High Frequency
Dome Radiator

Midrange Loudspeaker

Low Frequency
Loudspeaker

Passive
Radiator

Low Frequency

The newly developed 300 mm (12 in) low frequency loudspeaker produces the powerful bass of the L150. The driver utilizes a stiff, heavy cone, coated with an exclusive damping formulation (the white material on the cone) to give it optimum mass and density. The 75 mm (3 in) voice coil, formed of copper ribbon and hand wound on edge, is powered by a 4.7 kg (10¼ lb) magnetic assembly. Because the voice coil is unusually large for a 300 mm driver, the L150 offers exceptional transient response and high efficiency.

The magnetic assembly is the first JBL low frequency design to incorporate a ferrite magnet. Ferrite magnets have many desirable characteristics, but these have been overshadowed in conventional designs by unacceptably high (by JBL standards) levels of second- and third-harmonic distortion. However, after two years of concentrated research, JBL engineers have developed an assembly that solves the distortion problem.

One key to the new JBL design is the Symmetrical Field Geometry (SFG). Accurate reproduction of the audio signal requires that the cone and voice coil move in or out with equal facility. This does not happen in conventional designs because the magnetic field around the voice coil gap is not symmetrical; such designs generate large amounts of third-harmonic distortion. JBL's new SFG design greatly reduces this distortion by creating a symmetrical magnetic field on both sides of the gap.

JBL has also devised an innovative solution to the problem of second-harmonic distortion. As the voice coil moves in the gap in a conventional ferrite design, the electrical field produced by the coil (from the audio signal) modulates the flux in the magnetic structure. This in turn affects cone movement and generates from 3% to 5% second-harmonic distortion. JBL engineers found an ingenious solution—the Flux Stabilizer, an aluminum ring surrounding the pole piece. The Flux Stabilizer minimizes this flux modulation and thereby reduces second-harmonic distortion to 0.01% or less.

The low frequency reproduction of this driver is not only powerful, but *clean*, exhibiting a depth and transparency seldom encountered outside a live performance.

A 300 mm (12 in) passive radiator extends bass response to the lowest octaves. The passive radiator, essentially a loudspeaker cone with no magnet or voice coil but of a precise mass, takes the place of a large volume of air and allows the L150 to achieve its deep bass in an enclosure of modest size. Similar performance from a conventionally ported system would require a much larger enclosure; a completely sealed (acoustic suspension) design would be much less efficient.

Midrange

The 130 mm (5 in) midrange driver, housed in an isolated sub-chamber to prevent interaction with the low frequency loudspeaker, delivers clear, undistorted reproduction, even at extremely high volume levels. The combination of a stiff cone and large voice coil (22 mm, 7/8 in) give this driver exceptionally good transient response, crucial to accurate reproduction. The midrange driver is designed to be more efficient than the low frequency loudspeaker in order to maintain the substantial reserve dynamic range necessary to reproduce high-intensity program peaks without strain or distortion. (This reserve dynamic range is important because most music has far more energy in the midrange than in the bass or treble regions.)

High Frequency

The 25 mm (1 in) dome radiator produces high acoustic output with exceptional clarity and dispersion. The dome is constructed from phenolic-impregnated linen and combines stiffness with light weight; it is small enough to provide the dispersion necessary for excellent stereo imaging, yet strong enough to produce live-performance volume levels without distorting. Special clamping rings assure linear movement to further aid in distortion-free performance.

Freqency Dividing Network

The dividing network receives the signal from the amplifier and allocates each portion to the appropriate driver. The sophisticated network of the L150 utilizes phase-correcting and impedance-leveling circuitry so that the drivers operate through the transition frequencies in a manner approaching the theoretical ideal. All of the network components are mounted on a single large printed circuit board, which improves the already excellent reliability. The dividing network of the L150 does its job so well that the listener will never be aware of separate drivers—just the smooth, transparent sound.

Controls for midrange and high frequency output accommodate variations in room acoustics and personal preferences.