Although the finish is highly resistant to chemicals, sunlight, weathering, heat, abrasion, and other perils, some precautions should be followed:

- Direct, prolonged exposure to sunlight may cause some pigment deterioration and may similarly affect the polyester-grille cover cloth.
- The speaker panel is constructed of high-density composite board which will, with sufficient provocation, dent, gouge, and chip.

Questions and Answers

We have tried to anticipate and to answer some of the questions you might have about your Amazing Loudspeakers.

Why are the speakers so big?

They have to be big to accommodate an uninterrupted acoustic line source, which we consider to be the best transducer format. A long line source produces a large, lifelike, three-dimensional sound stage and delivers stunning height, depth, and width.

Why a flat-panel speaker?

A flat-panel speaker (an engineer would call it a free-field doublet) may be designed to cancel all sounds 90° off axis. The resulting dipole-radiating pattern prevents sound from reflecting from side walls, and allows the direct radiation to reach our ears as a strong, uncluttered *first arrival.* Our ear-brain system uses this pristine first arrival to create a sharply focused and stunning image that can float majestically in space.

Additionally, the Amazing Loudspeaker makes special use of room acoustics by reflecting the rear sound wave from the back wall. The resulting 4 to 12 millisecond delay produces an uncanny sonic image with a large soundstage and a wonderfully believable sense of acoustic space.

Why the semi-trapezoidal shape?

In a flat-panel speaker, low frequency sounds have long wavelengths that interfere with each other to produce an uneven frequency response. To prevent this undesirable combing effect, the panel's width was designed to vary smoothly from top to bottom, so that no single bass frequency eigentone could develop.

How can a flat-panel speaker have good bass?

Combining very low frequencies with high output is a simple matter of raw power and cubic inches (excursion times area). Since the flat baffle causes low frequency cancellation to occur below 100 Hz, a panel speaker must have many more cubic inches than a box speaker to achieve the same bass output. We gave the Amazing Loudspeaker enough displacement to achieve 108 dB SPL at 22 Hz.

Inspection of the fundamental efficiency equation:

$$E = \frac{f^3 V_{box}}{Q}$$

where: E = efficiency
f = resonant frequency cutoff
V_{box} = volume of box
Q = shape of curve at resonant frequency

shows that gigantic boxes can have efficiencies as large as we please. A flat-panel speaker is, in effect, an infinitely large box (with the hidden promise of high efficiency). As the box size becomes larger, the term V_{box} changes, into another term, V_{as}. Since V_{as} is a driver parameter only, it is a simple design job to choose the correct values of Q, f, and V_{as} to yield the desired response curve, efficiency, and SPL.

Q defines the shape of the frequency response curve, f is the low frequency cutoff, and Vas determines the efficiency. By properly designing the driver Q to complement the flat-panel rolloff, and designing in a very high V_{as}, a high output, critically damped (Q=.5), extended low frequency system is possible. The total displacement of a pair of Amazing Loudspeakers is 660 cubic inches.

Also, since a panel bass radiator doesn't have the intrinsic box resonance to deal with, the quality is tight without a trace of resonant box boom or semi one-note bass.

How can I possibly fit these big speakers into my small room?

They're only 1-1/2 inches thick, so they can be placed almost flat against the wall.

But doesn't putting a panel speaker against the wall hurt the sound?

Most panel speakers can't tolerate a powerful reflected backwave because the wave's energy tends to distort the diaphragm. However, the Amazing Loudspeaker has been designed to be almost totally opaque to any strong reflected backwave.

I always thought that ribbon drivers were very inefficient, requiring huge audio amplifiers to make even moderate sounds. How does Carver's Amazing Loudspeaker get around that problem?

Well, happily, we build high fidelity amplifiers that can deliver over 44 peak amperes, so we have a good head start. Beyond that, inspecting the defining force equation for a ribbon:

$$\text{Force} = qv \times B = il \times B$$

where : qv = charge velocity
i = current
l = length
B = magnetic field strength

shows that for a given charge velocity (qv) or current (i), and length (l), the force (and hence efficiency) can be made as large as we please by making B sufficiently large. Big, big magnets. Lots of magnetic energy. No magic, it just seems like it because we made the most intense force field of any commercial ribbon driver in the world. There is enough field strength to drive a pair of Amazing Loudspeakers to 108dB SPL with a Carver M-1.0t amplifier, or 110 dB SPL with a Carver M-1.5t. It is these momentary peak levels, undistorted, that help give music the lifelike quality we all search for. Any good quality amplifier up to 1200 watts can drive these satisfactorily.

Why are they so heavy?

For damping and good extreme low frequency bass. They have to be heavy, otherwise when the subwoofers move back and forth, the panels would move in opposition, causing cancellation. The optimum mass of the panels is related to the mass of the reflected airload at low frequencies.

Why are the ribbons mounted next to one edge of the panel?

A ribbon, like any other driver, is subject to two conflicting requirements to achieve its ideal performance. One, it should be mounted in free space, away from any reflective surface, to avoid frequency-related diffraction effects. Two, it should be mounted on a baffle to smooth and extend its response. By simply mounting it along the inside edge, with the listener on the free field side, we obtain the best of both worlds.

What about transparency, dynamic contrasts, musical accuracy, neutrality, and musicality?

This speaker was designed by and for the obsessive ears of the fanatic. We could expend thousands of words extolling the musical virtues of the Amazing Loudspeaker. But we believe that the printed word is a pale substitute for the physical experience and we are confident that others will extoll the Amazing Loudspeaker's virtues for us.

How does it sound?

There is no known method of expressing the performance of a loudspeaker in genuinely meaningful words or numbers, and there is no substitute for refined and careful listening using music and speech material.

Specifications

Frequency response:	18 Hz to 40 Khz, -3.0 dB from reference level
Impedance:	4.0Ω, resistive
Sensitivity:	85 dB @ 3 meters/7.12 volts Equivalent to 85 dB @ 1 meter/2.82 volts direct radiator
Maximum SPL:	113 dB, symphonic music power spectrum 110 dB, rock music power spectrum
Crossover:	Ribbon operates from 25 Hz to 40,000 Hz. Subwoofer system augments ribbon below 100 Hz
Finish:	Ebony lacquer with gold and anthracite highlights
Recommended Power:	1200 watts, 8Ω rating 200 watts minimum or 60 watts for very quiet listening
Dimensions:	66 inches high, 30 inches wide, and 1-1/2 inches deep (panel size)
Weight:	112 lbs each (boxed)