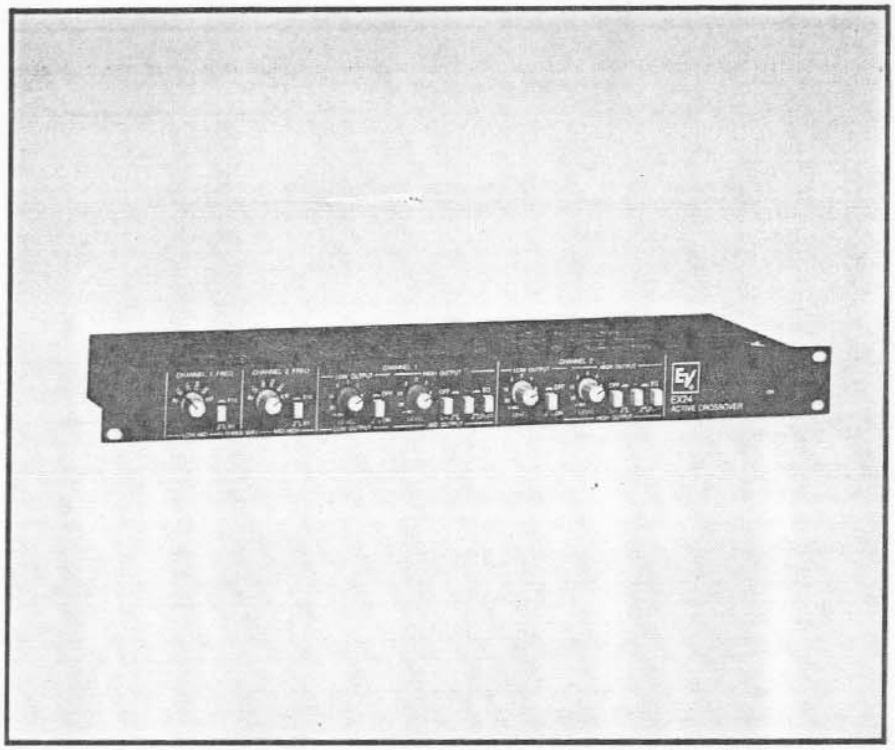

Electro-Voice®
a MARK IV company

Model EX-24 Electronic Crossover

SPECIFICATIONS

Conditions:
1. 0 dBu = 0.775 V rms.
2. 0 dBm = 1 mW (0.775 V rms into 600 ohms).
3. 120-volt ac line voltage maintained throughout testing.

Channel Configurations:
Stereo two-way or monaural three-way

Filter Type:
Fourth-order Linkwitz-Riley (24-dB-per-octave slopes)

Crossover Frequencies:
80, 125, 160, 250, 500, 630, 800, 1250, 1600, 2500, 5,000 and 6300 Hz

Infrasonic Speaker Protection,
Filter Type:
Second-order Butterworth (12-dB-per-octave slope)
Corner Frequency: 30 Hz

Gain:
Adjustable, off to +12 dB; center detent at unity gain

Frequency Response (sum of outputs):
30 Hz to 20 kHz +0/–3 dB

THD (20 Hz - 20 kHz):
<0.05% typical

IMB (SMPTE 4:1)
<0.05% typical

Noise, Each Output, Noise Bandwidth 20–20,000 Hz:
–90 dBu typical

Crosstalk:
-70 dBu typical

Inputs,
Type: Electronically differential balanced
Maximum Level: +20 dBu (7.75 V rms)
Impedance:
15 kilohms unbalanced
30 kilohms balanced
CMRR: 40 dB minimum
55 db typical
Connectors: Female 3-pin XLR-type and ¼-in. phone

Outputs,
Type: Electronically servo-balanced
Maximum Level: +18 dBm
Impedance: 100 ohms unbalanced
200 ohms balanced
Minimum Load Impedance: 600 ohms
Connectors: Male 3-pin XLR-type and 1/4-in. phone

Power Requirements:
100, 200, 220, 240 V ac, 50/60 Hz, 8 W

Fuse Type:
Littlefuse Type 3AB 175 mA/250 V Slo-Blo®* or equivalent

Dimensions,
Height: 4.4 cm (1.75 in.)
Width: 48.3 cm (19 in.)
Depth: 14.9 cm (5.88 in.)

Shipping Weight:
3.2 kg (7.0 lb)

Net Weight:
2.5 kg (5.4 lb)

Enclosure,
Chassis: Rack mount, 18-GA steel
Front Panel: 1/8-in. aluminum

Colors:
Gray front panel, black chassis

*Slo-Blo is a registered trademark of Littlefuse, Inc.

DESCRIPTION

The EV EX-24 electronic crossover is a stereo two-way/mono three-way device intended for professional sound reinforcement applications. The EX-24 allows bi- or triamplification which can provide a significant performance advantage over conventional passive crossovers. The EX-24 utilizes 24-dB-per-octave Linkwitz-Riley filter slopes for optimum transient performance and driver protection. The EX-24 is rack-mountable in a single rack space (1.75 inches).

GENERAL FEATURES

- Twelve selectable crossover frequencies per channel: 80, 125, 160, 250, 500, 630, 800, 1250, 1600, 2500, 5000 and 6300 kHz. The crossover frequencies may be altered by adding four resistors to each crossover circuit. This modification also disables the front panel controls to prevent unwanted tampering of the frequency settings.
- Each channel features a low- and high-frequency output level control. If the EX-24 is switched for three-way operation, the high output of channel 1 becomes the mid output control.
- Each output has an on/off control that allows it to be muted to aid in setup.
- Each channel has a polarity reversal switch which helps optimize overall frequency response.
- Each channel has horn EQ switches. This switch compensates for the natural rolloff in high-frequency response of compression drivers on constant-directivity horns.
- 30-Hz infrasonic speaker protection with 12-dB-per-octave slope.
- The input stage is electronically differential balanced.
- The output stage is electronically servo-balanced and is low impedance.
- Universal power supply. The crossover is provided with the primary of the transformer strapped for 120-V ac operation from the factory. The crossover may be powered from line voltages other than 120 volts by restrapping the primary of the power transformer.

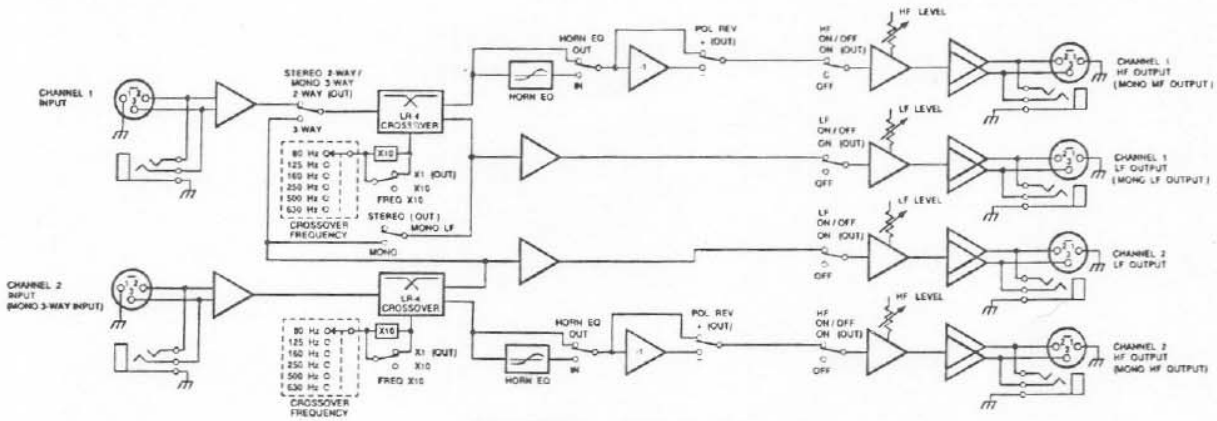

FIGURE 8 — Schematic

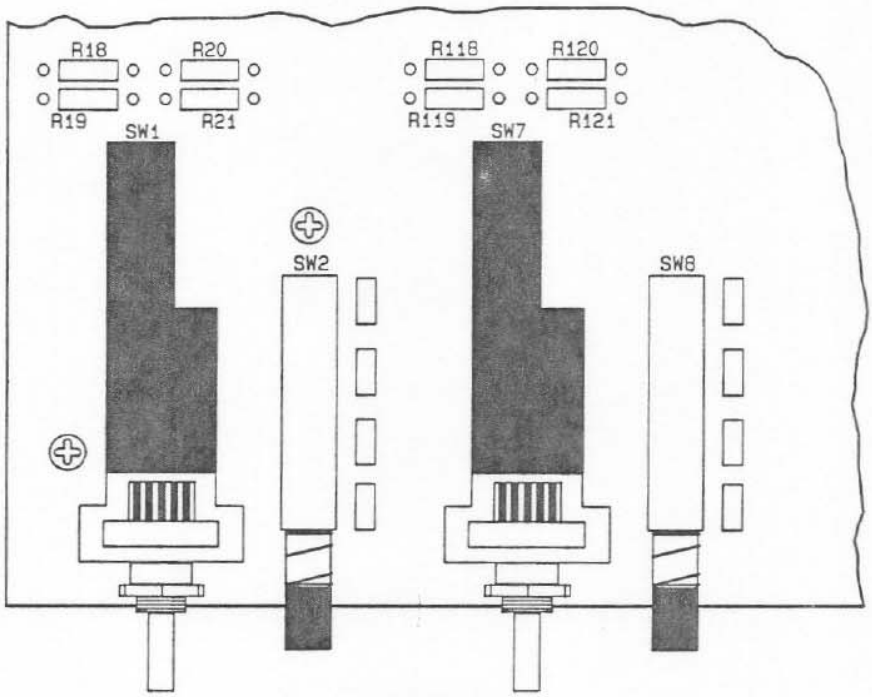

FIGURE 9
Location of Optional
Fixed-Frequency Resistors

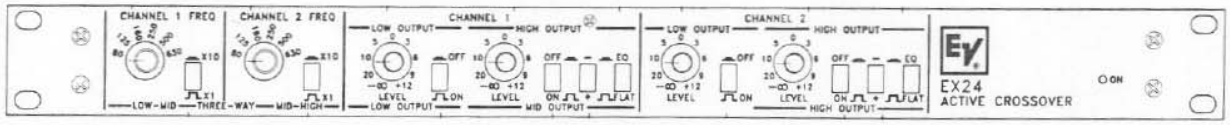

FIGURE 10
Front Panel Diagram

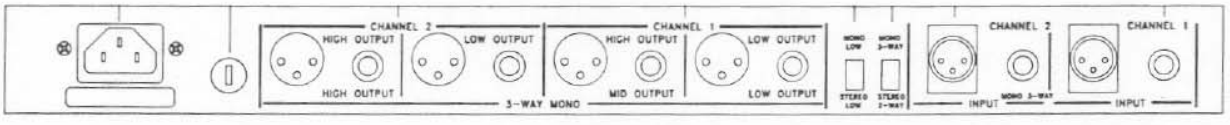

FIGURE 11
Rear Panel Diagram

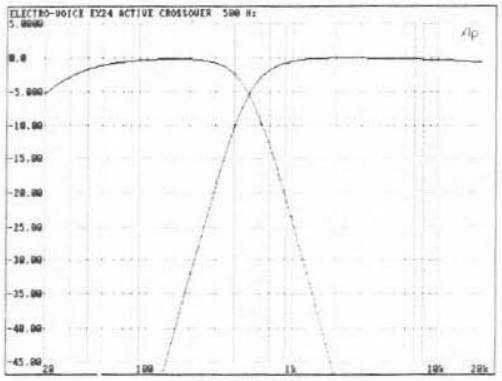

FIGURE 1
Typical Two-Way Crossover Curve

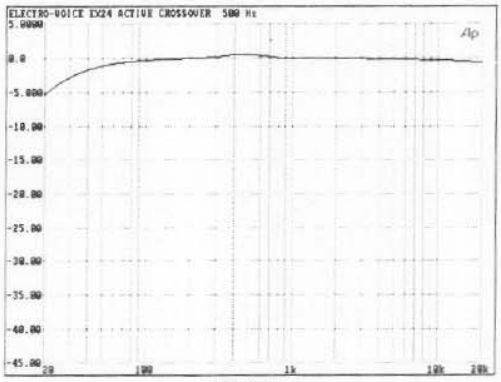

FIGURE 2
Summed High and Low Pass Outputs

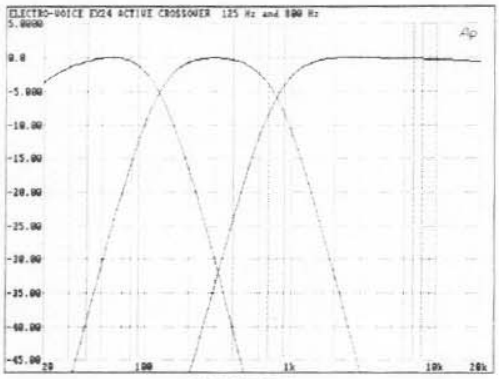

FIGURE 3
Typical Three-Way Crossover Curve

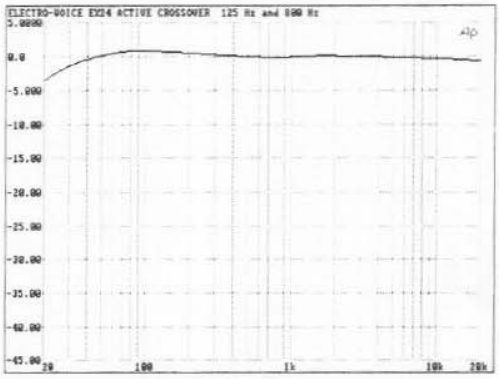

FIGURE 4
Summed High, Mid and Low Outputs

FIGURE 5
Constant-Directivity Horn Equalization

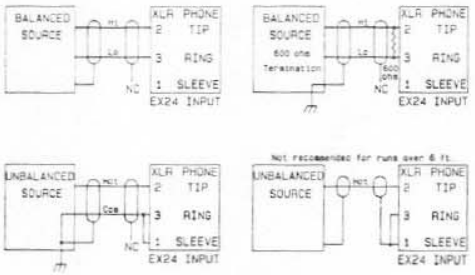

FIGURE 6
Typical Input Connections

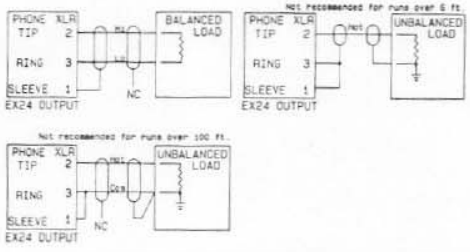

FIGURE 7
Typical Output Connections

POLARITY REVERSAL SWITCH

A two-position push-button switch is provided to change the polarity of the high-frequency channel relative to the low-frequency channel by 180 degrees. Although the "normal"

CONSTANT-DIRECTIVITY HORN EQUALIZATION

The active, high-frequency equalization accurately compensates for the falling high-frequency response of a compression driver used with a constant-directivity horn. This falling response occurs because the efficiency of all compression drivers begins to decrease above about 2500 Hz. When the driver is placed on a constant-directivity horn, one which spreads driver output over a uniform coverage angle throughout the frequency range, the response of the driver/horn combination falls. The EX-24's horn EQ circuit is a general purpose one that is designed to complement any CD horn (see Figure 5).

OPTIONAL FIXED-FREQUENCY MODIFICATION

Provisions have been designed into the crossover that allow the user to bypass the front panel controls and permanently set the crossover frequency to one fixed value and/or use a frequency other than the ones provided. This modification is performed by adding four resistors to each crossover circuit. The resistor locations are designated by R18, R19, R20 and R21 in channel 1 and R118, R119, R120 and R121 in channel 2. These resistor locations are shown in Figure 7. By performing this modification, the user forfeits the ability to use the modified channel's frequency control. The front panel frequency control must be in the 80-Hz position when using the modified crossover channel. If the desired crossover frequency is between 80 Hz and 800 Hz, the equation to obtain the resistor value is: $R = (8 \times 10^6)/(f_c - 80)$. If the desired crossover frequency is greater than 800 Hz, the equation to obtain the resistor value is: $R = (8 \times 10^7)/f_c - 800)$. In both equations, R = R18(R118) = R19(R119) = R20(R120) = R21(R121) in ohms and f_c is the desired crossover frequency in hertz. Choose the nearest standard value.

STEREO/MONO LOW-FREQUENCY SWITCH

The stereo/mono LF switch located on the rear panel of the unit sums together the low outputs of both channels if depressed. This is necessary with single-channel subwoofer systems or for maximizing low-frequency output for stereo setups.

MODE SWITCH

This switch, located on the rear panel of the unit, switches between the stereo two-way configuration for TRS ¼-inch phone connectors is as follows: the tip is positive, the ring is negative and the sleeve is signal ground (cable shield). The usual two-circuit phone jack with single-conductor shielded cable may be inserted directly into the EX-24's connectors and proper, though unbalanced, operation will result. (If a three-circuit, TRS input or output jack is used with single-conductor shielded cable, it is important that the ring and the sleeve of the connector be strapped together, or the input or output level will be reduced by 6 dB. Use of the usual two-circuit phone jack achieves this connection automatically.)

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The crossover shall be a two-way stereo or three-way monaural active crossover. Each crossover section shall provide adjustable crossover frequencies from 80 Hz to 6.3 kHz in two ranges. Level controls and on/off switches for each output shall be provided to facilitate setup and operation of any multiway sound system. The high-frequency output for each channel shall exhibit a polarity inversion switch and switchable constant-directivity horn equalization to allow optimum speaker response through the crossover region. A "mono low" function shall be included to provide maximum system output capability at low frequencies. A mode switch shall allow easy conversion from two-way to three-way operation.

The active crossover shall meet or exceed the following performance criteria: fourth-order-Linkwitz-Riley filter characteristics; infrasonic speaker protection with second-order Butterworth filter characteristic and 30-Hz corner frequency; electronically balanced differential inputs and servo-balanced outputs; maximum input level: 7.75 V rms; input impedance: 15 kilohms, unbalanced; 30 kilohms balanced; CMRR: 55 dB typical; maximum output level: +18 dBm; output impedance: 100 ohms, unbalanced 200 ohms balanced; minimum load impedance: 600 ohms; frequency response: 30 Hz to 20 kHz, +0/-3 dB; THD: 0.05% noise: -90 dBu typical, 20 Hz to 20 kHz NBW; crosstalk: -70 dB typical. Input connections shall be made with female 3-pin XLR-type connectors and three-circuit ¼-inch phone jacks. The output connections shall be made with male 3-pin XLR-type connectors and three-circuit ¼-inch phone jacks. Power shall be provided by a detachable IEC power cord receptacle. A detachable power weight of 5.4 pounds (2.5 kg). The active crossover shall be the Electro-Voice EX-24.

WARRANTY

Electro-Voice Uniform Limited Warranty Statement — 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 occuring 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 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 Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Service and repair of 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

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