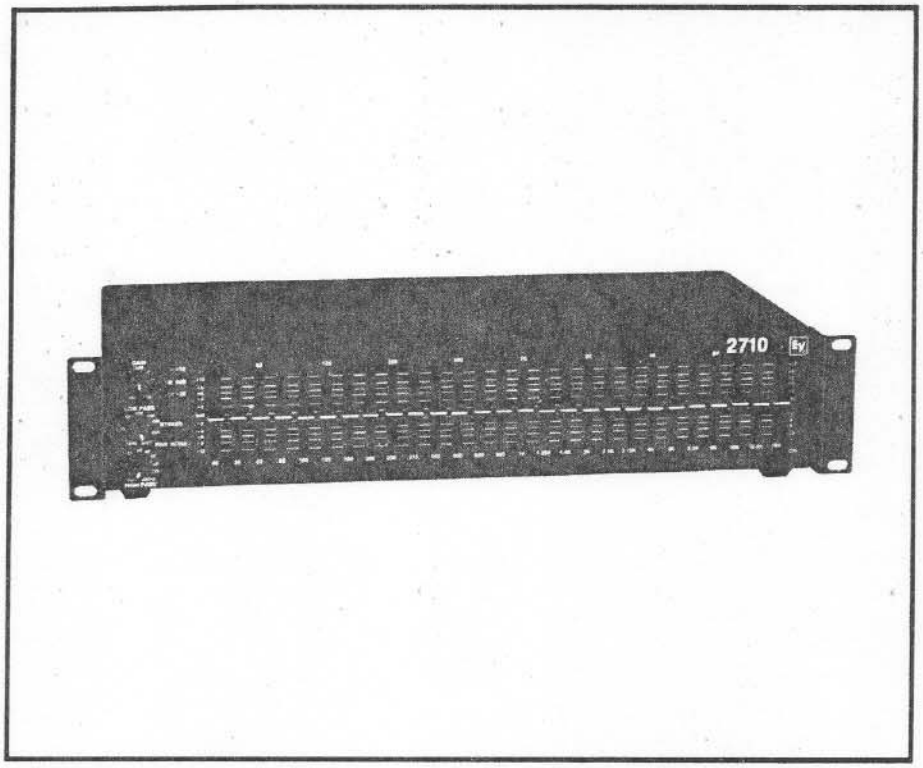

Electro-Voice®
a MARK IV company

Model 2710
1/3-Octave Graphic Equalizer

GENERAL SPECIFICATIONS[1]

Frequency Response at Unity Gain:
20-20,000 Hz ±1 dB

Total Harmonic Distortion at Unity Gain: 20-20,000 Hz, 0 dBu Output:[2]
0.01% typical

Noise at Unity Gain
-88 dBu typical

Front-Panel Controls:
Variable gain, low pass and high pass; EQ bypass; pink noise on; 27 boost/cut slide faders

Gain Control Range (center detent unity):
< - 100 dB to + 12 dB re unity

LED Level Indicators,
Green:
Input above -20 dBu
Yellow:
Input above 0 dBu
Red:
Input or output above + 16 dBu

Chassis Construction:
Painted Steel

Colors:
Black with white graphics

Mounting:
Standard 19-in. rack, 3.5 in. high, 9.75 in. deep behind mount

Accessories,
Supplied:
Security cover
Optional:
TRB-3 input transformer

Operating Environment:
0°C (32°F) to 50°C (122°F)

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

Overall Dimensions (see Figure 8):
8.9 cm (3.5 in.) high;
48.3 cm (19 in.) wide;
26 cm (10.25 in.) deep

Net Weight:
5.2 kg (11.5 lb)

Shipping Weight:
6.3 kg (14 lb)

INPUT SPECIFICATIONS

Type:
Active differential (TRB-3 isolations transformer available; see text)

Impedance,
Unbalanced:
15,000 ohms
Balanced:
30,000 ohms

Maximum Input Level at Unity Gain:
+ 18 dBu

Connectors,
Type:
Parallel female 3-pin XLR type and barrier strip

XLR-Type Connector Format (IEC Standard 268):
Pin 1 shield;
pin 2 high;
pin 3 low

OUTPUT SPECIFICATIONS

Type:
Transformer-coupled differential

Source Impedance:
15 ohms typical

Maximum Level:
+ 18 dBu

Minimum Load Impedance:
600 ohms

Connector,
Type:
Parallel male XLR-type and barrier strip

XLR-Type Connector Format (IEC Standard 268):
Pin 1 shield;
pin 2 high;
pin 3 low

FILTER SPECIFICATIONS

Type:
Constant Range™, Q=3 to 8

Center Frequencies (Hz):
40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1,000, 1,250, 1,600, 2,000, 2,500, 3,150, 4,000, 5000, 6,300, 8,000, 10,000, 12,500 and 16,000 (27 bands on ISO centers)

Center Frequency Tolerance:
±3% re ISO standard

Maximum Boost/Cut:
12 dB

High-Pass Filter,
Adjustment Range:
Up to 200 Hz
Slope:
18 dB per octave

Low-Pass Filter,
Adjustment Range:
Down to 5,000 Hz
Slope:
6 dB per octave

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.

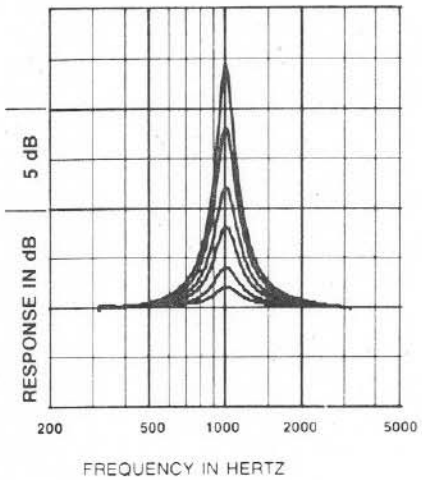

FIGURE 1
Constant-Range™ Filter Response

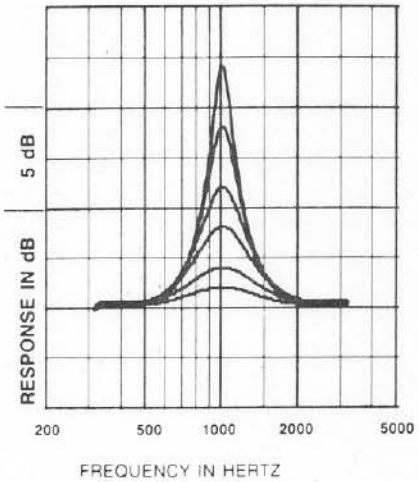

FIGURE 2
Variable-Q Filter Response

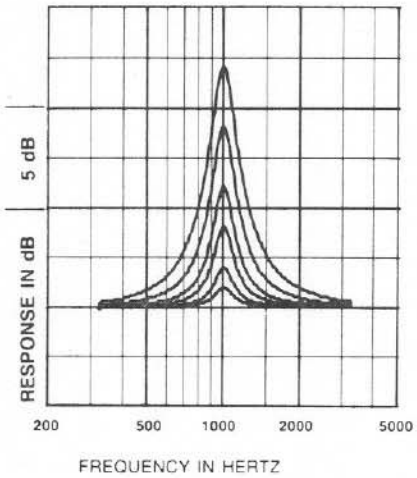

FIGURE 3
Constant-Q Filter Response

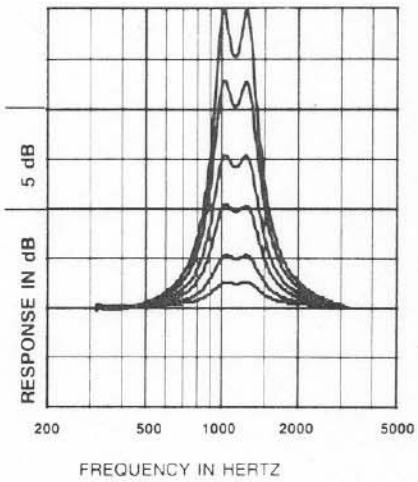

FIGURE 4
Two Adjacent Filters at Equal Settings

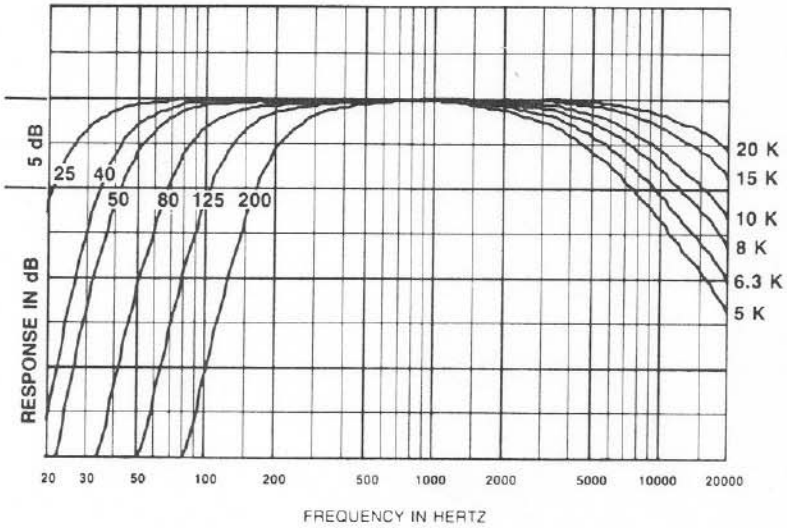

FIGURE 5
Typical High- and Low-Pass Filter Curves

DESCRIPTION

The Electro-Voice 2710 is a boost-and-cut 1/3-octave graphic equalizer whose primary use is for tuning the overall frequency response of a sound reinforcement system. This full-featured equalizer also has applications in broadcast, motion picture, TV and recordings studios.

FEATURES

Of all the outstanding features in the 2710, the focus must be on the new Constant-Range™ filter sets. In this filter design, the filter Q varies with the control setting in a way which provides optimum coverage of the intended frequency range at all control settings. The filter response is designed to affect a 1/3-octave range, with minimum influence on adjacent frequency bands (see Figure 1).

Most graphic equalizer designs have variable-Q filters which the Q, or the sharpness of the filter, varies depending on the amount of boost or cut used. In most cases the Q is very low when small corrections are set, and the affected frequency range goes beyond even the adjacent filter controls (see Figure 2). Constant-Q designs, on the other hand, provide good selectivity at low control settings, but when a large amount of boost or cut is used, the filter skirts spread out and influence a larger frequency range so that adjacent controls must be readjusted (see Figure 3).

One result of the Constant-Range design is minimal control interaction. Even if a large adjustment is made, little or no readjustment of the adjacent filters is necessary. Also, steep filter slopes and narrow notches or peaks can be achieved. If a broader response is needed, this can be achieved by combining adjacent filters at equal levels is shown in Figure 4.

Each of the 27 constant-range 1/3-octave filters provides 12 dB of boost or cut at ISO frequencies 40 through 16,000 Hz. An integral dust cover is included on the linear-travel sliders which have a positive detent in the center, flat-response position.

The variable high-pass filter, with a slope of 18dB per octave, allows adjustment of the system's lower cutoff frequency from below 20 Hz up to 200 Hz. The variable low-pass filter has a slope of 6 dB per octave and can operate from above 100 kHz down to 5 kHz, providing a smooth high-end rolloff (see Figure 5).

The gain control has a center detent at unity gain. The maximum setting is + 12 dB and the minimum is full attenuation (off). This control is used, along with the input level display, to optimize the signal level in the equalizer. The gain should be adjusted so that the yellow LED flashes with the signal but the red LED rarely or

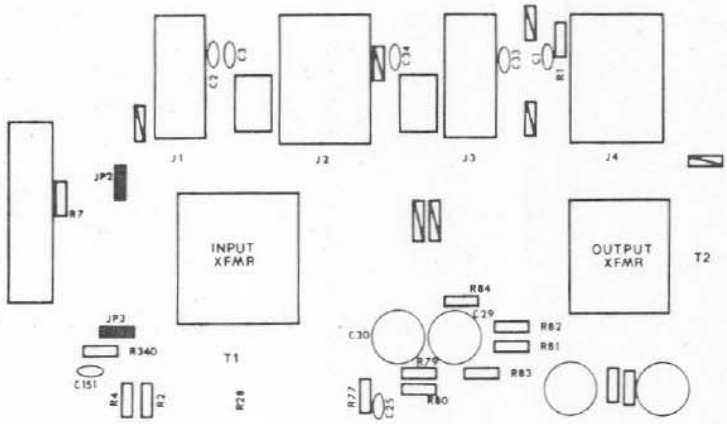

FIGURE 6
Input Transformer Mounting Location
(jumpers to cut are shown as solid rectangles)

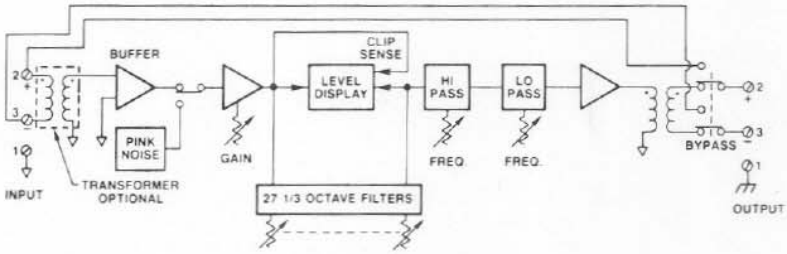

FIGURE 7
Equalizer Block Diagram

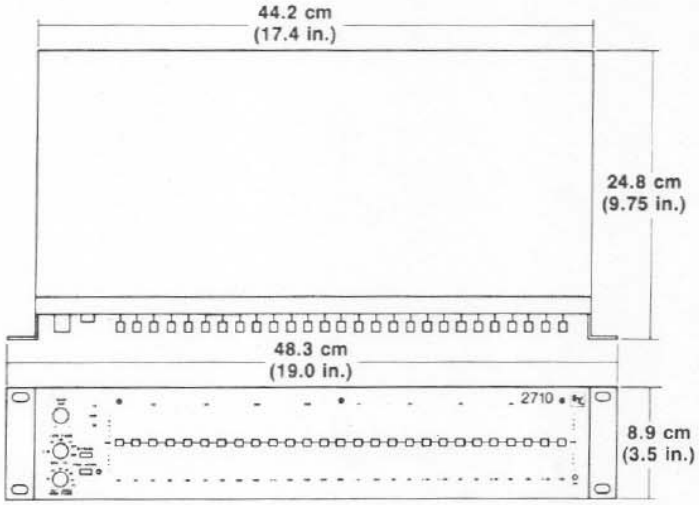

FIGURE 8
Dimensions

never lights. Then the subsequent equipment should be adjusted for proper operating level. This will provide the maximum possible signal-to-noise ratio.

The built-in pink-noise generator is operated by pressing the front-panel switch. A yellow LED indicates its operation.When the switch is pressed, the input signal is disconnected. The internal digital noise source is very accurate from 20-20,000 Hz and can be used with a spectrum analyzer for precise equalization. It can also be used as a source for noise masking systems.

A passive bypass switch and a low-distortion transformer-coupled output stage are incorporated into the two-space rack-mount chassis that features a flush-mount security cover.

INPUT TRANSFORMER OPTION

The input of the 2710 can be transforme-r coupled by adding the optional TRB-3 transformer to the circuit board. This should be done by a qualified service technician.

Remove two screws from each side and partially lift the top cover and disconnect the three connectors from the printed circuit board. Remove jumpers JP2 and JP3, plug in the transformer and secure with the two #6 screws provided (see Figure 6).

Reassemble the 2710 in reverse order from the description above.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The equalizer shall have 27 Constant-Range filters centered at the ISO standard 1/3-octave frequencies between 40 and 16,000 Hz. The filters shall provide 12 dB of boost or cut and be set by 45-mm linear controls. The accuracy of these filters shall be ±3% of the frequency indicated at the slider.

The front panel shall have the following controls: a gain control that is continuously variable from off to + 12 dB; a low-pass filter with a slope of 6 dB per octave that is variable from above 100 kHz down to 5 kHz; a high-pass filter with a slope of 18 dB per octave that is variable from below 20 Hz up to 200 Hz.

The gain control and the high- and low-pass filters shall be rotary potentiometers. A passive bypass switch shall be located on the front panel. A three-LED level indicator shall be on the front panel and display -20 dBu, 0 dBu and + 16 dBu. A power indicator shall be included on the front panel.

The equalizer shall have an integral pink-noise generator whose operational status is indicated by an LED. The noise shall be switchable on and off via a push-button switch located on the front panel. The pink-noise shall have flat amplitude response per octave change of frequency (equal energy per octave).

The input and output of the equalizer shall be accessible via a barrier strip and 3-pin XLR-type connectors located on the rear panel of the unit. The input shall be actively balanced. The output shall be a low-distortion transformer-coupled stage.

The equalizer shall meet or exceed the following performance specifications: frequency response at unity gain, ±1 dB 20-20,000 Hz; total harmonic distortion less than or equal to 0.01%, 20-20,000 Hz at 0 dBu; a noise level of -88 dBu (typical); gain that is variable between off to + 12 dB, balanced-input impedance of 30,000 ohms (typical); output impedance of 15 ohms (typical); a maximum output level of + 18 dBu at unity gain; a maximum output level of + 18 dBu into loads greater than or equal to 600 ohms; filter center frequencies that are within ±3% of ISO standard.

The equalizer shall operate on 120 V ac (or 100, 220 or 240 V ac) and consume less than 15 watts. The unit shall be operable over the temperature range of 0°C (32°F) to 50°C (122°F). The chassis shall be black painted sheet metal and occupy two rack spaces in a standard 19-inch rack (height: 3½ inches; depth: 10¼ inches; width: 19 inches). The weight shall be 11½ pounds. The equalizer shall be Electro-Voice model 2710.

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 guaranatee. A list of 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). 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., 600 Cecil Street, Buchanan, MI 49107.

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
©Electro-Voice, Inc 1990 ■ Litho In U.S.A.
a MARK IV company
Part Number 531698–036

2710 PARTS LIST

DESCRIPTION	PART NUMBER
CAPACITOR, 100 MFD 35 V ELEC AL RAD	15-01-027316
CAPACITOR, 1000 MFD 35 V	15-01-027317
CAPACITOR, 22 MF 16 V	15-01-028154
CAPACITOR, 22 UFD 10 V RAD	15-01-026793
CAPACITOR, 330 MFD 50 V	15-01-027318
CONNECTOR, XLR FEMALE	21-01-124470
CONNECTOR, XLR MALE	21-01-124642
DIODE, POWER 1 A 800 V 1N4006	48-01-027300
DIODE, SIGNAL 1N4447	48-01-027340
DIODE, ZENER 18 V 1N4746A	48-01-027339
DIODE, ZENER 6.2 V 1N5234	48-01-028163
FUSE CAP 3AG GRAY	51-07-026796
FUSE CAP 5X20mm BLACK	51-07-026866
FUSE HOLDER	51-04-026779
FUSE, .175 A 250 V	51-04-027350
FUSE, 80M/AMP 25O V	51-04-026895
IC, 4136 10 QUAD OP AMP	17-01-027338
IC, 4558 DUAL OP-AMP 8 PIN	17-01-027463
IC, BI 5532A DUAL OP-AMP 4MV	17-01-122832
IC, TL072CP DUAL OP-AMP	17-01-124688
KNOB, PUSH SWITCH BLACK	24-04-026896
KNOB, ROTARY MINI BLACK	24-04-028143
KNOB, SLIDER	24-04-028144
LED, 1.6 V ROUND RED	39-01-026843
LED, 2.2 V ROUND GREEN	39-01-027342
LED, 2.4 V ROUND YELLOW	39-01-027341
POT, 10 K +/- 20% .25 W	47-06-124523
POT, 16mm 4-GANG	47-06-027345
POT, 16mm 50 K	47-06-027344
POT, 5 K SLIDE	47-06-028169
POT, HORZ TRIM 1.0 K PCB	47-06-028157
POT, TRIM 5K	47-06-027459
RESISTOR, 10 OHM 5% .25 WATT	47-01-102030
RESISTOR, 100 OHM 5% .25 WATT	47-01-102054
RESISTOR, 100 OHM 5% .25 WATT	47-01-102054
RESISTOR, 22O OHM 5% .25 WATT	47-01-102062
SWITCH, PB VERT PC DPDT	51-02-026810
TRANSFORMER OUT AUDIO	56-07-026392
TRANSISTOR, 60 V PN3645	48-03-027333
TRANSISTOR, MPS 8098 NPN	48-03-027337
TRANSISTOR, T1P31 NPN S1L	48-03-027335
TRANSISTOR, T1P32 PNP S1L	48-03-027336