Next generation Intel® HD Graphics on the HP Z210 Workstations

Get affordable, competitive workstation-class graphics performance with entry-level discrete professional graphics cards from Intel now found on the HP Z210 Workstations.

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Introduction

Intel's new 32nm micro architecture for the 2nd generation Intel® Core™ i3/i5/i7 and Intel® Xeon® processor E3-1200 family[1,2] unifies processor cores, memory controller, last level cache, and graphics/media processing into a single chip. This brings a boost to system performance with faster access to the cache, fewer buses for data and signal travel, and more memory bandwidth for the GPU. Intel's built-in visuals include quick sync video, HD graphics, wireless display, HD Stereo 3D, additional 3D[3] graphics capabilities.

The Intel® Xeon® processor E3-1200 family[1,2] features Intel® HD Graphics P3000 graphics, which optimize performance on professional applications for entry workstation users who require enhanced media acceleration. Users get entry-level 3D discrete graphics card performance without needing an additional graphics card. The Intel® Xeon® processor E3-1200 family[1,2] is certified for key professional applications such as the Autodesk Suite, Adobe Photoshop CS5, and more listed later in this document.

The following chart shows the CPU line-up and features available on the HP Z210 CMT and HP Z210 SFF Workstations:

FIGURE 1

CPU Line-up[1,2]

	Integrated graphics	Multitasking	Max cache	ECC	Intel® Turbo Boost 2.0[4]	Intel® Hyper-Threading Technology[5]
Intel® Xeon® E3—1230/1240/1270/1280	None	8 Way	8 MB	Yes	Yes	Yes
Intel® Xeon® E3 1225	P3000	4 Way	6 MB	Yes	Yes	No
Intel® Core™ i7—2600	2000	8 Way	8 MB	No	Yes	Yes
Intel® Core™ i5—2400/2500	2000	4 Way	6 MB	No	Yes	No
Intel® Core™ i3—2100/2120	2000	4 Way	3 MB	Yes*	Yes	Yes

*non-ECC also supported

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Features available on HP Z210 Workstations

Flexible Display Interface

Intel® HD Graphics support dual independent displays with Intel® Flexible Display Interface

Supported resolutions

—DisplayPort: 2560 x 1600 at 60 Hz
—Single-Link DVI: 1920 x 1200 at 60 Hz
—VGA: 2048 x 1536 at 60 Hz

Intel® Turbo Boost Technology

Intel® Turbo Boost Technology[4] 2.0 automatically allows processor cores to run faster than the base operating frequency if it's operating below certain power, current, and temperature specification limits. Along with graphics dynamic frequency, Turbo Boost boosts graphics-intensive applications as they are needed by sharing the power and thermal envelope with the processor cores.

FIGURE 2

Intel® Turbo Boost Technology

Gfx core

CPU cores

CPU turbo bins and graphics dynamic frequency (with dynamic range)
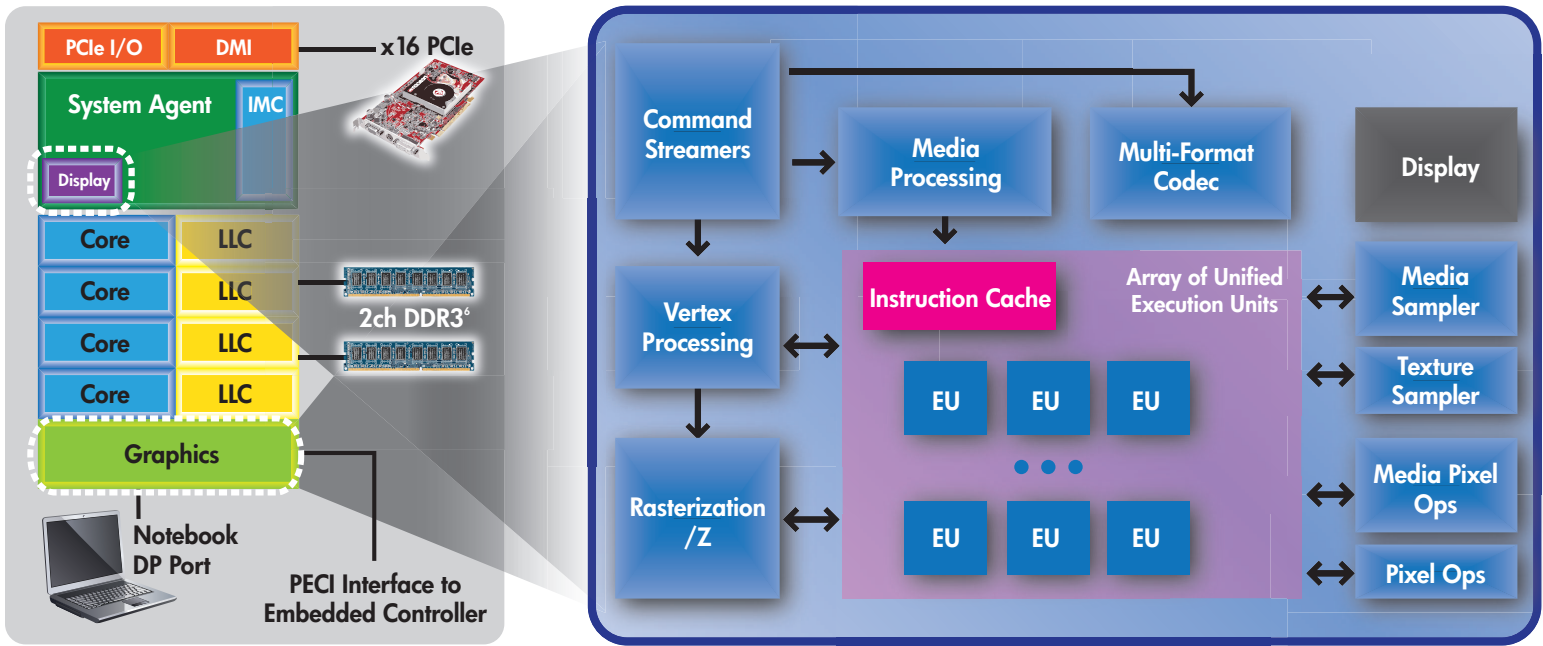
Base frequencies

Idle mode
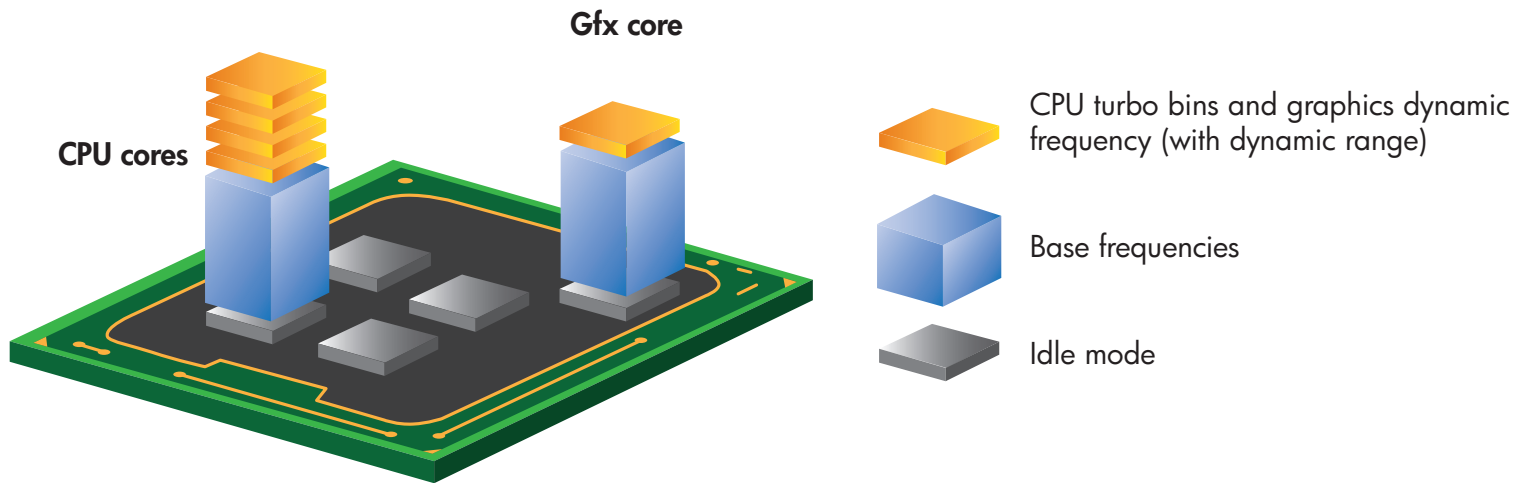
Open GL 3.0 and DirectX 9/10.1

Intel's 3D micro-architecture enhancements support these graphics APIs.

FIGURE 3

Next Generation Integrated Graphics Architecture Overview

The next generation Intel® HD Graphics architecture integrates—for the first time—the CPU and graphics engines on the same die. It makes use of new hardware-based media accelerators and graphics execution units (EUs) to deliver competitive entry 3D graphics performance. It uses Dynamic Video Memory Technology (DVMT) 5.0. DVMT dynamically allocates system memory for use as video memory to ensure the most efficient use of available resources for 2D/3D graphics performance. A range of 32 MB to 512 MB of graphics pre-allocated memory can be carved from system memory, and this is for integrated graphics only (64 MB is the default).

Media accelerators (Media Sampler and Media Pixel Ops) are dedicated modules used for video processing, color processing, and video encoding. Multi-Format Codec is a dedicated parallel engine for video decoding. This dedicated decoder furthers CPU optimization by offloading work ordinarily done by the CPU to the decoder and allows for higher performance video decoding.

EUs are media-optimized cores with zero overhead thread switching that effectively perform graphics operations for media accelerators. The number of EUs distinguishes which class of graphics processor is integrated on the chip. Intel® Xeon® processors E3-1200 family[1,2,3] members that are GT0 have no integrated graphics and therefore no EUs. The Intel® Core™ i3/i5/i7 (GT1) processors[1,2,3] available on the HP Z210 Workstations use Intel® HD Graphics 2000 and contain six execution units. The Intel® Xeon® processor E3-1200 family[1,2,3] members that are GT2 and have Intel® HD Graphics 3000 and P3000, have twice the number of EUs of the GT1 processors. (Note: A few Intel® Core™ i3/i5/i7 processors[1,2,3] targeted for the gaming/enthusiast market use Intel® HD Graphics 3000. These are not offered on the HP Z210 Workstations, as they do not have features for the commercial market such as Intel® vPro™ and do not have the optimization or certification for professional applications that are available with the Intel® HD Graphics P3000).

Intel® Xeon® advantage—workstation-class processor and integrated graphics

The Intel® Xeon® processor E3-1200 family[1,2] members with Intel® HD Graphics P3000 provides features geared towards the professional workstation user.

The following are Intel optimizations are designed for the workstation platform:

- ISV application certifications
  — Adobe Photoshop CS5
  — Adobe Premier Elements
  — Bentley Microstation
  — Solid Edge
  — Autocad 10/11/12
  — vit 11/12
  — Inventor 11/12
  — Solidworks

- The following are performance optimizations only with Intel® HD Graphics P3000 for target applications
  — Inventor, Solidworks, Civil 3D, Revit, Premiere Elements, Solid Edge and Microstation
  — Intel® Xeon® GT2 processors[1,2] use 12 execution units vs. the 6 EUs in GT1 processors, which provide a dramatic increase in performance

- Details on performance comparisons of GT1, GT2, and discrete professional cards will be available in a related document on integrated graphics performance for workstation users

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1 64-bit computing on Intel architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See www.intel.com/info/em64t for more information.

2 Intel's numbering is not a measurement of higher performance.

3 3D Glasses and 3D content are required to view images in 3D. 3D visual experience may vary by viewer.

4 Intel Turbo Boost Technology requires a PC with a processor with Intel Turbo Boost capability. Intel Turbo Boost performance varies depending on hardware, software, and overall system configuration. See www.intel.com/technology/turboboost for more information.

5 The hyper-threading feature is designed to improve performance of multi-threaded software products; please contact your software provider to determine software compatibility. Not all customers or software applications will benefit from the use of hyper-threading.
Go to http://www.intel.com/info/hyperthreading for more information, including which processors support HT Technology.

6 Each processor supports up to 2 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel. To get full 6 channel support, 2 processors MUST be installed.

For more information, visit the HP Workstations home page at **http://www.hp.com/go/workstations**.

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