Developments in Digital Signage Players

The evolution of media-player technology is allowing deployers to deliver captivating digital signage content from a small package.

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Digital signage continues to develop at breakneck speed, with changes driven by increased awareness in the market regarding the benefits of its use in applications such as retail, transport, hospitality and government.

Although estimates vary, according to Dallas-based research firm MarketsandMarkets, the global digital signage market is expected to grow from $14.6 billion in 2014 to $23.8 billion in 2020, a compound annual growth rate of more than 8 percent. Technological changes include advancements in displays as well as improvements in content management and delivery.

One of the key areas where digital signage has changed is in media players. Whereas years ago a digital signage deployment required a bulky computer with a high-powered graphics card for content delivery, limiting the placement of digital signage, many of today's media players are small enough to be mounted behind the display itself, opening up a wealth of new opportunities for screen placement.

As the size of those players shrinks, their power is increasing, allowing for the delivery of smooth, eye-catching content that can incorporate full-motion video and 3D graphics.

Seamless integration with HSA

To meet the demand for small, low-power digital signage players with powerful graphics capabilities, the industry has seen the advent of CPUs with built-in graphics processors from product manufacturers Intel, based in Santa Clara, California, and AMD, based in Sunnyvale, California. Those next-generation processors reduce the chip count, power consumption and heat production of computer systems, while increasing baseline graphics performance.

The trend received a boost in 2012 with AMD's introduction of its AMD Embedded R-Series accelerated processing units (APUs) — named not only for bringing graphics onto the processor die, but also for carrying a massive, discrete-class 384-core graphics engine, powerful enough to meet the needs of most digital signage deployers. The highly integrated architecture

of the AMD Embedded R-Series APU helped make attention-grabbing 3D graphics and smooth animation possible for digital signage.

AMD kicked its processors up a notch in 2014 with the introduction of its second-generation Embedded R-Series APU, designed to provide ultra-immersive, high-definition multimedia experiences and parallel processing computing performance. The new APUs, code-named Bald Eagle, deliver up to 66 percent more computing performance and up to 55 percent more 3D graphics performance than previous AMD Embedded R-Series APUs.

The APU uses the processing power of AMD's Steamroller CPU core and a new graphics core based on the AMD Radeon HD 9000 platform, offering next-generation performance-per-watt computing efficiency in the x86 product category by allowing system designers to take advantage of Heterogeneous System Architecture (HSA).

"When it comes to computing performance, graphics performance and performance-per-watt, the 2nd generation AMD Embedded R-series family is unique in the embedded market," Scott Aylor, corporate vice president and general manager of AMD Embedded Solutions, said in a news release. "The addition of HSA, [Graphics Core Next architecture] and power management features enables our customers to create a new world of intelligent, interactive and immersive embedded devices."

Before HSA, CPUs and GPUs were designed as separate processing elements and did not work together efficiently. Each had a separate memory space, requiring an application to copy data from CPU to GPU and back again.

HSA creates an improved processor design where applications can create data structures in a single unified address space and can initiate work items on the hardware most appropriate for a given task. The feature enables outstanding system performance and small, sleek form factors for a wide range of graphics and compute-intensive embedded applications.

Putting it into practice

A number of companies have incorporated Bald Eagle into digital signage applications, including Sunnyvale-based IBASE Technology and Korean manufacturer Samsung. The APU also is being eyed for applications ranging from slot machines to medical devices.

In the case of IBASE, for example, Bald Eagle anchors the company's SI-304 digital signage player.

The SI-304 features the highest memory bandwidth — 34.1 GB/s — available on any digital signage system without a discrete graphics processor,

Features of the SI-304 digital signage player

- iSMART — for EuP/ErP power saving, auto-scheduler and power resume
- Second-generation AMD Embedded R-Series APU (code-named "Bald Eagle"), up to 35W
- AMD Radeon HD 9000 series GPU
- 4x HDMI with 4096 x 2160 resolution per display output
- 2x DDR3-2133 SO-DIMM, dual channel, max. 32GB
- Dual Mini PCI-E(x1) slots for Wi-Fi, Bluetooth, 3G/LTE or TV tuner options
- Segregated flow ventilation design

Source: IBASE Technology

About the sponsor:

Focused on the design and manufacturing of industrial PC products, IBASE Technology Inc. was created by engineers with experience in industrial PCs. The company produces single-board computers, industrial motherboards, CPU modules, embedded systems and network appliances for different applications in the gaming, entertainment, automation, medical, military, networking and security markets.

IBASE is an associate member of the Intel Intelligent Systems Alliance, a global ecosystem of 200-plus member companies that provide the performance, connectivity, manageability and security that developers need to create smart, connected systems. Learn more at intel. com/go/intelligentsystems-alliance. Intel and Intel Core are registered trademarks of Intel Corp. in the United States and other countries.

according to IBASE. It also is equipped with solid-state drives for increased storage performance and reduced risk of mechanical failure.

In keeping with the tradition of previous IBASE media players, the SI-304 features a slim cast aluminum chassis with segregated flow cooling. Airflow through the system is kept in a separate channel and segregated from the electronics, preventing contaminants from affecting the reliability of sensitive electronics. In addition, the player incorporates dual air-moving impellers and can lose one and still function without overheating.

The SI-304 supports up to four independent HD 1080 displays via a quartet of HDMI ports. The displays can operate independently or be combined into a single logical display area using AMD's Eyefinity Technology. When combined in a 4x1, 1x4 or 2x2 array, they can function as a single 7680x1080, 1920x4320 or 3840x2160 display. And because they function as a "virtual" single monitor, there is no need for multiscreen support in the digital signage software used.

A major issue addressed by the SI-304 is the tendency of the Windows operating system to configure screens dynamically based on what actually is connected to the system. Although that can be convenient for PC users, it can be a disaster for digital signage.

If a display is powered off, is disconnected or simply malfunctions, it can cause a system to lose display configuration and trigger a Windows dialog box prompting the user to set up the screens. As a result, the entire deployment can fail.

To head off the problem, many providers choose to drive no more than one screen per digital signage player, ensuring that losing a screen for any reason will not affect other screens driven by the player. Although that solution effectively addresses the issue, it increases the cost of that deployment by the number of additional players needed.

Others have adopted a Band-aid solution in the form of dongles that fake the electronic display ID (EDID) data and the state of the connection from the system. They sit inline between the output and the screen; as long as the dongles are in place, the system will think that the screens are connected and function even when they aren't.

"The SI-304 features on-board EDID emulation, eliminating the need to adopt multiple players or a messy array of dongles," said Dwight Looi, director of product development for IBASE. "And unlike dongles, internal EDID emulators cannot be inadvertently disconnected or come loose, meaning an issue with one screen won't affect the others."