intel®
Leap ahead

Intel® G33 Express Chipset
Flexibility and scalability for digital home computing and entertainment

The new Intel® G33 Express Chipset supports Intel's upcoming 45nm processors. It combines performance with greater energy efficiency. The Intel G33 Express Chipset enables enhanced 3D and high-definition video technologies for a better end-user experience.

The Intel G33 Express Chipset

Desktop PC platforms combined with either the Intel® Core™2 Duo or Intel® Core™2 Quad processor, deliver new technologies and innovating capabilities for digital home consumers. A faster 1333 MHz system bus, DDR3 memory technology and Intel® Fast Memory Access (Intel® FMA) deliver increased system performance for today's user needs. Lower power consumption and Intel® Quiet System Technology (Intel® QST) enable quieter systems and innovative form factors. The combination of complementary technologies provides platform scalability. Innovative I/O technologies speed up application load times, provide data protection, and improve overall system responsive-ness. The Intel G33 Express Chipset enables a balanced digital home platform within your home computing environment.

Intel® Viiv™ processor technology

Intel® Viiv™ processor technology[1] is a set of PC technologies designed for the enjoyment of digital entertainment in the home. Intel G33 Express Chipset has support for Intel Viiv processor technology with either the ICH9R or ICH9DH SKUs.

Faster System Performance

The Intel® G33 Graphics Memory Controller Hub (GMCH) incorporates an updated GMCH backbone architecture that significantly increases overall system performance through the optimization of available bandwidth with the new 1333 MHz system bus and reduction of memory access latency with
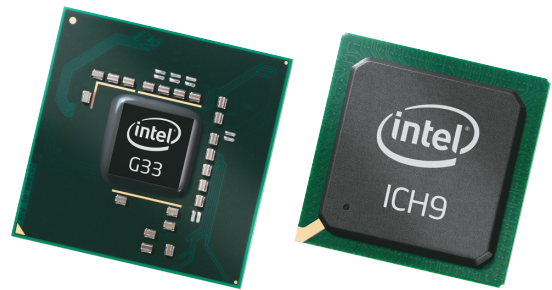
Intel Fast Memory Access. This updated GMCH also includes support for the next-generation 45nm Intel® Core™ processor family and wider internal data buses that support dual-channel DDR3 memory technology at 1066 MHz (up to 17 Gb/s of peak memory bandwidth in dual-channel interleaved mode).

DDR3 Memory

The Intel G33 Express Chipset supports the new dual-channel DDR3 memory technology at 1066 MHz while also maintaining support for DDR2 memory. The key advantages of DDR3 are the higher bandwidth and the increase in performance at a lower power than DDR2. The DDR3 SDRAM devices operating at 1066 MHz, offer peak data transfer rates of up to 17 Gb/s (when operated in dual-channel interleaved mode). The Intel G33 Express Chipset operates at a lower memory voltage, resulting in approximately 20% lower power consumption and reduced heat dissipation, but delivers higher bandwidth, faster system perfor-mance, and higher performance per watt than its predecessors.[2]

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G33
EXPRESS CHIPSET

Graphics Enhancements

The Intel G33 Express Chipset delivers an excellent blend of graphics performance and features to meet mainstream consumer needs with the new Intel® Graphics Media accelerator 3100 (Intel® GMA 3100). With optimized performance and support for Microsoft DirectX* 9.0c, Shader Model 2.0 and OpenGL* 1.4, Intel GMA 3100 delivers excellent 3D graphics and stunning graphics responsiveness. Intel GMA 3100 also includes support for the latest PC operating systems, including Windows Vista*.

Enhanced Video Playback and Advanced Digital Display Support

Intel® Clear Video Technology delivers enhanced high-definition video playback, sharper images, precise color control, and precise color control for a premium visual experience. In addition, Intel Clear Video Technology provides users with a rich, new media experience to deliver smooth, stutter free high-definition playback on the PC without the need for expensive add-in video cards or decoders.

Intel Clear Video Technology allows the PC to connect to a wide range of digital displays by supporting the latest digital display interfaces, including the High-Definition Multimedia Interface[3] (HDMI). HDMI carries uncompressed HD video and uncompressed multichannel audio in a single cable, supporting all HD formats including 720p, 1080i, and 1080p. The Intel G33 Express Chipset supports up to 2048 x 1536 screen resolution at 75 Hz.
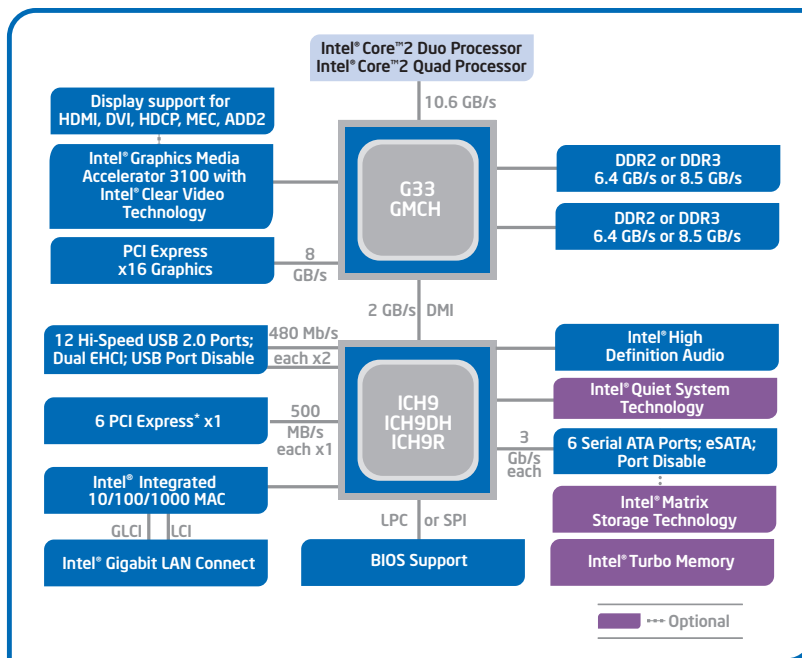
Intel® I/O Controller Hub (Intel® ICH9/R/DH)

The Intel® ICH9 I/O controller hub of the Intel G33 Express Chipset integrates several capabilities to provide flexibility for connecting I/O devices.

- **Intel® Matrix Storage Technology[4] (when configured with ICH9R I/O controller):** Native support of external SATA* ports (eSATA), combined with Intel Matrix Storage Technology (Intel® MST), provides the flexibility to add an external drive for increased data storage with up to 6 times faster performance than USB* 2.0 or Firewire* 400[5]. 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 (part of Intel Matrix Storage 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:** The Intel G33 Express Chipset also supports Intel® Turbo Memory (when configured with ICH9R I/O controller), 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[4].

- **Intel® Quiet System Technology (Intel® QST):** Integrated into all the different SKUs of the Intel ICH9, Intel QST can help reduce system noise and heat through more intelligent fan speed control algorithms.

Intel® Clear Video Technology

Feature	Benefit
Enhanced HD Playback	• Dedicated hardware acceleration enables smooth playback of high-bitrate high-definition MPEG2 video content and multi-stream playback (up to 1 HD and 1 SD stream) for picture-in-picture.
Sharper Image Quality	• Adaptive de-interlacing algorithms provide enhanced picture clarity for interlaced content by minimizing artifacts of interlaced video.
Precise Color Control	• Built-in ProcAmp color control settings allow user adjustment of hue, saturation, brightness, and contrast.
Advanced Digital Display Support	• Support for the latest digital displays, including the High-Definition Multimedia Interface[3] (HDMI), allows a simple and easy connection between the PC and set-top box, DVD player, and video monitor/DTV.

Intel® Core™2 Duo Processor
Intel® Core™2 Quad Processor

10.6 GB/s

Display support for HDMI, DVI, HDCP, MEC, ADD2

Intel® Graphics Media Accelerator 3100 with Intel® Clear Video Technology

G33 GMCH

DDR2 or DDR3 6.4 GB/s or 8.5 GB/s

DDR2 or DDR3 6.4 GB/s or 8.5 GB/s

PCI Express x16 Graphics

8 GB/s

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

6 PCI Express* x1

500 MB/s each x1

ICH9 ICH9DH ICH9R

Intel® Quiet System Technology

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

··· Optional

Intel® G33 Express Chipset Block Diagram

Intel® G33 Express Chipset Features at a Glance

Feature	Benefit
1333/1066/800 MHz System Bus	• Supports the Intel® Core™2 Duo and Intel® Core™2 Quad processors with Intel® Virtualization Technology[6], Dual-Core Intel® Pentium® processor, and Intel® Celeron® processor.
PCI Express* 1.1 Interface	• The PCI Express 1.1 provides 8 Gb/s bandwidth for platform graphics.
Intel® Fast Memory Access	• Updated Graphics Memory Controller Hub (GMCH) backbone architecture that improves system performance by optimizing the use of available memory bandwidth and reducing the latency of the memory accesses.
Dual-Channel DDR2 Memory Support	• Delivers up to 12.8 Gb/s (DDR2 800 dual 6.4 Gb/s) of bandwidth and 8 Gb memory addressability for faster system responsiveness and support of 64-bit computing.
Dual-Channel DDR3 Memory Support	• Delivers up to 17 Gb/s (DDR3 1066 dual 8.5 Gb/s) 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® Graphics Media Accelerator 3100	• 3D enhancements enable greater flexibility and scalability and improved realism with support for Microsoft DirectX* 9.0c Shader Model 2.0, OpenGL* 1.4. Intel® Graphics also support the highest levels of the Windows Vista* Aero experience.
Intel® Clear Video Technology	• Video processing hardware and software delivers enhanced high-definition video playback, sharper images with adaptive de-interlacing, and ProcAmp color controls.
Support for High Definition Multimedia Interface[3] (HDMI)	• HDMI delivers uncompressed HD video and uncompressed multi-channel audio in a single cable, supporting all HD formats including 720p, 1080i and 1080p.
Intel® High Definition Audio[7]	• Integrated audio support enables premium digital surround sound and delivers advanced features such as multiple audio streams and jack re-tasking.
Intel® Matrix Storage Technology[4]	• 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 can be 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 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 rate for improved data access with up to 6 SATA ports.
eSATA*/Port Multiplier	• SATA interface designed for use with external SATA devices. It provides a link for 3 Gb/s data speeds to eliminate bottlenecks found with current external storage solutions. Intel also supports natively port multipliers. Combining port multipliers, eSATA, and Intel® Matrix Storage Technology provides great flexibility and expandability for external storage solutions.
SATA* Port Disable	• Enables 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 external eSATA ports.
USB* Port Disable	• Enables 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.
Intel® Quiet System Technology	• Intelligent system fan speed control algorithms use operating temperature ranges more efficiently to reduce system noise by minimizing fan speed changes.

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