Intelligent Systems

Graphics and Media Performance in Intelligent Systems

Enhanced video and image processing make the Intel® Atom™ processor ideally suited for a broad range of intelligent systems.

Introduction

The Intel® Atom™ processor E3800 product family is based on the Silvermont microarchitecture, and utilizes Intel's industry-leading 22nm process technology with 3-D Tri-Gate transistors to deliver significant improvements in computational performance and energy-efficiency in intelligent systems.

This system-on-chip (SoC) solution helps save on bill of materials (BOM) cost and allows for smaller form factor solutions over previous generation two chip offerings. In addition to quad-core processing[1] and built-in security features, the product family includes a range of capabilities that will bring enhanced graphics and media performance to a broad range of intelligent systems, ranging from printing systems to digital security surveillance devices.

Standout features include Gen 7 Intel® Graphics Architecture with support for DirectX* 11, Open GL* 4.0, and OpenGL 1.2; full HD video playback; video transcoding and encoding functionality, in addition to hardware-based security features including Intel® Advanced Encryption Standard Instructions (Intel® AES-NI)[2].

Advancements in visual processing capabilities over previous-generation Intel® Atom™ processors include faster media conversions, stereoscopic 3-D, immersive web browsing, enhanced HD video transcoding with Gen 7 graphics, and highly efficient image processing.

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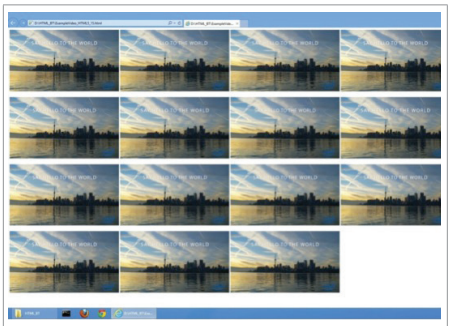
Graphics and Media Processing

Graphics performance of the Intel Atom processor E3800 product family is based on Intel® HD Graphics 4000 technology and features support for HDMI 1.4a and DisplayPort* 1.1 with maximum resolution of 2560x1600 @ 60 Hz and dual-display support. Hardware acceleration for video decode is enabled for H.264*, MVC*, VPG8*, JPEG/mJPEG*, VC1/WMV9*, and MPEG2* standards.

As illustrated in Figure 1, the processor is capable of decoding 10 or more streams of 1080p video, which can be simply implemented using the <video> tag in HTML5 in Microsoft Internet Explorer 10*.



Video Format: AVC
Format profile: High@L4.0
Bit rate: 20.0 Mbps
Width: 1920 pixels
Height: 1080 pixels

Figure 1. The Intel Atom processor E3800 product family is capable of simultaneously decoding 10+ streams of 1080p video.

Advancements in visual processing capabilities over previous-generation Intel Atom processors include faster media conversions, stereoscopic 3-D, immersive web browsing, enhanced HD video transcoding with Gen 7 graphics, and highly efficient image processing.

As shown in Figure 3, the Intel Atom processor E3800 product family includes a transcoder and encoder in the GPU. Firmware swapping is not required to implement additional media solutions, which allows transcoding of multiple videos in real time.

The processor also includes an image and signal processor (ISP) that supports multiple image processing functions. The ISP is connected to multiple MIPI-CSI interfaces, allowing up to two 1080p cameras plus one 720p camera, depending on raw image color formats. The ISP firmware enables image manipulation operations including filtering, statistics, color conversion and correction, in addition to image sizing, dithering, and error fusion.

Graphics and Media Performance in Intelligent Systems

As depicted in the following illustrations, the enhanced video and image processing capabilities make the Intel Atom processor E3800 product family ideally suited for a broad range of embedded intelligent systems.

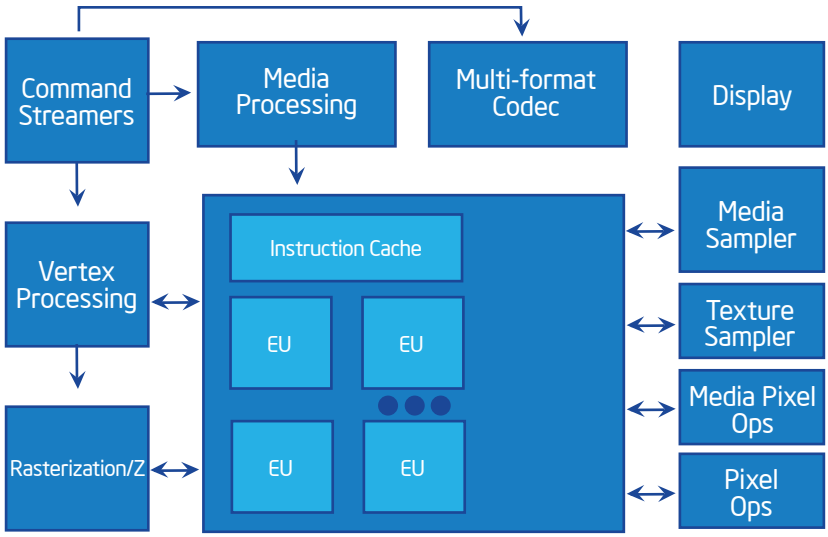


Figure 2. High level diagram of the graphics block in the Intel Atom processor E3800 product family.

Printing Systems

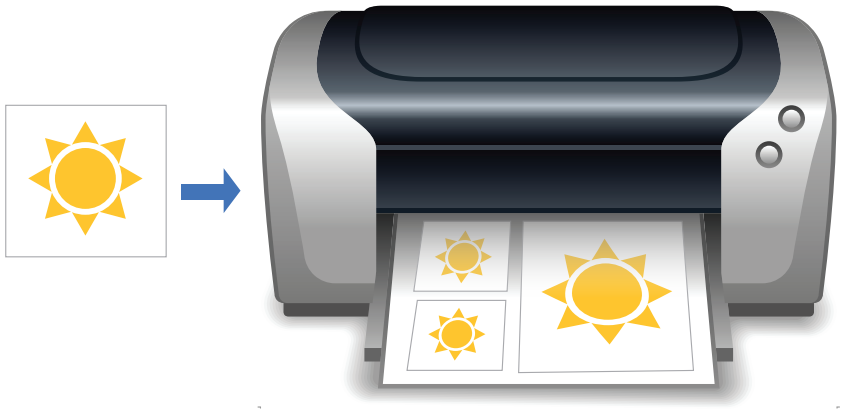


Figure 4. Printing systems can scan, resize, and color-correct images, utilizing heterogeneous computing capabilities in the Intel Atom processor E3800 product family on the CPU, GPU, and the ISP for image and signal processing.

Playback and Transcode Pipelines

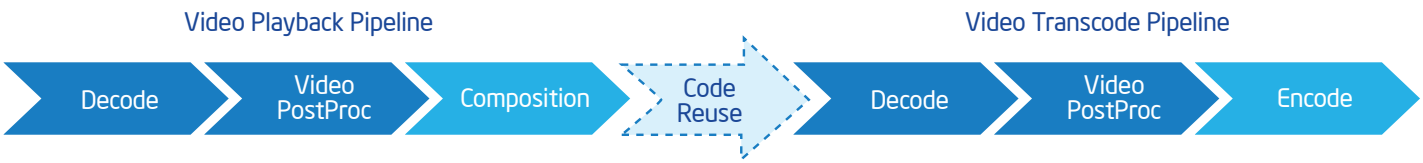


Figure 3. Video playback and transcode pipelines of Intel Atom processor E3800 product family enables transcoding of multiple videos in real time.

Digital Surveillance Systems

Figure 5. The Intel Atom processor E3800 product family enables digital surveillance systems to display and process videos from multiple IP cameras and while running tracking software applications to monitor individual subjects.

Intelligent Systems with Integrated Graphics and HD Video

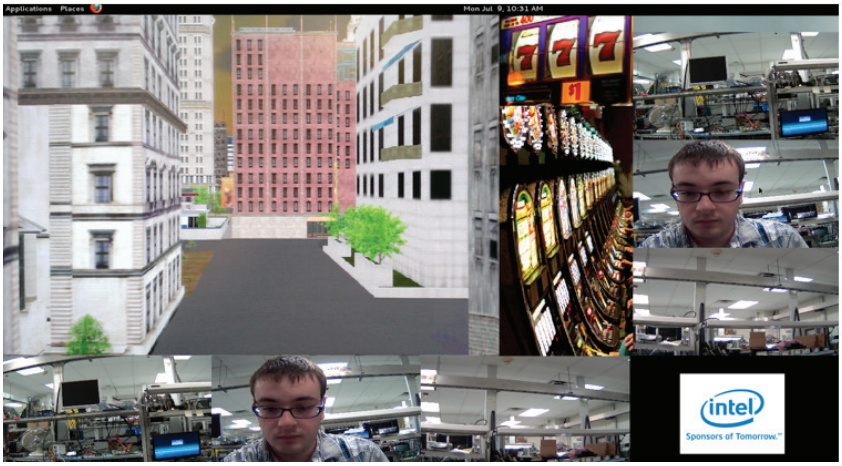


Figure 6. The Intel Atom processor E3800 product family simplifies the design of a broad variety of intelligent systems through integrated 3-D graphics with multiple HD video streams, with the additional advantages of software designed for Intel® architecture.

Conclusion

With improved media and graphics performance, the Intel Atom processor E3800 product family is poised to bring rich graphics, imaging, and video capabilities to new generations of embedded intelligent systems.

For more information

Intel® Media SDK: http://software.intel.com/en-us/vcsource/tools/media-sdk

Intel® Retail Client Manager: http://intel.com/rcm

[Δ] Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. Go to: http://www.intel.com/products/processor_number for details

[1] Not available in all SKUs.

[2] Intel® AES-NI requires a computer system with an AES-NI enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on select Intel® processors. For availability, consult your reseller or system manufacturer. For more information, see http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni.

Drivers available at: downloadcenter.intel.com.

Performance results are based on certain tests measured on specific computer systems. Any difference in system hardware, software or configuration will affect actual performance. For more information go to http://www.intel.com/performance.

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