

# Sonic Emotion Brings Audio Immersion to the Masses

Xilinx Spartan-3 FPGAs form the heart of its 3D Sound technology IP.

Just about everyone would love to have a fabulous, professional-quality stereo or surround sound-system in their home, but many folks can't afford one of that caliber. Even if they can, they typically don't want to sacrifice aesthetics to run wires and a set of speakers (at precise angles) all over the room. Luckily, a small but innovative IP company called Sonic Emotion is helping audio and video equipment manufacturers, including flat-panel display companies, deliver astonishingly realistic and immersive sound systems that don't require extra wires or speakers.

Sonic Emotion is the inventor of a unique technology based on wave-field synthesis that targets a number of audio applications, most notably a new class of stereo systems and flat-panel displays. The company, based in Zurich, Switzerland, got its start developing custom high-end audio systems for large and sophisticated, but sometimes acoustic-unfriendly, venues. In the process, its founders devised an ingenious technology they called 3D Sound and implemented it in a Xilinx® Spartan®-3AN FPGA. The company now licenses that technology to several customers, most notably manufacturers of home audio and surround-sound systems.

CTO Matthias Rosenthal said that even some of the most stunning and expensive flat-panel TVs on the market today fall short in audio, leading many consumers to purchase additional sound systems—or to return their TVs. TV manufacturers and third-party vendors are attacking the problem by introducing audio modules commonly called sound bars that typically line the bottom of a flat-panel display, seemingly inconspicuously, to better the sound.

Sonic Emotion is bringing a high level of quality to this emerging market as well as to docking stations and compact home entertainment systems. Its technology one-ups traditional 2.5-D surround-sound, all-in-one systems by offering an immersion experience for everyone in the room rather than one small, targeted location. The 3D Sound technology automatically generates a perfect sound field by using a room's acoustic properties. It extracts sound sources out of a simple stereo signal and re-creates them at the correct position in the room. This technique achieves the natural reproduction of audio through loudspeakers and realizes an acoustic immersion for everyone in the room.



*Coby's sound bar uses the Sonic Emotion technology to deliver 3-D audio from simple stereo input.*

“Our 3D Sound is a very powerful technology,” said Rosenthal. “You don't have to move speakers around a room or even tell the machine the size and layout of your room, and calibrate and designate a small area where the sound experience is optimal. The system employs advanced signal-processing techniques to create total audio immersion and even to make it sound like certain sounds are coming from behind you. You won't believe that the sound is coming from this single device.”

As it does when building high-end installations, the company customizes its 3D Sound IP for each licensee with the help of the Spartan-3AN, which adds on-board flash to the FPGA. “We implement very complex DSP algorithms and often have to add custom functions in hardware to suit a customer's requirements,” Rosenthal said. “The Spartan-3AN is great for this and it is also very secure, so we can be reasonably sure our IP is protected in this very competitive market.”

One vendor already deploying Sonic Emotion's technology is Scott Technology ([www.my-scott.com](http://www.my-scott.com)). In late 2009, Scott introduced its Zurigo docking station and Phuket and Egg entertainment systems incorporating 3D Sound. None of these products resembles a traditional stereo system. Rather, they look like a piece of modern sculpture. Each system has speakers on multiple sides, allowing it to adjust to a consumer's room rather than requiring the consumer to adjust the room's layout to suit the sound quality of the system. The systems are also fairly compact, so users can move them around the house, taking top-quality sound with them to other rooms.

Another product based on 3D Sound is Coby Electronics Corp.'s latest sound bar. Launched at this year's Consumer Electronics Show, the device plays 3-D sound from simple stereo input ([www.cobyusa.com](http://www.cobyusa.com)). Rosenthal said that 3D Sound will soon appear in a slew of other products due to hit the market this year. The Institute of Microelectronics of the University of Applied Sciences, Northwestern Switzerland, supported the design and implementation of the FPGA architecture. For more information, visit [www.sonicemotion.com](http://www.sonicemotion.com).