

# HARMAN SPECIALTY GROUP

## Cranking up the volume on digital amplifier development with SolidWorks software



*By moving from 2D to SolidWorks 3D design software, HSG discovered how improved visualization fosters collaboration and innovation.*

The Harman Specialty Group (HSG) develops the highest-quality brands of consumer audio products, including Mark Levinson, Revel, and Lexicon. Unlike mass-market consumer audio products, which manufacturers produce at high volume, HSG's products are upscale luxury items produced and sold at low volume. In the past, HSG's mechanical engineers used AutoCAD® 2D design tools to develop their products. However, the need to trim costs, increase profit margins, foster greater collaboration, improve accuracy, and more fully integrate mechanical design with electrical systems development led to HSG's decision to move to a 3D CAD platform, according to Matt Waterman, senior mechanical engineer.

"Engaging in more collaborative work with other divisions and needing to integrate more efficiently with ECAD data were the driving factors in our move to 3D mechanical design," Waterman explains. "Working more closely across facilities and departments means that we need to share files more frequently and speak the same language in terms of creating models of our designs. We believed that an integrated 3D platform would improve design accuracy, reduce prototyping needs, and better support our efforts to innovate and break new ground in the development of high-end audio products."

After evaluating available 3D CAD systems, HSG selected two finalists—SolidWorks® and Autodesk Inventor® software—and then conducted extensive trials. The company chose SolidWorks 3D CAD software, implementing two seats of SolidWorks Professional and one seat of SolidWorks Premium, because of its favorable brand recognition, widespread usage among key manufacturing vendors, integrated SolidWorks Workgroup PDM product data management capabilities, and ability to import and export mechanical and electrical CAD model data in IDF format.

"Our choice came down to the greater confidence we had with SolidWorks software," Waterman recalls. "Another reason we chose it is that most of our vendors use SolidWorks software, while none of our key vendors use Inventor."

### Results:

- Reduced prototype costs by 33 percent
- Established a platform for collaboration across divisions
- Improved design accuracy, minimized potential for error
- Enhanced design visualization and communication

## Improved visualization, PDM-driven collaboration

Following the completion of training, HSG engineers embraced the use of SolidWorks software for all new product development, and soon realized how improved visualization in 3D fosters collaboration as well as innovation.

"Once we had a taste of what we could do with SolidWorks software, we knew we had the right tool to support our new product development goals," Waterman stresses. "There's no comparison between how we designed products in the past and how the enhanced visualization we enjoy today with SolidWorks software improves the design process. Now, just about anyone can look over my shoulder and grasp what a design will look like.

"We also use SolidWorks eDrawings® files to communicate designs in-house and with external vendors, and we rely heavily on SolidWorks Workgroup PDM to support collaborative efforts with other divisions. With SolidWorks Workgroup PDM, we can design products with colleagues in other locations without the risk of stepping on each other's designs or confusing different versions and revisions," Waterman notes.

## Greater accuracy, fewer prototypes

Because HSG produces products using low-volume manufacturing processes—including aluminum extrusions, machining, sheet-metal fabrication, and injection-molded plastics—improving design accuracy and reducing the number of prototypes are critically important. With such small product runs, profit margins leave little room for absorbing unnecessary rework or protracted development costs.

"With 3D, we have improved our design accuracy, while reducing the complexity of our checking process," Waterman points out. "Using SolidWorks, it's easier to design right the first time with much less potential for error, which makes us even more efficient and cost-effective. Historically, we required three rounds of prototyping before releasing a design for production. With SolidWorks software, we only need two prototype cycles, which cuts our development costs by at least a third."

## Delivering a breakthrough reference amplifier

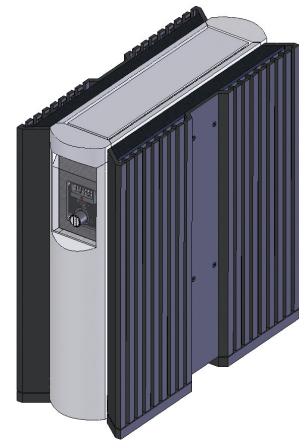
The first HSG product developed in SolidWorks software—the Mark Levinson No. 53 monaural reference amplifier—not only was a technological breakthrough as the first product of its kind to use new proprietary Harman amplifier technology, but also represented a watershed in terms of how the company develops products.

Using SolidWorks 3D CAD and PDM software to collaborate from any location, Waterman and another HSG engineer codeveloped the new, top-of-the-line reference amplifier for Mark Levinson faster and more accurately when compared with previous development cycles.

"We are all about efficiency and packaging more functionality in less space," Waterman says. "Using SolidWorks software, our first prototype for the Mark Levinson No. 53 was show-ready. We were able to demonstrate it at consumer electronics shows and pass audio tests with a prototype, which is something we would have deemed nearly impossible in the past."

*"USING SOLIDWORKS SOFTWARE, IT'S EASIER TO DESIGN RIGHT THE FIRST TIME WITH MUCH LESS POTENTIAL FOR ERROR, WHICH MAKES US EVEN MORE EFFICIENT AND COST-EFFECTIVE."*

Matt Waterman  
Senior Mechanical Engineer



Using SolidWorks software, HSG achieved a technological breakthrough with the Mark Levinson No. 53 monaural reference amplifier, the first product of its kind to use new proprietary Harman amplifier technology.



Harman Specialty Group  
3 Oak Park Drive  
Bedford, MA 01730  
Phone: +1 781 280 0300  
www.harman-specialtygroup.com  
VAR: Computer-Aided Products,  
Inc., Manchester, New Hampshire



Dassault Systèmes  
SolidWorks Corp.  
300 Baker Avenue  
Concord, MA 01742 USA  
Phone: 1 800 693 9000  
Outside the US: +1 978 371 5011  
Email: info@solidworks.com  
www.solidworks.com

