

Intel® Atom™ Processor E3900 Series

Next Generation Intel Atom Processor Built for Wide Range of IoT Applications



October 25, 2016 — Intel today announced the launch of a new generation of Intel® Atom™ processor, the Intel® Atom™ processor E3900 series, designed from the ground up to support the rapid development and the growing complexity of Internet of Things (IoT) businesses. The Intel Atom processor E3900 Series delivers excellent performance and a unique set of features for the edge in segments such as industrial, automotive, video, manufacturing, retail, and more. Intel is also offering an automotive grade processor specifically to address in-vehicle experiences called the Intel® Atom™ processor A3900 series.

Powering Connected Machines Across New Markets

IoT is expected to be a multi-trillion-dollar market, with 50 billion devices¹ creating 44 zettabytes (or 44 trillion gigabytes) of data annually by 2020², require much more processing power at the edge in order to maintain viability. The new Intel Atom processor E3900 series will be used across industries to realize the full potential of IoT, creating a wave of change in how we live and work. Key improvements include:

- Excellent CPU performance, fast GFX and media, image processing and Intel® Time Coordinated Computing Technology (Intel® TCC Technology)
- Achieves new levels of security, determinism, and image and video processing power in a compact form factor
- Delivers ability to handle more sensors and tasks across extended temperatures (T_A -40 – 85 degrees Celsius), which is especially critical for industrial use cases
- Keeps systems of devices in sync in reduced latency across a wide variety of applications

Delivering Advanced Solutions for the Next Generation of Smart and Connected Products

- **Enhanced CPU in a small, power-efficient package.** The Intel Atom processor E3900 series delivers 1.7 times more computing power compared to the previous generation³ at the edge of IoT operations, for faster memory speeds and memory bandwidth. Built into a compact flip chip ball grid array (FCBGA) and featuring Intel's latest 14 nanometer silicon technology, it is an excellent fit for a wide range of IoT applications when scalable performance, space and power are at a premium.
- **Increased graphics and media processing performance.** The processor offers powerful graphics and media capabilities in a flexible package, opening new opportunities for those creating systems for media-rich applications. It features a new graphics engine that improves 3-D graphics performance by 2.9 times compared to the previous generation⁴, offers outstanding video capabilities. It also features enhanced image processing with amazing color processing and multi-frame technology.
- **Intel TCC Technology.** Intel TCC Technology synchronizes peripherals and networks of connected devices, achieving determinism. It also resolves latency issues in applications, such as robotics manufacturing, by enabling 1 microsecond timing accuracy across the network.
- **Fast, strong processing and sensor integration at the edge.** The Intel Atom processor E3900 series will make the edge and fog more intelligent – enabling many of the processing needs to take place right at the edge or fog level and alleviating the need to push all data processing to the data center. For example, in traffic cams and sensor data, there are significant downsides to sending the data to a server to be processed, including loss due to video compression and time spent in data travelling, versus having the ability to process data at the device.

Building the Future of IoT

Intel is collaborating with a diverse ecosystem of leading IoT device and equipment manufacturers, software vendors and OEMs, including Delphi*, FAW*, Neusoft* and Hikvision*. Through these collaborations, Intel will enable a broad range of optimized and interoperable, multivendor solutions using the Intel Atom processor E3900 series across industries. Sample uses include:

- Industrial: Predictive maintenance, accelerated time to market and increased quality and remote management
- Digital security and surveillance (DSS)/vision systems (video): Visual data identification and analysis, safety and security, traffic management and monitoring, agriculture and pipeline monitoring, and manufacturing inspection
- Transportation/automotive: Software-defined cockpits and vehicle-to-vehicle communication; additionally, the Intel Atom processor A3900 series will specifically address automotive-grade, in-vehicle experiences

This latest Intel Atom processor for IoT is a major step in Intel's strategy to enable industries to unlock the promise of IoT. Intel is uniquely positioned to enable every segment of the smart and connected world – powering the majority of the world's data centers, connecting hundreds of millions of IoT devices and fulfilling the promise of always-on, 5G connectivity, deep machine learning, and security and privacy.

Lineup and Availability

This announcement of Intel Atom processor E3900 series will include the following SKUs:

- Intel® Atom™ x5-E3930 processor
- Intel® Atom™ x5-E3940 processor
- Intel® Atom™ x7-E3950 processor

The Intel Atom processor E3900 series is trending to becoming one of Intel's most successful IoT processors. Devices will come to market utilizing the new Intel Atom processor E3900 series starting around Q2 2017. For more information, visit <http://www.intel.com>. Customers can also contact their preferred PC OEM(s) for system offerings or their preferred retailer(s) for system availability.

KEY FEATURES

INTEL COMPUTE POWER

Memory Speeds: Get up to 8 GB of LPDDR4.

Processing Power: The new Intel® Atom™, Pentium®, and Celeron® processors are available with up to quad-core, 14 nm processors running at up to 2.5 GHz.

Compact Package: The low-power FCBGA package allows it be deployed in a wide range of applications.

POWERFUL MEDIA PERFORMANCE AND IMMERSIVE 3D GRAPHICS

Enhanced Display Performance: Get support for Ultra HD 4K at 60 Hz on three independent displays via three simultaneous graphics pipes.

Resolution: Capture 13MP stills and 1080p60 video.

Enhanced API Support: Take advantage of the latest media hardware acceleration, including Intel® Media SDK (Intel® Quick Sync Video), Intel® Computer Vision SDK, DirectX* 12, and OpenGL* 4.3.

Powerful Video Analytics: Up to 15 simultaneous 1080p30 decode streams deliver high-level performance for surveillance and other videocentric applications.

THE NEXT LEVEL OF DETERMINISM

Intel® Time Coordinated Computing Technology (Intel® TCC Technology): Available on Linux* Yocto*, Intel TCC Technology coordinates and synchronizes peripherals and networks of connected devices, achieving improved determinism. It can resolve latency issues in applications, such as robotics manufacturing, by synchronizing the clocks of devices across networks to within 1 µs.

RELIABLE AND EFFICIENT COMPUTING

Error Correction Code (ECC): Delivers enhanced system reliability by helping to detect and eliminate DDR3L memory errors.

High-Temperature Rating: Available SKUs offer -40°C to 110°C junction temperature to support applications in extreme environments.

Extended Reliability: Protect your investment in industrial and automotive use cases.

Automotive-Qualified: Select SKUs offer the durability that qualifies them for automotive applications.

MORE I/Os

More I/O Ports: More USB ports, PCIe* lanes, and other ports allow for more complex configurations with fewer hubs.

High-Speed Connectivity: Six USB 3.0 ports and four PCIe ports with six lanes allow for ultrahigh data transfer rates with a greatly expanded number of peripherals.

SECURITY FEATURES OF THE INTEL® ATOM™ E3900 SERIES

FEATURES OF THE NEW INTEL® TRUSTED EXECUTION ENGINE 3.0 (INTEL® TXE 3.0) DEDICATED SECURITY COPROCESSOR

Secure Boot or Measured Boot: Helps prevent malware and other unauthorized software from replacing or tampering with the low-level firmware and OS.

Digital Rights Management (DRM), HDCP 1.4 Wired/ HDCP 2.2 Wireless, Protected Audio Video Path (PAVP): Receive, process, and transmit premium content securely.

Intel® Platform Trust Technology on Linux* OS: Stores secrets in hardware and performs crypto operations compliant to full TCG TPM2.0 specification.

ENHANCED CPU CRYPTOGRAPHY FEATURES

Intel® AES New Instructions (Intel® AES-NI), SHA-NI, RDRAND: Enables data confidentiality and integrity at higher throughput using native CPU instructions. For example, whole disk encryption, data at rest, and data in transit.

INTEL NEWS FACT SHEET



INTEL® ATOM™, INTEL® PENTIUM®, AND INTEL® CELERON® PROCESSORS FOR IOT

PROCESSOR NUMBER	CPU CORES	CPU HFM FREQUENCY	CPU SINGLE-CORE BURST FREQUENCY	CPU L2 CACHE SIZE	THERMAL DESIGN POWER	PACKAGE
Intel® Celeron® Processor N3350	2	1.1 GHz	2.4 GHz	2 MB	6W	FCBGA1296
Intel® Pentium® Processor N4200	4	1.1 GHz	2.5 GHz	2 MB	6W	FCBGA1296
Intel® Atom™ x5-E3930 Processor	2	1.3 GHz	1.8 GHz	2 MB	6.5W	FCBGA1296
Intel® Atom™ x5-E3940 Processor	4	1.6 GHz	1.8 GHz	2 MB	9.5W	FCBGA1296
Intel® Atom™ x7-E3950 Processor	4	1.6 GHz	2.0 GHz	2 MB	12W	FCBGA1296

SUPPORTED SOFTWARE

OS VENDOR	OPERATING SYSTEM (TARGETED FOR SUPPORT)	IMPLEMENTATION	DISTRIBUTION AND SUPPORT
Microsoft	Windows* 10 Enterprise (64-bit), IoT Core (32/64-bit)	Intel	Intel, Microsoft
Linux*	Wind River 8 Linux distribution (64-bit)	Wind River	Wind River
	Yocto Project* BSP tool-based embedded Linux distribution (64-bit)	Intel	Yocto Project and ISV Partners
Android*	Android 7.0 (64-bit) Nougat (Target Gold Release Q2 17)	Intel	ISV Partners
RTOS	Wind River VxWorks* 7	Wind River	Wind River

¹ Cisco Internet Business Solutions Group (IBSG) White Paper, "The Internet of Things How the Next Evolution of the Internet Is Changing Everything," https://www.cisco.com/c/dam/en_us/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf. (April 2011)

² EMC Digital Universe Study, research and analysis by IDC, "The Digital Universe of Opportunities," <http://www.emc.com/collateral/analyst-reports/idc-digital-universe-2014.pdf?cmp=pt-du-infob-q2-2014>. (May 2014)

Configurations

³ SPECint*_rate_base2006 (1-copy):

- Current Device: Intel CRB; CPU: Intel® Atom™ processor x5-E3930; OS: CentOS 7 64-bit kernel 3.10.0-123el7; Memory: 4x2GB LPDDR4-2133; Storage: Intel 520 Series SSD 120GB.
- Previous Generation Device: Intel CRB; CPU: Intel® Atom™ processor E3825; OS: CentOS 6.4 64-bit kernel 3.5.0; Memory: 1x4GB DDR3L-1066; Storage: Western Digital* HDD 250GB.

⁴3DMark* 11 Performance LP graphics; Graphics Driver: 10.18.10.3925

Current Device: Intel CRB; CPU: Intel® Atom™ processor x7-E3950; OS: Microsoft* Windows* 10 Enterprise 64-bit; Memory: 4x2GB LPDDR4-2400; Storage: Samsung* SSD 750 EVO 120GB; Graphics: 9th gen Intel LP graphics; Graphics Driver: 15.42.4438

Previous Generation Device: Intel CRB; CPU: Intel® Atom™ processor E3845; OS: Microsoft* Windows* 8 64-bit; Memory: 2x4GB DDR3-1333; Storage: Intel 320 SSD 40GB; Graphics: 7th gen Intel k

FTC Optimization

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSE4 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice. Notice revision #20110804.

General Performance Disclaimer/"Your Mileage May Vary"/Benchmark

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.

Principled Technologies Benchmark Disclaimer (XPRT Benchmark Disclaimer)

Intel is a sponsor and member of the BenchmarkXPRT Development Community, and was the major developer of the XPRT family of benchmarks. Principled Technologies is the publisher of the XPRT family of benchmarks. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases.

Processor Numbering Notice

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.

Legal Disclaimer

Intel technologies may require enabled hardware, specific software, or services activation. Check with your system manufacturer or retailer.

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 complete information, visit <http://www.intel.com/benchmarks>.

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit <http://www.intel.com/benchmarks>

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