

# 3rd Generation Intel® Core™ i7-3770, Intel® Core™ i5-3550S, and Intel® Core™ i3-3220 Processor-based Platforms for Intelligent Systems

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



## Product Overview

Manufactured on industry-leading 22nm process technology with 3D Tri-Gate transistors, these 3rd generation Intel® Core™ processors offer superior performance, enhanced media and graphics capabilities and flexibility, making them ideal for a wide range of intelligent systems including retail transaction terminals, digital signage, digital security and surveillance, gaming platforms, industrial automation and medical equipment. As with the 2nd generation Intel® Core™ processor family, full integration of the CPU, media/graphics capabilities and memory controller reduces overall platform footprint and saves on-board real estate.

When paired with the Intel® B75 and Intel® Q77 Express chipsets, these processors offer fast connectivity with integrated next-generation I/O technologies such as USB 3.0. The platform includes Intel® Rapid Start Technology<sup>1</sup> for increased system responsiveness and support for DDR3L memory to improve power efficiency. Additionally, the Intel® Core™ i3-3220 processor can be paired with the Intel® C216 chipset to enable Error Correcting Code (ECC) capabilities.

Next-generation graphics engines significantly improve graphics and media performance compared to 2nd generation Intel Core processor-based platforms. This platform supports three independent displays, enabling one system to deliver multiple displays without the need for a discrete graphics card. Built-in visual features, including Intel® Clear Video HD

technology and Intel® Quick Sync Video, mean smoother visual quality, improved ability to decode and transcode simultaneous video streams, and spectacular HD media playback. Additionally, the platform supports next-generation graphics APIs, such as Microsoft DirectX® 11.

Processors offer quad- and dual-core capabilities with industry-leading performance and thermal design power (TDP) options of 55W to 77W. While incorporating advanced technology, they remain software-compatible with previous IA-32 processors.

Intel® vPro™ technology,<sup>2</sup> enabled when processors are paired with the Intel Q77 Express chipset, delivers intelligent security, expanded management capabilities and improved power management. The technology supports operating system-absent manageability and down-the-wire security even when the system is powered off, the operating system is unresponsive, or software agents are disabled.

This 3rd generation Intel Core processor family and Intel® 7 Series chipsets are pin and package compatible with the 2nd generation Intel Core processor family and Intel® 6 Series chipsets, allowing developers to mix and match processors and chipsets to better suit their design needs. Developers can create one board design and scale a product line, using the same sockets to help cut design costs and accelerate time-to-market.

## Product Highlights

### Intel® HD Graphics 4000 and 2500:

Enhanced, high-end media and graphics capabilities and performance.

### Intel® Quick Sync Video 2.0:

Significantly improves decode and transcode performance and frees up the CPU for other tasks.

### Intel® Advanced Vector Extensions:

Accelerated floating-point compute performance for signal and image processing applications.

### Intel® Intelligent Power Technology:

Reduced idle power consumption through architectural improvements such as integrated power gates and automated low-power states.

### Intel® Turbo Boost Technology<sup>3</sup> 2.0:

Runs applications faster by using available thermal headroom to run at a higher frequency.

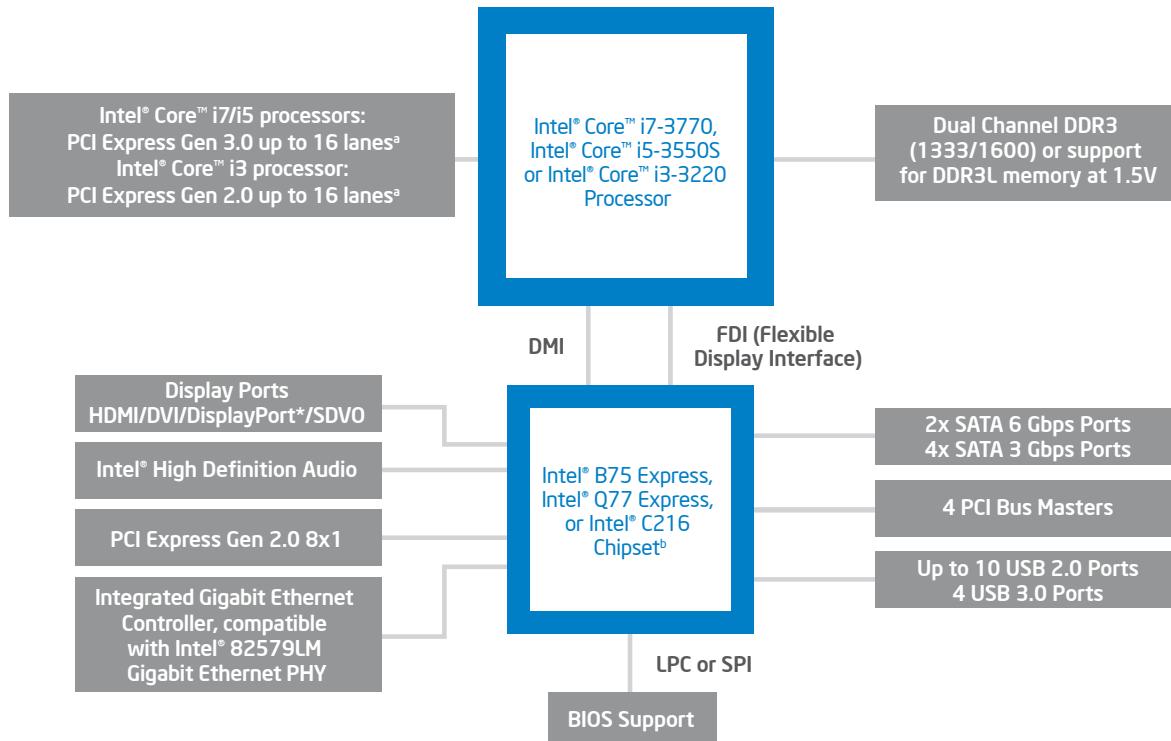
### Intel® Hyper-Threading Technology<sup>4</sup>:

Simultaneous multi-threading helps boost performance for parallel, multi-threaded applications.

### Intel® vPro™ Technology<sup>2</sup>:

Delivers unprecedented hardware support for vital security and management functions with Intel® Active Management Technology,<sup>5</sup> Intel® Virtualization Technology,<sup>6</sup> and Intel® Trusted Execution Technology<sup>7</sup> (enabled when processors are paired with the Intel Q77 Express chipset).

**ECC Memory:** Corrects memory errors without requiring system reset to enhance performance, uptime, and autonomous operation—essential for remote, embedded applications (Intel Core i3-3220 processor paired with Intel C216 chipset).



<sup>a</sup>1x16; 2x8; 1x8 + 2x4

<sup>b</sup>Intel® C216 chipset only pairs with the Intel® Core™ i3-3220 processor

## Software Overview

The following independent operating system and BIOS vendors provide support for these platforms.

### OPERATING SYSTEM

Microsoft Windows* 8	Intel provides drivers <sup>8</sup>
Microsoft Windows 7	Intel provides drivers <sup>8</sup>
Microsoft Windows XP SP3	Intel provides drivers <sup>8</sup>
Microsoft Windows 2008 Server	Intel provides drivers <sup>8</sup>
Microsoft Windows Embedded Standard 7	Intel provides drivers <sup>8</sup>
Microsoft Windows Embedded Standard 2009	Intel provides drivers <sup>8</sup>
Microsoft Windows Embedded POSReady 7	Intel provides drivers <sup>8</sup>
Microsoft Windows Embedded POSReady (WEPOS)	Intel provides drivers <sup>8</sup>
Red Hat Enterprise Linux* 6.1	Red Hat
SUSE SLE* 11 SP1	Novell
Wind River Linux* 5.0	Wind River
Wind River VxWorks* 6.9	Wind River

### CONTACT

Intel provides drivers <sup>8</sup>
Red Hat
Novell
Wind River
Wind River

### BIOS

American Megatrends
Insyde Software
Phoenix Technologies
Byosoft

## Platform Features and Benefits

FEATURES	BENEFITS
<b>Key Embedded Support</b>	
Extended life cycle product support	<ul style="list-style-type: none"> <li>Protects system investment by enabling extended product availability for embedded customers.</li> </ul>
Ecosystem support	<ul style="list-style-type: none"> <li>Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Intelligent Systems Alliance (<a href="http://intel.com/go/intelligentsystems-alliance">intel.com/go/intelligentsystems-alliance</a>), Intel helps to cost-effectively meet development challenges and speed time-to-market.</li> </ul>
<b>Built-In Visuals</b>	
Intel® HD Graphics 4000/ Intel® HD Graphics 2500	<ul style="list-style-type: none"> <li>Delivers enhanced visual experiences, including excellent 3D performance, for a broad range of intelligent systems.</li> <li>Provides support for dual LVDS, three independent displays and hybrid multi-monitor configurations.</li> <li>Integrated processor graphics help minimize power consumption while maximizing performance for decoding, encoding, and transcoding workloads with hardware acceleration of video codecs.</li> </ul>
Intel® Quick Sync Video 2.0	<ul style="list-style-type: none"> <li>Improved ability to decode and transcode simultaneous video streams for intelligent systems that include medical imaging and video surveillance functions.</li> </ul>
Intel® Clear Video HD Technology	<ul style="list-style-type: none"> <li>Provides visual quality and color fidelity enhancements for spectacular HD media playback for applications such as digital signs and gaming platforms.</li> </ul>
<b>Security</b>	
Intel® AES New Instructions (Intel® AES-NI) <sup>9</sup> and Intel® Secure Key <sup>10</sup>	<ul style="list-style-type: none"> <li>Helps protect media, data and assets from loss.</li> <li>Intel AES-NI accelerates data encryption/decryption and improves performance.</li> </ul>
Intel® OS Guard	<ul style="list-style-type: none"> <li>Helps detect and prevent malware.</li> </ul>
<b>Performance</b>	
Intel® Advanced Vector Extensions	<ul style="list-style-type: none"> <li>Faster performance on digital signal and image processing workloads for compute-intensive applications such as radar detection, hurricane command center, ruggedized navigation systems and remote medical image processing.</li> </ul>
Intel® Turbo Boost Technology <sup>3</sup> 2.0	<ul style="list-style-type: none"> <li>Boosts performance for specific workloads by increasing processor frequency.</li> </ul>
Intel® Hyper-Threading Technology <sup>4</sup>	<ul style="list-style-type: none"> <li>Enables simultaneous multi-threading within each processor core, up to two threads per core; reduces computational latency, making optimal use of every clock cycle.</li> </ul>
Error Correcting Code (ECC) memory (Intel® Core™ i3-3220 processor with Intel® C216 chipset)	<ul style="list-style-type: none"> <li>Detects multiple-bit memory errors; locates and corrects single-bit errors to keep the system up and running.</li> </ul>
Intel® Smart Cache Technology	<ul style="list-style-type: none"> <li>Large on-die shared Last-Level Cache reduces latency to data, improving performance and power efficiency.</li> </ul>
<b>Power Efficiency</b>	
Intel® Intelligent Power Technology	<ul style="list-style-type: none"> <li>Automated energy efficiency to reduce power consumption.</li> </ul>
Automated low-power states	<ul style="list-style-type: none"> <li>Adjusts system power consumption based on real-time processor loads.</li> </ul>
Intel® Rapid Start Technology <sup>1</sup>	<ul style="list-style-type: none"> <li>Improves OS boot time and wakes up from deep sleep state more quickly than previous generations for better system responsiveness.</li> </ul>
<b>Intel® vPro™ Technology<sup>2</sup> (platforms paired with Intel® Q77 Express chipset)</b>	
Intel® Active Management Technology <sup>5</sup>	<ul style="list-style-type: none"> <li>Provides remote management and maintenance capabilities which enable vendors to roll back firmware image; Remote host-based provisioning eases provisioning of end device.</li> </ul>
Intel® Virtualization Technology <sup>6</sup>	<ul style="list-style-type: none"> <li>Speeds transfer of platform control and movement of data between the virtual machine monitor (VMM) and other platform agents (including guest OSs and I/O devices). By lowering the workload on the VMM, this technology addresses many embedded system design challenges, like migrating legacy software, increasing real-time performance, and making applications more secure.</li> </ul>
Intel® Trusted Execution Technology <sup>7</sup>	<ul style="list-style-type: none"> <li>Protects embedded devices and virtual environments against rootkit and other system-level attacks. Using an industry-standard TPM 1.2 to store keys and other protected data, this portion of Intel® vPro™ technology boots the BIOS, operating system, and software into a "trusted" execution state, verifying the integrity of the virtual machine and protecting the platform from unauthorized access.</li> </ul>

## Intel® Core™ Processors for Intelligent Systems

PROCESSOR NUMBER <sup>a</sup>	CORE FREQUENCY (GHz)							INTEL® AES-NI	INTEL® AVX
	CORES/THREADS	BASE FREQUENCY	1 CORE TURBO (MAX)	INTEL® SMART CACHE	THERMAL DESIGN POWER	PACKAGE			
Intel® Core™ i7-3770 Processor	4/8	3.4	3.9	8 MB	77 W	LGA1155	Yes	Yes	
Intel® Core™ i5-3550S Processor	4/4	3.0	3.7	6 MB	65 W	LGA1155	Yes	No	
Intel® Core™ i3-3220 Processor	2/4	3.3	N/A	3 MB	55 W	LGA1155	No	Yes	

## INTEL® vPRO™ TECHNOLOGY<sup>a</sup>

PROCESSOR NUMBER <sup>a</sup>	INTEL® TURBO BOOST TECHNOLOGY	INTEL® HYPER-THREADING TECHNOLOGY	INTEL® VIRTUALIZATION TECHNOLOGY	INTEL® ACTIVE MANAGEMENT TECHNOLOGY	INTEL® TRUSTED EXECUTION TECHNOLOGY	ERROR CORRECTING CODE
Intel® Core™ i7-3770 Processor	Yes	Yes	Yes	Yes <sup>a</sup>	Yes <sup>a</sup>	No
Intel® Core™ i5-3550S Processor	Yes	No	Yes	Yes <sup>a</sup>	Yes <sup>a</sup>	No
Intel® Core™ i3-3220 Processor	No	Yes	Yes	Yes <sup>a</sup>	No	Yes <sup>b</sup>

<sup>a</sup>When paired with the Intel® Q77 Express chipset.

<sup>b</sup>When paired with the Intel® C216 chipset.

## Intel® B75 Express, Intel® Q77 Express, and Intel® C216 Chipsets for Intelligent Systems

PRODUCT	PRODUCT CODE	PACKAGE	FEATURES
Intel® BD82B75 Platform Controller Hub	BD82B75	FCBGA 942	6 SATA ports; 8 USB 2.0 ports; 4 USB 3.0 ports; 8 PCI Express* I/O ports
Intel® BD82Q77 Platform Controller Hub	BD82Q77	FCBGA 942	6 SATA ports; 10 USB 2.0 ports; 4 USB 3.0 ports; 8 PCI Express I/O ports; supports Intel® vPro™ Technology
Intel® BD28C216 Platform Controller Hub <sup>c</sup>	BD82C216	FCBGA 942	6 SATA ports; 10 USB 2.0 ports; 4 USB 3.0 ports; 8 PCI Express I/O ports

<sup>c</sup>Pairs with Intel® Core™ i3-3220 processor only.

## Intel in Intelligent Systems: [intel.com/intelligentsystems](http://intel.com/intelligentsystems)

<sup>a</sup> Intel 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](http://www.intel.com/products/processor_number).

<sup>1</sup> Requires a select Intel® processor, Intel® software and BIOS update, and Intel® Solid-State Drive (SSD). Depending on system configuration, your results may vary. Contact your system manufacturer for more information.

<sup>2</sup> Intel® vPro™ Technology is sophisticated and requires setup and activation. Availability of features and results will depend upon the setup and configuration of your hardware, software and IT environment. To learn more visit: <http://www.intel.com/technology/vpro>.

<sup>3</sup> Requires a system with Intel® Turbo Boost Technology. Intel Turbo Boost Technology and Intel Turbo Boost Technology 2.0 are only available on select Intel® processors. Consult your PC manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit <http://www.intel.com/go/turbo>.

<sup>4</sup> Available on select Intel® Core™ processors. Requires an Intel® HT Technology-enabled system. Consult your PC manufacturer. Performance will vary depending on the specific hardware and software used. For more information including details on which processors support HT Technology, visit <http://www.intel.com/info/hyperthreading>.

<sup>5</sup> Requires activation and a system with a corporate network connection, an Intel® AMT-enabled chipset, network hardware and software. For notebooks, Intel AMT may be unavailable or limited over a host OS-based VPN, when connecting wirelessly, on battery power, sleeping, hibernating or powered off. Results dependent upon hardware, setup and configuration. For more information, visit <http://www.intel.com/technology/platform-technology/intel-amt>.

<sup>6</sup> Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit <http://www.intel.com/go/virtualization>.

<sup>7</sup> No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). Intel TXT also requires the system to contain a TPM v1.1s. For more information, visit <http://www.intel.com/technology/security>.

<sup>8</sup> Drivers available at: [downloadcenter.intel.com](http://downloadcenter.intel.com) (enter chipset name).

<sup>9</sup> Intel® AES-NI requires a computer system with an AES-NI enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on select Intel® processors. For availability, consult your reseller or system manufacturer. For more information, see <http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni>.

<sup>10</sup> No system can provide absolute security. Requires an Intel® Secure Key-enabled PC with a 3rd gen Intel® Core™ vPro™ processor and software optimized to support Intel Secure Key. Consult your system manufacturer for more information. Performance results are based on certain tests measured on specific computer systems. Any difference in system hardware, software or configurations will affect actual performance. For more information go to <http://www.intel.com/performance>.

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