



Electro-Voice®
MTX-4A

CROSSOVER/EQUALIZER/DELAY UNIT

OWNER'S OPERATION AND SERVICE MANUAL

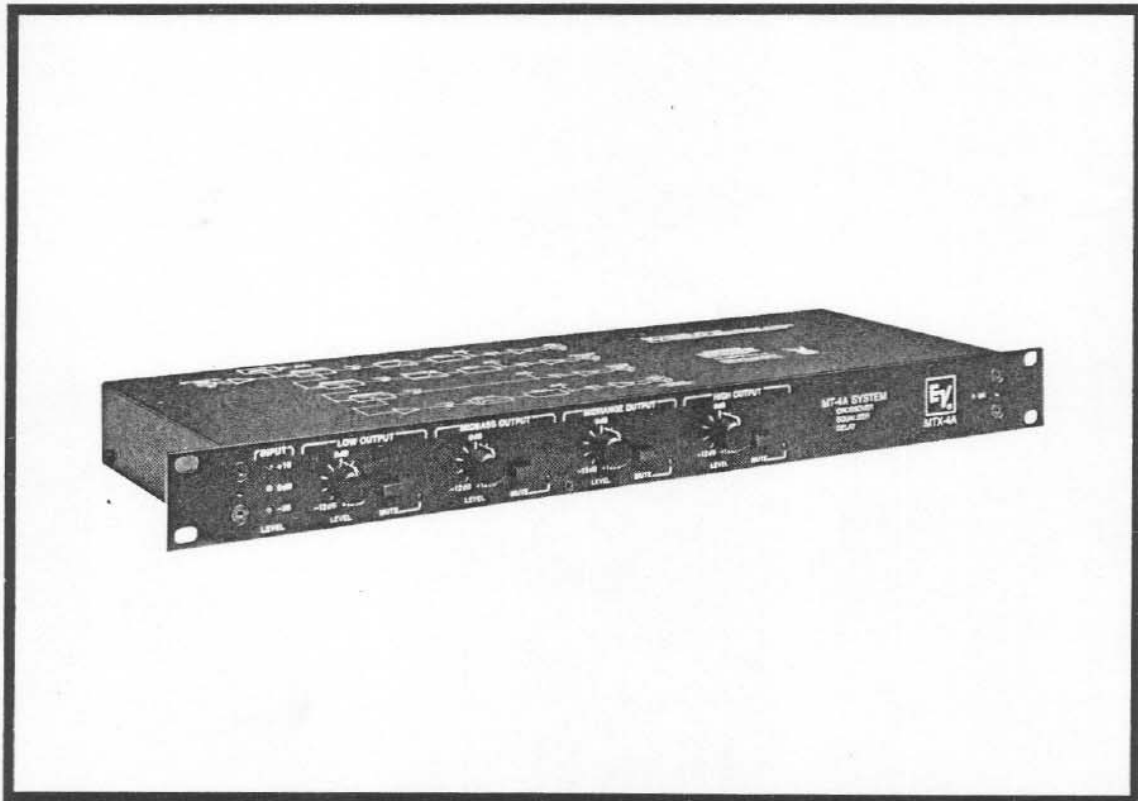


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1 DESCRIPTION

The MTX-4A electronic crossover/equalizer/delay unit is dedicated to the MT-4A Manifold Technology™ concert sound loudspeaker system. This signal processor, with fixed crossover frequencies, equalization, and time delay, was designed to obtain optimal performance from the MT-4A. A brief description of the MT-4A appears in the MT-4A Speaker System section.

The crossover section of the MTX-4A is a 4-way fourth-order Linkwitz-Riley frequency-dividing network. This configuration has two unique advantages over a third-order Butterworth network. First, a fourth-order network offers an out-of-passband attenuation rate of 24 dB per octave, greater than the 18-dB-per-octave rate of a third-order network. This provides better protection of drivers from energy outside their intended frequency range. Second, the use of a Linkwitz-Riley network results in zero lobing error, and smoother overall frequency response in the crossover region. See the Linkwitz-Riley Network section for more information about lobing error.

Other features include a differential input and a level display for optimizing dynamic range. Each output section has a level control with a mute switch. The outputs are normally floating active differential. They may be transformer coupled by installing two of the TRB-1 transformer kits. The MTX-4A mounts in one EIA rack space. Figure 2 shows the MTX-4A block diagram.

2 EQUALIZATION SECTIONS

2.1 Midrange and High-Frequency Equalization

The midrange and high-frequency equalization circuits accurately equalize the high performance compression driver/constant directivity horn combinations in the MTH-4A. This EQ is necessary because all horn/driver combinations that combine high overall efficiency with constant directivity exhibit a high frequency power-response roll off.

2.2 Low-Frequency Protection

A high-pass filter, with a corner frequency of 32 Hz, protects the speaker from infrasonic frequencies. The overall system acoustic corner frequency is 37 Hz.

3 TIME DELAY

3.1 Time Delay Circuit

Three of the four outputs on the MTX-4A have a time-delay circuit which correct for the time and phase-response differences which exist due to path-length differences of the MT-4A Speaker System. The delay sections are four-pole all-pass filters. A delay is acoustically equivalent to physically moving the corresponding speaker with respect to the others. The midbass output does not have a delay network since it is the rear most section of the speaker system in a normal setup.

4 CONNECTIONS

4.1 Input and Outputs

The input connector is a 3-pin female XLR type; output connectors are 3-pin male XLR types. Pins 2 and 3 are signal and each pin 1 is connected through a 10-ohm resistor to chassis ground. This grounding arrangement works well in most installations; pin 1 can be used as a ground reference or, if there is another reference (a ground loop is formed), then the

resistor allows pin 1 to follow the other ground reference. A solid chassis ground connection can be obtained at the connector shell.

The floating-differential input and outputs can be unbalanced and referenced to other equipment, or they can be connected to balanced lines. If a true balanced source (or load) is needed, connect a 300-ohm resistor from pin 2 to pin 1 and another 300-ohm resistor from pin 3 to pin 1.

5 POWER

5.1 Power Indicator

A green LED on the front panel indicates when ac power is on. The power supply is designed so that the unit can deliver ± 18 dBu at line voltages as low as 90 V ac. the MTX-4A may be left on indefinitely or externally switched with other equipment.

5.2 AC Line Voltage Selection

The MTX-4A is constructed using a universal AC power transformer. Six primary wires from the transformer run to a strip of solder lugs. These leads are connected in various combinations to allow the power transformer to operate on 100, 120, 220 or 240 volts.

Access to the transformer and terminal strip is gained by removal of the top cover of the unit. Remove two screws on each side and two screws on the back of the unit.

Figure 5 shows the various combinations of lead and strap connections for various voltages.

5.3 Fuses

For voltages of 100 and 120 volts use a 0.175 amp, 250 volt, slo-blo type fuse. The fuse holder cap

supplied with the unit holds type AGC 1/4" X 1 3/4" fuses.

For 220 and 240 volts use a 0.080 amp, 250 volt, slo-blo fuse.

6 CONTROL FUNCTIONS

6.1 Input Level Indicator

The level of the input signal to the MTX-4A is monitored with three LED's. The green LED indicates signals above -20 dBu, and the yellow LED lights when the signal reaches 0 dBu. The red LED lights if the input or any output exceeds +16 dBu. In normal operation, the yellow LED should light much of the time (indicating normal signal level) but the red LED should not light.

6.2 Level Controls

Each of the four outputs has a level control with ± 12 dB range. If the power amplifier channels have equal gain, then the center detent position is calibrated for flat MT-4A system frequency response in an anechoic environment. The level controls are intended for fine-tuning the system response; large differences in power amplifier sensitivities should be compensated by adjustment of the power amplifier attenuators.

6.3 Mute Switches

Four mute switches are located on the front panel. When the mute switch is depressed, the corresponding output will be disabled and a red LED lights to indicate the muted output. These switches are useful for setup, calibration, and troubleshooting.

7 OUTPUT TRANSFORMERS

7.1 Transformer Instal-

lation

The outputs of the MTX-4A can be transformer coupled by installing two of the optional TRB-1 transformer pairs. This should be done by a qualified technician. Remove two screws from each side and the back, and lift off the top cover. Then remove three screws holding the circuit board to the chassis, and four hex screws from the front panel. The circuit board, with the front panel attached, can then be removed from the chassis.

There are eight jumpers which must be removed from the board so that the transformers will have proper drive, feedback and output connections. The jumpers are labeled JP1 through JP8 (see figure 4). To remove a jumper, clip the lead at each end and remove the center section.

The transformer lead layout is asymmetrical, so verify the orientation of the transformer leads with the holes in the circuit board before installing. Solder all connections on the foil side of the board. Reassemble the MTX-4A in reverse order from the description above.

8 INSTALLATION

8.1 Rack Mounting

The MTX-4A may be installed in a standard 19 inch equipment rack. It requires 1 3/4 inches of vertical rack space and mounting is accomplished by using four rack mount screws provided.

8.2 Ventilation

The MTX-4A must be adequately ventilated to avoid excessive temperature rise. It should not be used in areas where the ambient temperature exceeds 60°C (140°F). To determine the ambient air temperature, operate the system

in the rack until the temperature stabilizes. Measure the ambient air with a bulb-type thermometer held at the bottom of the uppermost unit. Do not let the thermometer touch the metal chassis because the chassis will be hotter than the ambient air. If the temperature exceeds 60° (140°F), the equipment should be spaced at least 1 3/4 inches apart or a blower installed to provide sufficient air movement within the cabinet.

WARNING:

Do not operate the MTX-4A within a completely closed, unventilated housing.

9 IN CASE OF PROBLEMS

Please check the following items:

1. Verify the MTX-4A is properly connected to an ac power source and that the source is active.
 2. Verify that the ac line fuse is not open.
 3. Verify the input and output connections are properly made, as well as cables for proper wiring and continuity.
 4. Check the signal source and load.
- ## 10 MT-4A SPEAKER SYSTEM

The MT-4A is a two-box, four-way active loudspeaker system utilizing Manifold Technology™ over the entire audio frequency range. One enclosure is the MTL-4A low frequency system, a vented-box design comprised of four 18-inch woofers, each facing into a manifold chamber at the center of the cabinet. The second enclosure is

the MTH-4A midbass/mid-range/high frequency system, a three-way horn-loaded systems utilizing four drivers in each frequency range for a total of twelve drivers in a remarkably small package. The technique of manifolding, perfected by Electro-Voice engineers, effectively sums the output of four loudspeakers, producing from the four a single coherent source. The advantage of manifolding over multiple sources are improved directivity control and audience coverage, reduced polar lobing, extremely high power-to-enclosure-volume ratios, and in some instances reduced distortion and increased efficiency.

11 LINKWITZ-RILEY NETWORKS

Linkwitz-Riley networks have zero lobing error because their outputs are (1) in phase in the crossover region and (2) 6 dB down at the crossover frequency. (The outputs of a third-order Butterworth network are 90 degrees apart and 3 dB down at the crossover frequency.)

The acoustic consequences of zero lobing error can be appreciated by considering a two-way speaker system. For simplicity, assume that the sound from each transducer radiates from exactly the same vertical plane, i.e., the drivers have no time delay with respect to each other. Under these conditions:

1. A Linkwitz-Riley network promotes smoother overall frequency response in the crossover region, considering observation points both on and off the system axis. Frequency response is flat on the system axis and there are no off axis response peaks. In contrast, when a third-order Butterworth net-

work provides flat response on axis, a 3 dB peak must appear off axis, at that angle where the time delay due to different distances from the listener puts the two transducer outputs exactly in phase.

2. A Linkwitz-Riley network places the inevitable interference dips (due to two transducers providing output in the same frequency range) symmetrically above and below the system axis. The lobe in between is aimed along the system axis. In contrast, a third-order Butterworth network aims the lobe at some angle relative to the system axis, a consequence of 90 degrees phase difference between the outputs of the network. The angle of the lobe is the location of the Butterworth response peak described above.

A more detailed and graphic treatment of the subject is available in a number of technical articles, including:

1. S.H. Linkwitz, "Active Crossover Networks for Noncoincident Drivers," *J. Audio Eng. Soc.*, vol. 24, pp. 2-8 (1976 January/February).
2. S.P. Lipwitz and J. Vanderkooy, "A Family of Linear-Phase Crossover Networks of High Slope Derived by Time Delay," *J. Audio Eng. Soc.*, vol. 31, pp. 2-20 (1983 January/February).

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

12 SPECIFICATIONS

Channel Configuration:	Monaural four way.	Gain: (Controls at Center Detent)	
Filter Type:	Fourth-order Linkwitz-Riley (24-dB-per-octave attenuation)	Low:	-3.0 dB @ 100 Hz
Crossover Frequencies:		Midbass:	-10.4 dB @ 500 Hz
Low:	160 Hz	Midrange:	-11 dB @ 2.5 kHz
Midbass:	1,600 Hz	High:	0 dB @ 12.5 kHz
Midrange:	10,000 Hz	Adj. Range re Center Detent, Continuously Variable:	±12 dB
Output Delays:		Total Harmonic Distortion, 20Hz-20 kHz:	
Type:	Fourth-order all-pass	Typical:	0.02%
Range:		Maximum:	0.1%
Low:	2.6 ms at 160 Hz	Noise: (Each Output, Controls Flat)	
Midrange:	480 μs at 1.6 kHz	Typical:	
High:	84 μs at 10.0 kHz	Low Output	-91 dBu
Infrasonic Speaker Protection:		Midbass	-92 dBu
Filter Type:	Third-order Butterworth (18-dB-per-octave slope)	Midrange	-86 dBu
Corner Frequency:	32 Hz	High	-87 dBu
Input:		Transient Performance:	Not limited by slew rate or power bandwidth under any normal operating condition, 20Hz-20 kHz
Type:	Active differential	LED Level Indicators: (level-dependent brightness provides enhanced resolution)	
Maximum Level:	+18 dBu	Green:	Input level above -20 dBu
Impedance:	20,000 ohms	Yellow:	Input level above 0 dBu
Com.-Mode Volt. Range:	±24V (net of signal voltage)	Red:	Input or any output level above +16 dBu
Typ. Com.-Mode Rej. Ratio:	-55dB at 1 kHz	Front-Panel Controls, Each Output:	Gain and channel mute
Connector:	Female 3-pin XLR type	Chassis Construction:	Painted steel
Main Outputs:		Colors:	Black with white graphics
Type:	Active floating differential (transformer coupling kits are available as an accessory)	Mounting:	Standard 19-in. rack panel, 1 3/4 in. high, 7 in. deep behind panel
Maximum Level:	+18 dBu		
Impedance:	50 ohms		
Min. Load Impedance for Full Output Level:	600 ohms		
Protection:	Safe for short circuit		
Connectors:	Male 3-pin XLR type		

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

Optional Accessory: TRB-1 set of two output isolation transformers (two sets required)

Power Requirements: 100, 120, 220, 240 VAC 50/60 Hz. User selectable. Supplied wired for 120 VAC with power consumption of 12 watts. A detachable IEC line cord with 120 volt grounding plug is supplied.

Overall Dimensions:

(see Figure 1);

Height: 44 mm (1.73 in.)

Width: 483 mm (19.0 in.)

Depth: 185 mm (7.28 in.)

Net Weight: 2.84 kg (6 lb, 4 oz)

Shipping Weight: 3.35 kg (7 lb, 6 oz)

ELECTRO-VOICE WARRANTY STATEMENT

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunctions occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831) and/or Electro-Voice West at 8234 Doe Avenue, Visalia, CA 93291 (209/651-7777). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have rights which vary from state to state.

Electro-Voice Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from date of original purchase. Additional details are included in the Uniform Limited Warranty statement.



MTX-4A

ELECTRONIC CROSSOVER/EQUALIZER/DELAY UNIT

SERVICE INSTRUCTIONS

*****CAUTION*****

No user serviceable parts inside. Hazardous voltage and currents may be encountered within the chassis. The service information contained within this document is for use only by ELECTRO-VOICE authorized warranty stations and qualified service personnel. To avoid electric shock, DO NOT perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

15 SERVICE INFORMATION

CAUTION: *No user serviceable parts inside. Hazardous voltages and currents may be encountered within the chassis. The service information contained within this document is for use only by **ELECTRO-VOICE** authorized warranty stations and qualified service personnel. To avoid electric shock **DO NOT** perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Otherwise, refer all servicing to qualified service personnel.*

NOTE: *Modifications to **ELECTRO-VOICE** products are not recommended. Such modifications shall be at the sole expense of the person(s) or company responsible, and any damage resulting there from shall not be covered under warranty or otherwise.*

Shown on pages 11 and 12 is the MTX-4A schematic. There are no internal adjustments which can be made.

15.1 Parts Ordering

To order replacement parts, look up the ordering number from the parts list and write or call:

Electro-Voice
600 Cecil Street
Buchanan, MI 49107 U.S.A.
(616) 695-6831
FAX(616) 695-1304
TWX: 810-270-3135

Electro-Voice West
8234 Doe Avenue
Visalia, CA 93291 U.S.A.
(209) 651-7777
FAX(209) 651-0164
TLX 172119

15.2 Factory Service

If factory service is required, ship the unit prepaid to:

Electro-Voice
600 Cecil Street
Buchanan, MI 49107 U.S.A.

Electro-Voice West
8234 Doe Avenue
Visalia, CA 93291 U.S.A.

Enclose a note describing the problem in as much detail as possible. Include other helpful information such as test conditions, where used, how used, etc.

15.3 Technical Assistance

For applications assistance/technical information, write or call:

Electro-Voice
600 Cecil Street
Buchanan, MI 49107 U.S.A.
(616) 695-6831
FAX(616) 695-1304
TWX: 810-270-3135

Electro-Voice West
8234 Doe Avenue
Visalia, CA 93291 U.S.A.
(209) 651-7777
FAX(209) 651-0164
TLX 172119

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

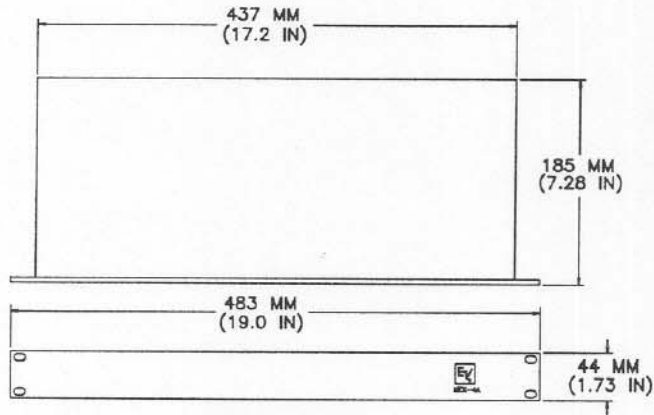


FIGURE 1 — Dimensions

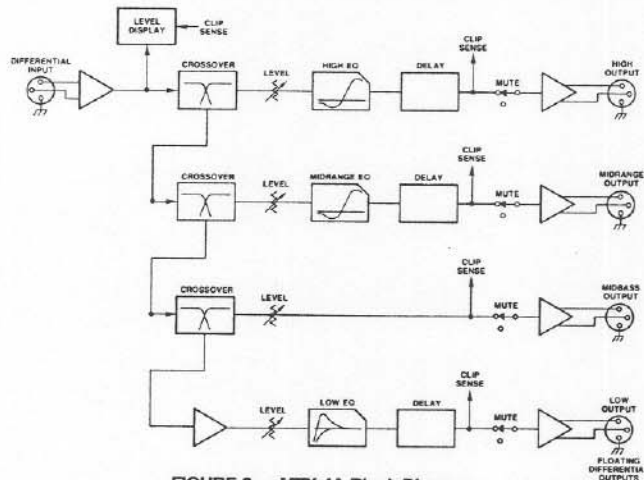


FIGURE 2 — MTX-4A Block Diagram

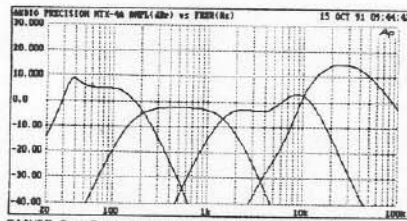


FIGURE 3 — Typical MTX-4A Frequency Response

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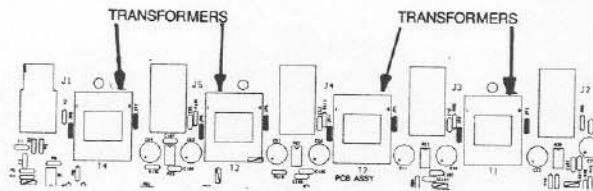


FIGURE 4 — Transformer Mounting Locations (Jumpers to cut are shown as solid rectangles)

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

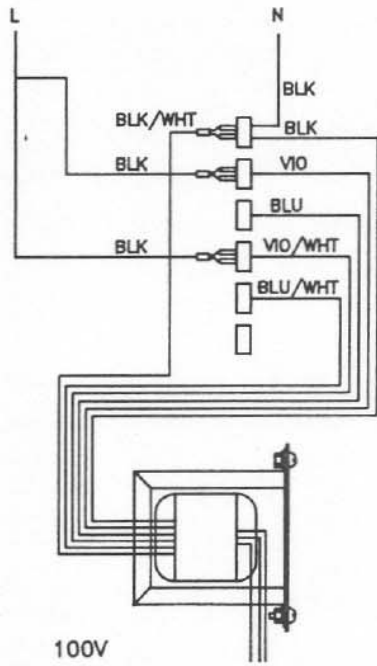


FIGURE 5A

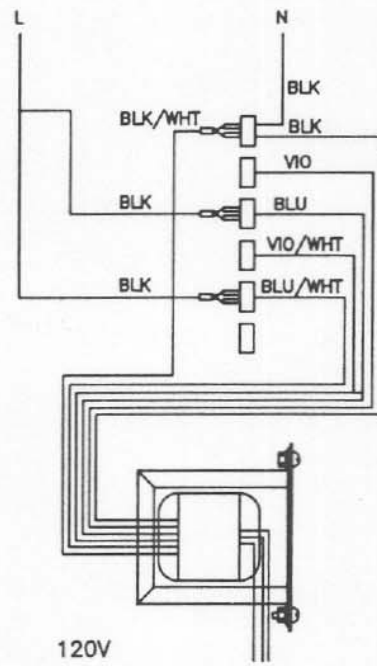


FIGURE 5B

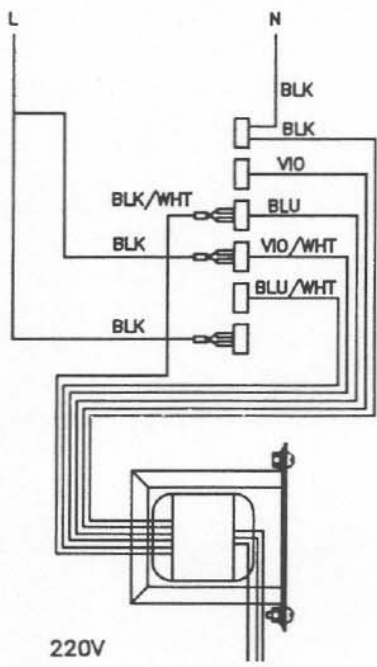


FIGURE 5C

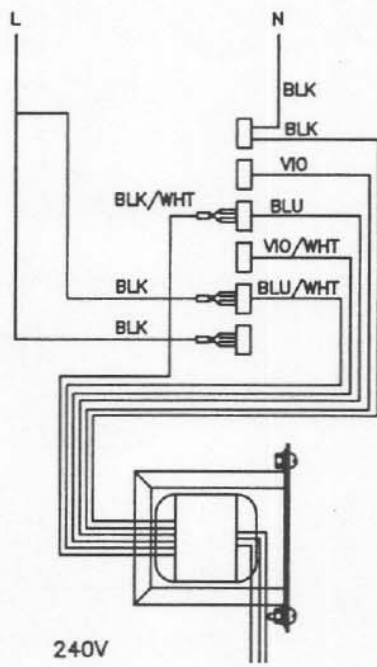
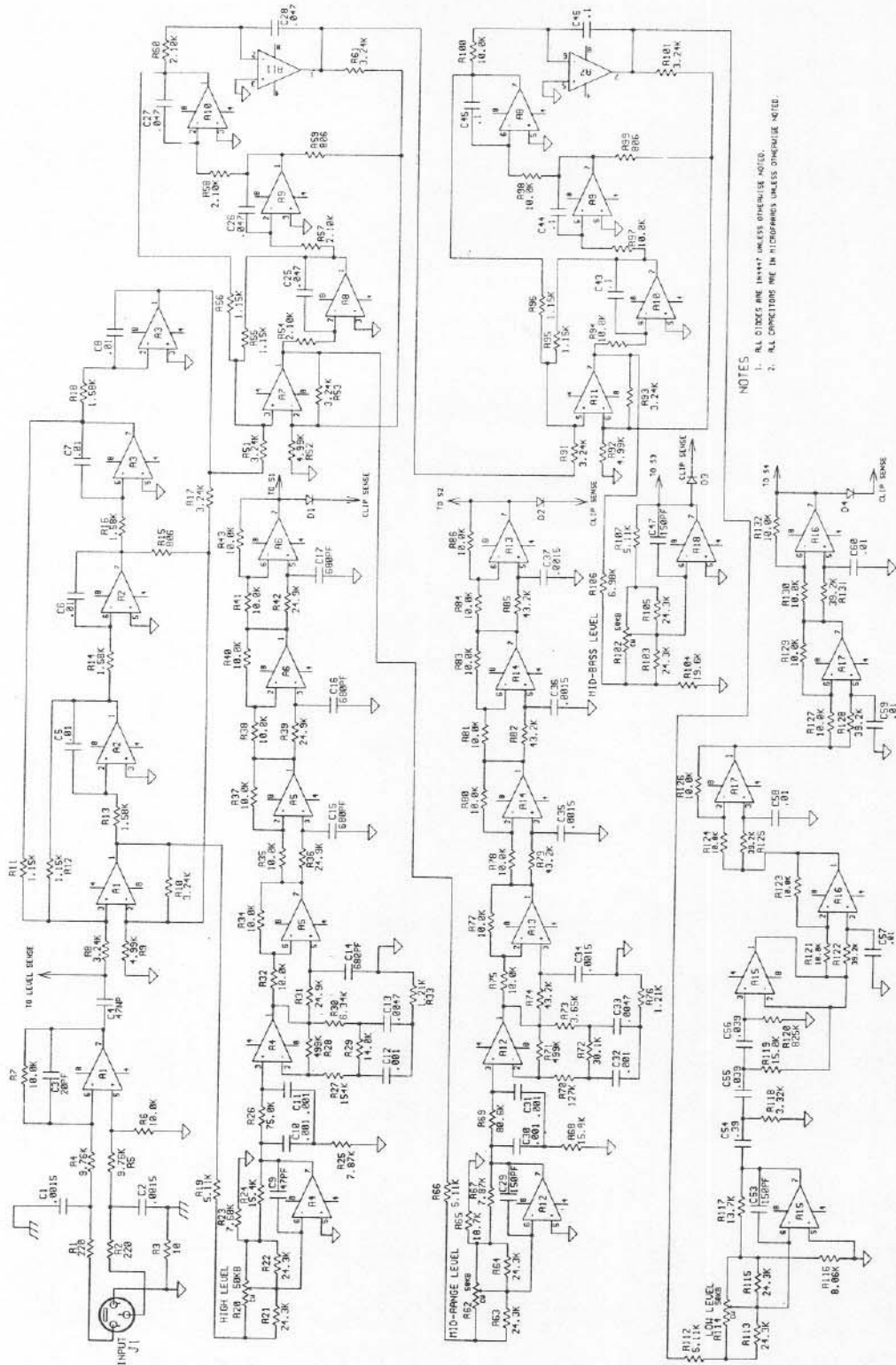


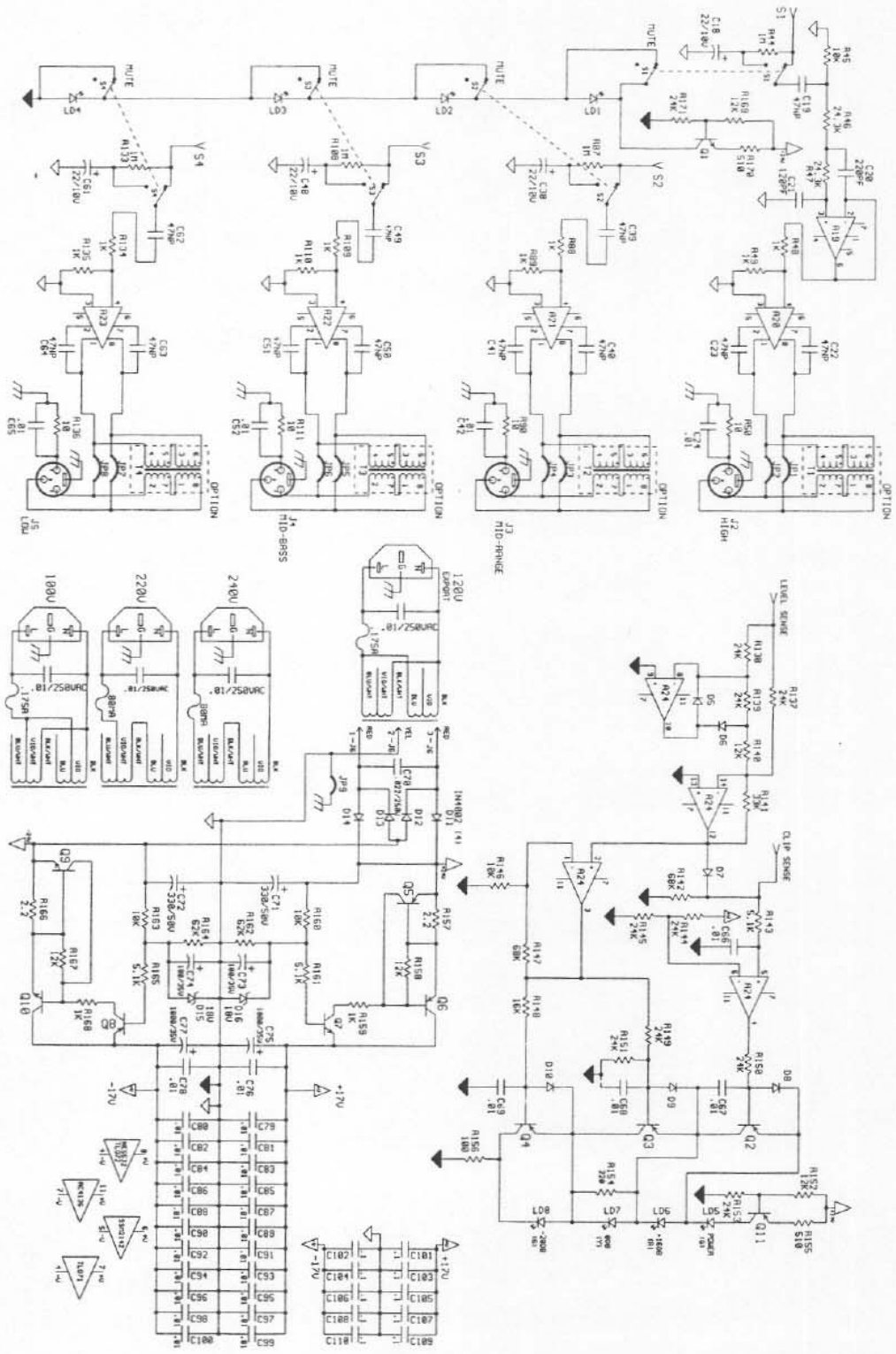
FIGURE 5D

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit



NOTES
 1. ALL DIODES ARE INN47 UNLESS OTHERWISE NOTED.
 2. ALL CONNECTIONS ARE IN MICROGRAMS UNLESS OTHERWISE NOTED.

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit



Schematic of MTX-4A Sheet 2 of 2

Component Parts Listing for the MTX-4A

Reference Designator	Ordering Number	Name and Description
A1, 2, 3, 7	17-01-122832	IC, 5532A
A4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	17-01-124688	IC, TL072CP
A19	17-01-124462	IC, TL071CP
A20, 21, 22, 23	17-01-125208	IC, SSM2142
A24	17-01-027338	IC, 4136
C1, 2	15-02-027326	Capacitor, 1500 PF, 10%, 100V
C3	15-02-026829	Capacitor, 20 PF, 10%, 50V
C4, 19, 22, 23, 39, 40, 41, 49, 50, 51, 62, 63, 64	15-01-027327	Capacitor, 47 μ F, 20%, NP, 25V
C5, 6, 7, 8, 57, 58, 59, 60	15-01-028065	Capacitor, .01 μ F, 2%, 50V, Poly
C9	15-02-037646	Capacitor, 47 PF, 5%, 100V, Disc
C10, 11, 12, 30, 31, 32	15-06-037649	Capacitor, .001 μ F, 2%, 100V, Poly
C13, 33	15-06-037650	Capacitor, .0047 μ F, 2%, 100V, Poly
C14, 15, 16, 17	15-06-037792	Capacitor, 680 PF, 2%, 100V
C18, 38, 48, 61	15-01-026793	Capacitor, 22 μ F, 10V
C20	15-02-107470	Capacitor, 220 PF, 10%, 100v, Disc
C21	15-02-102603	Capacitor, 120 PF, 10%, 100-500V, Disc
C24, 42, 52, 65, 76, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	15-02-100307	Capacitor, .01 μ F, 100V, Disc
C25, 26, 27, 28	15-06-037651	Capacitor, .047 μ F, 2%, 100V, Poly
C29, 47, 53	15-02-027325	Capacitor, 150 PF, 5%, 100V, Disc
C34, 35, 36, 37	15-06-037652	Capacitor, .0015 μ F, 2%, 100V, Poly
C43, 44, 45, 46	15-06-037653	Capacitor, .1 μ F, 2%, 100V, Poly
C54	15-06-037648	Capacitor, .39 μ F, 2%, 100V, Poly
C55, 56	15-06-037654	Capacitor, .039 μ F, 2%, 100V, Poly
C66, 67, 68, 69	15-06-027322	Capacitor, .01 μ F, 5%, 50V, Mylar
C70	15-06-027323	Capacitor, .022 μ F, 20%, 250V
C71, 72	15-01-027318	Capacitor, 330 μ F, 50V
C73, 74	15-01-027316	Capacitor, 100 μ F, 35V
C75, 77	15-01-027317	Capacitor, 1000 μ F, 35V
C101, 102, 103, 104, 105, 106, 107, 108, 109, 110	15-02-028693	Capacitor, .1 μ F, 20%, 50V, Disc
D1, 2, 3, 4, 5, 6, 7, 8, 9, 10	48-01-027340	Diode, 1N4447
D11, 12, 13, 14	48-01-027300	Diode, 1N4006
D15, 16	48-01-027339	Diode, Zener, 18V, 1N4746A
LD1, 2, 3, 4, 6	39-01-026843	LED, Red, T-1
LD7	39-01-027341	LED, Yellow, T-1
LD8	39-01-027342	LED, Green, T-1
Q1, 7, 9	48-03-027337	Transistor, MPS8090
Q2, 3, 4, 5, 8, 11	48-03-027333	Transistor, PN3645
Q6	48-03-027336	Transistor, T1P32
Q10	48-03-027335	Transistor, T1P31
R1, 2, 154	47-01-102062	Resistor, 220 Ω , \pm 5%, $\frac{1}{4}$ W
R3, 50, 90, 111, 136	47-01-102030	Resistor, 10 Ω , \pm 5%, $\frac{1}{4}$ W
R4, 5	47-01-027372	Resistor, 9.76 k Ω , \pm 1%, $\frac{1}{4}$ W, M.F.

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

Reference Designator	Ordering Number	Name and Description
R6, 7, 32, 34, 35, 37, 38, 40, 41, 43, 75, 77, 78, 80, 81, 83, 84, 86, 94, 97, 98, 100, 121, 123, 124, 126, 127, 129, 130, 132	47-03-109437	Resistor, 10 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R8, 10, 17, 51, 53, 61, 91, 93, 101	47-03-124697	Resistor, 3.24 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R9, 52, 92	47-03-124696	Resistor, 4.99 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R11, 12, 55, 56, 95, 96	47-03-124699	Resistor, 1.15 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R13, 14, 16, 18	47-03-037658	Resistor, 1.58 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R15, 59, 99	47-03-027328	Resistor, 806 Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R19, 66, 107, 112	47-03-028695	Resistor, 5.11 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R20, 62, 102, 114	47-06-027344	Potentiometer, 50 k Ω
R21, 22, 46, 47, 63, 64, 103, 105, 113, 115	47-03-037657	Resistor, 24.3 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R23	47-03-119021	Resistor, 7.68 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R24	47-03-037663	Resistor, 15.4 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R25, 67	47-03-037664	Resistor, 7.87 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R26	47-03-037665	Resistor, 75.0 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R27	47-03-037667	Resistor, 154 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R28, 71	47-03-037666	Resistor, 499 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R29	47-03-028160	Resistor, 14.0 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R30	47-03-124490	Resistor, 6.34 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R31, 36, 39, 42	47-03-124681	Resistor, 24.9 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R33, 76	47-03-124676	Resistor, 1.21 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R44, 87, 108, 133	47-01-108491	Resistor, 1 M Ω , $\pm 5\%$, $\frac{1}{4}$ W
R45, 146, 160, 163	47-01-102102	Resistor, 10 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R48, 49, 88, 89, 109, 110, 134, 135, 159, 168	47-01-102078	Resistor, 1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R54, 57, 58, 60	47-03-027370	Resistor, 2.1 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R65	47-03-037668	Resistor, 18.7 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R68	47-03-037669	Resistor, 15.8 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R69	47-03-037670	Resistor, 80.6 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R70	47-03-037671	Resistor, 127 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R72	47-03-037672	Resistor, 30.1 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R73	47-03-037662	Resistor, 3.65 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R74, 79, 82, 85	47-03-037673	Resistor, 43.2 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R104	47-03-037656	Resistor, 19.6 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R106	47-03-026836	Resistor, 6.98 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R116	47-03-028857	Resistor, 8.06 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R117	47-03-037659	Resistor, 13.7 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R118	47-03-037660	Resistor, 3.32 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R119	47-03-124484	Resistor, 15.0 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R120	47-03-037661	Resistor, 825 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R122, 125, 128, 131	47-03-124837	Resistor, 39.2 k Ω , $\pm 1\%$, $\frac{1}{4}$ W, M.F.
R137, 138, 139, 144, 145, 149, 150, 151, 153, 171	47-01-102111	Resistor, 24 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R140, 152, 158, 167, 169	47-01-102104	Resistor, 12 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R141	47-01-102114	Resistor, 33 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R142, 147	47-01-102123	Resistor, 68 k Ω , $\pm 5\%$, $\frac{1}{4}$ W

Installation and Operating Instructions for the Electro-Voice MTX-4A Xover/Eq/Delay Unit

Reference Designator	Ordering Number	Name and Description
R143, 161, 165	47-01-102095	Resistor, 5.1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R148	47-01-102107	Resistor, 16 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
R155, 170	47-01-102071	Resistor, 510 Ω , $\pm 5\%$, $\frac{1}{4}$ W
R156	47-01-102054	Resistor, 100 Ω , $\pm 5\%$, $\frac{1}{4}$ W
R157,166	47-03-026840	Resistor, 2.2 Ω , $\pm 5\%$, $\frac{1}{4}$ W
R162, 164	47-01-102122	Resistor, 62 k Ω , $\pm 5\%$, $\frac{1}{4}$ W
S1, 2, 3, 4	51-02-026810	Switch, Push-button
T1	56-08-026893	Transformer, Power
TS1	21-01-026799	Strip, terminal, 6 Pos.
CN1	21-02-026845	Connector, 3 Pin IDT
J1	21-01-124470	Connector, XLR Female
J2, 3, 4, 5	21-01-124642	Connector, XLR Male
	21-01-027343	Connector, receptacle, 2 pin
	21-02-026774	Receptacle, AC Power
	21-01-026804	Header, 3 Pin, W/Lock
	15-02-026884	Capacitor, .01 μ F, 250V, Ceramic UL Aprvd.
	51-07-026796	Cap, Fuse
	51-04-027350	Fuse, .175A 250V
Power Indicator	39-01-027342	LED, Green, T-1
	24-04-026780	Knob, Small
	24-04-026896	Knob, Push
	60-06-124962	Cable, Power

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