Guide

Intel® Xeon® Processor E3-1200 Family

Intel® HD Graphics P3000

Intel® HD Graphics P3000

for Intel® Xeon® Processor E3-1200 Family

Introduction

Intel® Xeon® processor E3-1200 family's greatest innovation is how it integrates – for the first time in an entry workstation product – the CPU and graphics are on the same die. Intel® HD Graphics P3000[1] integrates high-performance graphics and media processing right on the processor, putting these two key components together on a single chip. That means visual and 3D graphics capabilities that were once only available to entry workstation users with discrete graphics cards will now be accessible to anyone with an entry workstation powered by the Intel Xeon processor E3-1200 family with Intel HD Graphics P3000.

If your systems are to be employed by users of application like the Autodesk AutoCAD*/Inventor*/Revit*; Adobe Premiere* Elements; Adobe Photoshop*; SolidWorks and other similar volume professional software applications, then the Intel Xeon processor E3-1200 family with Intel HD Graphics P3000 is a solution to consider.

Intel® HD Graphics P3000 has been architected to support Microsoft DirectX* 10.1 and OpenGL* 3.0.

Intel HD Graphics takes advantage of a generalized unified shader model including support for Shader Model 4.1. The platform also has support for DirectX* 11 on DirectX* 10 hardware. The graphics core executes vertex, geometry, and pixel shaders on the programmable array of Execution Units (EUs). The EUs have programmable SIMD (Single Instruction, Multiple Data) widths of 4 and 8 element vectors (two 4 element vectors paired) for geometry processing and 8 and 16 single data element vectors for pixel processing. Each EU is capable of executing multiple threads to cover latency. The new generation of Intel HD Graphics now integrates transcendental shader instructions into the EU units, rather than a shared math box found in prior generations, resulting in improved processing of instructions such as POW, COS, and SIN. Clipping and setup have moved to Fixed Function units, further increasing performance by reducing contention within the EUs. The end result is the fastest Intel HD Graphics to date.

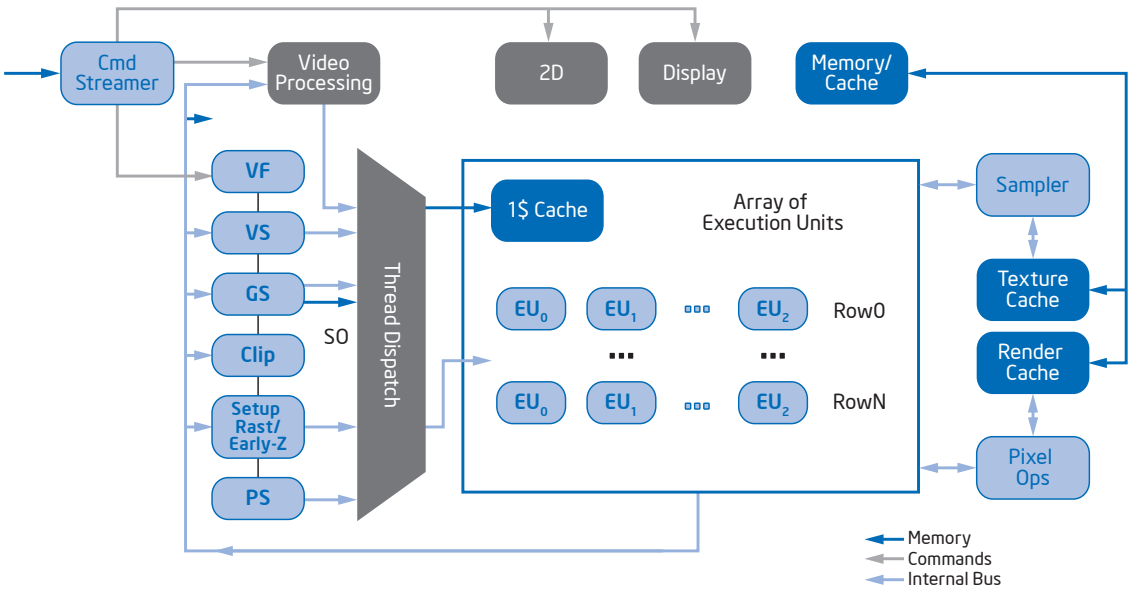

Table 1. Top-Level Processor Comparison

Feature	Intel® Xeon® Processor E3-1200 Family	Intel® Core™ i7 Processor	Intel® Core™ i5 Processor	Intel® Core™ i3 Processor
Cache Size	8 MB	8 MB	6 MB	3 MB
Intel® Hyper-Threading Technology[3]	●	●		●
Intel® Turbo Boost Technology 2.0[2]	●	●	●	
Intel® HD Graphics P3000[1]	●			

Table 2. Graphics Features – The latest version of Intel® HD Graphics includes several performance changes since the previous generation

3D Pipeline	Key Improvements in Intel® HD Graphics
Geometry Processing	▪ Improved throughput up to 2x better than previous generations ▪ Sharing of the last level cache with the CPU ▪ Increased number of threads for vertex shading ▪ Faster clip, cull, and setup ▪ Improved throughput of geometry shader and stream out ▪ OpenGL* driver now uses hardware geometry processing
Rasterization and Z	▪ Improved hierarchical Z performance ▪ Improved clear performance ▪ Added OpenGL* MSAA 4X support ▪ Added 2x and 4x MSAA support under DirectX* 9 and DirectX* 10
Computes	▪ >3x increase in transcendental computations ▪ Overall arithmetic performance improvement in shaders due to math box integration within EUs
Texture and Pixel Processing	▪ Added support for gather per the DirectX* 10.1 specification ▪ Improved fill rate for short shaders due to fixed function setup management of barycentric coefficients

Intel® Turbo Boost Technology and Intel HD Graphics

Intel HD Graphics utilizes a dynamic frequency on workstation graphics to automatically increase the clock frequency of the CPU and the GPU to boost performance when the workload demands it and also to scale back the frequency when demand decreases. Intel Xeon processor E3 family supports higher performance boosts after extended CPU idle periods. In addition to the Intel® Turbo Boost Technology 2.0[2] on the CPU, a similar technology has been extended to graphics on both the mobile and desktop platforms. This allows the graphics subsystem to run at higher frequencies when the CPU is not using its nominal thermal design power (TDP). In combination, these technologies dynamically manage the CPU and GPU performances based on workload demand to allow for better performance when needed and minimize power usage when possible.

To learn more about Intel® HD Graphics, Intel® Turbo Boost Technology and Intel® HD Graphics Dynamic Frequency Technology, go to:

http://www.intel.com/Assets/PDF/whitepaper/323324.pdf

http://www.intel.com/technology/turboboost/

http://www.intel.com/technology/graphics/intelhd.htm

http://software.intel.com/en-us/articles/quick-reference-guide-to-intel-integrated-graphics/

Table 3. Graphics Comparison Table

Specification	Intel® HD Graphics P3000	Intel® HD Graphics 3000/2000
Processor Support	Intel® Xeon® processor E3-1200 family (12X5 series)[1]	Intel® Core™ i3 processor, Intel® Core™ i5 processor, or Intel® Core™ i7 processor
Processor based	Yes	Yes
ECC Memory Support	Yes	No
Optimized and certified for professional applications	Yes	No
Processor Clock Speed	Up to 3.8 GHz	Up to 3.8 GHz
Execution Units	12	12/6
Shared L3 Cache	Yes	Yes
Graphics Frequency (MAX)	Up to 1350 MHz	Up to 1350 MHz
Max Dynamic Video Memory (Vista*/Windows* 7 for 1 GB/2 GB/>4 GB System Memory)	256 MB/>783 MB/1692 MB	256 MB/>783 MB/1692 MB
Number of Displays	2	2
Intel® Flexible Display Interface	Yes	Yes
Unified Shader Architecture	4th Generation	4th Generation
Hardware Vertex Processing	Yes	Yes
Shader Model Support 4.1	Yes	Yes
Intel® Turbo Boost Technology 2.0[2] Support	Yes	Yes
Max Resolution	DisplayPort* 2560 x 1600, HDMI, VGA	DisplayPort* 2560 x 1600, HDMI, VGA
Dual Simultaneous HDMI support	Yes	Yes
Hierarchal Z and Fast Z Clear	Yes	Yes
Encoding/Decoding Hardware Acceleration		
H.264	Yes	Yes
MPEG2 Encode	Yes	Yes
AVC, MPEG, VC1 encode	Yes	Yes
Dual video decode	Yes	Yes
Post Processing		
Total Color Control	Yes	Yes
Skin Tone detection/correction	Yes	Yes
Auto Contrast Enhancement	Yes	Yes
ProcAMP	Yes	Yes
Sharpness	Yes	Yes
xvYCC	Yes	Yes
Advanced De-Interlacing	Yes	Yes
Film Mode detection	Yes	Yes
Noise Detection	Yes	Yes
Scaling 8x8 Polyphase	Yes	Yes
Display		
HDMI (V.1.4 with 3D)	Yes	Yes
Bit Color Depth 12bpc DisplayPort, DVI, VGA, SDVD	Yes	Yes
8-Channel LPCM	Yes	Yes
Display Port Audio	Yes	Yes
Dolby TrueHD* and DTS*-HD Master Audio	Yes	Yes

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

[1] Optimized Intel® HD Graphics P3000 only available on select models of the Intel® Xeon® processor E3 family. To learn more about Intel® Xeon® processors for workstation visit www.intel.com/go/workstation.

[2] Requires a system with Intel® Turbo Boost Technology capability. Intel Turbo Boost Technology 2.0 is the next generation of Turbo Boost Technology and is only available on 2nd gen Intel® Core™ processors. Consult your PC manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit http://www.intel.com/technology/turboboost.

[3] Requires an Intel® HT Technology enabled system, check with your PC manufacturer. Performance will vary depending on the specific hardware and software used. Not available on Intel® Core™ i5-750. For more information including details on which processors support HT Technology, visit http://www.intel.com/info/hyperthreading

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