



Intel[®] Processor Graphics for Pentium[®] and Celeron[®] Processors

Product Guide

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Contents

1	Introduction	5
2	Intel® HD Graphics	6
2.1	Supported Operating Systems	7
2.2	Feature Support by Platform	8

Tables

Table 1. New Features.....	6
Table 2. Existing Features.....	7
Table 3. Feature Supported by Platform.....	8



Revision History

Document Number	Revision Number	Description	Revision Date
325628	001	Initial release.	June 2011
325628	002	Update for 3 rd Gen HD Graphics	November 2012

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1 *Introduction*

Intel® HD Graphics is the next-generation graphics technology available on the next-generation Intel® micro-architecture codenamed Ivy Bridge. Based on the 22nm process technology with 3D Tri-Gate transistors, it provides improved graphics performance compared to the previous Intel® Celeron® processor-based platforms. It combines cutting-edge 3D graphics, improved HD visuals, advanced video capabilities and enhanced display connectivity all built-in to the processor 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 graphics built into the CPU, providing superior performance over previous generation Intel® HD Graphics while creating additional headroom for tomorrow's embedded usages. It includes features such as accelerated graphics processing, faster 3D rendering and complex shading for increased realism. It delivers a competitive advantage, ideal to suit the needs of a broad embedded market whether that is in the Retail, Digital Signage, Gaming, Industrial, Military, Aerospace, Government, Digital Security/Surveillance or Medical segments.

Table 1 describes the new features introduced in the next-generation graphics engine 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
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
OpenCL 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	
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
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

2.1 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.



2.2 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 Supported by Platform

	2010 Intel® Core™ Processor Family with Intel® 5 Series Chipset	Intel® Processor Graphics for Pentium and Celeron with Intel® 6 Series Chipset	Intel® Processor Graphics for Pentium and Celeron 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	N	N
Accelerated AVC/H.264 Encode	N	N	N
Advanced Deinterlacing	Y	Y	Y
SD/HD Sharpness Control (Post Processing)	Y	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
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	N	N
Dual Stream Audio	Y	Y	Y



	2010 Intel® Core™ Processor Family with Intel® 5 Series Chipset	Intel® Processor Graphics for Pentium and Celeron with Intel® 6 Series Chipset	Intel® Processor Graphics for Pentium and Celeron with Intel® 7 Series Chipset
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	N	N
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 Analog CRT	Y	Y	Y
Support for External Digital Displays (DVI, HDMI, DP)	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
OpenCL 1.1	N	N	Y
Power Management			
Intel® Graphics Dynamic Frequency	Y	Y	Y
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	Y	Y	Y



	2010 Intel® Core™ Processor Family with Intel® 5 Series Chipset	Intel® Processor Graphics for Pentium and Celeron with Intel® 6 Series Chipset	Intel® Processor Graphics for Pentium and Celeron with Intel® 7 Series Chipset
Management			
Intel® Automatic Display Brightness (ADB)	Y	Y	Y
Extended Power Saving State	N	Y	Y

¹Intel® 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.