Electro-Voice®

S_b121

300-Watts Nonpowered Bass Module

- **Lightweight (32 lb) and compact**
- **Very durable structural-foam enclosure with integral handle**
- **Stand mountable and arrayable**
- **300-watts continuous power handling (1,200-watts short term)**

for high output

- **DL12Sx 12-inch woofer with Kevlar® Reinforced cone**
- **Neutrik Speakon® high-current connectors ($^1/_4$-in. phone jacks also provided)**
- **Four molded-in attachment points (metric M8 x 1.25) for secure suspension**

Description

The Electro-Voice S_b121 bass module is a compact, low-frequency enhancement system designed for sound reinforcement. Through the extensive use of computer-aided design and modeling, Electro-Voice engineers have developed a state-of-the-art portable system that combines the advantages of a long-throw 12-inch woofer in a high-impact polypropylene structural-foam cabinet that is light in weight (only 32.2 lb overall).

Low-Frequency Driver Description

The DL12Sx low-frequency driver was specially developed for the S_b121. Its deep-frame geometry provides high-peak excursion ability. At the heart of this driver, is a magnetic structure optimized to yield the best possible Thiele-Small parameters to match the tuned enclosure.

The woofer features beryllium copper lead wires, a low-mass edge-wound voice coil and high-temperature materials. The part of the magnet structure adjacent to the coil is insulated using the exclusive EV PROTEF™ process (U.S. Patent #4,547,632). The coil is driven by a massive, 16-lb magnet structure.

Enclosure Description

The enclosure is constructed of high-impact polypropylene structural foam. It provides a stiff and extremely durable enclosure. Molded into the cabinet are an integral carrying handle and a stand socket for mounting on $1^3/_8$-inch stands such as the 100BK. Rubber feet that are attached to the bottom of the cabinet and the mating sockets that are molded into the top provide a means of stacking systems. Four hanging inserts are also provided (four metric M8 x 1.25).

Xp200A Electronic System Controller

The optional Xp200A electronic system controller complements the characteristics of the S_b121. Its mono-summed subwoofer outputs provide crossover and infrasonic protection (see Crossover and Subpassband Protection sections). Its 24-db-per-octave filters roll-off response below 37 Hz and above 100 Hz. The Xp200A also includes a special low-frequency profile circuit that enhances the performance of the S_b121. The amount of enhancement can be adjusted to suit the user's personal preference.

Crossover

The S_b121 should be used in conjunction with an active crossover to roll-off response above 100-200 Hz, so that bass enhancement does not "muddy up" vocals or call attention to the physical location of the S_b121. (The closer the roll-off point is to 100 Hz, the least the overall sound quality will be affected by the enhancement of the bass module.) The roll-off rate should be a minimum of 12-dB per octave.

The optional Xp200A electronic controller provides a 24-dB-per-octave roll-off above 134 Hz.

Subpassband Speaker Protection

The S_b121, like all other vented systems, experiences rapidly increasing cone excursion below the box-tuning frequency (60 Hz for the S_b121). Acoustic output is also decreasing rapidly. Therefore, it is sensible to protect the S_b121 and maximize its undistorted output by inserting an active high-pass filter at a corner frequency somewhat below box tuning. The roll-off rate should be at least 12-dB per octave. At this minimum rate, a corner frequency of about 0.8 the box tuning frequency (48 Hz for the S_b121) is ap-

propriate. For higher roll-off rates, lower corner frequencies are permissible and provide essentially equivalent protection.

The sub output of the optional Xp200A electronic system controller provides a 24-dB-per-octave roll-off at 37 Hz.

Suspending Sb121 Enclosures

WARNING: Suspending any object is potentially dangerous and should only be attempted by individuals who have a thorough knowledge of the techniques and regulations of rigging objects overhead. Electro-Voice strongly recommends that the Sb121 be suspended taking into account all current national, federal, state and local regulations. It is the responsibility of the installer to ensure the Sb121 is safely installed in accordance with all such regulations. If the Sb121 is suspended, Electro-Voice strongly recommends that the system be inspected at least once a year. If any sign of weakness or damage is detected, remedial action should be taken immediately.

A manual entitled *Suspending System 200™ Loudspeakers* is included with every Sb121 system. It gives a summary of the suspension kits available and an idea of how each kit is used. A brief overview, which illustrates some approaches for single and multiple suspension, is given here for the benefit of the system designer. Please refer to individual suspension kit engineering data sheets for full details and safety information.

The first approach is to suspend an **individual** Sb121 enclosure. The four metric M8 x 1.25 inserts (see Figures 2 and 4) which are built into the enclosure allow the system to be suspended using eyebolts (Mb100 eyebolt attachment kit). Typically it will be necessary to attach two cables to the top eyebolt and "pull up" on the rear. The Mb200 bracket (see Figure 5) encompasses the top and bottom of the enclosure and has additional features to make suspending the Sb121 easier and more flexible. Electro-Voice recommends the use of the Mb200 in all but the simplest situations. The Mb200 has supplementary holes to allow the Sb121 to be attached to a wall or ceiling and aimed at an audience.

The Mb200 installation kit also allows the use of OmniMount® Series 100 mounting hardware by providing three-hole-pattern groups compatible with these support systems. When OmniMount® Series 100 mounting hardware is specified, the Mb200 installation kit must first be attached to the speaker enclosure.

The second approach is to suspend **multiple** Sb121 enclosures. The Sb121 enclosure is not designed to suspend multiple enclosures from itself. If an "array" is required, then multiple Mb200's must be used. Arrays may be constructed vertically by "daisy chaining" two Mb200's from each other. The Mb300 array bracket allows the easy and secure construction of horizontal arrays, using Mb200's to support the enclosure.

Power-Handling Capacity

To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test related to real-life conditions. First, a random noise input signal is used because it contains many frequencies simultaneously, just like the real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than the typical program, adding an extra measure of reliability. Third, the test signal includes not only the overall "long-term average" or "continuous" level—which our ears interpret as loudness—but also short-term peaks which are many times higher than the average, just like the actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion). Note that the sine-wave test signals sometimes used have a much less demanding peak value relative to their average level. In actual use, long-term average levels exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the Sb121 is designed to withstand the power test described in the ANSI/EIA RS-426-A 1980. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer ($^1/_3$-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz with a 3-dB-per-octave slope above 1,200 Hz. This shaped signal is sent to the power amplifier set at 300 watts into the 6.3-ohm EIA equivalent impedance (43.5-volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 1,200-watts peak (86.9-volts peak). This procedure provides a rigorous test of both thermal and mechanical failure models.

Amplifier Power Recommendations

As noted in the Power-Handling Capacity section, above, the Sb121 has a random-noise power capacity of 300-watts long term (1,200-watts peak) per ANSI/EIA RS-426-A 1980. The following guidelines will help relate this number to an appropriate power amplifier output rating.

1. To use the Sb121 to full capacity, skilled experts in sound-system installation and operation will obtain the best results if the power amplifier is 2.0 to 4.0 times the long- term average noise power rating of the speaker system (600 to 1,200 watts).

   The **caution** cannot be made strongly enough, however, that **this arrangement is only for experts** or for those who can discipline themselves against "pushing" the system for ever-higher sound levels and who can avoid "accidents" such as catastrophic feedback or dropped microphones.

2. A more conservative, "normal" amplifier size, which will produce audible results nearly equal to those of the "expert" recommendation, is 1.0 to 1.4 times the long-term average noise power rating of the speaker. For the Sb121 this is 300 to 420 watts.

3. To be very conservative, one can use an amplifier rated at 0.5 to 0.7 times the long-term average noise power rating of the loudspeaker. For the Sb121 this is 150 to 210 watts.

Request P.A. Bible Addition No. Two ("Power-Handling Capacity") for more background on these recommendations.

Sb121 Connections

The Sb121 is equipped with one Neutrik Speakon® NL4MP and one 1/4-in. phone jack connected in parallel, a configuration which allows for daisy-chaining of speaker systems. Additional Neutrik Speakon® NL4MP and 1/4-in. phone jacks are supplied for maximum flexibility. Instructions on how to interchange the connectors are included with every Sb121.

In continued high-power applications, Electro-Voice recommends the use of the Speakon connector. However, to provide a high level of compatibility, the 1/4-in. phone jacks are also provided. The Speakon NL4MP will mate to a NL4FC Speakon connector, which is a 4-pin connector. Figure 3 shows typical wiring configurations using banana plugs or 1/4-in. phone jacks (the banana plug provides the more reliable connection). Cable connections should be made to the 1+ and 1– terminals only. Cables utilizing the Speakon NL4FC are available from your local dealer.

Multiple Use

The Sb121 may be used in multiples to increase acoustic output. A 6-dB increase in maximum acoustic output occurs when two speaker systems are placed side by side and paralleled (yielding a 4-ohm load). For operation at very low frequencies, the woofer cones "mutually couple," acting as one system with twice the effective cone area and power-handling capacity. Efficiency is doubled by the increased cone area to provide 3 dB more output, while the doubled power capacity provides the potential for an additional 3-dB gain in maximum acoustic output.

Mutual coupling occurs when the center-to-center distance between woofers is less than one-half the wavelength. For the Sb121 crossed over at 100 Hz (the frequency provided by the optional Xp200A electronic system controller), the maximum distance for mutual coupling across the band is about 1.5 m (5 ft). When the woofers are spaced greater than one-half the wavelength, the level increase is limited to the 3-dB input-power increase.

The Sb121 is connected using the connector marked "input." A parallel woofer can be connected using the other jack. This halves the impedance the amplifier "sees," from 8 to 4 ohms. Care must be taken not to abuse the amplifier by connecting impedances which are too low (refer to amplifier specifications).

Loudspeaker Response Due to the Acoustical Environment

Several factors must be considered when determining the overall response of a speaker system in any listening environment. Physical characteristics of the room itself and placement of the speakers and listener can have considerable affect on SPL capability, perceived and/or measured frequency response and stereo imaging.

The low-frequency response of the Sb121 can be adversely affected by poor placement. The Sb121 was designed for quarter- or half-space use. This requires that the speaker system be positioned as close as possible to floor or wall surfaces (half space) or a floor/wall junction (quarter space). Corner placement, in most cases, will reinforce low frequencies the most. Also, placement in loose cavities or resonant mountings can seriously degrade the overall response.

Architects' and Engineers' Specifications

The loudspeaker system shall consist of a 12-inch long-throw low-frequency transducer mounted in a two-piece vented enclosure made of black textured injection-molded polypropylene structural foam.

The system shall exhibit a 50- to 500-Hz frequency response with a sensitivity of no less than 94 dB (1 watt /1 meter, 50- to 200-Hz band-limited pink noise). It will be capable of handling 300 watts of power by the test described in the ANSI/EIA RS-426-A 1980. Paralleled input and output connectors shall be present, consisting of a combination of Neutrik Speakon® NL4MP and 1/4-in. phone jacks. Four metric M8 x 1.25 attachment points capable of supporting the system in a permanent installation application shall also be present.

The loudspeaker shall be have a black, perforated metal grille covering the woofer. Overall dimensions shall be 586 mm (23.1 in.) high, 429 mm (16.9 in.) wide, 312 mm (12.3 in.) deep. The weight shall be 14.6 kg (32.2 lb).

The loudspeaker system shall be the Electro-Voice Sb121.

Uniform limited Warranty

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than EVI Audio Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to EVI Audio Service or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from EVI Audio Service at 600 Cecil Street, Buchanan, MI 49107 (800/234-6831 or FAX 616/695-4743)**. Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer.

Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Speakers and Speaker Systems are guaranteed against malfunction due to defects in materials or workmanship for a period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Electro-Voice active electronics associated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

For warranty repair, service information, or a listing of the repair facilities nearest you, contact the service repair department at: 616/695-6831 or 800/685-2606.

For technical assistance, contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard time.

Specifications subject to change without notice.

Figure 1 — Sb121 Frequency Response (1 watt/1 meter, anechoic environment)

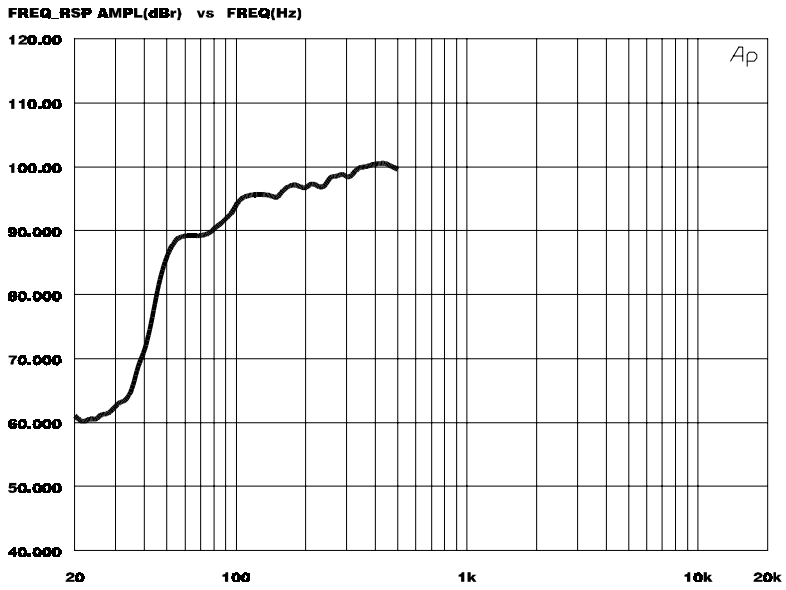


Figure 3 — Two-Conductor Cable Configurations for Sb121 Speaker System using Neutrik Speakon® NLF4C Four-Pin Connector

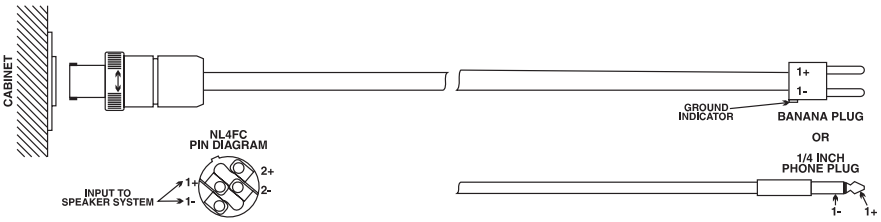


Figure 2 — Sb121 Dimensions

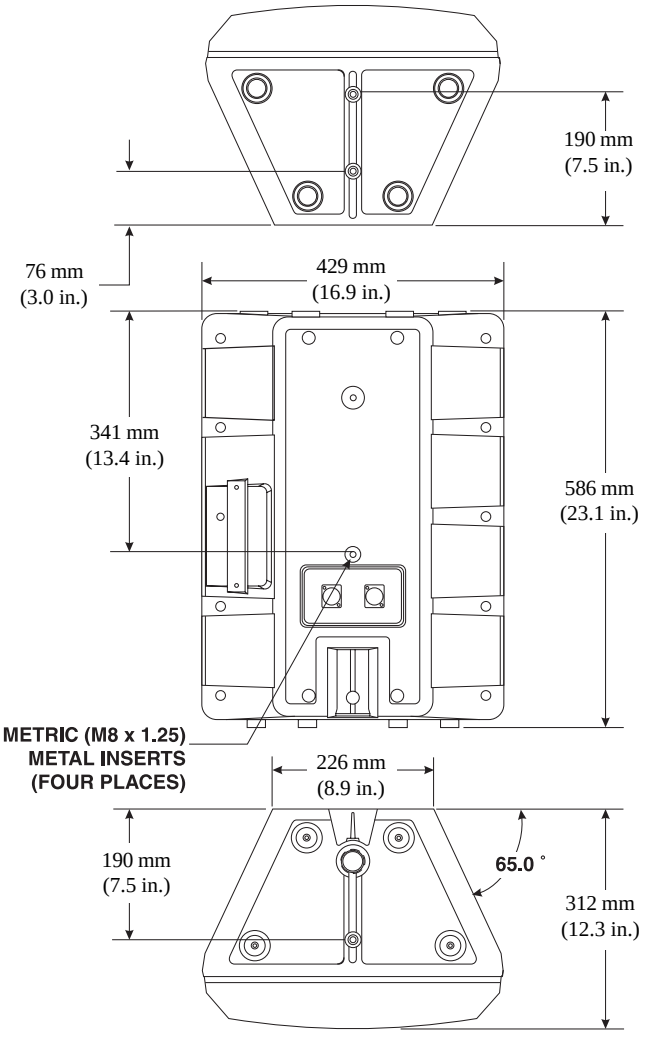


Figure 4 — Suspending Sb121 using the Mb100 Eyebolt Attachment Kit

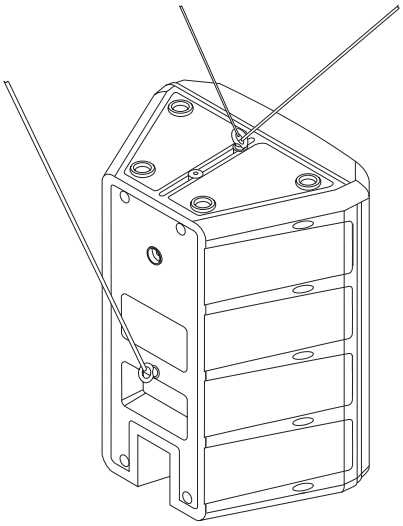
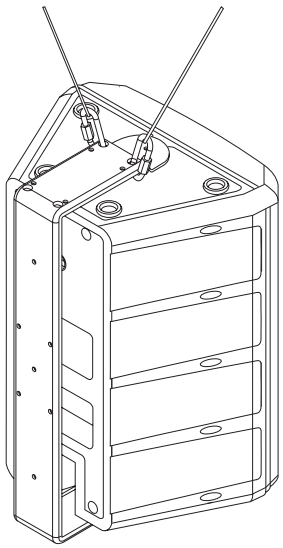


Figure 5 — Suspending Sb121 Using the Mb200 Installation Kit



Sb121 300-Watt Nonpowered Bass Module

Specifications:

Axial Frequency Response (swept sine-wave input, 4 volts at 10 feet on axis, anechoic environment, normalized for 1 watt/1 meter; see Figure 1):
50-500 Hz

Low-Frequency 3-dB-Down Point:
50 Hz

Usable Low-Frequency Limit with Xp200A Controller (10-dB-down point):
43 Hz

Half-Space Reference Efficiency:
4.0%

Long-Term Average Power-Handling Capacity per ANSI/EIA RS-426-A 1980 (see Power-Handling Capacity section)
300 watts

Maximum Acoustic Output:
11.1 watts

Sensitivity (SPL at 1 meter, 1 watt input, anechoic environment, band-limited pink-noise signal, 50 to 200 Hz):
95 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses:
Essentially omnidirectional

Distortion, 0.1 Full Power Output, Second Harmonic,
100 Hz: 5.3%
Third Harmonic,
100 Hz: 1.9%

Distortion, 0.01 Full Power Output, Second Harmonic,
100 Hz: 1.9%
Third Harmonic,
100 Hz: <0.01%

Transducer Complement:
DL12Sx 12-inch woofer

Box-Tuning Frequency:
60 Hz

Recommended Crossover Frequency:
100 to 200 Hz (12-dB-per-octave minimum slope)

Impedance,
Nominal:
8 ohms
Minimum:
6 ohms

Input Connectors:
Paralleled Neutrik Speakon® NL4MP and $^1/_4$-in. phone jack (allows paralleling of multiple speakers)

Enclosure Materials and Colors:
Black polypropylene structural foam

Supplied Accessories:
Additional Neutrik Speakon® NL4MP and $^1/_4$-in. phone jack (see Sb121 Connections section); *Suspending System 200™ Loudspeakers* instruction manual

Optional Accessories:
100BK mounting stand
Mb100 eyebolt attachment kit
Mb200 installation kit
Mb300 horizontal array kit
OmniMount® Series 100 mounting hardware[1]
VPCSx protective cover
PDSx padded cover
F200 monitor foot
Other Product Available for Enhancement of Sb121 Performance:
Xp200A electronic system controller

Attachment Points:
Four metric insert (M8 x 1.25) (see Figure 2 and Suspending Sb121 Enclosures section)

Dimensions (see Figure 2),
Height:
586 mm (23.1 in.)
Width:
429 mm (16.9 in.)
Depth:
312 mm (12.3 in.)

Net Weight:
14.6 kg (32.2 lb)

Shipping Weight:
16.0 kg (35.3 lb)

1. Available through OmniMount Systems, Inc. OmniMount® is a registered trademark of OmniMount Systems, Inc.

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