

**Product Bulletin**

# TMS320C64x™ DSP Generation

**Benefits**

- **Highest performance:** the C64x™ DSP generation is the industry's fastest DSP with up to 1-Gigahertz (GHz) performance
- **Code compatibility:** software compatibility with the TMS320C62x™ and TMS320C67x™ DSP generations allow easy migration to the C64x DSP generation

Texas Instruments (TI) offers a broad range of TMS320C64x DSPs to enable applications such as:

- **Video and Imaging Applications**—the 8-bit support of C64x™ DSPs enable more options and features for these applications such as MPEG-2 HDTV video decode, audio decode and picture formatting.
- **3G Wireless Infrastructure**—enables a wider range of new services and supports multimedia standards by offering over 420 voice channels and 42 data channels.

**The C64x DSP Generation**

The C64x DSP generation offers the industry's greatest megahertz (MHz) performance levels, with options varying from 300 MHz to 1 GHz. Each DSP in this generation is specifically targeted to meet the needs of signal processing customers by offering customized peripherals and is supported by TI's eXpressDSP™ Software and Development Tools and DSP/BIOS™ real-time kernel.

by featuring general-purpose, high-speed peripherals for systems that do not require dedicated network connectivity, such as:

- Three McBSPs
- 32-bit HPI
- 64-channel EDMA

**TMS320C6415 DSP**

The C6415 DSP includes the features found on the C6414 DSP and adds industry-standard interfaces to speed multimedia and media gateway system development.

- Flexible 32-bit/33-MHz Peripheral Component Interface

**TMS320C6000™ DSP Platform Roadmap**

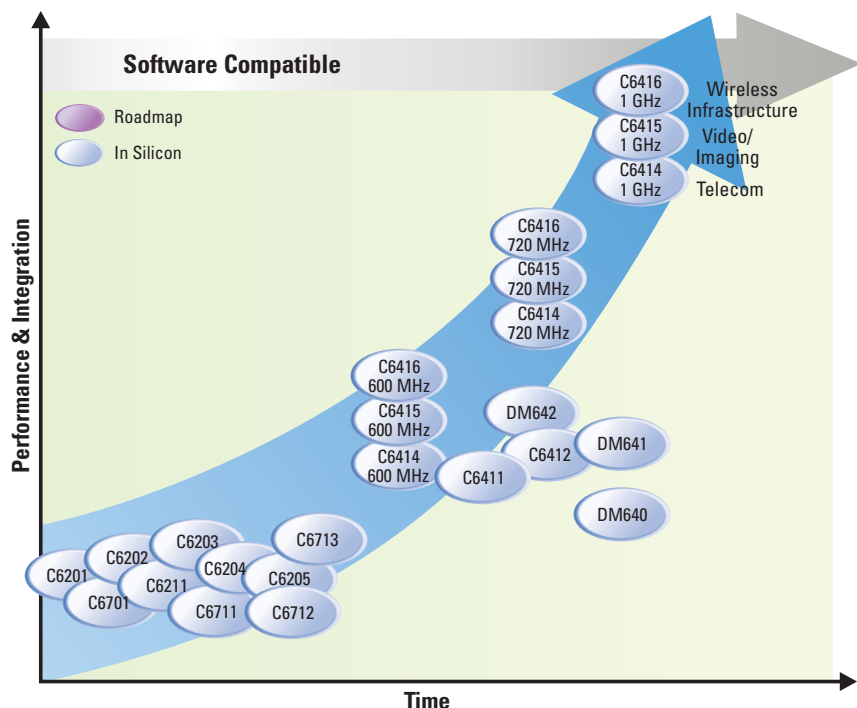


Figure 1: The C6000™ DSP platform's software-compatible roadmap protects your investment.

**TMS320C6414 DSP**

The C6414 DSP sets the performance standard for the industry

(PCI) or 32-bit HPI provide connections to future industry-standard or general-purpose busses.

- Includes universal test and operations PHY interface for ATM (UTOPIA) or McBSP for general-purpose connections to data sources.

### TMS320C6416 DSP

The most highly integrated of the new devices, the C6416 DSP, includes VCP and TCP co-processors, and peripherals specifically targeting 3G wireless infrastructures:

- Provides same peripheral choices as C6415 DSP
- Viterbi decoder co-processor (VCP) supports over 420 voice channels at 12.2 kbps

- Turbo decoder co-processor (TCP) supports 42 data channels at 384 kbps

### TMS320DM64x DSPs

Providing video OEM designers with unmatched performance and flexibility, the DM64x DSPs simplify design and reduce system cost with integrated multimedia and communication peripherals.

- **TMS320DM640** – Low-cost, single-channel digital media processor:
  - 10-/100-Mb Ethernet MAC (EMAC)/MDIO
  - One 8-bit BT656 video port (VP0)
- **TMS320DM641** – Low-cost, multi-channel digital media processor
  - 16-bit HPI or 10-/100-Mb EMAC/MDIO

- Two 8-bit BT656 video ports (VP0, VP1)

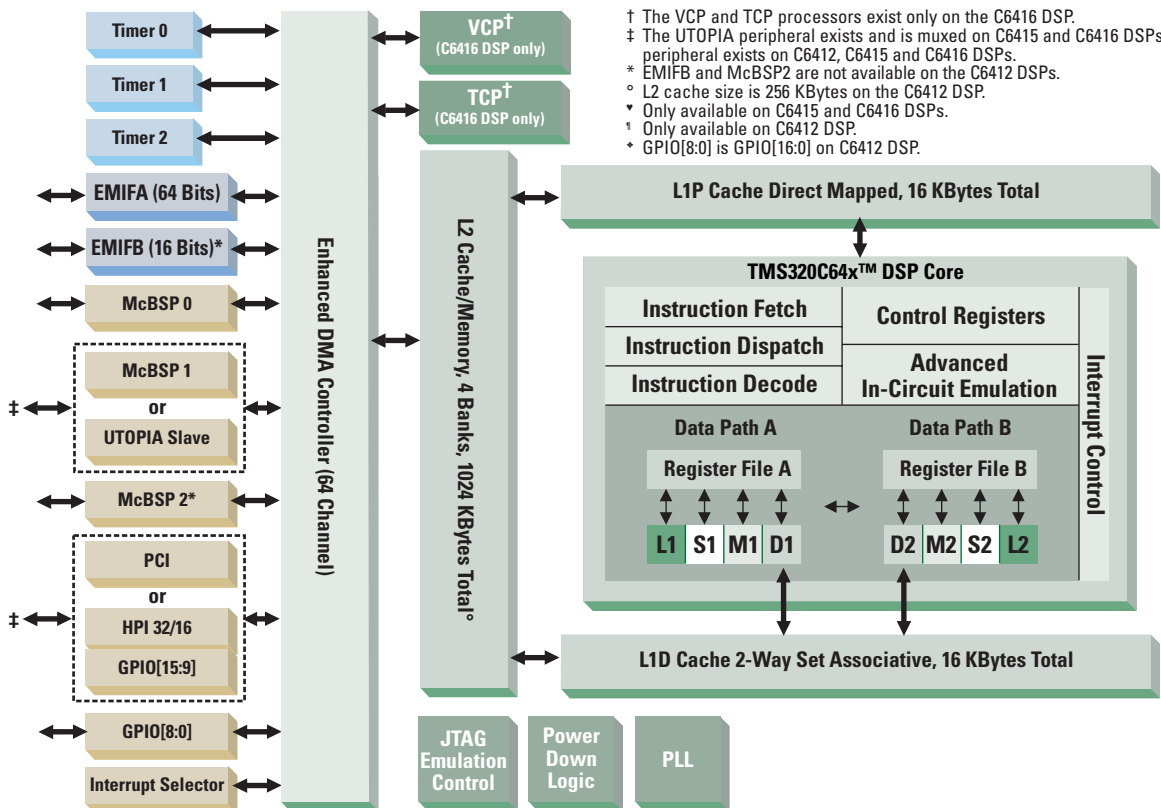
- **TMS320DM642** – Provides a rich peripheral set for multimedia client systems

- Flexible 8-bit audio serial port (McASP) and three 20-bit BT656 video ports (VP0, VP1, VP2)
- 66-/33-MHz PCI or 32-bit HPI or 10-/100-Mb EMAC/MDIO

### TMS320C6412 DSP

- TMS320C6412 DSP – Low-cost and best C64x™ DSP performance for communications and general-purpose processing
  - Flexible 32-bit PCI or 32-bit HPI or 10-/100-Mb Ethernet MAC
  - 256-KBytes L2 memory

## TMS320C6412/C6414/C6415/C6416 DSP Block Diagram



† The VCP and TCP processors exist only on the C6416 DSP.  
 ‡ The UTOPIA peripheral exists and is muxed on C6415 and C6416 DSPs. The PCI peripheral exists on C6412, C6415 and C6416 DSPs.  
 \* EMIFB and McBSP2 are not available on the C6412 DSPs.  
 † L2 cache size is 256 KBytes on the C6412 DSP.  
 ‡ Only available on C6415 and C6416 DSPs.  
 † Only available on C6412 DSP.  
 \* GPIO[8:0] is GPIO[16:0] on C6412 DSP.

Figure 2. The C64x fixed-point DSPs offer the highest level of performance to address the demands of the digital age.

## TMS320C64x™ DSP Generation Price/Performance Spectrum

Software Compatible 

	C6412	DM640	DM641	DM642	1 GHz Now Available		
					C6414	C6415	C6416
Performance	4000/4800 MIPS	1600 MIPS	4000/4800 MIPS	4000/4800 MIPS	4000/4800/5760/8000 MIPS	4000/4800/5760/8000 MIPS	4000/4800/5760/8000 MIPS
Memory (Bytes)	L1 Prog: 16K L1 Data: 16K L2 P/D: 256K	L1 Prog: 16K L1 Data: 16K L2 P/D: 128K	L1 Prog: 16K L1 Data: 16K L2 P/D: 128K	L1 Prog: 16K L1 Data: 16K L2 P/D: 256K	L1 Prog: 16K L1 Data: 16K L2 P/D: 1M	L1 Prog: 16K L1 Data: 16K L2 P/D: 1M	L1 Prog: 16K L1 Data: 16K L2 P/D: 1M
Key Feature	Selectable PCI/HPI/EMAC	EMAC, Video Ports	EMAC, Video Ports	EMAC, Video Ports	HPI	PCI, UTOPIA 2	VCP/TCP
BGA Package	23 mm/27 mm	23 mm/27 mm	23 mm/27 mm	23 mm/27 mm	23 mm	23 mm	23 mm
Internal Power (Typical)	0.64/1.06 W @ 500/600 MHz	0.5 W @ 400 MHz	0.6/1.1 W @ 500/600 MHz	0.64/1.1 W @ 500/600 MHz*	0.64/1.1/1.32 W @ 500/600/720 MHz*	0.64/1.1/1.32 W @ 500/600/720 MHz*	0.64/1.1/1.32 W @ 500/600/720 MHz*
1 KU Production Price (Estimated)	\$45.14/ \$50.79	\$22.54	\$36.89/ \$42.33	\$45.41/ \$50.79	\$82.37/ \$98.84/ \$128.49/ \$213.63	\$86.70/ \$104.05/ \$135.26/ \$224.87	\$95.37/ \$114.45/ \$148.78/ \$247.36
Samples	✓	✓	✓	✓	✓	✓	✓
Production#	✓	✓	✓	✓	✓	✓	✓

Figure 3: The C64x™ generation offers system developers a wide range of price/performance/peripheral options.

\*Estimated power  
# 1-GHz production in 4Q04

### Software and Development Tools

#### Free Software Downloads

Reduce your development time with a variety of free software:

- **TMS320C64x™ DSP Signal Processing Libraries:** The C64x DSP Signal Processing library is a free source-code library that includes C Callable functions (ANSI-C language compatible) for general signal processing math and vector functions.
- **C64x Imaging Library:** The DSP Image/Video Processing Library (IMGLIB) contains software code that is highly optimized for TMS320C6000 DSPs

and is compiled with the latest revision of the C6000™ DSP code-generation compile tools.

- **TMS320C64x Fast Run-Time Support Library:** The TMS320C62x™/C64x FastRTS Library is an optimized, floating-point function library for C programmers using either C62x or C64x devices.
- **Reference Frameworks (RF):** Jump start DSP-based application development with TI's Reference Frameworks software. This production-quality source code takes care of code common to many applications, eliminating many initial low-level design decisions. The out-

of-the-box software allows easy integration of eXpressDSP™-compliant algorithms into designs, saving more valuable time.

#### Development Tools Aid Faster Time-to-Market

Available today, the C6416 DSP Starter Kit (DSK), allows designers to accelerate the design process for existing C64x DSP applications. For more information or to purchase, visit: [www.dspvillage.ti.com/c6416dsk](http://www.dspvillage.ti.com/c6416dsk)

#### Pricing and Availability

For additional information about the C64x DSPs, contact your local TI sales representative or visit: [www.ti.com/c6000](http://www.ti.com/c6000)

# TI Worldwide Technical Support

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Phone +1(972) 644-5580  
Fax +1(972) 927-6377  
Internet/Email [support.ti.com/sc/pic/americas.htm](http://support.ti.com/sc/pic/americas.htm)

### Europe, Middle East, and Africa

Phone  
Belgium (English) +32 (0) 27 45 55 32  
Finland (English) +358 (0) 9 25173948  
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 +(49) (0) 8161 80 2045  
Internet [support.ti.com/sc/pic/euro.htm](http://support.ti.com/sc/pic/euro.htm)

### Japan

Fax International +81-3-3344-5317  
Domestic 0120-81-0036  
Internet/Email International [support.ti.com/sc/pic/japan.htm](http://support.ti.com/sc/pic/japan.htm)  
Domestic [www.tij.co.jp/pic](http://www.tij.co.jp/pic)

### Asia

Phone  
International +886-2-23786800  
Domestic Toll-Free Number  
Australia 1-800-999-084  
China 800-820-8682  
Hong Kong 800-96-5941  
Indonesia 001-803-8861-1006  
Korea 080-551-2804  
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Taiwan 0800-006800  
Thailand 001-800-886-0010  
Fax 886-2-2378-6808  
Email [tiasia@ti.com](mailto:tiasia@ti.com)  
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