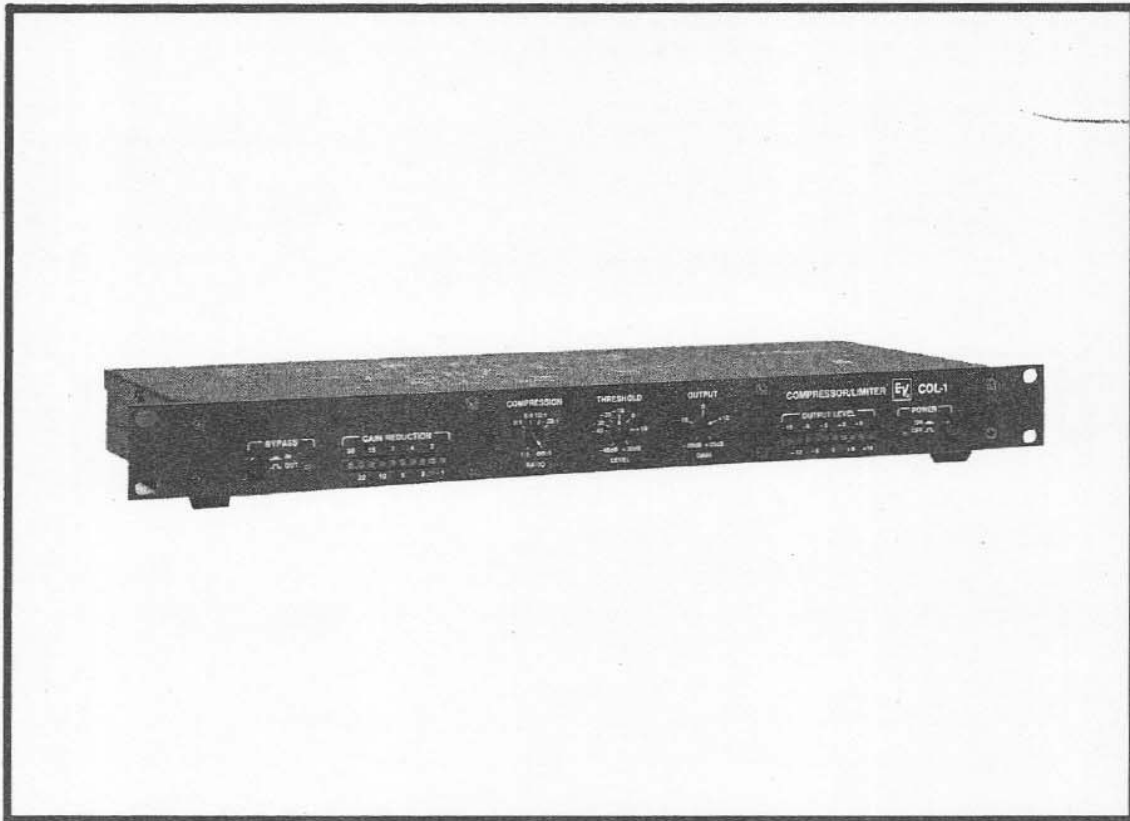




**Electro-Voice®**  
**COL-1**  
**COMPRESSOR/LIMITER**

**OWNER'S OPERATION AND SERVICE MANUAL**



**COL-1 COMPRESSOR/LIMITER**

## Table of Contents

<b>1</b>	<b>ELECTRICAL</b> .....	1
1.1	120 Vac, 50/60 Hz Power Connections .....	1
1.2	100, 220, 240 Vac, 50/60 Hz Power Connections .....	1
<b>2</b>	<b>INSTALLATION</b> .....	1
2.1	Rack Mounting .....	1
2.2	Ventilation .....	1
<b>3</b>	<b>SIGNAL CONNECTIONS</b> .....	1
3.1	Input Connections .....	1
3.2	Output Connections .....	1
3.2.1	Installing Output Isolation Transformer .....	2
<b>4</b>	<b>CONTROL FUNCTIONS</b> .....	2
4.1	Power Switch .....	2
4.2	Bypass Switch .....	2
4.3	Compression Ratio Control .....	2
4.4	Threshold Level Control .....	3
4.5	Output Gain Control .....	3
<b>5</b>	<b>DISPLAYS</b> .....	3
5.1	Gain Reduction Display .....	3
5.2	Output Level Display .....	3
<b>6</b>	<b>APPLICATIONS</b> .....	3
6.1	Restrict Dynamic Range .....	3
6.2	Loudspeaker Protection .....	3
<b>7</b>	<b>ADJUSTMENTS</b> .....	3
7.1	Detector Reference Level Section .....	3
7.2	Output Meter Calibration .....	4
<b>8</b>	<b>SPECIFICATIONS</b> .....	5
<b>9</b>	<b>SERVICE INFORMATION</b> .....	8
9.1	Alignment Procedure .....	8
9.2	Ordering Replacement Parts .....	8
9.3	Factory Service .....	9
9.4	Technical Assistance .....	9

1 ELECTRICAL

1.1 120 Vac, 50/60 Hz Power Connections

The COL-1 is provided with the primary of the power transformer strapped for 120 Vac operation from the factory. Refer to Table I for wiring details.

**WARNING:** Verify that the power transformer's primary circuit configuration is correct for the intended ac line voltage **BEFORE** applying power to the compressor/limiter.

Table I Primary Power Conversion Chart

PRIMARY CONFIGURATION	
VOLTAGE	CONNECT PINS
100 V	1 to 5, 2 to 4
120 V	1 to 6, 3 to 4
200 V	2 to 5
220 V	2 to 6
240 V	3 to 6

1.2 100, 220, 240 Vac, 50/60 Hz Power Connections

The COL-1 may be powered from line voltages other than 120 volts by restrapping the pri-

mary of the power transformer. Use the following procedures to change the factory strapping to the desired line voltage.

1. Disconnect the compressor/limiter from the ac power source.
2. Remove and save the seven screws securing the top cover. There are two screws on each side, two on the rear, and one inset into the front panel.
3. Locate the six voltage select solder cups near the power transformer. Referring to Figure 1, reconnect the lead corresponding to the desired primary voltage.
4. Install the top cover with the seven screws previously removed.

2 INSTALLATION

2.1 Rack Mounting

The compressor/limiter may be installed in a standard 19 inch equipment rack. It requires

1.75 inches of vertical space and mounting is accomplished by using the four screws supplied.

2.2 Ventilation

The unit should not be used in areas where the ambient temperature exceeds 60°C (140°F).

3 SIGNAL CONNECTIONS

3.1 Input Connections

Balanced input connections may be made either to the barrier strip or to the 3-pin XLR-type connector. For single-ended inputs, wire the low (-) input to ground. Otherwise, the compressor/limiter will see 6 dB less input signal than with a balanced input. Refer to Figure 2 for typical input connections.

3.2 Output Connections

Balanced output connections are made to the output barrier-strip connector.

**CAUTION:** The COL-1's active balanced output is ground referenced. **DO NOT OPERATE WITH THE HIGH (+) OR LOW (-) SIGNAL OUTPUT CONN-**

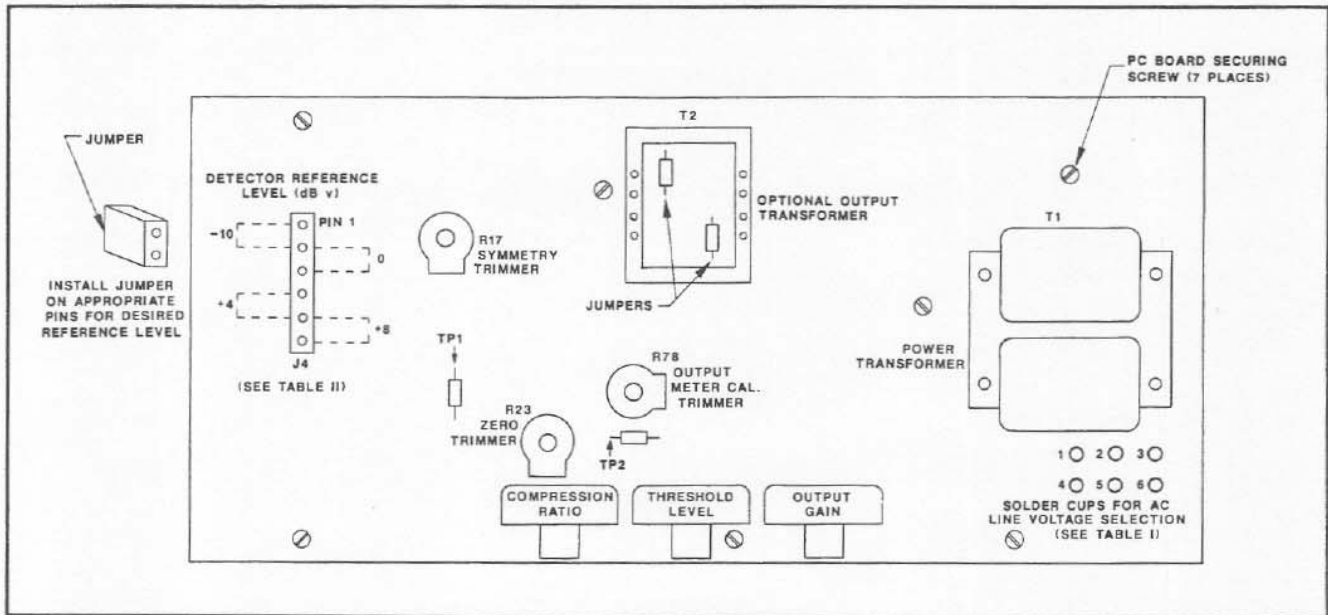


Figure 1 Location of Pertinent Components on Circuit Board

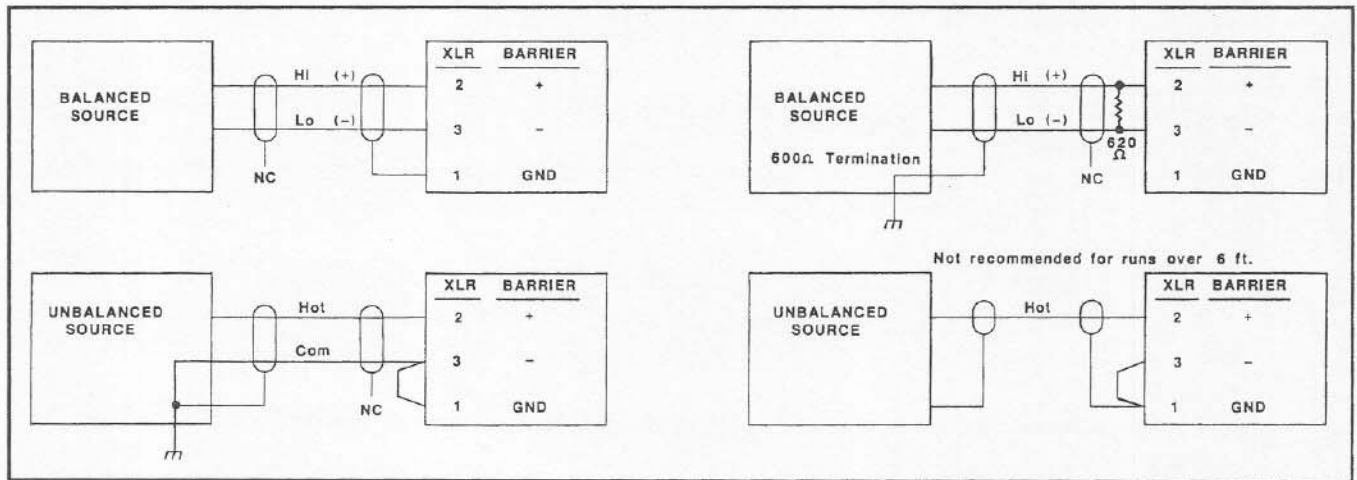


Figure 2 Typical Input Connections

**ECTED TO GROUND.** Doing so will short the output to ground.

Single-ended outputs may be connected between either the high (+) or low (-) signal output and ground. If a single-ended load is connected as described above, a 6 dB loss in output will occur. Refer to Figure 3 for typical output connection details.

### 3.2.1 Installing Output Isolation Transformer

The TRB-4 output isolation transformer is available to provide an isolated output, if necessary. The circuit board is drilled to accept the TRB-4. It is recommended that the transformer be added **ONLY** when an isolated output is needed. Use the following procedures to install the TRB-4 transformer:

1. Disconnect the compressor/limiter from the AC power source.
2. Remove the seven screws

securing the top/back cover.

3. Remove the seven screws securing the printed circuit board. Locate the mounting holes near the top of the circuit board. See Figure 1 for these locations.
4. Cut or unsolder the two jumpers inside the transformer mounting area.
5. Insert transformer in the drilled holes and solder each pin in place.
6. Install the printed circuit board and the top/back cover with their respective screws.

## 4 CONTROL FUNCTIONS

### 4.1 Power Switch

Depressing this switch

applies primary power. The LED beside this switch illuminates when power is turned on.

### 4.2 Bypass Switch

Depressing this switch provides a hard-wire bypass of the COL-1's circuitry by connecting the input directly to the output. The LED besides this switch illuminates when in bypass mode.

### 4.3 Compression Ratio Control

This control sets the ratio of the input level to the output level when the input level is above the threshold reference level. In the case of a compression ratio setting of 2:1, a 2 dB increase in input signal would result in a 1 dB increase in output signal. A compression ratio setting of  $\infty$ :1 indicates that an infinite increase in input level would be required for a 1 dB increase in output level. In other words, any finite increase in input would not change the output level. See Figure 4 for

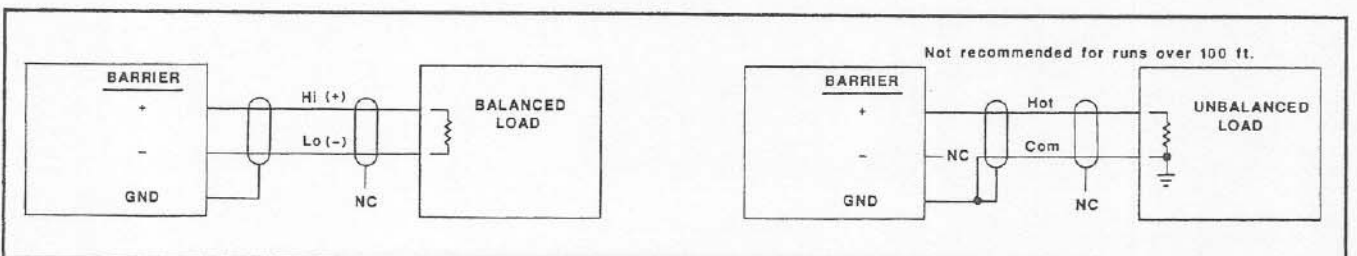


Figure 3 Typical Output Connections

various compression ratio curves.

#### 4.4 Threshold Level Control

This control sets a reference level above which the input signal will be compressed according to the setting of the Compression Ratio control. Input signals that fall below this level will pass through to the output uncompressed, but will still be affected by the Output Gain control.

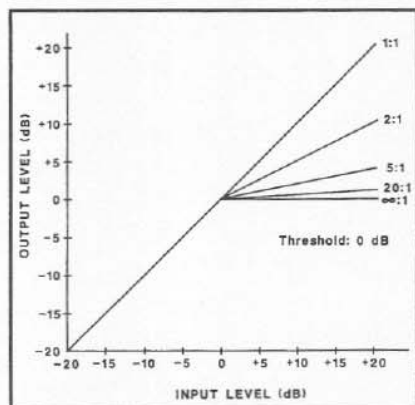


Figure 4 Compression Ratio Transfer Curves

#### 4.5 Output Gain Control

This control adjusts the gain in the output stage from -20 dB to +20 dB. The gain stage is post-processor and therefore does not affect any other function of the compressor/limiter, nor do other functions affect it.

### 5 DISPLAYS

#### 5.1 Gain Reduction Display

This row of 10 LED's displays up to 30 dB of gain reduction being caused by the COL-1.

#### 5.2 Output Level Display

This row of 10 LED's displays the output level from -15 dB to +14 dB. This display is factory set to indicate "0 dB" when the output level is 0 dBu.

### 6 APPLICATIONS

#### 6.1 Restrict Dynamic Range

The COL-1 compressor/limiter may be used to restrict the dynamic range of a sound system for clarity by raising the average level. Fixed installation sound systems are used by many different people with various vocal levels. The gain of the system may be set up for a loud-spoken person and a soft-spoken person may not be heard above the ambient noise level. On the other hand, the gain may be set for a soft spoken person and a loud-spoken person may overload the system and make the listeners feel uncomfortable. To solve this problem, the following steps may be used:

1. Set up the system gain to accommodate the soft-spoken person.
2. Set the COL-1 for low compression (about 2:1). Adjust the Threshold Level control to the desired maximum input level.
3. If the output level of the system is still too high for the loud-spoken person, increase the Compression Ratio control until the desired level is attained.

#### 6.2 Loudspeaker Protection

The COL-1 may also be used to protect compression drivers and loudspeakers from excessive levels and transients. Limiting the signal allows high levels to be maintained without damaging the loudspeaker. Speaker damage would normally occur due to excessive heat build-up and over-excitation. In this application, the COL-1 may be set up in the following manner:

1. Set the Compression Ratio control for a ratio of 20:1 to  $\infty$ :1.

2. Set the Threshold Level control to the highest permissible level. This will limit the signal at the level just below the maximum power handling of the loudspeaker.

Figure 5 shows the limiting effect of the COL-1 on an excessive input signal.

**NOTE:** The overall best way to set the controls on the COL-1 is to follow the above procedures and listen for the desired effects. Then change the settings again, if necessary.

### 7 ADJUSTMENTS

#### 7.1 Detector Reference Level Section

A Detector Reference Level Selector is provided to determine the nominal level of the detector circuitry. Selections include -10, 0, +4, and +8 dBu for interfacing with virtually any industry standard line level. For example, if the COL-1 is used in a broadcast application where the line level is +8 dBu, the Detector Reference Level should be set at a nominal level of 0 dBu. Use the following procedure to select another reference level, if needed:

1. Disconnect the COL-1 from the AC power source.
2. Remove the seven screws securing the top/back cover.
3. Select the desired nominal level by placing the jumper on two pins of the six-pin male connector (J4) located near the upper left edge of the circuit board as shown in Figure 1. Table II shows the pin numbers to be connected for each available refer-

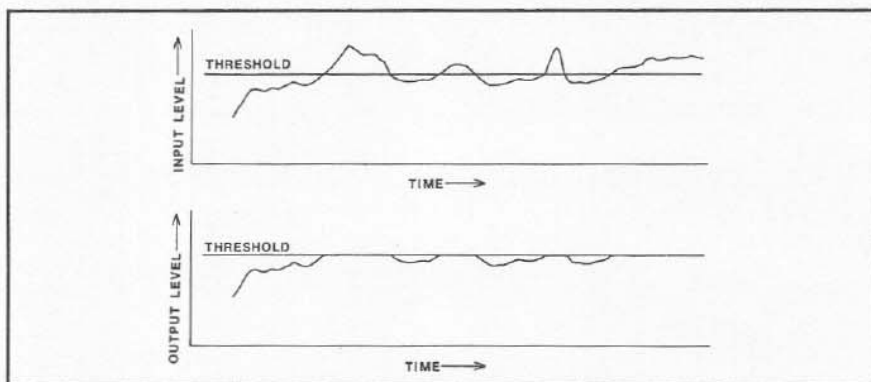


Figure 5 Input Level and Corresponding Output Level at  $\infty:1$  Compression Ratio

ence level.

4. After making any necessary adjustments, install the top/back cover with the seven screws previously removed.

Table II Detector Reference Selection Chart

REFERENCE (dBu)	PIN NUMBER CONNECTION
-10	1 to 2
0	2 to 3
+4	4 to 5
+8	5 to 6

## 7.2 Output Meter Calibration

An Output Meter Calibration trimmer is provided to vary the 0 VU reference level of the Output Meter from -10 to +8 dBm. The Output Meter is calibrated by the factory to indicate "0 dB" when the output level is 0 dBm (0.775 Vrms). To make an adjustment in the reference level of the Output Meter, use the following procedure:

1. Disconnect the COL-1 from the AC power source.
2. Remove the seven screws securing the top/back cover.

3. Verify that the Compression Ratio and Threshold Level controls on the front panel are fully clockwise and that the Output Gain control is set on "0".
4. Feed a 1 kHz signal at the selected nominal level (the level desired for a "0 dB" meter indication) to the signal input. Then adjust the meter calibration trimmer (R78) located near the center of the circuit board until the meter indicates "0 dB". See Figure 1 for location of calibration trimmer.
5. After making any necessary adjustments, install the top/back cover with the seven screws previously removed.

## Operating and Service Instructions for the Electro-Voice COL-1 Compressor/Limiter

### 8 SPECIFICATIONS

(All measurements made at 25°C (77°F))

#### Input:

**Type:** Active Differential  
**Impedance:** 20 k $\Omega$  balanced  
 10 k $\Omega$  unbalanced  
**Nominal Level:** Selectable by internal jumper for -10, 0, +4, +8 dBu  
**Maximum Level:<sup>1</sup>** +20 dBu (7.75 V rms)  
**Connectors:** Female 3-Pin XLR type in parallel with 3-terminal barrier strip

#### Output:

**Type:** Active balanced  
**Maximum Level:** +20 dBu  
**Minimum Load Impedance for Full Output Level:** 600  $\Omega$   
**Impedance:** 44  $\Omega$  balanced  
 22  $\Omega$  unbalanced  
**Connector:** 3-terminal barrier strip

**Frequency Response:** 20-20 kHz, +0/-1 dB

#### THD:

**0-dBu Input, Unity Gain, No Compression, 30 kHz Low-Pass Filter:**  
 <0.03%  
**0-dBu Input, Unity Gain, Reference 1 kHz, up to 20 dB of Compression:**  
 <0.05%

#### IMD (SMPTE):

**0-dBu Input, Unity Gain, No Compression:**  
 <0.03%

**Noise, Below Maximum Output, Output Gain Control at +20 dB, 30-kHz Low-Pass Filter:**  
 <-86 dBu

**Threshold Range:** Continuously variable from -40 to +20 dB

**Compression Ratio:** Continuously variable from 1:1 to  $\infty$ :1

**Maximum Compression:** 60 dB

**Attack Time:** Program dependent; 12 ms for 10 dB input level above threshold, 8 ms for 20 dB, 4 ms for 30 dB

**Release Time:**

Program dependent; automatically variable from 0 to 750 ms; affected by front panel control settings

**Output Gain:**

Continuously variable from -20 to +20 dB

**Controls and Switches:**

Threshold control, Compression ratio control, Bypass switch, Power switch

**Front Panel Indicators:**

Power LED, Bypass LED, Output level display indicating -15 to +14 dB, Gain reduction display indicating -1 to -30 dB

**Power:**

**Requirements:**

100, 120, 200, 220, 240 V ac, 50/60 Hz, 12 watts

**Connector:**

IEC power-cord receptacle

**Operating Environment:**

0°C (32°F) to 50°C (122°F)

**Dimensions:**

**Height:** 1.73 in (44 mm)  
**Width:** 19.0 in (483 mm)  
**Depth:** 7.28 in (185 mm)

**Shipping Weight:**

4.6 kg (10 lb)

**Net Weight:**

2.9 kg (6.3 lb)

**Color:**

Black

**Enclosure:**

Rack-mount chassis, 18-GA steel main chassis, 18-GA steel top/rear cover, 3/16-inch 6061-T6 aluminum front panel

**Optional Accessory:**

Model TRB-4 600  $\Omega$  output transformer

1. 0 dBu is 0.775 volts rms sine wave. At the minimum load impedance of 600  $\Omega$ , dBu figures may also be read as dBm, a power measure where 0 dBm is 1 mW into 600  $\Omega$ .

## ELECTRO-VOICE LIMITED 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 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 (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 other 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 the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.



COL-1 Compressor/Limiter

**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'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.

**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 Alignment Procedures**  
The alignment procedure requires the following equipment:

- Digital Voltmeter (DC)
- Signal Generator
- Oscilloscope

1. Disconnect the COL-1 from the AC power source.
2. Remove the seven screws securing the top/back cover.
3. Set the Compression Ratio control to  $\infty:1$  setting; the Threshold Level control to -10 dB; and the Output Gain control to 0 dB setting.
4. Apply an input signal of 100 Hz sine wave at 0 dB (0.775 Vrms) to the input Connector. Connect oscilloscope probe to TP1 (see

Figure 1 for location) and observe a mildly distorted 200 Hz sine waveform. Adjust the symmetry trim (R17) for equal peak amplitude of the waveform.

5. Connect the DC digital voltmeter to TP2 and adjust the zero trim (R23) for 0.5 VDC on the DC digital voltmeter.
6. Install the top/back cover with the seven screws previously removed.

**9.2 Ordering Replacement Parts**

To order replacement parts, look up the ordering number from the component parts listing and call (405) 324-5311, or write:

Electro-Voice  
Replacement Parts Sales  
600 Cecil Street

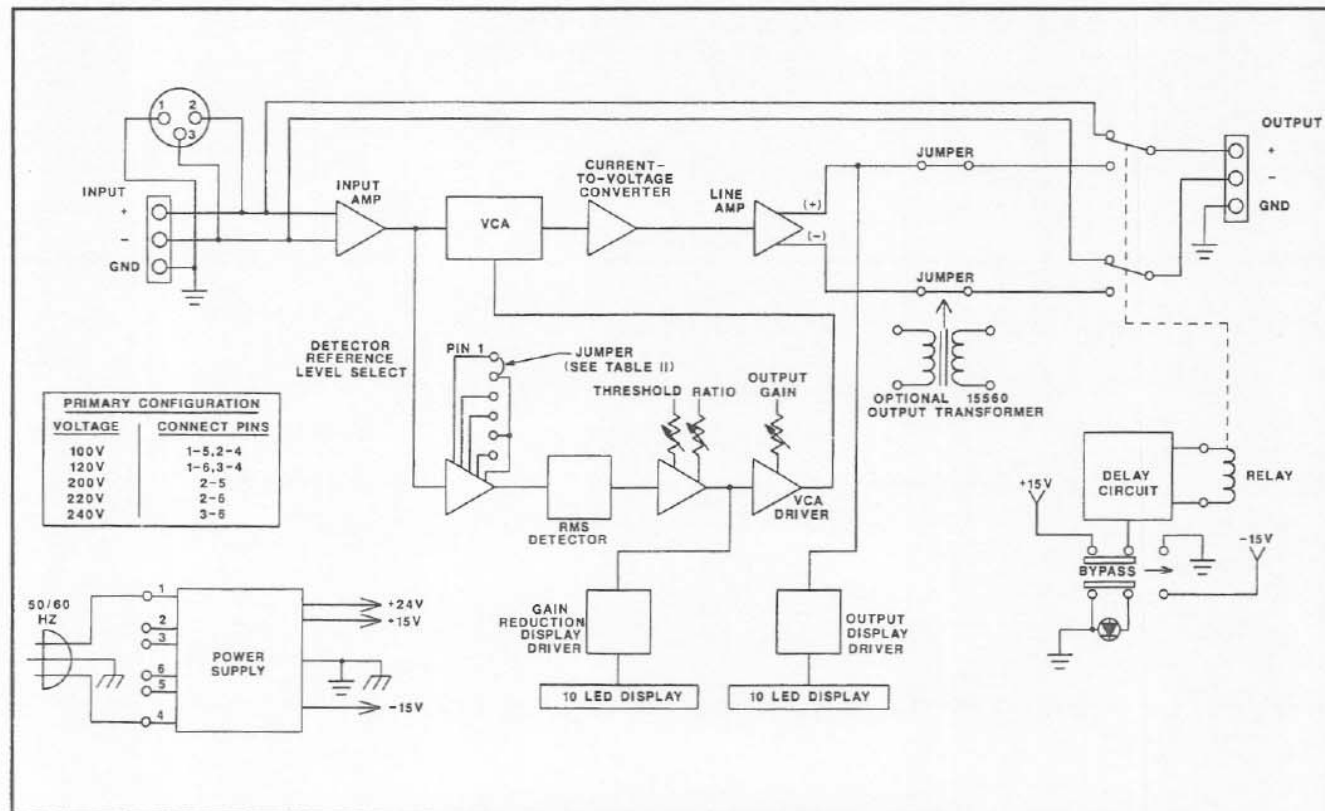


Figure 6 Block Diagram of the COL-1

Buchanan, MI 49107  
U.S.A.

**9.3 Factory Service**

If factory service is required, ship the unit in its original packing prepaid to:

Electro-Voice Customer  
Service/Repair  
600 Cecil Street  
Buchanan, MI 49107  
U.S.A.  
Tel: (616) 695-6831  
FAX: (616) 695-1304

Electro-Voice Customer  
Service/Repair  
8324 Doe Avenue  
Visalia, CA 93219 U.S.A.  
Tel: (209) 651-7777  
FAX: (209) 651-0164

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

**9.4 Technical Assistance**

For applications assistance or other technical information, contact the Technical Services Manager. You can call (616) 695-6831, TWX 810-270-31353, FAX (616) 695-1304, or write:

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

# Operating and Service Instructions for the Electro-Voice COL-1 Compressor/Limiter

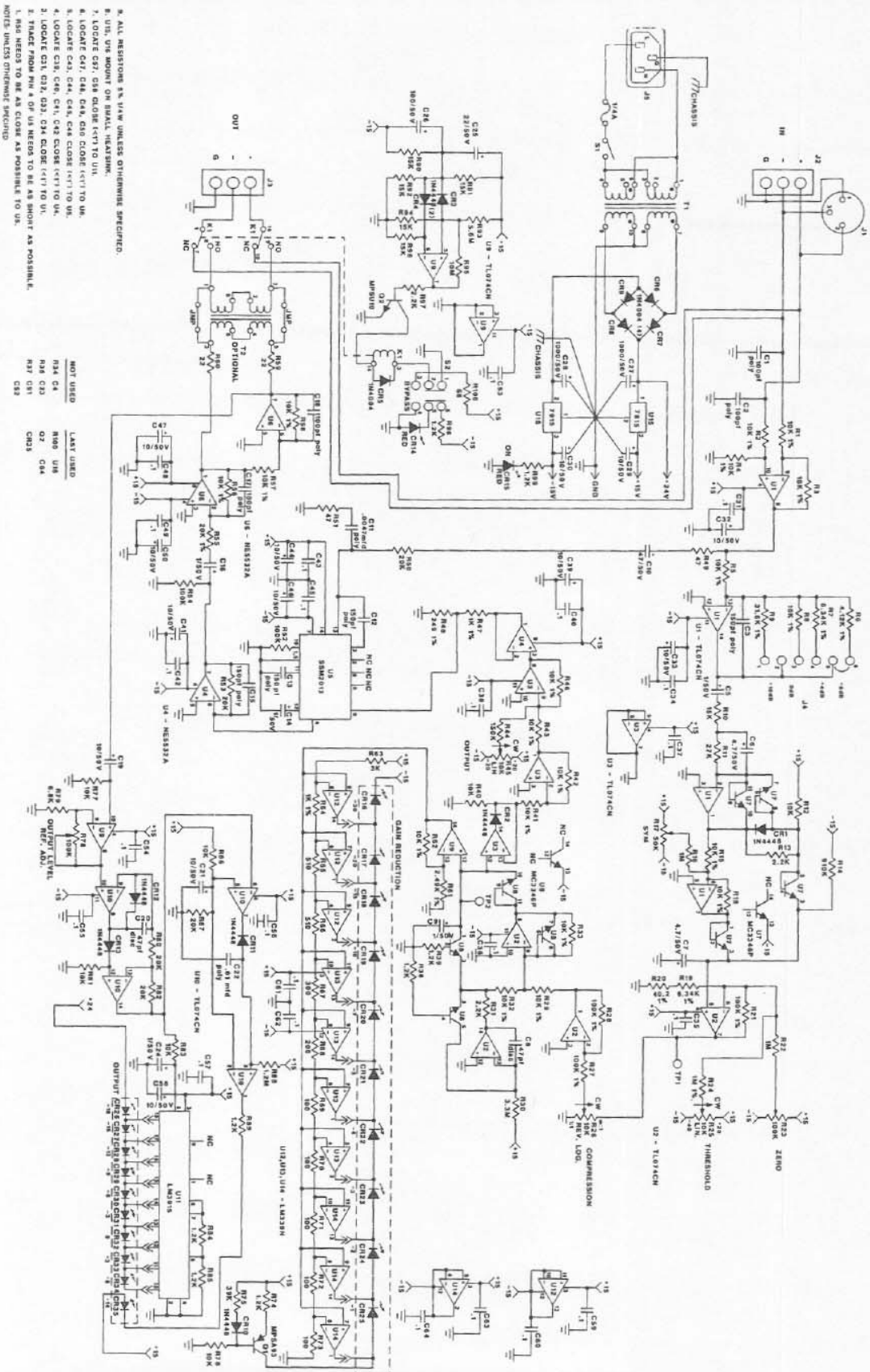


Figure 7 Schematic of the COL-1

## Component Parts Listing for the COL-1

Reference Designator	Ordering Number	Name and Description
C1, 2, 17, 18	15-06-124440	Capacitor, 100 pF, 630V
C3, 12, 13, 15	15-06-124499	Capacitor, 150 pF, 400V
C5, 9, 14, 16, 24	15-01-124507	Capacitor, 1 $\mu$ F, 50V
C6, 7	15-01-124506	Capacitor, 4.7 $\mu$ F, 50V
C8, 20	15-02-124498	Capacitor, 47 pF, 1000V
C10	15-01-124508	Capacitor, 47 $\mu$ F, 50V
C11	15-06-124517	Capacitor, .0047 $\mu$ F, polypropylene
C19, 21, 29, 30, 32, 33, 39, 41, 44, 46, 47, 50, 58	15-01-124502	Capacitor, 10 $\mu$ F, 50V
C22	15-06-124518	Capacitor, .01 $\mu$ F, polypropylene
C25	15-01-124504	Capacitor, 22 $\mu$ F, 50V
C26	15-01-124503	Capacitor, 100 $\mu$ F, 50V
C27, 28	15-01-124505	Capacitor, 1000 $\mu$ F, 50V
C31, 34, 35, 36, 37, 38, 40, 42, 43, 45, 48, 49, 53, 54, 55, 56, 57, 59, 60, 61, 62, 63, 64	15-02-124437	Capacitor, .1 $\mu$ F, 50V, disk
CR1-4, 10-13	48-01-122601	Diode, signal, 1N4448
CR5-9	48-02-042787	Rectifier, 1N4004
CR14	39-01-124540	LED with 12 inch leads
CR15	39-01-124973	LED, green with 6 inch leads
CR16-25	39-01-124519	10 LED Array, green
CR26-35	39-01-124520	10 LED Array
F1	51-04-124634	Fuse, 0.175A, 250V, Slo-Blo
K1	45-01-123000	Relay, 12V, 1A, DPDT
Q1	48-03-120234	Transistor, MPSA93, PNP, 200V
Q2	48-03-120159	Transistor, MPSU10, NPN, 300V
R1-5, 8, 15, 18, 29, 32, 33, 41, 42, 43, 46, 56, 57, 58, 62	47-03-109437	Resistor, 10 k $\Omega$ , $\pm$ 1%, 1/4 W
R6	47-03-108444	Resistor, 4.12 k $\Omega$ , $\pm$ 1%, 1/4 W
R7, 19	47-03-124490	Resistor, 6.34 k $\Omega$ , $\pm$ 1%, 1/4 W
R9	47-03-124489	Resistor, 31.6 k $\Omega$ , $\pm$ 1%, 1/4 W
R10, 90, 91, 92, 94, 96	47-01-102106	Resistor, 15 k $\Omega$ , $\pm$ 5%, 1/4 W
R11	47-01-102112	Resistor, 27 k $\Omega$ , $\pm$ 5%, 1/4 W
R12, 40, 76, 77, 81, 83, 86	47-01-102102	Resistor, 10 k $\Omega$ , $\pm$ 5%, 1/4 W
R13, 31, 97	47-01-102086	Resistor, 2.2 k $\Omega$ , $\pm$ 5%, 1/4 W
R14	47-01-121767	Resistor, 910 k $\Omega$ , $\pm$ 5%, 1/4 W
R16, 22	47-01-108491	Resistor, 1 M $\Omega$ , $\pm$ 5%, 1/4 W
R17	47-06-122135	Potentiometer, 50 k $\Omega$ , $\pm$ 30%, trim
R20	47-03-124487	Resistor, 40.2 k $\Omega$ , $\pm$ 1%, 1/4 W
R21, 27, 28	47-03-119305	Resistor, 100 k $\Omega$ , $\pm$ 1%, 1/4 W
R23, 78	47-06-122136	Potentiometer, 100 k $\Omega$ , $\pm$ 30%, trim
R24	47-03-124488	Resistor, 1 M $\Omega$ , $\pm$ 1%, 1/4 W
R25, 45	47-06-124523	Potentiometer, 10 k $\Omega$ , linear taper
R26	47-06-124524	Potentiometer, 10 k $\Omega$ , reverse audio taper
R30	47-03-124491	Resistor, 3.3 M $\Omega$ , $\pm$ 5%, 1/4 W
R38, 39, 74, 84, 85, 89, 98, 99	47-01-102080	Resistor, 1.2 k $\Omega$ , $\pm$ 5%, 1/4 W
R44	47-01-102131	Resistor, 150 k $\Omega$ , $\pm$ 5%, 1/4 W

Reference Designator	Ordering Number	Name and Description
R47, 64	47-03-121532	Resistor, 1 k $\Omega$ , $\pm$ 1%, 1/4 W
R48	47-03-124486	Resistor, 249 $\Omega$ , $\pm$ 1%, 1/4 W
R49, 51	47-01-102046	Resistor, 47 $\Omega$ , $\pm$ 5%, 1/4 W
R50, 53, 80, 82, 87	47-01-102109	Resistor, 20 k $\Omega$ , $\pm$ 5%, 1/4 W
R52, 54	47-01-102127	Resistor, 100 k $\Omega$ , $\pm$ 5%, 1/4 W
R55	47-03-109434	Resistor, 20 k $\Omega$ , $\pm$ 1%, 1/4 W
R59, 60	47-01-102038	Resistor, 22 $\Omega$ , $\pm$ 5%, 1/4 W
R61	47-03-124485	Resistor, 2.49 k $\Omega$ , $\pm$ 1%, 1/4 W
R63	47-01-102089	Resistor, 3 k $\Omega$ , $\pm$ 5%, 1/4 W
R65, 66	47-01-102071	Resistor, 510 k $\Omega$ , $\pm$ 5%, 1/4 W
R67	47-01-102065	Resistor, 300 $\Omega$ , $\pm$ 5%, 1/4 W
R68	47-01-102061	Resistor, 200 $\Omega$ , $\pm$ 5%, 1/4 W
R69-73	47-01-102054	Resistor, 100 $\Omega$ , $\pm$ 5%, 1/4 W
R75	47-01-102116	Resistor, 39 k $\Omega$ , $\pm$ 5%, 1/4 W
R79	47-01-102098	Resistor, 6.8 k $\Omega$ , $\pm$ 5%, 1/4 W
R88	47-01-108933	Resistor, 1.2 M $\Omega$ , $\pm$ 5%, 1/4 W
R93	47-01-113206	Resistor, 5.6 M $\Omega$ , $\pm$ 5%, 1/4 W
R95	47-01-107373	Resistor, 10 M $\Omega$ , $\pm$ 5%, 1/4 W
R100	47-01-102050	Resistor, 68 $\Omega$ , $\pm$ 5%, 1/4 W
S1	51-02-124478	Switch, PB, power, DPDT
S2	51-02-124479	Switch, PB, DPDT
T1	56-08-025906	Transformer, power
U1, 2, 3, 9, 10	17-01-124461	IC, TL074CN quad op-amp
U4, 6	17-01-122832	IC, 5532A dual op-amp
U5	17-01-124482	IC, SSM2013 VCA
U7, 8	17-01-124460	IC, 3346P, transistor array
U11	17-01-122347	IC, LM3915 LED driver
U12, 13, 14	17-01-124463	IC, LM339N quad comparator
U15	17-01-121660	IC, regulator, +15V, MC7815CT
U16	17-01-121659	IC, regulator, -15V, MC7915CT

NOTES:

*Operating and Service Instructions for the Electro-Voice COL-1 Compressor/Limiter*

---



600 Cecil Street, Buchanan, Michigan 49107, Phone (616)695-6831, FAX: 616-695-1304

B234 Doe Avenue, Visalia, California 93291, Phone (209)651-7777, TLX 172 119, FAX (209)651-0164

Mark IV Audio Canada, Inc., 345 Herbert St., Gananoque, Ontario, Canada K7G 2V1, Phone (613)382-2141, FAX (613)382-7466

Electro-Voice, S.A., Kellenstrasse 5, CH-2563 IPSACH, Switzerland, Phone (41)32-51-68-33, FAX (011)41/325 11221

Mark IV Audio Japan, Ltd., 2-5-60 Izumi, Suginami-ku, Tokyo, Japan 168, Phone (81)3-325-7900, TLX 781 232 2494, FAX (011)81/3-325-7878

Mark IV Vertriebs GmbH, Lärchenstrasse 99, 6230 Frankfurt/Main 80, Germany, Phone (49)69-380-100, TLX 841 413 847, FAX (011)49-69-386-959

Electro-Voice Pty, Ltd., Unit 24, Block C, Slough Business Park, Slough Ave., Silverwater, N.S.W. 2141, Australia, Phone (61)2-648-3455, FAX 2-648-5585