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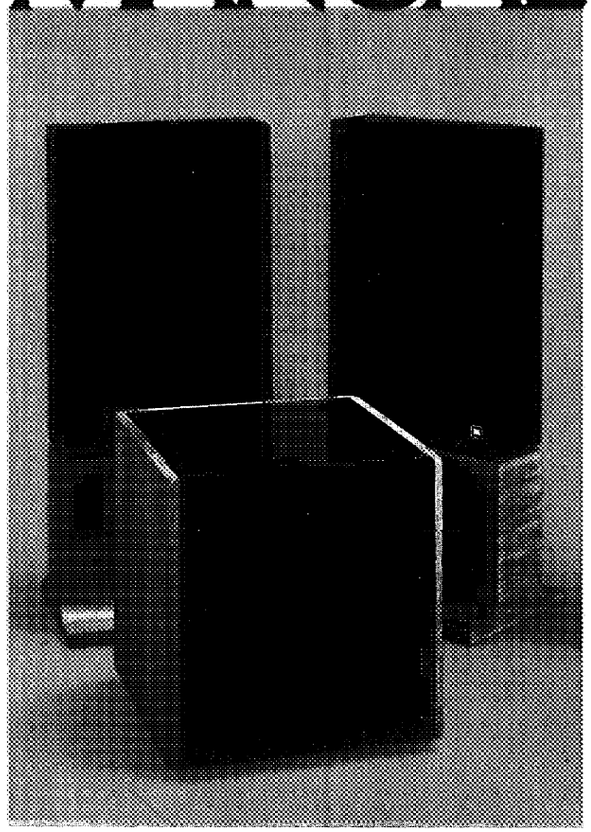
L212 INSTRUCTION MANUAL



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 L212 is a complete stereophonic loudspeaker system utilizing three units to reproduce the two channels of stereo. The most unusual of the three is the Ultrabass which houses a massive 12-inch loudspeaker and a specially designed amplifier, called a Bass Energizer. The Ultrabass operates from below audibility to 70 hertz. Two wide range, 3-way loudspeaker systems reproduce the balance of the audio spectrum, to beyond 20 kHz. Extreme bass information is completely nondirectional; therefore, one Ultrabass is used for both channels, offering important advantages with no loss of stereo imaging.

Since the internal volume required for an enclosure housing very low frequency loudspeakers is far greater than that required for drivers reproducing the remainder of the audio range, a more compact total system is made possible through the use of only one, discrete bass enclosure in conjunction with two moderately sized 3-way loudspeaker systems operating above the extreme bass region. The nondirectional nature of this portion of the audio spectrum also permits greater latitude in locating the Ultrabass in the listening room.

Combining extreme bass information into a single channel offers two advantages: conservation of amplifier power and reduction of intermodulation distortion. When playing a record, the program signal is generated by the motion of the stylus within the record groove. However, superimposed upon the program signal is noise generated by vertical stylus motion resulting from such factors as record warp and groove imperfections, turntable rumble, acoustic feedback, tonearm inertia and extraneous vibration. Although this noise is typically subsonic and, therefore, inaudible, it is reproduced by the amplifier and loudspeakers, wasting amplifier power and generating intermodulation distortion, which is audible. Each channel of the vertical noise is inherently out of phase with the other; when combined in the Bass Energizer they effectively cancel each other so that amplifier power is conserved for its intended purpose—reproduction of the program signal—and unnecessary distortion is avoided.

The Ultrabass may be connected to any amplifier or receiver. Its Bass Energizer, housed within, amplifies the signal for reproduction by the 12-inch loudspeaker. The input impedance of the Bass Energizer is relatively high (900 ohms, compared to the 8-ohm impedance of the loudspeakers); therefore, it requires only a negligible amount of current from the primary amplifier. The advantage of this design is that virtually all the primary amplifier power is available to the 3-way systems.

The Bass Energizer has a special purpose and design. Its response curve has been precisely tailored to complement the performance characteristics of the integrated 12-inch loudspeaker, resulting in consistent, linear response to below 25 Hz. The power output of the Bass Energizer is carefully matched to the efficiency of the loudspeaker. The Ultrabass will produce a sound pressure level balanced with that of the 3-way systems even when the L212 is driven by an amplifier rated at up to 200 watts continuous sine wave per channel, the maximum recommended power rating for the primary amplifier or receiver. It is virtually impossible to overdrive the Ultrabass with musical material, even at extreme sound pressure levels. Furthermore, housing the Bass Energizer within the Ultrabass enclosure permits use of a very short connecting wire from the Bass Energizer to loudspeaker, resulting in minimum power loss and maximum damping factor.

The 3-way systems consist of an 8-inch low frequency loudspeaker, 5-inch midrange transducer and 1-inch hemispherical radiator. Enclosure dimensions and the system components were engineered to ensure maximum flexibility of speaker placement in the listening environment. Locating the 3-way systems against a wall, away from a wall, or in a corner will yield excellent results. The enclosure pedestals place the high frequency hemispherical radiators at ear level, enhancing realism and spaciousness.

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 L212, for example, will convert a 1-watt input of "white noise"[1] into a sound pressure level of 77 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 system 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 Impedence	8 ohms	
Dispersion[2]	150° at 15 kHz, 90° at 20 kHz	
Crossover Frequencies[3]	70, 800 and 3000 Hz	
System Sensitivity[4]	1 watt input produces 77 dB sound pressure level at a distance of 4.6 m (15 ft) *(Note: 75-80 dB is a comfortable listening level.)*	
Ultrabass Loudspeaker		
Nominal Diameter	300 mm	12 in
Voice Coil	102-mm (4 in) edgewound copper ribbon	
Magnetic Assembly Weight	5.4 kg	12 lb
Flux Density	1.2 tesla (12,000 gauss)	
Sensitivity[5]	37 dB SPL	
Low Frequency Loudspeaker		
Nominal Diameter	200 mm	8 in
Voice Coil	76-mm (3 in) edgewound copper ribbon	
Magnetic Assembly Weight	3.5 kg	7¾ lb
Flux Density	0.93 tesla (9300 gauss)	
Sensitivity[5]	42 dB SPL	
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[6]	45 dB SPL	
High Frequency Hemispherical Radiator		
Hemisphere 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[7]	41 dB SPL	
Bass Energizer		
Primary Operating Range	20 to 100 Hz, equalized	
Signal-To-Noise Ratio	Better than 85 dB at full output	
Damping Factor	Greater than 80	
Power Requirement[8]	120 volts AC, 50/60 Hz	
Power Consumption		
Quiescent	15 watts	
⅓ Power Output	60 watts, continuous signal	
Full Power Output	120 watts, continuous signal	

General		
Finish	Oiled Walnut	
Grilles	Black fabric	
Ultrabass Top Surface	6-mm (¼ in) gray plate glass with ground and seamed edges; black foam cushioning	
	430 mm x 430 mm, ±1.5 mm	
	$16^{15}/_{16}$ in x $16^{15}/_{16}$ in, ±1/16 in	
Dimensions		
Ultrabass	486 mm x 470 mm x 470 mm deep	
	19⅛ in x 18½ in x 18½ in deep	
3-Way Loudspeaker Systems	981 mm x 432 mm x 330 mm deep,	
	38⅝ in x 17 in x 13 in deep	
Shipping Weight	102 kg	225 lb

1. Based on a laboratory test signal. See Power Capacity section for amplifier power recommendation.
2. The angle through which system output is diminished by no more than 6 dB relative to system output measured directly on-axis.
3. The 70-Hz transition, between the Ultrabass and the 3-way loudspeaker systems, is controlled by the Bass Energizer and by the acoustic characteristics of the 8-inch low frequency loudspeaker. The 800-Hz and 3000-Hz transitions are controlled by the frequency dividing networks contained in each 3-way system.
4. System sensitivity can also be expressed as 90 dB SPL at 1 metre (3.3 ft.).
5. Since the major portion of the energy reproduced by the ultrabass and low frequency loudspeakers lies below 800 Hz, this specification represents the sensitivity, within 1 dB, at 30 feet (9.1 m) using a 1-milliwatt test signal swept from 100 to 500 Hz, rather than the 1-kHz sine wave test signal on which the conventional EIA sensitivity rating is based.
6. Averaged from 1 to 3 kHz, within 1 dB, measured at 30 feet (9.1 m) with a 1-milliwatt input.
7. Averaged from 5 to 20 kHz, within 1 dB, measured at 30 feet (9.1 m) with a 1-milliwatt input.
8. Can be converted for 240-volt AC, 50/60-Hz operation by qualified service personnel.

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. This applies to the Ultrabass as well as the primary amplifier or receiver.

WIRE GAUGE– Eighteen-gauge insulated wire (ordinary household lampcord) is the minimum size recommended for loudspeaker connections up to 50 feet (15 m). Beyond this distance, heavier gauge insulated wire is recommended; 16-gauge from 50 to 100 feet (15-30 m) and 14-gauge 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.

In certain configurations, much thinner wire—as light as 24 gauge—may be used to connect the Ultrabass,

facilitating wire concealment. Such connections are represented by dashed lines in the wiring configurations shown on page 8. Use of smaller gauge wire is possible because the Bass Energizer provides a high impedance load to the power amplifier or receiver; thus, the wires are required to carry very little current. The nominal impedance of the complete L212 system, however, is 8 ohms.

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 Ultrabass or 3-way loudspeaker system (depending on the wiring configuration you are using) 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 L212 system.

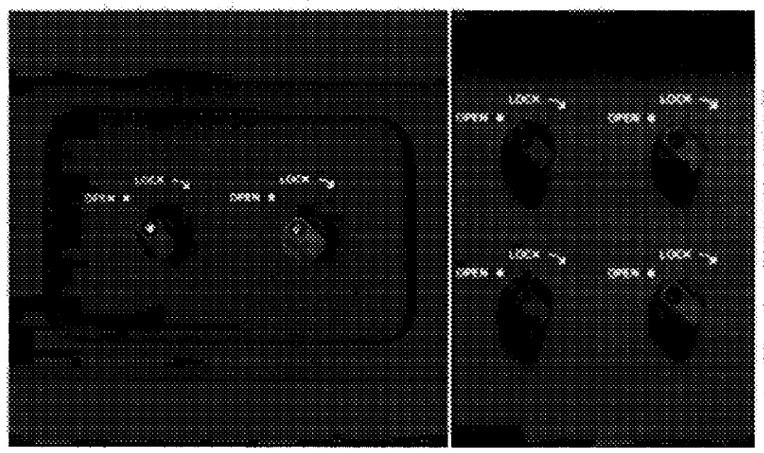
Note that many amplifiers have a chassis grounding terminal which is usually separated from the other connectors. This should not be confused with the "ground" designation sometimes used to describe one of the two terminals for each loudspeaker system connection.

CONNECTIONS BETWEEN THE ULTRABASS AND 3-WAY SYSTEMS– Each 3-way system must be connected to its corresponding channel on the Ultrabass, as illustrated on page 8. All four configurations are electrically equivalent; select the one that most easily meets the requirements of your particular listening room.

MAKING THE CONNECTION– Input terminals are located on the bottom panel of the Ultrabass, and inside the pedestal of each 3-way system. Access to the Ultrabass terminals can be obtained by placing it on its back (on a clean, padded surface), after first removing the glass top. To gain access to the input terminals of a 3-way system, place the unit on its side and reach into the pedestal.

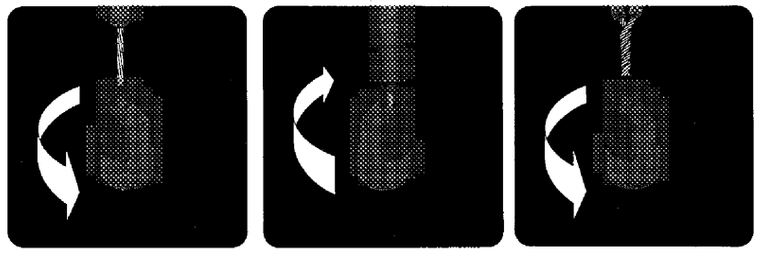
Caution: To avoid the possibility of enclosure damage, always place the 3-way loudspeaker system on its side; never place the 3-way loudspeaker system on its face or back.

3. Connecting the Ultrabass and 3-way 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.



Input Terminals

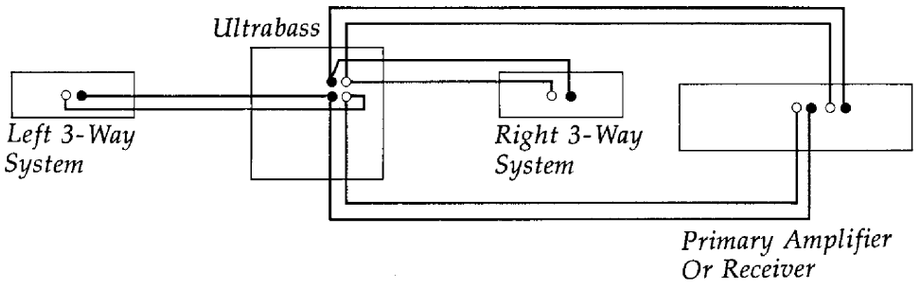
Place the 3-way loudspeaker system on its side and reach into the pedestal. Never place the 3-way loudspeaker system on its back or face. The input terminals of the Ultrabass (right) are located on its bottom panel.



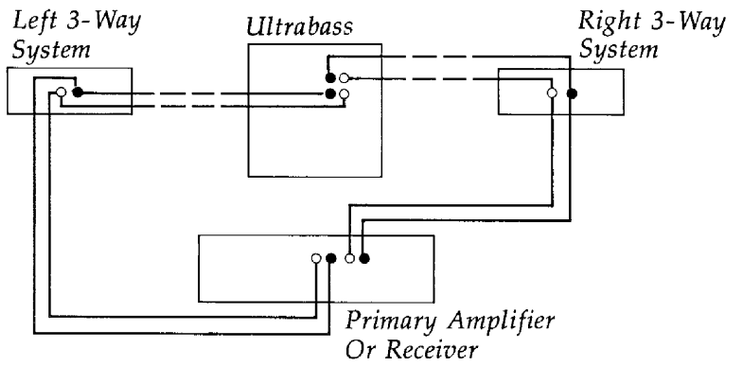
1. Strip approximately ¾ inch (19 mm) of the insulation from the end of the wire. Twist the wire strands together as shown. If two wires are to be inserted into the terminal, twist them together and insert them as a single wire as pictured in the third illustration. Soldering is not usually required; however, if the wires are of different sizes, or are solid rather than stranded, it is sometimes advantageous. (Note: stranded wire is recommended.)

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

POWER CONNECTION–The Bass Energizer, contained within the Ultrabass, must be connected to 110-120 volts AC, 50/60 Hz, and is provided with a 15-foot (4.6 m) power cord for that purpose. It may be plugged into a switched outlet on the back of a power amplifier or receiver or directly into a wall outlet. The power requirement of the Ultrabass is relatively low (60 watts); the switched outlet of almost any high quality amplifier or receiver will be capable of handling the load. When no signal is present, power consumption will be virtually nil; therefore, the Ultrabass may be plugged into a wall outlet and left on continuously without causing damage or noticeable increase in power costs (local ordinance permitting).

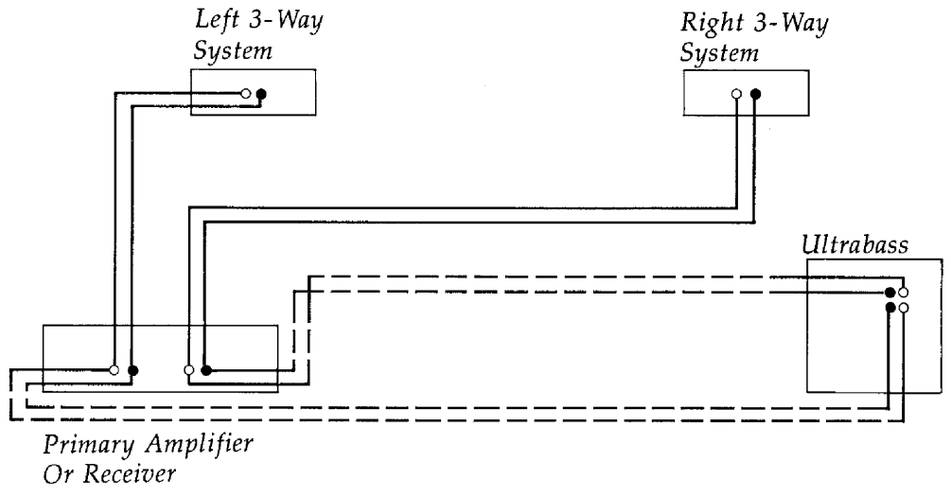


The simplest method.

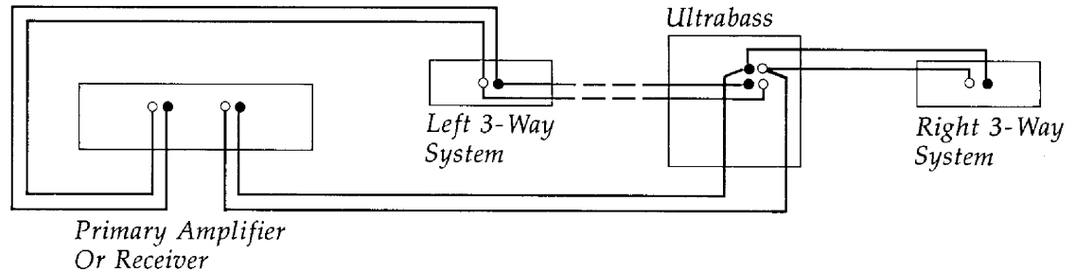


A very useful arrangement allowing utilization of very small gauge wire between the 3-way loudspeaker systems and the Ultrabass.

Note: If the Ultrabass is to be connected to any service other than 110-120 volts AC, 50/60 Hz, it must be modified by a qualified service technician.



The arrangement that may be most useful if the Ultrabass is not located between the 3-way systems; it allows use of very small gauge wire between the primary amplifier and the Ultrabass.



A combination of the first two arrangements, useful if the amplifier is located at the extreme side of the listening room.

WIRING CONFIGURATIONS

Use the arrangement which most easily adapts the system layout to your listening room. Each 3-way system is wired in parallel with its corresponding channel on the Ultrabass. Wire gauge recommendations are on page 5. The dashed lines indicate connections that can be made with wire as small as 24 gauge. The black terminals are shown in black; red terminals and their associated wiring are shown as white.

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.

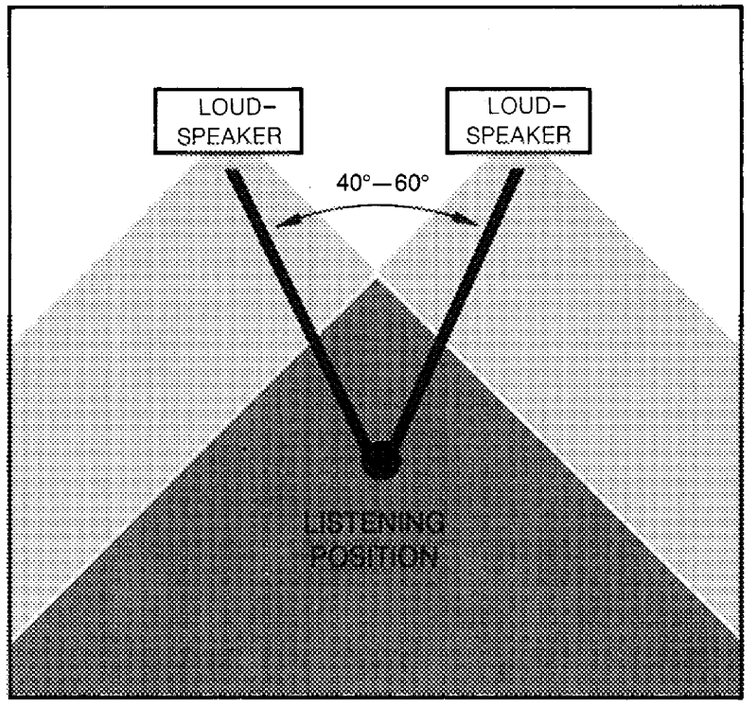
PLACEMENT

3-WAY LOUDSPEAKER SYSTEMS–Placement of the 3-way systems follow the same general guidelines applicable to all JBL loudspeaker systems. Although they have an extremely wide sound dispersion pattern, the sound of the installation will be dependent on the location of the 3-way loudspeaker systems within the listening environment. If possible, experiment with placement before deciding on a final arrangement.

For the best possible stereo performance, the two 3-way systems should be arranged symmetrically in front of the listener. As a general rule, a person sitting in the usual listening position should see an angle of about 40° to 60° between the two systems. The distance between systems is determined by their distance from the listener and by the 40° to 60° listening angle. Some listeners have experienced an increased sense of spaciousness when the systems are placed further apart than would be indicated by a 40° listening angle.

The 3-way systems may be located against a wall or up to three or four feet (1 to 1.3 m) from a wall with equal flexibility, depending upon decor and room treatment. In relatively live rooms, locating the systems away from the wall may be preferred, with the units turned in slightly toward the usual listening position. Such placement will increase the direct-to-reverberant sound ratio in the listening room. If corner location is desired,it is important that both 3-way loudspeaker systems be in corners.

ULTRABASS–The Ultrabass will provide excellent bass coupling from many locations within the room, and it may face any direction as long as the grille is more than 6 inches (150 mm) from a wall. However, adjusting the system, described in the following paragraphs, may be simplified if the Ultrabass is placed within 2 feet (0.6 m) of an imaginary line drawn between the two 3-way loudspeaker systems. The final location should be based on experimentation, utilizing the location which yields the most extended low frequency response.



40°-60° "Listening Angle"
Sound energy from each 3-way loudspeaker system 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

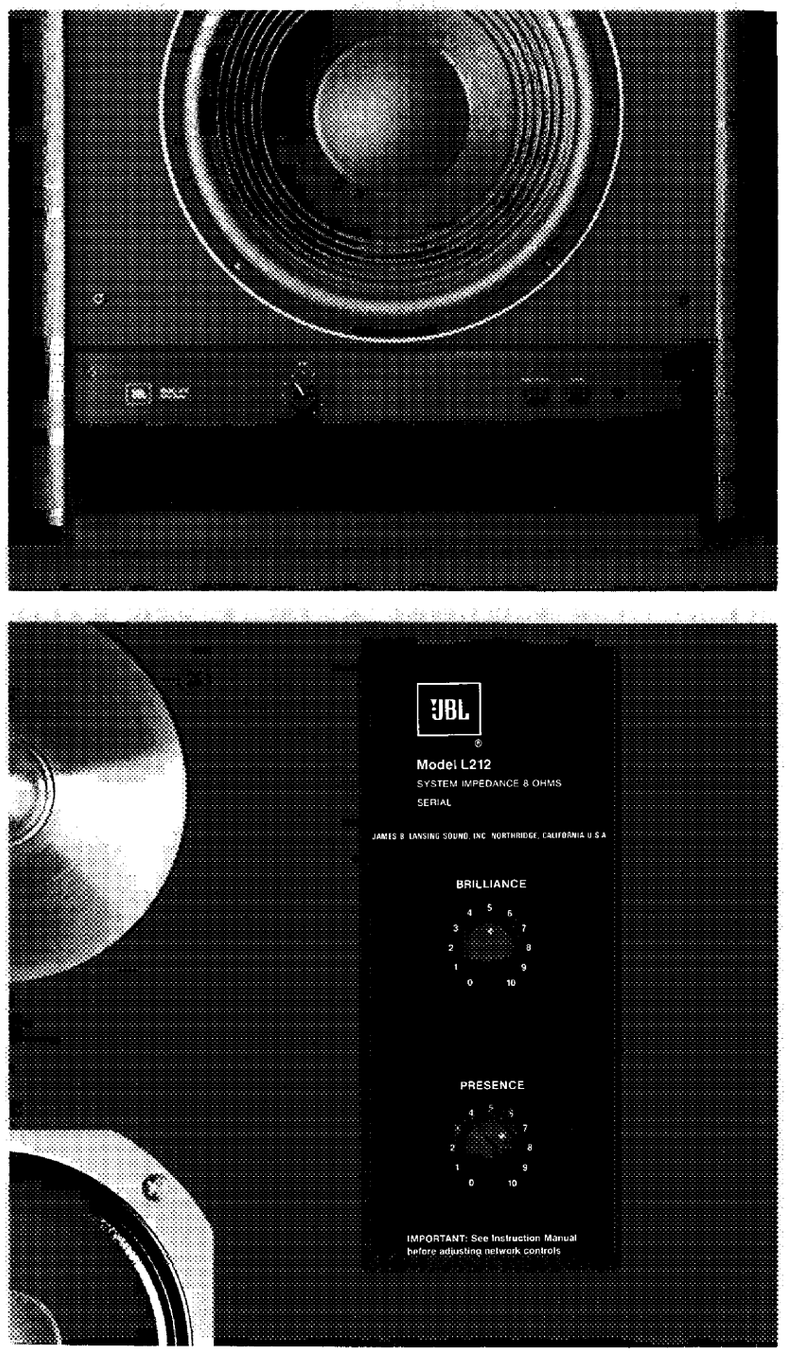
Although the L212 is designed to ensure maximum flexibility of placement within the listening room, some adjustment will usually be desired to accommodate personal preferences or specific room acoustics. Initially, set all controls at 5; determine the setting of the Phase Reversal switch on the Ultrabass; adjust the Brilliance and Presence controls of each 3-way loudspeaker system; and finally, set the Level control of the Ultrabass.

The numbers surrounding each control are for reference only. Variations in room acoustics usually result in control settings between 3 and 7. However, the settings could fall outside this range in unusually live or dead rooms. The system should be adjusted while reproducing typical program material, with amplifier tone controls set at the center (generally referred to as "flat") position. Except as noted, evaluations should be made while seated in the normal listening location. Once all adjustments have been made, and the exact placement of the Ultrabass and each 3-way system has been determined, compensation for differences in individual recordings should be made with the tone controls on the primary amplifier or receiver.

PHASE REVERSAL—In-phase operation of the Ultrabass is achieved when the Phase Reversal switch is depressed; conversely, when the switch is not depressed the Ultrabass will operate in reverse phase relative to the 3-way loudspeaker systems. When the switch is in the correct position for a given installation, reproduction in the middle bass region—bass guitar, bass drum or the lower register of the male voice—will sound most natural. This phenomenon will be most easily observed if the listener is between the Ultrabass and one of the 3-way systems. (A listener in this location will hear a definite hollowness in the middle bass region if the Phase Reversal switch is not in the appropriate position for the particular installation.) If the Ultrabass is placed within 2 feet (0.6 m) of an imaginary line drawn between the two 3-way loudspeaker systems, the most natural sound will probably be obtained when the switch is depressed (placing all three units in phase with each other). There is no "correct" position for all locations; use whichever switch position yields the most natural sound.

BRILLIANCE AND PRESENCE—Each 3-way loudspeaker system is provided with a Brilliance control that regulates the relative loudness of the high frequency hemispherical radiator and a Presence control that regulates the 5-inch midrange transducer. Listen to a variety of program material long enough to become accustomed to the system's performance with all level controls, including the Ultrabass level control, at 5. Once the ear has become attuned to the performance of the L212 system, evaluate the presence and brilliance qualities of the program material. If high frequency program material, such as cymbals, bells or triangles, seem to be overemphasized (sometimes sounding "tinny"), reduce the setting of the Brilliance control by rotating it counterclockwise. If high frequency program material is not loud enough, rotate the control clockwise to increase output of the high frequency dome radiator. Once the Brilliance control has been set, adjust the Presence control in a similar manner while listening to midrange program material, such as male voice, piano or guitar.

ULTRABASS LEVEL—The Ultrabass is provided with a level control which regulates its relative output. The control should be adjusted after determining the settings of the Phase Reversal switch and the Brilliance and Presence controls of the 3-way loudspeaker systems. Begin with a control setting of 5, evaluate the extreme bass performance of the loudspeaker system and increase or decrease the setting of the control until the preferred balance is obtained.



Phase Reversal and Power switches and the Level control are located on the lower front panel of the Ultrabass; Brilliance and Presence controls are located on the front of each 3-way loudspeaker system. Switches and controls are located behind the removable grille assemblies of their respective enclosures.

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 reponse of JBL loudspeaker system components. The L212 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.[4] However, for reproduction of the full dynamic range of contemporary recordings at high volume, a quality amplifier delivering up to 200 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.

4. 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.")

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.

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.

ULTRABASS–Use of a single loudspeaker of moderate diameter, housed in a relatively small enclosure, to reproduce information below 70 Hz while maintaining relatively high system efficiency, represents an extremely difficult engineering challenge. JBL transducer and electronic engineers met the challenge by creating a unique sub-system consisting of a new 12-inch loudspeaker driven by a specially designed amplifier installed within the Ultrabass enclosure.

JBL low frequency loudspeakers have always been known for outstanding solidity of construction and massive, precisely machined magnetic assemblies. The Ultrabass loudspeaker is a further expression of that design philosophy. Though only 12 inches in diameter, its 12-pound magnetic assembly with an Alnico V magnet and 4-inch edgewound copper ribbon voice coil, is more powerful than magnetic assemblies found on most 15-inch loudspeakers. The cone is extremely stiff and resistant to breakup; its mass, a critical parameter, is precisely maintained by the unique JBL Mass-Controlling Ring. Although the loudspeaker operates only below 70 Hz in the L212 system, its capabilities extend beyond 2 kHz, ensuring outstanding transient response.

The Ultrabass enclosure is extensively braced and virtually vibration-free. Its internal volume is precisely matched to the requirements of the loudspeaker, and it is densely packed with acoustic damping material. The resonant frequency of the enclosure/loudspeaker combination is a remarkably low 33 Hz.

LOW FREQUENCY–Program material between 70 and 800 Hz is reproduced by an innovative 8-inch low frequency loudspeaker utilizing a 3-inch voice coil, 7½-pound magnetic assembly housing an Alnico V magnet and a pole piece surrounded by a ring of pure silver that reduces third-harmonic distortion and results in a smoother impedance curve, permitting more uniform amplifier performance. The voice coil is exceptionally large for an 8-inch loudspeaker and is fabricated of copper wire milled to a flat ribbon and wound on edge

by hand. Edgewinding and the large diameter of the voice coil maximize the amount of conductor in the magnetic field, contributing to efficiency, power handling capacity and transient response. To ensure minimum cone breakup on strong low frequency peaks, the loudspeaker is equipped with an extremely hard, stiff cone. Although utilized only in the low frequency region, the loudspeaker is capable of performing smoothly up to 9 kHz, ensuring superior transient response throughout its operating range.

MIDRANGE–Typical of most JBL high frequency and midrange loudspeakers, the 5-inch midrange transducer was purposely designed to be considerably more efficient than the low frequency loudspeaker. This makes it possible to reduce the output level of the unit in the crossover network, utilizing the transducer at only a fraction of its full potential, thereby leaving the substantial reserve dynamic range necessary to recreate high intensity program peaks.

A unique feature of this 5-inch unit is a cone that is twice as stiff as the cone used in any other JBL 5-inch transducer. The stiffer cone lessens the possibility of cone breakup when played at loud listening levels. The cone is driven by a ⅞-inch diameter copper voice coil suspended within a powerful magnetic field generated by a 1⅝-pound magnetic assembly. The voice coil is unusually large in relation to cone size for exceptional transient response and acoustic efficiency. In addition, the unit is housed in its own sub-chamber, within the 3-way system enclosure, designed specifically for optimum cone loading and to prevent acoustical interaction with the low frequency loudspeaker.

HIGH FREQUENCY–Above 3 kHz, and extending to beyond 20 kHz, program material is reproduced by the 1-inch hemispherical radiator. 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, light dome reduces mechanical distortion and provides a degree of transient response rarely achieved in a high frequency radiator of this type; an achievement virtually unattainable with soft-dome designs of similar dimensions.

Use of a 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 this hemispherical radiator. The large coil also dissipates heat more rapidly, ensuring far greater reliability when operated at extremely loud listening levels.

The small diameter of the dome makes it possible to achieve exceptionally wide sound dispersion. An integral baffle eliminates possible aberrations from the edge compliance. If radiation from the edge compliance were not controlled by this integral baffle, the effective operating diameter of the dome would be increased, thereby reducing dispersion. The baffle is concentric to the radiating surface within a few thousandths of an inch, providing 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.

FREQUENCY DIVIDING NETWORK–In a conventional loudspeaker system, a frequency dividing network is needed to receive the incoming signal from the amplifier and then allocate each portion of the audio spectrum to the appropriate driver. This allocation, or division, occurs over a range of frequencies. The published crossover frequency is a nominal value indicating the central frequency of the transitional range. The loudspeakers actually operate, at diminishing output levels, for several octaves above and below the nominal frequency. Smooth, imperceptible operation of the network is vitally important to the total performance of a loudspeaker system; otherwise, with unregulated overlap, the listener would perceive the performance of individual drivers, rather than a blended loudspeaker system. To accomplish the smoothest possible transitions, 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 used have extremely low insertion loss so that very little 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 L212, however, utilizes a unique system concept to accomplish the crossover function. Information below 70 Hz is directed to the Ultrabass loudspeaker, at a filter slope of 12 dB per octave, by circuitry incorporated into the Bass Energizer. The transition to the 8-inch low frequency loudspeaker occurs at 12 dB per octave and is achieved acoustically by the inherent characteristics of the loudspeaker and by the physical configuration of the enclosure. The networks installed in each 3-way loudspeaker system control the midrange and high frequency transitions.

The 3-way system networks also contain extremely sophisticated impedance leveling and phase correcting circuitry. This circuitry is responsible for precise crossover

transitions, as well as for maintaining proper phase relationship and an exceptionally smooth impedance curve through the entire operating range of each of the three drivers utilized in the system. Maintaining proper phase relationship and controlling the impedance of the drivers is an important factor contributing to the exceptionally smooth overall frequency response of the L212. Each of the transitions controlled by the networks occurs at 6 dB per octave. The result is smoother blending and more homogeneous performance. The networks installed in the 3-way loudspeaker systems approach the theoretical model of a perfect frequency dividing network operating with perfect loudspeakers.

Loudspeaker System Components
Bass Energizer
12-inch Ultrabass Loudspeaker
8-inch Low Frequency Loudspeaker
5-inch Midrange Transducer
1-inch High Frequency Hemispherical Radiator

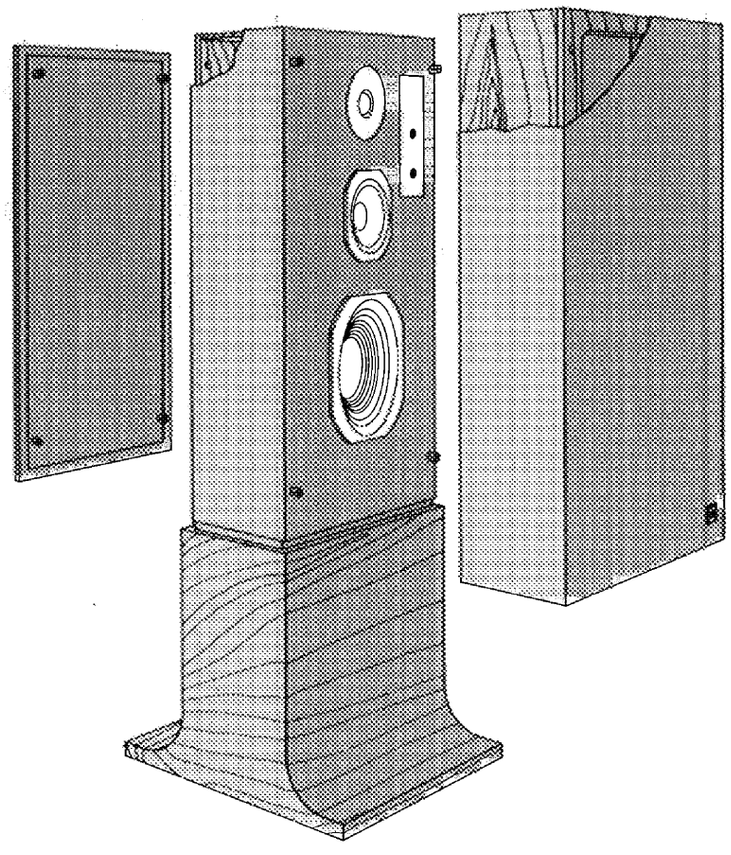
COMPONENT REMOVAL

If it should be necessary to remove the loudspeaker system components for testing or repair, first be sure the primary amplifier is turned off, unplug the Ultrabass from its power source, and then disconnect the system from the amplifier.

GRILLES–The Ultrabass grille assembly is secured by dowel pins located near the four corners of the enclosure baffle panel. Use both hands to grasp the grille along the bottom edge, near the two corners. Gently pull the assembly forward, away from the enclosure; then pull the grille from the remaining two dowel pins at the top of the enclosure baffle panel. When replacing the grille, place it so that the cutout on the grille frame follows the contour of the top edge of the loudspeaker, and check alignment of the dowel pins with their corresponding holes in the grille frame. Gently apply pressure at the corners of the grille until it seats on the dowel pins.

The grille on the front of each 3-way system is held in place by dowel pins anchored to the enclosure baffle panel. Grasp the grille at the top two corners and gently pull the assembly forward, until the dowel pins disengage; then, grasp the lower side panels of the grille and pull gently until the assembly can be removed from the enclosure. To replace the grille, place it on the enclosure and apply gentle pressure adjacent to the dowel pins until the grille is seated.

The grille on the back of the 3-way loudspeaker system enclosure, which is never removed under normal usage, is also secured by dowel pins; however, they are anchored to the grille frame (rather than to the enclosure) and fit into corresponding holes in the enclosure back panel. Grasp the grille by both top or both bottom corners and gently pull the assembly from the enclosure. Repeat this process with the other two corners in order to complete removal. To replace the grille, align the dowel pins with their respective holes in the enclosure panel, then apply gentle pressure adjacent to the dowel pins until they are seated.



Grilles are held by dowel pins.

ULTRABASS–The 12-inch loudspeaker is mounted to the enclosure baffle panel by four Phillips-head screws threaded into T-nut fasteners, which are anchored to the back of the panel. Remove the grille, glass top and cushion, then place the enclosure on its back on a clean, padded surface. Carefully unscrew the machine screws without applying pressure that might dislodge the T-nuts. After the four 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 from the enclosure. Be sure to replace the vinyl gasket which fits into a groove on the back of the loudspeaker frame, if it has become loose during removal.

LOW FREQUENCY AND MIDRANGE–The 8-inch low frequency loudspeaker and 5-inch midrange transducer are each mounted to the baffle panel of the 3-way loudspeaker system enclosure with four Phillips-head machine screws and T-nuts. Remove the front grille assembly, then take out the four mounting screws of the driver to be removed, without applying pressure that might dislodge the T-nuts.

Caution: Since the enclosure is upright or on its side, be certain to support the driver while taking out the mounting screws (never place the 3-way loudspeaker system enclosure on its back or face).

After the screws have been removed, lift the driver away from the enclosure just far enough to disconnect the lead wires at the binding posts, and remove the unit.

HIGH FREQUENCY–Remove the front and back grilles from the 3-way system enclosure. Reach into the enclosure through the opening in the rear panel, disconnect the lead wires from the binding posts and support the high frequency hemispherical radiator from behind while removing the three Phillips-head mounting screws from the front of the enclosure. Carefully lift the unit away from the inside of the baffle panel and remove it through the opening in the rear panel.

Caution: To avoid damage, exercise extreme care not to allow the dome to come into contact with any of the enclosure surfaces.

FREQUENCY DIVIDING NETWORK–The frequency dividing network is secured to the side panel of the 3-way system by three Phillips-head machine screws and is connected by cable to the Brilliance and Presence controls, which are mounted as an assembly to the front baffle panel by three Phillips-head machine screws. To gain access to the controls, remove both grilles from the enclosure, carefully peel off the serialized foil nameplate on the front baffle panel, reach into the enclosure through the opening in the rear panel and support the assembly while removing the three mounting screws; then lower the controls into the enclosure. The network itself can be removed by taking out the three mounting screws extending through the enclosure side panel and lowering the assembly into the enclosure. After disconnecting the six tab connectors on the terminal strip near the edge of the assembly and the two lead wires from the terminals of the high frequency hemispherical radiator, lift the network out of the enclosure. (Note: Malfunction of the network is highly unlikely. Since the nameplate is generally destroyed during removal, it is not recommended that the network be removed simply for the purpose of inspection. If the network must be returned for service, enclose the original nameplate; a new serialized nameplate will be provided.)

WIRING–When reconnecting the wire leads between the dividing network and the midrange transducer, proper polarity is ensured by the shape-coded connectors. Wire leads and connections to the other components are color coded as shown on page 25.

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.

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.

ENCLOSURE

The L212 enclosures, embodying the principles of fine furniture design and construction that have made JBL a leader in the industry, complement the acoustic characteristics of the loudspeaker system. 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 four corner pieces and the finish veneer on the three side panels of the Ultrabass, as well as the veneered surfaces of the 3-way loudspeaker system pedestals, are 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 used liberally to attenuate standing waves within the enclosures. To achieve maximum strength and resistance to vibration, all joints are hand fitted, interlock and are wood welded.

The Ultrabass is attractively highlighted by a smoked glass top. Its distinctive opaque effect is achieved by placing a black foam cushion beneath it. A clean soft dust cloth or quality household glass cleaner can be used to maintain the glass surface. Note: The glass panel and the foam cushion should be removed whenever the enclosure is moved or tilted, such as when removing the Ultrabass loudspeaker. In the event that the glass panel is damaged, it can be replaced by a local glass supplier (see Specifications for the dimensions).

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.

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.

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 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 franchised JBL dealer, should be inserted in unused phono imputs to help eliminate hum or stray signal pickup.

Hum may be caused by locating a turntable or tape recorder too close to 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 parallel 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, placement of the speaker system or the setting of the Phase Reversal switch. 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 noise 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

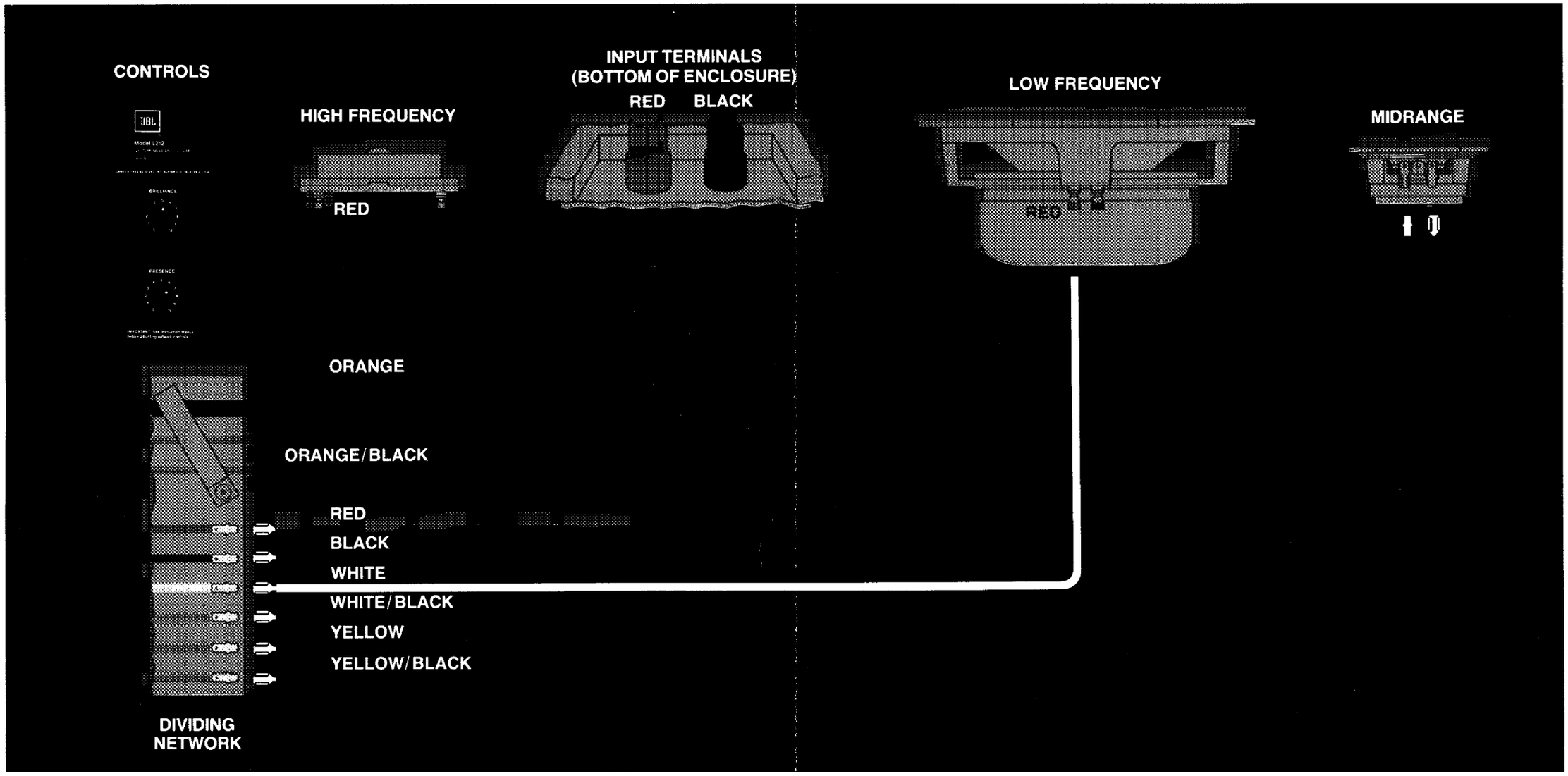
The L212 exemplifies JBL's reputation for leadership in acoustic and visual design. It is our sincere belief that the L212—like all JBL products—will provide undiminished listening pleasure for many years to come.

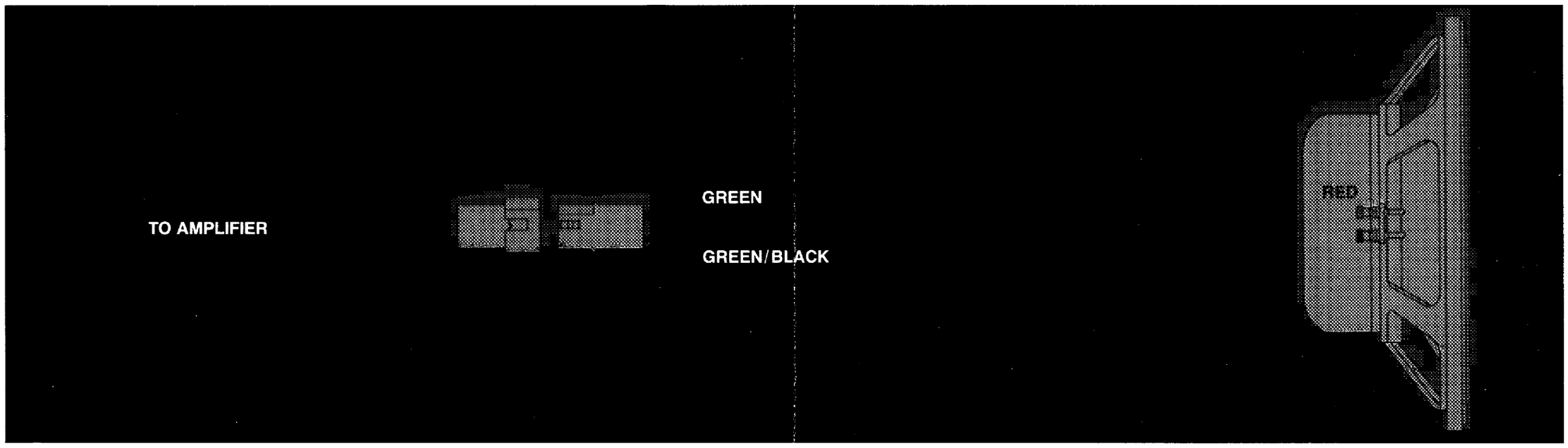
Like all fine loudspeaker systems, the L212 will reveal the quality of program material as well as the quality of the other components in your music system. It is recommended that you choose every component for its ability to provide a standard of performance, quality and reliability comparable to that 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.

3-WAY LOUDSPEAKER SYSTEM WIRING





ULTRABASS WIRING