Intel® Smart Display Module

Everything you need to know about Intel® Smart Display Module for Digital Signage

Digital signage technology companies have been on a steady quest through the years to reduce costs and complexity, but while engineering and design advances have resolved some issues, they've also introduced new complications.

Special-purpose media players and embedded system-on-chip smart displays have in recent years joined PCs as hardware options for digital signage projects. Now a relatively new option has emerged - an integrated module that takes the best of those newer options, but negates the problems they can otherwise present.

This white paper takes a look at how AUO and Intel® are collaborating on a new generation of hybrid smart displays that use the small, easily-swapped Intel® Smart Display Module (Intel® SDM) computing hardware.

ComQi
an AUO company

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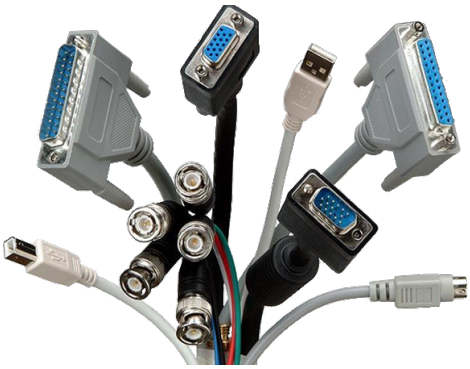
Many Parts, Much Complexity

Veterans across the digital signage industry know how putting together and running a screen network seemed a lot easier- before they actually tried it. They learned, through direct experience, that there are many parts, many considerations and variables, and many little and big things that can go wrong.

They also have many options to choose from, and decisions to make, about the best and most appropriate technology selections.



A basic digital signage system is managed over a cloud based network, and the end-points at locations most typically involve a display screen, connected by cables to a PC/media player and peripheral devices. The content management software usually has special playback software loaded on the PC/media player.

In the early days of signage, the big problems faced with PCs were hard drives or cooling fans that stopped spinning, which led to failure. Fanless, appliance-style PCs with solid state drives reduced failures, but could add a lot of additional cost.

Special-purpose media players that have shared engineering DNA with consumer streaming TV boxes have also come on the scene in recent years. There are exceptions, but most were found to be unsuitable and unreliable for the round-the-clock duty demands of digital signage networks. They are designed for periodic home use, not the 24/7 needs of busy retail or public environments.

The most recent innovation has been all-in-one "smart" displays that are commercial variations on smart TVs - with system-on-chip (SOC) computing devices built directly into commercial flat panels. The pitch: removing the need for external media player trims hardware costs and streamlines installations, because there are fewer parts, including cables.

The first smart displays arrived in the digital signage market in 2013, and since that time, most of the major commercial display manufacturers now make and market their own versions of SOC panels. Early versions were woefully underpowered, but as market demand has grown and the technology matured, the newer versions are more capable.

This new breed of displays seems ideal for signage, but that's not really the case.

All-In-One Issues

Think of a smart display as a very big tablet, or even as a giant smartphone. It's a big screen, with an SOC processor inside the enclosure handling instructions and graphic playback.

With a classic digital signage set-up, troubleshooting and repair involves getting at and possibly replacing a small media player that's most often attached in some way, out of view, to the rear of the screen. With a SOC-based smart display, if there's a problem with the SOC media player, that whole panel needs to come down, and likely be shipped to a repair depot. Even if it can be repaired on-site, it's complicated and time-consuming.

End-users who invest in SOC panels are also locking in on a moment in engineering time, for the anticipated five years or more of expected operating life. For some simple digital signage applications, computing power and graphical needs may never change. But as technology evolves, end-users can easily find themselves saddled with smart displays that are no longer smart enough for the content and capabilities of the network. That leaves them with two unpalatable choices: upgrade to newer smart displays or keep the existing ones and spend more money on external media playback devices.

The digital signage smart display ecosystem also has a big standardization issue - in that there is very little in the way of commonality. Two of the largest display manufacturers have competing, entirely different and proprietary operating systems. Several others work on different versions of the open source Android operating system - which is designed and optimized for smartphones, not digital signage displays and their software management platforms.

A blended network that may have the smart displays of multiple SOC manufacturers can be nightmarish to manage - because of a lack of compatibility, as well as differences between different versions (and capabilities) of individual platforms. What that means in real life is the content a network operator wants to run on all screens might only work on the newer ones.

Another wrinkle … if a network operator decides to change its content management platform, only a limited number of other software vendors are likely to support the smart displays that are already deployed. For example, a network operator who uses displays that run the Android operating system may like the capabilities of another software platform, only to learn it only works on LG's webOS smart sign platform.

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Intel® SDM – The Smart New Option

A decade ago, Intel introduced the first specification and standard for all-in-one displays, pre-dating the rise of SOC displays. The Intel's Open Pluggable Specification (OPS) was a reference design for full Intel-based PC modules that could be loaded into a slot on the rear or sides of commercial displays.

Space Optimized Intel® SDM-S

Credit card size
60mm x 100mm

Workload Optimized Intel® SDM-L

175mm x 100mm

The key selling point was the ability to easily swap modules on displays already installed in the field by a network operator. If the OPS unit failed, a spare could replace it in seconds by popping the old one out and docking the replacement. If content and presentation demands on the screen evolved, a newer OPS unit could upgrade the screen in moments, with minimal disruption.

Several display manufacturers developed OPS-compatible displays, but the emergence of SOC smart displays largely diverted industry interest in OPS.

Intel has responded with Intel® SDM - a Smart Display Module roughly one-third the size of the earlier generation OPS all-in-one modules. There are two versions of Intel® SDM - the Intel® SDM–S is not much larger in footprint than a credit card, and a larger one (Intel® SDM–L).

Like earlier OPS modules, these units slide and lock into the sides of compatible commercial display panels, without adding any additional bulk.

Intel® SDM units incorporate high-speed PCIe connectivity that effectively docks the modules. Unlike SOC displays that are locked in to specific media processors, Intel® SDM allows solutions providers, integrators and end-users to tune the smart displays to the network's demands. Multiple offerings span everything from entry-level Intel® Atom CPUs to powerful, high-demand Intel® Core™ processors. Intel® SDM modules are future-proofed for emerging requirements, such as 8K and video capture.

Using Intel® SDM also simplifies R&D for software companies delivering digital signage and other visual applications. The smart displays in the marketplace are all keyed to specific operating systems and versions of that operating system. By comparison, Intel® SDM supports Windows, Android and Linux.

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AUO's Simplified Hybrid

Display manufacturer AUO understands the varying demands of digital signage, supplying displays for networks and getting directly involved through its acquisition of the digital signage software firm ComQi.

Intel® SDM-S

Intel® SDM-L

AUO worked with Intel to develop a unique family of displays that are specifically tuned to Intel® SDM. A "hybrid slot" design is compatible with both the SDM-S & SDM-L models. That means network operators have no tangible restrictions on upgrades or replacements. A screen can start with the smaller module or the larger one, and if and when requirements change, a more powerful module can be slot-loaded, in seconds. No tooling. No extra parts or adjustments required.

AUO SDM Signage has standard industrial-grade 24/7-rated display models at 32, 43, 50 and 55 inches diagonal. Even with the Intel® SDM slot, the Full HD displays are just 5.3 mm thick. The new large format UHD 4K series - 55 and 85 inches will be available in late 2019.

AUO has also worked with Intel on SDM Video Wall Signage. The 24/7 rated displays - at 46 and 55 inches diagonal - supports using single-wire DisplayPort connections to achieve video walls as large as 10 wide by 10 high.

Smart Display Module READY

Hybrid SDM slot design

Ultra high resolution

High brightness

Stylish thin design

Long operational hours (24hrs/7days)

Portrait / landscape

The net result

- Scalable, future-proofed capabilities that allow easy upgrades and fast, simple maintenance;
- AUO's customers and partners have access to highly integrated digital signage display options, with flexibility in processors, peripheral devices, and operating Systems;
- Maximum flexibility for users who don't want to be restricted by operating systems or compromised by limited processing power;
- High reliability and cost effectiveness.

Problems Solved, Restrictions Gone

A truly smart display should not come with qualifiers. It shouldn't be smart enough for one task, but not for another. It also shouldn't limit a network operator to using one operating system, or just one version of an operating system.

Displays with Intel SDM and AUO's hybrid SDM optimize the opportunities presented by "smart" digital signage. They streamline installations, reduce capital costs and make installations and servicing fast and simple.

Most importantly, these smart displays don't force operators into choices they'll need to live with for the next three to five years. Requirements change. So do service providers. With SOC smart displays, those are potentially big and expensive problems.

With Intel® SDM –these problems disappear.
They're flexible, easy to work with, and as smart as they need to be.

"No one should be required to replace the most expensive aspect of digital signage, the display, when all that may be required is a simple upgrade to a small, but critical component – the media player. After all, it's the mind that powers your digital signage solutions and everyone's mind needs room to grow."

- Greg Galvin, SVP Technology and Solutions, ComQi

10 Reasons Why Intel® SDM Tops SOC

Compatibility
Plug and play design

Flexibility
Mix and match CPUs by need

Upgradeability
Changes take seconds

Reliability
Validated for commercial, industrial use

Serviceability
Remotely accessible, easy access on site

Security
Intel-grade hardware security

Stability
Rugged, simplified system design

Utility
Suits today's super-slim screens

Cost effectiveness
Buy based on needs

OS Options
Supports Windows, Linux and Android

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Email: pid.service@auo.com
PID.AUO.COM

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