Ada 95 Available for C6000™

inside

Highlighting military versions of TI's high performance DSPs

Military C6000™ DSPs

February 2002

Production Released - Available Now

Texas Instruments Incorporated (TI), the world leader in digital signal processors (DSP) and analog, is announcing the release of military versions of the C6201B, C6701, and C6203 DSPs. Designers of high performance military systems can take advantage of the design flexibility and reduced time-to-market afforded by the state-of-the-art eXpressDSP™ Real-Time Software Technology and the Code Composer Studio™ Integrated Development Environment (IDE). TI's military offering includes pinout & code compatible, fixed- and floating-point DSPs.

Give me more!

www.ti.com/sc/docs/military

TI's Military Products Division remains focused on maintaining its leadership position as a broad-based supplier to the military semiconductor market. Offering the industry's most powerful signal processing capability to the military, the C6000 platform includes C62x™ fixed-point DSPs with performance levels ranging from 1200 million instructions per second (MIPS) up to 1600 MIPS. The extended-temp C67x™ floating-point devices start at 840 million floating-point operations per second (MFLOPS), and a 1 GFLOPS speed (1 billion floating-point operations per second), extended-temp option is roadmapped for release.

The C6000 platform is well suited for "multi-channel" fixed-point and "raw performance" floating-point intensive applications. To accommodate the performance needs of emerging technologies, TI will continue to deliver the highest performance DSPs in the world. The C6000 platform provides a fully software-compatible, higher performance roadmap with speeds up to 1.1 GHz and performance up to 8,800 MIPS for the C64x™ generation fixed-point devices. The C64x carries on the TI tradition of easiest-to-use DSPs with the world's best C compiler efficiency.

C6000 Enables Performance & Flexibility

TI delivers this leap-frog performance through the revolutionary VelociTI™ advanced Very Long Instruction Word (VLIW) DSP architecture and a combination of 21st century hardware and development tools that all C6000 devices have in common. With this common architecture, the C67x floating-point and C62x fixed-point devices share more than high performance. Current C67x DSPs are code and pinout compatible with their counterparts in the C62x fixed-point generation, enabling designers to prototype their designs using floating-point and quickly move to fixed-point to achieve cost savings in production.

The platform creates a new system-design paradigm that represents a shift from a hardware-centric environment to a software-based model that promotes faster time-to-market and easy, extensible product development. To support this new design paradigm, the C6000 development tools are designed to provide users maximum throughput via the platform's highly parallel, advanced VLIW architecture. These tools create an easy-to-use environment that optimizes DSP device performance and minimizes technical barriers to software and hardware design.

The C6000 advanced development environment features an ultra-efficient C compiler, the industry's first Assembly Optimizer and Code Composer Studio – a fully integrated suite of DSP software development tools. Along with these tools, designers utilizing TI's C6000 devices get the assurance of a strong third-party support base that further simplifies the design and development of C6000-based end-equipment. Across the globe, more than one thousand third-party products support innovation based upon TI DSPs, and more are being

C6000 Platform:

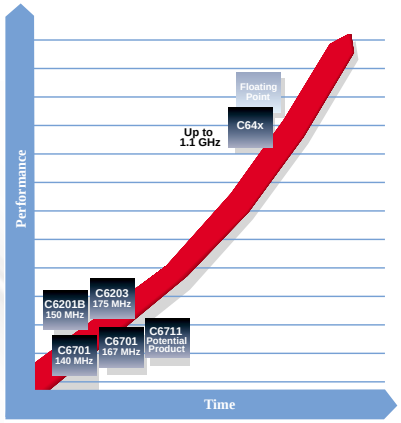
- One architecture
- One tool set
- Code Compatible

Key Features:

- Pinout and code compatibility between fixed- and floating-point DSPs
- Extended-temp performance up to 1600 MIPS and 840 MFLOPS
- Available to QML/DSCC Standard Microcircuit Drawings
- Code Composer Studio TI's new advanced development environment
- Industry's most advanced optimizing DSP C compiler
- Assembly Optimizer efficiently schedules tasks for maximum performance
- Ada 95 compiler: C6201B, C6701

High Performance Roadmap:

SMJ320C6000 Military Roadmap



Process-Speed Options:

- SM-level / Commercial processing
- SMJ-level / MIL-PRF-38535 QML
- Supplied to DSCC Standard Microcircuit Drawings (SMD)
- Up to 200 MHz for the C6201B, C6203
- Up to 140 MHz for the C6701 (167 MHz speed option is available, "S" temp)
- -40°C to 90° "S" temperature range
- -55°C to 115°C "W" temperature range
- -55°C to 125°C "M" temperature range

Package Options:

- Ceramic dimpled ball grid array (GLP)
- 429-ball fully populated array
- 27 x 27 mm package outline
- 1.27 mm ball pitch
- 3.3 mm package height
- 81% reduction in package parasitics
- 94% reduction in board space requirements when compared to the standard ceramic quad flatpacks of similar lead count

developed every day. TI makes it easy to complete your DSP design with compatible data converters and power supply products designed to interface with TI's C6000 DSPs.

Advanced Packaging

The military's requirement for high-performance, hermetic packages can be best served by the ceramic dimpled ball grid array package. The GLP CBGA utilizes a fully populated 429-ball array that measures 27 mm x 27 mm and offers an 81% reduction in package parasitics and a 94% reduction in board space when compared to the standard ceramic quad flatpacks of similar lead count. Thermal performance is dramatically improved. Typical thermal resistance values for the package are: $R_{\theta JA}$=14.47°C/W and $R_{\theta JC}$=7.34°C/W.

C6000 VelociTI Architecture

All of the C6000 devices are based on the same CPU architecture featuring VelociTI, a highly parallel and deterministic architecture that emphasizes software-based flexibility and maximum code performance.

Several high-level language coding options exist, and these currently include Ada and C. The C compiler offers up to 80% code cycle efficiency when compared to hand-coded assembly. Another programming option is to use the industry's first Assembly Optimizer. This tool converts the developer's serial assembly code into efficient parallel code resulting in the execution of up to 8 instructions per cycle. For military system designers, this means faster time-to-market for highly integrated and differentiated products.

The eight functional units of the C6000 core, including two multipliers and six arithmetic units, are highly orthogonal and provide the compiler and Assembly Optimizer with many execution resources. Eight 32-bit, RISC-like instructions are fetched by the CPU each cycle. VelociTI's instruction packing features allow these eight instructions to be executed in parallel, in serial, or in parallel/serial combinations. This optimized scheme enables significant reductions in code size, number of program fetches and power consumption.

TI has added floating-point capability to six of the eight functional units available on the C6000 architecture, making the C67x instruction set a superset of the C62x fixed point instruction set. Because of this, all C62x instructions will run unmodified on the C67x CPU.

Other features of the C6000 core that contribute to its leading performance include:

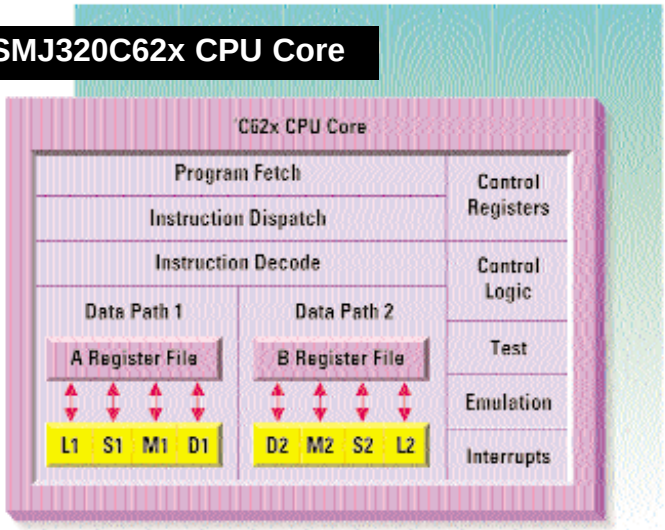
- Load-store architecture with 32 32-bit general-purpose registers
- Instruction packing for reduced code size
- 100% conditional instructions

Instruction set features include:

- Hardware support for IEEE single-precision instructions
- Hardware support for IEEE double precision instructions
- Byte-addressability (8-, 16-, 32-bit data)
- 32-bit address range
- 8-bit overflow protection
- Saturation
- Bit-field extract, set, clear
- Bit-counting
- Normalization

SMJ320C67x CPU Core and C6701 Peripherals

SMJ320C62x CPU Core



The eight functional units of the C6000 core provide the compiler and Assembly Optimizer with many execution resources.

C6000 Development Environment

Easy to use & efficient high-level language development tools:

• **DSP ANSI C compiler** – Developed in conjunction with the advanced VLIW core, the compiler achieves significant cycle-count efficiency when compared to existing fixed-point DSP C compilers in the market (relative to hand-coded assembly). The highly efficient C compiler enables user to program in C language instead of assembly language. This results in a faster time-to-market for the end user.

• **Industry's first assembly-level optimizer** – parallels assembly level-code on the fly to effectively use the VLIW architecture. The tool supports automatic scheduling, optimizing, and separation of fine-grained parallel tasks from linear assembly code thereby delivering a level of simplicity and power that is unprecedented in assembly-level tools.

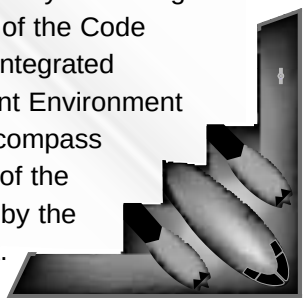
• **C Source Debugger and Simulator** – An effective state-of-the-art debugger and full instruction set simulator supports reduced time to market for new applications. The C6000 development environment provides an intuitive Windows™-based graphical user interface (GUI) for both debugging and simulation. The full-featured interface includes windows for source, reverse assembly, call stack, memory, registers and watch expressions as well as menu and tool bars. The debugger and simulator offer one-click breakpoint settings and dialogs for editing break points. They also incorporate a dynamic profiler to help users find performance bottlenecks and improve code efficiency.

• **Three C6000 EVMs from TI** – provide comprehensive development platforms that allow developers to benchmark their systems by running application software on target C6000 hardware. The EVMs save designers the time and expense of building their own application development board. The EVM options are: (1) TMS320C62x™ EVM for fixed point applications, (2) TMS320C67x™ EVM for floating-point applications and (3) TMS320C62x Multi-channel EVM for verification of multi-channel applications. Easy-to-use, low-cost EVM's (Evaluation Modules) and free, time-bound evaluation versions of the code-generation tools are available for download from TI's internet site:

www.ti.com/sc/docs/tools/dsp/index.html

TI announced an enhanced version of Code Composer Studio that increases product robustness and speeds time to market. The newly released software, Code Composer Studio 1.2, with visual linking and profile-based compilation capabilities, features DSP/BIOS II, an enhanced version of the industry's first real-time kernel. Support for the C55x™ and C64x cores are included. The DSP/BIOS II™ software foundation and Code Composer Studio 1.2 IDE are key components of the industry's first real-time software technology environment, eXpressDSP. Designed to cut software development time in half and increase DSP applications tenfold, eXpressDSP software technology sets the standard in the industry for DSP development support.

Code Composer Studio 1.2 features a new profile based compiler (PBC) and visual linker. TI improved its C compiler and compile tools to help programmers produce more efficient code faster, especially in designs based on the VLIW C6000 DSP platform. The new PBC, a unique tool for C6000 DSPs, enables developers to visualize and choose the optimum trade-offs associated with code size and performance in software applications. Code Composer Studio 1.2 simplifies all aspects of the DSP development cycle by extending the capabilities of the Code Composer Integrated Development Environment (IDE) to encompass awareness of the DSP target by the host.



DSP toolbox

Description	Part number	US $[1]
TMS320C6000™ DSP development tools		
EVALUATION MODULES (EVMS)		
C62x™ EVM	TMDS3260A6201	$995
C62x™ EVM Bundle[2]	TMDS326006201	$1,995
C67x™ EVM	TMDX3260A6701	$1,495
C67x™ EVM Bundle[2]	TMDX326006701	$2,495
C62x™ Multichannel EVM Bundle[2]	TMDX3260M6201	$3,995
SOFTWARE DEVELOPMENT TOOLS		
TMS320™ DSP Algorithm Standard Developer s Kit[3]	TMDS320DAIS-07	$149*
CODE COMPOSER STUDIO™ ■ Code Composer Studio™ IDE ■ Simulator ■ Code Gen Tools ■ DSP/BIOS/RTDX™ ■ Emulation SW	TMDS324685C-07	$2,995
CODE COMPOSER STUDIO™ COMPILE TOOLS ■ Code Composer Studio™ IDE ■ Simulator ■ Code Gen Tools ■ DSP/BIOS/RTDX™	TMDS3246855-07	$1,495
CODE COMPOSER STUDIO DEBUG TOOLS ■ Code Composer Studio IDE ■ DSP/BIOS/RTDX ■ Emulation SW	TMDS3240160-07	$1,995
JTAG EMULATOR		
XDS510 EMULATOR (ISA)		
JTAG Cable	TMDS00510	$4,000
XDS510 EMULATOR (SCSI)		
JTAG Cable	TMDS00510WS	$6,000

1 Prices are quoted in U.S. dollars and represent suggested resale pricing
2 Includes Code Composer Studio - Compile tools and an EVM specific debugger
3 Available only from Web
* Non-Code Composer Studio licensees pay US $149, otherwise the kit is free

To order any of these DSP tools, contact your local TI sales office or distributor in North America. To order in Europe, Asia and other regions, contact the TI Product Information Center (PIC) or your local TI distributor (visit **www.ti.com/sc/docs/distmenu.htm** for distributor listings).

Prices are subject to change. For more information about TI DSP development tools, Code Composer Studio or eXpressDSP™ Real-Time Software Technology, visit **www.ti.com/sc/docs/tools/dsp/index.html**

Code Composer Studio is the DSP development environment offering unprecedented host, target connectivity in an easy-to-use graphical environment. eXpress DSP Real-Time Software Technology is a premier open DSP software environment that combines tools and algorithm development standards to simplify application development and enhance innovation.

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Indonesia	001-801-10	-800-800-1450
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