

SRS TruSurround XT™ Technology



For an enhanced, virtual surround sound listening experience

SRS TruSurround XT™ is a patented audio technology that delivers an enhanced, virtual surround sound listening experience when multi-channel audio input is played on a two-speaker output system. Implemented in notebooks, this technology brings the home theatre experience to mobile computing.

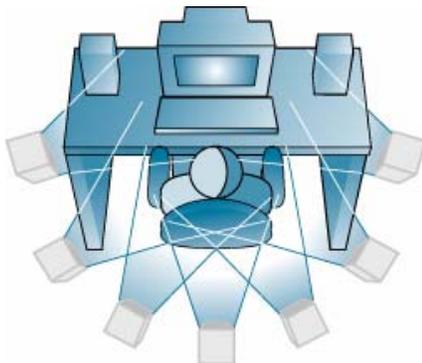
This technology briefing document explains how each of the features of SRS TruSurround XT contributes to this enhanced listening experience, including:

- ▶ **SRS TruSurround®** - provides a richer, virtualized surround sound experience
- ▶ **SRS Dialog Clarity™** - singles out voice frequencies and clarifies dialog and places them in the centre-channel.
- ▶ **SRS TruBass™** - Enhances the listening experience of low-frequency audio.
- ▶ **SRS WOW™** - Widens the perceived sound image.

TruSurround

Many of today's audio sources are provided in multi-channel encodings, in particular the audio tracks on DVD recordings or CDs. Multi-channel recordings are designed for playback on systems that feature five, six, or more, midrange speakers plus one low-range speaker (a sub-woofer) as found in typical home-theatre audio systems.

However, this presents a real drawback to people who want to watch DVD movies (and other multimedia with multi-channel audio tracks) who don't have multi-channel playback systems.



Graphic courtesy of SRS Labs, Inc

TruSurround technology addresses this limitation.

TruSurround takes the multi-channel audio signals as input and produces two-channel audio output specially designed to simulate the surround sound experience to the listener: the sound image perceived by the listener's ear paints a virtual picture of the centre-channel and side speakers that one would have in a multi-speaker surround sound system.

SRS Dialog Clarity

The multi-channel audio found in most of today's movies contains a rich mixture of sound effects. On systems with properly balanced speakers, with an adequate centre channel speaker, the listener typically has few problems picking out dialog. But poorly mixed audio, or an audio system that is not ideal (including trying to listen to a multi-channel recording on a two speaker system), can produce dialog that is unclear or inaudible. SRS Dialog Clarity picks out the dialog portion of the audio recording, enhancing its clarity and audibility, resulting in an improved listening experience.

SRS TruBass

Many audio systems simply cannot reproduce the low frequency signals found in many modern multi-channel



audio recordings. In some cases, cost is a factor: for fiscal reasons, the speakers are made of materials that are not well suited to the reproduction of low-range audio. In other cases, size is a factor: a notebook or monitor cabinet does not afford a sufficient amount of space for speakers large enough to provide the optimal reproduction of low-range audio.

SRS TruBass technology helps to compensate for these common limitations by capitalizing on a unique aspect of the human hearing system. The human ear has a tendency to infer low-range audio data when presented with higher frequency harmonic signals. Our auditory system “produces” the presence of the underlying low-range signal.

SRS TruBass technology takes advantage of this “illusion” performed by the brain. It processes the low-range sounds in the audio input so as to create higher frequency harmonic signals in the output. As a result, our ears “hear” the original low-range sounds that the speaker system is incapable of producing.

In this way, a pair of small speakers built into a notebook, television, or monitor can appear to produce low-range sounds. It’s important to note that SRS’ technology does not alter the original audio source at all during this process, so the original signal balance is left intact. Even systems with an attached sub-woofer can benefit from this technology as the TruBass technology can extend and enrich the capabilities of the low-range speaker from the point of view of the listener.

SRS WOW

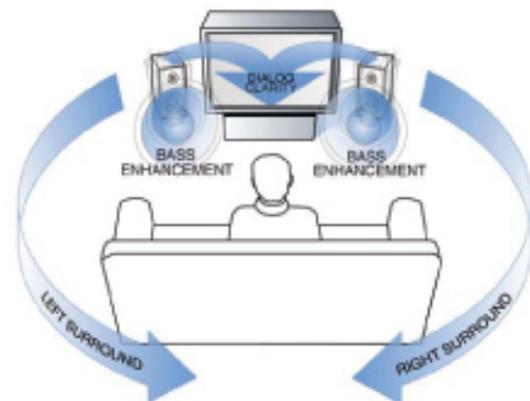
WOW technology incorporates the TruBass and Dialog Clarity technologies already



described, while also providing a horizontal and vertical extension of the sound image created by the two-speaker system. In this way, systems with two speakers positioned near one another, or speakers located close to the human ear (for example, headphones or notebook speakers), can take advantage of WOW technology to provide a richer, “wider,” listening experience. With WOW, the user perceives a panoramic 3D audio listening experience.

Putting it together

SRS TruSurround XT combines these four technologies into one comprehensive system. When TruSurround XT accepts a stereo signal, WOW is enabled for a better listening experience. As signals are processed, the system implements the Dialog Clarity process first. Then, it applies TruSurround to create a widened and enriched sound field in a two-channel signal. Finally, this two-channel signal is passed through the TruBass process to enhance the low-range portions of the audio signal.



Graphic courtesy of SRS Labs, Inc

Features and benefits for notebook users

The following chart summarizes some of the most important features and benefits of the TruSurround XT™ system:

Feature	Benefit
▶ Audio content placed in correct location in the sound field, with special attention placed on centre-channel dialog audio	▶ Complex multi-channel audio tracks, combining special effects and dialog content, can be reproduced on a two-speaker system without loss of “logic” and comprehension by the listener.
▶ Provides a wider and more dynamic sound stage	▶ Listeners using small, close-set two-speaker systems like headphones or notebook speakers can still receive a rich sound experience
▶ Enriched, extended low-range reproduction	▶ Listeners can receive a wider, richer sound even on systems not capable of reproducing low-range audio signals.

Primary beneficiaries of this technology are the owners of notebook and multimedia computer systems, which typically include speakers for two-channel audio output only. Whether listening on small desktop speakers, headphones, or built-in speakers, SRS technology can provide the listener with a richer, more immersive audio experience using multi-channel recordings as input. In particular, such recordings are used in movies or concert recordings in DVD format, and can also be increasingly found in modern computer games.

Conclusion

Any notebook incorporating SRS TruSurround XT provides a significantly enhanced listening experience. When watching DVD movies or listening to a favourite CD, users will enjoy a rich, immersive, virtual surround sound experience. For systems in which SRS TruSurround XT is incorporated at the driver-level, this same sound enhancement can also be enjoyed while playing games with multi-channel audio recording.