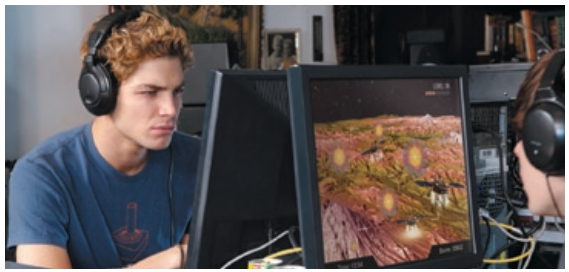
Product Brief

Intel® Core™2 Extreme Quad-Core Processor

Intel® Core™2 Extreme Quad-Core Processor

Untouchable desktop performance[1] for extreme gaming and multimedia.



Overview

The new Intel® Core™2 Extreme processor QX9770 with hafnium-infused chip design delivers unrivaled gaming performance[1] with four independent processing cores, 12 MB of cache, 1600 MHz Front Side Bus, and clock speeds of 3.2 GHz.

The Intel® Core™2 Extreme processor is the world's first quad-core desktop processor, delivering the latest in cutting-edge processor technology and unprecedented performance across a wide range of applications and benchmarks. All Intel Core 2 Extreme processor QX9000 series are based on the industry-leading 45nm manufacturing technology, providing another giant leap forward on the road to multi-core and parallel computing.

45nm manufacturing technology, with hafnium-infused Hi-k transistors, enables even more processor performance by doubling the transistor density, improving efficiency and speed relative to the previous generation, and increasing cache size by up to 50 percent. These new Intel Core 2 Extreme processors deliver more performance without using more energy.

For the added technical flexibility experienced enthusiasts want, the processor bus ratio locks (overspeed protection) have been removed in the Intel Core 2 Extreme processor. This delivers the ability to tune the system, taking it beyond the specification limits[1].

Faster System Performance

Desktop PCs based on the Intel® X48 Express Chipset, combined with the Intel Core 2 Extreme processor, establish a new standard for performance. Designed with headroom and engineering passion, the Intel X48 Express Chipset supports new dual-channel DDR3 memory technology and next-generation PCI Express* 2.0 Dual x16 graphics to unleash exceptional performance in today's extreme applications.

Untouchable Quad-Core Desktop Performance[1]

Shatter all gaming barriers with the astonishing speed and performance of Intel's fastest quad-core desktop processor with four processing cores to power the latest, greatest generation of multithreaded games. Shift your 3D gaming into high gear with radical, performance-enhancing features that Intel designed to wow those living on the edge: larger cache and Intel® Smart Memory

Access. Get unmatched quad-core desktop performance[1] for intensive multimedia applications such as video compression, photo editing, retouching, and publishing. With Intel® HD Boost, you will experience higher performance for intensive applications such as video compression while maintaining high visual quality.

Multitasking Monster

The Intel® Core™2 Extreme Quad-Core processor is a multitasking monster, so users can do more in less time. Significant improvements in system responsiveness are possible because certain tasks can be off-loaded to specific cores. Users can now take on several tasks at once, such as rendering a video, playing a game, or working on basic productivity software, because additional processor resources are free to handle other tasks.

Better Acoustics

Intel Core 2 Extreme Quad-Core processors are equipped with a Digital Thermal Sensor (DTS) to enable more efficient processor and platform thermal control. Thermal sensors located within the processor measure the maximum temperature on the die at any given time. The acoustic benefit of temperature monitoring is that system fans spin only as fast as needed to cool the system and slower spinning fans generate less noise.

This Intel-designed thermal solution for boxed processors utilizes a 4-pin header with variable fan speed control, based on processor temperature and power usage to minimize acoustic noise levels. The latest 45nm boxed Intel Core 2 Extreme processors include a new, more advanced thermal solution with improved acoustic and thermal performance.

45nm Comparison Table

	QX9770	QX9650
Clock Speed	3.2 GHz	3 GHz
L2 Cache[2]	12 MB	12 MB
Front Side Bus Speed	1600 MHz	1333 MHz
Intel® Express Chipset	X48	X48, X38, P35

Features and Benefits of the Intel® Core™2 Extreme Quad-Core Processor

Feature	Benefit
Quad-Core Processing	Provides four independent execution cores in a single processor package. Four dedicated processing threads help operating systems and applications deliver additional performance, so end users can experience better multitasking and multithreaded performance across many types of applications and workloads.
Chipset Support	Intel® Express Chipsets offer an array of exciting capabilities including dual graphics, and deliver an impressive level of performance for demanding users. Other third-party chipsets may support Intel® Core™2 Extreme processors; contact your board manufacturer for compatibility.
Intel® Wide Dynamic Execution	Improves execution speed and efficiency, delivering more instructions per clock cycle. Each core can complete up to four full instructions simultaneously.
Intel® Smart Memory Access	Improves system performance by optimizing the use of the available data bandwidth from the memory subsystem and reducing the effective latency of memory accesses.
Intel® Advanced Smart Cache[2]	Dynamically allocates the shared L2 cache to each processor core based on workload. This efficient, dual-core-optimized implementation increases the probability that each core can access data from fast L2 cache, significantly reducing latency to frequently used data and improving performance.
Intel® HD Boost	Accelerates the execution of Streaming SIMD Extension (SSE) instructions to significantly improve the performance on a broad range of multimedia and compute-intensive applications. The 128-bit SSE instructions are now issued at a throughput rate of one per clock cycle, effectively doubling their speed of execution on a per-clock basis over previous generation processors. This is now improved further on 45nm versions with new SSE4 instructions for even better multimedia performance.
Intel® Virtualization Technology (Intel® VT)[3]	Allows one hardware platform to function as multiple "virtual" platforms. Intel VT improves manageability, limits downtime, and maintains worker productivity by isolating computing activities into separate partitions.
Intel® 64 Architecture[4]	Allows the processor to access larger amounts of memory. With appropriate 64-bit hardware and software, platforms based on an Intel® processor supporting Intel 64 architecture can allow the use of extended virtual and physical memory.
Execute Disable Bit[5]	Provides extended virus defense when deployed with a supported operating system. Memory can be marked as executable or non-executable, allowing the processor to raise an error to the operating system if malicious code attempts to run in non-executable memory. This can prevent the code from infecting the system.

For more information, visit the Intel Web site: www.intel.com/products/desktop/processors

[†] **Warning:** Altering clock frequency and/or voltage may (i) reduce system stability and useful life of the system and processor; (ii) cause the processor and other system components to fail; (iii) cause reductions in system performance; (iv) cause additional damage; and (v) affect system data integrity. Intel has not tested, and does not warranty, the operation of the processor beyond its specifications.

[1] Performance based on select industry benchmarks, game titles, and multimedia creation applications. Actual performance may vary. See http://www.intel.com/performance/desktop/extreme/index.htm for additional information.

[2] For the Intel® Core™2 Extreme Quad-Core processor QX9000 series, shared L2 cache refers to 6 MB of L2 cache per core pair resulting in a total L2 cache size of 12 MB.

[3] Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance, or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

[4] 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. Contact your system vendor for more information.

[5] Enabling Execute Disable Bit functionality requires a PC with a processor with Execute Disable Bit capability and a supporting operating system. Check with your PC manufacturer on whether your system delivers Execute Disable Bit functionality.

Printed in USA 0308/MS/EC/PDF ♻ Please Recycle 315760-005US