Big Computing in a Small Package for Industrial Control & Automation

Advantech® 3.5-inch Biscuit SBC with the Intel® Atom™ Processor N270 and Mobile Intel® 945GSE Express Chipset Packs Performance and Features in a Fanless Design
Background
Smaller embedded form factors are helping system designers integrate their solutions into a wide variety of high performance low power solutions in the industrial control and automation segment. The demand for small form factors, such as the popular 3.5-inch Biscuit from Advantech®, is helping to drive the industry trend toward higher performance CPUs and smaller chip sizes for rugged, fanless devices.

The Intel® Atom™ processor N270 and mobile Intel® 945GSE Express chipset enable Advantech to deliver a high performance and feature-rich single board computer (SBC) that consumes approximately 10 watts, while reducing component count and platform cost.

Challenge
In designing its PCM-9361 SBC, Advantech faced the challenge of delivering a high-performance Intel® architecture platform and a rich set of peripherals, including support for CRT and LVDS/TTL video displays, Ethernet, audio, RS-232/422/485 ports, a printer port, USB, Serial ATA and Compact Flash. Advantech’s goal was to implement all of this functionality in its compact 3.5-inch Biscuit board, while keeping power consumption low enough for a fanless design.

Solution
Advantech selected the Intel Atom processor N270 because of its ability to provide optimal performance per watt in a compact form factor, avoiding the need for fan-based cooling. This processor is available as part of a validated platform with the mobile Intel 945GSE Express chipset, which enables the Advantech PCM-9361 SBC to support a rich feature set that meets all of Advantech’s interface requirements, without the need for additional components or the cost of an add-on module. Both the processor and chipset are offered with Intel’s 7-year extended life cycle support.

Performance and Features in a Small Fanless Design
Embedded application segments, from digital signage to interactive retail kiosks, require powerful computing performance, multiple display options and a broad choice of peripheral features and interfaces. In addition to meeting these requirements, SBCs for connected industrial control and automation applications must be implemented in small form factor fanless designs capable of extending the computing performance of Intel architecture throughout the factory floor and connecting with the IT infrastructure.

The Intel Atom processor N270 and mobile Intel 945GSE Express chipset based platform enabled Advantech to save power consumption and board design space. In addition, the chipset’s integrated capabilities helped reduce the design risk inherent in adding additional interfaces. Integrated Serial ATA II support enabled Advantech engineers to support multiple hard drives.

“Intel’s new generation Intel® Atom™ processor N270 and mobile Intel® 945GSE Express chipset is the best performance/low power consumption small form factor platform that offers the most features for our embedded customer’s diverse application needs.”

Franz Wei
Vice President, Advantech Ltd.

Performance per Watt Efficiency
At just 2.5 watts thermal design power (TDP) in a 22 x 22 mm package, the Intel Atom processor N270 provides 1.6 GHz core speed with a 533 MHz AGTL+ front-side bus (FSB). In addition to the energy efficiency of Intel’s hafnium-based 45nm technology, the Intel Atom processor N270 adds energy-saving enhancements including the efficiency of an in-order pipeline, Enhanced Intel SpeedStep® Technology, enhanced low-power sleep states (C1E, C2E, C4E) and dynamic resizing of the L2 cache that reduces electrical leakage in transistor sleep mode.
**Mobile Intel® 945GSE Express Chipset**

The Intel Atom processor N270 is validated with the mobile Intel® 945GSE Express chipset, which includes the Intel® 82945GSE Graphics Memory Controller Hub and Intel® I/O Controller Hub 7-M. In addition to SDVO, LVDS and CRT display ports, the chipset meets Advantech's requirements with a broad range of high-bandwidth interfaces including USB 2.0 connectivity. Additional features include power-efficient graphics with an integrated 32-bit 3D graphics engine based on Intel® Graphics Media Accelerator 950 architecture and an Intel® High Definition Audio interface.

**About Advantech**

Founded in 1983, Advantech cooperates closely with solution partners to provide complete solutions for a wide array of applications in diverse industries, offering products and solutions in three business categories: Embedded ePlatform, eServices & Applied Computing, and Industrial Automation groups.

With more than 3,400 dedicated employees, Advantech operates an extensive support, sales and marketing network in 18 countries and 39 major cities to deliver fast time-to-market services to our worldwide customers. Advantech is a Premier Member of the Intel® Embedded and Communications Alliance, a community of embedded and communications developers and solution providers.
The TDP specification should be used to design the processor thermal solution. TDP is not the maximum theoretical power the processor can generate.

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