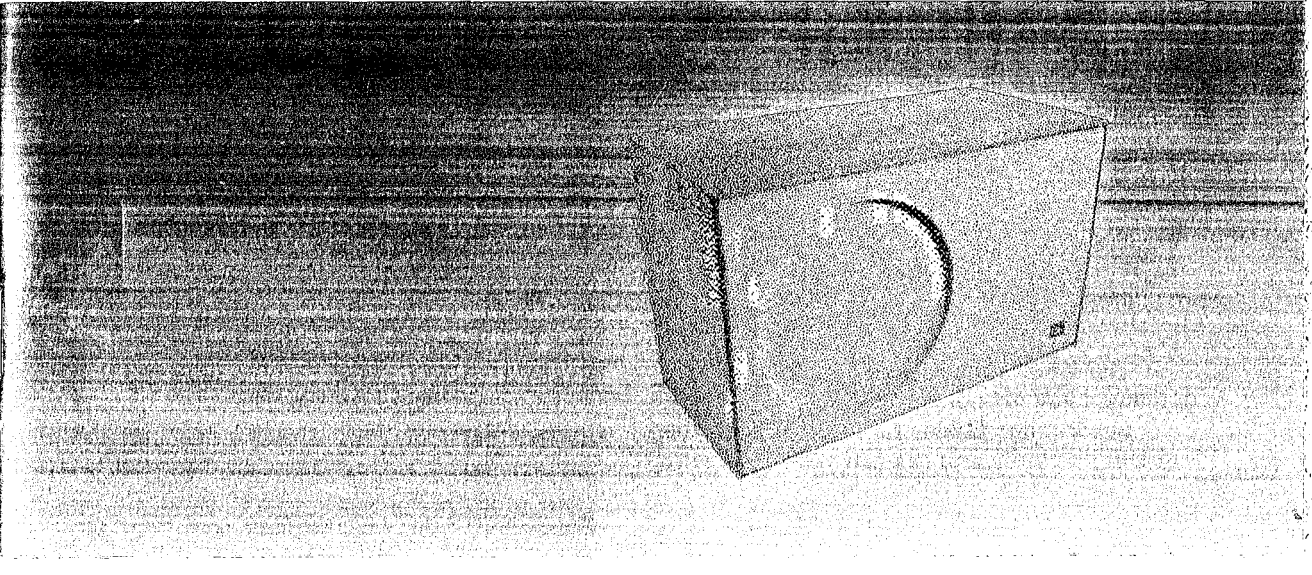
Owner's Manual

L88P 88 Plus



Excellence is an elusive quality. It is so easy to recognize and so difficult to attain.

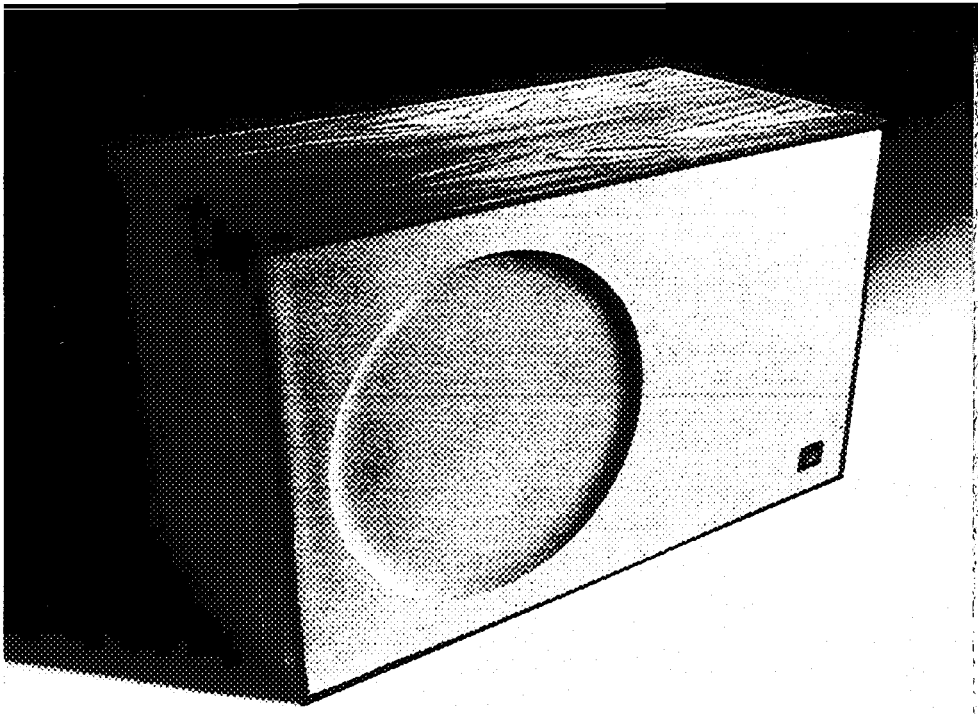
JBL craftsmen have been involved in the art of sound for more than a generation—signal and source, wood and fabric, transducers and acoustics—all of it.

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.

JBL



The 88 Plus

When JBL engineers were asked by the recording industry to design a control room monitor loudspeaker system that would be highly efficient, accurate and capable of extremely high acoustic output without distortion, they based its development on an existing loudspeaker system noted for its smooth bass, dynamic midrange and exceptionally transparent high frequency reproduction—the JBL 88.

The 88 Plus is a further expression of the original JBL 88 loudspeaker system, with built-in expansion capability. The M12 Expander Kit can be installed in the 88 Plus enclosure to achieve the added presence and power handling capacity of the famous JBL Control Monitor and its consumer counterpart, the L100 Century—first to utilize the Sculptured Air foam grille.

The M12 Expander Kit can be installed quickly and easily by the user at any time to convert the two-element loudspeaker system of the 88 Plus to the same three-element loudspeaker system used in the L100 Century. All materials are supplied, the simple, solderless connections are color-coded and the finished installation looks entirely professional. The only tool required is a Phillips screwdriver.

Performance Characteristics

The 88 Plus loudspeaker system exhibits remarkable clarity, providing rich, robust performance that is free of the subtle distortion known as aural fatigue. Whether played at very low volume or at concert hall levels, the 88 Plus loudspeaker system faithfully recreates every nuance of the original program material.

Low frequency reproduction of the 88 Plus is clean, solid and well-defined without unnatural accentuation or boominess. The midrange region of the audio spectrum is reproduced with exceptional presence—creating the sensation of sound emanating from a point well in front of the loudspeaker rather than from within the enclosure. High frequency transient response—the ability to respond instantaneously to sudden bursts of audio power—is exceptionally accurate, contributing to verbatim reproduction of the delicate treble waveforms that extend beyond the range of human audibility.

With the installation of the M12 Expander Kit, the 5-inch midrange transducer reinforces the vital midrange region of the audio spectrum, further

enhancing presence. The additional section of the frequency dividing network controls the midrange and high frequency units to produce the smooth frequency response and increased power handling capacity characteristic of the three-element loudspeaker system. The network also contains the presence control, which regulates the relative loudness of the midrange transducer.

To accurately test the loudspeaker system, a set of evaluation parameters was developed, and specifications derived from measurements made under standard laboratory test conditions. The 88 Plus was mounted in the measured center of a large, flat baffle in a reverberation-free environment. A calibrated condenser microphone was suspended at a specified distance from the sound source. All electronic equipment was checked and calibrated before tests were run.

Due to the wide-angle sound dispersion characteristic of the loudspeaker system components, frequency response measured up to 45° off-axis does not deviate more than 6 dB from on-axis response.

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 88 Plus, for example, will convert a 1 Watt input of "white noise"[1] into a sound pressure level of 76 dB measured at a distance of 15 feet.[2] This is approximately twice as loud as ordinary conversation and represents a comfortable listening level, demonstrating that the 88 Plus delivers substantial output from very little input power.

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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

JBL attributes major importance to the validity of published information. 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. In every critical listening situation—wherever the sound of the loudspeaker must be depended upon—JBL is the overwhelming professional choice.

Power Capacity*	**35 Watts continuous program**
with M12	**50 Watts continuous program**
Nominal Impedance	**8 ohms**
Dispersion	**90° horizontal and vertical**
Crossover Frequency	**2000 Hz**
with M12	**1500 and 6000 Hz**
Efficiency	**1 Watt input produces 76 dB Sound Pressure Level at a distance of 15'. (Note: 75-80 dB is a comfortable listening level.)**

**Based on a laboratory test signal. See Power Capacity section for amplifier power recommendation.*

Low Frequency Loudspeaker	
Nominal Diameter	12 inches
Voice Coil	3 inch, edgewound copper ribbon
Magnetic Assembly Wt.	6 pounds
Flux Density	10,000 gauss
Sensitivity**	40 dB

High Frequency Direct Radiator	
Nominal Diameter	1.4 inches
Voice Coil	⅝ inch, copper
Magnetic Assembly Wt.	1.6 pounds
Flux Density	15,000 gauss
EIA Sensitivity	47 dB

Midrange Transducer (Included in M12 Expander Kit)	
Nominal Diameter	5 inches
Voice Coil	⅞ inch, edgewound copper ribbon
Magnetic Assembly Wt.	2.75 pounds
Flux Density	16,500 gauss
EIA Sensitivity	46 dB

Finish	Oiled Walnut
Grille	Sculptured Air foam, Novex design
Grille Color Options	Ultra Blue, Chocolate Brown or Flame Orange
Dimensions	14¼"x23½"x11¾" deep 36 x 60 x 30 cm deep
Shipping Wt.	45 lbs 20 kg

***Since the major portion of the energy reproduced by the low frequency loudspeaker lies below 800 Hz, this specification has been developed by using a test signal warbled from 100-500 Hz, rather than the conventional 1 kHz sine wave test signal on which the EIA sensitivity rating is based.*

Connecting the 88 Plus

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

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

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

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.

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

Locate the loudspeaker output terminals on the back of the receiver or power amplifier. For each loudspeaker system, connect the wire from

the black terminal post to the amplifier output terminal labeled "common," "ground" or (−), and the wire from the red terminal post to the remaining 8-ohm speaker output.[3]

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

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

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

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.

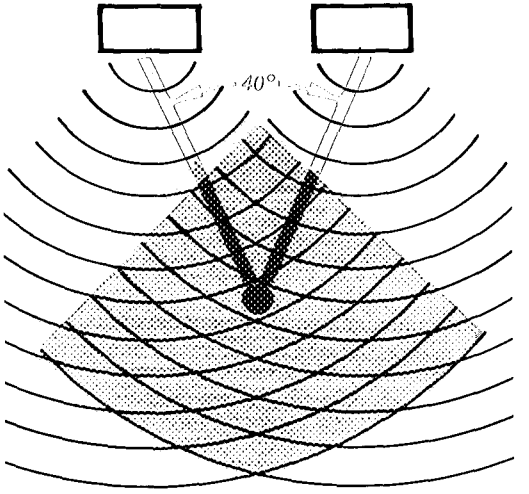
Ideally, there should be a reasonable balance between absorptive material and sound reflecting surfaces. If there are two large reflecting surfaces facing each other, the "bounce" between them will make sounds run together and the music will lack definition. Large, flat wall surfaces should be broken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

Placement

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

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

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



40° "Listening Angle"

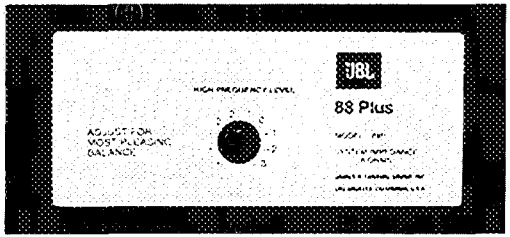
Sound energy from each loudspeaker blends to form a stereo "wall of sound." The stereo image will be intensified and the area of best stereo perception increased if the two systems are rotated slightly toward the preferred listening position.

Adjusting the System

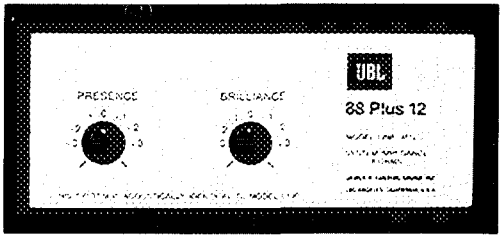
The 88 Plus is provided with a High Frequency Level control located on the front of the enclosure behind the removable grille assembly. The control adjusts the relative volume level of the high frequency direct radiator to achieve realistic tonal balance of the loudspeaker system components in a variety of room conditions. The control is calibrated in terms of a reference level, indicated by a "0" on the instruction label.

When the control is at the reference level, the loudspeaker system will be adjusted for balanced performance characteristics in a reverberation-free environment. Since most listening rooms possess varying degrees of high frequency absorption and reverberation, some adjustment of the control is usually preferred.

The loudspeaker system should be adjusted while reproducing normal program material with the amplifier tone controls set at the middle (generally



The 88 Plus is provided with a High Frequency Level control; with the M12 Expander Kit, the loudspeaker system will be equipped with both Presence and Brilliance controls. The controls regulate the relative loudness of the loudspeaker



system components to accommodate a variety of specific room acoustics and personal listening preferences. They do not alter the crossover frequencies or limit the upper frequency response of the loudspeaker system.

referred to as "flat") position. Begin by placing the control at the reference level 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 "0" setting, evaluate the brilliance of the loudspeaker system's performance. The most valid evaluation will be obtained using a variety of program 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.

If high frequency material—such as violin overtones, bells, triangles or chimes—does not seem loud enough, use a coin or screwdriver to rotate the control to the right, which will increase high frequency output of the loudspeaker system. Conversely, if high frequency material seems too prominent, rotating the control counter-clockwise will reduce high frequency output.

After each adjustment, listen to a variety of program material until the ear becomes attuned to the new sound and can compare it to the previous performance of the system. Experimentation with positioning of the loudspeakers, as outlined, will also be beneficial. Once loudspeaker positioning and the High Frequency Level control have been set for optimum balance in the listening environment, compensation for differences in individual recordings should be made with the tone controls on the audio power source.

With M12—Installation of the M12 Expander Kit adds a Presence control to regulate the relative loudness of the midrange transducer while the existing Brilliance control continues to govern the volume level of the high frequency direct radiator. The controls are calibrated to the same reference level as the High Frequency Level control of the standard 88 Plus. When both controls are at the "0" position, the loudspeaker system will be adjusted for balanced performance in an anechoic, or reverberation-free environment.

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

1. Set the Presence control at "0" and rotate the Brilliance control to the extreme left of its travel. This will attenuate high frequency performance so that the ear will perceive only the balance between the low frequency loudspeaker and the midrange transducer.

2. If midrange material—such as violins, piano or guitar—seems too close or overemphasized, reduce the setting of the Presence control by rotating it to the left. Conversely, if midrange material seems too distant, increase the output of the midrange transducer by rotating the control clockwise.

3. Once the Presence control has been adjusted to provide the most pleasing balance between the low frequency and midrange transducers, set the Brilliance control at "0". If high frequency material—such as cymbals, bells, triangles, violin overtones or vocal sibilants—seems too prominent, lower the setting of the Brilliance control. If greater high frequency output is desired, increase the setting of the control.

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 88 Plus will reproduce clean sound at comfortable listening levels when driven by an amplifier having an output of as little as 10 Watts RMS per channel.[4] However, for reproduction of the full dynamic range of contemporary recordings at high volume, a quality amplifier delivering up to 75 Watts RMS per channel will provide optimum performance; with the M12 Expander Kit, the system may be driven by an amplifier delivering from 60 to 150 Watts RMS per channel. Such amplifiers have the reserve

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

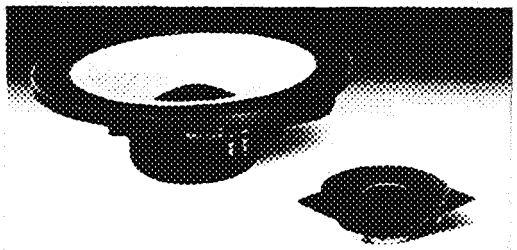
power necessary for accurate reproduction of transients, which can reach momentary peaks equivalent to ten times the average power level.

In almost all cases, the volume 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.

System Components

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



Loudspeaker System Components
12-inch Low Frequency Loudspeaker
1.4-inch High Frequency Direct Radiator

tures 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—Extended low frequency reproduction is accomplished by a 12-inch, long excursion loudspeaker. Its large, edgewound copper ribbon voice coil is immersed in an intense magnetic field, generated by a massive magnetic assembly, allowing it to follow the audio signal with unerring fidelity. Each part of the 6-pound magnetic assembly is precisely machined and assembled to concentrate all of the essential magnetomotive energy, provided by a powerful Alnico V magnet, in the one place where it contributes most to loudspeaker performance—the voice coil gap.

The 3-inch voice coil is fabricated of wire milled to a flat ribbon, wound on the ribbon's edge by hand. It drives a shallow, integrally stiffened, curvilinear cone that delivers uniform, wide-angle distribution of sound energy through the full range of the loudspeaker. The cone is freely suspended and terminated with a corrugated viscous-damped surround that absorbs mechanical vibrations traveling through the cone and allows the extremely long, linear excursions that are necessary for smooth low frequency performance. The cone itself is further damped with another exclusive JBL formulation, Lansaplas, for rich, full performance through the vital midrange region. It is this damping compound that gives the cone its white color.

High Frequency—The upper register of the audio spectrum is reproduced by a 1.4-inch direct radiator energized by a 1.6-pound magnetic assembly that concentrates an intense magnetic field in a very narrow voice coil gap. The 5/8-inch copper voice coil, suspended within the magnetic field, is unusually large in relation to cone diameter to allow maximum interaction of the input signal with the field of the permanent magnet. The small, yet precisely formed cone and center dome distribute high frequency material evenly through a wide angle, assuring that each listener hears the same tonal balance and blend of direct and reverberant sound.

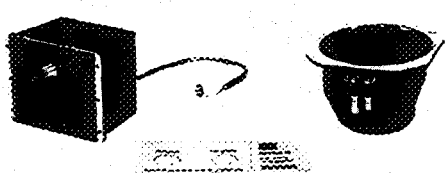
Dividing Network—The function of a precision dividing network is considerably more complex than merely feeding low and high frequency information to the appropriate reproducers. Since both loudspeakers operate through the crossover region, the control exerted by the dividing network is vitally important to the total sound of the loudspeaker system. The circuit values of JBL dividing networks are adjusted so that acoustic output of each transducer remains smooth and uniform through the crossover region, assuring that the superior performance characteristics of the complete loudspeaker system are maintained through the full audio spectrum.

JBL network tolerances are much more stringent than normal industry practices. For example, JBL networks use non-inductive, non-polarized capacitors—not electrolytic types—individually tested to meet rigid production tolerances. The special inductors used in JBL networks have extremely low insertion loss so that none of the driving power to the loudspeaker system is wasted in the network. To meet JBL production tolerances, each inductor is calibrated on a sensitive electronic bridge and its value set precisely.

The dividing network installed in the 88 Plus is provided with a level control to regulate the relative loudness of the high frequency direct radiator to suit listening room acoustics and personal preference.

M12 Expander Kit—All the necessary provisions for expanding the 88 Plus to the three-element loudspeaker system installed in the JBL Control Monitor and L100 Century are included in the M12 Expander Kit.

Program material lying in the midrange region of the audio spectrum, such as vocal overtones and strings, is reproduced by a precision 5-inch transducer exhibiting accuracy, definition and a wide



M12 Expander Kit
5-inch Midrange Transducer
Matched Frequency Dividing Network
Presence Control

sound distribution pattern. The outstanding transient response and clarity of the unit is the result of its rigid, yet exceptionally light moving assembly and acoustic efficiency. Its molded cone, viscous damped to prevent spurious resonance, is driven by a 7/8-inch copper voice coil immersed in the intense magnetic field generated by a 2.75-pound low-loss magnetic assembly. Optimum performance is further assured by housing the transducer in an isolated chamber built into the 88 Plus enclosure to prevent acoustical interaction with the low frequency transducer.

The M12 also contains the additional frequency dividing network circuitry that permits conversion of the 88 Plus to a three-element loudspeaker system. The electro-acoustic characteristics of this circuit are designed to integrate the three elements of the expanded loudspeaker system. The effects of individual transducer characteristics, impedance fluctuations and the physical separation of the individual sound sources are all taken into account in the complete network design.

The Presence control regulates the power fed to the midrange transducer. When the M12 is installed, the control will be located on the enclosure baffle panel, next to the existing Brilliance control.

Component Removal

Grille—The grille is secured to the enclosure with hook-and-pile mounting tape. Removal can be accomplished by applying firm pressure to the grille surface in the corners between the circle recessed in the Sculptured Air foam and the closest narrow side of the enclosure. This will cause the opposite end of the grille frame to rise from the enclosure so that it can be grasped with the fingers for complete removal of the assembly. As the grille is removed, a "ripping" sound will be heard, indicating the normal disengagement of the mounting tape. The procedure may be repeated hundreds of times without damage. To replace the grille, position it on the enclosure so that the circular recession on the face of the grille is over the low frequency loudspeaker, and apply light pressure to engage the mounting tape.

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

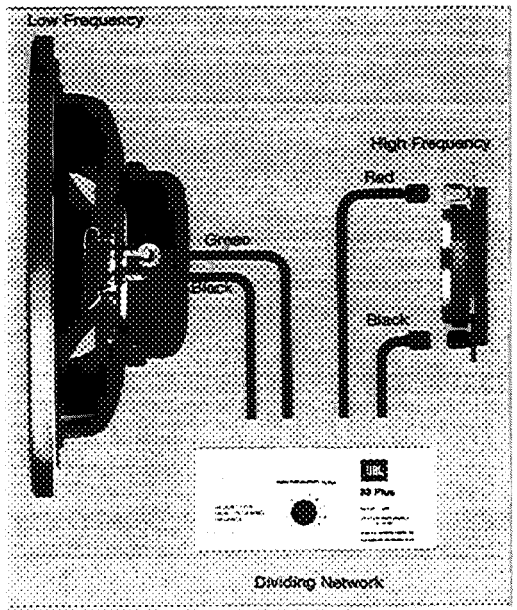
High Frequency—The high frequency direct radiator is secured to the enclosure baffle panel by wood screws at each corner of its frame. The unit is removed by carefully taking out the mounting screws and lifting the complete assembly out of the enclosure. The two leads from the dividing network can then be disconnected at the tab connectors on the back of the frame.

Dividing Network—The dividing network is installed on the rear panel of the enclosure and is held in place by four screws and T-nuts. Remove the transducers as previously described and disconnect the leads from the dividing network. After removing the four mounting screws, which are accessible on the rear of the enclosure, lift the dividing network assembly out through the low frequency loudspeaker opening.

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.

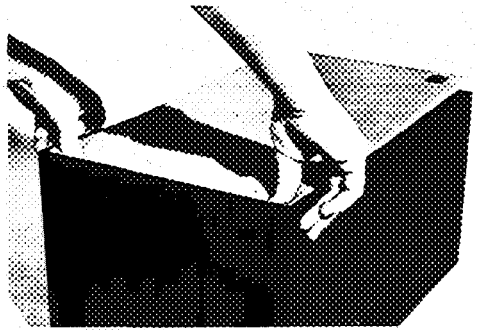
Although JBL loudspeakers are extremely rugged, the cone and other moving parts are subject to accidental damage. Exercise extreme caution when using a screwdriver or other tools in their immediate vicinity.

Wiring—When reconnecting the wire leads between the dividing network and the components, observe the following polarity:



Installing the M12 Expander Kit

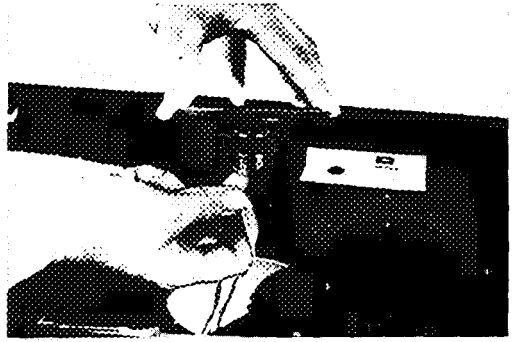
The M12 Expander Kit, consisting of a 5-inch midrange transducer, frequency dividing network and presence control, can be installed easily in minutes. The enclosure baffle panel contains all the necessary cutouts, connections are color coded and the finished installation looks entirely professional. The only tool required is a screwdriver. To install the M12 Expander Kit, first read through all the instructions and then proceed as indicated:



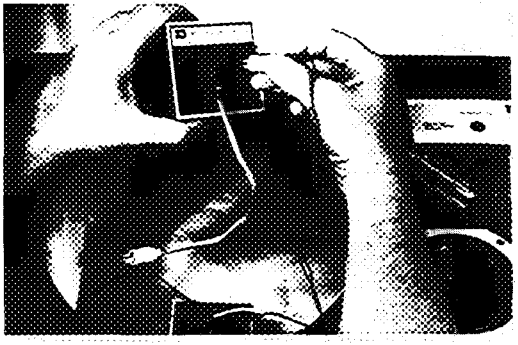
The Novex design Sculptured Air grille is removed by applying direct pressure at the two corners nearest the recessed circle.

Remove the low frequency loudspeaker—After removing the grille, take out the four machine screws that secure the low frequency loudspeaker to the enclosure baffle panel and lift the unit from the enclosure. Place the loudspeaker on the baffle panel for temporary support and disconnect the two leads at the push button terminals on the loudspeaker frame.

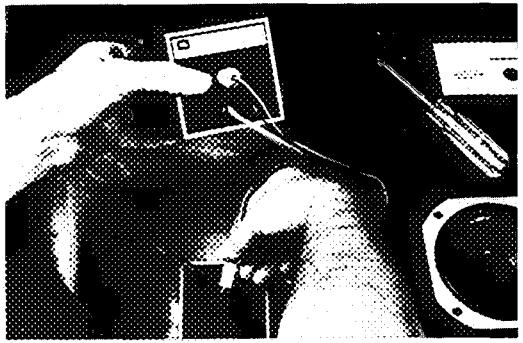
Install the midrange transducer—Remove and discard the midrange transducer cover plate, located on the baffle panel, and identify the two connecting leads within the opening. Place the midrange transducer on the baffle panel adjacent to its mounting hole and connect the leads to the push button terminals on the transducer frame. (White wire to the red terminal and black wire to the black terminal.) Lower the transducer into position on the baffle panel and secure it with the mounting screws that originally held the cover plate in position.



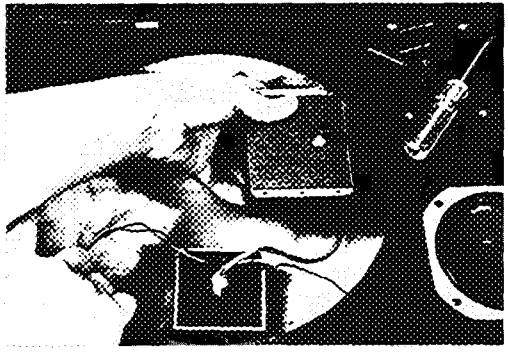
Connect the 88 Plus to the M12—Place the M12 dividing network on the baffle panel; reach into the enclosure through the low frequency loudspeaker opening; remove the cable with the connector identified by a red band from the existing 88 Plus frequency dividing network (located on the rear panel of the enclosure) and plug it into the receptacle on the M12 housing.



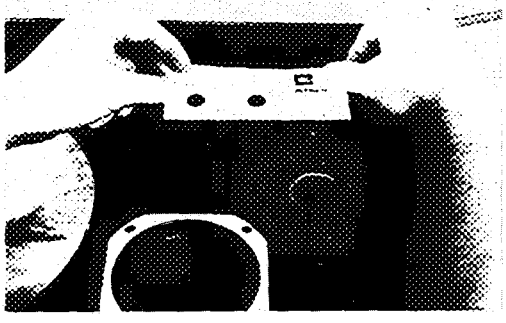
Connect the M12—Plug the green color-coded connector and its cable from the M12 housing into the receptacle on the 88 Plus frequency dividing network. All connections are now complete.



Install the M12—Peel off and discard the instruction label that surrounds the Brilliance control. Remove the four mounting screws that secure the Presence control cover plate to the back of the baffle panel and discard the plate. (Do not remove the screws securing the Brilliance control.) Install the M12 dividing network on the rear of the baffle panel so that the control knob is centered in the opening provided on the baffle panel and secure the housing in place using the mounting screws that originally held the cover plate in position. The Presence control on the M12 regulates the relative loudness of the midrange transducer.



Apply the new instruction label—Peel the protective backing from the instruction label included with the M12 and position it on the baffle panel so that the Presence and Brilliance controls appear through their respective openings in the label. Apply pressure to the entire surface of the label for proper adhesion. Extreme care should be taken when positioning the label; the initial contact strength of the adhesive will make any correction difficult.



Reinstall the low frequency loudspeaker—Place the low frequency loudspeaker next to its opening in the enclosure baffle panel and reconnect the leads to the push button terminals. (Green wire to the red terminal and black wire to the black terminal.) Lower the loudspeaker into position and replace the four mounting screws. Avoid over-tightening

Replace the grille—The three-element loudspeaker system is now acoustically identical to the loudspeaker system installed in the L100 Century.

The 88 Plus Enclosure

JBL cabinetry represents the finest quality available in the high fidelity industry, uniquely styled and solidly constructed to last a lifetime. Designed to complement the characteristics of the loudspeaker components, JBL enclosures feature tight, wood-welded, lock-mitered joints and acoustic padding to eliminate undesirable resonance and warpage. Only the finest compressed woods, furniture hardwoods and hardwood veneers are used—carefully selected, skillfully prepared and hand-rubbed to a rich, lustrous finish enhancing the natural beauty of individual grain structure and color. Detail work is obvious: hand-fitted joints are expertly closed; edge veneering is flawless; scratches, dents, gluelines and other defects are non-existent. Typical assembly line procedures are not followed. Each cabinet receives all of the personal attention it must have before it can bear the JBL medallion—the symbol for quality throughout the world.

Occasional dusting with a clean, soft cloth will maintain the original beauty of the 88 Plus enclosure. The grille can be cleaned by gently dusting it with a vacuum cleaner. Since the oiled walnut finish is moisture resistant, a damp cloth will remove most household stains. 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 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 sanding them out with 500 grit wet/dry sandpaper 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 trouble-some unit can be identified by disconnecting inputs from the receiver or amplifier until the interference stops. Again, if the interference persists with none of the input devices operating through the power source, the receiver or amplifier itself is probably defective. Shorting plugs, available

from your JBL Audio Specialist, should be inserted in unused phono inputs to help eliminate stray hum or signal pickup.

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

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

Acoustic feedback is the result of mechanical vibrations produced by excessive bass at very high volume levels. The loudspeaker system can produce enough low frequency 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 JBL dealer from whom it was purchased. If it is not possible to contact a dealer, write directly to the JBL Service Department describing the difficulty as fully as possible. Products returned to the factory must be sent prepaid and will not be accepted unless written authorization has first been obtained. 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 two-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 88 Plus exemplifies JBL's reputation for leadership in acoustic and visual design. It is our sincere belief that the 88 Plus—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.

50632S Publication OM88P/72 Printed in U.S.A.