TMS320C6000™ DSP Platform Update

Revised: March 9, 2004

Product Info / Tech Support / Literature: **North America** support@ti.com or (972) 644-5580
Europe epic@ti.com
Texas Instruments Website: http://www.ti.com or http://www.dspvillage.com
DSP Knowledge Base: http://www-k.ext.ti.com/sc/technical-support/knowledgebase.htm

C6000 DSP SILICON BUDGETARY PRICING, SPECIFICATIONS & AVAILABILITY

- Pricing reflects year 2004 SUGGESTED RESALE and is subject to change. Please consult your preferred TI distributor for formal quotation requests.
- Prototype and production availability dates do not include product lead-times and are subject to change. Standard production lead-times are 10–12 weeks.

TMS320C62x Fixed-Point Digital Signal Processors

Device	C6201	C6202B	C6203B	C6204	C6205	C6211B
MIPS	1600	2400/2000	2400	1600	1600	1336/1200
MHz	200	300/250	300	200	200	167/150
Internal Memory	Prog:64KB (1) Data:64KB	Prog:256KB (1) Data:128KB	Prog:384KB (1) Data:512KB	Prog:64KB (1) Data:64KB	Prog:64KB (1) Data:64KB	L1 Prog:4KB (2) L1 Data:4KB (2) L2 P/D:64KB (2)
External Memory (EMIF) (6)	32-bit 52MB (4 CE)	32-bit 52MB (4 CE)	32-bit 52MB (4 CE)	32-bit 52MB (4 CE)	32-bit 52MB (4 CE)	32-bit 512MB (4 CE)
Peripheral Port (8)	16-bit HPI	32-bit XBus	32-bit XBus	32-bit XBus	32-bit PCI	16-bit HPI
DMA (Channels)	Standard (3) (4+1)	Standard (3) (4+1)	Standard (3) (4+1)	Standard (3) (4+1)	Standard (3) (4+1)	Enhanced (4) (16+1+1)
McBSP	2	3	3	2	2	2
Timer / Counters	2	2	2	2	2	2
Core Voltage	1.8V	1.5V	1.5V(10)	1.5V	1.5V	1.8V
I/O Voltage	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V
Typical Activity Total Internal Power (W) Full Device Speed	1.3	1.0/0.9	1.3/1.1	0.8	0.8	1.0/0.9
Package(s) (9)	GJC or GJL	GNY or GNZ	GNY or GNZ	GHK or GLW	GHK	GFN
TMS - prod	NOW	NOW	NOW	NOW	NOW	NOW
TMS 1,000u	$86.57	$70.29/$58.57	$74.96	$9.66/$21.90	$10.43	$28.18/$22.54

TMS320C67x and TMS320VC33 Floating-Point Digital Signal Processors

Device	C6701	C6711D	C6712D	C6713B	VC33 (5)
MFLOPS (MIPS)	1000/900	1200/1000 (A)	900	1350/1200/1000	150/120
MHz	167/150	200/167 (A)	150	225/200/167 (A)	75/60
Internal Memory	Prog: 64KB(1) Data: 64KB	L1 Prog: 4KB(2) L1 Data: 4KB(2) L2 P/D: 64KB(2)	L1 Prog: 4KB(2) L1 Data: 4KB(2) L2 P/D: 64KB(2)	L1 Prog: 4KB L1 Data: 4KB L2 P/D: 256KB	P: 256B cache P/D: 136KB
External Memory (EMIF)(6)	32-bit 52MB (4 CE)	32-bit 512MB (4 CE)	16-bit 512MB (4 CE)	32-bit 512MB (4 CE)	32-bit 16M x 32 (4 CE)
Peripheral Port(8)	16-bit HPI	16-bit HPI	—	16-bit HPI	—
DMA (Channels)	Standard(3) (4+1)	Enhanced(4) (16+1+1)	Enhanced(4) (16+1+1)	Enhanced(4) (16+1+1)	C3x DMA(1)
McBSP	2	2	2	2 (or McASP)*	1 (not McBSP)
Timer/Counters	2	2	2	2	2
Core Voltage	1.9V/1.8V/1.8V	1.26V	1.26V	1.26V/1.2V	1.8V
I/O Voltage	3.3V	3.3V	3.3V	3.3V	3.3V
Typical Activity Total Internal Power (W) Full Device Speed	1.4/1.3/1.3	0.9/0.9	0.7	1.2/1.2/1.0	0.075
Package(s) (9)	GJC	GDP	GDP	GDP/PYP	PGE
TMS - prod	NOW	NOW	NOW	NOW	NOW
TMS 1,000u	$124.66/$82.24	$21.55	$15.26	$29.14/$22.18	$13.87/$11.26

* The C6713 DSP can be configured to have up to three serial ports in various McASP/McBSP combinations by not utilizing the HPI. Other configurable serial options include I²C and additional GPIO. There are 16 GPIO pins.
(A) Extended temperature range.

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TMS320C64x Fixed-Point Digital Signal Processors

Device	C6411	C6412	C6414	C6415	C6416	DM642	DM641	DM640
MIPS	2400	4800/4000	8000/5760/4800/4000	8000/5760/4800/4000	8000/5760/4800/4000	4800/4000	4800/4000	1600
MHz	300	600/500	1000/720/600/500	1000/720/600/500	1000/720/600/500	600/500	600/500	400
Internal Memory	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 256KB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 256KB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 1MB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 1MB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 1MB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 256KB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 128KB	L1 Prog: 16KB L1 Data: 16KB L2 P/D: 128KB
External Memory (EMIF)	32-bit, 256MB (4 CE)	64-bit, 1024MB	64-bit, 1GB (4 CE) and 16-bit, 256MB (4 CE)	64-bit, 1GB (4 CE) and 16-bit, 256MB (4 CE)	64-bit, 1GB (4 CE) and 16-bit, 256MB (4 CE)	64-bit, 1024MB	32-bit, 256MB	32-bit, 256MB
Peripheral Port [8]	16/32-bit HPI or 32-bit 33-MHz PCI	16/32-bit HPI or 32-bit 66-MHz PCI or 16-bit HPI + EMAC	16/32-bit HPI	16/32-bit HPI or 32-bit 33-MHz PCI	16/32-bit HPI or 32-bit 33-MHz PCI	16/32-bit HPI or 32-bit 66-MHz PCI or 16-bit HPI + EMAC	16-bit HPI or 10/100-Mbit EMAC	10/100-Mbit EMAC
DMA (Channels)	Enhanced (64)	Enhanced (64)	Enhanced (64)	Enhanced (64)	Enhanced (64)	Enhanced (64)	Enhanced (64)	Enhanced (64)
McBSP	2 standard	2 standard	3 standard	3 standard - or 2 standard + Utopia 2	3 standard - or 2 standard + Utopia 2	3 20-bit Video Ports (VP) or 1 20-bit VP + 2 10-bit VP + 2 McBSP + 1 8-bit McASP	2 8-bit Video Ports + 2 McBSP + 1 4-bit McASP	1 8-bit Video Port + 2 McBSP + 1 4-bit McASP
H/W Accelerators	—	—	—	—	Viterbi Decoder(VCP) Turbo Decoder (TCP)	—	—	—
Timer/ Counters	2[7]	3	3	3	3	3	3	3
GPIO	16	16	16	16	16	16	8	8
Core Voltage	1.2V	1.2 (500 MHz) 1.4 (600 MHz)	1.2V (720 MHz, 1 GHz) 1.1V (600 MHz) 1.2V (500 MHz)	1.2V (720 MHz, 1 GHz) 1.1V (600 MHz) 1.2V (500 MHz)	1.2V (720 MHz, 1 GHz) 1.1V (600 MHz) 1.2V (500 MHz)	1.4V (600 MHz) 1.2V (500 MHz)	1.4V (600 MHz) 1.2V (500 MHz)	1.0 (400 MHz)
I/O Voltage	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V
Typical Activity Total Internal Power (W) Full Speed	0.64	1.06/0.64	TBD/1.27/1.06/0.64	TBD/1.27/1.06/ 0.64	TBD/1.27/1.06/0.64	1.06/0.64	1.1/0.6	0.5
Package(s) [9]	GLZ	GDK/GNZ	GLZ	GLZ	GLZ	GDK/GNZ	GDK/GNZ	GDK/GNZ
Part Number	TMS320C6411GLZ	TMX320C6412GDK	TMS320C6414GLZ	TMS320C6415GLZ	TMS320C6416GLZ	TMX320DM642	TMX320DM641	TMX320DM640
TMX / TMS	NOW	NOW / 2Q04	C641x TMS NOW C641xT (90nm) TMX	C641x TMS NOW C641xT (90nm) TMX	C641x TMS NOW C641xT (90nm) TMX	NOW / 2Q04	NOW / 2Q04	NOW / 2Q04
TMS 1,000u	$39.76	$50.79/$45.14	$213.63/$128.49/ $98.48/$82.37	$224.87/$135.26/ $104.05/$86.70	$247.36/$148.78/ $114.45/$95.37	$50.79/$45.14	$42.33/$36.89	$22.54

Notes:

(1) C6201/C6204/C6205/C6701 DSP internal program memory can be configured as cache or addressable RAM.
C6202/C6203 DSP allows 512Kb to be programmed as cache or addressable RAM, the balance is always addressable RAM.
(2) L1 data cache and L1 program cache are always configurable as cache memory. L2 is configurable between SRAM and cache memory.
(3) DMA has 4 fully configurable channels, plus one dedicated to host for HPI transfers.
(4) C6211/C6711/C6712 DSP Enhanced DMA (EDMA) has 16 fully configurable channels. Additionally, there is an independent single-channel quick DMA (QDMA) and a channel dedicated to the host for HPI transfers.
(5) VC33 is an upgrade TI's 'C3x family. While not a 'C6000 DSP device, it is part of TI's floating-point family.
(6) Each Chip Enable (CE) allows the user to assign a specific memory space.
(7) A third timer is on-chip but not pinned-out.
(8) Host Port Interface (HPI) is slave-only async host access.
Expansion Bus (XBus) is master/slave async or sync interface; operates in host or FIFO/Memory modes.
(9) These devices are pin-for-pin compatible: (Note, be aware of voltage differences.)
- (GJC) C6201/C6701 DSP
- (GFN) C6211/C6711/C6712 DSP
- (GDP) C6713/C6711C/C6712C DSP
- (GJL, GNZ) C6202/C6203, (GLS, GNY, GLW) C6202/C6203/C6204
- (GLZ) C6411/C6414/C6415/C6416 DSP
- (GDK, GNZ) C6412/DM642/DM641/DM640 DSP

(10) Device may operate at 300 MHz with 1.7-V core.

Packages:

GGP= 35mm x 35mm, 1.27-mm ball pitch 352-pin BGA
GFN= 27mm x 27mm, 1.27-mm ball pitch 256-pin BGA
GLS = 18mm x 18mm, 0.8-mm ball pitch 384-pin BGA
PGE= 20mm x 20mm, 0.5-mm pitch, 144-pin TQFP
PYP = 28mm x 28mm, 0.5-mm pitch, 208-pin PQFP
GNY= Same as GLS
GDP = 27mm x 27mm, 1.27-mm ball pitch, 272-pin BGA
GJC = 35mm x 35mm, 1.27-mm ball pitch, 352-pin BGA
GJL = 27mm x 27mm, 1.0-mm ball pitch 352-pin BGA
GHK = 16mm x 16mm, 288-pin µStar BGA
GLW = 18mm x 18mm, 340-pin BGA
GLZ = 23mm x 23mm, 0.8-mm ball pitch, 532-pin BGA
GNZ = Same as GJL
GDK = 23mm x 23mm, 0.8-mm ball pitch, 548-pin BGA

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C6000™ DSP DEVELOPMENT TOOLS

- Please note that all C6000 DSP tools support all C6000 generation members (C62x™, C67x™, and C64x™ DSP CPUs) unless otherwise noted.
- All tools support Windows 98/2000/NT and Windows XP.

C6000 DSP HARDWARE DEVELOPMENT TOOLS

Development Tool	Part Number	Includes	Price
DM642 EVM	TMDXEVM642 TMDXEVM642-0E	DM642 EVM baseboard, Code Composer Studio™ v2.20.18 patch (CCStudio 2.0 required), Quick Start Guide, Technical Reference	$1,995
DM642 DMDK	TMDXDMK642 TMDXDMK642-0E	DM642 EVM baseboard, CCStudio v2.20 (for DM64x only), XDS560™ PCI, NTSC or PAL camera	$6,495
C6713 DSK	TMDSDSK6713 TMDSDSK6713-0E	C6713 DSK, DSK CCStudio v2.2 including fast simulators.*[1]	$395
C6711 DSK	TMDS320006711 TMDS320006711E	C6711 DSK, DSK Code Composer Studio v2.1 *[1] Planned EOL--Being replaced by C6713 DSK	$395
C6000 TCP/IP NDK	TMDX320036711 TMDX320036711E	C6000 TCP/IP Network Developer's Kit (NDK) *[2] Not being updated to CCStudio v2.2 Planned EOL.	$995
C6711 IDK	TMDX320026711 TMDX320026711E	C6711 Imaging Developer's Kit (IDK) *[3] Not being updated to CCStudio v2.2 Planned EOL.	$4,500
C6416 DSK	TMDSDSK6416 TMDSDSK6416-0E	C6416 DSK, DSK Code Composer Studio v2.2 including fast simulators and trace header*[1]	$395
C6416 NVDK	TMDX3PNV6416S TMDX3PNV6416SE	C6416 Network Video Development Kit Board Only *	$4,495
C6416 NVDK Bundle	NVDKCCS NVDKCCSE	C6416 Network Video Development Kit with CCStudio & Spectrum Digital 510PP+ *[3]	$6,595
C6701 EVM Bundle	TMDSEVM6701-4	C6701 EVM with Code Composer Studio [3]	$3,495
C6701 EVM Board	TMDSBRD6701	C6701 EVM board only	$1,995
XDS510PP-Plus JTAG Emulator	TMDSEMUPP TMDSEMUPP-0E	Emulator with parallel port connection, JTAG cable	$1,500
XDS510 USB based emulator for Windows	TMDSEMUUSB TMDSEMUUSB-0E	Emulator with USB connection, JTAG cable	$1,995
XDS560 JTAG Emulator	TMDXEMU560	PCI-bus JTAG Scan-Based Emulator	$3,995
Fingerprint Authentication Development Tool	TMDSFDCFPC10	Includes the daughter card and software to get started. Configured to work with the C6711 and C6713 DSKs	$245
C6416 TEB	TMDX3260C6416 TMDX3260C6416E	C6416 Test Evaluation Board Only * Planned EOL for this product replaced by 6416 DSK	$1,995
C6416 TEB Bundle	TMDX3260E6416 TMDX3260E6416E	C6416 Test Evaluation Board bundled with CCStudio & Spectrum Digital 510PP+ *[3] Planned EOL for this product replaced by 6416 DSK	$3,995

Additional hardware development tools are provided by TI's large assortment of Third Parties. See the 3rd Party resource link below.

* "E" is European version

[1] CCStudio only works with the DSK. Does not include simulation and has 256K word program space memory limitation.

[2] CCStudio only works with the DSK. Does not include simulation however there is no memory limitation.

[3] Full version of CCStudio.

C6000 DSP SOFTWARE DEVELOPMENT TOOLS

Code Composer Studio (CCStudio) is an integrated development environment (IDE) consisting of the Code Generation Tools (C compiler, assembler and linker), Debugger, Simulator, XDS510 JTAG emulator drivers, Real-Time Data Exchange (RTDX™) extensions, and the DSP/BIOS™ run-time environment.

Tool Description	Part Number	Components	Price
C6000 DSP Code Composer Studio V2.2 (Windows 98/NT/2000) includes first year of annual subscription	TMDSCCS6000-1	IDE, Code Gen Tools, Debugger, Simulator, DSP/BIOS and RTDX, DSK, EVM and XDS510 drivers	$3,595
C6000 DSP Code Composer Studio Annual S/W Subscription	TMDSSUB6000	Product Upgrades, Updates and Special Utilities	$599

- **Specific upgrades to Code Composer Studio available to users with a current registration for previous versions of TI software development tools**

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TOOL LINKS

- **Chip Support Library**
  (TI Home > DSP Village Home > Software > Peripheral Drivers > Chip Support Libraries)
- **DSP Library, Image/Video Processing Library, FastRTS Library**
  (TI Home > DSP Village Home > Software > Signal Processing Libraries > C6000 Libraries)

C6000 DSP TECHNICAL DOCUMENTATION

All released technical documentation and application notes can be found by referencing one of the following web sites: http://www.ti.com/sc/docs/general/dsp/docsrch.htm or http://dspvillage.ti.com

GENERAL	NUMBER	REVISED	LOCATION
TMS320C6000 Technical Brief	SPRU197d	02/1999	http://www-s.ti.com/sc/psheets/spru197d/spru197d.pdf
TMS320C64x Technical Overview	SPRU395b	01/2001	http://www-s.ti.com/sc/psheets/spru395b/spru395b.pdf
TMS320C6711C Migration Document	SPRA837f	02/2004	http://www-s.ti.com/sc/psheets/spra837f/spra837f.pdf

TMS320C6000 HARDWARE GUIDES	NUMBER	REVISED	LOCATION
C6000 CPU and Instruction Set Reference Guide	SPRU189f	10/2000	http://www-s.ti.com/sc/psheets/spru189f/spru189f.pdf
Update for TMS320C6000 CPU Guide (SPRU189F)	SPRZ168c	09/2003	http://www-s.ti.com/sc/psheets/sprz168c/sprz168c.pdf
C6000 Peripherals Reference Guide	SPRU190e	08/2003	http://www-s.ti.com/sc/psheets/spru190e/spru190e.pdf
C62x/C64x FastRTS Library Programmer's Reference	SPRU653	02/2003	http://focus.ti.com/lit/ug/spru653/spru653.pdf
C6000 Instruction Set Simulator Technical Overview	SPRU600a	12/2002	http://focus.ti.com/lit/ug/spru600a/spru600a.pdf
C6000 DSP Multichannel Audio Serial Port (McASP)	SPRU041c	08/2003	http://focus.ti.com/lit/ug/spru041c/spru041c.pdf
C6000 DSP I^2C Module Reference Guide	SPRU175a	10/2002	http://focus.ti.com/lit/ug/spru175a/spru175a.pdf
C6000 Phase-Locked Loop (PLL) Controller	SPRU233a	04/2003	http://focus.ti.com/lit/ug/spru233a/spru233a.pdf

TMS320C6000 TOOLS GUIDES	NUMBER	REVISED	LOCATION
C6000 Programmer's Guide	SPRU198g	08/2002	http://www-s.ti.com/sc/psheets/spru198g/spru198g.pdf
C6000 Optimizing C Compiler UG	SPRU187k	10/2002	http://www-s.ti.com/sc/psheets/spru187k/spru187k.pdf
C6000 Assembly Language Tools UG	SPRU186m	03/2003	http://www-s.ti.com/sc/psheets/spru186m/spru186m.pdf
Code Composer Studio User's Guide	SPRU328b	02/2000	http://www-s.ti.com/sc/psheets/spru328b/spru328b.pdf
C6000 Code Composer Studio Tutorial	SPRU301c	02/2000	http://www-s.ti.com/sc/psheets/spru301c/spru301c.pdf
C6000 DSP/BIOS User's Guide	SPRU303b	05/2000	http://www-s.ti.com/sc/psheets/spru303b/spru303b.pdf
TMS320C6000 DSP/BIOS App Programming I/F (API)	SPRU403f	04/2003	http://www-s.ti.com/sc/psheets/spru403f/spru403f.pdf
TMS320 DSP Standard Algorithm Developer's Guide	SPRU424c	01/2002	http://www-s.ti.com/sc/psheets/spru424c/spru424c.pdf
TMS320 DSP Algorithm Standard API Reference	SPRU360c	09/2002	http://www-s.ti.com/sc/psheets/spru360c/spru360c.pdf
C Source Debuggers UG for SPARCstations	SPRU224	01/1997	http://www-s.ti.com/sc/psheets/spru224/spru224.pdf
Chip Support Library API User's Guide	SPRU401g	06/2003	http://www-s.ti.com/sc/psheets/spru401g/spru401g.pdf

TMS320C6000 DATA SHEETS (*)	NUMBER	REVISED	LOCATION
C6201 Data Sheet	SPRS051g	11/2000	http://www-s.ti.com/sc/ds/tms320c6201.pdf
C6202 Data Sheet	SPRS104h	09/2003	http://www-s.ti.com/sc/ds/tms320c6202.pdf
C6203B Data Sheet	SPRS086l	09/2003	http://www-s.ti.com/sc/ds/tms320c6203b.pdf
C6204 Data Sheet	SPRS152a	06/2001	http://www-s.ti.com/sc/ds/tms320c6204.pdf
C6205 Data Sheet	SPRS106d	02/2003	http://www-s.ti.com/sc/ds/tms320c6205.pdf
C6211/C6211B Data Sheet	SPRS073j	12/2003	http://www-s.ti.com/sc/ds/tms320c6211.pdf
C6701 Data Sheet	SPRS067e	05/2000	http://www-s.ti.com/sc/ds/tms320c6701.pdf
C6711/C6711B/C6711C/C6711D Data Sheet	SPRS088j	01/2004	http://www-s.ti.com/sc/ds/tms320c6711.pdf
C6712/C6712C/C6712D Data Sheet	SPRS148h	01/2004	http://www-s.ti.com/sc/ds/tms320c6712.pdf
C6713/C6713B Data Sheet	SPRS186g	01/2004	http://www-s.ti.com/sc/ds/tms320c6713.pdf
C6411 Data Sheet	SPRS196f	12/2003	http://www-s.ti.com/sc/ds/tms320c6411.pdf
C6414/C6415/C6416 Data Sheet	SPRS146j	11/2003	http://www-s.ti.com/sc/ds/tms320c6414.pdf
C6414T/C6415T/C6416T Data Sheet	SPRS226	11/2003	http://focus.ti.com/lit/ds/symlink/tms320c6414t.pdf
DM642 Data Sheet	SPRS200d	12/2003	http://www-s.ti.com/sc/ds/tms320dm642.pdf
DM641/DM640 Data Sheet	SPRS222a	10/2003	http://www-s.ti.com/sc/ds/tms320dm641.pdf
VC33 Data Sheet	SPRS087e	01/2004	http://www-s.ti.com/sc/ds/tms320vc33.pdf

(*) For Military C6000 DSP information and data sheets, please visit: http://www.ti.com/sc/docs/products/military/processr/index.htm

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TI DSP TRAINING INFORMATION

Please visit the training webpage for a full details and schedules: http://focus.ti.com/docs/training/traininghomepage.jhtml

Workshops	Length
C6416/C6713 DSK One-Day Workshop	1 day
C6000 DSP Integration Workshop (IW6000)	4 days
C6000 DSP Optimization Workshop (OP6000)	4 days
DSP/BIOS™ Kernel One-Day Workshop	1 day

ONLINE TRAINING

- TI Monthly DSP Customer Technology Webcasts: http://www.ti.com/sc/webcasts
- Tech Online University: http://www.ti.com/sc/docs/training/techonline.htm
- Network Video Developer's Kit (NVDK): http://ti-training.com/courses/coursedescription.asp?iCSID=1250

ADDITIONAL ONLINE RESOURCES

- FTP Site: ftp://ftp.ti.com/mirrors/tms320bbs
- TI & ME Online Sample Requests https://www-a.ti.com/apps/ti_me/ti_me.asp
- Software Upgrades & Registration / Hardware Repair & Upgrades (972) 293-5050 / (281) 274-2285
- C6000 DSP Platform Benchmarks http://www.ti.com/sc/docs/products/dsp/c6000/benchmarks/index.htm
- Data Converters and Power Solutions http://www.ti.com/sc/docs/msp/dsps.htm