

Electro-Voice

ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN



Specifications and Instructions

Stereon IA and III

Stereon III

Stereon Control

Filter Model XX3

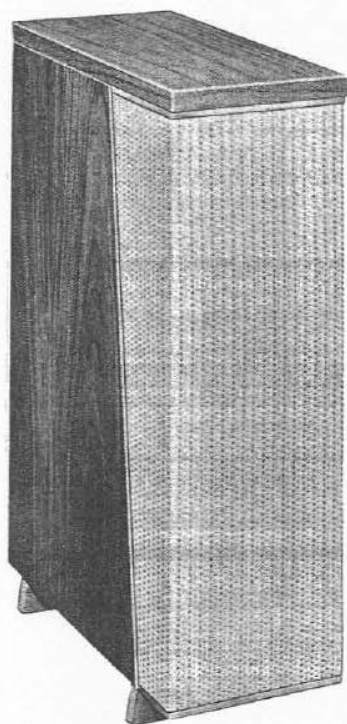


Fig. 1 — Stereon Enclosure

GENERAL DESCRIPTION

The Electro-Voice STEREOON is a new kind of speaker system presented to solve the space problem for stereophonic sound reproduction. These systems are simple, effective, and relatively low in cost.

Measuring only 25 inches high, 17½ inches deep, and 7½ inches wide, the space saving STEREOON is designed to complement virtually any existing full range high fidelity system and is offered in two models to match varying efficiencies.

The STEREOONS employ a cabinet of pleasing, inconspicuous proportions with a coaxial mid-bass and treble assembly using a compound compression driver as well as a very-high-frequency driver.

The STEREOON cabinet is finished with side panels of selected hardwood veneers and a genuine FORMICA top — this durable finish is resistant to liquid stains, burns and abrasions and provides a wood grain finish which is enduring and pleasing in appearance.

SPECIFICATIONS

	STEREOON IA	STEREOON III	STEREOON CONTROL MODEL XX3
Frequency Response	300 cps to 18 kc	300 cps to 19 kc	
Crossover Frequencies	300 cps and 3500 cps	300 cps and 3500 cps	
Power Handling Capacity			
Program Material	25 watts	30 watts	
Peak	50 watts	60 watts	
Nominal Impedance	16 ohms	16 ohms	8 ohms input 16 ohms output
Overall Size	25" h., 17½" d., 7½" w.		5½" h., 4¾" w. 5¼" d.
Net Weight	33 lbs.	35 lbs.	7 lbs.
Shipping Weight	35 lbs.	37 lbs.	8 lbs.

THEORY OF OPERATION

No stereophonic effect exists when listening to sounds below 300 cycles per second — the human ear is incapable of determining the directionality of such sounds. This was proved in 1934 by a famous acoustic engineer, Harvey Fletcher, who determined that these sounds, from about the middle of the fifth octave down, and with a wavelength of 2½ feet or more are not intercepted to any detectable degree by the head. Consequently both ears hear them alike and no determination of the direction of the source can be made. This principle is made use of in the Electro-Voice STEREOON system; one full-range speaker is made to reproduce all the BASS from both stereo channels while the directional sounds above 300 cycles per second are fed through both channels in the normal stereophonic manner.

In the single STEREOON system, as illustrated in Figure 3, the 16-ohm output of one amplifier and the 8-ohm output of the second unit are fed into the Model XX3 STEREOON CONTROL FILTER. This unit correctly phases the BASS below 300 cycles per second from both channels and directs the composite bass to the full-range system. This makes use of the full bass reproduction capabilities of the system in supplying full bodied bass for both channels. The upper range of one channel follows into the same full-range system; the mid and high-range from the other channel is fed to the highly developed STEREOON. The STEREOON

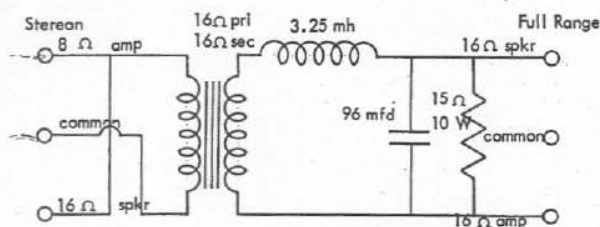


Fig. 2 — Model XX3 Wiring Schematic

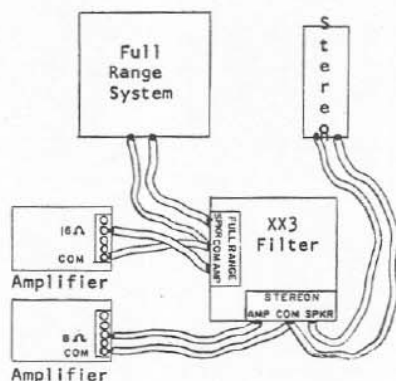


Fig. 3 — Schematic Wiring Diagram
For Single Stereon

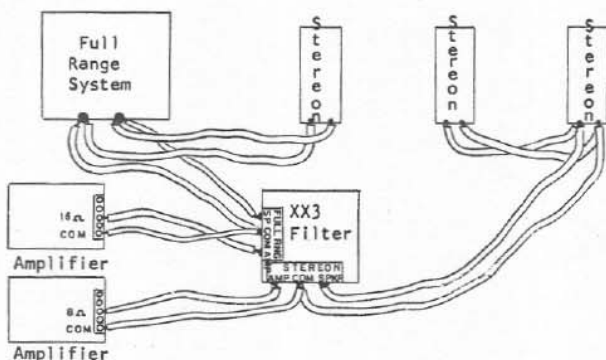


Fig. 4 — Schematic Wiring Diagram
For Triple Stereons

III system employs the Model MT30 Mid-Bass and Treble driver assembly (MT30B in the case of the STEREO IA) and the Model T35 VHF driver (T35B in the STEREO IA) built into an integral horn of 200 cps taper rate. The crossover network limits the overall input of the STEREO to sounds above 300 cycles per second and crosses over electrically at 3500 cps to the Very-High-Frequency driver. If the existing full range system has a rated nominal impedance of 8 ohms it may be safely connected to the Stereon system without effect.

The Model XX3 STEREO CONTROL FILTER is a device which receives the two amplifier outputs, one at 8 ohms and the other at 16 ohms; one channel is passed through full range to the wide range system; all signals below 300 cycles per second are taken out of the second input and fed by means of capacitance and inductance (LC) filter into this same full-range channel thereby effecting the desired reinforcement of bass. Sounds above 300 cycles per second are fed through to the STEREO output on the CONTROL FILTER. The XX3 incorporates a transformer to ensure isolation of the two amplifier channels and to prevent feedback. The use of high quality components results in less than $\frac{1}{2}$ db insertion loss in the system.

In stereo, a concentration of 3 db of sound in one portion of the listening area is sufficient to cause apparent displacement of the subject with the resultant distortion of the "stereo" effect; the use of the Diffraction principle in horn design affording maximum dispersion ensures an even sound distribution together with ease of balancing for both channels.

Further details concerning the theory of diffraction will be found in the Specifications and Instructions for Models T35B and T35 VHF Drivers.

Optimum positioning of loudspeakers for stereophonic sound varies with listening areas, and is dependent upon the geometry and the acoustics of the room in which the system is to be used.

Stereo is realized in the brain, through the two ears. Inside the cranial structure is a cross-referencing center which compares the intensities of the sounds received by the two ears. This cross-referencing center judges and contrasts the qualities of the sounds received by each ear; it notes the arrival time from right and left sources through determination of stops and starts in vowels, transient and staccato tones from musical instruments, the irregularities in noise, and other sounds.

The brain evaluates the reverberance in the sound, rationalizes the overall intensity, and determines direction as well as distance in an instantaneous, composite and subconscious function. The integration of all these factors produces the stereo effect.

How to Place Speakers in Your Living Room—In what has gone before, we have become conscious of a geometrical plan to stereo—a plan embodying the head and the two loudspeakers as points of a triangle. While this may seem restrictive in the placing of our equipment, what follows will show a welcome latitude in deployment.

Comparison of Sight in 3 Dimensions with Hearing in Stereo—In order properly to understand the relationship between the loudspeakers and their stereophonic effects on the listener or listeners, a digression on visual depth perception will be helpful.

Sight in 3 Dimensions depends upon what is known as the *Visual Horopter*. This is the angle at which the two eyes converge on the image of the point.

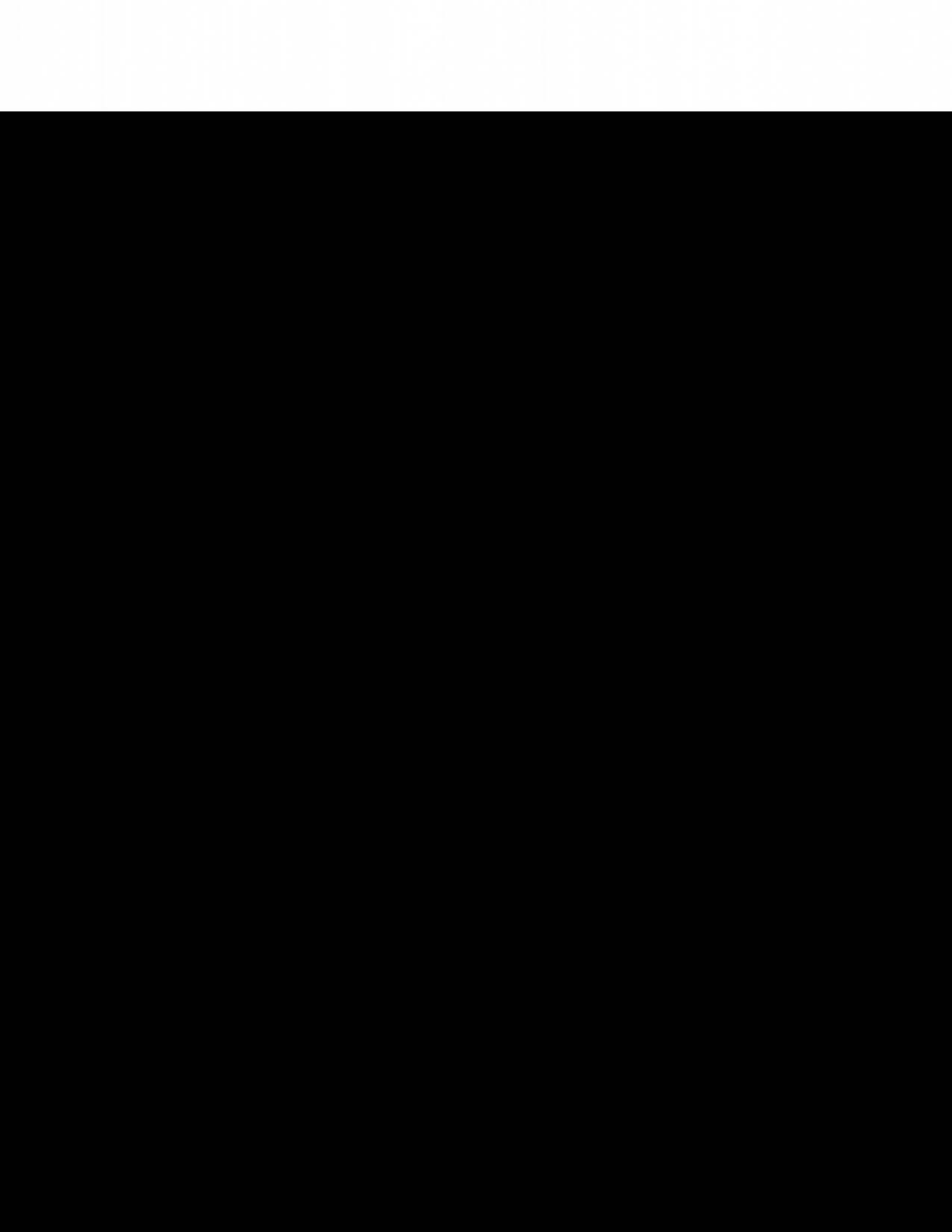
When this angle is less than 3 degrees, it is true that no depth, or solid effect from the binocular function results; for the images reaching each eye become too nearly alike. It is only by comparing two dissimilar images in the brain that the composite, single stereo image with depth and form results.

So in Stereo Listening, the two microphone sound images, through the two loudspeakers, must converge upon the listener's ears so that different sounds are transmitted to each.

Typical Placement of Speakers for Good Stereo—In the illustration (Fig. 6) we see a typical living room with speakers placed in the corners so that the normal listening distance of 12 to 15 feet forms the apex of a triangle whose sides diverge at an angle of 30 to 40 degrees.

The axis of the loudspeakers, substituting for the microphones, has the same angle of convergence as did the microphones in recording the original performance, and full balanced sound in the listening area results from the left, the center and the right.

How to Guard Against Poor Stereo—If you move too far back beyond the area which approximates the 30 to 40 degree angle with the speakers, you lose 3-D. The hearing angle diminishes, as it did in the visual analogy and the sound images become too nearly alike for stereo perception.



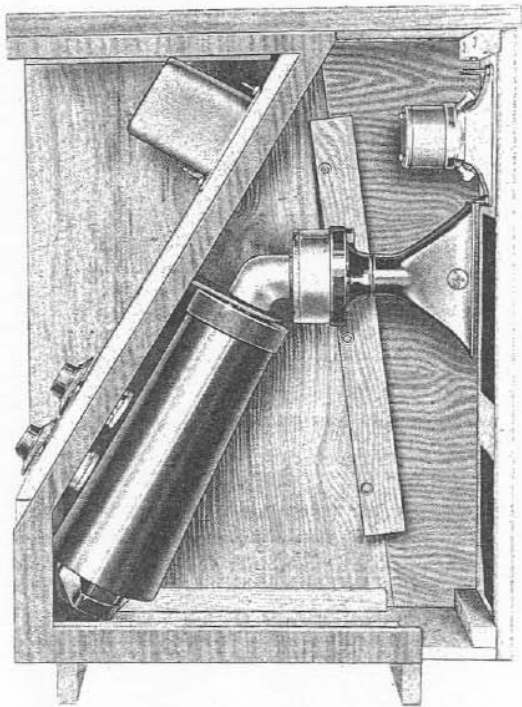


Fig. 5 — Stereon Interior Layout

It becomes apparent from this that the loudspeakers must *spread* the sound, so that the hearing angle becomes less acute, and so that more people can enjoy the stereo effect over a greater listening area.

Further advice upon location will be found in the Electro-Voice publication entitled **HOW TO CHOOSE AND PLACE STEREO EQUIPMENT IN THE HOME** — Catalog No. 255. Having selected the optimum position, the following instructions should be read before making any connections.

INSTALLATION

The STERION comes with all components installed and ready for operation.

The STERION CONTROL FILTER Model XX3 may be located either near the amplifiers or the speaker systems, whichever is more convenient.

1. Connect amplifiers, full-range system and STERION to STERION CONTROL FILTER as shown in Figure 3.
2. Use standard lamp cord No. 18 or equivalent. With some designs of amplifier the high capacitor load created by long leads may create Supersonic oscillation whereby high power inaudible sine wave signals may generate damaging heat in the driver units. Such oscillation may be detected with an oscilloscope, or by the presence of heat in the driver unit by feeling the pot structure of the driver. This can be corrected in some cases by using low-capacity television twin-lead between the amplifier and speaker system.
3. Proper balance and correct phasing of the system is essential. The simplest and most effective means of achieving this employs a monaural signal.

Use either a standard monaural disc played through a stereophonic cartridge or a full track monaural tape on a stereo tape deck. The requirement being a monaural signal through both channels of the stereo system simultaneously.

The amplifiers and preamplifiers should be adjusted so that the tonal quality of the sound from each speaker system is similar. Adjust volume controls to give equal loudness from both channels. When standing in the optimum listening as shown in Fig. 6 the sound should appear to emanate from a point centrally located between the speakers. If the sound image appears to shift from side to side the phasing is incorrect and may be corrected by reversing the leads to the input of either speaker system (only one channel should be changed).

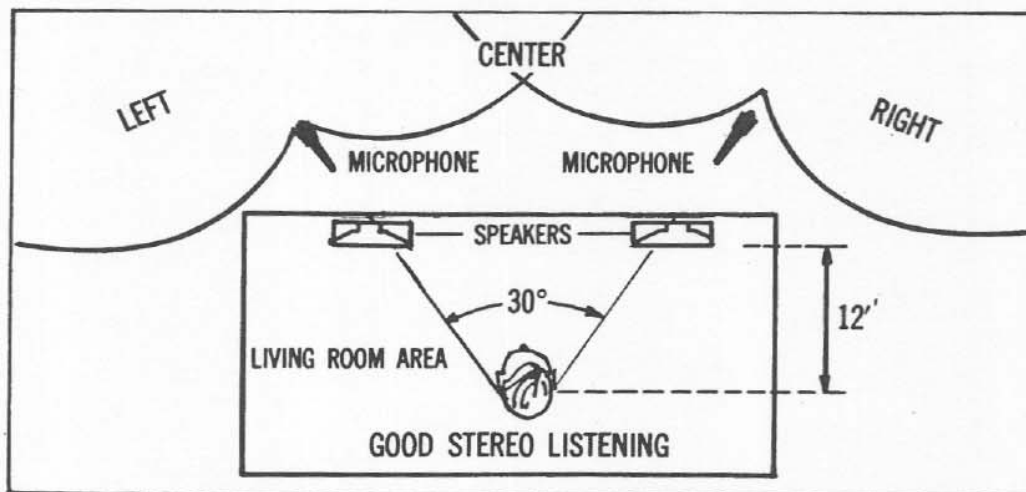


Fig. 6 — Typical Placement of Speakers

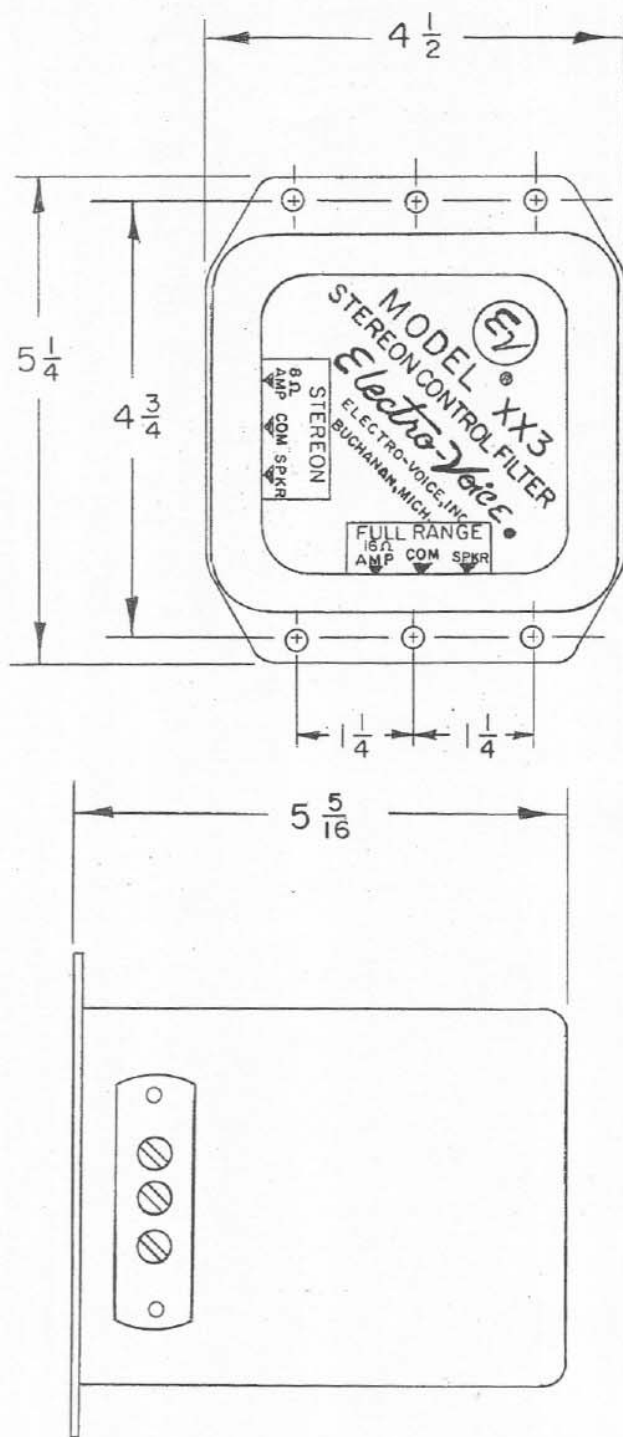


Fig. 7 — Model XX3 Dimensions

To Widen the Aural Horopter and Give Greater Stereo Area — To enable more individuals to enjoy good stereo with more convergent points throughout the room, hide two more STEREONS around the listening area. These may be conveniently placed as pleasing decorative accents alongside chairs and divans, and are connected in parallel to either side of the system as shown in Figure 4. Some of the sound is sampled from the right and left channels and fed to the central STEREONS. This results in a broad *plane* of sound from the right and left, converging over a much larger part of the listening field.

A corollary benefit of employing multiple STEREONS is the ability to listen much closer to the forward plane of the speakers without having the orchestra diverge to both sides, leaving the familiar "hole in the middle." With only two speakers, it will be seen that the area close to them is deficient in the overlap which insures balance.

ADJUSTMENT OF LEVEL CONTROLS — Sensitivity is regulated by means of two level controls mounted on the rear of the cabinet. These controls provide individual control of "Brilliance" and "Level" to enable the musical balance to be perfectly matched to both the full-range system being used, as well as to the acoustic qualities of the room in which the system is placed. It may be seen from these considerations that absolute settings for these controls cannot be stated, but the necessity for a close match is important. Level may be controlled from several points in the system and it is recommended that as many variables as possible be set as constants — the power amplifier level controls should be set equally and the position marked; the preamplifier level controls once set should be only varied for unusual variations in source material; final refinement may be made by adjusting the STEREON level controls.

Tone controls should be set on both preamplifiers to give similar characteristics to the sound; the exact setting of the "Brilliance" control on the STEREON will vary with the high frequency absorption coefficient of the room as determined by the amount of soft furnishings and drapes.

The ELECTRO-VOICE STEREO DEMONSTRATION RECORD Model 560 has a series of test tones which will greatly facilitate correct balancing of your system for maximum listening pleasure.

AMPLIFIER DAMPING CONTROL SETTING — If your amplifiers have variable damping controls, set the controls at maximum damping factor for both channels.

TO GAIN ACCESS TO CABINET — The interior layout of the STEREON components is shown in Fig. 5. To gain access, remove screws securing the sloping board inside the back; remove those holding vertical square back board. Lay the cabinet on its face on a soft surface to avoid marring the finish.

The entire back panel may now be lifted out using the Crossover Network as a handhold. When the panel with Mid-Bass and Treble driver attached is just clear of the cabinet, reach inside and disconnect leads to the VHF Driver. The interior may now be lifted clear.

The Mid-Bass and Treble Driver is removed from the assembly by rotating the black phenolic horn (Model A8419) counter-clockwise, unthreading it from the angle coupler neck. The Treble Horn (Model 823) and Driver (Model 828HF) may now be removed. The VHF Driver is removed by releasing the four corner nuts holding the mounting flange.

For further information on application under unusual circumstances, write to the Manager, High Fidelity Division, Electro-Voice, Incorporated, Buchanan, Michigan, U.S.A.