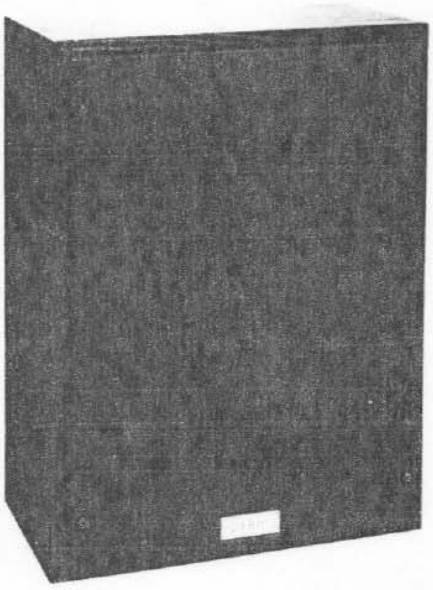
Electro-Voice®

FR10-2B

High-Output, Two-Way, Cinema Surround Speaker System



- High output—complements the potential of digital surround on film
- 94-dB sensitivity
- 100 watts long-term power capacity
- Easy suspension
- OmniMount® Series 100 compatible[1]
- ISO 2969 treble roll-off

SPECIFICATIONS

Axial Frequency Response (swept sine wave, 4 volts at 10 feet on axis, anechoic environment with optional APX-200 active equalizer, normalized for 1 watt/1 meter; see Figure 1):
75-18,000 Hz

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

Usable Low-Frequency Limit (10-dB-down point):
48 Hz

Half-Space Reference Efficiency:
2 1%

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

Maximum Woofer Acoustic Output:
2.1 watts

Sensitivity (SPL at 1 m, 1 W into nominal impedance, anechoic environment, band-limited pink-noise signal, 100-15,000 Hz):
94 dB

Beamwidth (angle included by 6-dB-down points on polar responses, horizontal and vertical planes, indicated one-third-octave bands of pink noise; see Figure 3),
250-6,300 Hz:
150° ±30°
8,000-18,000 Hz:
60° ±15°

Directivity Factor R_θ (Q), 800- to 16,000-Hz Median (see Figure 4):
8.5 (+12.5, −4.0)

Directivity Index D_i, 800- to 16,000-Hz Median (see Figure 4):
7 dB (+3.5 dB, −2.5 dB)

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%

Transducer Complement,
Low-Frequency:
10-inch woofer
Low-Frequency:
1½-inch Super-Dome™ tweeter

Box Tuning Frequency:
50 Hz

Crossover Frequency:
2,500 Hz

Crossover Slope:
12 dB per octave

Impedance,
Nominal:
8 ohms
Minimum:
6.7 ohms

Input Connections:
Screw terminals (#10) on barrier strip

Enclosure Materials and Colors:
Paintable, black vinyl-clad enclosure constructed of MDF (medium density fiberboard)

Grille:
Black cloth

Suspension (see Suspending the FR10-2B section):
WCB-1 universal hanging bracket
WCB-2 cinema wall bracket
OmniMount® Series 100 support system

Optional Accessories:
WCB-1 universal hanging bracket
WCB-2 cinema wall bracket

Dimensions,
Height:
55.9 cm (22.00 in.)
Width:
41.9 cm (16.50 in.)
Depth:
22.2 cm (8.75 in.)

Net Weight:
15.5 kg (34 lb)

Shipping Weight:
17.3 kg (38 lb)

DESCRIPTION

The Electro-Voice FR10-2B is a black, compact, two-way, high-efficiency speaker system. Its primary intended application is for high-quality surround sound in premium cinema installations, and it has been designed with the rigors of a digital signal source in mind. High-quality, professional-level components are used throughout the design, including a Super-Dome™ high-frequency driver and a professional-grade woofer. The black oak-grain vinyl has been selected to blend into most interior design concepts and is complemented with a removable black cloth grille.

A second-order (12-dB-per-octave) crossover at 2,500 Hz is used to separate the two frequency sections and provide equalization for the Super-Dome™ tweeter. The bass section was designed for efficient low-end performance in a compact enclosure.

FREQUENCY RESPONSE

The FR10-2B axial frequency response was measured in Electro-Voice's large anechoic chamber at a distance of 10 feet with a swept sine-wave input (see Figure 1).

1. OmniMount® is a registered trademark of OmniMount Systems.

FR10-2B SPECIFICATION GRAPHICS

FIGURE 1 — Axial Frequency Response (anechoic environment, 1 watt at 1 meter into mid band with ISO 2969 rolloff)

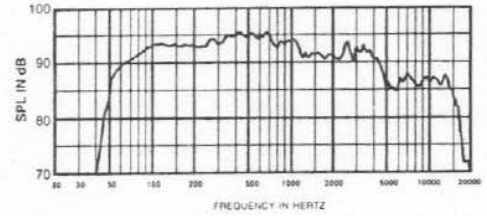


FIGURE 2 — One-Third-Octave Polar Response (anechoic environment)

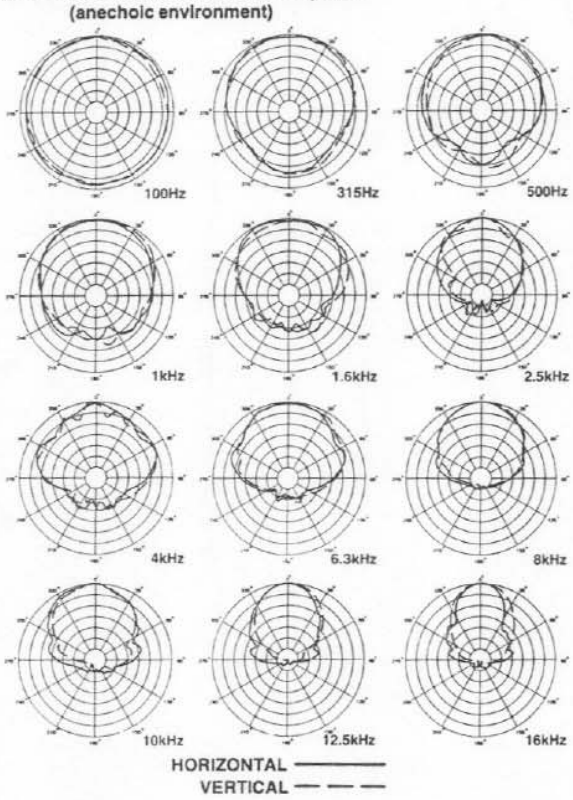


FIGURE 3 — Beamwidth vs. Frequency (anechoic environment)

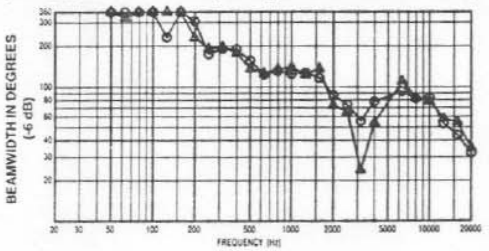


FIGURE 4 — Directivity vs. Frequency (anechoic environment)

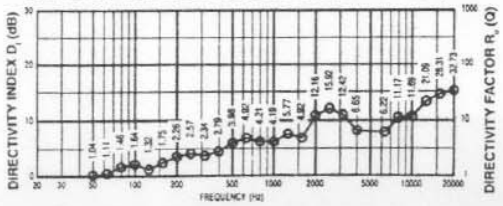


FIGURE 5 — Harmonic Distortion, 0.1 Rated Power Input (10 watts)

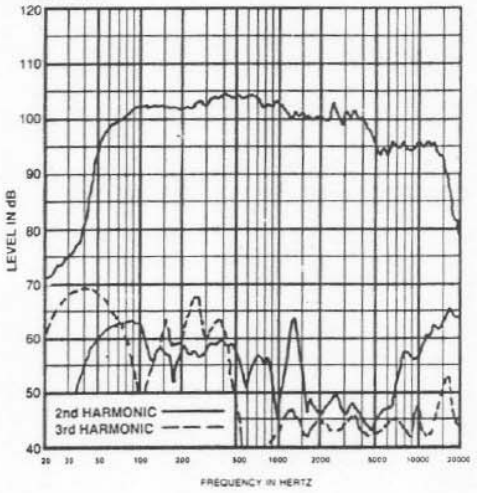


FIGURE 6 — Mounting the FR10-2B Using the WCB-1 Bracket

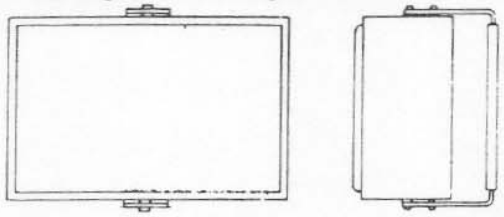
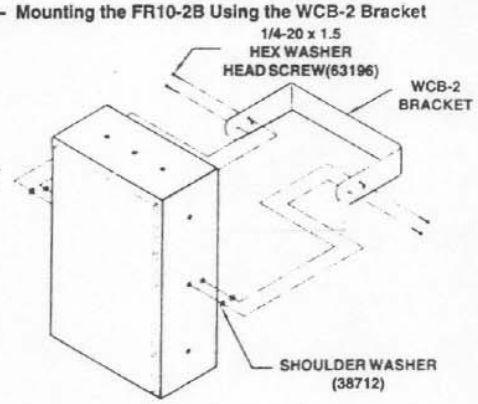


FIGURE 7 — Mounting the FR10-2B Using the WCB-2 Bracket



DIRECTIVITY

The directional characteristics of the FR10-2B 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 the 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 FR10-2B. The directivity factor $R_\theta(Q)$ is the relative value, at a point, of the FR10-2B when compared to an ideal spherical response. The directivity index, D_I, is calculated by $D_I = 10\log_{10}R$.

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, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the FR10-2B is designed to withstand the power test described in ANSI/EIA RS-426-A 1980. 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 roll-off 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 6.3-ohm EIA equivalent impedance (25.1 volts rms).

Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power or 400 watts peak (50.2 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

USE IN MOTION PICTURE THEATRES

The FR10-2B has a number of features which make it particularly suitable for use in cinema surround sound. It is black to complement most theater interiors. The WCB-2 U-bracket provides a cost-effective and safe method of suspending the FR10-2B at the correct (15°) angle. The high dynamics and high power handling offered by professional-grade components make it especially suitable for digital signals.

SUSPENDING THE FR10-2B

The FR10-2B is fitted with a number of 1/4-20 threaded inserts and can be suspended in several ways:

1. WCB-2 is a U-bracket designed specifically for the FR10-2B when being used in a cinema installation. It supports the FR10-2B vertically and can be locked at an angle of 15° (see Figure 7).
2. WCB-1 is a universal U-bracket designed to allow the suspension of the FR10-2B system at any angle and any orientation from the wall or ceiling (see Figure 6).
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® specifications for full instructions.)

It is the responsibility of the installer to ensure the integrity of the mounting surface. The grille of the FR10-2B is securely attached on the front of the cabinet with four screws.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker system shall be a two-way, full-range design consisting of a 10-inch woofer, a 1 1/2-inch Super-Dome™ tweeter and a passive crossover network installed in a MDF enclosure with a black cloth grille. Finish shall be black vinyl.

The system shall have a crossover point of 2,500 Hz and have a nominal impedance of 8 ohms. Usable frequency range shall extend from 48 Hz to 18,000 Hz. Sensitivity shall be at least 94 dB for a 1 watt input at a distance of 1 meter on axis. Long-term power capacity shall be at least 100 watts, based on ANSI/EIA RS-426-A 1980 standard for full-range loudspeaker systems.

Input connections shall be #10 screw terminals on a barrier strip. Suspension of the system shall be achieved through the use of the WCB-2 U-bracket (for vertical suspension at 15°), the WCB-1 U-bracket (for suspension at any angle or orientation), or the OmniMount® Series 100 support system; four 1/4-20 threaded inserts shall be located in the rear panel of the speaker enclosure to accommodate the OmniMount hardware.

Overall dimensions shall be no greater than 55.9 cm (22.00 in.) high by 41.9 cm (16.50 in.) wide by 22.2 cm (8.75 in.) deep. Net weight shall be 15.5 kg (34 lb). The system shall be the Electro-Voice FR10-2B.

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 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 or 800/234-6831). **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 (616/695-6831 or 800/234-6831).

Specifications subject to change without notice.