

Electro-Voice®

a MARK IV company

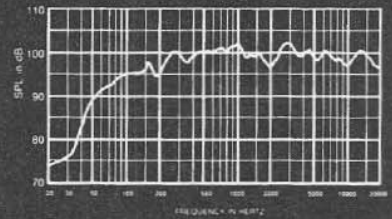


FIGURE 1 — Axial Amplitude Response
(4 volts/10 feet)

Model SH-1810-ER

Three-Way Full-Range
All-Horn-Loaded
Speaker System

SPECIFICATIONS

Frequency Response, 10 Feet on Axis, Swept 1/3-Octave, Half-Space Anechoic Environment (see Figure 1):

46-20,000 Hz

Low-Frequency 3-dB-Down Point:

46 Hz

Usable Low-Frequency Limit (10-dB-down point):

34 Hz

Half-Space Reference Efficiency:

6.2%

Long-Term Average Power Handling Capacity per EIA Standard RS-426A (see Power Handling Capacity section):

Normal: 300 watts

Bi-Amp Hi: 300 watts

Bi-Amp Low: 400 watts

Maximum Woofer Acoustic Output:

24.8 watts

Sound Pressure Level at 1 Meter, 1 Watt Input, Anechoic Environment, Band-Limited Pink Noise Signal, 300 to 2,000 Hz:

105 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated 1/3-Octave Bands of Pink Noise,

600-16,000 Hz Horizontal (see Figure 3):

60° (+15°, -10°)

800-16,000 Hz Vertical (see Figure 3):

45° (+35°, -15°)

Directivity Factor R_0 (Q), 800-16,000 Hz Median (see Figure 4):

17.3 (+11.7, -10.1)

Directivity Index D_i , 800-16,000 Hz Median (see Figure 4):

12.1 dB (+2.5 dB, -3.5 dB)

Distortion, 0.1 Full Power Input, Second Harmonic,

100 Hz: 1%

1,000 Hz: 0.6%

10,000 Hz: 6%

Third Harmonic,

100 Hz: 0.6%

1,000 Hz: 0.6%

10,000 Hz: 2%

Distortion, 0.01 Full Power Input, Second Harmonic,

100 Hz: 0.5%

1,000 Hz: 0.4%

10,000 Hz: 4%

Transducer Complement,

High-Frequency:

DH3 titanium diaphragm driver

Mid-Frequency:

DL10X

Low-Frequency:

EVM-18B Pro-Line

Crossover Frequencies:

250 Hz and 2,500 Hz

Impedance,

Nominal:

8 ohms

Minimum:

6 ohms

Input Connections:

Parallel 1/4-in. phone jacks (allows

paralleling of multiple speakers)

Enclosure Materials and Colors:

Black carpet covered 3/4-in. void-free plywood

Perforated metal grille

Enclosure Dimensions,

Height: 121 cm (47.6 in.)

Width: 63 cm (24.8 in.)

Depth: 61 cm (24.0 in.)

Shipping Dimensions,

Height: 125 cm (49.0 in.)

Width: 65 cm (25.8 in.)

Depth: 65 cm (25.8 in.)

Net Weight:

75 kg (163 lb)

Shipping Weight:

81 kg (176 lb)

DESCRIPTION

The Electro-Voice SH-1810-ER is a three-way Extended Range™ main speaker system. Professional quality components, arrayed vertically in a rugged, road-ready cabinet, are protected by an acoustically transparent metal grille. Each section of the SH-1810-ER incorporates concepts and features drawn from the MT-4 Manifold Technology® concert system, resulting in high-output, high-fidelity sound reproduction from a compact main speaker system.

The low frequencies (34-250 Hz) are reproduced by an EVM®-18B Pro-Line woofer in a new reverse version of the SubScoop™ geometry. The SubScoop enclosure combines the best attributes of horn-loaded and vented-box designs.

High-efficiency horn principles dominate most of the frequency range, while vented-box principles contribute the very lowest octave. The reverse-geometry woofer gives additional performance advantages: the rear volume and associated flare-rate contraction are optimized for low-end extension.

901-1111

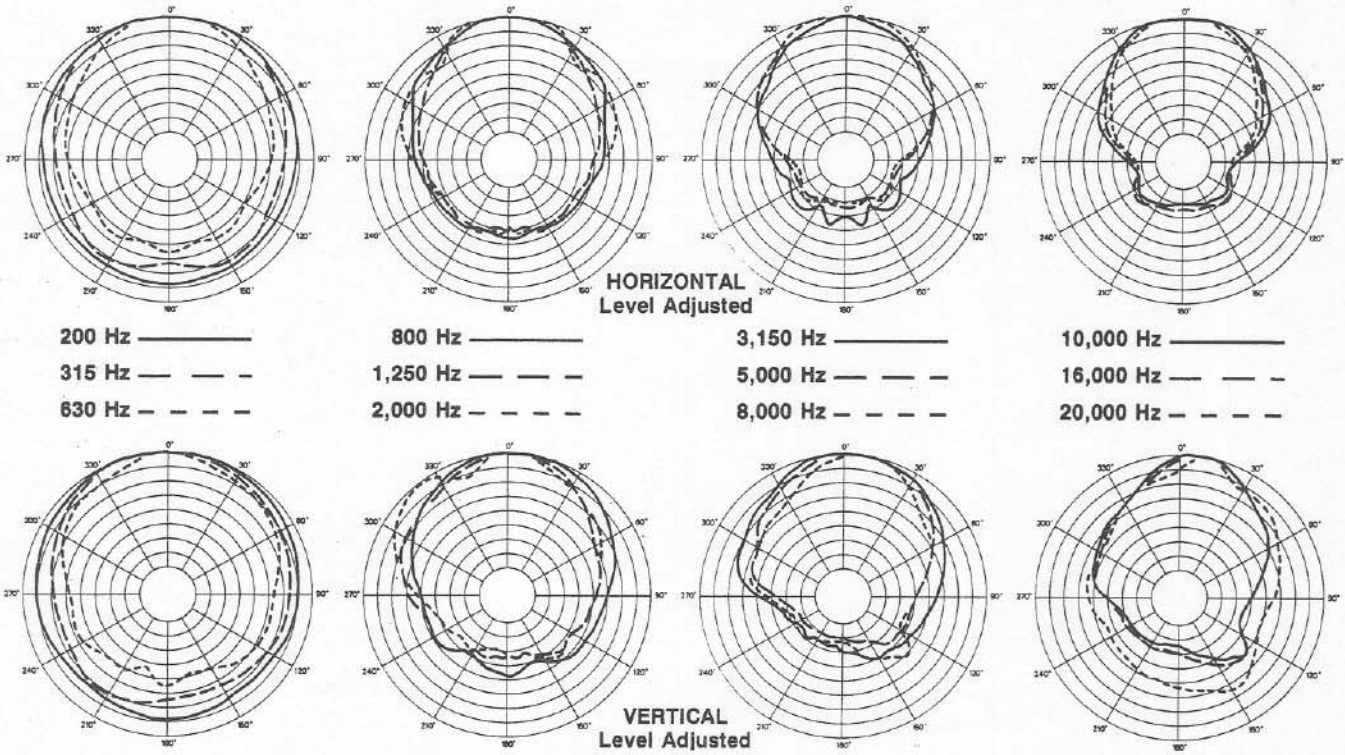


FIGURE 2
Polar Response

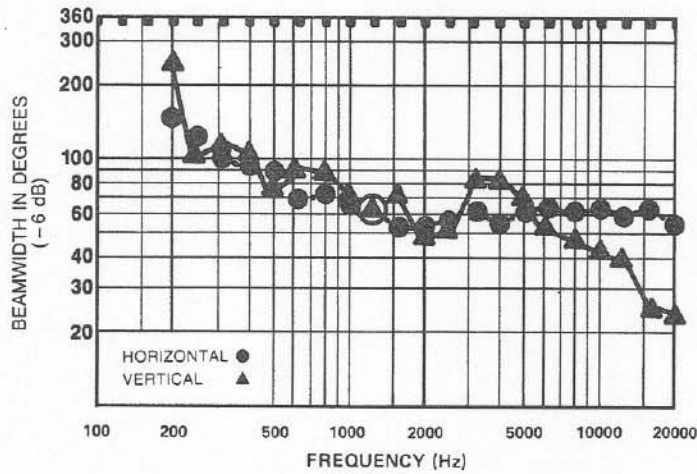


FIGURE 3
Beamwidth vs. Frequency

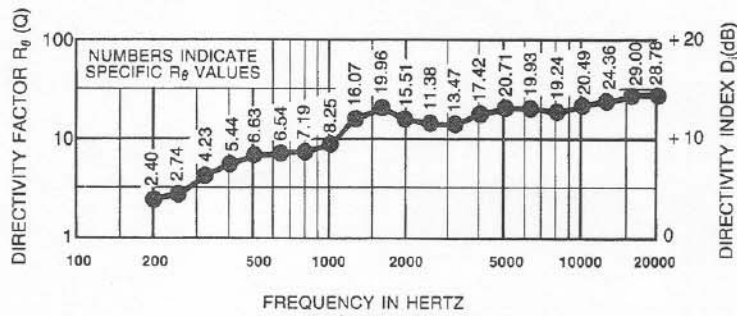


FIGURE 4
Directivity Factor and
Directivity Index vs. Frequency

The midbass/midrange section consists of the DL10X professional driver, combined with a proprietary aperiodic phase plug (U.S. patent no. 4,718,517)—identical to the combination used in the MT-4 concert system. Its range extends from 250 to 2,500 Hz, encompassing the entire vocal range within a single driver/phase plug.

The phase plug automatically compensates for loudspeaker "beaming"—the tendency for higher frequencies to radiate from the center of the cone area at a constantly narrowing coverage angle. The integral 60° x 40° horn is therefore fed a consistent acoustic input, resulting in a wide, uniform sound field.

The DH3 high-frequency driver, which is also used in the MT-4 concert system, provides the SH-1810-ER with smooth, extended response. The DH3 consists of a 1.25-inch titanium diaphragm with a Time Path™ convex phase plug (U.S. patent no. 4,525,604).

The driver's output exits through a one-inch throat into a 60° x 40° constant-directivity horn, which is centrally mounted within the mouth plane of the midrange horn. This mounting position encourages stable sound projection and horizontal pattern control through the critical crossover region.

BI-AMPING

Bi-amping is an option that may be used when full use of the extra power handling of the bass section is required. It may also be used when additional bass units (such as the SH-1810L-ER) are used in large venues or outdoors. Bi-amping is activated by a switch located at the rear of the system. Set this switch to "Bi-Amp" mode and use an external active crossover (please refer to manufacturer's instructions for exact details). The crossover frequency should be 250 Hz and have a slope of at least 12 dB per octave. The woofer can be accessed in this mode by using the ¼-inch phone jacks marked "Low in Bi-Amp."

RECOMMENDED POWER AMPLIFIERS

Due to the high efficiency of the SH-1810-ER, less amplifier input is needed to achieve a given sound output level. In the passive mode, amplifiers with a rating of up to 600 watts rms into 8 ohms may be used.

When the SH-1810-ER is used in the bi-amp mode, the recommended amplifier rating for the mid/high section remains unchanged from that of the passive mode (600 watts rms into 8 ohms). However, the optimal

performance of the low end can be achieved by using an amplifier of up to 800 watts rms into 8 ohms.

MULTIPLE USE

More than one SH-1810-ER may be used from one amplifier by the use of the parallel ¼-inch phone jacks provided on all the inputs. Care must be taken not to "abuse" the amplifier by connecting impedances that are too low (see amplifier specifications). This feature is of interest when used in the "Bi-Amp" mode with additional bass units such as the Electro-Voice SH-1810L-ER.

TWEETER PROTECTION

The SH-1810-ER is built with professional grade components of outstanding power handling and durability. To provide additional performance a solid-state, self-resetting protection device for the DH3 is incorporated into the crossover. This device permits short-term transients to pass. It gently attenuates long-term signals exceeding the thermal limits of the DH3. This means none of the musical highs disappear and the long term power handling is not compromised.

ENCLOSURE CONSTRUCTION

Intended to be used as a portable speaker system, the SH-1810-ER is ruggedly constructed of ¾-inch void-free plywood. All joints are dado cut and the cabinet is finished with a densely-woven, abuse-resistant carpet that is both attractive and highly durable. A metal grille protects and enhances the visual appeal of the SH-1810-ER. The system is easily transported by one person tilting the cabinet back on the attached wheels. Large, heavy-duty metal corner protectors, firmly secured rubber feet, and recessed handles complete the picture and ensure that the SH-1810-ER speaker system is ideally suited to a long and reliable life on the road.

FREQUENCY RESPONSE

The combination of the 18-inch woofer, midrange horn/driver and high-frequency tweeter provide the wide and smooth overall response shown in Figure 1. This response was measured at ten feet, using a four-volt input in an anechoic chamber, and was measured using a swept ⅓-octave pink noise signal. No external equalization was used.

DIRECTIVITY

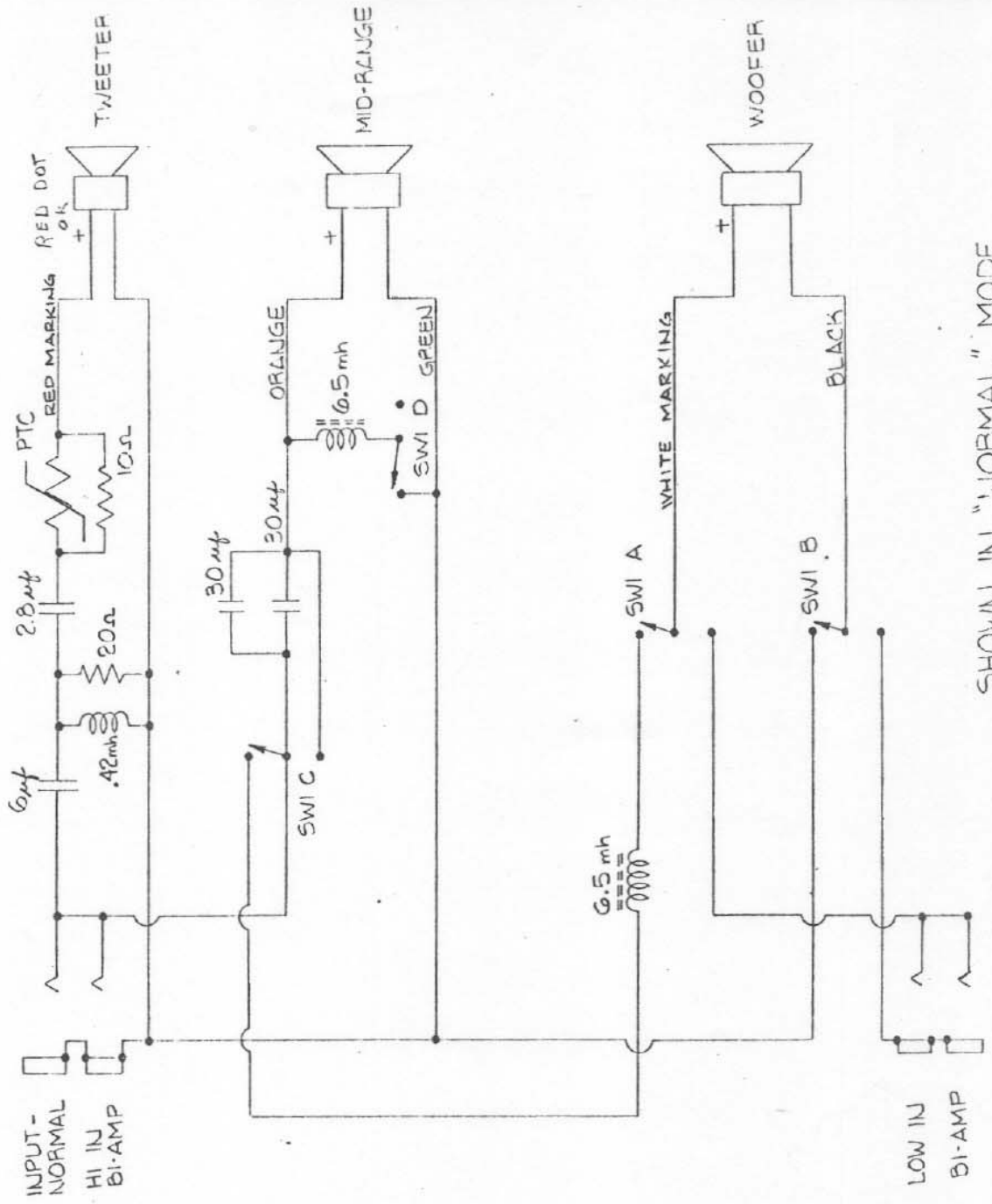
The polar response of the SH-1810-ER speaker system at selected ⅓-octave bandwidths is shown in Figure 2. These polar responses were measured in an anechoic environment at 20 feet using ⅓-octave pink

noise inputs. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete ⅓-octave polar data is shown in Figure 3. R_{θ} (Q) and the directivity index (D_i) are plotted in Figure 4.

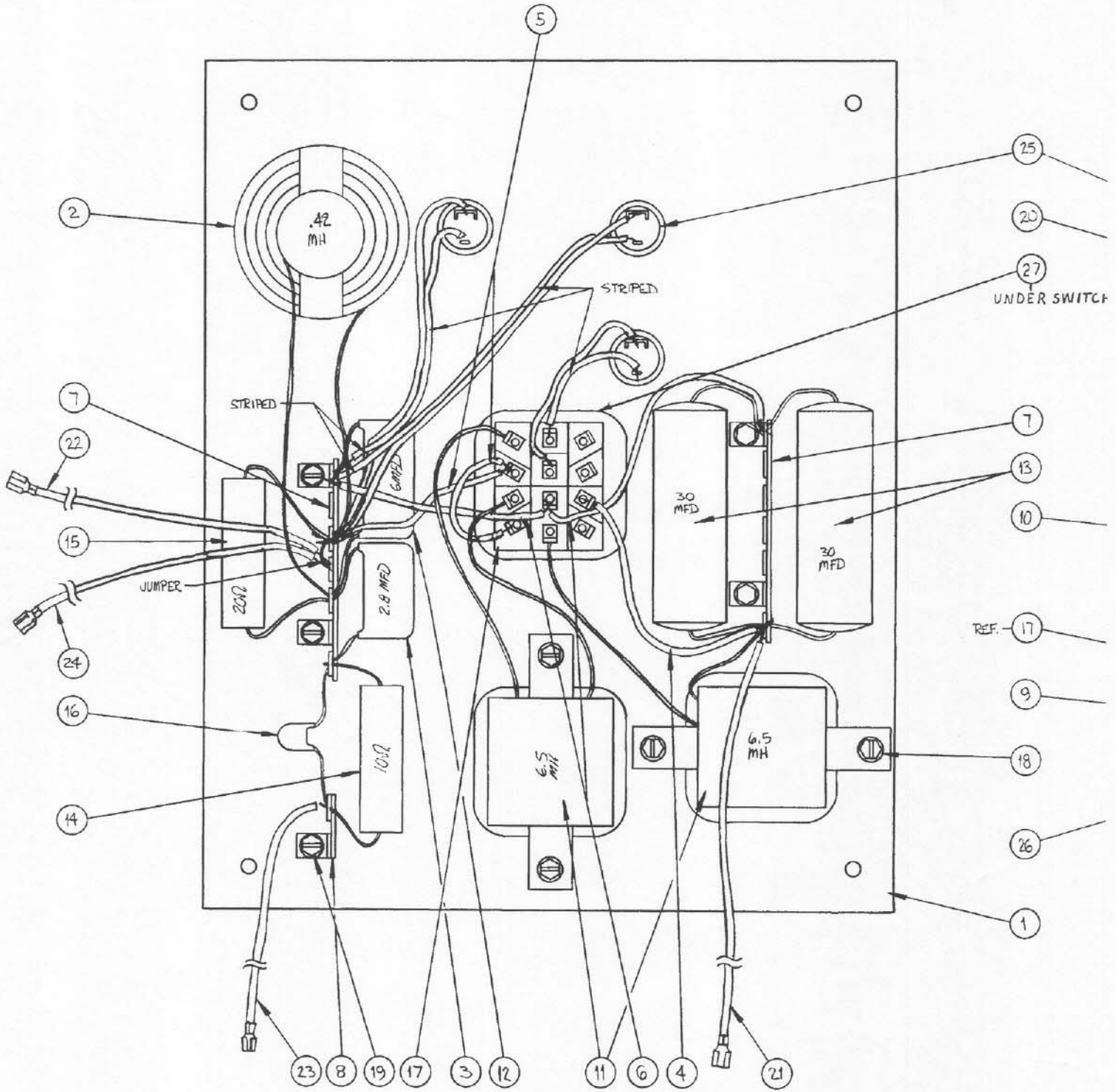
POWER HANDLING CAPACITY

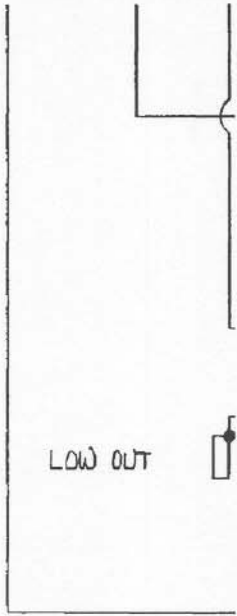
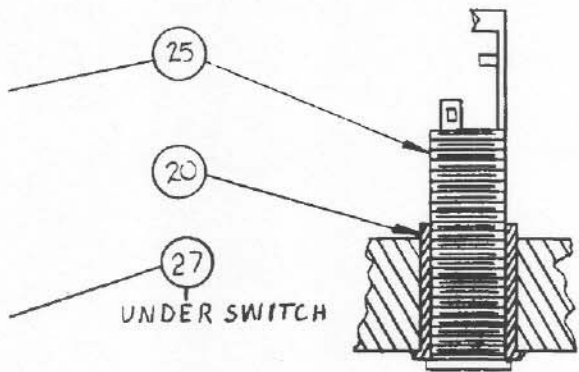
To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test related to real-life conditions. First, a random noise input signal is used because it contains many frequencies simultaneously, just like the real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than the typical program, adding an extra measure of reliability. Third, the test signal includes not only the overall "long-term" average or "continuous" level — which our ears interpret as loudness — but also short-term peaks which are many times higher than the average, just like the actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion). Note that the sine wave test signals sometimes used have a much less demanding peak value relative to their average level. In actual use, long-term average levels exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability. Specifically, the SH-1810-ER is designed to withstand the power test described in the EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer (⅓-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz with a 3-dB-per-octave slope above 1,200 Hz. In the normal (passive) mode, this shaped signal is sent to the power amplifier set at 300 watts into 6.9 ohms EIA equivalent impedance, (45.6 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 1,200 watts peak (91.2 volts peak). In the bi-amp mode, an active crossover is inserted between the noise generator and the power amplifiers, with the crossover point set at 250 Hz. In this case, the continuous power output of the low-frequency power amplifier is set at 400 watts and the continuous power output of the mid/high-frequency power amplifier is set at 300 watts, yielding a total system input power of 700 watts continuous or 2,800 watts peak. This procedure provides a rigorous test of both thermal and mechanical failure modes.

SHIBDIER SCHEMATIC

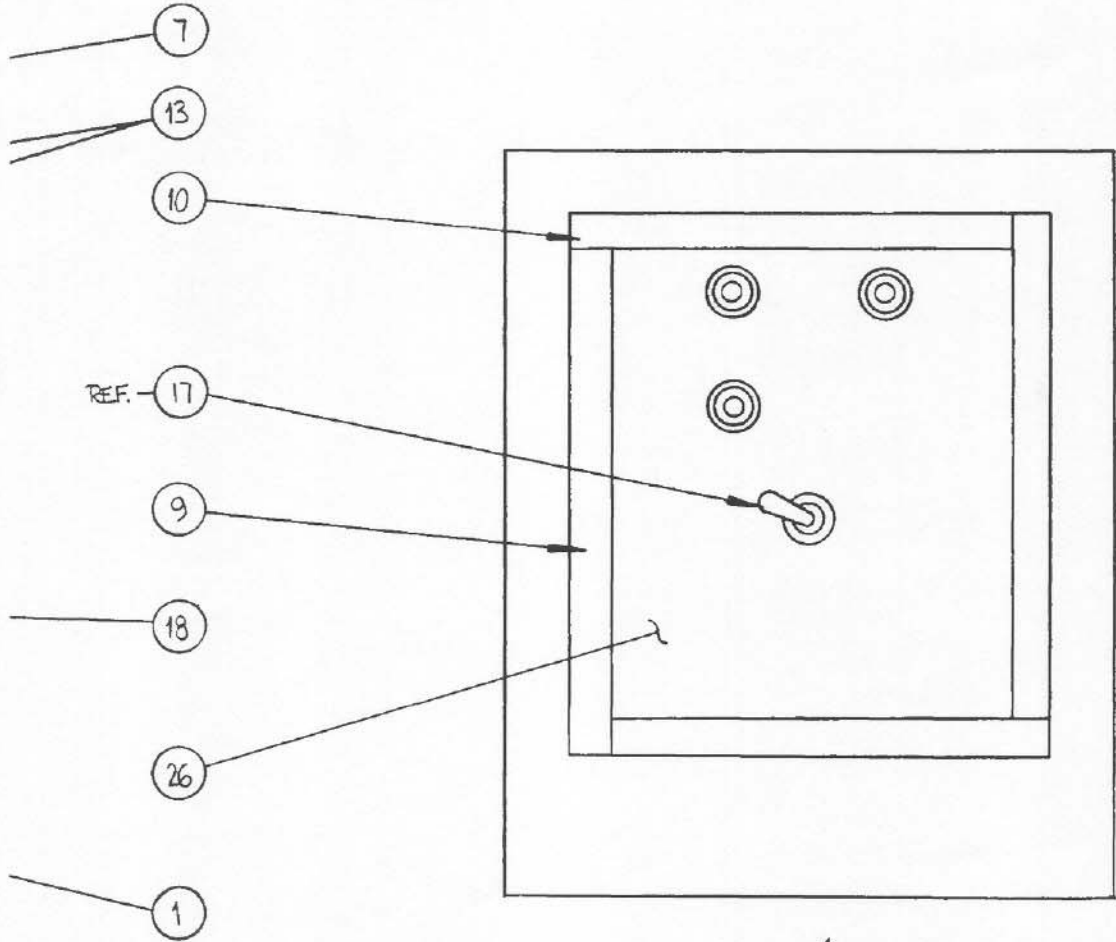


SHOWN IN "NORMAL" MODE





DETAIL "A"
SCALE: 1/1



BACK VIEW
SCALE: 1/2

28			
27	38780	1	WASHER, EXTERNAL TOOTH
26	531176	1	LABEL, INPUT
25	69643	3	POWER JACK S/A
24	81299	1	WIRE S/A, BROWN, 36" LG.
23	81298	1	WIRE S/A, YELLOW, 36" LG.
22	81297	1	WIRE S/A, GREEN, 18" LG.
21	81296	1	WIRE S/A, ORANGE, 18" LG.
20	70759-UP	3	RETAINER, SOCKET, PLASTIC
19	63012-CP	5	SCREW, 8-15 X 1/2" HEX. WSHR. HD. SLTD, STL. TYPE A
18	62849-CP	4	SCREW, 8-15 X 1" HEX. WSHR. HD. SLTD, STL. TYPE A
17	56202	1	SWITCH, 4 PDT,
16	56201	1	SWITCH, POLY, PTC RESIST.
15	46815	1	RESISTOR, 10Ω, 10%, 2CW POWER
14	46793	1	RESISTOR, 20Ω, 10%, 20W
13	42589	2	CAPACITOR, 30MFD, 100V
12	42489	1	CAPACITOR, 6MFD, 100V
11	35484	2	COIL, 6.5 MH
10	28039-TT	2	TAPE, TESIMOL, 6" LG.
9	28039-69	2	TAPE, TESIMOL 7" LG.
8	27389	1	TERMINAL STRIP, 1 LUG, MANDEX
7	A 27323	2	TERMINAL STRIP, 7 PUST, XP GRADE
6	16587-17	2	WIRE, #18 AWG, STRND COPP. RED, 5" LG.
5	16586-18	2	WIRE, #18 AWG, STRND COPP. BLACK, 3" LG.
4	16430-04	1	WIRE, #18 AWG, STRND COPP. ORANGE, 5" LG.
3	4234	1	CAPACITOR, 2.8 MFD, 100V
2	3574	1	COIL, 42 MH, #18 COPPER
1	69070	1	BOARD, MOUNTING
ITEM	PART No.	QTY	DESCRIPTION
BILL OF MATERIAL FOR ONE COMPLETE UNIT			

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS IN INCHES EXCEPT METRIC IN (PAREN.)

TOLERANCES

INCHES	METRIC	ANGLES
.X ± .03	X. ± .8MM	MACHINED } ± 1/2°
.XX ± .01	.X ± .3MM	CAST } ± 2°
.XXX ± .005	.XX ± .10MM	MOLDED } ± 2°
		FORMED } ± 2°

CONCENTRICITY T.I.R. DRAFT ANGLES

MATERIAL FROM

UN-MARKED ANGLES & INTERSECTS - 90°
REMOVE ALL BURRS AND SHARP EDGES
THREADS TO BE UNIFIED SERIES
CLASS 2 AFTER PLATING

DO NOT SCALE DRAWING

gulton **ELECTRO-VOICE, INC.**
600 CECIL ST. • BUCHANAN, MICH. 48107

TITLE *CROSSOVER S/A*

SCALE *1/1* MODEL FIRST USED ON

DRN *M. BLAVL* DATE *7/24/86* *5418105*

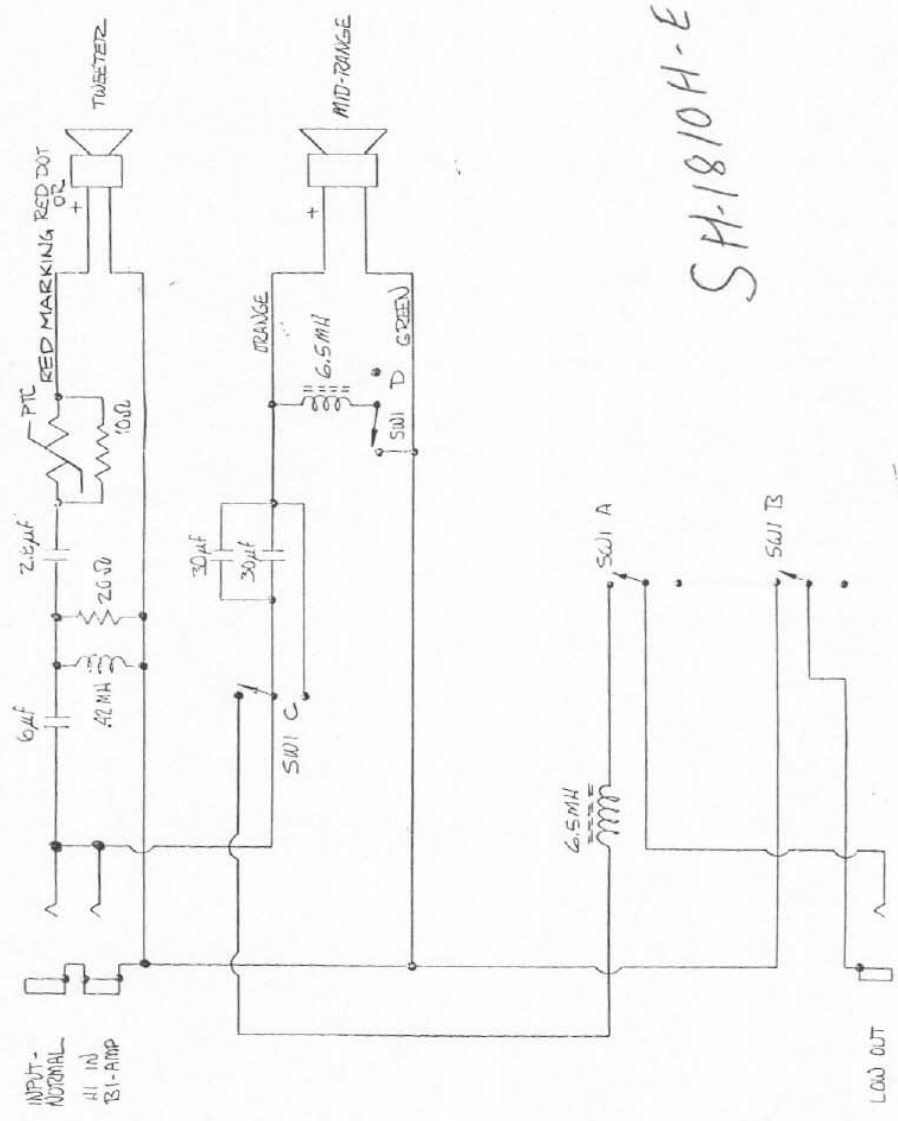
ENG *SKF* DATE *7-30-86* PRODUCTION NO. *81347* REV. *C*

RELEASED TO PRODUCTION DATE *7-30-86* *SKF* ROM *7-30-86*

EXP. NO.

REV.	DESCRIPTION	APPROVAL & DATE
A	1) CHARTED ITEM 16 CW S1787 ECR # 3576 S.D. 10-13-88	11/01/88 OBS
B	1) ITEM 16 WAS 56201 ITEM 20 WAS 70759 ITEM 21 WAS 81296 ITEM 22 WAS 81297 ITEM 23 WAS 91298 ITEM 24 WAS 81299 ITEM 26 WAS 53176 ADD ITEM 27 ECR 2976 GW 3-6-89	14-03-89 OBS
C	1) ITEM 22 WAS 16630-03 ECR 3174 GW 7-12-89	03/11/89 47/11/89
D	1) ITEM 28 ADDED ECR # 3576 S.D. 12-19-89	12/19/89
E	1) ITEM 20 WAS 72502 ECR 4118 GW 9-4-90	03/10/90
F	CORRECT DRAWING TO REFLECT SCHEMATIC 20JL RESISTOR WAS 10JL 10JL RESISTOR WAS 20JL ECR # 4758 CDS 6.10.91	03/10/91 JUN 91
G	1) ADDED 38780 ECR # 6649 L.S. 3-7-94	03/11/94

11-2-89
11



SH-1810H-ER

SCHEMATIC
SHOWN IN "GENERAL" NOTE