

**Product Bulletin**

# Audio DSP System for Home Theater Products

**Key Benefits**

- **Most realistic** audio experience enabled by highest performance audio DSP system
- **More features at any price point** with highly-integrated audio DSP
- **Differentiation and customization** possible with industry's first open audio framework and 1800-MIPS programmable DSP
- Better **spacialization** and **localization** with 32-/64-bit audio experience
- **Reduced time to market** with industry's best development tools
- **Reduced development cost** with scalable family of code-compatible devices enabling common solutions across product line
- **Field upgradeable products** with programmable DSP
- Library of optimized industry standard decoder implementations, including Dolby™ and DTS™ suites and multi-channel AAC

TI's audio DSP solutions for home theater products enable OEMs to deliver the most features and most realistic sound across product lines including high-fidelity, high-end systems and feature-rich low-end systems. TI's new solution features the new TMS320DA610 (DA610) audio DSP—**delivering three times the performance of any existing solution.** The DA610 DSP is the industry's first open audio software framework—that enables rapid differentiation of products, and a library of highly optimized decoder implementations—reducing time to market.

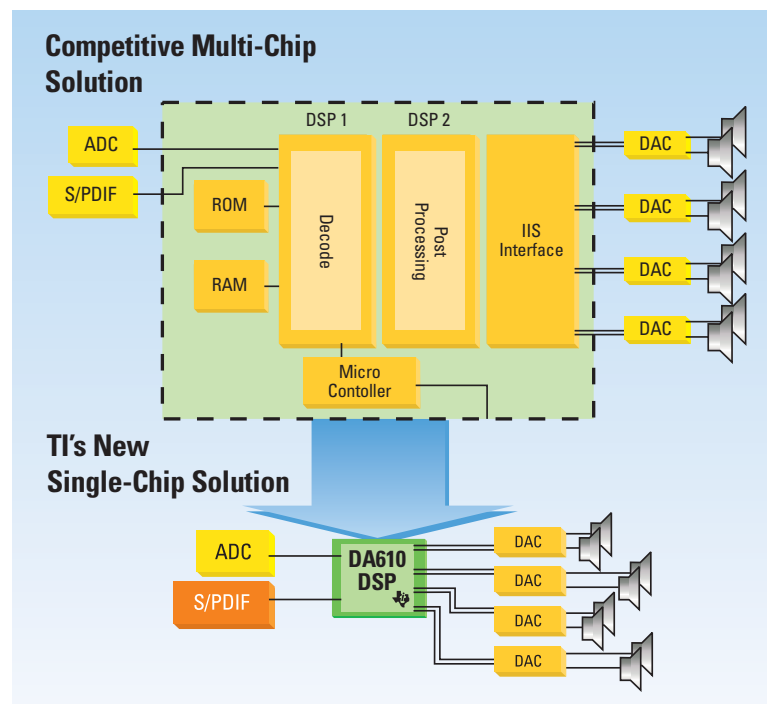
**TMS320DA61x™ 32-/64-Bit Floating-Point Audio DSPs**

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

**TMS320DA610 Integration Block Diagram**



*TMS320DA610 DSP single-chip solution reduces system cost and complexity.*

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.

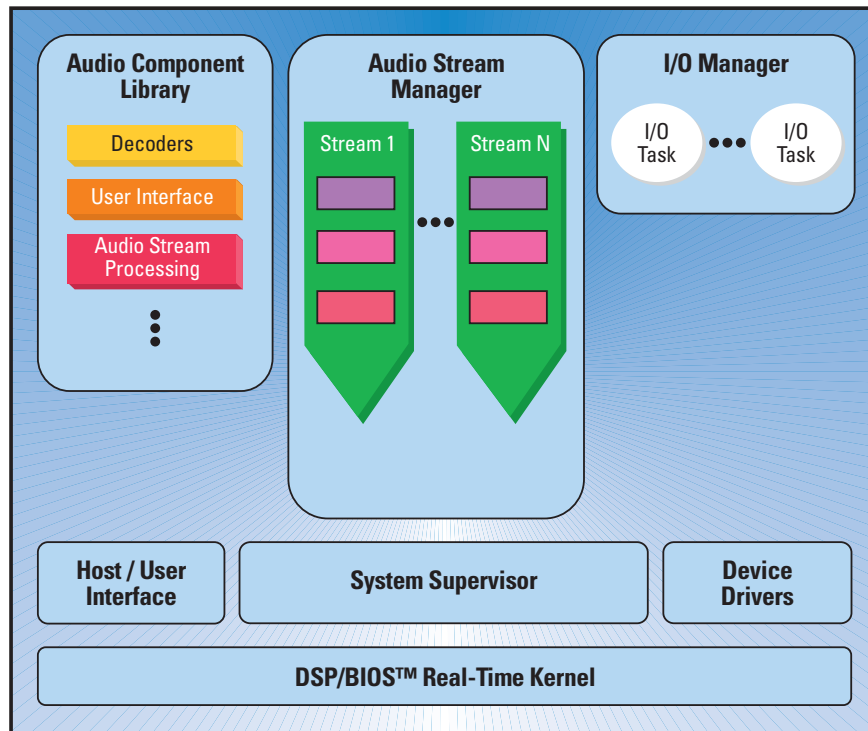
## Home Theater Development Kit

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.

## Open Audio Framework for Home Theater Products



*First open audio framework makes it easy to add new features.*

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 plugins 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.

**For more information, please visit [www.ti.com/sc/performanceaudio](http://www.ti.com/sc/performanceaudio)**

# TI Worldwide Technical Support

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## Internet

### TI's High-Performance Audio Home Page

[www.ti.com/sc/performanceaudio](http://www.ti.com/sc/performanceaudio)

### TI Semiconductor Product Information Center Home Page

[www.ti.com/sc/support](http://www.ti.com/sc/support)

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## Product Information Centers

### Americas

Phone	+1(972) 644-5580
Fax	+1(214) 480-7800
Internet	<a href="http://www.ti.com/sc/ampic">www.ti.com/sc/ampic</a>

### Europe, Middle East, and Africa

Phone	
Belgium (English)	+32 (0) 27 45 55 32
France	+33 (0) 1 30 70 11 64
Germany	+49 (0) 8161 80 33 11
Israel (English)	1800 949 0107
Italy	800 79 11 37
Netherlands (English)	+31 (0) 546 87 95 45
Spain	+34 902 35 40 28
Sweden (English)	+46 (0) 8587 555 22
United Kingdom	+44 (0) 1604 66 33 99
Fax	+44 (0) 1604 66 33 34
Email	<a href="mailto:epic@ti.com">epic@ti.com</a>
Internet	<a href="http://www.ti.com/sc/epic">www.ti.com/sc/epic</a>

### Japan

Fax	International	+81-3-3344-5317
	Domestic	0120-81-0036
Internet	International	<a href="http://www.ti.com/sc/jpic">www.ti.com/sc/jpic</a>
	Domestic	<a href="http://www.tij.co.jp/pic">www.tij.co.jp/pic</a>

### Asia

#### Phone

International	+886-2-23786800	
Domestic	<u>Local Access Code</u>	<u>TI Number</u>
Australia	1-800-881-011	-800-800-1450
China	1-0810	-800-800-1450
Hong Kong	800-96-1111	-800-800-1450
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Singapore	800-0111-111	-800-800-1450
Taiwan	0800-006800	—
Thailand	0019-991-1111	-800-800-1450

Fax	886-2-2378-6808
Email	<a href="mailto:tiasia@ti.com">tiasia@ti.com</a>
Internet	<a href="http://www.ti.com/sc/apic">www.ti.com/sc/apic</a>

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