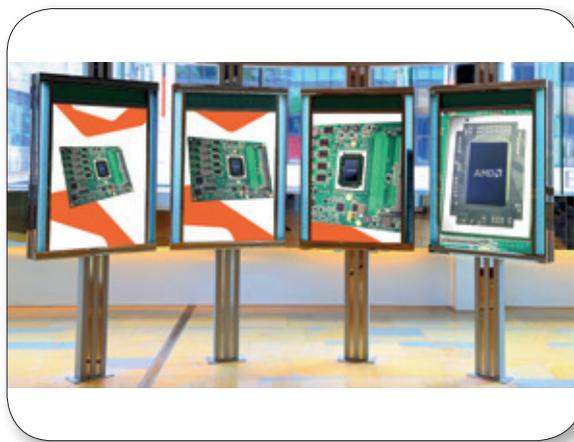


Graphics power for high-volume digital signage installations

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This article highlights the cooperation of semiconductor, computer module and display companies to create powerful digital signage systems at affordable cost.



■ Digital signage installations are no longer restricted to just a few prestigious applications that require ultimate graphics performance in order to deliver stunning visuals. These days, what matters is being able to offer appealing graphics performance at an attractive price in order to realize high-volume installations. The new AMD Embedded G-Series processors (codenamed Brown Falcon) and its attractive price point now open the door for the mass production of multiple range digital signage solutions.

When using x86-based embedded SoC graphics, it has to be AMD. There is no question about this in the embedded community, even among the fans of other processor makers. The AMD Radeon graphics is without doubt the greatest heavyweight compared to similar competitive solutions. Scalability up to high-end gaming graphics, comprehensive and always up-to-date support of the latest graphics CODECs, plus wide-reaching efforts to continually improve the visual experience of embedded computer applications make the AMD-R-Series processors the technology of choice for graphics-rich digital signage applications.

Perceptual computing, for example, enables us to interact with a system not just via keyboard, mouse or touch, but also through facial

expressions, gestures and speech. It is therefore possible to imagine digital signage solutions that can not only count pedestrians and recognize gender but also react to perceived moods. Vending machines might even get a face allowing customers to speak to it as if they were served by a kiosk attendant in person. Many other innovative applications for digital outdoor advertising (often called DOOH or Digital Out of Home) are conceivable thanks to such innovative technologies. This often requires the use of the GPU as a GPGPU and hence the support of heterogeneous system architectures. In this respect too, AMD leads over competing x86 vendors.

Another key aspect in many digital signage applications is cost. So what do you do, when the performance of the currently available AMD-G-Series processors (Steppe Eagle) is not enough, but the R-Series processors (Merlin Falcon) are too expensive? You choose the new AMD-G-Series processors (Brown Falcon), because they are designed to fill this performance gap. They were developed on the basis of the Excavator microarchitecture, which is also used for the new AMD-R-Series SoCs.

AMD has transferred all characteristics that are relevant for the basic structure and the overall performance of a system from the high-end R-Series processors to the new

G-Series processors. However, the feature set was thinned out in favor of a more cost-effective design, which also allows for slimmer and more energy-efficient designs. For example, the G-Series SoCs support only a dual-core version of the Excavator microarchitecture. But thanks to the new boost function, it can be enhanced with an extra shot of performance. This can continue until a specified surface temperature on the die is reached. This is especially important for single-threaded applications, commonly found in digital signage applications - for example in the use of HTML or other web-based content.

For extremely graphics-rich digital signage applications, the new graphics of the G-Series supports two monitors with now up to 4K resolution of 4096 x 2160 pixels at 60Hz. Compared to the previous G-Series, it provides approximately 30% more performance and supports the latest 3D features of DirectX 12 and OpenGL 4.4. This is made possible by the AMD Graphics Core Next (GCN) Generation 3 architecture. While support in the new G-Series SoCs is limited to a maximum of 4 compute units with 64 execution units each, this still adds up to 256 execution units. The G-Series also offers new features for video streaming, which is very important for digital signage applications. For instance, hardware-accelerated decoding of the latest and

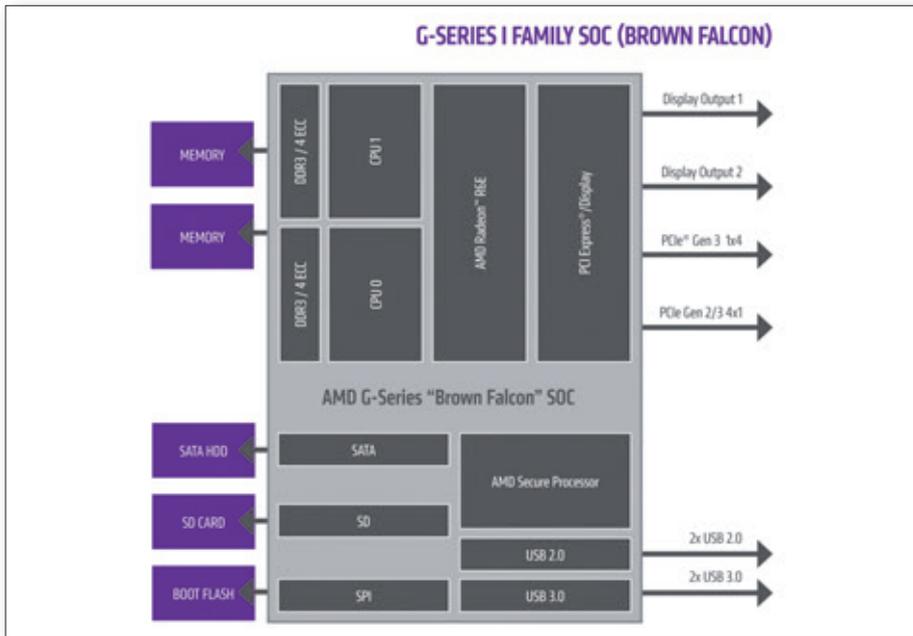


Figure 1. The new AMD G-Series SoCs are based on the powerful Excavator microarchitecture, which is also used for the new R-Series SoCs.



Figure 2. The new cong-a-TR3 COM Express Module with AMD Embedded G-Series SoC provides a convincing price/performance ratio.



Figure 3. Technagon covers the display technology, including safety glass and anti-reflective coating technologies.

most efficient performance-hungry H.265 codec is now supported. In addition, developers can use the integrated AMD Radeon graphics for GPGPU tasks related to perceptual computing, such as the analysis of live audio and video data. Full support of the recently adopted 1.0 specification for Heterogeneous System Architecture (HSA) makes this now easier than ever. With HSA compatible SoCs, developers need to code only once and can then use the same code on different platforms. This streamlines and simplifies programming and there is no need for adaptation to potentially varying heterogeneous resources. This makes dealing with different platform structures very simple. HSA also uses the same memory address space for CPU and GPU, which accelerates the data exchange. The processing power required from the software is automatically allocated to the most appropriate computing units. This leads to optimum performance at minimum power consumption.

Another innovation for the cost-optimized mid-performance range of embedded SoC processors is support of up to 32GB of dual-channel DDR4 RAM with ECC. DDR4 RAM is not only faster but also around 20% more energy-efficient than the previous DDR3 RAM, which has an additional positive effect on performance and power consumption. For applications that require a higher degree of operational safety, or that for instance are exposed to increased radiation, ECC memory modules can be used. This means that bit errors can be corrected automatically in RAM, which significantly increases the application reliability. As far as bandwidth is concerned, it is important to mention that PCI Express

Gen 3.0 is supported. This allows designers to double the data rate over PCIe 2.0 based designs with the same number of lanes. Compared to modules featuring the previous generation of AMD Embedded G-Series SoCs, the dual-core AMD GX 217GI processor provides up to 30% more graphics performance and 15% more overall system performance. At the same time, the maximum configurable TDP remains between 12 to 15 watts, the ideal range for fanless system designs.

congatec has made the new AMD G-Series available on COM Express modules that are also available with R-Series processors to provide a complete family. This makes the new module the first choice for many mainstream applications in the digital signage segment. OEMs also benefit from extremely high scalability up to quad-core performance in the 35 W TDP class that offers game console level graphics performance on up to three independent screens and top class GPGPU performance. Developing solutions ranging from the entry-level to high-end systems with only one module design becomes quick and easy. In the high-performance graphics seg-

ment the new conga-TR3 provides best pricing for high-volume applications. The new conga-TR3 COM Express Basic module with Type 6 pin-out is equipped with the dual-core AMD Embedded G-Series SoC GX-217GI processor with 1.7 GHz to 2.0 GHz and supports up to 32GB DDR4 memory, optionally with ECC. The new AMD Graphics Core Next (GCN) Generation 3 architecture controls up to two independent 4K Ultra HD displays @ 60Hz via DisplayPort 1.2 or HDMI 2.0. In safety-critical applications, the integrated AMD Secure Processor provides hardware-accelerated encryption and decryption of RSA, SHA and AES.

The new computer module supports COM Express pin-out Type 6 with 1x4 PCIe 3.0, 1x PEG, Gigabit Ethernet, 4x USB 3.0 / 2.0, 4x USB 2.0, SPI, LPC plus I²C, SDIO and 2x UART. Operating system support is offered for Linux and Microsoft Windows 10, Windows 8.1 and, optionally, Windows 7. Embedded Design and Manufacturing Services for custom carrier boards and a wide range of accessories to facilitate design-in are also offered. As part of its Embedded Design and Manu-

facturing (EDM) Services congatec offers its customers everything OEMs need. The spectrum ranges from the development of custom carrier boards to complete digital signage systems, which congatec realizes with partners such as Technagon. congatec EDM Services start in the design phase with requirement engineering. Services include the development of all specific embedded hardware as well as the required low-level software such as BIOS/UEFI, driver and OS images, ensuring perfect integration into the customer-specific application. Together with the production-ready components from Technagon, full advertising and information systems are designed for optimum manufacturing, both from a technical and economic point of view. Among other things, Technagon covers the display technology, including safety glass and anti-reflective coating technologies required for locations that are prone to vandalism or direct sunlight. The service also covers the entire production cycle and system integration, with the option of including certification and global logistics for delivery at the customers of the customer. OEM customers also benefit from technical system support. ■