



Electro-Voice®
ELX-1A
BROADCAST MIXER

OWNER'S OPERATING AND SERVICE INSTRUCTIONS

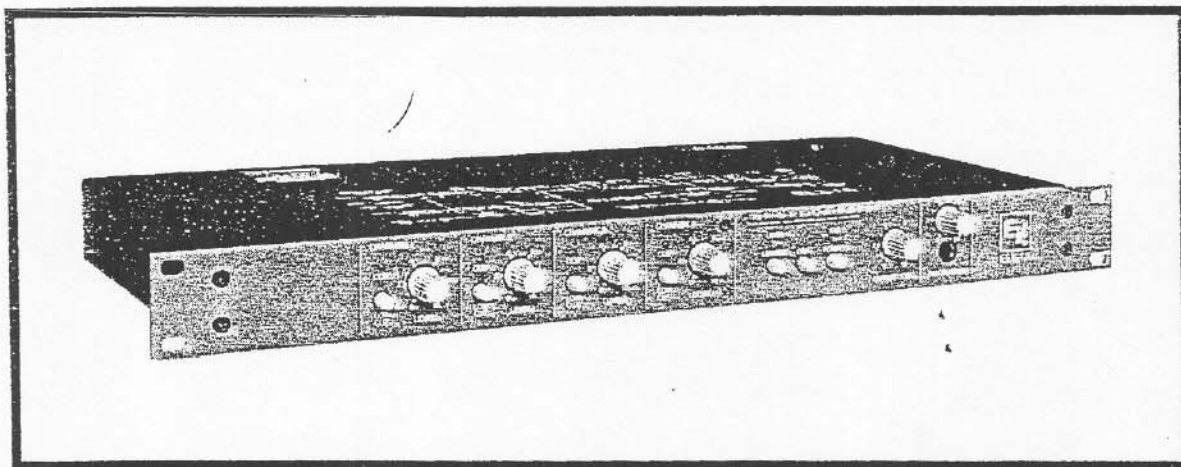
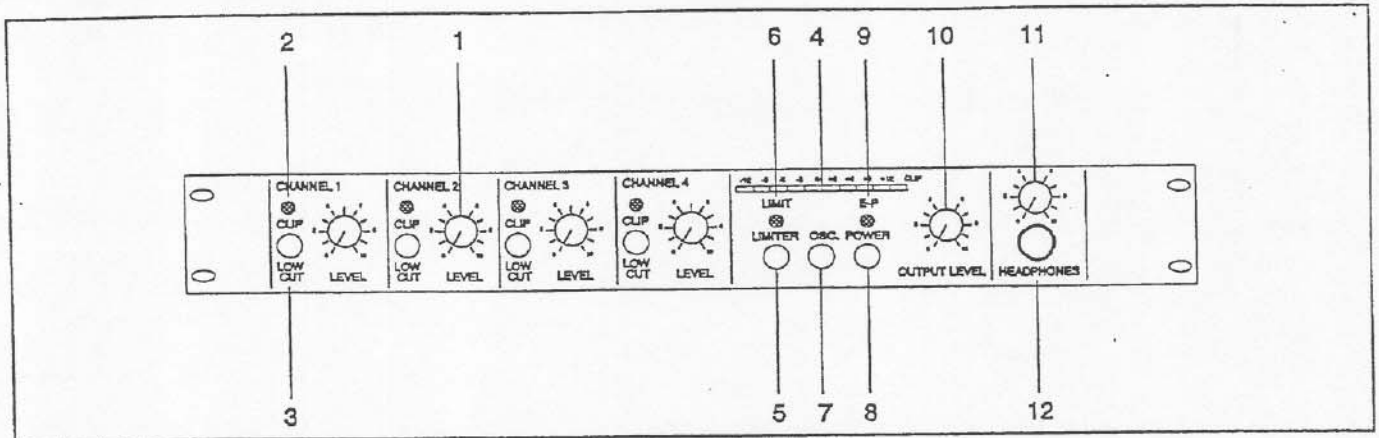


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Pictorial 1 Front Panel Diagram

1. OPERATION

1.1 Front Panel Connection and Controls (Referring to Pictorial 1)

1. INPUT LEVEL CONTROLS

These level controls simultaneously adjust the preamplifier gain and mix the input channels to the output.

2. INPUT CLIP INDICATORS

These LEDs light when the preamplifier is clipping. The level control should be turned down in this situation.

3. LOW-CUT CONTROLS

These controls attenuate the low frequency response (at 100 Hz) of the input channels. Wind, handling and background noises may be reduced by switching the low-cut control at the appropriate input channel.

4. DISPLAY

This display indicates audio output levels. TO AVOID DISTORTION, DO NOT EXCEED "0 dB". The display will show a bar graph when the AC power is used. When external DC is used, the display will switch to a dot mode, lighting just one segment at a time to conserve power.

5. LIMITER SWITCH

This switch activates the limiter which protects the output from clipping distortion that might otherwise occur during unexpected increases in program level.

6. LIMITER LED INDICATOR

This LED lights when the limiter has been enabled.

7. OSCILLATOR SWITCH

This switch activates the built-in oscillator which is used for level checks or verifying operation of a system. The output is a 1 kHz sine wave. The Output Level control sets the level, which is indicated on the display. The oscillator signal is also available at the Stack Output jack at a fixed level of -10 dBu.

8. POWER SWITCH

This switch turns the mixer on or off.

9. ELECTRO-PULSE™ POWER STATUS INDICATOR

This LED will light steadily during AC operation. When external DC power is used, the LED will flash to indicate that the power is on. The flash rate corresponds to the supply voltage. The indication rate ranges from one second per flash to about five seconds per flash (low supply voltage). If the supply voltage drops to 18 volts or less, the Electro-Pulse LED will stop flashing.

10. OUTPUT LEVEL CONTROL

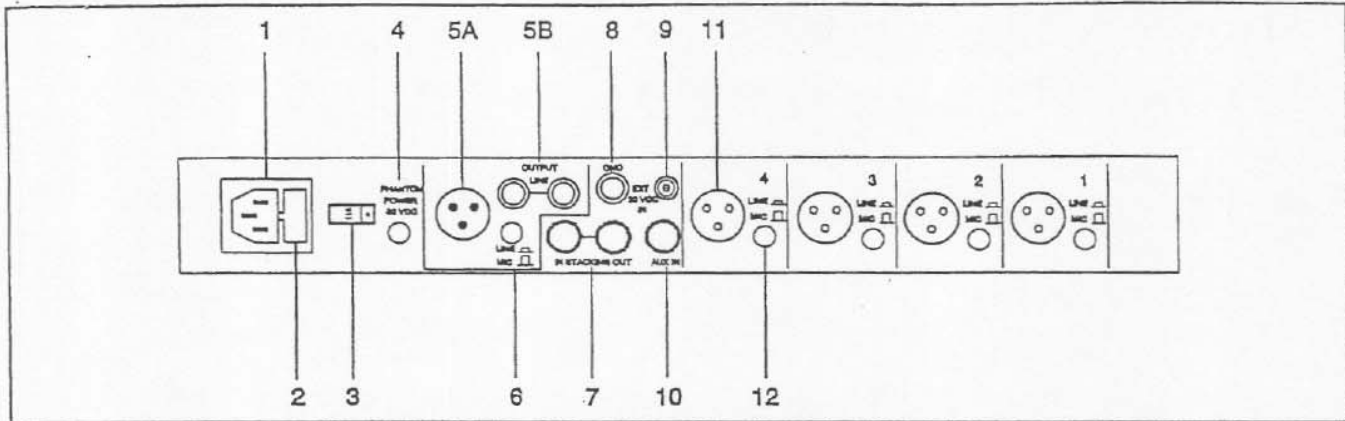
This control adjusts the level of the main output. The main output signal is available from two transformer windings, one connected to the Mic/line Output XLR-type connector and the other to the Line Output binding posts.

11. HEADPHONE LEVEL CONTROL

This control adjusts the gain for the device connected to the Headphone Output Connector independently from the Output Level Control. This allows an output to be cued or a mix to be adjusted before the master volume control is adjusted.

12. HEADPHONE OUTPUT CONNECTOR

This three-conductor jack is provided on the front panel to drive stereo headphones or a cue speaker.



Pictorial 2 Back Panel Diagram

1.2 Back Panel Connections and Controls
(Referring to Pictorial 2)

1. AC POWER CONNECTOR

This receptacle is for an AC power cord (supplied with the unit).

2. FUSE HOLDER

This receptacle is for a T100 mA/250 V slow blow fuse (supplied with the unit).

3. AC VOLTAGE SELECTOR SWITCH

This switch selects AC line voltage from 115 Vac 50/60 Hz to 230 Vac 50/60 Hz. When using the unit at 230 Vac, the user must replace the fuse with the T50 mA/250 V slow blow fuse supplied with the unit in the shipping carton.

4. PHANTOM POWER SWITCH

This switch applies phantom power to the microphone level inputs. Pins 2 and 3 have 30 Vdc with a source resistance of 3600 ohms. Pin 1 is the ground reference.

5. MAIN OUTPUT CONNECTORS

The main transformer-isolated output has two different connections, each with its own secondary winding:

A. MIC/LINE OUTPUT CONNECTOR

This 3-pin male XLR-type connector is for both mic and line level outputs.

B. LINE OUTPUT CONNECTOR

This binding post connection is for a line-level output.

6. OUTPUT MIC/LINE LEVEL SELECT SWITCH

This switch selects either the mic or line output level

for the XLR Main Output Connector.

7. STACKING CONNECTORS

These 1/4-inch jacks are for the connection of additional mixers to increase the number of inputs available.

8. GROUND CONNECTOR

This jack is for grounding external devices.

9. EXTERNAL DC CONNECTOR

This power jack is for an external 30-volt DC supply to power the mixer.

10. AUXILIARY INPUT CONNECTOR

This 1/4-inch phone jack is for the output of another mixer or other audio equipment to mix with the four input channels. The input is line level (-10 to +4 dBu) and buffered.

11. INPUT CONNECTORS

These 3-pin female XLR type connectors are for microphone and line-level inputs.

12. INPUT MIC/LINE LEVEL SELECT SWITCHES

These switches select either the mic or line input levels for each input channel. The line-level position should be used when the nominal input level is above -20 dBu.

2. POWER CONNECTIONS

The power transformer has two independent 115 Vac primary windings. The windings can be connected in series to achieve a 230 Vac, 50/60 Hz requirement.

2.1 For 115 Vac, 50/60 Hz Operation

The ELX-1A is normally selected for 115 Vac operation from the factory. However, it is always pru-

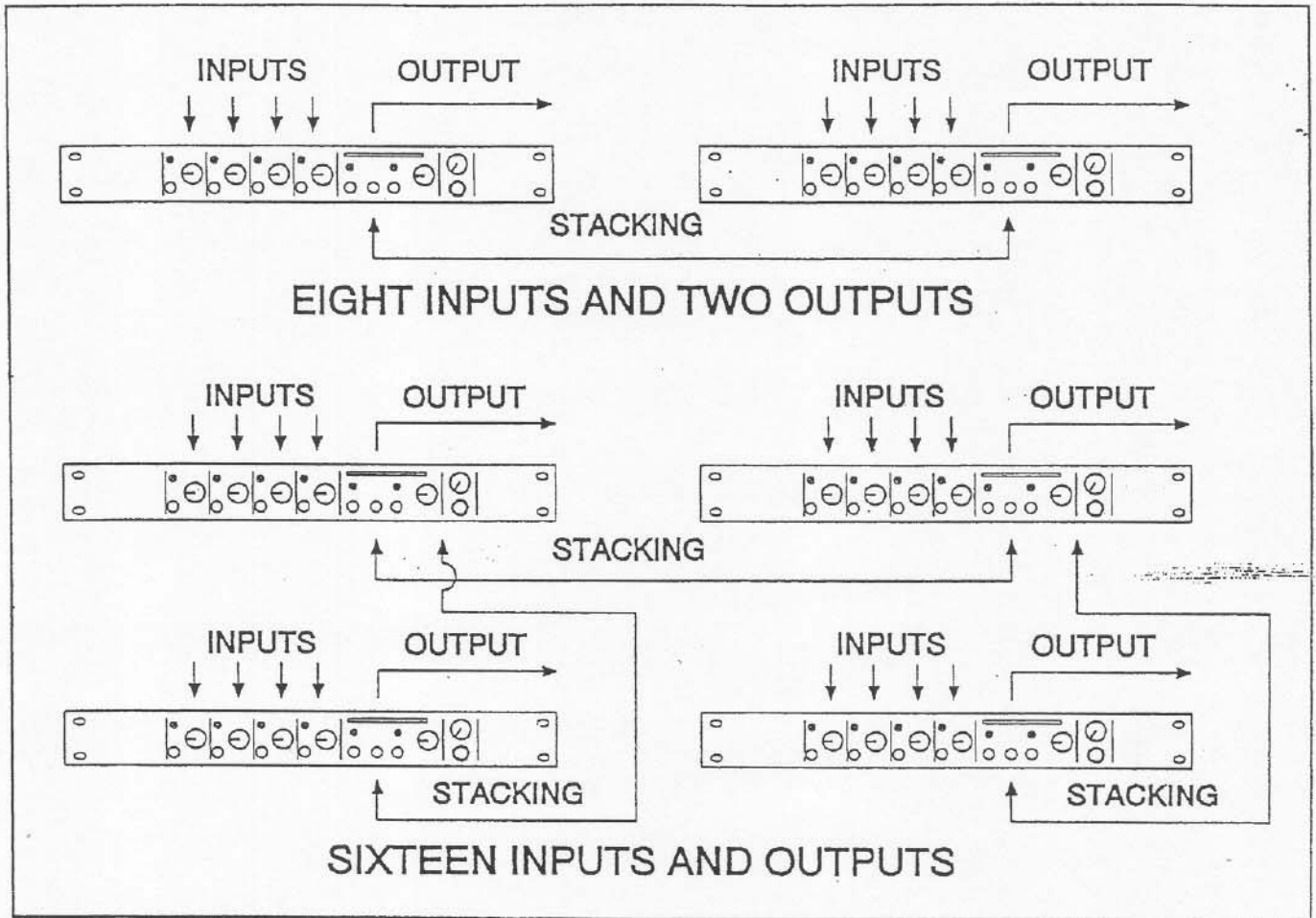


Figure 1 Possible Stacking Connections

dent to check the voltage selector switch and fuse size before powering the unit. The voltage selector switch must be in the 115 Vac position with a T100 mA/250 V fuse installed into the AC receptacle as shown in Pictorial 2, Number 3.

2.2 For 230 Vac, 50/60 Hz Operation

To connect the power transformer's primary windings for 230 Vac operation, move the voltage selector switch so the 230 label is fully visible. Replace the fuse in the AC receptacle with the T50 mA/250 V fuse supplied with the unit. Install the 230 Vac 50/60Hz and the T50 mA/250 V decals in the proper positions.

3 INSTALLATION

3.1 Rack Mounting

The mixer may be installed in a standard 19 inch (48.3 cm) equipment rack. It requires 1.75 inches (4.45 cm) of vertical rack space and secures to the rack cabinet with the four rack mount screws and cup washers provided in the hardware kit.

3.2 Ventilation

The mixer must be adequately ventilated to avoid excessive temperature rise. It should not be used in areas where the ambient temperature exceeds 50°C (122°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 (amplifier, EQ, mixer, etc.). Do not let the thermometer touch the metal chassis because the chassis will be hotter than the ambient air. If the air temperature exceeds 50°C (122°F), the equipment should be spaced at least 1.75 inches apart or a blower installed to provide sufficient air movement within the cabinet.

4 SIGNAL CONNECTIONS

4.1 Input Signal Connections

Female XLR-type connectors are used for the balanced mic/line inputs. Pin 2 is +, pin 3 is -, and pin 1 is the shield-ground connection. Next to each input connector is a mic/line level select switch which

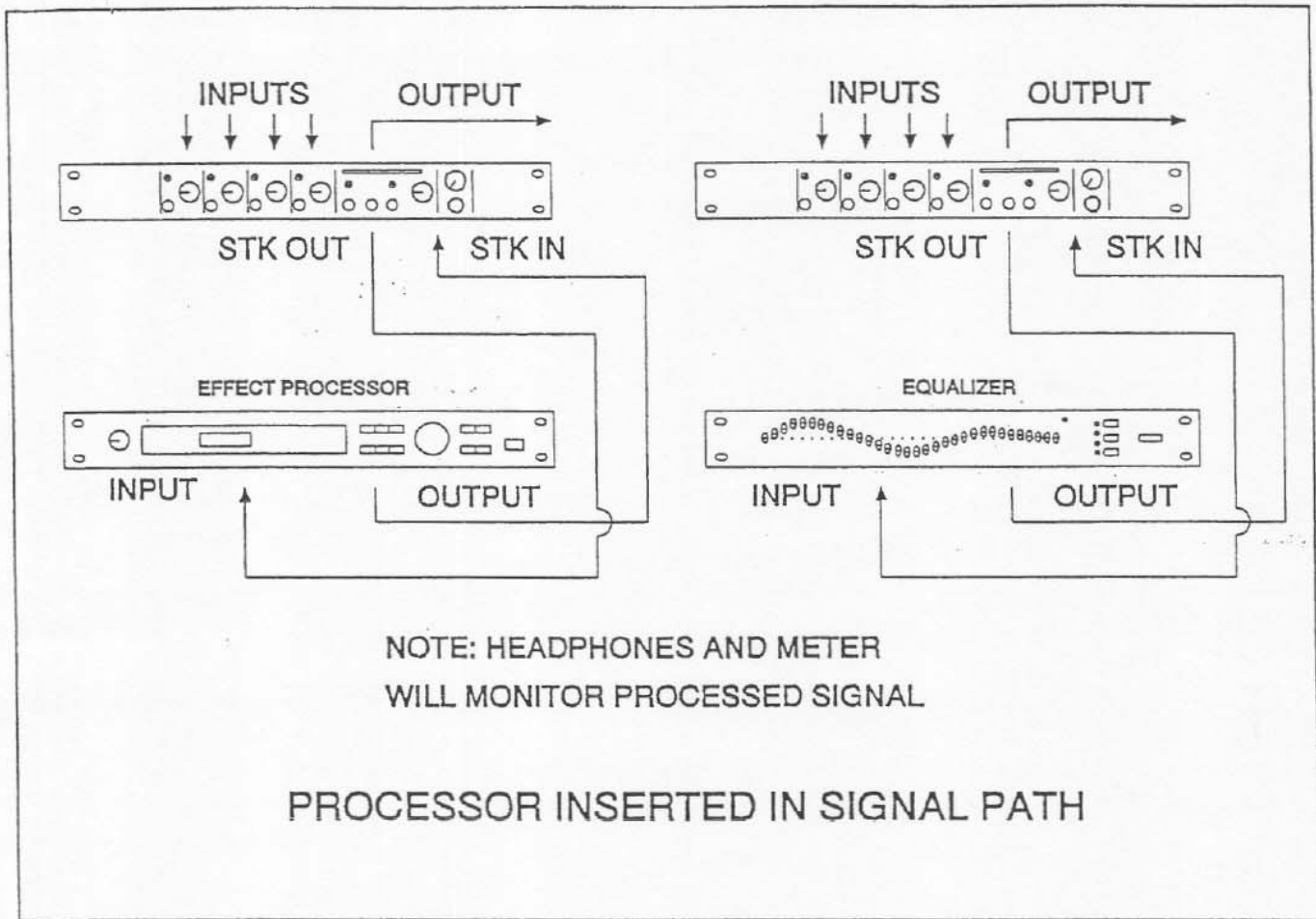


Figure 2 Modified Stacking with Signal Processors

allows any input level to be accommodated. The line level position should be used when the nominal input level is above -20 dBu.

4.2 Stacking Connections

The two stacking jacks are wired at the factory for passive mix bus connections. The tip of the ¼-inch phone jack is positive and the sleeve is ground (shield). Two ELX-1A's can be connected by patching a stacking jack on one mixer to a stacking jack on the other mixer; it makes no difference which jack is used. Additional ELX-1A's can be added using one extra patch cord per mixer (see Figure 1). Each Output Level will control only that mixer's output, which consists of the complete mix of all input channels. These jacks can also be used as fixed-level outputs; they are unaffected by the Output Level control.

The stacking jacks can be converted to normal or for inserting auxiliary equipment in the signal path. This modification is described in the SERVICE section, page 12. If this modification is performed, other connection possibilities will exist (see Figure 2).

Standard ¼-inch, two-conductor (or three-conductor) patch cords can be used.

The connections in Figure 1 (unmodified stacking jacks) result in some drop in signal level, which is partially compensated by the use of more input channels. These connections use simple patch cords. In Figure 3, no level loss occurs. If three or more mixers are stacked and all outputs need to have the complete mix, some Y-connectors will be required.

4.3 Auxiliary Input Connection

This ¼-inch phone jack is for the output of another mixer or other audio equipment to mix with the four input channels (see Figure 4). The tip of the ¼-inch phone jack is the positive and the sleeve is the ground (shield). The input is line level (-10 to + 4 dBu) and buffered.

4.4 Main Output Connections

The main transformer isolated output has two different connections, each with its own secondary winding. The binding post connection can accom-

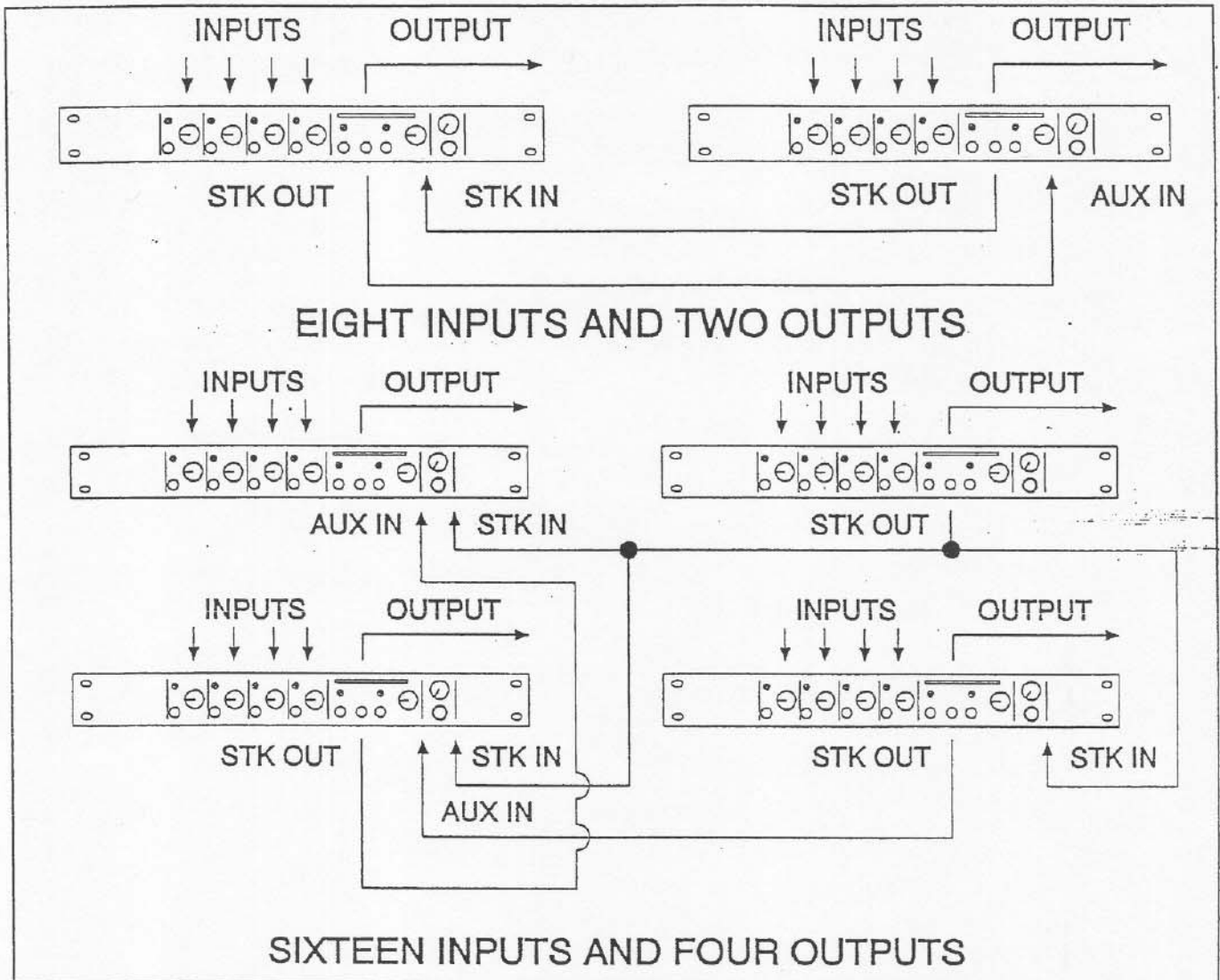


Figure 3 Modified Stacking Jack Connections

modate a telephone line. The telephone company may require an interface device between the telephone line and the mixer. The other winding has a 3-pin male XLR connector with a level switch for line or mic level. Like the inputs, pin 2 is +, pin 3 is -, and pin 1 is shield ground.

4.5 Headphone Output Connection

The Headphone Output jack can be used as a separate line-level output. Like the main output, the signal will be clean, with very-low distortion and noise. A tip/ring/sleeve 1/4-inch phone plug should be used with this jack. If a two-conductor plug is used, it should be inserted only part way (to the first detent).

5 EXTERNAL DC POWER SOURCE

For external DC power operation, use a Switchcraft S-760 or equivalent power plug to insert

into the 1/8-inch diameter pin-type jack. Place a 250 mA fuse in series with the power source. The external power supply voltage should be between 24 and 45 volts for optimum performance, although the mixer will operate at lower voltages.

6 CALIBRATION

(Before calibrating the mixer, connect it to the necessary external equipment as detailed in the INSTALLATION section, page 3.)

6.1 Input Level Controls

To optimize the input levels, apply the loudest signal that will be encountered to the input. Set the Input Level Control as high as possible without lighting the Input Clip Indicator. Then reduce the level if necessary to create the desired mix.

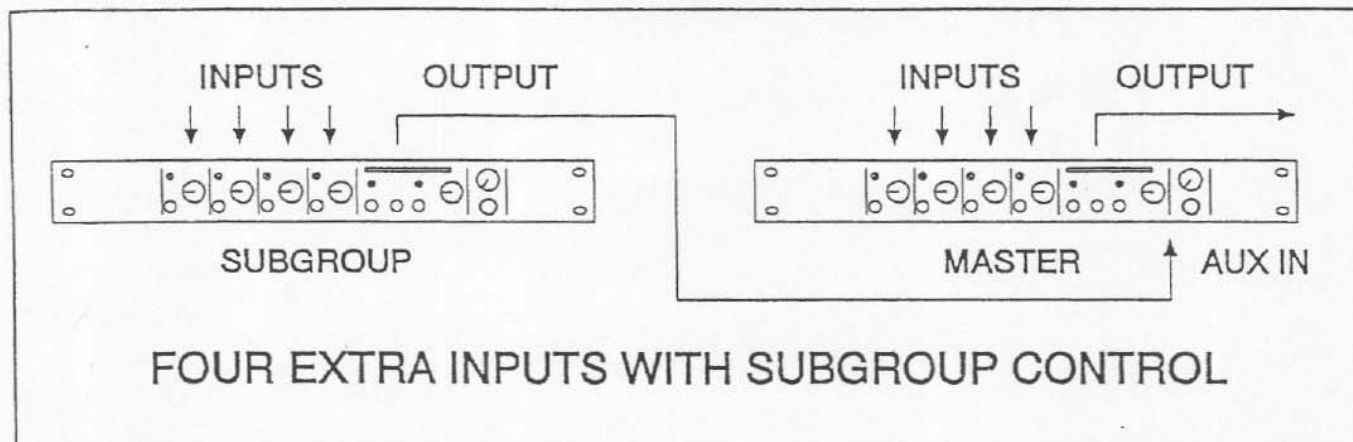


Figure 4 Using the Auxiliary Input

6.2 Display

A ten-segment LED bargraph shows the level at the main outputs. The meter responds to peaks; its rise and fall times conform to the widely accepted Peak Program Master Standard, BS4297. By observing peak signal levels, one can make use of the available headroom in the mixer (or following equipment) without the risk of clipping the signal. In normal operation, signal peaks should reach into the yellow display range (+ 3 dB to + 12 dB). The 0 dB reference level is factory calibrated to read 0 dBu (sine wave).

To change the reference level (Refer to the Schematic in Figure 8, page 15):

1. Turn on the mixer with AC power.
2. Turn all level controls down.
3. Press the oscillator switch on.
4. Connect a 600-ohm (or desired) load and a voltmeter to the Main Output (either the binding posts or XLR-connector).
5. Increase the Master Output Level Control until the output reaches 0 dBu (0.775 V) or the desired reference.
6. Adjust VR223 until the 0 dB LED just lights. VR223 can be accessed through a hole in the PC board.

The last segment of the display is an LED clip indicator. It senses clipping at two places; the mix amplifier output, and the main output. If reducing the Output Level control does not affect the clip indication, then the mix amplifier is being overdriven. The actual clip threshold will drop if the supply voltage drops.

The time constants of the display can be changed to match those of a VU meter (the clip indicator will still operate normally). The meter indication will then correlate more with perceived loudness than with actual signal voltage. This modification is described in the SERVICE section, page 12.

6.3 Limiter

The output level is limited to + 14 dBu. The yellow limit indicator above the Limiter switch will light whenever limiting (gain reduction) occurs (see Figure 5). If large amounts of limiting are anticipated, be sure that the Input Level controls are low enough so that the input preamps will not clip even with the lowest sound that might occur.

The limiter threshold (+ 14 dBu) can be changed to a different level. This modification is described in the SERVICE section, page 12.

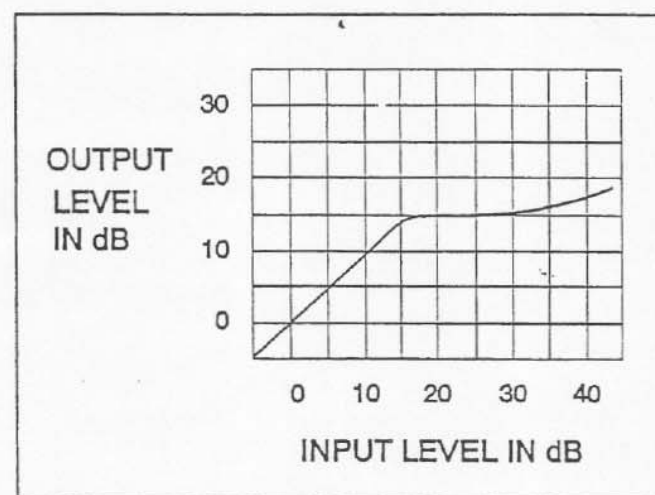


Figure 5 Limiter Response

6.4 Oscillator

To calibrate the oscillator:

1. Turn on the mixer with AC power.
2. Set all level controls down.
3. Press the oscillator switch and measure the output voltage at the Stacking Output Jack.
4. Adjust VR390 for -10 dBu (245 mV). The output should be a clean sine wave.

7 IN CASE OF PROBLEMS

Please check the following items:

1. Verify that the mixer is properly connected to an AC or DC power source and the source is active.
2. Verify that the input connections are properly made.
3. Verify that the output connections are properly made.
4. Check the input and output cables for proper wiring and continuity.
5. Check the signal source.

8 SPECIFICATIONS

Conditions:

1. 0 dBu = 0.775 Vrms
2. 0 dBm = 1 mW = 0.775 Vrms across 600 Ω load.
3. Measurements are referred to a 1 kHz, 0 dBu sine wave input unless noted.
4. Measurement bandwidth is restricted to 30 kHz unless noted.

Frequency Response:

Any input to any output:
30 Hz-20 kHz +0, -1 dB
(Ref. 1 kHz, 0 dBm output, 500 kHz measurement bandwidth)

%(THD+Noise):

Mic/Line output:
< 0.15%, 20 Hz to 20 kHz at + 4 dBm
< 0.15%, 50 Hz to 20 kHz at + 18 dBm
Stack or Headphone Output:
<0.1%, 20 Hz to 20 kHz at + 18 dBm

Noise:

EIN, MIC Input, Max Gain, 150-ohm Source:
-130 dBm (typical, A-Weighted bandwidth)

Output Noise:

(A-Weighted bandwidth)
Inputs Down, Master Down: \leq -82 dBm
Inputs Down, Master at Nominal: \leq -81 dBm
Inputs Down, Master at Full Up: \leq -68 dBm

Maximum Voltage Gain:

(\pm 2 dB)
Mic Input to Main Outputs: 91 dB
Mic Input to Headphone Output: 82 dB
Mic Input to Stack Output (modified): 63 dB

Common Mode Rejection:

60 dB, 20 Hz to 20 kHz (typ)

Phantom Power:

30 Vdc, 3.6 K Ω Equivalent Source Resistance,
Mic Input Only

Low-Cut Filter:

Slope: 6 db per octave
Corner Frequency: 100 Hz

Clip LED's:

Light 1 dB below clipping, follow supply voltage

Limiter Threshold:

(Changeable, see page 12)
+ 14 dBu, \pm 0.5 dB (Ref. 17 dBm
Line Output)

Oscillator:

Frequency: 1 kHz
Sine Wave Distortion: < 1.5%

Display:

(Changeable to VU, see page 12)
Range: -12 dBu to clipping
Rise Time: 10 Ms
Fall Time: 3 s

Shorting Protection:

Any output may be shorted indefinitely without causing damage.

Operating Temperature Range:

-200°C to +600°C (-40°F to +1400°F)

Power Requirements:

AC: 115 Vac, 50/60 Hz 12 watts
230 Vac, 50/60 Hz 12 watts

External DC:

24 to 45 Vdc, 100 mA maximum

Enclosure:

Dark gray with white graphics

Dimensions:

Height: 1.75 in. (4.45 cm)
Depth: 8.25 in. (20.96 cm)
Width: 19.0 in. (48.26 cm)

Net Weight: 7.4 lb (3.36 kg)

Shipping Weight:

Operating and Service Instructions for the Electro-Voice ELX-1A Broadcast Mixer

INPUT SPECIFICATIONS

Input Impedance:

Mic:	3.5k Ω
Line:	30k Ω
Aux:	15k Ω
Stacking:	2k Ω
Stacking, Modified:	22k Ω

Nominal Source Impedance:

Mic:	300 Ω
Stack:	2k Ω

Nominal Level:

Mic:	-50 dBu
Line:	-10 dBu
Aux:	-10 dBu
Stacking:	-10 dBu
Stacking, Modified:	-10 dBu

Maximum Level:

Mic:	-5 dBu
Line:	+35 dBu
Aux:	+18 dBu
Stacking:	+18 dBu
Stacking, Modified:	+30 dBu

OUTPUT SPECIFICATIONS

Output Impedance:

Main:	
Binding Posts:	60 Ω
XLR-Line Level:	60 Ω
XLR-Mic Level:	10 Ω

Headphone:

Left Channel:	43 Ω
Right Channel:	43 Ω
Stacking:	2k Ω

Nominal Load Impedance:

Main:

Binding Posts:	600 Ω
XLR-Line Level:	600 Ω

Headphone:

Left Channel:	8 Ω to 600 Ω
Right Channel:	8 Ω to 600 Ω

Stacking:

2k Ω

Nominal Level:

Main:

Binding Posts:	+4 dBu
XLR-Line Level:	+4 dBu
XLR-Mic Level:	-44 dBu

Headphone:

8 Ω Load:	-11 dBu
600 Ω Load:	-4 dBu

Stacking:

-10 dBu

Maximum Level:

Main:

Binding Posts:	+12 dBu
XLR-Line Level:	+12 dBu
XLR-Mic Level:	-30 dBu

Headphone:

8 Ω Load:	-1 dBu
600 Ω Load:	+18 dBu
Stacking:	+12 dBu

Electro-Voice continually strives to improve products and performance. Therefore, the specifications are subject to change without notice.

ELECTRO-VOICE LIMITED WARRANTY STATEMENT

Electro-Voice electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. If such malfunction 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; or (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 (800/685-2606) and/or Electro-Voice West at 8234 Doe Avenue, Visalia, CA 93291 (800/825-1242).

Incidental and Consequential Damages Excluded: Product repair or replacement and return to the customer are the 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 other rights which vary from state to state.



ELX-1A Broadcast Mixer

SERVICE INSTRUCTIONS

* * * CAUTION * * *

NO USER SERVICEABLE PARTS INSIDE. EXTREMELY HAZARDOUS VOLTAGES AND CURRENTS MAY BE ENCOUNTERED WITHIN THE CHASSIS. THE SERVICING INFORMATION CONTAINED WITHIN THIS DOCUMENT IS ONLY FOR USE BY ELECTRO-VOICE'S AUTHORIZED WARRANTY REPAIR 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.

9 SERVICE INFORMATION

WARNING: *No user serviceable parts inside. Extremely hazardous voltages and currents may be encountered within the chassis. The servicing information contained within this document is only for use by Electro-Voice authorized warranty repair 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.*

NOTICE: *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 therefrom shall not be covered under warranty or otherwise.*

9.1 To Remove the Display Board

1. Remove the three philip screws from the top of the display board and pull upward at the back of the board until the connector is disengaged.
2. When reinstalling, be sure the bargraph and individual LEDs are properly placed on the front panel.

9.2 To Service the Main Board

1. Remove the nuts on the pots and the screws holding the printed circuit board.
2. If power is to be applied while servicing, be sure to ground the power supply to the chassis.
3. The rear board is held by three screws and five XLR-type connectors. The XLR-type connectors can be removed by rotating the screw in the small hole at the contact end of each connector. The board can then slide out toward the front.

9.3 Change the Display Time Constants to Match Those of a VU Meter
(Refer to the schematic in Figure 8, page 15)

1. Replace C371 with a 10 μ f capacitor.
2. Replace D333 with a shorting jumper.
3. Recalibrate the display with VR223. VR223 can be accessed through a hole in the PC board.

9.4 To Change the Limiter Threshold
(Refer to the schematic in Figure 7, page 14)

The limiter threshold can be set for levels from + 4 dBm through -14 dBm.

1. To change the limiter threshold to + 8 dBm, install IN5226 or an equivalent Zener Diode in the location marked "Note 2" on the schematic.
2. For a + 4 dBu threshold, install a shorting jumper instead of IN5226.

9.5 To Convert the Stacking Jack for Insert Patching (Refer figure 7, page 14)

1. Remove the jumper JP1-1 and install it in JP1-2, then remove JP2-1 and install it in JP2-2.

9.6 Ordering Replacement Parts

To order replacement parts, look up the ordering number from the component parts listing and call E.S.T. (800) 685-2606, FAX (800) 955-6831, for P.S.T. call (800) 825-1242, FAX (800) 999-1243, or write:

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

9.7 Technical Assistance

For applications assistance or other technical information, contact the Technical Services Manager. You can call (800) 234-6831, FAX (616) 695-4743, or write:

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

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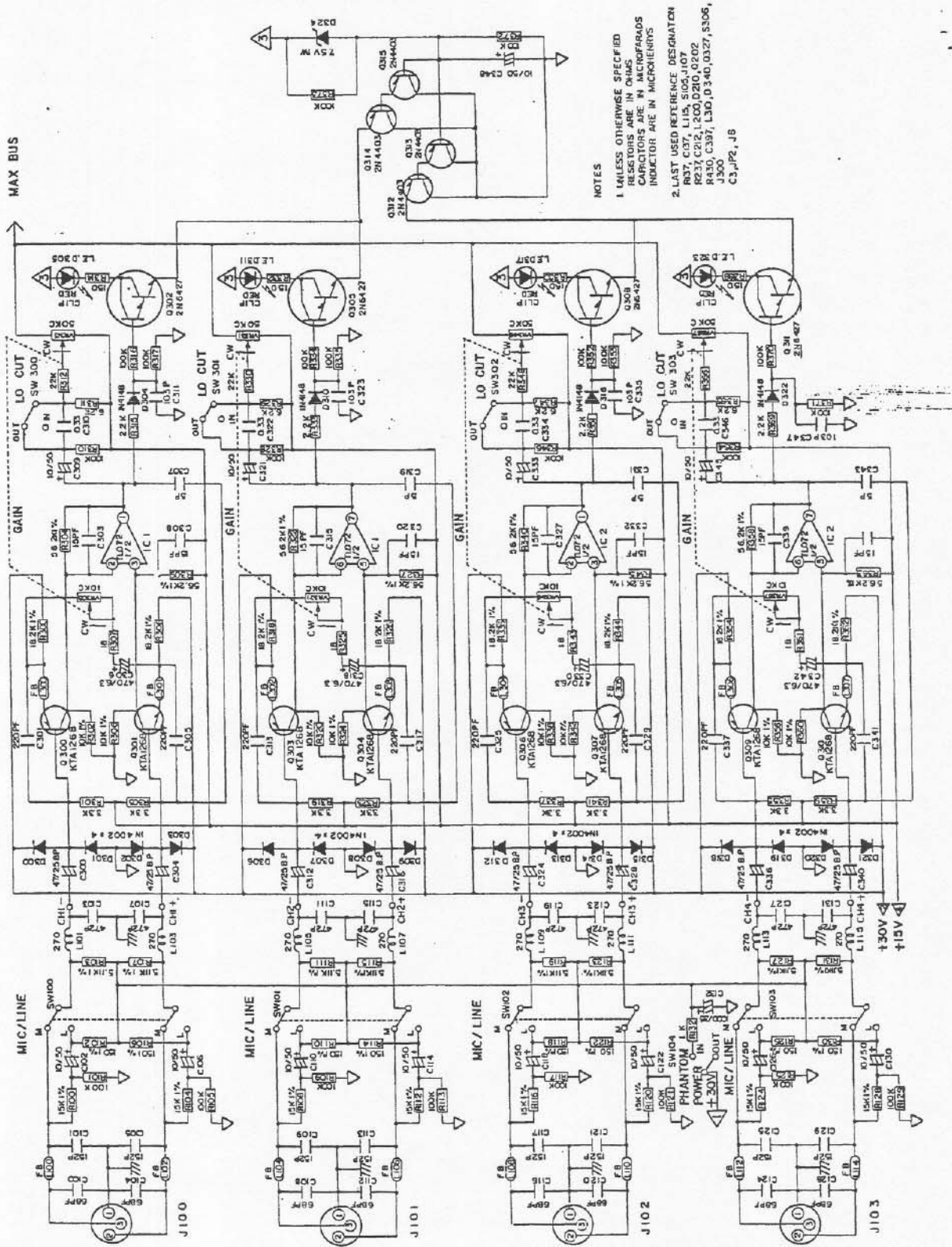


Figure 6 Schematic of the Input Section

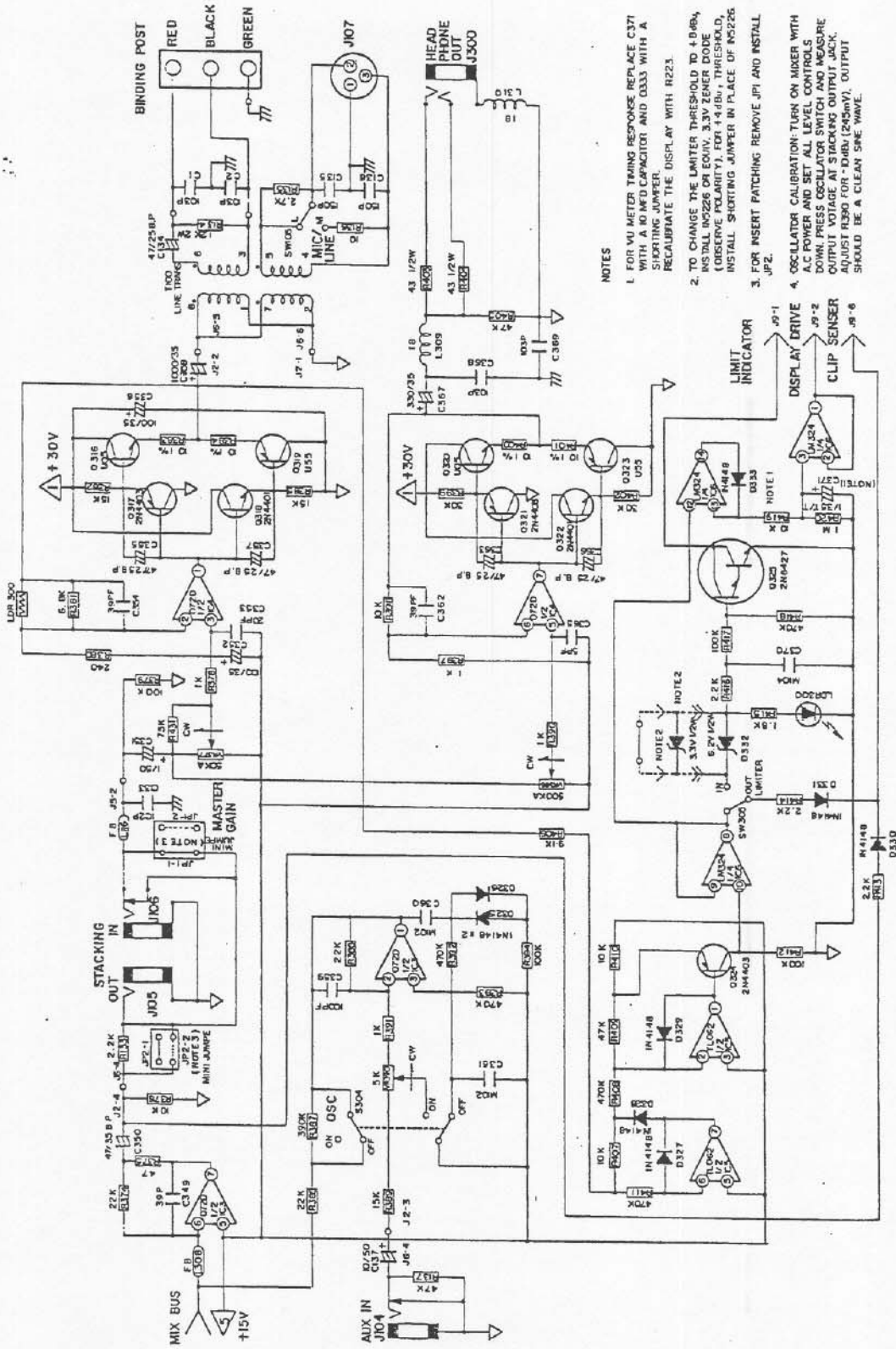


Figure 7 Schematic of the Output Section

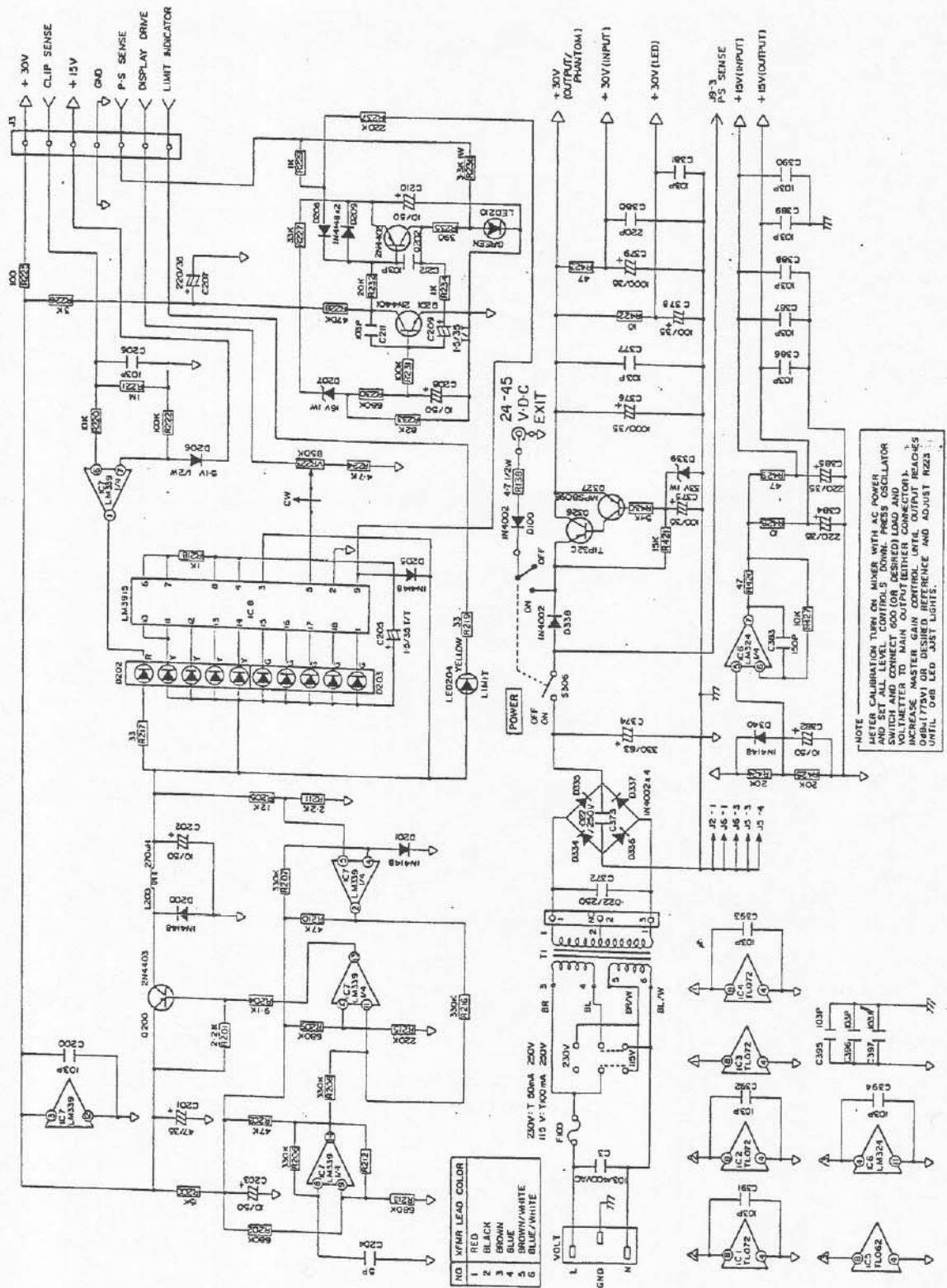


Figure 8 Schematic of the Display and Power Supply

Component Parts Listing for the ELX-1A

Reference Designator	Ordering Number	Name and Description
MAIN P.C.B.		
IC1, IC2, IC3, IC4	17-01-124688	IC, TL072C
IC5	17-01-029027	IC, TL062C
IC6	17-01-029028	IC, LM324M
Q300, Q301, Q303, Q304, Q306, Q307, Q309, Q310	48-03-038461	Transistor, KTA 1268 GR, PNP
Q302, Q305, Q308, Q311, Q325	48-03-038462	Transistor, 2N6427, NPN
Q312, Q313, Q314, Q315, Q316, Q320	48-03-027334	Transistor, 2N4403, PNP
Q317, Q321, Q324	48-03-028711	Transistor, MPS U05, NPN
Q319, Q323	48-03-028712	Transistor, MPS U55, PNP
Q318, Q322	48-03-028816	Transistor, 2N 4401, NPN
Q326	48-03-027336	Transistor, TIP32C, PNP
Q327	48-03-038463	Transistor, MPS 8098, NPN
D300-303, D306-309, D312-315, D318-321, D334, D338	48-01-037276	Diode, IN4002, rectifier
D304, D310, D316, D322, D325-331, D333, D340	48-01-122601	Diode, 1N4448, switching
ZD322	48-01-028163	Zener Diode, UZ-6.2B, 6.2 volt, 0.5 watt
ZD324	48-01-037486	Zener Diode, UZ-7.5B, 7.5 volt, 1 watt
ZD339	48-01-038464	Zener Diode, UZ-30B, 30 volt, 1 watt
LD305, LD311, LD317, LD 323	48-04-038018	L.E.D. KLR-124 3DIA
J300	21-01-038465	Phone Jack, H13080N20S, ¼ inch
SW300-306	51-02-038466	Push Switch, JPB-21S-A
VR303/313, VR321/331, VR339/349, VR357/367	47-06-038469	Potentiometer, 18CP 15SK C10K Ω /50K Ω
VR377	47-06-038467	Potentiometer, 18PN01 15SK A50K Ω
VR390	47-04-038470	Semi Fixed Resistor, CER92 B5K Ω
VR395	47-06-038468	Potentiometer, 18SN 15SK A500K Ω
R300, R308, R318, R326, R336, R334, R354, R362	47-03-029035	Resistor, 18.2 k Ω , 0.25 watt, 1%, metal film
R301, R305, R319, R323, R337, R341, R355, R359	47-01-102090	Resistor, 3.3 k Ω , 0.25 watt, 5%, carbon film
R302, R306, R320, R324, R342, R356, R360	47-03-109437	Resistor, 10 k Ω , 0.25 watt, 1%, metal film
R304, R309, R322, R327, R340, R345, R358, R363	47-03-029036	Resistor, 56.2 k Ω , 0.25 watt, 1%, metal film
R307, R325, R361, R343	47-01-029034	Resistor, 18 Ω , 0.25 watt, 5%, carbon film
R310, R316, R317, R328, R334, R335, R346, R352, R353, R364, R370-373	47-01-102127	Resistor, 100 k Ω , 0.25 watt, 5%, carbon film
R311, R329, R347, R365	47-01-102097	Resistor, 6.2 k Ω , 0.25 watt, 5%, carbon film
R312, R330, R348, R366, R474, R386, R388	47-01-102110	Resistor, 22 k Ω , 0.25 watt, 5%, carbon film
R314, R332, R350, R368	47-01-102058	Resistor, 150 Ω , 0.25 watt, 5%, carbon film
R315, R333, R351, 369, R413, R414, R416	47-01-102272	Resistor, 2.2 k Ω , 0.25 watt, 5%, carbon film
R338, R384, R400, R401	47-01-122803	Resistor, 10 Ω , 0.25 watt, 1%, metal film

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Reference Designator	Ordering Number	Name and Description
R375, R423, R426, R429	47-01-102046	Resistor, 47 Ω , 0.25 watt, 5%, carbon film
R376, R398, R407, R410, R419, R427	47-01-102102	Resistor, 10 k Ω , 0.25 watt, 5%, carbon film
R378, R391, R396, R397	47-01-102078	Resistor, 1 k Ω , 0.25 watt, 5%, carbon film
R380	47-01-102063	Resistor, 240 Ω , 0.25 watt, 5%, carbon film
R381	47-01-102098	Resistor, 6.8 k Ω , 0.25 watt, 5%, carbon film
R382, R385, R389, R421	47-01-102106	Resistor, 15 k Ω , 0.25 watt, 5%, carbon film
R387	47-01-102886	Resistor, 390 k Ω , 0.25 watt, 5%, carbon film
R392, R393, R408, R411	47-01-109204	Resistor, 470 k Ω , 0.25 watt, 5%, carbon film
R418		
R399, R402	47-01-102113	Resistor, 30 k Ω , 0.25 watt, 5%, carbon film
R403, R404	47-01-029037	Resistor, 43 Ω , 0.5 watt, 5%, metal film
R405, R409	47-01-102119	Resistor, 47 k Ω , 0.25 watt, 5%, carbon film
R406	47-01-027462	Resistor, 9.1 k Ω , 0.25 watt, 5% carbon film
R415,	47-01-102084	Resistor, 1.8 k Ω , 0.25 watt, 5%, carbon film
R420	47-01-108491	Resistor, 1 M Ω , 0.25 watt, 5%, carbon film
R424, R425	47-01-102109	Resistor, 20 k Ω , 0.25 watt, 5%, carbon film
R431	47-01-102124	Resistor, 47 k Ω , 0.25 watt, 5%, carbon film
R422, R428	47-01-102030	Resistor, 10 Ω , 0.25 watt, 5%, carbon film
R430	47-01-102095	Resistor, 5.1 k Ω , 0.25 watt, 5%, carbon film
C300, C304, C312, C316, C324, C328, C336, C350, C355, C357, C363, C366	15-01-038472	Capacitor, 47 μ F, 25 Vdc, electrolytic (B.P.)
C301, C305, C313, C317, C325, C329, C337, C341, C380	15-02-037911	Capacitor, 220 pF, 50 volt, 5%, ceramic
C303, C308, C315, C320, C327, C332, C339, C344	15-02-029032	Capacitor, 15 pF, 50 volt, 5%, ceramic
C306, C318, C330, C342	15-01-027319	Capacitor, 470 μ F, 6.3 Vdc, electrolytic
C307, C319, C331, C343, C365	15-02-026625	Capacitor, 5 pF, 50 volt, 5%, ceramic
C309, C321, C333, C345, C348, C382	15-01-028379	Capacitor, 10 μ F, 50 Vdc, electrolytic
C310, C322, C334, C346	15-06-038473	Capacitor, 0.33 μ F, 250 volt, polypropylene
C311, C323, C335, C347, C368, C369, C377, C381, C386, C397	15-02-026630	Capacitor, 0.01 μ F, 50 volt 5%, ceramic
C349, C354, C362	15-02-026830	Capacitor, 39 pF, 50 volt, 5%, ceramic
C351	15-01-124507	Capacitor, 1 μ F, 50 Vdc, electrolytic
C352, C356, C375, C378	15-01-028050	Capacitor, 100 μ F, 35 Vdc, electrolytic
C353	15-02-026829	Capacitor, 20 pF, 50 volt, 5%, ceramic
C358, C376, C379	15-01-027317	Capacitor, 1000 μ F, 35 Vdc, electrolytic
C359	15-02-027455	Capacitor, 100 pF, 50 volt, 5%, ceramic
C360, C361	15-06-026823	Capacitor, 0.001 μ F, 50 volt, 5%, mylar
C367	15-01-038471	Capacitor, 330 μ F, 35 Vdc, electrolytic
C370	15-06-026822	Capacitor, 0.1 μ F, 50 volt, 5%, mylar
C371	15-01-121637	Capacitor, 1 μ F, 35 volt, tantalum
C372, C373	15-06-027323	Capacitor, 0.022 μ F, 250 volt, polypropylene
C383	15-02-037887	Capacitor, 150 pF, 50 volt, 5%, ceramic
L300-307	56-01-038476	Ferrite, RI-3.5-7-1.2, core

Reference Designator	Ordering Number	Name and Description
L308	56-01-038475	Inductor, BL03B010, bead
L309, L310	56-010038474	Inductor, TP0206-180K, coil
LED P.C.B.		
IC7	17-01-124463	IC, LM339N
IC8	17-01-028723	IC, LM3915
Q200, Q202	48-03-027334	Transistor, 2N 4403, PNP
Q201	48-03-028816	Transistor, 2N 4401, NPN
D200, D201, D205, D208, D209	48-01-122601	Diode, 1N4448, switching
ZD206	48-01-029026	Zener Diode, UZ-5.1B, 5.1 volt, 0.5 watt
ZD207	48-01-028045	Zener Diode, UZ-16BL, 16 volt, 1 watt
LD204	39-01-038478	L.E.D., KLY-124 3DIA, yellow
LD202/203	39-01-038480	L.E.D., AR-RS102, bar
LD210	39-01-038479	L.E.D., KLG-124 3DIA, green
VR223	47-04-038481	Semi Fixed Resistor, CER92 B50K
R200	47-01-102106	Resistor, 15 k Ω , 0.25 watt, 5%, carbon film
R201, R211	47-01-102272	Resistor, 2.2 k Ω , 0.25 watt, 5%, carbon film
R202, R209, R212, R213, R230	47-01-100479	Resistor, 680 k Ω , 0.25 watt, 5%, carbon film
R203, R210	47-01-102119	Resistor, 47 k Ω , 0.25 watt, 5%, carbon film
R204	47-01-027462	Resistor, 9.1 k Ω , 0.25 watt, 5%, carbon film
R205	47-01-102104	Resistor, 12 k Ω , 0.25 watt, 5%, carbon film
R206, R207, R208, R216	47-01-104541	Resistor, 330 k Ω , 0.25 watt, 5%, carbon film
R215, R237	47-01-107043	Resistor, 220 k Ω , 0.25 watt, 5%, carbon film
R217, R219	47-01-102042	Resistor, 33 Ω , 0.25 watt, 5%, carbon film
R218, R229, R234	47-01-102078	Resistor, 1 k Ω , 0.25 watt, 5%, carbon film
R220	47-01-102102	Resistor, 10 k Ω , 0.25 watt, 5%, carbon film
R221	47-01-108491	Resistor, 1 M Ω , 0.25 watt, 5%, carbon film
R222, 231	47-01-102127	Resistor, 100 k Ω , 0.25 watt, 5% carbon film
R224	47-01-102094	Resistor, 4.7 k Ω , 0.25 watt, 5%, carbon film
R225	47-01-102054	Resistor, 100 Ω , 0.25 watt, 5%, carbon film
R226	47-01-102089	Resistor, 3 k Ω , 0.25 watt, 5%, carbon film
R227	47-01-102114	Resistor, 33 k Ω , 0.25 watt, 5%, carbon film
R228	47-01-109204	Resistor, 470 k Ω , 0.25 watt, 5%, carbon film
R232	47-01-102109	Resistor, 20 k Ω , 0.25 watt, 5%, carbon film
R233	47-01-102125	Resistor, 82 k Ω , 0.25 watt, 5%, carbon film
R235	47-01-102068	Resistor, 390 Ω , 0.25 watt, 5%, carbon film
R236	47-01-028708	Resistor, 3.3 k Ω , 1 watt, 5%, metal film
C200, C206, C211, C212	15-02-026630	Capacitor, 0.01 μ F, 50 volt, 5%, ceramic
C201	15-01-028690	Capacitor, 47 μ F, 35 Vdc, electrolytic
C202, C203, C208, C210	15-01-028379	Capacitor, 10 μ F, 50 Vdc, electrolytic
C204	15-02-026625	Capacitor, 5 pF, 50 volt, 5%, ceramic
C205, C209	15-12-028006	Capacitor, 1.5 μ F 35 volt, tantalum
C207	15-01-028924	Capacitor, 220 μ F, 35 Vdc, electrolytic
L200	56-01-038482	Inductor, TPF0410-271K, coil

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Reference Designator	Ordering Number	Name and Description
In/Out P.C.B.		
J107	21-01-038495	XLR Jack, E3MRAM3
J100-103	21-01-038496	XLR Jack, E3FRAM3
J104-106	21-01-038497	Phone Jack, H10380N10S, ¼ inch
SW100-105	51-02-038466	Push Switch, JPB-21S-A
D100	48-01-037276	Diode, 1N4002, rectifier
L100-102, L104, L106, L108, L110, L112, L114	56-01-038475	Inductor, BL03B010, Bead
R134	47-03-123111	Resistor, 1.2 k Ω , 2 watt, 5%, metal oxide
R138	47-01-102208	Resistor, 4.7 k Ω , 0.5 watt, 5%, metal film
R100, R104, R108, R112, R116, R120, R124, R128	47-03-028238	Resistor, 15 k Ω , 0.25 watt, 1%, metal, film
R101, R105, R109, R113, R117, R121, R125, R129	47-01-102127	Resistor, 100 k Ω , 0.25 watt, 5%, carbon film
R102, R106, R110, R114, R118, R122, R126, R130	47-03-028694	Resistor, 150 Ω , 0.25 watt, 1%, metal film
R103, R107, R111, R115, R119, R123, R127, R131	47-03-028695	Resistor, 5.11 k Ω , 0.25 watt, 1%, metal film
R132	47-01-102078	Resistor, 1 k Ω , 0.25 watt, 5%, carbon film
R133	47-01-102272	Resistor, 2.2 k Ω , 0.25 watt, 5%, carbon film
R135	47-01-102088	Resistor, 2.7 k Ω , 0.25 watt, 5%, carbon film
R136	47-01-102030	Resistor, 10 Ω , 0.25 watt, 5%, carbon film
R137	47-01-102119	Resistor, 47 k Ω , 0.25 watt, 5%, carbon film
C100, C104, C108, C112, C116, C120, C124, C128	15-02-027454	Capacitor, 68 pF, 50 volt, 5%, ceramic
C101, C105, C109, C113, C117, C121, C125, C129, C135, C136	15-02-038498	Capacitor, 0.0015 μ F, 50 volt, 5%, ceramic
C102, C106, C110, C114, C118, C122, C126, C130, C137	15-01-037222	Capacitor, 10 μ F, 50 Vdc, electrolytic
C103, C107, C111, C115, C119, C123, C127, C131	15-01-028918	Capacitor, 0.0047 μ F, 50 volt, 5%, ceramic
C132	15-01-027317	Capacitor, 1000 μ F, 35 Vdc, electrolytic
C133	15-02-026629	Capacitor, 0.001 μ F, 50 volt, 5%, ceramic
C134	15-01-038472	Capacitor, 47 μ F, 25 Vdc, electrolytic (B.P.)
L101, L103, L105, L107, L109, L111, L113, L115, T100	56-01-038482	Inductor, TPF0410-271K, coil
	15560A	Output Transformer, 600 Ω to 600 Ω
Chassis		
C1, C2	15-01-038499	Capacitor, 0.01 μ F, 50 volt
C3	15-01-038500	Capacitor, 0.01 μ F, 400 Vac, line
	51-02-038501	Switch, T2225B, 115/230 Vac
	56-08-038502	Power Transformer, ELX-1A, 115/230 Vac
	21-02-038504	AC inlet holder, fuse holder
	51-04-038505	Fuse, 250V, 100mA, 50T, 115 Vac 50/60 Hz operation
	51-04-038506	Fuse, 250V, 100mA, 50T, 230 Vac 50/60 Hz operation