

Electro-Voice®

a MARK IV company

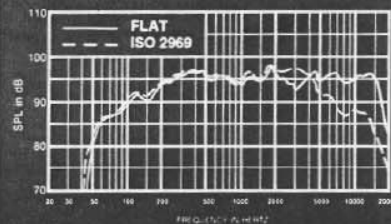


FIGURE 1
Axial Frequency Response
(Anechoic Environment, 1 Watt at 1 Meter)

FR12-2B

Two-Way Constant-Directivity Speaker System

SPECIFICATIONS

Frequency Response, 10 Feet on Axis,
Swept Sine Wave, Half-Space Anechoic
Environment (see Figure 1):

80-18,000 Hz

Low-Frequency 3-dB-Down Point:

80 Hz

Usable Low-Frequency Limit

(10-dB-down point):

50 Hz

Half-Space Reference Efficiency:

2.3%

Long-Term Average Power Handling

Capacity per EIA Standard RS-426A

(see Power Handling Capacity section):

100 watts

Maximum Woofer Acoustic Output:

2.3 watts

Sound Pressure Level at 1 Meter, 1 Watt

Input, Anechoic Environment, Band-

Limited Pink Noise Signal, 300 to 2,000 Hz:

96 dB

Dispersion Angle Included by 6-dB-Down

Points on Polar Responses, Horizontal

and Vertical Planes, Indicated One-Third-

Octave Bands of Pink Noise,

250-20,000 Hz:

150° ±30°

500-10,000 Hz:

100° ±20°

10,000-20,000 Hz:

60° ±12°

Directivity Factor R_0 (Q), 800-16,000 Hz

Median (see Figure 4):

10 (+12.5, -4.5)

Directivity Index D_i , 800-16,000 Hz Median

(see Figure 4):

10 dB (+3.5, -2.5 dB)

Phase Variation, 300-3,000 Hz:

±30°

Distortion, 0.1 Full Power Input

(see Figure 5),

Second Harmonic,

100 Hz: <1%

1,000 Hz: 4%

10,000 Hz: 3%

Third Harmonic,

100 Hz: 1%

1,000 Hz: <1%

10,000 Hz: <1%

Distortion, 0.01 Full Power Input

(see Figure 6):

Second Harmonic,

100 Hz: <.5%

1,000 Hz: 1%

10,000 Hz: 1.5%

Third Harmonic,

100 Hz: <1%

1,000 Hz: <1%

10,000 Hz: 1%

Transducer Complement, High-Frequency:

12-inch woofer

1 1/2-inch Super-Dome™ tweeter coupled to

9-inch Direktor™

Box Tuning Frequency:

48 Hz

Crossover Frequency:

1,500 Hz

Crossover Slope:

12 dB per octave

Impedance,

Nominal:

8 ohms

Minimum:

6.5 ohms

Input Connections:

Screw terminals (#10) on barrier strip

Enclosure Materials and Colors:

Paintable black vinyl clad enclosure
constructed of ProWood™ and particle
board.

Grille:

Black cloth

Suspending (see Suspending the FR12-2B
section):

1. WCB-1 universal hanging bracket
2. WCB-2 cinema wall bracket
3. OmniMount® Series 100 support system

Optional Accessories:

1. WCB-1 universal hanging bracket
2. WCB-2 cinema wall bracket

Dimensions,

Height:

25.50 in. (64.8 cm)

Width:

16.50 in. (41.9 cm)

Depth:

8.75 in. (22.2 cm)

Net Weight:

20.8 kg (46 lb)

Shipping Weight:

22.6 kg (50 lb)

DESCRIPTION

The Electro-Voice FR12-2B is a black, compact, two-way, high-efficiency, constant directivity speaker system with user selectable frequency compensation for ISO2969. Its primary area of use is intended to be high quality surround sound in premium cinema installations. The FR12-2B is THX® approved and has been designed with the rigors of a digital signal source in mind. If the "flat" response (see selecting frequency response section) is selected, the system can be used as a general sound reinforcement product for churches and small auditoriums. High quality professional-level components are used throughout the design, including a 100° x 100° Direktor® horn coupled to a Super-Dome high frequency driver and a professional grade 12 inch woofer. The black oak-

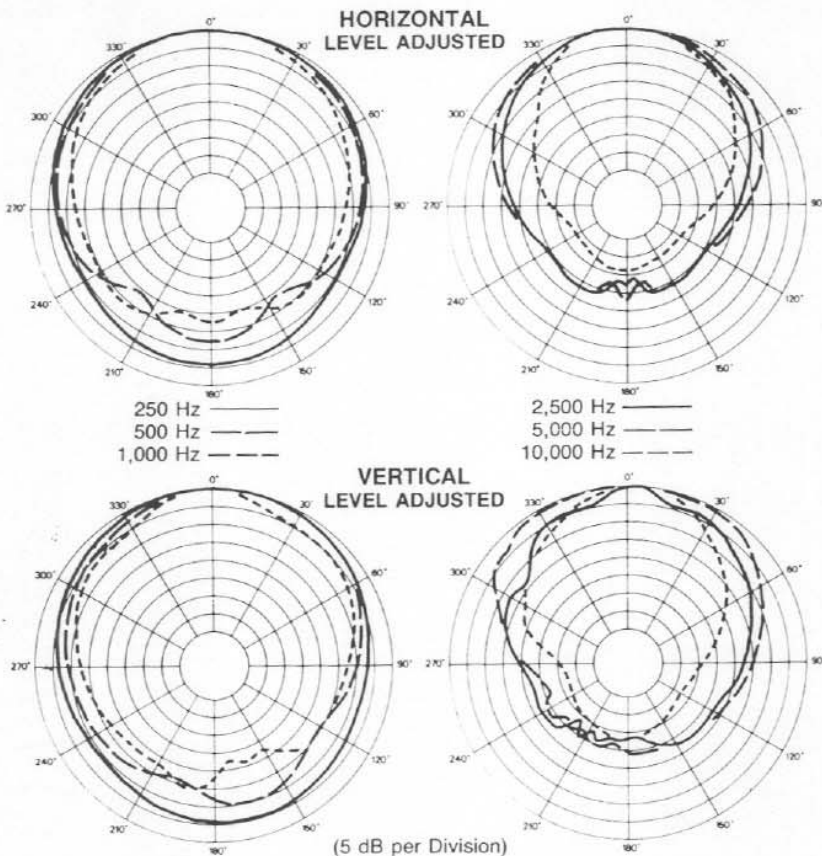


FIGURE 2 — Polar Response (1/3-octave pink noise 4 volts/10 feet)

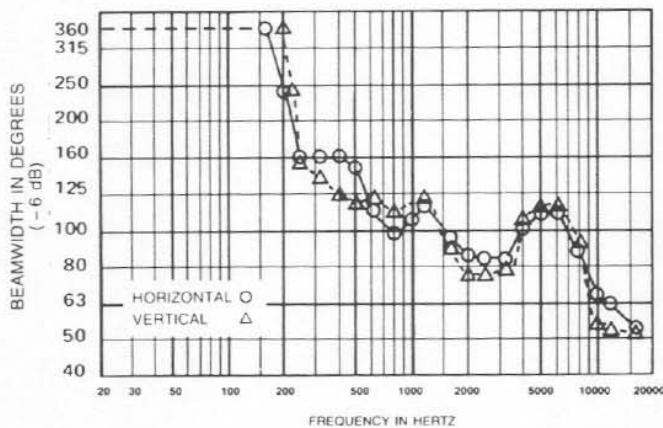


FIGURE 3 — Beamwidth vs. Frequency Whole Space (anechoic)

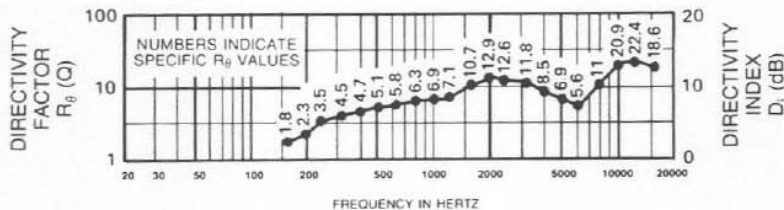


FIGURE 4 — Directivity vs. Frequency Whole Space (anechoic)

grain vinyl has been selected to blend into most interior design concepts and is complemented with a removable black cloth grille. The black surface is a proprietary vinyl laminate which can be painted or stained to match any decorative environment (see Finishing section).

A second order (12-dB-per octave) crossover at 1,500 Hz is used to separate the two frequency sections and provide equalization for the Super-Dome® and Direktor® horn. The bass section was designed for efficient low-end performance in a compact enclosure resulting in a nominally flat response on axis. Additional equalization can be switched in as necessary to provide an ISO2969 response.

CONSTANT-DIRECTIVITY SPEAKER SYSTEM

The crossover frequency and speaker component geometries have been carefully selected so that the directional characteristics of the woofer and Direktor match at the crossover frequency (approximately 100 degrees circular coverage patterns for each) to create a special system type — the constant-directivity system. At higher frequencies, the horizontal and vertical coverage pattern remains essentially constant. Response within the 100° x 100° rated coverage angle is uniform, which means dependable audience coverage without "hot spots" or dead zones at certain frequencies. The 100° x 100° dispersion characteristic permits this small system to be used horizontally or vertically to aesthetically best suit the environment it is placed in without basically changing the coverage angles. The controlled directivity of the high- and low-frequency transducers also eliminates response irregularities caused by diffraction off enclosure edges and, in combination with an essentially flat on-axis frequency response, produces a total acoustic power output that is uniform with frequency.

FREQUENCY RESPONSE

The FR12-2B axial frequency response was measured in Electro-Voice's large anechoic chamber at a distance of 10 feet with a swept sine-wave input of 4 volts. The "flat" and ISO2969 responses are shown. Figure 1 has been averaged and corrected for 1 watt at 1 meter.

DIRECTIVITY

The directional characteristics of the FR12-2B were measured in Electro-Voice's large anechoic chamber. The test signal was one-third-octave filtered pink noise at the frequencies indicated. A full spherical measurement system was used, which is compatible with AcoustaCADD™ computer-aided design program. All directional information was measured at 20 feet.

Figure 2 illustrates the horizontal and vertical polar responses.

Figure 3 shows the horizontal and vertical beamwidths. Beamwidth is the angle at which the horizontal and vertical polar responses have decreased in level by 6 dB when compared with the axial frequency response.

Figure 4 illustrates the total directivity of the

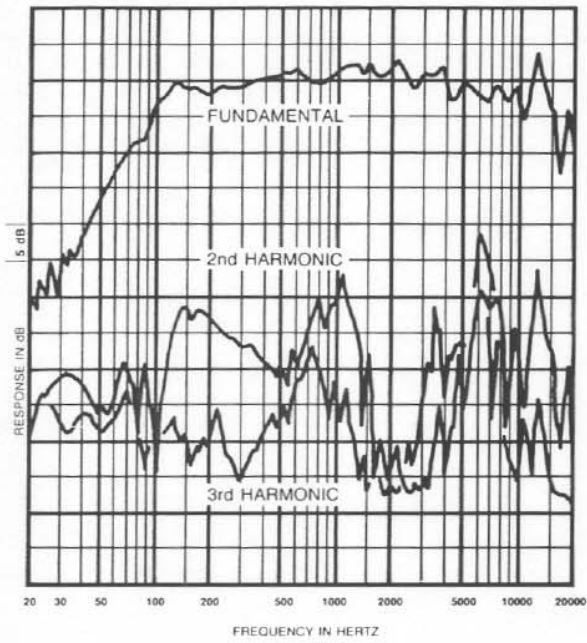


FIGURE 5 — Harmonic Distortion,
0.1 Rated Power Input (10 watts)

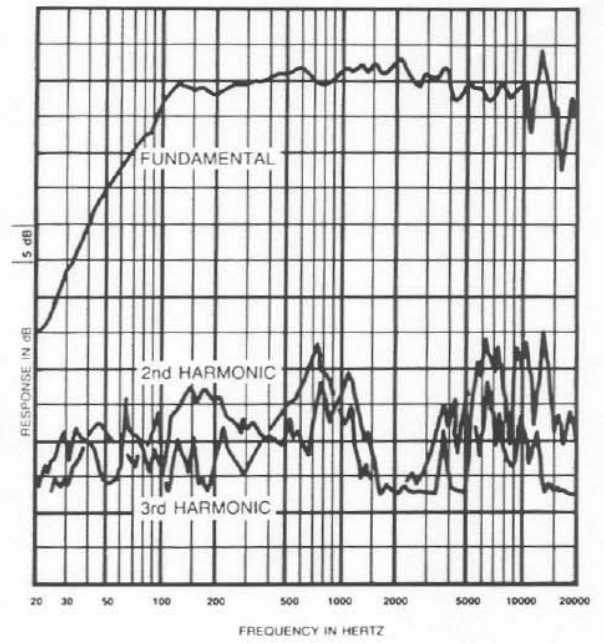


FIGURE 6 — Harmonic Distortion,
0.01 Rated Power Input (1 watt)

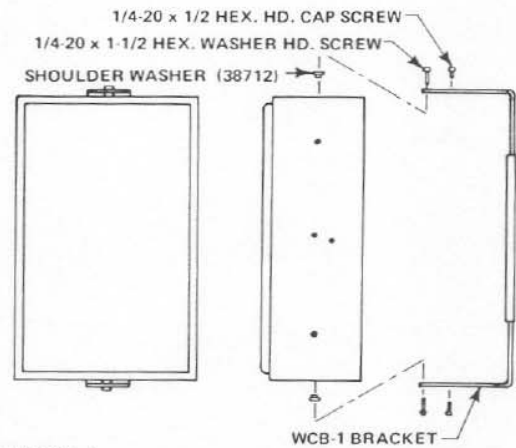
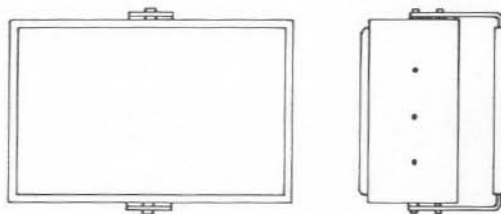


FIGURE 7 — Using WCB-1

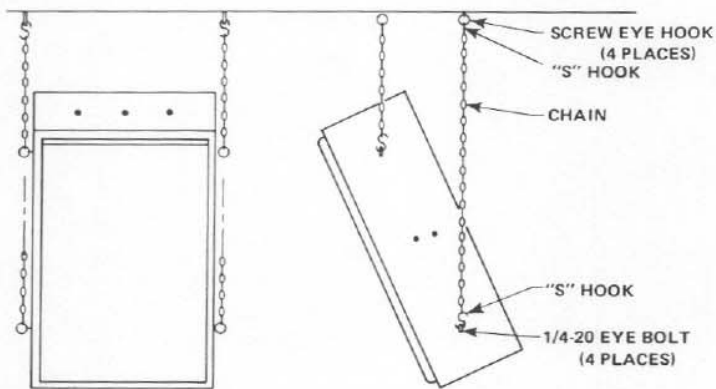


FIGURE 8 — System Mounting

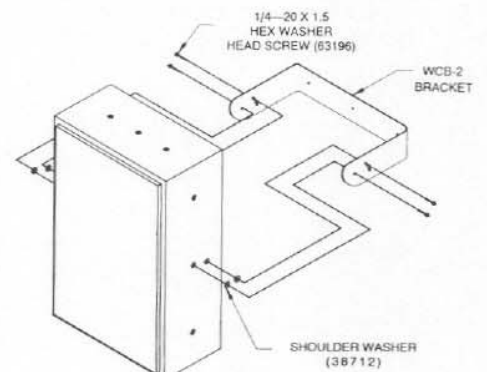


FIGURE 9 — Showing WCB-2

FR12-2B. The directivity factor $R(Q)$ is the relative value, at a point, of the FR12-2B when compared to an ideal spherical response. The directivity index, D_i , is calculated by $D_i = 10 \log R$.

POWER HANDLING CAPACITY

To our knowledge Electro-Voice was the first U.S. manufacturer to develop and publish a power test closely related to real-life conditions. A random noise input signal is used because it contains many frequencies simultaneously, just like real voice or instrument program. The signal contains more energy at extremely high and low frequencies than typical actual program adding an extra margin of reliability. The test combines not only the overall long-term average or continuous level — which our ears interpret as loudness — but also short duration peaks which are many times higher than average, just like actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone 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. The test lasts for eight hours, adding another extra level of confidence.

Specifically, the FR12-2B is designed to withstand the power test described in EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. The spectrum is obtained by filtering white-noise (a particular type of random noise with equal energy per bandwidth). The filter applies a 6 dB per octave below 40 Hz and above 318 Hz. When measured with a one-third-octave constant-percentage analyzer, this 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 fed to the power amplifier with the continuous power set to provide 100 watts into the 6.0-ohm EIA equivalent impedance (24.5 volts rms).

Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power or 400 watts peak (49.0 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

USE IN MOTION PICTURE HOUSES

The FR12-2B has a number of features which make it particularly suitable for use in cinema surround sound. It is THX® approved when used in its selectable ISO2969 mode. It is black to complement most theater interiors. The WCB-2 "U" bracket provides a cost-effective and safe method of suspending the FR12-2B at the correct 15° angle. The high dynamics and high power handling offered by professional-grade components make it especially suitable for digital signals.

SELECTING FREQUENCY RESPONSE

The FR12-2B is shipped with a "flat" frequency response. The ISO2969 response can be selected by removing the jumper on

the input panel on the rear of the system.

SUSPENDING THE FR12-2B

The FR12-2B is fitted with a number of 1/4-20 threaded inserts and can be suspended in a number of ways:

1. WCB-2 is a U-bracket designed specifically for the FR12-2B when being used in a cinema installation. It supports the FR12-2B vertically and can be locked at an angle of 15° (see Figure 9).
2. WCB-1 is a universal U-bracket designed to allow the suspension of the FR12-2B system at any angle and any orientation from the wall or ceiling (see Figure 7).
3. OmniMount® Series 100 support system. Four 1/4-20 threaded inserts are located in the rear panel to allow the use of the OmniMount® Series 100 support system. A safety chain should be used to ensure safe operation. (Obtain OmniMount® specification for full instructions.)
4. Eyebolts, chains and "S" hooks supplied by user (see Figure 8).

It is the responsibility of the installer to ensure the integrity of the mounting surface. The grille of the FR12-2B is securely attached on the front of the cabinet with four screws.

FINISHING

Finishing the FR12-2B is simple and straight forward as long as a few things are understood:

1. ProWood has been tested with a large number of commercially available paints with 100% success. However, it is impossible to test every paint available. Electro-Voice therefore recommends that you test a small area on the rear of the cabinet or under the grille to check that there are no adverse effects.
2. Ensure the surface is clean and free of grease (use soapy water if necessary).
3. Any latex, enamel or acrylic based paint can be used. The special top layer of ProWood was developed in conjunction with Pittsburgh Paints. They developed their Manor Hall® Exterior House series of paints to complement the ProWood. Electro-Voice recommends the use of these paints in adverse or tough situations.
4. Water-based latex paints in particular can take a considerable time to dry fully. They can be handled in a few hours but full strength may not be achieved for a week, particularly in damp or cool conditions.
5. The paint can be applied with a brush, roller or spray. Care should be taken not to get paint on the woofer cone.
6. Stain can be used to highlight the grain in the ProWood or match real wood. But the black surface must be initially painted a light color. Care should be taken when using stain because it is impossible to refinish the material after staining. A good approach is to use a stained varnish, but be careful. It is very difficult to lighten a stain.

WARRANTY (Limited)

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 Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice 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 Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831) and/or Electro-Voice West, at 8234 Doe Avenue, Visalia, CA 93291 (209/651-7777). **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.

Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.

Specifications subject to change without notice.



ELECTRO-VOICE, INC., 600 Cecil Street, Buchanan, Michigan 49107

MANUFACTURING PLANTS AT ■ BUCHANAN, MI ■ NEWPORT, TN ■ SEVIERVILLE, TN ■ OKLAHOMA CITY, OK ■ CANANOOQUE, ONT.
©Electro-Voice, Inc. 1992 ■ 138-1115-1