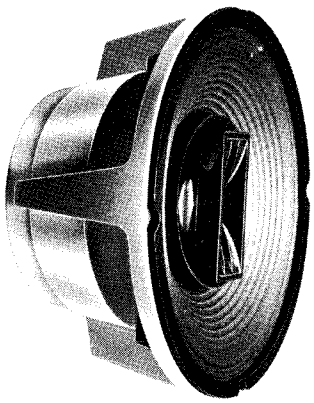
12TRXB INTEGRATED 3-WAY SPEAKER



FEATURES

- Massive die-cast frame
- Viscous damped cloth suspension
- Ceramic magnet
- Integral Sonophase VHF driver

Incorporating all the design advantages of the famous Electro-Voice Radax® Coaxial principle, the Electro-Voice Model 12 TRXB integrated 3-way loudspeaker includes, also, the latest developments in the reproduction of the highest audible frequencies through the use of an integral Super Sonax VHF driver.

The 12TRXB employs the Model T35B VHF driver. Bass response is excellent, affording pleasing musical balance without the masking effects previously experienced from extended high frequency reproduction.

SPECIFICATIONS

Frequency Response:	35 to 18,000 cps
Electrical Crossover:	Integral 3500 cps
EIA (RETMA) Sensitivity Rating:	52 db
Power Handling Capacity:	
Program Material	20 watts
Peak	40 watts
Nominal Impedance:	16 ohms
Voice Coil Diameter:	Woofer 2-1/2 in. Tweeter 1 in.
Magnet Weight:	1 lb., 9.16 oz.
Gauss:	Woofer 12,000 G Tweeter 9,000 G
Size:	12-1/4 in. dia. x 7 in. deep overall
Mounting:	Four 9/32 holes on an 11-1/2 in. circle
Baffle Opening:	10-1/2 in.
Net Weight:	11 lbs.
Shipping Weight:	15 lbs.

THEORY OF OPERATION

The 12TRXB loudspeaker is designed to meet optimum listening requirements; latest developments incorporated insure even, smooth coverage of the entire listening area. The engineered features of the Electro-Voice integrated 3-way speaker system include true concentric mounting of all reproducing elements; augmented balanced bass response in conjunction with smooth, extended high frequency reproduction, carefully tailored mid-range characteristic to provide realism and a considerable degree of "presence" at usual sound levels. The 12TRXB incorporates in the high frequency section the Sonophase® throat design. Fig. No. 2 shows the cross-section of a conventional high frequency driver. Response is flat up to 4 or 5 kc, after which destructive interference results from inability of the diaphragm to act as a piston. Increasingly higher frequencies cause the phase of sound produced at the diaphragm periphery to shift with respect to sound produced by the diaphragm center — this being due to diaphragm deformation (see Fig. 3). In the Sonophase design, Fig. 4, sound from the central portion of the diaphragm is delayed by the longer path length, restoring proper phase relationship and level as the frequency increases. The importance of the Sonophase throat design is paramount above 12 kc, where sound must be taken from the center of the diaphragm and the outer periphery simultaneously; in this design this is accomplished without destructive interference or cancellation within the sound chamber. At lower frequencies, where the diaphragm is a piston, and no phase shift is required in the path configuration, the longer central path length does not appreciably change the phase due to the longer wave lengths involved. Further benefits are afforded in the high frequency section of the Electro-Voice integrated 3-way speaker systems by the incorporation of Electro-Voice developed diffraction horns as the method of achieving the best dispersion. In stereophonic use especially, a 3 db concentration of sound in one portion of the room is sufficient to cause an apparent displacement of the subject, with the resultant distortion of the solid or stereo effect. An adjustable "brilliance" control is incorporated to allow matching of response to room acoustics, compensating for high frequency absorptive effects of heavy drapery and soft furnishings; crossover network with full 12 db per octave slope minimizes distortion; edgewise-wound aluminum voice coil design affords 18% more efficiency and consequent damping of transient distortion.

INSTALLATION

Unusually good bass response with the Electro-Voice 12TRXB integrated 3-way unit is obtained in the Electro-Voice Aristocrat, Marquis, and similar enclosures. Where a baffle is available of the "infinite" type, such as a closet or a wall with a large volumetric capacity available behind the cone, excellent results will be obtained in the bass range. The ideal volume is 20 cubic feet or more; for with this volume, the low free space resonance of the bass cone becomes the controlling factor in achieving the lower octaves of sound. The response in such an application will extend to 35 or 40 cps.

Where restrictive space of only 3 to 5 cubic feet is available for housing the speaker, bass response will suffer and the low range will be compressed. This deficiency may be offset somewhat by reinforcing the bass through the incorporation of a frontal port (bass reflex enclosure). More accurate design data on this form of enclosure is available from the Consumer Products Division of Electro-Voice and in the many articles on enclosure design now published.

MOUNTING THE SPEAKER

Cut a circular hole 10-1/2" in diameter. Four 1/4" mounting holes are provided on the outer periphery of the speaker frame. Use four No. 12 x 1-1/2" long wood screws, or preferably drill four 1/4" holes spaced 90° apart on a 11-1/2" circle (see Fig. 1) and employ four 3/16-inch carriage bolts, 2 inches long with nuts and washers. Secure the speaker to the front baffle, making certain that the very high frequency driver horn slit has its long dimension vertical. This will insure widest dispersion of the high frequencies in the horizontal plane. Tighten the remaining screws just enough to compress the speaker gasket.

ADJUSTMENT OF LEVEL CONTROL: Perfect musical balance to match the acoustic conditions in any room may be made by the proper setting of the "brilliance" control. Rooms having large amounts of overstuffed furniture or thick rugs will require an advanced setting of the brilliance control of about 3/4 clockwise rotation (3/4 fully open). Rooms with

little absorptive material or of small size and having high reverberation characteristics, will give best musical balance when the control is set at about half open. In order to achieve correct setting for any particular room, rotate the control while playing a comprehensive musical passage and by careful listening, you will have no difficulty in obtaining the correct balance— the highs and lows will come into balance, placing the sound "in focus"

CONNECTIONS: No. 22 fixture wire or larger can be used to connect the 12TRXB integrated 3-way reproducer to the amplifier. Connect the two terminals, black and red, on the 12TRXB to the "16-ohm" and "Common" output terminals on your amplifier. The 16-ohm impedance of the 12TRXB is a standard nominal EIA rating. A mismatch by as much as 40% may be made without affecting the reproduction of the unit. If only an 8-ohm tap is available on the amplifier, a loss of loudness will be barely noticeable. A loss of overall loudness will result from connection to a 4-ohm tap.

FUTURE EXPANSION OF YOUR SYSTEM

The 12TRXB integrated 3-way system may be expanded by the addition of a separate midrange or treble driver. On the 12TRXB a third terminal has been added to facilitate this addition. To use the speaker alone, without the mid-range driver, strap the two terminals having red washers. The chart in Fig. 5 will give details of the exact units which are compatible with both systems. The Electro-Voice Building Block plan has been devised to make these units available in a convenient package complete with accompanying level control and all necessary wiring harness, enabling installation to be made with a minimum of inconvenience or disturbance of the existing system. Detailed installation instructions to enable the additions to be made are given with each Building Block and little technical knowledge will be required to effect this modification.

CAUTION NOTES

POWER HANDLING CAPACITY: In program material feeding through a 40-watt amplifier, only occasional peaks actually approach a full 40 watts. The average power is much less throughout the musical range. Less than 3% of the total energy in comprehensive musical passages lies above 3500 cps. This energy is composed of transient signals which are never sustained for long periods. Accordingly, it will be seen that the loudest passages above 3500 cps seldom reach a total of one watt. The lowest frequency reproduction recommended for the VHF driver in the 12TRXB is 3500 cps, and attenuation below this point should occur at the rate of 12 db per octave. This attenuation is afforded by E-V crossover networks, integral in the 12TRXB.

TEST PRECAUTIONS: A sustained tone from an oscillator such as is used for test purposes may be employed on the units for short periods with up to 5 or 7 watts of power, but at the end of five minutes or so, tremendous heat builds up in the sensitive driver and damages the coil. For this reason, such tests must be of short duration. Naturally, sustained signals of this kind are never remotely approached in program material.

PRECAUTIONS IN TAPE MACHINE OPERATION: If the speed of a tape machine is advanced beyond the normal speed, high-frequency power is increased at the rate of 6 db per octave over normal for each doubling of tape speed. On fast forward or rewind supersonic energy of great magnitude may be generated, even though the head gate is open. Always reduce volume during this process, even though the signal is inaudible. This is especially important in fast editing procedures, where the gate is frequently only partially opened so that the tape traverse can be cued audibly.

UNSTABLE AMPLIFIERS: Supersonic oscillation may occur in an amplifier 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.

CHANGING TUBES WHILE AMPLIFIER IS ON: Another cause of excessive power application is the changing of amplifier tubes in low-level stages while the system is operating, when the volume control is advanced. The removal or plug-in of the tube generates a tremendous surge, many times in excess of the rated amplifier power. This will damage sensitive VHF driver units, treble drivers, and sometimes cone speakers. Defective switching units in the amplifier can cause a similar effect.

FEEDBACK: Feedback frequently occurs when the input and output leads of an amplifier are brought into proximity with each other. This feedback, inaudible because it occurs at supersonic frequencies, may cause high overloads. Precautions should, therefore, be taken to prevent it.

Acoustic feedback should also be avoided. This condition may be the result of a speaker feeding back into a microphone, or it may be caused by the oscillations given off by a "microphonic" electronic tube; another common cause is the mechanical vibration from a speaker adjacent to the phono pickup or turntable. Feedback of this nature will build up at a continuously accelerating rate until some link in the reproducing chain fails, the amplifier "flat tops", or the power is reduced below the point of critical excitation. Because damage to treble and VHF units may occur, due caution should be exercised.

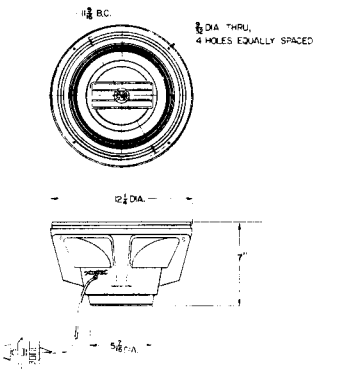


Fig. 1 — Dimensions

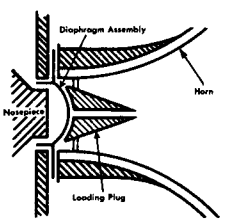


Figure 2

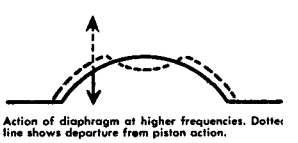


Figure 3

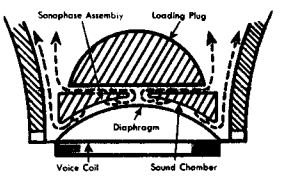


Figure 4

Basic Full Range System — STEP 1	To complete a 2-way system, add the VHF Driver — STEP 2	To complete a 3-way system, add the Mid-Range Driver — STEP 3
SP8B SP12B SP15B	T35B (BB1)	T10A/8HD (BB3)
12TRXB 15TRXB	(TRX Speakers Already Are Provided with VHF Driver)	
SP12 SP15	T35 (BB2) or T350 (BB5)	T25A/8HD (BB4)
12TRX 15TRX	(TRX Speakers Already Are Provided with VHF Driver)	

Figure 5