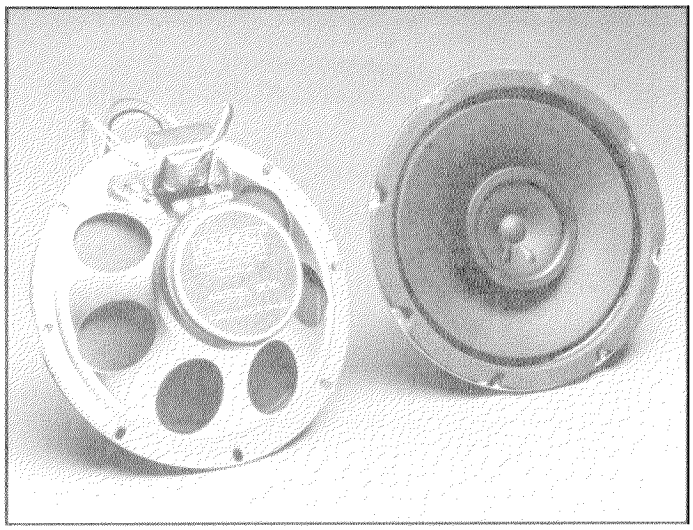
ALTEC LANSING

309 Series 8" Duplex® Ceiling Loudspeakers



KEY FEATURES

- ★ **Offers Wide Dispersion, High Efficiency**
- ★ **Dual Magnet Construction**

PRIMARY SPECIFICATIONS

System Type:	Two-way, full range, Duplex® loudspeaker system.
Pressure Sensitivity:	96 dB SPL (1 W, 500 Hz - 3 kHz) re: 20 µPa, see Note 1).
Frequency Response:	85 Hz - 18 kHz (see Figure 1, Note 2).
Power Handling:	16 watts, 85 Hz - 18 kHz, AES method (see Note 3).
Maximum Long Term Output:	107.6 dB SPL (16 W/1 m) re: 20 µPa, see Note 4).
Impedance:	6.0 ohms minimum at 11 kHz. 8.0 ohms nominal.
Components:	8-inch, high-efficiency, low-frequency driver with a coaxially mounted, 2.5-inch cone tweeter.
Crossover Network:	3000 Hz with 6-dB-per-octave tweeter protection.
Input Terminals:	.212-inch push terminals.

DESCRIPTION

The Altec Lansing **309** series Duplex® loudspeaker systems are two-way loudspeakers with 8-inch low-frequency cones and high-temperature voice-coil assemblies coaxially mounted with wide-dispersion cone tweeters. The dual magnet construction allows each speaker to be structurally, magnetically, electrically and mechanically independent of the other. The **309-8A/309-4T/309-8T** utilize a single section crossover network, centered at 3000 Hz and providing 6 dB of attenuation for the tweeter outside its operating range.

The **309-4T** is provided with a 25/70 V line transformer that offers <1 dB insertion loss and a selection of 0.5, 1, 2 and 4 W taps.

The **309-8T** is provided with a 70 V line transformer that offers <1 dB insertion loss and a selection of 1, 2, 4 and 8 W taps.

The **5281-W** grille is available as an accessory, and provides an attractive means to conceal the loudspeaker in ceiling or wall installations. The perforated grille is finished in semigloss white enamel. Other grilles available include the **5281-S** (satin aluminum), **5282-W** and **5284-WM** (both are square grilles).

Five sealed, metal ceiling-type enclosures are offered with the **309-8A/309-4T/309-8T**. Each is made of heavy-gauge, rugged, cold-rolled steel, undercoated to prevent panel resonance, and finished with rust-inhibiting paint. The enclosures are classified as Utility or Deluxe. Utility model numbers are as follows: **5183-X, 5184-E** and **5184-N.** Deluxe enclosures are lined with glass wool blankets. Deluxe model numbers are as follows: **5181-XM, 5182-XM, 5184-X** and **5189-X**.

These components are designed to work together as a complete system of in-ceiling loudspeakers and accessories. They give wide dispersion, high-efficiency, high-maximum output, ease of installation, and wide-range reproduction of music or voice.

Accessories,	
Grilles:	5281-W, 5281-S, 5282-W and 5284-WM
Enclosures:	5183-X, 5184-E, 5184-N
Deluxe Enclosures:	5181-XM, 5182-XM, 5184-X and 5189-X
Tee-bar Support:	5487-X
Dimensions,	
Loudspeaker Diameter:	8.13 in. (20.65 cm)
Depth:	3.25 in. (8.26 cm)
Net Weight,	
309-8A:	2.8 lbs (1.3 kg)
309-4T:	3.1 lbs (1.4 kg)
309-8T:	4.0 lbs (1.8 kg)
Shipping Weight,	
309-8A:	3.3 lbs (1.5 kg)
309-4T:	3.6 lbs (1.6 kg)
309-8T:	4.5 lbs (2.0 kg)
Finish:	Black

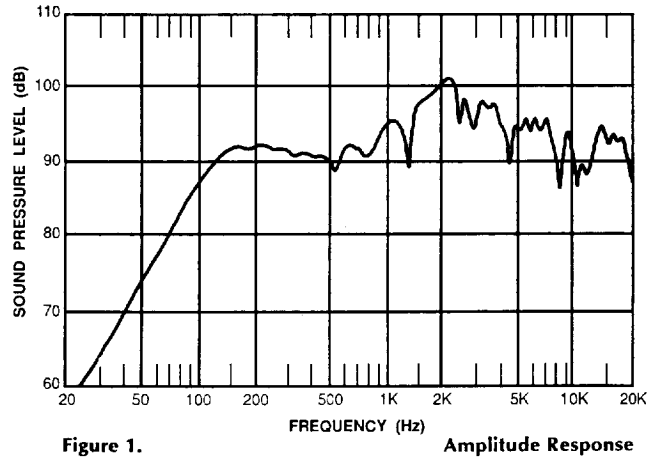


Figure 1. **Amplitude Response**

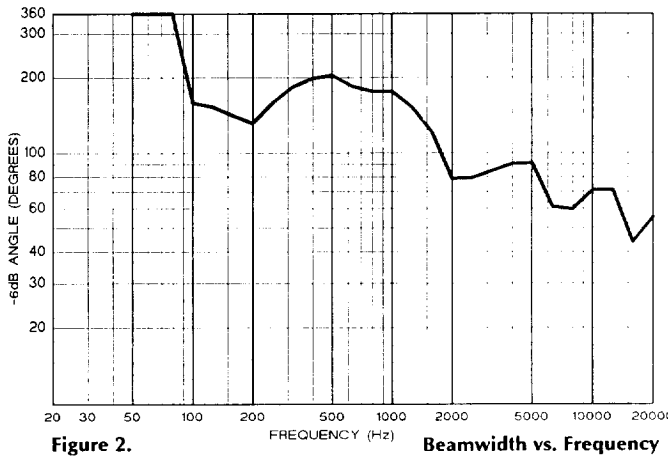


Figure 2. **Beamwidth vs. Frequency**

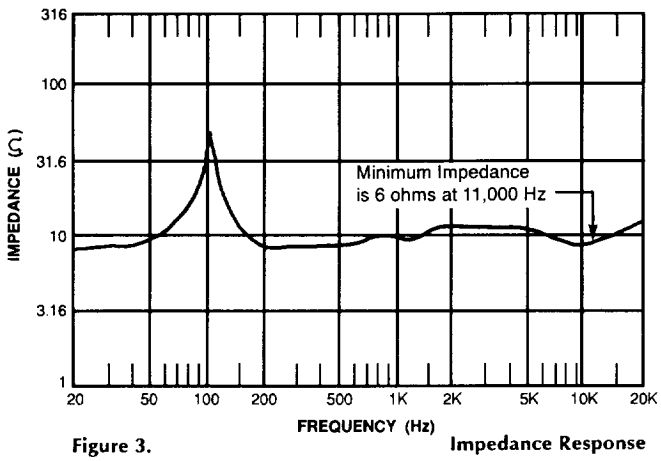


Figure 3. **Impedance Response**

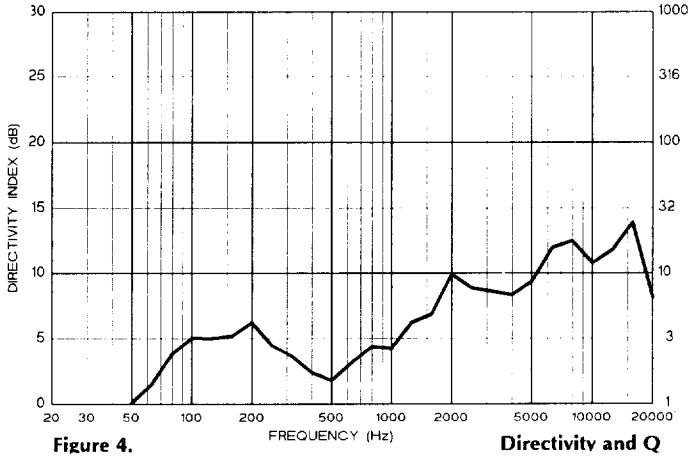


Figure 4. **Directivity and Q**

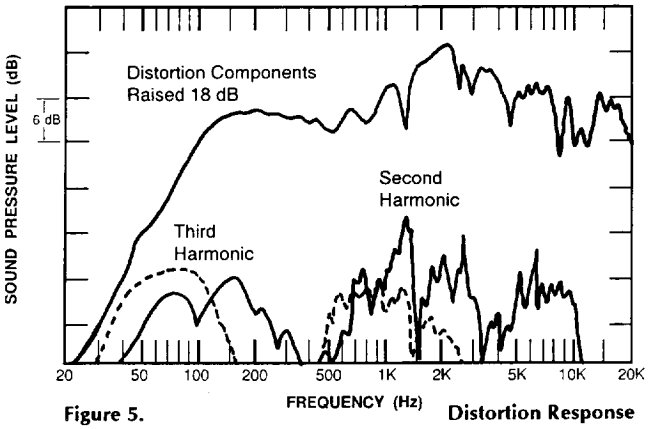


Figure 5. **Distortion Response**

309-8A - THEILE-SMALL PARAMETERS

Free Air Resonance, f_s:	110 Hz
Equivalent Volume Compliance, V_{AS}:	0.92 ft³
Total Q, Q_{TS}:	0.94
Electrical Q, Q_{ES}:	1.16
Mechanical Q, Q_{MS}:	5.03
Volume Displacement, V_D	1.61 in.³
Reference Efficiency:	2.87%

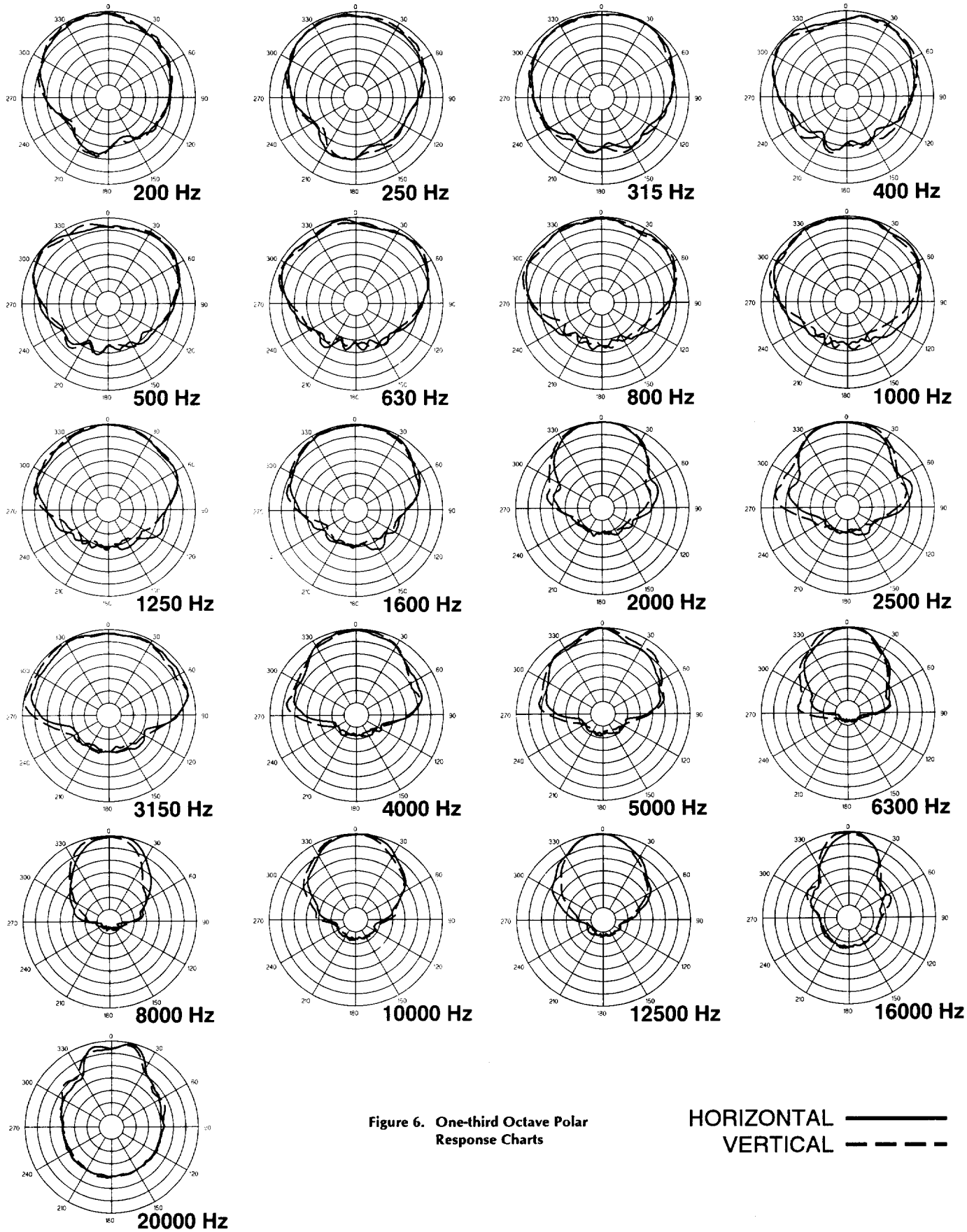


Figure 6. One-third Octave Polar Response Charts

NOTE: MEASUREMENTS WERE MADE IN A 1.5 FT³ CLOSED ENCLOSURE

NOTES ON MEASUREMENT CONDITIONS

1. Pink-noise signal, one watt calculated using E^2/Z_{min}, 3.16-meter measurement distance referred to one meter.
2. On-axis, one watt calculated using E^2/Z_{min}, 3.16-meter measurement distance referred to one meter, low frequencies corrected for anechoic chamber error.
3. This system rating patterned after the AES method for individual driver, where the test signal is pink noise with a 6-dB crest factor over the bandwidth of the system, with power calculated using the E^2/Z_{min}, for two hours.
4. This measurement made under the same conditions as Pressure Sensitivity, but at rated power, and takes into account any power compression effects due to non-linearities in the system.
5. Distortion components invalid above 10 kHz. The distortion at any given frequency may be found by graphically taking the difference between the fundamental and harmonic, adding the number of decibels which the harmonic has been raised on the graph, and applying the formula:

percent distortion = $100 \times 10 - (\text{difference in dB}/20)$

SPECIFICATIONS - TRANSFORMER

Frequency Response: 100 Hz to 15 kHz, ±1 dB

Maximum Insertion Loss: 1.0 dB

Secondary Impedance: 8 ohms

Connection Type: Bunch tinned wires for soldering or crimping.

Primary Impedances and Power Drawn:

309-4T:					309-8T:	
Power	**25 V**	**25 V**	**70 V**	**70V**	**70 V**	**70 V**
0.5 W	1250 Ω	YELLOW	10000 Ω	VIOLET	N/A	N/A
1.0 W	625 Ω	ORANGE	5000 Ω	BLUE	5000 Ω	YELLOW
2.0 W	312 Ω	RED	2500 Ω	GREEN	2500 Ω	ORANGE
4.0 W	156 Ω	BROWN	1250 Ω	YELLOW	1250 Ω	RED
8.0 W	N/A	N/A	N/A	N/A	625 Ω	BROWN

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

309-8A/309-4T/309-8T DUPLEX LOUDSPEAKERS

The loudspeaker shall be a Duplex® type with an 8-inch low-frequency cone radiator and a coaxially mounted, wide-dispersion cone tweeter. The Duplex® loudspeaker shall meet the following criteria. AES power rating shall be 16 watts of band-limited pink noise (85 Hz to 18 kHz, 6 dB crest factor). Frequency response will uniform from 85 Hz to 18 kHz on both the transformer and non-transformer versions. Pressure sensitivity, 96 dB SPL at 1 meter (94 dB at 4 feet) on axis with one watt of band-limited pink noise from 500 Hz to 3 kHz (ref. 20 µPa). Minimum impedance, 6.0 ohms.

The loudspeaker shall be 8.13 in. (20.65 cm) in diameter and 3.25 in. (8.25 cm) deep. Weight shall be 2.8 lbs (1.3 kg) [**309-8A**], 3.1 lbs (1.4 kg) [**309-4T**] and 3.2 lbs (1.45 kg) [**309-8T**]. The 309-4T shall have a 25/70 V transformer with taps at 0.5, 1, 2 and 4 watts. The 309-8T shall have a 70 V transformer with taps at 1, 2, 4 and 8 watts. The maximum insertion loss shall be less than 1.0 dB. The Duplex® loudspeakers shall be the Altec Lansing models **309-8A**; and **309-4T** and **309-8T** with transformer.

ALTEC LANSING
a **MARK IV** company

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