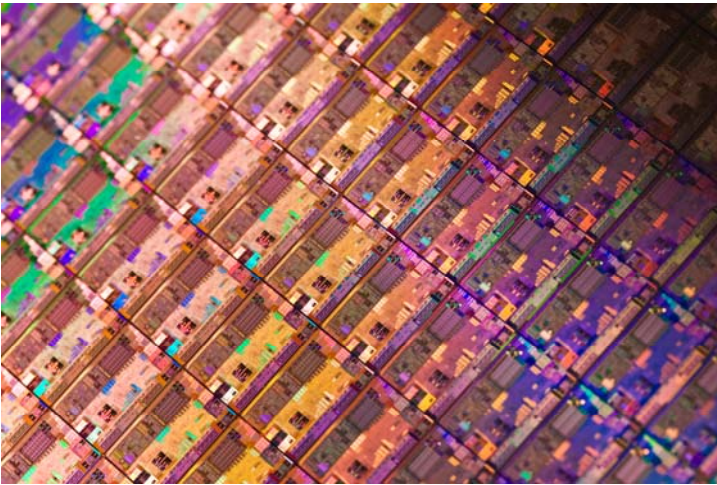# Intel® Atom™ Pineview-based Platforms from WIN Enterprises

Figure 1. *Detail of Intel Atom N450 (Pineview) wafer.*

WIN Enterprises
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Intel Atom Pineview Platforms from WIN Enterprises

Embedded Atom Processor Overview

The Atom processor is a striking success for Intel. Without detracting from their efforts in the high-end of the microprocessor market, the company has been able to develop a significant presence in the market's low end. From the Intel perspective, the Atom processor has enabled a highly desired expansion of its overall exposure in both B2B and B2C market arenas.

By definition, products addressing the low end of the market should cost less, but otherwise market requirements are pretty much the same as for the high-end: low-power consuming, low heat, and smaller size for either mobility or higher density. Intel's 45nm and High-K metal gate technology enables Intel to meet these emerging needs by offering a highly-efficient micro-platform with reduced size and excellent performance value.

Figure 2. *Intel Atom logo for use by ecosystem partners.*

WIN Enterprises

Our business is the design and production of embedded computing and networking devices. Our products span board- and platform-level devices used for everything from intense computing to industrial control and small business networking.

The original generation of Atom processors aimed for the embedded market that WIN Enterprises serves was code named Silverthorne. These processors used Intel's 45nm process technology with the goal of delivering robust performance per watt. This made them ideal for embedded applications such as interactive kiosks, point-of-sale (POS) terminals, in-vehicle infotainment systems, media phones, industrial automation equipment, digital security systems, and residential applications.

Because the embedded industry provides the core components deployed by OEMs in their solution-level products, a long product life is almost always a requirement. Given that, there are many OEM solutions still using the original generation of Atom Silverthorne processors, and this will continue for some time, as many OEM products, once successful, are not prone to rapid change. The medical industry where products can go over five years maintaining the same basic design is a good example.

Intel was gratified as their original Atom processors were used in hundreds of applications new to the company. This success in broadening its markets helped established Atom as a key area of development for Intel.

The Pineview Advantage

Pineview is a new generation of the embedded Atom processor. In the Pineview series of processors Intel integrated a 3D graphics core and a memory controller onto the CPU die helping to simplify board-level architectures. Additionally, the embedded market is now provided with a Dual-Core Atom with the introduction of the D510 in this series. This processor features dual 1.66GHz, x86 processing cores plus the benefit of Intel Hyper-Threading. The D510 ultimately offers an embedded x86 processor with 4 logical threads at a power envelope of only 13 Watts. Another significant addition to the Pineview CPU is its support for 64-bit processing.

The embedded Pineview family consists of 3 products that offer somewhat different benefits:

- The Intel Atom **N450**, 1.66GHz, Hyper-Threaded, single-core, power-optimized part with the best CPU power draw in the series of only 5 - 8 Watts.
- The Intel Atom **D510**, 1.66GHz, Hyper-Threaded, dual-core part offering 2 true x86 cores, each Hyper-Threaded at a power draw of 13 Watts.
- The Intel Atom **D410**, 1.66GHz, Hyper-Threaded, single-core part offering the most economical price of the three and a TDP of 10 Watts.

The embedded Silverthorne options were limited to single-core and required either an additional 2 chips selected from the i945GS/GC mobile chipset family or single chip, the US15x. These designs are still quite popular in the embedded market, but have important limitations that hinder their flexibility.

As indicated, they require a 3-chip solution with the use of one of the 945 chip variants. This approach requires a larger board size and generates more heat. The US15x enables a 2-chip solution, but contains only 2 PCIe expansion ports with no options for the popular PCI bus.

The Pineview processor generation, however, uses only one chip to support the CPU, i.e., the ICH8M.   The ICH8M is a mature, well-recognized chip with years of driver support for virtually any OS. It provides 6 PCI Express and 4 PCI masters, as well as additional 3 SATA, 1 IDE, 10 USB 2.0, and GbE MAC support. In some cases, on-board footprints using an Atom Pineview processor can be reduced by over 60%, and overall total kit power up to 20%.

The Pineview generation of Intel Atom processors are a good solution for any platform that seeks to leverage the low-power and excellent performance value of Atom processors, while gaining increased system I/O and processor scalability.

A Pineview Family Snapshot

As mentioned, the Intel Atom Pineview is available in both single- and dual-core versions. The single-core Atom N400 series is targeted for netbooks (hence the N designation) and entry-level desktop platforms (hence the D). All Atom Pineview processors operate at a respectable 1.66GHz. The single-core Atom D400 and dual-core Atom D500 series are targeted at the Nettop, home storage, and small business network attached storage (NAS) systems. When used in embedded systems these processors are broadly applied across industries from networking, portable medical, industrial control, and anywhere low power consumption with good performance is a requirement.
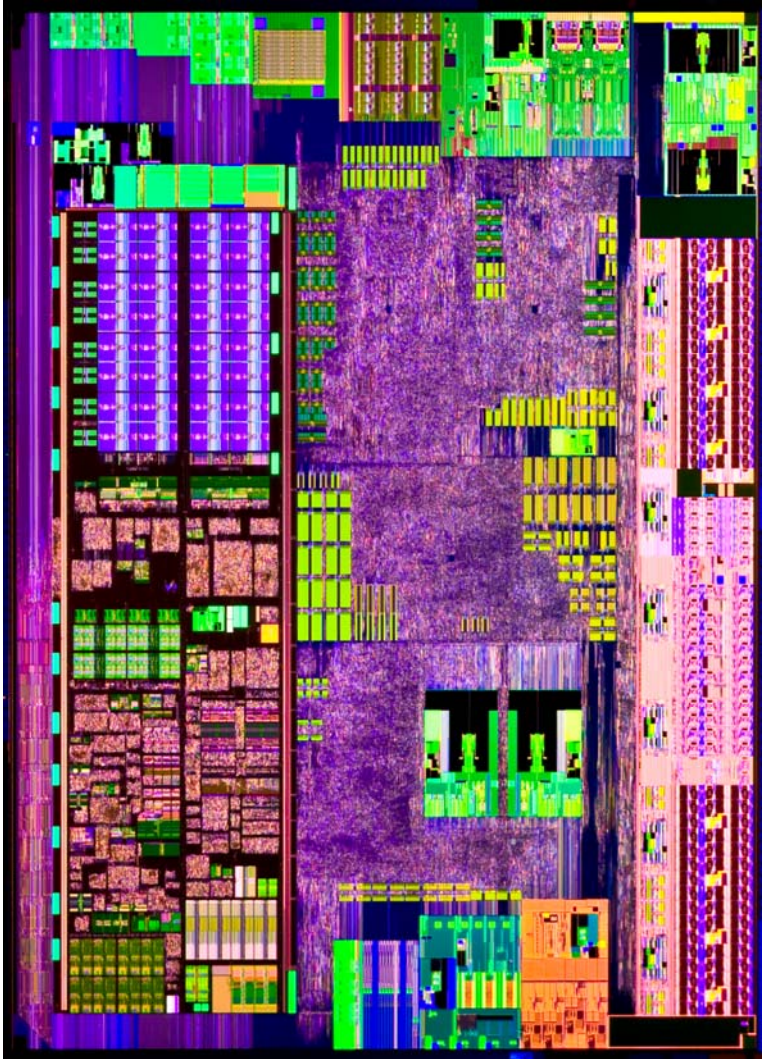
Figure 3. *False color rendering of Intel Atom N450 (Pineview) processor*

Here's a look at the Intel Atom Pineview family:

• **Intel Atom N450:** single-core processor with Intel Hyper-Threading support, 1.66GHz, 512KB cache, x86-64, BGA437 package, TDP 5W ~ 8W (range due to processors Intel power management features).

• **Intel Atom D510:** dual-core processor with Intel Hyper-Threading support, 1.66GHz, 1MB cache, x86-64, BGA437 package, TDP ~13W with no power management features

• **Intel Atom D410:** single-core with Hyper-Threading support, 1.66GHz, 512KB cache, x86-64, BGA437 package, TDP ~10W with no power management features

Note that power numbers are for the Pineview processors only and don't include the ICH8 chip.

WIN Enterprises Pineview-based Platforms

Now let's take a look at the WIN Enterprises platforms featuring the Intel Atom Pineview processors. These particular platforms are used for by small- and medium-size business for IP PBX / VoIP, networking security and other networking applications. Typical applications can include: IP PBX / VoIP, firewall, unified threat management (UTM), anti-SPAM, anti-virus, routing, quality of service (QoS), database management, and network attached storage (NAS).

PL-60780 Small Business Network Platform

Figure 4. *The PL-60780 Converged Application Platform*

At just 11 ½" wide, the PL-60780 is a compact networking platform for small business and remote office networks. Powered by the Intel® Atom™ N450 (1.66GHz) processor, it features a gigabit Ethernet switch for high bandwidth communications.

The PL-60780 was co-developed by WIN Enterprises for Intel as an Intel Converged Application Platform (CAP) reference design. It is ideal for integrators and OEMs for use as an IP PBX / VoIP platform to support open source packages such as Asterisk™.

Features of the PL-60780 include:

FEATURES

- Intel® Atom™ N450 1.6 GHz processor
- SATA, CompactFlash, optional NAND Flash module
- 10x GbE LAN ports
- Riser card for PCIe support
- Compact size: 11.5" (W) x 8.83" (D) x 1.94" (H)
- Can be configured as IP PBX or network appliance

PL-80120 Networking Platform

Figure 5. *The PL-80120 Networking Platform*

PL-80120 is a 1U rack-mounted network appliance available with a choice of the full range of Pineview Processors. The feature list of the PL-80120 includes:

FEATURES

- Support for Intel® Atom low-voltage Atom Pineview processors: D410, D510, N450 with the Intel 82801HM Controller
- Maximum 6 GbE ports via PCI-E x1 or x5 GbE ports and 4 switch ports
- Expansive I/O with USB 2.0; 3.5" SATA HDD bay, CF socket, mini-PCI slot and Console port
- Built with Intel® Embedded IA components with warranty for market longevity
- PCI slot available through front bezel for your PCI expansion cards
- RoHS compliant

PL-80260 Networking Platform

Figure 6. *PL-80260 Networking Platform, front and back views.*

The PL-80260 is the compact cousin of the MB-80120. It's a desktop network appliance that provides customers a choice of Atom™ Pineview D410 or D510 processors. Like its larger family member, it provides support for 6x GbE, SATA, CF, Mini-PCI, and LAN bypass.

At a little over 9" wide, a compact form factor makes the PL-80260 ideal for small business and remote office networking applications. It's designed with an onboard dual-core Intel® Atom D510 or single-core D410. These low power-consuming processors are used with the Intel® 82801HM I/O Hub. Both the CompactFlash™ and DDR2 SO-DIMM socket can be accessed and upgraded through an easily removable chassis cover. The PL-80260 supports six GbE Ethernet ports. Each Ethernet interface has an LED indicator to indicate activity and transfer rate. The unit is FCC and CE compliant.

Features of the MB-80260 include:

FEATURES

- Intel® Atom D510 dual-core or D410 single-core low voltage processor with Intel Hyper-Threading and the Intel 82801HM I/O Hub
- Integrated DDR2 Memory Controller supports single SoDIMM up to 2GB DDR2 (667MHz)
- Up to 6 full-bandwidth Intel® 82574L GbE LAN ports with PXE boot and Wake-on LAN options
- CompactFlash and dual SATA-II interfaces (optional 2.5" HDD mounting kit available)
- 2 external USB 2.0 ports
- Compact dimensions: 232mm (W) x 153.3mm (D) x 44mm (H); 9.1" (W) x 6" (D) x 1.7" (H)
- Supports Windows® XP Pro, Windows® 7; and Fedora 13, Debian 5.0.6, SuSe 11.3, and Ubuntu 10.04 version of Linux. Check vendor documentation for additional compatibilities

Conclusions

Today's embedded platforms, regardless of their use must address the need for lower power consumption, smaller footprint, efficient thermals, and lower costs. The Pineview processor family from Intel helps original design manufacturers (ODMs) like WIN Enterprises to meet today's market needs. Intel has been able to harness the benefits of its 45nm and high-K and metal gate technology to serve the needs of the low end of the embedded computing market.

The feature integration of the Intel Atom Pineview family enables reduced PCB footprint and improved thermals. The availability of the dual-core Intel Pineview processor enables robust performance in a small footprint. In providing a choice of platforms based on the Atom Pineview, WIN Enterprises enables OEM customers to offer solutions across a range of IP PBX / VoIP, networking, and network security applications for small business and Enterprise remote offices.

Contact WIN Enterprises with any questions you may have at +1 (978) 688-2000 or e-mail sales@win-ent.com.

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