

Intel® Atom™ Processor E3800 Product Family for Intelligent Systems

Ideal for Intelligent Systems—context-aware, securely managed embedded devices that connect seamlessly to networks, clouds and each other.



Platform Overview

The Intel® Atom™ processor E3800 product family is the first system-on-chip (SoC) designed for intelligent systems, delivering outstanding compute, graphical and media performance while operating in an extended range of thermal conditions. Highlights include high I/O connectivity, integrated memory controller, virtualization, Error Correcting Code (ECC), and built-in security capabilities within a thermal design power (TDP) range of 5W to 10W.¹ This product family is ideal for efficient imaging workflows, digital signage with secure content delivery, visually appealing interactive clients (interactive kiosks, intelligent vending, ATM and point-of-sale (POS) terminals), portable medical devices, industrial control systems, and in-vehicle infotainment (IVI) systems.

These SoCs, based on the Silvermont microarchitecture, deliver numerous enhancements over previous-generation Intel Atom processor microarchitectures. Utilizing Intel's industry-leading 22nm process technology with 3-D Tri-Gate transistors, this new microarchitecture features significant improvements in computational performance and energy efficiency, along with a new out-of-order execution engine for superior compute performance, outstanding power management capabilities, and enhanced security. Intel® Virtualization Technology²

increases virtualization performance by allowing the operating system more direct access to the hardware.

Two Intel® Celeron® processors, based on the same microarchitecture, are offered alongside the Intel Atom processor E3800 product family on Intel's embedded roadmap. While they do not offer an industrial temperature range or ECC, they provide many of the same features and performance-per-watt benefits, making them ideal for PC-like designs, such as thin clients, retail transactional clients, and digital signage.

Platform Highlights

Advancements in visual processing capabilities over previous-generation Intel Atom processors:

Enables faster media conversions, stereoscopic 3D, immersive web browsing, enhanced HD video transcoding with Gen 7 graphics, and highly efficient image processing.

Outstanding integration of I/O interfaces:

Supports display interfaces with graphics processing, camera interfaces with image processing, audio with digital signal processing, multiple storage types, and legacy embedded I/O. Provides interface expansion capabilities through industry-standard high-bandwidth interfaces such as PCI Express* Gen 2.0, Hi-speed USB 2.0, and USB 3.0 connectivity.

Platform Highlights (continued)

Security enhancement and content protection: Hardware-assisted capabilities include Intel® AES New Instructions³ (Intel® AES-NI) and Secure Boot.

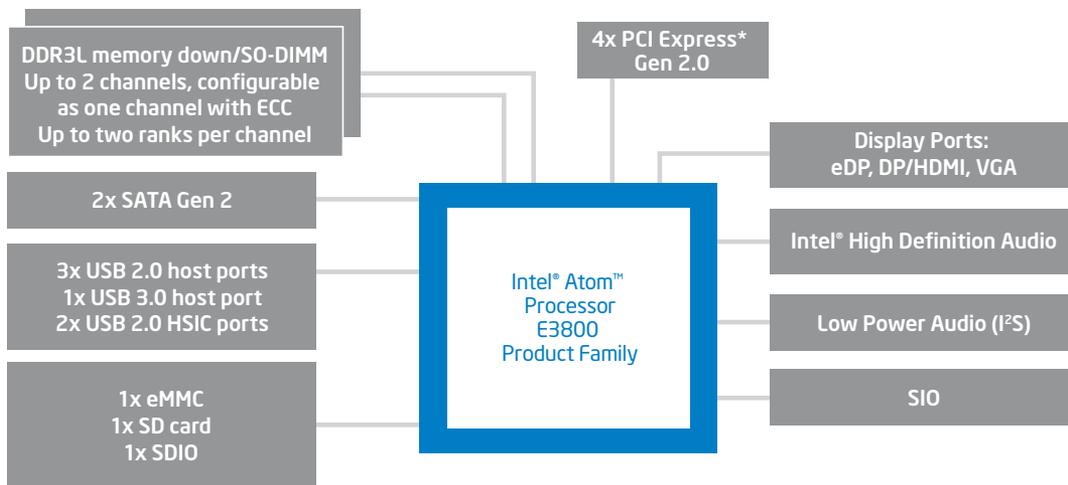
Integrated 64-bit memory controller: Features either one or two channels of up to 8 GB DDR3L system memory and optional ECC memory.

Options for industrial temperature range: Excellent reliability for rugged designs and extreme environments, such as industrial control and automation applications found in factories and in-vehicle infotainment systems in consumer and commercial vehicles.

Solution scalability: Product line features multiple SKUs with quad-, dual-, and single-core offerings that are pin-compatible.

Embedded 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.

Extended life cycle product support: Protects system investment by enabling extended product availability for embedded customers.



A range of SoCs in the Intel® Atom™ processor E3800 product family offer from one to four cores. Not all hardware features shown are supported on all processors. Please refer to the table on page 4 for details.

Intel® Atom™ Processor E3800 Product Family at a Glance

FEATURES	BENEFITS
System-on-chip (SoC)	<ul style="list-style-type: none"> Single die on a single package delivers the high levels of integrated functionality needed for intelligent system designs. One-chip solution helps save on bill of materials (BOM) cost and allows for smaller form factor solutions over previous-generation, two-chip offerings.
Integrated, highly efficient and dedicated image signal processing	<ul style="list-style-type: none"> Saves time-to-market and helps reduce BOM cost by reducing or, in certain cases, eliminating the need to develop custom ASICs/FPGAs to perform imaging functions. Applicable usages include multifunction printers and ultrasound machines.
Graphics turbo capability	<ul style="list-style-type: none"> Delivers graphical performance throughput for demanding applications such as complex 3D drawings and gaming.
Intel® AES-NI ³ and Secure Boot	<ul style="list-style-type: none"> Hardware-assisted capabilities help secure endpoints, protect content and allow only chosen software to run on the device.
Very low standby power (milli-watt range)	<ul style="list-style-type: none"> Enables very low power consumption for embedded solutions that spend significant time in sleep states, such as printers and ATMs.
Error Correcting Code (ECC)	<ul style="list-style-type: none"> Detects multiple-bit memory errors and locates/corrects single-bit errors to keep a system up and running without requiring system reset. Helps to enhance performance, uptime and autonomous operation.
Industrial temperature range (Tjunction ranges from -40° C to 110° C)	<ul style="list-style-type: none"> Supports systems that must exist in extreme environments, either hot or cold.
Intel® Virtualization Technology ² (Intel® VT-x)	<ul style="list-style-type: none"> Hardware-based Intel® Virtualization Technology provides near-native performance of virtualized workloads for greater reliability, security, investment protection, and flexible resource management.
Intel Firmware Support Package (Intel® FSP)	<ul style="list-style-type: none"> Provides key programming information for initializing Intel® silicon, and can be easily integrated into a boot loader of the developer's choice. Easy to adopt, scalable to design and economical to build for reduced time-to-market.

Software Overview

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

OPERATING SYSTEMS

Microsoft Windows* 8, Windows Embedded Standard 8^a (non-connected standby)
 Microsoft Windows 7, Windows Embedded Standard 7^b
 Linux* Tizen (select in-vehicle infotainment (IVI) customers only)^b
 Linux based on Yocto Project* Tools^b
 Linux based on Fedora* distribution^b
 Microsoft Embedded Compact 7^b
 Wind River VxWorks*^b
 Android* (JB MR2 4.3)^b

^a32-bit available immediately; 64-bit available Q1 2014
^bAvailable in Q1 of 2014

SOLUTIONS DELIVERY AND SUPPORT

Microsoft (Intel provides drivers⁴)
 Microsoft (Intel provides drivers⁴)
 Intel provides drivers⁴
 Yocto Project
 Timesys
 Bsquare, Adeneo
 Wind River
 Wind River, Insyde, Timesys

BIOS

American Megatrends
 Insyde Software
 Byosoft
 Phoenix Technologies

BOOT LOADER

American Megatrends
 Insyde Software
 Sage Electronic Engineering
 Waris Technologies
 Wind River Systems

Intel® Atom™ and Intel® Celeron® Processors for Intelligent Systems

PRODUCT NAME ^A	CORES	CORE SPEED (GHz)	L2 CACHE	GRAPHICS FREQUENCY (MHz)	MEMORY FREQUENCY	MEMORY CHANNELS	THERMAL DESIGN POWER ¹	TEMPERATURE RANGE	PACKAGE	ECC
Intel® Atom™ Processor E3845	4	1.91	2 MB	542/792 (Turbo)	DDR3L-1333	2	10W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3827	2	1.75	1 MB	542/792 (Turbo)	DDR3L-1333	2	8W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3826	2	1.46	1 MB	533/667 (Turbo)	DDR3L-1066	2	7W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3825	2	1.33	1 MB	533 (no Turbo)	DDR3L-1066	1	6W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Atom™ Processor E3815	1	1.46	512 KB	400 (no Turbo)	DDR3L-1066	1	5W	Industrial -40° to 110° C	Type-3 25x27 mm	Configurable, one channel
Intel® Celeron® Processor J1900	4	2.0, 2.42 (burst)	2 MB	688/854 (Turbo)	DDR3L-1333	2	10W	Commercial 0° to 105° C	Type-3 25x27 mm	No
Intel® Celeron® Processor N2920	4	1.86, 2.0 (burst)	2 MB	311/844 (Turbo)	DDR3L-1066	2	7.5W	Commercial 0° to 105° C	Type-3 25x27 mm	No

Intel in Intelligent Systems: intel.com/intelligentsystems

^A 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 for details.

¹ The TDP specification should be used to design the processor thermal solution. TDP is not the maximum theoretical power the processor can generate.

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 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.

⁴ Drivers available at: downloadcenter.intel.com.

Performance results are based on certain tests measured on specific computer systems. Any difference in system hardware, software or configuration will affect actual performance. For more information go to <http://www.intel.com/performance>. 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. A "MISSION CRITICAL APPLICATION" IS ANY APPLICATION IN WHICH FAILURE OF THE INTEL PRODUCT COULD RESULT, DIRECTLY OR INDIRECTLY, IN PERSONAL INJURY OR DEATH. SHOULD YOU PURCHASE OR USE INTEL'S PRODUCTS FOR ANY SUCH MISSION CRITICAL APPLICATION, YOU SHALL INDEMNIFY AND HOLD INTEL AND ITS SUBSIDIARIES, SUBCONTRACTORS AND AFFILIATES, AND THE DIRECTORS, OFFICERS, AND EMPLOYEES OF EACH, HARMLESS AGAINST ALL CLAIMS COSTS, DAMAGES, AND EXPENSES AND REASONABLE ATTORNEYS' FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PRODUCT LIABILITY, PERSONAL INJURY, OR DEATH ARISING IN ANY WAY OUT OF SUCH MISSION CRITICAL APPLICATION, WHETHER OR NOT INTEL OR ITS SUBCONTRACTOR WAS NEGLIGENT IN THE DESIGN, MANUFACTURE, OR WARNING OF THE INTEL PRODUCT OR ANY OF ITS PARTS.

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 go to: <http://www.intel.com/design/literature.htm>.

Copyright © 2013 Intel Corporation. All rights reserved. Intel, the Intel logo, Atom, and Celeron 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

0913/KSC/OCG/PDF

329621-001US

