White Paper

Axiomtek’s Digital Signage Players and Modules

Digital Signage Trends

The highly diversifying digital signage industry is expected to retain its growth momentum in the coming years as digital signage continues to stretch across a broader range of sectors worldwide. From public transportation to commercial operations to campus and corporate facilities, digital signage applications like large signboards, video walls, smart displays, interactive kiosks and whiteboards are more widely used than ever before. Of all the markets driving the prevalence of digital signage, education and retail remain in the spotlight, thanks to the increased implementation of digital signage solutions in both segments following a rising demand for relevant applications.

EDUCATION

Increasing adoption of interactive whiteboard (IWB) solutions has been an important driving force behind the booming digital signage needs in the education sector, as more schools and educational institutions are funding to incorporate the interactive whiteboard as part of their standard classroom equipment.

Educators are now able to create a tech-based learning environment by utilizing interactive whiteboards and multimedia teaching solutions to enhance student engagement in class activities and improve teacher-student interaction. This growing need for creating an e-learning environment for interactive education has significantly contributed to the strong growth of the interactive whiteboard market.

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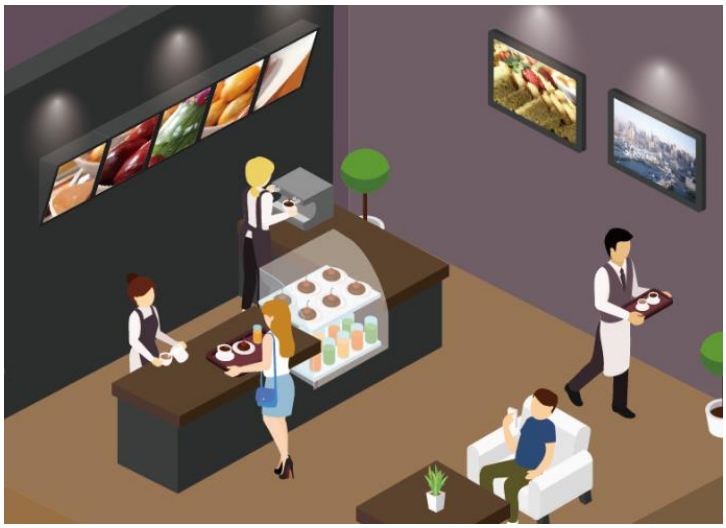


Commercial digital signage enjoys substantial development in the retailing industry as a fast growing number of retailers are looking to integrate in-store digital signage into their store design or marketing strategies in hopes of boosting sales or brand awareness, a trend that has been pushing the growth of the retailing sector and generating numerous opportunities for display solution providers.

Digital signage is believed to benefit retail businesses in several aspects:

It enriches shopping experiences with eye-catching content. The superior image quality of high-resolution display presents fascinating visual content to draw passersby's attention and bring in more intrigued customers. The ability to provide an immersive viewing experience with vivid photos or dynamic videos also helps stores entertain shoppers and stimulate their buying desire.

It changes information in real time. Retailers prefer digital signage as it has the advantage of changing what is being displayed with the least time and effort. Signage systems with network connectivity and IoT support can even roll out fresh ads as quickly as loading a social media post, which is ideal for running time-sensitive product promotions, discount offers, in-store events or other marketing campaigns.

It motivates consumers with interactive features. With touchscreen technology built into digital signage, customers can interact with displays to obtain the information that interests them, an incentive that encourages customer attendance to in-store activities. A smart signage system incorporating high-performance computing and analytical abilities can even analyze the demographical characteristics of a group of people looking at the display, and then based on the analyzed data change the content instantly to promote relevant products for that particular audience. This provides an effective medium for retailers to reach out for their target customers.

It intensifies brand loyalty. Digital signage produces an instant visual impact, giving stores an edge over their competitors relying on conventional signboards. With advanced functionality including human-machine communication and data collecting features, it allows marketers to broadcast appealing information to targeted audiences and express their brand messaging, thereby increasing the possibility of turning prospective customers into a cult of brand advocates.

Overview of the Intel® Open Pluggable Specification (OPS)

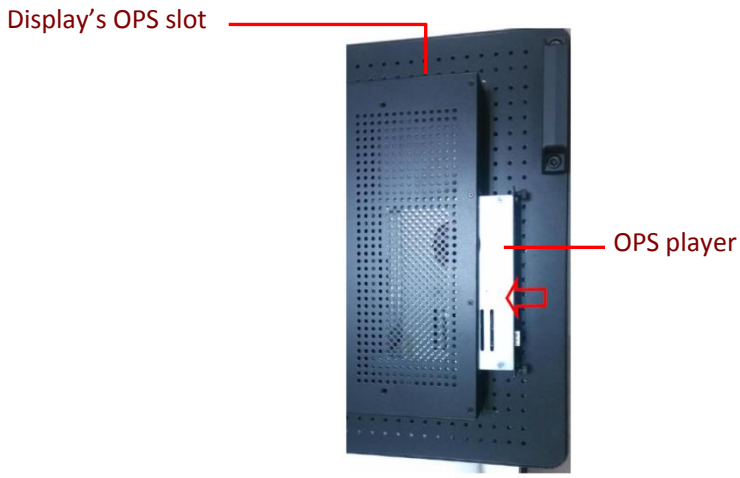
Before the introduction of Intel's Open Pluggable Specification (OPS), the digital signage market was highly fragmented and filled with different types of form factors, displays and media playing peripherals. Most signage systems consisted of a single computer or player connecting to a monitor via cables, or a monitor accommodating a computer that could not be removed easily.

Intel launched the Open Pluggable Specification (OPS) as a way to bring standardization to the highly fragmented media player market. The OPS defined a standardized hardware architecture that enabled the integration of a pluggable digital signage player into the display panel, creating a lean yet highly effective computing system exclusively for digital signage operation, while eliminating the need of an external device or computer to run signage content.

Modular, single-unit and slot-in design. The OPS media player module is integrated into an OPS-compliant display panel through the interconnection of a set of 80-pin JAE TX25A plug and TX24A receptacle connectors. This JAE connector interface enables a single plug mechanism that provides I/O signal connectivity between the OPS player and the display panel, as well as the player's power supply received from the display, so that a fully functional signage computing system can be established without requiring external cabling or additional hardware.

The single JAE connector interfacing has driven the modularization of digital signage panels and pluggable media players, making it possible for system manufacturers to construct OPS based modules with efficient heat dissipation and a small, lean form factor that can insert directly into slim sized signage displays for greater compatibility and interoperability.

This modular signage solution not only saves loads of assembly complexities, but makes the whole system far easier to operate, maintain and upgrade, allowing system integrators to offer total solutions rather than separate displays and media players. Now the integrator can quickly set up a plug-and-play signage platform simply by slotting an OPS player into the docking board in the back of an OPS-compliant display. All functional controls and settings of the OPS player can be done via the screen of the connected display using the display's remote control.



(Illustration: Easy installation of the OPS player into the display)

OPS also allows for more display solutions that support intelligent interactivity, remote status monitoring, anonymous audience analytics, and other advanced use cases.

INTEL'S NEW OPS+

Now, Intel has announced an enhanced OPS version—Open Pluggable Specification-Plus (OPS+)—in response to a widening range of new usage models arising from quickly evolving resolution standards, as well as to satisfy anticipation for higher scalability that allows for more features to be built into digital displays. Built on the full functionality of OPS with the same small form factor, OPS+ adopts improved thermal design to expand the list of Intel® processors that can be integrated into displays, offering additional capabilities such as support for driving one more display's content through DisplayPort (DP) interface, and the ability to run three individual 4K resolution display outputs.

OPS+ Key Features

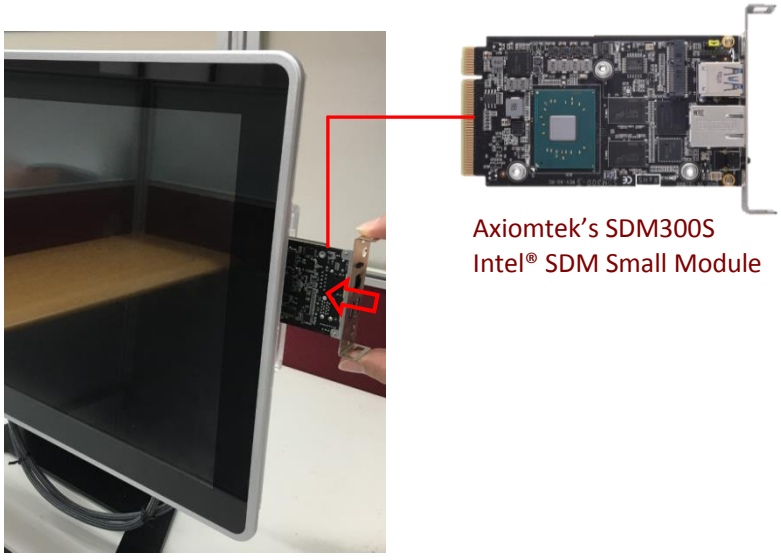
- 180 mm x 119 mm x 30 mm, same physical dimensions of OPS
- Enhanced thermal design that supports broader range of Intel® processors
- Optimized for interactive white boards (IWBs), commercial digital signage, kiosks, visual data devices, video walls, and more
- Features a second high-speed connector that enables additional DP interface support and can drive three single 4K displays
- Backward compatible to OPS (OPS+ modules plug into both OPS+ and OPS displays)

Overview of the Intel® Smart Display Module (Intel® SDM)

As digital displays get thinner and power-efficient performance becomes increasingly critical, Intel is introducing the Intel® Smart Display Module (Intel® SDM) specification—its next-generation signage display platform that delivers the same level of intelligence and interoperability as the Open Pluggable Specification, but in a tiny form factor that removes the housing for easy incorporation into the sleekest all-in-one designs and thinnest displays.

Flexible Integration. Intel® SDM comes in two form factor sizes—the Intel® SDM Small (Intel® SDM-S) and Intel® SDM Large (Intel® SDM-L), and is designed to be built in or externally plugged into a display to ensure maximum integration flexibility. Intel® SDM Small is 60 mm x 100 mm with a maximum thickness of 20 mm, so it can easily slot into ultra-slim displays that require minimal space with maximum performance. Intel® SDM Large has a slightly larger form factor roughly the size of OPS, although thinner.

Scalable, future-proofed with integrated intelligence. Intel® SDM demonstrates superb scalable performance by supporting multiple generations of Intel® processors—from the energy-efficient Intel Atom® processors all the way up to the performance-driven Intel® Core™ processors—all thanks to its high-speed PCIe edge connector, which also supports higher resolution displays up to 8K and video capture, and provides built-in I/O that eliminates the need for external I/O to further reduce the space required. Without housing, Intel® SDM makes it easy to pack robust computing capabilities into the slimmest of displays for future-proofed designs, enabling the creation of digital signage innovations for applications like interactive kiosks, point-of-sale (POS) devices, TV walls, and other visual IoT equipment with extremely limited installation space.



(Illustration: Installation of Axiomtek's SDM300S Intel® SDM Small Module into the display)

Axiomtek's Digital Signage Solutions

Axiomtek has years of experience in developing innovative digital signage systems, offering a complete portfolio of Intel-powered OPS+/OPS-series and SDM-series solutions to facilitate digital signage usages with the following benefits:

High compatibility and easy setup. As one of Intel's strategic partners, Axiomtek has been working closely with Intel and following Intel's OPS and SDM architecture to provide OPS/OPS+/SDM-compliant media player modules. Featuring pluggable interface and standard signal output, Axiomtek's signage players and modules have been proven to be among the most compatible products available, ensuring the highest interoperability possible with a diversity of Intel®-standard compliant displaying apparatus for simplified installation, operation, upgrades, and maintenance.

Impressive 4K UHD technology supported. Axiomtek's OPS players and SDM modules deliver excellent graphical performance including support for 4K Ultra HD resolution, allowing users to run 4K UHD images and video to enjoy high-resolution viewing experience.

Satisfying multiple signage applications. In addition to delivering high computing performance with adaptation to streamlined management and scalability needs, Axiomtek's digital signage solutions combine cutting-edge technologies to cover the demands across multiple applications—interactive whiteboards (IWBs), video walls, smart kiosks, digital menu boards, mass transit system advertising, POS systems and more.

Web connectivity with remote management. Axiomtek's digital signage solutions are fully network capable, with built-in connectivity interfacing that brings the conveniences of quick Ethernet, WLAN, and 3G/LTE connections, while also supporting Intel® Active Management Technology (Intel® AMT) for managing, upgrading and protecting devices remotely.

Recommended Axiomtek OPS+ Solution—OPS700-520

The OPS700-520 is an Intel® OPS+-compliant digital signage player powered by the 8th generation Intel® Core™ i7/i5/i3 & Celeron® processors (codename: Coffee Lake-S) with the Intel® Q370 chipset. The OPS700-520 supports LGA1151 socket-type processors to offer greater flexibility for Intel® Core™ CPU selection. It comes with two 260-pin DDR4-2400 SO-DIMM sockets with up to 32GB memory, and has one M.2 E Key card for Wi-Fi connectivity and one M.2 M Key card for storage (SATA & PCIe). It supports Trusted Platform Module 2.0 (TPM 2.0) for system security reinforcement.

The cableless OPS700-520 player can be easily integrated into an OPS-compliant display via a standardized JAE TX-25A plug connector, which supports HDMI 2.0 with 4K @ 60Hz resolution, DisplayPort, UART, audio, USB 3.0 and USB 2.0 signals. It also features an additional HRS-FX18 connector that supports PCIe x4 and extra DisplayPort, plus rich I/O interfacing for expansion flexibility, including two USB 2.0 ports, two USB 3.1 ports, one COM port, one Gigabit LAN port, and one HDMI port for supporting second Ultra HD display with 4K resolution.

Capable of connecting to multiple 4K display devices via DisplayPort and HDMI 2.0, the high-performance OPS700-520 player presents an ideal multi-display solution for interactive whiteboards in classroom and meeting venues, as well as for various digital signage deployments in shopping malls, banks, retail stores, restaurants, performing art centers, and more.

OPS700-520

Intel® OPS+ Digital Signage Player Feature Highlights

- Intel® Open Pluggable Specification-Plus (OPS+ compliance)
- 8th generation Intel® Core™ i7/i5/i3 & Celeron® processors (codename: Coffee Lake-S)
- 2 DDR4-2400 SO-DIMM sockets, up to 32GB
- 1 M.2 M Key for storage and 1 M.2 E Key for Wi-Fi connectivity
- Supports additional DisplayPort and PCIe x4 through HRS-FX18 connector
- Supports Intel® AMT (Active Management Technology) 12.0

Recommended Axiomtek SDM Solution—SDM300S

The SDM300S module is based on the Intel® SDM Small architecture and is powered by the Intel® Pentium® processor N4200 and Celeron® processor N3350. It has a lean form factor that measures only 60 mm x 100 mm and can nicely integrate into sleekly thin display panels.

By featuring a card edge connector that supports HDMI 1.4 and DP 1.2 display interfaces, the SDM300S is able to deliver smooth 4K UHD output while maintaining outstanding power-efficiency performance. The module also comes with sufficient built-in I/O for flexible expansion including two USB 3.0 ports and one Gigabit LAN port, plus an SSD storage capacity of 32/64GB eMMC onboard, making it an ideal modular solution for all-in-one signage applications.

SDM300S

Intel® SDM–S Module Feature Highlights

- Intel® Pentium® processor N4200 and Celeron® processor N3350 (codename: Apollo Lake)
- 4GB LPDDR4 memory onboard (8GB optional)
- Onboard 32/64GB eMMC
- Supports 4K UHD output
- 1 M.2 Key E 2230 slot
- 2 USB 3.0; 1 GbE LAN

Application Cases of Axiomtek's OPS500-501-H Digital Signage Player

The OPS500-501-H, a 4K resolution OPS-compliant digital signage player, is powered by the LGA1151 socket 7th generation Intel® Core™ and Celeron® processors (codename: Kaby Lake) with the Intel® H110 chipset. It supports one 260-pin DDR4-2133 SO-DIMM socket with up to 16GB memory, one PCI Express Mini Card slot for WLAN connectivity, as well as one easy-to-access 2.5" SATA HDD for storage.

The cableless OPS500-501-H signage player can be easily connected to an OPS-compliant display via a standardized JAE TX-25A plug connector, which supports HDMI 2.0 with 4K @ 60Hz resolution, DisplayPort, UART, audio, USB 3.0 and USB 2.0 signals. To add expansion flexibility for various application needs, the system also comes with rich I/O interface including one USB 2.0 port, two USB 3.0 ports, one COM port, one Gigabit LAN port, plus an HDMI port to support the second Ultra HD display with 4K resolution.

OPS500-501-H

4K Intel® OPS Digital Signage Player Feature Highlights

- Intel® Open Pluggable Specification (OPS compliance)
- 7th/6th generation Intel® Core™ i7/i5/i3 and Celeron® processor (codename: Kaby Lake/Skylake) with Intel® H110 chipset
- JAE TX-25A plug connector supporting DisplayPort 1.2 and HDMI 2.0 with 4K @ 60Hz resolution
- HDMI port for 2nd Ultra HD display with 4K resolution
- High-speed DDR4-2133/2400 SO-DIMM, up to 16GB
- 1 PCI Express Mini Card expansion slot
- 2.5" SATA HDD tray for storage
- Ultra low-noise cooling fan
- Easy installation and maintenance

Case 1: OPS500-501-H for Public School Interactive Whiteboards

As a system integrator in the sphere of informational and audiovisual technologies offering integrated multi-media solutions across a diversity of markets, the customer was requesting a cost-effective OPS compliant digital signage player with 4K display at 60Hz resolution support for its interactive whiteboard (IWB) solution, which was to be installed in a classroom where noiseless operation was essential.

Axiomtek proposed the OPS500-501-H digital signage player to suit the customer's needs, an exceptional multimedia teaching solution providing quick installation and plug-and-play operation for educators who anticipated a cost-effective, entry-level interactive whiteboard system. The system was integrated into an OPS-compliant 84-inch interactive whiteboard (IWB), allowing teachers and students to use a stylus or finger to move and manipulate words, images, and other objects on the screen. The interactive whiteboard supported many different types of media content and file formats to let teachers add more dynamic elements to their lectures.

System Configurations

- Built-in Intel® Core™ i3-6100TE processor (codename: Skylake)
- 8GB DDR4-2133 memory onboard
- 128GB 2.5" MLC SSD
- Adopting ultra low-noise CPU fan
- Microsoft Windows® 10 Enterprise

Case 2: OPS500-501-H for Airport In-Store Digital Signage

The customer, a leading distributor of hardware and software solutions for a variety of digital signage industries encompassing retail, transportation, entertainment, government, financial services, etc., was seeking an OPS-compliant digital signage player that could be plugged into OPS-compliant displays for in-store marketing at the retail stores of a metropolitan international airport. The requested system solution should meet the following requirements:

- Intel® Open Pluggable Specification (OPS compliance)
- High performance Intel® Core™ processor and long-term support
- 4K Ultra High Definition (UHD) support
- Easy installation and maintenance

Axiomtek proposed the OPS500-501-H, a 4K resolution OPS-compliant digital signage player, as the solution to fulfill the customer demands.

The OPS500-501-H was slid into the customer's OPS compliant displays of various types and brands for playing interactive advertisements. The displays were either mounted on the walls as part of the storefront layout for showcasing merchandise or mounted above product shelves or behind the counter, producing dazzling visual images that made it easier for stores to arouse customers' interests in promotional items and eventually helped raise sales revenue.

System Configurations

- Intel® Open Pluggable Specification (OPS compliance)
- 6th generation Intel® Core™ i5 processor (Codename: Skylake)
- 4K @ 60 Hz resolution

About Axiomtek Co., Ltd.

As one of the world's leading designers and manufacturers of PC-based industrial computer products, Axiomtek specializes in data acquisitions and control systems of rich diversity and modularization. With the upmost enthusiasm in serving their customers, Axiomtek has mirrored PC evolutions in various industries by shifting its focus toward the design and manufacture of PC-based industrial automation solutions, standing as a trustworthy long-term provider of industrial computers.

Established in 1990, Axiomtek has partnered with more than 60 distributors globally, offering more than 400 products through product lines of Industrial PCs (IPCs), Single Board Computers (SBCs), System on Modules (SoMs), Fanless and Rugged Embedded Systems (eBOX and rBOX), Intelligent Transportation Systems (tBOX), Industrial IoT Gateway, Industrial Firewall, Touch Panel Computers (TPCs), Medical Panel Computers (MPCs), Digital Signage Solutions (DSSs), Network Appliances (NAs) and Industrial Ethernet products.

Axiomtek is a Member of the Intel IoT® Solutions Alliance. A global ecosystem of more than 800 industry leaders, the Alliance offers its Members unique access to Intel technology, expertise, and go-to-market support—accelerating deployment of best-in-class solutions.