

Intel® G965 Express Chipset

Advanced capabilities for digital home computing and entertainment

Desktop PC platforms based on the Intel® G965 Express Chipset, combined with either the Intel® Core™2 Duo or Intel® Pentium® D processor, deliver innovative capabilities and usages for digital home consumers. Exciting improvements expand digital home capabilities, while enabling lower power and quieter systems.



The Intel® G965 Express Chipset

The Intel G965 Express Chipset continues the Intel chipset legacy and extends it to new levels with purpose-built capabilities designed specifically to address the key needs of the home user. With advancements in graphics, video, responsiveness and data protection, the Intel G965 Express Chipset allows your PC to be the center of home computing, communication, and entertainment.

Advanced Graphics Performance

The Intel G965 Express Chipset delivers a new generation of graphics with the Intel® Graphics Media Accelerator X3000 (Intel® GMA X3000). With 667 MHz performance and support for Microsoft DirectX® 9.0c Shader Model 3.0 and OpenGL® 1.5, Intel GMA X3000 delivers spectacular 3D graphics and remarkable graphics responsiveness. Further support for hardware transform and lighting and floating point operations enables greater gaming compatibility and increased detail and realism. This enhanced graphics core provides performance on par with mainstream graphics card solutions that would typically cost significantly more. Intel GMA X3000 also includes support for the latest PC operating systems, including Microsoft Windows Vista® (Premium), which includes integration of the Media Center Edition® (MCE) features and video controls.

The Intel Chipset Story

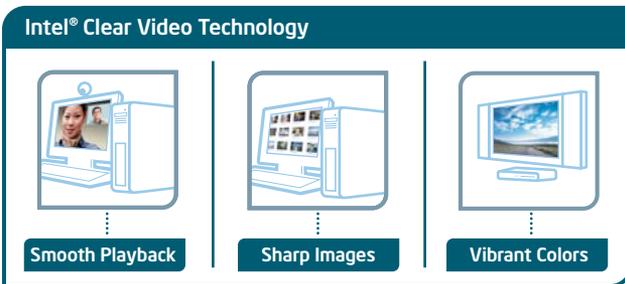
Since delivering its first chipset almost 25 years ago, Intel's Chipset Group has maintained a vision to design, develop and deliver the highest quality and most innovative chipsets to maximize the home and office computing experiences. A commitment to the highest levels in validation, interoperability, ecosystem completeness and scalability goes into each and every Intel chipset. The work of over 2,500 people and Intel's annual investment of \$300M in platform validation, combined with full chipset simulation a year prior to production shipment, ensure these high-quality products are delivered on a predictable annual cadence. Bringing these chipsets to you requires the industry's most far reaching supply and services network. Intel chipsets mean innovation, completeness and reliability.

Enhanced Video Playback

Intel® Clear Video Technology, a new feature available on all Intel G965 Express Chipset-based platforms, is a combination of video processing hardware and software technologies that delivers enhanced high-definition video playback, sharper images, precise color control and advanced support for a wide range of digital displays. This technology allows users to experience high-definition playback on the PC without the need for expensive add-in video cards or decoders.

Advanced Digital Display Support

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 (HDMI). HDMI carries uncompressed HD video and uncompressed multi-channel audio in a single cable, supporting all HD formats including 720p, 1080i and 1080p. The Intel G965 Express Chipset supports 2048 x 1536 screen resolution at 75 Hz.



Intel® Clear Video Technology uses advanced hardware and software techniques to deliver smooth high-definition video playback, sharp images with fine detail, and precise color control, enabling a premium visual experience.

Faster System Performance

With the growing imbalance between CPU and memory performance, it becomes critical to optimize the memory controller features to obtain the maximum possible performance out of the memory subsystem. The Intel G965 Express Chipset incorporates Intel® Fast Memory Access, an updated Graphics Memory Controller Hub (GMCH) backbone architecture that significantly increases overall system performance through the optimization of available bandwidth and reduction of memory access latency. This updated GMCH with Intel Fast Memory Access also includes wider internal data buses that support dual-channel DDR2 memory technology at 800 MHz (up to 12.8 GB/s of peak memory bandwidth) for greater platform performance and memory flexibility.

Intel® I/O Controller Hub (Intel® ICH8/R/DH)

The I/O controller hub of the Intel G965 Express Chipset integrates several capabilities designed to improve data protection, audio, and performance in the PC.

- Intel® Matrix Storage Technology (Intel® MST): With new support for external SATA* ports (eSATA), Intel MST provides flexibility to add a second external drive for increased data protection with up to 6 times faster performance¹ than USB* or Firewire* 400. Support for eSATA enables the full SATA interface speed outside the chassis, up to 3 Gb/s. Support for RAID levels 0, 1, 5 and 10 enable greater reliability for personal data, or maximum storage performance for intensive applications. 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).

Intel® Clear Video Technology

Enhanced HD Playback

- Dedicated hardware acceleration enables smooth playback of high bitrate high-definition video content and multi-stream playback (up to 1 HD and 1 SD stream) for picture-in-picture.

Sharper Image Quality

- Advanced de-interlacing algorithms provide enhanced picture clarity for interlaced content. Directional motion detection and phase algorithms minimize artifacts of de-interlaced video.

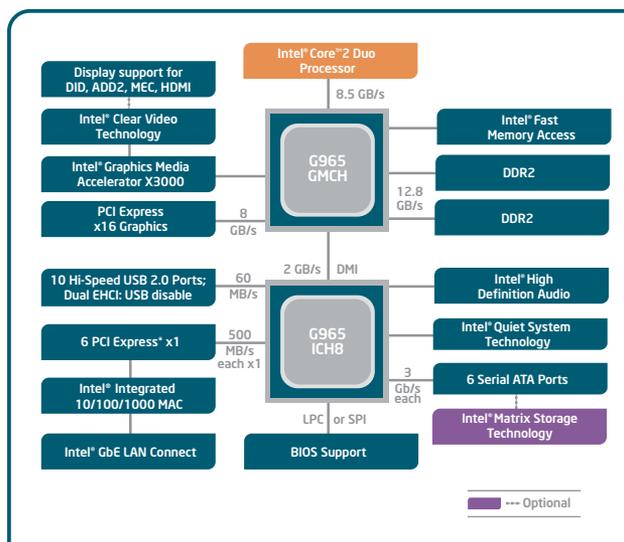
Precise Color Control

- 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 (HDMI), allows a simple and easy connection between the PC and set-top box, DVD player, and video monitor/DTV.

- Intel® High Definition Audio³ (Intel® HD Audio) enables premium digital sound in the PC for an immersive surround sound home theater experience. Support for multiple audio streams enables users to listen to two different audio streams simultaneously in two separate rooms.
- Intel® Quiet System Technology integrated into the Intel G965 Express Chipset can help reduce system noise and heat through more intelligent fan speed control algorithms.



Intel® G965 Express Chipset Block Diagram

Intel® G965 Express Chipset Features At A Glance

Feature	Benefit
1066/800/533 MHz System Bus	<ul style="list-style-type: none"> Supports the Intel® Core™2 Duo processor with Intel® Virtualization Technology⁴, Intel® Pentium® D processor 900⁵, Intel® Pentium® 4 processor with HT Technology¹ and all other Intel® processors using the LGA775 socket.
PCI Express* Interface	<ul style="list-style-type: none"> The PCI Express x16 graphics interface supports the latest high-performance graphics cards. The PCI Express x1 I/O ports offer up to 3.5X the bandwidth over traditional PCI architecture, delivering faster access to peripheral I/O devices.
Intel® Fast Memory Access	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Delivers up to 12.8 GB/s of bandwidth and 8 GB memory addressability for faster system responsiveness and support of 64-bit computing.
Intel® Flex Memory Technology	<ul style="list-style-type: none"> Facilitates easier upgrades by allowing different memory sizes to be populated and remain in dual-channel mode.
Intel® Graphics Media Accelerator X3000	<ul style="list-style-type: none"> 3D enhancements enable greater game compatibility with support for Hardware T&L, and improved realism with support for Microsoft DirectX* 9.0c Shader Model 3.0, OpenGL* 1.5, and floating point operations. Intel® Graphics also support the highest levels of the Microsoft Vista* Aero experience.
Intel® Clear Video Technology	<ul style="list-style-type: none"> Video processing hardware and software delivers enhanced high-definition video playback, sharper images with advanced de-interlacing, and advanced ProcAmp color controls.
Support for High Definition Multimedia Interface (HDMI)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Integrated audio support enables premium digital sound and delivers advanced features such as multiple audio streams and jack re-tasking. The Dolby PC Entertainment Experience*⁵ is available exclusively on systems with Intel High Definition Audio.
Intel® Matrix Storage Technology	<ul style="list-style-type: none"> 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.
Serial ATA (SATA) 3 Gbp/s	<ul style="list-style-type: none"> High-speed storage interface supports faster transfer rate for improved data access.
USB* Port Disable	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Intelligent system fan speed control algorithms use operating temperature ranges more efficiently to reduce perceived system noise by minimizing fan speed changes.

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

¹Intel® Matrix Storage Technology requires a motherboard with the Intel® 82801HR (ICH8R), Intel® 82801GR (ICH7R), or Intel® 82801FR (ICH6R) I/O Controller Hub System. The system must also have the RAID controller in the BIOS enabled and the Intel Matrix Storage Technology software driver installed. Please consult your system vendor for more information.

²Performance based on interface speed and data transfer rate specifications for eSATA, USB 2.0 and Firewire 400.

³Intel® High Definition Audio requires a system with the Intel 965, 955, 945, 925, 915 or 910 Express Chipset and a motherboard with an appropriate codec and the necessary drivers.

⁴Intel® Virtualization Technology requires a computer system with a processor, chipset, BIOS, virtual machine monitor (VMM) and applications enabled for virtualization technology. Functionality, performance or other virtualization technology benefits will vary depending on hardware and software configurations. Virtualization technology-enabled BIOS and VMM applications are currently in development.

⁵The Dolby PC Entertainment Experience* Initiative is only available on systems based on the Intel 965, 975, 955, 945, 925, 915 or 910 Express Chipset. Only boards with either Dolby Home Theater Ready or Dolby Master Studio Ready logo and systems with either Dolby Home Theater or Dolby Master Studio logos are capable of supporting the Dolby PC Entertainment Initiative.

⁶Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number for details.

⁷Hyper-Threading Technology requires a computer system with an Intel® Pentium® 4 processor supporting HT Technology and a HT Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See www.intel.com/homepage/land/hyperthreading_more.htm for additional information.

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