APUs GAIN MOMENTUM IN EMBEDDED

APUs STRIKE BALANCE FOR PORTABLE DEVICES

SMART CAMERAS GETTING SMARTER

EXCLUSIVE INSIDE: READY TO GO EMBEDDED DESIGNS
**Gaming System ACE-S7400**

- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- Digital inputs and digital outputs with Micro Fit 3.0 connector
- 2 x cTalk
- 2MB Battery back up SRAM
- Timer & Meter pulse generator, counters
- Intrusion Logger
- Storage: 2 x CF connectors

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**COM Express Module Express GFC**

- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- 2xSO DIMM DDR3 800/1066 MHz of memory up to 8GB
- Realtek ALC883, 2/4/5.1/7.1 HD sound channel
- 1 x Realtek 8111C, 10/100/1000M, support PXE boot
- 8 x USB 2.0, 6 x UART, 2 x MINI_PCIE x1
- SATA I, xSPDIE2 x Parallel, 1xPCI, PCIe x1
- 1 x HDMI, 1x VGA, 1 x RJ45, 1 x AUDIO, 4 x USB
- Mini-ITX 170*170mm, DC Power 12~24 VDC/5A (Optional)

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**MiniITX Single Board Computer AA55E-IF**

- AMD Embedded G-Series Platform
- SODIMM, 4GB, DDR3 non-ECC, 1x, 1333/1066/800

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**Digital Signage Player ARK-DS306**

- AMD Embedded G-T40N APU
- with AMD Radeon™ HD 6290 Graphics AMD A50M Controller Hub
- Dual display: HDMI/VGA
- Built-in Mini PCIe slot
- Supports 2 GLAN, HD audio, I/O interface
- with 2 x COM, 2 x USB
- 1 x 2.5” SATA HDD drive bay, 1 x Fast slot
- Supports VESA mounting (Optional)

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**MI/O Extension SBC MIO-5270**

- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- 1 x DDR3 memory support up to 4 GB
- Multiple display: 48-bit LVDS, HDMI, VGA
- 2 GB, support, HD Audio, Rich I/O interface
- with 4 COM, 2 SATA, 6 USB and GPIO
- Supports embedded software APIs and Utilities

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**MiniITX Single Board Computer AIMB-223**

- AMD Embedded G-Series Platform
- One 204-pin SODIMM up to 2 GB DDR3 1333 MHz SDRAM
- Supports VGA/LVDS/HDMI
- Dual LANs, 6 COM, Mini PCIe, and CFast
- Supports embedded software APIs and Utilities

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It was just over a year ago that AMD announced the AMD Embedded G-Series platform, the first APU for embedded applications. At that time there was a lot of anticipation around the new applications that would be able to take advantage of the combination of low power and high performance that the APU delivers for the obvious reason of enabling low power applications with exceptional discrete-class graphics performance, but also for the additional performance that can be realized by leveraging the heterogeneous architecture of the APU for parallel processing applications.

For those of you who are coming in late and just now learning about APUs, APU stands for Accelerated Processing Unit, which combines both x86 processing cores and discrete-level graphics processing units on a single die. But these APUs go beyond just a combination of a CPU and GPU like other solutions. They earned the name APU by making the GPU fully programmable through open and royalty-free programming standards for general-purpose computations that are developing around them, such as OpenCL™. These programming standards allow programmers to preserve their expensive source code investment and easily target and port code between multi-core CPUs, GPUs, and APUs.

Since these solutions are x86 compatible, adopting hardware that supports this technology for an existing application is easy, and board and system level solutions are available in a large variety of form factors to replace the CPU-based motherboard in your application. You can easily upgrade your motherboard to an APU-based motherboard that will deliver exceptional graphics performance per watt. This is where things get exciting...designers have found that through the heterogeneous architecture and the parallel processing capabilities of the APU they have been able to significantly increase their system performance for computation or data intensive applications, without adding significant additional power or cost to the system.

We are already seeing the application of heterogeneous processing solutions in small form factor and low power applications such as smart cameras that are now able to run a full PC operating system and deliver up to 90 Gflops of performance, where previous generations only had 2-3 Gflops of performance. In medical imaging, parallel processing has been used to accelerate the FDK algorithm, which is widely used for tomographic reconstruction of X-ray CT scanner data, and similar approaches are being investigated for applications such as portable ultrasound devices. To improve analytics and automation in digital signage and surveillance applications, companies are working on algorithms to identify whether the subject or audience is male or female and whether it is a child or an adult, and they are investigating parallel processing as a way to enable these algorithms to be run on low power and low cost processing solutions, which could enable them to be easily integrated into a camera or display. And companies are investigating whether programmable parallel processing solutions can be used to replace DSPs in telecommunications and mobile radar imaging.

So for designers who are looking for innovative new approaches to beat their competition, or to simply meet their customers increasing requirements, we are happy to share with you a variety of hardware solutions that are available through our embedded solution partners with support for AMD Accelerated Parallel Processing Technology and some examples of where the AMD Embedded G-Series platform is making a difference for embedded applications.
Semi-Industrial Mini-ITX Motherboard SIMB-M22

- AMD Embedded G-Series Platform
- AMD A55E Controller Hub
- Fanless design
- Dual display: HDMI, VGA, 18-bit single channel LVDS, eDP (optional)

Advantech
PHONE (949) 789-7178
FAX (949) 789-7179
EMAIL ECGinfo@advantech.com
WEB www.advantech.com/embcore

Custom Gaming Motherboard GA-2200

- AMD Embedded G-T56N APU
- with AMD Radeon HD 6320 Graphics
- Also supports AMD G-T44R with AMD Radeon HD 6250
- 10 x COM, 2nd RTC and NVRAM

AEWIN Technologies Co., Ltd.
PHONE +886-2-8692 6677
FAX +886-2-8692 6655
EMAIL sales@aeWIN.com.tw
WEB www.aeWIN.com.tw

Gaming System SGA-2200

- AMD Embedded G-T56N APU
- with AMD Radeon HD 6320 Graphics
- Also supports AMD G-T44R with AMD Radeon HD 6250
- 10 x COM, 2nd RTC and NVRAM

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WEB www.aeWIN.com.tw

Networking Appliance SCB-6977

- AMD Embedded G-Series Platform
- One SO-DIMM up to 4GB DDR3 1066MHz SDRAM
- Max 6 GbE ports via PCIe x1
- Robust 1U with USB 2.0, 2.5” SATA HDD bay, CF socket, Minicard slot and Console port
- Built with long-life AMD Embedded components
- RoHS compliant

AEWIN Technologies Co., Ltd.
PHONE +886-2-8692 6677
FAX +886-2-8692 6655
EMAIL sales@aeWIN.com.tw
WEB www.aeWIN.com.tw

Industrial Tablet WA-10

- AMD Embedded G-T56N APU
- with AMD Radeon HD 6320 Graphics
- Memory: SODIMM, 2GB, DDR3

Amtek System Company
PHONE +886-2-26492212#133
FAX +886-2-26492363
EMAIL ch.chang@amtek.com.tw
WEB www.amtek.com

Industrial Computer iGO-700

- AMD Embedded G-T40N APU
- with AMD Radeon HD 6250 Graphics
- AMD A55M Controller Hub
- DDR3-1066, one SO-DIMM
- Supports four PCIe Port
- Supports two Gb Ethernet Port
- Supports four SATA Port
- Supports two COM Port
- VGA Display by independent Display Card

ANOVO
PHONE +44 (0)161 654 1400
EMAIL contact@anovo.com
WEB www.anovo.com
**Digital Signage**

**DE35-HD**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- High Performance: Full HD 1080p content playback
- Multi display capability via Displayport
- DDR3 800/1066 MHz up to 8GB
- A xSFF compact size of 166mm x 157mm x 48mm
- Support for one 2.5” S-ATA III HDD
- USB 3.0, DVI support DVI+VGA, Displayport, COM port, LAN

**AOpen Inc.**

PHONE +886-2-7710-1195
FAX +886-2-7710-1187
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WEB www.aopen.com

**Panel PC**

**APC-18**
- AMD Embedded G-T40E APU
- with AMD Radeon™ HD 6250 Graphics
- 18” Projected Capacitive Multitouch Screen
- 1 GBE, 2W Amplifier
- 1 CF, 2 USB, 1 COM, 1 Mini PCIe
- Wide Voltage 12V~28V Input, ErP Power
- Over Current & Surge Protection
- Backlight controlled by PWM, Timer-Power-on
- Programmable Function Key

**Avalue Technology Inc.**

PHONE +886-2-8226-2345
EMAIL sales@avalue.com.tw
FAX +886-8226-2777
WEB www.avalue.com.tw

**3.5” Single Board Computer**

**ECM-A50M**
- AMD Embedded G-T40N APU
- with AMD Radeon™ HD 6290 Graphics (Optional G-T56N APU)
- AMD A50M Controller Hub
- One 204-pin DDR3 SODIMM Socket
- Supports Up to 4GB DDR3 1066 SDRAM
- Dual View, 2-CH LVDS, CRTC, HDMI
- 7-1 CH Audio, Dual GbE
- 1 CF, 2 SATA, 2 COM, 7 USB, 16-bit GPIO

**Avalue Technology Inc.**

PHONE +886-2-8226-2345
EMAIL sales@avalue.com.tw
FAX +886-8226-2777
WEB www.avalue.com.tw

**5.25” Single Board Computer**

**EBM-A50M**
- AMD Embedded G-T40E APU
- with AMD Radeon™ HD 6250 Graphics
- Fan-less (Optional G-T56N APU/ with fan)
- With AMD Radeon™ HD 6250 Graphics or Optional AMD Radeon™ HD 6320 Graphics
- AMD A50M Controller Hub
- Onboard 2GB DDR3 1333 SDRAM, One 204-pin DDR3 SODIMM Up to 4GB DDR3 1333 SDRAM
- Dual View, 2-CH LVDS, HDMI
- 7-1 CH Audio, Dual GbE, 2W Amplifier
- Two Mini PCIe Slots, Optional Supports mSATA
- 1 CF, 2 SATA, 6 COM, 8 USB, 16-bit GPIO
- +12V - 28V Wide Voltage Power Input
- ErP/ErP 2.0 compliant

**Avalue Technology Inc.**

PHONE +886-2-8226-2345
EMAIL sales@avalue.com.tw
FAX +886-8226-2777
WEB www.avalue.com.tw

**COM Express Module**

**ESM-A50M**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- Also supports AMD G-T40E APU with AMD Radeon™ HD 6250
- AMD A50M Controller Hub
- Two 204-pin DDR3 SODIMM Up to 8GB DDR3 1066/1333 SDRAM
- Dual View, Dual-Channel 18/24-bit LVDS
- GbE
- 4 SATA, 8 USB, 8-bit GPIO
- Pin-out Type 6
- TPM (Support Version 1.2)

**Avalue Technology Inc.**

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**Industrial Panel PC**

**LPC-08/10/12/15/17**
- AMD Embedded G-T40E APU
- with AMD Radeon™ HD 6250 Graphics
- 8”/10”/12”/15”/17” 5-wire Resistive Touch Screen
- VGA/HDMI, Audio, GbE, optional WiFi
- 1 CF, 2 COM, 4 USB
- Fanless operation, VESA Compliance
- IP 65/66 Compliant Front Panel
- High Brightness, Anti-scratch Panel (option)
- Compatible installation/mounting Accessories

**Avalue Technology Inc.**

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High-Octane Distributed Computing Fuels Intelligent Highways

In the effort to modernize the nation’s transportation infrastructure, the idea of the intelligent highway is gaining ground. This will entail high-speed communication among vehicles, between vehicles and the highway system, and high-speed data capture. Units will have to be powerful, rugged and small.

by Kelly Gillilan, AMD

The intelligent highway expands and gains speed each year. To fuel the expansion, the U.S. Department of Transportation (USDOT) has an Intelligent Transportation Systems (ITS) research program focused on intelligent vehicles, intelligent infrastructure and the creation of the intelligent transportation system. The USDOT’s five-year plan is designed to achieve a vision of a national, multi-modal surface transportation system that features a connected and distributed transportation environment among vehicles, the infrastructure and passengers’ portable devices. This environment leverages computing technology to maximize safety, mobility and environmental performance. Traditional desktop and server computing platforms do not meet these needs, thus opening the door for processors, boards and systems developed for embedded applications. For a list of some of the research topics under investigation, see “A Partial List of Intelligent Transportation System Research Projects,” p. 7.

Countless needs that require vehicles to communicate and interact with each other and with their surroundings exist in the intelligent highway. Real-time, distributed computing through computer networks is widely used in vehicle location, cargo tracking and highway monitoring. The key applications currently under study by the USDOT require distributed computing systems, creating very interesting opportunities for embedded computing platforms.

Distributed computing systems intended for use in transportation systems have many challenges to overcome. Computing platform size, weight and power (SWaP), the operating environment where the computing platform must operate, easy to use man-machine interfaces, interoperability between systems, and the computing platform’s life cycle cause the biggest headaches. Transportation applications tend to be mobile, making the computing platform’s size, weight and power (SWaP) very critical in the decision process. Space is limited, especially in vehicles, so systems must be compact. Power is often from batteries, solar panels and alternate energy sources, so low power is critical.

Computing platforms in transportation systems frequently get deployed in harsh outdoor environments exposed to the elements or in moving vehicles. Here they must tolerate extended temperatures from -30° to 60°C and humidity up to 100 percent. In essential computing systems cooling fans may not be allowed. For devices on the move, shock and vibration become an integral part in the equation. Reliability is a must in all cases.

Perhaps the single biggest challenge is the interface between the computing elements and humans. Transferring data between the distributed elements in the computing network is relatively easy work compared to getting the data to the humans that interface with the computers. Many devices need to visually present data to humans, easing their use and information sharing. Making the man-machine interface easy and intuitive to use is very difficult, especially when safety is a major concern. Driver distraction is a major issue when it comes to highway safety.

Component qualification can take a very long time when changes occur to a platform. The cost to re-qualify can be very high, causing resistance to many changes. This requires designers to use parts committed to long product life cycles where ten years is not uncommon. Many parts in a distributed transportation system live on different refresh cycles making changes even more challenging.

Mobile applications have common problems: limited space and little power available for computing elements, high demands on the processing elements, and challenging human interface requirements. The stationary elements may not be as limited in space and power, but restrictions exist, and the performance and interface issues remain the same. Combined, both the mobile and stationary elements need to communicate effectively in a distributed computing environment.

Paving the Road

Computing platforms suitable for vehicles or nodes on the intelligent highway
exist from processors to computer boards. Finding the right processor family with the right balance between processing performance, power consumption, user I/O and supplier life cycle support means doing some serious homework. It is not hard to find processors with the necessary computing power, but it usually means increased electrical power consumption. Or the processor may require one or more bridge or I/O chip to solve the I/O challenges, making the design more complicated or more expensive. Sometimes the right processor does not have the proper supplier support for long product life cycles, making future product support to be very difficult to manage. Most processors require additional chipsets to provide the needed I/O and graphics capability leading to increased costs, design complexity and power consumption.

The AMD Embedded G-Series APU is a suitable choice for applications that depend on graphics output for the man-machine interface. This processor combines a low-power CPU and a discrete-class graphics processor unit (GPU) into a single embedded accelerated processing unit (APU). The APU integration reduces the footprint from a traditional three-chip platform to two chips, the APU and its companion controller hubs, the A55E or A50M. This simplifies the design, requiring fewer board layers and a smaller power supply, further driving down system costs, making it possible to utilize the Embedded G-Series APU on very small board form factors (Figure 1).

Today’s high-definition displays can benefit from the advanced graphics and hardware acceleration that delivers over 3X the performance per watt over previous generation AMD processors. DirectX 11 support delivers the graphics performance; 3D visual effects and dynamic interactivity can make information stand out on the display. The advanced discrete-level GPU with OpenGL 4.0 and OpenCL 1.1 support ensures that the platforms using this processor support future designs. OpenGL with its 2D and 3D graphics application programming interface (API), provides a
broad set of rendering, texture mapping, special effects and other powerful visualization functions that ease the man-machine graphics development.

Innovative designers can leverage the GPU computing power of the APU to do things such as accelerate data calculations, manipulate GPS coordinates, encrypt data to improve security, and even use them for facial recognition to improve access security. The graphics capability makes the Embedded G-Series a natural for applications with digital maps. Interconnecting to a display is easy to accomplish with multiple display options for DisplayPort, HDMI, DVI and VGA, and it still includes support for system integrated LVDS displays or eDP support for the latest generation of integrated LCD displays.

Several board level platforms based on the Embedded G-Series APU can speed time-to-market, reduce design risk and allow the system developer to focus on core competences and value add that directly benefit the final application. Board level products can also integrate additional functionality that may be needed in the application. Many board level products have additional I/O interfaces such as CAN bus, widely used in vehicles. Specialized packaging for fanless operation and rugged environments can be obtained from many suppliers. Board form factors such as COM Express, Nano or PicoITX, EBX, EPIC and many others should be considered. The extensive board and system options available using the AMD Embedded G-Series platform make it easy to find a form factor appropriate for vehicle or stationary applications.

Some applications run better under a real-time operating system instead of Windows. A real-time operating system is generally more stable in demanding conditions, more responsive and more secure. The AMD Embedded G-Series has choices beyond Windows with Linux, Express Logic’s ThreadX and Green Hills’ Integrity available to the software development team. For applications that simply require a reduced version of Windows, a Windows Embedded Compact 7 board support package is available.

Where the Rubber Meets the Road

Distributed computing systems can be found in many applications in transportation. Delivery systems have a wealth of data that must be collected and processed to improve the collection and goods delivery. Truck fleets travel from farm to farm collecting perishable milk before returning to the dairy. Freight haulers move from major ports to distribution centers and on to retail stores delivering merchandise. Delivery systems benefit from knowing key information about the items being collected or delivered; the quantities, conditions, location and special handling instructions for material make the system more effective. Having this information available in real time can reduce costs associated with the process. Frequently, embedded computing systems using modified laptops that cannot handle the operating environments, get placed in the vehicles or the intelligent highway in order to put a quick solution in place. Equipment cost leads the reasons for using laptops, but hidden costs from failures and inadequate interfaces can make the true cost much higher than expected. Using laptops also leads to frustration with reliability and equipment durability. Embedded computers packaged to operate in the mobile environment but with the robust graphics capability found in the latest PC technology, can operate where laptops dare not be used.

The graphics capability in the Embedded G-Series APU makes it efficient and cost-effective to implement man-machine interfaces that can be used in either the vehicles or dispatch centers, enabling a unified platform across the network. The low-power multicore processor options, extensive I/O connectivity, PCI Express expansion and 7-year planned availability make the AMD Embedded G-Series an ideal catalyst for the intelligent highway.

Advanced Micro Devices
Sunnyvale, CA.
(408) 749-4000.
[www.amd.com]

Panel PC
MPC-10/21
- AMD Embedded G-T40E APU
- with AMD Radeon HD 6250 Graphics
- 10.1”/21” 5-wire resistive touch panel
- GLB, Audio, Amplifier
- 1 CF, 1 COM, USB
- Optional 1.3M Camera, WiFi Module
- Wide Voltage, 12V-28V Input, ErP Power
- Timer Power on, Fanless operation, VESA Compliance
- Compact, Slim Bezel Design

MiniITX Single Board
Computer
EMX-A55E
- AMD Embedded G-T56N APU
- with AMD Radeon HD 6320 Graphics
- Also supports AMD G-T40N APU with AMD Radeon HD 6250
- AMD A55E Controller Hub
- One 204-pin SODIMM Socket Supports Up to 1GB DDR3 1066 DDRAM
- Dual View, HDMI, VGA, 18-bit Single-channel LVDS
- Realtek ALC892 Supports 7.1 CH HD Audio
- Realtek RTL8111F 10/100/1000 GbE
- 1 PCIe x1, 1 Mini PCIe, 1 CFast
- 5 SATA 3.0, 4 COM, 8 USB, 8-bit GPIO
- RAID 0, 1, 5, 10 Support

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FAX +886-2-8226-2777 WEB www.avalue.com.tw
Panel PC PPC-15/17/18/21
- AMD Embedded G-T40E APU
- with AMD Radeon® HD 6250 Graphics
- 15”/17”/18.5”/21” 5-wire resistive Touch panel
- 1 GbE, Audio, 2W Amplifier
- 1 CF, 2 USB, 1 COM, 1 mini PCIe
- Wide Voltage 12V-28V, ErP Power
- Over Current & Surge Protection
- Backlight controlled by PWM, Timer-Power-on
- Programmable Function Key
- Fanless Operation, VESA Compliance

Panel PC FPC-08/10
- AMD Embedded G-T40E APU
- with AMD Radeon® HD 6250 Graphics
- 8.9”/10.1” 5-wire resistive Touch panel with LED backlight
- VGA, Audio, GbE, 1 CF, 2 COM, 3 USB
- -10°C to 60°C Wide Working Temperature
- Fanless Operation, VESA Compliance
- IP-65 compliant Front Panel

Medical Panel PC MTP-12
- AMD Embedded G-T40E APU
- with AMD Radeon® HD 6250 Graphics
- 12.1” Shatterproof Touch Panel
- GbE, 2x2W Speakers
- Mini PCIe, 1 CF, 1 COM, 2 USB
- Optional 2M Camera, MSR, VoIP & Barcode Scanner
- Wide Voltage 12V-28V Input, ErP Power
- IP-65 Compliant Front Panel & IPX1 Top Side
- Anti-bacteria Plastic housing, Fanless, Timer-Power-on

COM Express Module ERS-A50M-56N
- AMD Embedded G-T56N APU
- with AMD Radeon® HD 6320 Graphics
- AMD A50M Controller Hub
- One 204-pin DDR3 SODIMM Up to 4GB DDR3 1066 SDRAM
- 1 mSATA, 1 CF, 1 SSD
- Dual GbE, 7.1-CH Audio
- 1 VGA, 1 HDMI, 2 COM, 6 USB
- Service Windows, Easy to Install HDD/ SSD and Memory
- Operating Temperature -10 ~ 50°C, Ambient w/ Air Flow

Rugged Panel PC SPC-12/15/17/22
- AMD Embedded G-T40E APU
- with AMD Radeon® HD 6250 Graphics
- 12.1”/15”/17”/22” 5-wire resistive, high-brightness touch panel
- 1 GbE, 1 COM, 3 USB
- Membrane Power Button
- Wide Voltage 12~28V Input, ErP Power
- Over Current & Surge Protection
- Backlight Controlled by PWM/BIOS/API
- Power on Timer
- Water-proof cable/accessories for option

Industrial Computer EPC-A50M-56N
- AMD Embedded G-T56N APU
- with AMD Radeon® HD 6320 Graphics
- AMD A50M Controller Hub
- One 204-pin DDR3 SODIMM
- Up to 4GB DDR3 1066 SDRAM
- Dual View, VGA and HDMI
- Dual GbE, 7.1-CH HD Audio
- 1 CF, 1 SATA, 2 COM, 4 USB
- Supports mSATA, 2.5” SATA HDD
- VESA Compliance
**Industrial Computer**

**eBOX620-110-FL**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- AMD Radeon™ HD 6250, AMD Radeon™ HD 6310
- SODIMM, 2GB, DDR3, 1x, 1333/1066/800

**NanoITX Single Board Computer**

**NANO100**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub

**NanoITX Single Board Computer**

**NANO101**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub

**PicoITX Single Board Computer**

**PICO100**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Power Consumption: 8W
- SODIMM, 4GB, DDR3, 1x, 1066/800

**COM Express Module**

**conga-BAF**
- AMD Embedded G-Series Platform
- Single channel up to two 4 GB
- DDR3 SO-DIMM memory (up to 1066 MHz)

**ETX Module**

**conga-EAF**
- AMD Embedded G-Series Platform
- AMD A55E Controller Hub
- Power Consumption: 9-18W
Qseven Module
conga-QAF

- AMD Embedded G-Series Platform
- Up to 4 GB of low power DDR3 memory and up to 32 GB solid state Disk

congatec Inc.
PHONE (858) 457-2600
EMAIL sales-us@congatec.com
WEB www.congatec.us

XTX Module
conga-XAF

- AMD Embedded G-Series Platform
- AMD A55E Controller Hub
- Power Consumption: 9-18W

congatec Inc.
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3.5” Single Board
Computer
OT951-DT56N

- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- AMD A50M Controller Hub
- SODIMM, 8GB, DDR3 non-ECC, 1x, 1333/1066/800
- CompactFlash

DFI
PHONE (916) 568-1234
EMAIL sales@dfitech.com
WEB www.dfi.com

Digital Signage
Player
DS910-OT

- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- SODIMM, 4GB, DDR3 non-ECC, 2x, 1066/800

DFI
PHONE (916) 568-1234
EMAIL sales@dfitech.com
WEB www.dfi.com

Digital Signage
Player
DS912-OT

- AMD Embedded G-Series Platform
- AMD A50M Controller Hub (for Embedded OS)

DFI
PHONE (916) 568-1234
EMAIL sales@dfitech.com
WEB www.dfi.com

MiniTX Single Board
Computer
D3003-S

- AMD Embedded G-Series Platform
- HDMI on board
- Dual GigE LAN on board
- Serial ATA III RAID on board
- mSATA socket support (for Embedded OS)
- USB 2.0 on board
- 8 Bit GPIO on board
- Embedded TPM V1.2 on board
- Designed for fanless operation
- Mainboard ready for EuP

Fujitsu Technology Solutions
PHONE (01805) 372 100
EMAIL oem-sales@ts.fujitsu.com
WEB ts.fujitsu.com/mainboards
Accelerated Processing Units Strike the Ideal Balance of Form, Function, and Power Consumption for Graphics-intensive Portable Devices

by Christine Van De Graaf, Kontron America

Achieving high levels of graphics and video performance for portable, small form factor systems is extremely difficult when utilizing conventional CPU and discrete GPU processor architectures. With the recent advent of Accelerated Processing Units (APUs), designers are equipped to break this graphics barrier without giving an inch – literally – in board space.

Ongoing innovation in the x86 semiconductor industry is the foundation for the nearly ubiquitous use of x86 embedded computing technology in an ever-growing range of Small Form Factor (SFF) applications. Even with continued improvements in CPU performance and power efficiency, however, designers of SFF portable systems remain challenged to achieve their most ambitious design goals centric to graphics performance and visual immersion. Growing demand for higher performance graphics capabilities has led OEMs to explore new x86 processor architectures that promise to meet exacting multimedia performance requirements for applications spanning commercial, medical, and industrial domains, with a growing focus on portable and/or battery-powered devices.

Embedded boards and modules equipped with new-generation Accelerated Processing Units (APUs) can facilitate advanced graphics capabilities within an extremely small footprint without compromising power and cooling efficiency or cost. The merging of advanced x86 computing capabilities with the parallel processing power of a General-Purpose Graphics Processing Unit (GPGPU) in a single device allows OEMs to design low-power, graphics-intensive SFF systems that until now had been the exclusive domain of power-hungry multicore CPUs and add-on graphics cards.

The Evolution to Increasingly Intense Graphics

Graphics-driven applications are accelerating the pace of innovation for portable, energy-efficient SFF systems. Applications spanning digital signage, information terminals, point-of-care medical imaging and diagnosis, and industrial applications are evolving to offer advanced graphics performance, but in many cases are constrained by conventional CPU and discrete GPU processor architectures. Here we’ll look at each of these applications individually and address some of their unique design constraints, and also assess the ways in which APUs can minimize these constraints.

Mobile Digital Signage and Information Terminals

The travel services industry in particular has embraced digital signage as a means to provide timely, location-aware information. GPS-assisted in-vehicle digital signage and other mobile digital signage better equip travelers for personal use and empower travel services and transportation vendors with “high proximity” advertising space for local businesses. Multi-screen display capabilities are emerging as an important feature for these applications, and mobile digital signage is especially sensitive to power consumption requirements. Low power draw is crucial if a mobile digital sign is to be powered by, for example, a shuttle bus battery.

Point-of-care Medical Imaging and Diagnosis

Portable medical devices with sophisticated medical imaging capabilities for use at the point of care outside of the hospital can enable medical professionals to exam-
ine patients in the field as well as access and process imaging-intensive patient data such as Picture Archiving and Communications Systems (PACS) datasets stored within hospital information systems. These devices ensure high-resolution imaging and ultra-precise diagnostic information that first responders and care providers can count on to expedite treatment decisions.

Apart from the inherent design constraints associated with high-performance graphics processing, device portability, and battery-life preservation, medical device designers grapple with intense time-to-market pressures that few other industries face as acutely, and stringent device certification processes that often consume valuable time along the way.

**Portable Industrial Applications**

Imaging and data-intensive industrial applications such as image detection and recognition, automated inspection, and distributed data collection systems that require high-speed vector processing are increasingly being deployed in remote settings for monitoring purposes, and are therefore sensitive to portability requirements. In addition to requiring increased parallel processing capabilities to facilitate high-precision real-time data collection, these systems often need to be ruggedized for harsh environments. Highly compact, fluid- and particle-sealed system enclosures present obvious challenges centric to airflow and venting – challenges that are often insurmountable with traditional CPUs due to their thermal profiles.

**APUs Yield Higher Performance Graphics with Fewer Components**

New-generation boards and modules designed with advanced x86 APUs are ideally suited to minimize and/or eliminate the aforementioned design challenges while maximizing overall graphics performance. The combination of a low-power CPU and a discrete-level GPU into a single embedded APU provides OEMs with optimal picture resolution (frame rates and resolutions of up to 2560 X 1600 pixels, for example) for their graphics-driven, mobile SFF systems. Combining a GPU core on the same die as the CPU enables host systems to offload computation-intensive pixel data processing from the CPU to the GPU. Freed from this task, the CPU can serve I/O requests with much lower latency, thereby dramatically improving real-time graphics processing performance.

**Size and Integration**

APUs also reduce the footprint of a traditional three-chip platform to just two chips – the APU and the companion controller hub. The combination of general purpose CPU and GPU onto a single die with a high-speed bus architecture and shared, low-latency memory model simplifies design complexity through a reduction in board layers and power supply needs, enabling SFF system designers to achieve aggressive form factor goals while driving down overall system costs.

By providing native, high-performance graphics processing at the silicon level, APUs preclude the need for bulky, add-on graphics cards that usually require a right-edge connector. In space-constrained designs, an edge connector takes up more space (card-edge boards are typically 3” to 5” taller) and exposes it to additional shock and vibration that can lead to signal integrity issues. Designing APU-caliber graphics capabilities directly onto a carrier board is a more rugged, long-term option.

**Power and Cooling**

The performance-per-watt gains enabled by APUs assure greater power efficiency and lower heat dissipation, which in turn can preclude the need for fan cooling within SFF systems, thus helping to preserve board space, improve overall system reliability, limit system noise and lower BOM costs. Supporting thermal design power (TDP) profiles from 5.5 W to 18 W, with typical power consumption below 6 W, AMD G-Series APUs enable designers to keep board-level total power dissipation to within 35 W approximately, well within the 45 W threshold at which mobile systems begin to become hot and physically uncomfortable to the touch. These factors enable designers to optimize their SFF systems for extremely compact enclosures and/or applications with power constraints, and can help enable designers to stay within the 25 W threshold at which passive cooling is an acceptable (and typically favorable) option.

**Multi-display Video Immersion**

As previously mentioned, the ability to support multiple independent display outputs simultaneously is an emerging requirement for realizing ultra-immersive video displays for digital signage, and also SFF portable medical devices. New-generation APUs enable designers to cost-effectively facilitate panoramic video displays without sacrificing board space for add-on graphics cards and controllers or compromising overall picture resolution. They also offer the ability to decode up to three HD video streams in parallel and support up to four independent digital displays via a wide range of standard interfaces including DisplayPort, DVI, HDMI™, LVDS, and VGA.

**Vector Processing for SFF Industrial Systems**

Applications requiring increased parallel computing capabilities, such as the portable medical and industrial devices mentioned above, are well suited for boards and modules equipped with APUs. These applications include 3D medical X-ray image reconstruction and smart camera applications such as high-precision image/pattern detection and identification. However, traditional CPU architectures and application programming tools are optimized for scalar data structures and serial algorithms, and as such, are not the best match for data-intensive vector processing applications.

The integration of general purpose, programmable scalar and vector processor cores for high speed parallel processing establishes a new level of processing performance for SFF systems, at an unprecedented performance-per-watt ratio. In the case of AMD G-Series APUs, the general purpose vector processor cores within the embedded GPU – 80 shader cores running at 500 MHz (AMD Fusion T56N) – drive the ultra high speed processing required to handle intensive numerical computations.
Time to Market

The inherent architectural advantages introduced with APUs go a long way toward minimizing design complexity and accelerating time to market. These advantages owe primarily to reductions in board layers, discrete add-on processors/cards, and power supply and cooling needs, which naturally minimize the number of components on the board and therefore enable designers to shorten and in some cases eliminate design cycles.

The underlying x86 APU architecture also enables portable SFF system designers to tap into the vast selection of existing x86-optimized software, applications, and development environments available on the market today, introducing additional opportunities to enhance development efficiency and speed time to market.

The open development ecosystem for the AMD G-Series platform, for example, includes support for Microsoft Windows®, Linux®, and real-time operating systems, multiple BIOS options, OpenGL 4.0 and OpenCL™ support, and source level debug tools.

By implementing AMD G-Series APUs on the most common form factors for graphics-intensive applications, such as Kontron’s computer-on-modules and SFF SBCs and motherboards, Kontron is making the benefits of this new x86 processing architecture readily available for application development. OEMs and system integrators can take advantage of highly scalable, validated APU-based platforms that streamline design cycles and minimize designs risks to ensure fast time to market for graphics-intensive and parallel-data SFF applications.

New APU processor architectures are making a fast and transformative impact on SFF design initiatives, unlocking high-performance graphics capabilities in small form factors that simply can’t be achieved with conventional CPUs and GPUs. Continued innovation in the APU domain promises to push graphics performance boundaries even further, and will ultimately yield a new generation of portable SFF systems that defy space, power and cooling limitations in ways previously unimagined.

Christine Van De Graaf is the product manager for Kontron America’s Embedded Products Business Unit. Christine has more than a decade of experience working in the embedded computing technology industry and holds an MBA in marketing management from California State University, East Bay, Hayward, California.
**Industrial Computer EPC-A50M-40E**
- AMD Embedded G-T40E APU
- with AMD Radeon HD 6250 Graphics
- AMD A55E Controller Hub
- One 204-pin DDR3 SODIMM Up to 4GB DDR3 1066 SDRAM
- Dual View, VGA and HDMI
- Dual GbE, 7.1-CH HD Audio
- 1 CF, 1 SATA, 2 COM, 4 USB
- Supports mSATA, 2.5” SATA HDD
- VESA Compliance

**Ultra Slim Industrial Computer ASM-A50M-40E**
- AMD Embedded G-T40E APU
- with AMD Radeon HD 6250 Graphics
- AMD A50M Controller Hub Chipset
- Onboard 2GB DDR3 1066 SDRAM and One 204-pin SODIMM Up to 6GB
- Dual Display Output, VGA, HDMI
- 7.1-CH Audio, Dual GbE
- 1 CF, 1 SATA, 2 COM, 4 USB
- ErP/EuP 2.0 compliant

**COM Express Module CEM100**
- AMD Embedded G-Series Platform
- AMD A55E Controller Hub
- SODIMM, 8GB, DDR3, 2x, 1033/1066/800
- TPM supported

**EPIC Single Board Computer EP100**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- SODIMM, 4GB, DDR3, 1x, 1033/1066/800

**3.5” Single Board Computer CAPA110**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Power Consumption: 18W

**3.5” Single Board Computer CAPA111**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Power Consumption: 18W
**Qseven Module H6059**
- AMD Embedded G-Series Platform
- Soldered DDR3 DRAM
- Onboard NANDrive Flash SSD
- 2 x SATA ports
- 4 x PCIe ports
- Gigabit Ethernet
- 8 x USB 2.0 Ports
- LVDS, Displayport, DVI/HDMI
- HD Audio
- RTC
- Fully RoHS compliant

**Digital Signage Player SI-08**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- Fanless and compact design
- One RS232 serial port
- On/Off Scheduler

**MiniITX Single Board Computer IBASE-M1955**
- AMD Embedded G-Series Platform
- AMD A55E Controller Hub
- 2x DDR3 DIMM, Max. 8GB
- Onboard single PCIe Gigabit LAN
- Integrated VGA, supports CRT, DVI-D, LVDS (18-bit single channel)
- Watchdog timer, Digital I/O
- 8x USB 2.0, 4x COM, 4x SATA II
- 1x PCI, 1x PCIe-E(x1)

**Digital Signage Player SI-18**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- Remote On/Off Control
- WiFi + Bluetooth Option
- Serial Port (RS232)
- Cable-less and Compact Design

**E105 Single Board Computer EB900**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- Remote On/Off Control
- Support DDR3 1066MHz memory up to 4GB
- mPCIe(x1) slots for WiFi + Bluetooth Option
- Dual Serial Ports (RS232)
- Cable-less and Compact Design

**MiniITX Single Board Computer KINO-A55E**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- DX11/H.264, VC-1, Mpeg2 H/W decode support
- Single voltage 12VDC input designed
- Single channel DDR3 supported up to 1333MHz
- Super speed USB 5Gbps and SATA 6Gbps for data transfer

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**HECTRONIC**

**iBASE**

**iBase**

**iBase**

**IEI Technology USA Corp.**
MiniITX Single Board Computer
NF81-T56N
- AMD Embedded G-T56N APU with AMD Radeon™ HD 6320 Graphics
- Designed for Digital Signage and Gaming machine applications

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COM Express Module
SECOMExp-GSeries
- TYPE II Extension
- LVDS / DisplayPort / HDMI, basic form factor
- AMD Embedded G-Series Platform
- 1 x P-ATA Channel
- 4 x S-ATA Channels
- 8 x USB 2.0 ports
- 6 x PCI Express x1 lanes
- 2 x ExpressCard interfaces
- Gigabit Ethernet port
- HD Audio Interface
- PCI Bus
- LPC Bus, SM Bus, I2C Bus
- 4 x GPIO, 4 x GPO
- Power Supply +12VDC and +5VSB (optional)

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QSeven Module
Quadmo747-GSeries
- AMD Embedded G-T40E APU
- with AMD Radeon™ HD 6250 Graphics
- LVDS / HDMI / VGA
- 2 x external S-ATA channels
- SATA Flash Disk soldered onboard, up to 32GB
- SD Memory Card interface
- 8 x USB 2.0 ports
- 3 x PCI Express x1 ports
- 2 x Express Card Interface
- Gigabit Ethernet port
- HD Audio Interface
- 12C Bus, LPC Bus, SM Bus
- Thermal/FAN management
- Power Supply +5VDC and +5VSB (optional)

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Gaming System
QXi-200
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- DirectX® 11, OpenGL 4.1, OpenGL 1.1 compatible
- SDRAM, Digital I/O, Audio Amp and strong security built in
- Patent passively cooled enclosure and runs from standard cabinet 12V eliminating extra ATX PSU

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3.5” Single Board Computer
NF35-T40E
- AMD Embedded G-T40E APU
- with AMD Radeon™ HD 6250 Graphics
- Designed for Digital Signage, Thin Client, Car PC and other small form factor’s applications

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WEB www.menmicro.com

COM Express Module
SECOMExp-GSeries
- TYPE II Extension
- LVDS / DisplayPort / HDMI, basic form factor
- AMD Embedded G-Series Platform
- 1 x P-ATA Channel
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- LPC Bus, SM Bus, I2C Bus
- 4 x GPIO, 4 x GPO
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- Gigabit Ethernet port
- HD Audio Interface
- 12C Bus, LPC Bus, SM Bus
- Thermal/FAN management
- Power Supply +5VDC and +5VSB (optional)
Smart Cameras
Getting Smarter

The AMD Embedded G-Series processor gives XIMEA CURRERA-G ‘PC Camera’ a 45X performance boost over earlier-generation Intel-based model.

90 GFLOPs processing power sets new standard for machine vision smart cameras.

by Max Larin, CEO, XIMEA GmbH

The evolution of machine vision cameras has in many ways mirrored the evolution of the modern personal computer. Ever shrinking form factors, dramatic gains in processing power and a growing ecosystem of software and development tools have yielded advanced system capabilities that open the door to greater overall productivity and versatility. Tapping into Heterogeneous Systems Architecture (HSA) technology to achieve an unprecedented processing performance boost, the design visionaries at smart camera maker XIMEA have married cutting-edge machine vision and x86 technology to pioneer the world’s highest-performance ‘PC camera.’

XIMEA, a leading innovator of smart camera and machine vision technology, faithfully adheres to a centuries-old design principle championed by Leonardo da Vinci: “Simplicity is the ultimate sophistication.” This core philosophy has guided XIMEA’s design team throughout the development of the company’s flagship CURRERA series of smart cameras – or ‘PC cameras’ – the first intelligent vision systems to forego traditional DSP, RISC and FPGA-based processing platforms in favor of x86 processor architectures. This shift away from specialized legacy processing platforms and the limited ecosystem of supported imaging software has proven to be a tipping point for the machine vision industry, allowing integrators and system builders to overcome the frustrating hardware/software incompatibilities and cumbersome software maintenance processes that had previously impeded them.

Designing its CURRERA series PC cameras on the x86 processor platform enabled XIMEA to achieve PC-caliber performance and application agility complemented by a rich ecosystem of industry-standard, x86-optimized software, applications and development environments. Full Microsoft® Windows® and Linux® operating system compatibility would dramatically enhance vision system development, deployment and management efficiencies while providing smoother interoperability with x86 Internet backbone infrastructure to ensure improved remote management capabilities. Collectively these efficiencies yield significantly leaner cost structures for integrators and end users alike, ensuring that XIMEA’s CURRERA series PC cameras deliver greater value than traditional smart cameras.

Shipped with fully tested Microsoft Windows- and Linux-based application programming interfaces (APIs) for 25 of the most common image processing libraries, XIMEA’s CURRERA series PC cameras afford integrators true plug-and-play deployment flexibility. Integrators are now liberated from having to stock and support specialized camera lines to accommodate customer-specified image processing libraries, manipulate code for re-use, or develop custom APIs themselves. CURRERA series PC cameras ensure near universal application interoperability, right out of the box. Sophisticated, yet simple.
### Industrial Computer

**TM-8050/MP-8050**
- AMD Embedded G-Series Platform
- Able to drive two independent monitors using the VGA / HDMI / DisplayPort interfaces
- Fanless support
- eSATA interface support
- Mini Computer Form:
  - 194.4MM*122.8MM*35MM
  - 175MM*121.5MM*31.5MM
- Embedded computer Form:
  - 194.4MM*122.8MM*35MM

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### Industrial Computer

**GY-01-A**
- AMD Embedded G-Series Platform
- with AMD Radeon™ HD 6320 Graphics
- 1* SO DIMM DDR3 800/1333MHz of memory up to 4GB
- Realtek ALC883, support 2/4/5.1/7.1 HD sound channel
- 1* Realtek 8111C, 10/100/1000M, support PXE boot
- 8 x USB 2.0, 2* UART, 2* Mini_PCIE, 4* SATA, 1* S/PDIF, 2* PS-S EL (SATA and PCIe header)
- 1* HDMI, 2* VGA, 1* RJ45, 1* AUDIO, 4* USB
- Mini-ITX 170*170mm, DC Power 12–24VDC/5A (Optional)
- Fanless support
- eSATA interface support
- Mini Computer Form:
  - 194.4MM*122.8MM*35MM
  - 175MM*121.5MM*31.5MM
- Embedded computer Form:
  - 194.4MM*122.8MM*35MM

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### NanoITX Single Board Computer

**K-A8HD**
- AMD Embedded G-Series Platform
- Able to drive two independent monitors using VGA/HDMI/LVDS
- Support 3G and onboard SIM interface
- Support 1*Mini PCIe+1*DDR3I-SODIMM
- Small size and full function

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### NanoITX Single Board Computer

**K-A8HD**
- AMD Embedded G-Series Platform
- Able to drive two independent monitors using VGA/HDMI/LVDS
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- Support 1*Mini PCIe+1*DDR3I-SODIMM
- Small size and full function

---

### NanoITX Single Board Computer

**AF2X62A**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- 1* SO DIMM DDR3 800/1333MHz of memory up to 4GB
- Realtek ALC883, support 2/4/5.1/7.1 HD sound channel
- 1* Realtek 8111C, 10/100/1000M, support PXE boot
- 8 x USB 2.0, 2* UART, 2* Mini_PCIE, 4* SATA, 1* S/PDIF, 2* PS-S EL (SATA and PCIe header)
- 1* HDMI, 2* VGA, 1* RJ45, 1* AUDIO, 4* USB
- Mini-ITX Form:
  - 170*170mm, DC Power 12–24VDC/5A (Optional)

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### NanoITX Single Board Computer

**AF2X62A**
- AMD Embedded G-T56N APU
- with AMD Radeon™ HD 6320 Graphics
- 1* SO DIMM DDR3 800/1333MHz of memory up to 4GB
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- 1* HDMI, 2* VGA, 1* RJ45, 1* AUDIO, 4* USB
- Mini-ITX Form:
  - 170*170mm, DC Power 12–24VDC/5A (Optional)

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### NanoITX Single Board Computer

**NANO-AF2S1E**
- AMD Embedded G-Series Platform
- OS Supported: Linux®, Windows® 7
- Power Consumption: <25W
- Memory: SODIMM, 2GB, DDR3, 1x, 1333/1066/800

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- OS Supported: Linux®, Windows® 7
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### NanoITX Single Board Computer

**NANO-AF2S1A**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Memory: SODIMM, 4GB, DDR3, 1x, 1066/800

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### NanoITX Single Board Computer

**NANO-AF2S1A**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Memory: SODIMM, 4GB, DDR3, 1x, 1333/1066/800
- Ethernet: RTL8111D, 10/100/1000 Base-T, RJ-45
- Display: 1x, HDMI, 2560 x 1600 HDMI, 1920 x 1080
- Storage: SATA 1x, 3.0Gbps, 2.0 compliant

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### NanoITX Single Board Computer

**NANO-AF2S1E**
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Memory: SODIMM, 4GB, DDR3, 1x, 1333/1066/800
- Ethernet: RTL8111D, 10/100/1000 Base-T, RJ-45
- Display: 1x, HDMI, 2560 x 1600 HDMI, 1920 x 1080
- Storage: SATA 1x, 3.0Gbps, 2.0 compliant
Performance Potential

With the development of its maiden CURRERA PC camera – the CURRERA-R camera – XIMEA achieved aggressive design goals centric to form factor and integration, ultimately yielding a vision system that incorporated a fully functional personal computer, standard PC peripheries and Internet-enabled remote management capabilities within a stunningly elegant, ultra compact 59 x110 x 48 mm IP67-class industrial housing. The introduction of XIMEA's CURRERA series PC cameras would fundamentally transform intelligent vision system technology, enabling advanced new capabilities for a broad range of smart camera applications spanning machine vision, automated inspection, non-contact measurement and security.

But XIMEA wasn’t finished. The Intel Atom processors at the heart of the CURRERA-R PC cameras limited system performance to approximately 2 GFLOPs – impressive performance compared to traditional smart cameras, but not enough to meet XIMEA's ambitious performance goals. Its design team envisioned a smart camera capable of accelerating part-per-minute inspection rates to unprecedented speeds. It sought a processing platform that would enable image detection and identification at a level of precision previously unimagined. It recognized that for integrators and system builders to embrace this new class of smart cameras, CURRERA PC cameras needed to prove their value in the field as a means to achieve huge gains in productivity, quality control, and overall vision system versatility.

Convinced that the full evolution to x86-caliber smart camera performance and agility would not be realized via traditional CPU architectures, XIMEA's design team shifted its attention from Intel Atom processors to the AMD Embedded G-Series processor featuring Heterogeneous Systems Architecture (HSA) technology.

From 2 GFLOPS to 90 GFLOPS with HSA Technology

With the introduction of its second-generation CURRERA PC cameras – the CURRERA-G series cameras, based on the AMD Embedded G-Series platform – XIMEA boosted the processing performance of its CURRERA platform from 2 GFLOPs to 90 GFLOPs – a staggering 45X performance gain. The CURRERA-G PC camera houses a single-board computer designed to accommodate an AMD Embedded G-Series accelerated processing unit (APU), which combines a low-power CPU and a discrete-level GPU on a single die with a high-speed bus architecture. Combining a GPU core on the same die as the CPU enables the system to offload computation-intensive pixel data processing from the CPU to the GPU. Freed from this task, the CPU can serve I/O requests with much lower latency, thereby dramatically improving the real-time performance of the whole system.

The AMD Embedded G-Series APU within the CURRERA-G PC camera helps enable a fully optimized data path from image sensor to application, eliminating CPU overhead during image data delivery. Direct access to the unified memory shared between the CPU and GPU enables a true zero-copy data transfer path and the lowest possible latency. Meanwhile the general purpose vector processor cores within the integrated GPU – 80 shader cores running at 500MHz (AMD G-T56N) – drive the ultra high speed parallel processing required to handle intensive numerical computations.

In addition to offering performance that's an order of magnitude greater than most competing smart cameras, CURRERA-G PC cameras offer resolutions from WVGA to 5 megapixel (MP) and feature a pair of MicroSD card slots. CURRERA-G PC cameras come with a variety of I/O options, including Gigabit Ethernet (GigE), USB interfaces, VGA, RS232, and eight isolated Digital Inputs and Outputs, programmable current-controlled output for LED lighting, and a graphically configurable micro PLC capable of running at sub-microsecond jitter.

Smaller Faster Better

The addition of a GPU to the CURRERA processing module by way of the AMD Embedded G-Series APU would have been extremely difficult, if not impossible, to achieve within the specified system form factor targets if not for the AMD APU architecture. By reducing the footprint of a traditional three-chip platform to just two chips – the APU and the companion controller hub – design complexity is simplified and XIMEA's designers were much better equipped to realize their aggressive form factor goals.

With the development of the AMD Embedded G-Series APU-based CURRERA-G PC camera, XIMEA's designers were able to integrate the processor module and solid-state micro cooling components within an enclosure nearly identical in size (62 x 105 x 62 mm) to the earlier generation Intel Atom-based CURRERA-R PC cameras. In the end, XIMEA achieved a 45X processing performance boost for its CURRERA PC camera platform, without giving an inch – literally – on system form factor dimensions.

Simplicity and Efficiency

AMD's early and ongoing support for the cross-platform, non-proprietary Open Computing Language (OpenCL™) programming framework has played to XIMEA's favor, enabling developers to easily and more cost-effectively program code that accelerates image processing performance for their unique CURRERA-G-based vision system applications. With OpenCL APIs, developers can repurpose code across CPU, GPU and APU platforms from the leading processor vendors, thereby maximizing the value of their investment in source code development.

XIMEA's innovation with x86 processing platforms and the OpenCL framework is unique in the smart camera industry, distinguishing XIMEA's commitment to promoting end-to-end vision system design and management efficiencies spanning hardware and software. And just as XIMEA's AMD Embedded G-Series processor-based CURRERA-G PC cameras provide integrators and end users with ample performance overhead to future-proof their investments in the CURRERA platform, so too does OpenCL allow developers to future-proof their source code.

In this way, XIMEA's technology sophistication makes high-performance machine vision simpler than ever. Da Vinci would be proud.
Reference

1 In testing conducted by AMD performance labs, 18 W AMD G-Series APUs demonstrated approximately 90 GFLOPS. In testing conducted by XIMEA, the Intel Atom Z530 demonstrated approximately 2 GFLOPs using the SiSoft Sandra CPU MFLOPs test.

XIMEA GmbH believes that the best industrial, smart, and scientific cameras offer the highest levels of processing power, compatibility, and support at a competitive price. That’s why for more than 20 years, XIMEA has designed the smartest, most compact industrial cameras for motion control, assembly, robotics, and industrial inspection and process control, as well as scientific cameras for life-science, security, and defense applications. Learn more about XIMEA at www.ximea.com.

AMD is a semiconductor design innovator leading the next era of vivid digital experiences with its groundbreaking Accelerated Processing Units (APUs) that power a wide range of computing devices. AMD Embedded Solutions give designers ample flexibility to design scalable, x86-based, low-cost and feature-rich products, and drive energy conservation into their systems without compromising application performance or compatibility, graphics performance or features. For more information, visit www.amd.com/embedded.
EmbeddedITX Single Board Computer
UMB-AFEI01
- AMD Embedded G-Series Platform
- AMD A55E C
- OS Supported: Windows® Vista, Linux®, Windows® XP, Windows® 7, Linux® Terminal, Redhat Linux
- Power Consumption: <36W
- AMD Radeon™ HD 6310
- Memory: SODIMM, 4GB, DDR3, 1x, 1066/800

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MiniITX Single Board Computer
TEB-M7162
- AMD Embedded G-Series Platform
- AMD A55E Controller Hub
- Power Consumption: 25W
- Memory: DIMM, 4GB, DDR3, 1x, 1066/800
- Flash: Other, 4MB

TOPSTAR
PHONE 86 755-8341 2266
EMAIL maxl@topstar1.com
WEB www.cszte.com

Intelligent Camera
CURRERA-G
- AMD Embedded G-T40E APU
- with AMD Radeon™ HD 6250 Graphics
- AMD A55E Controller Hub
- Memory: Soldered Down, 2GB, DDR3
- Flash: NAND, 4GB

YDSTECH Technology Co., Ltd
PHONE 86 755 26009198
EMAIL LJ@ydstech.com
WEB www.ydstech.com

3.5” Single Board Computer for Thin Client
TEB-S6210
- AMD Embedded G-Series Platform
- Thin-client solutions delivering the latest
- Up to 4GB DDR3 system memory
- Up to 2 RJ45 Ports

TOPSTAR
PHONE 86 755-8341 2266
EMAIL maxl@topstar1.com
WEB www.cszte.com

Networking Appliance
PL-80400
- AMD Embedded G-Series Platform
- AMD A50M Controller Hub
- Power Consumption: 60W
- Memory: SODIMM, 4GB, DDR3, 1066/800
- Customizable with OEM quantity orders

Win Enterprises
PHONE (978) 688-2000
EMAIL info@win-ent.com
WEB www.win-ent.com

COM Express Module
COME-FT11
- AMD Embedded G-Series Platform
- On-board 2GB DDR3 memory, up to 4GB
- Gigabit network, Realtek ALC662 channel audio
- 2 Mini-PCIe, 2 SATA2, 6 COM and eight USB 2.0
- SIM card slot, Use Bluetooth headset to make 3G wireless call
- I/O board can be customized

Ximea
PHONE (303) 389-9838
FAX (303) 202-6350
EMAIL info@ximea.com
WEB www.ximea.com

YDSTECH Technology Co., Ltd
PHONE 86 755 26009198
EMAIL LJ@ydstech.com
WEB www.ydstech.com
The AMD Embedded G-Series processor is the world’s first integrated circuit to combine a low-power CPU and a discrete-level GPU into a single embedded Accelerated Processing Unit (APU). This unprecedented level of graphics integration builds a new foundation for high performance multimedia content delivery in a small form factor and power efficient platform for a broad range of embedded designs. Based on a new power-optimized core, the AMD Embedded G-Series platform delivers levels of performance in a compact BGA package that is ideal for low-power designs in embedded applications such as Digital Signage, x86 Set-Top-Box (xSTB), IP-TV, Thin Client, Information Kiosk, Point-of-Sale, Casino Gaming, Media Servers, and Industrial Control Systems.

### AMD G-Series Accelerated Processing Units

<table>
<thead>
<tr>
<th>Model</th>
<th>OPN</th>
<th>Package</th>
<th>CPU Cores</th>
<th>L2 Cache/Core</th>
<th>Memory Interface</th>
<th>CPU Core Frequency</th>
<th>Discrete Class Graphics</th>
<th>GPU Core Frequency</th>
<th>Hardware Video Acceleration</th>
<th>Graphics</th>
<th>Display Outputs</th>
<th>Display Resolutions</th>
<th>Thermal Design Power</th>
<th>Tdie</th>
<th>Product Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>T52N</td>
<td>GET52NGBB20GVE</td>
<td>1</td>
<td>1 512KB DDR3-1066, Unbuffered</td>
<td>1.4GHz</td>
<td>AMD Radeon™ HD 6250</td>
<td>280MHz</td>
<td>UVD 3.x for H.264, VC-1 and MPEGS2</td>
<td>9W 90°C Q2-11</td>
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<td>1 512KB DDR3-1066</td>
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<td>AMD Radeon™ HD 6290</td>
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<td>UVD 3.x for H.264, VC-1 and MPEGS2</td>
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<td>1</td>
<td>1 512KB DDR3-1066</td>
<td>1.0GHz</td>
<td>AMD Radeon™ HD 6250</td>
<td>280MHz</td>
<td>UVD 3.x for H.264, VC-1 and MPEGS2</td>
<td>9W 90°C Q2-11</td>
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</tbody>
</table>

12. Refer to the Brazos Platform Minimum System Recommendations for HD Video Playback, order #48826 to view the minimum system configurations required to enable HD playback and the maximum resolution supported for each advanced video quality feature.

13. Other resolutions available that do not oversubscribe link bandwidth. Display resolutions limited by available memory bandwidth.

14. eDP translator option supporting 2048x1536 (HD 6310) or 1920x1200 (HD 6250) at 18 or 24 bpp.

15. Low voltage (1.35V) DDR3 is assumed for the 9W TDP processors. The use of 1.5V DDR3 will incur a power adder.


17. Models enabled by AMD Turbo Core technology, up to 10% clock speed increase is planned. For CPU boost, only one processor core of a dual-core has boost enabled.
AMD is ushering in a new era of embedded computing. The AMD Embedded G-Series processor is the world’s first integrated circuit to combine a low-power CPU and discrete-level GPU into a single embedded Accelerated Processing Unit (APU).

AMD is also proud to offer extended availability of the AMD Geode™ LX processor family until 2015.

Learn more about new levels of performance in a compact BGA package at: www.amd.com/embedded