

## ADVANTECH LOW POWER

Computer on Modules  
Embedded SBCs  
Slot SBCs  
Industrial Motherboards  
Industrial Box PCs  
Portable Computers  
Vehicle Mounted Systems

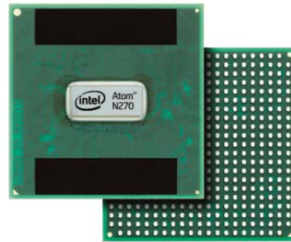


### The Intel Atom Advantage:

- Ultra low power processors with good performance
- 45nm high-k silicon technology allows smaller size and less heat
- Energy efficiency in 1 to 2.5 watt range for mobile devices
- Very low idle and average power eliminate need to turn devices off
- Software compatible with 32-bit Intel® architecture
- Full compatibility with the Intel Core® microarchitecture instruction set
- CPU and chipset combined only use from 5 to 8 watts
- HyperThreading architecture operates as two logical cores with enhanced performance while retaining single core efficiency
- Chipsets to support USB, HD audio, SATA, PATA, PCI-e, DDR2, SVDO, LVDS, SDIO, 3D graphics, dual display, high def video decoding

## Doing More With Less — A Commitment To Low Power Technology From Board Level To System Level

Systems integrators and embedded system developers frequently need to decide what hardware to use for their projects. Making those decisions requires a careful analysis of features, performance and costs, and how those factors relate both to the project at hand and to clients' expectations. More is not always better, especially when it comes to embedded and mobile applications. This is why Advantech offers a full lineup of "low power" solutions ranging from the board level to the system level. These products use emerging processor technologies such as the Intel® Atom™ in Advantech's comprehensive and growing catalog of embedded and industrial systems solutions.

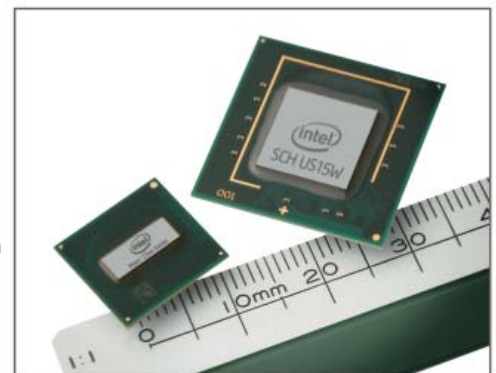


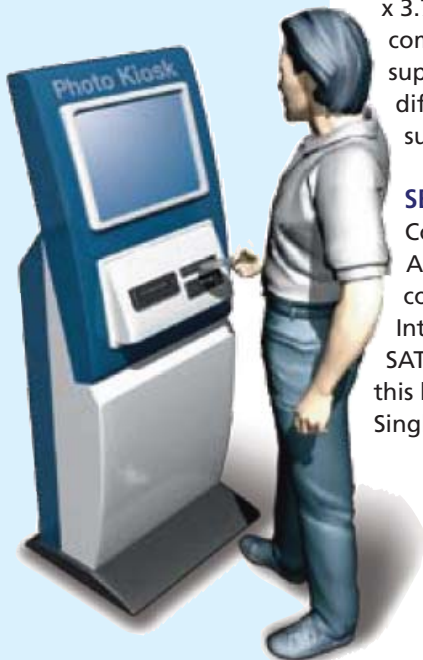
The core of many of Advantech's low power products is Intel's Atom processor, which combines efficiency with excellent performance for applications where small size, thermal efficiency and power consumption matter. Atom processors were created for smaller, more compact designs and have stunningly low thermal design power specifications ranging from less than one watt to 2.5 watts for mobile devices. The Atom processor families are complemented by equally low power chipsets and system controller hubs, making for superbly power-efficient solutions.

Providing targeted performance for a wide variety of embedded application projects, Advantech's Atom-based products offer systems integrators a number of significant design advantages and considerations. Since Atom processors are completely compatible with the full Intel Core™ microarchitecture instruction set, developers can use the same compilers and existing software development tools. This means faster time to market. The use of a single processor architecture can eliminate the extra training and support required for multiple processor architecture and proprietary bus systems. This means lower development cost. And as a new processor family, Atom offers 7+ years of manufacturing availability. This guards against obsolescence.

### Embracing Low Power Technology

As a leader in providing innovative ePlatform products and services since 1983 as well as an authorized alliance partner with both Intel and Microsoft®, Advantech strives to offer a comprehensive product line of boards, modules and systems to our customers. We are fully embracing Low Power platforms as a way to provide targeted performance in energy-efficient and environmentally responsible solutions, and are introducing Low Power products into our entire lineup.





## Advantech: A Full Low Power Product Lineup

### Low power — a good idea from board level to system level

Embedded system developers have been waiting for a low power Intel architecture that provides enough performance for common embedded applications. The new Intel Atom processor lines fill an important gap between low-end processor that are not powerful enough and high-end processors that are too complex and expensive. Atom processors are compatible with the Intel architecture platform and enable many new embedded and mobile devices for a wide range of markets and usage models. This opens important new opportunities for power-efficient devices.

Atom supports most popular embedded operating systems, with drivers available for Windows XP Embedded, Windows CE, QNX and various versions of Linux. This allows systems integrators to extend their embedded designs for thermally and size-constrained applications and create new ones that were simply not possible before. Innovative embedded systems developers are creating entirely new applications for medical, retail, signage, surveillance, factory floor and many other settings, all made possible by low power systems. And designers can more easily answer their customers' requests for solutions that use less power and the demand for more functionality in ever smaller, fanless devices. Here are some of Advantech's new and upcoming Atom-based products:

**COM-Micro** — The Advantech SOM-6760 COM-Micro form factor Computer on Module is based on the Z5x0 Series of Atom processors. The SOM-6760 has all the benefits and functionality of traditional COM-Express modules but has a smaller board size of 3.74 x 3.74 inches. There is a special SOM-6760 development kit as well as Advantech's own SUSI (Secure and Unified Smart Interface) API library. The SOM-6760 is Advantech's first COM board using the Atom processing platform. The 6760 supports up to 1GB of DDR2, 8 USB 2.0 ports, a PCI-e interface and has integrated graphics support. Total power consumption is under 10 watts. It all adds up to longer battery life, smaller devices while retaining full backwards compatibility with existing hardware and software.



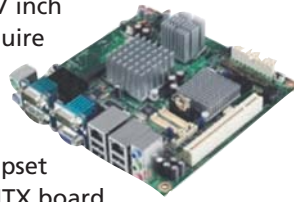
**COM-Express** — The Advantech SOM-5761 COM-Express module brings the advantages of Intel's popular and successful Diamondville Atom N270 processor to the COM-Express 4.92 x 3.74 inch form factor. The processor's ultra-low thermal design power of just two watts combined with a low-power version of Intel's well documented i945 chipset makes for a super-efficient board that is filling the need for applications that require serial differential signaling technology and maximum I/O bandwidth. The SOM-5761 also supports serial ATA I/O and multiple displays.

**SBC** — For applications requiring very low power on a 3.5-inch Biscuit Single Board Computer (5.7 x 4 inches), Advantech offers the PCM-9361 built around the 1.6GHz Atom 270 processor that's used in millions of netbooks. The processor and chipset combined use less than 8 watts. The N270, which has a 533MHz frontside bus, supports Intel's HyperThreading for increased performance. The board supports dual 150 MB/s SATA I/O, dual-channel LVDS and a rich complement of onboard connectivity. Essentially, this board brings the power-efficiency of the Atom processor to a full-function, full-feature Single Board Computer.

**PCI** — Half-size Single Board Computers fill an important niche between computer modules and full-size motherboards. Measuring 7.3 x 4.8 inches, the PCI-7030 (available Q3 2009) brings lower power consumption and heat dissipation to a board type often used for industrial applications and control interfaces.

## Advantech: Advantage for Embedded Applications

**Mini-ITX** — With the AIMB-210, Advantech brings Atom power to the Mini-ITX motherboard class. Mini-ITX boards with their 6.7 x 6.7 inch footprint are ideal for fast-emerging markets that require compact size and power efficiency, such as information kiosks, Point-of-Sale applications, lotteries, gaming and similar. The combination of the 1.6GHz Atom N270 processor and the Intel 945GSE chipset reduces the power requirement of an advanced Mini-ITX board with all of its advanced features and options while offering targeted performance at a very competitive price.



**Box IPC** — Industrial applications requiring a Compact Embedded Computer, or Box IPC, can now take advantage of the Atom platform with the Advantech ARK-6310, a heavy-duty full-function computer in a 9.1 x 9.1 x 2.6 inch enclosure based on the 1.6GHz Atom N270 and Intel 945GSE chipset. Here, the Atom's low idle and average power performance mean that systems can be left on instead of being shut down and started up again, and still conserve power. The ARK-6310 supports SATA, LVDS, dual LAN, as well as both legacy and state-of-the-art interfacing. Cooling is never an issue due to the N270's low TDP.



**Industrial computer chassis** — Industrial environments require industrial-strength solutions, and companies the world over are using our rugged, flexible Advantech wallmount and desktop industrial computer chassis. These are compatible with upcoming Advantech Single Board Computers such as the Atom N270-based PCM-9361 3.5-inch Biscuit for compact, quiet, and power-efficient customer solutions.



**Portable computing** — Mobile computing relies on ruggedness, compact size, light weight and maximum battery life, all the while providing adequate performance. Advantech MARS handhelds and Tablet PCs (such as the MARS-3100 shown to the right) are among the most efficient portable platforms already, and will leverage that advantage with Atom-based additions such as the MARS-3070, which will be released later this year.



**Vehicle mounts** — Advantech TREK vehicle mounted systems must provide reliable performance under adverse conditions on the road where shock, vibration and temperature extremes are the order of the day. The simplicity and small size of an Atom-based fanless design are a perfect match for vehicle mounts, as the upcoming TREK-536 will demonstrate.

**Mobile Clinical Assistant** — An example of a full commercial system based on the Atom processor is Advantech's MICA-101 Mobile Clinical Assistant for use in clinical and hospital environments. Here, the Atom Z510 or Z530's low heat dissipation facilitates a sealed, fanless design, which is crucial for this particular application and provides a competitive advantage over fan-based designs that are more difficult to disinfect. The MICA-101 is based on the Intel Mobile Clinical Assistant reference platform.



### ADVANTECH LOW POWER

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- Industrial Motherboards
- Industrial Box PCs
- Portable Computers
- Vehicle Mounted Systems

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LOW POWER

## Low Power: Relative Performance

One of the frequent questions about the Atom platform is its performance. Performance has to be viewed in relationship to power consumption.

Common notebook processors generally have thermal design powers of 17 watts (example: 1.6GHz Core 2 Duo L7500) to 35 watts (example: 2.5GHz Core 2 Duo T9400). Ultra low power processors range from 5.5 watts (example: 1.2GHz Core Solo U1400) to 10 watts (example: 1.2GHz Core Duo U2500). The Atom processors used by Advantech, on the other hand, use just 2 watts.

In terms of benchmark performance, Atom-based systems score about 50% higher than systems based on the 1GHz Celeron M 373, about the same as a 1.2GHz Intel Core Solo U1400, about 30% lower than a 1.2GHz Core Duo U2500, and roughly one half of a 1.6GHz Core 2 Duo L7500.

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### For more information:

[www.advantech.com](http://www.advantech.com)  
[ECCInfo@advantech.com](mailto:ECCInfo@advantech.com)

## Understanding the Intel Atom Processor

### Extending the Limits With Hafnium-Based Processor Design

As transistors have been getting smaller, conventional silicon dioxide gate materials reach their limits, which manifests itself in current leakage that can result in increased power consumption and reduced reliability. High-k dielectric, or insulator, materials virtually eliminate these leakage problems. Specifically, Hafnium-based High-k materials allowed the continuing miniaturization that made possible the 45 nanometer technology used in the Atom processors. Hafnium is a corrosion-resistant metal with the atomic number 72 and makes a great gate insulator due to its neutron absorption properties.

With these issues solved, the goals for the Atom processor were low power consumption and affordability. An entirely new design allows high-end Atom chips to use less power than reduced-speed ultra-low voltage versions of the more complex Core processors.

The Z5xx versions of the Atom processor, codenamed "Silverthorne," have a 13 x 14 mm package footprint. They were initially targeted at mobile internet devices (MIDs) and use the also new "Poulsbo" System Controller Hub. The processor has about 47 million transistors — more than the original Pentium 4. Bus frequency is 400MHz or 533MHz (which support Intel's HyperThreading). Thermal Design Power is between 0.85 watts for a low-end 800MHz version without HyperThreading, and 2.65 watts for a 1.86GHz version with HyperThreading. The chipset uses about 2.3 watts, which means total CPU and chipset consumption isn't even 5 watts. And the chipset has hardware support for H.264 and other HD decoding. However, as the combo was targeted for internet devices, there is PATA but no SATA support.

A second family of Atom processors, the N2x0 that was codenamed "Diamondville," is meant for standard low-cost PCs and netbook type of devices. The N2x0 is similar to the Z5xx, but measures 22 x 22 mm. The popular 1.6GHz N270 has a Thermal Design Power of 2 watts. The N2X0 processors use lower power versions of the standard Intel 945 chipset. This chipset does not provide HD decoding, but supports SATA.



While Atom processors do not use two cores for power conservation reasons, they use Intel's proven HyperThreading technique that can process two threads, yet increases energy usage by only about 10%. Intel also developed a very power-efficient bus and a cache that can be disabled when it is not needed. Further, the Atom Z5xx uses a new and readily available "Deep Power Down" C6 state; similar advanced power management is available in the Atom N2x0.

What the Intel Atom offers is a very thrifty processor technology that can significantly lower the power consumption of an entire system. As a Premier member of the Intel Embedded and Communications Alliance, Advantech makes this processor technology available in a full lineup of reliable, innovative products, from the board level to the system level.