at least 300

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Has been revised

ELECTRO-VOICE, INCORPORATED
Buchanan, Michigan

9/26/57

Part No. 53505

SPECIFICATIONS AND INSTRUCTIONS

Tentative

MODELS 117B, 105E and 105D

4-WAY DRIVER COMPONENTS

These instructions cover the installation and operation of the Electro-Voice Models 117B, 105E and 105D Driver Components Packages.

LISTING OF COMPONENTS

MODEL 117B

The Model 117B system is a standard 4-way system for Phase Loaded and indirect radiator folded corner horn enclosures. It consists of the following components:

1 each 15BWK Low Frequency Driver
1 each MT30B Coaxial Mid-Bass and Treble Driver with Horn Assembly
1 each T35B Super-Sonax Very High Frequency Driver
1 each X336 300 and 3500 cps Electrical Crossover Network
2 each AT37 Level Controls
1 each Wiring Harness

MODEL 105E

The Model 105E system is a deluxe 4-way system for Phase Loaded and indirect radiator folded corner horn enclosures. It consists of the following components:

1 each 15WK Low Frequency Driver
1 each MT30 Coaxial Mid-Bass and Treble Driver with Horn Assembly
1 each T350 Ultra-Sonax Very High Frequency Driver
1 each X336 300 and 3500 cps Electrical Crossover Network
2 each AT37 Level Controls
1 each Wiring Harness

Model 105D

The Model 105D system is identical to the 105E except that it employs the Model T3500 Ionovac Very High Frequency Driver in place of the T350.

Models 117B and 105E are recommended for use in the Electro-Voice DUCHESS, SUZERAIN, CARLTON, EMPIRE, CENTURION, CARDINAL and GEORGIAN enclosures. Model 105D is recommended for use in the CENTURION, CARDINAL and GEORGIAN.

SPECIFICATIONS

	117B	105E	105D
Sensitivity Rating in Recommended Enclosures	48 db	54 db	54 db
Power Rating*:			
Program	25 watts	35 watts	35 watts
Peak	50 watts	70 watts	70 watts
Impedance	16 ohms	16 ohms	16 ohms
Shipping Weight:	50 lbs.	100 lbs.	113 lbs.

UNPACKING INSTRUCTIONS

To obtain the best possible performance from your new system, read these instructions thoroughly before you begin installation.

Immediately upon unpacking, carefully inspect all material for physical damage. If damage is apparent, notify the distributor from whom it was purchased, or the transportation company if it was shipped to you. Responsibility for shipping damage lies with the carrier and a claim should be made immediately for recovery.

Your system was carefully tested and inspected before leaving the factory. If it is installed properly and operated in accordance with the instructions given in this booklet, it will give you the very finest high-fidelity reproduction.

INSTALLATION

Physical installation of the 117B, 105E and 105D loudspeaker systems is completely described in the instruction sheets accompanying the various enclosures in which the systems will operate. In addition, physical and electrical specifications for the VHF drivers, LF drivers and crossovers will be found in the instruction sheets accompanying the individual units.

MT30 and MT30B

The Electro-Voice Models MT30 and MT30B coaxial midrange reproducers are wide-range, integrated horn and driver systems using a compound driver unit with two coaxially mounted high and low-frequency horn paths coupled to opposite sides of a single diaphragm.

The units provide better than twice the treble and high-frequency polar distribution of re-entrant or multicellular reproducers of comparable size through use of the diffraction principle with an increase in efficiency of 3 db. Because there are no cells to beam the sound path, the pinpointing effect associated with multicellular designs is completely absent. The

*Amplifiers producing power well in excess of the listed peak power rating for the speaker systems can be used with safety. Operation at extremely high volume levels requires only a few watts of power except for instantaneous peaks. Because of short duration, these will do no harm to the speaker system as thermal rise is low under program playing conditions. As a general rule, amplifiers rated to 125 watts can be used without danger.

elimination of multiple throats at the driver mouth permits greater high-frequency efficiency as compared to multicellular horns. The wide-angle dispersion of the MT30 and MT30B results in smooth and even distribution of sound throughout the entire listening area. Stereophonic sound, especially, depends on this feature for its effect.

SPECIFICATIONS

	MT30	MT30B
Frequency Response:	200 to 10,000 cps ± 5 db	200 to 10,000 cps ± 5 db
Sensitivity Rating:	54 db	52 db
Power Handling Capacity*:		
Program Material:	35 watts	25 watts
Peak:	70 watts	50 watts
Impedance:	16 ohms	16 ohms
Acoustical Crossover:	1000 cps	1000 cps

The MT30 and MT30B are supplied with a 60° coupler which adapts the units to use in areas where the depth is restricted. This coupler should be discarded if the assembly is used in the CENTURION, GEORGIAN or CARDINAL enclosures where greater depth allows central and symmetrical placement.

Assembly of the MT30 or MT30B:

1. Attach "L" bracket to cabinet with wood screws.

2. Remove red dust cover from back of driver. Assemble angle coupler to back of driver unit and horn by screwing units together. Connection should be snug.

3. Slip back end of angle coupler through "L" bracket.

4. Screw tube assembly to angle coupler.

5. The small horn should be in a vertical position.

6. For use without the coupler, the driver and horn are screwed directly to the tube assembly.

Horn Extension for MT30 and MT30B

Drawings are attached showing the dimensions of 200 cycle wooden horns required with the MT30 and MT30B. This horn is an integral part of the recommended Electro-Voice enclosures, but can be constructed for use with other systems. Two horns are illustrated: a smaller horn which utilizes the 60° coupler and a larger, symmetrical horn of the type used on the CENTURION, CARDINAL and GEORGIAN. Performance of the horns is similar.

WIRING

The 117B, 105E and 105D should be wired according to the attached diagram. Low Frequency Driver polarity shown on the schematic is for indirect

* See footnote on page 2

radiator folded horns, but should be reversed for Phase Loaded systems. Connect the system to the amplifier by running two leads (fixture wire No. 18 or equal) from the "Common" and "16 ohm" amplifier output terminals to the terminal posts on the crossover. Phasing of this connection is not required except for dual systems for stereo, where it must be symmetrical with the second speaker.

THEORY OF OPERATION

The 4-way systems covered by these instructions subscribe to advanced design principles, and deliver efficient, distortion-free, extended range performance through the following means:

The LF driver is specially designed to work with a sealed back-load, and crosses over at 300 cps through the X336 crossover network. Thus, any harmonic distortion falling above 300 cps is suppressed, because the MT30B is now in operation.

The long, folded 62 inch pathlength for sounds up to 1000 cps generates high efficiencies with smoothness because of the slow taper rate calculated for 125 cps in the MT30B assembly. This means that tones from 300 to 1000 cps are propagated under ideal conditions. In addition, the highly tooled reentrant tubes permit a compact assembly for the desirably low crossover used.

The bulk of a mid-bass and treble horn of ordinary 300 cps design would preclude use in a cabinet suitable for the living room.

The series 828 Compound Drivers employ an acoustic low pass filter in the throat feeding the lower frequency path, and an acoustic high pass filter for the opposite throat which feeds the Model 823 1000 cps diffraction horn. It is well known that frequencies above 3000 cps cannot follow the circuitous path of the reentrant folds, and the use of the separate, smaller horn presents again an ideal acoustical environment for producing the frequencies from 1000 cps up. Further, the division of the spectrum at numerous points prevents compression distortion, evident in all horns to a serious degree when more than 4 octaves in range are attempted.

Carrying still further with the benefits of multiple driver operation, at 3500 cps the X336 crossover delivers energy to the VHF unit for generating all tones with $\pm$ 2 db flatness to 20 kc. All Electro-Voice VHF drivers employ the diffraction principle for ideal dispersion, and the complete story on these new developments will be found in the individual data sheets which accompany the drivers.

In summary, it will be seen that these systems minimize harmonic distortion through 3 crossover points; that specialized components working over smaller ranges thereby deliver top efficiencies with unparalleled smoothness; that compression distortion, serious in less integrated systems, is virtually non-existent.

OPERATING INSTRUCTIONS

Corner Systems

The CENTURION, CARDINAL and GEORGIAN assemblies will function in an optimum manner only when placed in a corner. Closely situated objects affect the operation of the bass reproducing section only if their size is very large so

that they form an appreciable portion of the wavelength of the low frequency tones being emitted.

For instance, the wavelength of a 30 cycle per second tone is 111 inches and an object 3 or 4 feet square must actually be blocking the side ports to affect radiation at this frequency. If furniture is kept 2 or 3 feet away from the sides of the unit, perfect radiation at all frequencies is assured. An open window or door several feet away will cause little degradation of response.

Phase Loaded Systems

When these component packages are used in Phase Loaded enclosures, the unit is placed along the wall and will achieve a very low range of bass response because of its design.

The back of the enclosure should be approximately 3 inches from the wall. This distance is not critical.

Setting the Controls

The two level controls allow complete balancing of the system to any acoustical environment. The controls are continuously variable, ensuring optimum adjustment to all tastes. While playing a comprehensive orchestral selection, set the PRESENCE control to between 5 and 7 on the setting dial and the BRILLIANCE to between 7 and 8. This will be a pleasing setting for a large living room with hard surface walls and few drapes or rugs. If the room is average in size (about 14 by 20 feet),advance the PRESENCE control to 8 and re-adjust the BRILLIANCE setting to achieve good musical balance. Effect this adjustment by advancing the control slightly while listening to various passages in the music. If the source material is clean and wide range, the point of balance will be definite, the higher tones will suddenly fall into place and there will be little doubt that the proper setting has been achieved. In heavily draped rooms the setting may be as high as 9 or 0, but only in extreme cases.

Once set, the controls need never be touched except for an unusual record with poor musical balance or a badly worn record which requires lowering of the BRILLIANCE control setting to subdue scratch.

NOTE: When this instruction sheet accompanies Electro-Voice systems installed complete in an enclosure from the factory, additional data sheets become a part of the instruction set as follows:

1. Instruction sheet for the particular cabinet.
2. Instruction sheet for the T350, T35, T35B.
3. Instruction sheet on the LF Driver applicable.
4. In the case of the 105D system employing the IONOVAC VHF Driver, the instructions for this unit are also to be included.

WIRING

105E System

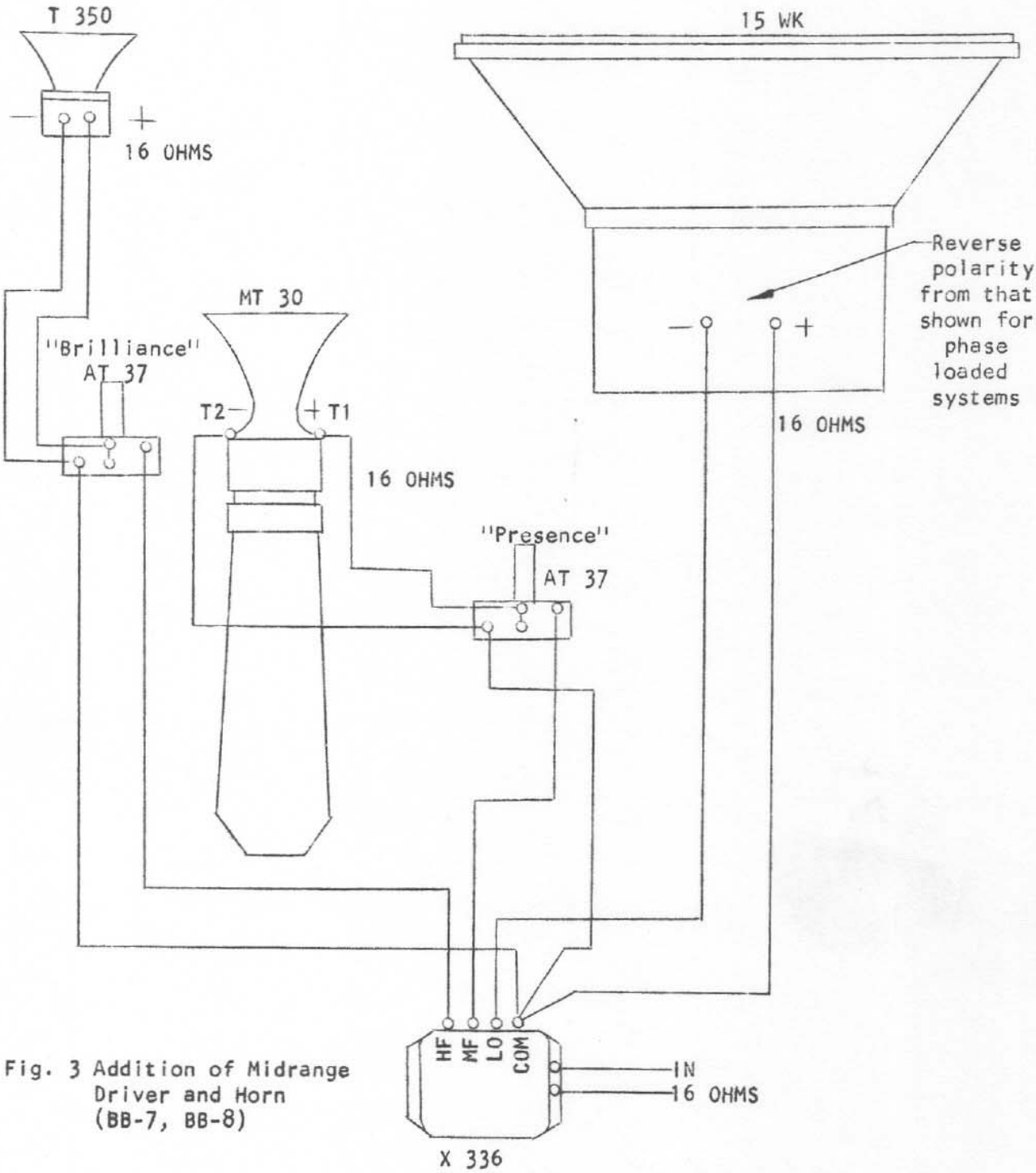


Fig. 3 Addition of Midrange Driver and Horn (BB-7, BB-8)

117B System
Same as above

CONNECTION ⊕
NO CONNECTION +
RED = POS +
BLACK = NEG. —

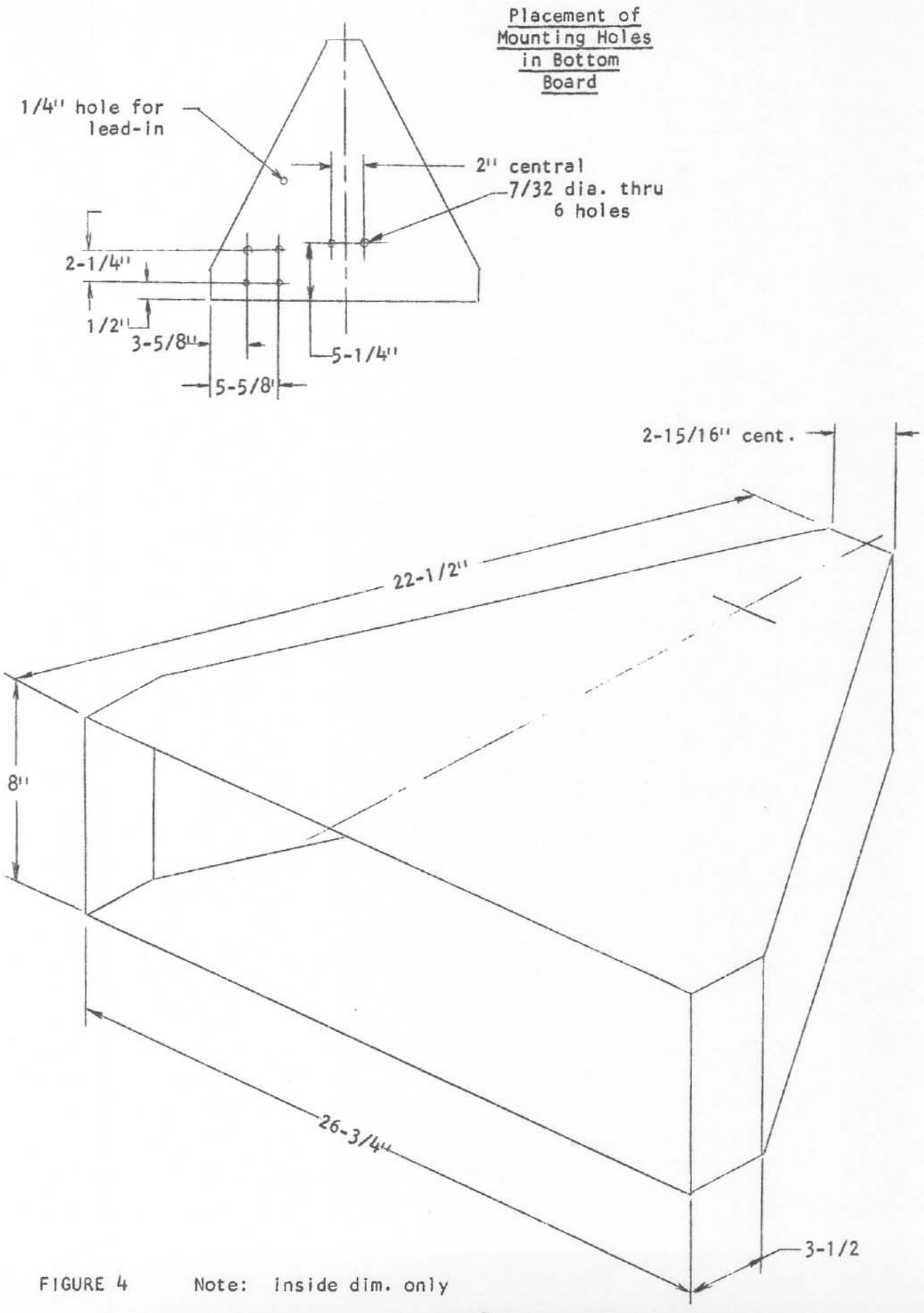
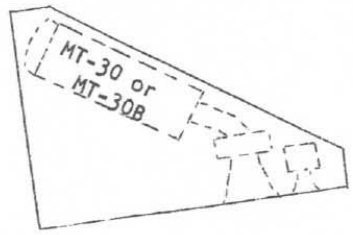
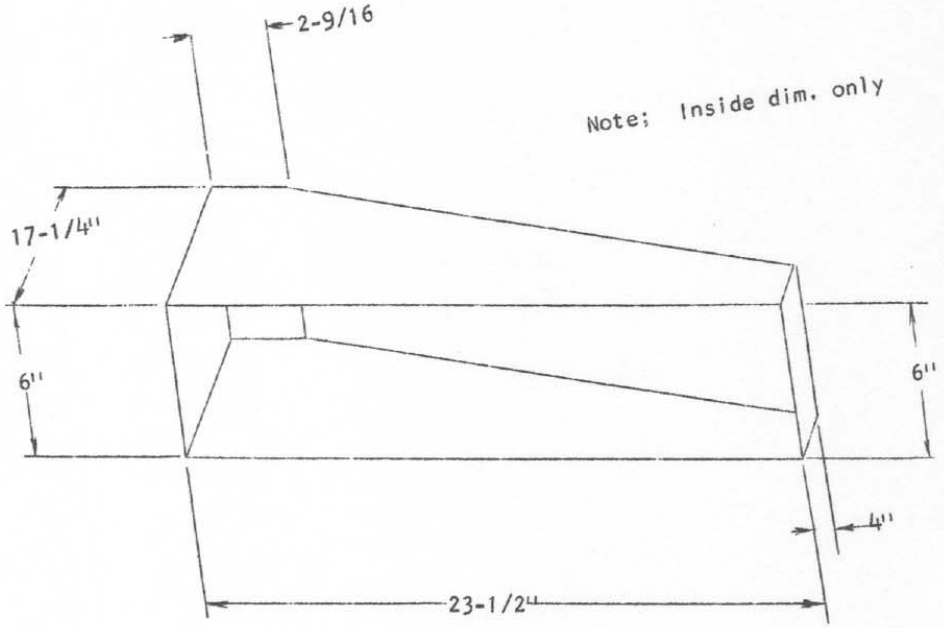
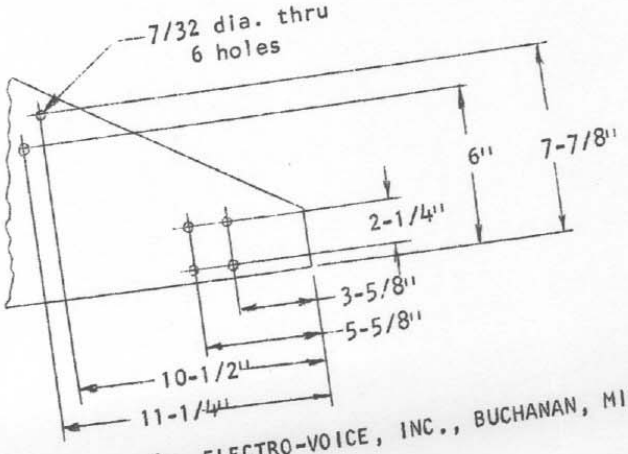


FIGURE 4 Note: inside dim. only







Detail For
Placement of
Mounting Holes
in Bottom Board

FIGURE 5

Mimeo in U.S.A.