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Backgrounder

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Intel's Next-Generation Handheld Platform (Codenamed 'Moorestown')

Intel Corporation's next-generation handheld platform, codenamed "Moorestown," is scheduled to launch in 2010 and will target the MID and smart phone market segments.

Moorestown consists of a System on Chip (SoC), codenamed "Lincroft," that integrates a 45nm[1, 2] Intel® Atom™ processor core, graphics and video engines, as well as memory and display controllers. The platform also includes an Input/Output Platform Controller Hub (I/O-PCH), codenamed "Langwell," which supports a range of I/O blocks to connect with wireless, camera sensor and flash storage, in addition to incorporating several board level functions. Moorestown is accompanied by a dedicated Mixed Signal IC (MSIC), codenamed "Briertown," and implements next-generation OS Power Management (OSPM). Additionally, Moorestown is accompanied by a newer Moblin software version, Moblin v2.1.

The SoC, I/O-PCH, MSIC and OSPM work in concert to dramatically reduce the idle power of the platform by up to 50x and size of the board size by 2x compared to Intel's first-generation "Menlow" platform. Intel is currently working on next-generation Moorestown designs with leading system manufacturers, including Aava Mobile*, Compal Communications*, Compal Electronics*, EB*, Inventec*, LG Electronics* and Quanta*.

At the IDF in San Francisco, Sept. 22-24, Intel discussed some of unique platform innovations behind advances in high performance, low power, small footprint and always connected experiences.

Architected to Deliver High Performance
The Moorestown platform is designed to deliver high performance to run the rich PC-like Internet in its entirety. High performance is made possible by the 45nm high-k-based low leakage transistors on the Lincroft SoC and the highly integrated Langwell I/O-PCH hub. Key innovations include:

- Lincroft SoC architecture is designed to deliver a wide range of ***scalable frequencies*** for multimedia blocks (graphics, video encode, video decode), making it to possible to deliver the right performance at the right power for the right usage at the right time.

- ***Bus Turbo Mode*** increases bus bandwidth and reduces CPU-to-memory bus latency when the CPU is operating at higher frequencies, thus increasing the overall system performance.
- ***Intel® Burst Performance Technology*** (Intel® BPT) enables the processor to burst to higher performance on demand, making it possible to provide higher performance in smaller form factors without impacting thermal design.
- The platform supports ***Intel® Hyperthreading[3] technology***, enabling excellent performance/power efficiency and enabling multi-tasking oriented usage models.
- The Langwell hub combines ***PC and Handheld I/O*** – such as MIPI®-CSI, SDIO ports, USB controllers, NAND controller and audio engine – contributing to high performance of the overall platform.

Designed for Low Power Consumption

The Moorestown platform incorporates a range of innovations across Lincroft, Langwell and Briertown. Additionally, Intel is using high-k transistors and industry-leading 45nm process to address power leakage. Key features that enable low power include:

- Lincroft supports the ***MIPI display interface***, in addition to LVDS. This MIPI implementation meets the unique needs of devices with handheld screen resolutions while requiring lower power consumption. Lincroft also supports ***Low-Power DDR1*** and ***DDR2*** memory technologies to meet the varied needs of smart phones and MIDs.
- Enhanced Intel SpeedStep® Technology is creating a new dynamic range for lower power, helping to deliver performance on demand using dynamic voltage and frequency scaling, and making it possible to deliver better user experience while saving battery life.
- Aggressive use of ***Distributed Power Gating*** across power islands on the Lincroft SoC makes it possible to achieve new thresholds in platform idle power by shutting off parts not in active use. The Langwell I/O-PCH interfaces with a dedicated ***MSIC*** (Mixed Signal IC) – Briertown -- which plays a key role in efficient power delivery and enabling power gating on Moorestown platform. By shutting down transistors when not in use, power leakage goes down and battery life goes up. The MSIC also enables faster transitions in and out of power states, allowing for more frequent and longer residency in ultra-low-power saving states.
- The Moorestown platform implements next-generation ***OS Power Management (OSPM)***, an OS-directed software managed technique, to aggressively manage active and idle power states by controlling power and incorporating clocking gating on the platform.

Optimized for Small and Sleek Form Factors

A number of optimizations on the Moorestown platform are resulting in reducing the board size by 2x compared to the Menlow platform. In traditional PC platforms, a large number of embedded controllers, USB chips, clock chips and storage controllers are distributed throughout the motherboard. On the Moorestown platform, Intel has taken aggressive measures to integrate this functionality into the Briertown MSIC and Langwell I/O-PCH to help achieve drastic form factor reductions.

Enabling an Always Connected[4] Experience

Intel is working with industry leaders to provide people with an always connected experience using devices based on the Moorestown platform. Moorestown-based devices will feature 3G/HSPA modules from Option* and Ericsson*. Moorestown will also support Intel's next-generation WiMAX or 4G technology codenamed "Evans Peak."

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1 Intel 45nm product is manufactured on a lead-free process. Lead-free per EU RoHS Directive (2002/95/EC, Annex A). Some RoHS exemptions may apply to other components used in the product package.
2 Applies to components containing flame retardants & PVC only. Halogens are below 900 PPM bromine, 900 PPM chlorine, and 1500 PPM combined bromine and chlorine.
3 Intel® Hyper-Threading Technology requires a computer system with an Intel processor supporting Hyper-Threading Technology and an HT Technology enabled platform controller hub, firmware and operating system.
4 Always Connected experience is dependent on a number of factors including wireless component integration, infrastructure availability and user activation.