

## Xi-2123/106 X-Array Install™

### Three-Way, Three-Element Line Array, Full-Range, Sound-Reinforcement System

- Full Ring-Mode Decoupling (RMD™)
- Three-Element-Line-Array configured vertical control below 160 Hz
- Ultra-compact/high-level, three-way design
- 2 12-inch low-frequency drivers with improved internal damping
- New design, 10-inch mid-bass driver (100° x 60°)
- New 100° x 60° HF section includes DH6 compression driver for very high output, extremely rigid piston range performance
- Fully rotatable MB and HF section for vertical or horizontal suspension

#### Description

Introducing a family of advanced sound reinforcement products for everyone who desires the sound quality of Electro-Voice's X-Array™ touring systems. X-Array Install™ is the ideal choice for small-to-medium array configurations and fixed installations of any size.

Inspired by the most demanded features of EV's acclaimed X-Array™ touring systems, the X-Array Install™ series incorporates a potent combination of very high output, medium- to long-throw "cells," and Ring-Mode Decoupling (RMD™). The Xi-2123/106 is the first in a series of compact, low- to medium-throw enclosures with optimized directivity for a wide range of applications.

#### Ring-Mode Decoupling (RMD™)

RMD™ (Ring-Mode Decoupling) is the same advanced technology built into the X-Array™ touring series. RMD™ produces substantially improved tonal character and fidelity whether operated at low or extremely high sound pressure levels. RMD™ attacks time domain "ringing modes" at their sources. Mechanical solu-

tions resolve mechanical issues, and acoustical solutions address acoustical modes found in all sound reinforcement systems. The combination of each RMD™ technique provides improved tonal character and fidelity at increasing drive levels. The result is clear, even sound quality with vastly improved intelligibility.

#### Xi-2123/106 and Three-Element Line Array

These triamp-ready, three-way systems in a unique three-element-line-array configuration are designed for use in reverberant spaces. Dual spaced woofers flank and work with the central mid-bass horn to form the line array, extending vertical directivity control to below 160 Hz. Such wide-bandwidth control and the low-Q (100° x 60°) pattern provides superior direct-to-reflected SPL ratios and improved system intelligibility, and suppress feedback below arrays.

When optimum directivity control is required, the Xi-2123/106 with dual 12-inch woofers should be used. The 10-inch mid-bass driver features RMD™ and is coupled to a rotatable 100° x 60° vertical horn.

The high-frequency system uses a DH6 large-format compression driver with a rotatable 100° x 60° horn. It is mounted within

the upper woofer manifold to provide a compact vertical size. For extended-bass/subbass, the Xi-2123/106 may be used with the Xi-1191 or Xi-2181 subwoofers.

#### Applications

The Xi-2123/106 is ideally suited for high-level, high-fidelity applications. The system is particularly suited where extended vertical polar control is necessary. The extended capabilities of the system, particularly the low-frequency capability, allow the system to be used in many applications without a subwoofer. For applications requiring very high low-frequency sound pressure levels as well as very accurate vocal reproduction, the Xi-2123/106 may be coupled with the Electro-Voice Xi-1191 or Xi-2181. The combined system should be run with a conventional subwoofer crossover implementation (sub crossover to Xi-2123/106 at 80 Hz).

#### Power-Handling Test

Electro-Voice components and systems are manufactured to exacting standards to ensure reliability in continuous use in arduous real-life conditions. Besides utilizing industry-standard power tests, extreme in-house

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power tests which push the performance boundaries of the loudspeakers are also performed for an extra measure of reliability. The Xi-2123/106 systems are rated per ANSI/EIA RS426-A 1980 Loudspeaker Power Rating, Full Range Test, which uses a shaped-random-noise signal to simulate typical music to test the mechanical and thermal capabilities of the loudspeakers. The DN8000 digital electronic unit was used to provide the necessary crossover filters and equalization during power testing. Specifically, the Xi-2123/106 passes the ANSI/EIA RS426-A power test with the following test parameters:

### Low-Frequency Section:

$P_{E(MAX)}$ :	600 watts
Test Voltages:	47.0 volts rms 94.0 volts peak
$R_{SR}(1.15 R_E)$ :	3.68 ohms

### Mid-bass Section:

$P_{E(MAX)}$ :	300 watts
Test Voltages:	45.5 volts rms 91 volts peak
$R_{SR}(1.15 R_E)$ :	6.9 ohms

### High-Frequency Section:

$P_{E(MAX)}$ :	75 watts
Test Voltages:	30.1 volts rms 60.2 volts peak
$R_{SR}(1.15 R_E)$ :	12.1 ohms

### Biamplifying, Crossover, Equalization And Time-Delay Controller

The Xi-2123/106 speaker system and variants are designed as an integrated package that utilizes the Merlin ISP-100, Klark Teknik DN8000 or Electro-Voice Dx34A digital crossover system. Optimal performance of the Xi-2123/106 speaker system can only be assured when using the above controllers. The systems may be biamplified by removing the input panel and switching a 6-pin molex connector. Separate presets are available for the biamplified mode.

### Electrical Connection And System Wiring

Electrical connections to the Xi-2123/106 are made on the back of the enclosure via an 8-pin connector. There are two connec-

tors on the input panel to allow paralleling of other Xi-2123/106 systems. The Neutrik Speakon® NL8MPR is used for both connections. The pin assignments are as follows:

HF:	Pin 4 In / Pins 4 Out
MB:	Pin 3 In / Pins 3 Out
LF:	Pin 1 In / Pins 2 Out

The wiring diagram of the loudspeaker system is shown in figure 7. The electrical impedance is shown in Figure 6.

### Amplifier Recommendations

Power amplifiers with the following ratings are recommended for use with the Xi-2123/106 speaker systems:

LF:	600 watts per channel into 8 ohms.
MB:	600 watts per channel into 8 ohms.
HF:	600 watts per channel into 8 ohms.

Xi-2123/106 speakers may be paralleled only with other Xi-2123/106 speakers if the amplifier is capable of delivering full power at the lower impedances. The use of amplifiers with lower power ratings is acceptable; however, the full-power capabilities of the Xi speakers will not be realized. The use of amplifiers with significantly higher power ratings will generate maximum dynamic range and fidelity, but care must be utilized for longer duration signals as mechanical and thermal damage is possible in the system.

### Flying the Xi Systems

A manual entitled the *X-Array Install™ Flying Manual* is available from Electro-Voice, and is included with each flying Xi loudspeaker system. A brief introductory overview is included here. The *X-Array Install™ Flying Manual* should be consulted for complete structural specifications and detailed information on safely suspending and using the Xi systems.

The Xi systems incorporate a unique two-point flying system that permits a wide range of vertical angle adjustment, and offers maximum flexibility in array design for both touring sound and permanent installations. The quick-release, aircraft-rated heavy-duty L-track-type hardware design allows arrays of loudspeakers to be assembled (and disassembled) very quickly, and offers such flex-

ibility in the vertical angling of cabinets that pull-up points are usually unnecessary. Furthermore, all of the flying Xi loudspeaker models include the same rigging hardware, allowing different models to be mixed as necessary throughout an array.

The working-load limit (for an 8:1 safety factor) for each rigging point on the Xi loudspeaker enclosure is 227 kg (500 lb) for a 0° pull angle and 170 kg (375 lb) for a 90° pull angle when used with the New Haven NH32101-2 double-stud fitting, and 113 kg (250 lb) at any angle when used with the New Haven NH8192-2S or Ancra 42546-10 single-stud fittings with locking pins. The working-load limit (for an 8:1 safety factor) for the overall enclosure is 340 kg (750 lb). (Consult the *X-Array Install™ Flying Manual* for specific structural ratings and limitations.) The enclosures may be oriented with the rigging track on the sides of the enclosure, or on the top and bottom, and may be daisy-chained together as long as the safety factor is 8:1 or greater, and local regulations are met. For fire safety and additional structural strength in both flying orientations, top-to-bottom and side-to-side metal straps link the rigging track inside the enclosure. All associated rigging is the responsibility of others.

**CAUTION:** The Xi loudspeaker system should be suspended overhead only in accordance with the procedures and limitations specified in the *X-Array Install™ Flying Manual* and manual updates notices.

### Field Replacment

Normal service for the Xi requires only a #2 Phillips screwdriver and a 3/16-inch hexkey wrench. The drivers may be accessed as follows:

HF: First remove the grille, then remove the nine screws securing the front flange of the high-frequency horn. Lift the horn and driver out of the wood assembly. In the event of failure, the diaphragm assembly can be replaced with the driver attached to the horn.

MB: First remove the grille, then remove the sixteen screws securing the front flange of the midbass horn and lift the horn out. Remove the four screws securing the phase

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plug baffle and lift the baffle assembly out of the enclosure. Remove the remaining four screws securing the 10-inch midbass and lift the driver out of the enclosure. In the event of failure, the entire woofer must be replaced.

**LF:** First remove the grille, then remove the screws securing the hatch on the front of the enclosure. In both the upper and lower woofer hatches, four screws pass through the midbass horn and must be removed. The hatches and woofers may both be removed without removing the midbass horn. To remove the hatch under the high-frequency horn, the HF horn must be removed first. Remove the four screws securing the 12-inch woofer and lift the driver out of the enclosure. In the event of failure, the entire woofer must be replaced.

The following replacement parts are available from Electro-Voice Service in Buchanan, Michigan:

**LF:** Complete woofer: EV Part No. 812-3074

**MB:** Complete woofer: EV Part No. 810-1663

**HF:** Diaphragm kit; EV Part No. 84233-XX

### Architects' and Engineers' Specifications:

The loudspeaker system shall be a three-way tri- or bi-amplified system. The system shall have two paralleled 12-inch, low-frequency loudspeakers in sealed, slot-loaded enclosures with a nominal impedance of 6 ohms and 2.5 inch aluminum voice coils. The low-frequency loudspeakers shall have a power handling capacity of 600 watts with a shaped pink-noise signal with a 6-dB crest factor for 8 hours (as per ANSI/EIA RS-426 A). The mid-bass section shall be a horn-loaded 10-inch driver with a 2.5-inch aluminum voice coil and a nominal impedance of 16 ohms. The mid-bass driver shall have a power-handling capacity of 300 watts for 8 hours (as per ANSI/EIA RS-426 A). The high-frequency section shall be coaxially mounted in one woofer manifold and shall employ a 76.2-mm (3.0-inch) aluminum voice coil, titanium-dome compression driver capable of handling a 75 watt, 1,760- to 20,000-Hz pink-noise signal with a 6-dB crest factor for 8 hours (as per ANSI/EIA RS426-A). The loudspeaker shall be

constructed of 18-mm, 13-ply birch and shall be trapezoidal in shape. The wedge angle shall be 18-degrees.

The system shall be capable of very-high-level operation with a bandwidth of 80 to 16,000 Hz. The system dimensions shall be 456 mm (17.95 inches) wide by 1007 mm (39.65 inches) high by 473 mm (18.64 inches) deep and shall weigh 68.0 kg (150 lb). The system shall employ flying hardware of a "track" style and two tracks on the enclosure top and two tracks on the enclosure bottom (top and bottom reference to the 39.65-inch dimension.)

The loudspeaker shall be the Electro-Voice Xi-2123/106.

### 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 Service or any of its authorized service representatives. Obtaining Warranty Service: To obtain warranty service, a customer must deliver the product, prepaid, to Electro-voice 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 Electro-Voice 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.

**Electro-Voice Accessories** are guaranteed against malfunction due to defects in materials or workmanship for a period of one (1) year from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

**Electro-Voice Flying Hardware** (including enclosure-mounted hardware and rigging accessories) is guaranteed against malfunction due to defects in materials or workmanship for a period of one (1) year 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.

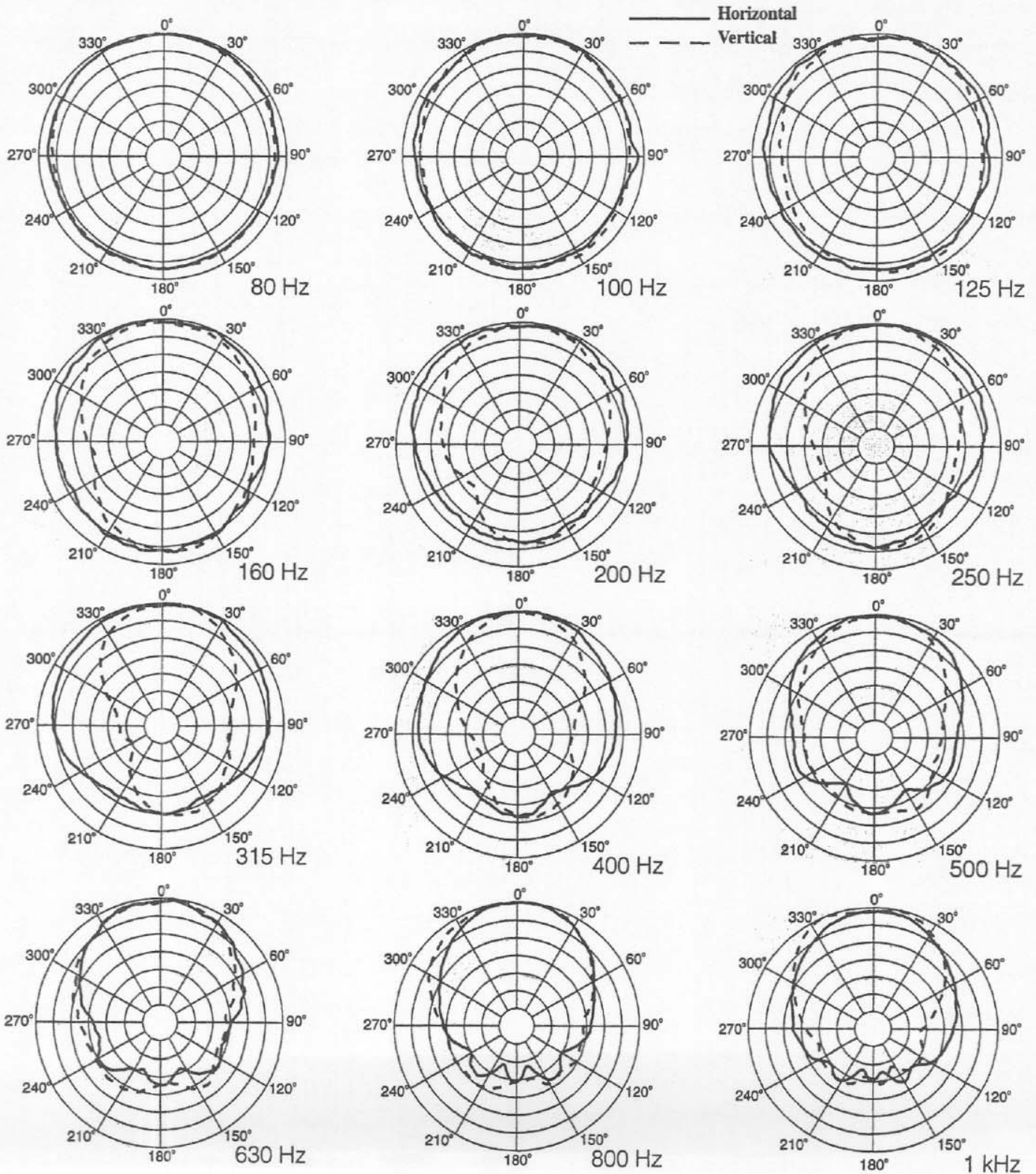


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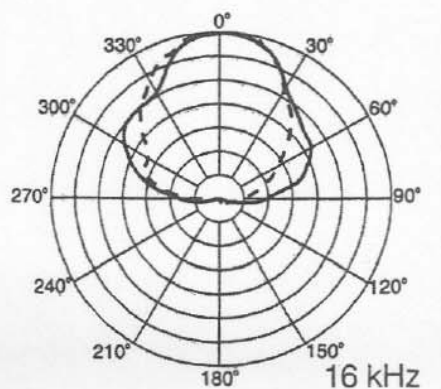
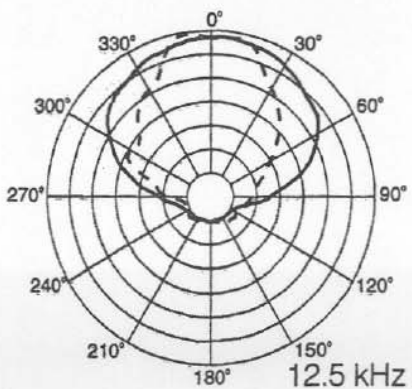
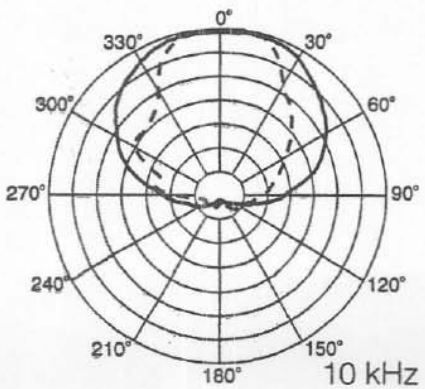
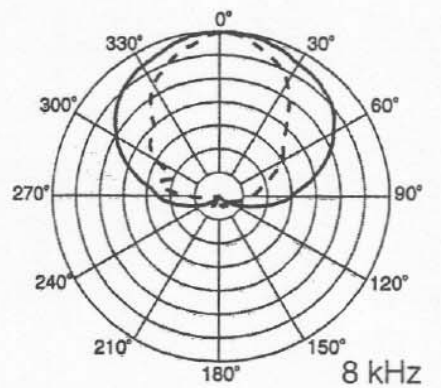
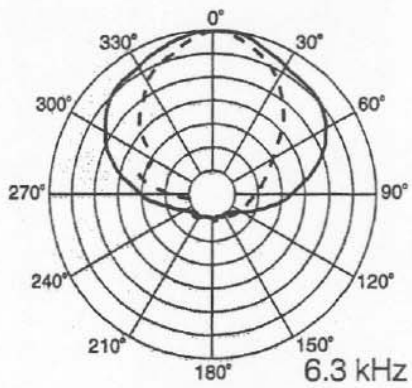
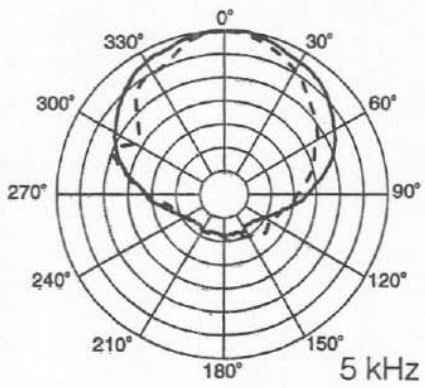
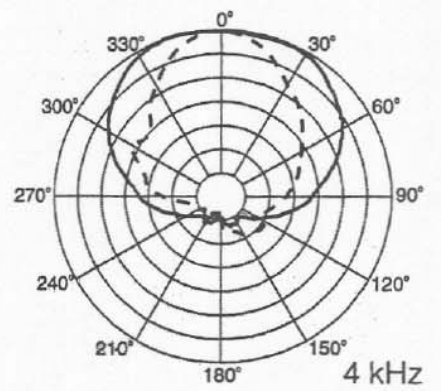
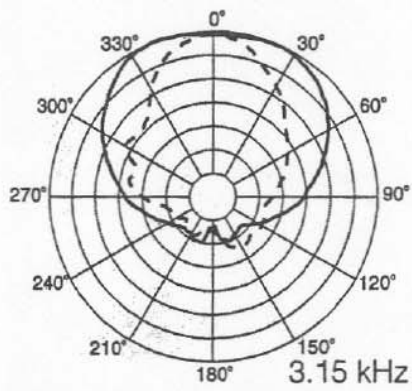
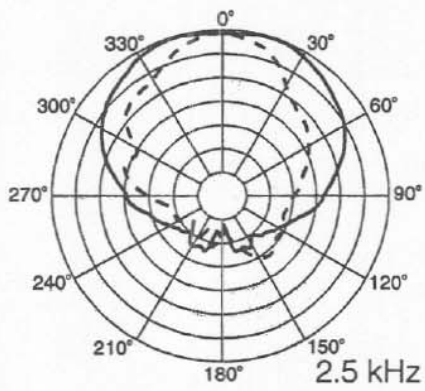
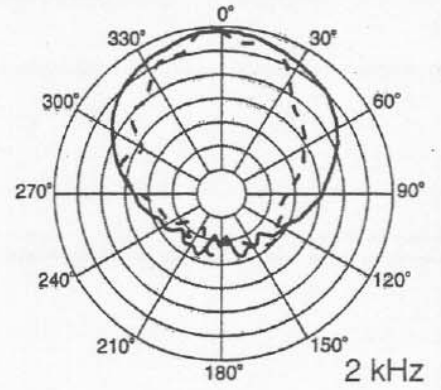
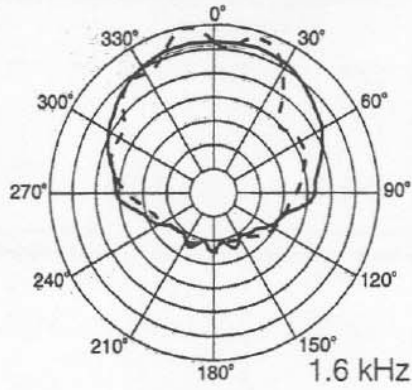
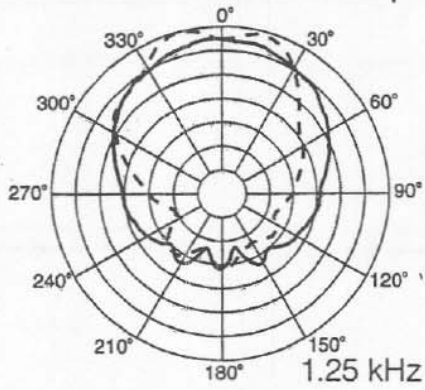
Figure 1—Polar Response

The directional response of the system was measured in an anechoic environment at a distance of 6.1 m (22.0 feet) using 1/3-octave-filtered pink noise with a full spherical measurement system. The Merlin ISP-100 digital electronic unit was used to provide the necessary three-element-line-array crossover filters, equalization and time delay. The polar response of the loudspeaker system at selected 1/3-octave frequencies is shown. The selected frequencies are representative of the polar response of the system. The horizontal polar is from the perspective of looking down on the top of the loudspeaker, where 270° is to the left and 90° is to the right. The vertical polar is from the perspective of looking at the side of the loudspeaker, where 90° is to the top and 270° is to the bottom. 0° is directly on axis of the loudspeaker both horizontally and vertically.

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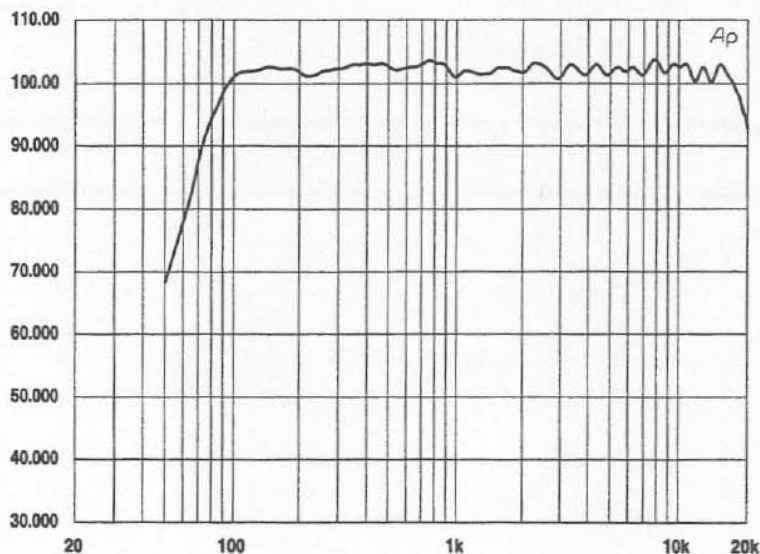
# X-Array Install™ Xi-2123/106 Loudspeaker System



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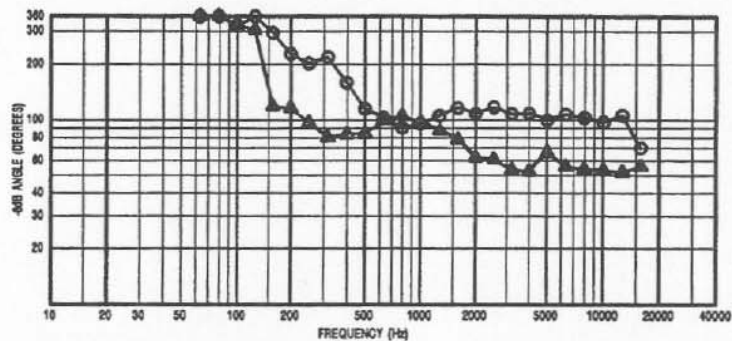
**Figure 2—Frequency Response**

The frequency response of the system was measured on axis in the farfield in an anechoic environment using a swept sine-wave signal. The ISP-100 digital electronic unit was used to provide the necessary three-element-line-array crossover filters, equalization and time delay. One-half watt of power (2.83 volts rms at 1000 Hz) was applied to the midband of the midbass section. The sound-pressure level was normalized for an equivalent one-meter distance.



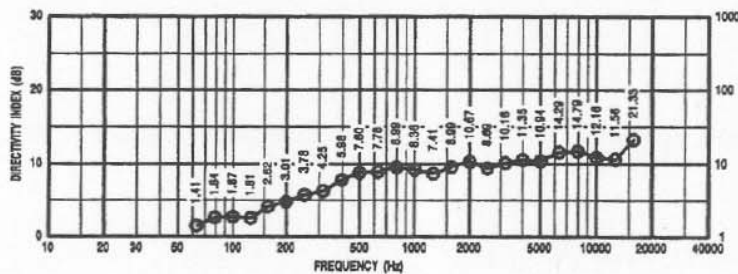
**Figure 3—Beamwidth**

The beamwidth of the system, (i.e., the included horizontal and vertical coverage angles at the -6-dB points) was measured with a full spherical measurement system as described in *Polar Response*.



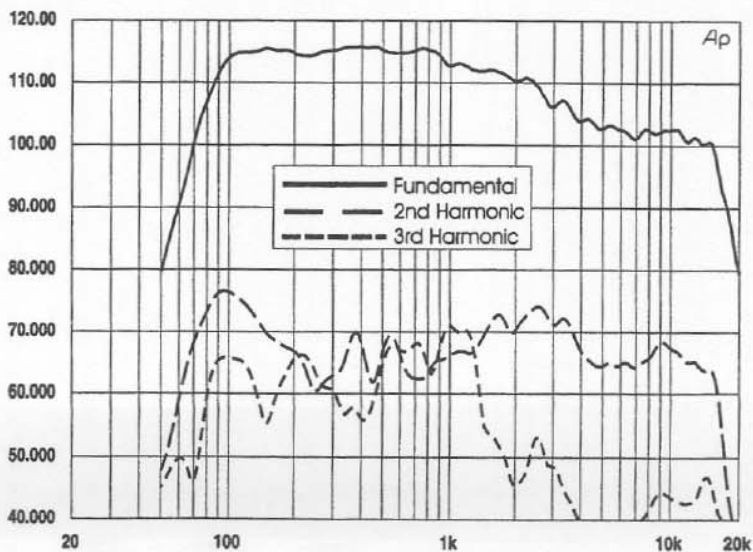
**Figure 4—Directivity**

The directivity index,  $D_p$ , and directivity factor,  $R_0$ , of the system were measured with a full spherical measurement system as described for the Polar Response.



**Figure 5—Distortion**

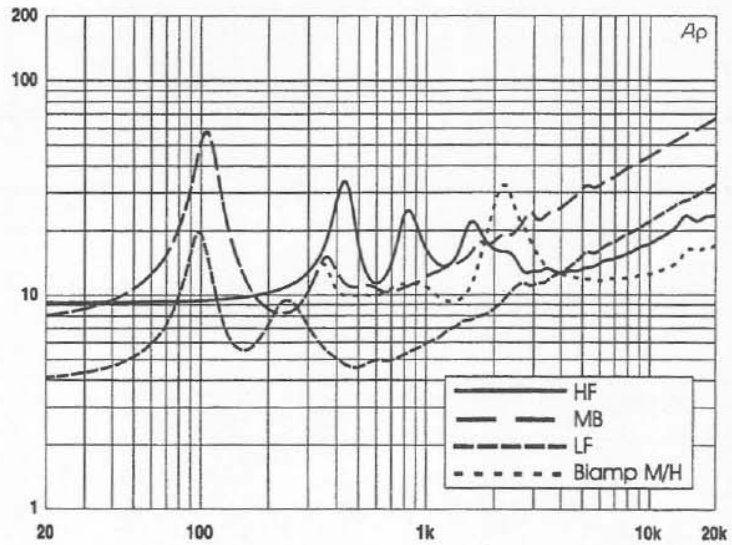
Distortion for the system was measured on axis in the farfield in an anechoic environment with an input signal that would result in a sound-pressure level of 115 dB at one meter. The ISP-100 digital electronic unit was used to provide the necessary three-element-line-array crossover filters, equalization and time delay. A frequency spectrum typical of close-miked rock music was employed. The sound-pressure level was normalized for an equivalent one-meter distance. Plots of second and third harmonic distortion are shown referenced to the fundamental.



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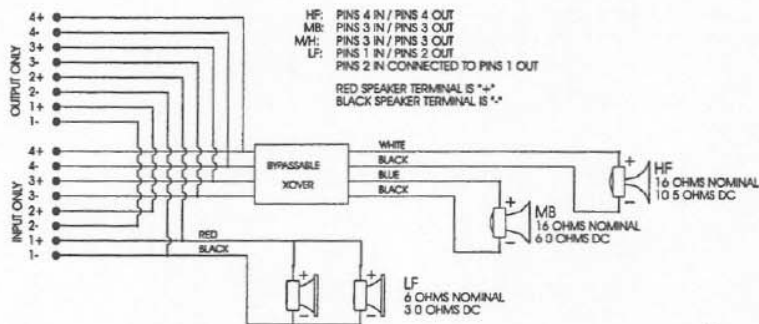
**Figure 6—Impedance**

The impedance of each frequency band of the system was measured in an anechoic environment.

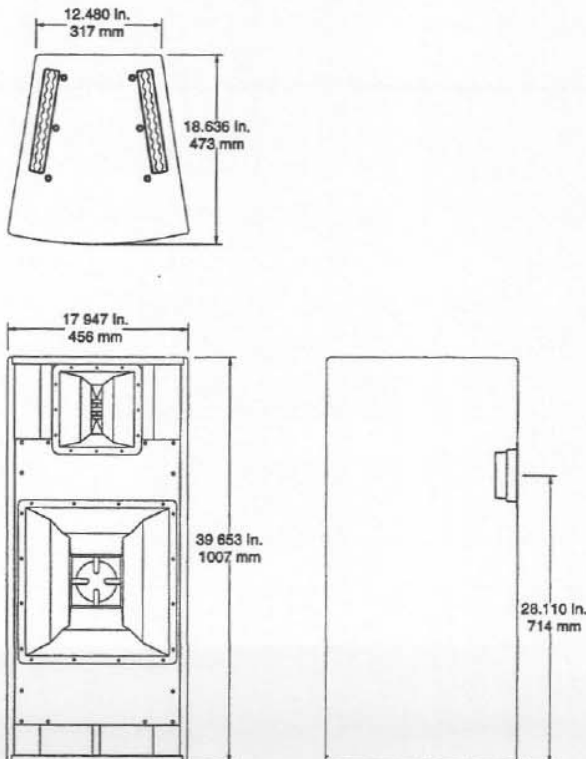


**Figure 7—Wiring Diagram**

The wiring diagram of each frequency band of the system is shown.



**Figure 8—Dimensions**





# X-Array Install™ Xi-2 123/106 Loudspeaker System

X-Array Install™ Xi-2 123/106 Loudspeaker System

## Specifications:

**Frequency Response** (measured in far field, calculated to one meter on axis, swept sine wave, one-half watt into MB section—2.83 V at 1000 Hz, anechoic environment; see Figure 2):

80-16,000 Hz

**Crossover Frequency, Three-Element Line Array:**

250/550 and 1,760 Hz

**Efficiency,**

**LF/MB/HF/Biamp (MB/HF):**

8.6/21/25/16%

**Maximum Long-Term-Average Power-Handling Capacity** (per ANSI/EIA RS-426-A 1980),

**LF/MB/HF/Biamp (MB/HF):**

600/300/75/300 watts

**Maximum Long-Term-Average Midband Acoustic Output, LF/MB/HF/Biamp:**

51/63/19/48 acoustic watts

**Sensitivity (SPL at one meter, indicated input power, anechoic environment, average level),**

**LF/MB/HF/Biamp (MB/HF),**

1/1/1 watt:

101.4/109.0/111.7/106.7 dB

600/300/75/300 watts:

129.1/133.7/130.5/131.5 dB

**Beamwidth** (angle included by 6-dB-down points on polar responses, indicated one-third-octave bands of pink noise; see Figures 1 and 3),

**Horizontal, 500-16,000 Hz:**

100° (+20°, -15°)

**Vertical, 160-16,000 Hz:**

60° (+35°, -8°)

**Directivity Factor,  $R_0$  (Q), 160-16,000 Hz Average** (see Figure 4):

10.3 (+4.5, -5.8)

**Directivity Index,  $D_p$ , 160-16,000 Hz Average** (see Figure 4):

10.1 dB (+1.6 dB, -3.5 dB)

**Distortion** (115 dB SPL at one meter, shaped spectrum; see Figure 5),

**Second Harmonic,**

**100 Hz:**

1.2%

**500 Hz:**

0.3%

**2,000 Hz:**

0.9%

**5,000 Hz:**

1.2%

**Third Harmonic,**

**100 Hz:**

0.4%

**500 Hz:**

0.3%

**2,000 Hz:**

<0.1%

**5,000 Hz:**

<0.1%

**Transducer Complement,**

**HF:**

DH6-16/2 driver, HP-type 100° x 60° horn

**MB:**

DL-type 10-in. woofer, 100° x 60° horn

**LF:**

2 DL-type 12-in. woofers, manifold-loaded

**Impedance** (see Figure 6),

**Nominal,**

**LF/MB/HF/Biamp (MB/HF):**

6/16/16/16 ohms

**Minimum,**

**LF/MB/HF/Biamp (MB/HF):**

4.7/10.3/12.6/9.3 ohms

**Input Connections:**

Two Neutrik NL8MPR Speakon® connectors paralleled

**Recommended Amplifier Power** (at 8 ohms):

**HF:**

600 watts

**MB:**

600 watts

**LF:**

600 watts

**Enclosure Construction,**

**Enclosure Shell:**

18 mm, 13-ply birch plywood

**Finish:**

Black textured paint

**Grille:**

Powder-coated steel with foam

**Rigging:**

Two-point heavy-duty L-track system, accepts New Haven NH32102-2 double-stud fittings, or New Haven NH8192-2S or Ancra 42546-10 single-stud fittings with safety pins

**Dimensions,**

**Height:**

1007 mm (39.65 in.)

**Width (front):**

456 mm (17.95 in.)

**Width (back):**

317 mm (12.48 in.)

**Depth:**

473 mm (18.64 in.)

**Angle:**

18° wedge

**Net Weight:**

68.0 kg (150 lb)

**Shipping Weight:**

73.9 kg (163 lb)

## Electro-Voice®

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