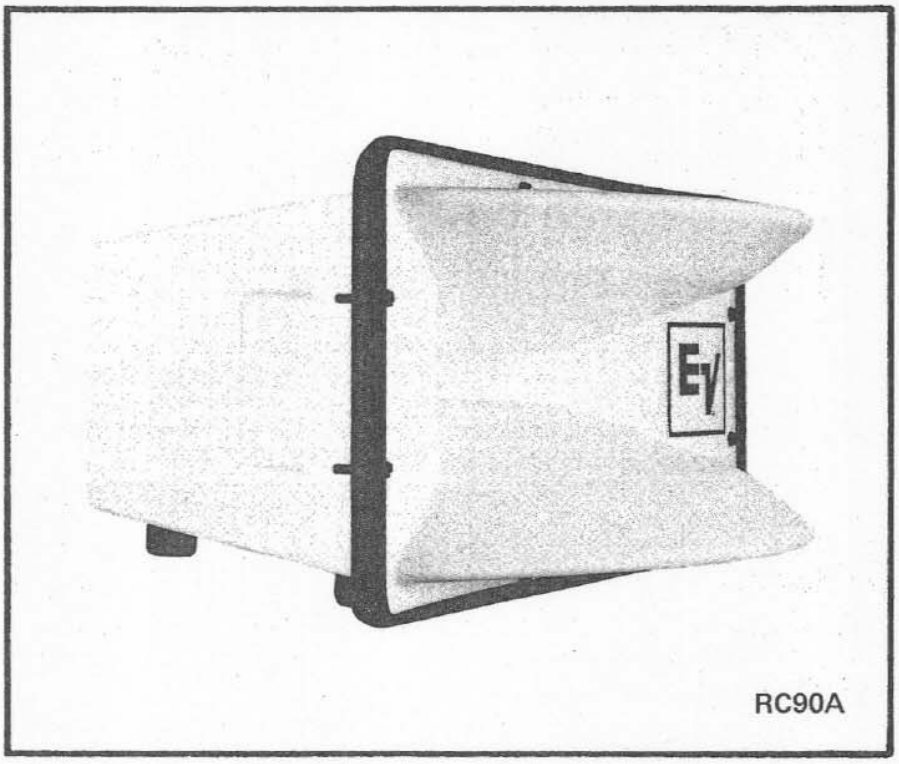


RC90A

Electro-Voice®
a gulton company

RC60A
RC90A
Encased High-Frequency Horn/Driver Systems

GENERAL SPECIFICATIONS
(more detailed specifications are available upon request)

Frequency Response:
500—20,000 Hz

Beamwidths:
RC60A:
Horizontal 60°
Vertical 40°
RC90A:
Horizontal 90°
Vertical 40°

Horn Type:
Constant directivity

Driver:
DH1506, high performance

Maximum Long-Term Acoustic Power Output:
7.5 watts

Long-Term Average Power Capacity:
30 watts (thermal limit)

Recommended Crossover Frequency:
800 Hz

Nominal Impedance:
8 ohms

Minimum Impedance:
6.3 ohms

Sound Pressure Level (1 watt at 10 ft),
RC60A:
103 dB
RC90A:
101 dB

Nominal Efficiency:
25% (band limited pink noise input, 500—2500 Hz assuming 8 ohm driver impedance)

Protective Capacitor, Built In:
60 microfarads

Construction:
Fiberglass with vinyl trim

Patent Coverage:
U.S. patent number 4071112

Dimensions (see Figure 1),
RC60A:
30.5 cm (12 in.) high,
54.9 cm (21.6 in.) wide,
57.4 cm (22.6 in.) deep
RC90A:
30.3 cm (11.94 in.) high,
60.7 cm (23.9 in.) wide,
54.4 cm (21.43 in.) deep

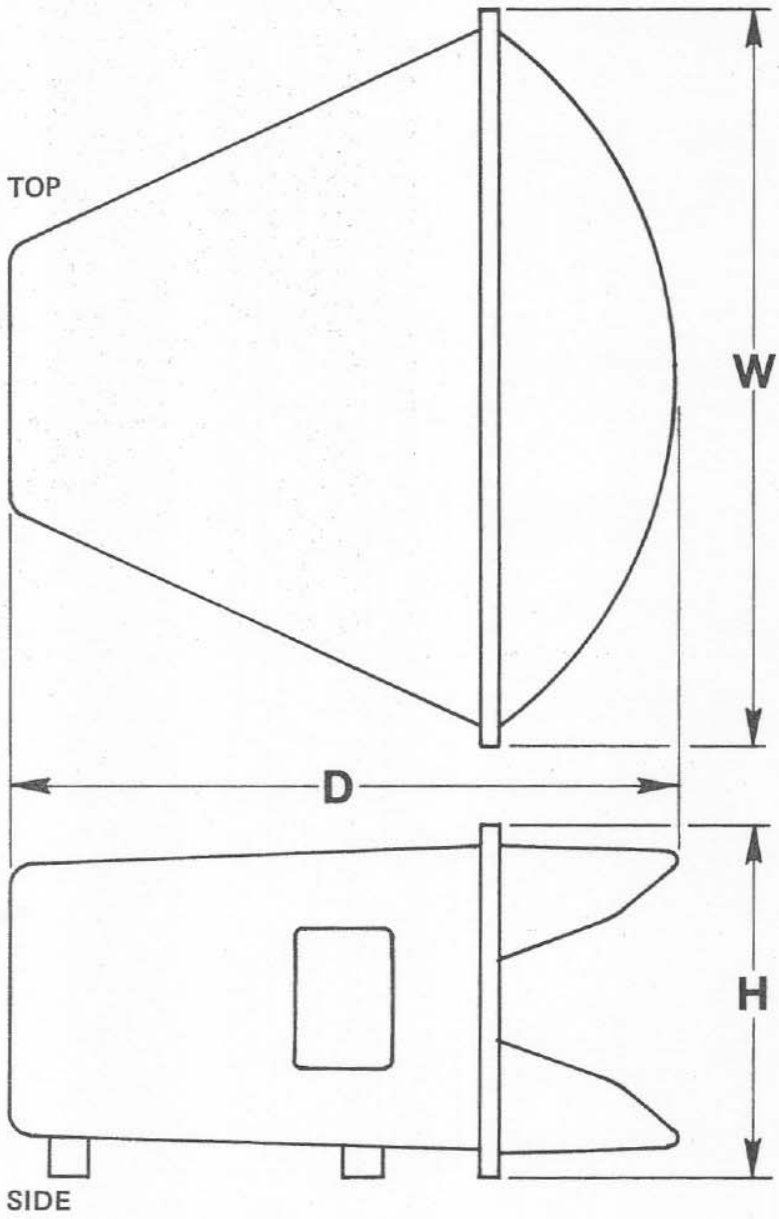
Net Weight:
RC60A:
14.5 kg (32 lb)
RC90A:
15.0 kg (33 lb)

DESCRIPTION AND APPLICATIONS

The Electro-Voice RC60A and RC90A are encased versions of the small HR series constant directivity horns, equipped with the Electro-Voice DH1506 high-performance driver and a protective series capacitor. The truly constant coverage angles of the RC series allow, for the first time, each person in the rated coverage pattern to enjoy the entire range of frequencies. No more dead spots! This allows the road performer the option of selecting the exact coverage angle needed, while using fewer speakers to cover the area more effectively.

Electro-Voice HR constant directivity horns are a patented exclusive and the first real improvement in horn design since the pioneering work of the 1930's (U.S. patent number 701112, applied for on September 30, 1975, issued on January 30, 1978). Addition Number 6 of the E-V "PA Bible" ("The Con'-stant Di-rec-tiv'-i-ty Horn White Paper") covers the constant directivity concept in great detail. To obtain a copy, see the "PA Bible" section of this engineering data sheet.

Electro-Voice HR horns were formerly available only in a large format that was cumbersome for many portable applications. The RC horn/driver systems are not only conveniently smaller but also very portable. Horn construction is of glass-reinforced plastic, at once both light in weight and appropriately rigid. Horn outer surfaces and the driver are surrounded by



MODEL	H	W	D
RC60A	30.5 cm (12")	54.9 cm (21.6")	57.4 cm (22.6")
RC90A	30.3 cm (11.94")	60.7 cm (23.9")	54.4 cm (21.43")

FIGURE 1 – Dimensions

durable fiberglass material with a tough, permanently white smooth surface. To add to the ease of handling, the case rests on three massive rubber pedestals with scuff guards and has molded-in handles on both sides.

Intended to be used in applications where portability is important, the RC encased horns are perfect mates for the rugged, roadable Electro-Voice LF215 low-frequency speaker system. They may also be used with the TL806A/D and TL606A/D systems.

DRIVER PROTECTION

All RC horns have an internal 60 microfarad protective capacitor. The capacitor starts with 3 dB of attenuation at 350 Hz and continues at a rate of 6 dB additional attenuation per octave (at 50 Hz, the protection is 20 dB). This method, therefore, provides significant protection from very-low-frequency and DC inputs such as could be produced by power amplifier turn-on/turn-off transients and some types of amplifier failure.

CROSSOVER AND EQUALIZATION

Combining the highest possible efficiency from the driver with the unique properties of constant directivity, the RC driver/horn systems require a different type of equalization than traditional designs. Recognizing this requirement, E-V developed the XEQ electronic crossover/equalizers which perfectly duplicate the equalization needs as well as providing the appropriate 800 Hz crossover. Figure 2 shows a typical complete RC system hook-up utilizing an XEQ crossover/equalizer, two power amplifier channels, and the LF215 low-frequency speaker system. If the XEQ-2 is used, maximum clockwise setting of the high-frequency boost control will provide the flatest overall system response and is the suggested starting point. The control may be adjusted downward to taste if desired.

A conventional electronic crossover may also be used. It should have a crossover frequency of 800 Hz or above, with slopes of at least 12 dB per octave. The required equalization may then be approximated with an octave band equalizer. On one particular series of equalizers (E-V/TAPCO C201, 2202, and 2200), the settings shown in Table 1 should be used (octave band equalizers of different manufacture should provide similar performance).

Figure 3 shows an RC system employing a conventional active crossover (no equalization) with a separate octave

band equalizer to provide the appropriate frequency tailoring.

BALANCING HORN LEVELS

Systems using the RC horn/driver systems will usually be biamplified. It is necessary to balance the level of the RC horns against the low-frequency speakers. This may be accomplished simply by ear.

First, with the amps driving the RC horns and the low-frequency speakers turned up to the maximum, turn the high-frequency level control on the crossover all the way down. (If the crossover has no such control, use in its place the gain control on the high-frequency power amp.) Then, speak or sing into the microphone while bringing the high-frequency level control on the crossover up until a natural, balanced sound is heard. The appropriate high-frequency/low-frequency balance may also be obtained in a more scientific manner by employing a one-third-octave real-time spectrum analyzer which will display the frequency response of the system in the audience area. Adjust the gain, level, and relative phase controls (if any) for smoothest response in the crossover frequency region (800 Hz).

POWERING THE RC SERIES

The long-term average power handling capacity of each RC system is 30 watts above 800 Hz. However, the systems will withstand up to 300 watts for 10 milliseconds. This means that power amplifiers larger than the long-term average capacity of 30 watts may be used to reproduce the short duration peaks of program material. These peaks are typically up to ten times the average program levels. They do not contribute to perceived loudness (which is closely related to the average levels) but their clean reproduction is an essential part of pleasing, accurate sound reproduction.

In this context, amplifiers in the range of 60 to 120 watts may be used in order to fully realize the maximum output ability of the RC series. However, the power above 30 watts should only be used for reproduction of the short-duration peaks. If ever higher sound levels are sought, or accidents such as PA system feedback are encountered, the long-term average power output may exceed the 30-watt rating of the RC series, and damage the driver. If a more conservative position seems appropriate, amplifiers with ratings close to the 30 watt long-term rating (say, 25-40 watts) will suffice. Addition Number Two of the "PA Bible" ("Power Handling Capacity") discusses power handling capacity in detail.

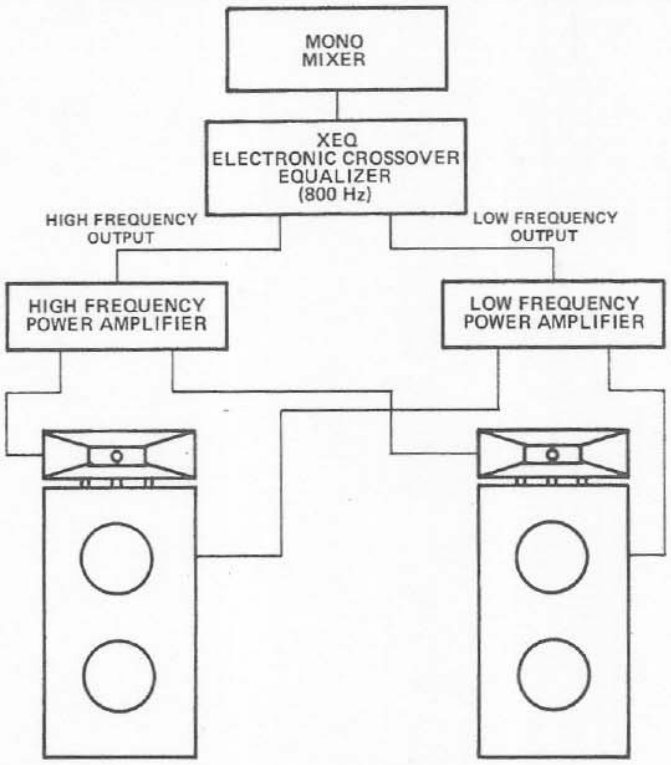


FIGURE 2 – RC System Using XEQ Crossover/Equalizer

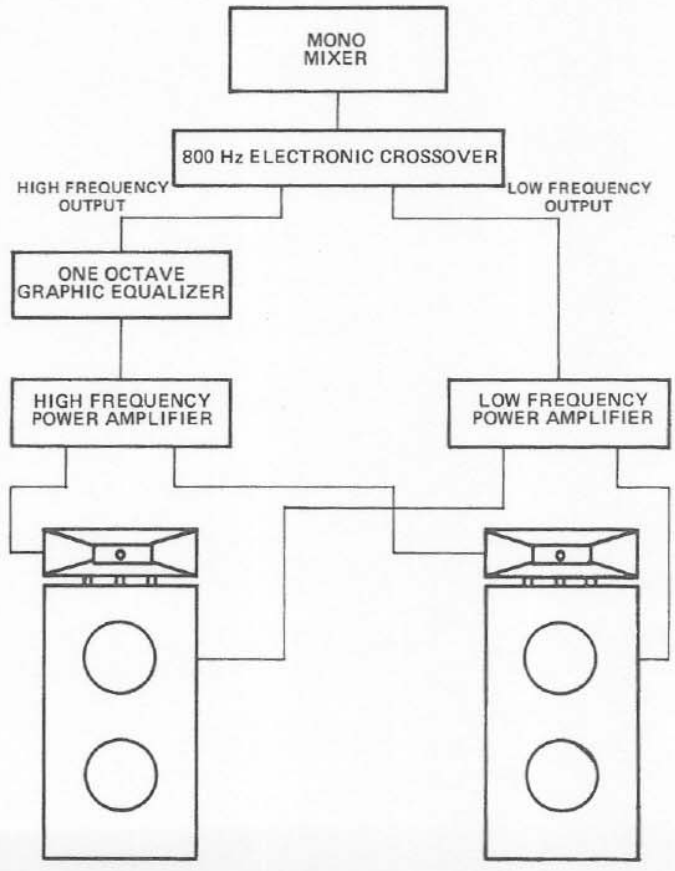


FIGURE 3 – RC System Using Crossover with Separate Octave Equalizer

Horn/Driver System	Control Settings (dB)									
	31.5 Hz	63	125	250	500	1000	2000	4000	8000	16,000
RC60A	–15	–15	–15	0	–6	–3	–9	–9	+15	+15
RC90A	–15	–15	–15	0	–5	–4	–10	+4	+15	+15

Table 1 — Recommended Octave Band Equalizer Settings for E-V RC High-Frequency Horn/Driver Systems

HANGING SUSPENSION

Both RC encased horns have provision for three-point hanging suspension. This is accomplished by using two of the 12-24 bolts, which go through the flange of the horn, and the 1/4-20 bolt installed in the nut at the rear of the case. Attachment can be accomplished by fastening directly to the bolts supplied or by retrofitting the case with eye bolts. For the bolts which go through the flange, either the 12-24 or 1/4-20 size may be used. Washers are recommended as shown in Figure 4.

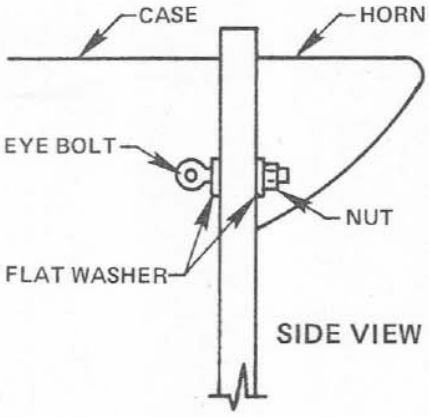


FIGURE 4 — Hanging Suspension

MULTIPLE HORN SYSTEMS

The RC encased horns are perfect for the elimination of reverberant sound in most situations. This may be done by combining long-throw horn (RC60A) together with short-throw horn (RC90A) in a system. The definitive text for the design of multiple horn systems is the E-V "PA Bible."

THE E-V "PA BIBLE"

The "PA Bible" is a practical, complete guide to solving the sound reinforcement problems faced by professional musicians. For the first time, the important fundamentals of high-performance sound system design and application are outlined and made useful to the performer. If you work with loudspeakers and microphones, you should have the E-V "PA Bible."

A number of additions to the basic "Bible," each covering a separate topic of interest, have been produced. If you would like a copy of the "PA Bible," all existing and future additions, send name and address with **Two Dollars ($2.00)** to:

E-V "PA Bible"
Electro-Voice, Inc.
600 Cecil Street
Buchanan, Michigan 49107

WARRANTY (Limited) —Electro-Voice Music Loudspeaker Systems and Accessories are guaranteed for five 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 cover finish or appearance items or malfunction due to abuse or operation at other than specified conditions. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee.

For repair information and service locations, please write: Service Department, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107 (Phone 616/695-6831) or Electro-Voice, West, 8234 Doe Avenue, Visalia, CA 93277 (Phone 209/ 625-1330,-1).

Electro-Voice also maintains complete facilities for non-warranty service of E-V products.

Specifications subject to change without notice.

Part Number 530140 — 136

a Gulton COMPANY **ELECTRO-VOICE, Inc., 600 CECIL ST., BUCHANAN, MICH. 49107**

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