

JBL

OWNER'S GUIDE

DX1

ELECTRONIC DIVIDING NETWORK

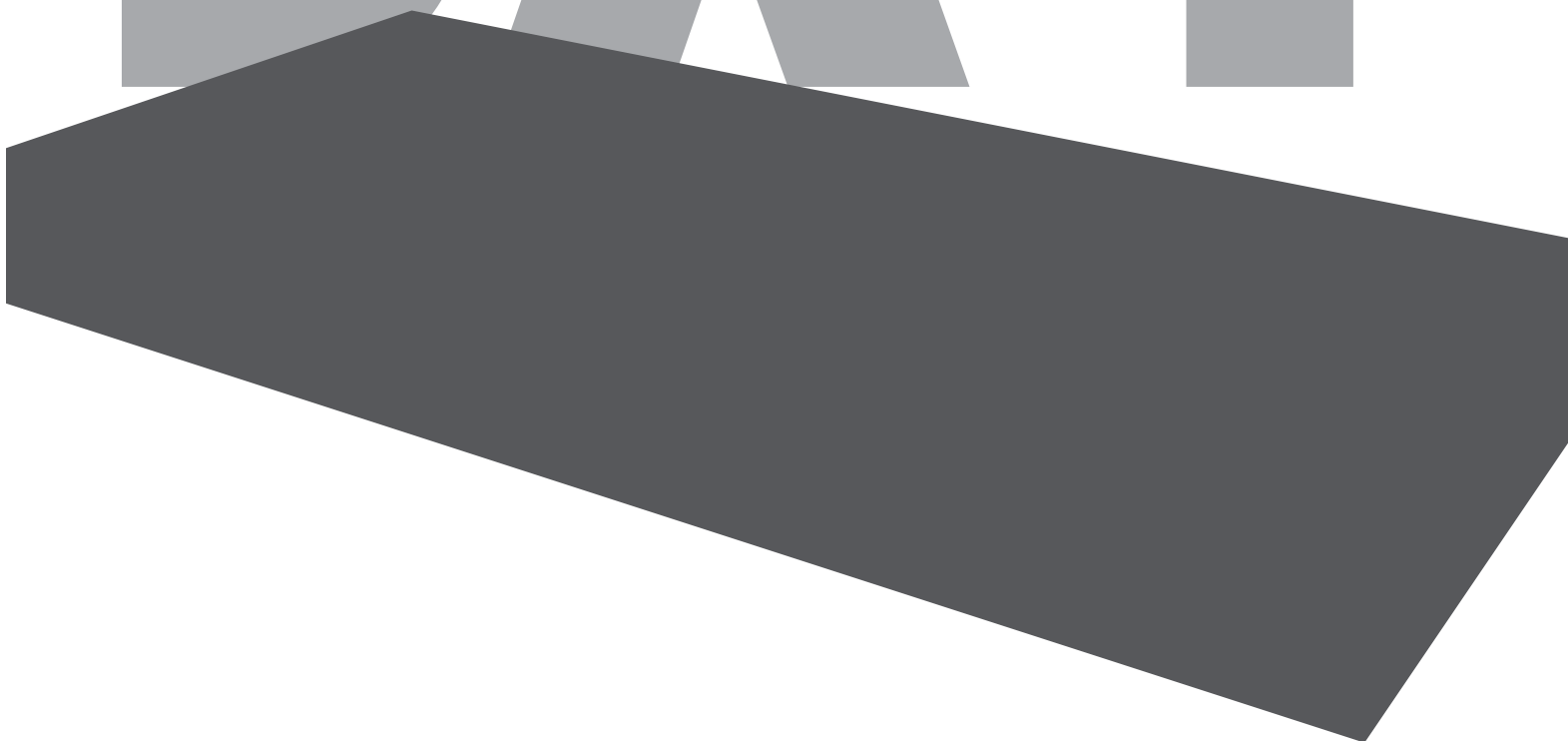


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Preface

Congratulations on your purchase of a JBL DX-1 Electronic Dividing Network. The DX-1 crossover has been built to meet the same rigorous standards of construction and performance that have been long established by all JBL loudspeakers.

This manual has been designed to make your JBL DX-1 Electronic Dividing Network installation and ownership as trouble-free as possible. Please read through this manual completely to familiarize yourself with your new electronic crossover before beginning the installation.

Introduction to Bi-Amplification

The DX-1 Electronic Dividing Network is designed to bi-amplify JBL loudspeaker systems equipped with bi-amplification (bi-amp) switches. In bi-amplification, one stereo amplifier is dedicated to driving the high frequency and (in three- or four-way systems) midrange transducers with the upper part of the audio spectrum; another stereo amplifier (or two bridged amplifiers) drives only the low frequency transducers with their portion of the spectrum. Using properly chosen amplifiers, bi-amplification can reduce intermodulation distortion and dramatically improve system dynamics.

To achieve the best sonic results from bi-amplification, the high and low frequency amplifiers must have power ratings suitable for the transducers each is driving. High frequency and midrange transducers require only low to moderate power to achieve the desired sound pressure level in the listening environment and, thus, do not require a high power amplifier to drive them. High and low frequency amplifiers can be selected based upon their relative power ratings and sound characteristics. For example, a moderate size tube-type amplifier may be underpowered for low frequency or full range use but may be ideal for high frequency applications if the smooth, warm response characteristics present in many high quality tube-type amplifiers is desired. Conversely, a particular solid-state amplifier may have relatively harsh high frequency response but may be well suited for low frequency usage if it has sufficient power output. Your DX-1 dealer can help you select appropriate amplification for your system.

Product Description

The DX-1 Electronic Dividing Network is an audiophile quality crossover network with ultra-low distortion, low feedback and extremely wide bandwidth. It enhances the high performance quality of bi-amplifiable JBL loudspeaker systems by separating the frequency spectrum prior to the power amplifiers, allowing you to directly connect the low and high frequency transducer complements of your JBL systems to two frequency dedicated power amplifiers.

The DX-1 approximates the operational characteristics of a passive crossover in the active domain, with an active section and separate low and high frequency passive sections with active equalization. Every element of the DX-1, including its simple circuit design and use of minimal external controls, contributes to its exceptional sonic transparency:

- Crossover points and slopes are predetermined on plug-in low and high frequency cards that match the response characteristics of the specific loudspeaker
- A double-sided circuit board provides shielding and isolation for extraordinary stereo separation
- Light emitting diodes (LED's) are used instead of conventional diodes in the buffer stage for cooler operation

- All inputs and outputs are gold-plated to resist oxidation which can create sonic coloration
- All signal paths are as short as possible

The DX-1 operates essentially in Class A. Two input buffers provide a stable high impedance load to the pre-amplifier. Special non-polarized electrolytic capacitors are used in the gain block and high frequency crossover stages and are bypassed with polystyrene types for additional sonic transparency.

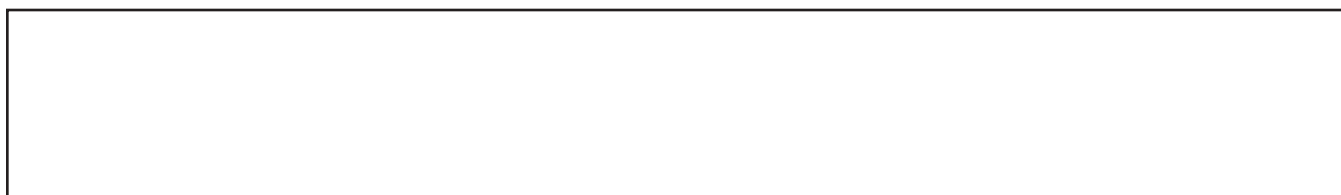


Figure 1

There are only two user-accessible controls. The POWER switch (Figure 1) energizes a slow-controlled type regulated EL low flux transformer and power supply which eliminates turn-on transients, clicks and thumps. Press once to turn the unit on, press again to turn it off. The low frequency level control (LF LEVEL) is a precision laser-trimmed component with very low distortion characteristics to avoid generating distortion in the audio path. This control allows you to match the relative efficiencies of the high frequency and low frequency transducers.



Figure 2

One pair of stereo inputs, one pair of stereo high frequency outputs, and two pairs of stereo low frequency outputs are located on the rear of the chassis (Figure 2). This configuration accommodates conventional stereo amplifiers operating in bridge mode (see next page).

Speakers

The DX-1 Electronic Dividing Network is configured to a particular JBL loudspeaker system through the installation of model-specific high and low frequency cards. Your unit may be reconfigured for use with other selected JBL loudspeakers by replacing the card with another set that is configured to the desired loudspeaker model. Contact your DX-1 dealer for an updated list of available crossover card configurations. Cards may be purchased from your DX-1 dealer, who will install them for you.

Amplifiers

As stated above, the amplifiers used for the low and high frequency spectra need not be the same model, brand or even type, and need not have the same input sensitivity. In most installations, particularly with two-way loudspeaker systems equipped with compression drivers, the high frequency transducers will not require as much electrical power to reach the same room loudness as the low frequency sections.

There are many variables involved in the selection of the amplifiers for a particular system, including the particular loudspeaker model, the size of the listening room, the placement of the loudspeakers in the room, the maximum listening level and type of program material used, and your personal preferences. Consequently, we recommend that the amplifiers for your installation be selected in consultation with your JBL DX-1 dealer.

Bridged Low Frequency Amplification

Some two-channel power amplifiers may be operated with both channels coupled together so that they operate as a more powerful single-channel unit. This mode, called bridging, is particularly useful for low frequency amplifiers which may have the desired sonic character but do not have sufficient output power available in each channel.

In bridge mode, both channels are fed with the identical signal, but the signal fed to one of the channels (usually Channel B) has inverted polarity. The loudspeaker wires are connected to the “hot” or “+” (usually red) output terminals of both channels, with the red terminal of the speaker usually connected to Channel A’s hot terminal, and the black speaker terminal connected to Channel B’s hot terminal. No connection is made to the “—” (usually black) amplifier terminals. The DX-1 has both standard and inverted polarity low frequency output jacks, simplifying the task of bridging if this mode is employed.

Caution: Some power amplifiers may not be compatible with bridge mode operation and may be damaged if this configuration is used. Also, the minimum operating impedance of an amplifier in bridge mode is double the minimum impedance of each channel alone. For example, a power amplifier with a 4 ohm minimum rating in two-channel mode should not drive a load below 8 ohms impedance in bridge mode. Consult your dealer or the amplifier manufacturer to confirm the suitability of a particular amplifier before attempting to bridge its channels together.

Other Electronics

Because bi-amplification improves the ability of the loudspeaker system to accurately reproduce the signal which has been fed into it, the quality of all associated electronic equipment in the system, and, indeed, of the program source, should be of the highest level. The interconnections should also be premium grade. An accurate loudspeaker system will faithfully reproduce any flaws in the audio signal presented to it, and perceptible audio problems may originate anywhere in the audio chain.

Safety Considerations

Please note the following safety considerations before proceeding with the installation of your DX-1 Electronic Dividing Network. Exercising proper precautions in the setup and use of this product will ensure your safety and satisfactory, long-term performance from this product.

- 1. Inspect the power cord and connection before using the DX-1.** Do not use if either is damaged. Make sure that the power cord is properly routed and secured so that it will not be walked on or compressed by furniture.
- 2. Do not place the DX-1 in a location where it will be exposed to moisture.**

Save Your Purchase Receipt

You will need your purchase receipt as proof of purchase for any and all warranty repairs and for insurance purposes. Keep your receipt, this owner's manual, and packing materials in a safe location for possible future use.

Inspect for Shipping Damage

When unpacking your JBL DX-1 Electronic Dividing Network, inspect it thoroughly for shipping damage. Each unit leaves our factory only after thorough inspection, and any visible or concealed damage may have occurred in transit after the unit left our factory.

If there is damage: Your DX-1 crossover and a copy of your purchase receipt should be returned to your dealer for inspection. Do not return any JBL products to the JBL factory without prior written authorization.

Pre-Installation Instructions

Your DX-1 electronic crossover is a highly advanced electronic product that requires proper installation in order to operate at its maximum performance potential. JBL suggests that you have your electronic crossover professionally installed by your JBL dealer. This will ensure the use of proper installation techniques and materials, and will save much time and effort.

If you choose to perform your own installation, the following instructions will give you general directions toward making your purchase complete. Read the following information and precautions carefully. **Failure to follow the stated precautions may result in personal injury and/or damage to your amplifier or preamplifier.**

As with any audio installation, all work performed should be checked carefully before operating the system.

Internal Adjustments/Power Supply Information

The DX-1 is designed for operation at 100-130 volts or 200-260 volts, 50/60 Hz, and is fully electrically insulated to meet international safety standards. An IEC standard AC power cord appropriate to the country in which the system is purchased is supplied with the DX-1 crossover and plugs into the AC POWER connector on the back of the unit. Check the labeling on the unit to insure that the voltage is set correctly for the AC mains in your area.

WARNING: Connecting the DX-1 to AC power mains with voltage greater than that to which the unit is configured may damage the unit. If the DX-1 is configured for 100-130 volts and you intend to operate it at

200-260 volts, it must be converted prior to its installation. Refer the conversion to your dealer or to a qualified technician. Do not open the DX-1 and attempt the voltage conversion yourself.

Designing the Audio System

It is best to plan and draw out the complete audio system configuration before attempting any installation procedure. The routing of wires, power connections, placement of system components, and signal interconnects must be planned in advance. Locate the DX-1 close to the preamplifier to ensure short signal runs, and make sure all wiring will easily reach the DX-1's back panel.

Power amplifiers often generate significant amounts of heat, and their power transformers may have significant magnetic fields radiating from them. It is generally advisable to install the amplifiers at least 12" away from the other equipment in the system to avoid heat buildup as well as possible magnetically induced hum in the other system components. In particular, do not place the DX-1 on top of an amplifier.

For your safety as well as protection of your equipment, do not stack heavy items on top of the DX-1 — its housing is strong but not designed to support large objects.

Installing the DX-1

General Setup

Set up all system components as designated by the manufacturer of your components.

The DX-1 is shipped with rubber feet attached to the bottom. If the installation configuration requires that the feet be removed, install rubber pads under the chassis to avoid vibration and shock.

Wiring

To ensure maximum performance and long-term reliability, proper wiring is critical at all stages of the installation. Wiring type, location, and execution will affect system performance, overall sound quality and noise level. The DX-1 uses standard type cables for all external connections. For maximum high frequency transparency, use high quality, well-shielded audiophile interconnect cables.

Caution: Make sure the audio system is off when making any electrical or signal connections. Failure to do so may damage parts of the audio system beyond repair.

- Do not bend wires sharply. Allow enough length for making gentle bends.
- Do not route wires through sharp or hot objects. Use rubber or plastic bushings to insulate all wires passing through metal.

- Route signal wires away from power and/or speaker cables.
- Use wire ties to dress wiring away from potential hazards.

Connections

For operation with standard (non-bridged) amplifiers: (Please refer to figure 2)

- Connect the output jacks on your preamplifier to the LEFT and RIGHT INPUT jacks on the DX-1.
- Connect the HIGH FREQUENCY OUTPUT jacks on the DX-1 to the high frequency input jacks on the amplifier driving the high frequency portion of your stereo system.
- Connect the positive (+) LOW FREQUENCY OUTPUT jacks on the DX-1 to the low frequency input jacks on the amplifier driving the low frequency portion of your stereo system.
- Plug the female end of the power cord into the AC POWER connector and plug the other end into the power source.

For two-way operation with dual bridged low frequency amplifiers (Caution: be certain that the low frequency amplifiers are compatible with bridging operation prior to connecting them; see **Bridged Low Frequency Amplification on page 5**):

- Connect the output jacks on your preamplifier to the LEFT and RIGHT INPUT jacks on the DX-1.
- Connect the HIGH FREQUENCY OUTPUT jacks on the DX-1 to the high frequency input jacks on the amplifier driving the high frequency portions of your loudspeaker systems.
- Connect the positive (+) LOW FREQUENCY OUTPUT CHANNEL A jack on the DX-1 to the Channel A input jack of the bridged amplifier driving the low frequency portion of your left channel loudspeaker.
- Connect the negative (–) LOW FREQUENCY OUTPUT CHANNEL A jack on the DX-1 to the Channel B input jack of the bridged amplifier driving the low frequency portion of your left channel loudspeaker.
- Similarly, connect the positive (+) LOW FREQUENCY OUTPUT CHANNEL B jack on the DX-1 to the Channel A input jack of the bridged amplifier driving the low frequency portion of your right channel loudspeaker.
- Finally, connect the negative (–) LOW FREQUENCY OUTPUT CHANNEL B jack on the DX-1 to the Channel B input jack of the bridged amplifier driving the low frequency portion of your right channel loudspeaker.
- Connect the low frequency loudspeaker wires only to the red or positive (+) output terminals on the bridged amplifiers. Do not connect anything to the black or negative (–) bridged amplifier terminals.

NOTE: The negative (–) LOW FREQUENCY OUTPUT jacks on the DX-1 are provided for maintaining the integrity of the polarity convention of the loudspeaker for optimal response. Do not use these connections unless you know to which convention your loudspeakers and amplifiers conform.

Caution: Be absolutely certain that the high and low pass signal connections are routed to the correct amplifier(s). Incorrect connections may damage the loudspeaker system.

Testing

Caution: Carefully check all system settings and wiring connections before first energizing the system. (Please refer to figure 1)

- Recheck the power cable for secure connection
- Recheck signal cable routing
- Recheck all loudspeaker wiring for correct routing, polarity and secure connections

Before applying AC power to the system, turn the low frequency control (LF LEVEL), all amplifier gain controls (if present) and audio system pre-amplifier volume control fully counterclockwise to reduce the signal to the low frequency section of the loudspeakers in the event of a system malfunction.

To confirm proper system operation:

1. First, turn on the power switches of the program sources (tuner, compact disk and/or tape player) and the preamplifier. Then, press the DX-1's POWER switch to turn the unit on.
2. Turn on the low frequency amplifier(s) only. Do not turn on the high frequency amplifier now.
3. Feed program material from a compact disk, tape or tuner into the system. Gradually increase the preamplifier volume control, amplifier gain controls (if present), and the LF LEVEL control on the DX-1 to low/moderate settings to confirm correct operation. Do not overpower the system. You should hear low frequency information coming from the low frequency transducers. If you hear any high frequency information at this time, this is a symptom of high frequency signals being misrouted. Turn off the amplifier(s) and check the wiring between the DX-1, the amplifier(s) and the loudspeakers to find and correct the error.
4. Turn on the high frequency amplifier, set the amplifier gain controls (if present) to a low/moderate level, and confirm that high frequency program material is being reproduced through the high frequency transducers.
5. Gradually advance the amplifier level controls (if present) and the low frequency output from the DX-1 by turning the LF LEVEL control clockwise until the desired amount of low frequency response and overall balance of the audio spectrum is obtained. Do not drive the loudspeaker system or amplifier(s) into distortion, or transducer damage may occur.
6. It is normal to need some time and experimentation to achieve the proper frequency balance in a particular listening room, adjusting loudspeaker and listening positions as well as the relative balance of high and low frequencies. Some JBL loudspeaker systems include high frequency controls which remain active when the systems are bi-amplified; these controls may also be adjusted to assist in obtaining proper balance.

Operation

In normal use, the DX-1 requires no special user attention, and may be powered up separately or simultaneously with other line level system components, such as program sources and the preamplifier. It is, however, always advisable to turn on the power amplifiers separately, after the other components have been on for a short time, to insure that any turn-on transients or other disturbances in the system are not amplified and sent to the loudspeakers. This simple precaution can prevent inadvertent, serious transducer damage.

Troubleshooting

The DX-1 crossover is designed to provide years of trouble-free service with no required maintenance. Below is a list of some problems which may be experienced with any electrical components, and some suggestions for identifying the source. Most often they occur in another system component.

WARNING: Turn off all audio system components before attempting any of the following procedures.

- No power (LED does not light).

Check for a loose power cable connection on the DX-1. If the crossover is powered from a remote source (preamplifier or power strip), check the connection at that point. Confirm all power connections in the system.

- No sound, but LED is lit.

Check for loose or incorrect signal connections. Check operational status and output levels of all additional system electronics. Check for shorted loudspeaker wires.

- Distorted sound at all volumes.

Check for loose or incorrect signal connections. Check operational status and output levels of all additional system electronics. Check loudspeaker connections for correct polarity, loose components or possible damage.

- Poor bass response.

Check for loose or incorrect low frequency connections. Check for proper low frequency amplifier operation. Check loudspeaker connections for correct polarity. Inspect loudspeakers for woofer cone damage.

- Poor high frequency response.

Check loudspeaker connections for correct polarity. Inspect loudspeakers for tweeter damage.

If, after attempting the above troubleshooting measures, your DX-1 crossover appears to require service, contact the JBL dealer, agent, or authorized representative from whom the unit was purchased. Do not attempt to make any repairs on your own or allow anyone but an authorized repair person to make the repairs. Remember to retain your original sales slip or invoice.

Specifications

Power requirements: 100-130/200-260 volts, 50-60 Hz; 15 watts

Signal-to-noise ratio: Greater than 100 dB ("A" weighted)

Input Impedance: 47,000 ohms

High frequency section: High frequency crossover point and slope specifications will vary depending on the card used;
to be determined by the requirements of the specified JBL loudspeaker system

Gain: 0.99 (1 volt in = 0.99 volts out)

Distortion: Less than .005% Total Harmonic and Intermodulation Distortion at 3 volts output with 3,000 ohm load, 10 Hz to 20kHz

Output impedance: Less than 110 ohms

Low frequency section: Low frequency crossover point and slope specifications will vary depending on the card used;
to be determined by the requirements of the specified JBL loudspeaker system

Gain: Adjustable 0-10 dB

Distortion: Less than .005% Total Harmonic and Intermodulation Distortion at 8.0 volts with 3,000 ohm load, 10 Hz to 2 kHz

Dimensions

Height: 64 mm (2½ in)

Width: 394 mm (15½ in)

Depth: 248 mm (9¾ in)

Weight: 4.5 kg (10 lb)

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.

JBL Limited Warranty

This JBL product is warranted for 1 year from the date of original purchase. This warranty applies to non-commercial, residential use only.

WHO IS PROTECTED BY THIS WARRANTY?

Your JBL warranty protects the original owner and all subsequent owners, so long as the original bill of sale is presented when warranty service is required.

WHAT IS COVERED BY THE JBL WARRANTY?

Your JBL warranty covers all defects in material and workmanship with the following specified exceptions. These are (1) damage caused by accident, unreasonable use or neglect (including the lack of reasonable and necessary maintenance); (2) damage caused by improper installation or adjustment; (3) damage occurring during shipment (claims must be presented to the carrier); (4) damage to or deterioration of any accessory or decorative surface; (5) damage resulting from failure to follow instructions contained in your owner's manual; (6) damage resulting from the performance of repairs by someone other than an authorized JBL warranty station; (7) any JBL unit on which the serial number has been effaced, modified, or removed; (8) units which have been altered or modified in design, appearance or construction. This warranty covers only the actual defects within the product itself, and does not cover the costs of installation or removal from a fixed installation, normal set-up or adjustments, claims based on any misrepresentation by the seller, or performance variations resulting from installation related circumstances such as program source quality or AC power.

HOW TO OBTAIN WARRANTY PERFORMANCE

If your JBL product ever needs service, we may direct you to an Authorized JBL Warranty Station, or ask you to send your unit to the factory for repair in which case we will also supply a Service Return Authorization and complete shipping instructions. If the product was purchased in a country other than the USA, it is necessary to return the product to the distributor or selling location in the same country in which it was purchased. Either way, you will need to present the original bill of sale to establish the date of purchase. Please do not ship your JBL product to the factory without our prior authorization. Please call 1-800-336-4JBL for the location of an authorized warranty station nearest you.

If service under this warranty is not necessary, but you have questions regarding the installation or operation of this unit, please contact your authorized JBL retailer or call 1-800-336-4JBL for further assistance.

WHO PAYS FOR WHAT?

JBL will be happy to pay all labor and material expenses for all repairs covered by this warranty. If necessary repairs are not covered by this warranty, or if a unit is examined which is not in need of repair, you will be charged for the repairs or the examination.

Although you must pay any shipping charges incurred in getting your JBL product to an Authorized Warranty Station or to the factory, we will pay return shipping charges if the repairs are covered by the warranty. Please be sure to save the original shipping cartons because a nominal charge will be made for additional cartons.

LIMITATION ON IMPLIED WARRANTIES

IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY, UNLESS OTHERWISE PROVIDED BY STATE LAW.

EXCLUSION OF CERTAIN DAMAGES

JBL'S LIABILITY IS LIMITED TO THE REPAIR OR REPLACEMENT AT OUR OPTION, OF ANY DEFECTIVE PRODUCT AND SHALL IN NO EVENT INCLUDE INCIDENTAL OR CONSEQUENTIAL COMMERCIAL DAMAGES OF ANY KIND.

SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

We sincerely thank you for your expression of confidence in JBL products. This equipment has been painstakingly assembled by high trained craftspeople. It should give you many years of musical enjoyment.



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