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**Product Bulletin**

**Audio DSP System for Home Theater Products**

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**TMS320DA61x™ 32-/64-Bit Floating-Point Audio DSPs**

The DA610 DSP device is the first in a family of high-performance audio DSPs. At 225 MHz and 1800 MIPS, it offers three times the performance of existing solutions. OEMs can use the performance to deliver the most realistic audio experience and incorporate the most features into their products at any price point. For the first time, OEMs will be able to offer single-chip solutions for advanced features such as automatic room correction and speaker virtualization in...
mass-market products available to consumers.

At the heart of the DA610 DSP is TI’s TMS320C67x™ floating-point DSP core, featuring 32- and 64-bit native processing. This gives OEMs the flexibility to choose between single- or double-precision arithmetic implementations.

The DA610 integrates the C67x floating-point DSP core with three Mbit of on-chip ROM and two Mbit of on-chip RAM. This allows designers to eliminate external memory components, further reducing the bill of materials (BOM) and simplifying board design.

The DA610 DSP also integrates a set of robust peripherals including two Multichannel Audio Serial Ports (McASPs). The two McASPs are capable of up to 16 stereo channels of IIS. These ports also implement Digital Audio Interface Transmitter (DIT) functionality—removing the need for an external DIT driver.

Other peripherals integrated on the DA610 DSP are:

- Two IIC ports
- 32-bit EMIF (External Memory Interface)
- Two Multichannel Buffered Serial Ports (McBSPs)
- Two 32-bit timers
- 16-bit HPI (Host Port Interface)
- 50 GPIO pins

The DA610 DSP will be available in both PQFP and BGA packages.

Open Audio Framework

TI’s audio DSP system includes a set of highly-optimized decoder implementations and the industry’s first open audio framework. This software offering provides designers with the base functionality they need and allows them to focus on adding value-add features to their products while shortening time to market.

The offering will include optimized implementations of the following decoders and audio stream processing software:

- Dolby™
  - Dolby Digital™ (AC3)
  - ProLogic™
  - ProLogic™ II
  - Dolby Headphone™
- Fraunhofer™
  - MPEG AAC (LC)
- DTS™
  - Consumer 5.1™
  - ES 6.1™
  - Neo 6.1™
  - DTS 96/24™

Texas Instruments will also be working with Lucasfilm THX™ to include the full post-processing power of THX, available to qualified THX licensees.

Additionally, the open audio framework offers a set of robust and extensible Application Program Interfaces (APIs) that builds on TI’s DSP/BIOS™ kernel RTOS and is compliant with the TMS320™ DSP Algorithm Standard. The extensible and open nature of the framework allows OEMs to quickly add features and change system functionality.

The audio framework manages data I/O, user interface and task scheduling for audio and non-audio (control) stream I/O, decoding and encoding, audio stream processing, and end-user setup.

The audio framework is implemented using methodologies that ensure artifact free sound, allow for multi-zone operation and maximize component reuse.

Home Theater Development Kit

TI’s home theater development kit is a comprehensive development platform that customers can use for evaluation, rapid prototyping, development and debug of their systems. The development

Major modules of the open audio framework

- Component Library—includes the various implementations of decoder, encoder and effects processing components.
- Stream Manager—manages stream creation and allows designers to quickly “plug-in” components such as decoders and effects processing modules into these audio streams.
- I/O Manager—manages audio stream I/O through peripherals to ensure artifact-free sound as different sources and/or components are selected and allows for various connectivity options.
- System Controller—manages system-level control and scheduling of systems events.
- Open Audio Framework Tool Kit—includes standard facilities and utilities such as bitstream packing and unpacking, PCM-type conversions that are used by other open audio framework components and can be used by the user to create custom components.
kit includes a development board that gives customers access to:

- Analog I/Os
  - 3 stereo inputs
  - 6 stereo outputs
- Digital I/Os
  - 4 S/PDIF inputs
  - 4 S/PDIF outputs
- Software:
  - TI Code Composer Studio™ Integrated Development Environment (IDE) development tools
  - Open audio framework
  - Decoder and effects-processing software

### Development Tools

Texas Instruments offers a world-class development environment. Code Composer Studio IDE is a fully integrated suite of easy-to-use DSP software development tools, incorporating TI's efficient TMS320C6000™ DSP C compiler with the Code Composer IDE, DSP/BIOS kernel and Real-Time Data Exchange (RTDX™) technologies. Code Composer Studio IDE's real-time analysis and data visualization capabilities, open architecture and advanced code-generation tools greatly reduce the complexity of DSP development, enabling designers to focus their resources and creativity on adding value to the application. Code Composer Studio IDE provides standard open APIs, allowing third parties to build higher-level products that add functionality to the environment. Designers can now extend their complete TI development system with a wide variety of specialized third-party tool plug-ins that support their specific application needs. As a result, DSP developers no longer have to spend time and resources in creating customized utilities, focusing instead on building more robust DSP applications.

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