

# TMS320C640x Fixed-Point DSPs



## High performance at half the power

TMS320C640x DSPs use half the power of existing high-performance devices in the TMS320C6000™ DSP platform, giving system designers the ability to add portability to processing-intensive applications including public safety and military radio, diagnostics, portable music recording and applications we haven't thought of yet. Based on TI's high-performance TMS320C64x+™ core, the devices offer performance up to 2400 MMACs with extremely low power. Through pin-for-pin and software compatibility with select OMAP-L1x and TMS320C674x processors, C640x processors offer unprecedented levels of scalability.

The high-performance C64x+™ processor core, flexible cache architecture, enhanced

DMA subsystem and dynamic power management (DPM) functionality provide system designers with a flexible, scalable platform to add portability to a wide spectrum of applications. With C640x DSPs, designers now have the option to add features to existing battery-operated products like energy saver capability and portability or lower heat dissipation to traditionally wired applications such as conferencing phones. Price points starting as low as USD \$9.10 in 100u quantities combined with a scalable architecture and connectivity peripherals allow designers to choose the right features and price point to meet their application needs.

These processors will be sampling in early 2009.

## Increase battery life through TI process technology

Combining industry-leading, cutting-edge 65-nm process technology with low-leakage transistor technology, the C640x generation of DSPs offers unprecedented performance with power consumption as low as 6 mW\* in deep-sleep mode, 11 mW† in standby mode and 415 mW‡ total power in active mode. The combination of high-performance, low-power architecture and power-management software technology allows C640x DSPs to offer not only CPU core frequency and voltage granularity to meet design needs, but also to further optimize power consumption at a device level with the

### Key Features:

- Power consumption ranging from 6\* mW deep-sleep mode power to 415‡ mW total power in active mode enabling more than eight hours battery life
- Pin-for-pin compatible with select OMAP-L1x and TMS320C674x processors
- Up to 2400 MMACs of DSP processing capability
- Smaller, ergonomic products with 13x13-mm packaging
- More than 2x the processing capability with the same power as existing low-power DSPs

ability to manipulate individual peripherals to further optimize power consumption. Designers can save significant system power and cost through peripheral integration such as 10/100 Ethernet MAC, USB 1.1 Host, USB 2.0 Host/Device/OTG, MMC/SD controllers, universal

\* Power-use scenario – deep sleep: 0.95-V core, DSP clock OFF, all peripherals clock OFF, RTC ON, PLL disabled, 25°C

† Power-use scenario – standby: 0.95-V core, DSP clock OFF, all peripherals clock OFF, RTC ON, PLL enabled, 25°C

‡ Power-use scenario – active: 70% max load of CPU running at 300 MHz at 1.2 V, mDDR 133 MHz/16 bit accessed 50% of the time, McBSP, SPI and GPIOs peripherals are active, 25°C

DSP

TMS320C640x



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INSTRUMENTS

## Technical details

### Architectural features

- High-performance 16-/32-bit, 300-MHz (2400 MMACS) C64x+™ processor core
- Portable power-tuned peripherals including USB 2.0 Host/Device/OTG, USB 1.1 Host and MMC/SDIO

### System integration

- Up to 448 KB of internal memory through a combination of L1/L2 cache and internal RAM memory
- Universal parallel port provides a direct interface to FPGAs, high-speed A/Ds,

data converters and inter-processor communication

- Up to 64-channel DMA supporting 1D, 2D and 3D data transfers
- NAND flash controller with 8-/16-bit interface for commands, addresses and data
- Connectivity: host DMA port, UARTs, McASP/McBSPs, SPI, I<sup>2</sup>C, PWM, MMC/SD controllers, USB 1.1/2.0 interfaces, SATA, eCAP, eQEP
- Selection of memory controller options providing a glueless connection to multiple banks of external mDDR, DDR2, SDRAM, SRAM and Flash

- Package options: QFP, BGA, nFBGA in various sizes and ball pitches (commercial temperature and industrial range 0°C to 70°C or –40°C to 85°C)

### Applications

- Public safety radio
- Military radio
- Diagnostics
- Portable music recording

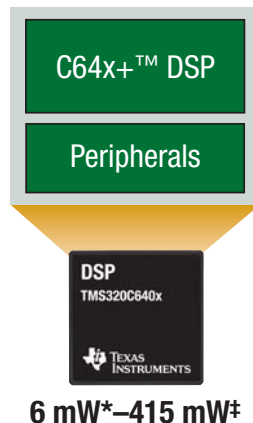
parallel port (uPP) for interfacing with FPGAs, data converters and other inter-processor communication, uHPI, multi-channel serial ports and an LCD controller negating the need for external processors and logic. On-chip memory options of up to 448 KB reduce the need for external memory in some applications again saving both power and cost.

C640x DSPs are available in a wide variety of packages to address applications with various size constraints.

## Get started quickly

To get started quickly, designers can purchase C640x development kits with built-in emulation for less than USD \$400 and limited-use development kits for less than USD \$100. All kits include full board support packages and the associated debugging environment. C640x DSPs are supported by Code Composer Studio™ (CCStudio) integrated development environment.

For more information on TMS320C640x fixed-point DSPs, visit [www.ti.com/c640x](http://www.ti.com/c640x).



## TI Worldwide Technical Support

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