

## **OMAP™ 3 family of multimedia applications processors**

*Revolutionizing  
entertainment  
and productivity  
in wireless  
handheld  
communications*

### Key features

- Combines mobile entertainment and high-performance productivity applications
- Integrates the advanced Superscalar ARM® Cortex™-A8 RISC core, enabling up to 3X gain in performance
- Designed in 65-nm CMOS process technology for less power consumption
- Includes integrated image, video, audio accelerators to enable multi-standard encode/decode up to DVD resolution
- Available integrated image signal processor (ISP) enables faster, higher-quality image capture, lower system cost and lower power consumption
- Provides seamless connectivity to hard disk drive (HDD) devices for mass storage
- Leverages SmartReflex™ technologies for advanced power reduction
- Assures mobile security with M-shield™ capability enhanced with ARM TrustZone™ support
- Supports all OMAP 2 and OMAP 3 processors with fully scalable software solution
- HLOS support for customizable interface
- Packaging: 12 mm x 12 mm, MicroStar BGA™, memory stackable package

**P R O D U C T   B U L L E T I N**

The OMAP 3 family of multimedia applications processors from Texas Instruments (TI) introduces a new level of performance that enables laptop-like productivity and advanced entertainment in multimedia-enabled handsets. The OMAP 3 devices support various applications:

- The OMAP3430 meets the needs of high-end multimedia-enabled handsets
- The OMAP3420 meets the needs of multimedia-enabled handsets
- The OMAP3410 meets the needs of the mass market multimedia-enabled handsets

TI's OMAP™ 3 family of applications processors integrate the ARM Cortex-A8 superscalar microprocessor core, delivering up to 3X the performance of ARM11-based processors. This new processor family leverages industry-leading technologies to provide mobile-phone battery life with the performance needed for laptop-comparable productivity software along with an audio-video experience equivalent to that of consumer electronics devices.

## Overview

The OMAP 3 family opens new areas for compelling mobile applications that will revolutionize handheld communications in both work and play. The OMAP 3 family is the industry's first applications-targeted processors to be designed in a 65-nanometer (nm) CMOS process technology—reflecting TI's commitment to providing advanced silicon technology to drive a revolution in mobile communications. These devices can operate at a higher frequency than previous-generation OMAP processors, while lowering the core voltage and needed power with features to prolong battery life.

For example, multimedia applications benefit from faster, higher-quality image capture and processing for cameras; exceptional audio/video performance; and enhanced support for external displays and high-speed connectivity interfaces. Also, extensive mobile security guards the increasingly important role of wireless handsets in e-commerce, while still being compatible with a wide range of modems.

The OMAP3430, OMAP3420 and OMAP3410 devices fully support memory stacking through package-on-package technology, with a stackable 12 mm x 12 mm, 515-lead ball-grid array (BGA) package.

### OMAP 3 processor comparison table

Features	OMAP3430	OMAP3420	OMAP3410
General purpose processor	ARM® Cortex™-A8 RISC core		
Image, video, audio accelerator (IVA™)	IVA 2 +	IVA 2	IVA 2
2D/3D graphics accelerator	PowerVR SGX	PowerVR SGX	N/A
Integrated image signal processor	✓	✓	N/A
Camera resolution (megapixel)	12	5	3
Display resolution	XGA	VGA	QVGA
TV out	Composite, S-Video	Composite, S-Video	N/A
Multimedia class	DVD	VGA	CIF
M-Shield™ security technology	Available in all		
SmartReflex™ technology	Available in all		
Packaging	12 mm x 12 mm BGA memory stackable package		



## *A new level of performance*

The OMAP3430 processor is the first processor in the industry to integrate the superscalar ARM® Cortex™-A8 core, the newest generation of ARM RISC processors. With features such as deeper pipelines, a dedicated level-2 cache and execution of up to twice as many instructions per clock cycle, the new high-performance ARM processor provides the processing power to support high-quality productivity applications and faster user interfaces. Mobile workers will be able to access databases, work on spreadsheets and presentations, use email, send instant messages, browse and download from the Web, attend videoconferences and play audio-video clips faster. Outstanding gaming capabilities will also be possible, thanks to ARM's integrated vector floating-point acceleration working with the OMAP3430's dedicated 2D/3D graphics hardware accelerator.

In addition, the OMAP3430 processor integrates the advanced IVA™ 2+ acceleration with new support for critical-coded functions. A second-generation, power-optimized version of the imaging, video and audio accelerator used in TI's DaVinci™ technology, IVA 2+ improves multimedia processing up to 4X from previous OMAP processors. The increased capabilities of the IVA2+ enable multi-standard (MPEG4, H.264, Windows Media Video, RealVideo, H.263, etc.) encode and decode at DVD resolution. With the advanced multimedia capabilities of the OMAP3430, a multi-standard DVD-quality camcorder can be added to a phone for the first time. In addition, the IVA2+ advances video teleconferencing by providing H.264-based video at greater than CIF resolutions.

## *OMAP3430 processor's image capture, display and storage*

An integrated image signal processor offers a means for quality differentiation, PCB area savings, reduced BOM (bill-of-material) costs and lower system power and design flexibility. The on-chip camera image pipeline eliminates the need for external circuitry for image capture and processing, while the software image pipeline provides configurable quality for sharper, clearer pictures.

Camera sensors up to 12 megapixels in size can be accommodated for higher quality images with less shot-to-shot delay. On-the-fly JPEG compression aids in throughput and storage, while power-reduction features save battery drain in preview mode. Support for serial and parallel sensors provide design flexibility.

The OMAP3430 supports high-quality outputs as well as inputs, enabling easy sharing of multimedia content. Composite and S-video outputs provide flexible connectivity options to extend to TV displays and projectors. For handheld displays, the OMAP3430 can support up to XGA resolution and 16-M colors. The device can also interface to Flatlink™ 3G-compliant serial and parallel displays for use in mobile handsets.

# OMAP3420 processor

## Unique device features

- IVA 2 (image, video, audio) accelerator enables VGA resolution video playback for multiple video standards
- OpenGL ES2.0 compliant
- Integrated image signal processor (ISP) enables up to 5-megapixel still image capture
- Flexible system support
  - Composite and S-video TV output
  - VGA (640 x 480 pixels), 16-M color (24-bit definition) display support
  - MIPI and Flatlink 3G-compliant serial display, and parallel display support
  - High-speed USB 2.0 OTG support
- Optimized power management companion chip: TWL5030

## OMAP3420 processor meets the needs of multimedia enabled handsets

The OMAP3420 is designed to meet the needs of the multimedia enabled handsets market, including VGA quality video camcorder and playback, up to 5-megapixel still image capture, music playback and 3D gaming. The OMAP3420, shares many of the advanced productivity and multimedia technologies present in the OMAP3430 and OMAP3410 devices, including 65-nm CMOS process technology, the ARM Cortex-A8 superscalar microprocessor core and the IVA 2 image, video and audio accelerator.

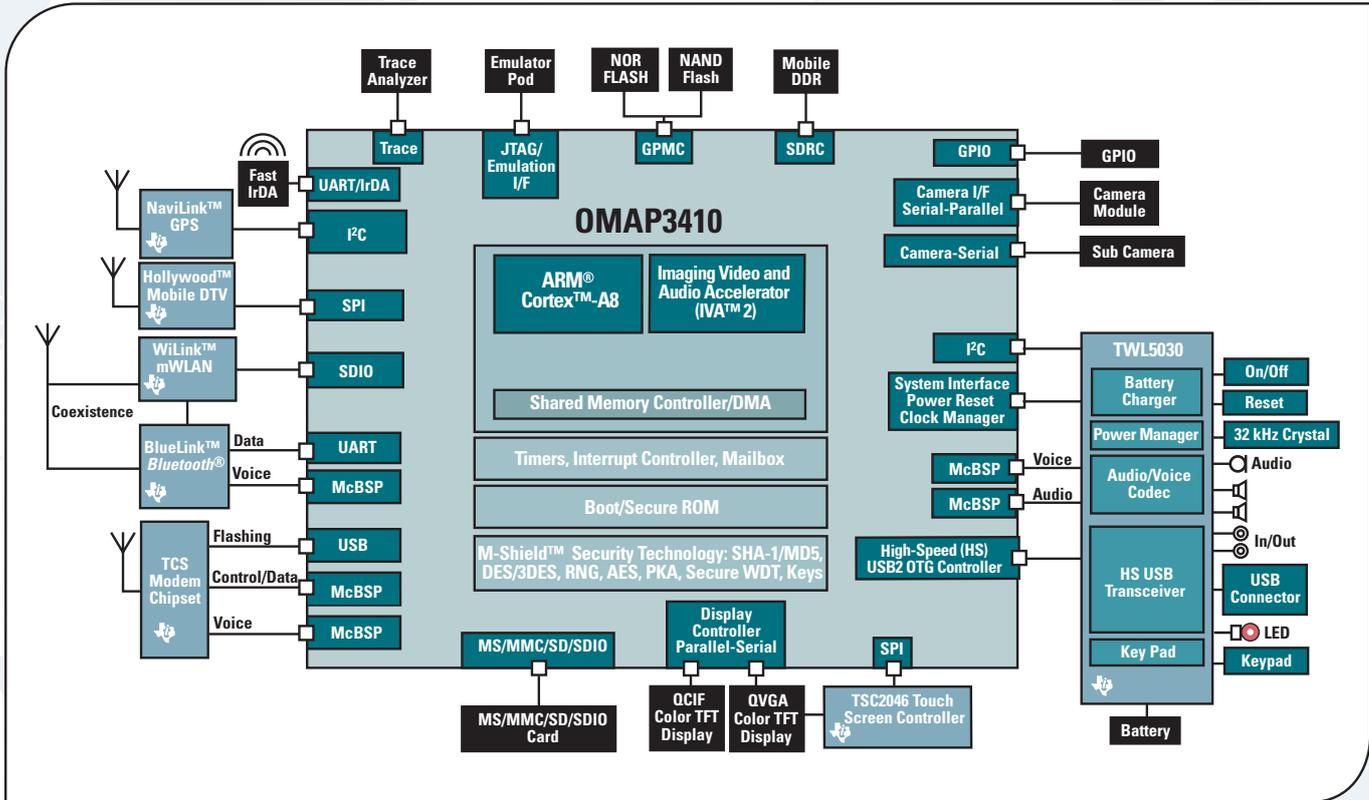
The OMAP3420 also embeds Imagination Technologies' PowerVR SGX graphics core, supporting OpenGL ES 2.0 and Open VG to deliver exceptional graphics performance. In addition, the OMAP3420 is software compatible with all OMAP 2 and OMAP 3 processors, allowing a fully software scalable solution.

With the inclusion of IVA 2, one of TI's advanced imaging, video and audio accelerators, the OMAP3420 provides VGA quality video camcorder and playback for all popular standards, such as MPEG4, Windows Media Video 9, H.264 and RealVideo® 10. In addition, the ARM's vector floating-point acceleration, coupled with the OMAP3420's dedicated 2D/3D graphics hardware accelerator, provides outstanding gaming capabilities. The IVA 2 enables advancements in video teleconferencing with capabilities of performing MPEG4-based video teleconferencing at greater than CIF resolutions.

## OMAP3420 device imaging

Like the OMAP3430, the OMAP3420 includes an integrated image signal processor (ISP) and can connect to image sensors up to 5 megapixel in size with minimal shot-to-shot delay. Additionally, the OMAP3420 provides connectivity support for both serial and parallel cameras to aid in throughput and storage as well as add design flexibility. The OMAP3420 supports high-quality outputs as well as inputs, enabling easy sharing of multimedia content. Composite and S-video outputs provide flexible connectivity options to extend to TV displays and projectors. For handheld displays, the OMAP3420 can support up to VGA resolution and 16-M colors. The device can interface to Flatlink 3G-compliant serial and parallel displays for use in mobile handsets.

# OMAP3410 processor



## Unique device features

- IVA™ 2 (Image Video Audio) accelerator enables CIF resolution video playback for multiple video standards
- Seamless connectivity to Hard Disk Drive (HDD) devices for mass storage
- Leverages SmartReflex™ technologies for advanced power reduction
- M-shield™ mobile security enhanced with ARM TrustZone™ support
- Software-compatible with OMAP 2 and other OMAP 3 processors
- HLOS support for customizable interface

## Basic multimedia enabled handset performance needs met

The OMAP3410 processor meets the needs of mass market multimedia enabled handsets, which include CIF quality video camcorder and playback, up to 3-megapixel still image capture, music playback and 3D gaming. The lowest cost member of the OMAP 3 family, the OMAP3410 shares many of the technologies of the OMAP3430 and OMAP3420 devices, including 65-nm CMOS process technology, the ARM Cortex-A8 superscalar microprocessor core as well as IVA 2 image, video and audio accelerator, for a rich multimedia experience and targeted general purpose processing. In addition, the OMAP3410 is software compatible with all OMAP 2 and OMAP 3 processors, allowing a fully software scalable solution.

With the inclusion of IVA 2, one of TI's advanced image, video and audio accelerators, the OMAP3410 processor provides CIF quality video camcorder and playback for all popular standards, such as MPEG4, Windows Media Video 9, H.264 and RealVideo 10. Software stacks are available to provide 2D/3D gaming capabilities, as most phones in this basic market will not require high-end gaming. Additionally, IVA 2 on the OMAP3410 enables MPEG4 quality video conferencing at QCIF resolutions.

### *OMAP3410 processor imaging*

The OMAP3410 device provides basic camera interfaces and can connect to image sensors up to 3 megapixels in size, enabling low-tier phones to have basic camera functions while keeping the system cost low. In addition, the OMAP3410 provides connectivity support for serial and parallel cameras to aid in throughput and storage as well as design flexibility.

For handheld displays, the OMAP3410 processor can support up to QVGA resolution and can interface to parallel displays.

### *OMAP 3 platform HDD interfaces*

With the increasing popularity of mass storage devices saving digital media, OMAP 3 processors boast fully compliant HDD interfaces for seamless connectivity to even the largest HDD devices. HDD interfaces enable the storage of hundreds of hours of video, thousands of hours of music and thousands of photographs, transforming the handset into a digital library. OMAP 3 processors also include high-speed USB 2.0 OTG support for faster file transfer of data on/off the handset.

### *OMAP 3 processor power conservation*

The OMAP 3 family leverages the most advanced and effective power management techniques in the market. The chips make exhaustive use of TI's SmartReflex™ power and performance management technologies, which include a broad range of intelligent and adaptive hardware and software techniques that dynamically control voltage, frequency and power based on device activity, modes of operation and temperature. SmartReflex technologies in OMAP 3 alleviate chip-level leakage power dissipation at 65 nm, allowing the device to have ultra-low active and standby current drain, thereby saving critical battery power.

A companion device to the OMAP 3 processors, the *TWL5030 power management/audio* codec, maximizes battery life and boosts system performance in mobile phones that use batteries based on lithium-ion, lithium-ion polymer or cobalt nickel manganese chemistries. The highly integrated TWL5030 combines SmartReflex technology-compliant voltage regulators and converters, a high-fidelity audio/voice codec, class-AB/D audio amplifiers, a high-speed USB 2.0 OTG transceiver and battery charger circuitry onto a single chip—significantly reducing board space and system cost while managing power consumption efficiently.

### *OMAP 3 platform security*

TI's M-Shield™ mobile security technology enables robust protection of premium copyrighted digital media content, secure protocol applications and e-commerce applications such as ticketing, banking, brokering and shopping. Enhanced with ARM TrustZone™ support, the OMAP 3 processor security offering is based on open APIs and provides an environment for secure applications that deliver robust performance, interoperability, greater development speed and large economies of scale.

As the advanced hardware and software security framework for the OMAP 3 processors, M-Shield technology enables new value-added services and increased terminal security, allowing operators, content providers and manufacturers to secure sensitive assets and usage rights for protection against revenue loss. Features include secure flashing and booting so that only authorized software can be loaded on the handset, terminal identity protection that makes stolen phones useless, and network lock protection that prevents users from arbitrarily switching networks on the Web.

## *OMAP 3 platform HLOS support*

The OMAP 3 family of processors supports all high-level operating system (HLOS) platforms, including Linux®, Microsoft® Windows Mobile® and Symbian™ operating systems. HLOS platforms enable manufacturers and mobile operators to differentiate their products through an easy-to-use, customizable interface and robust, flexible architecture for applications and services. TI was the first wireless system vendor to offer all major HLOS platforms on mobile phones. As a result, the great majority of smartphones running HLOS today are based on the OMAP platform. Information about the independent OMAP Technology Centers (OTCs), TI's extensive network of specialized system integrators skilled in all aspects of HLOS porting and integration, is available at [www.ti.com/omapotcs](http://www.ti.com/omapotcs).

## *In-depth development support*

The OMAP 3 family is backed by TI's extensive development support. Code compatibility with other OMAP processors makes it easy to port software, and a sophisticated development environment speeds programming for all on-chip processors. In addition, OMAP 3 processors are supported by the OMAP platform ecosystem, comprised of the OMAP Developers Network and OMAP Technology Centers, as well as systems integrators, development tool providers and leading content providers worldwide.

## *For more information*

To learn more about the OMAP3430, OMAP3420 or OMAP3410 or about other OMAP applications processors from TI, visit [www.ti.com/omap](http://www.ti.com/omap). Find out how the OMAP 3 processors can open a revolutionary new world of compelling applications for your next product.

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