Intel® Core™2 Duo Desktop Processor

New version now available based on Intel's 45nm technology

Product Description

The Intel® Core™2 Duo processor was developed to meet the insatiable demand for increased performance from PC users running multiple intense software applications simultaneously. In the office, PC usage has changed from data entry and word processing to e-Commerce, online collaboration, and an ever-increasing need for continual security and virus protection. In the home, interests have shifted from low-bandwidth photos and Internet surfing to downloading and viewing high-definition videos, as well as advanced photo and video editing.

Intel's new 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 Duo processors deliver more performance without using more energy.

Built on the innovative Intel® Core™ microarchitecture, the Intel Core 2 Duo desktop processor delivers revolutionary dual-core performance and breakthrough processor energy efficiency. With Intel® Wide Dynamic Execution, Intel® Smart Memory Access, Intel® Advanced Smart Cache, and Intel® Digital Media Boost, this new processor is designed to do more in less time. Additional features, which support enhanced security, virtualization, and 64-bit computing, make the Intel Core 2 Duo the most impressive processor developed for an increasingly multimedia-centered, high-definition world.

Energy Efficiency

Design changes in the Intel Core 2 Duo processors that improve performance also increase processor energy efficiency by operating at lower frequencies that require less power to run. Intel® Intelligent Power Capability, a feature that optimizes energy usage of the processor cores, turns on computing functions only when needed. These more energy-efficient processors support smaller, more capable, and quieter desktop PCs to conserve critical power resources.

Better Acoustics

Intel® Core™2 Duo processors are equipped with a Digital Thermal Sensor (DTS) that enables efficient processor and platform thermal control. Thermal sensors located within the processor measure the maximum temperature on the die at any given time. Intel® Quiet System Technology, included in the Intel® Express Chipset families[1], uses the DTS to regulate the system and processor fan speeds. 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.

Comparison Table

	E8000 series	E7000 series	E6000 / E4000 series
Manufacturing Process	45nm	45nm	65nm
L2 Shared Cache	6 MB	3 MB	4 MB / 2 MB
System Bus	1333 MHz	1066 MHz	1333, 1066, and 800 MHz
SSE Instructions	SSE4, SSE3, SSE2, and SSE	SSE4, SSE3, SSE2, and SSE	SSE3, SSE2, and SSE
Intel® Express Chipset[2]	Intel® 3 Series Express Chipsets	Intel® 3 Series Express Chipsets	Intel® 3 Series and 9xx Express Chipsets

Features and Benefits of the Intel® Core™2 Duo Desktop Processor

Feature	Benefit
Dual-Core Processing	Two independent processor cores in one physical package run at the same frequency, and share up to 6 MB of L2 cache as well as up to a 1333 MHz[3] Front Side Bus, for truly parallel computing.
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	Optimizes the use of the data bandwidth from the memory subsystem to accelerate out-of-order execution. A newly designed prediction mechanism reduces the time in-flight instructions have to wait for data. New pre-fetch algorithms move data from system memory into fast L2 cache in advance of execution. These functions keep the pipeline full, improving instruction throughput and performance. 45nm versions further improve this feature, with more efficient methods of loading and storing data in main memory.
Intel® Advanced Smart Cache	The shared L2 cache is dynamically allocated 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® Advanced Digital	Accelerates the execution of Streaming SIMD Extension (SSE) instructions to significantly improve the performance on a broad range of applications, including video, audio, and image processing, and multimedia, encryption, financial, engineering, and scientific 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. 45nm versions include a new Super Shuffle Engine, which improves existing SSE instructions while enabling significant gains on the latest SSE4 instruction set. SSE4-optimized applications, such as video editing and encoding in high-definition resolution, will see additional performance improvements.
Intel® Virtualization Technology (Intel® VT)[4/5]	Intel® VT allows one hardware platform to function as multiple "virtual" platforms. For businesses, Intel VT offers improved manageability, limiting downtime and maintaining worker productivity by isolating computing activities into separate partitions.
Intel® Trusted Execution Technology (Intel® TXT)[4/5]	Intel® TXT provides hardware-based mechanisms to help protect against software-based attacks and help protect the confidentiality and integrity of data stored or created on the system. It does this by enabling a trusted environment where applications can run within their own space, protected from all other software on the system.
Intel® 64[4] Architecture	Enables the processor to access larger amounts of memory. With appropriate 64-bit supporting 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[6]	Provides enhanced virus protection when deployed with a supported operating system. The Execute Disable Bit allows memory to 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, thereby preventing the code from infecting the system.
Intel Designed Thermal Solution for Boxed Processors	Includes a 4-pin connector for fan speed control to help minimize the acoustic noise levels generated from running the fan at higher speeds for thermal performance.[7] Fan speed control technology is based on actual CPU temperature and power usage.

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

(intel®)