Intel® Core™2 Extreme Quad-Core Processor

Untouchable desktop performance¹ for extreme gaming and multimedia.

Overview
The new Intel® Core™2 Extreme processor QX9770 with hafnium-infused chip design delivers unrivaled gaming performance¹ 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 limits¹.

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 Performance¹
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 performance2 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

<table>
<thead>
<tr>
<th>Feature</th>
<th>QX9770</th>
<th>QX9650</th>
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<tr>
<td>Clock Speed</td>
<td>3.2 GHz</td>
<td>3.0 GHz</td>
</tr>
<tr>
<td>L2 Cache</td>
<td>12 MB</td>
<td>12 MB</td>
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<tr>
<td>Front Side Bus Speed</td>
<td>1600 MHz</td>
<td>1333 MHz</td>
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<tr>
<td>Intel® Express Chipset</td>
<td>X48</td>
<td>X48, X38, P35</td>
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For more information, visit the Intel Web site: [www.intel.com/products/desktop/processors](http://www.intel.com/products/desktop/processors)

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1Warning: 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.


3For the Intel® Core™2 Extreme Quad-Core processor QX9650 series, shared L2 cache refers to 6 MB of L2 cache per core pair resulting in a total L2 cache size of 12 MB.

4Intel® 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.

564-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.

6Enabling 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.

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