

JBL

PUBLICATION SB1209

D50SMS7 ENERGIZED

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SELF-POWERED
PROFESSIONAL
STUDIO
MONITOR



D50SMS7 This JBL loudspeaker system was designed to meet the need for a compact professional monitor capable of reproducing the full frequency and dynamic range of master recordings. Its exceptionally smooth response, uniform dispersion, and high power-handling capacity have made it the first choice of record manufacturers and broadcasting networks.

The D50SMS7 is equally well suited to the demands of medium-size auditoriums, theaters, and other installations requiring sound reproduction or reinforcement of the highest quality. In sound reinforcement applications, the absence of response peaks or directional lobes means that greater acoustic intensity can be obtained without approaching the point of acoustic feedback.

The efficiency of the D50SMS7 is considerably higher than that of other "infinite baffle" loudspeaker systems. In spite of its modest proportions, it is only 6-8 db less efficient than very large JBL horn-loaded theater systems. Its high sensitivity, plus full 60 watt power-handling ability, allows the studio monitor to be used in the most demanding applications without distortion or danger of overload.

Height . . . 30"
Width . . . 23 3/4"
Depth . . . 20"

Professional audio consultants and engineers are invited to compare the JBL D50SMS7 with other monitor loudspeakers, both on the basis of acoustical measurements and extended listening tests.

C50SM ENCLOSURE WITH S7 SPEAKER SYSTEM INSTALLED

- Professional two-way loudspeaker components: 15-inch long-excursion low frequency loudspeaker and horn-loaded high frequency assembly with acoustic lens.
 - Smooth response, uniform spatial distribution, and high power-handling capacity through the full range of audible frequencies.
 - Specially designed 500 cps crossover network with 12 db per octave attenuation and adjustable high frequency intensity.
 - Rigidly constructed enclosure provides optimum acoustic loading for the loudspeaker components, yet is modest in size.
 - System may be wall-hung or used as a freestanding reproducer.
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D50SMS7

The photo at right shows a rear view of the system with the JBL Solid State Energizer installed. The Energizer is a matching audio power source which mounts directly in the rear panel of the enclosure. It is described more fully on the last page of this bulletin.



REAR VIEW

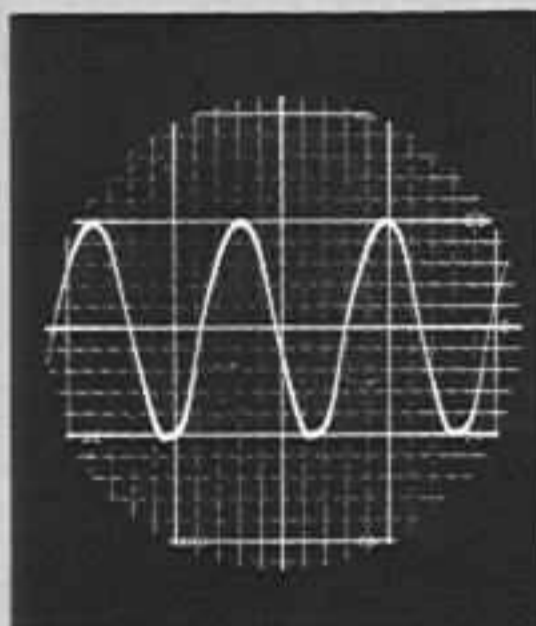
C50SM ENCLOSURE Although modestly proportioned, the C50SM provides six cubic feet of internal volume to bring out the full bass capabilities of the low frequency loudspeaker. All panels are made from 3/4-inch stock, rigidly braced and strutted to prevent unwanted resonance. Joints are lock-mitred and wood-welded. Interior surfaces are lined with heavy absorptive padding.

The wrap-around grille of the enclosure is not a mere decorative touch — the lateral high frequency dispersion of the acoustic lens is so wide that a substantial amount of energy is propagated at right angles to the axis of the transducer and must not be obstructed.

Model C50SM is finished in Satin Gray and supplied with Silver Gray grille fabric. It can also be furnished as an unfinished enclosure. It can be safely supported by brackets bolted to the rear or side panels. In wall-hung installations, the enclosure may be inverted if desired.

This unretouched photo shows the actual acoustic output of the LE15A when driven by 60 watts of continuous sine wave power at a frequency of 40 cps. A calibrated laboratory microphone was used to pick up the sound from the D50SMS7. The signal from the microphone was connected directly to an oscilloscope, and the trace photographed.

Naturally, sustained performance at this ear-splitting intensity would never be required during normal use. A 60-watt sine wave signal represents a far more difficult job for the speaker than its rated power capacity of 60 watts program material. Yet it can be seen that the acoustic output of the LE15A is an almost perfect sine wave. Moreover, the rugged edgewound copper ribbon voice coil and Lansaloy cone suspension enable the LE15A to operate indefinitely without breakdown, even at highest power levels.



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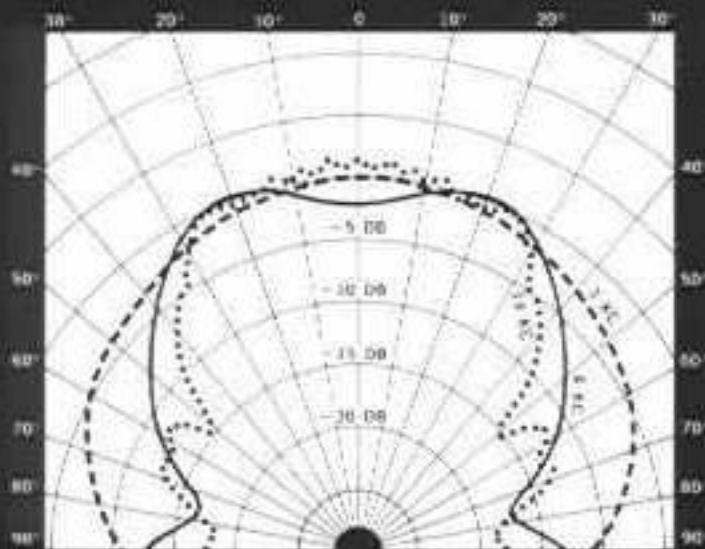
S7 SYSTEM COMPONENTS Low frequencies are reproduced by the JBL LE15A, a 15-inch Linear Efficiency bass driver with 4-inch edgewound copper ribbon voice coil. The free air resonance of the LE15A is 20 cps. The flux density in the voice coil gap is 9500 gauss and the total flux is 450,000 maxwells. Because of the sophisticated magnetic circuit and voice coil configuration, the coupling coefficient of the speaker is exceptionally high — 10 watts of DC into the voice coil terminals produces 5½ pounds of force acting on the cone assembly.

The outer edge of the LE15A cone is terminated in a molded ring of Lans-a-loy. This material, developed by JBL engineers, allows the cone to move through wide excursions with a linear force/displacement relationship. The Lans-a-loy termination also acts as a non-reflective acoustic termination for spurious wave energy travelling through the material of the cone.

Above a crossover frequency of 500 cps, the LE85 high frequency driver operates smoothly through a range greater than five octaves. The diaphragm of the LE85 is hydro-pneumatically drawn to shape from .002" dural alloy and is driven by a 1¼" edgewound aluminum ribbon voice coil operating in a field of 19,000 gauss. A pure silver impedance-controlling ring counteracts the voice coil inductive component, resulting in greatly improved efficiency through the highest octave of audible frequencies. Sound from the diaphragm is conducted to the horn throat through concentric channels of a mathematically determined phasing plug. Sound waves are conducted to the horn throat in constant phase relationship.

The LE85 is coupled to a heavy cast aluminum exponential horn and slant-plate acoustic lens. The JBL L91 lens is designed according to advanced wave propagation theory and acts exactly as a divergent optical lens. The formula for hyperbolic cylindrical lenses is used to determine the basic parameters of the L91. The lens employs eleven plates set at an angle of 38 degrees and spaced 0.25 inches center to center. Because of the precisely calculated hyperbolic curvature of the front of the lens, sound is spread evenly through a 120 degree lateral angle, but restricted to approximately 40 degrees in the vertical direction.

The transition between low and high frequency transducers is made by a crossover network whose circuit was determined by extended acoustic tests with the components of the S7 system. The network includes special reactive components to compensate for the complex impedance characteristics of the transducers, and to maintain the desired 12 db per octave slope in terms of actual acoustic output. A three-position switch allows the intensity of the high frequency driver to be balanced to the "liveness" of the listening environment. The attenuation circuit uses a tapped autotransformer rather than resistive pads so that the coupling between amplifier and transducer is not affected by the setting of the control.

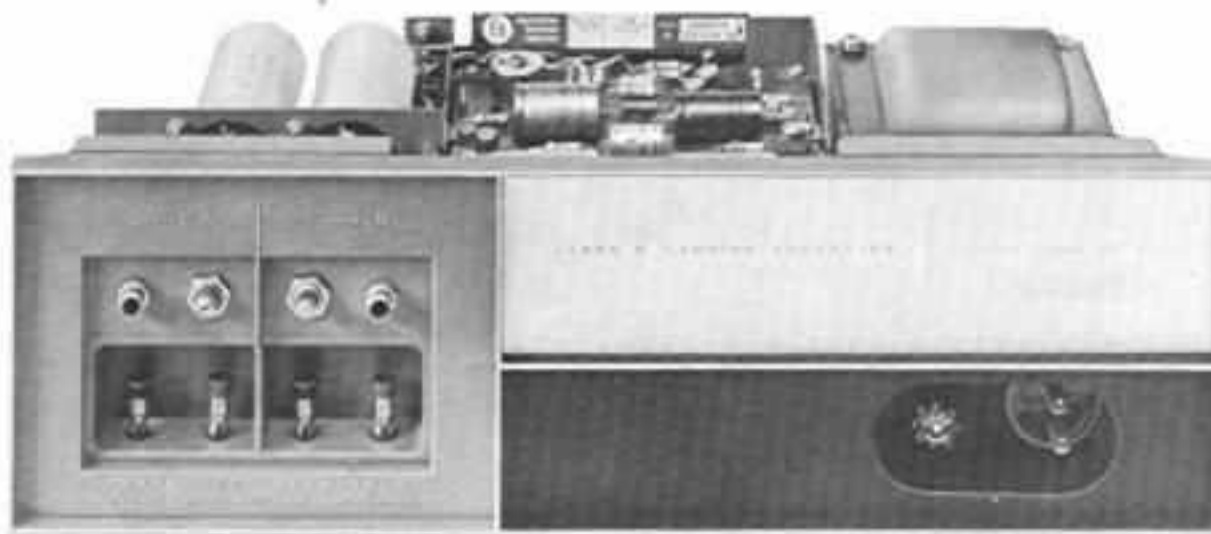


This polar response graph shows the horizontal sound dispersion of the high frequency assembly used in the JBL S7 loudspeaker system. The curves were traced by an automatic recorder with the transducer located in a free-field environment. The power fed to the LE85 driver was adjusted to give the same 0 db reference in all cases.

Note that even without help from the adjacent reflecting surfaces which are present when the assembly is installed in a cabinet, the distribution pattern is extremely smooth over a wide horizontal angle. There are no prominent lobes, and all three curves follow each other closely even though they cover a frequency range of almost four octaves.

In free space, a listener sitting 45° off the axis of the D50SM57 would hear almost exactly the same overall response as someone directly on axis. The reflected sound present in any normal listening environment effectively swamps out even these minor differences, so that uniform coverage through a lateral angle of approximately 120° is achieved.

D50SMS7



JBL STEREO ENERGIZER JBL has long recognized the intimate relationship between a loudspeaker system and the signal power source. By controlling generator impedance for critical damping and making slight corrective adjustments in the frequency response contour, it is possible to achieve performance noticeably superior to that obtained when the same speaker system is connected to an all-purpose power amplifier. The JBL Solid State Energizer takes the place of a conventional stereo power amplifier—it supplies a signal precisely tailored to the requirements of the D50SMS7 and is installed directly in one loudspeaker enclosure. Problems of heat, microphonics, tube replacement are eliminated.

In professional applications, Energizer inputs can be bridged across standard 500-600 ohm program lines. When each pair of monitor loudspeakers is self-energized, there are none of the usual difficulties associated with impedance matching, power losses in long lines, or controlling the intensity of individual loudspeakers.

The D50SMS7 may be ordered in stereo pairs with the Energizer factory-installed in one enclosure. Where existing power amplifiers are to be used, the D50SMS7 can be supplied without the Energizer.

S8 SYSTEM COMPONENTS Those users who wish to take advantage of the distinctive qualities of the JBL 375 driver may purchase the C50SM with the JBL S8 system installed. The S8 uses the same low frequency driver and crossover network as the S7, but the massive 375 high frequency driver takes the place of the LE85. A special cast aluminum horn is used to couple the 375 driver to the slant-plate acoustic lens.

PERFORMANCE Whether the S7 or S8 components are installed in the C50SM, performance represents the closest approach to perfection at the present state of the art. Recording studios and acoustic consultants who have tested the performance of these systems in their own laboratories have been universally enthusiastic in their reports. The D50SMS7 is used by numerous broadcast and recording studios in the United States and abroad. Professional users include Capitol Records, Columbia Records, CBS Television, Decca Records, and MGM Verve.

If you require more detailed information regarding specific applications, please feel free to write to the JBL Technical Service Department.

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Publication SB1209 • Printed in U.S.A. • November, 1967