Novel Acoustics Concept Speakers

Designed by Boaz Dekel

The Novel Acoustics 3D-printed concept speaker set was produced as a technology demonstrator, showcasing the capability of prototyping large functional parts with 3D printing, and utilizing 3D printing technology as a facilitator for innovation to improve product performance.

Designing a high-performance loudspeaker requires overcoming mechanical and acoustical challenges that often present contradicting requirements. Yet the complexity doesn't end at the design, but carries over to execution - production and assembly - therein lay countless potential points of failure.

The complex internal lattice geometry featured in this design, elegantly addresses both the mechanical and acoustical requirements of a loudspeaker enclosure. The lattice is used to fine-tune the structural rigidity and the acoustic absorption properties at different regions of the enclosure, at an extremely high resolution. This lattice structure can only be achieved with 3D printing.

Speakers, being high-vibration environments, demand parts to be produced with high precision and assembled with great care and attention. Even a small defect can completely change the parameters of the system, introduce air leaks or noise that will ultimately result in distortion of the reproduced audio. The high precision and accuracy of parts achievable with the Stratasys Neo800 makes it highly suitable system for such demanding applications.

Leveraging the large print platform of the Neo800, the entire speaker enclosure could be designed and printed as a single monocoque component - a huge benefit both for acoustics and mechanics. A single solid structure means there are no seams or interfaces to rattle or loosen up over time, simplifying production and guaranteeing performance consistency over time.

Somos® WaterShed material, a general purpose resin, was used to create the enclosure - its superior clarity allowed for visual inspection of the print quality and early identification of any defects. The mechanical properties of the cured resin lend themselves nicely for use as a loudspeaker enclosure thanks to sufficient rigidity and vibration damping properties. Somos® PerFORM was another material used for the project to increase the stability of the front and base sections.

This Novel Acoustics concept speaker was designed around driver components by Morel (TSCW634 Woofers and ST1108 Tweeters) with dedicated analog crossovers. Morel manufactures consistently excellent, world-class speaker drivers that deliver predictable and reliable performance every time.

Novel Acoustics develops innovative technologies in the fields of acoustics and audio reproduction, and offers consulting to select clients.

System	Neo®800 Stereolithography
Material	Somos® WaterShed® XC 11122 and Somos® PerFORM
Build Time	6.5 days (WaterShed XC part), 1 day, 16 hrs (PerFORM base), 21 hrs (PerFORM Baffle)
Material Used	23.43kg (WaterShed XC part), 9.03kg (PerFORM base), 2.73kg (PerFORM Baffle)
Designers	Boaz Dekel, co-founder of Novel Acoustics
Speaker Drivers	Morel

ISO 9001:2015 Certified

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