(intel®)

**Intelligent
Systems**

# Intel® Atom™ Processor N2000 and D2000 Series-Based Platforms for Intelligent Systems

Ideal for Intelligent Systems—context-aware, securely managed embedded devices that connect seamlessly to networks, clouds and each other.
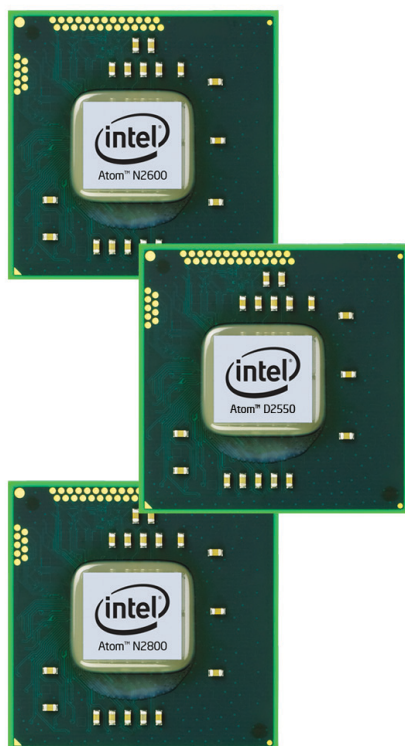
## Overview

The Intel® Atom™ processor N2000 and D2000 series feature new levels of performance-per-watt, opening the door to always-on, always-connected, intelligent, embedded devices. Based on 32nm process technology, they offer significant power-reduction and performance improvements to deliver the best-in-class response time of any embedded Intel® Atom™ processor. The series offer a range of thermal design power[1] (TDP) from 3.5 W to 10 W for power-efficient, fanless embedded designs, with stunning video graphics performance and support for up to 4 GB of DDR3 system memory. Processors include:

- Intel® Atom™ processor N2600△
- Intel® Atom™ processor N2800△
- Intel® Atom™ processor D2550△

These processors are paired with the Intel® NM10 Express chipset, providing rich I/O capabilities and flexibility via high-bandwidth interfaces such as PCI Express;* Serial ATA, Hi-Speed USB 2.0 connectivity and Intel® High Definition Audio.[2]

These platforms offer excellent solutions for embedded market segments such as digital signage, interactive clients (kiosks, point-of-sale terminals), thin clients, medical devices and industrial control. Processors are drop-in compatible, enabling platforms to scale seamlessly with minimal design effort. Additionally, they remain software compatible with previous 32-bit Intel® architecture and complementary silicon.
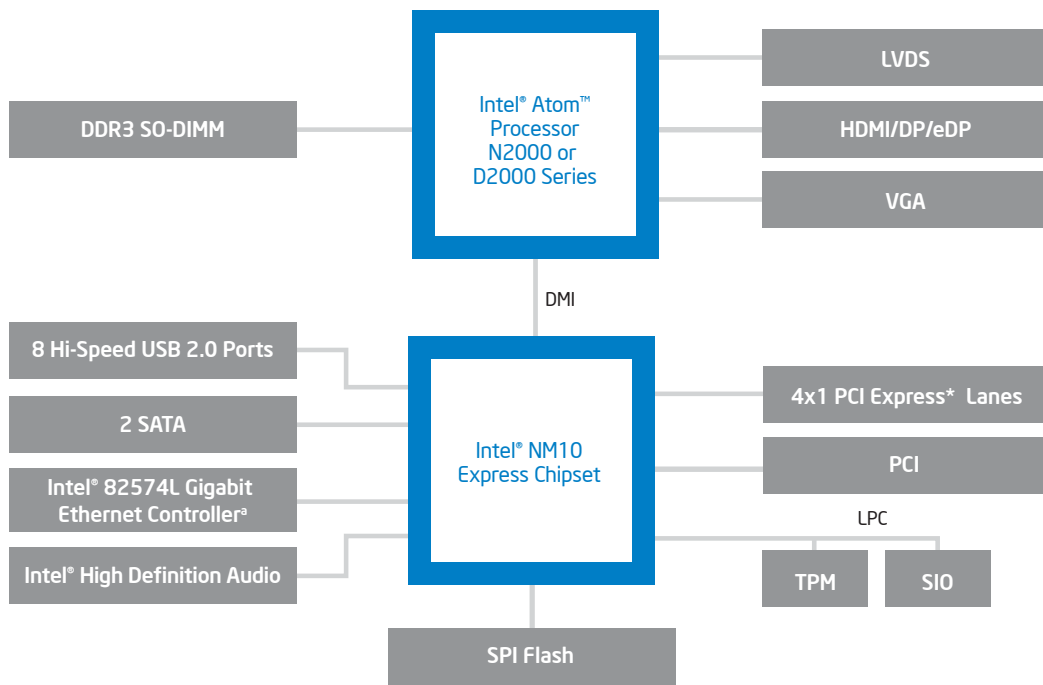
## Product Highlights

- This series introduces the first embedded Intel Atom processor core based on Intel® 32nm logic technology, incorporating 2nd generation Hi-k metal gate transistors. The ultra-low power core includes low-standby/always-on circuit applications and high-voltage I/O transistors, enabling embedded computing devices to be more energy efficient, smaller in size, and offer more robust capabilities.

- Intel® Rapid Start Technology provides fast resume; Intel® Smart Connect Technology enables an always-updated experience even during standby.

- Integrated Intel® Graphics Media Accelerator 3600/3650 combined with the integrated memory controller provides enhanced performance and system responsiveness.

- Integrated hardware-accelerated decoder enables smooth full HD (up to 1080p) video playback and streaming at a fraction of the power consumption of previous generations.

- eDP/DP, LVDS, VGA and HDMI provide a wide range of display outputs for design flexibility and display scalability.

- Intel® Deep Power Down Technology significantly reduces power usage during idle periods so that internal transistor power leakage is minimal (available on N2600 and N2800).

- Intel® Hyper-Threading Technology[3] (two threads) provides high-performance-per-watt efficiency in an in-order pipeline for increased system responsiveness in multi-tasking environments. One execution core is seen as two logical processors, and parallel threads are executed on a single core with shared resources.

- Intel® Streaming SIMD Extensions (SSE) 2 and Intel® SSE3 enable software to accelerate data processing in specific areas, such as complex arithmetic and video decoding.

- Execute Disable Bit[4] prevents certain classes of malicious buffer overflow attacks.

- Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Embedded Alliance (intel.com/go/eca), Intel helps to cost-effectively meet development challenges and speed time-to-market.

- Intel® Boot Loader Development Kit (Intel® BLDK) support helps optimize firmware to reduce boot time, firmware size and cost.[5]

| | |
|---|---|
| DDR3 SO-DIMM | Intel® Atom™ Processor N2000 or D2000 Series |
| | LVDS |
| | HDMI/DP/eDP |
| | VGA |

DMI

| | |
|---|---|
| 8 Hi-Speed USB 2.0 Ports | Intel® NM10 Express Chipset |
| 2 SATA | |
| Intel® 82574L Gigabit Ethernet Controllerᵃ | |
| Intel® High Definition Audio | |
| | 4x1 PCI Express* Lanes |
| | PCI |

LPC

TPM    SIO

SPI Flash

ᵃThis device requires an x1 PCIe lane. Other Ethernet solutions from Intel include:
 – Intel® 82574IT Gigabit Ethernet Controller
 – Intel® 82583V Gigabit Ethernet Controller

## Software Overview

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

| OPERATING SYSTEM | CONTACT | BIOS |
|---|---|---|
| Microsoft Windows* 7 | Intel provides drivers[6] | American Megatrends |
| Microsoft Windows Embedded Standard 7 | Intel provides drivers[6] | Insyde Software |
| Microsoft Windows XP[5] | Intel provides drivers[6] | Phoenix Technologies |
| Microsoft Windows XPe[5] | Intel provides drivers[6] | Byosoft |
| Microsoft Windows Embedded CE 7.0[5] | Intel provides drivers[6] | |
| MeeGo* 1.2 | Intel provides drivers[6] | |
| Yocto Project* | Intel provides drivers[6] | |
| Wind River VxWorks*[5] | Wind River | |

### Intel® Atom™ Processors for Intelligent Systems

| Product Name[Δ] | Product Number | Cores | Core Speed | L2 Cache | Graphics Speed | C-States Supported | Thermal Design Power[1] | Tjunction | Package |
|---|---|---|---|---|---|---|---|---|---|
| Intel® Atom™ Processor N2600 | DF8064101050706 | 2 | 1.60 GHz | 1 MB (512 kB per core) | 400 MHz | C0 – C6 | 3.5 W | 0 to 90°C | 437-ball lead-free FCBGA 22 mm x 22 mm |
| Intel® Atom™ Processor N2800 | DF8064101050503 | 2 | 1.86 GHz | 1 MB (512 kB per core) | 640 MHz | C0 – C6 | 6.5 W | 0 to 90°C | 437-ball lead-free FCBGA 22 mm x 22 mm |
| Intel® Atom™ Processor D2550 | DF8064101211300 | 2 | 1.86 GHz | 1 MB (512 kB per core) | 640 MHz | C0 – C1 | 10 W | 0 to 90°C | 437-ball lead-free FCBGA 22 mm x 22 mm |

### Intel® NM10 Express Chipset for Intelligent Systems

| Product Name | Product Code | Thermal Design Power | Package | Features |
|---|---|---|---|---|
| Intel® NM10 Express Chipset | CG82NM10 | 1.5 W | 360 MMAP 17 mm x 17 mm | 4 PCI Express,* Serial ATA, Hi-Speed USB 2.0 connectivity, Intel® High Definition Audio interface[2] |

Intel in Embedded and Communications: intel.com/embedded

ΔIntel 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.

[1] The TDP specification should be used to design the processor thermal solution. TDP is not the maximum theoretical power the processor can generate.

[2] Requires an Intel® HD Audio enabled system. Consult your PC manufacturer for more information. Sound quality will depend on equipment and actual implementation. For more information about Intel® HD Audio, refer to http://www.intel.com/design/chipsets/hdaudio.htm.

[3] Requires 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. For more information including details on which processors support HT Technology, visit http://www.intel.com/info/hyperthreading.

[4] Requires an Execute Disable Bit enabled system. Check with your PC manufacturer to determine whether your system delivers this functionality. For more information, visit http://www.intel.com/technology/xdbit/index.htm.

[5] Support for these operating systems and software ingredients will be available in Q1 of 2012.

[6] Drivers 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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