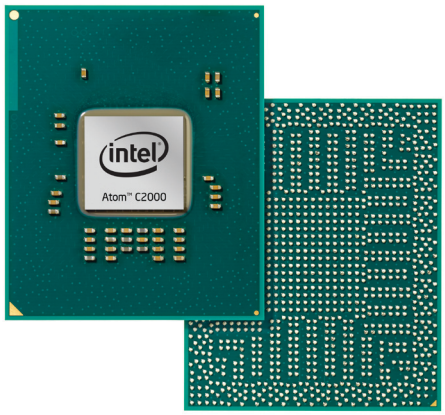
PLATFORM BRIEF
Intel® Atom™ Processor C2000 Product Family
Communications Infrastructure

Intel® Atom™ Processor C2000 Product Family for Communications Infrastructure

Ideal for smaller footprint, thermally constrained communications and infrastructure systems, including fanless embedded designs.



Product Overview

The Intel® Atom™ processor C2000 product family features a range of multi-core pin-compatible system on chips (SoCs), extending the scalability of Intel® architecture into smaller footprint and energy-efficient communications infrastructure systems. Based on the newest Silvermont microarchitecture, these SoCs utilize Intel's industry-leading 22nm process technology with 3-D Tri-Gate transistors. Featuring an out-of-order execution engine, outstanding power management capabilities, and enhanced security, this microarchitecture offers significant performance and power improvements over prior-generation Intel Atom processors.

These SoCs offer a range of multi-core processing capabilities (from two cores up to eight cores), a thermal design power (TDP) range of 7 W to 20 W, and high levels of I/O and acceleration integration, resulting in a highly scalable single-chip solution. They are ideal for thermally constrained solutions such as entry to mid-range branch office routers, security appliances, wireless access, communications servers, control plane processors, and storage.

An integrated memory controller features multiple configurable options with up to 1600 MT/s, one or two DIMMs per channel (up to two channels), and optional Error Correcting Code (ECC) memory, enabling product designers to make memory decisions based on specific features, performance, and budget parameters.

When paired with the Intel® Data Plane Development Kit (Intel® DPDK), this platform utilizes optimized data plane software solutions to improve packet processing speeds to handle increased network traffic data rates and associated control/signaling infrastructure requirements.

A variety of integrated I/O interfaces enhances connectivity and eliminates the need for an additional I/O chip, which helps reduce board real estate and platform BOM costs. They include four integrated Intel® 10/100/1000/2500 Gigabit Ethernet Controllers (MACs), four USB 2.0 ports, up to 16 PCI Express* Gen 2.0 lanes with four controllers, up to four SATA Gen 2 ports, two SATA Gen 3 ports, and two UARTs.

Integrated Intel® QuickAssist Technology (select SKUs) provides hardware acceleration to help improve cryptographic performance. This helps meet the demands of securing and routing Internet traffic, thereby reserving processor cycles for application processing. Please see a full list of functions on page 3.

These SoCs are manufactured with lead-free[1] and halogen-free[2] component packages, and offer at least seven-year availability. 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.

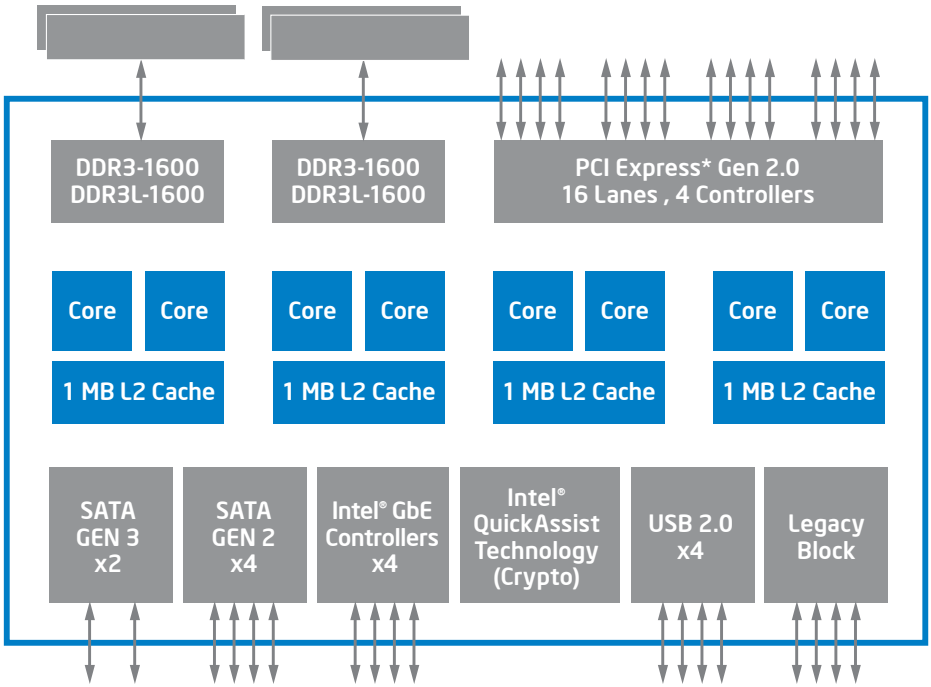


Figure 1. A range of energy-efficient SoCs in the Intel® Atom™ processor C2000 product family offer from two to eight cores with significant I/O and acceleration integration. Pictured above is the block diagram for the eight-core Intel® Atom™ processor C2758.

Software Overview

The following independent operating system and BIOS vendors provide support for this platform:

OPERATING SYSTEM	CONTACT
Wind River Linux* BSPs	Wind River
Linux based on Yocto Project*	Open source

BIOS
American Megatrends
Insyde Software

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FEATURES	BENEFITS
Error Correcting Code (ECC) (optional)	▪ Enhances performance, uptime, and autonomous operation. ▪ Detects double-bit memory errors and locates/corrects single-bit errors to keep a system up and running without requiring system reset.
Intel® Data Plane Development Kit	▪ Optimized data plane software solutions help to deliver breakthrough packet processing performance on Intel® architecture.
Intel® Virtualization Technology[3] (Intel® VT)	▪ Hardware-based Intel® VT-x2 provides platform capability for virtualized workloads and flexible resource management.
Intel® Advanced Encryption Standard New Instructions[4] (Intel® AES-NI)	▪ Improves security without slowing response time and delivers more efficient cryptographic performance. Accelerates AES encryption and decryption used in multiple communications workloads.
Intel® QuickAssist Technology (Select SKUs)	▪ Provides hardware acceleration services for efficient cryptographic 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]) with HMAC and AES-XCBC); Authenticated Encryption (HMAC, AES-XCBC, AES-CCM, and AES-GCM). ▪ Public Key functions include: RSA operation; Diffie-Hellman operation; digital signature standard operation; key derivation operation; elliptic curve cryptography (ECDSA and ECDH). ▪ Supports random number generation.
Intel QuickAssist Technology software support	▪ Linux*, KVM, open source framework patches, Yocto Project* BSPs and Wind River Linux* 5.0 BSPs.
Four integrated Intel® 10/100/1000/2500 Gigabit Ethernet Controllers (MACs)	▪ Operation capability in 1 GbE or 2.5 GbE modes. Enables dense applications by integrating this key connectivity capability for all communications applications.
Up to four SATA Gen 2 ports (3 Gb/s) Two SATA Gen 3 ports (6 Gb/s) Up to 16 PCI Express Gen 2.0 lanes with four controllers	▪ Supports faster transfer rate for improved data access. ▪ A variety of integrated I/O interfaces eliminates the need for an additional I/O chip, This helps lower platform BOM costs and board real estate. ▪ Delivers rich I/O connectivity and flexibility.
Extended life cycle product support	▪ Protects system investment by enabling extended product availability for embedded, communications and storage customers.

Intel® Atom™ Processor C2000 Product Family for Communications Infrastructure[Δ]

	INTEL® ATOM™ PROCESSOR C2758	INTEL ATOM PROCESSOR C2738	INTEL ATOM PROCESSOR C2718	INTEL ATOM PROCESSOR C2558	INTEL ATOM PROCESSOR C2538	INTEL ATOM PROCESSOR C2518	INTEL ATOM PROCESSOR C2358	INTEL ATOM PROCESSOR C2338
Cores	8	8	8	4	4	4	2	2
Core Frequency	2.4 GHz	2.4 GHz	2.0 GHz	2.4 GHz	2.4 GHz	1.7 GHz	1.7 GHz	1.7 GHz
Thermal Design Power	20 W	20 W	18 W	15 W	15 W	13 W	7 W	7 W
Memory Type	DDR3/3L	DDR3/3L	DDR3/3L	DDR3/3L	DDR3/3L	DDR3/3L	DDR3/3L	DDR3/3L
Memory Frequency	1600 MT/s	1600 MT/s	1333 MT/s	1600 MT/s	1600 MT/s	1333 MT/s	1333 MT/s	1333 MT/s
Memory Channels	2	2	2	2	2	2	1	1
PCI Express* Gen 2.0	16 lanes 4 controllers	16 lanes 4 controllers	16 lanes 4 controllers	16 lanes 4 controllers	16 lanes 4 controllers	16 lanes 4 controllers	8 lanes 4 controllers	8 lanes 4 controllers
USB 2.0 ports	4	4	4	4	4	4	4	4
SATA Gen 2 (3 Gb/s) ports	4	4	4	4	4	4	2	4
SATA Gen 3 (6 Gb/s) ports	2	2	2	2	2	2	2	2
Integrated Intel® GbE Controller ports	4	4	4	4	4	4	4	4
Intel® QuickAssist Technology	Yes	No	Yes	Yes	No	Yes	Yes	No

Intel in Communications: intel.com/go/commsinfrastructure

[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] 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.

[2] 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.

[3] 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.

[4] 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 http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni/.

Performance results are based on certain tests measured on specific computer systems. Any difference in system hardware, software or configurations will affect actual performance. For more information go to http://www.intel.com/performance.

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