



4th Generation Intel® Core™ Processor-based Platforms with Intel® Communications Chipset 89xxCC Series

A range of Intel® processors, paired with the Intel® Communications Chipset 89xxCC series, provide a scalable platform utilizing two- and four-core systems for single-socket designs.



Product Overview

Manufactured on industry-leading 22nm process technology with 3D Tri-Gate transistors, these 4th generation Intel® Core™ processors are based on the Intel® microarchitecture, codename Haswell, offering numerous advancements over previous processors (codename Ivy Gladden). The introduction of Intel® Advanced Vector Extensions (Intel® AVX) 2.0 benefits math, codec, image, and digital signal processing software while improving performance in face, detection, professional imaging, and high-performance computing.

Paired with the Intel® Communications Chipset 89xxCC series, this processor-based platform extends the scalability of Intel® architecture (IA) into smaller footprint communications systems without sacrificing industry requirements such as workload acceleration and compression, multicore processing, and virtualization. The platform addresses the needs of thermally constrained solutions, such as midrange security appliances, branch office routers, network access, media and communications servers, small cells, control plane processing, and storage.

By scaling the powerful IA instruction set into lower power network nodes, the platform enables software reuse, power management, and software-based load balancing. The Intel® Data Plane Development Kit (Intel® DPDK)

complements the platform by improving packet processing speeds to handle increasing network traffic data rates and associated control/signaling requirements.

With thermal design power (TDP) options of 27 W and 43 W, these processors are designed for single processor systems of two or four cores. They are pin-to-pin compatible and deliver a consistent feature set, allowing developers to design a footprint and later choose a specific processor, based on performance-per-watt requirements.

Processors include Intel® Hyper-Threading Technology¹ to boost performance for multi-threaded applications, while Intel® Virtualization Technology² (Intel® VT-d and Intel® VT-x) increases virtualization performance and robustness by allowing the operating system more direct access to the hardware.

With up to 16 PCI Express* 3.0 lanes, these processors provide multiple high-speed component interfaces. Up to 8 MB Intel® Smart Cache (L3 Cache) supports complex pipelines and large control plane tables. An integrated memory controller supports DDR3/DDR3L protocols with up to two channels (up to two DIMMs per channel), runs at speeds up to 1600 MT/s, and features optional Error Correcting Code (ECC) memory. This enables product designers to make memory decisions based on specific features, performance, and budget parameters.

The Intel Communications Chipset 89xxCC series includes Intel® QuickAssist Technology with improved cryptographic and compression performance. This provides hardware acceleration to assist with the performance demands of securing and routing Internet traffic and other workloads such as compression and wireless 3G/4G LTE algorithm offload, thereby reserving processor cycles for application processing. (See a full list of cryptographic and compression functions on page 3.)

This chipset series provides hardware offload assistance (up to 20 Gbps for virtual private networks [VPNs]) and helps storage and network optimization applications better handle compression and decompression tasks. Kasumi and Snow 3G functions within Intel QuickAssist Technology help with 3G and 4G LTE mobile gateway and infrastructure workloads. Four integrated GbE MACs save board real estate and BOM costs over previous-generation Intel chipsets.

These processors and chipsets are manufactured with lead-free³ and halogen-free⁴ component packages and provide at least seven-year availability and ten-year reliability 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.

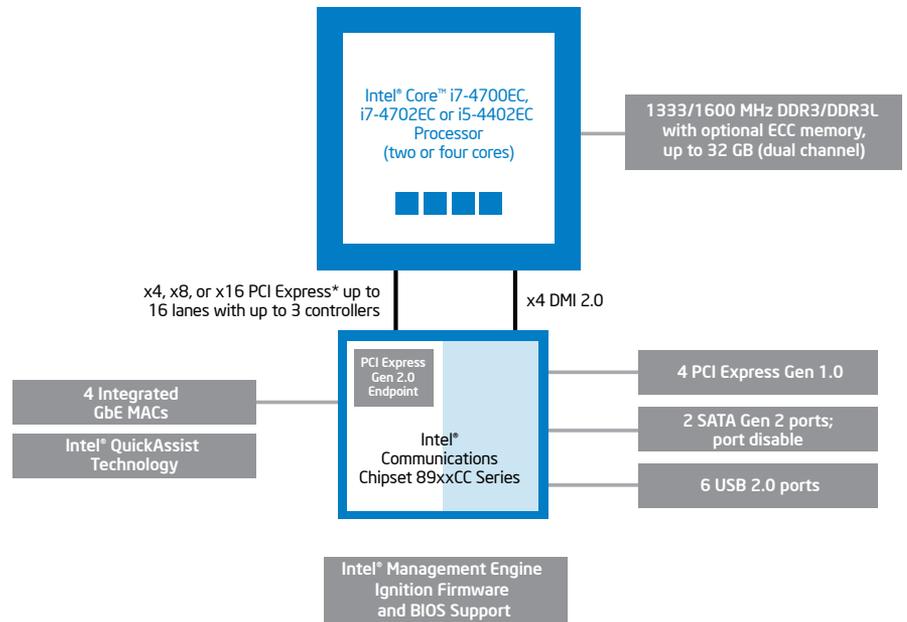


Figure 1. Two- and four-core Intel® processors for single-socket designs, paired with the Intel® Communications Chipset 89xxCC series, make this an ideal platform for smaller footprint communications infrastructure systems.

Intel® Core™ Processors for Smaller Footprint Communications Infrastructure Systems

Features	Benefits
Error Correcting Code (ECC) (optional)	<ul style="list-style-type: none"> Enhances performance, uptime, and autonomous operation. Detects multiple-bit memory errors and locates/corrects single-bit errors to keep a system up and running without requiring system reset.
Intel® Hyper-Threading Technology ¹	<ul style="list-style-type: none"> Additional logical cores on Intel® architecture-based systems increase control plane and data plane performance. Boosts performance for parallel, multi-threaded applications.
PCI Express* Gen 3.0	<ul style="list-style-type: none"> Fast access to peripheral and networking devices: up to 16 PCI Express lanes with three PCI Express controllers that can be independently configured to Gen 1.0, Gen 2.0, or Gen 3.0, allowing operation at 2.5 GT/s (giga-transfers/second), 5.0 GT/s, and 8 GT/s data rates.
Intel® Virtualization Technology ² for IA-32 and Intel® 64 (Intel® VT-x)	<ul style="list-style-type: none"> Faster performance for core virtualization processes. Improves application performance, live migration, provisioning, dynamic load balancing, and disaster recovery.
Intel Virtualization Technology for Directed I/O (Intel® VT-d)	<ul style="list-style-type: none"> Built-in hardware support for I/O virtualization. Improves I/O performance, increases system reliability, and provides enhanced memory protection.
Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) ⁵	<ul style="list-style-type: none"> Processor assistance for accelerating AES encryption and decryption used in multiple communications workloads.
Enhanced Intel SpeedStep® Technology ⁶	<ul style="list-style-type: none"> Multiple frequency and voltage points for optimal performance and power efficiency.
Intel® Advanced Vector Extensions 2.0	<ul style="list-style-type: none"> Supports faster performance on digital signal and image processing workloads of compute-intensive applications.
Fully Integrated Voltage Regulator	<ul style="list-style-type: none"> Simplifies power delivery by integrating legacy power delivery onto processor package/die.
Intel® Transactional Synchronization Extensions - New Instructions (Intel® TSX-NI)	<ul style="list-style-type: none"> Allows programmers to specify regions of code for transactional synchronization. These extensions can be used to achieve the performance of fine-grain locking while actually programming with coarse-grain locks. Details on Intel TSX-NI may be found in <i>Intel® Architecture Instruction Set Extensions Programming Reference</i>.

Intel® Communications Chipset 89xxCC Series

Features	Benefits
PCI Express* Interface	<ul style="list-style-type: none"> Up to 2.5 GT/s for fast access to peripheral devices and networking with up to four PCI Express* lanes; configurable as 4x1, 2x2, 1x2 + 2x1 or 1x4.
Intel® QuickAssist Technology	<ul style="list-style-type: none"> Delivers hardware acceleration services for efficient cryptographic and compression performance. Symmetric cryptography functions include: cipher operations (AES, DES, 3DES, ARC4); wireless (Kasumi, Snow3G); hash/authenticate operations (SHA-1, MD5; SHA-2 [SHA-224, SHA-256, SHA-384, SHA-512]); authentication (HMAC, AES-XCBC, AES-CCM); random number generation. Public key functions include: RSA operation; Diffie-Hellman operation; digital signature standard operation; key derivation operation; elliptic curve cryptography (ECDSA and ECDH); random number generation and prime number testing. Compression/decompression include: DEFLATE (Lempel-Ziv 77); LZS (Lempel-Ziv-Stac).
Intel® QuickAssist Technology Software Support	<ul style="list-style-type: none"> Provides support for Fedora Linux*.
Four Integrated GbE MACs	<ul style="list-style-type: none"> Simplifies reuse; compatible with standard Intel® Ethernet drivers.
SATA Gen 2 ports (3 Gb/s)	<ul style="list-style-type: none"> Supports faster transfer rate for improved data access.
Universal Serial Bus (USB) 2.0	<ul style="list-style-type: none"> Greater performance enhancement with a design data rate of up to 480 Mbps. Rate-matching hub enables lower power requirements and manages the transition of the communication data rate from the high speed of the host controller to the lower speed of USB full-speed/low-speed devices.
Intel® Management Engine Ignition Firmware	<ul style="list-style-type: none"> Supports essential platform functionality.
Intel® Data Plane Development Kit	<ul style="list-style-type: none"> Delivers breakthrough packet processing performance on Intel architecture.

Intel® Core™ Processors for Smaller Footprint Communications Infrastructure Systems

Product Name ^A	Intel® Core™ i7-4700EC Processors	Intel® Core™ i7-4702EC Processors	Intel® Core™ i5-4402EC Processors
Frequency	2.7 GHz	2.0 GHz	2.5 GHz
Thermal Design Power	43 W	27 W	27 W
Cores/Threads	4/8	4/8	2/4
Intel® Smart Cache (L3 Cache)	8 MB	8 MB	4 MB
Max Memory Size (dependent on memory type)	32 GB	32 GB	32 GB
Memory Types	DDR3/DDR3L 1333/1600	DDR3/DDR3L 1333/1600	DDR3/DDR3L 1333/1600
Memory Channels	2	2	2
Max Memory Bandwidth	25.6 GB/s	25.6 GB/s	25.6 GB/s
PCI Express* Configurations	up to 1x16; 2x8; 1x8/2x4	up to 1x16; 2x8; 1x8/2x4	up to 1x16; 2x8; 1x8/2x4
Package Type	BGA1364 (37.5 mm x 32 mm)	BGA1364 (37.5 mm x 32 mm)	BGA1364 (37.5 mm x 32 mm)

Intel® Communications Chipset 89xxCC Series

Product Number	8920	8910	8903	8900
Intel® QuickAssist Technology	Up to 20 Gbps	Up to 10 Gbps	Up to 5 Gbps	None
Thermal Design Power	12 W	11 W	9.5 W	8.5 W
PCI Express* Gen 2.0 Endpoint	x16	x8	x4	x4
PCI Express Gen 1.0	4x1,2x2, 1x2/2x1, or 1x4			
SATA Gen 2 ports (3 Gb/s)	2	2	2	2
USB 2.0 ports	6	6	6	6
Integrated Gigabit Ethernet MACs	4	4	4	4
GPIO pins (multiplexed or dedicated)	68	68	68	68
FCBGA Package	27mm x 27mm (0.7mm variable pitch)			

Intel in Communications: intel.com/go/commsinfrastructure

^A This Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. For more information, visit http://www.intel.com/products/processor_number.

¹ Requires an 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 HT Technology, visit <http://www.intel.com/info/hyperthreading>.

² 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>.

³ This Intel product is manufactured on a lead-free process. Lead is below 1000 PPM per EU RoHS directive (2002/95/EC, Annex A). No exemptions required.

⁴ Applies only to brominated and chlorinated flame retardants (BFRs/CFRs) and PVC in the final product. Intel components, as well as purchased components on the finished assembly, meet J-709 requirements, and the PCB/Substrate meet IEC 61249-2-21 requirements. The replacement of halogenated flame retardants and/or PVC may not be better for the environment.

⁵ Intel® AES-NI requires a computer system with an AES-NI-enabled processor, as well as non-Intel software, to execute the instructions in the correct sequence. AES-NI is available on select Intel® processors. For availability, consult your reseller or system manufacturer. For more information, see the Intel® Advanced Encryption Standard Instructions (AES-NI).

⁶ See the Processor Spec Finder at <http://ark.intel.com> or contact your Intel representative for more information.

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL® PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER, AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. UNLESS OTHERWISE AGREED IN WRITING BY INTEL, THE INTEL PRODUCTS ARE NOT DESIGNED NOR INTENDED FOR ANY APPLICATION IN WHICH THE FAILURE OF THE INTEL PRODUCT COULD CREATE A SITUATION WHERE PERSONAL INJURY OR DEATH MAY OCCUR.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request. Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order. Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or by visiting Intel's Web site at www.intel.com.

Copyright © 2014 Intel Corporation. All rights reserved. Intel, the Intel logo and Intel Core are trademarks of Intel Corporation in the U.S. and other countries.

*Other names and brands may be claimed as the property of others.

Printed in USA

0114/MS/SD/PDF

 Please Recycle

330100-001US

