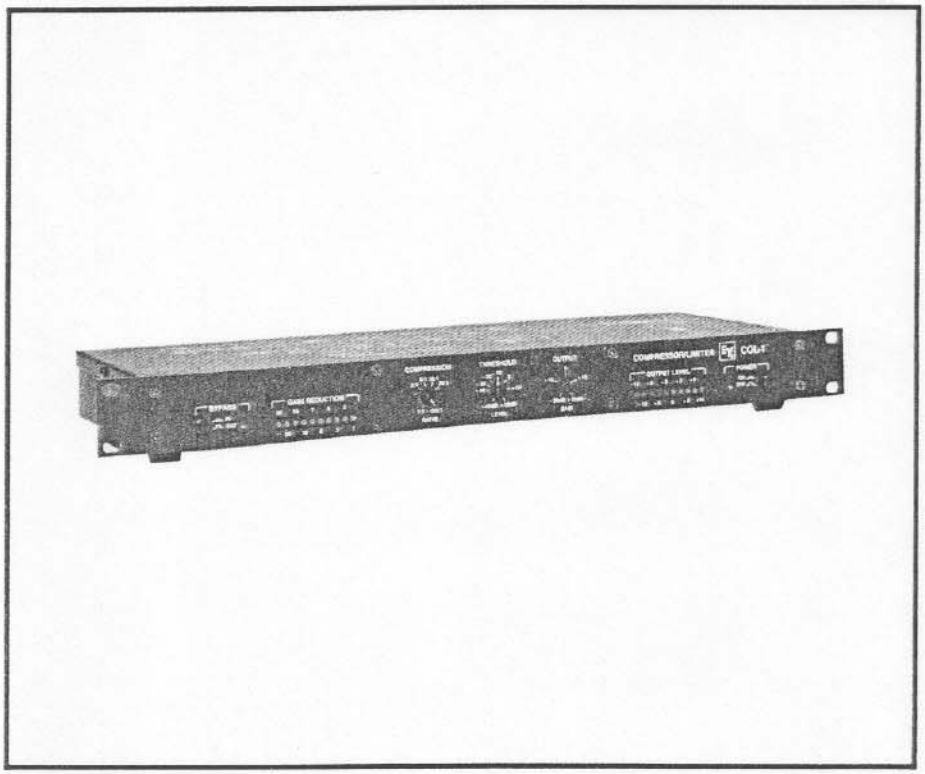

Electro-Voice®
a MARK IV company

Model COL-1
Single-Channel Compressor/Limiter

SPECIFICATIONS[1]

Input,
  Type:
    Active differential
  Impedance:
    20,000 ohms balanced
    10,000 ohms unbalanced
  Nominal Level:
    Selectable by internal jumper for
    −10, 0, +4, +8 dBu
  Maximum Level:[2]
    +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 ohms
  Impedance:
    44 ohms balanced
    22 ohms unbalanced
  Connector:
    3-terminal barrier strip
Frequency Response:
  20-20,000 Hz, +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 ∞: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 (see Figure 1):
  44 mm (1.73 in.) high;
  483 mm (19.0 in.) wide;
  185 mm (7.28 in.) deep
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-ohm output transformer
Shipping Weight:
  4.6 kg (10 lb)
Net Weight:
  2.9 kg (6.3 lb)

1. All measurements made at 25°C (77°F).
2. 0 dBu is 0.775 volts rms sine wave. At the minimum load impedance of 600 ohms, dBu figures may also be read as dBm, a power measure where 0 dBm is 1 mW into 600 ohms.

DESCRIPTION

The Electro-Voice COL-1 single-channel compressor/limiter is intended primarily for sound systems where transient protection and/or minimization of level differences between paging system announcers is desired. Its feed-forward design permits compression ratios up to ∞:1 with complete stability, to automatically restrict the system output to a predetermined level. Special compensation

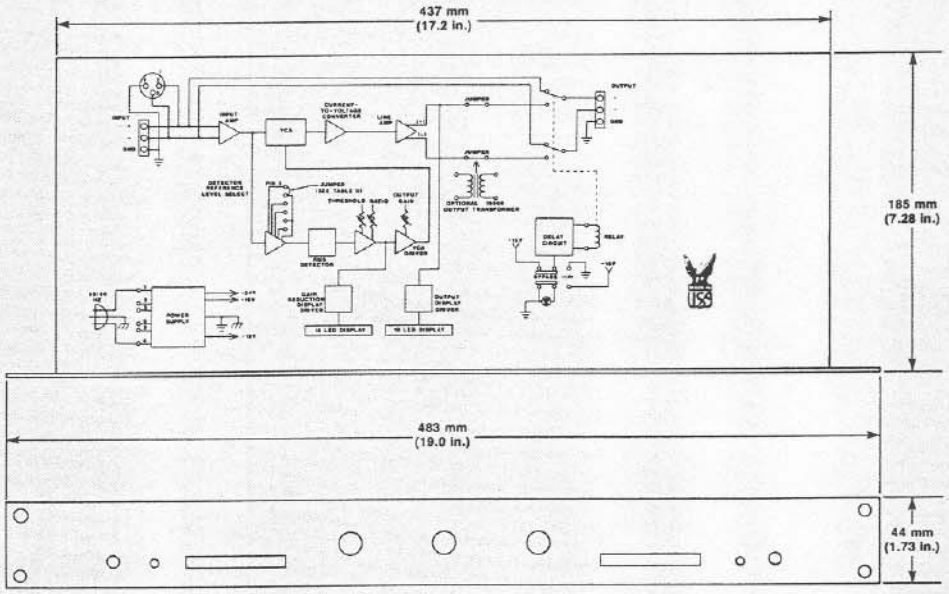

FIGURE 1 — Dimensions

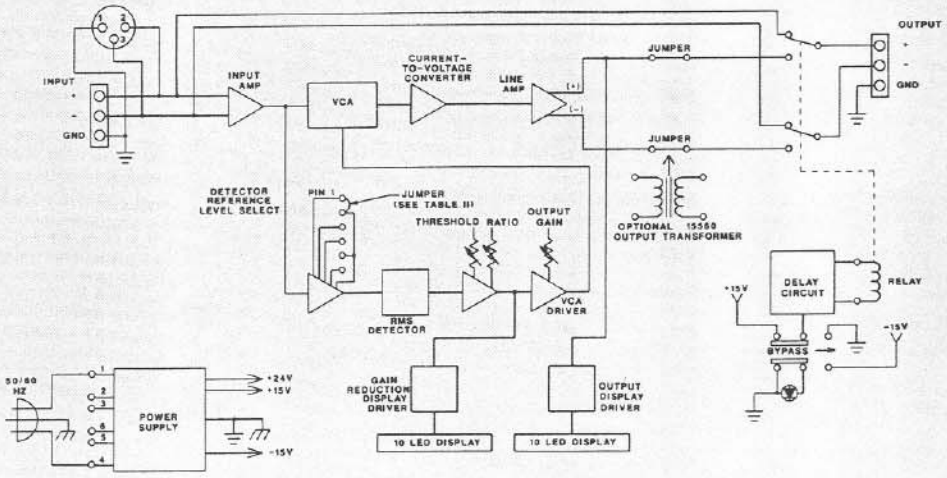

FIGURE 2 — Block Diagram

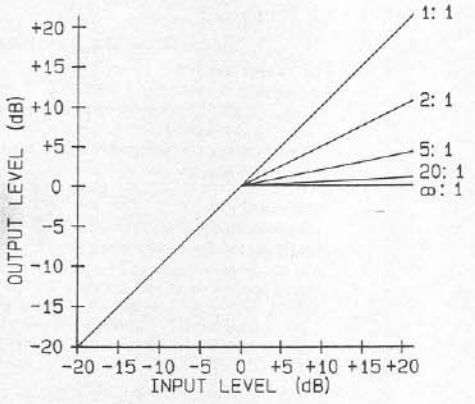

FIGURE 3
Compression Ratio Transfer Curves

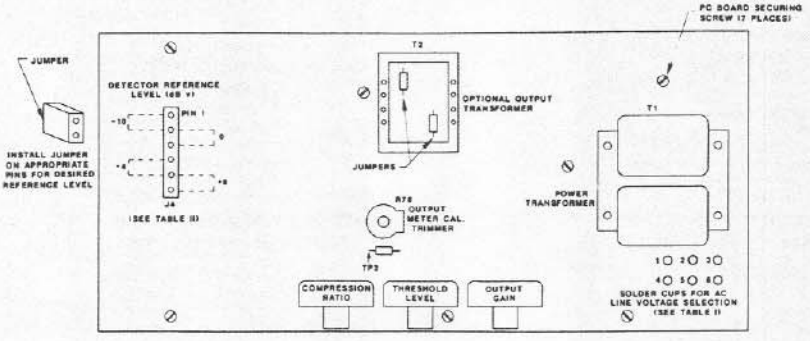

FIGURE 4
Location of Pertinent Components on Circuit Board

circuitry minimizes coloration and audible side-effects for virtually unmatched sonic qualities.

The COL-1 features an rms-calibrated linear-integration detector. Its logarithmic output (linear in decibels) closely matches the characteristics of the human ear for a more natural-sounding response when undergoing gain changes. The detector is also compensated to prevent "peak reversion" — a condition that occurs when low-frequency signals are below the period chosen for the integration time. Without correction, an rms or averaging detector would revert to peak detection resulting in an over-measurement of the low-frequency energy. This causes over-compression, increased distortion and audible pumping. The COL-1 is free from these side effects.

The input level for a 0-dB reference is determined by an internal jumper which may select −10, 0, +4, or +8 dBu. This permits interfacing with virtually any industry-standard line level. Two LED arrays simultaneously display gain reduction and output level for effective monitoring of system operation. The continuously variable Threshold, Compression Ratio, and Output Gain controls are recessed, screwdriver-slotted adjustments to minimize inadvertent changes to the control settings. Program-dependent attack and release times assure natural-sounding compression wihtout the need for continuous manual adjustments.

Other features include a true hard-wired bypass switch, an automatic ac-dropout bypass. XLR-type and barrier-strip input connectors, a barrier-strip output connector, and electronically balanced input and output circuitry. The universal power transformer permits 100-, 120-, 200-, 220-, and 240-V, 50/60-Hz operation. The output may be transformer isolated with the optional TRB-4 PC-board-mounted transformer.

CONNECTIONS

Input

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.

Output

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 CONNECTED TO GROUND.** Doing so will short the output to ground. Single-ended outputs should be connected between either the high (+) or low (-) signal output and ground. If a single-ended load is connected as described above, the output level will be 6 dB less than that of a balanced connection.

Primary Power Connection

The ac line voltage is applied through this connector.

CONTROL FUNCTIONS

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 beside this switch illuminates when in bypass mode.

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 ∞:1 indicates that an infinite increase in input level would be required for a 1-dB increase in output level or, any finite increase in input level would result in no change in output level. See Figure 3 for various compression ratio curves.

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.

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 does not affect any other function of the compressor/limiter, nor do other functions affect it.

Power Switch

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

DISPLAYS

Gain Reduction

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

Output Level

This row of 10 LEDs 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.

ADJUSTMENTS

Detector Reference Level Selection

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 selected accordingly. The detector reference level selector is factory set at a nominal level of 0 dBu. Use the following procedure to select another reference level, if desired.

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 4. Table 1 shows the pin numbers to be connected for each available reference level.
4. Reinstall the top/back cover.

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

TABLE 1 — Detector Reference Level Selection Chart

Output Meter Calibration

An output meter calibration trimmer is provided to vary the 0-dB reference level of the output meter from −10 to +8 dBu. The output meter is calibrated by the factory to indicate "0 dB" when the output level is 0 dBu. 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 the 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 with an amplitude of the desired nominal level (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 4 for the location of the calibration trimmer.

OUTPUT TRANSFORMER

The output of the COL-1 can be transformer isolated by adding the optional TRB-4 transformer to the circuit board. This should be done by a qualified service technician. The procedure is as follows.

1. Disconnect the COL-1 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 4 for these locations.
4. Cut or unsolder the two jumpers inside the transformer mounting area.
5. Insert the transformer in the drilled holes and solder each pin in place.
6. Reinstall the circuit board and replace the top/back cover.

ALTERNATE PRIMARY VOLTAGE SELECTION

The COL-1's power-transformer primary is factory set for 120-V operation. Table 1 lists other voltage options and connection details. To change from the existing primary configuration to a configuration that corresponds to the prevailing line voltage, use the following procedure. This should be performed by a qualified technician.

1. Disconnect the ac power cord from the unit.
2. Remove the seven screws securing the top/back cover.
3. Locate the six voltage selection solder cups on the right side of the circuit board in front of the power transformer. See Figure 4 for location. Referring to Table 2, unsolder the jumper wires from the solder cups and resolder them in accordance with the pin designations that correspond to the desired operating voltage.
4. Install the top/back cover with the seven screws previously removed.

PRIMARY CONFIGURATIONS	
Voltage	**Connect Pins**
100 V	1-5,2-4
120 V	1-6,3-4
200 V	2-5
220 V	2-6
240 V	3-6

TABLE 2
Primary Power Conversion Chart

APPLICATIONS

Restrict Dynamic Range

The COL-1 may be used to compress a signal to a desired nominal level. To obtain this function, adjust the compression for a fairly low ratio and the threshold control to a low level, the gain control would be adjusted for the desired output level. Final settings that work for a particular system are dependent upon the system gain structure and the amount of compression desired.

Loudspeaker Protection

To protect loudspeakers and compression drivers from harmful transients the COL-1 may be set to function as a limiter. In this case, select a high compression ratio, >20:1, and set the threshold level equal to the input level that represents the maximum power handling capability of the speaker system. These parameters are of course system dependent, so final settings must be determined, as always, on an individual basis.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The compressor/limiter shall be a single-channel unit of solid-state design that is capable of detecting input levels above the threshold control setting and automatically reducing the gain of the signal level in accordance with the compression ratio control setting. The 0-dB reference level of the detector circuitry shall be selectable to be −10, 0, +8 dBu. The amount of gain reduction introduced by the system and the output level of the compressor/limiter shall be presented on their respective LED displays. The gain-reduction display shall have a range from −1 dB to −30 dB of attenuation and the output-level display shall show levels from −15 dBu to +14 dBu. Automatic bypass and manual hardwire bypass of the compressor/limiter shall be provided, along with turn-on delay to eliminate turn-on and turn-off transients. The compressor/limiter shall be capable of operating from a 100-, 120-, 220-, 240-V, 50/60 ac line.

The compressor/limiter shall meet the following performance criteria. Maximum input level: +20 dBu (7.75 V rms). Input impedance: 20 kilohms balanced, 10 kilohms unbalanced. Maximum output level: +20 dBu (7.75 V rms). Output impedance: 44 ohms balanced, 22 ohms unbalanced. Frequency response: 20 Hz to 20 kHz, +0, −1 dB. Threshold range: continuously variable from −45 to +20 dB. Compression ratio: continuously variable from 1:1 to ∞:1. Attack time: program dependent; 12 msec from 10 dB input level above threshold, 8 msec from 20 dB above threshold level, 4 msec for 30 dB above threshold level. Release time: program dependent; automatically variable from 0 to 750 msec. Output gain: continuously variable from −20 to +20 dB. THD: less than 0.03% from 20 Hz to 20 kHz with no compression, less than 0.05% at 1 kHz with up to 20 dB of compression. IMD (SMPTE): less than 0.03% with no compression. Noise: less than −86 dBu below maximum output with the threshold control, compression-ratio control, and output gain control fully clockwise.

The compressor/limiter shall be 1¾" Hx19"Wx9"D, and shall have a net weight of 6.3 lb.

The compressor/limiter shall be the Electro-Voice Model COL-1.

WARRANTY (Limited)

Electro-Voice Professional Sound Reinforcement Electronic Components are guaranteed for two years from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper Electro-Voice service facility. Unit will be returned prepaid. Warranty does not extend to finish, appearance items or malfunction due to abuse or operation under other than specified conditions, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee. A list of authorized service centers is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831); Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777); or Electro-Voice, Inc., 10500 West Reno, Oklahoma City, OK 73128 (AC/405-324-5311). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Service and repair address for this product: Electro-Voice, Inc., 10500 West Reno, Oklahoma City, OK 73128.

Specifications subject to change without notice.

ELECTRO-VOICE, INC., 600 Cecil Street, Buchanan, Michigan 49107
MANUFACTURING PLANTS AT ■ BUCHANAN, MI ■ NEWPORT, TN ■ SEVIERVILLE, TN ■ OKLAHOMA CITY, OK ■ GANANOQUE, ONT.

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