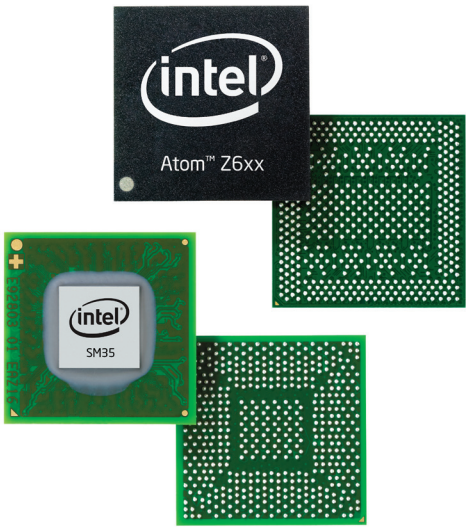
PLATFORM BRIEF
Intel® Atom™ Processor Z6xx Series with Intel® SM35 Express Chipset
Embedded Computing

Intel® Atom™ Processor Z6xx Series-Based Platform for Embedded Computing



Platform Overview

The Intel® Atom™ processor Z6xx series implements ground-breaking power management techniques on 45nm process technology to deliver the lowest Intel® architecture platform power to date for embedded devices.[1] This series offers clock speeds of 1.5 GHz or 1.2 GHz, both at 3W thermal design power (TDP), along with an integrated, power-optimized 2D/3D graphics engine, all in an ultra-small 13.8mm x 13.8mm package. These processors are paired with the Intel® SM35 Express chipset, which is also highly optimized for low-power solutions (0.75W TDP), making this platform ideal for a range of innovative, battery-capable, small form-factor embedded designs requiring rich multimedia capabilities.

The chipset incorporates four USB ports, three SDIO ports, two SPI ports, and one SATA port for storage, along with other common I/O blocks such as I^2C, Intel® High Definition Audio, and GPIOs. The platform provides an excellent solution for tablets used in industrial, medical, retail, or educational situations, as well as applications requiring minimum I/O interfaces to save on power consumption.

This platform offers a selection of operating system options including support for Windows* 7, Windows Embedded Standard 7 and MeeGo*. Windows Embedded Standard 7 allows for OS footprint size optimizations by selecting just the drivers, services, and applications needed. MeeGo offers a full-featured Linux* open-source operating system solution with advanced capabilities for custom multi-touch, user-interface environments.

Additionally, a compatible, dedicated Power Management Integrated Circuit (PMIC) solution is required and may be obtained from leading PMIC suppliers. The PMIC replaces several previously required parts to help minimize platform part count while reducing bill of materials and design complexity.

Product Highlights

- **Integrated, energy-efficient processor:** Includes an Intel® Atom™ processor core (512K L2 cache, 24K data, and 32K instruction L1 cache), 3D graphics engine, and support for video decode, plus memory and display controllers in one package to help reduce bill of materials and save board real estate. Intel's 45nm Hafnium-based high-k metal gate transistor technology helps increase energy efficiency and performance.
- **Integrated Intel® Graphics Media Accelerator (GMA) 600 graphics engine:** Power-optimized 2D/3D engine operating at 400 MHz core frequency supports DX9, OpenGL 2.1, and hardware-accelerated HD video decode (MPEG2, H.264, WMV9 and VC1). Supports LVDS display using a pixel clock up to 80 MHz, and HDMI using a pixel clock of up to 160 MHz, supporting decode acceleration up to 1080p.

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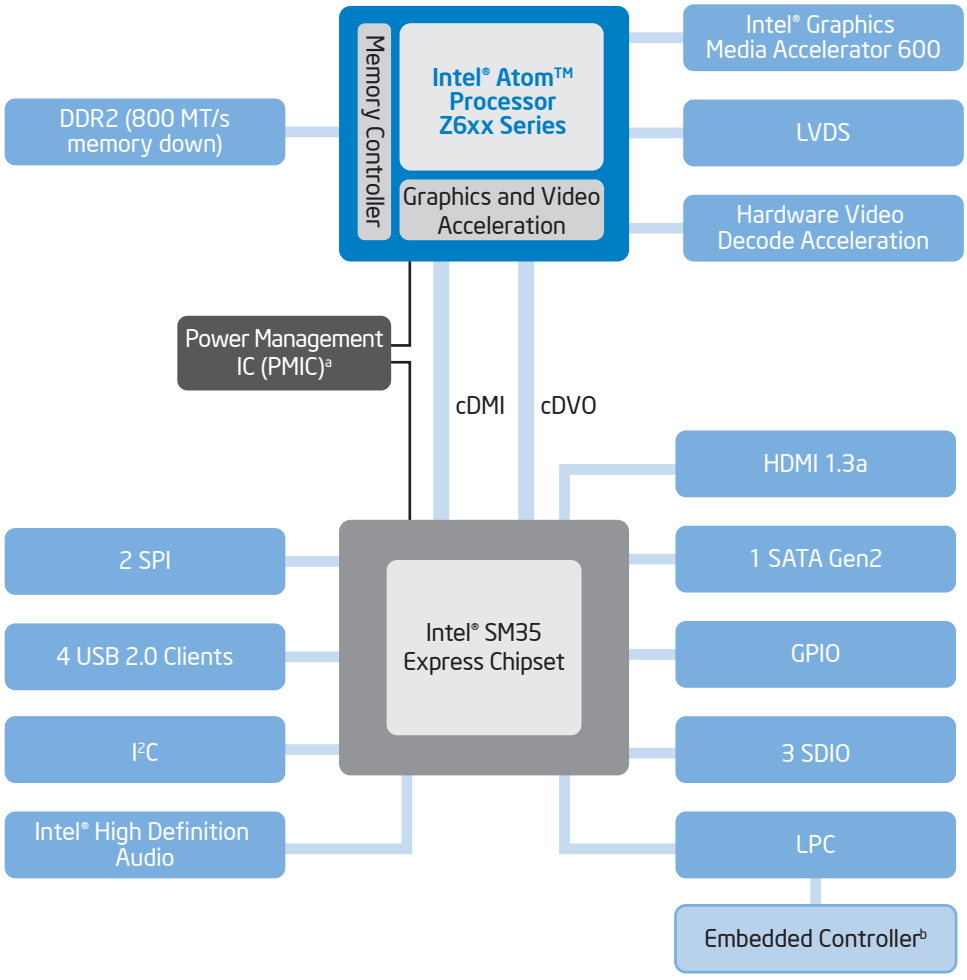
- **Integrated memory controller and DDR2 support:** Integrated 32-bit single-channel memory controller offers fast memory read/write performance through efficient pre-fetching algorithms, low latency, and high-memory bandwidth. Processors include support for DDR2 800 memory technology up to 2 GB.
- **Intel® Hyper-Threading Technology[2]:** Provides performance and support for multi-threaded applications. This helps deliver increased performance and system responsiveness in today's multi-tasking environments by enabling the processor to execute two instruction threads in parallel. Benefits include fast Web page downloads, multi-tasking and multi-window capabilities.
- **Green technology:** Both the Intel Atom processor Z6xx series and Intel SM35 Express chipset are manufactured and available only in lead-free[3] and halogen-free[4] component packages.
- **Reliable technology ecosystem:** Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Embedded Alliance (intel.com/go/eca), Intel helps cost effectively meet developer challenges and speed time-to-market.
- **Embedded lifecycle support:** Protects system investment by enabling extended product availability for embedded customers.



[a]The PMIC is required for design and is available from third-party vendors.
[b]The embedded controller is required for design. Solutions are available from third-party vendors.

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Software Overview

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

OPERATING SYSTEM	CONTACT	BIOS
Microsoft Windows* 7	Intel provides drivers[5]	American Megatrends
Microsoft Windows Embedded Standard 7	Intel provides drivers[5]	Insyde Software
MeeGo* 1.2	MeeGo community, Wind River	Phoenix Technologies

Intel® Atom™ Processor Z6xx Series for Embedded Computing

Product Name[Δ]	Product Number	Clock Speed (GHz)	Graphics Speed (MHz)	Thermal Design Power[6]	Tjunction Max	Temperature Range	Package
Intel® Atom™ processor Z670	AY80609007293AA	1.5	400	3.0W	110°C	Commercial 0° to 70°C	518-ball FCMB3 13.8x13.8mm
Intel® Atom™ processor Z650	AY80609007296AA	1.2	400	3.0W	110°C	Commercial 0° to 70°C	518-ball FCMB3 13.8x13.8mm

Intel® SM35 Express Chipset for Embedded Computing

Product Name	Product Number	Thermal Design Power	Tjunction	Temperature Range	Package
Intel® SM35 Platform Controller Hub	AF82SM35	0.75W	100° C	Commercial 0° to 70° C	493-ball FCBGA 14x14mm

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Third-Party Vendors

POWER MANAGEMENT INTEGRATED CIRCUIT (PMIC)

Freescale Semiconductor — www.freescale.com/webapp/sps/site/overview.jsp?code=PMICINTEL

Maxim Integrated Products, Inc. — www.maxim-ic.com

Renesas Electronics Corporation — www.renesas.com/pmic

Intel in Embedded and Communications: **intel.com/embedded**

[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 for details.

[1] Intel® Atom™ processor Z6xx series-based platform total TDP value of 3.75 watts compared to the Intel® Atom™ processor Z5xx series with Intel® System Controller Hub US15W which has a total platform TDP of 4.3 to 4.5 watts.

[2] Requires an Intel® HT Technology enabled system, check with your PC manufacturer. Performance will vary depending on the specific hardware and software used. Not available on Intel® Core™ i5-750 processor. For more information including details on which processors support HT Technology, visit http://www.intel.com/info/hyperthreading.

[3] Intel 45nm product is manufactured on a lead-free process. Lead is below 1000 PPM per EU RoHS directive (2002/95/EC, Annex A). Some EU RoHS exemptions for lead may apply to other components used in the product package.

[4] Applies only to halogenated flame retardants and PVC in components. Halogens are below 900ppm bromine and 900ppm chlorine.

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

[6] TDP values for Intel® Atom™ Processor Z6xx Series are pre-silicon estimates.

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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