

# Embracing the New Generation Intel Atom Family with DDR3 Memory Support

By Victor Huang, Product Manager, Advantech



Advantech recently launched eight new products based on the latest Intel Atom N410/ D510 processors released in 2010. The new processors gained many project wins due to their low power and exceptional performance, which are suitable for a wide range of applications. The new processors replace the Intel Atom N410/D510 solutions which only supported DDR2 memory. DDR3 memory has become mainstream now and has higher speeds, 30% less power consumption, lower cost, better supply lead times, as well as larger memory capacities than DDR2 memory.

## First Atom Processor with DDR3 Support

The latest Intel Atom N455 processor single core and D525 dual core processors both support DDR3 memory up to 2 GB for N455, and up to 4 GB for D525. With integrated graphics and memory controllers, these processors deliver graphics core rendering speeds from 200 to 400 MHz while maintaining excellent power efficiency.

The new Intel Atom platforms are empowered by enhanced Intel SpeedStep and C-states, and dynamic L2 cache sizing technology, which enables much better power savings while providing top performance and rich I/O capability—meaning the new platform can do more with less power. The graphics support Intel Gen 3.5 DX9, DirectX 9.0c, and MPEG2

hardware decoding. They also support Intel® streaming SIMD Extensions (SSE) 2 and Intel® SSE3, enabling software to accelerate data processing in specific areas, such as complex arithmetic and video decoding. The Intel Atom N455/D525 processors run at 1.66/1.8 GHz with single channel DDR3 at 800MHz, and TDP of 9W for N455 and 13W for D525.

The new platforms include the Intel® 82801HM ICH8M I/O controller that provides a high definition audio interface and rich I/O capabilities via multiple high bandwidth interfaces such as PCI Express, PCI, Serial ATA, and Hi-Speed USB 2.0.

	Intel Atom Processor D510	Intel Atom Processor N450	Intel Atom Processor D525	Intel Atom Processor N455
<b>Cores</b>	2	1	2	1
<b>CPU Frequency</b>	1.66Ghz/667	1.66Ghz/667	1.8Ghz/800	1.66Ghz/667
<b>Memory Frequency</b>	DDR2 667	DDR2 667	DDR3 800	DDR3 800
<b>CPU Cache</b>	2 x 512kB L2	512kB L2	2 x 512kB L2	512kB L2
<b>Power States</b>	C0 to C1 (POR)	C0 to C4 (POR)	C0 to C1 (POR)	C0 to C4 (POR)
<b>Graphics</b>	Gen3.5 DX9, 400MHz	Gen3.5 DX9, 200MHz	Gen3.5 DX9, 400MHz	Gen3.5 DX9, 200MHz
<b>Max Resolution</b>	VGA: 2048 x 1536 max	VGA: 1400 x 1050	VGA: 2048 x 1536 max	VGA: 1400 x 1050
	LVDS: 1366 x 768; WXGA: 1280 x 800 max		LVDS: 1366 x 768; WXGA: 1280 x 800 max	
<b>Memory</b>	Single Ch, 2 SoDIMM per ch, DDR2		Single Ch, 2 SoDIMM per ch, DDR3	
<b>Max Memory</b>	2 GB		4 GB	2 GB
<b>Display I/F</b>	Dual Display VGA and LVDS		Dual Display VGA and LVDS	
<b>KIT TDP</b>	16W	8W	16W	9W
<b>*T support</b>	HT, EM64T, XD			
<b>IO Hub</b>	ICH8M			

Table 1. Comparison with Intel Atom D510/N450 and D525/N425

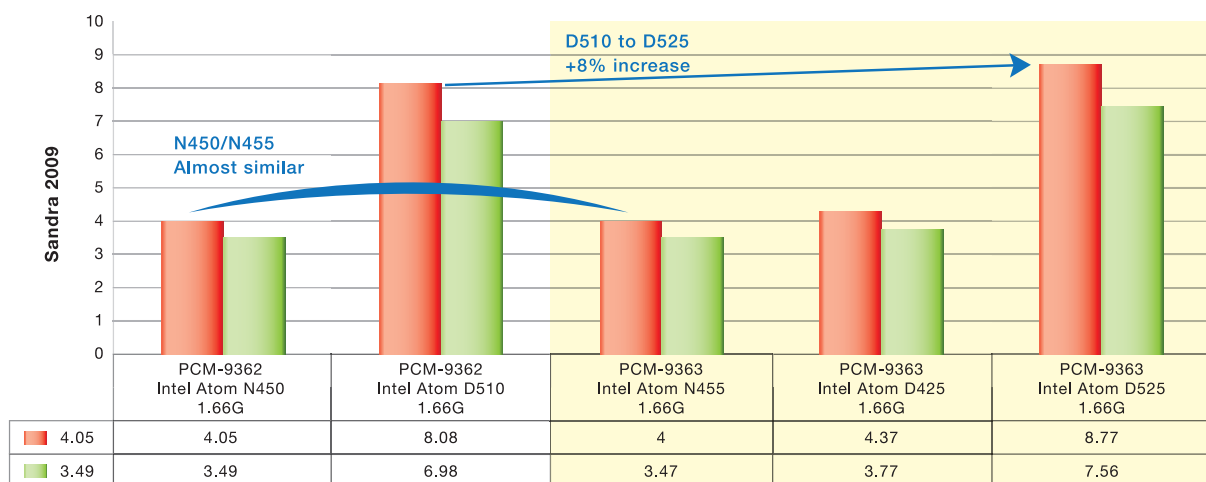


Table 2. Performance benchmark with Intel Atom D510/N450 and D525/N425

## Full Spectrum of Atom Platforms

Providing targeted performance for a wide variety of embedded application projects, Advantech has implemented the Intel Atom N455 single core and D525 dual core, and the ICH8M chipset into various embedded form factors and systems ranging from computer on modules, PC/104, 3.5" SBC, half-size SBC, and mini-ITX, to fanless embedded IPC. These combinations provide a superb balance of performance versus power, they are ideal for applications where small size, low power consumption, and thermal efficiency are crucial.


Not only do a wide range of products benefit from the Atom N455/D525 platform itself, but they are also incorporated with Advantech's add-on value hardware and software design. For example, stackable single board computer products such as PCM-9363 (3.5" SBC) and PCM-3363 (PCI-104), which feature 24-bit LVDS, are developed by Advantech from older 18-bit LVDS originating from Intel Atom N455/D525 processors, helping to make them compatible with many common LCD panels. PCM-9363 also supports HDMI display resolutions up to 1080p to fulfill demands for large monitor displays with HDMI interface. PCM-9363 supports a DC power hot-plug protection design to prevent board damage from direct DC power which can cause unstable voltages

to pulse through and damage the board. To be much more reliable and endure extreme environments, Advantech's PCM-9363/3363 are designed with 15KV air protection ESD COM Port Driver IC, 100% solid capacitors with better MTBF compared with electrolytic capacitors, and a TG-150 PCB type that allows the PCB to endure higher temperatures.

To fulfill rugged application demands, Advantech's PCM-3363 supports DDR3 on board memory with lockable box wafer connector for anti-vibration. PCM-3363 also has an enhanced reliable hardware design to guarantee 100% bootups, even when enduring low temperatures for extended periods of time, even down to -40° C. It also ensures that abnormal transient power fluctuations won't cause a system to freeze, making it suitable for un-manned and outdoor applications which occasionally experience unstable mains power.

Advantech not only provides a comprehensive range of Atom-based embedded boards, but also multi OS support, including Windows 7, XPe, WinCE, QNX, and Linux. Plus, a variety of intelligent software API's are bundled with Advantech Atom-based boards to facilitate application development.

### PCM-3363 PCI-104 Modules with Ruggedized Design



Extreme Cold  
Start Guaranteed

- **Low Power**
  - Intel Atom N455 SC 1.66 GHz, Fanless, 9W
  - Intel Atom DC D525 1.8 GHz, 16W
- **Rugged Adaptation**
  - Supports extended temperatures -40~85°C
  - HALT (Highly Accelerated Life Testing) applied
- **Anti-Vibration**
  - Onboard memory 512MB/1GB
  - 100% locked connector
- **Reliability Enhanced**

Extreme cold start guaranteed and voltage dip protection
- **Software Compatible**

Complete Windows Embedded OS support: CE, XPe, WES, WES7
- **Compact**

Standard PCI-104 96 x 90mm dimensions



Model Name	SOM-7562 B1	PCM-3363	PCM-9363	AIMB-213	PCA-6782	ARK-1503
<b>Form Factor</b>	COM-Ultra	PCI-104	3.5" SBC	Mini-ITX	Haf-size SBC	Embedded BOX IPC
<b>Processor</b>	Intel Atom N455	Intel Atom N455/D525	Intel Atom N455/D525	Intel Atom N455/D525	Intel Atom N455/D525	Intel Atom D425/D525
<b>Memory</b>	On-board DDR3 1GB	On-board DDR3 1GB	DDR3 SO-DIMM up to 4GB	DDR3 SO-DIMM up to 4GB	DDR2 SO-DIMM up to 2GB	DDR3 SO-DIMM up to 4GB
<b>Display Output</b>	VGA/18-bit LVDS	VGA/24-bit LVDS	VGA/24-bit LVDS/HDMI	VGA/24-bit LVDS/DVI	VGA/18-bit LVDS	VGA/ 24-bit LVDS
<b>IO Type</b>	COM-Express	USB, SATA, COM, GPIO, CF, SMBUS, HD audio	USB, SATA, COM, GPIO, CF, SMBUS, I2C, HD audio, mini-PCIe	USB, SATA, COM, GPIO, CF, HD audio	USB, SATA, COM, GPIO, CF, 8bit GPIO, PS/2, FDD	USB, COM, CF, LAN, mini-PCIe, DIO
<b>Dimensions</b>	84 x 55 mm (3.3"x2.17")	96 x 90 mm (3.8"x3.5")	146 x 102 mm (5.7"x 4")	170 mm x 170 mm (6.69" x 6.69")	185 mm x 122 mm (7.3" x 4.8")	230.6 x 133.0 x 44.4 mm
<b>Special Features</b>	<ul style="list-style-type: none"> <li>Built-in Advantech iManager</li> <li>Supports extended temperatures -40~85°C</li> </ul>	<ul style="list-style-type: none"> <li>15KV COM ESD protection driver IC design</li> <li>Locked box wafer connector</li> <li>100% boot up in cold start</li> <li>Endurance in unstable power, power on-off in a transient period (mSec)</li> <li>Designed with 100% Solid Capacitors</li> </ul>	<ul style="list-style-type: none"> <li>Multiple display: 18/24-bit LVDS, VGA or HDMI</li> <li>PWM and linear panel backlight control</li> <li>15KV COM ESD protection driver IC design</li> <li>12V DC power and DC power hot plug protection design</li> <li>Designed with 100% Solid Capacitors</li> </ul>	<ul style="list-style-type: none"> <li>Supports TPM(optional) for security application</li> <li>Supports Mini-PCIe for wireless module</li> <li>Supports VGA/24-bit LVDS/DVI display output</li> </ul>	<ul style="list-style-type: none"> <li>Ultra low power, fan-less N455 CPU and max. 2 GB DDR2 667 memory (Only for N SKU)</li> <li>Dual core high performance D525 CPU and maximum 2 GB DDR2 667 memory (Only for D SKU)</li> <li>VGA/LVDS dual video outputs</li> <li>Optional module for 4 x RS-485 w/ auto-flow control</li> </ul>	<ul style="list-style-type: none"> <li>Built-in 1 x PCIe expansion slot for communication modules, like WLAN</li> <li>Supports external CF socket</li> <li>Supports 2.5" SATA HDD and easy to maintain</li> <li>Integrated LVDS interface for panel display</li> </ul>
<b>Target Market</b>	<ul style="list-style-type: none"> <li>Portable Device Application</li> <li>Medical applications</li> <li>Robust applications.</li> </ul>	<ul style="list-style-type: none"> <li>Medical applications</li> <li>Outdoor application</li> <li>CNC machines</li> <li>Transportation</li> <li>Military</li> </ul>		<ul style="list-style-type: none"> <li>POS/KIOSK</li> <li>Gaming</li> </ul>	<ul style="list-style-type: none"> <li>CNC machines</li> <li>Factory automation</li> </ul>	<ul style="list-style-type: none"> <li>Embedded Control System</li> <li>Factory/Machine control</li> <li>KIOSK</li> </ul>