Three New Floating-Point Devices from TI

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Continuing to drive down the price of developing high-quality audio products, Texas Instruments Incorporated today announced three new floating-point digital signal processors (DSPs) based on the TMS320C67x DSP generation. The new C67x DSP generation-based core is a C-efficient, VLIW architecture that offers significant application performance improvements. With a price/performance ratio of up to 130 MFLOPS/dollar, the TMS320C6722, TMS320C6726 and TMS320C6727 DSPs enable audio engineers to incorporate unprecedented DSP processing power into a broad spectrum of audio applications, including broadcast, conferencing, musical instruments and professional audio.

In response to customers' desire for more audio performance, TI created the C672x devices for high-quality audio applications where audio quality and price/performance ratio are critical. TI developed several innovative optimizations for the new C672x floating-point devices, which are code compatible with TI's entire portfolio of C67x DSPs to address these market concerns. Improvements include:

-- Implementing a dMAX DMA engine to offload the processor for specialized off-chip memory accesses during effects processing.
-- Providing new mixed precision instructions, including 32-bit by 32-bit multiplication with a 64-bit result and 32-bit by 64-bit multiplication with a 64-bit result , to improve high-quality FIR and IIR filter performance efficiency in high-sample rate, low-frequency audio applications.
-- Including a flat-memory model for more deterministic application

performance.
-- Doubling the number of internal registers from 32 to 64 to improve performance in register-bound kernels, as well as making compiler optimizations easier.
-- Doubling the number of concurrent floating-point add instructions from two to four to boost FFT processing by 20 percent.
-- Increasing the size of instruction cache from 4K to 32K to reduce instruction cache miss penalties.

Together, these innovations provide greater than 20 percent increase in performance for a host of real-world audio applications. For example, MP3 decoding now requires only 16 MHz on a C672x DSP, down from 20 MHz for the C6713 DSP, and 10-band equalizer decoding requires only 6 MHz on a C672x DSP, down from 17 MHz for the C6713 DSP. The C672x devices range in clock speed from 200 to 300 MHz with up to 256 KBytes of SRAM and 32 KBytes of instruction cache. The peripherals on the C672x were selected specifically with audio applications in mind. The subset of peripherals varies depending on the specific processor, but the C672x devices include up to three McASPs, two SPI, an HPI, an RTI, an EMIF, two I2C, a PLL and a dMAX engine.

“We developed our professional audio FireWire products around TI’s C6713 because of its high level of floating point processing power and audio connectivity,” said Milo Street, chief technology officer, Echo Digital Audio. “With the coming release of the C672x devices and their lower price points, we will be able to broaden our product line and continue to build on our investment in code developed for TI’s processors and tools.”

Fast Time to Market with Professional Audio Development Kit

TI is simultaneously announcing availability of a Professional Audio Development Kit (PADK) from Lyrtech Signal Processing. With the PADK, developers are able to quickly evaluate the C672x device performance and begin product development immediately without having to first develop their own prototype board, reducing product design time.

The PADK integrates the C6727 DSP with TI's complementary analog technology, including A/D and D/A converters from TI's Burr-Brown product line, and it is tuned for high-end pro-audio applications. Designed by Lyrtech, the PADK demonstrates the efficiency of the C672x DSP, with the inclusion of real-world pro-audio algorithms and software examples that demonstrate the core's performance and audio processing capabilities. An onboard expansion slot provides flexible I/O connectivity and enables developers to evaluate other analog components to achieve different product price points.

"With the architectural improvements of the C672x DSP core, TI has focused on increasing performance of real-world applications," said Gerard Andrews, worldwide audio DSP marketing manager, TI. "The combination of optimized silicon, production-ready software and comprehensive technical support will enable our customers to get to market quickly."

In addition to the PADK, TI offers DSP development tools designed in tandem with hardware to achieve a high level of raw performance using C. Code Composer Studio™ (TMDSCCSALL-1) includes TI's optimizing C compiler to eliminate the need for assembly code in most cases, creating an easier to maintain code base. For applications requiring mixed video and audio, such as video conferencing, developers save time and effort by being able to use the same development tools for both audio and video subsystems.

In addition to audio applications, the C672x devices are well-suited for a wide variety of applications that leverage floating-point technology, including biometrics, medical and industrial applications. The C67x™ floating-point DSP has been broadly accepted by the digital audio industry and appears in consumer electronics equipment. It is the core technology for the family of Aureus™ audio DSPs which do the multi-channel audio processing in A/V receivers, such as those from Harman/Kardon, JVC, Yamaha and Denon and multimedia/gaming systems. TI's Burr-Brown product line also offers an expanding portfolio of precision analog and mixed-signal IC solutions to meet the high-performance signal processing demands of the professional audio market.

Pricing and Availability

C672x devices are sampling immediately with production slated for 4Q05. The C6722 DSP at 200 MHz is priced at $9.95, the C6726 DSP at 250 MHz is priced at $14.10 and the C6727 DSP at 300 MHz is $19.95, all in production volumes. The PADK is also available now from Lyrtech at a cost of $1995, and it will be available from TI in 3Q05.

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