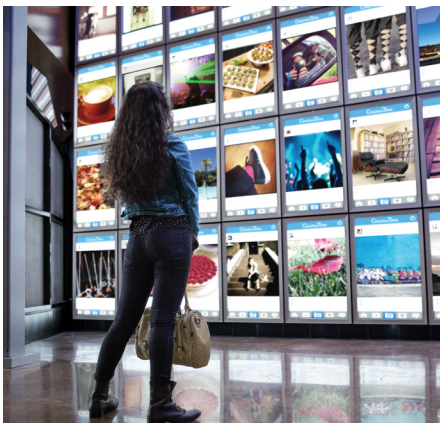


Streamline the Design of Complete Digital Signage Solutions

Comprehensive system specification from Intel makes it easier to design systems that support compelling usage models and address emerging trends.



Intel specification simplifies the design of turnkey solutions for next-generation digital signs.

Integration Challenges

For digital signage vendors, delivering a complete system requires the integration of many diverse components such as an LCD display, media player, content management system (CMS), device management console, wireless networking, security, and cloud connectivity. Moreover, technology is advancing at a rapid pace, requiring vendors and integrators to become proficient in many new areas such as data analytics, 4K ultra high definition displays, and wireless connectivity, just to name a few.

Easing this effort, the Intelligent Pluggable System Specification (IPSS) from Intel provides digital signage vendors with a comprehensive recipe that simplifies the design, deployment, use, and management of digital signage networks. Building upon the Open Pluggable Specification (OPS), IPSS includes various "out of the box" capabilities, enabling vendors to differentiate themselves by supporting compelling usage models and addressing emerging trends. These capabilities include 4K compliance, CMS, analytics, remote device management, and secure connectivity.

Digital Signage Operator Benefits

Complementary technologies, like interactivity, data analytics, and social media, are expanding the scope and effectiveness of digital signage. For instance, interactive digital signage is integral to wayfinders, self-service stations, recognition walls, and intelligent vending machines, among many other applications. Data analytics is being used by retailers to learn the interest level and preferences of customers viewing and interacting with digital signs. This information also helps measure advertising effectiveness and enables operators to play directed content based on a viewer's demographics (e.g., gender and age range). Internet connectivity, 4K resolution, large video walls, and other digital signage capabilities may further enhance the viewer experience.

Intel developed IPSS to streamline the design of digital signage turnkey solutions, particularly those addressing new usage models and emerging trends. With this complete system specification, digital signage vendors can reduce their design effort and time to market. Signage operators also benefit from the availability of digital signage solutions that are interoperable across vendors and support the latest features.

Complete Digital Signage Solution

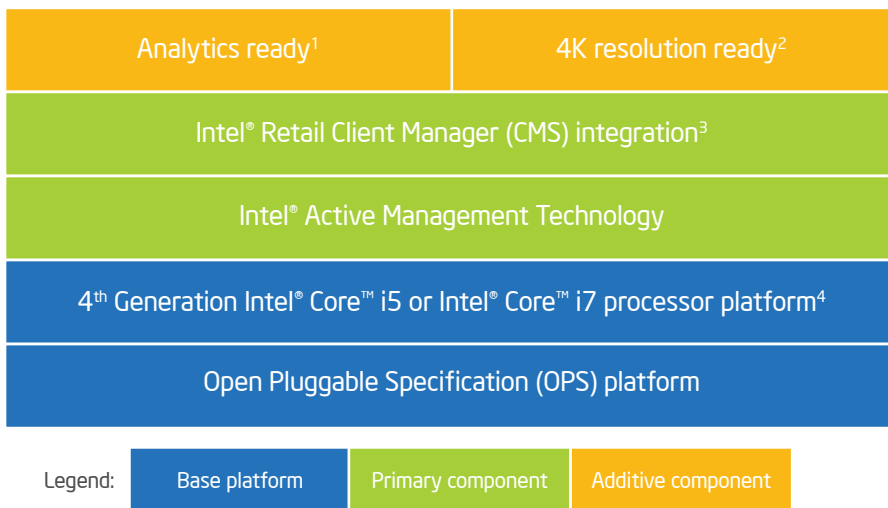
IPSS offers a complete system specification that can help vendors address the emerging requirements of deploying and managing next-generation digital signs. The specification extends the predecessor OPS specification by adding Intel® technologies and software solutions that increase compatibility among digital signage components, thus helping to reduce overall solution cost. Advanced remote device management technology helps lowers maintenance and operational costs, and the integrated content management system (CMS) enables vendors to offer a turnkey solution with a compelling out-of-box experience. The included analytics software provides analysis of the size and behaviors of the viewing audience, information that can be used to optimize marketing campaigns.

Digital signage vendors can use the Intel reference design files to dramatically reduce their development effort resulting in fast time to market (TTM) of turnkey systems with a wide range of capabilities. In addition, there are a limited number of seed units available, consisting of an IPSS-compliant module with pre-installed trial versions of the Intel software ingredients – contact your Intel field sales representative for more information.

Figure 1 shows the key features of IPSS:

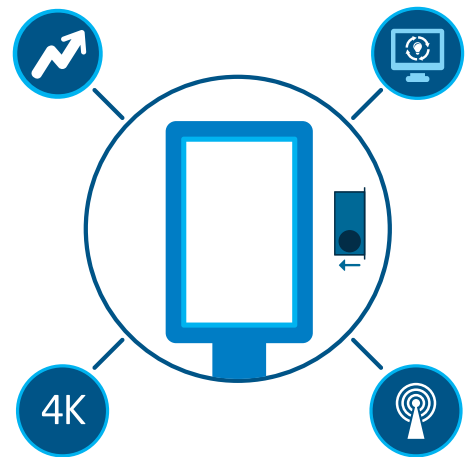
- **Open Pluggable Specification (OPS)** simplifies digital signage installation, usage, maintenance, and upgrades.
- **4th Generation Intel® Core™ i5 and Intel® Core™ i7 Processors** deliver the necessary compute and multi-media performance – power-efficiently.

- **Intel® Active Management Technology (Intel® AMT)** lowers digital signage maintenance and operational costs.
- **Intel® Retail Client Manager** integrates an easy-to-use digital signage content CMS with analytics and security features.
- **Analytics Capabilities** sense viewer demographics (age range, gender) and responses to content played on digital signs – all anonymously – and provide ‘proof of play’ reporting.
- **4K Ultra High Definition Resolution** supports four times the pixels of 1080p.



Legend: Base platform Primary component Additive component

1. This feature is integrated in the Intel® Retail Client Manager (module ready) for dynamic advertising and image sensor integration is needed to enable usage model.
2. 4K is supported by the 4th Generation Intel® Core™ processors.
3. Intel® RCM is the recommended CMS for IPSS, other CMS not otherwise covered by Intel® RCM may also be used
4. IPSS supports 4th Generation Intel® Core i5 and Intel® Core i7 processors and beyond.



IPSS: Ready for analytics, content management, remote manageability and 4K resolution.

Figure 1. Key Features of the Intelligent Pluggable System Specification (IPSS).

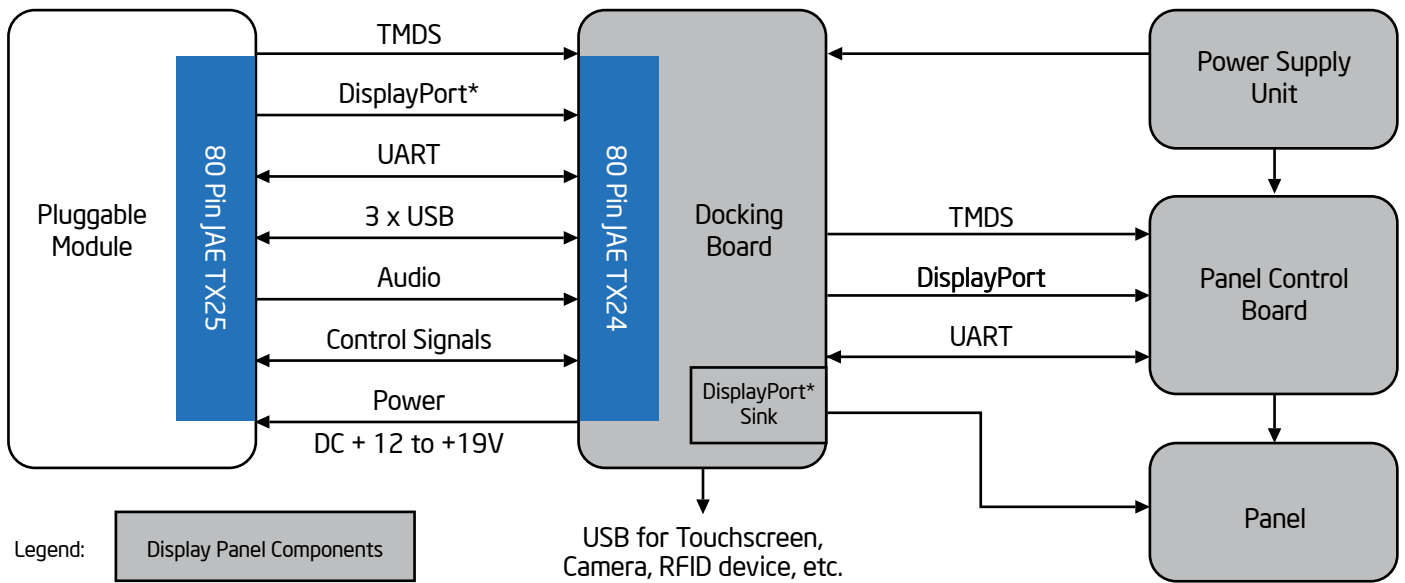


Figure 2. OPS Standard Components: Pluggable Module and Docking Board.

Increasing Interoperability with the Open Pluggable Specification (OPS)

Intel developed and introduced to the industry the OPS specification to simplify the device installation, usage, maintenance, and upgrade of digital signage infrastructure. This open standard comprises electrical, mechanical, and thermal specifications for media player boards and display boards connected together via an 80-pin JAE connector that supports commonly used interfaces such as DisplayPort* and USB, among others. The overall objective is to enable digital signage manufacturers to deploy interchangeable systems faster and in higher volumes, while lowering the costs for deployment and implementation.

Powering Media Players with Intel® Core™ Processors

The 4th generation Intel® Core™ processor family features significant upgrades in media processing and graphics capabilities, and improvements⁵ in compute performance and power consumption. These upgrades will help drive new opportunities in digital signage by enabling the design of high-performance, low-power media players that drive display panels.

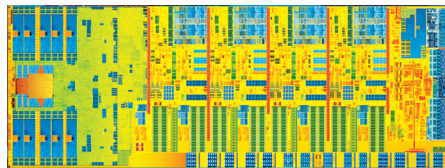


Figure 3. 4th Generation Intel® Core™ Processor

Amazing Graphics for Richer, Interactive Content

With excellent 3-D graphics and media performance, the integrated HD processor graphics delivers outstanding HD media playback without the need for a discrete graphics card. The Intel platform can also support up to three independent displays, enabling one system to drive multiple screens.

Securing Media Content

The 4th generation Intel Core processor family features the latest Intel security and management technology that secures the content played on digital signs. For instance, Intel® Advanced Encryption Standard New Instruction (Intel® AES-NI) enables media players to quickly decrypt media content from the CMS in real time before playback.

Advancing Remote Device Management

With Intel AMT, the operating system can now be easily shut down remotely, thus expanding the overall manageability tools available to customers. This platform enables operators to activate, deploy, and securely manage unattended digital signs, potentially saving time and cost⁴ through a centralized IT administration. Intel AMT Release 9.0/9.5 introduces a new option for provisioning unattended devices, called Embedded Host-based Configuration (EHBC), which simplifies the activation and deployment of Intel AMT. Another enhancement is graceful shutdown, which improves uptime⁶ and reduces on-site visits by allowing IT staff to remotely analyze a hung operating system, initiate a graceful shutdown, reboot the device, and restore it to normal operation.

Easing Hardware Design

Lower-power 4th generation Intel Core processors help ease the design of media players in pluggable modules because of their small form factor and low power consumption – down to 15-watt thermal design power (TDP) – compared to⁷ Intel's previous generation processors.

Lowering Digital Signage Support Costs with Intel® Active Management Technology (Intel® AMT)

With an escalation of networked devices, IT departments are turning to remote management to help them contain rising support costs. Remote management facilitates the repair of system problems over the network, a cost-effective alternative to an onsite repair visit.

Fixing Software Issues

Advancing the capabilities of remote management solutions, Intel AMT establishes an out-of-band (OOB) link that enables IT professionals to diagnose and fix software issues on media players, even when they're powered off. This is a unique capability since other remote system management solutions usually require several equipment components, like the OS and IP software stack, to be working properly. In contrast, IT consoles implementing Intel AMT only require the equipment to be plugged into a power outlet and a network.

Activating Without an Attendant

The ability to manage digital signs remotely using Intel AMT is especially valuable to operators because these devices are typically unattended (i.e., no employee is assigned to them). As such, Embedded

Host-based Configuration can be used to securely deploy and activate Intel AMT without requiring onsite personnel.

Saving Power During Off Hours

When issues can be resolved remotely, the time to problem resolution is reduced, which may translate into increased uptime. Moreover, Intel AMT also enables retailers to save power by shutting down systems – in a structured, simple way – during off hours using the remote on/off switching option. This is made possible by the OPS display panel power delivery design that powers the media player via the display panel. More information is available in the white paper “[Designing Intel® vPro™ Technology Capable OPS Display Panels.](#)”

Initiating a “Fast Call For Help”

A unique capability of Intel AMT enables a digital media player to initiate a connection with the IT, even if it is down. This feature, called Establish Secure Connection, is particularly valuable since media players could be hidden behind a firewall – conditions that may prevent IT from establishing communications. In practice, the media player can send heart beat messages to the IT device management console in order to communicate on a regular basis.

Simplify Device Control

Intel AMT also has a feature called KVM redirection over Internet Protocol (IP), permitting the keyboard-video-mouse (KVM) for an IT console to display and control the graphical user interface (GUI) of a media player in the field. No additional hardware is required. As a result, technicians can control the system as if they were sitting right in front of it, even when the operating system is down.

Delivering Captivating Content with Intel® Retail Client Manager

Managing a digital signage infrastructure and its supporting software is not a trivial task. But now retailers can simplify the entire process with the Intel Retail Client Manager, an intelligent, intuitive software solution for managing content and devices across consumer digital touch points, like point-of-sale, digital signs, and kiosks. This software solution delivers a seamless and consistent experience that is personalized, relevant, and meaningful.

Creating Effective Campaigns

Non-technical employees can quickly learn how to use the intuitive CMS software - no dedicated staff required. Easily broadcast video, images, sound, and advertisements together or separately across a digital signage network.

- Compose and schedule marketing campaigns in minutes
- Customize content on the fly
- Deliver marketing content in real time

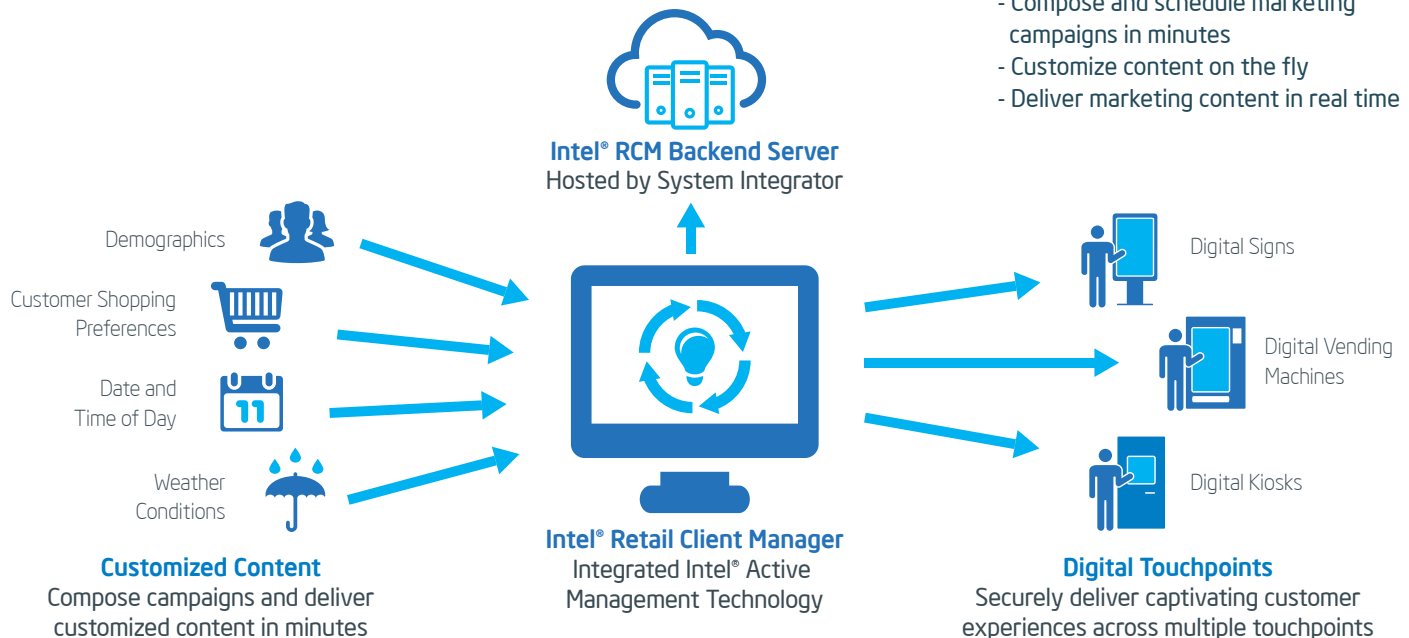


Figure 4. Using Intel® Retail Client Manager, operators manage digital content for point-of-sale, digital signs, kiosks, and intelligent vending in real time from anywhere.

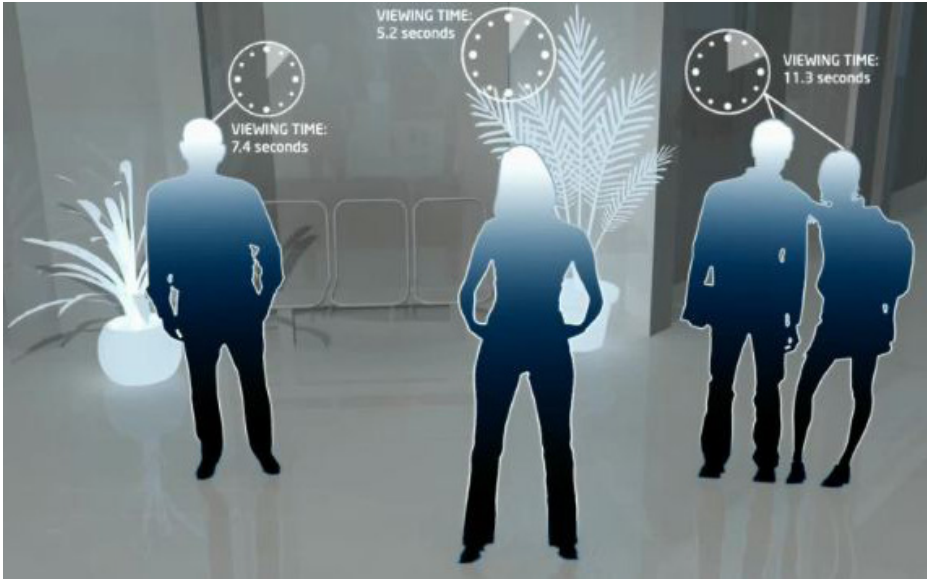


Figure 5. Anonymous viewer analytics (AVA) Technology can provide information on how many people looked at the signage, how long they watched, and their demographic characteristics.

- Control each digital sign independently
- Respond to touch screen inputs or sensor data
- Create content quickly using included templates
- Play content conditionally, based on audience demographics
- Connect out-of-band to an Intel AMT-enabled media player
- Manage access with permissions
- Receive real-time error reports

Reducing Time and Effort

Create and manage content with drag-and-drop ease. Design eye-catching campaigns with multiple zones playing just about any type of content: HD video, H.264, MPEG4, HTML5, FLASH, images, web content, RSS feeds, Adobe* Flash, Silverlight*, and TV (terrestrial, satellite or cable).

Although IPSS integrates the Intel Retail Client Manager, signage operators and vendors may use other compatible CMSs, especially those with complementary or unique features supporting applications such as education whiteboards, vending, video walls, etc.

Optimizing Marketing Campaigns with Data Analytics

Retailers are employing data analytics tools to generate the information they

need to make merchandising and marketing decisions. For example, anonymous viewer analytics (AVA) running on a media player can measure viewers’ interest in advertisements, information that can be used to improve marketing campaign effectiveness. This capability is available with the Intel® Retail Client Manager 2.0 (Intel® RCM 2.0) with integrated Analytics, which incorporates the powerful data collection and audience measurement tools to a digital signage network.

With valuable AVA metrics that were previously unavailable, retailers and brands can measure advertising effectiveness through a better understanding of audience characteristics such as actual impressions, length of impressions, potential audience size, and customer demographic data (e.g., age range and gender). It is also possible to collect, record, and report ‘proof-of-play’ data, including playback frequency and duration. Intel RCM 2.0 does all of this while maintaining total anonymity and complete respect for people’s privacy as outlined in the 7 Foundational Principles of Privacy by Design.⁸

Measuring Audience Response to Content

Intel Retail Client Manager with integrated Analytics uses AVA technology to transform digital signage into an intelligent, situation-aware content

system (Figure 5). Small optical sensors connected to digital signs send video streams to Intel® processors for processing by Intel RCM 2.0. The software extracts information from the video, such as how many people looked at the signage, how long they watched, and their demographic characteristics – data that can be used to gauge advertising effectiveness. Intel RCM 2.0 can also measure the duration of a person’s gaze, further enhancing retailers’ ability to track consumer behavior, adapt messages, and calculate their ROI.

Playing Directed Marketing Messages

Intel Retail Client Manager allows operators to play advertising content conditionally, based on audience behavior and characteristics, weather conditions, shopper preferences, and more. With this feature, it is possible to trigger a media player to interrupt its normal messaging sequence to play a shaving cream or automobile advertisement, for instance, when a middle-aged man stands in front of the digital sign.

Ensuring Customer Privacy

The Intel Retail Client Manager 2.0 with integrated Analytics maintains complete respect for individual privacy. It uses audience-detection technology (as opposed to facial-recognition technology) to generate viewer information. The software never records images or captures any personal information about viewers. Once real-time video

is scanned and analyzed, it is immediately destroyed as part of the AVA process.

Perceptual Computing Analytics

Perceptual computing will fundamentally change how people interact with digital signs, making the experience more intuitive, natural, and engaging. With the Intel® Perceptual Computing SDK 2013, developers can create exciting new applications that take advantage of the SDK's core capabilities: speech recognition, close-range hand and finger tracking, face analysis, augmented reality, and background subtraction. The SDK can be downloaded from the Intel web site.

Increasing Digital Signage Resolution with 4K Ultra High Definition Displays

The next generation of display technology, called 4K Ultra High Definition, promises to deliver incredible clarity by delivering four times the pixels of 1080p.

IPSS and 4th generation Intel Core processors make it easy for digital signage vendors to support this feature, enabling operators to present exceptionally vivid content.

Intel® platforms enable:

- Single port support for 4K capable display without the need for a graphics card
- Optional 4K2K display resolution support for screens with ultra high definition (UHD) capability
- IPSS modules that are ready to support 4K2K@24Hz with HDMI1.4a
- 4K2K@60Hz with DP1.2 (with select Intel Core processors)

Access IPSS and Design Guides from Intel Website

Intel maintains the Intel® Embedded Design Center (Intel® EDC) website to assist hardware and software

engineers developing products using Intel® architecture processors. Developers can download IPSS collaterals, including detailed design guides for OPS systems, at <http://intel.com/ipss>, and request a seed unit from their Intel field sales representative. Deployment-ready, IPSS-compliant systems are also available from members of the Intel® Intelligent Systems Alliance: see [solutions directory](#).

Learn more about Intel solutions for digital signage at www.intel.com/content/www/us/en/retail/retail-digital-signage.html.

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[^] The TCO or other cost reduction scenarios described in this document are intended to enable you to get a better understanding of how the purchase of a given Intel product, combined with a number of situation-specific variables, might affect your future cost and savings. Circumstances will vary and there may be unaccounted-for costs related to the use and deployment of a given product. Nothing in this document should be interpreted as either a promise of or contract for a given level of costs.

¹ This feature is integrated in Intel® Retail Client Manager (module ready) for dynamic advertising and image sensor integration is needed to enable usage model.

² 4K is supported by 4th Generation Intel® Core™ processors.

³ Refer to the "Designing Intel® vPro™ Technology Capable OPS Display Panels" whitepaper at <http://www.intel.com/content/www/us/en/intelligent-systems/digital-signage/vpro-ops-display-panels-paper.html>.

⁴ IPSS supports 4th Generation Intel® Core i5 and Intel® Core i7 processors and beyond.

^{5,6,7} Source: http://download.intel.com/newsroom/kits/core/4thgen/pdfs/4th_Gen_Core_ISG_FactSheet.pdf

⁸ Sources: www.ipc.on.ca/images/Resources/7foundationalprinciples.pdf, www.privacybydesign.ca.

Intel® Active Management Technology: 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 [Intel® Active Management Technology](#).

No computer system can provide absolute security under all conditions. Built-in security features available on select Intel® processors may require additional software, hardware, services and/or an Internet connection. Results may vary depending upon configuration. Consult your system manufacturer for more details. For more information, see <https://security-center.intel.com/>

KVM Remote Control (Keyboard, Video, Mouse) is only available with Intel® Core™ i5 vPro™ and Core™ i7 vPro™ processors with Intel® Active Management technology activated and configured and with integrated graphics active. Discrete graphics are not supported.

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>.

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