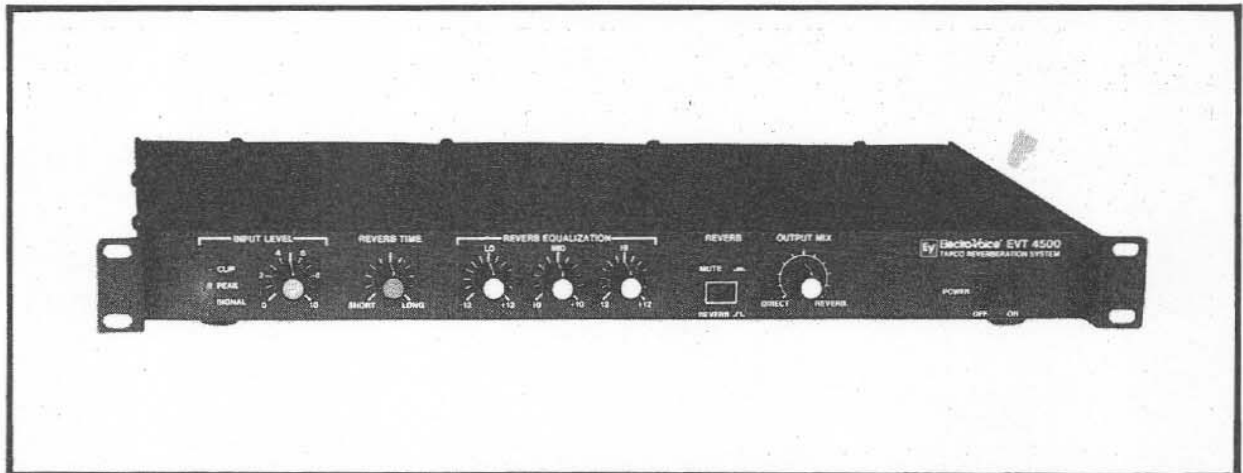


EV **Electro-Voice**[®]
EVT 4500
REVERBERATION SYSTEM

OWNER'S MANUAL



EVT 4500 FEATURES

- 1 rack space
- 3 LED level display
- Variable reverb time
- 3-Band reverb equalizer
- Remote footswitch connection and front panel mute control plus LED indicator
- Output mix control for in-line operation
- Unique five-spring design for improved echo density and smoothness
- Floating threshold compressor/limiter for easy level setting and protection against distortion
- No turn-on or turn-off click
- 25 dB available gain

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1. INTRODUCTION

The EVT 4500 reverberation system represents the new state-of-the-art in low cost reverberation systems. The design innovations incorporated in the EVT 4500 give it the flexibility and quality you would expect from systems costing many times more. It is compatible with all standard audio equipment, and like all EV products, it is built to withstand the rigors of daily professional use, in the studio or on the road.

WHAT IS REVERBERATION?

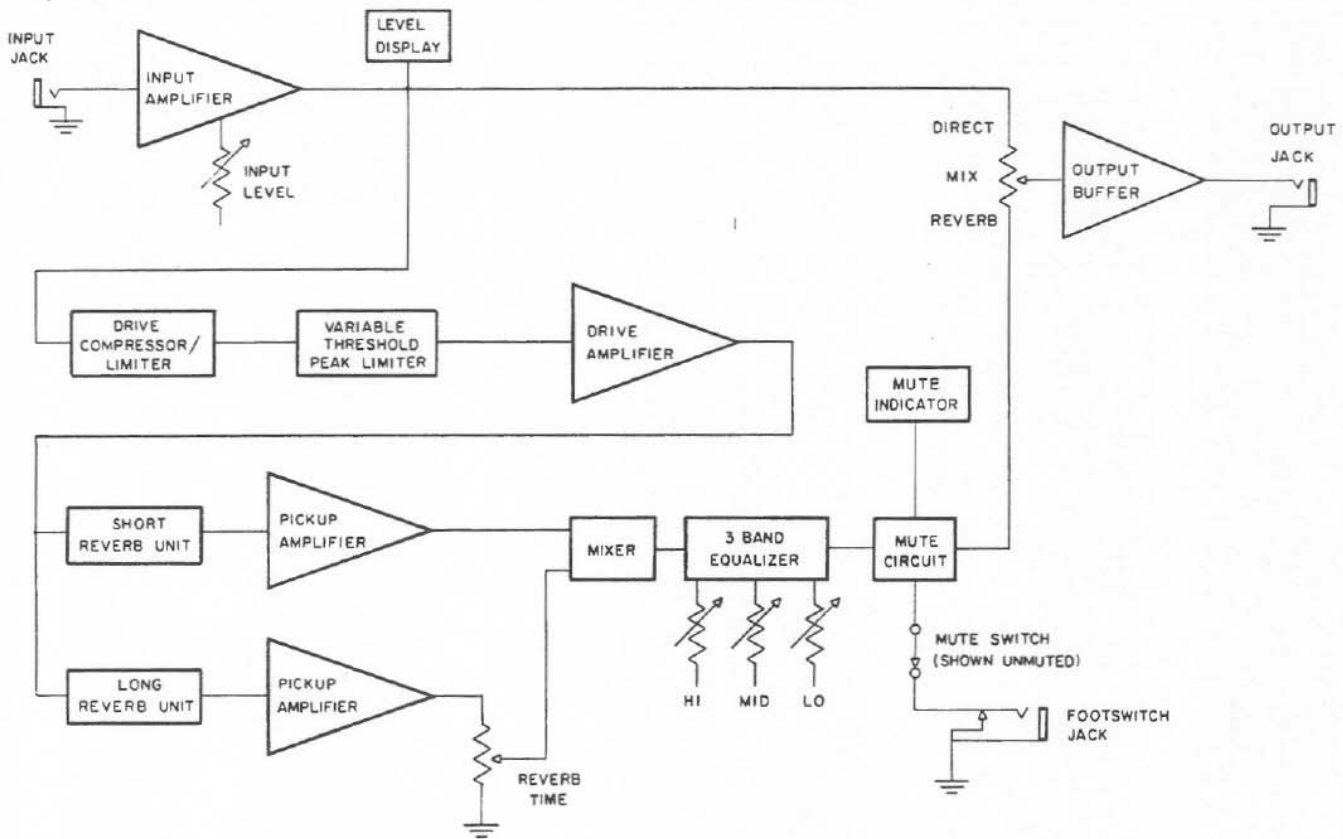
When sound waves are produced in a room, some of them will travel directly to the listener. These are called direct sound waves. The rest of the sound waves will bounce off of walls and other objects, reaching the listener just an instant later in a small room, and perhaps a few seconds later in a large room. The resulting sound is comprised of the many indirect sound waves arriving at different times depending on the distance they have traveled to reach the listener. This indirect or reflected sound is called reverberation. Reverberation is an important component of most musical performances as it adds to the warmth and fullness of the sound.

The reverberant quality of a room is mainly determined by its size, shape, and the hardness of its walls and ceiling. As a general rule, large rooms have longer reverberation times, that is, it takes longer for the reverberation to die away. This is because of the larger distances the sound waves must travel when bouncing from one wall to another. Also, as a sound wave travels through the air, some energy is lost, particularly at high frequencies. This effect shortens the reverberation time of large rooms in the treble range and gives the sound a "bassy" quality. Smaller rooms, by comparison, have more treble response and shorter reverberation times. The shape of the room will affect the smoothness of the reverberation. Square or rectangular rooms may produce objectionable echos, while odd-shaped rooms will have a smoother sound. Also, hard walls will reflect high frequencies (treble) much more than softer surfaces such as carpeting, curtains, clothing, etc.

The EVT 4500 is designed to provide complete control over the sound of the reverberation. Its reverb time control allows simulation of different size rooms, and the three band equalizer allows adjustment for different auditorium or music characteristics. The EVT 4500 is ideally suited for professional sound reinforcement and most recording applications.

EVT 4500 REVERBERATION SYSTEM

2. SYSTEM DESIGN



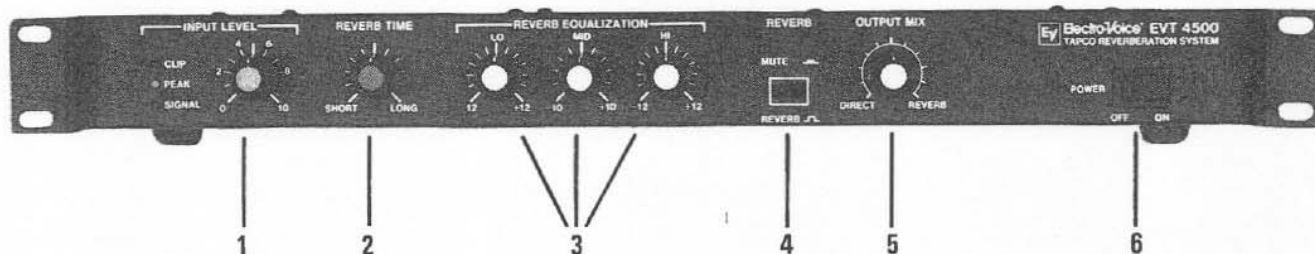
EVT 4500 BLOCK DIAGRAM

This block diagram shows how the signals are routed within the EVT 4500. A simplified version is on the back panel of the case for quick reference.

The Input Level control allows you to match the gain of the 4500's input circuitry to the output level of the preceding equipment. A three-LED level display shows where to set this control for optimum performance. The drive compressor/limiter provides some compression and limiting at maximum drive, which makes level setting less critical. The variable threshold peak limiter detects fast high energy pulses which could overdrive the reverb units and cause distortion. It automatically lowers the gain of the driver circuit just enough to keep the signal within limits, without disturbing normal level signals.

The current drive amplifier is like a small power amplifier; it drives the reverb input coils with cur-

rent sensing feedback which smoothes their response. The reverb units consist of five springs, two shorter ones and three longer ones. This results in excellent diffusion and echo density. Their separate pickup amplifiers allow mixing the longer springs, which have longer delay times, in any proportion with the shorter ones, thus providing adjustable reverb time. The three band equalizer, with specially selected center frequencies, allows custom tailoring of the reverb frequency response to suit the music. A mute switch allows the reverberation to be turned on or off noiselessly, and a footswitch can be plugged in for remote control. The panel mute switch and the footswitch are connected in series so either one being pressed will mute the reverb. When the remote switch contacts are closed, the reverb is on; when they are open, the reverb is muted. A red LED indicates when the reverb is muted. The ratio of reverberation to direct sound at the output is controlled by the Output Mix control.



3. CONTROL FUNCTIONS

1. INPUT LEVEL

The "traffic light" input display allows quick, accurate adjustment of input level. During most of the music, the green SIGNAL indicator should light. During louder parts of the music, such as solo passages or drum beats, the yellow PEAK indicator should light. Adjust the Input Level control for this display indication. If the red CLIP indicator lights, the output will be distorted and the Input Level control should be turned down. If the yellow PEAK indicator never lights, the Input Level control should be turned up.

2. REVERB TIME

This controls the time it takes for the reverberation to die away. The range is approximately 1.5 seconds to 3.5 seconds.

A long reverb time will simulate a large room, while a short reverb time will sound like a smaller room. Usually a long setting is preferable for slow music, while a shorter time sounds better with fast music.

3. REVERB EQUALIZATION

These controls affect the tone quality of the reverb signal only. They can be used to simulate different rooms, or to match the reverb quality to each individual piece of music. A larger room can be simulated with Lo boost, or a smaller, harder room with some Hi boost.

4. REVERB MUTE

This switch, when pressed, will mute (turn off) the reverb portion of the output signal. If the Output Mix control is all the way to reverb, then the entire output will be muted. This switch can be used during a performance to add reverberation only when it is desired. A footswitch for remote control of this function can be plugged in at the back panel. The front panel switch must be in the reverb (out) position for remote control operation. The red mute indicator will light when the reverb is muted.

5. OUTPUT MIX

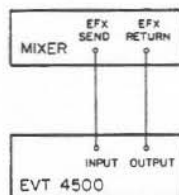
This control sets the amount of reverb that will be heard in the overall signal at the 4500's output. This allows you to put the 4500 between the mixer and power amp (or tape recorder, etc.), or to put the 4500 in the effects send/receive loop. The Output Mix control should normally be set to Reverb when the system is used in an effects loop. When it is used between the mixer and power amp, the control should be set for just the right amount of reverb in the total signal — usually no more than 50%.

6. POWER ON/OFF

4. CONNECTIONS AND SETUP PROCEDURE

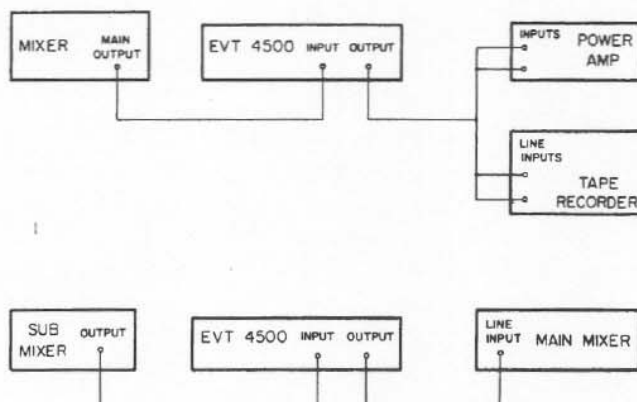
There are basically two ways to connect the 4500 in a system: 1) in the effects send/return loop of a mixer, or 2) in the main signal path — between the mixer and power amplifier (or tape recorder, etc.) or between a sub mixer and a main mixer. The mixer loop connection is usually preferable because it offers precise control over the amount of reverb added from the sound of each input channel. For systems that are not equipped with an effects bus, the 4500's Output Mix control allows adding just the right amount of reverb to the overall sound.

CONNECTION IN THE EFFECTS SEND/RETURN LOOP

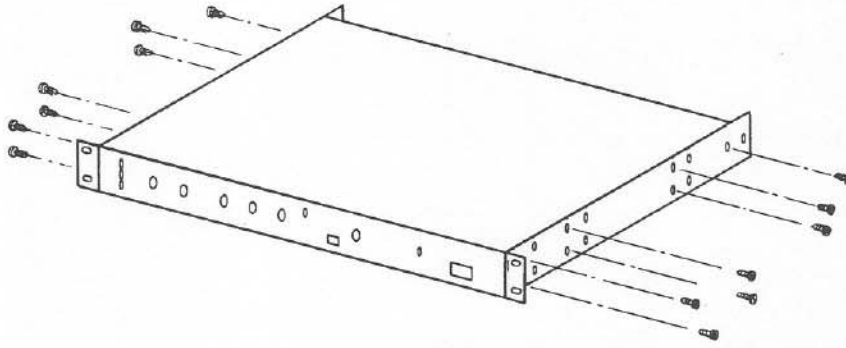


1. Connect the effects send mixer output to the EVT 4500 input. Connect the EVT 4500 output to the effects return input to the mixer.
2. Set Output Mix to Reverb, Reverb switch to Reverb, and all other knobs to center position. Turn on the power.
3. First set up your basic mix on the mixer. Set the effects send master control to nominal position. Then turn up the effects send controls at the input channels to which you want to add reverb, until the green SIGNAL indicator on the EVT 4500 lights. The yellow PEAK indicator should light occasionally. This might require readjustment of the effects send master control on the mixer or the Input Level control on the EVT 4500.
4. Increase the effects return control until the right amount of reverb is heard with the mix.
5. Adjust the Reverb time and Reverb Equalization controls for the reverb sound that you want.

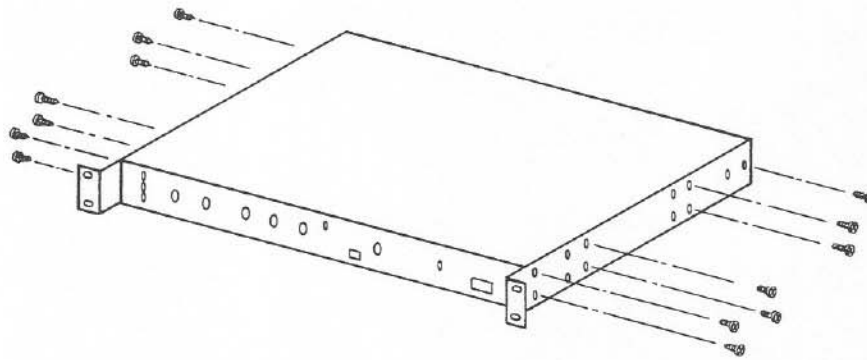
MAIN SIGNAL PATH CONNECTION



1. Connect the output of the mixer (or sub mixer) to the EVT 4500 input. Connect the EVT 4500 output to the power amp/tape recorder (or main mixer line input).
2. Set the Output Mix control to Direct, Reverb switch to Reverb, all other knobs to center position, and turn the power on.
3. Set up the mixer (or submixer) for normal operation, and adjust the Input Level on the EVT 4500 for optimum display indication. Adjust loudness with the power amp level control (or input control on the main mixer).
4. While listening, gradually turn the Output Mix control clockwise until you have the right amount of reverb.
5. Adjust the Reverb Time and Reverb Equalization controls for the reverb sound that you want.



FLUSH MOUNTING



RECESSED MOUNTING

5. MOUNTING CONSIDERATIONS

For best results, the EVT 4500 should be placed on a solid surface or securely mounted in a rack. It should not be placed adjacent to a speaker system.

There are two ways to mount the unit in a rack. The front panel can be flush or recessed from the

mounting rails of your rack. The mounting flanges can be easily repositioned by removing seven screws from each end, adjusting the end panels and reinstalling the screws through the alternate holes. See diagram below. **CAUTION:** unplug AC line cord first! The rubber feet on the bottom of the unit can be peeled off if necessary to allow rack mounting.

6. REFERENCES

WHERE TO GET MORE INFORMATION

Modern Recording Techniques by Robert Runstein, published by Howard W. Sams Co. The complete modern text book of studio recording techniques.

Modern Recording is a bi-monthly magazine from the Recording Institute of America. MR covers equipment techniques, actual studio sessions, etc. This magazine is highly recommended to anyone interested in recording

Modern Recording
Recording Institute Publishing Inc.
15 Columbus Circle
New York, N.Y. 10023

Recording Engineer/Producer is another very good bimonthly magazine dealing with the recording arts.

Recording Engineer/Producer
P.O. Box 2449
Hollywood, CA 90028

Basic Audio by Norman Crowhurst, is available from the John F. Rider Publishing Company. This book is just what the title implies.

Microphone Primer by Jim Long available from Electro-Voice, 600 Cecil Street, Buchanan, MI 49107. The basic guide to microphones.

THE FOLLOWING ARE AVAILABLE FROM:

Sagamore Publishing Co., Inc.
1120 Old Country Road
Plainview, N.Y. 11803

DB Magazine — an authoritative, well known magazine, dealing with recording, sound reinforcement and general audio topics. Monthly.

Microphones: Design and Application by Lou Burroughs. The author was one of the two original founders of Electro-Voice, Inc. He is responsible for a great deal of today's accepted microphone theory and design. The book is a practical, non-theoretical reference manual for anyone in the audio industry.

The Technique of the Sound Studio by Alec Nisbett. This is a handbook on radio and recording techniques, but the principles described are equally applicable to film and television sound, 264 pages, 60 diagrams, glossary, indexed.

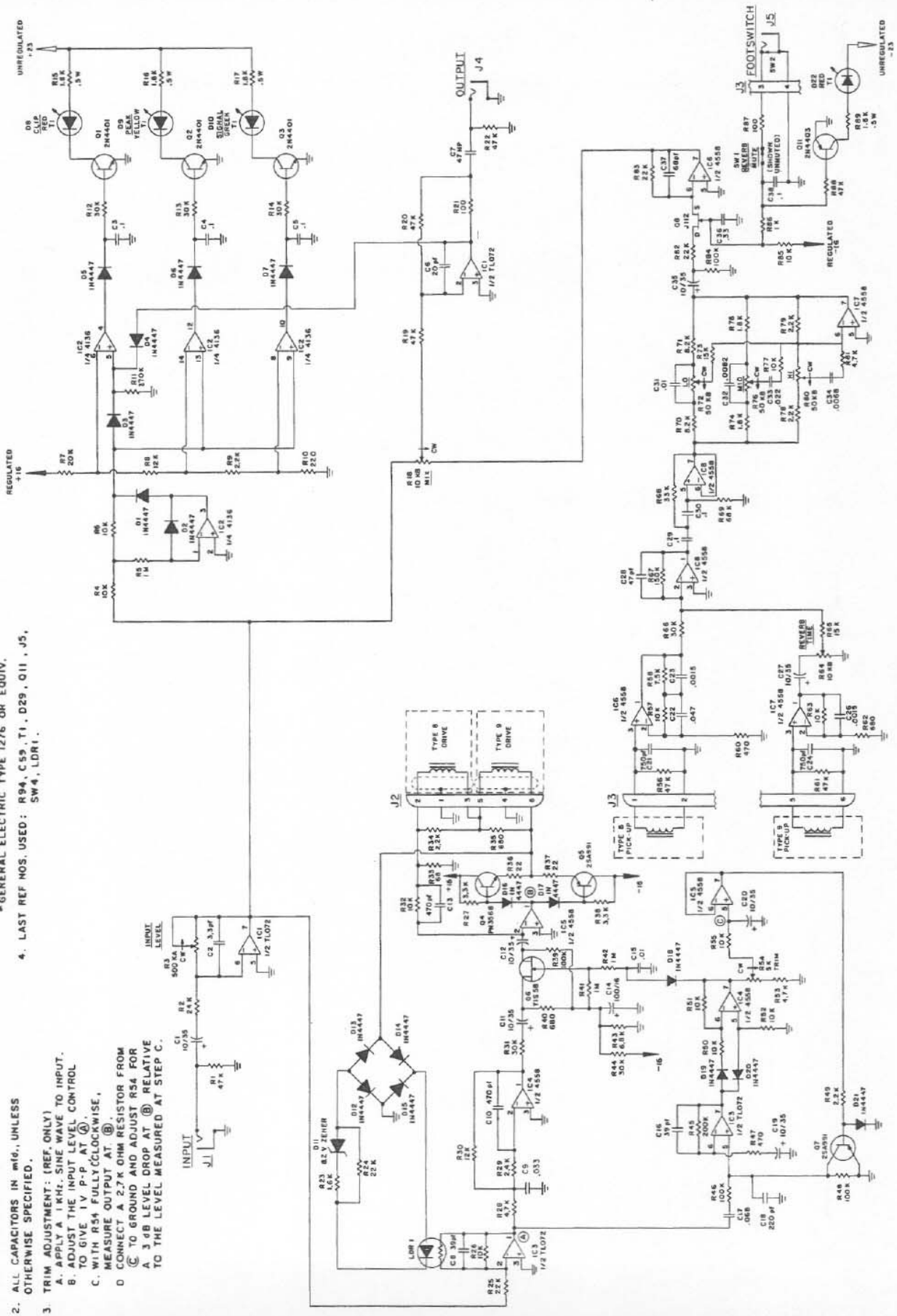
Modern Sound Reproduction by Harry F. Olson. This basic text covers amplifiers, microphones, loudspeakers, earphones, tape systems, film sound, TV and sound reinforcement — the significant elements and systems of modern sound reproduction. Employs simple physical explanations which are easily understood without special engineering training, 328 pages.

We might suggest that instead of investing your hard earned bucks in any of these publications on our word alone, go down to your library and look them over first. That much, at least, is free.

NOTES

NOTES:

1. ALL RESISTORS 1/4 W., 5%, UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN μf ., UNLESS OTHERWISE SPECIFIED.
3. TRIM ADJUSTMENT: (REF. ONLY)
 - A. APPLY A 1 KHZ. SINE WAVE TO INPUT.
 - B. ADJUST THE INPUT LEVEL CONTROL TO GIVE 1 V P-P AT (A).
 - C. WITH R54 FULLY COUNTERCLOCKWISE, MEASURE OUTPUT AT (B).
 - D. CONNECT A 2.7 K OHM RESISTOR FROM (C) TO GROUND AND ADJUST R54 FOR A 3.48 LEVEL DROP AT (B) RELATIVE TO THE LEVEL MEASURED AT STEP C.
4. LAST REF NOS. USED: R94, C59, T1, D29, O11, J5, SW4, LDR1.
5. AFTER CALIBRATION, APPLY GLYPHTAL TO POT ACTUATOR TO LOCK IN PLACE.
6. GENERAL ELECTRIC TYPE 1276 OR EQUIV.



SCHEMATIC

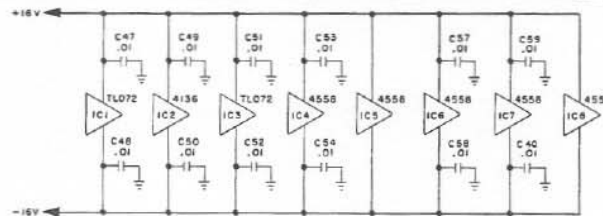
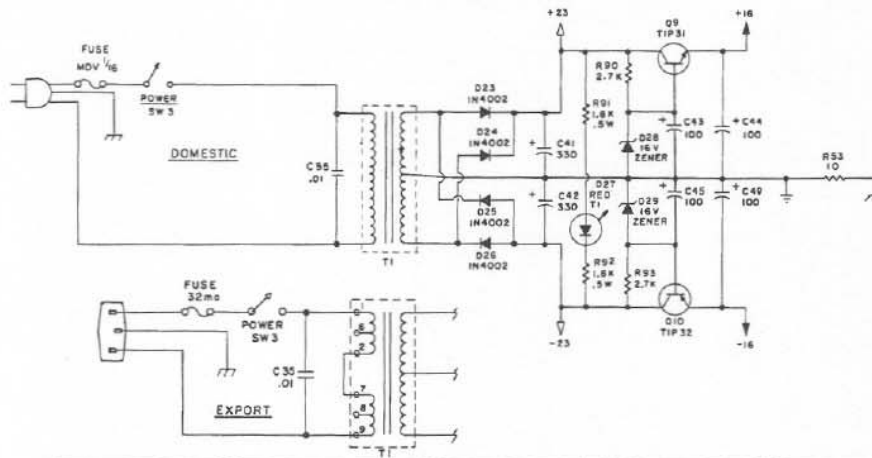
EVT 4500 REVERBERATION SYSTEM

7. SPECIFICATIONS AND SCHEMATIC

EVT 4500 SPECIFICATIONS

Input:		Drive Level Indicator:	
Minimum level	-25 dBu	+16 dBu	Clip LED (red)
Impedance	15 K ohms	0 dBu	Peak LED (yellow)
		-20 dBu	Signal LED (green)
Output:		Connections:	
Maximum level	+20 dBu	Input	1/4 in. phone jack
Nominal level	0 dBu	Output	1/4 in. phone jack
Impedance	<10 ohms	Footswitch	1/4 in. phone jack
Frequency Response (Direct Channel):		Controls:	
20 Hz – 20 kHz		Input Level	
+0, -1 dB		Reverb Time	
		Lo EQ	
Output Noise:		Mid EQ	
Direct channel, unity gain,		Hi EQ	
<-90 dBu 20 Hz – 20 kHz		Reverb Mute	
Reverb channel, (A weighted, medium reverb time)		Output Mix	
<-70 dBu (A)		Power	
Harmonic Distortion (Direct channel):		Power Requirement:	
At 0 dBu	<.01%, 20 Hz–20 kHz	100 – 130 VAC, 6 W maximum (domestic)	
At +20 dBu	<.02%, 20 Hz–20 kHz	200 – 240 VAC, 6 W maximum (export)	
Reverb Time		Dimensions:	
Minimum control setting	Approx. 1.5 sec.	4.5 cm (1.75 in.) height	
Maximum control setting	Approx. 3.5 sec.	30.5 cm (12 in.) depth,	
		48.3 cm (19 in.) width	
Reverb Equalization (Peak/dip):		Weight:	
LO 60 Hz	± 12 dB	4.1 kg (8 lb, 14 oz)	
MID 600 Hz	± 10 dB		
HI 6 kHz	± 12 dB		

POWER SUPPLY



IC POWER CONNECTIONS

8. LIMITED WARRANTY

a. TAPCO Inc. warrants the materials, workmanship and proper functioning of this product for a period of one year. If any defects are found in the materials or workmanship of EV/TAPCO products, or if the product ceases to properly function within the appropriate warranty period from the date of first purchase, TAPCO Inc. will repair or replace any non-conforming materials through the nearest EV/TAPCO authorized warranty service center.

b. Purchaser must return the product to the EV/TAPCO authorized warranty service center, freight prepaid. A list of authorized warranty service centers is available from TAPCO Inc., Redmond WA. Claims must be sent to any EV/TAPCO authorized warranty service center. If claims are not resolved by the EV/TAPCO authorized warranty service Center, any warranty claim should be sent to:

TAPCO Inc.
3810 148th Ave. NE
Redmond WA 98052
(206) 881-9555

c. TAPCO Inc. reserves the right to inspect any products which are the subject of any warranty claim prior to repairing or replacing. Any products which do not conform to this warranty should be repaired or replaced by TAPCO Inc. as soon as possible following receipt of the product and warranty claim, but in no event later than 30 days after receipt of the product. Out-of-warranty claims will be billed for labor and materials as required. Prepayment of these charges may be required. Any product for which a warranty claim is accepted will be returned to the purchaser and cost of shipping and insurance will be factory prepaid. This warranty gives specific legal rights. The purchaser also has implied warranty rights, and may also have other rights which vary from state to state.

d. This warranty is extended to the purchaser and to any purchaser from him for value.

e. THE ABOVE WARRANTY IS THE SOLE WARRANTY GIVEN BY TAPCO Inc. AND IS IN LIEU OF ALL OTHER WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE SHALL BE STRICTLY LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL PURCHASE AND UPON THE EXPIRATION OF THE WARRANTY

PERIOD TAPCO Inc. SHALL HAVE NO FURTHER WARRANTY OBLIGATION OF ANY KIND WHETHER EXPRESS OR IMPLIED. INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY. FURTHER, TAPCO Inc. SHALL IN NO EVENT BE OBLIGATED FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF ANY DEFECT OR ANY WARRANTY CLAIM, WHETHER EXPRESS OR IMPLIED. Some states do not allow exclusion or limitation of incidental or consequential damages or limitation on how long implied warranties last, so the above limitations and exclusions may not apply to you.

f. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

g. TAPCO Inc. does not authorize any third party, including any dealer or authorized warranty service center to assume any liability of TAPCO Inc. or make any warranty for TAPCO Inc.

Warranty registration cards must be completed and mailed to TAPCO Inc. within 30 days of purchase.

9. APPLICATIONS ASSISTANCE

TAPCO Inc. has a staff of highly qualified service personnel who can assist with any field problems which may arise, and are able to answer questions concerning any aspect of the use and performance of our products. Our telephone number is (616) 695-6831.

10. FACTORY SERVICE

If you wish written service information, replacement parts, or factory service, our address is:

TAPCO Inc.
Service Department
3810 148th Ave. NE
Redmond WA 98052
(206) 881-9555

If you write the factory, please include a concise description of your problem, any related equipment, your phone number and the time of day when you can be reached.

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