2nd Generation Intel® Core™ Processor Mobile Platform

The all new 2011 Intel® Core™ mobile processor family delivers smart, energy-efficient processors that enable thin and innovative laptop designs. These new processors, combined with the Intel® 6 Series chipsets and Intel® Centrino® Wireless Technology, deliver smart performance, a visibly sharper and richer-looking experience, and mobility from your most demanding to everyday applications.

New 2nd Generation Intel® Core™ i7, i5 and i3 mobile processors equipped with enhanced visual features achieve several milestones for Intel platforms:

- **Revolutionary new microarchitecture** delivered on Intel’s cutting-edge 32nm process technology with second-generation high-k metal gate transistors. This new microarchitecture features vastly improved cores that are better connected with an innovative ring interconnect for improved data bandwidth, performance and power efficiency.

- **Industry’s first processor graphics** featuring a new execution pipeline which significantly increases performance to deliver new features and enhanced visual features focused on the areas where most users are computing today: high-definition (HD) video, mainstream gaming, Stereoscopic 3-D, multi-tasking and online socializing and multimedia.

- **New built-in visual features** in every 2nd Generation Intel® Core™ processor deliver everything you need to enjoy a stunning and seamless visual experience. These features include:
  - **Intel® Quick Sync Video** – Incredibly fast conversion of video for portable media players, online sharing, and video editing and authoring.
  - **Intel® Clear Video HD Technology** – Visual quality and color fidelity enhancements for HD playback and immersive Web browsing.
  - **Intel® InTru™ 3D** – Stereoscopic 3-D Blu-ray® playback in full 1080p resolution over HDMI* 1.4 and premium audio.
  - **Intel® Insider™** – Unlock a world of premium HD movies and entertainment with your PC.
  - **Intel® HD Graphics 3000** – Enhanced 3-D performance for immersive mainstream and casual gaming.

- **The next generation of Intel® Wireless Display** supporting up to 1080p HD resolution, Intel Wireless Display allows user to wirelessly project their computing experience on a big screen HDTV, quickly and easily.

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• A new generation of Intel® Centrino® Wireless adapters supporting WiFi technology and Bluetooth* wireless technology allowing for connectivity to Bluetooth*-enabled devices, such as keyboards and mice.

Below are additional details for the all new 2011 Intel® Core™ mobile processors and chipsets:

**Intel® Core™ i5 and i7 Mobile Processor Family (former codenamed “Sandy Bridge”)**

- **Built-in Visual Features**⁴ – New visual capabilities built into every 2nd Generation Intel® Core™ processor deliver everything you need to enjoy a stunning and seamless visual experience. These features include:
  - Intel® Quick Sync Video – Incredibly fast conversion of video for portable media players, online sharing, and video editing and authoring.
  - Intel® InTRU™ 3D¹⁷ – Stereoscopic 3-D Blu-ray* playback in full 1080p resolution over HDMI* 1.4 and premium audio.
  - Intel® HD Graphics 3000 – Enhanced video and 3-D engine delivers smooth 1080p HD video playback and mainstream 3-D gaming without the need for add-in video cards.

- **Intel® Wireless Display (Intel® WiDi)¹⁵** – Now supporting up to 1080p HD resolution, Intel WiDi allows user to wirelessly project their computing experience on a big screen HDTV, quickly and easily. Using a laptop enabled with Intel® Wireless Display, a consumer can connect the PC to an HDTV using WiFi technology to enjoy content from the comfort of a couch without huddling over a computer screen.

- **Intel® Insider™¹⁶** – Intel Insider is hardware-based technology on 2nd Generation Intel® Core™ processors that creates a protected environment for the distribution, storage and playback of premium content. Intel Insider offers movie studios and online video services an additional level of protection over existing software-based solutions providing access to more movies and entertainment in high-definition than previous- generation PCs.

- **Intel® Advanced Vector Extensions (Intel® AVX)** – A new 256-bit instruction set that builds upon the highly successful SSE4/SIMD instructions. Intel AVX provides the infrastructure and building blocks for delivering the performance required by the growing needs of applications such as financial analysis, media content creation, natural resource industry, and HPC computing. The Intel AVX instruction set can benefit operations such as image processing, audio and some business usage.

- **Intel® Turbo Boost Technology for Intel Core™ i5 and i7 processors** – Intel® Turbo Boost Technology operation on 2nd Generation Intel® Core™ processors has been optimized for the new microarchitecture and takes advantage of CPU enhancements and improved power sharing between processor and graphics. Intel Turbo Boost Technology boosts power levels to achieve performance gains for high intensity “dynamic” workloads. In addition, a new power averaging algorithm manages power and thermal headroom to optimize performance.

- **Intel® Hyper-Threading Technology (Intel® HT Technology)³** – Delivers two processing threads per physical core for a total of eight threads on Quad Core processors and four threads on Dual Core processors for massive computational throughput. With

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Intel® HT Technology, highly threaded applications can get more work done in parallel, completing their tasks sooner.

- **Intel® Smart Cache** – The shared cache is dynamically allocated to each processor core, based on workload. This efficient, dual-core-optimized implementation increases the probability that each core can access data from the fast cache, significantly reducing latency to frequently used data and improving performance.

- **Integrated Memory Controller and DDR3 support** – An integrated memory controller offers excellent memory read/write performance through efficient pre-fetching algorithms, lower latency, and higher memory bandwidth. The 2nd Generation Intel® Core™ Processor family includes support for single-channel DDR3 memory technology up to 1,600 MHz on select Quad Core processors and dual-channel DDR3 memory technology up to 1333 MHz on Dual Core processors.

- **Intel® Virtualization Technology (Intel® VT-x)** – Intel® VT allows one hardware platform to function as multiple “virtual” platforms. For businesses, Intel® VT offers improved manageability, limiting downtime and maintaining worker productivity by isolating computing activities into separate partitions.

- **Intel® Virtualization Technology for Directed I/O (VT-d)** – Intel® VT-d extends Intel's Virtualization Technology roadmap by providing hardware assists for I/O virtualization solution.

- **Advanced Encryption Standard New Instructions (AES-NI)** – New AES instructions add hardware acceleration to AES algorithms and speeds up the execution of AES applications.

- **Intel® Trusted Execution Technology (Intel® TXT)** – Highly versatile set of hardware extensions for Intel processors and chipsets which, with appropriate software, enhance platform security capabilities.

**Intel® Core™ i3 Mobile Processor Family (formerly codenamed “Sandy Bridge”)**

- **Built-in Visual Features** – New visual capabilities built into every 2nd Generation Intel® Core™ processor deliver everything you need to enjoy a stunning and seamless visual experience. These features include:
  - **Intel® Quick Sync Video** – Incredibly fast conversion of video for portable media players, online sharing, and video editing and authoring.
  - **Intel® Clear Video HD Technology** – Visual quality and color fidelity enhancements for HD playback and immersive Web browsing.
  - **Intel® InTRU™ 3D** – Stereoscopic 3-D Blu-ray* playback in full 1080p resolution over HDMI* 1.4 and premium audio.
  - **Intel® HD Graphics 3000** – Enhanced video and 3-D engine delivers smooth 1080p HD video playback and mainstream 3-D gaming without the need for add-in video cards.

- **Intel® Wireless Display (Intel® WiDi)** – Now supporting up to 1080p high definition resolution, Intel® WiDi allows user to wirelessly project their computing experience on a big screen HDTV, quickly and easily. Using a laptop enabled with Intel® Wireless Display, a consumer can connect the PC to an HDTV using WiFi technology to enjoy content from the comfort of a couch without huddling over a computer screen.

- **Intel® Insider™** – Intel Insider is hardware-based technology on 2nd Generation Intel® Core™ processors that creates a protected environment for the distribution, storage and playback of premium content. Intel Insider offers movie studios and online video services
an additional level of protection over existing software-based solutions providing access to more movies and entertainment in high-definition than previous generation PCs.

- **Intel® Advanced Vector Extensions (Intel® AVX)** – A new 256-bit instruction set that builds upon the highly successful SSE4/SIMD instructions. Intel® AVX provides the infrastructure and building blocks for delivering the performance required by the growing needs of applications such as financial analysis, media content creation, natural resource industry, and HPC computing. The Intel® AVX instruction set can benefit operations such as image processing, audio and some business usage.

- **Intel® Hyper-Threading Technology³ (Intel® HT Technology)** – Delivers two processing threads per physical core for a total of four threads for massive computational throughput. With Intel® HT Technology, highly threaded applications can get more work done in parallel, completing their tasks sooner.

- **Intel® Smart Cache** – The shared cache is dynamically allocated to each processor core, based on workload. This efficient, dual-core-optimized implementation increases the probability that each core can access data from the fast cache, significantly reducing latency to frequently used data and improving performance.

- **Integrated Memory Controller and DDR3 support** – An integrated memory controller offers excellent memory read/write performance through efficient pre-fetching algorithms, lower latency, and higher memory bandwidth. The 2nd Generation Intel® Core™ i3 Processor includes support for dual channel DDR3 memory technology up to 1333 MHz.

- **Intel® Virtualization Technology (Intel® VT-x)** – Intel® VT allows one hardware platform to function as multiple “virtual” platforms. For businesses, Intel VT offers improved manageability, limiting downtime and maintaining worker productivity by isolating computing activities into separate partitions.

### Mobile Intel® 6 Series Chipset Family

The Mobile Intel® 6 Series Chipset family continues to push innovation with a new architecture designed to deliver quality, performance and industry-leading I/O technologies on platforms powered by the all new 2011 2nd Generation Intel® Core™ mobile processors. Feature highlights include:

- **Intel® vPro™ Technology⁷** – PCs with a processor from the Intel® Core™ vPro™ processor family enable IT to take advantage of hardware-assisted security and manageability capabilities that enhance their ability to maintain, manage, and protect their business PCs.

- **Intel® Active Management Technology 7.0⁷** – Using built-in platform capabilities and popular third-party management and security applications, Intel® Active Management Technology allows IT to better discover, heal and protect their networked computing assets.

- **Intel® Rapid Storage Technology** – With additional hard drives added, provides quicker access to digital photo, video and data files with RAID 0, 5, and 10, and greater data protection against a hard disk drive failure with RAID 1, 5, and 10³. Support for external SATA (eSATA) enables the full SATA interface speed outside the chassis, up to 3 Gb/s.

- **Intel® Rapid Recover Technology** – Intel’s latest data protection technology provides a recovery point that can be used to quickly recover a system should a hard drive fail or if there is data corruption. The clone can also be mounted as a read-only volume to allow a user to recover individual files.

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• **Support for HDMI, DisplayPort and DVI** – High Definition Multimedia Interface (HDMI) and DisplayPort interfaces deliver uncompressed HD video and uncompressed multi-channel audio in a single cable, supporting all HD formats including 720p, 1080i and 1080p. Dual Independent Display expands the viewable workspace to two monitors.

• **PCI Express® 2.0 interface** – Offers up to 5GT/s for fast access to peripheral devices and networking with up to 8 PCI Express® 2.0 x1 ports, configurable as x2 and x4 depending on motherboard designs.

• **Intel® High-Definition Audio** – Integrated audio support enables premium digital surround sound and delivers advanced features such as multiple audio streams and jack re-tasking.

• **Intel® Anti-Theft Technology (Intel® AT)** – Intel® Anti-Theft Technology (Intel® AT) allows systems to be disabled if they are lost or stolen. The technology can be used with or without a connection to the Internet or a corporate network. Intel® AT can block the OS from loading, even if the hard drive is replaced or reformatted. Intel® AT can also be used to disable access to data encryption keys and block access to valuable data on the hard drive, even if the drive is moved to a different system. Intel AT adds 3G connectivity support for the 2nd Generation Intel® Core™ Processor Mobile platform.

• **Universal Serial Bus (USB)** – High-speed USB 2.0, provides greater enhancement in performance with a design data rate of up to 480 megabits per second (Mbps) with up to 14 USB 2.0 Ports.

• **USB 2.0 rate matching hub** – Enables lower power requirements and manages the transition of the communication data rate from the high-speed of the host controller to the lower speed of USB full speed/low speed devices.

• **Serial ATA (SATA)** – High-speed storage interface supporting up to 6 Gb/s transfer rate for improved data access. Provides up to 6 SATA ports at 3 Gb/s with up to 2 ports supporting 6 Gb/s transfer rates.

• **eSATA** – SATA interface designed for use with external SATA devices. It provides a link for 3 Gb/s data speeds to eliminate bottlenecks found with current external storage solutions.

• **SATA port disable** – Enables individual SATA ports to be enabled or disabled as needed. This feature provides added protection of data by preventing malicious removal or insertion of data through SATA ports. Especially targeted for eSATA ports.

• **USB port disable** – Enables individual USB ports to be enabled or disabled as needed. This feature provides added protection of data by preventing malicious removal or insertion of data through USB ports.

• **Intel® integrated 10/100/1000 MAC** – Support for the Intel® 82579LM and 82579V Gigabit Network Connection LAN.

• **Green technology** – Manufactured with lead-free and halogen-free component packages

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**Intel® Centrino® Series:** The Intel® Centrino® wireless product brand is synonymous with innovation, consistent coverage, and reliable connectivity with minimal power consumption.

The **Intel® Centrino® 6000** series targets performance and mainstream platforms via multi-stream and **dual-band** 802.11agn WiFi capabilities, support for compelling features such as Intel® Advanced Management Technology, Intel® My WiFi (PAN) Technology, and Intel® Wireless Display Technology, and through various WiFi discrete, WiFi/WiMAX, or WiFi/Bluetooth combination solutions.

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• The **Intel® Centrino® Ultimate-N 6300** is the industry’s leading-performance WiFi product, capable of delivering data rates up to 450Mbps\(^1\).

• The **Intel® Centrino® Advanced-N + WiMAX 6250** enables up to 300Mbps WiFi performance, and includes 4G wireless broadband WiMAX capabilities for maximum versatility and flexible coverage.

• The **Intel® Centrino® Advanced-N 6230** also provides up to 300Mbps WiFi performance, coupled with Bluetooth connectivity for added convenience.

• The **Intel® Centrino® Advanced-N 6205** is a WiFi-only product, also enabling up to 300Mbps WiFi performance.

• The **Intel® Centrino® Wireless-N + WiMAX 6150\(^1\)** is a consumer-focused solution that combines 4G WiMAX with 802.11bgn WiFi performance.

The **Intel® Centrino® 1000/100** series enable single-band 802.11bgn WiFi capabilities and support for Intel® My WiFi (PAN) Technology via WiFi discrete and WiFi/Bluetooth combination options for value notebooks, netbooks, and tablets.

• The **Intel® Centrino® Wireless-N 1000 and 1030** are multi-stream 802.11bgn WiFi discrete and WiFi/Bluetooth products, which enable WiFi data rates up to 300Mbps and offer additional support for Intel® Wireless Display Technology.

• The **Intel® Centrino® Wireless-N 100 and 130** are basic, single-stream 802.11bgn WiFi discrete and WiFi/Bluetooth solutions capable of WiFi data rates up to 150Mbps.

**Intel® My WiFi Technology\(^1\)** – Wireless Personal Area Networking (PAN) solution. Enables Intel mobile platforms, equipped with Intel® Centrino® Wireless products, to connect to millions of wireless devices such as digital cameras, portable media players, game players, and printers, (in addition to other Intel® Centrino® Wireless enabled PC clients) for activities such as file sharing, file syncing or file streaming.

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1 Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

2 Requires a system with Intel® Turbo Boost Technology capability. Intel Turbo Boost Technology 2.0 is the next generation of Intel Turbo Boost Technology and is available only on 2nd generation Intel® Core™ i5 and Core™ i7 processors. Consult your PC manufacturer. Performance varies depending on hardware, software and system configuration. For more information, visit [http://www.intel.com/technology/turbo}.boost](http://www.intel.com/technology/turbo}.boost).

3 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](http://www.intel.com/info/hyperthreading).
Available on the 2nd gen Intel® Core™ processor family. Includes Intel® HD Graphics, Intel® Quick Sync Video, Intel® Clear Video HD Technology, Intel® InTru™ 3D Technology, and Intel® Advanced Vector Extensions. Also optionally includes Intel® Wireless Display depending on whether enabled on a given system or not. Whether you will receive the benefits of built-in visuals depends upon the particular design of the PC you choose. Consult your PC manufacturer whether built-in visuals are enabled on your system. Learn more about built-in visuals at http://www.intel.com/technology/visualtechnology/index.htm.

Intel® Rapid Storage Technology (Intel® RST) requires the computer have an Intel® RST-enabled Intel chipset, RAID controller in the BIOS enabled and the Intel Rapid Storage Technology software driver installed. Please consult your system vendor for more information.

Support for RAID 5/10 on Mobile requires a RAID supporting PCH.

Intel® vPro™ Technology, Intel® Virtualization Technology (Intel® VT), and Intel® Trusted Execution Technology (Intel® TXT) require a computer system with a processor, chipset, BIOS, enabling software and/or operating system, device drivers and applications designed for these features. Performance will vary depending on your configuration. Contact your vendor for more information.

Intel® High Definition Audio requires a system with an appropriate Intel chipset and a motherboard with an appropriate codec and the necessary drivers installed. System sound quality will vary depending on actual implementation, controller, codec, drivers and speakers. For more information about Intel® HD audio, refer to http://www.intel.com/design/chipsets/hdaudio.htm.

No system can provide absolute security under all conditions. Requires an enabled chipset, BIOS, firmware and software, and a subscription with a capable Service Provider. Consult your system manufacturer and Service Provider for availability and functionality. Intel assumes no liability for lost or stolen data and/or systems or any other damages resulting thereof. For more information, visit http://www.intel.com/go/anti-theft.

WiMAX connectivity requires a WiMAX-enabled device and subscription to a WiMAX broadband service. WiMAX connectivity may require you to purchase additional software or hardware at extra cost. Availability of WiMAX is limited; check with your service provider for details on availability and network limitations. Actual broadband performance will depend upon your service provider and results may vary due to environment factors and other variables. See www.intel.com/go/wimax for more information.

Up to 450 Mbps bandwidth based on the theoretical maximum bandwidth enabled by 3x3 802.11n implementations with 3 spatial streams in combination with a 3 spatial stream Access Point. Actual wireless throughput and/or range will vary depending on your specific operating system, hardware and software configurations. Check with your PC manufacturer for details.

The Intel® Centrino® Wireless-N + WiMAX 6150 is the only single-band 802.11bgn WiFi product in the 6000 series, with WiFi data rates up to 150Mbps transmit and up to 300Mbps receive. It is also the only 6000 series product that does not support Intel® AMT.

Intel® My WiFi Technology is an optional feature and requires additional software and an Intel® Centrino® wireless adapter. WiFi devices must be certified by the WiFi Alliance for 802.11b/g/a in order to connect. See www.intel.com/network/connectivity/products/wireless/mywifi.htm for more details.

References to industry leading power consumption refer to WiFi module power consumption comparisons versus competing 802.11n WLAN solutions. Actual platform battery life savings will vary depending on your specific operating system, hardware and software configurations. Check with your PC manufacturer for details.

Requires an Intel® Wireless Display enabled PC, TV Adapter, and compatible television. Available on select Intel® Core™ processors. Does not support Blu-Ray or other protected content playback. Consult your PC manufacturer. For more information, see www.intel.com/go/wirelessdisplay.

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Intel® Insider™ is a hardware-based content protection mechanism. Requires Intel Insider enabled PC, internet connection, and content purchase or rental from a qualified provider. Consult your system manufacturer. For more information, visit www.intel.com.

Viewing stereo 3D content requires 3D glasses and a 3D capable display. Physical risk factors may be present when viewing 3D material.

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