**Product Bulletin**

**TMS320DM642**

**Digital Media Processor**

The TMS320DM642 Digital Media Processor offers multimedia system designers:

- High-quality, multi-channel video with industry-leading performance based on the proven TMS320C64x™ DSP core technology
- A time-to-market advantage through complete range of ready-to-use application software
- Reduced system cost for video over IP applications through on-chip integration of key audio/video and connectivity peripherals
- Extensive design, software and systems support from TI and the industry's largest third-party network

**Performance**

At 600 MHz and 4800 MIPS, the DM642 digital media processor offers industry-leading performance. For example, a single DM642 can simultaneously decode four channels of MPEG2 video, Main Profile at Main Level (MP@ML), D1 (720 x 480) resolution, at 30 frames per second. The DM642 is based on TI's proven C64x™ DSP core, which contains instruction set extensions (VelociTI.2™) for accelerating video and imaging applications. Since the DM642 is fully software-programmable, a customer's system can be upgraded from MPEG2 video Codec to H.26L video Codec or other streaming media technologies. Upgrading a customer's video-on-demand set-top box from MPEG2 video to H.26L video standards can double the service provider's channel capacity and double the consumer's hard disk drive storage capacity while maintaining video quality.

**Focused on Emerging Video over IP Applications**

The DM642 was designed to meet the needs of several end-equipment applications including:

- **Video over IP**
  - Networked streaming video appliances, wired and wireless: Future proof with remote upgradeability

**Key Features**

- Industry's highest-performance, fully software-programmable digital media processor
  - 4800 MIPS performance at 600 MHz
  - Multiple input/output glueless interfaces for common video and audio formats
  - Based on the C64x™ VLIW DSP core. Includes VelociTI.2™ extensions to VelociTI™ instruction set for video and imaging
- Performs real-time video encoding, decoding and transcoding between Codecs—any video format to any video format
- Three dual-channel video ports—supports up to 6 channels of simultaneous video input/output
  - Glueless interface to common encoder and decoder devices
  - High speed video ports can support up to uncompressed HDTV data rates
  - Highly configurable video ports support video input/output for variety of formats including BT.656, HDTV Y/C at up to 10 bits per component, RGB, raw video, MPEG-2 transport stream interface
  - Variety of digital video formats supported: BT.656, SMPTE 260M, SMPTE 274M, SMPTE 296M, BT.1120
  - Each video port can be configured as one 20-/16-bit channel or two 10-/8-bit channels
  - Video ports include support for picture resizing, format conversions, YC multiplexing/demultiplexing
- Multi-channel audio serial port (McASP) supports up to 16 channels
- Advanced connectivity with 10/100 Ethernet MAC and 66-MHz PCI
- Code-compatible to TMS320C6000™ DSP platform architecture
- Leverages industry's most comprehensive third-party network
- Wide variety of encoders and decoders currently available from TI's Third-Party Network: AC-3, AAC, H.26L, H.263, MPEG2 video, MPEG4 video and more
- Supported by industry award-winning eXpressDSP™ software and development tools

**Software Support**

- On2 Technologies
  - MPEG-2
  - H.26L
  - H.263
  - DivX
  - MPEG-4
- RealNetworks
  - G.7xx
  - MP3
- Windows Media 9 Series
Streaming video-on-demand over DSL and cable modems:
Benefit from the latest Codecs and the performance to run the entire system

IP-based video conferencing:
Encode and decode multiple channels and multiple formats.

IP-based video phones:
Leverage the DM642’s mix of low power and high performance

- Digital video recorders with the right level of peripheral integration and performance for the lowest-cost implementation
- Encoding and decoding flexibility for the latest industry standards and proprietary Codecs
- High-performance imaging applications that require multifunction processing

In each of these applications, the DM642 offers real advantages with peripherals that are geared for these markets.

**Integrated Multimedia Peripherals**

**Three Dual-Channel, HD Video Ports**
The three integrated video ports connect directly to industry standard video encoders and decoders, eliminating the need for glue logic. The ports support multiple resolutions and standards including CCIR601, ITU–BT.656, BT.1120, SMPTE 125M, 260M, 274M and 296M. Each video port is 20 bits wide and can be configured as one 20-/16-bit channel or two 10-/8-bit channels. The ports can also be configured as video capture, video display, raw mode or transport stream interface capture. The video ports also include support for format conversion and horizontal scaling.

**Multichannel Audio Serial Port (McASP)**
The multichannel audio serial port (McASP) functions as a general-purpose audio serial port optimized for the needs of multichannel audio applications. The McASP provides support for 16 single channels or 8 stereo lines. The serial data pins can be config-
ured as transmit or receive. The McASP supports the common industry-standard serial interfaces. The McASP is useful for both inter-integrated sound (IIS) protocols and inter-component digital audio interface transmission. Key features include two independent clocks for transmit and receive; support for a wide variety of IIS and similar bit-stream formats; and the digital audio interface transmitter (DIT). The DIT supports SPDIF, IEC60958-1, AES-3 and extensive error checking and recovery.

**Integrated Connectivity Peripherals**

**10/100 Ethernet MAC**

This peripheral allows easy connection to IP-based, packet-switched networks. It is compliant with industry-standard PHY interfaces and supports multiple data flows on multiple transmit (TX) and receive (RX) data channels. TCP/IP network protocol stack software is available from TI third-party partners.

**66 MHz PCI**

The 66-MHz PCI connects directly to a PCI bus and facilitates rapid system integration.

**World-Class Development Support**

TI supports the DM642 with the world’s most comprehensive development tool suite, including:
- Code Composer Studio™ integrated development environment (IDE) tools
- DSP/BIOS™ software kernel foundation
- ImageLIB—an optimized library of video and imaging functions
- Reference frameworks for easy integration of Codecs
- TMS320™ DSP algorithm standard for eXpressDSP™ software that allows customers to mix and match algorithms and software components from different providers

Additionally, customers can start development on TI’s Network Video Developers Kit (NVDK) and take advantage of an extensive range of system solutions from TI’s third-party network—the industry’s most wide-ranging and complete network for developing high-performance DSP applications.

**Roadmap**

The DM642 digital media processor is a new addition to the TI family of high-performance processors. Built on the C64x DSP core, the DM642 shares software binary code compatibility with other C64x DSP devices. Moving forward, TI will continue to augment the TMS320C6000™ DSP platform with new, lower-cost, application-specific media processors as well as higher-performance processors.

**One-Stop Shopping for Video Components**

Glueless interfacing to the main system components in video applications is one of the goals of the DM642. With glueless connection to video Codecs and data-conversion providers, the device greatly reduces design complexity and cost. Designers can utilize TI’s high-performance, digital-media, mixed-signal portfolio to complement and complete digital-media application designs. Products include:

**TVP5150**—The TVP5150 is an ultra-low-power NTSC/PAL composite and S-video decoder in the smallest video decoder footprint available today (32-pin TQFP), making this device ideally suited for portable video applications. The device outputs standard 8-bit
ITU-R BT.656 video with embedded syncs or, alternatively, component video output with dedicated sync.

**TVP5145**—The TVP5145 is the industry's first 10-bit NTSC/PAL/SECAM composite, S-video and component video decoder with Macrovision detection.

**THS8133/34**—The THS8133A and THS8134B are the industry's first triple 10- and 8-bit video DACs optimized for high-definition TV (HDTV) component video signals. They can be used at the output of set-top boxes or other equipment that needs to generate standard TV (SDTV) or HDTV analog-component video or PC graphics. The devices operate at up to 80 MSPS to handle all SDTV/HDTV formats and PC graphics up to XGA at 75 Hz.

**THS8135**—The THS8135 is a higher-performance upgrade to the THS8133, built around a new low-power 1.8-/3.3-V triple 10-bit 240-MSPS DAC core.

**THS8200**—The THS8200 is an all-format encoder for component video and PC graphics, built around a triple 11-bit 205-MSPS DAC.

### Technical White Papers

TI's Wired Digital Media Website at [www.ti.com/rd/wdm-wp](http://www.ti.com/rd/wdm-wp) contains several insightful technical white papers such as:

- Emerging H.26L Standard: Overview and TMS320C64x Digital Media Platform Implementation
- MPEG-4 Video on TI TMS320C6000 DSP
- Imaging with Texas Instruments TMS320C64x
- H.263 Standard—Overview and TMS320C6000 DSP Implementation

### For More Information

If you would like more information on how the TMS320DM642 can help make your next digital media system a success, please contact your local TI field sales office (see below). Or visit us at: [www.ti.com/rd/vidm642ph](http://www.ti.com/rd/vidm642ph).

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