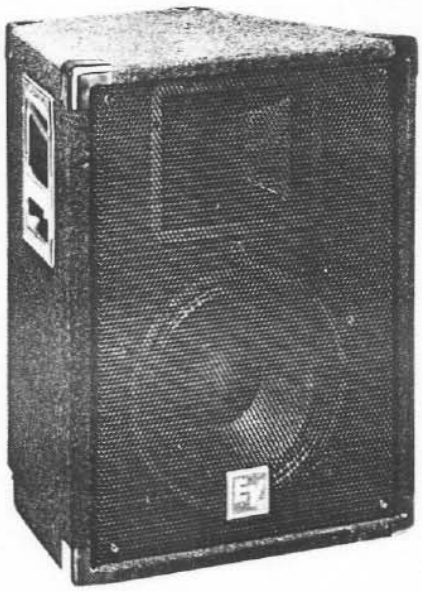
Electro-Voice®

T22

Trapezoidal Stage Speaker System



- PRO™ circuit provides HF driver protection
- Integral stand mount
- Roadworthy enclosures with metal corners and grille, and heavy-duty handles
- Constant-directivity 90° x 40° die-cast horn
- 12-inch Pro-Line woofer

SPECIFICATIONS

Frequency Response, 1 Watt/1 Meter on Axis, Swept Sine-Wave Input, Half-Space Anechoic Environment (see Figure 1):
72-20,000 Hz

Low-Frequency 3-dB-Down Point:
72 Hz

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

Half-Space Reference Efficiency:
5.9%

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

Maximum Woofer Acoustic Output:
17.7 watts

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

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise,
250-20,000 Hz, Horizontal (see Figure 3):
110° ±60°
5,000-20,000 Hz, Vertical (see Figure 3):
51° ±7°

Directivity Factor R_s(Q), 800-16,000-Hz Median (see Figure 4):
11.6 (+5.5, −8)

Directivity Index D_I, 800-16,000-Hz Median (see Figure 4):
10.5 dB (+1.5 dB, −5 dB)

Distortion, 0.1 Full Power Input,
Second Harmonic,
100 Hz:
4%
1,000 Hz:
1.5%
10,000 Hz:
4.5%
Third Harmonic,
100 Hz:
3%
1,000 Hz:
1%
10,000 Hz:
2%

Distortion, 0.01 Full Power Input,
Second Harmonic,
100 Hz:
1.5%
1,000 Hz:
0.5%
10,000 Hz:
3%
Third Harmonic,
100 Hz:
1%
1,000 Hz:
1.3%
10,000 Hz:
1%

Transducer Complement,
High Frequency:
DH2010A driver; HT94 horn
Low Frequency:
12-inch Pro-Line

Box Tuning Frequency:
75 Hz

Crossover Frequency:
1,600 Hz

Crossover Slope:
12 dB per octave

Impedance,
Nominal:
8 ohms
Minimum:
7 ohms

Input Connections:
Two paralleled 1/4-inch phone jacks (allows paralleling of multiple speakers)

Enclosure Materials and Colors:
Black carpet-covered Road-Wood™

Optional Accessory:
100BK mounting stand

Dimensions,
Height:
62.0 cm (24.4 in.)
Width:
48.3 cm (19.0 in.)
Depth:
39.6 cm (15.6 in.)

Net Weight:
26.3 kg (58 lb)

Shipping Weight:
29.0 kg (64 lb)

DESCRIPTION

The compact, trapezoidal-shaped Electro-Voice T22 is a 300-watt, two-way, high-efficiency, constant-directivity stage system. A stand socket for 1 3/8-inch diameter stands, such as the Electro-Voice 100BK, is provided. The system combines professional-quality components, arranged in a time-coherent vertical array, with an unusually durable Thiele-Small-aligned vented enclosure. The result is clear and articulate, high-quality sound.

The enclosure is constructed of Road-Wood™, a structural material made of layered and selectively oriented hardwood strands strongly bonded together with phenolic resins. This high-strength shell (U.S. Patent #4,624,338) is covered with densely woven, abuse-resistant black carpeting.

The high-frequency section of the T22 utilizes a 90° x 40° constant-directivity horn driven by a

one-inch-throat, 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 T22 is designed using Thiele-Small parameters for efficient performance to below 72 Hz. The EV 12-inch Pro-Line woofer features beryllium copper lead wires, a low-mass, edge-wound voice coil and high-temperature materials. The part of the magnetic structure adjacent to the coil is insulated using the exclusive EV PROTEF™ process (U.S. Patent #4,547,632). The coil is driven by a massive, 16-lb magnetic structure.

CONSTANT-DIRECTIVITY SPEAKER SYSTEM

The crossover frequency and speaker component geometries have been selected so that the directional characteristics of the woofer and constant-directivity horn match at the crossover frequency (approximately 90° circular coverage patterns for each) to create a special system type—the constant-directivity system. At higher frequencies the horizontal coverage pattern remains constant and the vertical pattern smoothly transitions to a 40°-to-50° angle above 5,000 Hz. Response within the 90° x 40° rated coverage angle is uniform, which means dependable audience coverage without "hot spots" or dead zones at certain frequencies. The 90° x 40° dispersion characteristic also helps avoid early reflections from nearby floor or side wall surfaces which could degrade performance. The controlled directivity of the high- and low-frequency transducers also eliminates response irregularities caused by diffraction off nearby enclosure edges and, in combination with an essentially flat on-axis frequency response, produces a total acoustic power output that is uniform with frequency.

ENCLOSURE CONSTRUCTION

The T22 enclosure utilizes a structural material that combines the strength of high-quality plywood with the density and acoustic damping of particle board without brittleness. Road-Wood™ uses the same principle of crossbanding veneers as in plywood, in order to achieve its very high rigidity. A tough, liquid-phenolic resin is blended with long, narrow strands of hardwood. Alternate layers are perpendicularly bonded under intense heat and pressure to form panels of superior uniformity. Unlike many grades of plywood, Road-Wood is dimensionally stable, water resistant and free from voids.

A combination of dado-cut joints, tough adhesives and proper bracing ensures a sonically dead enclosure free from panel resonances.

The densely woven, industrial-grade, abuse-resistant carpeting provides a finish that is both attractive and highly durable. Large, heavy-duty metal corner protectors, firmly secured rubber feet and recessed handles complete the picture and ensure that the T22 speaker system is ideally suited for a long and reliable life "on the road."

FREQUENCY RESPONSE

The combination of a 12-inch woofer, wide-bandwidth high-frequency driver and an equalized crossover results in the wide and smooth overall response shown in Figure 1. The T22'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

A unique feature of the T22 is the constant-directivity dispersion provided by the 90° x 40° horn. The polar response of the 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_θ and 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 closely related to real-life conditions. First, we use a random-noise input signal because it contains many frequencies simultaneously, just like real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than typical actual 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-duration peaks which are many times higher than the average, just like 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 T22 is designed to withstand the power test described in 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 an analyzer having the usual constant-percentage bandwidth (one-third 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. This shaped signal is sent to the power amplifier with the continuous power set at 300 watts into the 6.4-ohm EIA equivalent impedance (43.8 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 1,200 watts peak (87.6 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker system shall be a two-way, full-range design consisting of a 30.5-cm (12-inch) woofer in a vented, trapezoidal-shaped enclosure, a high-frequency compression driver mounted on a 90° x 40° constant-directivity horn, and a passive crossover/equalizer network. The loudspeaker shall meet the following performance criteria: frequency response of 72-20,000 Hz, –3 dB; power handling of 300 watts long term and 1,200 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, 300-2,000-Hz pink-noise input; 6-dB-down horizontal coverage angle of 110° ±60° in the 250-20,000-Hz range; 6-dB-down vertical coverage angle of 51° ±7° in the 5,000-20,000-Hz range; crossover frequency of 1,600 Hz; nominal impedance of 8 ohms; and minimum impedance of 7 ohms. Input connections shall be two paralleled 1/4-inch phone jacks. The enclosure shall be constructed of Road-Wood™, a structural hard-wood composite material, covered in black carpet and fitted with a black steel grille, metal corner protectors, rubber feet, two recessed carrying handles and a socket on the bottom to accept 1 3/8-inch diameter speaker stands. Dimensions shall be 62.0 cm (24.4 in.) high x 48.3 cm (19.0 in.) wide x 39.6 cm (15.6 in.) deep. Net weight shall be 26.3 kg (58 lb).

The loudspeaker system shall be the Electro-Voice T22.

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

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FIGURE 1 — T22 Axial Frequency Response, 1 Watt/1 Meter

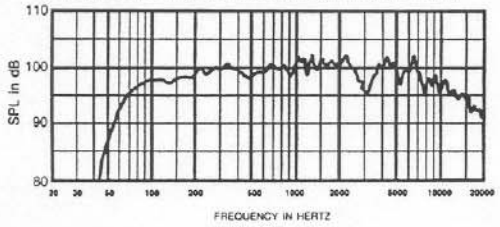


FIGURE 2 — T22 Polar Response
(one-third-octave pink noise, 4 volts/10 feet)

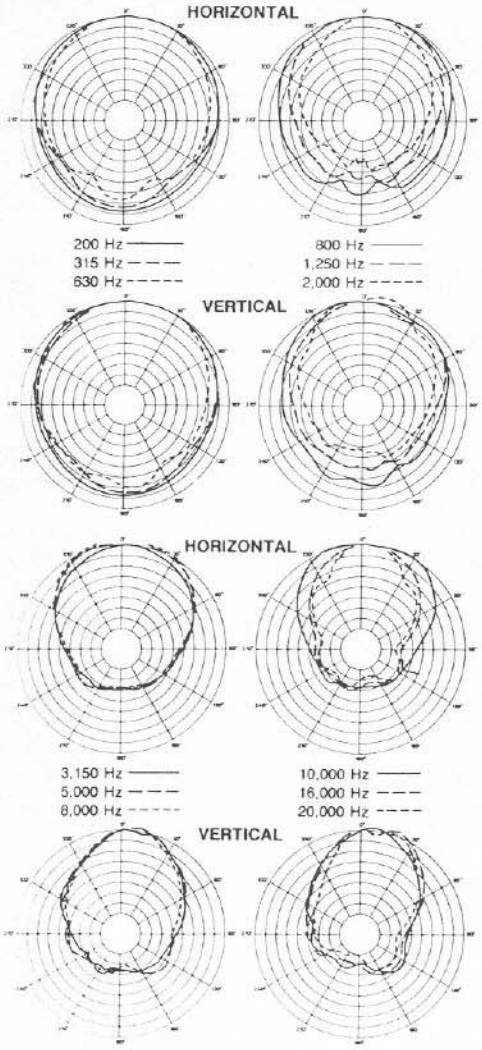


FIGURE 3 — T22 Beamwidth vs. Frequency, Whole Space (anechoic)

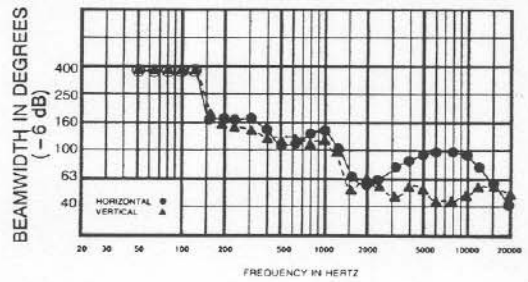
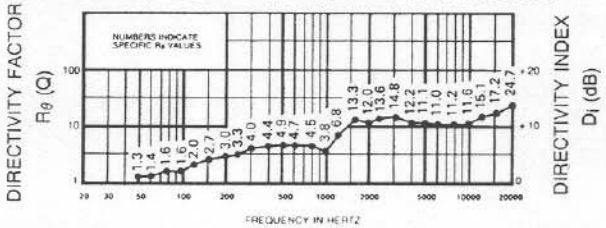
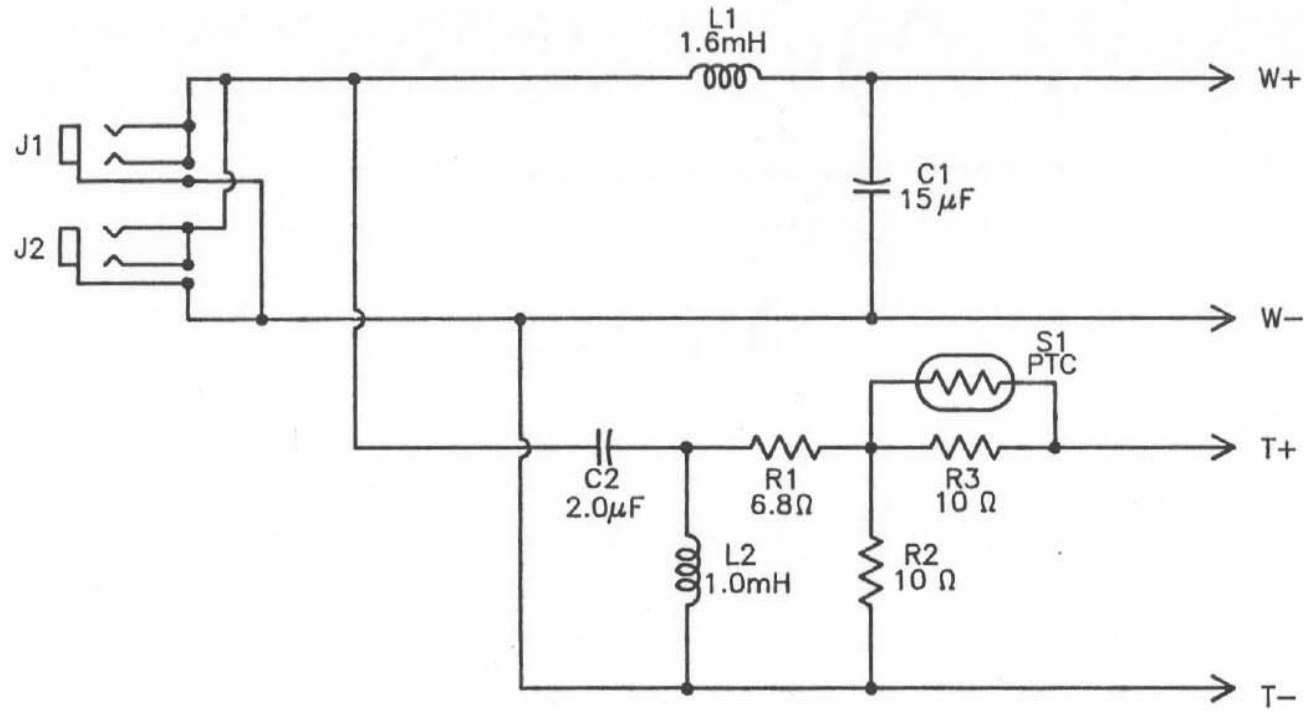


FIGURE 4 — T22 Directivity vs. Frequency, Whole Space (anechoic)





SCHEMATIC DIAGRAM

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