Product Brief

Mobile Intel® Express Chipsets

Embedded Computing

Mobile Intel® GM45, GS45, and GL40 Express Chipsets for Embedded Computing

Product Overview

The Mobile Intel® GM45, GS45, and GL40 Express chipsets provide outstanding flexibility for developers of embedded applications with excellent graphics, memory and I/O bandwidth, as well as remote asset management capabilities, storage speed and reliability. They address requirements of a broad range of embedded applications such as retail and transaction solutions, gaming platforms and industrial automation equipment. The Mobile Intel GM45 and GS45 Express chipsets provide the same feature set and functionality in different form factors, while the Mobile Intel GL40 Express chipset offers a subset of features ideal for value-oriented applications.

These chipsets consist of the Intel® 82GM45/82GS45/82GL40 Graphics Memory Controller Hub (GMCH), and the Intel® I/O Controller Hub 9M (ICH9M), available in three SKUs. The ICH9M delivers outstanding system performance through high-bandwidth interfaces including PCI Express*, Serial ATA, and USB 2.0.

Product Highlights

- Optimized for the following processors:
  - Intel® Core™2 Duo processor T9400[Δ] at 2.53 GHz with 35 watts thermal design power (TDP) [GM45]
  - Intel® Core™2 Duo processor P8400[Δ] at 2.26 GHz with 25 watts TDP [GM45]
  - Intel® Core™2 Duo processor SL9400[Δ] at 1.86 GHz with 17 watts TDP [GS45]
  - Intel® Core™2 Duo processor SP9300[Δ] at 2.26 GHz with 25 watts TDP [GS45]
  - Intel® Core™2 Duo processor SU9300[Δ] at 1.2 GHz with 10 watts TDP [GS45]
  - Intel® Celeron® M processor ULV 722[Δ] at 1.2 GHz with 5.5 watts TDP [GS45]
  - Intel® Celeron® M processor ULV 723[Δ] at 1.2 GHz with 10 watts TDP [GS45]
  - Intel® Celeron® processor T3100[Δ] with two cores at 1.9 GHz with 35 watts TDP [GL40/GM45]
  - Intel® Celeron® processor 575[Δ] at 2.0 GHz with 31 watts TDP [GL40/GM45]
- Up to 1066 MHz FSB delivers a high-bandwidth connection between processor and chipset.
- Dual-channel memory controller supports non-ECC, 667/800 MHz DDR2 or 800/1066 MHz DDR3 SODIMM SDRAM, and provides high-speed memory transactions for greater system performance.
- Mobile Intel® Graphics Media Accelerator 4500MHD, Intel® Clear Video Technology, and graphics core speeds up to 533 MHz improve graphics and 3D rendering performance, and enable high-definition video playback (GM45 and GS45).
- Support for numerous display/video output options includes VGA, LVDS, DVI, High Definition Multimedia Interface (HDMI) and DisplayPort with integrated High-bandwidth Digital Copy Protection (HDCP) technology. Dual independent display support allows for flexible display configurations.
- x16 PCI Express graphics or a dual-channel Serial Digital Video Output (SDVO) graphics interface supports high throughput for high-end graphics (GM45 and GS45).
- Advanced packaging technology and industry-leading electrical design innovations deliver long-term system reliability over a broad spectrum of operating conditions.
- Direct Media Interface chip interconnect between the GMCH and the ICH can be implemented at x4 or x2 widths, providing up to 1 GB/s in each direction in full duplex.
- 12 USB 2.0 ports may be controlled by up to two high-speed Enhanced Host Controller Interfaces (EHCI) or up to six Universal Host Controller Interfaces. Each EHCI allows data transfers of up to 480 Mb/s.
- Up to six PCI Express root ports on the ICH are configurable as six single x1 ports or partially ganged together as one x4 port and two x1 ports. Each root port allows transfer rates of up to 2.5 GB/s in each direction.
- Intel® High Definition Audio[1] interface delivers premium digital multi-channel sound.

Product Highlights (continued)

- LAN Connect Interface provides flexible network solutions such as 10/100/1000 Mb/s Ethernet with LAN manageability.
- Two integrated Serial ATA host controllers, each with transfer rates of up to 3 Gb/s, support four SATA ports for increased storage capacity and speed.
- Intel Matrix Storage Technology provides both AHCI and RAID functionality for improved storage speed and data redundancy (ICH9M-Enhanced SKU only; GM45 and GS45).
- Intel® Active Management Technology[2] (Intel® AMT), when used with the Intel® WG82567LM Gigabit Ethernet Controller, supports asset management capabilities such as remote management of unmanned sites (ICH9M-Enhanced SKU only; GM45 and GS45).
- Intel® Trusted Execution Technology[3] Intel® (TXT) provides hardware-based mechanisms to help defend against software-based attacks and protect the confidentiality and integrity of data stored or created on the system. Intel TXT enables each application to run within its own space, protected from all other software on the system (GM45 and GS45).
- Embedded lifecycle support protects system investment by enabling extended product availability for embedded and communications customers.
- A strong ecosystem of hardware and software vendors, including members of the Intel® Embedded and Communications Alliance (intel.com/go/eca), helps developers cost-effectively meet design challenges and speed time-to-market.

Software Overview

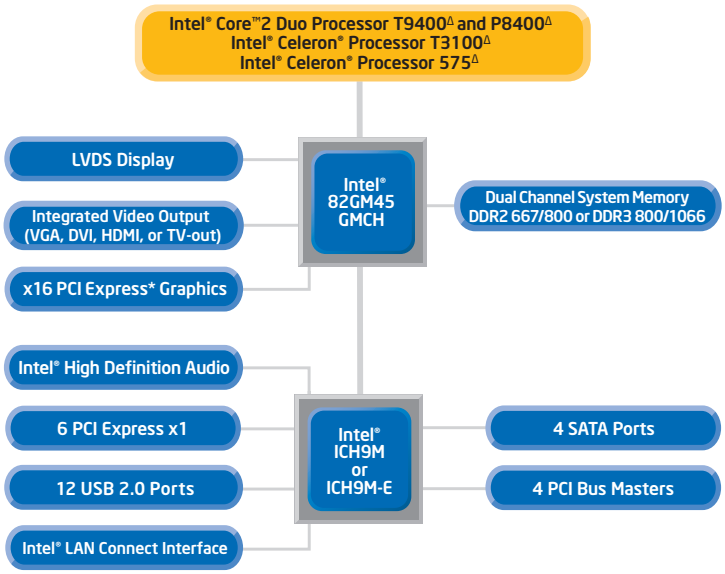
A number of independent operating system and BIOS vendors provide support for these platforms:

Operating System	Contact
Microsoft Windows* XP	Intel provides drivers[4]
Microsoft Windows* Embedded Standard	Intel provides drivers[4]
Microsoft Windows* Embedded POSReady	Intel provides drivers[4]
Red Hat Enterprise Linux* 5	Red Hat
Novell SUSE Linux* Enterprise 10	Novell
Wind River Linux*	Wind River
Wind River VxWorks* 6.6	Wind River

BIOS
American Megatrends
Insyde Software
Phoenix Technologies

These chipsets are supported by the Intel® Embedded Graphics Drivers and video BIOS, developed specifically for embedded products and applications (developer.intel.com/design/intarch/SWsup/graphics_drivers.htm).

For the most recent software updates, please visit downloadcenter.intel.com, and enter the product name.



Mobile Intel® GM45/GS45/GL40 Express Chipsets for Embedded Computing

Product Name	Product Code	Package	Features
Intel® 82GM45 Graphics Memory Controller Hub	AC82GM45	1329 µFC-BGA	1066 MHz FSB; up to 8 GB 667/800 MHz DDR2 or 800/1066 MHz DDR3 system memory; Mobile Intel® Graphics Media Accelerator 4500MHD; PCI Express* graphics support.
Intel® 82GS45 Graphics Memory Controller Hub	AC82GS45	1363 µFC-BGA SFF[5]	Includes all features of GM45.
Intel® 82GL40 Graphics Memory Controller Hub	AC82GL40	1329 µFC-BGA	800 MHz FSB; up to 4 GB 667/800 MHz DDR2 or 800 MHz DDR3 system memory; Mobile Intel® Graphics Media Accelerator 4500M.
Intel® I/O Controller Hub 9M (ICH9M)	AF82801IBM	676 µ-BGA	Direct connection to the GMCH via Direct Media Interface; six PCI Express root ports; four-port Serial ATA controller; up to twelve USB 2.0 ports; Intel® High Definition Audio interface.
Intel® I/O Controller Hub 9M Enhanced (ICH9M-Enhanced)	AF82801IEM	676 µ-BGA	Includes all features of ICH9M, plus RAID 0/1 and Intel® Active Management Technology 4.0 support.
Intel® I/O Controller Hub 9M Enhanced SFF (ICH9M-Enhanced SFF)[5]	AM82801IUX	576 µ-BGA SFF	Includes all features of ICH9M-Enhanced. Available with GS45 only.

Intel in Embedded and Communications: Intel.com/embedded

[Δ] Intel 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.

[1] Intel® High Definition Audio requires a system with a supporting chipset and a motherboard with an appropriate codec and the necessary drivers installed. System sound quality will vary depending on actual implementation, controller, codec, drivers and speakers. For more information about Intel® HD audio, refer to www.intel.com.

[2] Intel® Active Management Technology requires the computer system to have an Intel® AMT-enabled chipset, network hardware and software, as well as connection with a power source and a corporate network connection. Setup requires configuration by the purchaser and may require scripting with the management console or further integration into existing security frameworks to enable certain functionality. It may also require modifications or implementation of new business processes. For more information, see www.intel.com/technology/platform-technology/intel-amt/.

[3] No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). The MLE could consist of a virtual machine monitor, an OS or an application. In addition, Intel TXT requires the system to contain a TPM v1.2, as defined by the Trusted Computing Group and specific software for some uses. For more information, see http://www.intel.com/technology/security.

[4] Drivers available at: downloadcenter.intel.com (enter chipset name).

[5] SFF = small form factor package.

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