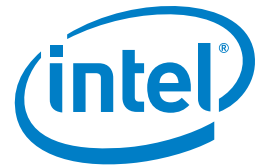


PLATFORM BRIEF

Intel® Atom™ Processor E6xx Series
with Intel® Platform Controller Hub EG20T
Embedded Computing



Intel® Atom™ Processor E6xx Series-Based Platform for Embedded Computing



Platform Overview

The Intel® Atom™ processor E6xx series delivers an unprecedented level of I/O flexibility, departing from proprietary interfaces such as FSB and DMI and moving to the open PCI-Express* standard for processor-to-chipset interfaces. Processors in this series can be paired with the Intel® Platform Controller Hub EG20T or I/O hubs from a variety of third-party vendors (including Lapis Semiconductor Co., Ltd., Realtek Semiconductor Corp., STMicroelectronics) to meet the specific I/O requirements of many embedded applications such as in-vehicle infotainment systems, media phones and connected services gateways.

The Intel Platform Controller Hub EG20T integrates a range of common I/O blocks required in many market segments such as industrial automation, retail, gaming, and digital signage. These include SATA, USB client, SD/SDIO/MMC, and Gigabit Ethernet MAC, as well as general embedded interfaces such as CAN, IEEE* 1588, SPI, I²C, UART, and GPIO. For applications requiring a minimum of I/O interfaces, developers can also use discrete PCIe* devices such as PCIe-GbE controllers or PCIe-SATA controllers instead of an I/O hub.

The Intel Atom processor E6xx series is available with industrial and commercial temperature ranges. Both the Intel® processors and platform controller hub provide embedded lifecycle support, and are supported by a range of software ingredients.

Additionally, a compatible, dedicated Power Management Integrated Circuit (PMIC) solution may be obtained from leading PMIC suppliers, which will help to minimize platform part count and reduce BOM cost and design complexity. Options include separate PMIC and clock generator chips (e.g., ROHM Co., Ltd.) or a single-chip solution that integrates the voltage regulator and clock generator (e.g., Dialog Semiconductor).

Product Highlights

- **Integrated processor:** Includes a 45nm Intel Atom processor core (512K L2 cache, 24K data, and 32K instruction L1 cache), 3D graphics, and video encode/decode, plus memory and display controllers in one package to help reduce bill of materials and save board real estate.
- **Integrated Intel® Graphics Media Accelerator (GMA) 600 graphics engine:** Power-optimized 2D/3D graphics engine provides up to 400 MHz graphics core frequency, support for OpenGL* ES2.0, OpenGL 2.1, and OpenVG* 1.1 and hardware-accelerated HD video decode (MPEG4 part 2, H.264, WMV and VC1) and encode (MPEG4 part 2, H.264). Supports LVDS display using a pixel clock of 80 MHz and SDVO using a pixel clock of 160 MHz.
- **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 MT/s memory technology up to 2 GB.

▪ **Intel® Hyper-Threading Technology¹:**

Provides performance and support for multi-threaded applications, to deliver increased performance and system responsiveness in today's multi-tasking environments by enabling the processor to execute two instruction threads in parallel. Examples include fast Web page downloads, multi-tasking and multi-windowing capabilities.

▪ **Integrated, hardware-assisted Intel® Virtualization Technology² for IA-32 Intel® architecture (Intel® VT-x):**

Provides greater flexibility and maximum system utilization by consolidating multiple environments into a hardware platform. With support from the processor, BIOS and enabling software, Intel

VT improves traditional software-only-based virtualization. By offloading workloads to system hardware, virtualization software can provide more streamlined software stacks and "near native" performance characteristics. The required virtualization software (virtual memory manager or VMM) is available from third parties such as TenAsys Corporation.

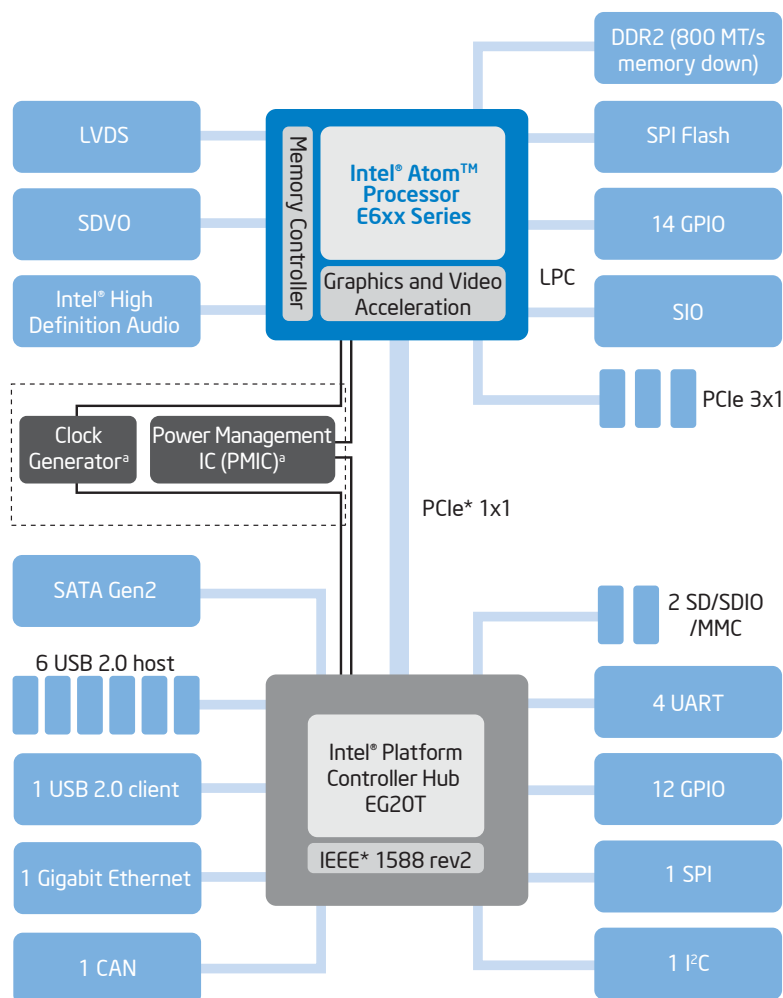
▪ **Industrial temperature range option:**

-40° to +85°C temperature range meets requirements for many embedded in-vehicle infotainment system designs in both consumer and commercial vehicles. This option is also important for industrial control and automation applications often found in factories with unconstrained thermal environments.

▪ **Green technology:** Both the Intel Atom processor E6xx series and Intel Platform Controller Hub EG20T are manufactured and available only in lead-free³ and halogen-free⁴ 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.



^aPMIC and Clock Generator products are available from third parties.
An integrated PMIC and Clock Generator on a single chip is also available from a third party.

Software Overview

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

OPERATING SYSTEM	CONTACT	BIOS
Microsoft Windows* XP SP3	Intel provides drivers ⁵	American Megatrends
Microsoft Windows Embedded Standard 2009	Intel provides drivers ⁵	Insyde Software
Microsoft Windows Embedded Standard 7	Intel provides drivers ⁵	Phoenix Technologies
Microsoft Windows Embedded POS Ready 2009	Intel provides drivers ⁵	Byosoft
Microsoft Windows 7	Intel provides drivers ⁵	
Microsoft Windows Embedded CE 6.0 R3	Adeneo, BSQUARE, Wipro	
Timesys Fedora Remix*	Fedora community, Timesys	
MeeGo 1.0*	MeeGo community, Wind River	
QNX Neutrino*	QNX Software Systems	
Wind River VxWorks*	Wind River	

Intel® Atom™ Processor E6xx Series for Embedded Computing

Product Name ^Δ	Product Number	Clock Speed (GHz)	Graphics Speed (MHz)	Thermal Design Power	TjunctionMax	Temperature Range	Package
Intel® Atom™ processor E620	CT80618005844AA	0.6	320	3.3 W	90°C	Commercial 0 to 70°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E620T	CT80618005844AB	0.6	320	3.3 W	110°C	Industrial -40 to 85°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E640	CT80618005841AA	1.0	320	3.6 W	90°C	Commercial 0 to 70°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E640T	CT80618005841AB	1.0	320	3.6 W	110°C	Industrial -40 to 85°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E660	CT80618003201AA	1.3	400	3.6 W	90°C	Commercial 0 to 70°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E660T	CT80618003201AB	1.3	400	3.6 W	110°C	Industrial -40 to 85°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E680	CT80618007035AA	1.6	400	4.5 W	90°C	Commercial 0 to 70°C	676-ball FCBGA 22x22mm
Intel® Atom™ processor E680T	CT80618007035AB	1.6	400	4.5 W	110°C	Industrial -40 to 85°C	676-ball FCBGA 22x22mm

Intel® Platform Controller Hub EG20T for Embedded Computing

Product Name	Product Number	Thermal Design Power	Tjunction	Temperature Range	Package
Intel® Platform Controller Hub EG20T	CS82TPCF	1.55 W	125°C	Industrial -40 to 85°C	376-ball PBGA 23x23mm

Third-Party Vendors

I/O HUBS

Lapis Semiconductor Co., Ltd. — www.lapis-semi.com/en/

STMicroelectronics — www.st.com

Realtek Semiconductor Corp. — www.realtek.com

POWER MANAGEMENT INTEGRATED CIRCUIT (PMIC)

Dialog Semiconductor — www.dialog-semiconductor.com

ROHM Co., Ltd. — www.rohm.com

VIRTUALIZATION SOFTWARE

TenAsys Corporation — www.TenAsys.com/company

Intel in Embedded and Communications: intel.com/embedded

⁴Intel 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.

¹Requires 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>.

²Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, 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>.

³Intel 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.

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

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

Performance results are based on certain tests measured on specific computer systems. Any difference in system hardware, software or configuration will affect actual performance. Configurations: [describe config + what test used + who did testing]. For more information go to <http://www.intel.com/performance>.

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