

Integrated Graphics Matches Add-In Cards

Next-generation Intel® processors are on par with discrete graphics solutions

White Paper

Intel® Core™ i7 620M
Processor with Intel® HD
Integrated Graphics



Patrons walking into any of the thousands of gaming venues world-wide immediately face a barrage of multi-media sounds and images. Attracting the attention of potential customers is vital in gaming, and high-quality graphics play a crucial role in creating a more exciting atmosphere for customers. Compelling 3D animation and high definition video can make playing games, like arcade, slot machines and amusement with prize (AWP), much more enjoyable.

In addition to satisfying high-quality graphics requirements, gaming equipment manufacturers are under pressure to produce more games with superior innovation. At the same time, intense competition is driving the need to get new products into production faster and reduce system cost. Intel can address both of these requirements via integrated graphics to reduce design effort and hardware cost, saving time and money. The performance of this integrated solution, which requires virtually no hardware design effort, is comparable to embedded add-in graphics cards that cost upwards of \$150 or more (US dollars).

Comparing Embedded Graphics Performance

Engineers at Intel used 3DMark06 from Futuremark (www.futuremark.com) to measure both 3D rendering and CPU performance of the Intel® Core™ i7 620M^A processor with Intel® HD integrated graphics. The benchmark results were compared to both the AMD Athlon® Neo X2 Dual-Core Processor with ATI Radeon® E2400 discrete graphics and the AMD Athlon® 64 X2 3400+ with AMD 780E integrated graphics, two platforms used in some gaming machines. The 3D performance of the Intel Core i7 620M processor with Intel HD integrated graphics¹ clocked in at 33 percent better than the AMD 780E integrated graphics but was only 10 percent lower than the Radeon E2400 discrete GPU, as shown in the bar charts on the left of Figure 1.

Eliminating Discrete Graphics Components

Gaming developers can drive down bill of materials (BOM) cost using Intel integrated graphics and designing out expensive GPU subsystems and add-in cards. By making this switch, gaming equipment manufacturers not only lower system cost, but also reduce system form factor and cut power consumption when discrete graphics components are eliminated.

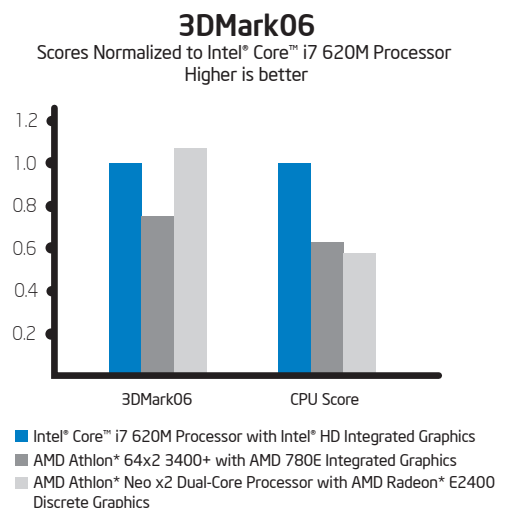


Figure 1. Benchmark Performance Comparison

Table 1. System Configurations

	Intel® Core™ i7 620M Processor with Intel® HD integrated graphics	AMD Athlon® Neo X2 Dual-Core Processor with ATI Radeon® E2400 discrete graphics	AMD Athlon® 64 X2 3400+ with AMD 780E integrated graphics
Processor frequency	2.66 GHz	1.50 GHz	1.80 GHz
Cores	2	2	2
RAM	1 GB (single channel) ^a DDR3-1066	1 GB DDR2-800	1 GB DDR2-800
Screen resolution	1280x1024	1280x1024	1280x1024
Driver revision	8.15.10.2082	8.61-090409a-080347E-EDG Direct	8.61-090409a-080347E-EDG Direct

^aThe Intel® Core™ i7 620M processor supports dual-channel memory configurations. For the purpose of this benchmark, only one channel was populated in order to equate the system configurations with the AMD-based systems.

Integrated graphics also simplify hardware design, manufacturing and purchasing. This solution requires no hardware design effort, unlike a solution using a discrete graphics card or a GPU with supporting components. A platform with fewer components also reduces the number of materials and suppliers the purchasing department must manage and manufacturing department has to build and test. Compared to a discrete graphics solution, integrated graphics provide the following benefits:

- Lower platform cost
- Simpler design, purchasing and manufacturing benefits
- Smaller platform form factor
- Lower overall power consumption

Checking It Out

It's time to take a new look at integrated graphics from Intel. The latest graphics capabilities are delivering the performance gaming developers expect, while lowering BOM cost and reducing development and manufacturing effort over discrete solutions. Please contact your Intel sales representative to learn the fastest way to evaluate the latest embedded Intel processors with integrated graphics.

For more information on embedded Intel processors, visit www.intel.com/embedded

To learn more about Intel's solutions for gaming devices, please visit www.intel.com/design/intarch/platforms/gaming

Why Integrated Graphics From Intel

Intel has a long history of integrating graphics in Intel® chipsets used across many embedded market segments. Today, Intel is integrating even more powerful graphic engines in processors, with up to 260 percent greater 3D performance within the same power envelope. This capability increases the throughput for gaming, as well as meeting more complex lighting and shading requirements. This breakthrough performance is attributable, in part, to manufacturing the processors and graphics engines on fast 32 and 45 nanometer (nm) semiconductor technology, an entire generation ahead of the competition. In addition to high performance, integrated graphics from Intel provides a host of features and benefits, including:

- **Open Source Driver:** Provides the code visibility needed to streamline gaming certification (the driver is available at intellinuxgraphics.org)
- **Long Life Support:** Protects equipment manufacturers' product development investments by backing embedded Intel processors and chipsets for seven years
- **Dual-Independent Display:** Allows for flexible display configurations
- **Concurrent Graphics:** Runs a graphics card and integrated graphics simultaneously, further increasing design options

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

¹ Performance tests and ratings are measured using specific computer systems and/or components and reflect approximate performance of Intel® products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit http://www.intel.com/performance/resources/benchmark_limitations.htm.

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