Intel® Built-in Visuals

Product Guide

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Revision History

Document Number	Revision Number	Description	Revision Date
325650	001	Initial release.	June 2011
325650	002	Update for 3rd Gen HD Graphics	October 2012

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1 Introduction

Intel® Built-in Visuals combines cutting-edge 3D graphics, stunning HD visuals, advanced video capabilities and enhanced display connectivity all built-in to the processor, delivering seamless visual experiences without the need of a discrete graphics card. It integrates high-performance graphics and media processing on the processor, putting two key embedded application components – CPU processing and graphics – on a single chip.

2 Intel® HD Graphics

Intel® HD Graphics is the next-generation graphics technology available on the 3rd Generation Intel® Core™ processor. It is graphics built into the CPU providing best-in-class compute, integrated media and graphics performance over the previous generation while creating additional headroom for tomorrow's embedded usages. It delivers an enhanced visual experience, including excellent 3D performance and support for three independent displays.

Two versions are available on the 3rd Generation Intel® Core™ processor family: Intel® HD Graphics 2500 and Intel® HD Graphics 4000.

3 Intel® Clear Video HD Technology

Intel® Clear Video HD Technology (Intel® CVT HD) is a collection of video playback and enhancement features that improve the end user's viewing experience. These features are a combination of industry standardized playback and image enhancement features as well as additional Intel® specific features. It integrates a wide array of image processing technologies including noise and jitter removal, total color control, contrast and skin tone enhancements and intelligent color space mapping, ensuring colors and images are viewed the way they are meant to be seen.

4 Intel® Quick Sync Video

In the video creation and editing space, Intel® Quick Sync Video provides accelerated media conversion equating to improved compatibility between devices and file formats. It uses hardware on the processor instead of software to accelerate video decoding and encoding, reducing video conversion time and enabling the processor to complete other tasks, improving overall performance.

5 InTru™3D Technology

Users can now enjoy the ultimate in 3D visuals with InTru™3D technology. Stereoscopic 3D Blu-ray* playback support is available using active shutter 3D glasses in full high definition 1080p resolution over the HDMI* V1.4 interface.

6 Intel® Advanced Vector Extensions (Intel® AVX)

Intel® Advanced Vector Extensions is a new 256 bit instruction set extension to SSE and is designed for applications that are Floating Point (FP) intensive. Introduced with the 3rd Generation Intel® Core™ processor, it improves performance due to wider vectors, new extensible syntax, and rich functionality. This results in better management of data and general purpose applications such as image, audio/video processing, scientific simulations, financial analytics and 3D modeling and analysis.

7 Features

All combined, the 3rd Generation Intel® Core™ processor with built-in visuals boasts a competitive advantage, ideal to suit the needs of a broad embedded market whether that be in the Retail, Digital Signage, Gaming, Industrial, Military, Aerospace, Government, Digital Security/Surveillance or Medical segments. Table 1 describes the new built-in visual features introduced in the 3rd Generation Intel® Core™ processor as well as those best suited for the embedded computing market. Table 2 describes the existing built-in visual features in the 2nd Generation Intel® Core™ processor.

For a comprehensive list of supported features, refer to *the Intel® Graphics Software for Intel® HD Graphics Family Product Requirements Document (PRD)*. The latest Intel® HD Graphics Driver packages are available for download at http://www.intel.com.

Table 1. New Features

Features	Description and Benefits
Media	
Improved MPEG2/AVC/VC1 decode performance	HW Accelerated decode for improved media playback for MPEG2, AVC and VC1
Improved AVC/H.264 encode performance	Compression of raw content to AVC and MPEG2 streams
3D Graphics	
DirectX* 11	New API support and performance enhancements for improved 3D visuals
OpenGL* 3.1	New API support and performance enhancements for improved 3D visuals
OpenGL 1.1	API support and performance enhancements for improved 3D visuals
Display	
3 independent displays	3 non-symmetric independent and concurrent display support

Table 2. Existing Features

Features	Description and Benefits
Post-Processing	
Adaptive Contrast Enhancement	Dynamically adjust image contrast levels resulting in improved visibility in darker scene areas
Skin Tone Enhancement	Dynamically correct hue and saturation levels on pixels detected with skin-like colors without affecting other video regions

Features	Description and Benefits
Total Color Control	Independent adjustment of RGB and CMY video channels provides precise control over video feeds without affecting other on screen elements
ProcAmp	Adjust hue, brightness, saturation and contrast of video channels independently of other on screen content
Display	
Embedded DisplayPort* (eDP)	Dedicated Embedded DisplayPort (eDP) support on low-power CPU's and support for eDP on PCH for low-power and scalable CPU's offers design flexibility
HDMI v1.4 with Stereoscopic 3D	Support for HDMI v1.4 displays with Stereoscopic 3D functionality
12bpc Color Depth (DisplayPort* and HDMI)	Increased color depth for improved accuracy and vividness
Power Management	
Render Standby	Impressive power savings allows reduction of core graphics voltage down to 0V
Extended Power Saving State (Power Reduction During Idle)	Power savings technology allowing powering down of High Definition Audio bus when not in use to help meet Energy Star requirements

7.1 Supported Operating Systems

The following operating systems are supported:

- Microsoft* Windows* XP
- Microsoft* Windows* 7 Starter/Home Basic/Home Premium/Professional/Ultimate
- Microsoft* Windows* Embedded Standard 7
- Microsoft* Windows* 8
- Microsoft* Windows* Embedded Standard 2009
- Microsoft* Windows* Embedded POSReady 2009
- Linux* [1,2]

Notes:

1. Intel does not develop distribution specific drivers for Intel® HD Graphics. All Linux driver components are up-streamed to their respective repositories once a quarter. Information on these components is posted on www.intellinuxgraphics.com under the Downloads section. Distributions may pick up components as they choose.

2. Linux driver features represent only a subset of those supported by the Intel® HD Graphics driver. For additional information, visit www.intellinuxgraphics.com.

7.2 Feature Support by Platform

Table 3 represents a subset of the features available on these platforms. Some features are also Operating System dependent. Refer to the Software Graphics Product Requirements Document for full details.

Table 3. Feature Support by Platform

	2010 Intel® Core™ Processor Family with Intel® 5 Series Chipset	2nd Generation Intel® Core™ Processor Family with Intel® 6 Series Chipset	3rd Generation Intel® Core™ Processor Family with Intel® 7 Series Chipset
Media			
Hardware Accelerated MPEG2 Decode	Y	Y	Y
Hardware Accelerated VC1 Decode	Y	Y	Y
Hardware Accelerated AVC/H.264 Decode	Y	Y	Y
Hardware Accelerated Decode (MPEG2, VC1, AVC/H.264) in All Rotated Modes	Y	Y	Y
Multi-Function Decode + De-blocking	N	Y	Y
Dual Video Hardware Accelerated Decode	Y	Y	Y
Accelerated MPEG2 Encode	N	Y	Y
Accelerated AVC/H.264 Encode	N	Y	Y
Accelerated Transcode	N	Y	Y
Advanced Deinterlacing	Y	Y	Y
SD/HD Sharpness Control (Post Processing)	Y	Y	Y
Blu-ray S3D (eDP and HDMI only)	N	Y	Y
Adaptive Contrast Enhancement (Post Processing)	N	Y	Y
Skin Tone Enhancement (Post Processing)	N	Y	Y
Total Color Control (Post Processing)	N	Y	Y

	2010 Intel® Core™ Processor Family with Intel® 5 Series Chipset	2nd Generation Intel® Core™ Processor Family with Intel® 6 Series Chipset	3rd Generation Intel® Core™ Processor Family with Intel® 7 Series Chipset
12bpc Color Depth (DisplayPort* and HDMI)	Y	Y	Y
Display / Audio			
DisplayPort 1.1a Audio Support (LPCM 2 channel & AC3)	Y	Y	Y
HDMI v1.4 with Stereoscopic 3D	N	Y	Y
Dual Stream Audio	Y	Y	Y
HDCP 1.3 (for basic Blu-ray playback)	N	Y	Y
Embedded DisplayPort*	Y	Y	Y
Dual LVDS (Integrated LVDS + SDVO LVDS)	Y	Y	Y
EDID-less display support	Y	Y	Y
Wireless Display[1]	Y	Y	Y
SDVO-DVI Support	Y	Y	Y
SDVO-LVDS Support	Y	Y	Y
SDVO-HDMI Support	N	N	N
SDVO-TVOut Support	Y	N	N
SDVO-CRT Support	Y	Y	Y
Support for External Digital Displays (DVI, HDMI, DP)	Y	Y	Y
Support for Analog CRT	Y	Y	Y
Three active displays	N	N	Y
3D Graphics			
DirectX* 10.0	Y	Y	Y
DirectX* 10.1	N	Y	Y
DirectX* 11.0	N	Y	Y
OpenGL* 2.1	Y	Y	Y
OpenGL* 3.0	N	Y	Y
OpenGL* 3.1	N	N	Y
Open CL 1.1	N	N	Y
Power Management			
Intel® Graphics Dynamic Frequency	Y	Y	Y

	2010 Intel® Core™ Processor Family with Intel® 5 Series Chipset	2nd Generation Intel® Core™ Processor Family with Intel® 6 Series Chipset	3rd Generation Intel® Core™ Processor Family with Intel® 7 Series Chipset
Render Standby	Y	Y	Y
Intel® Display Refresh Rate Switching – For Seamless and Static Panel Displays	Y	Y	Y
Intel® Graphics Performance Modulation Technology	Y	Y	Y
Intel® Display Power Savings Technology (DPST)	Y	Y	Y
Intel® Smart 2D Display Technology (S2DDT)	Y	Y	Y
Intel® Rapid Memory Power Management	Y	Y	Y
Intel® Automatic Display Brightness (ADB)	Y	Y	Y
Extended Power Saving State	N	Y	Y

[1] Intel® Wireless Display is not Plan of Record for embedded long life support, requires Intel® My WiFi Technology and is only supported on Mobile products. Contact your local FAE for interest in this feature.