Surround sound on the move

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Surround sound gives you the feeling of being right in the middle of the action. Until now, it took massive data packets to achieve the ultimate sound experience. But at CeBIT, which will take place from March 15 to 21, Fraunhofer researchers will be demonstrating software that streamlines audio files to such an extent that even surround sound can be transferred and stored quickly and conveniently.

An audio experience like that of a movie theater involves huge amounts of data. The sound engineer mixes down dozens of signals from individual microphones and produces files which are then played back through six channels. The recording of a Robbie Williams concert, for instance, would fill an entire audio DVD. Such mammoth files can be played on the surround sound system at home or in the car, but they are much too large for transmission via Internet radio or for storing on an MP3 player. “In order to make surround sound files interesting for sale via webshops or transmission on Internet radio, the data rate has to be drastically reduced,” explains Matthias Rose from the Fraunhofer Institute for Integrated Circuits IIS in Erlangen.

Together with engineers from Agere Systems, the IIS researchers have discovered a new way of streamlining the data packets: Special software reduces the data stream down to a stereo signal, and additional information is then packed into this so-called “downmix”. After this, the file is compressed and can be transmitted in the usual way, for example via the Internet. The receiver reads the additional information packed into the file and, with its help, is able to reconstruct the original signal. “This approach combines the advantages of previous procedures,

allowing surround sound to be stored or transmitted in top quality without taking up too much space, and that's the basis of MP3 Surround," says Rose. "MP3 Surround is the multi-channel upgrade to the MP3 audio compression standard."Basically, MP3 reduces the data stream: Those parts of the signal which are almost or entirely imperceptible to the human ear are coded with less accuracy and consequently take up less storage space. Then there is the additional information for the different channels, for example the time taken for audio signals to travel between speakers or differences in volume. The software packs the coded stereo signal and the sound parameters into an MP3 Surround file, which can then be stored or sent via the Internet. It can be played back on any MP3 player. If the MP3 player is fitted with an MP3 Surround chip and is attached to six speakers, the room will resound to the full surround sound effect. If not, a normal stereo signal will be heard.

The new technology has already begun to take hold of the multimedia world. The first manufacturers have started to integrate MP3 Surround into their products. The German software house Magix, for instance, is equipping many of its entertainment, music and video products with MP3 Surround. Steinberg's professional audio processing software, Cubase 4, also supports the new surround sound format and, in the video field, the company DivX supports mp3 surround in its software. Many consumer electronics companies, such as Samsung, Sony and LG, have taken out licenses for MP3 Surround.

However, despite the promising start, it will still be some time before surround sound becomes fully accepted, as Rose realizes: "It's a little like the change from mono to stereo. That didn't happen overnight either. Consumers gradually changed over, and at some point it became the norm." In the meantime, surround sound has also been made available for mobile devices. Researchers at the IIS have developed a technology called 'Ensonido,' which enables a surround sound experience over

headphones. “Headphones only have two channels, one for the right ear and one for the left, but we can produce surround sound by recreating the path which the sound travels from the speaker to the ears. A sound coming from the back left will reach the left ear a little bit earlier – and louder – than the right ear. The software emulates this difference,” explains Jan Plogsties, the project manager responsible for the development of Ensonido.

In this way, headphones can actually create an impression of spatial sound similar to that of a full surround sound system. The only requirement for the new surround sound is that the piece of music be available as a surround sound audio file. And that currently means that only newly mixed tracks are suitable. However, the system will soon be open to other file types: The Fraunhofer researchers in Erlangen are working on an MP3 SX converter which converts conventional stereo MP3 files into MP3 Surround files. “This opens up a lot of possibilities for the MP3 Surround family,” says Rose. “And soon it will be taken just as much for granted as stereo is today.”

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