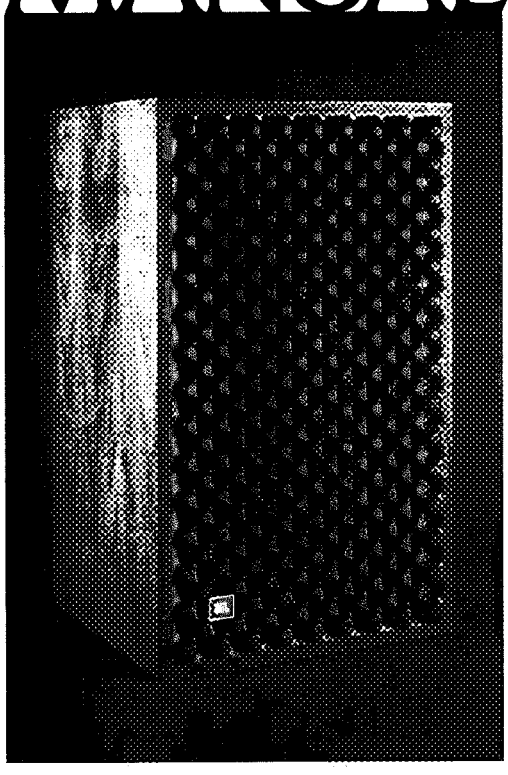
L166 HORIZON INSTRUCTION MANUAL



Excellence is an elusive quality. It's so easy to recognize yet so difficult to attain.

JBL craftsmen have been involved in the art of sound for more than a generation—signal and source, wood and fabric, transducers and acoustics—all of it.

Today these craftsmen continue to perform to the most rigid standards any craftsmen can submit to: those they impose upon themselves.

JBL loudspeakers are carefully engineered instruments, painstakingly crafted and assembled to watchmakers' standards. JBL enclosures express the excitement of creative design; they are elegant, solid and flawlessly finished. JBL transducers and electronics offer what has been characterized by devoted music listeners as the "incomparable JBL sound."

By following the few simple suggestions contained in this booklet, you can look forward to superb high fidelity reproduction that will retain its clarity and realism year after year.

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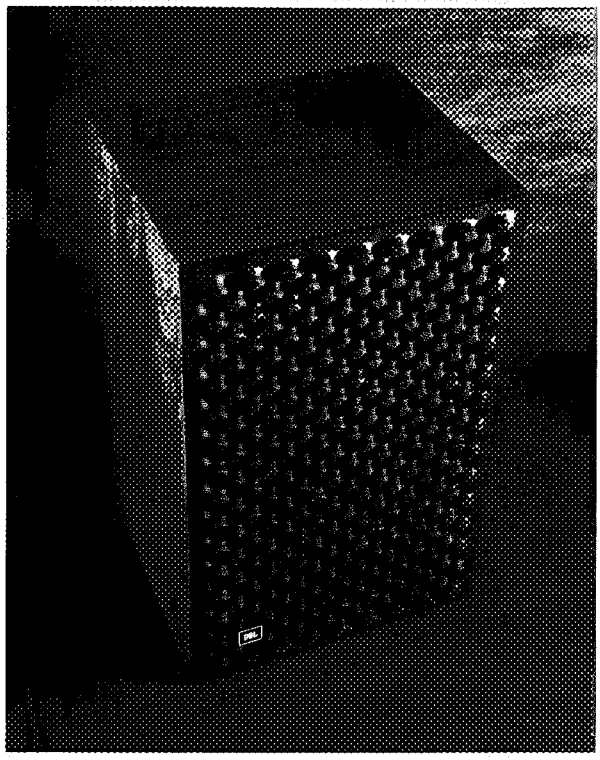

The L166 Horizon is a bookshelf loudspeaker system incorporating significant improvements in overall accuracy, transient response, clarity, bandwidth and sound distribution, combined with the capability to effortlessly reproduce even the most complex program material at high volume levels. It features an exciting new high frequency hemispherical radiator. The system also includes a 12-inch low frequency loudspeaker designed specifically for the 1.75-cubic foot internal volume of the Horizon enclosure, and a 5-inch midrange transducer selected for optimum performance with the new bass and treble components.

The grille was developed from a unique material called APP. JBL research engineers found that when perforated and formed, APP became the most acoustically transparent grille yet tested, having no detrimental effect on frequency response or sound distribution.

To accurately test the loudspeaker system, a set of evaluation parameters was developed and specifications derived from measurements made under standard laboratory test conditions. The L166 was mounted in the measured center of a large flat baffle in a reverberation-free environment, and a calibrated condenser microphone was suspended at a specified distance from the sound source. All electronic equipment was checked and calibrated before tests were run.

Due to the wide-angle sound dispersion characteristics of the loudspeaker system components installed in the L166, frequency response measured up to 75° off-axis, horizontally or vertically, does not deviate more than 6 dB from on-axis response.

A number of compact loudspeaker systems can handle large amounts of power; others are highly efficient. JBL products are unique in their ability to combine both attributes. The L166 Horizon, for example, will convert a 1-Watt input of "white noise"[1] into a sound pressure level of 76 dB at a distance of 15 feet[2] This is approximately twice as loud as ordinary conversation and represents a comfortable listening level, demonstrating that the L166 delivers substantial output from very little input power.

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

1. "White noise" is a rigorous test simulating average musical program material under laboratory conditions. It provides a controlled means of energizing all the transducers of a loudspeaker system simultaneously. "White noise" encompasses all audible frequencies just as white light includes all the colors of the visible spectrum. Produced in the laboratory by a signal generator, "white noise" sounds very much like the hiss heard between FM radio stations.

2. A decibel (dB), in this context, is a unit expressing relative loudness of sound. Three dB is approximately equal to the smallest change in loudness of program material ordinarily detectable by the human ear.

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	Greater than 150° to 20 kHz
Crossover Frequencies	1,000 and 6,000 Hz
System Sensitivity	1 Watt input produces 76 dB Sound Pressure Level at a distance of 15'

(Note: 75-80 dB is a comfortable listening level.)

Low Frequency Loudspeaker

Nominal Diameter	12 inches 30cm
Voice Coil	3-inch (7.6cm) edgewound copper ribbon
Magnetic Assembly Weight	7½ pounds 3.4 kg
Flux Density	11,000 gauss
Sensitivity[2]	40 dB SPL

Midrange Transducer

Nominal Diameter	5 inches 13cm
Voice Coil	⅞-inch (2.2cm) copper
Magnetic Assembly Weight	1⅝ pounds 0.7 kg
Flux Density	15,000 gauss
Sensitivity[3]	46 dB SPL

High Frequency Hemispherical Radiator

Hemisphere Diameter	1-inch 2.5cm
Voice Coil	1-inch (2.5cm) aluminum
Magnetic Assembly Weight	1½ pounds 0.680 kg
Flux Density	13,000 gauss
Sensitivity[4]	42 dB SPL
Finish	Oiled Walnut
Grille	APP
Dimensions	14¼"x23½"x13" deep 36.2cmx59.7cmx33.0cm deep
Shipping Weight	55 lbs 25 kg

1. Based on a laboratory test signal. See Power Capacity section for amplifier power recommendation.
2. Since the major portion of the energy reproduced by the low frequency loudspeaker lies below 800 Hz, this specification has been developed by using a test signal warbled from 100 to 500 Hz, rather than the 1-kHz sine wave test signal on which the conventional EIA Sensitivity rating is based.
3. Averaged from 1 to 3 kHz, within 1 dB, measured at 30 feet (9.1m) with a 1-milliwatt input.
4. Averaged from 5 to 20 kHz, within 1 dB, measured at 30 feet (9.1m) with a 1-milliwatt input.

CONNECTING THE L166

IMPORTANT: When connecting or disconnecting loudspeakers from an amplifier, the amplifier must be turned off. Making connections while the amplifier is operating could seriously damage the loudspeaker system and void the warranty.

Eighteen-gauge insulated wire (ordinary household lampcord) is the minimum size recommended for loudspeaker connections up to 50 feet. Beyond this distance, heavier gauge insulated wire is recommended; 16-gauge from 50 to 100 feet and 14-gauge from 100 to 200 feet. If lampcord is used, wires can be differentiated by noting that one of the insulating jackets is smooth, while the other has a distinct ridge. By considering the ridged jacket "red" and the smooth jacket "black," wiring connections can be made as if using color-coded wire.

Connections to the audio power source are made using the two pushbutton terminal posts located on the back of the loudspeaker system enclosure. The holes in JBL terminal posts do not allow the connecting wire to pass all the way through, preventing the possibility of a short to the other terminal post or to nearby electrical conductors.

To make a secure connection, strip approximately ¼ inch of the insulation from the end of the wire, push down the spring-loaded terminal post cap, insert the bare wire into the exposed opening of the terminal post and release. (Insertion of the wire into the opening will be easier if the stripped wire is first tinned with a soldering tool and solder.)

Locate the loudspeaker output terminals on the back of the receiver or power amplifier. For each loudspeaker system, connect the wire from the black terminal post to the amplifier output terminal labeled "common," "ground" or (–), and the wire from the red terminal post to the remaining 8-ohm speaker output.[3]

Note that many amplifiers have a chassis grounding terminal which is usually isolated from the other connectors. This should not be confused with the "ground" designation sometimes used to describe two of the terminals in each set of loudspeaker connections.

The specified 8-ohm impedance rating is a nominal figure which suggests a connection giving the most efficient power transfer between amplifier and loudspeaker system. However, 4- or 16-ohm amplifier terminals can be used without danger.

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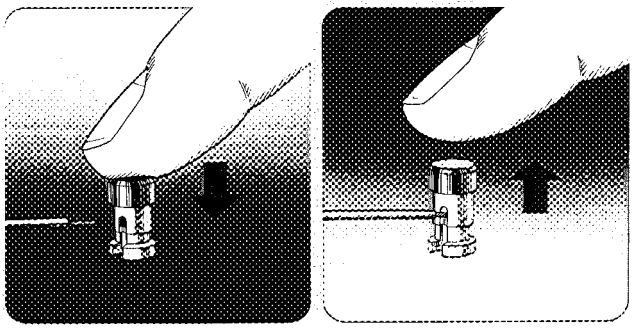
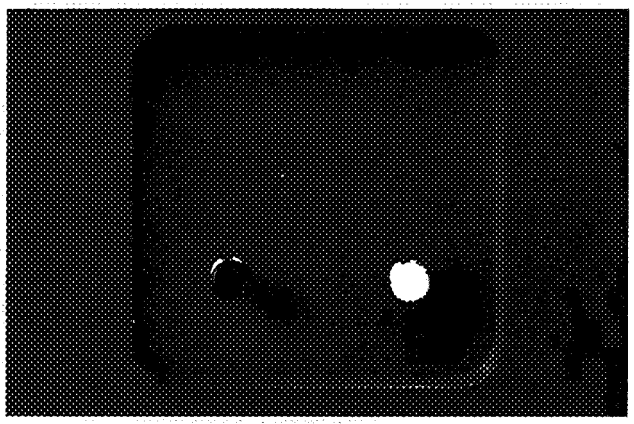
3. Connecting both speakers as described will insure proper "in phase" operation; i.e., their cones will respond to a monophonic signal by moving simultaneously in the same direction, and not opposite to each other. Inadvertent out-of-phase operation (which occurs when one set of speaker wires is reversed with respect to the other) will not harm the system, but may cause some acoustical "cancellation" which will have the audible effect of reducing low frequency response.



1. Depress colored button, exposing hole in terminal post.

2. Push stripped end of lead wire into hole and release button. Never apply twisting force to the terminal post.



The input terminals are located on the back of the L166 enclosure.

LISTENING ROOM ACOUSTICS

In addition to placement, the sound reflecting or sound absorbing qualities of the listening room will affect sound quality. Room acoustics can be tested by listening to the echo of a sharp sound, such as hand clapping.

A room having large windows, paneled walls and a hardwood floor or ceiling will be acoustically "live" and will echo noticeably. A room containing overstuffed furniture, carpeted floors or draped windows will be acoustically "dead" and will echo very little or not at all.

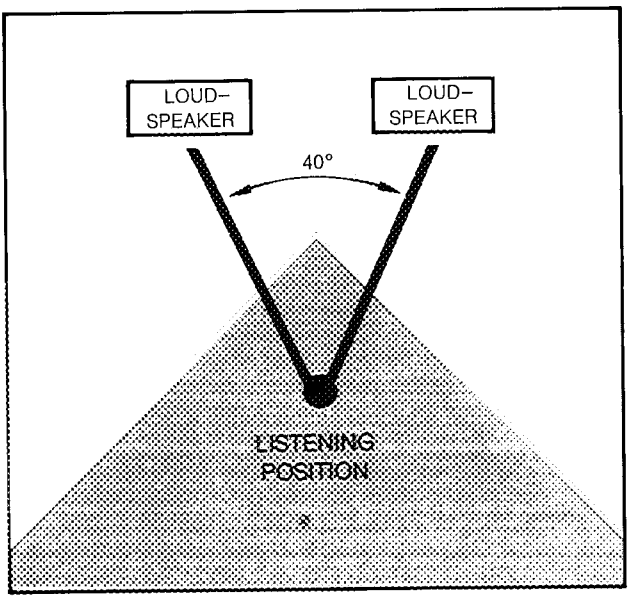
Ideally, there should be a reasonable balance between absorptive material and sound reflecting surfaces. If there are two large reflecting surfaces facing each other, the "bounce" between them will make sounds run together and the music will lack definition. Large, flat wall surfaces should be broken up with bookshelves, drapes, screens or tapestries.

PLACEMENT

Although JBL loudspeakers have a wide sound dispersion pattern, the final sound of the completed installation is affected by the location of the enclosure within the listening environment. If possible, experiment with placement of each loudspeaker system before deciding on a final arrangement.

For the best possible stereo performance, the two loudspeaker systems should be arranged symmetrically on each side of the listener. As a general rule, a person sitting in the usual listening position should see an angle of about 40° between the two sound sources. The distance from one loudspeaker enclosure to the other is determined by their distance from the listener and by the 40° "listening angle."

Loudspeakers may be positioned at any height above the floor, although locating the high frequency radiator near ear level usually gives the most realistic suggestion of a live performance. Bass response will be augmented if the enclosures are placed near adjacent room surfaces, such as in a corner or on a wall near the floor or ceiling.



40° "Listening Angle"

Sound energy from each loudspeaker blends to form a stereo "wall of sound." The stereo image will be intensified and the area of best stereo perception increased if the two systems are rotated slightly toward the preferred listening position.

The Horizon is provided with a Presence control to regulate the relative loudness of the midrange transducer and a Brilliance control to adjust the volume level of the high frequency hemispherical radiator. These controls adjust the output of the components to achieve realistic tonal balance in a variety of room conditions.

The controls are calibrated in terms of a reference level, indicated by a "0" on the instruction plate. When both the Presence and Brilliance controls are set at this level, the loudspeaker system will be adjusted for balanced performance characteristics in a reverberation-free environment. Since most listening rooms possess varying degrees of reverberation, some adjustment of the controls is usually preferred.

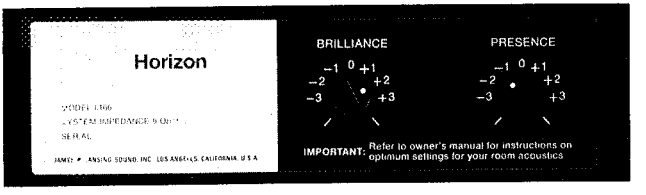
The loudspeaker system should be adjusted while reproducing normal program material with the amplifier tone controls set at the middle (generally referred to as "flat") position. Begin by using a coin or screwdriver to set both the loudspeaker system controls at their reference levels and then listening to a variety of program material long enough to become accustomed to the system's performance.

After the ear has become attuned to the "0" settings, evaluate the presence and brilliance qualities of the loudspeaker's performance. The most valid evaluation will be obtained using various types of material played monaurally. (This can be accomplished in stereo or quadraphonic installations by setting the amplifier mode control for monaural reproduction and using the balance control to select the individual loudspeaker system to be adjusted.) The evaluation should be made while seated in the normal listening position.

To arrive at the specific setting for each of the loudspeaker system controls, proceed as follows:

1. Set the Presence control at "0" and rotate the Brilliance control to the extreme left of its travel. This will attenuate high frequency performance so that the ear will perceive only the balance between the low frequency loudspeaker and the midrange transducer.
2. If midrange material—such as violin, piano or guitar—seems too close or overemphasized, reduce the setting of the Presence control by rotating it to the left. Conversely, if midrange material seems too distant, increase the output of the midrange transducer by rotating the control clockwise.
3. Once the Presence control has been adjusted to provide the most pleasing balance between the low frequency and midrange transducers, set the Brilliance control at "0." If high frequency material—such as cymbals, bells, triangles, violin overtones or vocal sibilants—seems too prominent, lower the setting of the Brilliance control. If greater high frequency output is desired, increase the setting of the control.

After each set of adjustments, again listen until the ear has become attuned to the new sound characteristics and can compare them to the previous performance of the system. Once the Presence and Brilliance controls have been set for the most pleasing overall results, and the exact placement of each loudspeaker has been determined, compensation for differences in individual recordings should be made with the tone controls on the amplifier or receiver.



Brilliance and Presence controls are located on the front of the enclosure, behind the removable grille assembly.

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 L166 will reproduce clean sound at comfortable listening levels when driven by an amplifier having an output of as little as 10 Watts RMS per channel.[4] However, for reproduction of the full dynamic range of contemporary recordings at high volume, a quality amplifier delivering up to 150 Watts RMS 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. Of course, an amplifier intended for normal high fidelity applications, regardless of its power output, should never be operated with its volume control at the maximum position; even an amplifier of the highest quality can produce severe distortion under such extreme conditions.

If distortion is heard, one or more of the sound system components is operating beyond its capacity (assuming each component is properly adjusted) and the overall volume level of the sound system should be reduced. In almost all cases, the acoustic level generated by a JBL

4. The RMS (root mean square) rating of amplifier power is the most stringent method currently used in the audio industry. An amplifier rated at 60 Watts RMS per channel, for example, is generally considered to be a high-powered unit. The same output expressed in terms of "Music Power" would be 160 Watts.

loudspeaker will become noticeably discomforting to the ear before the loudspeaker can become damaged by excessive power from the amplifier. There is virtually no danger of damaging a JBL loudspeaker if it is operated within the following guidelines: 1) the signal from the amplifier, regardless of its rated power, is not distorted; 2) the amplifier is not driven into clipping (another form of distortion which occurs when the power output limitations of the amplifier circuitry are exceeded); and 3) the power cord or audio connectors are not inserted or unplugged while the amplifier is operating.

However, a powerful wide range amplifier can accidentally damage any loudspeaker under certain conditions. For example, rewinding a tape recorder with the playback volume turned up can generate "squeals" powerful enough to burn out the high frequency unit. Similarly, powerful low frequency pulses extending down into the subsonic range can eventually damage the low frequency loudspeaker. If the phonograph pickup is accidentally dropped with the volume control full up, or if the system is played very loudly with excessive bass boost, nearly the full rated power of the amplifier can be channeled into dangerous subsonic energy.

SYSTEM COMPONENTS

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 to 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.

Do not move the cone by hand. The clearance between the voice coil and magnet assembly is so small that any attempt to move the cone manually can easily force it out of alignment.

LOW FREQUENCY—To balance the extended high frequency response of the JBL hemispherical radiator, an entirely new 12-inch, long excursion low frequency loudspeaker was developed for use in bookshelf enclosures having an internal volume of 1.75 cubic feet. Proceeding from a loudspeaker already proven in extensive field applications, JBL engineers redesigned the entire magnetic assembly. They increased the size of the Alnico V magnet by 40% and modified the top plate and pole piece to place 40% more voice coil in the gap.

The increase in magnetic power permitted the use of a harder and heavier cone for extended low frequency response. Precise cone assembly weight is achieved through use of the JBL Mass-Controlling Ring which also stiffens the cone for smoother performance in the upper regions of the loudspeaker's range, as it approaches the crossover frequency.

MIDRANGE—The 5-inch midrange loudspeaker is housed in an isolated sub-chamber within the Horizon enclosure. Its ⅞-inch copper voice coil, unusually large in relation to cone diameter, and its powerful magnetic assembly assure outstanding transient response and greater undistorted acoustic output. Designed to provide the exceptionally long and linear cone travel necessary for the system's 800-Hz crossover frequency, the midrange transducer is purposely more efficient than the low frequency loudspeaker and is attenuated by the frequency dividing network to achieve a smooth low-to-midrange balance. The advantage of greater midrange efficiency is that at loud listening levels the unit is typically producing only a fraction of its full output potential, leaving substantial reserve for the dynamic range needed to accurately recreate high intensity peaks and transients.

HIGH FREQUENCY—The JBL hemispherical radiator is a dome-type tweeter with several significant differences. Its 1-inch dome is formed of linen impregnated with phenolic resin. A vapor deposition process is used to apply a microscopically thin layer of pure aluminum on the phenolic surface of the dome. This process eliminates the stress factors normally associated with traditional lamination. The extremely hard dome reduces mechanical distortion and provides a degree of transient response rarely achieved in a high frequency radiator of this type. The hard dome has the added advantage of shifting natural resonances above the audible range; an achievement nearly impossible with soft-dome designs of similar dimensions.

The hemispherical configuration of the dome allows utilization of a large voice coil – 1-inch in diameter and fabricated of aluminum wire. A cone radiator of similar size, limited to a smaller voice coil, cannot equal the power handling capacity of the JBL unit. The large coil also dissipates heat more readily, ensuring far greater reliability when operated at extremely loud listening levels.

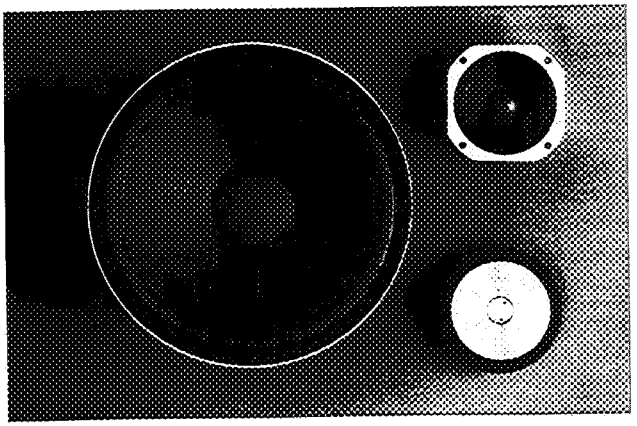
The hemispherical radiator has a dispersion pattern of 150° horizontal and vertical at 20 kHz. Its small diameter permits achievement of 90° dispersion at a remarkable 30 kHz. An integral baffle virtually eliminates aberrations from the edge compliance. If the radiation from the compliance were not damped by this integral baffle, the effective operating diameter of the dome would be increased, thereby reducing dispersion. The close proximity of the integral baffle to the radiating surface also provides ideal acoustic damping of the dome/voice coil assembly, eliminating the need to apply viscous damping compounds commonly used when attempting to achieve smooth frequency response.

The hemispherical radiator provides greater bandwidth and wider sound distribution than any high frequency direct radiator yet produced by JBL.

DIVIDING NETWORK—The function of the frequency dividing network is to distribute the incoming signal among the component loudspeakers. The crossover frequencies of the L166 occur much lower in the audio spectrum than is typical so that each component loudspeaker is operating within its range of widest sound dispersion. This results in sound that is radiated in an essentially spherical pattern, enabling listeners seated considerably off to the side to hear virtually the same sound as if they were seated directly in front of the loudspeaker system.

Smooth, imperceptible operation of the network is vitally important to the total performance of the loudspeaker system. To accomplish this, the tolerances of JBL network components are much more stringent than general industry practice. For example, the capacitors used are non-inductive types with high AC current handling capability built expressly for use in dividing networks and individually tested for conformity to rigid performance standards. The special inductors have extremely low insertion loss so that none of the essential driving power to the loudspeaker system is dissipated in the network. Each inductor is calibrated on a sensitive electronic bridge and its value set precisely.

The network installed in the L166 has two continuously variable controls permitting adjustment of the relative loudness of the midrange and high frequency components to satisfy individual preferences and the acoustic properties of the listening room. The controls do not affect the crossover frequencies, nor do they limit the upper frequency response of the loudspeaker system.



Loudspeaker System Components
12-inch Low Frequency Loudspeaker
5-inch Midrange Transducer
1-inch Hemispherical Radiator

COMPONENT REMOVAL

If it should be necessary to remove the loudspeaker system components for testing or repair, disconnect the amplifier and proceed as follows:

GRILLE—The grille is secured to the enclosure by strips of hook-and-pile mounting tape located at each corner of the assembly. To remove the grille, grasp the surface near both top or both bottom corners and gently lift the grille from the enclosure. A "ripping" sound will be heard, indicating normal disengagement of the mounting tape. This procedure may be repeated hundreds of times without damage. To replace the grille, reposition it on the enclosure and apply light pressure at the corners.

LOW FREQUENCY—Place the enclosure on its back on a clean, padded surface. The low frequency loudspeaker is mounted from the front of the baffle panel and held in place by four Phillips-head screws threaded into T-nut fasteners which are attached to the back of the panel. Carefully unscrew the machine screws without applying pressure that might dislodge the T-nuts. When the mounting screws have been removed, gently lift the edge of the loudspeaker frame from the baffle panel, disconnect the wires at the binding posts and remove the loudspeaker.

MIDRANGE—The midrange transducer is held in place by four self-tapping screws at each corner of its frame. Carefully remove the screws, lift the unit from the enclosure and disconnect the leads at the tab connectors.

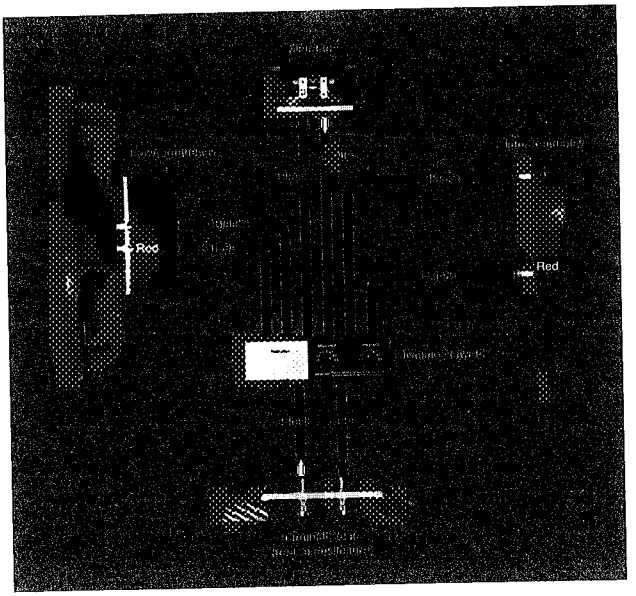
HIGH FREQUENCY—The high frequency hemispherical radiator is secured to the back of the baffle panel by three machine screws extending through the panel from the front of the enclosure. Removal is accomplished by taking out the low frequency loudspeaker, reaching into the enclosure to support the radiator while removing the mounting screws, and carefully lowering the unit from the baffle panel; then lift the unit out of the enclosure through the low frequency loudspeaker opening and disconnect the wire leads at the terminal posts. **CAUTION: The dome is extremely fragile. It can be damaged by slight pressure from touching, mishandling or bumping against enclosure surfaces.**

DIVIDING NETWORK—Remove the transducers as previously described and pull the wire leads from the midrange sub-chamber so that they fall into the enclosure. The Presence and Brilliance controls are mounted with the network as an assembly secured to the back of the baffle by four screws. After disconnecting the leads from the input terminals at the rear of the enclosure, remove the mounting screws, the assembly can then be lifted out of the enclosure through the low frequency loudspeaker opening. (Note: It is not necessary to remove the serialized nameplate on the baffle panel to gain access to the network mounting screws.)

REPLACEMENT—Reverse the removal procedure to replace the loudspeaker system components. Mounting screws should be tightened evenly to avoid the possibility of frame warpage, and just enough to prevent air leaks between the components and the enclosure. Avoid excessive force.

WIRING—When reconnecting the wire leads between the dividing network and the components, observe the polarity shown on page 14.

Although JBL loudspeakers are extremely rugged, the cone and other moving parts are subject to accidental damage. Exercise extreme caution when using a screwdriver or other tools in their immediate vicinity.



THE HORIZON ENCLOSURE

The L166 Horizon enclosure, embodying the principles of fine furniture design and construction that have made JBL a leader in the industry, complements the acoustic characteristics of the loudspeaker system. It utilizes a ducted port extending through the baffle panel to provide proper loading of the low frequency loudspeaker and optimize power handling capacity. 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. Acoustic damping material is applied to the interior surfaces of side and back panels to attenuate standing waves within the enclosure. To achieve maximum strength and resistance to vibration, all panels are constructed of ¾- or 1-inch stock; a brace is installed for additional stiffening of the baffle and back panels; and all corner joints are hand fitted, lock mitered and wood welded.

Occasional dusting with a clean, soft cloth will maintain the original beauty of the walnut finish. Since moisture cannot penetrate the oiled surface, most household stains can be removed with a damp cloth.

The surface should be treated only with wax specifically formulated for use on oiled finishes. Conventional furniture waxes, polishes or cleaners are not recommended.

As the oil penetrates deeper and deeper into the walnut, the finish may appear to be drying out. Many owners find it desirable to re-oil the enclosure surface from time to time. With each application, the beauty of the finish will become more apparent and a warm, rich patina will eventually be obtained.

To re-oil a JBL finish, use any one of the several clear oil finishing preparations available through furniture or hardware outlets. Apply a liberal amount of the preparation over the entire finished surface of the enclosure. In ten to fifteen minutes wipe off the remaining oil with a soft, clean, dry cloth. Small surface scratches can usually be removed by gently rubbing them out with very fine steel wool (4/0 grade) and applying oil to the entire panel. When using steel wool, apply light pressure and rub only in the direction of the grain. Very deep scratches, dents or other serious damage should be repaired only by a qualified furniture refinisher.

Caution: Improper storage of wiping rags could result in spontaneous combustion. They should be thrown away or spread out to dry in a well-ventilated area before storage or disposal.

IN CASE OF TROUBLE

A JBL loudspeaker system responds with verbatim accuracy to the signal supplied by the audio power source; it will therefore produce extraneous noises just as accurately as it reproduces desired program material. Noise seldom originates in the loudspeaker system. Its presence usually indicates that one of the other components of the music system, or the program material itself, is faulty. In rare instances when something does go wrong with the loudspeaker system, one or more of the component loudspeakers will stop working altogether or a distinct rattling or scraping sound (indicating a rubbing voice coil) will be heard whenever the system is operating.

If one channel of a stereo installation is not operating, examine the loudspeaker wiring and check the balance control. If wiring instructions were followed correctly, if the connections are clean and tight, and if centering the balance control does not remedy the situation, reverse the right and left loudspeaker connections at the amplifier, taking care to turn the amplifier off before each connection or disconnection. If the previously non-functional loudspeaker system operates, the amplifier or one of the component progam sources (tuner, phono,

tape deck, etc.) is malfunctioning. In the event that the suspect loudspeaker system is still inoperative, it is probably defective.

To determine whether the defect lies in the amplifier or in one of the component program sources (after verifying that the loudspeaker systems are not defective) reverse the right and left cables from the program source at the amplifier. If the original channel is still inoperative, the amplifier is defective; if the previously inoperative channel functions, the program source is defective. If the amplifier is not faulty, alternately check each program source until the defective unit has been isolated. It is unlikely that more than one program source will be faulty at any given time.

Extraneous interference such as static or radio broadcast signals can be picked up by the component devices. When this occurs, the troublesome unit can be identified by disconnecting inputs from the receiver or amplifier until the interference stops. Again, if the interference persists with none of the input devices operating through the power source, the receiver or amplifier itself is probably defective. Shorting plugs, available from your JBL Audio Specialist, should be inserted in unused phono inputs to help eliminate stray hum or signal pickup.

Hum may be caused by locating a turntable or tape recorder directly over or underneath the amplifier or receiver. The farther the audio power source is located from the phonograph cartridge or tape heads, the less chance there will be of picking up hum. The AC leads and shielded cables should be as widely separated as possible; AC lines should never cross cables or speaker wiring. Power line interference can be further attenuated by using a heavy duty line interference filter between the audio power source and the AC wall outlet.

Fuzzy or indistinct high pitched sounds can usually be traced to the recording itself, a defective cartridge, a worn stylus or insufficient tracking force. Problems with low frequency reproduction are usually the result of room acoustics or placement of the speaker system. Excessive bass boost or incorrect loudness compensation tend to give a muddy or "boomy" quality to reproduced music. The music system can be checked for turntable rumble or other extraneous low frequency signals by removing the loudspeaker grille assembly and observing the motion of the low frequency cone while the system is playing at high volume. If the cone continually moves in and out more than ½-inch or so, excessive low frequency power is being fed to the loudspeaker system.

Acoustic feedback is the result of mechanical vibrations produced by excessive bass at very high volume levels. The loudspeaker system can produce enough energy to vibrate other objects in the room—including the record player and, by direct mechanical transmission, the stylus itself. These vibrations are reamplified again and again, producing very loud "rumble," or even sustained howl that increases in intensity as the volume or bass control is turned up. Possible solutions: 1) locate the speaker cabinets as far as possible from the turntable, 2) adjust or replace the turntable shock mountings, 3) place the turntable on a rubber or sponge mat to further absorb vibrations. If the low frequency tone is still audible, it is probably the result of inherent turntable rumble rather than acoustic feedback.

SERVICE

Should your JBL loudspeaker system require service, return it to the JBL dealer from whom it was purchased. If it is not possible to contact a dealer, write directly to the JBL Service Department describing the difficulty as fully as possible. Products returned to the factory must be sent prepaid to JBL Customer Service, 11340 Sherman Way, Sun Valley, California 91352.

SUMMARY

The Horizon exemplifies JBL's reputation for leadership in acoustic and visual design. It is our sincere belief that the L166—like all JBL products—will provide undiminished listening pleasure for many years to come.

FOR ADDITIONAL INFORMATION

If you have difficulty in achieving the fine performance of which your JBL loudspeaker system is capable, consult the JBL Audio Specialist from whom the system was purchased. He is equipped with the knowledge required to provide expert advice and assistance. If for some reason the JBL dealer is unable to assist you, write directly to the JBL Technical Information Department explaining the difficulty in detail.