

Electro-Voice

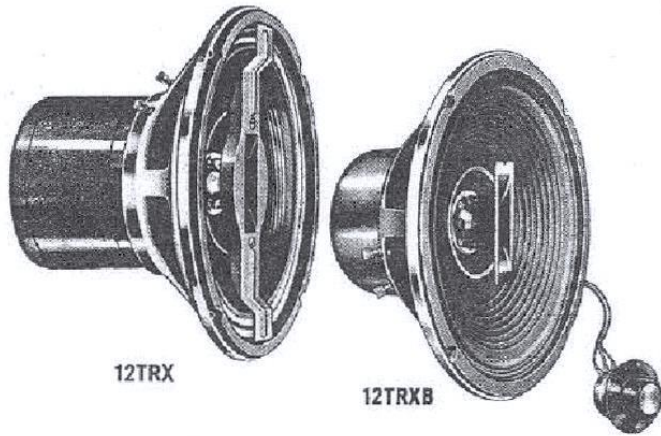
ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN



Specifications and Instructions

Models 12TRX and 12TRXB

Triaxial Speaker Systems



12TRX

12TRXB

Incorporating all the design advantages of the famous E-V Radax coaxial principle, the E-V Models 12TRX and 12TRXB Triaxial Reproducers include also the latest developments in the art of reproducing the highest audible frequencies through the use of an integral Super-Sonax VHF driver. The 12TRX employs the T35 VHF driver, while the sensitivity of the 12TRXB is matched by the triaxially mounted T35B. Bass response is phenomenal, affording for the first time, pleasing musical balance without the masking effects previously experienced from extended high-frequency reproduction. Tailored to optimum listening requirements, these new developments insure even, smooth coverage of the entire listening area. This is achieved by the exclusive concentric mounting design of all reproducing elements.

FEATURES — Exclusive, E-V engineered features include true concentric mounting of all reproducing elements insuring smooth room coverage; augmented balanced bass response in conjunction with smooth extended "silky" high-frequency reproduction; carefully tailored midrange characteristic to provide realism and "presence" at usual sound levels, offsetting ear insensitivity at low volume; adjustable brilliance control to allow matching to room acoustics, compensating for high-frequency absorptive effects of rugs and draperies; crossover network with full 12 db-per-octave slope minimizes distortion; edgewise wound aluminum voice coil design affording 18% more efficiency and consequent damping of transient distortion; heavy magnet structure.

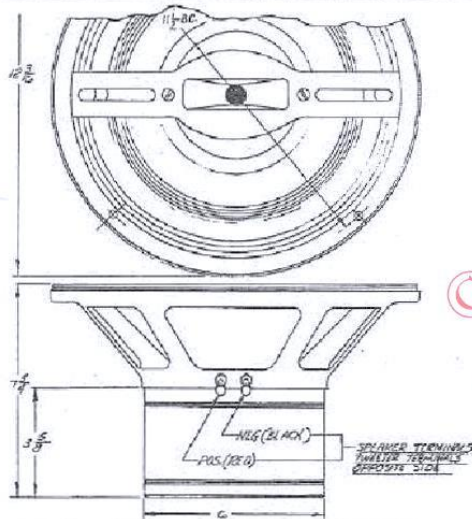


Fig. 1 — Dimensions Model 12TRX

SPECIFICATIONS

	12TRXB	12TRX
Frequency Response:	35 to 15,000 cps (In recommended Aristocrat Enclosure)	30 to 15,000 cps
RETMA Sensitivity Rating:	46 db	49 db
Free-Space Cone Resonance:	40-50 cps	35-45 cps
Power Handling Capacity:		
Program Material:	20 watts	25 watts
Peaks:	40 watts	50 watts
Critical Damping Factor:		
In Aristocrat enclosure:	4	2
In an infinite baffle:	2.5	1
Impedance:	16 ohms	16 ohms
Mechanical Crossover:	2000 cps	2500 cps
Electrical Crossover:	Integral 3500 cps	Separate 3500 cps
Dispersion:	1 kc - 180°; 5 kc - 130°; 10 kc - 100°	
Magnet Weight:	1 lb 3 oz	3 1/2 lb
Size:	12 1/4 in. dia. x 6 in. deep overall	12 1/4 in. dia. x 7 3/4 in. deep overall
Mounting:	Four 3/8-in. holes equally spaced on 1 1/2-in. circle	
Baffle Opening:	10 3/4 in.	10 3/4 in.
Net Weight:	10 1/2 lb	24 lb
Shipping Weight:	14 lb	32 lb

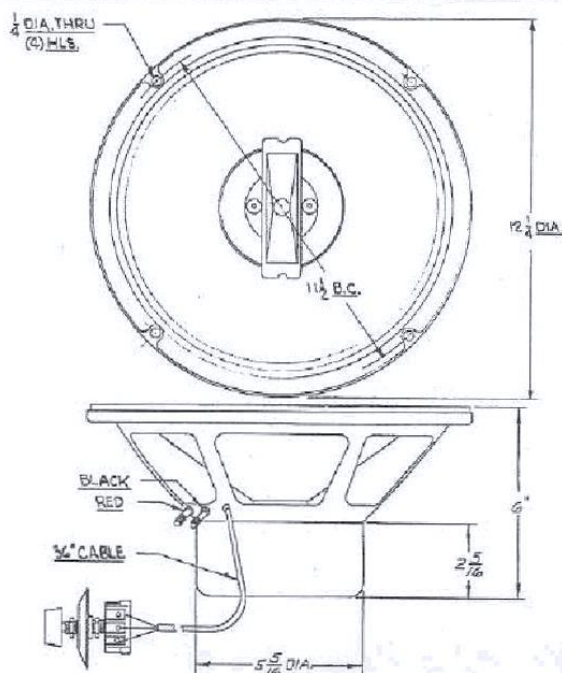


Fig. 2 — Dimensions Model 12TRXB



INSTALLATION

Optimum bass response with the E-V 12TRX and 12TRXB triaxial units is obtained in the E-V Aristocrat radiator Klipsch-licensed corner horn. Where a baffle is available of the "infinite" type, such as a closet, or a wall with large volumetric capacity available behind the cone, excellent results will be obtained in the accomplishment of the bass range. The ideal volume is 14 cubic feet or more, for with this volume the low free-space resonance of the bass cone becomes the controlling factor in achieving the first octaves. This response will be flat to 35-45 cps.

Where restricted space of only 4 to 8 cubic feet is available for housing the speaker, bass response will suffer and the low range will be compressed by about 1 octave. This deficiency may be offset somewhat by reinforcing the bass through porting the enclosure. Start with an opening of about 130 square inches and gradually decrease this area until most pleasing response is obtained. More accurate design data on this form of enclosure is available from the Reproducing Components Division of Electro-Voice, and in the many articles on enclosure design now published.

Reflections on the interior cavity will cause ragged response, indicated by undue reinforcement at certain frequencies and cancellation at others, unless sound absorbent material is used on at least three of the opposing interior sides. The material may be "Kimsul" 2 inches thick or equivalent. "Kimsul" is available from any building supply house as a product of the Kimberly-Clark Manufacturing Company. Glass wool or glass block is good, but must be covered with cheese cloth to confine the fibers. Blankets, jute, and rug pads are satisfactory substitutes.

MOUNTING THE SPEAKER — Cut a circular hole $10\frac{3}{4}$ inches in diameter. Four $\frac{1}{4}$ -inch mounting holes are provided on the outer periphery of the speaker frame. Use four #12 x $1\frac{1}{2}$ -inch long wood screws, or preferably drill four $\frac{1}{4}$ -inch holes on a $11\frac{1}{2}$ -inch circle spaced 90 degrees apart (See Fig. 3 for hole arrangement), and employ four $\frac{3}{16}$ -inch carriage bolts 2 inches long with hex nuts and washers. Secure the speaker to the front baffle, making certain that the VHF driver horn slit has its long dimension vertical. This will insure widest dispersion of the high frequencies in the horizontal plane. Tighten the retaining screws just enough to compress the speaker gasket. Do not tighten too much or the frame may be sprung out of line. This will damage the speaker unit.

Drill a $\frac{3}{8}$ -inch hole nearby and mount the high-frequency level control. (Note: The E-V Aristocrat enclosure has a predrilled hole for accepting the Brilliance level control.) Insert the AT37 level control with the lugs toward the top. Replace the AT37 dial and affix it by tightening the lock nut with a pair of long-nosed pliers. Replace the knob on the AT37 control and note to be certain that the dot on the knob coincides with the zero on the dial at maximum clockwise rotation.

OPERATION

CONNECTIONS — No. 22 fixture wire or larger can be used to connect the 12TRX and 12TRXB triaxial reproducers to the amplifier. The 12TRX has a wiring harness, and the X36 and AT37 level controls should be connected as shown in Fig. 3. Connect the two terminals on the 12TRXB to the "16-ohm" and "Common" output terminals on your amplifier. The 16-ohm impedance of the 12TRX and 12TRXB is a standard RETMA rating. A mismatch by as much as 40% may be made without affecting the reproduction or efficiency of the unit. If only an 8-ohm tap is available on the amplifier, a loss of efficiency will be just noticeable. Connected to a 4-ohm terminal, a loss of overall efficiency will be observed.

AMPLIFIER DAMPING CONTROL SETTING — If your amplifier has a variable damping control, as do all E-V units, set this control in accordance with the value in the table of specifications.

THE BRILLIANCE CONTROL — Perfect adjustment to match the acoustic conditions in any room may be made by 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 $\frac{3}{4}$ clockwise rotation. Rooms with little padded material or of small size will allow best musical balance when the control is set at about $\frac{1}{2}$ rotation. The correct position of the control for any environment will be immediately apparent, bringing the highs and lows into balance and making the sound come into "focus."

E-V "BUILDING BLOCK" METHOD

The E-V Aristocrat enclosure has precut holes and mounting facilities for future expansion of the 12TRX system through the addition of the T25A midrange driver with the 8HD horn, the X8 crossover, and the AT37 level control, if further enhancement of midrange reproduction is desired. Such an addition is not possible with the 12TRXB because of the integral arrangement of the electrical crossover network.

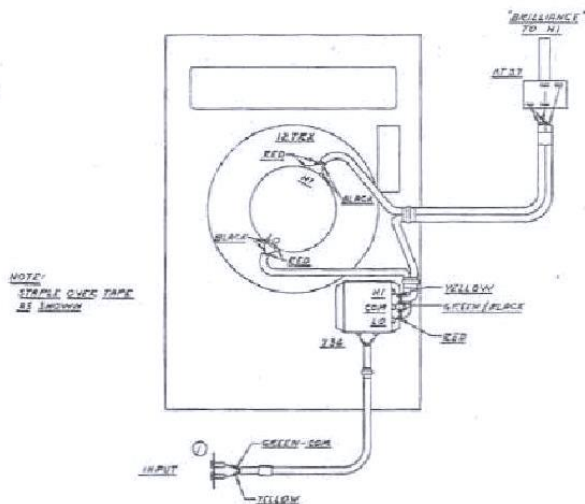


Fig. 3 — Pictorial Wiring Diagram
Model 12TRX on Aristocrat Mounting Board

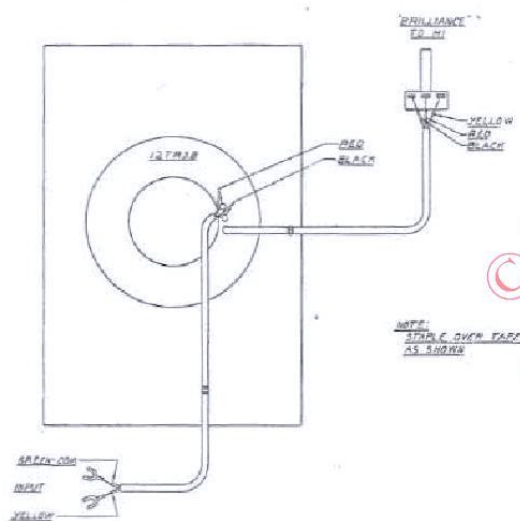
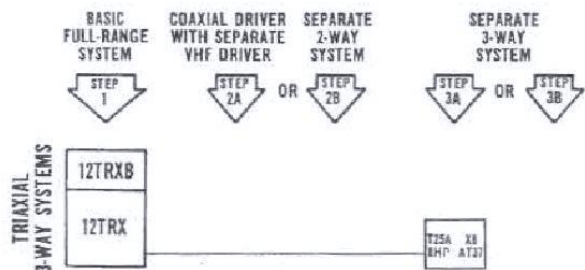


Fig. 4 — Pictorial Wiring Diagram
Model 12TRXB on Aristocrat Mounting Board



E-V "Building-Block Method" Compatibility Chart

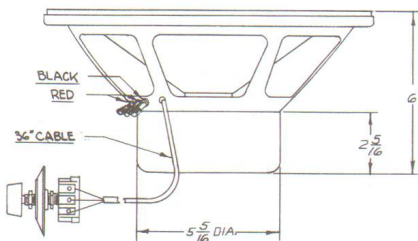
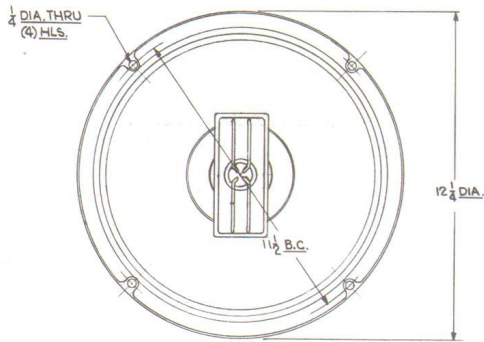


Fig. 2 — Dimensions Model 12TRXB

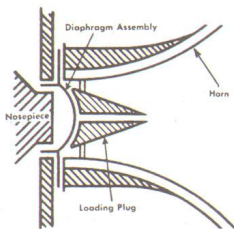


Figure 3A



Action of diaphragm at higher frequencies. Dotted line shows departure from piston action.

Figure 3B

SPECIFICATIONS

	12TRX	12TRXB
Frequency Response:	30 to 19,000 cps	35 to 18,000 cps
Electrical Crossover:	Separate 3500 cps	Integral 3500 cps
EIA (RETMA) Sensitivity Rating:	49 db	48 db
Power Handling Capacity:		
Program Material	25 watts	20 watts
Peak	50 watts	40 watts
Nominal Impedance:	16 ohms	16 ohms
Voice Coil Diameter:	Woofer 2½ in. Tweeter 1 in.	Woofer 2½ in. Tweeter 1 in.
Magnet Weight:	3 lbs. 7 oz.	1 lb. 11 oz.
Gauss:	Woofer 11,000 G Tweeter 12,800 G	Woofer 12,000 G Tweeter 9,000 G
Size:	12¼ in. dia. x 7¾ in. deep overall	12¼ in. dia. x 6 in. deep overall
Mounting:	Four 9/32 holes on an 11½ in. circle	
Baffle Opening:	10½ in.	10½ in.
Net Weight:	24 lbs.	11 lbs.
Shipping Weight:	32 lbs.	15 lbs.

INSTALLATION

Optimum bass response with the Electro-Voice 12TRX and 12TRXB integrated 3-way units is obtained in the Electro-Voice ARISTOCRAT 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 accomplishment of the bass range. The ideal volume is 20 cubic feet or more; for with this volume, the low free space resonance of the bass cones becomes the controlling factor in achieving the lower octaves of sound. The response in such an application will be flat 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 High Fidelity Division of Electro-Voice and in the many articles on enclosure design now published.

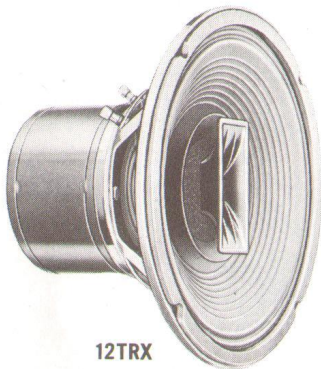
Electro-Voice®

ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN

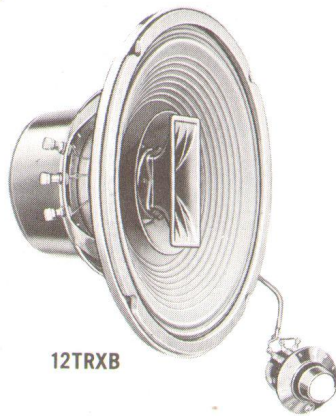


Specifications and Instructions

Models 12TRX and 12TRXB Integrated 3-Way Speaker Systems



12TRX



12TRXB

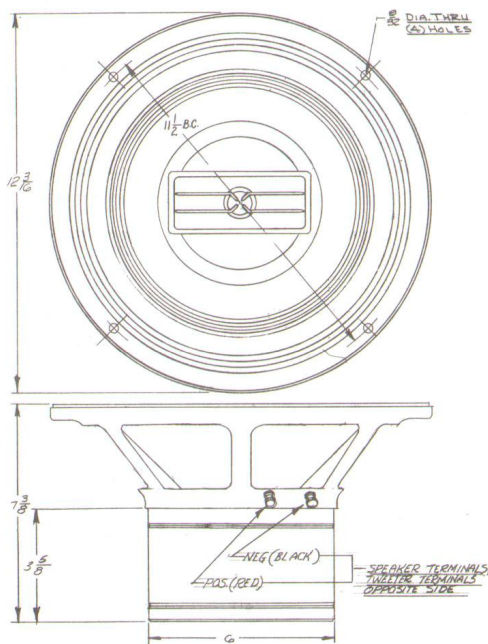


Fig. 1 — Dimensions Model 12TRX

GENERAL DESCRIPTION — Incorporating all the design advantages of the famous Electro-Voice Radax Coaxial principle, the Electro-Voice Models 12TRX and 12TRXB integrated 3-way loudspeakers include also, the latest developments in the art of reproducing the highest audible frequencies through the use of integral Super Sonax VHF drivers.

The 12TRX employs the Model T35 VHF driver while the sensitivity of the 12TRXB is matched by the integrally mounted Model T35B. Bass response is excellent, affording for the first time pleasing musical balance without the masking effects previously experienced from extended high frequency reproduction.

THEORY OF OPERATION — Both the 12TRX and 12TRXB loudspeakers are tailored to 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 systems 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. Both the 12TRX and 12TRXB incorporate in the high frequency section the Avedon Sonophase throat design. Fig. No. 3A 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. 3B). 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 by the high frequency section of the Electro-Voice integrated 3-way speaker systems by the incorporation of Electro-Voice developed diffraction horns as the recommended method of achieving the best dispersion. In stereophonic work 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 affording 18% more efficiency and consequent damping of transient distortion.



MOUNTING THE SPEAKER

Cut a circular hole $10\frac{1}{2}$ " in diameter. Four $\frac{1}{4}$ " mounting holes are provided on the outer periphery of the speaker frame. Use four No. 12 x $1\frac{1}{2}$ " long wood screws, or preferably drill four $\frac{1}{4}$ " holes spaced 90° apart on a $11\frac{1}{2}$ " circle (see Fig. 1) and employ four $\frac{3}{16}$ -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—avoid tightening too much or the frame may be sprung out of line—this will result in damage to the speaker unit.

Drill a $\frac{3}{8}$ -inch hole nearby and mount the "brilliance" level control. (Electro-Voice recommended enclosures have predrilled holes for accepting the level control.) Insert the level control with the lugs toward the top. Replace the dial and affix it by tightening the lock nut with a pair of longnosed pliers. Replace the knob on the control and be certain that the dot on the knob coincides with the zero on the dial at maximum clockwise rotation.

OPERATION

CONNECTIONS: No. 22 fixture wire or larger can be used to connect the 12TRX or 12TRXB integrated 3-way reproducers to the amplifier. The 12TRX has a wiring harness, and the X36 crossover network. The AT37 level control should be connected as shown in Fig. 5 (A or B). 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 12TRX and 12TRXB is a standard nominal EIA (RETMA) 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 just noticeable. Connected to a 4-ohm tap, a loss of overall loudness will be observed.

AMPLIFIER DAMPING CONTROL SETTING — If your amplifier has a variable damping control, set this control as follows:

SPEAKER	INF. BAFFLE	ARISTOCRAT
12TRX	1.0	2.0
12TRXB	1.5	3.0

Chart 1A

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 $\frac{3}{4}$ clockwise rotation ($\frac{3}{4}$ fully open). Rooms with little absorptive material or of small size and having a high reverberation time, 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 the correct position will become immediately apparent—the highs and lows will come into balance placing the sound "in focus."

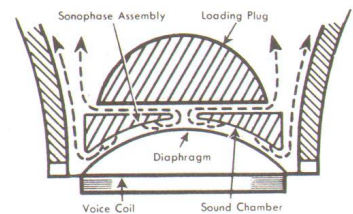


Figure 4

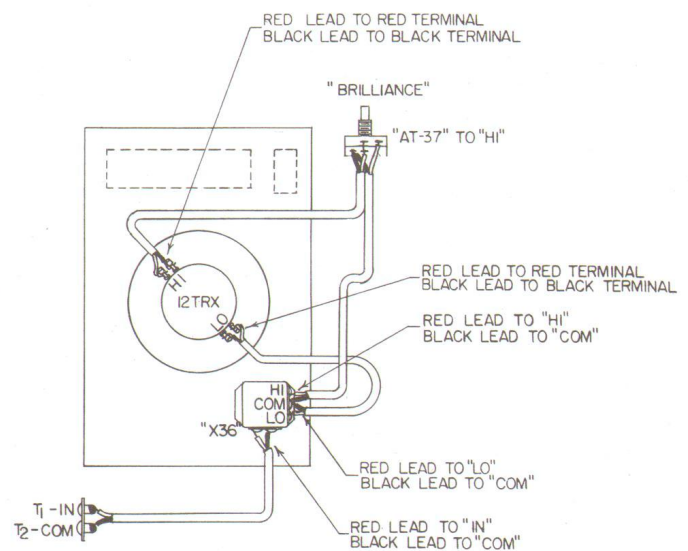


Fig. 5A — Pictorial Wiring Diagram
Model 12TRX on Aristocrat Mounting Board

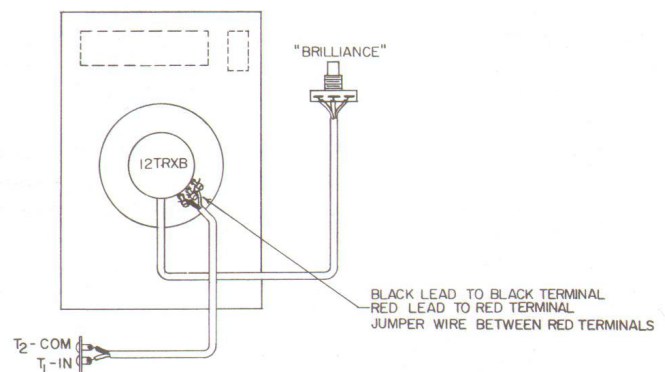


Fig. 5B — Pictorial Wiring Diagram
Model 12TRXB on Aristocrat Mounting Board

FUTURE EXPANSION OF YOUR SYSTEM

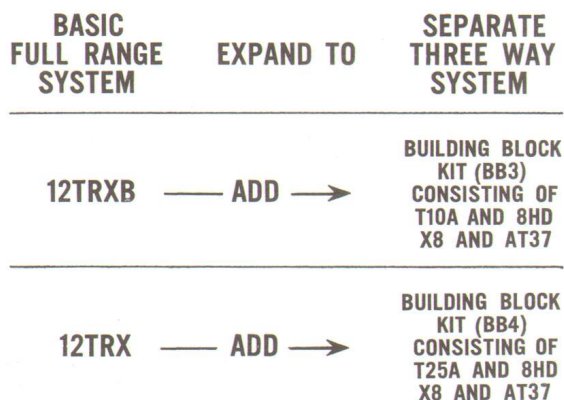


Figure 6 — How to Expand with the E-V "Building-Block Method"

Both the 12TRX and 12TRXB integrated 3-way systems may be expanded by the addition of a separate mid-range or treble driver. On the 12TRXB a third terminal has been added to facilitate this addition. For driver use without this midrange a jumper should strap the two terminals having red washers. The chart in Fig. 6 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, for example, only occasional peaks reach this power. The actual 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 never reach a steady state 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 these units is 3500 cps, and attenuation below this point should occur optimally at the rate of 12 db per octave. This attenuation is afforded by E-V crossover networks, integral in the 12TRXB and separate with the 12TRX.

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 often is inaudible, occurring at supersonic frequencies. Under such conditions, high overloads occur and, therefore, such feedback should be guarded against.

Acoustic feedback, resulting when the speaker feeds back into a microphone, microphonic tubes, and feedback caused by mechanical vibration from a speaker adjacent to the pickup or turntable, should be avoided. 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 transpire, due caution should be exercised.