Axiomtek
OPS871

High Performance OPS Player Based on 3rd Generation Intel® Core™ Processors

Application Reference Design

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www.axiomtek.com

Building Reliable, Secure Retailer Digital Signage Systems Using the Axiomtek OPS871 and Intel® Technologies

INTRODUCTION: Secure Retailer Digital Signage

The digital advertising market continues at a steady market growth rate of more than 25%. Digital signage advertising expenditures continue to have a higher growth rate than all other advertising media combined. Among the market segments for digital signage, the retailer market is number one and presents the greatest opportunity for sales

Rapidly replacing printed posters, digital signage systems make information eye-catching and compelling. The ability to provide real-time information between retailers and their customers is a huge business advantage. This big advantage though comes with big responsibility. Along with its immediacy and convenience, digital signage presents new security challenges in display and data safety. Few companies are prepared for it and most are not even aware of the risk and responsibility.

The best security relies on both hardware technologies and excellent planning. Trusted Platform Module (TPM) technology provides a relatively foolproof mechanism for the protecting digital signage content and the underlying data. To provide this protection, the TPM effectively puts "locks" around the data. Just like with physical locks, all the valuable data is inaccessible to any device without the keys.

For years now, Axiomtek has been committed to providing reliable digital signage solutions. When Intel created the Open Pluggable Specification (OPS) to address digital signage market fragmentation and simplify device installation, usage, maintenance and upgrades, we responded. We developed a comprehensive product line of OPS-compliant modules.

OPS modularizes display panels and digital signage platforms players by specifying a built-in slot for an OPS-compliant media player in OPS-compliant displays. Our latest media player, the Axiomtek OPS871 module, based on the 3rd generation Intel® Core™ processor family (formerly codenamed Ivy Bridge) adds a TPM module for implementing advanced security. Through OPS compliance, this module delivers greater interoperability, reduced installation costs, and enables easy upgrades and replacement of either the player or the display panel.

Axiomtek's customers include many professional retailer equipment suppliers offering 31.5" to 65" digital signage system to retailers, museums, schools, and other enterprises, as well as the largest transit advertising light box vendor of heavy duty vehicle/bus digital signage systems.

Growing demand for digital signage

Properly implemented retailer technology can substantially increase the sales of retailers, which is why more and more retailers are replacing poster and LED wall systems with digital signage. Digital signage systems give retailers new compelling ways to promote products, interact with customers, and build the brand Axiomtek knows the importance of a reliable digital signage system and uses the latest Intel® processors and technologies to provide some of the most reliable OPS-compliant platforms on the market.

The Axiomtek OPS871 digital signage player

What is the most impactful digital signage in the world? A digital signage equipped with a large size LCD and the highest performance CPU. Powered by the 3rd generation Intel® Core^{TM} processor, the Axiomtek OPS-compliant OPS871 digital signage player supports industrial grade reliability, as well as excellent compute performance. This intelligent digital signage system can ease the burden of retailer marketing staff, particularly when combined with our 31.5 inch OPS full HD TFT LCD panel display, the Axiomtek OFP321.

Figure 1: Intelligent digital signage system featuring the Axiomtek OPS871 digital signage player

When it comes to infrastructure, we realize that it can be challenging to build an efficient but adaptable environment given the accelerated pace of new devices, new usage models, increasing security risks, and expanding requirements for staff and support. Using OPS-compliant systems can help users get the right fit while reducing total cost of ownership (TCO), simplifying training, and delivering the best value.

➢ **Reliable OPS-Compliant Design and High Performance**

The high performance **OPS871** is based on the Mobile Intel® QM77 Express chipset and the 3rd Generation Intel® Core™ processor family manufactured with Intel's leading edge 22nm process technology. The **OPS871** is engineered for installation in any OPS-compliant display panel. It provides superb graphics performance, full HD content playback, and dual display capability. Equipped with the OPS871, users can run a large variety of DOOH (Digital Out Of Home) applications with ease. What's more, the included TPM 1.2 provides excellent protection for the system when used with security applications designed to use cryptographic keys to avoid data loss or breaches, malware, unauthorized network access or other security challenges. In addition to a random number generator, the TPM function also includes capabilities for remote attestation and sealed storage.

The OPS871, is connected to displays via a standardized JAE TX-25 plug connector supporting HDMI, Display Port, UART, and USB 3.0. A pluggable HDD tray and room for up to 8GB of DDR3 1600 SO-DIMM enable easy and versatile customization for a range of storage and performance. The OPS871 also supports one 10/100/1000Mbps Ethernet and USB 3.0 port to enable fast and efficient data computation and communication. One PCI Express Mini Card slot is equipped for an optional graphics-enhanced video card, wireless LAN card for 802.11 b/g/n and 3G/GPRS, or tuner/AV capture card.

Figure 2: Axiomtek's comprehensive OPS-compatible digital signage products (OPS series)

➤ **Advanced Intel® Active Management Technology (AMT) 8.0 for remote management**

The Axiomtek OPS871 includes Intel® AMT 8.0 for remote management capabilities. Using integrated platform capabilities and popular third-party management and security applications, Intel® AMT allows IT or managed service providers to better discover, repair, and protect networked computing assets, such as digital signage system. For embedded developers, this means that devices can be diagnosed and repaired remotely, ultimately lowering IT support costs. Intel® AMT is a feature of Intel® Core™ processors with Intel® vPro™ technology.

Of particular interest, Intel® AMT enables IT professionals to query, fix and protect networked embedded devices even when they're powered off, not responding, or have software issues. What's more, Intel® AMT helps perform remote asset tracking and checks for the presence of management agents virtually anytime. IT staff can also use Intel® AMT to remotely turn devices on and off to reduce energy consumption during non-peak operating times.

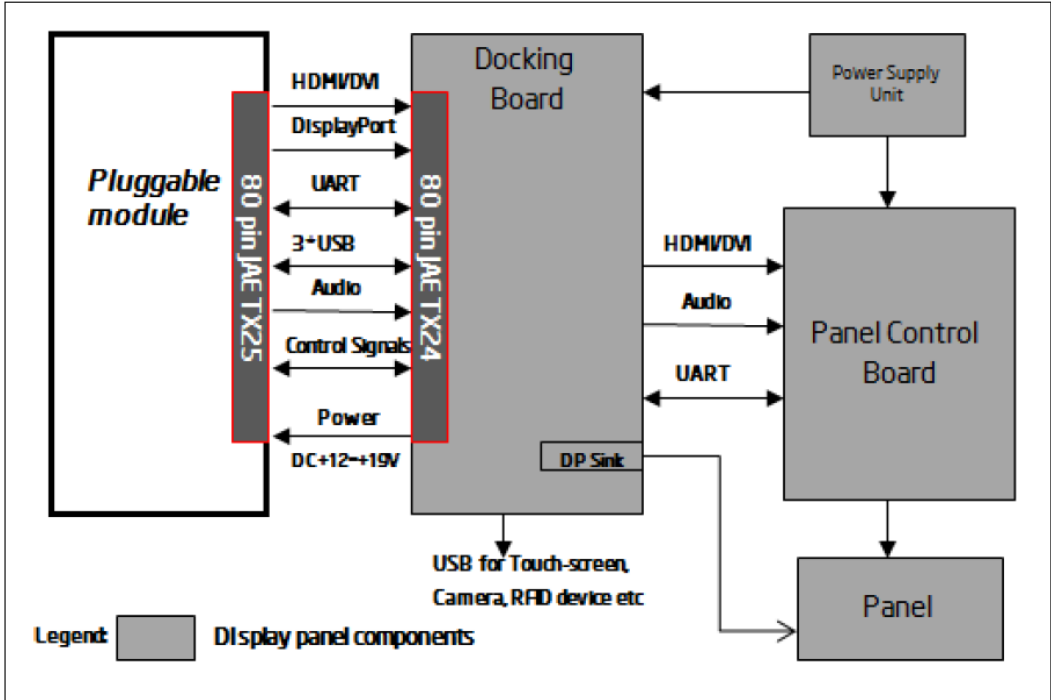## Integrating the OPS871 with the Display


Figure 3: OPS block diagram

An OPS-compatible digital signage system consists of 5 parts:

- **OPS-compatible media player module**
- **OPS-compatible digital display**
- **Integrated docking board**
- **Wide range temperature facilitator**
- **Power supply**

The OPS-pluggable module docks in a display panel system. In Figure 3, the module is docked and undocked in a horizontal direction. There are two system fans that drive room temperature air to enter the system through the vent holes at the back cover. For some applications where the operating environment may be below zero degrees, a heater can be included to warm up the system to start up. After the system starts, the heater will be stopped.

The power supply unit provides power both to the display and the player module. The player module relies on a pair of guide rails for docking and undocking, ensuring that the module's plug connector mates seamlessly with the docking board. OPS-compatible touch screens are available and, with appropriate software, work with the OPS871.

The signals between the pluggable module and docking board include: power, display interface (DVI-D/TMDS and DisplayPort), USB, UART and control signals. There are two ways to connect an OPS-compatible player module to the display panel. For a legacy design, the HDMI output is connected to an AD controller board which outputs the video to a display panel in the proper resolution. For OPS-compatible displays, the OPS's HDMI output is connected directly to the video board. The docking board gets the USB signals from pin 65 and 66 of the OPS JAE connector (see table 1), Touch-screen sensors also communicate directly through the docking board (see Fig. 4).
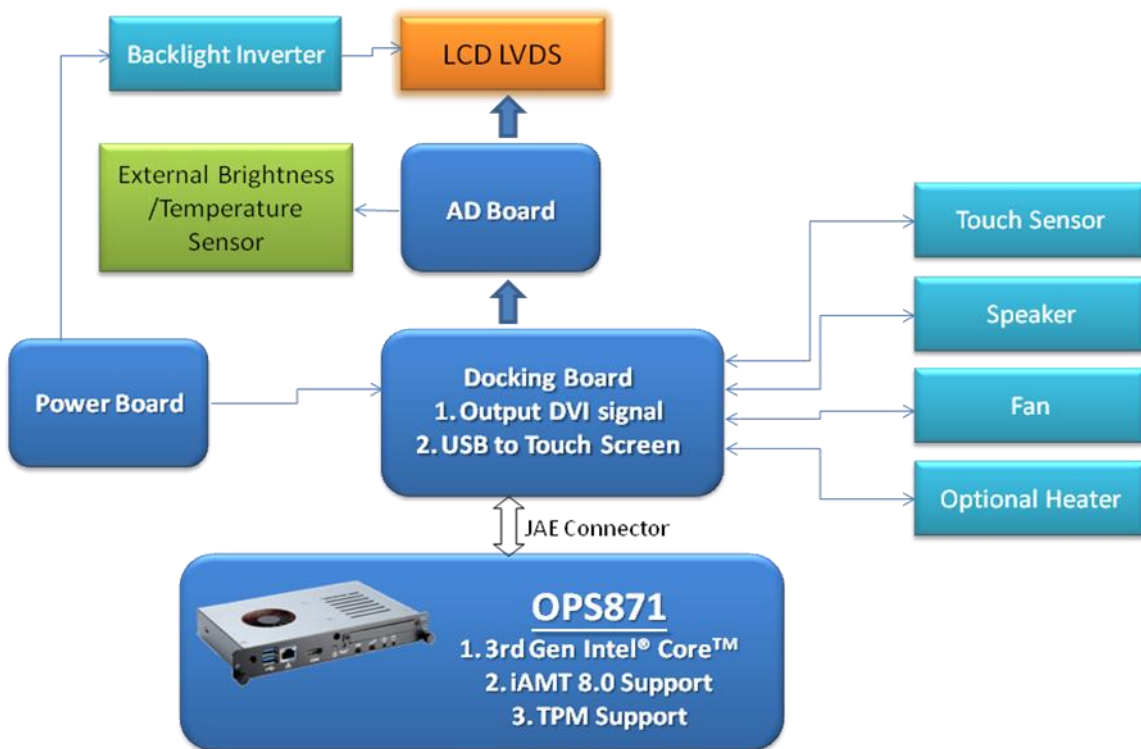
Figure 4: OPS-compliant digital signage system with touch screen

Intel® Active Management Technology in action

To deal with those times when units freeze with a "blue screen" or "system fault," the Axiomtek OPS871 platform offers a great solution: remote management and automation features enabled by Intel AMT. Using integrated platform capabilities and popular third-party management and security applications, Intel AMT enables technicians to remotely detect a system fault and use remote tools to recover the system without the expense of traveling to the machine. Even if the system does not respond, Intel® AMT provides a remote hardware power reset function to restart the system.

About Axiomtek Co., Ltd

Axiomtek Co., Ltd. is one of the world's leading designers/manufacturers of PC-based industrial computer products. From its roots as a turnkey systems integrator specializing in data acquisition and control systems, Axiomtek has mirrored the PC evolution in various industries by shifting its focus toward the design and manufacture of PC-based industrial automation solutions.

Axiomtek was established since 1990. It has over 400 employees in headquarters and over 150 employees in subsidiaries including USA, China, and Europe. More than 60 distributor partners around the globe have appointed. Axiomtek offers IPC, Embedded Boards and SoM, Rugged Embedded System and Platforms, Touch Panel Computers, Medical Panel Computers, Digital Signage & Displays, Industrial Networking & Converters, and Network Appliance product lines with more than 400 items.

Axiomtek is an Associate member of the Intel® Intelligent Systems Alliance. From modular components to market-ready systems, Intel and the 250+ global member companies of the Alliance provide the performance, connectivity, manageability, and security developers need to create smart, connected systems. Learn more at: Intel.com/go/intelligentsystems/alliance.

Intel is a registered trademark and Core and vPro are trademarks of Intel Corporation in the United States and other countries.

Appendix 1

OPS JAE connectors

Pin No	Signal	Description	I/O	Pin No	Signal	Description	I/O
40	+12V~+19V	Power	-	80	GND	Ground	-
39	+12V~+19V	Power	-	79	GND	Ground	-
38	+12V~+19V	Power	-	78	GND	Ground	-
37	+12V~+19V	Power	-	77	GND	Ground	-
36	+12V~+19V	Power	-	76	GND	Ground	-
35	+12V~+19V	Power	-	75	GND	Ground	-
34	+12V~+19V	Power	-	74	PWR_STATUS	PowerGood	OUT (OC)
33	+12V~+19V	Power	-	73	PS_ON#	Pluggable Signal ON	IN
32	GND	Ground	-	72	PB_DET	Pluggable Board Detect	OUT
31	HDMI_HPD	DVI/HDMI	IN	71	HDMI_CEC	HDMI CEC	I/O
30	HDMI_DDC_CLK	DVI/HDMI	I/O	70	AZ_UNEOUT_R	Audio-Rch	OUT
29	HDMI_DDC_DATA	DVI/HDMI	I/O	69	AZ_UNEOUT_L	Audio-Lch	OUT
28	GND	Ground	-	68	GND	Ground	-
27	TMDS2+	DVI/HDMI	OUT	67	USB_PP0	USB	I/O
26	TMDS2-	DVI/HDMI	OUT	66	USB_PN0	USB	I/O
25	GND	Ground	-	65	GND	Ground	-
24	TMDS1+	DVI/HDMI	OUT	64	USB_PP1	USB	I/O
23	TMDS1-	DVI/HDMI	OUT	63	USB_PN1	USB	I/O
22	GND	Ground	-	62	GND	Ground	-
21	TMDS0+	DVI/HDMI	OUT	61	USB_PP2	USB	I/O
20	TMDS0-	DVI/HDMI	OUT	60	USB_PN2	USB	I/O
19	GND	Ground	-	59	GND	Ground	-
18	TMDS_CLK+	DVI/HDMI		58	StdA_SSTX+	USB 3.0	OUT
17	TMDS_CLK-	DVI/HDMI		57	StdA_SSTX-	USB 3.0	OUT
16	GND	Ground		56	GND	Ground	-
15	DDP_HPD	DisplayPort		55	StdA_SSRX+	USB 3.0	IN

14	DDP_AUXP	DisplayPort		54	StdA_SSRX-	USB 3.0	IN
13	DDP_AUXN	DisplayPort		53	GND	Ground	-
12	GND	Ground		52	UART_TXD	UART 3.3V	OUT
11	DDP_0P	DisplayPort		51	UART_RXD	UART 3.3V	IN
10	DDP_ON	DisplayPort		50	SYS_FAN	System Fan Control	OUT
9	GND	Ground		49	RSVD	Reserved Pins	-
8	DDP_1P	DisplayPort		48	RSVD	Reserved Pins	-
7	DDP_1N	DisplayPort		47	RSVD	Reserved Pins	-
6	GND	Ground		46	RSVD	Reserved Pins	-
5	DDP_2P	DisplayPort		45	RSVD	Reserved Pins	-
4	DDP_2N	DisplayPort		44	RSVD	Reserved Pins	-
3	GND	Ground		43	RSVD	Reserved Pins	-
2	DDP_3P	DisplayPort		42	RSVD	Reserved Pins	-
1	DDP_3N	DisplayPort		41	RSVD	Reserved Pins	-

Table 1: Pin Definition of OPS module