(intel®)

ENABLE NEW INTERNET OF THINGS DESIGNS

5th generation Intel® Core™ processors (H-processor line) are ideal for enabling more capable intelligent system designs across multiple industries. Deeper security technologies, enhanced manageability, richer graphics support, and higher performance enabling small, yet powerful, versatile solutions.

Product Overview

The Internet of Things (IoT) offers tremendous new business opportunities. Organizations can integrate real-time intelligence, control, and interactivity into almost any process to improve how they engage with customers, treat patients, optimize operations, and run factories. The 5th generation Intel® Core™ processor is engineered to drive high capability and value into IoT usage models by enabling high-quality user experiences with devices that are powerful, manageable, and secure.

Manufactured on Intel's industry-leading 14 nm process technology with 2nd generation 3D Tri-Gate transistors, these 47W TDP quad-core 5th generation Intel® Core™ i7 processors provide powerful CPU performance for demanding workloads. Intel® Iris™ Pro graphics delivers amazing, vibrant visuals and media performance with support for up to three independent 4K displays. Along with built-in enhanced security and manageability options, these new processors are ideal for a wide range of high perfor-mance intelligent systems, including digital security and surveillance, industrial automation, and medical equipment.

When paired with the Mobile Intel® QM87 or Mobile Intel® HM86 chipset, these platforms support dual-channel DDR3L memory at 1600 MHz (ECC optional) and Intel® Rapid Storage Technology[1] for enhanced performance and low power consumption from the latest storage technologies. They

support fast connectivity and flexibility with integrated I/O technologies, such as PCI Express* Gen 3.0, SATA 6.0 Gbps, and USB 3.0 with Intel® Flex I/O.

Intel Iris Pro graphics, with a new graphics engine architecture, delivers powerful image processing and visualizations— without a discrete graphics card. Built-in visual features, including Intel® Clear Video HD technology and Intel® Quick Sync Video 2.0, enable smooth visual quality, efficient transcoding of simultaneous video streams, and outstanding HD media playback. Additionally, the platform supports next-generation graphics APIs, such as Microsoft* DirectX* 11.1, OpenGL* 4.2, and OpenCL* 2.0.

Enhanced built-in security features[1] in 5th generation Intel Core processors support strong, hardware-enabled protec-tion against malware and attacks. These technologies work below the OS and software agents to help strengthen secure operations. Additionally, data in transit across networks and the Internet are protected with strong, efficient encryption and key security using the latest enhancements in Intel® Data Protection technology with new extensions to Intel Advanced Encryption Standard New Instructions (Intel® AES-NI) and Secure Key technology.[1]

Intel® vPro™ technology[2] is enabled when paired with the Mobile Intel QM87 chipset and corporate firmware (5M). These platforms support out-of-band manageability, even when the system is powered off, the operating system is unresponsive, or software agents are disabled, allowing accessible, remote manageability and maintenance wherever the system is located.

Highlights

Quad-Core Design – Powerful, advanced quad-core design with Intel® Hyper-Threading Technology[3] for high performance IoT edge devices.

Intel® Iris™ Pro Graphics 6200 – Delivers amazing and vibrant visuals with 128 MB of on-package cache memory, support for Ultra HD 4K resolution, and the ability to drive up to three independent displays.

Security[1] – Strong, silicon-level security to help protect increasingly connected intelligent systems and their data against hacking, malware, and attack without impacting system operations.

Manageability – With Intel vPro Technology[2] enabled, enhanced remote, out-of-band manageability helps maintain a strong, efficient, and resilient operation.

Flexibility – Intel Flex I/O allows users to assign a variable number of SATA 6.0 Gbps, USB 3.0, and PCI Express 2.0 ports based on configuration needs (see specifications below).

Compatibility – Designed to be compatible with 4th generation Intel® Core™ processors. Intelligent system designs can be upgraded to benefit from 5th generation enhancements and features.

For more information on the 5th generation Intel® Core™ processors (H-processor line) for Internet of Things, contact your Intel representative or visit www.intel.com/iot.

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

Figure 1. Block diagram.
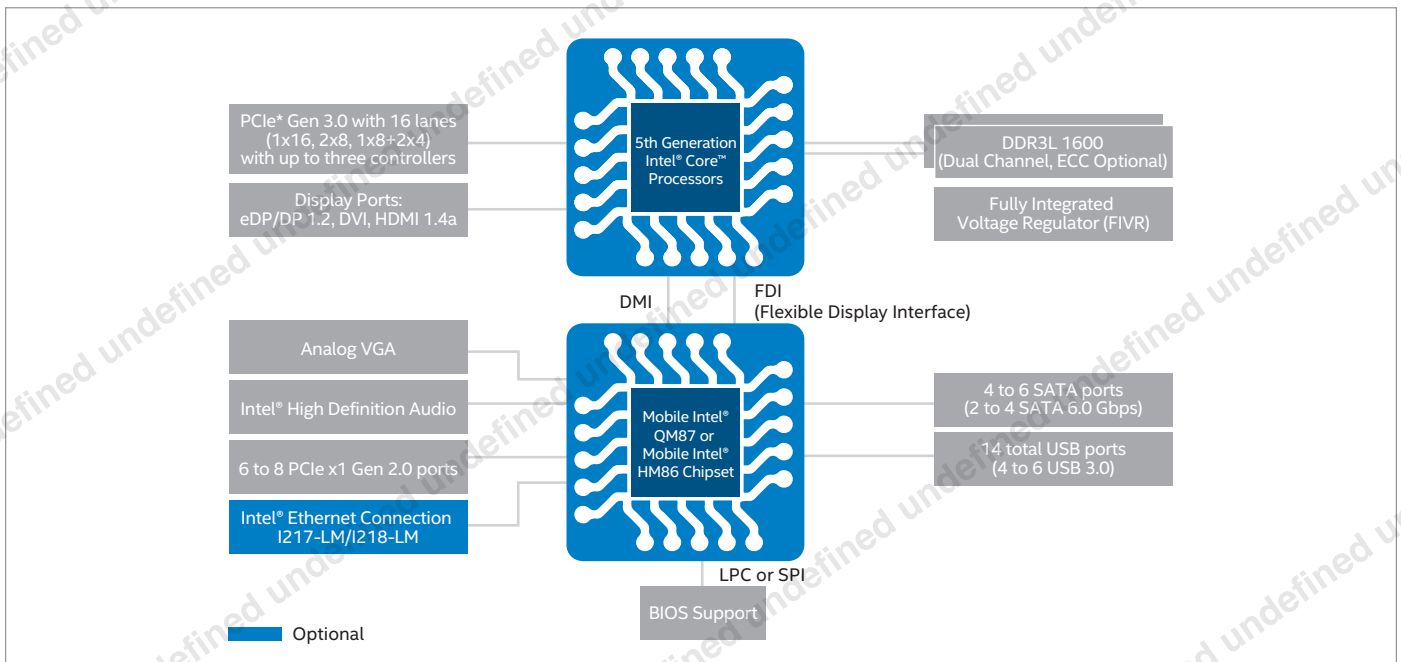
5TH GENERATION INTEL® CORE™ PROCESSOR (H-PROCESSOR LINE) FAMILY AT A GLANCE

FEATURES	BENEFITS
Key Embedded Support	
Extended life cycle product support	• Protects system investment by enabling extended product availability for embedded customers.
Ecosystem support	• From modular components to market-ready systems, Intel and the 250+ global member companies of the Intel® Intelligent Systems Alliance (intel.com/go/intelligentsystems-alliance) provide the performance, connectivity, manageability, and security developers need to create smart, connected systems.
Platform Compatibility	
Compatible with 4th generation Intel® Core™ processor-based platforms	• Protects system investment by enabling extended product availability for embedded customers.
Built-In Visuals	
Intel® Iris™ Pro Graphics 6200 Intel® HD Graphics 5600	• Delivers enhanced visual experiences, including excellent 3D performance, the addition of HDMI* 4K support, and enhanced color and deep color support for a broad range of intelligent systems. • Provides repartitioned display architecture, allowing three independent displays and hybrid multi-monitor configurations. • Integrated processor graphics help minimize power consumption while maximizing performance for decoding, encoding, and transcoding workloads with hardware acceleration of video codecs.
Intel® Quick Sync Video 2.0	• Fast simultaneous decode and transcode of video streams for intelligent systems, including medical imaging and video surveillance functions.
Intel® Clear Video HD Technology	• Provides visual quality and color fidelity enhancements for spectacular HD media playback for applications such as digital signs and gaming platforms.
Security	
Intel® AES New Instructions (Intel® AES-NI) and Intel® Secure Key[1]	• Helps protect media, data and assets from loss. • Intel AES-NI accelerates data encryption/decryption and improves performance.
Intel® OS Guard[1]	• Helps detect and prevent malware.
Intel® Platform Protection Technology with BIOS Guard[1]	• Protects Flash from modification without platform manufacturer authorization.
Performance	
Intel® Advanced Vector Extensions[8] 2.0	• Supports faster performance on digital signal and image processing workloads of compute-intensive applications such as radar detection, hurricane command centers, ruggedized navigation systems and remote medical image processing.
Intel® Turbo Boost Technology[4] 2.0	• Boosts performance for specific workloads by increasing processor frequency.
Intel® Hyper-Threading Technology[3]	• Enables simultaneous multi-threading within each processor core, up to two threads per core; reduces computational latency, making optimal use of every clock cycle.
Error Correcting Code (ECC) memory (Optional)	• Detects multiple-bit memory errors; locates and corrects single-bit errors to keep the system up and running.
Intel® Smart Cache Technology	• Large on-die shared Last-Level Cache reduces latency to data, improving performance and power efficiency.
Power Efficiency	
Intel® Dynamic Platform and Thermal Framework (DPTF)	• Automated energy efficiency to reduce power consumption.
Automated low-power states	• Adjusts system power consumption based on real-time processor loads.
Fully Integrated Voltage Regulator	• Simplifies power delivery by integrating legacy power delivery onto processor package/die.
Intel® vPro™ Technology[2] (platforms paired with Mobile Intel® QM87 chipset)	
Intel® Active Management Technology[5] 9.1	• Intel's remote management and maintenance capabilities enables vendors to roll back firmware image; remote host capabilities help ease provisioning of end devices.
Intel® Virtualization Technology[6]	• Speeds 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[7]	• 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.

SOFTWARE SUPPORT OVERVIEW

OS VENDOR	OPERATING SYSTEM	DISTRIBUTION/SUPPORT	BIOS
Microsoft*	Windows* 8.1u (64 bit)	Microsoft/Intel and Microsoft	American Megatrends*
	Windows Embedded Industry 8.1 (64 bit)	Microsoft/Intel and Microsoft	Insyde Software*
	Windows 7 (32/64 bit)	Microsoft/Intel and Microsoft	Nanjing Byosoft*
	Windows 7 (POS ready 7 and WES7) (32/64 bit)	Microsoft/Intel and Microsoft	Phoenix Technologies*
	Windows 10 (64 bit)	Microsoft/Intel and Microsoft	
Linux*	Fedora* (19 or later) Distribution (64 bit)	Open Source	
	Ubuntu,* SuSe Enterprise,* Red Hat* Enterprise (64 bit)	Canonical Ltd.,* Attachmate Group,* Red Hat, and Open Source	
	Yocto* Tool-based Embedded Linux	Yocto Project Community	
Wind River*	VxWorks* (RTOS) (64 bit)	Wind River Systems	

5TH GENERATION INTEL® CORE™ PROCESSORS (H-PROCESSOR LINE) FOR INTERNET OF THINGS

PROCESSOR NUMBER△	CORES/ THREADS	CORE FREQUENCY (GHZ)		INTEL® SMART CACHE	THERMAL DESIGN POWER	PACKAGE	INTEL® AES NEW INSTRUCTIONS	INTEL® ADVANCED VECTOR EXTENSIONS[8]
		BASE FREQUENCY	1 CORE TURBO					
Intel® Core™ i7-5850EQ Processor	4/8	2.7	3.4	6 MB	47 W (37 W cTPD)	BGA1364	Yes	Yes
Intel® Core™ i7-5700EQ Processor	4/8	2.6	3.4	6 MB	47 W (37 W cTPD)	BGA1364	Yes	Yes

PROCESSOR NUMBER△	INTEL® TURBO BOOST TECHNOLOGY 2.0	INTEL® HYPER-THREADING TECHNOLOGY	INTEL® vPRO™ TECHNOLOGY[2]			ERROR CORRECTING CODE
			INTEL® VIRTUALIZATION TECHNOLOGY	INTEL® ACTIVE MANAGEMENT TECHNOLOGY 9.1	INTEL® TRUSTED EXECUTION TECHNOLOGY	
Intel® Core™ i7-5850EQ Processor	Yes	Yes	Yes	Yes	Yes	Optional
Intel® Core™ i7-5700EQ Processor	Yes	Yes	Yes	Yes	Yes	Optional

INTEL® CHIPSETS FOR INTELLIGENT SYSTEMS

PRODUCT	PRODUCT CODE	PACKAGE	FEATURES
Intel® DH82QM87 Platform Controller Hub	DH82QM87	FCBGA 695	6 SATA ports (2 to 4[b] SATA 6.0 Gbps); 14 total USB ports (4 to 6[b] USB 3.0); 6 to 8[b] PCI Express* 2.0 ports; supports Intel® vPro™ Technology; supports Intel® Smart Response Technology and RAID[a]
Intel® DH82HM86 Platform Controller Hub	DH82HM86	FCBGA 695	6 SATA ports (2 to 4[b] SATA 6.0 Gbps); 12 total USB ports (2 to 4[b] USB 3.0); 6 to 8[b] PCI Express 2.0 ports; supports Intel vPro Technology

Learn more: intel.com/iot

a   Available with Intel® Core™ processors only.   b Enabled with I/O Port Flexibility.

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

1   No computer system can provide absolute security. Requires an enabled Intel® processor and software optimized for use of the technology. Consult your system manufacturer and/or software vendor for more information.

2   Intel® vPro™ technology is sophisticated and requires setup and activation. Availability of features and results will depend upon the setup and configuration of your hardware, software and IT environment. To learn more visit: http://www.intel.com/technology/vpro.

3   Available on select Intel® Core™ processors. Requires an Intel® Hyper-Threading Technology (Intel® HT Technology)-enabled system. Consult your PC manufacturer. Performance will vary depending on the specific hardware and software used. For more information including details on which processors support Intel HT Technology, visit http://www.intel.com/info/ hyperthreading.

4   Requires a system with Intel® Turbo Boost Technology. Intel Turbo Boost Technology and Intel Turbo Boost Technology 2.0 are only available on select Intel® processors. Consult your system manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit http://www.intel.com/go/turbo.

5   Requires activation and a system with a corporate network connection, an Intel® AMT-enabled chipset, network hardware and software. For notebooks, Intel AMT may be unavailable or limited over a host OS based VPN, when connecting wirelessly, on battery power, sleeping, hibernating or powered off. Results dependent upon hardware, setup and configuration. For more information, visit: http://www.intel.com/ content/www/us/en/architecture-and-technology/intel-active-management-technology.html.

6   Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit http://www.intel.com/go/virtualization.

7   No computer system can provide absolute security. Requires an enabled Intel® processor, enabled chipset, firmware, software and may require a subscription with a capable service provider (may not be available in all countries). Intel assumes no liability for lost or stolen data and/or systems or any other damages resulting thereof. Consult your Service Provider for availability and functionality. For more information, visit http://www.intel.com/go/anti-theft. Consult your system manufacturer and/or software vendor for more information.

8   Intel® Advanced Vector Extensions (Intel® AVX)* provides higher throughput to certain processor operations. Due to varying processor power characteristics, utilizing Intel AVX instructions may cause a) some parts to operate at less than the rated frequency and b) some parts with Intel® Turbo Boost Technology 2.0 to not achieve any or maximum turbo frequencies. Performance varies depending on hardware, software, and system configuration and you can learn more at http://www.intel.com/go/turbo.

(FTC) Software and workloads used in performance tests may have been optimized for performance only on Intel® microprocessors. Performance tests, such as SYSmark* and MobileMark*, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to http://www.intel.com/performance

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

Performance results are based on certain tests measured on specific computer systems. Any difference in system hardware, software or configuration will affect actual performance. Configurations: [describe config + what test used + who did testing]. For more information go to http://www.intel.com/performance.

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