

T351

Biampable, NGM Equipped, Three-Way Stage System

- Compact, high-output, three-way design
- New High-Q NGM midrange mounted, in front of the woofer
- Constant-directivity 60° x 40° rotatable horn
- High-excursion, DL15X 15-in. woofer
- Biampable with LF power handling of 400 watts (1,600 watts peak) and HF power handling of 250 watts (1,000 watts peak)
- Roadworthy enclosure with metal corners and grille, and heavy-duty handles
- Professional Neutrik Speakon® connectors for biamp or full-range operation

SPECIFICATIONS

Frequency Response, 1 watt/1 meter on Axis, Swept Sine-Wave Input, Half-Space Anechoic Environment (see Figure 1):

52-20,000 Hz

Low-Frequency 3-dB-Down Point:

52 Hz

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

47 Hz

Half-Space Reference Efficiency:

5.3%

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

400 watts

Low Frequency:

400 watts

High Frequency:

250 watts

Maximum Woofer Acoustic Output:

21.2 watts

Sound Pressure Level at 1 Meter, 1 Watt Input, Anechoic Environment, Band-Limited Pink-Noise Signal, 200-3,000 Hz:

98 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise, 2,000-20,000 Hz, Horizontal (see Figure 3):

60° ±20°

2,000-20,000 Hz, Vertical (see Figure 3):

40° +27°, -0°

Directivity Factor $R_0(Q)$, 500- to 16,000-Hz Median (see Figure 4):

13.5 (+6.7, -10.8)

Directivity Index D_0 , 500- to 16,000-Hz Median (see Figure 4):

11.3 dB (+1.8 dB, -7.05 dB)

Distortion, 0.1 Full Power Input, Second Harmonic,

100 Hz:

1.26%

1,000 Hz:

1.12%

10,000 Hz:

13.3%

Third Harmonic,

100 Hz:

1.2%

1,000 Hz:

3.5%

10,000 Hz:

2.8%

Distortion, 0.01 Full Power Input, Second Harmonic,

100 Hz:

0.35%

1,000 Hz:

0.32%

10,000 Hz:

3.2%

Third Harmonic,

100 Hz:

0.15%

1,000 Hz:

2.4%

10,000 Hz:

0.25%

Transducer Complement,

High Frequency:

DH2010A driver; HP64M horn

Mid Frequency:

NGM (6.5 in.)

Low Frequency:

DL15X high-excursion woofer (15 in.)

Box Tuning Frequency:

50 Hz

Crossover Frequencies:

400 Hz, 3,000 Hz

Crossover Slope:

12 dB per octave

Impedance,

Nominal:

8 ohms

Minimum:

5.6 ohms

Input Connections:

Two paralleled Neutrik Speakon® NL4MPR jacks for full-range or biamp operation

Enclosure Materials and Colors:

Black carpet-covered plywood Void - free fir plywood

Dimensions,

Height:

842 mm (33.1 in.)

Width:

485 mm (19.1 in.)

Depth:

600 mm (23.6 in.)

Net Weight:

44 kg (97 lb)

Shipping Weight:

50 kg (110.3 lb)

DESCRIPTION

The Electro-Voice T351 is a 400-watt, three-way, high-efficiency stage system. It combines professional-quality components, highlighted by the NGM midrange speaker which is mounted in front of the woofer. The NGM is a 6.5 inch cone midrange speaker that is driven by a 7.5 inch diameter magnet structure. The speaker is mounted in its own 10 inch diameter vented enclosure. The NGM features a high power 2.5 inch diameter voice coil and a circumferential directivity control device. The system may be biampified or used full range with the internal passive crossover. Either way the result is clear and articulate, high-quality sound.

The enclosure is constructed of void-free plywood. This high-strength shell is covered with densely woven, abuse-resistant black carpeting and finished with metal corners, large rubber feet and heavy-duty recessed handles.

T351 SPECIFICATION GRAPHICS

Figure 1, Axial Frequency Response, 1 watt 1 meter

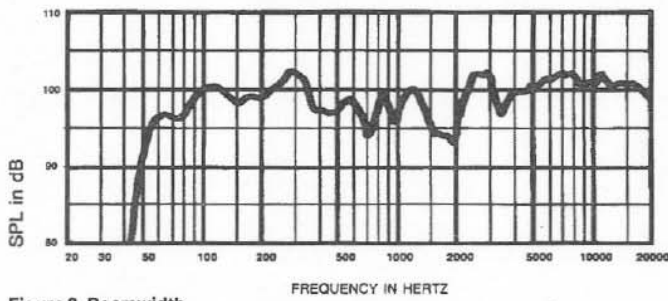


Figure 2, Beamwidth

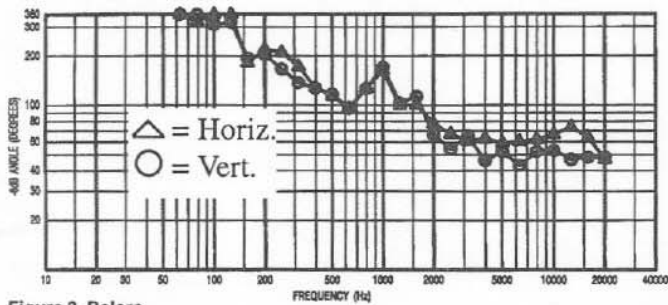


Figure 3, Polars

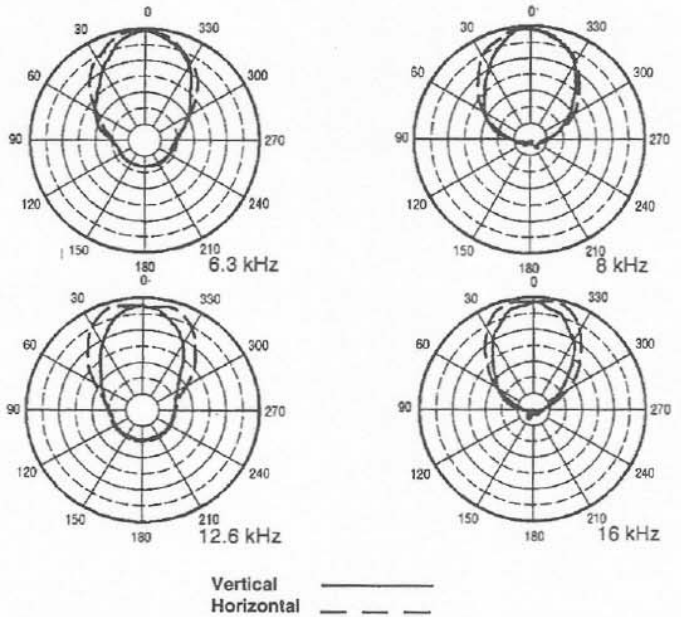
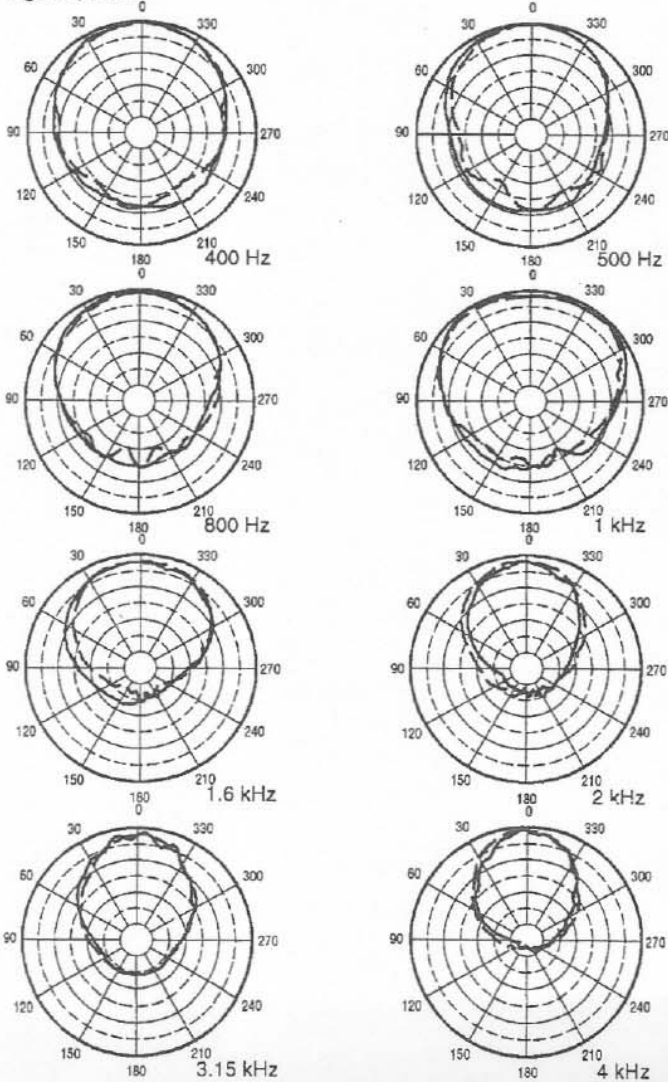


Figure 4, Directivity

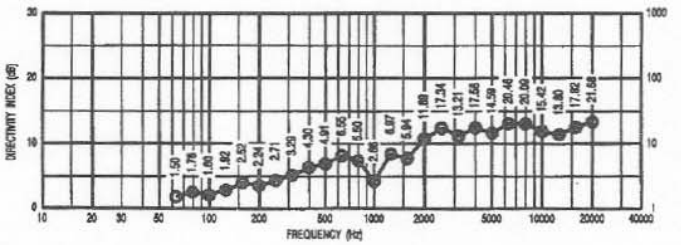
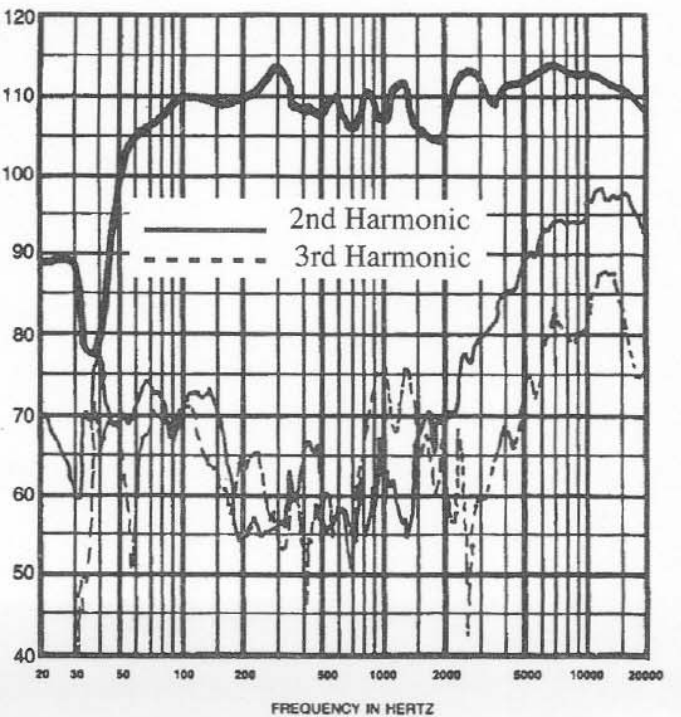


Figure 5, Distortion Response (40 w), 10% Rated Power (on axis at 1 meter from system)



The high-frequency section of the T351 utilizes a 60° x 40° rotatable, constant-directivity horn driven by a wide-bandwidth, titanium-diaphragm driver. This driver uses a unique convex-drive Time Path™ phasing plug structure (U.S. Patent #4,525,604) for smooth and extended high-frequency performance. The voice coil is coupled to the diaphragm with EV's exclusive Resonant Drive™ technology. This increases and smooths the high-frequency response and reduces the amount of internal equalization required for flat frequency response.

EV's self-resetting PRO™ circuit is built into the crossover network to guard the compression driver from damage. If input power to the driver exceeds the nominal rating, the PRO™ circuit is activated, reducing the power delivered to the driver by 6 dB. The system will remain in this mode of operation until input power is reduced to a safe level.

The optimally vented bass section of the T351 is designed using Thiele-Small parameters for efficient performance to below 52 Hz. The DL15X high-excursion 15-inch woofer is used for its outstanding performance. It features beryllium copper lead wires with a low-mass, extended-length, edge-wound voice coil and high-temperature materials. EV's unique Thermo Inductive Ring (TIR™) is placed on top of the pole piece, where the extended-length voice coil would normally be exposed, placing metal in close proximity to the coil and providing a major heat-transfer path that helps keep the voice coil cool. Also, the part of the magnetic structure adjacent to the coil is insulated from any rubbing contact induced by high power inputs, using EV's exclusive PROTEF™ coating (U.S. Patent #4,547,632). The coil is driven by a massive, 16-lb magnetic structure.

FREQUENCY RESPONSE

The combination of DL15X 15-inch woofer, NGM 6.5-inch midrange, DH2010A wide-bandwidth high-frequency driver and equalized crossover results in the wide and smooth overall response shown in Figure 1. The T351's axial frequency response was measured in Electro-Voice's large anechoic chamber at a distance of 10 feet with a swept sine-wave input of 4 volts. Figure 1 has been averaged and corrected for 1 watt/1 meter.

DIRECTIVITY

The polar response of the T351 speaker system at selected one-third-octave bandwidths is shown in Figure 2. These polar responses were measured in an anechoic environment at 10 feet using one-third-octave pink-noise inputs. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete one-third-octave polar data is shown in Figure 3. R_0 and directivity index (D) are plotted in Figure 4.

BIAMPED OPERATION

The T351 is shipped from the factory in "full-range mode" with its passive crossover utilized. If biamp operation is desired, this is easily achieved. The input panel/crossover assembly (on the back of the system) must first be removed using a #2 Phillips screwdriver. After removing the input panel/crossover, refer to the instruction label in the side of the panel. There are three automotive fuses on the printed circuit board. These fuses are not functioning as fuses, but rather are functioning together as

a three-pole switch. To convert the T351 to biamp operation, move each fuse over one position. The fuses should, once again, all be in one column. Replace the input panel/crossover assembly in the enclosure and carefully replace the screws—being careful not to strip the holes. To return the system to full-range operation, repeat the steps in a similar manner. Remember, **ALL FUSES MUST BE ARRANGED IN ONE VERTICAL COLUMN FOR SAFE, PROPER OPERATION.** The crossover frequency should be 500 Hz with slopes of 12-dB-per-octave or greater. If 500 Hz is not an available frequency, then 800 Hz should be used.

CONNECTIONS

The T351 is equipped with Neutrik Speakon® NL4MPR connectors. Two connectors are installed in parallel allowing additional T351's to be connected in parallel. One mating Speakon® NL4FC connector is supplied with each system. These connectors are locking, self-polarizing and capable of 30 amps rms continuously. Additional connectors and cables can be purchased from your dealer.

Full-range pin arrangements are:

- 1- = IN, FULL RANGE(-)
- 1+ = IN, FULL RANGE(+)
- 2- = Not used
- 2+ = Not used

Biamp pin arrangements are:

- 1- = IN, LOW FREQUENCY (-)
- 1+ = IN, LOW FREQUENCY (+)
- 2- = IN, MID AND HIGH FREQUENCY (-)
- 2+ = IN, MID AND HIGH FREQUENCY (+)

If you experience any difficulty in obtaining cables, connectors or wiring accessories, the following companies can be contacted:

Neutrik USA, Inc.
1600 Malone Street
Millville, NJ 08332

Pro Co Sound, Inc.
135 E. Kalamazoo Avenue
Kalamazoo, MI 49007

Whirlwind Music Distributors, Inc.
P.O. Box 1075
Rochester, NY 14603

POWER-HANDLING TEST

Electro-Voice components and systems are manufactured to exacting standards, ensuring they will hold up, not only through the most rigorous of power tests, but also through continued use in arduous, real-life conditions. The EIA Loudspeaker Power Rating Full Range (ANSI/EIA RS-426-A 1980) used a noise spectrum which mimics typical music and tests the thermal and mechanical capabilities of the components. Electro-Voice will support relevant additional standards as and when they become available. Extreme, in-house power tests, which push the performance boundaries of the woofers, are also performed and passed to ensure years of trouble-free service.

Specifically, the T351 passes ANSI/EIA RS-426-A 1980 with the following values:

- $R_{SR} = 6.9$ ohms ($1.15 \times R_E$)
- $P_{E(MAX)} = 400$ watts
- Test Voltage = 52.5 volts RMS,
105 volts peak

The "peak" power-handling capacity of a woofer is determined by the peak test voltage amount. For the T351, a 105-volt peak test voltage translates into 1,600 watts short-term peak power-handling capacity. This is the equivalent of four times the "average" power-handling capacity and is a peak that can be sustained for only a few milliseconds. However, this sort of short-duration peak is very typical in speech and music. Provided the amplifier can reproduce the signal accurately, without clipping, the woofer will also perform accurately and reliably, even at these levels.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker system shall be a three-way, full-range design consisting of a 38.1-cm (15-inch) woofer in a vented enclosure, an NGM (6.5-inch) midrange speaker, a high-frequency compression driver mounted on a 60° x 40° constant-directivity horn, and a passive crossover/equalizer network, of which the lower frequency may be bypassed for use with an external low-level active dividing network with a corner frequency of 600 Hz. The loudspeaker shall meet the following performance criteria: frequency response of 52-20,000 Hz, -3 dB; full-range power handling of 400 watts long term and 1,600 watts short term with a shaped random-noise input per EIA Standard RS-426A; low-frequency power handling below 500 Hz in the biamp mode of 400 watts long term and 1,600 watts short term with a shaped random-noise input per EIA Standard RS-426A; high-frequency power handling above 500 Hz in the biamp mode of 250 watts long term and 1,000 watts short term with a shaped random-noise input per EIA Standard RS-426A; sensitivity of 100 dB SPL at 1 meter with a 1-watt, 300- to 2,000-Hz pink-noise input; 6-dB-down horizontal coverage angle of 60° ±20° in the 2,000- to 20,000-Hz range; 6-dB-down vertical coverage angle of 40° +27°, -0° in the 2,000- to 20,000-Hz range; crossover frequencies of 400 and 3,000 Hz; nominal impedance of 8 ohms; and minimum impedance of 5.6ohms. Input connections shall be two paralleled Neutrik Speakon® NL4MPR jacks for full-range and biamp operation. The enclosure shall be constructed of plywood, covered in black carpet and fitted with a black steel grille, metal corner protectors, rubber feet and two recessed carrying handles. Dimensions shall be 842 mm (33.1 in.) high x 485 mm (19.1 in.) wide x 600 mm (23.6 in.) deep. Net weight shall be 44 kg (97 lb).

The loudspeaker system shall be the Electro-Voice T351.

WARRANTY (LIMITED)

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 or 800/234-6831). **Incidental and**

Consequential Damages Excluded: Product repair or replacement and return to the customer are the 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 Speakers and Speaker Systems are guaranteed against malfunction due to defects in materials or workmanship for a

period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Electro-Voice active electronics associated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

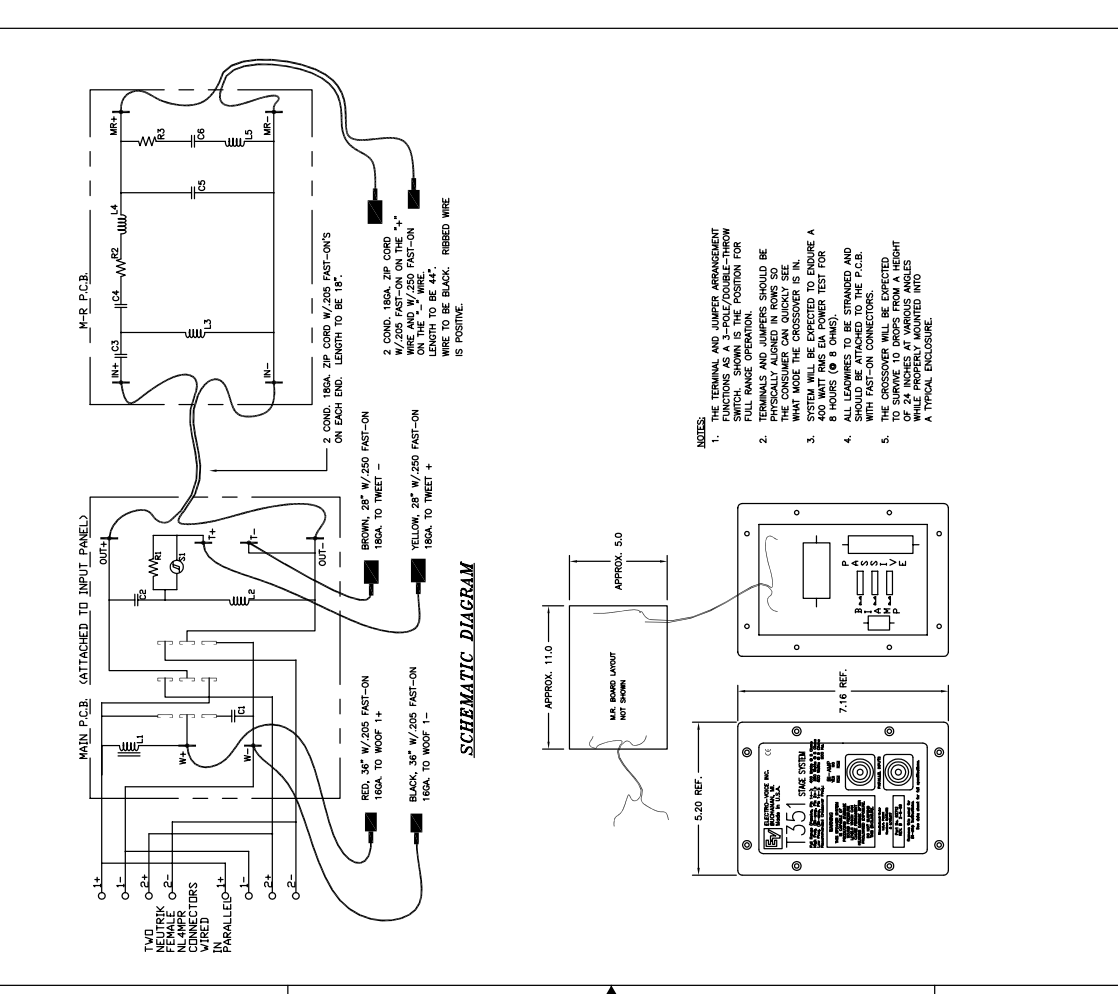
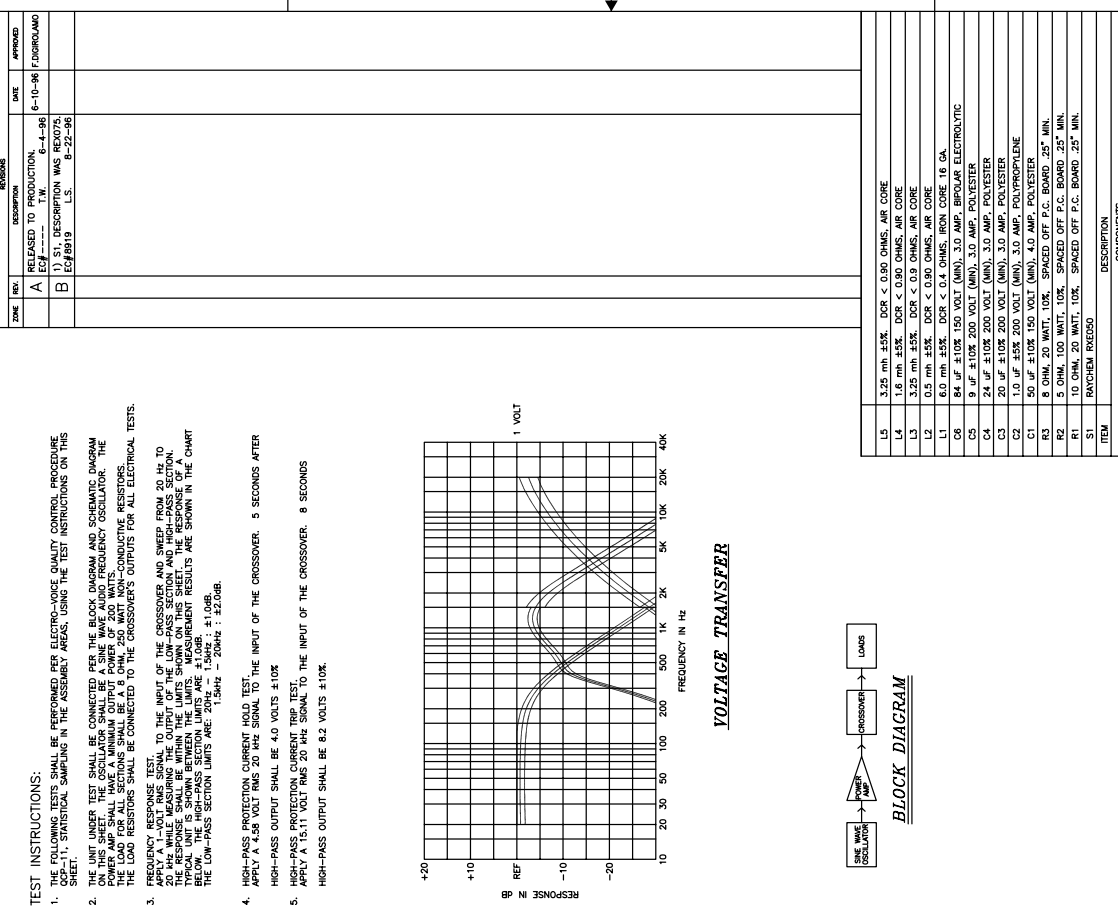
Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107 (616/695-6831 or 800/234-6831).

Specifications subject to change without notice.



ELECTRO-VOICE

600 Cecil Street, Buchanan, Michigan 49107
MANUFACTURING PLANTS AT ■ BUCHANAN, MI ■ NEWPORT, TN ■ SEVIERVILLE, TN ■ OKLAHOMA CITY, OK ■ GANANOQUE, ONT.
© Electro-Voice, Inc. 1997 ■ Litho in U.S.A. Part Number 533921 — 9729



NOTES:

- THE TERMINAL AND JUMPER ARRANGEMENT SHOWN AS A GUIDE TO THE LOW SWITCH RANGE OPERATION.
- TERMINALS AND JUMPERS SHOULD BE STRIPPED TO THE CORRECT LENGTH. WHAT MADE THE CROSSOVER IS IN. THE CONSUMER CAN QUICKLY SEE WHAT MADE THE CROSSOVER IS IN.
- SYSTEM WILL BE EXPECTED TO ENDURE A MINIMUM OF 1000 HOURS OF TEST FOR 8 HOURS (0.8 CHANS).
- ALL LEADWIRES TO BE STRIPPED AND SHOULD BE ATTACHED TO THE P.C.B. WITH FAST-ON CONNECTORS.
- THE SYSTEM SHOULD BE TESTED TO SURVIVE 10 DROPS FROM A HEIGHT OF 24 INCHES AT VARIOUS ANGLES. THE SYSTEM SHOULD BE TESTED INTO A TYPICAL ENCLOSURE.



ITEM	DESCRIPTION
L5	3.25 mm .45% DCR < 0.90 OHMS, AIR CORE
L4	1.6 mm .45% DCR < 0.90 OHMS, AIR CORE
L3	3.25 mm .45% DCR < 0.90 OHMS, AIR CORE
L2	0.5 mm .45% DCR < 0.90 OHMS, AIR CORE
L1	6.0 mm .45% DCR < 0.4 OHMS, IRON CORE 16 GA
C6	84 uF ±10% 150 VOLT (MIN), 3.0 AMP, BIPOLAR ELECTROLYTIC
C4	9 uF ±10% 200 VOLT (MIN), 3.0 AMP, POLYESTER
C3	24 uF ±10% 200 VOLT (MIN), 3.0 AMP, POLYESTER
C2	1.0 uF ±5% 200 VOLT (MIN), 3.0 AMP, POLYPROPYLENE
C1	50 uF ±10% 150 VOLT (MIN), 4.0 AMP, POLYESTER
R3	8 OHM, 20 WATT, 10%, SPACED OFF P.C. BOARD, 25° MIN.
R2	8 OHM, 20 WATT, 10%, SPACED OFF P.C. BOARD, 25° MIN.
R1	1.0 OHM, 20 WATT, 10%, SPACED OFF P.C. BOARD, 25° MIN.
S1	RAYCHEM REE950

REVISION	DATE	DESCRIPTION
A	6-10-86	RELEASED TO PRODUCTION.
B	6-4-86	(1) S1 DESCRIPTION WAS REVISED TO REE950.
C	5-22-86	(2) S1 DESCRIPTION WAS REVISED TO REE950.

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C	5-22-86	(2) S1 DESCRIPTION WAS REVISED TO REE950.

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