PRODUCT BRIEF
Intel® Core™ i5 and Core™ i3 Processors
Embedded Computing

Intel® Core™ i5-660 and Core™ i3-540 Processors for Embedded Computing

Product Overview

Based on 32nm process technology, Intel® Core™ i5-660Δ and Core™ i3-540Δ processors feature dual-core processing and Intel® Hyper-Threading Technology[1] to meet the performance needs of embedded applications. The Intel Core i5-660 processor also features Intel® Turbo Boost Technology.[2] This further improves performance by allowing processor cores to run at higher frequencies within the available thermal headroom.

When paired with the Intel® Q57 chipset or the Intel® 3450 chipset, these platforms provide ideal solutions for embedded market segments such as retail, digital signage, digital security surveillance, gaming, medical, communications and industrial automation and control.

With the graphics engine integrated into the processor, these two-chip solutions provide enhanced graphics performance compared with previous Intel® platforms. The memory controller hub is also integrated into the processor, providing for lower memory latency and overall platform footprint. While incorporating advanced technology, these processors remain software-compatible with previous IA-32 processors. Developers can create one board design and scale their product line with a variety of processors using the same socket.

Advanced Encryption Standard Instructions (AES-NI) has been added to the Intel Core i5-660 processor to help accelerate data encryption, decryption, and improve performance. Error correcting code (ECC) memory is supported on both processors when paired with the Intel 3450 chipset.

Product Highlights

Integrated graphics engine: Supports enhanced graphics performance and capabilities while reducing overall platform power and footprint.

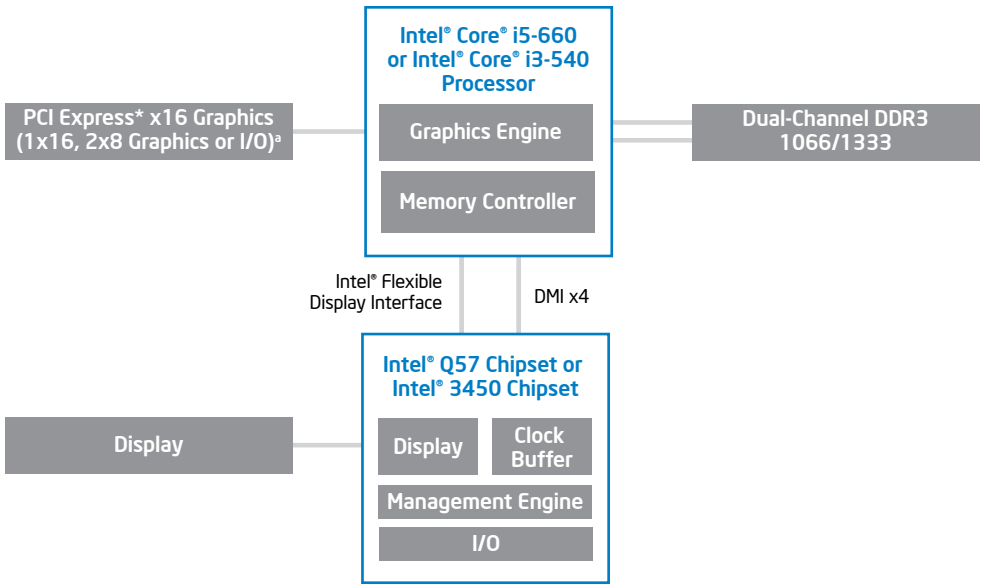
Memory Error Correction: When paired with the Intel 3450 chipset, ECC memory provides a higher level of data integrity, reliability, and system uptime.

Intel® Intelligent Power Technology[3]: Reduces idle power consumption through architectural improvements such as integrated power gates and automated low-power states.

Intel Turbo Boost Technology: Applications take advantage of higher speed execution on demand by using available processor thermal headroom, allowing individual processor cores to run at a higher frequency (Intel Core i5-660 processor only).

Intel Hyper-Threading Technology: Enables simultaneous processing of two threads per core, significantly improving performance and efficiency of multi-threaded applications.

Intel® vPro™ technology: Delivers unprecedented hardware support for vital security and management functions with Intel® Virtualization Technology,[4] Intel® Active Management Technology,[5] and Intel® Trusted Execution Technology[6] (Intel Core i5-660 processor only).



a2x8 PCIe graphics option available when paired with Intel® 3450 chipset

Software Overview

The following independent operating system and BIOS vendors provide support for these platforms.

OPERATING SYSTEM	CONTACT
Vista* SP2	Intel provides drivers[7]
Windows Server* 2003/2008	Intel provides drivers[7]
Windows* 7	Intel provides drivers[7]
Windows 7 Embedded	Intel provides drivers[7]
Microsoft Windows* XP SP3	Intel provides drivers[7]
Microsoft Windows Embedded Standard (XPe)	Intel provides drivers[7]
Microsoft Windows Embedded POSReady (WEPOS)	Intel provides drivers[7]
Red Hat Enterprise Linux* 6	Red Hat
Fedora Core* 10	Red Hat
SUSE SLE* 11	Novell
Wind River Linux* 3.0	Wind River
Wind River VxWorks* 6.8	Wind River

BIOS
American Megatrends
Insyde Software
Phoenix Technologies

Platform Features and Benefits

FEATURES	BENEFITS
Supports key embedded platform requirements	Ideal for compute-intensive embedded applications.
Extended life cycle product support	Protects system investment by enabling extended product availability for embedded customers.
Embedded ecosystem support	Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Embedded Alliance (intel.com/go/eca), Intel helps to cost-effectively meet development challenges and speed time-to-market.
Intelligent performance	Delivers optimum efficiency by adapting performance to embedded application needs.
Intel® Turbo Boost Technology[2] (i5-660 only)	Boosts performance for specific workloads by increasing processor frequency.
Intel® QuickPath Technology	Delivers bandwidth improvement for data-intensive applications.
Intel® Hyper-Threading Technology[1]	Enables simultaneous multi-threading within each processor core, up to two threads per core, or up to four threads per processor; reduces computational latency, making optimal use of every clock cycle.
Intel® Advanced Smart Cache	Large on-die shared Last Level Cache reduces latency to data, improving performance and power efficiency.
Advanced Encryption Standard Instructions (AES-NI) (i5-660 only)	New instructions added to the architecture help accelerate data encryption and decryption, and improve performance.
Error Correcting Code (ECC) Memory (when paired with Intel® 3450 chipset)	Detects multiple-bit memory errors; locates and corrects single-bit errors to keep the system up and running.
Intel® Intelligent Power Technology[3]	Automated energy-efficiency capabilities reduce power consumption.
Integrated power gates	Reduces idle processor cores to near zero power when not in use to help conserve power and lower operating costs.
Automated low-power states	Adjusts system power consumption based on real-time processor loads.
Intel® vPro™ Technology	Remote management, flexible virtualization and enhanced security capabilities enable solutions that are reliable, trusted, and cost-effective.
Intel® Active Management Technology[5] 6.0 (Intel® AMT) (i5-660 only)	The latest remote management and maintenance capabilities enable IT professionals to query, fix, and protect networked embedded devices, even when they're powered off, not responding or have software issues. As part of Intel vPro technology, Intel AMT helps perform remote asset tracking and checks the presence of management agents virtually anytime. Also, devices can be remotely turned on/off to reduce energy consumption during non-peak operating times.
Intel® Virtualization Technology[4]	Speeds the transfer of platform control and movement of data between the virtual machine monitor (VMM) and other platform agents (including guest OSs and I/O devices). By lowering the workload on the VMM, this technology addresses many embedded system design challenges, like migrating legacy software, increasing real-time performance, and making applications more secure.
Intel® Trusted Execution Technology[6] (i5-660 only)	Protects embedded devices and virtual environments against rootkit and other system level attacks. Using an industry-standard TPM 1.2 to store keys and other protected data, this portion of Intel vPro technology boots the BIOS, operating system and software into a "trusted" execution state, verifying the integrity of the virtual machine and protecting the platform from unauthorized access.

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PROCESSOR NUMBER[Δ]	CORES/ THREADS	CORE FREQUENCY (GHz)			LAST LEVEL CACHE	THERMAL DESIGN POWER	PACKAGE
		BASE FREQUENCY	1 CORE TURBO	2 CORE TURBO			
Intel® Core™ i5-660	2/4	3.33	3.60	3.46	4 MB	73 W	LGA1156
Intel® Core™ i3-540	2/4	3.06	N/A	N/A	4 MB	73 W	LGA1156

PROCESSOR NUMBER[Δ]	ERROR CORRECTING CODE[a]	AES-NI	INTEL® TURBO BOOST TECHNOLOGY	INTEL® HYPER-THREADING TECHNOLOGY	INTEL® vPRO™ TECHNOLOGY		
					INTEL® VIRTUALIZATION TECHNOLOGY	INTEL® ACTIVE MANAGEMENT TECHNOLOGY 6.0	INTEL® TRUSTED EXECUTION TECHNOLOGY
Intel® Core™ i5-660	▪	▪	▪	▪	▪	▪	▪
Intel® Core™ i3-540	▪			▪	▪		

[a]When paired with Intel® 3450 chipset 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 www.intel.com/products/processor_number for details.

[1] Hyper-Threading Technology requires a computer system with a processor supporting Hyper-Threading Technology and an HT Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See www.intel.com/info/hyperthreading/ for more information including details on which processors support HT Technology.

[2] Intel® Turbo Boost Technology requires a Platform with a processor with Intel Turbo Boost Technology capability. Intel Turbo Boost Technology performance varies depending on hardware, software and overall system configuration. Check with your platform manufacturer on whether your system delivers Intel Turbo Boost Technology. For more information, see www.intel.com/technology/turboboost.

[3] Intel® Intelligent Power Technology requires a computer system with an enabled Intel® processor, chipset, BIOS and for some features, an operating system enabled for it. Functionality or other benefits may vary depending on hardware implementation and may require a BIOS and/or operating system update. Please check with your system vendor for details.

[4] Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain computer system software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

[5] 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 of implementation of new business processes. With regard to notebooks, Intel AMT may not be available or certain capabilities may be limited over a host OS-based VPN or when connecting wirelessly, on battery power, sleeping, hibernating or powered off. For more information, see www.intel.com/technology/platform-technology/intel-amt/.

[6] 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.

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

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