

TMS320C5000™ DSP PLATFORM UPDATE

Revised March 8, 2004

Device	VC5401	VC5402	VC5402A	VC5404	VC5407	V5409VC	V5409UC	V5409A	VC5410	VC5410A	VC5416
MIPS	50	100	160	120	120	100/80	80	160/120	100	160/120	160/120
RAM	8Kw	16Kw	16Kw	16Kw	40Kw	32Kw	32Kw	32Kw	64Kw	64Kw	128Kw
ROM	4Kw	4Kw	16Kw	64Kw	128Kw	16Kw	16Kw	16Kw	16Kw	16Kw	16Kw
McBSP	2	2	3	3	3	3	3	3	3	3	3
HPI	8-bit	8-bit	8-bit	8/16-bit	8/16-bit	8/16-bit	8/16-bit	8/16-bit	8/16-bit	8/16-bit	8/16-bit
DMA	6-channel	6-channel	6-channel	6-channel	6-channel	6-channel	6-channel	6-channel	6-channel	6-channel	6-channel
USB	-	-	-	-	-	-	-	-	-	-	-
ADC	-	-	-	-	-	-	-	-	-	-	--
I ² C	-	-	-	-	-	-	-	-	-	-	-
UART	-	-	-	YES	YES	-	-	-	-	-	-
Ethernet	-	-	-	-	-	-	-	-	-	-	-
Timer	2	2	2	2	2	1	1	1	1	1	1
Core Volt	1.8	1.6/1.8	1.6/1.8	1.5	1.5	1.8	1.8	1.6/1.5	2.5	1.6/1.5	1.5
I/O Volt	3.3	3.3	3.3	3.3	3.3	3.3	1.8-3.6	3.3	3.3	3.3	3.3
Package	PGE/GGU	PGE/GGU	PGE/GGU	PGE/GGU	PGE/GGU	PGE/GGU	PGE/GGU	PGE/GGU	PGE/GGW	PGE/GGU	PGE/GGU
TMS - prod	NOW	NOW	NOW	NOW	NOW	NOW	NOW	NOW	NOW	NOW	NOW
~ 1KU Price (2004)	\$4.29	\$5.37	\$10.63	\$7.78	\$9.39	\$10.22 / \$8.32	\$15.10	\$13.37/\$12.07	\$28.83	\$16.05/ \$14.49	\$26.84 / \$24.15

Device					Multi-Core:			DSP + RISC:		System Solutions:	OMAP™:
	VC5501	VC5502	VC5509A	VC5510A	VC5420 (dual-core)	VC5421 (dual-core)	VC5441 (quad-core)	VC5470 (DSP/ARM)	VC5471 (DSP/ARM)	C54CSTI	OMAP5910 (DSP/ARM)
MIPS	600	600/400	400/288	400/320	200	200	532	100/47.5	100/47.5	120	300
RAM	16Kw	32Kw	128Kw	160Kw	192Kw	256Kw	640Kw	72Kw/4Kw	72Kw/4Kw	40Kw	160/192Kb
ROM	16Kw	16Kw	32Kw	16Kw	N/A	4Kw	N/A	N/A	N/A	128Kw	32Kb
McBSP	2	3	3	3	6	6	12	2	2	2	3
HPI	8/16-bit	8/16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	-	-	8/16-bit	16-bit
DMA	6-channel	6-channel	6-channel	6-channel	6-ch/core	6-ch/core	6-ch/core	6-channel	6-channel	6-ch/core	9- / 6-channel
I ² C	YES	YES	YES	-	-	-	-	YES	YES	-	YES
UART	YES	YES	-	-	-	-	-	2	2	YES	YES
Ethernet	-	-	-	-	-	-	-	-	10/100 MAC	-	NO
Timer	3	3	2	2	2	2	4	1/2	1/2	2	9
Core Volt	1.26	1.26	1.6	1.6	1.8	1.8	1.6	1.8	1.8	1.5	1.6
I/O Volt	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	1.8/2.75/3.3
Package	PGF/GZZ	PGF/GZZ	PGE/GHH	GGW	PGE/GGU	PGE/GGU	PGF/GGU	GHK	GHK	PGE/GGU	GZG / GDY
TMS - Prod	3Q03	NOW	GHH NOW	-	NOW	NOW	NOW	NOW	NOW	NOW	NOW
1KU Price (2004)	\$5.37	\$10.17/7.91	\$18.19	\$21.47/\$18.28	\$62.37	\$63.90	\$121.25	\$12.49	\$13.60	\$8.31	\$28.80/\$32

Packages: PGE: 20x20x1.4 mm 144-pin LQFP
 GGU: 12x12x1.4 mm 144-pin MicroStar BGA™
 GGW: 15x15x1.4 mm 176-pin MicroStar BGA
 GHK: 16x16x1.4 mm 257-pin MicroStar BGA
 GZZ: 15x15x1.4 mm 201-pin MicroStar BGA
 PGF: 24x24x1.4 mm 176-pin LQFP
 GHH: 12x12x1.4 mm 179-pin MicroStar BGA
 GGW: 15x15x1.4 mm 240-pin MicroStar BGA
 GZG: 12x12x1.4 mm 289-pin MicroStar BGA

Notes: Prototype and production dates do not include lead times and are subject to change.
 Standard lead times are 12–16 weeks.
 Pricing reflects year 2004 TMS silicon and is subject to change, pricing for devices in TMX stage is not provided here.
 TMX prices are available on the DSP Info net.
 Pricing listed in the same order as speed grades.

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C5000™ DSP HARDWARE DEVELOPMENT TOOLS

Development Tool	Part Number	Includes	Price
C5416 DSP Starter Kit (DSK)	TMDSDSK5416 TMDSDSK5416-0E	Code Composer Studio™ for DSK, C5416 hardware board, USB cable	\$395
C547x EVM**	701791/701790	Spectrum Digital EVM	\$2,999
C5510 DSP Starter Kit (DSK)	TMDSDSK5510 TMDSDSK5510-0E	Code Composer Studio for DSK, C5510 hardware board, USB cable	\$395
Fingerprint Authentication Development Tool	TMDSFDCFPC10	DSK plug-on daughter card, fingerprint sensor and software	\$245
Deluxe Innovator™ Development Kit for OMAP™	INNOVATOREVMV1	Handheld, expandable OMAP1510-based hardware, cables, accessories documentation	\$2,995
XDS510™ USB-Based Emulator for Windows	TMDSEMUUSB	XDS510 JTAG emulator, USB cable, and drivers	\$1,995
XDS510PP-Plus JTAG Emulator for Windows**	TMDSEMUPP TMDSEMUPP-0E	XDS510 JTAG emulator, parallel port cable, power supply, and drivers	\$1,500
XDS560™ PCI-Bus JTAG Scan-Based Emulator	TMDXEMU560	XDS560 high speed PCI-bus JTAG emulator, flexible 5 ft. cable, drivers	\$3,995

**In addition to TI's eStore, emulator is also available through Spectrum Digital. Please visit: <http://www.spectrumdigital.com>

Hardware Development Tools Summary: <http://focus.ti.com/docs/tool/matrix.jhtml?FamilyId=44>.

Alternative Hardware Development Tools (TI third parties): www.spectrumdigital.com; www.dspr.com

TI Third Party Catalog: <http://focus.ti.com/catalog/docs/thirdpartycatalog.tsp?templateId=5681&navigationId=10205>

C5000 DSP SOFTWARE DEVELOPMENT TOOLS

Code Composer Studio (CCStudio) is an integrated development environment (IDE) consisting of the Code Generation Tools (C/C++ compiler, assembler and linker), Debugger, Simulator, XDS510/XDS560 JTAG emulator drivers, Real-Time Data Exchange (RTDX™) extensions, and the DSP/BIOS™ run-time environment. Code Composer Studio also offers environment customization capabilities through third party plug-ins such as system simulation and design packages, application code, additional hardware and software development tools, and analysis tools.

Tool Description	Part Number	Components	Price
C5000 DSP Code Composer Studio V2.2 (Win XP, 2K, NT, 98)	TMDSCCS5000-1	IDE, Code Generation Tools, Debugger, Simulator, DSP/BIOS and RTDX, device drivers, annual subscription	\$3,595
C5000 DSP CCStudio Annual SW Subscription	TMDSSUB5000	Keep CCStudio up-to-date with product upgrades, updates, and special utilities	\$600
OMAP™ Code Composer Studio v2.2	TMDSCCSOMAP-1	TMS320C5000 CCStudio 2.2 and TMS470 CCStudio 2.2 products merged on single CD with OMAP specific plug-ins (DSP/ARM heterogeneous debug)	\$5,400
OMAP™ CCStudio Annual SW Subscription	TMDSSUBOMAP	Keep CCStudio for OMAP up-to-date with product upgrades, updates, and special utilities	\$900

Free C54x™ DSP Software Library: <http://focus.ti.com/docs/tool/toolfolder.jhtml?PartNumber=SPRC099>

Free C55x™ DSP Software Library: <http://focus.ti.com/docs/tool/toolfolder.jhtml?PartNumber=SPRC100>

Free C55x Imaging Library: <http://focus.ti.com/docs/tool/toolfolder.jhtml?PartNumber=SPRC101>

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RESOURCES

Texas Instrument's Web Site	http://www.ti.com
DSP Developer's Village	http://dspvillage.ti.com/
C54x → C55x Migration Tutorial	http://ti-training.com/courses/CourseDescription.asp?iCSID=7627
TI Training Web Site	http://focus.ti.com/docs/training/traininghomepage.jhtml
Data Converters and Power Solutions	http://www.ti.com/sc/docs/msp/dsps.htm
DSP Online KnowledgeBase	http://www.ti.com/sc/docs/dsps/hotline/c54x.htm
Online Sample Requests	http://my.ti.com
Linux for the 547x devices	http://www.montereylinux.com
Customer Complaint Hotline	ticomplaints@ti.com
Product Info/Technical Support/Literature	(972) 644-5580 or sc-infomaster@ti.com
Software Upgrades/Registration	(972) 293-5050
Hardware Repair/Upgrades	(281) 274-2285

TECHNICAL DOCUMENTATION

All released technical documentation & application notes can be found by referencing the following web site:

<http://www.ti.com/sc/docs/general/dsp/docsrch.htm>

Please use the appropriate literature number below for key user's guides and datasheets.

GENERAL

	LITERATURE NUMBER	LOCATION
TMS320C5000™ DSP Family Functional Overview	SPRU307	http://www-s.ti.com/sc/techlit/spru307
C55x™ DSP Technical Overview	SPRU393	http://www-s.ti.com/sc/techlit/spru393
C55x DSP Functional Overview	SPRU312	http://www-s.ti.com/sc/techlit/spru312

TMS320C5000 HARDWARE USER'S GUIDES

	LITERATURE NUMBER	LOCATION
C55x CPU Reference Guide	SPRU371	http://www-s.ti.com/sc/techlit/spru371
C55x DSP Mnemonic Instruction Set Ref Guide	SPRU374	http://www-s.ti.com/sc/techlit/spru374
C55x Algebraic Instruction Set Ref Guide	SPRU375	http://www-s.ti.com/sc/techlit/spru375
C55x DSP Peripherals Reference Guide	SPRU317	http://www-s.ti.com/sc/techlit/spru317
OMAP5910 Processor Technical Reference	SPRU602	http://www-s.ti.com/sc/techlit/spru602
C54x™ CPU and Peripherals User's Guide (Vol 1)	SPRU131	http://www-s.ti.com/sc/techlit/spru131
C54x Mnemonic Instruction Set User's Guide (Vol 2)	SPRU172	http://www-s.ti.com/sc/techlit/spru172
C54x Algebraic Instruction Set User's Guide (Vol 3)	SPRU179	http://www-s.ti.com/sc/techlit/spru179
C54x Applications Guide (Vol 4)	SPRU173	http://www-s.ti.com/sc/techlit/spru173
C54x Enhanced Peripherals User's Guide (Vol 5)	SPRU302	http://www-s.ti.com/sc/techlit/spru302
C547x CPU and Peripherals Reference Guide	SPRU038	http://www-s.ti.com/sc/techlit/spru038

TMS320C5000 TOOLS USER'S GUIDES

	LITERATURE NUMBER	LOCATION
Code Composer Studio™ User's Guide	SPRU328	http://www-s.ti.com/sc/techlit/spru328
Code Composer Studio Getting Started Guide	SPRU509	http://www-s.ti.com/sc/techlit/spru509
C5000 Code Composer Studio Tutorial	SPRU327	http://www-s.ti.com/sc/techlit/spru327
C5000 DSP/BIOS™ User's Guide	SPRU326	http://www-s.ti.com/sc/techlit/spru326
C5000 DSP/BIOS Application Programming Interface User's Guide	SPRU404	http://www-s.ti.com/sc/techlit/spru404
OMAP Instruction Set Simulator Technical Overview	SPRU601	http://www-s.ti.com/sc/techlit/spru601
C55x DSP Programmer's Guide	SPRU376	http://www-s.ti.com/sc/techlit/spru376
C55x DSP Assembly Language Tools User's Guide	SPRU280	http://www-s.ti.com/sc/techlit/spru280
C55x DSP Optimizing C Compiler User's Guide	SPRU281	http://www-s.ti.com/sc/techlit/spru281
C55x DSP Functional Library Programmer's Ref Guide	SPRU422	http://www-s.ti.com/sc/techlit/spru422
C55x DSP Chip Support Library API Reference Guide	SPRU433	http://www-s.ti.com/sc/techlit/spru433
C55x DSP Chip Support Library USB Programmer's Reference	SPRU511	http://www-s.ti.com/sc/techlit/spru511
C55x DSP Image/Video Processing Library Programmer's Reference	SPRU037	http://www-s.ti.com/sc/techlit/spru037
C55x DSP Instruction Set Simulator Technical Overview	SPRU599	http://www-s.ti.com/sc/techlit/spru599
C54x DSP Instruction Set Simulator Technical Overview	SPRU598	http://www-s.ti.com/sc/techlit/spru598
C54x to C55x Code Migration Reference Guide	SPRU429	http://www-s.ti.com/sc/techlit/spru429
C54x DSP Programmer's Guide	SPRU538	http://www-s.ti.com/sc/techlit/spru538
C54x Chip Support Library API Reference Guide	SPRU420	http://www-s.ti.com/sc/techlit/spru420
C54x Assembly Language Tools User's Guide	SPRU102	http://www-s.ti.com/sc/techlit/spru102
C54x Optimizing C Compiler User's Guide	SPRU103	http://www-s.ti.com/sc/techlit/spru103
C54x DSP Library User's Guide	SPRU518	http://www-s.ti.com/sc/techlit/spru518
C5xx C Source Debugger User's Guide	SPRU099	http://www-s.ti.com/sc/techlit/spru099

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POPULAR TMS320C5000 APPLICATION NOTES

Cyclic Redundancy Check Computation: An Implementation using the TMS320C54x™ DSP
 Emulation Fundamentals for TI's DSP Solutions
 Cellular Handset Architectures Using the TMS320C54x DSP
 TMS320UC5402 and TMS320VC5402 Bootloader Features
 Implementing a Software UART on the TMS320C54x with the McBSP and DMA
 DTMF Tone Generation and Detection: An Implementation Using the TMS320C54x DSP
 A Practical Application of the TMS320C54x DSP Host Port Interface (HPI)
 Programmable DSP Platform for Digital Still Cameras Using the TMS320C54x DSP
 Texas Instruments TMS320VC5409/21 DSP to PCI Bus: IOP 480 to TI DSP
 TMS320C54x DSP Application Code Examples
 TMS320C5416 DSP Bootloader
 Understanding the C54x Memory Maps and Examining an Optimum C5000™ DSP Memory Interface
 TMS320C5000 DMA Applications
 TMS320C54x Digital Filters
 Using the Flash Bootload Capability of the TMS320VC5402 DSK
 Interfacing TMS320C54x DSP with SDRAM
 Implementation of G.729 on TMS320C54x DSP
 System Initialization for the OMPA5910 Device
 Configuring Code Composer Studio for OMAP Debugging

LITERATURE NUMBER

[SPRA530](#)
[SPRA439](#)
[SPRA650](#)
[SPRA618](#)
[SPRA661](#)
[SPRA096](#)
[SPRA574](#)
[SPRA651](#)
[SPRA679](#)
[SPRA673](#)
[SPRA602](#)
[SPRA607](#)
[SPRA641](#)
[SPRA669](#)
[SPRA723](#)
[SPRA531](#)
[SPRA656](#)
[SPRA828](#)
[SPRA807](#)

LOCATION

<http://www-s.ti.com/sc/techlit/spra530>
<http://www-s.ti.com/sc/techlit/spra439>
<http://www-s.ti.com/sc/techlit/spra650>
<http://www-s.ti.com/sc/techlit/spra618>
<http://www-s.ti.com/sc/techlit/spra661>
<http://www-s.ti.com/sc/techlit/spra096>
<http://www-s.ti.com/sc/techlit/spra574>
<http://www-s.ti.com/sc/techlit/spra651>
<http://www-s.ti.com/sc/techlit/spra679>
<http://www-s.ti.com/sc/techlit/spra673>
<http://www-s.ti.com/sc/techlit/spra602>
<http://www-s.ti.com/sc/techlit/spra607>
<http://www-s.ti.com/sc/techlit/spra641>
<http://www-s.ti.com/sc/techlit/spra669>
<http://www-s.ti.com/sc/techlit/spra723>
<http://www-s.ti.com/sc/techlit/spra531>
<http://www-s.ti.com/sc/techlit/spra656>
<http://www-s.ti.com/sc/techlit/spra828>
<http://www-s.ti.com/sc/techlit/spra807>