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ESTELON AURA

TECHNICAL NOTES

1. DESIGN PHILOSOPHY

All Estelon products are produced in a similar fashion using the same general design and construction principles. In the design and construction process, it is crucial to consider room and environmental acoustics. All listening rooms have walls, floors, ceilings, furniture, and various décor and treatments which affect the listening experience. Together with the loudspeaker, they participate in acoustical sound reproduction. The goal of the loudspeaker, and the associated system electronics, is to create a life-like (live) and engaging musical experience.

Through Estelon's advanced and innovative engineering concepts, the loudspeakers form a synergy with the room and its acoustics to re-create an emotionally involving listening experience that exposes the soundstage and musical details of the recording, as it was meant to be heard.

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Sound waves below 100 Hz

Room dimensions and characteristics have a significant effect on the listening experience. In typical room dimensions, the longest distance between reflective surfaces is smaller than the length of the low bass sound waves up to 100 Hz. The pressure at these frequencies' changes equally in every position, similar to pressing on a balloon. In these conditions, it is impossible to localize the exact position of the bass driver. This situation allows the placement of the low-frequency driver to be separate from other drivers. The Estelon AURA's woofer is positioned in the base of the speaker facing the floor so that the woofer couple acoustically with the surface of the floor maximizing its efficiency and output. The placement of the woofer assists in bass coherency and more even distribution of room standing waves. This makes it easier to find a suitable listening position in the room, with fewer compromises in bass accuracy.
Furthermore, the base-plate's design and woofer elevation from the floor allows the bass to propagate properly through the provided opening, even when the speaker is placed on thick carpeting.

Sound waves over 100 Hz

In frequencies over 100 Hz, there are numerous sound reflections created between the loudspeakers and the walls, ceiling, floor, and furniture/décor. In these higher than low bass frequencies where the wavelength of the sound is short enough for human hearing to be able to detect where the sound originates and to produce localized peaks and valleys in the room due to standing waves, the placement of the driver in relation to other drives becomes significant. The drivers that reproduce sounds over 100 Hz (mid-woofer and tweeter) are grouped together and physically placed higher in the cabinets. In this configuration, the reflections from adjacent surfaces are minimized. Furthermore, a high degree of coherency can be achieved with a stable stereo image from high bass notes up to the highest harmonics. To further minimize high bass to low midrange colouration, it is beneficial to have the mid-woofer driver positioned higher. Thus, in all Estelon speakers, the midrange/mid-woofer driver is positioned above the tweeter.

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2. CABINET & TECHNOLOGY

The Estelon AURA loudspeakers use a sealed box concept, which is more compact compared to the bass reflex concept and is less demanding regarding the positioning requirements in a room. The bass is nimble, accurate, and with authentic timbre.

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Proprietary mineral-filled composite and thermoforming technology

Estelon engineering took many years of research and testing to find the right material that would allow the highest quality of cabinet and construction for the loudspeaker’s acoustically engineered complex shape. The use of a thermoformed proprietary mineral-filled composite allows the AURA cabinet development with such advanced surface geometry, inside and out. The purposeful shape, and various internal chambers, result in characteristics that allow for ideal acoustical properties. The cabinet is extremely rigid, highly dense, resonant-free, and with exceptional internal dampening and acoustical control.

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Curved surfaces and a system of interior chambers

The unique shape of the cabinet is highly complicated and differs greatly from a classical box design. In fact, it’s not a box at all! There are no parallel walls, almost every surface inside is curved. The combination of curved cabinet walls and a complex system of interior chambers make the cabinet completely “dead” and non-resonant. Furthermore, the enclosure of each driver system has optimized enclosure geometry to suit specifically for the driver to perform its best. Such a highly advanced and complex cabinet design and construction allows only pure and uninfluenced sound to emanate from the various high-performance driver elements. The 34 kg (75 lbs.) weight of each speaker along with the base coupler, gives it static and dynamic stability. This provides a solid foundation for the explosive acceleration of the driver membranes. There are no compression effect in macro dynamics and no confusion or uncertainty in subtle micro-dynamics of the sound.

Advanced internal dampening

In order to assist the loudspeaker to unveil its purest musicality, advanced internal dampening has been implemented. The dampening was designed through a long testing process to have the best effect and overall balance throughout the musical spectrum. We have chosen different natural and synthetic dampening materials. The dampening materials type, placement and amount have been chosen through calculations, measuring and rigorous listening test.

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3. TOP QUALITY DRIVERS, CABINET CHAMBERS, AND CROSSOVERS

Each speaker has one woofer, 2 mid-woofers and one tweeter. In order for the speaker to reproduce the full spectrum of sound with the absolute highest quality, a combination of three different driver types has been carefully chosen. These high-quality drivers are designed and produced by Faital, Satori, and Scan-Speak.

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High quality drivers from Scan-Speak, Satori and Faital

The 26mm (1”) Scan-Speak ‘Illuminator’ Textile Dome tweeter has a symmetrical drive motor for outstanding sound quality and linearity, regardless if the music is reproduced at high or low volume levels. The tweeter excels at speed and high resolution.

The 130mm (5”) mid-woofer by Satori is using a proprietary Egyptian Papyrus Cone for achieving transparency and effortless delivery of the sound. The vented aerodynamic cast aluminium chassis provides optimum strength and low compression. The driver features a soft, low-dampening rubber surround for optimum transient response, and its neodymium motor system is optimized for low distortion. The silver lead wires are attached 180° apart for improved stability.

The 250mm (10”) Faital woofer provides articulate, deep-bass. It has a semi-pressed paper cone that provides clean and tight low frequencies. The woofer has an accurate, effortless bass sound. The curved base plate enables the bottom firing woofer to acoustically couple with the floor

* We provide special fabric wrapped driver covers/grilles, which can be placed magnetically on the front panel of the speakers for protection.

Special Chambers in the Loudspeaker Cabinet

The woofer is in its own optimized sealed chamber. The speaker chassis interior has no parallel walls. The standing waves in the cabinet are spread out and minimized in magnitude and the curves aid in rigidity. The combination of the heavy and rigid material, curved shapes, and internal bracing suppresses the cabinets inherent resonances to practically non-existent levels.
The drivers have everything to support them to perform their absolute best.
The chamber of the mid-woofers and tweeter is isolated and constructed by the same principles as the woofer chamber, free from resonances and well dampened.

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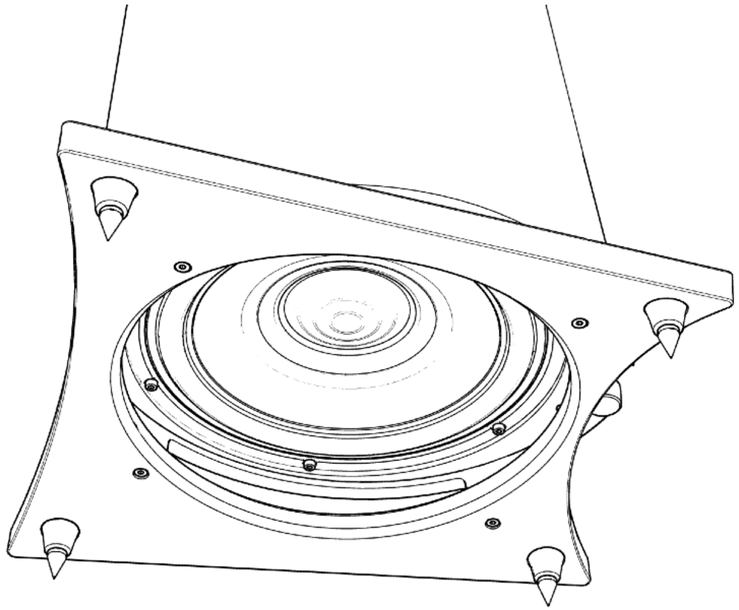
Woofer positioning

AURA’s innovative design allows the incorporation of a powerful 10" woofer in the base of the loudspeaker (down-firing), for a rich and smooth bass reproduction.
In smaller rooms, the loudspeakers are often located near the sidewalls, and part of the midrange frequencies reflect on the walls and add colouration to the sound. The stereo image can also be impaired. The woofer position assists in reducing these reflections so that the audio signal remains purer with more uniform bass propagation. Furthermore, the acoustical environment created in the base of the AURA speaker provides an additional low-pass filter. This low-pass curve is deeper than the electrical filter. Therefore the higher frequencies that are produced by the bass driver, at around the 80Hz, are eliminated.
For these reasons, the woofer is positioned in the base of the speaker (Graph 1).



Graph 1. Estelon AURA woofer position

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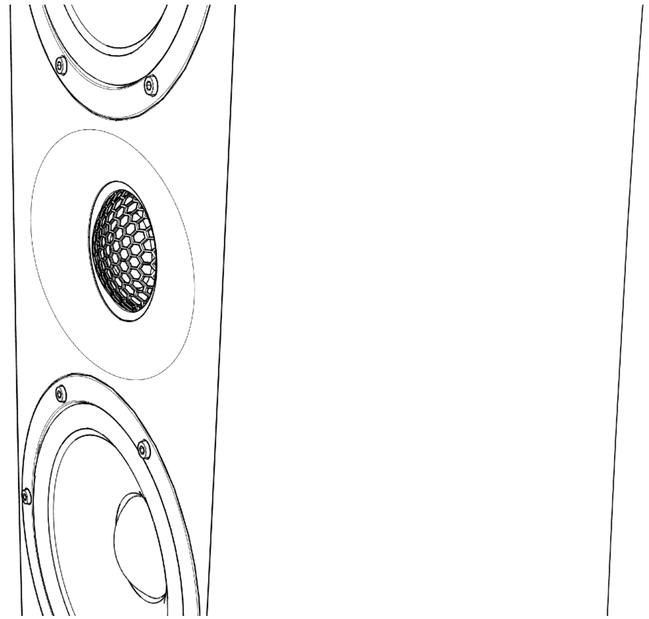
Tweeter waveguide

The tweeter waveguide makes the sound dispersion of the tweeter more uniform, and it pairs with the mid-woofer drivers for a pure and uninfluenced sound . The tweeter waveguide has a complex elliptical shape, and it is fine-tuned to match the specific tweeter by Scan-Speak to eliminate diffraction and reflections (Graph 2).



Graph 2. Estelon AURA tweeter waveguide

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Carefully designed and manufactured crossovers

Countless hours of R&D and real-world listening test have been conducted of each crossover design and its related parts, right down to the physical placement of each part and its positioning within the cabinet. The crossover components have been chosen from among the absolute best available, and the synergy of the end result has been a significant deciding factor. Every component is measured to yield perfect pairs.

We use custom OFC (oxygen-free copper) air-core coils, supercapacitor type capacitors and wire-wound resistors of the finest quality. Every component is measured to yield perfect pairs. In order to achieve the highest degree of micro-detail fidelity, the filter components are connected directly, via point-to-point techniques, all hand-soldered with high-quality solder, and with the shortest possible cable runs between drivers, crossover and binding posts. All internal cabling is from the renowned cable manufacturer Kubala-Sosna. The connectors are strong and stable and are provided by Cardas.

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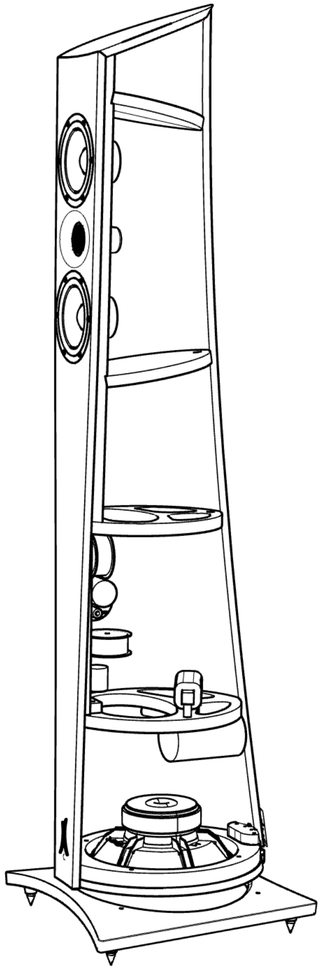
The crossover filters are located in the woofer chamber (Graph 3). In order to reduce the microphonic effects and vibration influence we are using dampening materials in contact with the filter plate. The woofer has a second-order low-pass network. The mid-woofer has a high-pass network that is a blend of second and third order. The mid-woofer low-pass network is third order, and the tweeter high-pass network is second order. Each crossover construction process involves careful attention from our engineers and designers, where every process is carefully thought out and each component tested to make sure that the final result is perfect. After passing technical measurement tests, the finished speaker is put through extensive critical listening tests.



Graph 3. Internal cabinet construction showing the individual chambers and crossovers

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3. EASY TO SET UP

Considering the mentioned special characteristics, the AURA loudspeaker is easy to set-up and achieves a natural tonal balance with realistic 3D image.

To decrease the vibrating effect from the floor, we offer special stainless-steel stand options – with a flat bottom surface for hard floors and with spiked cones for carpeted floors. Both types are included with the loudspeakers. It is important to note that setting up these speakers will require two able-bodied individuals.

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8. TECHNICAL SPECIFICATIONS

Type:	3-way passive speaker, sealed box
Frequency response:	35 - 25 000 Hz
Power rating:	200 Watts
Nominal impedance:	4 Ω (min 2 Ω at 58 Hz)
Sensitivity:	90 dB/2.83 V
Min amplifier power:	30 Watts
Internal cabling:	Kubala-Sosna
Cabinet material:	Mineral-filled polymer composite

Drivers:

Woofer:	250mm (10”) Semi-pressed paper cone from Faital
2 x Mid-woofer:	130mm (5”) Egyptian Papyrus cone from Satori
Tweeter:	26mm (1”) “Illuminator” Textile dome from Scan-Speak

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9. DIMENSIONS

Height:	1366 mm (53.7”)
Width:	384 mm (15.1”)
Depth:	367 mm (14.4”)
Net weight:	34 kg (75 lbs.) per piece
Recommended room size:	15 - 60 m^2 (161 - 645 ft^2)

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