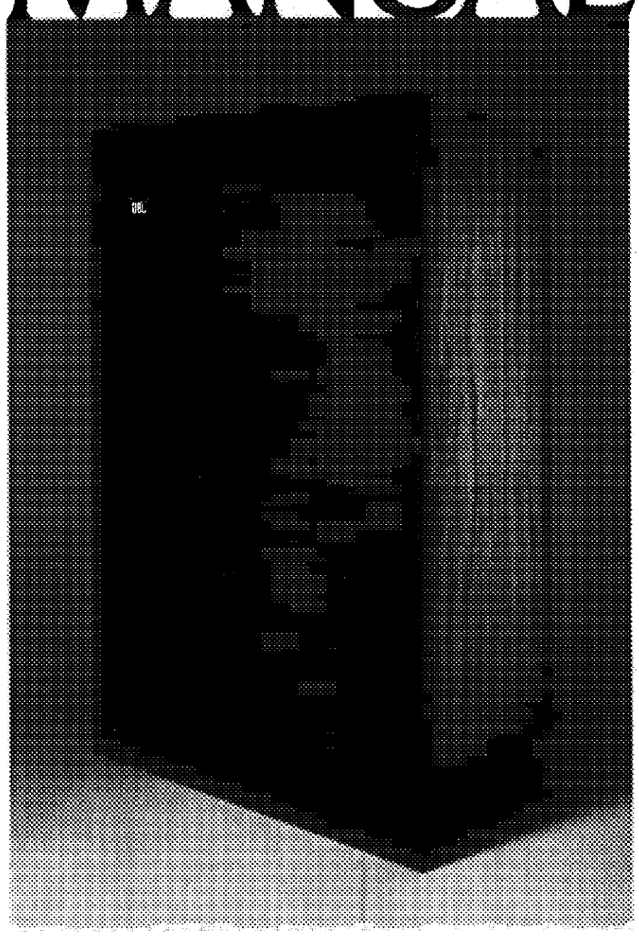
L110

L110 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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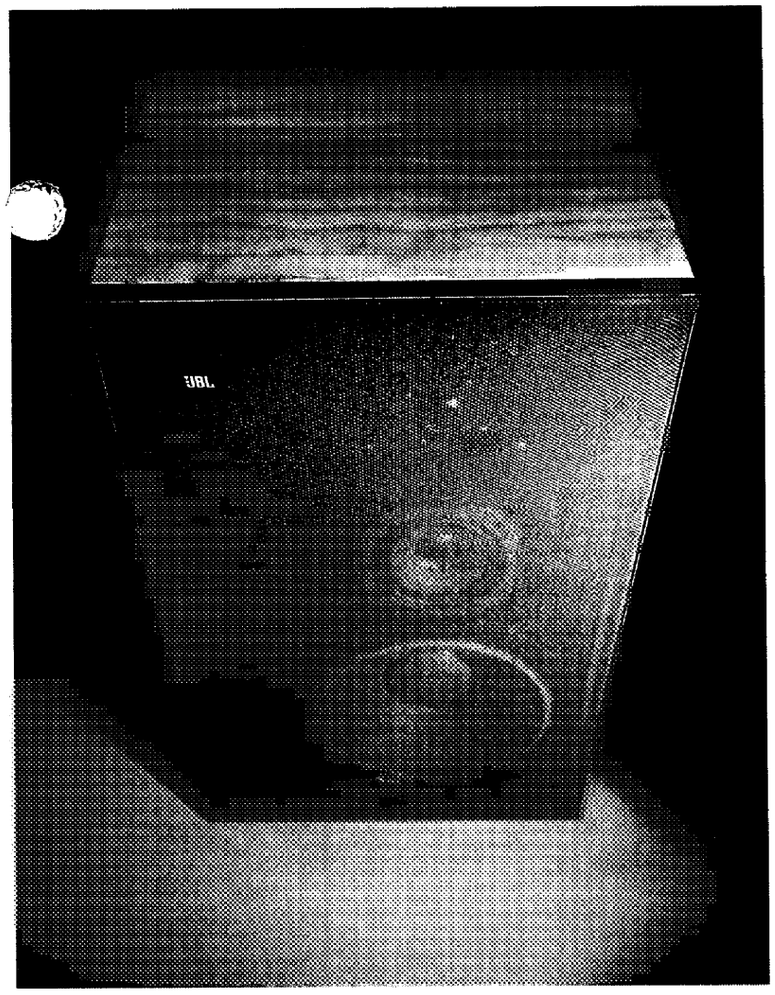


The L110 incorporates the latest advances in bookshelf system design, offering performance characteristics that rival those of the most sophisticated full-sized JBL loudspeaker systems. Each component of the system was engineered to attain the maximum power-flat frequency response, widest sound dispersion, 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.

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 of "white noise"[1] into a sound pressure level of 76 dB measured 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 L110 delivers substantial sound 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 engineers, producers and performers—professionals whose artistic achievements are closely related to the equipment they use.

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.

Power Capacity[1]	75 watts continuous program
Nominal Impedance	8 ohms
Dispersion[2]	150° at 15 kHz, 90° at 20 kHz
Crossover Frequencies	1 kHz, 4 kHz
System Sensitivity[3]	89 dB, 1 watt, 1 m (3.3 ft)
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]	89 dB, 1 watt, 1 m (3.3 ft)
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]	91 dB, 1 watt, 1 m (3.3 ft)
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]	90 dB, 1 watt, 1 m (3.3 ft)
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 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 achieved.
4. Averaged from 100 to 500 Hz, within 1 dB.
5. Averaged from 1 to 3 kHz, within 1 dB.
6. Averaged from 5 to 20 kHz, within 1 dB.

CONNECTING THE L110

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.

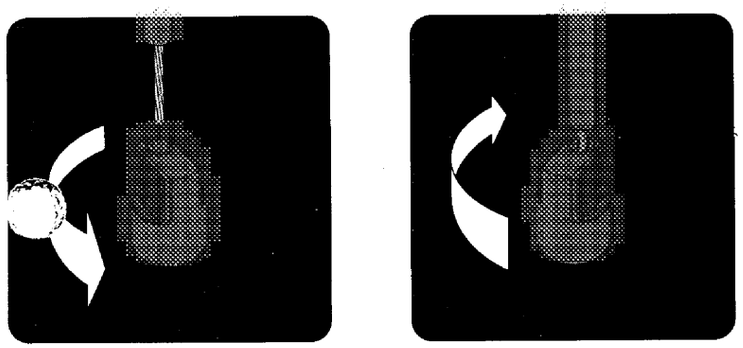
WIRE GAUGE—The minimum wire size recommended for loudspeaker connections up to 50 feet (15 m) is #18 AWG (1 mm) insulated wire. Beyond this distance, heavier gauge insulated wire is recommended; #16 AWG (1.3 mm) from 50 to 100 feet (15-30 m) and #14 AWG (1.6 mm) from 100 to 200 feet (30-60 m). If lampcord 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 LOUDSPEAKER SYSTEM—Connections to the loudspeaker system are made at the two terminals located on the back of the enclosure. The terminals will accept either stranded or solid wire up to #12 AWG (2 mm). Two wires, up to #16 AWG (1.3 mm) can be accepted simultaneously if they are first twisted together into a single wire and then inserted as illustrated.

CONNECTIONS TO THE POWER AMPLIFIER OR RECEIVER—Locate the loudspeaker output terminals on the back of the power amplifier or receiver. For each channel, connect the wire from the black terminal of the loudspeaker system to the output terminal labeled "common," "ground" or (-), and the wire from the red terminal to the remaining 8-ohm output.[3] The specified 8-ohm impedance rating is a nominal figure which suggests a connection giving the most efficient power transfer between the amplifier and the loudspeaker system.

Note that many amplifiers have a chassis grounding terminal which is usually separated from the other connectors. This should not be confused with the "ground" designation sometimes used to describe one of the two terminals for each loudspeaker system connection.

3. Connecting the two loudspeaker systems as described will ensure that they are in phase, i.e., the component loudspeakers 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 wires is reversed with respect to the other) will not harm the system, but will cause some acoustical cancellation, which has the audible effect of reducing low frequency output and degrading stereo imaging.



1. Strip approximately ¾ inch (19 mm) of the insulation from the end of the wire. Twist the wire strands together, as shown. (Soldering is not required.)

2. Rotate the terminal fully counterclockwise to the open position. Insert the wire, then rotate the terminal clockwise until the wire is secured. Rotate the terminal by hand—extreme force is not required.

LISTENING ROOM ACOUSTICS

The sound reflecting or sound absorbing qualities of the listening room will affect the sound quality of a loudspeaker system. 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 or screens.

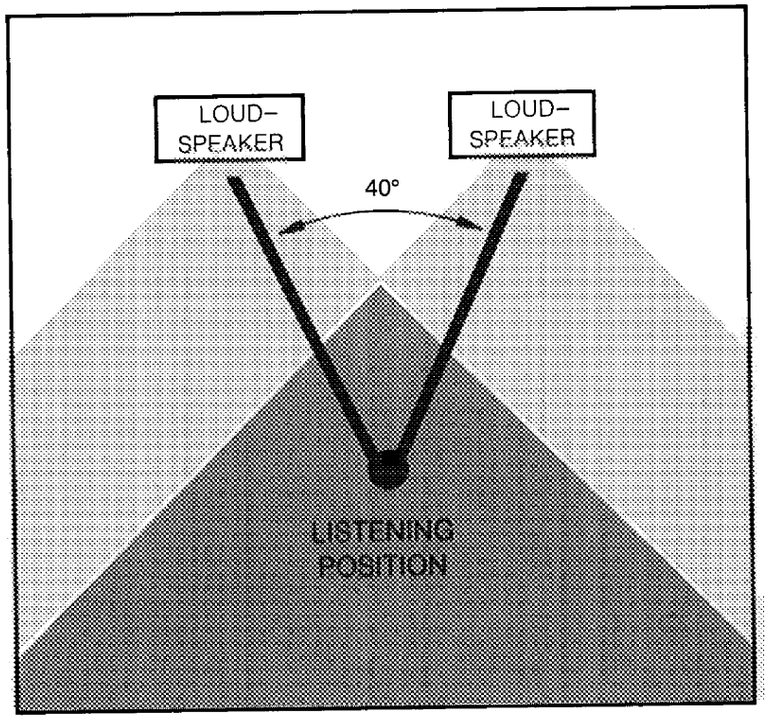
PLACEMENT

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."

The L110 enclosure is finished on all four sides so that it can be positioned vertically or horizontally. Note: Vertical orientation is preferred for smoother performance and best stereo imaging.

Loudspeakers may be positioned at any height above the floor, although locating the high frequency direct 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.



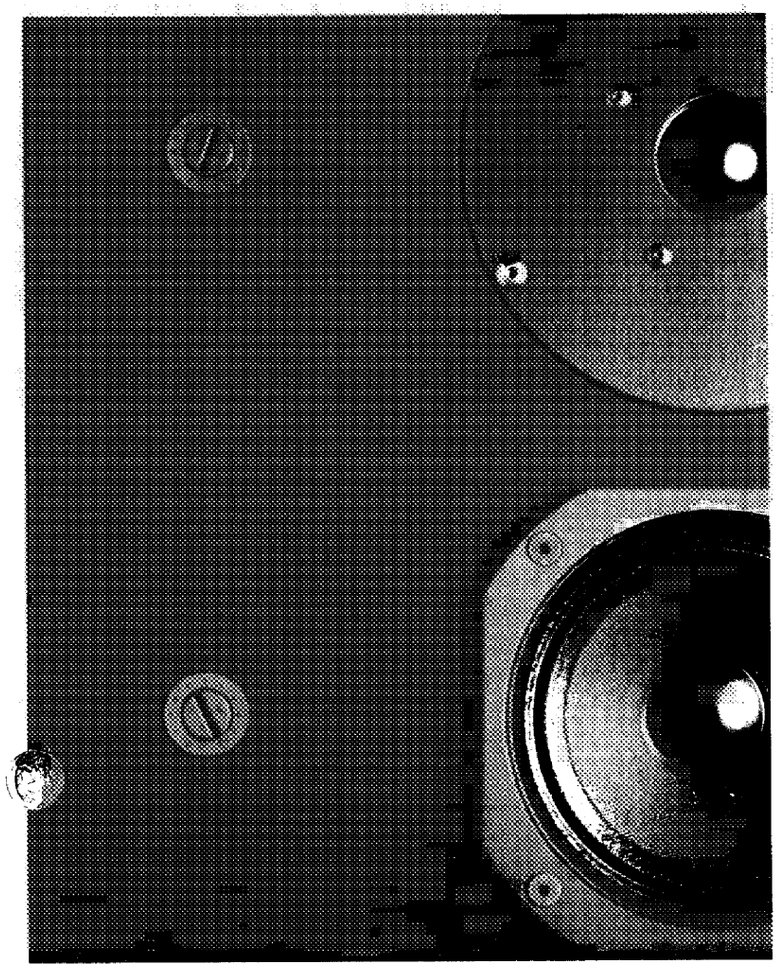
40° "Listening Angle"
Sound energy from each loudspeaker blends to form a stereo "wall of sound." The stereo image will be intensified and the area of best stereo perception increased if the two systems are rotated slightly toward the preferred listening position.

ADJUSTING THE SYSTEM

The L110 is provided with controls to regulate the relative loudness of the high frequency dome radiator and to adjust the volume of the midrange transducer. These controls permit adjusting loudspeaker system performance to achieve realistic tonal balance in a variety of room conditions.

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 adjusting both of the controls so that the raised dot on the front surface of each is at the 12-o'clock position[4] and listening to a variety of program material long enough to become accustomed to the system's performance. The raised dots surrounding the controls are for reference only. Variations in room acoustics usually result in control settings between 10 o'clock and 2 o'clock. However, the settings could fall outside this range in unusually reverberant or absorptive rooms.[5]

After the ear has become attuned to the 12-o'clock setting, evaluate the high frequency and midrange qualities of the loudspeaker system's performance. The most valid evaluation will be obtained using various types of program material played monaurally. (This can be accomplished by setting the amplifier mode control for



High frequency and midrange controls are conveniently located on the front of the enclosure, behind the removable grille assembly. Each is closest to the component it regulates. In this view, the high frequency control is above the midrange control.

4. These instructions assume the L110 is positioned vertically, with the low frequency loudspeaker closest to the supporting shelf or the floor. Naturally, if the L110 is placed horizontally, the equivalent control position would be at 3 o'clock or 9 o'clock, depending on which side the enclosure is placed.

5. Under laboratory conditions, the loudspeaker system will be acoustically flat in a half-space environment when each control is at 3 o'clock.

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.

If program material such as cymbals, bells or triangles seems overemphasized (sometimes sounding "tinny"), reduce the setting of the high frequency control by rotating it counterclockwise. If high frequency program material is not loud enough, rotate the control clockwise to increase output of the dome radiator. Once the high frequency control has been set, adjust the midrange control in a similar manner while listening to program material such as male voice, piano or guitar.

After each set of adjustments, again listen to a variety of program material until the ear has become attuned to the new characteristics and can compare them to the previous performance of the system. Once the 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.

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.[6] 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 any case, an amplifier should be chosen with an output power rating that is greater than the maximum power that will be used. This margin of reserve power will help ensure that the amplifier will not attempt to deliver more power than its design allows. When overdriven, most amplifiers will clip signal waveforms, a condition of severe distortion which is particularly dangerous to high frequency radiators.

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 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, fast winding 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 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.

6. The continuous sine wave rating of amplifier power is the most stringent method currently used in the audio industry. An amplifier rated at 60 watts continuous sine wave 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. (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.")

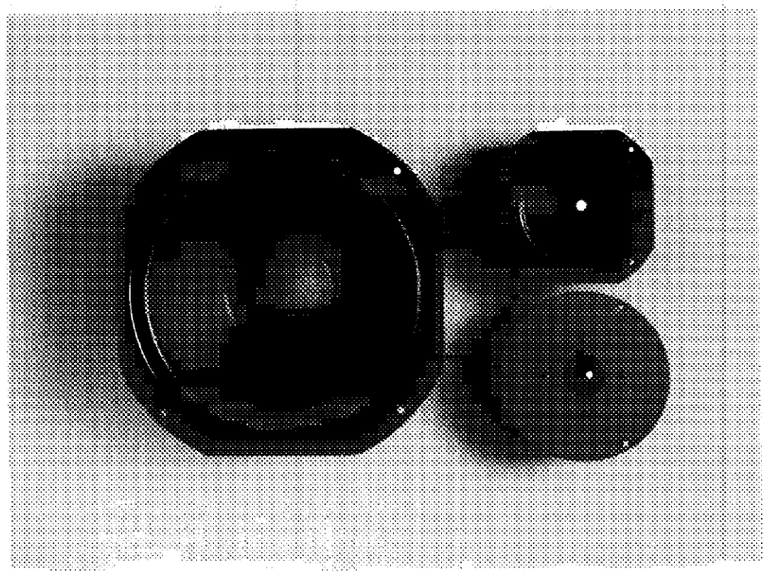
Caution: Do not move the cone by hand. The clearance between the voice coil and magnet assembly is so small that any attempt to move the cone manually can easily force it out of alignment.

LOW FREQUENCY—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 1 kHz 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 lev 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 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 quency 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.



Loudspeaker System Components
10-inch Low Frequency Loudspeaker
5-inch Midrange Transducer
1-inch Dome Radiator

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 the output of the midrange and high frequency drivers to accommodate variations in room acoustics and personal preferences.

COMPONENT REMOVAL

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

GRILLE—The grille is secured to the enclosure by dowel pins located near the four corners of the assembly. It can be removed by placing the L110 on its back on a clean padded surface and then grasping both top or both bottom corners of the grille frame and gently lifting the assembly from the enclosure. To replace the grille, reposition it on the enclosure and apply light pressure over the dowel pins until the assembly is fully seated. The JBL emblem can be rotated to read correctly whether the loudspeaker system is placed horizontally or vertically. Note: When rotating the JBL emblem, remove the grille and support the fastener behind the grille cloth with your free hand.

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 Allen-head screws threaded into T-nut fasteners which are anchored on the back of the panel. Carefully unscrew the machine screws, using a 1/8-inch Allen wrench, 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 on the loudspeaker frame and remove the unit from the enclosure. The sealing gasket should be reused when the unit is replaced.

MIDRANGE—The midrange transducer is held in place by Allen-head screws and T-nuts at each corner of its frame. Carefully remove the screws, with a 5/64-inch Allen wrench, lift the unit from the enclosure and disconnect the leads at the tab connectors.

HIGH FREQUENCY—The high frequency dome radiator is secured to the enclosure baffle panel by three Allen-head screws threaded into T-nuts. The unit is removed by carefully taking out the mounting screws, using a 3/32-inch Allen wrench, and lifting the complete assembly out of the enclosure. The two leads from the dividing network can then be disconnected at the tab connectors at the back of the frame.

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 high frequency and midrange controls are individually mounted to the enclosure baffle panel and must be removed prior to removing the main network assembly. Slip a thin screwdriver blade under the lip of the bezel that surrounds the control knob and lift the bezel from the baffle panel. (Place a piece of masking tape on the panel surface to prevent scratches.) Use a needle-nose pliers to pull the control knob from the shaft, then remove the retaining nut with a 1/2-inch nut driver; the control can then be lowered into the enclosure. Note that the control shaft is fitted with a spacer that should be retained for reassembly. The network itself is mounted on the back panel of the enclosure and is held in place by six threaded Phillips-head screws extending through the panel. After removing the mounting screws, the network and controls can be lifted out of the enclosure through the low frequency loudspeaker opening.

WIRING—When reconnecting the wire leads between the dividing network and the components, observe the polarity shown on page 18.

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.

Before replacing the component loudspeakers and prior to reinstalling the network, replace the controls on the enclosure baffle panel, beginning with the midrange control identified by a white dot on the end of its shaft. Slide the spacer onto the control shaft, if it came off during removal, then reach into the enclosure through the low frequency loudspeaker opening and insert the control into the hole closest to the midrange transducer. Holding the control in position, replace the washer and tighten the retaining nut until it is snug. Apply just a spot of household glue to the lip of the bezel and install it, aligning the ridge on its body with the keyway in the enclosure. Rotate the control fully counterclockwise with a screwdriver, position the control knob so that the raised dot on its surface is in alignment with the raised dot furthest counterclockwise on the bezel, and apply firm pressure to seat the knob on the control. Install the midrange control in the same manner. The network itself can then be replaced by reversing the removal procedure.

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 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.

The grille cloth is a synthetic fabric selected for acoustic transparency, beauty, physical strength, color-fastness and soil resistance. It can be cleaned by gentle dusting with a vacuum cleaner. Stains can be removed by using a soft bristle brush moistened with mild soap and water. Caution: Remove the grille from the enclosure prior to cleaning in order to prevent damaging the loudspeaker system components.

Warning: Cleaning fluids, solvents, acetone or cleaners containing such chemicals should not be used; they can destroy the fabric.

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.

A JBL loudspeaker system responds accurately 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 program 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

If your JBL product ever needs service, simply return it to the JBL dealer from whom it was purchased. He will arrange for necessary repairs. If for some reason this is impractical, please write to us at James B. Lansing Sound, Inc., (ATTN: Customer Service Department), 8500 Balboa Boulevard, Northridge, California 91329.

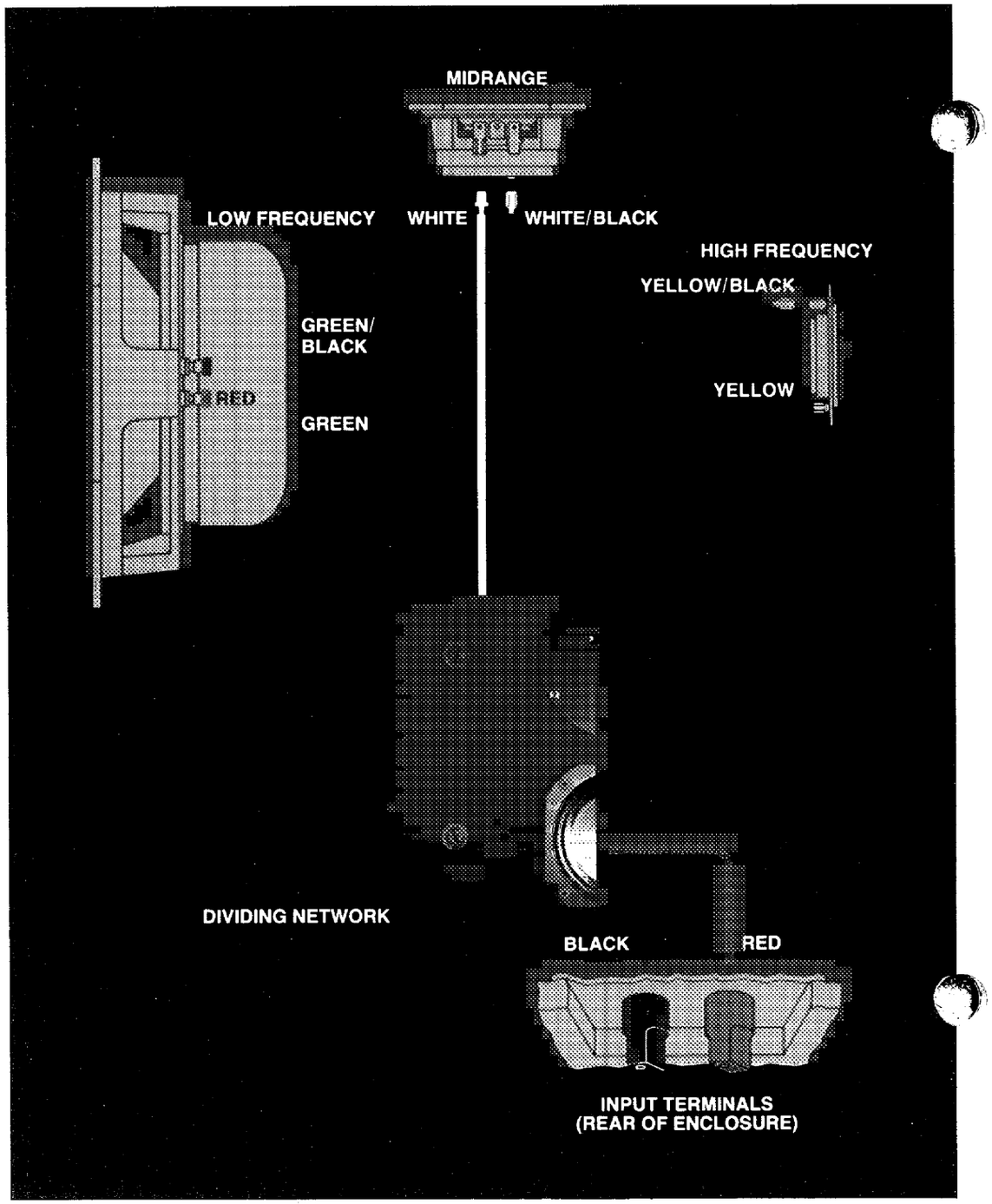
SUMMARY

The L110 exemplifies JBL's reputation for leadership in acoustic and visual design. It is our sincere belief that the L110—like all JBL products—will provide undiminished listening pleasure for many years to come.

The L110 will reveal the quality of program material as well as the quality of the other components in your music system. It is recommended that you choose every component for its ability to provide a standard of performance, quality and reliability comparable to that of your JBL loudspeakers. The reward will be a level of enjoyment of the highest order.

FOR ADDITIONAL INFORMATION

If you have difficulty in achieving the fine performance of which your JBL loudspeaker system is capable, consult the franchised JBL dealer 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 Services Department explaining the difficulty in detail.


MIDRANGE
LOW FREQUENCY
WHITE
WHITE/BLACK
HIGH FREQUENCY
YELLOW/BLACK
GREEN/
BLACK
RED
YELLOW
GREEN
DIVIDING NETWORK
BLACK
RED
INPUT TERMINALS
(REAR OF ENCLOSURE)