity and depth: essential ingredients of realism in sound reproduction lost to systems of lesser sophistication.

Power Capacity

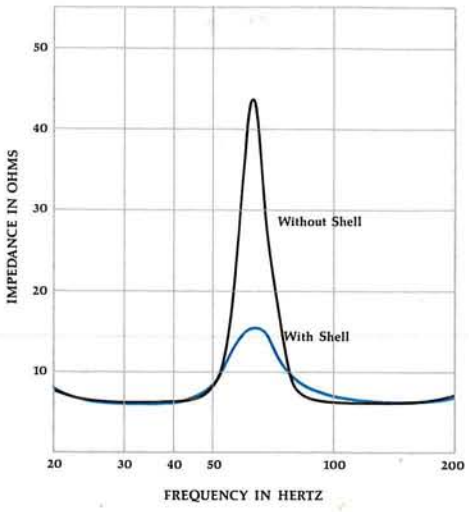
The specified power capacity indicates the continuous program power level that can be accepted by the L50. Its peak power capacity is considerably greater than the continuous rated value, as indicated by the remarkable transient response of JBL components. The L50 produces sound at comfortable listening 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 high quality amplifier delivering up to 60 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.

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.

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



In the JBL laser laboratory, holograms are used to study the behavior of loudspeaker components under operating conditions.



Effect of the Acoustic Resistance Shell
Impedance curves of the low frequency loudspeaker mounted in the L50 enclosure were taken under standard laboratory test conditions. The effect of the shell can be seen by comparing the curves. Impedance is the electrical load the loudspeaker presents to the amplifier; current from the amplifier drives the loudspeaker. Amplifiers provide less current at higher impedances. Therefore, the amplifier has less control of the loudspeaker through those frequencies corresponding to the sharp peak in the impedance curve. The shell considerably reduces the magnitude of the peak. The smoother impedance enables the amplifier to maintain consistent control of the loudspeaker throughout its operating range.

Enclosure

The enclosure is a functional component of the loudspeaker system. Its internal volume is matched to the characteristics of the low frequency loudspeaker. A ducted port extending through the baffle provides proper acoustic loading for optimum bass response while maintaining efficiency and power capacity.

The L50 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, superior to solid wood in its acoustic properties. The finish veneer is American black walnut, hand rubbed to a lustrous finish that enhances the natural beauty of grain structure and color. Detail work is apparent: materials are carefully selected and skillfully prepared; joints are expertly closed; scratches, dents, gluelines and other defects are nonexistent. To achieve maximum strength and resistance to vibration, all panels are constructed of 19-mm (¾-inch) stock; side and back panels are lined with acoustic damping material to attenuate standing waves within the enclosure.

Specifications

JBL has traditionally refrained from listing data for which no widely accepted test procedures has been established. In the absence of such standards, any laboratory can legitimately produce a variety of values, depending on the conditions selected.

Power Capacity[1]	35 watts continuous program	
Nominal Impedance	8 ohms	
Dispersion[2]	120° at 15 kHz	
Crossover Frequencies	800 Hz, 3 kHz	
System Sensitivity[3]	88 dB SPL, 1 watt, 1 m (3.3 ft)	
Low Frequency Loudspeaker		
Nominal Diameter	250 mm	10 in
Voice Coil	50-mm (2-in) copper	
Magnetic Assembly Weight	1.1 kg	2.5 lb
Flux Density	0.85 tesla (8500 gauss)	
Sensitivity[4]	88 dB SPL, 1 watt, 1 m (3.3 ft)	
Midrange Loudspeaker		
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]	91 dB SPL, 1 watt, 1 m (3.3 ft)	
High Frequency Loudspeaker		
Nominal Diameter	36 mm	1½ in
Voice Coil	16-mm (⅝-in) copper	
Magnetic Assembly Weight	0.74 kg	1⅝ lb
Flux Density	1.5 tesla (15,000 gauss)	
Sensitivity[6]	91 dB SPL, 1 watt, 1 m (3.3 ft)	
General		
Finish	Oiled walnut	
Grille Colors	Blue, brown, rust	
Dimensions	622 mm x 362 mm x 314 mm deep 24½ in x 14¼ in x 12 11/32 in deep	
Shipping Weight	21 kg	47 lb

1. See Power Capacity section for amplifier power recommendations.
2. The angle through which output diminishes no more than 6 dB relative to output on axis.
3. All sensitivities are measured under hemispherical free-field conditions. In a room, an additional 1 to 3 dB SPL would be realized.
4. Averaged from 100 Hz to 500 Hz, within 1 dB.
5. Averaged from 1 kHz to 3 kHz, within 1 dB.
6. Averaged above 2 kHz, within 1 dB.

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.

James B. Lansing Sound, Inc.
8500 Balboa Boulevard
Northridge, California 91329 U.S.A.

SB50/1-78 Printed in U.S.A.