



# TI Gets Into the Game

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*TI's Aureus(TM) DSP Brings Audiophile Sound to the Xbox(R) 5.1 Surround Sound System Built Under License by Spherex Inc.*

Mar 9, 2004

DALLAS (March 9, 2004) - Providing exceptionally high quality source audio for gaming and multimedia systems, Texas Instruments (TI) (NYSE:TXN) announced today that Spherex Inc. developed the Xbox 5.1 Surround Sound System based on the Aureus™ audio digital signal processor (DSP), setting a new standard for video game audio. The six-speaker Xbox 5.1 system with state-of-the-art sound processing supplied by TI's Aureus DSP provides surround sound for the entire home theater. The new multimedia audio platform by Spherex was also a finalist in TechTV's "Best of CES" awards, given for the most innovative products introduced in the 2004 Consumer Electronics Show in Las Vegas. (See [www.ti.com/pa6](http://www.ti.com/pa6).)

Priced at less than \$500, the Xbox 5.1 system incorporates all current popular surround sound formats and multiple audio inputs, allowing simultaneous support for up to five directly connected and networked audio sources. Audio inputs can include the Xbox® video game system from Microsoft, DVD and CD players, satellite TV, MP3/WMA compressed audio, PC and Internet radio. Spherex, a subsidiary of Audio Products International Corp. (API), one of the world's largest loudspeaker manufacturers, designed the Xbox 5.1 system to take advantage of technology normally used in much more expensive audio systems. TI's TMS320DA601 audio DSP is at the heart of the system, enabling high-fidelity sound reproduction by decoding audio standards such as Dolby Digital®, Dolby® Pro Logic II and DTS®, while still having the processing headroom for advanced acoustic features such as bass extension and audio dynamics.

"We selected TI's Aureus audio DSP for the Xbox 5.1 system because of the outstanding performance, flexibility and cost effectiveness of the device," said Alex Romanov, President and CEO. "Working with TI, Spherex has been able to achieve the best speaker system available at this price point for video gaming and audio entertainment."

## **An Immersive, Realistic Sound Experience**

The Xbox 5.1 system includes a subwoofer and five satellite speakers based on API's Mirage OMNIPOLAR™ technology, which utilizes room reflections to create sound as 30 percent direct to 70 percent reflected - the same ratio found in nature. As a result, the speakers disperse sound in a 360-degree pattern, giving listeners a realistic immersive experience for gaming, movies and music playback.

"Innovative products like the Xbox 5.1 system demonstrate how TI is working with customers like Spherex to bring the best available audio technology to all multimedia applications," said Mohsin Imtiaz, marketing manager of performance audio, TI. "High-performance Aureus audio DSPs make it possible for inexpensive multimedia audio platforms like the Xbox 5.1 system to provide a listening experience previously found only in high-priced equipment."

## **TI Enables More Robust Multimedia Sound**

TI's Aureus audio DSP solutions for home theater and gaming products enable audio manufacturers to deliver feature-rich, realistic listening experiences across product lines from high-fidelity high-end systems to feature-driven low-cost systems. The Xbox 5.1 system uses the DA601 DSP, a member of the Aureus family, to produce high-end audiophile sound at a cost-effective price point for multimedia solutions. The DA601 is a 225-megahertz (MHz) floating-point processor that delivers 1800 million

instructions per second (MIPS) and 32/64-bit native processing. It also features an open audio framework that provides a flexible environment in which manufacturers can easily add the features that differentiate their products and bring them to market more quickly.

## **Product Availability**

The Xbox 5.1 Surround Sound System is scheduled for availability in April 2004, in stores where Xbox gaming equipment and speakers are sold. Suggested retail pricing is \$499.

# TI DSP Plays in Xbox

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March 11, 2004

Texas Instruments this week announced today that Spherex Inc. developed the Xbox 5.1 surround sound system based on the Aureus audio DSP from the Dallas-based company.

The six-speaker Xbox 5.1 system is said to provide surround sound for the entire home theater and allows simultaneous support for up to five directly connected and networked audio sources.

Spherex, a subsidiary of Audio Products International Corp. (API), designed the Xbox 5.1 system based on TI's TMS320DA601 audio DSP. DA601, a member of the Aureus family, is a 225MHz floating-point processor that delivers 1800 million instructions per second and 32/64-bit native processing.

"Innovative products like the Xbox 5.1 system demonstrate how TI is working with customers like Spherex to bring the best available audio technology to all multimedia applications," said Mohsin Imtiaz, marketing manager of performance audio at TI, in a statement. "High-performance Aureus audio DSPs make it possible for inexpensive multimedia audio platforms like the Xbox 5.1 system to provide a listening experience previously found only in high-priced equipment."

The Xbox 5.1 surround sound system is scheduled for availability in April with a suggested retail price of \$499.

# AUREUS™ TMS320DA610, TMS320DA601 FLOATING-POINT DIGITAL SIGNAL PROCESSORS

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*SPRS002H - SEPTEMBER 2001 - REVISED JANUARY 2004*

- Aureus™ High-Performance 32-/64-Bit Audio Digital Signal Processors (DSPs)
- DA610-250 MHz, 2000 MIPS/1500 MFLOPS
- DA601-225 MHz, 1800 MIPS/1350 MFLOPS
- Single DSP Solutions for Multichannel Audio Applications: A/V and DVD Receivers, Multi-Zone Receivers, High Speed Encoder, Simultaneous Encode/Decode, Surround Headphone, Speaker Virtualization, Room Correction
- DA601 and DA610 Compatibility Provides a Scalable Audio Solution Based on a Single DSP Instruction Set Architecture
- Certified Algorithms:
  - Dolby Digital Decoder, Dolby Digital EX,
  - Dolby Pro Logic IIx, Dolby Pro Logic II
  - DTS 5.1, DTS-ES 6.1, DTS Neo:6,
  - DTS 96/24
  - MPEG-2 AAC
  - THX Ultra 2
- Supports Other Algorithms Including:
  - MP3 CODEC
  - WMA CODEC
  - SRS Circle Surround II

- Waves' MaxxBass Technology
- Highly Optimized C/C++ Compiler
- VelociTI™ Advanced Very Long Instruction Word (VLIW) C67x™ DSP Core
  - Native Instruction Set Support for:
    - 32-/64-Bit IEEE 754 Floating-Point
    - 32/40/64 & Packed-16-Bit Fixed-Point
  - Eight Independent Functional Units:
    - Two ALUs (Fixed-Point)
    - Four ALUs (Floating- and Fixed-Point)
    - Two Multipliers (Floating-/Fixed-Point)
  - Fast Time to Market with RISC-Like ISA
- Low-Cost, Two-Level Memory System
  - 4K-Byte L1P Plus 4K-Byte L1D Cache
  - 256K-Byte L2 Cache/RAM (DA610)
  - 128K-Byte L2 Cache/RAM (DA601)
  - 512K-Byte L2 ROM (DA610/DA601)
- 32-Bit External Memory Interface (EMIF) Seamlessly Expands Memory Space by Supporting: SRAM, SDRAM, FLASH, EPROM, and SBSRAM. Four External Address Spaces
- 16-Bit Host-Port Interface (HPI) Enables High-Speed Encode/Decode Applications
- Enhanced Direct-Memory-Access (EDMA) Controller With 16 Independent Channels
- Two Multichannel Audio Serial Ports (McASPs)
  - Independent Dual Zone Audio on a Single DSP
  - 16 Data Pins (32 Channel Stereo)

- Flexible Clocking
- TDM Streams 2-32 Channels per Pin
- Data Formatting Unit Supports Wide Variety of I2S and Similar Formats
- Integrated Digital Audio Interface Transmitter (DIT) With Enhanced Channel Status/User Data
- Extensive Error Checking and Recovery
- Two Inter-Integrated Circuit Bus (I2C Bus™) Multi-Master and Slave Interfaces
- Two Multichannel Buffered Serial Ports (McBSPs) Supporting:
  - Serial-Peripheral-Interface (SPI)
  - High-Speed TDM Interface
- Two 32-Bit General-Purpose Timers
- Two General-Purpose Input/Output Modules
- On-Chip Oscillator and PLL Module
- IEEE-1149.1 (JTAG<sup>+</sup>) Boundary-Scan-Compatible
- Package Options:
  - 208-Pin PowerPAD™ PQFP (suffix PYP)
  - 272-Pin Ball Grid Array (suffix GDP)
- 0.13-μm Copper Metal CMOS Process
- 3.3-V I/Os, 1.2-V Internal

Aureus, VelociTI, C67x, and PowerPAD are trademarks of Texas Instruments. All trademarks are the property of their respective owners.

† IEEE Standard 1149.1-1990 Standard-Test-Access Port and Boundary Scan Architecture.