



## CS410/ CS410T

### Full-Range Loudspeaker

- 4 inch full range loudspeaker
- 10 watts RMS
- 40 watts peak
- High SPL (91 dB, 1 watt, 1 meter)
- Multiple transformer taps

#### Description

The University sound CS410 is a high quality 4-inch, full-range loudspeaker for distributed sound systems.

An acoustically transparent dome encloses a small, centrally mounted free-edge cone which is used to improve high-frequency dispersion.

The CS410 is suitable for use in applications requiring highly intelligible speech or smooth musical reproduction.

To ensure long-term reliability in installations, the CS410 is designed to handle 10 watts continuous power (40 watts peak) of shaped white noise for eight hours per EIA Standard RS-426A 1980.

The CS410T includes a transformer, allowing connection to 70.7-volt line, with taps of 0.25 to 4 watts.

#### Directional Performance

The directional characteristics of the CS410 in a 1.8 cubic-foot vented enclosure were measured by running a set of polar responses in University Sound's large anechoic chamber. The test signal was 1/3-octave-band-limited pseudo-random pink noise centered at the ISO standard frequencies indicated in Figure 3.

Additional typical data is provided in Figures 4 and 5, which indicate 6-dB-down beamwidth versus frequency and directivity factor, respectively, for a CS410 in the test enclosure.

#### Power Handling Test

The CS410 is designed to withstand the power test described in EIA RS-426-A 1980. 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 usual constant-percentage-bandwidth analyzer (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 15 watts into the EIA equivalent impedance (10.5 volts true RMS). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 40 watts peak (17.2 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

#### Recommended Connections

The CS410 is a nominal 8-ohm impedance loudspeaker with a 10-watt input capability. The CS410T utilizes a 4-watt, 70.7-volt universal line matching transformer with power taps ranging from 0.25 to 4 watts. The transformer is mounted to the frame and the primary winding is accessible for the user to select any of the power taps indicated in Table 1. For use with 100-V lines, connect to the 70.7 V primary winding, and use Table 1 above to determine the wattage ratings of various secondary winding taps. Do not use the tap marked 4 W.

All wattages marked for the various taps refer to the load on the amplifier, with the insertion loss of the transformer being less than 1.0 dB.

#### Recommended Enclosures and Baffles

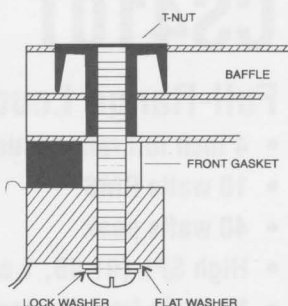
The CS410 and CS410T-8 are designed to fit on standard 4-inch ceiling speaker baffles.

	70 V	100 V
0.25 W	Green	n/a
0.5 W	Yellow	Green
1.0 W	Orange	Yellow
2.0 W	Red	Orange
4.0 W	Brown	Red
8 ohms	White	White
Common	Black	Black

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Additionally, these loudspeakers will accommodate the use of any standard back enclosure with a diameter of 5.5 inches or greater and a depth of at least 4.5 inches.

Larger back volumes will increase the low-frequency output. The frequency response of a CS410 in typical 1.0-cubic-foot and 1.8-cubic-foot back enclosure are shown in Figure 1.



### Mounting

The CS410 may be front- or rear-mounted against either surface of its mounting flange and requires a 110 mm (4.35 in.) diameter cutout and a 120 mm (4.72 in.) bolt circle. Normal fasteners up to 5 mm (0.20 in.) will fit through the eight holes in the frame. The CS410 is designed for mounting on standard ceiling speaker baffles.

### Architects' and Engineers' Specifications

The loudspeaker shall be a ceiling loudspeaker with a nominal diameter of 128 mm (5.1 in.), an overall depth of 56 mm (2.2 in.) for the CS410 and 94 mm (3.7 in.) for the CS410T, and shall weigh no more than 0.9 kg (2.0 lb) for the CS410, 1.3 kg (2.8 lb) for the CS410T. The voice coil shall have a nominal diameter of 25.4 mm (1.0 in.) and length of 7.6 mm (0.3 in.) and shall operate in a gap of not less than 1.0 T (10,000 Gauss). The loudspeaker shall exhibit a sensitivity (SPL, 1 watt at 1 meter (3.28 ft) averaged 200-4,000 Hz) of no less than 91 dB on axis maintaining an essentially flat frequency response with 3-dB-down points at 65 Hz and 16,000 Hz in a two-cubic-foot sealed box in a

free field. The half-space reference efficiency shall be 0.8%. The nominal impedance shall be 8 ohms and the dc resistance shall be 6.5 ohms. The loudspeaker shall be capable of handling a continuous 10-watt (8.6 volts true RMS) shaped white-noise signal (as per EIA Standard RS-426A 1980) with a 6-dB crest factor for eight hours.

The loudspeaker shall be the University Sound model CS410. When fitted with a transformer that allows connection to 70.7-volt systems of 0.25 to 4 watts, the loudspeaker shall be referred to as the University Sound model CS410T.

### Uniform Limited Warranty Statement

University Sound 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 EVI Audio Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to EVI

Audio Service 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 EVI Audio Service at 10500 W. Reno Avenue, Oklahoma, OK 73127 (800/845-8727 or FAX 405/577-3274). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. University Sound 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.

**University Sound 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. University Sound 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.

**For technical assistance,** contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard time.

Specifications subject to change without notice.

# CS410/CS410T Full-Range Loudspeaker

Figure 1—Axial Frequency Response, 1 watt/ 1 meter

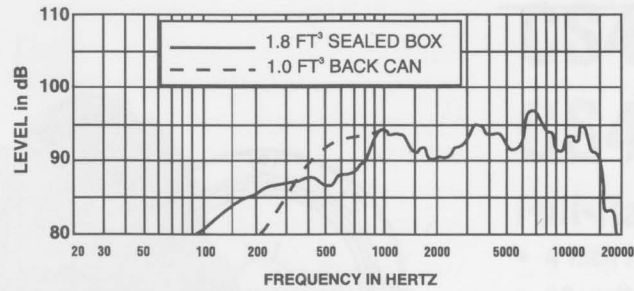


Figure 2—Input Impedance vs. Frequency

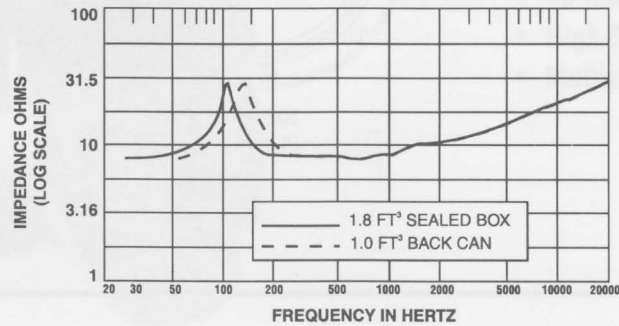


Figure 3—CS410 Polar Response in 1.8 ft³ Sealed Box 4-Volt RMS of 1/3-octave-Band Limited Noise in Anechoic Environment, 20 Feet on Axis (5 dB per Division)

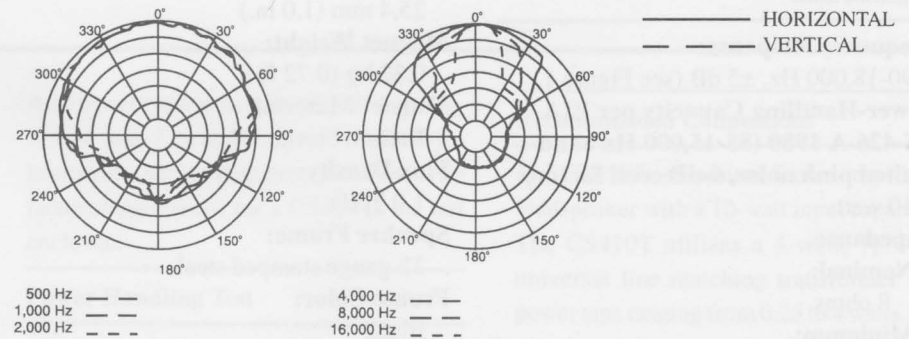


Figure 4—CS410 Beamwidth vs. Frequency in 1.8 ft³ Sealed Box

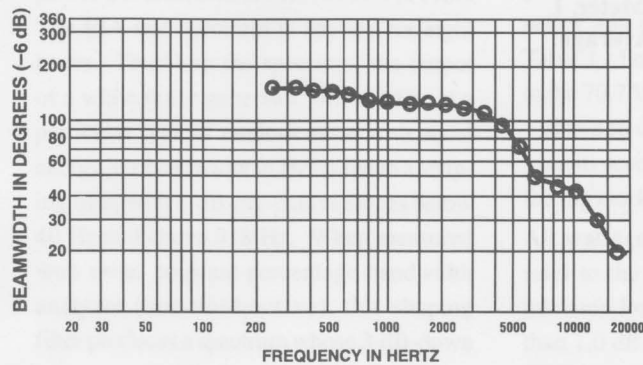
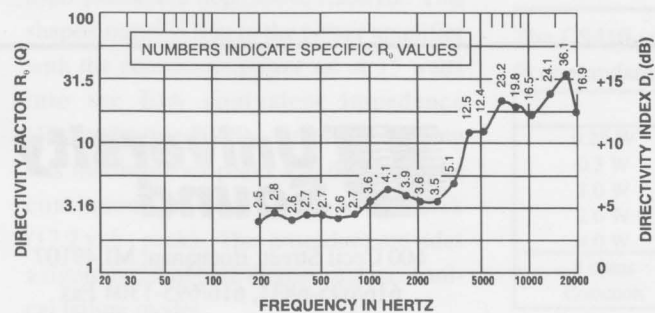
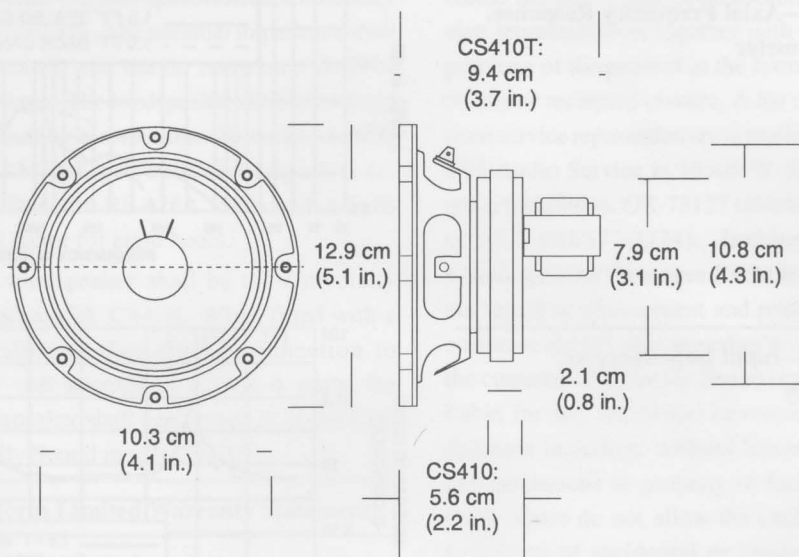


Figure 5—CS410 Directivity Factor and Directivity Index vs. Frequency in a 1.8 ft³ Sealed Box



# CS410/CS410T Full-Range Loudspeaker

Figure 5—CS410 Dimensions



## Specifications

### Frequency Response:

90-18,000 Hz,  $\pm 5$  dB (see Figure 1)

**Power-Handling Capacity per EIA RS-426-A 1980 (85-15,000 Hz band-limited pink noise, 6-dB crest factor):**

10 watts

### Impedance,

#### Nominal:

8 ohms

#### Minimum:

6.7 ohms (230 Hz)

### Sound Pressure Level at 1 Meter, 1

### Watt Input, 200-4,000 Hz Average:

91 dB

### Voice-Coil Diameter:

25.4 mm (1.0 in.)

### Magnet Weight:

0.32 kg (0.72 lb)

### Magnet Material:

Barium Ferrite

### Flux Density:

1.0 Tesla

### Speaker Frame:

22-gauge stamped steel

### Frame Color:

Black

## Dimensions,

### Diameter,

#### CS410, CS410T:

206 mm (8.1 in.)

### Height,

#### CS410:

56 mm (2.2 in.)

#### CS410T:

94 mm (3.7 in.)

### Net Weight,

#### CS410:

0.9 kg (2.0 lb)

#### CS410T:

1.3 kg (2.8 lb)

### Transformer Input ,

#### CS410T:

70.7- volt line(100-volt option)



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