Product Brief
Intel® X48 Express Chipset

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Own Your Competition

Desktop PC platforms based on the Intel® X48 Express Chipset, combined with either the Intel® Core™2 Extreme, Intel® Core™2 Quad, or Intel® Core™2 Duo processors, drive performance to new levels on games and multimedia applications. The Intel X48 Express Chipset supports the new Intel® QX9770 Core 2 Extreme processor with 1600 MHz Front Side Bus, dual-channel DDR3 1600 MHz Memory Support, Intel® Extreme Memory Profile (Intel® XMP), next-generation dual x16 PCI Express* 2.0, and Intel® Extreme Tuning, allowing for maximum platform performance.

The Intel® X48 Express Chipset

The Intel X48 Express Chipset adds a new chapter to the Intel chipset legacy and establishes new levels of performance with headroom and capabilities designed specifically to deliver the fastest platforms. The Intel X48 Express Chipset achieves this by supporting next-generation Intel® 45nm dual- and quad-core processors, enabling increased system bandwidth by supporting industry-leading technologies such as Intel Extreme Memory Profile, 1600 MHz System Bus Speed, and PCI Express* 2.0. Intel® Fast Memory Access and Intel® Turbo Memory further improve performance, while the removal of overspeed protection and ability to easily tune the system for optimum performance enable extreme power users to achieve performance levels beyond the Intel X48 Express Chipset's industry-leading baseline performance.

PCI Express* 2.0

The Intel® X48 Express Chipset supports PCI Express* 2.0 dual x16 graphics, delivering up to 16 GB/s bandwidth per port, double the bandwidth of PCI Express 1.0. PCI Express 2.0 enables greater flexibility and reliability in design because it is backward compatible with PCI Express 1.0 and can dynamically manage power and performance through software controls. The greatly improved 32 GB/s of graphics bandwidth capability enables higher levels of performance on graphics-intensive applications such as high-end gaming and video rendering.

Faster System Performance

With the growing imbalance between CPU and memory performance, it is critical to optimize the memory controller design to obtain the maximum possible performance from the memory subsystem. The redesigned Intel X48 Express Chipset Memory Controller Hub (MCH) architecture significantly increases overall system performance through the optimization of available bandwidth with the new 1600 MHz System Bus and reduction of memory access latency with Intel® Fast Memory Access. These technology breakthroughs result in optimized system architecture with built-in intelligence, greatly improving system memory performance.

DDR3 Memory

The updated Intel X48 Express Chipset includes support for wider internal data buses that enable dual-channel DDR3 memory technology, including support for Intel® XMP 1600 MHz DDR3 memory modules. The key advantages of DDR3 are higher bandwidth and an increase in performance at a lower power than DDR2. DDR3 SDRAM devices operating at 1600 MHz offer peak data transfer rates of up to 25.6 GB/s (12.8 GB/s per channel with DDR3 1600) of bandwidth and 8 GB memory addressability. The Intel X48 Express Chipset operates at a lower memory voltage—resulting in lower power consumption and reduced heat dissipation—while delivering higher bandwidth, faster system performance, and higher performance per watt than its predecessors.

What is Intel® Extreme Memory Profile (Intel® XMP)?

Intel XMP is a performance-packed expansion of the standard DDR3 memory specification, enabling a robust, overclocking solution designed to take advantage of the mega-gaming features built into Intel® technology-based PCs. If you like to overclock and squeeze every possible ounce of performance from your PC, memory based on Intel XMP is the solution you need to make overpowering your opposition look easy.
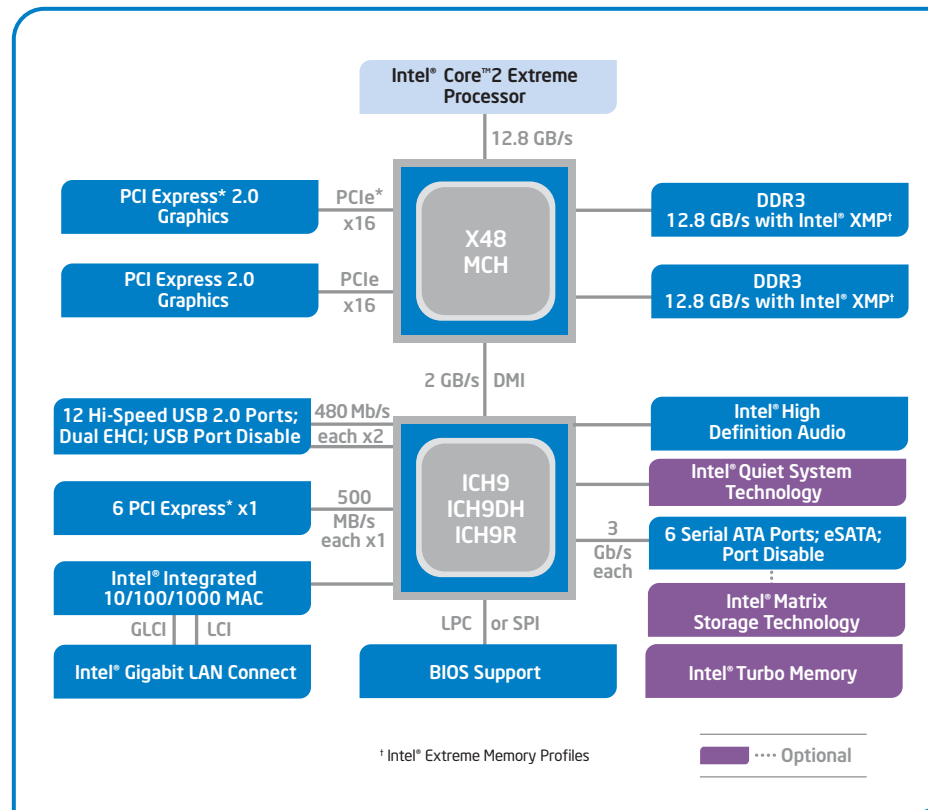
Designed for ultimate flexibility, Intel XMP-based platforms offer major advantages for pro gamers, novices, and everyone in between. With predefined and certified memory optimizations built into Intel XMP, overclocking on Intel technology-based PCs is easy right out of the box. Expert users still have the option of manually changing specific parameters for more aggressive tuning. Full specifications available at intel.com/personal/gaming/extremememory.htm

Intel® I/O Controller Hub (Intel® ICH9R/DH)

The Intel® ICH9 I/O Controller Hub of the Intel® X48 Express Chipset integrates several capabilities to provide flexibility for connecting I/O devices.

- **Intel® Matrix Storage Technology[1] (AHCI):** Native support of external SATA ports (eSATA), combined with Intel Matrix Storage Technology, provides the flexibility to add an external drive for increased data storage with up to six times faster performance than USB 2.0 or Firewire* 400[2]. Support for eSATA enables the full SATA interface speed of up to 3 Gb/s outside the chassis. The Advanced Host Controller Interface (AHCI) provides easier expandability with support for eSATA devices and native hot plug, while boosting boot and multi-tasking performance with Native Command Queuing (NCQ). In addition, support for Command-Based Port Multipliers, and RAID levels 0, 1, 5, and 10 enable greater reliability for personal data or maximum storage performance for intensive applications.

- **Intel® Rapid Recover Technology:** With the ability to instantly boot off a clone, Intel Rapid Recover Technology provides a fast, easy-to-use method for the end user to recover their data and return their system to an operational status.

- **Intel® Turbo Memory support (with Intel® ICH9R I/O controller configuration only):** An innovative flash memory-based overall system performance and boot-time accelerator. This feature is easily implemented using a PCI Express* x1 module and can be used with any SATA hard drive to improve system responsiveness. Intel Turbo Memory enables faster application loading and concurrent performance enhancements when used in conjunction with Intel Matrix Storage Technology (MST).

- **Intel® Quiet System Technology:** When integrated into all the different versions of the Intel ICH9 Intel Quiet System Technology can help reduce system noise and heat through more intelligent fan speed control algorithms.

Intel® X48 Express Chipset Block Diagram

Intel® Core™2 Extreme Processor

12.8 GB/s

PCI Express* 2.0 Graphics — PCIe* x16 — X48 MCH — DDR3 12.8 GB/s with Intel® XMP[†]

PCI Express 2.0 Graphics — PCIe x16 — DDR3 12.8 GB/s with Intel® XMP[†]

2 GB/s DMI

12 Hi-Speed USB 2.0 Ports; Dual EHCI; USB Port Disable — 480 Mb/s each x2 — Intel® High Definition Audio

Intel® Quiet System Technology

6 PCI Express* x1 — 500 MB/s each x1 — ICH9 ICH9DH ICH9R — 3 Gb/s each — 6 Serial ATA Ports; eSATA; Port Disable

Intel® Integrated 10/100/1000 MAC — Intel® Matrix Storage Technology

GLCI | LCI | LPC or SPI

Intel® Gigabit LAN Connect — BIOS Support — Intel® Turbo Memory

† Intel® Extreme Memory Profiles — ···· Optional

3

Intel® X48 Express Chipset Features at a Glance

Feature	Benefit
1600 / 1333 / 1066 / 800 MHz System Bus	Supports the Intel® Core™2 Extreme, Intel® Core™2 Quad, and Intel® Core™2 Duo processors with Intel® Virtualization Technology[3] and any Intel® processor using the LGA775 socket.
PCI Express* 2.0 Interface	PCI Express 2.0 delivers up to 16 GB/s bandwidth for each port, twice that of PCI Express 1.0. It provides leading-edge graphics performance with dual x16 graphic card configuration.
Intel® Fast Memory Access	Updated Memory Controller Hub (MCH) backbone architecture improves system performance by optimizing the use of available memory bandwidth and reducing the latency of the memory accesses.
Dual-Channel DDR3 Memory Support	Delivers up to 25.6 GB/s (12.8 GB/s per channel with DDR3 1600) of bandwidth and 8 GB memory addressability for faster system responsiveness and support of 64-bit computing.
Intel® Flex Memory Technology	Facilitates easier upgrades by allowing different memory sizes to be populated and remain in dual-channel mode.
Intel® High Definition Audio[4]	Integrated audio support enables premium digital sound and delivers advanced features such as multiple audio streams and jack re-tasking.
Intel® Matrix Storage Technology	With a second hard drive added, provides quicker access to digital photo, video, and data files with RAID 0, 5, and 10, and greater data protection against a hard disk drive failure with RAID 1, 5, and 10. Support for external SATA (eSATA) enables the full SATA interface speed outside the chassis, up to 3 Gb/s.
Intel® Rapid Recover Technology	Intel's latest data protection technology provides a recovery point that is used to quickly recover a system should a hard drive fail or if there is massive data corruption. The clone can also be mounted as a read-only volume to allow a user to recover individual files.
Intel® Turbo Memory	Intel's innovative NAND cache is designed to improve the responsiveness of applications, application load times, and system boot performance.
Serial ATA (SATA) 3 Gb/s	High-speed storage interface supports faster transfer rates for improved data access.
eSATA	SATA interface designed for use with external SATA devices. Provides a link for 3 Gb/s data speeds to eliminate bottlenecks found with current external storage solutions.
SATA Port Disable	Allows individual SATA ports to be enabled or disabled as needed. This feature provides added protection of data by preventing malicious removal or insertion of data through SATA ports. Especially targeted for eSATA ports available on the outside of the system.
USB Port Disable	Allows individual USB ports to be enabled or disabled as needed. This feature provides added protection of data by preventing malicious removal or insertion of data through USB ports.

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

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