



Model XEQ 808 Crossover/Equalizer

SPECIFICATIONS

Nominal Crossover Frequency:
800 Hz

Nominal Load Impedance, Both Channels:
8 Ohms

Attenuation Rate Outside of Crossover Region, Low-Pass Output:
12 dB per octave

High-Pass Output:
18 dB per octave except 12 dB per octave on high-frequency attenuation adjustment E (see Figure 4)

Equalization at 10,000 Hz:
Approximately 12 dB above 1,000 Hz reference (varies slightly with high-frequency attenuation adjustment)

High-Frequency Attenuation (1,000 Hz):
9-16 dB, adjustable in five steps

Insertion Loss,

Low-Frequency Channel:
0.7 dB, typical

Maximum Safe Amplifier Power Rating with Typical Program Material (maximum voltage input not to be exceeded):

400 watts continuous sine wave

Long-Term Average Power Handling Capacity:

100 watts shaped random noise per EIA Standard RS-426A

Maximum Input Voltage:
±80 volts peak

Circuit Type (see Figure 6),

Frequency Division:
Second-order L-C

High-Frequency Equalization and Attenuation:

Adjustable series capacitance

Connectors:

Barrier terminal strips in parallel with ¼-inch phone jacks

Maximum Wire Gauge, Barrier Terminal Strips:

AWG 10

Dimensions,

Overall (including flange):

178 mm (7.00 in.) high

140 mm (5.50 in.) wide

164 mm (6.44 in.) deep

Depth Behind Flange:

160 mm (6.31 in.)

Net Weight:

3.13 kg (6.91 lb)

Shipping Weight:

3.43 (7.56 lb)

DESCRIPTION

The Electro-Voice XEQ 808 crossover/equalizer combines a passive high-level frequency-dividing network with a high-frequency equalization circuit. This unique combination, heretofore unavailable, provides essentially flat overall frequency response in two-way systems utilizing compression drivers. Conventional crossover networks cannot provide this performance. The XEQ 808 is designed for 8-ohm loads and has a nominal crossover frequency of 800 Hz. Attenuation rates outside of the crossover region are 12 dB per octave for the low-pass output for adjustments A-D (see Figure 4). High-frequency attenuation for adjustment E provides a rate of 12 dB per octave. Designed for high-output systems, the XEQ 808 may be safely used with amplifiers of up to 400 watts continuous sine wave output rating on typical program material.

The high-frequency equalization compensates for the falling high-frequency response of a high-performance compression driver used with a constant-directivity horn. This falling response occurs because the efficiency of all compression drivers begins to decrease above about 2,500 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 XEQ 808 compensates for this characteristic. In addition, adjustable attenuation matches the sensitivity of compression drivers to the lower sensitivity direct-radiator bass systems. The equalization and attenuation are achieved without resistive losses.

The XEQ 808 is ideally suited for Electro-Voice DH series compression drivers when used with the HR, HP and RC series constant-directivity horns and single-woofer low-frequency systems such as the TL606AX and the TL806AX. A typical frequency response is illustrated in Figure 1. The XEQ 808 may also be used with other 8-ohm low-frequency systems and driver/horn combinations. In this regard, adjustment E will allow the crossover to function in a similar manner to conventional unequalized passive crossovers.

Excellent performance and reliability are achieved through the use of highest quality components. Air-core inductors are used throughout to avoid any harmonic or intermodulation distortion which otherwise

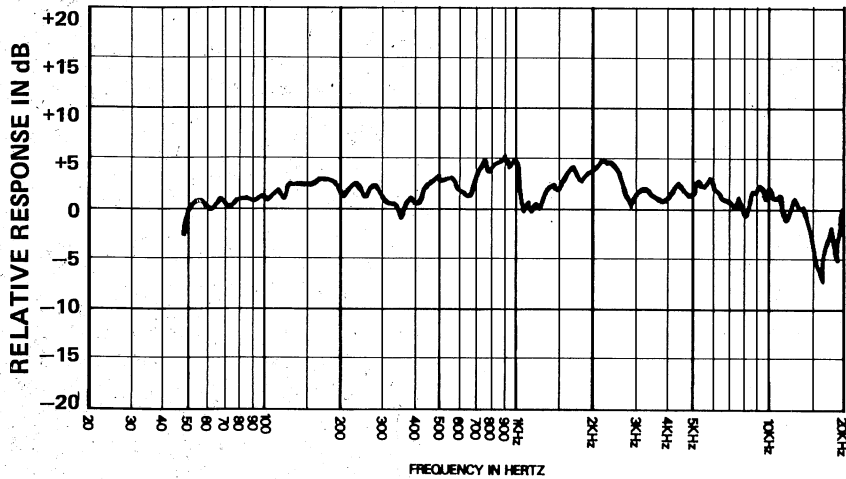


FIGURE 1 – Typical Anechoic Frequency Response of System Using XEQ 808 (with DH1506/HR90/TL606A)

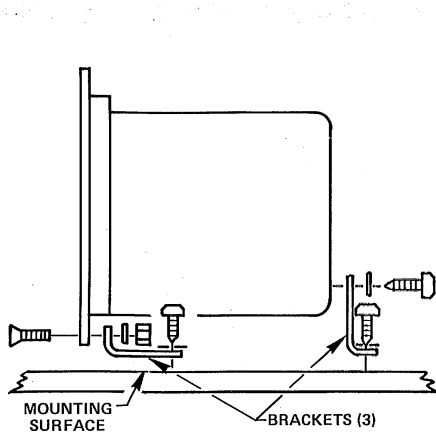


FIGURE 2a – Surface Mounting

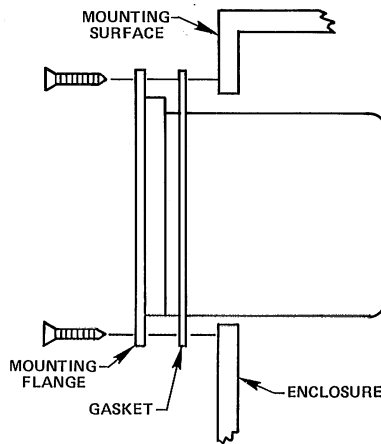


FIGURE 2b – Flush Mounting

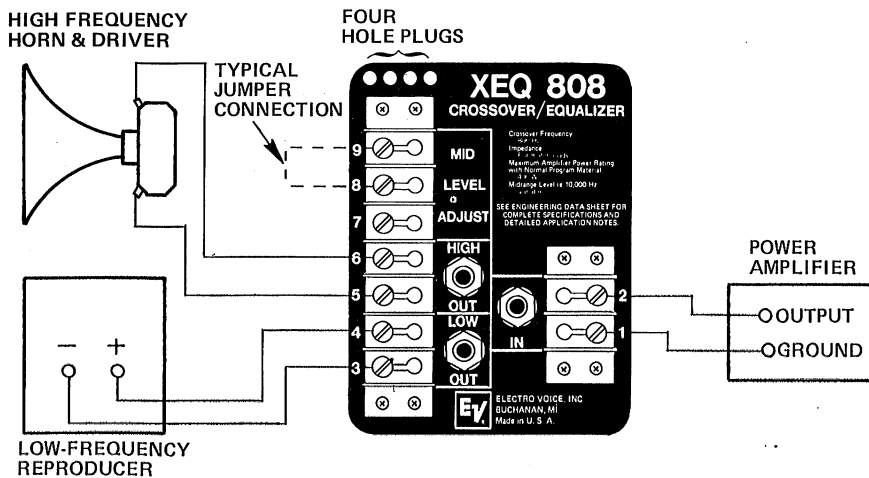


FIGURE 3 – Typical Connections of XEQ 808

can result from core hysteresis and saturation. Polypropylene capacitors in the high-frequency channel result in negligible dielectric losses. Adjustment of the high-frequency attenuation is made by strapping various screw terminals together. This method avoids the possibility of intermittent contact or resistance variation in a switch or potentiometer.

Connections can be made to the XEQ 808 in either of two ways. For portable installations, standard 1/4-inch phone jacks are provided. For fixed installations, use of the barrier terminal strips is recommended. These strips will accommodate either a terminal lug or bare wire. Since each jack and the corresponding terminals are internally connected, a combination of these methods is possible.

The crossover is housed in a steel enclosure, finished in non-reflecting black enamel. The enclosure is electrically isolated, permitting it to be mounted on any conductive surface without the possibility of generating a system ground loop. Surface mounting may be accomplished by using the three brackets and hardware provided, or it may be flush-mounted in a rectangular opening cut in the speaker enclosure. For enclosure mounting, a gasket is provided to eliminate air leakage, and leadwire holes are provided for access into the cabinet.

MOUNTING

Hardware has been supplied with the crossover to allow installation either (1) through a cutout in the low-frequency transducer cabinet (flush mounting), or (2) fastened upon any convenient surface. When surface mounted, the crossover can be positioned with its larger dimension either parallel to, or at right angles to, the surface. Since the exterior of the crossover is electrically isolated from all circuitry, mounting on a conductive surface is permissible. Although magnetic shielding is provided by the steel enclosure, good practice dictates that the crossover should not be located in the immediate vicinity of high-power transformers, motors, or other inductive devices.

Surface Mounting (see Figure 2a):

1. Determine the desired orientation of crossover.
2. Temporarily remove the appropriate screw on the rear of the crossover and attach a mounting bracket using this screw with a lockwasher under its head. Note that the screw passes through a hole in the longer arm of the bracket.
3. Using two 1/2-inch flat-head screws, install two brackets behind the front

flange of the crossover, with lockwashers under the hex nuts. Note that these screws pass thru the hole in the shorter arm of the bracket.

4. Position the brackets against the desired mounting surface and mark location for three screw pilot holes.
5. Drill pilot holes where marked, using a $\frac{5}{32}$ -inch (0.156) drill and install the crossover using three $\frac{3}{4}$ -inch screws supplied with lockwashers under the heads.

Flush Mounting (see Figure 2b):

1. Using the template provided, cut an opening in the desired mounting surface and mark the location of the four mounting screws. Be certain that there are at least $6\frac{3}{16}$ inches of clearance behind the surface.
2. Drill pilot holes as marked above, using a $\frac{5}{32}$ -inch (0.156) drill.
3. Peel and discard paper backing (if present) from the gasket supplied, place it over the rear of the crossover, and push it into position against the rear of the mounting flange.
4. Insert the crossover into the cutout and secure it with the four 1-inch flat-head screws supplied.
5. If it is necessary to make connection inside the enclosure, remove as many rubber plugs (located at the upper left of the crossover nameplate) as needed, and pass the insulated wires through the holes thus exposed.

Properly installed, there should be no air leakage or vibration which could degrade acoustical performance.

CONNECTION

Connection to the crossover may be made either by means of the barrier terminal strips, the one-quarter-inch phone jacks, or a combination of the two. Refer to Figure 3 for the wiring diagram. Although use of the terminal strips is recommended for all permanent installations, the phone jacks may be more convenient in many portable or temporary systems. Jack bushings (sleeves) are tied to terminal numbers 1, 3 and 5. Jack center contacts are tied to terminal numbers 2, 4 and 6.

The XEQ 808 has been designed to minimize signal power losses. Care should likewise be taken to minimize system losses external to the crossover. All connections should be tight and clean, and adequate wire size should be used in the speaker circuits. Power loss is directly proportional to the total wire length between the power amplifier and loudspeakers. Table 1 shows cable lengths which result in typical losses in an 8-ohm circuit.

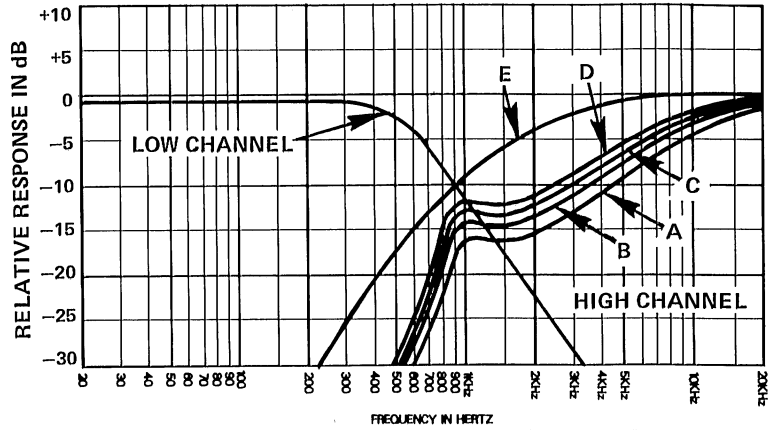


FIGURE 4 – XEQ 808 Frequency Response with 8 ohm, Resistive Loads

HORN MODEL	MORE ATTENUATION (SEE CURVES A-E, FIGURE 4)				
	Curve A: No Jumper	Curve B: Jumper 7-8	Curve C: Jumper 8-9	Curve D: Jumper 7-8; 8-9	Curve E: Jumper 6-7; 7-8
HR40	DH1506 DH1012A DH2012				
HR60	DH1012A DH2012	DH1506			
HR90			DH1506 DH1012A DH2012		
HR120			DH1012A DH2012	DH1506	
HR6040A		DH1506 DH1012A DH2012			
HR9040A			DH1506 DH1012A DH2012		
HR4020A	DH1506 DH1012A DH2012				
HP940	DH1, DH1A DH2				
HP1240			DH1, DH1A DH2		
HP640			DH1, DH1A DH2		
HP6040	DH1, DH1A DH2				
HP420			DH1, DH1A DH2		
HP4020	DH1, DH1A DH2				
HP9040	DH1, DH1A DH2				

FIGURE 5 – Horn/Driver Attenuation/Equalization Chart

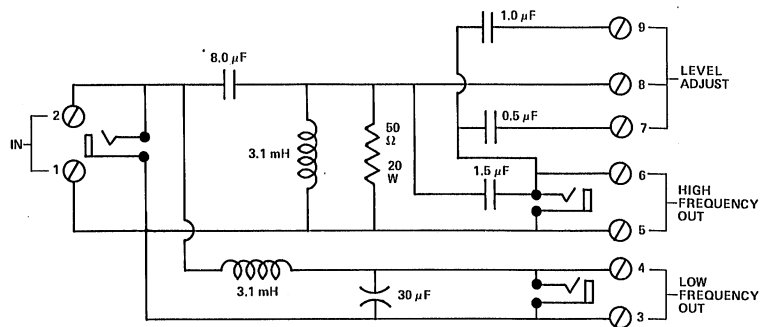


FIGURE 6 – XEQ 808 Schematic

AWG Wire Gauge	Resistance Ohms/1000 Feet	Cable Length in Feet	
		For 0.5 dB Loss	For 1.0 dB Loss
10	1.00	237	488
12	1.59	149	307
14	2.53	94	193
16	4.02	59	122
18	6.39	37	76

Table 1 — Two-Wire Copper Cable Length vs. Power Loss for an 8-Ohm Circuit.

The barrier terminal strips provided accommodate up to 10 gauge wire. During installation, the wire ends should be carefully scraped clean, and the terminal screws tightened securely. Stranded speaker wire should be used with phone plugs, and should be soldered to the plug terminals. Unused terminal screws should be tightened to avoid vibration and eventual loss.

CAUTION:

As is true of any high-level passive crossover, it is important that a load be connected to both the high- and low-channel outputs before applying a signal to the input. This avoids the possibility of damage to the crossover and to the driving amplifier. If only one output channel is to be used, an 8-to 16-ohm load resistor should have a power rating of at least 25% of the amplifier output rating, when used on typical program material.

POLARITY

In the crossover region of 800 Hz, there is comparable acoustic output from the high- and low-frequency reproducers. It is therefore desirable that the respective outputs be connected to avoid out-of-phase sound cancellation between them. To achieve the proper connection, both the phase characteristics of the drivers and phase rotation within the crossover network must be considered. Also important is the physical placement of the reproducers with respect to each other. It is usually desirable to equalize the acoustic path lengths from the horn driver diaphragm and low-frequency speaker cone to the listener's location.

For the proper relationship, following are the normal polarity connections:

	Terminal Number	Phone Jack	
Power Amp Output	2	"In"	} Tip } Sleeve
Power Amp Common (or "Ground")	1		
L.F. Transducer "+"	4	"Low Out"	} Tip } Sleeve
L.F. Transducer "-"	3		
H.F. Driver "+"	5	"High Out"	} Tip } Sleeve
H.F. Driver "-"	6		

NOTE: The high-frequency connections described above apply to most drivers, such as the EV DH1506, DH1, DH1A or DH2, in which a positive voltage input applied to "+" results in a diaphragm movement toward the listener. In an inverted design, such as the EV DH1012A or DH2012 drivers, these connections must be reversed to maintain proper polarity. For other drivers, the appropriate data sheet should be consulted.

The low-frequency speaker polarity may readily be checked, using a flashlight battery. When the positive battery terminal is momentarily connected to the "+" speaker terminal, cone motion will be in a direction toward the listener. In systems where more than one low-frequency speaker is employed, it is vital that they operate in phase with each other.

POWER CONSIDERATIONS

The XEQ 808 may be safely used on program material with any amplifier having a continuous sine wave (sometimes erroneously called "RMS") power rating of up to 400 watts into eight ohms. Peak input voltage will be limited to approximately ± 80 volts under these conditions. Two smaller amplifiers may be bridged to achieve this power, if desired. The crossover will handle a continuous 100-watt, shaped white noise input when measured in accordance with EIA Standard RS-426A.

EQUALIZATION

Low-Frequency Channel

A small amount of fixed equalization is provided in the low-frequency channel to counteract the usual rising speaker response on axis with frequency. This can result from directivity changes of the speaker system.

Figure 4 shows the XEQ 808 frequency response with 8-ohm resistive loads. Minor deviations can be expected when operating into actual transducer loads.

High-Frequency Channel

High channel equalization has been tailored to complement the EV series of HR, HP and RC constant-directivity horns. When used with an EV DH series driver and a TL series low-frequency speaker system, an essentially flat acoustic frequency response is obtained with little or no additional system equalization. Adjustment of the horn driver level may be made by using the jumpers provided to connect two or more of the terminals numbered 6 thru 9 together. The

chart in Figure 5 provides recommended jumper locations for various horn and driver types. For example, connect terminals 8 and 9 when using an HR90 horn. To install a jumper, temporarily remove the two terminal screws involved, then tighten them with the jumper in place.

Although the jumper connections in Figure 5 provide the flattest response in most installations, they may readily be changed to accommodate special requirements. Moving one column to the right increases the mid-range horn level by approximately 2 dB, and a 2-dB level decrease results from each column moved to the left. This allows the user to balance the system to meet his individual requirements. The right-hand column (curve E) provides maximum level by sacrificing much of the equalization, and is intended for use only where external frequency and/or level compensation is employed.

WARRANTY (Limited)

Electro-Voice Professional Sound Reinforcement Electronic Components are guaranteed for two years from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper Electro-Voice service facility. Unit will be returned prepaid. Warranty does not extend to finish, appearance items or malfunction due to abuse or operation under other than specified conditions, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee. A list of authorized service centers is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831); or Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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

Specifications subject to change without notice.



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