

OMAP-DM5x family of multimedia coprocessors



Product Bulletin

TI's OMAP-DM5x family of imaging and video coprocessors helps mobile handset manufacturers get to market quickly with 20-megapixel images and 720p H.264 camcorder functionality.

Consumers are driving demand for high-quality, integrated camera and camcorder functions in mobile devices; the OMAP-DM5x family of coprocessors from Texas Instruments (TI) helps meet that demand.

The highly integrated OMAP-DM5x family of multimedia coprocessors combines low-power hardware and programmable image processing capability to deliver high-quality still image and video for mobile handset designs. With the OMAP-DM5x family's ease of design and scalability, new products can be brought to market quickly, with minimal development costs. Pin compatibility between all OMAP-DM5x coprocessors allows designers to easily upgrade designs to match changing consumer demands now and in the future.

TI's OMAP-DM5x coprocessors bring accelerated imaging performance to mobile phones, delivering digital still camera quality support for up to 20-megapixel sensors as well as up to 720p H.264 camcorder performance, giving mobile phone users the best possible imaging and video performance available. Low shot-to-shot delays of less than 1.5 seconds gives consumers performance similar to a digital still camera, a requirement that is migrating into the mobile environment. An integrated standard TV-out interface eliminates external components, saving board space and cost. Additionally, seamless interfaces to OMAP™ applications processors and other

baseband and applications processors provide further cost and board space savings.

Overview

The OMAP-DM5x family of coprocessors comes with a complete software package, delivered by TI, that enables quick and efficient development of new or existing mobile handset designs. OMAP-DM5x coprocessors feature a high-performance ARM9 microprocessor as well as TI's advanced image signal processor (ISP) technology and dedicated video coprocessor to deliver industry-leading, 20-megapixel still camera imaging as well as 720p H.264 camcorder functions. A variety of memory and features sets are available to meet the needs of every mobile handset, as shown in the table on page 2.

Flexible interfaces allow the OMAP-DM5x family of coprocessors to support a multitude of sensors and controls, including:

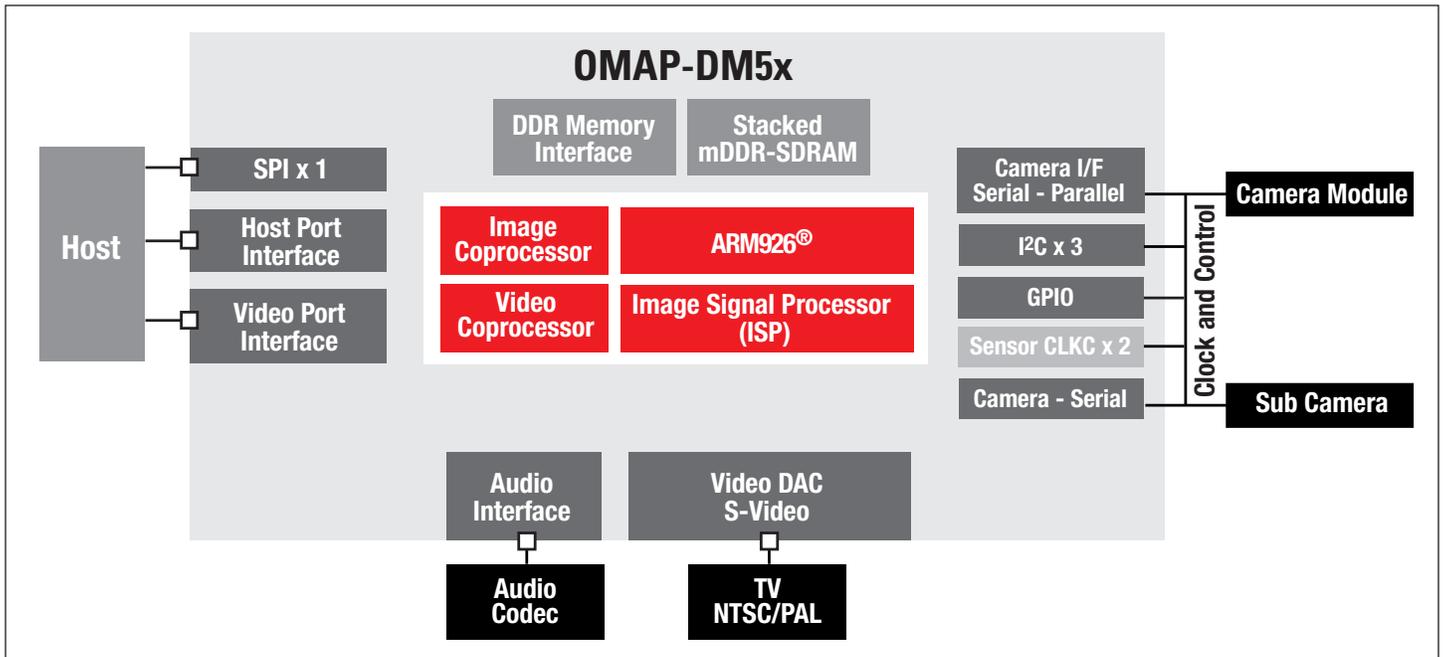
- CMOS sensor interfaces
- Signal conditioning circuits
- Power management
- Mobile DDR-SDRAM
- Shutter, iris and auto-focus motor controls

OMAP-DM5x coprocessors deliver a seamless interface to application and baseband processors via SPI, host port interface (HPI), I²C and parallel interfaces, minimizing design time and costs. OMAP-DM5x coprocessors operate side by side with OMAP media processors or directly

with baseband modem processors to deliver high quality imaging and video functions. An integrated standard TV-out interface allows mobile handset customers to use a composite or S-video cable to view the mobile handset display on a TV screen, allowing easy sharing of content between groups of people.

Key Features

- Supports up to 20-megapixel sensors
- Supports up to 720p H.264 camcorder functionality
- Implements advanced imaging noise filter in hardware
- Enhances low light performance with advanced still image stabilization and noise filtering up to 3200 ISO
- Uses video stabilization and video noise filtering along with high-resolution advanced video codecs to support 720p high-quality video capture
- Provides integrated composite and S-video output to TV with digital overlay
- Optimized for low power consumption, leveraging TI's SmartReflex™ technology
- Stacked memory and small form-factor packaging aid mobility
- Includes TI baseline imaging and video processing software, with additional advanced still imaging and video features available from third parties
- Seamless interface to OMAP™ application processors and other baseband and application processors
- Ready to use without coprocessor programming, minimizing risk and saving development time



▲ OMAP-DM5x coprocessor family block diagram

Family overview

The OMAP-DM5x family of coprocessors includes three distinct parts, each offering a different level of performance and memory to meet the needs of a wide variety of mobile handset markets:

- **OMAP-DM510**
 - Delivers up to 8-megapixel still imaging performance
 - 720p H.264 camcorder
 - 128-Mb stacked mDDR memory
- **OMAP-DM515**
 - Delivers up to 12-megapixel still imaging performance
 - 720p H.264 camcorder
 - 256-Mb stacked mDDR memory
- **OMAP-DM525**
 - Delivers up to 20-megapixel still imaging performance
 - 720p H.264 camcorder
 - 256-Mb stacked mDDR memory

	OMAP-DM510	OMAP-DM515	OMAP-DM525
Still image support	Up to 8 megapixels	Up to 12 megapixels	Up to 20 megapixels
H.264 camcorder performance (encode and decode)	720p @ 24 fps		
Universal MPEG-4 decode	WVGA @ 25 fps		
Universal H.264 decode	WVGA @ 25 fps		
H.264 encode	WVGA @ 25 fps		
JPEG capability	Up to 90 megapixels per second		
Host interfaces	SPI, HPI, I ² C, parallel		
Camera interfaces	Serial parallel		
Memory	Includes 128-Mb stacked mDDR	Includes 256-Mb stacked mDDR	Includes 256-Mb stacked mDDR
Display/TV-out	Composite/S-video		
Package	8 x 8 mm ² BGA, 0.5-mm ball pitch		

▲ OMAP-DM5x coprocessor family features table

Delivering high-quality still image and video

The OMAP-DM5x family of coprocessors has been designed to deliver the highest level of imaging quality available today with minimal shot-to-shot delay. The OMAP-DM525 is able to provide industry-leading 20-mega-pixel still images with less than a 2-second shot-to-shot delay, giving mobile handsets digital still camera performance and quality.

To help provide the best picture in low-light situations, OMAP-DM5x coprocessors include a 3200 ISO-equivalent noise filter. This noise filter is implemented in hardware and software to deliver the best possible processing speed. Consumers will be able to capture stunning photographs in all different lighting situations and surroundings.

Not only does TI's OMAP-DM5x family of processors deliver high-performance image quality, it also delivers high camcorder quality. With up to 720p H.264 camcorder functionality at 24 frames per second, OMAP-DM5x coprocessors deliver high-definition performance for camera phones, giving customers the high-definition video experience they have come to expect in stand-alone handheld camcorders. The ability to record and then playback content at 720p gives consumers instant gratification along with the ability to quickly and easily relive their favorite captured moments. This, coupled with the integrated TV-out solution, further expands the sharing possibilities with friends and family.

Ready-to-use software

With ready-to-use software included with OMAP-DM5x coprocessors, designers can extend their existing solutions without major development time or costs. TI's software package includes the framework and codecs that form the baseline software, minimizing risk and development time to bring new mobile handsets to market quickly. No coprocessor programming is needed, making operation of the software transparent to the developer. The high-level operating system (HLOS), multimedia applications and graphical user interface all remain on the host processor. Additionally, the software management for the OMAP-DM5x coprocessor's programmable image processing functions and peripherals are also performed through the HLOS on the host processor.

A wide variety of additional imaging and video software is available through TI and third parties. These additional software applications will help designers deliver all the right features for their product, including:

- Face detection
- Face tracking
- Red eye removal
- Panoramic stitching
- Auto smile detection
- Multiframe image stabilization
- Additional features from TI
 - Motion triggered image stabilization
 - *Perfect moment* technology
 - Smart lighting
 - Auto-scene detection
 - Video noise filter
 - Advanced noise filter

With all of the standard OMAP-DMD5x software features, combined with any number of third-party applications, consumers will be able to take the perfect picture or record an unforgettable moment.

Advanced power management

TI's OMAP-DM5x coprocessors include TI's SmartReflex™ technology, which helps extend battery life with intelligent and adaptive hardware and software techniques to dynamically control voltage, frequency and power based on the device activity, modes of operation and temperature. With so many applications all converging into a single battery-operated device, power management becomes critical to ensure the best possible customer experience. TI's SmartReflex technology helps ensure that customers get the long battery life they expect.

In addition to TI's SmartReflex technology, TI offers a wide variety of other power management chips in OMAP-DM5x coprocessors, including the TPS62352. The TPS62352 is a high-frequency, synchronous, step-down DC-DC converter made especially for low-power applications like mobile handsets. This perfect pairing with the OMAP-DM5x coprocessors helps extend battery life to meet customer demands.

For more information

To learn more about OMAP-DM5x coprocessors, see www.ti.com/omapdm5x-pb.

These products are intended for high-volume wireless OEMs and ODMs
and are not available through distributors.

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