



Product Parameters and Specifications

Model: Legatia L6SE Super Wide-Bandwidth Midrange/Midbass

Thank you for your interest in Hybrid Audio Technologies' Stage 4 super wide-bandwidth, point source Legatia Special Edition drivers, and specifically, the Legatia L6 Special Edition (SE) midrange/midbass. The Legatia L6SE is the culmination of an inordinate amount of time and resources spent testing and refining this product to the exacting specifications of Hybrid Audio Technologies and our long heritage of quality speakers. We are certain that this product will provide class-leading performance - that simply cannot be beat by competing brands - if installed properly.



### The Legatia L6SE - A Brief History

The Legatia L6SE's topology has been based off of the massively successful Stage 3 Legatia L6 transducer, which was first launched in 2007 to an enthusiastic reception of car audio competitors, enthusiasts, and car audiophiles. In the years since its inception, the L6 midbass has been included in more International Auto Sound Challenge Association (IASCA<sup>®</sup>) national- and world-championship vehicles than any other midrange/midbass in this period of time. When it came time to develop the SE series, the first product earmarked for production was the Legatia L6SE. In Spring 2009, the first prototypes were developed by company founder and lead designer Scott Buwalda, and the concept of a Special Edition series was born. The Legatia L6SE was to be the first in the series, and would be the cornerstone for the most exciting new line of products in high-end car audio, to eventually include Legatia L3SE and L4SE super wide-bandwidth midranges, and an L8SE midrange/midbass, together with tweeter offerings from the emerging Stage 5 product line Legatia Pro Series.

By Fall 2009, a beta prototype pair of Legatia L6SE's had been refined after hundreds of hours of testing and development; these highly-evolved drivers were sent to John Sketoe, multiple IASCA and USACi champion for final testing, evaluation, and debut in organized competition. After several successful showings with the "special L6's", and countless hours testing on the speakers under various circumstances, both as a dedicated midbass and as a midbass/midrange, Sketoe gave his final approval. Production refinements included the Winter and Spring of 2010, to include features inclusive and proprietary to the SE line, and final production commenced late Summer 2010.

The Legatia L6SE is the world's finest-sounding, most refined midrange/midbass! The incredible L6SE midrange/midbass is an exceptional super high-end solution for installers, enthusiasts, and car audio competitors, and provides the midbass and midrange foundation for many of our high-end two-way systems, as well as a dedicated midbass in several of our three-way systems.



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## Legatia L6SE Attributes

The Legatia L6SE is a 181mm (7.1-inch) “large format” wide-bandwidth midbass/midrange driver to compliment both two-way and three-way system designs, where a point-source midrange or dedicated midbass driver is required. The following are the L6SE’s design attributes:

### *Basket*

The basket of the L6SE is a shared design with the Stage 3 Legatia L6 for easy upgrade potential. If you already own the L6, the L6SE will drop right into place with only a negligible amount of mounting depth difference. The basket is a high-quality cast aluminum design, and contains a 181mm wide flange providing for the mounting of the driver via four screw holes (the use of 4mm cap head screws is ideal). The overall dimensions of the driver are very amenable for use in the car audio environment, and in locations typical of the standard 165mm (6.5-inch) driver, boasting a depth of just 78mm (3 1/16-inch). The basket features large openings behind the cone to eliminate chuffing and other aerodynamic-based noises, as well as provides adequate communication to the back of the cone for acoustic suspension.

### *Motor*

The motor of the L6SE is key to the performance of the Legatia L6SE, providing for a flat and wide BL curve (as a learning note, BL is the equivalent of torque in a car; a car with a flat and constant torque curve provides much better acceleration and performance than a car with a peaky, non-constant torque curve). The BL curve is very flat and extended, yielding 17mm of two-way linear excursion, resulting in the L6SE being able to accurately track the input signal. Reduced distortion and greater dynamics are the immediate sonic benefits.

The motor of the L6SE is a cup-style neodymium (N48H grade) design, with the magnetic circuit fully enclosed within the voice coil. The result is the total profile of the motor as small as possible, enhancing acoustic performance, and aiding in mounting via small size and low weight. The final enhancement to the motor is a machined aluminum, rose-tinted copper-plated motor radiator, which significantly increases thermal power dissipation and improves thermal power handling.

### *Shorting Rings*

The L6SE uses the CuAl inductance ring system, consisting of optimally sized and placed rings of copper (Cu) and aluminum (Al) to create a total inductance profile that is extremely low over stroke, frequency, and power. Inductance is the biggest limiter of high frequency extension and modulation of inductance with stroke, frequency and power, and is the primary source of intermodulation distortion (IMD). The Legatia L6SE design ensures optimization of the total inductance profile.

### *Voice Coil*

The voice coil diameter of the L6SE is a large 35.55mm (1.4-inch), which is the proper balance between size and moving mass in a super high-end mobile audio midrange/midbass. The voice coil diameter serves several key functions: elevated power handling, dissipation of heat (thereby lowering power compression), and maximizing the size of the neodymium magnet inside the motor for enhanced motor compliance. The voice coil is high-purity aluminum, which is superior to copper for heat dissipation, as well as significantly reduced moving mass. The result is an extremely light weight winding with good power handling and low inductance.



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### *Suspension*

The inverted surround is butyl rubber which is highly consistent, and does not suffer the variance of natural rubbers. This rubber surround terminates mechanical vibrations well, having a low stiffness for positive damping of resonances well above the usable range of the L6SE. The spider material was chosen for optimal performance; the spider is a 90/10 cotton/Nomex blend with single-dip low viscosity phenolic. This material provides the stiffness desired without being overly brittle or stiff, where vibrations in the spider are well damped and do not translate into the former or the cone.

### *Cone*

Like other Legatia midrange designs, you will find no composite or metal cone materials used on the L6SE, as our approach to point-sourcing is to allow the Special Edition midrange driver to effectively play into middle treble frequencies. The Legatia L6SE is a cone-type driver consisting of a proprietary hybrid paper diaphragm with extremely low moving mass. Paper is widely acknowledged as the best-damping material, as provides the near optimum balance of strength and weight. The cone has been treated with a water resistant element at the rear to accommodate door mounting, or other areas prone to *occasional* contact with liquid. The cone design offers a wide dispersion pattern to make for flexible installation and speaker location. The Legatia L6SE has an outstanding extended frequency response; the usable frequency range of this driver exceeds seven complete octaves of usable bandwidth on-axis (51 Hz - 10,500 Hz). Even off-axis, the L6SE faithfully recreates six full octaves of information, for the ultimate “large-format” midrange/midbass.

### *Phase Plug*

The L6SE comes equipped with a phase plug pole piece extension at the center of the cone; the phase plug is aluminum and provides some of the total inductance reduction benefits. The phase plug is plated in rose-tinted copper, which by design does not negatively reduce eddy current, and adds thermal dissipation potential, not to mention class-leading cosmetics. The phase plug extends well down inside the pole vent, and acts as a very large and efficient heatsink for any heat that radiates into the pole.

The highest frequencies of audio emanate from the area around the center of the cone and the lower frequencies are produced by the area of the cone that is farther from the center. The phase plug pole piece extension improves the L6SE’s performance and clarity by deflecting delicate midrange tones forward of the driver, while minimizing distortion and improving bandwidth.

### *Tinsel Leads*

The tinsel leads for the L6SE are terminated on one side of the voice coil, with a second, unused set of tinsel leads exiting the opposite side of the termination. Having two sets of tinsel leads reduces the rocking of the system under high stroke; the spider is mechanically balanced. Additionally the tinsel leads are bonded directly to the former and brought out to the terminals, which keeps tinsel lead slap to a minimum and does not compromise the structural integrity of the cone.

### *Terminals*

The Legatia L6SE comes equipped with heavy-duty spring loaded brass core terminals that are nickel plated to optimize contact, and give the end user flexibility in tinned wire or binding post terminations. The terminals are designed to accept up to 12 gauge wiring.



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## Summary

The Legatia L6SE is the ideal multi-purpose super high-end speaker driver. Mechanical and electrical parameters are amenable to a variety of different installations and speaker locations. This driver is intended to be used in an infinite baffle configuration; a simple, solid baffle, solidly attached to the car's chassis with available airspace at the rear of the baffle is all that is required for optimum operation. The size of the L6SE allows it to be mounted in typical 165mm (6.5-inch) midbass locations within a vehicle, as long as there is adequate airspace behind the driver to allow it to maintain proper damping and acoustic suspension.

At home in virtually any arrangement, the L6SE is Hybrid Audio's newest flagship super wide-band midrange/midbass driver, boasting exceptional performance and a design philosophy that goes hand in hand with true high-fidelity playback.

## Legatia L6SE Thiele-Small Parameters

Overall Diameter	$\phi$ 181 mm (7.1-inch)
Mounting Depth	78 mm
Bolt Circle Diameter	$\phi$ 167.5 mm
Mounting Hole	$\phi$ 146 mm
Recommended <i>Minimum</i> Crossover Frequency	50 Hz at 24 dB/octave highpass
P <sub>nom</sub> Rated Power Input (No Crossover)	75 watts (AES Standard)
P <sub>max</sub> Rated Power Input (No Crossover)	150 watts (AES Standard)
P <sub>max</sub> (With Recommended Minimum Crossover)	200 watts
Frequency Range	51 Hz - 10,500 Hz, +/- 3 dB
Sensitivity	89 dB at 1 watt/1meter
Mms	13.446 g
Cms	721.580 $\mu$ m/N
BL	4.898 T*m
Voice Coil Diameter	35.55 mm (1.4-inch)
Impedance	4 $\Omega$
DC Resistance	3.4 $\Omega$
Fs	51 Hz (free air)
Qms	1.941
Qes	0.612
Qts	0.466
Xmax	8.5 mm (one way)
Vas	18.613 L
Sd	13478 mm <sup>2</sup>



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### Legatia™ L6SE Impedance and SPL Verses Frequency Plot

\*note, curve is not smoothed or corrected\*

