The Intel® Integrated Graphics Advantage

Today's end users demand a more realistic digital experience. Intel continues to evolve integrated graphics solutions designed to support today's complex graphics environment. Intel® Extreme Graphics 2 is the next generation of Intel's revolutionary integrated graphics core that delivers intense, realistic 3D graphics with sharp images, fast rendering, smooth motion, and incredible detail for more enjoyable 3D and high resolution video playback experience.

This unique architecture enables balanced memory usage between graphics and other system functions. The result is more realistic visual quality for graphics—without sacrificing the system performance needed for such tasks as video editing and music recording. Additionally, innovative technologies add new levels of 2D and 3D graphic quality to integrated graphics chipsets:

- Dynamic Video Memory Technology 2.0
- Enhanced Intelligent Memory Management
- Enhanced Rapid Pixel and Texel Rendering
- Zone Rendering 2

Intel Extreme Graphics 2 supports the latest 2D and 3D APIs, delivering real-life environment and character effects. A 256-bit internal path enables up to four textures per pixel on a single pass for super light maps, atmospheric effects, and more realistic surface details.

Flexible display capabilities enhance the personal computing experience, offering significant benefits for applications requiring 32-bpp and higher display resolutions.

Intel Extreme Graphics 2 represents the latest integrated graphics platform from Intel, an industry leader you can trust.

Performance where users need it most.

Intel®
extreme
graphics 2

Intel Access

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Intel Literature Center	(800) 548-4725 7 a.m. to 7 p.m. CST (U.S. and Canada) International locations please contact your local sales office.
General Information Hotline	(800) 628-8686 or (916) 356-3104 5 a.m. to 5 p.m. PST

For more information, visit the Intel Web site at:
developer.intel.com/design/graphics2

†Separate license may be required; contact vendor for details

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ORDER NUMBER: 253529-002

Printed in USA/0803/10K/MI/LB

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design/graphics2

Integrated graphics solution for mainstream and corporate markets

Can an integrated graphics solution deliver stunning performance while reducing the total system cost?

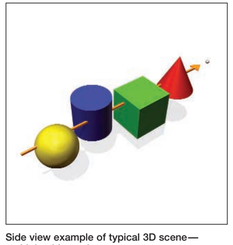
Yes. Intel® Extreme Graphics 2 is an integrated graphics solution that delivers stunning performance at a fraction of an add-in graphics card cost.

Why is an Integrated Graphics solution important?

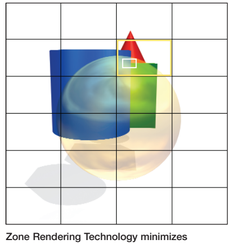
Integrated graphics is the preferred solution for the mainstream and corporate market segments. According to Mercury Research, "The PC graphics market has always been fiercely competitive. But that competition is about to take on a whole new dimension. The reason: integrated, system-level solutions are taking hold in the PC market."

Information at: http://www.mercuryresearch.com/

Key factors for both mainstream and corporate markets include, ease of use, lower cost and performance. The Intel® Extreme Graphics 2 integrated solution is designed to offer all three. The unique architecture of Intel Extreme Graphics 2 allows it to be an integral part of Intel's mainstream and corporate chipsets, offering lower cost and ease of integration in a standard-size package. Because it is designed on a proven core graphics engine, it allows driver-stack compatibility with previous integrated graphics solutions offered by Intel. On the performance side, Intel Extreme Graphics 2 has advanced features that support the latest 3D, 2D, and video-playback applications targeted for mainstream and corporate users.



Side view example of typical 3D scene—multiple objects deep.



Zone Rendering Technology minimizes memory accesses by resolving object ordering and visibility on chip.

Features and Benefits of Intel Extreme Graphics

Feature	Benefits
Multi-texture	Useful for creating light maps, atmospheric effects and more
2kx2k texture	Enables desktop-size textures
Cube reflection textures	Enables environment specular reflections
Render-to-texture	Streamlines generation of textures
Projected textures	Projects textures onto other objects
DOT3 bump-mapping	Models realistic surface details
Destination alpha blend	Creates effects like force fields, flames, or plasma beams
Point sprites	Provides particle systems for atmospheric effects such as snowfall
Per pixel fog	Enables depth-cruising or hidden objects
Alpha blended sub-picture support	Enables softer effects for captions and subtitles
Anisotropic filtering	Provides high-quality views of oblique surfaces
Hardware motion compensation	Provides high-quality DVD playback
5x3 overlay	Delivers smooth scaling of DVD playback
Digital Video	Extends the integrated graphics engine to Output (DVO) support digital FP and TV-out
Dual display	Supports synchronous display on analog and digital ports

Specifications

Enhanced 2D

- 256-bit internal path
- 8/16/32 bpp
- DirectDraw*, GDI, GDI+
- Anti-aliased text support
- Alpha blending
- Alpha stretch blitter
- Hardware alpha blended RGB cursor
- Color space conversion
- Rotate, scale, and translate operations

High-performance 3D

- 256-bit internal path
- 32 bpp/24Z or W/8 Stencil
- DX7/DX8/OpenGL1.3
- DXTn texture decompression
- Up to four textures/pixel on a single pass
- Cubic reflection map
- Embossed/DOT3 bump mapping
- Point sprites

Video and Display

- DirectShow*/DirectVA*
- Alpha blended sub-picture support
- Hardware motion compensation support for DVD playback
- 5x3 overlay filter
- 350MHz DAC frequency for up to QXGA resolution for both analog and digital displays
- Up to 2048x1536 maximum analog CRT resolution
- Dual Digital Video Out (DVO) ports for flat panel monitors and/or TV-out support via AGP Digital Display (ADD) cards
- Multiple display types (LVDS, DVI, TV-out, CRT) for dual monitor capabilities

Intel® Extreme Graphics 2 Advanced Features and Benefits

Dynamic Video Memory Technology (DVMT 2.0)

- More efficient usage of system memory for graphics-intensive applications.
- Dynamic Video Memory Technology (DVMT 2.0) allows for up to 64MB of system memory to be shared between the Operating System (OS), applications and graphics display.

How does it work?

DVMT 2.0 manages memory between applications in a manner that minimizes impact to the overall system performance. In traditional Unified Memory Architecture (UMA) a certain area of memory is "locked down" for graphics use whether an application needs it or not. With DVMT 2.0, as graphics applications need memory, the request is sent to the OS through the graphics driver. The OS then allocates the additional memory based on availability.

When applications no longer need the memory, the memory is returned back to the OS and made available for other applications.

This unique technology ensures that the system memory is shared across all applications for optimal overall system performance.

Benefits

- Mitigates the need for additional stand-alone memory dedicated for graphics, which reduces the overall system cost
- Eliminates the need for large amounts of system memory to be "locked down" that can negatively impact overall system performance
- Optimized for up to 64MB of memory, which ensures more efficient system memory usage for great graphics and system performance

Enhanced Intelligent Memory Management

Intel's unique shared-memory manager architecture

Key elements

- Tiled memory addressing improves visual performance
- Dynamic mode, dua channel tiled memory addressing capability
- Deep display buffer implementation
- Dynamic data management scheme

How does it work?

Memory addressing allows address remapping in the hardware for all graphics surfaces, including textures, frame buffer, Z buffer, and video surfaces. Deep display buffers and dedicated screen refreshes improve visual performance, while the dynamic data management scheme manages burst-size and page-closing policies for memory accesses.

Benefits

Enhanced Intelligent Memory Management reduces the aggregate CPU latency and allows longer in-page bursts for higher system performance. It also increases page coherency and improves memory efficiency in texture loads, 2D BLTs, color and Z buffer accesses, MPEG2 (DVD) hardware motion compensation, and other operations. Intel Extreme Graphics 2 also includes the following enhancements:

- Dual Channel Memory
  — Larger addressability of tiled memory
  — Greater bandwidth allows increased performance in the hardware for all graphics surfaces such as Textures, Frame Buffer, Z Buffer, Video Surfaces, etc.
- Dynamic Mode
  — Optimized system memory accesses allow for improved system and graphics performance

Enhanced Rapid Pixel and Texel Rendering

Speeds up visual effects without impacting system performance

Enhanced Rapid Pixel and Texel Rendering capability in Intel Extreme Graphics 2 utilizes special pipelines that allow 2D and 3D operations to overlap. Other features and benefits include:

Hardware support for Texel formatting

- A8, XRGB8888, XBGR8888 Direct3D* and OpenGL* formats
- Enables faster texture rendering Color Blending Accuracy
- Linear Gamma blending modes support RGB, resulting in more accurate color representation and proper Gamma correction

Video Mixing Renderer (VMR)

- Seamless blending of applications with true windowless rendering
- VMR also eliminates color and brightness distortion

Bicubic Filtering

- Improved image filtering results in high-quality up/down scaling of 2D and 3D scenes

How does it work?

A dedicated, non-locking, multi-tier cache is provided for textures, colors, Z and vertex rendering. With single-pass, quad-texture support, the driver can submit up to four textures that pass to the graphics engine concurrently.

Intel Extreme Graphics 2 can switch between 2D and 3D operations without having to complete all operations of the same mode. This minimizes the overhead time required in switching between modes and therefore increases the performance of 3D rendering tasks.

Benefits

Enhanced Rapid Pixel and Texel Rendering delivers higher performance and higher quality 2D and 3D rendering, resulting in a better user experience.

Zone Rendering 2

Advanced technology for drawing 3D scenes

Zone Rendering 2 in Intel Extreme Graphics 2 ensures efficient memory usage for optimal graphics and system performance. Zone Rendering 2 reduces the system memory bandwidth required to draw each scene, which eliminates the need for local graphics memory, resulting in reduced system costs.

How does it work?

Zone Rendering 2 divides the frame buffer into rectangular zones and then processes the zones, writing pixel data to memory. The benefit is realized in the way each zone is processed, as only pixels visible in the scene are written to memory. Most other solutions render each 3D object completely and write the data to memory, whether or not it is completely visible in the scene. This results in many pixels being written multiple times for a given scene where many objects overlap, resulting in wasted resources and memory space that can otherwise be used to enhance the visible 3D graphics being displayed.

The unique architecture of Intel® Extreme Graphics 2 allows it to be an integral part of Intel's mainstream and corporate chipsets, offering lower cost and ease of integration in a standard-size package.