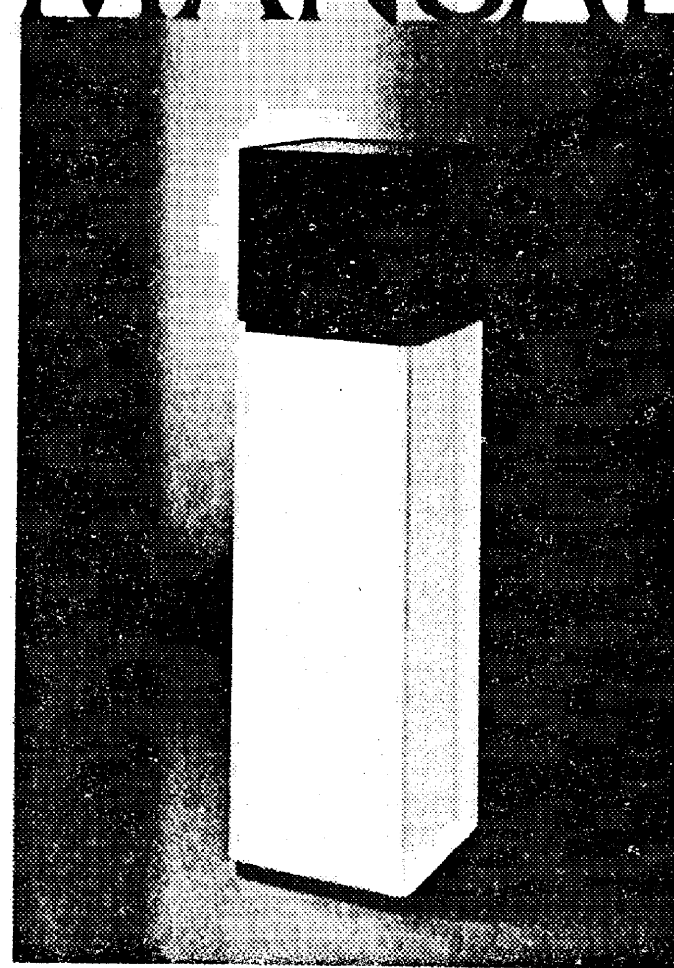


# L120 AQUARIUS Q INSTRUCTION MANUAL





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.

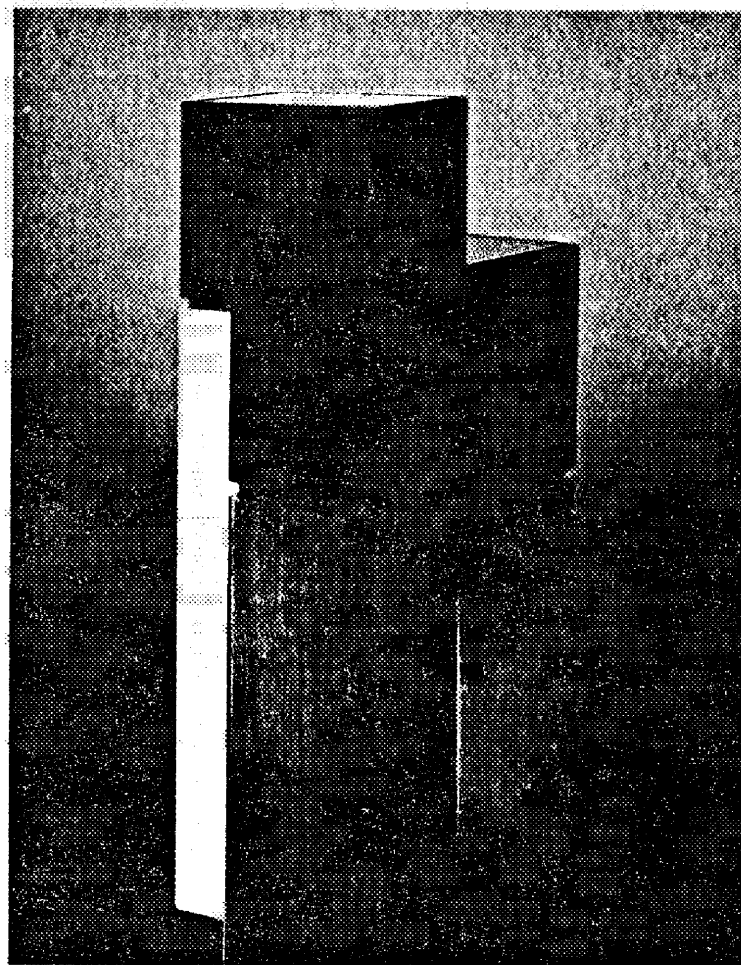
Today these craftsmen continue to perform to the most rigid standards any craftsman can submit to: those they impose upon themselves.

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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JBL continually engages in research related to product improvement. New materials, production methods and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description but is always warranted to equal or exceed the original design specifications unless otherwise stated.

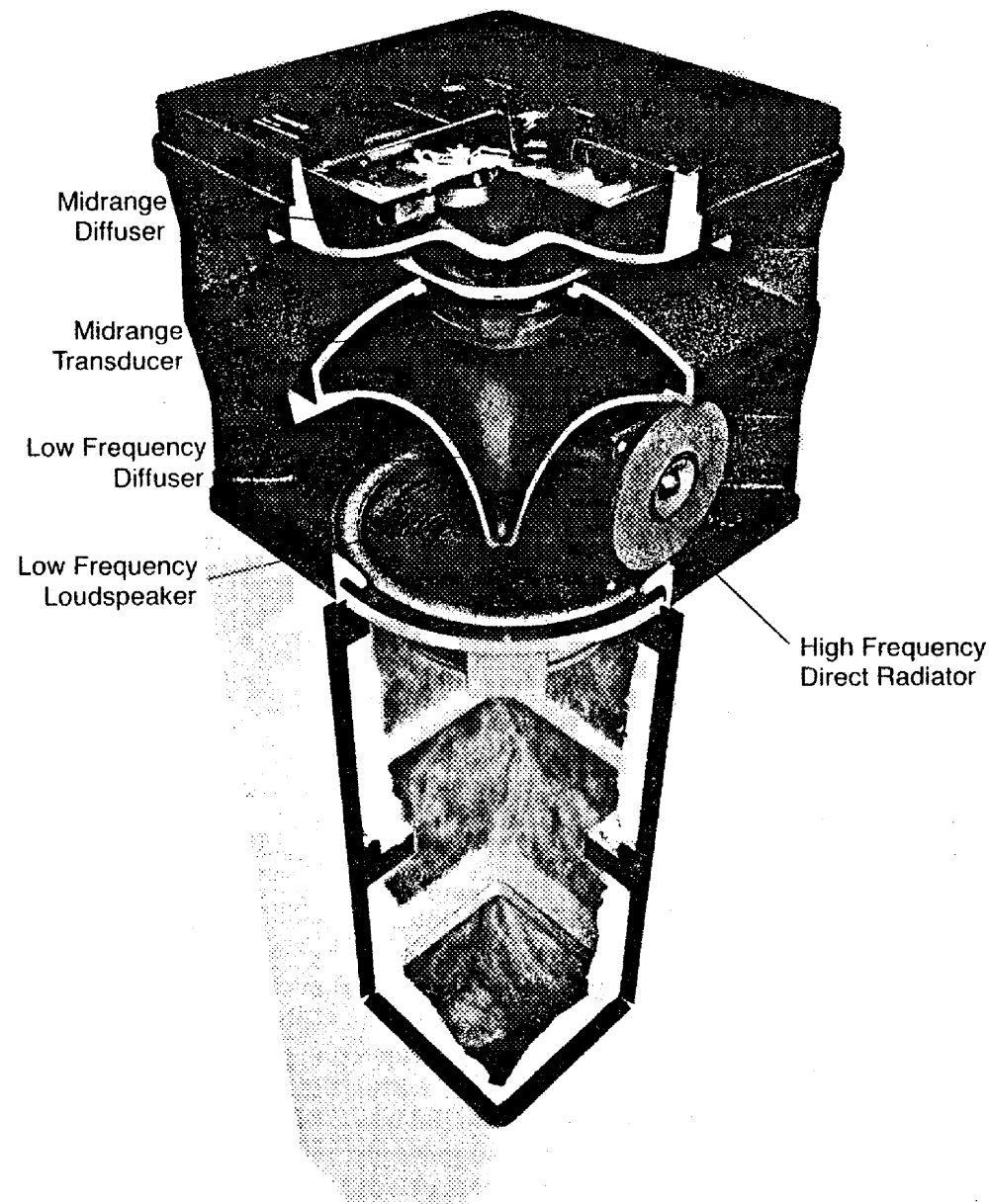


Most loudspeakers have the ability to reproduce the obvious characteristics of music—the highs and lows, the louds and softs. But music is more than that.

Music produced by a voice, instrument, band or ensemble radiates sound in many directions. Some of the sound reaches you directly while some of it comes to you after being reflected by the walls, ceiling and floor of the room.

The Aquarius Q houses two critically engineered dispersive elements, each having precisely contoured surfaces to spread sound completely in a spherical wavefront. The expanding wavefront fills the room the way a live performance would in that same environment. Unlike so-called "omnidirectional" systems, the Aquarius Q is therefore not highly dependent on placement within the room. It utilizes room surfaces to distribute the music with a natural balance of direct and reflected sound—just like the acoustical propagation of actual instruments or voices.

The Aquarius Q exhibits the characteristics that are typical of all JBL systems—solid bass, smooth midrange and sparkling high frequency reproduction accompanied by exceptional transient response and clarity. The L120 exhibits



Interior View

the presence for which JBL is known worldwide. Presence is the feeling that a performance is occurring in front of the loudspeaker system, rather than coming from within it.

The most dramatic characteristic of the Aquarius Q is its imaging effect—the apparent width and depth of the sound stage with the ability to localize instruments. The low frequency and midrange drivers each face a dispersive element that projects an expanding wavefront 360 degrees in the horizontal plane, and yet contains vertical distribution within 120 degrees. The purpose of this particular distribution pattern—called a toroidal or doughnut-shaped pattern—is to recreate the wide horizontal sound distribution of an actual acoustical event, and at the same time, keep most of the available sound energy at the listener's ear level.

The dispersive elements, called diffusers, were developed through research at JBL using laboratory models in a ripple tank, where wave patterns in water were used to simulate the dispersion of soundwaves in air. The result of this research was applied to the Aquarius Q, a loudspeaker system providing even, controlled distribution of sound energy without the coloration often found in "direct-reflecting" systems, which require careful placement in relation to walls, or in systems having restrictive enclosure baffling devices to achieve their sound distribution patterns.

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 Aquarius Q, for example, will convert a 1-Watt input of "white noise"<sup>1</sup> into a sound pressure level of 73 dB measured at a distance of 15 feet<sup>2</sup>. This is approximately twice as loud as ordinary conversation and represents a comfortable listening level, demonstrating that the L120 delivers substantial output from very little input power.

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.

SPECIFICATIONS

Power Capacity <sup>1</sup>	50 Watts continuous program
Nominal Impedance	8 ohms
Dispersion	360° horizontal x 120° vertical
Crossover Frequencies	1000 and 8000 Hz
Efficiency	1 Watt input produces 73 dB Sound Pressure Level (Note: 75-80 dB is a comfortable listening level.) at a distance of 15'
<b>Low Frequency Loudspeaker</b>	
Nominal Diameter	10 inches 25 cm
Voice Coil	2-inch (5 cm) copper
Magnetic Assembly Weight	2½ pounds 1.1 kg
Flux Density	8500 gauss
Sensitivity <sup>2</sup>	40 dB
<b>Midrange Transducer</b>	
Nominal Diameter	5 inches 13 cm
Voice Coil	¾-inch (2.2 cm) copper
Magnetic Assembly Weight	1½ pounds 0.7 kg
Flux Density	15,000 gauss
Sensitivity (Averaged 1-3 kHz)	45 dB
<b>High Frequency Direct Radiator</b>	
Nominal Diameter	1.4 inches 3.6 cm
Voice Coil	¾-inch (1.6 cm) copper
Magnetic Assembly Weight	1½ pounds 0.7 kg
Flux Density	15,000 gauss
Sensitivity (Averaged above 2 kHz)	41 dB
Finish	Oiled Walnut or Satin White
Grille	Stretch fabric
Grille Color	Brown with oiled walnut finish Blue with satin white finish
Top Surface	¼-inch light gray tinted plate glass with ground edges; black foam cushioning
Dimensions	44" x 12" x 12" deep 112x31x31 cm deep
Shipping Weight	71 lbs

1. Based on a laboratory test signal. See Power Capacity section for amplifier power recommendation.
2. Since the major portion of the energy reproduced by the low frequency loudspeaker lies below 800 Hz, this specification has been developed using a test signal warbled from 100 to 500 Hz, rather than the 1-kHz sine wave test signal on which the conventional EIA sensitivity is based.

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.

CONNECTING  
THE AQUARIUS Q

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

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

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

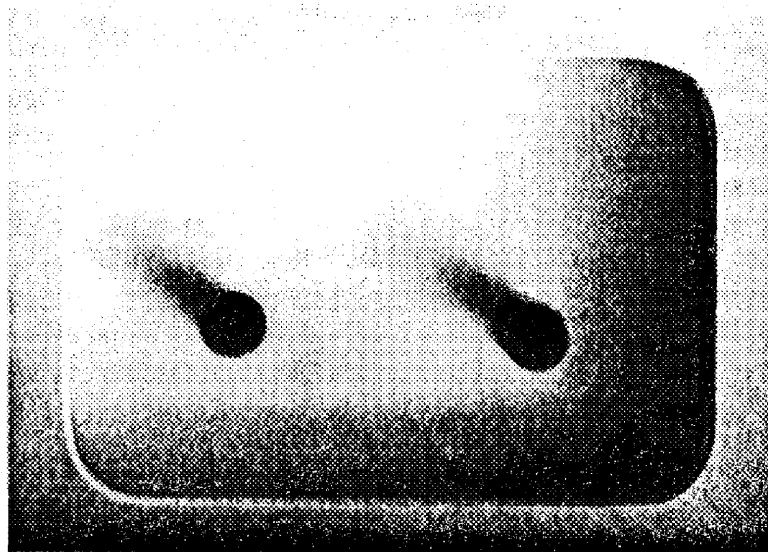
To make a secure connection, strip approximately ¼ inch of the insulation from the end of the wire, push down the spring-loaded terminal post cap, insert the bare wire into the exposed opening of the terminal post and release. (Insertion of the wire into the opening will be easier if the stripped wire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

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

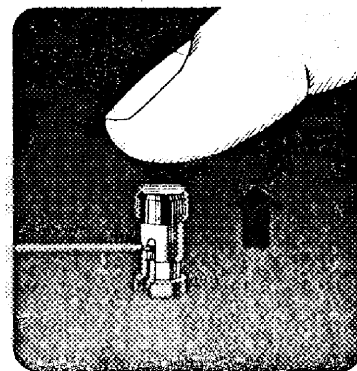
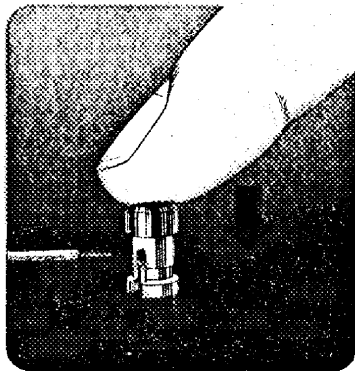
*3. Connecting both speakers as described will insure proper "in phase" operation; i.e., their cones will respond to a monophonic signal by moving simultaneously in the same direction, and not opposite to each other. Inadvertent out-of-phase operation (which occurs when one set of speaker wires is reversed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

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

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



*The input terminals are located on the bottom of the Aquarius Q enclosure.*



1. Depress colored button, exposing hole in terminal post.
2. Push stripped end of lead wire into hole and release button. Never apply twisting force to the terminal post.

## 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.

Since the Aquarius Q has such wide dispersion, room placement is a far less significant factor than it would be for conventional loudspeaker systems. In addition, an L120 can be placed much closer to chairs, couches or other furniture without sacrificing the integrity of its performance. The Aquarius Q, therefore, lends itself most readily to blending with the decor of a listening room. Its acoustical versatility permits maximum flexibility in positioning a pair of loudspeakers for stereo, and is particularly advantageous for quadraphonic installations since the four enclosures do not necessarily have to be in the four corners of the room.

Low frequency output will normally be greatest if an Aquarius Q is positioned in the corner of a room. Conversely, the room will generally have the least effect on bass reproduction when the loudspeaker system is placed furthest from the walls.

By rotating the enclosure, the high frequency direct radiator can be oriented to face the listener or toward a wall of the room.<sup>4</sup> Directing the high frequency unit at a reflective surface will generally provide a more expansive acoustic effect, as contrasted to the greater degree of directionality obtained if the high frequency unit faces you. If an L120 is adjacent to a sound absorbing surface, with the high frequency direct radiator facing that surface, naturally, the output of the high frequency unit will be reduced.

Most normal listening rooms exhibit some high frequency absorption, and this effect usually increases at the higher frequencies. If this condition exists in your listening room, the high frequency direct radiator, which reinforces the system in the region above 8000 Hz, can be used to achieve the desired balance by changing its orientation relative to the wall surfaces and by adjusting its loudness with the Brilliance control.

A pair of Aquarius Q's will provide encompassing stereo reproduction even when placed further apart than generally recommended for conventional loudspeaker systems. For example, in an odd-shaped room, a pair of L120's could be placed in diagonally opposed corners, or on each side of an alcove, door or entranceway without adverse effects. If the

4. When you stand in front of an Aquarius Q so that the JBL medallion is at the near left-hand corner of the top surface, the high frequency direct radiator will be facing you.

## PLACEMENT

room is such that the loudspeakers cannot be placed symmetrically on each side of the listener, a realistic stereo image can still be obtained. Set the amplifier mode control for monaural operation and use the balance control to place a vocal performance directly in front of your usual listening position; when the mode control is reset for stereo, a normal stereo image will be achieved.

In a quadraphonic installation the most widely accepted practice would be to place four L120's in or near the corners of a room. While this arrangement would lessen the tendency of them becoming the dominant visual element, as could occur with conventional loudspeaker enclosures, it is certainly not the only available option. Four L120's could be placed in virtually any arrangement around the listening position. With each basic arrangement, the versatility provided by the Presence and Brilliance controls in conjunction with the orientation of the high frequency direct radiator, and the 4-channel balance control of the amplifier will provide variation of image placement and tonal balance for the desired acoustic effect. When establishing the desired balance of the four loudspeaker systems, use appropriate 4-channel material and adjust the amplifier balance control so that your usual listening position is in the apparent center of the 4-channel image.

#### ADJUSTING THE SYSTEM

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

The controls are calibrated so that when they are each at the mid-points of their rotation, the loudspeaker system will be adjusted for balanced performance characteristics in a reverberation-free environment. Since most listening rooms possess varying degrees of reverberation, some adjustment of the controls is usually preferred.

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

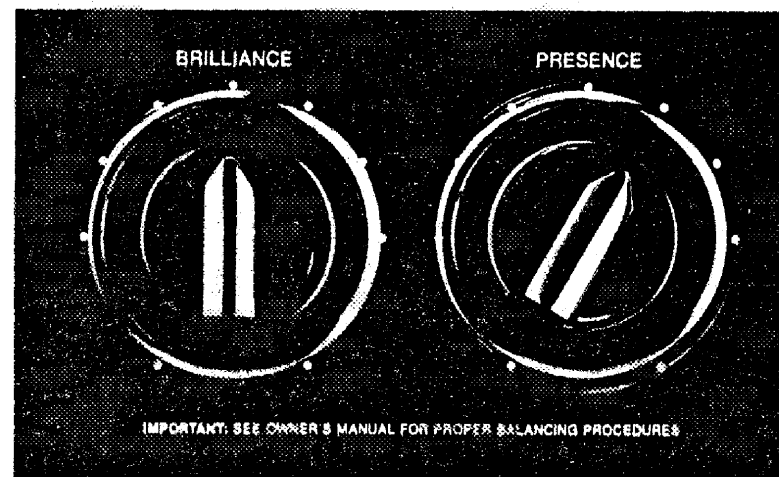
After the ear has become attuned to the "mid" settings, evaluate the presence and brilliance qualities of the loudspeaker's performance. The most valid evaluation will be obtained using various types of material played monaurally. (This can be accomplished in stereo or quadraphonic installations by setting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

adjusted.) The evaluation should be made while seated in the normal listening position.

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

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

After each set of adjustments, again listen 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 Presence and Brilliance controls have been set for the most pleasing overall results, and the exact placement of each loudspeaker has been determined, compensation for differences in individual recordings should be made with the tone controls on the amplifier or receiver.



The Presence and Brilliance controls are located beneath the removable glass top surface and foam nesting pad. They may be left in view, if desired, with the network components also visible through the translucent plexiglass panel.

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## 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 Aquarius Q will reproduce clean sound at comfortable listening levels when driven by an amplifier having an output of as little as 10 Watts RMS per channel.<sup>5</sup> However, for reproduction of the full dynamic range of contemporary recordings at high volume, a quality amplifier delivering up to 100 Watts RMS per channel will provide optimum performance. In normal high fidelity applications an amplifier should never be operated with its volume control at maximum, yet 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.

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

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

Loudspeaker frames are massive rigid structures. 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, punched magnetic structures and mass-produced voice coils would be less expensive; however, the resultant loss of structural integrity, magnetic force and acoustic efficiency would tend to degrade low-distortion performance and transient response—qualities that have become JBL hallmarks.

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

**LOW FREQUENCY**—Solid bass reproduction is accomplished by a 10-inch loudspeaker having a 2½ -pound magnetic assembly and a 2-inch copper voice coil. The magnetic assembly incorporates closed construction and a precisely machined iron magnetic return casting, top plate and pole piece to concentrate all the energy of an Alnico V magnet in the only place it contributes to loudspeaker performance—the voice coil gap. The large voice coil, interacting with the fixed magnetic field, provides the physical drive necessary for instantaneous transient reproduction. Mass and stiffness of the loudspeaker cone have been carefully selected for optimum low frequency performance and definition. A highly flexible ring suspension at the outer edge of the cone absorbs extraneous sound waves traveling within the material and allows the long excursion necessary to achieve dynamic range and extend bass response through the lowest registers of the audio spectrum. The cone is supported by a cast aluminum frame that maintains precise alignment of the voice coil within the magnetic gap.

**MIDRANGE**—The midrange transducer is a 5-inch cone loudspeaker selected for its smooth performance, sensitivity and power handling capacity. It utilizes a 1½ -pound magnetic assembly and a 7/8 -inch copper voice coil. The diameter of the voice coil is large in relation to that of the cone, resulting in outstanding transient response. The structural geometry of the magnetic assembly and cast aluminum frame, as well as the weight, rigidity and suspension of the dynamic assembly, have all been calculated to minimize distortion and yet allow the high, undistorted acoustic output for which the driver is noted. The cone is fitted with an aluminum center dome, pneumatically drawn from thin alloy stock, that contributes to the smoothness of response in the upper regions of the musical spectrum.

**HIGH FREQUENCY**—The 1.4-inch high frequency unit is oriented to project sound directly into the listening room. It operates above the region of musical fundamentals,

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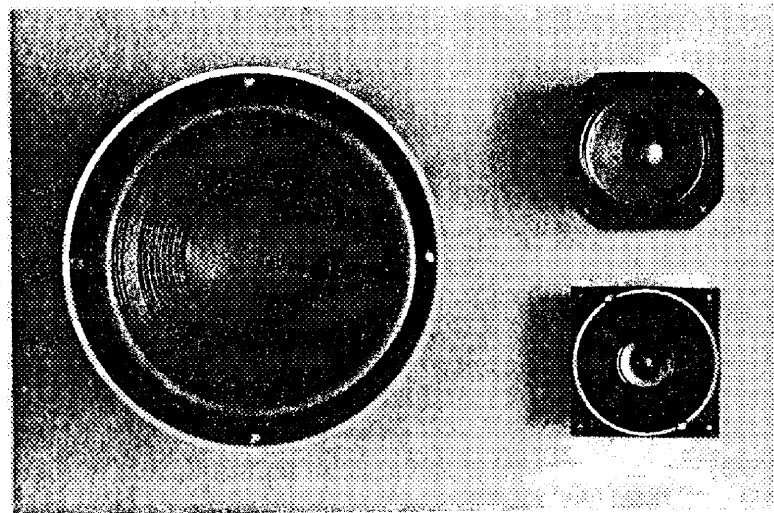
## SYSTEM COMPONENTS

The components used in every JBL product are designed and produced by JBL personnel to exacting standards. JBL

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

reproducing the overtone structure, filling out the sound and providing a degree of directionality, aiding the listener to locate the various voices or instruments within the stereo or quadraphonic perspective. The unit features a 1 $\frac{5}{8}$ -pound magnetic assembly and a  $\frac{5}{8}$ -inch copper voice coil. Its small, yet precisely formed cone and center dome allow realization of a wide sound distribution pattern. The cone is suspended by an impregnated cloth surround that insures linearity and damps spurious resonances traveling within the cone material. The voice coil is large in relation to cone diameter to provide maximum interaction with the intense magnetic field for efficiency and instantaneous transient response. The entire dynamic assembly is surrounded by a ring of dense foam damping material to prevent unwanted radiations and reflections.

**DIVIDING NETWORK**—Smooth, imperceptible transition between component loudspeakers is controlled by the frequency dividing network. The function of a precision dividing network is considerably more complex than merely feeding low, midrange and high frequencies to their respective transducers. Vitally important to the total sound of a JBL loudspeaker system is the way the network distributes electrical energy for optimum control of the system components through the transition frequencies.



*Loudspeaker System Components*  
 10-inch Low Frequency Loudspeaker  
 5-inch Midrange Transducer  
 1.4-inch High Frequency Direct Radiator

JBL network component tolerances are much more stringent than normal industry practices. For example, the capacitors used are non-inductive, non-polarized types with high AC current capacity 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 none of the driving power to the loudspeaker system is wasted in the network.

Each inductor is calibrated on a sensitive electronic bridge and its value set precisely. Network component values are selected not only to accommodate the various performance characteristics of the individual drivers of the system, but also to accommodate their physical location within the enclosure and the radiating characteristics of the diffuser elements that are responsible for the wide sound dispersion of the Aquarius Q. The dividing network is provided with Brilliance and Presence controls which allow balancing of the system to listening room acoustics and personal preference.

Prior to removing the loudspeaker system components for testing or repair, identify the side of the enclosure on which the high frequency direct radiator is mounted with a small piece of masking tape. Then, as the plexiglass sub-panel, network printed circuit board and the diffusers are each removed, place an additional small piece of masking tape on the edge that is toward the side of the enclosure previously identified. These seven pieces of tape will serve as reference marks for re-assembly. To remove the components, disconnect the loudspeaker system from the amplifier and proceed as follows:

#### COMPONENT REMOVAL



*Grille Removal*

**GRILLE**—It will first be necessary to remove the smoked glass top and the black foam nesting pad beneath it. Stand in front of the Aquarius Q so that the JBL medallion is at

the near left-hand corner of the top surface. Press down on the glass top at the left-hand corner furthest from you. The diagonally opposite edge of the glass top will then be elevated enough for you to grasp it for removal. To remove the foam nesting pad, carefully slide a thin knife under the edge near one of the corners and gently lift until it can be grasped for complete removal. Hold the grille at two diagonally opposite corners and lift the assembly straight up with firm even force. Note that it is possible to grasp just the inside top edges of the grille frame, thus avoiding direct contact with the decorative surface of the grille.

**HIGH FREQUENCY**—The high frequency direct radiator is held in place by four machine screws, nuts and washers. Reach behind the unit and disconnect the input leads at the tab connectors on the back. Prevent the retaining nuts from turning with a  $\frac{5}{16}$ -inch open end wrench and remove the four mounting screws from the front, being careful not to allow the nuts and washers to drop into the low frequency cavity. (Do not place the driver face down.)

**DIVIDING NETWORK**—The frequency dividing network is mounted in the top half of the midrange diffuser. The diffuser must be removed to gain access to the midrange and low frequency units. If the network will not be serviced, it may be left fastened to the diffuser while removing the other system components.

Remove the Presence and Brilliance control knobs by pulling each straight up with firm, steady force. (Do not use pliers or pry against the knobs since they can easily be damaged.) Use an  $\frac{1}{8}$ -inch Allen wrench to take out the four self-tapping screws that secure the plexiglass sub-panel to the diffuser. Lift the plexiglass sub-panel from the enclosure and place it on a soft, clean surface.

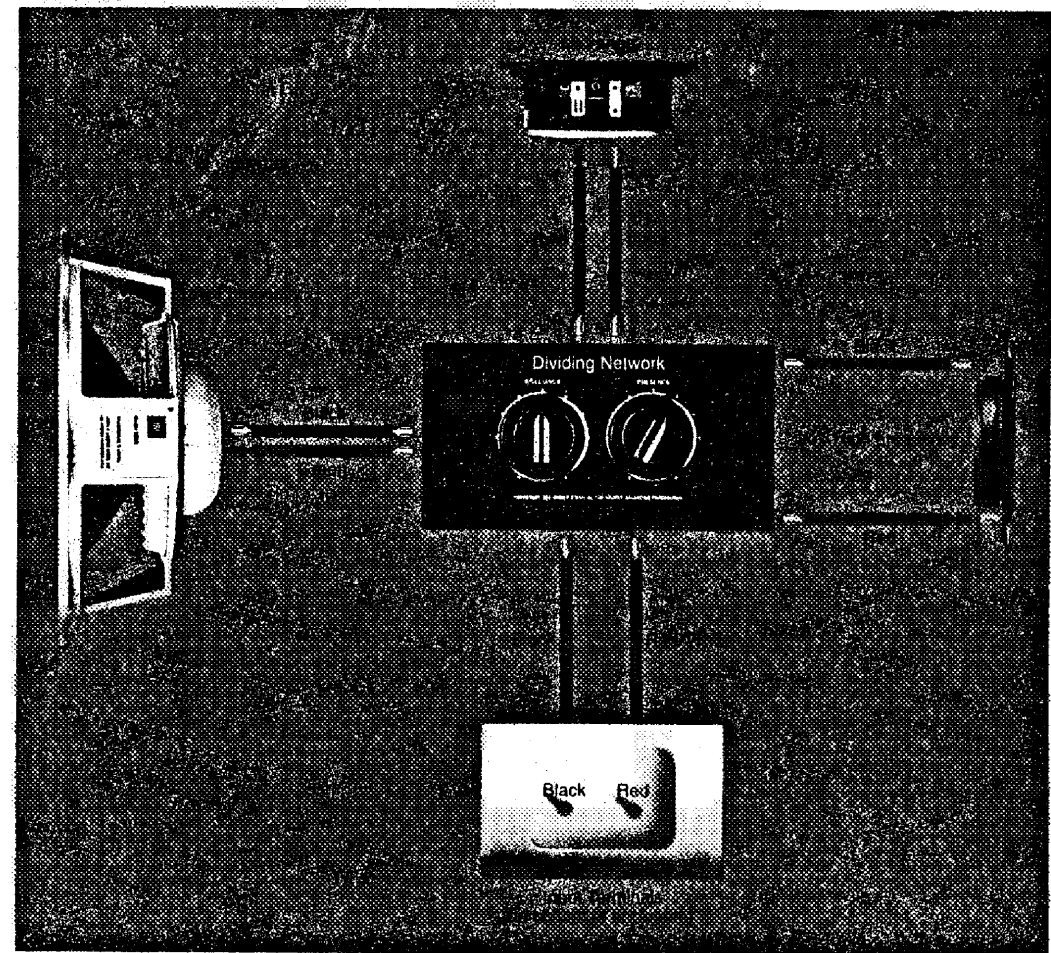
Disconnect the lead wires from the tab connectors at each corner of the dividing network printed circuit board. Note that the color coding of the wires is imprinted on the board; the wires must be reconnected according to this code. The network can be removed from the diffuser, if necessary, by taking out the four self-tapping screws that hold it in place.

When replacing the network control knobs, use your fingers to rotate each control to the extreme high or low point of its travel, align the knob with the appropriate dot on the plexiglass sub-panel, and press the knob into position with firm, steady pressure.

**MIDRANGE**—After disconnecting the network, use a screwdriver to remove the four special slotted fasteners at each corner of the midrange diffuser. Lift off the top half of the midrange diffuser and let the lead wires slide through their passage holes. The four self-tapping screws that hold the midrange transducer in position can then be removed and the unit lifted from its mounting. Disconnect the midrange input leads at the tab connectors on the back of the transducer's frame.

**LOW FREQUENCY**—To gain access to the low frequency loudspeaker, the bottom half of the midrange diffuser, and the top and bottom sections of the low frequency diffuser must be removed by lifting each straight up over the rods that support the diffuser assembly. As each diffuser section is removed, note how the various lead wires are threaded through their respective passages so that they can be replaced in the same manner. The low frequency loudspeaker is held in place by four machine screws threaded into T-nut fasteners which are attached to the back of the mounting panel. Carefully unscrew the machine screws without applying pressure that might dislodge the T-nuts. When the mounting screws have been removed, gently lift the edge of the loudspeaker frame from the enclosure mounting panel, disconnect the input leads on the tab connectors on the loudspeaker frame, and lift the loudspeaker from the enclosure.

**WIRING**—When reconnecting the wire leads at the dividing network, observe the color coding imprinted on the printed circuit board; at the transducers, proper polarity is assured by the connectors. Wire leads are color coded as shown.

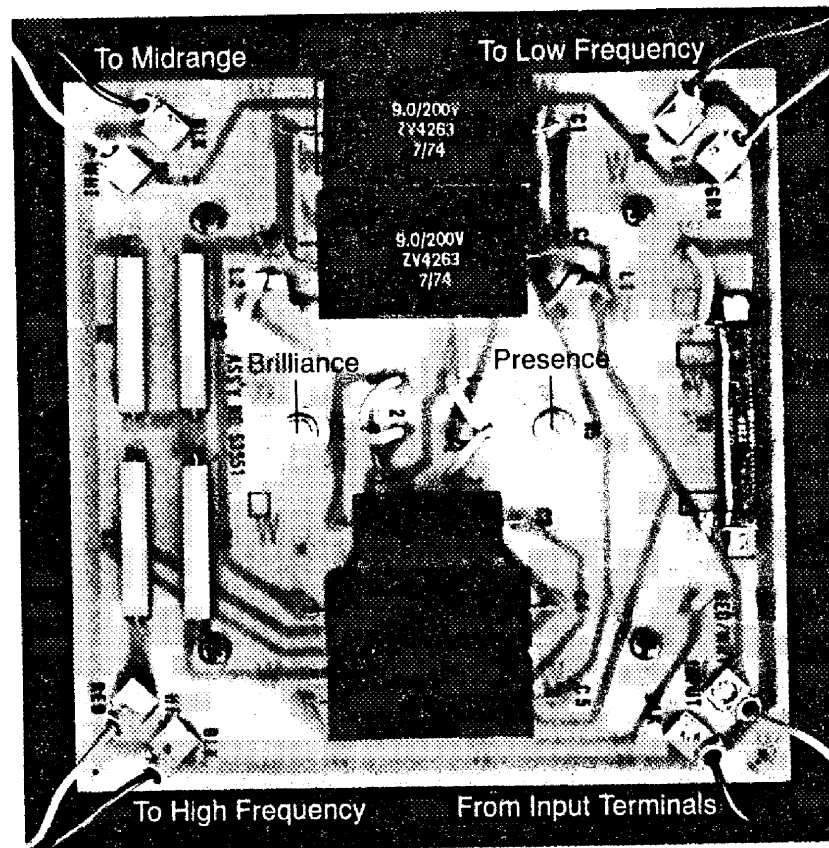


Loudspeaker System Wiring

**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. Self-tapping screws should be tightened just until snug. Avoid excessive force.

When replacing the plexiglass sub-panel, note that the JBL medallion can be rotated 180 degrees to read correctly if the Aquarius Q is positioned so that the high frequency unit is directed away from the listener.

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.



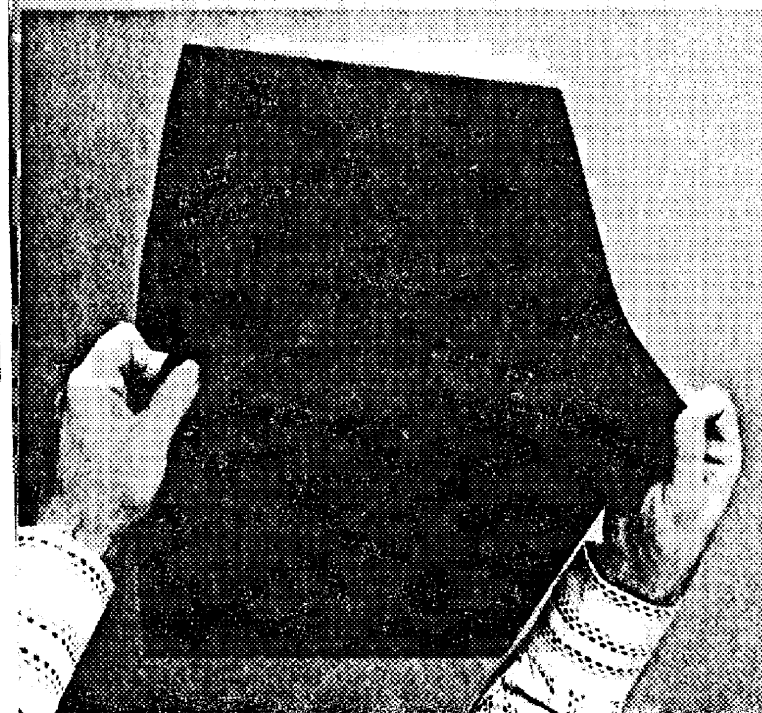
*Frequency Dividing Network Connections*

walnut finish, hardwood veneers. Detail work is obvious: hand-fitted joints are expertly closed; scratches, dents, gluelines and other defects are non-existent. To achieve maximum strength and dampen vibration, the enclosure is internally braced and lined with acoustic padding, and all joints are hand fitted, lock mitered and wood welded.

The oiled walnut surface is hand rubbed to a rich lustrous finish enhancing the natural beauty of individual grain structure and color. The same care and craftsmanship are lavished on the alternate Aquarius Q acrylic lacquer finish: a sealer/primer undercoat is applied, the surface is filled and sanded by hand, re-sprayed with a second coat of sealer/primer, sanded again, and finished with a satin white lacquer followed by a clear blending coat to produce the velvet smoothness of the enclosure.

The grille cloth is a double knit polyester fabric selected for acoustic transparency, beauty, physical strength, color fastness and soil resistance. It can be cleaned by gently dusting it with a vacuum cleaner. Stains can be removed by using aerosol cleaners, such as Texize K2r, Goddard's Dry Clean, or Pen Champ Quick 'n Easy, according to each manufacturer's instructions.

**Warning:** Cleaning fluids or other solvents should not be used. Although they may appear to remove a stain, liquid cleaners will dissolve the base paint on the grille frame beneath the cloth, resulting in permanent discoloration of the material.



*When replacing the grille material, stretch the fabric into position. To prevent twisting the fabric, sight along the grain and make adjustments so the pattern is parallel with the edges of the grille frame.*

## THE AQUARIUS Q ENCLOSURE

The Aquarius Q enclosure, embodying the advanced principles of fine furniture design and construction that have made JBL leader of the industry, complements the acoustic characteristics of the loudspeaker system. It utilizes a ducted port extending through the base panel to properly load the low frequency loudspeaker for optimum bass response and to control cone excursion, thus minimizing distortion and maximizing power handling capacity of the driver. Like all JBL enclosures, the Aquarius Q features lifetime construction using only the finest available compressed woods, hardwoods and, in the case of the oiled

In cases of extreme soiling, it is advised that the grille fabric be removed from its frame and professionally dry cleaned. Laundering is not recommended. To remove the fabric sleeve, lift the grille assembly from the enclosure, as described under Component Removal. Pull the edges of the fabric from the mounting tape (which is located on the inside edges of the grille frame) and remove the sleeve. Reverse this procedure to replace the sleeve, positioning it so that there is an equal amount of fabric at the top and bottom of the frame. Beginning at one of the corners, stretch the fabric across the frame, then wrap its edges around the frame to engage the mounting tape. Repeat this process at each of the remaining three corners and then along the four sides of the grille. Stretch the fabric into position so that it will be taut across the grille surface. The tightest bond will be achieved if you slide the fabric across the mounting tape with slight pressure; when the fabric is released, it will cling tightly.

Occasional dusting with a clean, soft cloth will maintain the original beauty of the glass top, plexiglass sub-panel, and exterior finish of the Aquarius Q. Since these surfaces are moisture resistant, a damp cloth will remove most household stains. A coating of high quality furniture wax or polish may be applied to the satin white finish to bring out its luster and to remove smudges. The oiled walnut 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 obvious, 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. 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 reproduce 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 1/2 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 a sustained howl that increases in intensity as the volume or bass control is turned up. Possible solutions: 1) locate the speaker cabinets as far as possible from the turntable, 2) adjust or replace the turntable shock mountings, 3) place the turntable on a rubber or sponge mat to further absorb vibrations. If the low frequency tone is still audible, it is probably the result of inherent turntable rumble rather than acoustic feedback.

#### SERVICE

Should your JBL loudspeaker system require service, return it to the dealer from whom it was purchased. If it is not possible to contact a dealer, write directly to the JBL Service Department describing the difficulty as fully as possible. Products returned to the factory must be sent prepaid. The warranty is recognized only when the unit is repaired by JBL or an authorized JBL Service Agency and if the serial number of the unit has not been defaced or removed.

In addition to the established five-year warranty, JBL will, at its option, repair the speakers free of charge during their entire normal life if factory inspection discloses an original manufacturing defect. To establish the warranty, fill out and mail the warranty card, packed with every JBL loudspeaker system, within ten days of purchase.

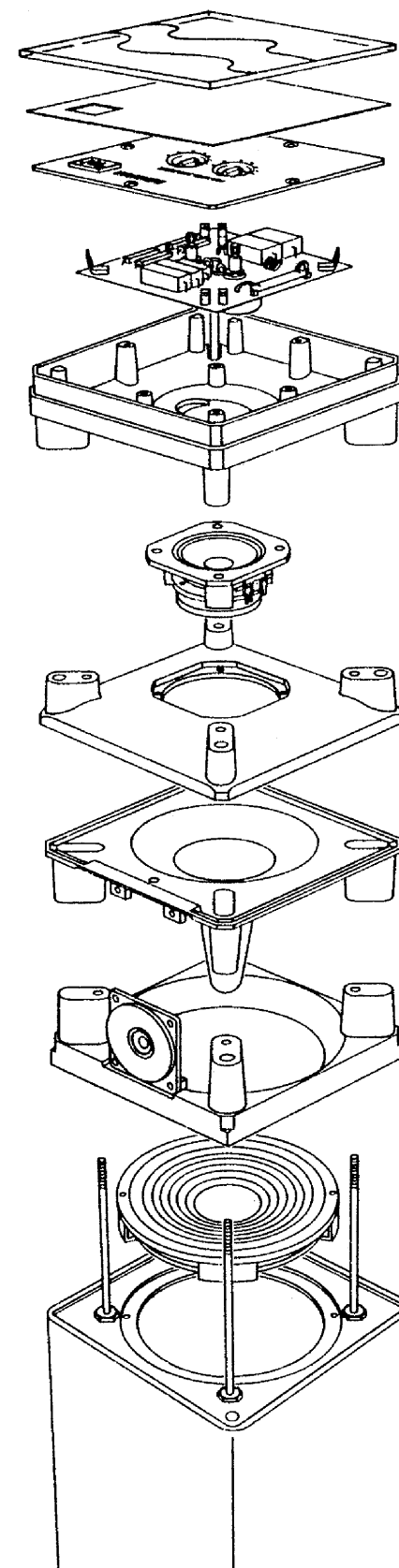
#### SUMMARY

The Aquarius Q exemplifies JBL's reputation for leadership in acoustic and visual design. It is our sincere belief that the L120—like all JBL products—will provide undiminished listening pleasure for many years to come.

#### FOR ADDITIONAL INFORMATION

If you have difficulty in achieving the fine performance of which your JBL loudspeaker system is capable, consult the JBL Audio Specialist from whom the system was purchased.

He is equipped with the knowledge required to provide expert advice and assistance. If for some reason the JBL dealer is unable to assist you, write directly to the JBL Technical Information Department explaining the difficulty in detail.



Assembly Of The Aquarius Q