Digital Signage Market: Eye-Catching Graphics and Next-Generation Technology
Digital Multimedia Technology Excels for Interactive Retail Applications
Developing Embedded Systems with Discrete High-Performance Graphics Processors

JANUARY-JUNE 2015
THE FUTURE BELONGS TO THOSE WHO BUILD IT.

INTRODUCING GIZMO 2:
A 4”x4”, x86-based DIY board that puts the power of a supercomputer (85 GFLOPs!) with the I/O capabilities of a microcontroller in the palm of your hand.
In Digital menu boards are at the heart of a fast food restaurant. Without the right content, right price, and associated images, the customer would have no idea what is available, how much to pay, or, more importantly, what the food looks like. This is especially important because customers can be highly influenced through visually appealing images. What’s driving these boards? Increasingly, multicore APUs and SoCs provide the compute resources needed for multiple, high-resolution displays.

If you’ve recently ventured into a newly built or modernized fast food restaurant, chances are the menu boards inside and at the drive-through have gone digital. The benefits of going digital are many, not least of which is the ability to create specials in real-time such as promoting cold drinks on a hot summer day, or selling off excess inventory of a specific item. They also allow extensive business efficiency with the ability to connect with point-of-sale (POS) systems for on-demand promotions, and significantly improve the customer experience through an eye-catching menu board.

In a freestanding quick service restaurant (QSR) one will typically find four to six menu boards above the counter space. However, not all restaurants within a chain have the same menu board display space, location, and configuration. A similar restaurant in a space-constrained location – a mall food court, airport, or shopping arcade might only have room for two or three menu boards overhead, but could have a sidewall that’s suitable for additional display panels.

The kitchen areas in these restaurants are typically very warm, greasy, and potentially dusty, which can damage electronics by fan clogging and overheating. The media players that run the multi-display digital menu boards are business critical and cannot fail, because it’s difficult for customers to order if the menu boards lose power or are accidentally unplugged. These systems must be flexible to account for the physical constraints imposed on them such as space, menu board size and layout, as well as the challenging environment they operate in.

In a scenario where the restaurant has four to six digital menu boards overhead, a cost-efficient option is to use a media player that offers multiple independent display outputs with three or four outputs, resulting in just one or two media players being used.

AMD works hard to understand the challenges of the embedded digital signage market and has developed solutions that combine high-level graphics performance with a high-value feature set. AMD Embedded Processors deliver high-performance processing coupled with a premium high-definition visual experience through the combination of compute and parallel processing cores that includes discrete-class AMD Radeon™ graphics. Plus, AMD embedded solutions deliver support for features such as remote management and analytics.

AMD’s Eyefinity technology provides key functionality that simplifies the software implementation and development of the on-screen content. Having the right software and independent software vendor (ISV) that can manage the various layouts and orientations for small or large deployments is essential. Consider the options for low-cost, low-power fanless solutions from multicore AMD Embedded G-Series and R-Series Processor-based media players for two output systems or for four output high-performance systems respectively.

The next time you’re in a public place – be it a fast-food restaurant, an airport or the ballpark – look around. I bet you’ll see that the signage around you has gone digital. If it hasn’t, it’s only a matter of time.
The AMD Embedded Family of Accelerated Processing Units (APUs) and Systems-on-Chip (SoCs) deliver high-performance processing coupled with a premium high-definition visual experience that is ideal for the digital signage market. AMD embedded processors meet the challenges of this demanding market through a combination of compute and parallel processing cores and discrete-class AMD Radeon™ graphics. AMD embedded processors also deliver support for features such as remote management and analytics that were previously not available in a platform in this price and power range.

Digital signage customers include a wide-range of applications, including retail (supermarkets, shopping centers), hospitality (virtual concierge in hotels), and transportation (onboard small systems, including point-of-sale). Whatever the application, most digital signage customers are looking for a system that:

- Delivers high-definition multi-media content capabilities – including 4K, gesture control and facial recognition – to generate customer attention and interest.
- Supports multiple displays with configuration options.
- Enables small media player design due to its decreased footprint.
- Provides the ability to maintain a low system power footprint.
- Offers the right balance of performance per watt per dollar.

More and more customers are not only requiring better graphics, more display options, and interactivity, but are also demanding higher reliability and long-term availability from their systems. AMD offers a variety of solutions to meet these needs including the AMD Embedded R-Series APUs, AMD Embedded G-Series SoCs, and discrete AMD Embedded Radeon™ graphics.

Whether the application requires basic 2D graphics with a single display or 3D graphics and high-definition video on multiple displays, the AMD Embedded Family of processors and discrete AMD Embedded Radeon™ graphics processors help deliver the performance, features and scalability to meet your requirements.

www.amd.com/digitalsignage

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The AMD Embedded G-Series SOC platform is a high-performance, low-power System-on-Chip (SOC) design, featured with enterprise-class error-correction code (ECC) memory support, dual and quad-core variants, integrated discrete-class GPU and I/O controller on the same die.

The AMD Embedded G-Series SOC achieves superior performance per watt in the low-power x86 microprocessor class of products when running multiple industry standard benchmarks1. This helps enable the delivery of an exceptional HD multimedia experience and provides a heterogeneous computing platform for parallel processing. The small-footprint, ECC-capable SOC sets the new foundation for a power-efficient platform for content-rich multimedia processing and workload processing that is well-suited for a broad variety of embedded applications.

The embedded evolution continues with x86 CPU, integrated discrete-class GPU and I/O controller on the same die.

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### AMD EMBEDDED G-SERIES SYSTEM-ON-CHIP (SOC)

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**Table: AMD G-Series SOC Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Opn#</th>
<th># of x86 Cores</th>
<th>TDP (CPU, GPU, &amp; SB)</th>
<th>Shared L2 Cache</th>
<th>CPU freq.</th>
<th>GPU freq. (Graphics)</th>
<th>DDR Speed</th>
<th>TJC</th>
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<td>4</td>
<td>25W</td>
<td>2MB</td>
<td>2.0GHz</td>
<td>600MHz (HD 8400E)</td>
<td>DDR3-1600</td>
<td>0-90°C</td>
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<td>GX-415GA</td>
<td>GE415GIBJ44HM</td>
<td>4</td>
<td>15W</td>
<td>2MB</td>
<td>1.5GHz</td>
<td>500MHz (HD 8330E)</td>
<td>DDR3-1600</td>
<td>0-90°C</td>
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<td>GX-217GA</td>
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<td>15W</td>
<td>1MB</td>
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<td>1.65GHz (HD 8280E)</td>
<td>DDR3-1600</td>
<td>0-90°C</td>
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<tr>
<td>GX-210HA</td>
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<td>1MB</td>
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<td>DDR3-1333</td>
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<tr>
<td>GX-209HA</td>
<td>GE209HISJ23HM</td>
<td>2</td>
<td>9W</td>
<td>1MB</td>
<td>1.0GHZ</td>
<td>225MHZ</td>
<td>DDR3-1066</td>
<td>-40-105°C</td>
</tr>
</tbody>
</table>

| w/o GPU     |      |               |                     |                 |           |                      |            |     |
| GX-416RA    | GE416RIBJ44HM | 4  | 15W | 2MB  | 1.6GHz | N/A      | DDR3-1600 | 0-90°C |
| GX-420MC    | GE420MIXJ44JB | 4  | 17.5W| 2MB  | 2.0GHz | N/A      | DDR3-1600 | 0-90°C |
| GX-412TC    | GE412TIIJ44JB | 4  | 6W  | 2MB  | 1.2GHz | N/A      | DDR3-1600 | 0-90°C |

1. The low-power x86 microprocessor class includes: CX-420CA @ 25W TDP (scored 19); CX-415GA @ 15W (25), CX-217GA @ 15W (17), CX-210HA @ 9W (20), G-T56N @ 18W (12), G-T52R @ 18W (7), G-T40N @9W (14), G-T16R @ 4.5W (19), Intel Atom N270 @ 2.5W (20), Intel Atom D525 @ 13W (9), Intel Atom D2700 @ 10W (12) & Intel Celeron G440 @ 35W (5). Performance score based on an average of scores from the following benchmarks: Sandra Engineering 2011 Dhrystone ALU, Sandra Engineering 2011 Whetstone iSSE3, 3DMark® 06 (1280 x 1024), PassMark Performance Test 7.0 2D Graphics Mark, and EEMBC CoreMark Multi-thread. All systems running Windows® 7 Ultimate for Sandra Engineering, 3DMark® 06 and PassMark. All systems running Ubuntu version 11.10 for EEMBC CoreMark. All configurations used DirectX 11.0. AMD C-Series APU system configurations used iBase MI958 motherboards with 4GB DDR3 and integrated graphics. All AMD G-Series SOC systems used AMD “Larne” Reference Design Board with 4GB DDR3 and integrated graphics. Intel Atom D2700 was tested with Jetway NC9KDL -2700 motherboard, 4GB DDR3 and integrated graphics. Intel Celeron system configuration used MSI H61M-P23 motherboard with maximum supported configuration of 1GB DDR2 (per http://download.intel.com/design/intarch/manuals/304386.pdf,) and Intel GM945 Intel Atom D525 used MSI MS-A923 motherboard with platform integrated 1GB DDR3 and integrated graphics.

Note: Always refer to the processor/chipset data sheets for technical specifications. Feature information in this document is provided for reference only.
**Pico-ITX**

- **MIO-2270**
  - AMD Embedded G-Series SOC
  - DDR3/DDR3L 1600MHz Support up to 16GB
  - SATA 6.0 Gb/s x 2, USB 3.0 x 2, USB 2.0 x 8
  - PCI-Express [x1] x 5
  - 24-bit single channel LVDS
  - High Definition Audio Interface
  - Communications, Industrial Controllers, Medical, Single Board Computers, Networking, Point Of Sale

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**COM Express Compact**

- **COM-KB**
  - AMD Embedded G-Series SOC
  - DDR3/DDR3L 1600MHz Support up to 16GB
  - SATA 6.0 Gb/s x 2, USB 3.0 x 2, USB 2.0 x 8
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**EPIC Board**

- **EMB-KB1**
  - AMD Embedded G-Series SOC
  - DDR3/DDR3L 1600MHz Support up to 16GB
  - USB3.0 x 2 and SATA 6.0 Gb/s x 2
  - Realtek 8111F Gigabit Ethernet
  - Dual Independent Displays: VGA, DVI-D, LVDS
  - Rich Expansion: PCI-E [x1] x 1, Mini Card x 2
  - Industrial Controllers, Medical, Single Board Computers

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**SOM-9751**

- **COM Express**
  - AMD Embedded G-Series SOC Platform
  - AMD Radeon HD 8400E
  - Industrial Controllers, Medical, Single Board Computers, Other

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  - Communications, Industrial Controllers, Medical, Single Board Computers, Networking, Point Of Sale

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Industrial Computer
SEM-6335
- AMD Embedded G-Series SDC
- 1x SODIMM, 4GB, DDR3, 1x 1600/1333/1066 MHz
- 1x Mini-PCIe w/USB Signal, full-size; 1x Mini-PCIe w/USB 6 Gbps SATA signal, half-size
- 1x SATA, 6.0 Gbps, 3.0 compliant, 2.5" drive bay
- Fanless operation
- kGaming, Information Appliance, Industrial Controllers, Digital Signage, Point Of Sale, Thin Clients

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Custom Board
KCGX210
- AMD Embedded G-Series SDC
- 1x SODIMM DDR3 1333/1066/800 MHz, Max up to 4GB
- 2x TypeA USB 3.0 Host, 6x TypeA USB 2.0 Host, 1x TypeA USB 2.0 Host
- 1x HDMI
- 2x SATA 6.0 Gbps, 3.0 compliant
- 1x Mini-PCIe
- Digital Signage

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Custom Board
KCGX210J
- AMD Embedded G-Series SDC
- 1x SODIMM DDR3 1066/800 MHz, Max up to 4GB
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- 1x HDMI
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Custom Board
KCGX217-DH
- AMD Embedded G-Series SDC
- 1x SODIMM DDR3 1600/1333/1066 MHz, Max up to 4GB
- 2x TypeA USB 3.0, 6x TypeA USB 2.0, 1x Header USB 2.0
- 1x HDMI
- 2x SATA 6.0 Gbps, 3.0 compliant, 1x mSATA slot
- Digital Signage

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Custom Board
KCGX210J-LV
- AMD Embedded G-Series SDC
- 1x SODIMM DDR3 1333/1066/800 MHz, Max up to 4GB
- 2x TypeA USB 2.0, 2x TypeA USB 3.0
- 1x HDMI
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KCGX415-DH
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Custom Board
KCGX415-DH
- AMD Embedded G-Series SDC
- 1x SODIMM DDR3 1600/1333/1066 MHz, Max up to 4GB
- 2x TypeA USB 3.0, 6x TypeA USB 2.0, 1x Header USB 2.0
- 2x HDMI
- 2x SATA 6.0 Gbps, 3.0 compliant
- 1x Mini-PCIe
- Digital Signage

Albatron
PHONE 886-2-8227-3277
FAX 886-2-8227-3266
EMAIL DarrylChan@albatron.com.tw
WEB www.albatron.com.tw

WWW.AMD.COM/EMBEDDED | PAGE 7
**Custom Board**

**BioDigitalPC 7 Family**

- **AMD Embedded G-Series SOC**
- 2GB, 4GB or 8GB of DDR3 RAM
- 4 USB 2.0 Ports, 1 USB 3.0 Port, DisplayPort, 2 PCIe x1 Gen 2
- Size: 84mm x 52mm x 6mm
- Epoxid for Rugged Design and Harsh Environmental Conditions, Waterproof
- Information Appliance, Medical, Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

---

**Arnowse Digital Devices Corp.**

**PHONE** 1 (516) 673-4444  
**WEB** http://arnousedigitaldevices.com/newsite/home.php

---

**3.5" Micro Module**

**ECM-KA**

- **AMD Embedded G-Series SOC**
- One 204-pin DDR3 SODIMM Socket Supports Up to 8GB DDR3 1600 SDRAM
- 1 x Mini PCIe (mSATA Supported)
- 2 x USB 3.0, 6 x USB 2.0
- Supports HDMI and LVDS
- Industrial Controllers, Single Board Computers

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**Avalue Technology Inc.**

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

---

**AsRock Inc.**

**PHONE** (909) 590-8308  
**EMAIL** sales@asrockamerica.com  
**WEB** www.asrock.com

---

**COM Express Module**

**CSB1890T10-Q15**

- **AMD Embedded G-Series SOC**
- Excellent choice for size restricted, low power, ruggedized embedded applications
- 4GByte 64-Bit Wide DDR3-1600 Memory with 8-Bit ECC
- PCIe: One x4 and Two x1 GEN II (5G/s) Ports
- Dual Simultaneous Display via HDMI, DisplayPort 1.2, eDP or LVDS
- Gaming, Information Appliance, Communications, Industrial Controllers, Storage, Medical, Digital Set Top Boxes, Networking, Digital Signage, Point Of Sale, Thin Clients

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**Cogent Computer Systems, Inc.**

**PHONE** 1-401-349-3999  
**EMAIL** sales@cogcomp.com  
**WEB** http://www.cogcomp.com/

---

**SMARC**

**CSB1690SM1-D10**

- **AMD Embedded G-Series SOC**
- Industry Standard SMARC, 82mm x 50mm
- 32Kbyte Instruction and Data Caches, 1Mbyte L2 Cache
- 4GByte 64-Bit Wide DDR3L-1066 Memory
- Three x1 GEN II (5G/s) Ports
- Dual Simultaneous Display via HDMI and eDP/LVDS
- Gaming, Information Appliance, Communications, Industrial Controllers, Storage, Medical, Digital Set Top Boxes

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**Cogent Computer Systems, Inc.**

**PHONE** 1-401-349-3999  
**EMAIL** sales@cogcomp.com  
**WEB** http://www.cogcomp.com/

---

**Mini-ITX Motherboard**

**IMB-A180-H**

- **AMD Embedded G-Series SOC**
- Supports DDR1600MHz
- 1 x VGA, 2 x HDMI
- 24 bit dual channel LVDS (optional)
- 6 x COM ports, 6 x USB 2.0, 2 x USB 3.0
- 1 x PCIe x4, 1 x SATA 3.0, 1 x mSATA
- Industrial Controllers, Single Board Computers, Digital Signage

---

**congatec Inc.**

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

---

**Mini-ITX**

**conga-IGX**

- **AMD Embedded G-Series SOC Platform**
- Gaming, Information Appliance, Medical, Single Board Computers, Point Of Sale
**Mini-ITX**

**KB160/161 Series**
- AMD Embedded G-Series SOC
- 2 DDR3L SODIMM up to 8GB
- 4 x PCIe 2.0
- 2 x USB 3.0, 8 x USB 2.0
- 1 x HDMI, VGA, LVDS, 1 x DisplayPort
- Gaming, Information Appliance, Communications, Industrial Controllers, Medical, Digital Set Top Boxes, Networking, Digital Signage, Point Of Sale, Thin Clients

**Deciso B.V.**
- PHONE +31187744020
- EMAIL contact@deciso.com
- WEB www.deciso.com

**DFI**
- PHONE (916) 568-1234
- FAX (916) 568-1233
- EMAIL sales@dfitech.com
- WEB www.dfi.com

**COM Express Compact/Type 6**

**congo-TCG**
- AMD Embedded G-Series SOC
- Max. 8 GByte DDR3L 1600 MHz
- 4 x PCIe 2.0
- 2 x USB 3.0, 8 x USB 2.0
- 1 x HDMI, VGA, LVDS, 1 x DisplayPort
- Gaming, Information Appliance, Communications, Industrial Controllers, Medical, Digital Set Top Boxes, Networking, Digital Signage, Point Of Sale, Thin Clients

**congatec Inc.**
- PHONE (858) 457-2600
- FAX (858) 457-2602
- EMAIL sales-us@congatec.com
- WEB www.congatec.us

**COM Express Compact/Type 6**

**congo-QC**
- AMD® Embedded G-Series SDC Platform
- Gaming, Information Appliance, Communications, Point Of Sale

**Deciso B.V.**
- PHONE +31187744020
- EMAIL contact@deciso.com
- WEB www.deciso.com

**Proprietary Network Board**

**Netboard A10**
- AMD Embedded G-Series SDC
- SODIMM, max. 8GB, DDR3 non-ECC, 1x 1600/1333/1066
- 1 x PCIe x4 Edge Connector
- 5x USB 2.0
- 2x SATA 3 + mini power header (JST)
- 1x Display Port ++, 1x VGA
- Communications, Networking

**Deciso B.V.**
- PHONE +31187744020
- EMAIL contact@deciso.com
- WEB www.deciso.com

**COM Express Compact**

**KB968 Series**
- AMD Embedded G-Series SOC
- Max. 8 GByte DDR3L 1600 MHz
- 4 x PCIe 2.0
- 2 x USB 3.0/2.0, 6 USB 2.0
- 1 VGA, 1 LVDS, 1 DDI
- 2 SATA 3.0
- Gaming, Information Appliance, Communications, Industrial Controllers, Medical, Digital Set Top Boxes, Networking, Digital Signage, Point Of Sale, Thin Clients

**congatec Inc.**
- PHONE (858) 457-2600
- FAX (858) 457-2602
- EMAIL sales-us@congatec.com
- WEB www.congatec.us

**Conga-QG**
- Qseven
- AMD® Embedded G-Series SOC Platform
- Gaming, Information Appliance, Communications, Point Of Sale
**Desktop Thin Client**

**t520 Flexible Thin Client**
- AMD DX-230E, Dual-Core SOC APU
- AMD Radeon HD Graphics (1.2 GHz)
- DDR3 1600/1600 SDRAM Memory
- USB 2.0 and USB3.0 onboard
- PCIe x4 connector and Mini-PCI Express onboard
- 2x DisplayPort 1.2 and Dual Channel LVDS support
- Designed for fanless operation
- Gaming, Server, Information Appliances, Communications, Industrial Controllers, Medical, Digital Set Top Boxes, Single Board Computers, Networking, Digital Signage, Point Of Sale, Thin Clients

PHONE 800-334-5144
WEB http://www.hp.com

**Hewlett-Packard**

---

**Mini-ITX**

**D3313-S**
- AMD Embedded G-Series SOC
- DDR3 1666/1600 SDRAM Memory
- USB 2.0 and USB3.0 onboard
- PCIe x4 connector and Mini-PCI Express onboard
- 2x DisplayPort 1.2 and Dual Channel LVDS support
- Designed for fanless operation
- Gaming, Server, Information Appliances, Communications, Industrial Controllers, Medical, Digital Set Top Boxes, Single Board Computers, Networking, Digital Signage, Point Of Sale, Thin Clients

**Fujitsu**

PHONE +49 821 804 3387
WEB www.ts.fujitsu.com

**QSeven**

**H6069**
- AMD Embedded G-Series SOC
- Soldered DDR3 RAM 2GB (Module prepared for 4GB)
- 1x SATA ports
- 2 x USB 3.0, 4 x USB 2.0
- 4 ports for PCIe x1
- Dual 24-bit LVDS and DisplayPort or DVI or HDMI
- Gaming, Information Appliances, Communications, Industrial Controllers, Medical, Single Board Computers, Digital Signage, Point Of Sale

PHONE +49 821 804 3387
EMAIL Thomas.Stanik@ts.fujitsu.com
WEB www.ts.fujitsu.com

**Mini-ITX**

**FUTRO S720/ S920**
- AMD Embedded G-Series SOC
- 1x SODIMM DDR3 1600/1333/1066 MHz, Max up to 4GB
- 2x Front USB 3.0, 4x Rear USB 2.0
- 1x DisplayPort 2560 x 1600, 1x DVI-I 1920 x 1200
- Thin Clients

**Fujitsu**

PHONE +49 821 804 3387
WEB www.ts.fujitsu.com

**Mini-ITX**

**FUTRO S520**
- AMD Embedded G-Series SOC
- 1x SODIMM DDR3 1600/1333/1066 MHz, Max up to 2GB
- 2x Front USB 3.0, 2x Rear USB 2.0
- 2x DVI-I 1920 x 1200
- Thin Clients

**Fujitsu**

PHONE +49 821 804 3387
WEB www.ts.fujitsu.com

**Mini-ITX**

**D3313-S**
- AMD Embedded G-Series SOC
- DDR3 1600/1600 SDRAM Memory
- USB 2.0 and USB3.0 onboard
- PCIe x4 connector and Mini-PCI Express onboard
- 2x DisplayPort 1.2 and Dual Channel LVDS support
- Designed for fanless operation
- Gaming, Server, Information Appliances, Communications, Industrial Controllers, Medical, Digital Set Top Boxes, Single Board Computers, Networking, Digital Signage, Point Of Sale, Thin Clients

**Fujitsu**

PHONE +49 821 804 3387
WEB www.ts.fujitsu.com

**iBASE**

PHONE +886-2-2655-7588
EMAIL sales@iBASE.com.tw
WEB www.iBASE-usa.com

---

**Digital Signage Player**

**SI-22**
- AMD Embedded G-Series SOC
- Operating Temp: 0 ~ 45 C
- SODIMM, 8GB, DDR3, 1x 1600/1333/1066
- 2x, Mini-Pcie, X1, Including mSATA
- 2x, HDMI, 1920 x 1080
- 2x TypeA, USB 3.0, Host; 1x TypeA, USB 2.0, Host
- iSMART for EuP/ErP power saving, auto-scheduler and power resume
- Single Board Computers, Digital Signage, Thin Clients

**Fujitsu**

PHONE +49 821 804 3387
WEB www.ts.fujitsu.com

**Hectronic AB**

PHONE +46-733-660704
EMAIL patrik.bjorklund@hectronic.se
WEB www.hectronic.se

**QSeven**

**H6069**
- AMD Embedded G-Series SOC
- Soldered DDR3 RAM 2GB (Module prepared for 4GB)
- 1x SATA ports
- 2 x USB 3.0, 4 x USB 2.0
- 4 ports for PCIe x1
- Dual 24-bit LVDS and DisplayPort or DVI or HDMI
- Gaming, Information Appliances, Communications, Industrial Controllers, Medical, Single Board Computers, Digital Signage, Point Of Sale

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EMAIL Thomas.Stanik@ts.fujitsu.com
WEB www.ts.fujitsu.com

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**Mini-ITX**

**FUTRO S520**
- AMD Embedded G-Series SOC
- 1x SODIMM DDR3 1600/1333/1066 MHz, Max up to 4GB
- 2x Front USB 3.0, 4x Rear USB 2.0
- 1x DisplayPort 2560 x 1600, 1x DVI-I 1920 x 1200
- Thin Clients
Digital Gaming System

**QXi-300**
- AMD Embedded G-Series SOC
- 2x DDR3-1600 (PC3-12800) SODIMM sockets
- 4x USB 2.0 ports
- Advanced PCI Express, gaming logic and NVRAM
- Meets the requirements of GLI-11 and all major global gaming jurisdictions
- Fanless operation
- Cost-effective “all-in-one” two-screen gaming platform

**QXi-307**
- AMD Embedded G-Series SOC Platform
- AMD Radeon E8000 Series
- Gaming

**4”x4”**
- AMD Embedded G-Series SOC
- AMD Radeon R800 series graphics
- Dual memory 50-DIMMS non-ECC
- Dual simultaneous displays
- 4 x 4 Audio jacks
- Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

**3.5” Single Board Computer**

**IB903**
- AMD Embedded G-Series SOC
- 1x DDR3 500M , Max. 8GB
- Supports DVI-I and 24-bit dual channel LVDS
- 2x Realtek RTL8111G PCI-E Gigabit LAN
- Watchdog timer, Digital I/O, mSATA, ISAMRT
- 6x USB, 4x COM, 2x SATA III
- 2x Mini PCI-E (half-sized)
- Gaming, Single Board Computers, Digital Signage, Thin Clients

**COM Express Compact**

**MSC C6C-GX**
- AMD Embedded G-Series SOC
- Up to 16GB DDR3 SDRAM, dual-channel
- 2x SATA 3Gb/s mass storage interfaces
- 2x USB 3.0 and 6x USB 2.0 interfaces
- 1x Digital Display Interface (DP 1.2, DVI, HDMI 1.4a)
- 1x Embedded DisplayPort 1.3 (shared with LVDS 24 bit, dual channel)
- Gaming, Information Appliance, Communications, Industrial Controllers, Medical, Digital Signage, Point Of Sale

**3.5” Single Board Computer**

**IB903**
- AMD Embedded G-Series SOC
- 1x DDR3 500M , Max. 8GB
- Supports DVI-I and 24-bit dual channel LVDS
- 2x Realtek RTL8111G PCI-E Gigabit LAN
- Watchdog timer, Digital I/O, mSATA, ISAMRT
- 6x USB, 4x COM, 2x SATA III
- 2x Mini PCI-E (half-sized)
- Gaming, Single Board Computers, Digital Signage, Thin Clients

**COM Express Compact**

**MSC C6C-GX**
- AMD Embedded G-Series SOC
- Up to 16GB DDR3 SDRAM, dual-channel
- 2x SATA 3Gb/s mass storage interfaces
- 2x USB 3.0 and 6x USB 2.0 interfaces
- 1x Digital Display Interface (DP 1.2, DVI, HDMI 1.4a)
- 1x Embedded DisplayPort 1.3 (shared with LVDS 24 bit, dual channel)
- Gaming, Information Appliance, Communications, Industrial Controllers, Medical, Digital Signage, Point Of Sale

**4”x4”**
- AMD Embedded G-Series SOC
- AMD Radeon R800 series graphics
- Dual memory 50-DIMMS non-ECC
- Dual simultaneous displays
- 4 x 4 Audio jacks
- Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

**Digital Gaming System**

**QXi-300**
- AMD Embedded G-Series SOC
- 2x DDR3-1600 (PC3-12800) SODIMM sockets
- 4x USB 2.0 ports
- Advanced PCI Express, gaming logic and NVRAM
- Meets the requirements of GLI-11 and all major global gaming jurisdictions
- Fanless operation
- Cost-effective “all-in-one” two-screen gaming platform

**QXi-307**
- AMD Embedded G-Series SOC Platform
- AMD Radeon E8000 Series
- Gaming

**4”x4”**
- AMD Embedded G-Series SOC
- AMD Radeon R800 series graphics
- Dual memory 50-DIMMS non-ECC
- Dual simultaneous displays
- 4 x 4 Audio jacks
- Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients
**TM-F3GS Mini-ITX**

- AMD Embedded G-Series SOC Platform
- AMD Radeon HD 8400DE
- Industrial Controllers, Medical, Single Board Computers, Other

**IPC-F3GS**

- AMD Embedded G-Series SOC
- AMD Radeon 8000 series graphic
- Dual Memory DIMMS Non-ECC
- Dual simultaneous displays
- 4 SATA ports, 8 USB ports
- 2x DDR3 DIMMs up to 1600
- 1x PCI-E (x16 at x4 BW), 1x Mini PCI-E
- Gaming, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

**Sapphire Technology Limited**

PHONE 886226270685  
EMAIL embedded@sapphiretech.com  
WEB www.sapphiretech.com

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**Pico-ITX SECOpITX-GX**

- AMD Embedded G-Series SOC
- Reduced space, with low power consumption and high performance
- Up to 8GB on DDR3 1600MHz SO-DIMM @1.5V
- 18 bit single channel LVDS or embedded DisplayPort internal connector
- VGA interface (requires external optional Video Adapter)
- 2 x standard USB 3.0 Type A connectors; 4 x internal USB 2.0 ports
- Gaming, Medical, Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

**Seco**

PHONE +39 0575 26979  
FAX +39 0575 350210  
EMAIL info@seco.com  
WEB www.seco.com

---

**Panel PC Thinlabs TL2300/2400 22” POE AIO Touch Computer**

- AMD Embedded G-Series SOC
- 2x DDR3, 1600/1333/1066, Max up to 16GB
- 1x LVDS 2 Channel 1920 x 1080  
1x DVI/HDMI 1920 x 1080
- 2x USB 3.0, 4x USB 2.0, Host
- 3x SATA 3.0Gbps, 2.0 compliant
- Digital Signage, Point Of Sale, Thin Clients

**Thinlabs**

PHONE 215-315-3858  
EMAIL sachit.baliga@thinlabs.com  
WEB thinlabs.com

---

**Panel PC Thinlabs TL8500/8600 19” POE AIO Touch Computer**

- AMD Embedded G-Series SOC
- 2x DDR3, 1600/1333/1066, Max up to 16GB
- 1x LVDS 2 Channel 1920 x 1080, 19"  
1x DVI/HDMI 1920 x 1080, 19"
- 2x USB 3.0, 4x USB 2.0, Host
- 3x SATA 3.0Gbps, 2.0 compliant
- Digital Signage, Point Of Sale, Thin Clients

**Thinlabs**

PHONE 215-315-3858  
EMAIL sachit.baliga@thinlabs.com  
WEB thinlabs.com

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**ZTE Corporation**

**PHONE** +86 18627573568  
**WEB** www.en.zte.com.cn/en  
**EMAIL** feng.guang39@zte.com.cn

**ZXLoud iBOX CT340**
- AMD Embedded G-Series SOC Platform
- Thin clients

**Win Enterprises**

**PHONE** (978) 688-2000  
**FAX** (978) 688-4884  
**EMAIL** info@win-ent.com  
**WEB** www.win-ent.com

**Fanless System PL-60830**
- AMD Embedded G-Series SOC
- HDMI & VGA Dual Display
- DDR3 1600 up to 4GB
- Support 1 x 2.5” SATA HDD and 1 x Half-size mSATA
- 3 x COM, USB3.0, Audio
- 2 x Mini-PCIe sockets, DC 8V~32V input
- Gaming, Industrial Controllers, Digital Set Top Boxes, Networking, Digital Signage, Point Of Sale

**TUL Corporation**

**PHONE** 886 8698 3000 ext. 261  
**EMAIL** willie@tul.com.tw  
**WEB** www.tulembedded.com

**TUL**
- RS-240
  - AMD Embedded G-Series SOC Platform
  - AMD Radeon™ HD 7000G Series
  - API: DirectX® 11, OpenGL® 4.2
  - 2 x, 6.0Gbps, 3.0 compliant, 1 standard (support SATA DOM), and the other 1 support mSATA
  - 1x, Header, RS232
  - Gaming, Digital Set Top Boxes, Digital Signage, Point Of Sale, Thin Clients, Other

**RS-240**
- AMD Embedded G-Series SOC Platform
- AMD Radeon™ HD 7000G Series
- API: DirectX® 11, OpenGL® 4.2
- 2 x, 6.0Gbps, 3.0 compliant, 1 standard (support SATA DOM), and the other 1 support mSATA
- 1x, Header, RS232
- Gaming, Digital Set Top Boxes, Digital Signage, Point Of Sale, Thin Clients, Other

**Follow AMD Embedded Solutions on Twitter! @AMDEmbedded**
DIGITAL MULTIMEDIA TECHNOLOGY EXCELS FOR INTERACTIVE RETAIL APPLICATIONS

AMD Embedded R-Series APU Helps TMTFactory and AOpen Create a Personalized Digital Experience at the FC Barcelona MegaStore

FC Barcelona Megastore provides its customers with a unique experience both in terms of retail innovation and multimedia technology, offering them a seamless digital experience and the opportunity to customize, visualize and purchase personalized products onsite at the store. The three-story store located on the Camp Nou premises, a football stadium in Barcelona, Catalonia, Spain, is renowned for offering the finest collection of official FC Barcelona and brand-name football products.

FC Barcelona has further differentiated itself by embracing digital media as a means to entice customers. The high profile FC Barcelona Megastore recently underwent a sophisticated makeover, redesigning its shop interior and integrating a sixteen meter-wide LED screen which now takes center stage in the store. But FC Barcelona wanted an additional “wow” factor – the megastore wanted to fuse the digital and physical domains by automating its popular personalized shirt printing, making it more interactive for customers and cutting long wait times.

Working with TMTFactory and using AOpen Digital Engine media players as the technological backbone, FC Barcelona installed large interactive touch kiosks throughout the store so that customers can choose their favorite football shirt, add their name or text plus their lucky number, and immediately see the result on the large display to review what they have created.

TMTFactory, a service company that provides multimedia content and consulting services for digital projects, selected AOpen Digital Engine DE6100 media players with AMD Embedded R-Series APUs to power the displays due to the underlying multi-display capabilities and rich-media application support, which helped to ensure smooth operation and quick response times.

GETTING THE RIGHT TECHNOLOGY

Among the reasons that TMTFactory chose AOpen Digital Engine DE6100 media players were the high performance, low total cost of ownership, and reliability of the systems. AOpen’s Digital Engine DE6100 media players are designed to handle advanced multimedia and computational workloads. Compact and powerful systems, they enable multi-display capabilities for cutting-edge digital signage applications with support for Spanning (stretched desktop) and Extended Desktop for up to three independent HD displays.

As the underlying processing platform behind AOpen’s Digital Engine DE6100 media players, AMD Embedded R-Series APUs deliver high-performance processing coupled with a premium high-definition visual experience. With extraordinary integrated graphics and multi-display capabilities in a compact, low power solution, AMD R-Series APUs are well-equipped to power AOpen/TMTFactory’s embedded application. With average power as low as 13 Watts and discrete-class AMD Radeon™ HD 7000G Series graphics integrated into the AMD R-Series APU, applications that previously required a discrete graphics card can be developed with a single-chip solution in smaller form factors potentially resulting in lower power and cost. 1

The third generation Unified Video Decoder in the AMD R-Series APU enables the delivery of crisp and clear video. For more demanding graphics applications, AMD Radeon™ Dual Graphics technology combines the processing power of AMD R-Series APUs and discrete AMD Radeon™ Embedded GPUs to more than double graphics performance compared to using discrete graphics alone. 2, 3 AMD Eyefinity technology allows the AMD R-Series APUs to drive multiple displays simultaneously as a single large surface, enabling stunningly crisp 3D, 4K, and HD video content and offering support for up to four independent displays (4096 x 2160 resolution per display output). 4
AMD Embedded R-Series APUs help enable a wide range of compute intensive applications that are low power and fit into small form factors, easily accommodating AOpen’s compact Digital Engine DE6100 media players.

HIGH-DEFINITION VISUALIZATION HELPS DRIVE SALES
FC Barcelona’s interactive kiosk, the Digital Locker™, is a fully integrated eCommerce platform spanning product selection to point-of-sale capabilities. To buy a personalized shirt, the customer simply touches the screen, customizes its item and pays via credit card, then picks up the final product from FC Barcelona’s “Printing Lab” without having to wait in long queues. In the first four months after the Digital Locker went live, FC Barcelona enjoyed a 22% increase in sales on personalized shirts.5

The Digital Locker instills elements of fun and enticement, because passers-by can see what others create and are tempted to do the same. Shoppers are embracing digital technology in the store, which in turn is driving sales. In addition to the sales increase, the store also minimizes waiting times as queues are much shorter at the cash register and the shirt customization process has shortened as a result of the real-time product visualization capability.

AMD Embedded R-Series APUs are an excellent fit for solution providers such as TMTFactory and AOpen who help facilitate high-definition visual experiences for customers like FC Barcelona. AMD R-Series APUs offer the right balance of performance per watt per dollar, and help deliver the rich multimedia content that grabs consumers’ attention and drives sales.

ABOUT AOPEN
AOPEN is a major electronics manufacturer and one of the world’s leading providers of commercial products and applied business solutions. It specializes in two areas: ultra-small form factor computing for both home and business applications, and digital signage, from hardware to software and services. For more information, visit www.aopen.com.

ABOUT TMTFACTORY
TMTFactory is recognized on a global level as a consultant in strategic technology for digital signage, with global solutions based on the conceptualization, production and management of various distinguished channels. The current goal of the company is to offer all kinds of digital products and services in the field of digital marketing and communications, providing creative and technical experience in a language adapted and suited for any audience. For more information, visit www.tmtfactory.com.

Images courtesy of TMTFactory
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1. The average power for 35W TDP AMD APU when running one iteration of 3DMark 06 default run was 12.861 Watts. Test performed on an AMD A10 Series APU that is equivalent to the AMD R-464L APU. System configuration: AMD A10 2.3GHz 4/1/D, “Pumori” development platform, 4 GB RAM, Windows 7 Ultimate. EMB-20
2. AMD Radeon™ Dual Graphics technology combines the processing power of select AMD APUs and select AMD Radeon GPUs and can support displays connected to either the APU or the discrete GPU. Windows Vista® or Windows® 7 operating system required.
3. 3DMark® Vantage P score for AMD Radeon E6460 alone is 2162. The combined 3DMark Vantage P score for the E6460+R-464L is 4538. System configuration: AMD R-464L APU, “Parmer” development platform, AMD Radeon E5760 6XMDP graphics adapter, 4 GB RAM, Windows 7 Home Premium. EMB-19
4. AMD Eyefinity technology supports up to six DisplayPort monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design; consult specifications with manufacturer before purchase. To enable two displays, or multiple displays from a single output, additional hardware such as DisplayPort-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See www.amd.com/eyefinityfaq for full details.
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 EMBEDDED G-SERIES APU PLATFORM

AMD’s original combination of low-power CPU and advanced GPU integrated into a single embedded device.

<table>
<thead>
<tr>
<th>Model</th>
<th>x86 Core Clock Speed Base/Boost</th>
<th>L2 Cache</th>
<th>GPU</th>
<th>DDR3 Speed</th>
<th>x86 Cores</th>
<th>UVD 3</th>
<th>Display Outputs</th>
<th>Max TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>T56N</td>
<td>1.65GHz</td>
<td></td>
<td>AMD Radeon™ HD 6320</td>
<td>DDR3-1333 Unbuffered</td>
<td>2</td>
<td></td>
<td>Yes</td>
<td>18W</td>
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<tr>
<td>T56E</td>
<td>1.65GHz</td>
<td></td>
<td>AMD Radeon™ HD 6250</td>
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<td>2</td>
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<td></td>
<td>AMD Radeon™ HD 6250</td>
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<td>2</td>
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<td>T48E</td>
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<td>18W</td>
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<tr>
<td>T44R</td>
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<tr>
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<td></td>
<td>5W</td>
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</tbody>
</table>

1. Unified Video Decoder (UVD 3) for hardware decode of high-definition video.
2. 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.
3. Low voltage (1.35V) DDR3 is assumed for the 9W TDP processors. The use of 1.5V DDR3 will incur a power adder.
4. Other resolutions available that do not oversubscribe link bandwidth. Display resolutions limited by available memory bandwidth.

**Note:** Always refer to the processor/chipset data sheets for technical specifications. Feature information in this document is provided for reference only.
PC/104 Plus
PFM-HDS
- AMD Embedded G-Series APU
- AMD AS5E Controller
- 50DIMM, 4GB, DDR3, 1x, 1066/800
- 4x Header, USB 2.0
- 3x ESM, Header, RS232/RS422/RS485
- 1x SATA, 3.0Gbps
- Aeon Hi-Safe SDK/Utility supported
- Gaming, Communications, Industrial Controllers, Single Board Computers, Digital Signage, Point of Sale

Aeon
PHONE (714) 996-1800
FAX (714) 996-1811
EMAIL info@aeon.com
WEB www.aeon.com

PICMG 1.0
PCA-6763
- AMD Embedded G-Series APU
- AMD AS5E Controller Hub
- 1x DDR3 1066/800, Max up to 1GB
- 1 x Mini-PCIe
- 4 SATA 6.0 Gbps, 3.0 compliant
- 6x Header USB 2.0, 1x TypeA USB 2.0
- 1x DVI 1920 x 1200, LVDS 1920 x 1200
- Industrial Controllers, Single Board Computers

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

COM Express Type 6 Module
Express-GFC
- AMD Embedded G-Series APU
- AMD AS5E Controller Hub
- Up to 8GB Dual Channel DDR3 SDRAM at 1333MHz
- 2x DDR (Digital Display Interface) for DP/HDMI/DVI
- 6 free PCIe x1 lanes (optional PCIe x4)
- 4x SATA 6 Gb/s, Gigabit Ethernet
- 2x USB 3.0/2.0 and 6x USB 2.0
- Gaming, Medical, Digital Signage

ADLINK Technology, Inc.
PHONE 886-2-8226-5877 x8530
EMAIL elsie.chen@adlinktech.com
WEB www.adlinktech.com

Fanless Box PC
ARES-1500-A10
- AMD Embedded G-Series APU
- AMD AS5E Controller Hub
- Fanless with Aluminum Chassis Design
- Suitable for Harsh Environment
- Support Optional WiFi or 3G Connection
- Slim, Compact 6 Cable-free Design
- 4 x USB, 4 x COM, 2 GBE LAN, DVI-I
- Industrial Controllers, Medical, Networking, Point Of Sale, Thin Clients

Arbor Technology Corp.
PHONE (866) 270-2617
FAX (408) 452-8909
EMAIL info1@arborsolution.com
WEB www.arbor.com.tw

Embedded Gaming Board
GA-1200
- AMD Embedded G-Series APU
- AMD AS5M Controller Hub
- 50DIMM, 4GB, DDR3, 1x, 1333/1066/800
- PCIe, X4, PCI-E x4 (PCI-E x16 connector)
- 6x USB 2.0
- Independent dual display by VGA + DVI-D
- Gaming, Industrial Controllers, Single Board Computers

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

3.5" Single Board Computer
ECM-AS5M
- AMD Embedded G-Series APU
- with AMD Radeon HD 6290 Graphics
- (Optional C-T56N APU)
- AMD AS5M Controller Hub
- One 204-pin DDR3 500MM Socket Supports Up to 4GB DDR3 1066 SDRAM
- Dual View, 2-CH LVDS, CRT, HDMI
- 7.1-CH Audio, Dual GbE
- 1CF, 2 SATA, 2 COM, 7 USB, 16-bit GPIO

Avalue Technology Inc.
PHONE +886-2-8226-2345
FAX +886-8226-2777
EMAIL sales@avalue.com.tw
WEB www.avalue.com.tw
Industrial Panel PC
LPC-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, G2E, optional WiFi
- 1 CF, 2 COM, 4 USB
- Fanless operation, VESA Compliance
- IP-65 Compliant Front Panel
- High Brightness, Anti-scratch Panel (option)
- Compatible installation/mounting Accessories

Centerm Information Co., Ltd.
PHONE 0591-28053888-8757
EMAIL ctsales@centerm.com
WEB www.centerm.com.cn

DSB-310
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- Fanless, light-weight design
- DDR3-1066/1133 3D-DIMM max up to 4GB
- Displayport & VGA
- 2.5” SATA drive bay & 1 CF
- Optional wireless LAN module
- Gaming, Single Board Computers, Digital Signage

Custom Board
GA690-2r
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- 1x SODIMM DDR3 1066/800, Max up to 4GB
- 1x SATA, 3.0Gbps, 3.0 compliant
- 5x TypeA USB 2.0
- Thin Clients

Mini-ITX Single Board Computer D3003-S
- AMD Embedded G-Series APU
- HD Audio on board
- Dual GbE LAN on board
- Serial ATA III RAID on board
- mSATA socket support (for Embedded OS) onboard
- 2x USB 2.0 onboard
- 8 Bit GPIO onboard
- Infineon TPM V1.2 onboard
- Designed for fanless operation
- Mainboard ready for EuP

DT Research, Inc.
PHONE (408) 934-6220
EMAIL info@dtresearch.com
WEB www.dtresearch.com

Industrial Computer
Modular Thin Platform DT135D
- AMD Embedded G-Series APU Platform
- High performance with low power consumption
- Support for Linux, Microsoft® Windows® XP
- Embedded or Windows® Embedded Standard 7
- 2 video-out ports: DVI-I connector and VGA Port
- Fanless design, no moving parts
- Integrates major thin-client/server computing protocols
  (Citrix ICA, Microsoft RDP) and web browsers
- Comprehensive remote device administration through
  server-based WebDT Device Manager software

Axiomtek
PHONE (626) 581-3232
EMAIL info@axiomtek.com
WEB www.axiomtek.com/US

Digital Signage Player
eBOX532-100-FL
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- Ultra slim and compact design
- Supports 4 USB 2.0 ports and 2 COM ports
- 1.25 SATA HDD drive bay, 1 CompactFlash™
- 4x USB 2.0
- Gaming, Information Appliance, Medical, Single Board Computers, Digital Signage

Avalue Technology Inc.
PHONE +886-2-8226-2345
EMAIL sales@avalue.com.tw
WEB www.avalue.com.tw

DT Research, Inc.
PHONE (408) 934-6220
EMAIL info@dtresearch.com
WEB www.dtresearch.com

Axiomtek
PHONE (626) 581-3232
EMAIL info@axiomtek.com
WEB www.axiomtek.com/US

Centerm Information Co., Ltd.
PHONE 0591-28053888-8757
EMAIL ctsales@centerm.com
WEB www.centerm.com.cn

Custom Board
GA690-2r
PHONE (626) 581-3552
EMAIL info@axiomtek.com
WEB www.axiomtek.com/US

Fujitsu
PHONE +49 821 804 3387
EMAIL Thomas.Stanik@ts.fujitsu.com
WEB www.ts.fujitsu.com

Fujitsu
PHONE +49 821 804 3387
EMAIL Thomas.Stanik@ts.fujitsu.com
WEB www.ts.fujitsu.com
**Custom Board**

**FUTRO X913**
- AMD Embedded G-Series APU
- 2x SODIMM DDR3 1600/1333/1066 MHz, Max up to 4GB
- 2x Left side USB 2.0, 2x Rear USB
- 2.0, 2x Internal USB 2.0
- 1x DVI-I @ 1920 x 1200
- Thin Clients

**Fujitsu**

PHONE  +49 821 804 3387
WEB  www.ts.fujitsu.com

**Shenzhen i-long Business Machine Co., Ltd.**

PHONE  86-755-82877033
FAX  86-755-82674781
WEB  i-long.en.gongchang.com

**Industrial Computer**

**JBC361F35**
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- Support DirectX 11 3D Graphics Acceleration
- Support 2.5 Gigabit LAN
- Equipped with 802.11 b/g/n WiFi card & Internal Antenna (JBC361F35W-B only)
- Support 2.5" SATA HDD
- Small size and provide VESA mount bracket
- Gaming, Digital Set Top Boxes, Digital Signage, Point Of Sale, Thin Clients

**JETWAY Information Co., Ltd**

PHONE  +886 2 89132711
FAX  +886 2 89132722
EMAIL  louis.chang@jetway.com.tw
WEB  www.jetway.com.tw

**Mini-ITX Single Board Computer**

**NF81-T56N**
- AMD Embedded G-T56N APU with AMD Radeon™ HD 6320 Graphics
- Silent fan, silent drivers
- 6x SATA, 6.0Gbps, 3.0 compliant, 1 port is m-SATA connector
- Designed for Digital Signage and Gaming machine applications

**Men Micro, Inc.**

PHONE  +49 011-93 33 5-242
WEB  www.men.de

**Mini-ITX**

**ITX-AF2X21B/D**
- AMD Embedded G-Series APU
- AMD AS55 Controller Hub
- 2x DIMM DDR3 1066/800, Max up to 8GB
- 4x TypeA USB 2.0 Host, 2x Header USB 2.0 Host
- 5x SATA 3.0 Gbps
- 2x Mini PCIe X1, 1x PCIe X1
- 1x DVI 1280 x 720
- Accelerated Parallel Processing, Gaming, Medical, Networking, Digital Signage, Point Of Sale, Thin Clients

**Men Micro, Inc.**

PHONE  86 0755 83663196
WEB  www.micputer.com

**SHENZHEN XINZHIXIN ENTERPRISE DEVELOPMENT CO., LTD**

PHONE  86-755-83663196
EMAIL  sale@czx.net.cn
WEB  www.micputer.com

---

**Custom Board**

**IM-AMD-Ontario**
- AMD Embedded G-Series APU
- AMD AS55 Controller Hub
- SODIMM, 4GB, DDR3, 1x 1920/1066/800
- 2x TypeA USB 2.0, Host, Front
- 3x TypeA USB 2.0, Host, Back
- 6x Header, USB 2.0, Host, Internal
- 3x SATA, 6.0Gbps, 3.0 compliant
- Information Appliance, Industrial Controllers, Medical, Digital Set Top Boxes, Digital Signage, Point-Of-Sale, Thin Clients

**JETWAY Information Co., Ltd**

PHONE  +886 2 89132711
EMAIL  louis.chang@jetway.com.tw
WEB  www.jetway.com.tw

**Men Micro, Inc.**

PHONE  +49 011-93 33 5-242
EMAIL  info@men.de
WEB  www.men.de

**SHENZHEN XINZHIXIN ENTERPRISE DEVELOPMENT CO., LTD**

PHONE  86-755-83663196
EMAIL  sale@czx.net.cn
WEB  www.micputer.com
Mini-ITX
ITX-AF2X62A/B
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- 2x 512MB DDR3 1333/1066/800, Max up to 8GB
- 4x TypeA USB 2.0 Host, 4x Header USB 2.0 Host
- 6x SATA 3.0 Gbps, 2.0 compliant
- 2x Mini-PCIe X1
- 1x HDMI 2560 x 1600
- Gaming, Storage, Medical, Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

Nano-ITX Motherboard
NANO-AF251F
- AMD Embedded G-Series APU
- AMD A55M Controller Hub
- 1x 512MB DDR3 1333/1066/800, Max up to 8GB
- 1x Notebook SATA 3Gb/s with power interface
- 2x MINI PCI-E slot (support WiFi and S50)
- 6x USB 2.0
- 1x VGA port, 1x HDMI port

Nano-ITX
Nano AF251E
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- 1x 512MB DDR3 1333/1066/800, Max up to 2GB
- 4x TypeB USB 2.0 Host, 2x Header USB 2.0 Host
- 1x SATA 3.0 Gbps, 2.0 compliant
- 1x Mini-PCIe X1
- LVDS 1024 x 768, HDMI 24-bit
- Industrial Controllers, Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

Desktop Network Security Appliance CAF-1000
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- 50x DIMM, 8GB, DDR3, 1x, 1066/800
- 2x USB 2.0
- 1x SATA, 3.0 Gbps, 2.0 compliant
- 200(W) x 112(D) x 52(H) mm

Mini-ITX Motherboard
ITX-AF2E21A/C
- AMD Embedded G-Series APU
- AMD A55M Controller Hub
- 2x DDR3-1333 (PC3-10600) SODIMM sockets
- 4x USB 2.0 ports
- Gaming, Storage, Medical, Digital Set Top Boxes, Single Board Computers, Digital Signage, Point Of Sale, Thin Clients

Nano-ITX Motherboard
NANO-AF2S1F
- AMD Embedded G-Series APU
- AMD A50M Controller Hub
- 1x 512MB DDR3 1333/1066/800, Max up to 4GB
- 1x Notebook SATA 3Gb/s with power interface
- 2x MINI PCI-E slot (support WiFi and S50)
- 6x USB 2.0
- 1x VGA port, 1x HDMI port

Digital Gaming System
QXi-200
- AMD Embedded G-Series APU
- AMD AS50 Controller Hub
- 2x DDR3-1333 (PC3-10600) SODIMM sockets
- 1x DVI-I (analogue or digital), 1x DVI-D (digital)
- 1x PCI Express® Gigabit LAN controllers
- 4x USB 2.0 ports
- Cost effective, compact “all-in-one” gaming platform

American Portwell Technology, Inc.
PHONE (510) 403-3399
FAX (510) 403-3184
EMAIL info@portwell.com
WEB www.portwell.com

Quixant UK Ltd
PHONE +44 (0) 1223 89296
FAX +44 (0) 1223 892401
EMAIL sales@quixant.com
WEB www.quixant.com

SHENZHEN XINZHIXIN ENTERPRISE DEVELOPMENT CO.,LTD
PHONE 86 0755 83663196
EMAIL sale@xzx.net.cn
WEB www.micputer.com

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WEB www.micputer.com

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PHONE 86 0755 83663196
EMAIL sale@xzx.net.cn
WEB www.micputer.com

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AMD EMBEDDED SOLUTIONS GUIDE
Mini PC Solution
SP-FT1M1
- AMD Embedded G-Series APU
- AMD ASOM Controller Hub
- SODIMM, 8GB, DDR3, 1x 1333/1066/800
- 320 GB SATA 2.5" Hard Drive (Optional)
- 1x HDMI, 1x VCA
- 0.5L: 19.3 x 14.8 x 2.2 cm (L / W / H)
- Digital Signage, Point Of Sale, Thin Clients

Sapphire Technology Limited
PHONE 886226270685
WEB www.sapphiretech.com
EMAIL embedded@sapphiretech.com

Panel PC
TP057GT
- AMD Embedded G-Series APU
- AMD ASSE Controller Hub
- 2 Gbyte DDR3, 8 Gbyte Flash (maximum 32 GByte), SD/SDHC memory card (maximum 2 Gbyte / 32 GByte)
- 4 x USB host 2.0 full speed
- Resolution (W x H in pixels) 640 x 480
- Analog resistive touch, 5.7" display
- Industrial Controllers

SÜTRON electronic GmbH
PHONE +49 711 77098618
WEB www.suetron.de
EMAIL info@suetron.de

RS-180
- AMD Embedded G-Series APU Platform
- Graphics Processor: AMD Radeon™ HD 6250
- HDMI, 1920 x 1080
- PCIe: 1x, Mini-PCIe, X1
- SATA: 2x, 3.0Gbps, 2.0 compliant
- Digital Set Top Boxes, Digital Signage, Point Of Sale, Thin Clients, Other

TUL Corporation
PHONE 886 8698 3000 ext. 261
WEB www.tulembedded.com
EMAIL willie@tul.com.tw

3.5”
Refugio/Vulcan/Magnum Series
- AMD Embedded G-Series APU
- Ethernet Flash drive with iSCSI protocol built in.
- PoE powered from standard Network switch.
- Single 1G, dual 1 Giga and dual 10 Giga.
- Flash capacities up to 1TB.
- Management software
- SAN, NAS, Object Storage and Hadoop

Silvercor
PHONE (408) 426-4428
WEB www.silvercor.com
EMAIL info@silvercor.com

NANO PC HD ITX
TS 1000/TS 1100
- AMD Embedded G-Series APU
- AMD ASOM Controller Hub
- X 5 GDDMM DDR3 1066/800, Max up to 4GB
- 1x SATA, 3.0Gbps, 2.0 compliant
- 1x TypeA USB 2.0
- 1x HDMI 1920 x 1080
- 1x Mini-PCIe
- Accelerated Parallel Processing, Information Appliance, Industrial Controllers, Storage, Digital Set Top Boxes, Single Board Computers, Networking, Digital Signage, Point Of Sale, Thin Clients

TECSYS
PHONE 55 12 3797-8800
FAX 55 12 3797-8824
EMAIL tecsysbrasil@tecsysbrasil.com.br
WEB www.tecsysbrasil.com.br

Z3RO Pro Computer
- AMD Embedded G-Series APU
- AMD ASSE Controller Hub
- 4GB of DDR3 RAM
- 32GB - 512 GB Masa SSD
- 1x Displayport/HDMI Combo, 1x Mini-DisplayPort, 1x eSATA/USB 2.0 combo ports
- Can run two HD displays simultaneously
- Information Appliance, Industrial Controllers, Medical, Digital Set Top Boxes, Digital Signage, Point of Sale

XI3 Corporation
PHONE 801-478-3800
WEB www.xi3.com
EMAIL sales@xi3.com

TUL Corporation
PHONE 886 8698 3000 ext. 261
WEB www.tulembedded.com
EMAIL willie@tul.com.tw

3.5”
Refugio/Vulcan/Magnum Series
- AMD Embedded G-Series APU
- Ethernet Flash drive with iSCSI protocol built in.
- PoE powered from standard Network switch.
- Single 1G, dual 1 Giga and dual 10 Giga.
- Flash capacities up to 1TB.
- Management software
- SAN, NAS, Object Storage and Hadoop

Silvercor
PHONE (408) 426-4428
WEB www.silvercor.com
EMAIL info@silvercor.com

NANO PC HD ITX
TS 1000/TS 1100
- AMD Embedded G-Series APU
- AMD ASOM Controller Hub
- X 5 GDDMM DDR3 1066/800, Max up to 4GB
- 1x SATA, 3.0Gbps, 2.0 compliant
- 1x TypeA USB 2.0
- 1x HDMI 1920 x 1080
- 1x Mini-PCIe
- Accelerated Parallel Processing, Information Appliance, Industrial Controllers, Storage, Digital Set Top Boxes, Single Board Computers, Networking, Digital Signage, Point Of Sale, Thin Clients

TECSYS
PHONE 55 12 3797-8800
FAX 55 12 3797-8824
EMAIL tecsysbrasil@tecsysbrasil.com.br
WEB www.tecsysbrasil.com.br

Z3RO Pro Computer
- AMD Embedded G-Series APU
- AMD ASSE Controller Hub
- 4GB of DDR3 RAM
- 32GB - 512 GB Masa SSD
- 1x Displayport/HDMI Combo, 1x Mini-DisplayPort, 1x eSATA/USB 2.0 combo ports
- Can run two HD displays simultaneously
- Information Appliance, Industrial Controllers, Medical, Digital Set Top Boxes, Digital Signage, Point of Sale

XI3 Corporation
PHONE 801-478-3800
WEB www.xi3.com
EMAIL sales@xi3.com

TUL Corporation
PHONE 886 8698 3000 ext. 261
WEB www.tulembedded.com
EMAIL willie@tul.com.tw
The 2nd Generation AMD Embedded R-Series APU (previously codenamed "Bald Eagle") delivers breakthrough graphics performance and power efficiency for a new generation of embedded systems designed to provide ultra-immersive HD multimedia experiences and parallel processing compute performance. The AMD R-Series APU offers next-generation performance-per-watt compute efficiency in the x86 product category by allowing system designers to take advantage of Heterogeneous System Architecture (HSA).

2nd Generation AMD Embedded R-Series APUs enable stunningly crisp 3D, 4K, and HD video content and offer support for up to four independent displays (4096 x 2160 resolution per display output). The AMD Dual Graphics configuration allows you to combine the power of the 2nd Generation AMD R-Series APU with an AMD Embedded Radeon™ E8860 discrete GPU to provide up to 64% more 3D graphics performance than a standalone 2nd Generation AMD R-Series APU.

AMD's 2nd Generation AMD Embedded R-Series APU is a revolutionary leap in processing performance, power efficiency and multimedia immersion, well-suited for embedded gaming, medical imaging, digital signage and other embedded applications.

---

### Model Specifications

<table>
<thead>
<tr>
<th>Model#</th>
<th>OPN</th>
<th># x86 Cores</th>
<th># GPU CU</th>
<th>TDP (W)</th>
<th>L2 Cache (MBytes)</th>
<th>CPU Frequency (GHz) Max/Base</th>
<th>GPU (MHz) Max/Base</th>
<th>Memory</th>
<th>Max DDR3 Rate</th>
<th>CTDP Range</th>
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<tbody>
<tr>
<td>RX-427BB</td>
<td>RE427BDGH44JA</td>
<td>4</td>
<td>8</td>
<td>35W</td>
<td>4</td>
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<td>DDR3</td>
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<td>0</td>
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<td>3.6/2.7</td>
<td>-</td>
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<td>2133</td>
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<tr>
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<td>0</td>
<td>17W</td>
<td>1</td>
<td>3.0/2.2</td>
<td>-</td>
<td>DDR3</td>
<td>1600</td>
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</table>

1. AMD Dual Graphics technology combines the 3D graphics rendering resources of the APU’s discrete-class graphics processor with the discrete graphics processor to accelerate the Microsoft® Direct3D function for software applications using Microsoft DirectX® 10 or DirectX 11 technology.

2. The AMD RX-427BB scored 2,051, and the AMD Radeon™ E8860 paired with RX-427BB at dual-graphics mode scored 3,359 when running 3DMark®11P benchmark. The AMD Bald Eagle RX-427BB used an AMD Ballina motherboard with 8GB DDR3 1600 SO-DIMM memory and 256GB SanDisk SSD. The AMD Radeon E8860 used an AMD DB-FS1r2 motherboard with 8GB DDR3 memory, 64GB Crucial M4 SSD, and RX-427BB. The system ran Windows® 7 Ultimate. EMB-97.

Note: Always refer to the processor/chipset data sheets for technical specifications. Feature information in this document is provided for reference only.
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Aopen Inc.

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EMAIL tonyylim@aopen.com
WEB www.aopen.com/global/home
DEC 6100
- AMD Embedded R-Series APU
- AMD Radeon HD 7000G Series
- OS Supported: Windows® 7, Windows® XP, Linux®, Windows® XPe
- API: OpenCL™ 1.1, DirectX® 11
- Digital: 2x, HDMI, 1920 x 1080
- Digital Signage

Aopen Inc.
PHONE 886-2-77101161
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WEB www.aopen.com/global/home

COM Express / Type 6 conga-TFS
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3 SODIMM, 16GB, DDR3, 2x 1066/800
- 7 x PCI Express™
- 4 x SATA
- 4 x USB 3.0, 4 x USB 2.0
- High performance DirectX®11 GPU supports OpenCL™ 1.1 and OpenGL 4.2
- Gaming, Server, Information Appliance, Communications, Industrial Controllers, Medical, Digital Signage

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EMAIL sales-us@congatec.com
WEB www.congatec.us

Mini-ITX Motherboard CM100-C
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3 SODIMM, up to 8GB
- 1x HDMI, 2x DI (2 supports DVI-D signal), 1xVDS
- 1 PCIe x16, 2 PCIe x1 gold fingers, 1 Mini PCIe
- 4x SATA 3.0
- 4x USB 3.0, 6x USB 2.0
- Gaming, Industrial Controllers, Medical, Digital Signage, Point Of Sale

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WEB www.IBASE-usa.com

Mini-ITX Single Board Computer MAN0111
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A75 Controller Hub
- 2x DDR3 Dual channel 6G-DIMM
- T333/1600 max up to 16 GB
- 4 SATA-600 support RAID 0, 1, 5, 10
- 4 USB 3.0 supported
- 3 independent displays
- DisplayPort 2 supports multi-stream
- Gaming, Communications, Industrial Controllers, Medical, Digital Signage, Point Of Sale

Axiomtek
PHONE (626) 581-3232
FAX (626) 581-3552
EMAIL info@axiomtek.com
WEB www.axiomtek.com/US

Mini-ITX Motherboard M1059
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3-1600 Memory, up to 16GB Dual Channel
- 2 x DVI-D, Display Port & LVDS
- 2 x Mini PCIe (Ex1), PCI-Ex16
- 4 x USB 3.0 + 8x USB 2.0
- Gaming, Communications, Industrial Controllers, Medical, Digital Signage, Point Of Sale

DFI
PHONE (916) 568-1234
FAX (916) 568-1233
EMAIL sales@dfitech.com
WEB www.dfi.com

Mini-ITX Motherboard M1059
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3-1600 Memory, up to 16GB Dual Channel
- 2 x DVI-D, Display Port & LVDS
- 2 x Mini PCIe (Ex1), PCI-Ex16
- 4 x USB 3.0 + 8x USB 2.0
- Gaming, Communications, Industrial Controllers, Medical, Digital Signage, Point Of Sale

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FAX (916) 568-1233
EMAIL sales@dfitech.com
WEB www.dfi.com

COM Express Compact R2.0, Type 6 CM901-B
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3 SODIMM up to 8GB
- VCA, LVDS, DVI (DisplayPort, LVDS, VGA)
- 1 PCIe x16, 7 PCIe x1 (first 4 PCIe support PCIe x4)
- 4 SATA 3.0
- 8 USB 2.0 (first 4 USB ports support up to USB 3.0)
- Gaming, Information Appliance, Industrial Controllers, Medical, Digital Signage, Point Of Sale

DFI
PHONE (916) 568-1234
FAX (916) 568-1233
EMAIL sales@dfitech.com
WEB www.dfi.com

COM Express / Type 6 conga-TFS
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3 SODIMM, 16GB, DDR3, 2x 1066/800
- 7 x PCI Express™
- 4 x SATA
- 4 x USB 3.0, 4 x USB 2.0
- High performance DirectX®11 GPU supports OpenCL™ 1.1 and OpenGL 4.2
- Gaming, Server, Information Appliance, Communications, Industrial Controllers, Medical, Digital Signage

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Mini-ITX Motherboard MI959
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3-1600 Memory, up to 16GB Dual Channel
- 2 x PCI Express ™ x16, 7 PCIe x1 (first 4 PCIe support PCIe x4)
- 4x SATA 3.0
- 4x USB 3.0, 4x USB 2.0
- Gaming, Industrial Controllers, Medical, Networking, Digital Signage, Point of Sale

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WEB www.IBASE-usa.com

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- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- 2x DDR3-1600 Memory, up to 16GB Dual Channel
- 2 x PCI Express ™ x16, 7 PCIe x1 (first 4 PCIe support PCIe x4)
- 4x SATA 3.0
- 4x USB 3.0, 4x USB 2.0
- Gaming, Industrial Controllers, Medical, Networking, Digital Signage, Point of Sale

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WEB www.IBASE-usa.com
jETWAY Information Co., Ltd

**Mini-ITX Motherboard**

- **NF82**
- AMD Embedded R-Series APU
- AMD A75 Controller Hub
- 2 x SO DIMM sockets for un-buffered Dual Channel DDR3 1600 SDRAM up to 16 GB
- 6 x Serial ATA3 6Gb/s connectors support RAID 0, 1, 5, 10 functions
- 1 x PCI x 16 slot, 1 x Mini PCI-E
- Embedded 4 x USB 3.0 & 8 x USB 2.0/1.1
- Gaming, Digital Signage, Point Of Sale

---

**JETWAY Information Co., Ltd**

**Mini-ITX Motherboard**

- **NF82**
- AMD Embedded R-Series APU
- AMD A75 Controller Hub
- 2 x SO DIMM sockets for un-buffered Dual Channel DDR3 1600 SDRAM up to 16 GB
- 6 x Serial ATA3 6Gb/s connectors support RAID 0, 1, 5, 10 functions
- 1 x PCI x 16 slot, 1 x Mini PCI-E
- Embedded 4 x USB 3.0 & 8 x USB 2.0/1.1
- Gaming, Digital Signage, Point Of Sale

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**iBASE**

**Digital Signage Player**

**SI-38**

- AMD R-Series Quad-Core / Dual-Core APU, up to 35W
- Integrated AMD Radeon™ 384/240 Cores
- DirectX® 11 GPU in Processor
- Winner of Computex 2012 Design & Innovation Award
- Dual independent 1080p Hybrid DVI-I display outputs
- Supports DDR3 memory up to 16GB
- SMART - for End User power saving, auto-scheduler and power resume
- Dual Mini PCI-E (x1) slots for WiFi and TV tuner options
- 2x USB 3.0 and serial port (RS232)

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**SI-38**

- AMD R-Series Quad-Core / Dual-Core APU, up to 35W
- Integrated AMD Radeon™ 384/240 Cores
- DirectX® 11 GPU in Processor
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- SMART - for End User power saving, auto-scheduler and power resume
- Dual Mini PCI-E (x1) slots for WiFi and TV tuner options
- 2x USB 3.0 and serial port (RS232)

---

**Mini-ITX**

**KATA7OM/mITX**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- 10x USB 2.0, 4x USB 3.0
- 1x PCIe x8 & 1x PCIe x4
- Up to 4 independent display outputs
- Medical, Industrial Automation, Gaming, Digital Signage

---

**kontron America**

**Mini-ITX**

**KATA7OM/mITX**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- 10x USB 2.0, 4x USB 3.0
- 1x PCIe x8 & 1x PCIe x4
- Up to 4 independent display outputs
- Medical, Industrial Automation, Gaming, Digital Signage

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**kontron America**

**Mini-ITX**

**KATA7OM/mITX**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- 10x USB 2.0, 4x USB 3.0
- 1x PCIe x8 & 1x PCIe x4
- Up to 4 independent display outputs
- Medical, Industrial Automation, Gaming, Digital Signage

---

**COM Express Compact Module**

**MSC C6C-A7**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- Up to 16GB DDR3-1333 SDRAM, dual channel
- 4x SATA-300 mass storage interfaces
- 1x, LVDS 2 Channel
- 1x, DVI/HDMI/DisplayPort, 4096 x 2560
- 4x USB 3.0, 4x USB 2.0
- Gaming, Information Appliance, Industrial Controllers, Medical, Digital Signage, Point Of Sale

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**Nexcom**

**Multi-Display Embedded Computer**

**NDis B862**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- Slim and compact design
- 5 x HDMI
- 2 x USB3.0 support
- WLAN and TV tuner support
- Removable Fan Module
- Designed for Digital Signage

---

**Nexcom**

**Multi-Display Embedded Computer**

**NDis B862**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- Slim and compact design
- 5 x HDMI
- 2 x USB3.0 support
- WLAN and TV tuner support
- Removable Fan Module
- Designed for Digital Signage

---

**Nexcom**

**Multi-Display Embedded Computer**

**NDis B842**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- Slim and compact design
- 4 x HDMI
- 2 x USB3.0 support
- WLAN and TV tuner support
- Removable Fan Module
- Designed for Digital Signage

---

**Nexcom**

**Multi-Display Embedded Computer**

**NDis B842**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- Slim and compact design
- 4 x HDMI
- 2 x USB3.0 support
- WLAN and TV tuner support
- Removable Fan Module
- Designed for Digital Signage
Digital Gaming System
QX-40
- AMD Embedded R-Series APU
- AMD Radeon™ HD 6760 Graphics integrated
- AMD A75 Controller Hub
- 2x DDR3, 16GB, Max. 16GB (Non-ECC), 2x 1066/1333/1600
- 5x Type-A USB 3.0, 4x Type-B USB 2.0, 2x Header USB 2.0
- 1x PCI-E x4, 1x Mini PCI-E x1
- Fanless, all-in-one PC-based gaming controller for slot machines
- Supports up to four independent HD monitors
- Advanced PCIe® Express™ 2.0x gaming logic & SRAM / MRAM
- 4x DisplayPort, 2560 x 1600
- 6x SATA, 6.0Gbps, 2x eSATA, 6.0Gbps
- 2x PCIe
- Gaming

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Digital Gaming System
QX-50
- 2nd Generation AMD Embedded R-Series APU
- 2x DDR3-2133 (PC3-17000), Max. up to 16GB
- 2x USB 3.0, 1x USB 2.0 (4 internal, 7 on BP board)
- 6x DisplayPort, 1x DVI, 1x HDMI
- 4x SATA, 5.0Gbps, 4x eSATA, 5.0Gbps
- 4x PCIe
- Gaming

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WEB www.quixant.com

Digital Gaming System
QXi-4000
- AMD Embedded R-Series APU
- AMD Radeon™ HD 7000G Series Graphics integrated
- AMD A70 Controller Hub
- Fanless all-in-one PC-based gaming controller for slot machines
- Supports up to 10 independent monitors
- Advanced PCIe® Express™ 2.0x gaming logic & SRAM / MRAM
- 4x DisplayPort, 2560 x 1600
- 5x Type-A USB 2.0, Host
- 4x SATA, 6.0Gbps, 3.0 compliant, 2 x FCA sockets

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WEB www.quixant.com

Embedded System
SP-FP2M3
- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- 5x DIMM, 4-16GB, DDR3, 2x 1333/1066/800
- 1x HDMI, 1x DP, 1x 10/100, 1x GbE
- 2x SATA 2.5”, 1x eSATA 2.5” Hard Drive (Optional)
- 7.8” x 7.2” x 1.2” 197.5 x 182.5 x 31.6mm (L / W / H)
- Digital Signage, Point Of Sale, Thin Clients

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Gaming, Server, Storage, Digital Signage, Other

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EMAIL embedded@saphiretech.com
WEB www.saphiretech.com
**COM Express Basic SECOMExp-Rseries**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- Up to 8GB of 1600MHz DDR3 on two SO-DIMMs
- Able to drive up to 4 independent monitors using the EDVS / CRT / Digital Display interfaces
- Offering a PCIe Express Graphics x8 interface
- 4 x 5-ATA Channels 66a/s
- 8 x USB 2.0 ports; 4 x USB 3.0 ports
- Gaming, Digital Signage

**Mini-ITX Motherboard ITX-ATX21A, ITX-ATX21B, ITX-ATX21B-1, ITX-ATX21D, ITX-ATX21E, ITX-ATX21F**

- AMD Embedded R-Series APU
- AMD A70 Controller Hub
- 1x 5G DIMM DDR3 1066/1333MHz, Max up to 8GB
- 2x SATA 3Gb/s with power
- 2x MINI PC-E slot (1 pcs for wifi, 1 pcs for SSD)
- Industrial Controllers, Digital Set Top Boxes, Digital Signage, Point Of Safe, Thin Clients

**RS-400**

- AMD Embedded R-Series APU
- AMD Radeon HD 7000G Series
- PCIe: 1x, PCIe, X4
- Digital Signage, Other

**Embedded Gaming Board MB-63010**

- AMD Embedded R-Series APU
- AMD A75 Controller Hub
- 2x SODIMM DDR3 1600/1333/1066, Max up to 16GB
- 1x HDMI, 3x DVI
- 4x USB 3.0, 8x USB 2.0
- 1x PCIe, X8, X16 slot
- 1x Mini-PCIe, X1 or mSATA
- Gaming, Industrial Controllers, Medical

**Mini-ITX Motherboard MB-63010**

- AMD Embedded R-Series APU
- AMD A75 Controller Hub
- 2x SODIMM DDR3 1600/1333/1066, Max up to 16GB
- 1x HDMI, 3x DVI
- 4x USB 3.0, 8x USB 2.0
- 1x PCIe, X8, X16 slot
- 1x Mini-PCIe, X1 or mSATA
- Gaming, Industrial Controllers, Medical
DEVELOPING EMBEDDED SYSTEMS WITH DISCRETE HIGH-PERFORMANCE 3D GRAPHICS PROCESSORS

By Mitch Furman, Senior Manager, Embedded GPU products, AMD.

Designing a discrete graphics-processor-based system for embedded applications presents very different types of challenges when compared to more mainstream discrete graphics, especially as the systems are often used in domains like industrial automation, in-the-field digital signage, medical imaging, and casino gaming. Embedded systems such as these often must withstand extreme temperatures, and meet additional shock and vibration, cooling, and lifecycle requirements.

The three standard embedded graphics board formats – Multi-Chip Module (MCM) mounted directly on a motherboard, Mobile PCI Express Modules (MXM) connected to motherboards, and Peripheral Component Interconnect Express (PCIe) graphics cards – each present their own unique design considerations, and many applications have their own unique requirements and challenges.

HIGH-PERFORMANCE 3D GRAPHICS AND COMPUTE PERFORMANCE

Today’s embedded applications feature high-performance 3D graphics and compute capabilities not found in older solutions. For example, operators in an industrial manufacturing facility are constantly monitoring processes on systems that have changed from static, text-based displays to more elaborate and intuitive 3D graphic representations. Casino gaming solutions now require more processing power and immersive 3D graphics to capture players’ attention. Advanced discrete graphics processors now support multiple displays with improved 3D and video performance, which is essential for many industrial shop floor monitoring applications and casino gaming machines.

The medical imaging industry is also moving quickly to embrace 3D visualization at the point of care. For example, where dentists previously provided diagnoses and treatment recommendations made on the basis of static renderings on conventional 2D X-ray film and light-box illuminators, dentists and their patients can now have a much clearer view of teeth and gums with a new generation of video- and graphics-optimized 3D touchscreen panels attached to dental chairs.

GRAPHICS PROCESSOR OPTIONS

Developers who want to deliver high-definition visual experiences such as these in compact, power-efficient embedded systems can leverage the parallel processing performance of GPUs. Some GPUs integrate on-chip memory, eliminating the need for external graphics memory, which further reduces the complexity of PCB design and layout, memory tuning, and memory procurement logistics. GPUs can support 3D Application Programming Interfaces (APIs), such as OpenGL ES, and hardware-based video compression and decode. Developers can also have more flexibility if the graphics processor supports a wide variety of industry-standard operating systems, including VxWorks, Green Hills, and Linux.

The AMD Embedded Radeon E8860 GPU, introduced in February 2014, is an example of a GPU that offers these features...
to help developers deliver desktop-caliber graphics from small, embedded systems.

**DESIGN IMPLEMENTATIONS**

How a developer decides to implement discrete embedded graphics solutions will often depend on how much shock and vibration the application will receive, as well as upgrade requirements.

The most ruggedized and perhaps smallest of all the design options is the MCM. An MCM is comprised of a discrete graphics semiconductor die and memory packaged on a single substrate, which is mounted directly on the motherboard. MCMs take up less real estate on a PCB (33 mm x 33 mm), allowing for an optimal, low power, compact design. MCM solutions are usually the best choice for ruggedized environments because the graphics chip is mounted on the motherboard and is therefore very secure for applications that must deal with shock and vibration.

From a design perspective, using an MXM solution offers developers added design flexibility over the MCM solution. MXM was originally designed to create an industry-standard socket for laptops to ensure that users could upgrade their graphics processors easily, without having to buy a new system. MXMs connect to the motherboard via a specialized MXM interface, and are smaller than typical PCIe cards. However, from a design perspective, the interface and module take up more space on the motherboard when compared to an MCM. The advantage of this solution is that it is interchangeable. Developers can replace it with a higher-performing model at a later time or create customized versions.

MXM solutions are not as ruggedized as MCM solutions; there are degrees of movement possible, but because the MXM is contained in a fairly small package, it is less likely to shift. However, the MXM module can be physically secured to the motherboard to accommodate shock and vibration.

Developers typically choose a PCIe solution as an option when they want high-end graphics like higher-resolution 3D rendering or video playback, and additional display outputs (six or eight displays up from two or three). The card connects to a PCIe slot on the motherboard and is physically the largest of the three options at 6.5” to 13” long. It is also heavy, typically twice the weight of an MXM or MCM and up to five times heavier at several pounds, and therefore may have problems with shock and vibration. Designers developing a system that has the potential to be deployed in stressful environments should ensure a solid fit to minimize excessive vibration and should work to identify stress points.

**EXTREME TEMPERATURES, COOLING, AND LIFECYCLE REQUIREMENTS**

After shock and vibration, the remaining variables span all three design architectures: extreme temperatures, cooling, and lifecycle requirements.

Extreme temperature standards for systems operating in harsh environments are -40 °C to +120 °C. Designers should ensure that their GPU vendors’ processors meet those standards, which implies an additional level of testing and qualification beyond the standard 0 °C to +105 °C.

Designers can cool GPUs by attaching an active fan or by using a passive heatsink to dissipate heat. Either solution can require specialized versions that must take into account the system’s environment. If it disrupts the airflow design, an active solution may not be possible. A passive solution that requires a specific airflow at a specific temperature may not cool a graphics device enough. Sometimes a custom solution will be necessary, such as when a passive heatsink needs to connect physically to the metal case of the system to use the greater metal surface of the system as a cooling medium.

While standard consumer graphics systems may last a few years, many embedded projects have lifecycles of 7-10 years. That means parts must also be available for an extended period of time. Some GPU vendors – such as AMD – offer extended longevity for embedded parts. Without such support, designers need to take inventory of their parts and maintain them in special storage to ensure long-term viability (and they must also plan for potential yield loss).

**IT’S A GRAPHICAL WORLD**

Embedded discrete graphics solutions have advanced tremendously, based on technology that originated from mainstream commercial graphics solutions. For some applications – such as digital signage, medical imaging, and casino gaming – they must perform in some fairly challenging environments. With the right design choices, developers can create a new breed of embedded systems that provide the next generation of amazing 3D graphics.
The AMD Embedded Radeon™ E8860 discrete GPU – the first embedded GPU developed on the groundbreaking Graphics Core Next (GCN) architecture – pushes AMD Radeon graphics and parallel processing performance to unprecedented new heights while increasing power efficiency. The AMD Radeon E8860 GPU delivers industry-leading 3D video graphics performance, enabling stunning, multi-display visual experiences for a range of embedded applications spanning digital gaming, digital signage, medical imaging, avionics, and more.

The AMD Radeon E8860 GPU supports DirectX® 11.1, OpenGL 4.2, and OpenCL™ 1.2, enabling high-performance graphics and massive parallel processing. Supporting thermal design power of 37 watts, the AMD Radeon E8860 GPU provides the optimal performance-per-watt profile for embedded applications that require outstanding multi-display experiences, superior visual quality, and massive parallel compute but have exacting power efficiency and heat dissipation requirements.

The AMD Embedded Radeon™ E8860 GPU is available in the following formats:

<table>
<thead>
<tr>
<th>OPN</th>
<th>MODEL</th>
<th>OUTPUT</th>
<th>COOLING</th>
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<tr>
<td>100-CG2514</td>
<td>AMD E8860 GPU</td>
<td>N/A</td>
<td>N/A</td>
</tr>
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<td>100-K00190</td>
<td>AMD E8860 MXM 3.0 Type A</td>
<td>5 DisplayPort</td>
<td>Fansink</td>
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<tr>
<td>100-K00189</td>
<td>AMD E8860 MXM 3.0 Type A</td>
<td>5 DisplayPort</td>
<td>Heatpipe</td>
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<td>100-438110</td>
<td>AMD E8860 PCIe®</td>
<td>2x DVI + mini DisplayPort</td>
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<td>AMD E8860 PCIe</td>
<td>4x mini DisplayPort LPX</td>
<td>Low-power Heatsink</td>
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1. AMD Radeon™ E8860 scored 2689 and AMD Radeon E6760 scored 1327 when running 3DMark® 11P benchmark paired with the AMD R-464L APU. AMD Radeon E8860 and AMD Radeon E6760 used an AMD DB-FS1r2 motherboard with 8GB DDR3 memory, 64GB Crucial M4 SSD, and the AMD R-464L APU. The system ran Windows® 7 Ultimate (EMB-79).
**Sapphire E8860 Series**
- AMD Embedded Radeon™ E8860 GPU
- DirectX® 11.1 and Shader Model 5.0 support
- Dual stream HD content decoding
- H.264 encoding support
- 825MHz 640 stream processors
- 128-bit GDDR5 memory, Max up to 2GB

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**AMD Radeon™ E8860**

**MXM Module**
- AMD Embedded Radeon™ E8860 GPU
- 2GB of GDDR5
- OpenCL™ 1.2, DirectCompute 11.1
- VCE (video encode), UVD4 (video decode)
- 768 / 48 GFLOPS single / double precision peak (600e/4.5Gbps)
- GPU, HDMI® 1.4, Wireless Display, Stereo 3D

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**VPX 3U**

**VPX3-716**
- AMD Embedded Radeon™ E8860 GPU
- 2GB GDDR5
- DirectX® 11.1, OpenGL 4.2
- 4x DVI 1920 x 1200, 2x DisplayPort 2560 x 1600
- Tested between -40°C ~ 85°C
- PCIe x8 Gen 3

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**TechSource**

**Condor 4000X**
- AMD Embedded Radeon™ E8860 GPU
- 2GB of high-speed GDDR5
- DirectX® 11.1, OpenGL 4.2
- 768GFLOPS
- DVI-I and DisplayPort++

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**CutissWright**

**Sapphire Technology Limited**

**E8860RFB**

**ATX**
- AMD Radeon E8860
- API: DirectX® 11.1, OpenGL 4.1, OpenCL™ 1.2
- System RAM: - Other, 2GB, GDDR5
- Accelerated Parallel Processing, Gaming, Medical, Digital Signage, Other

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**TechSource**

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WEB www.tulembedded.com
AMD Embedded Radeon™ E8860 GPU
- 2GB of high-speed GDDR5
- 4 Displayport outputs
- DirectX® 11.1 and Shader Model 5.0 support
- Entropy decode of H.264 and VC-1
- Entropy decode of MPEG-2 HD and MPEG-4 Part 2
- 16 lanes PCI Express® 3.0 interface

TUL Corporation
PHONE 886 8698 3000 ext. 261
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WEB www.tulembedded.com

VPX3U
E8860-H264
- Dedicated H.264 encoder with UDP output over GigE
- Encoder Input from GPU output or from SDI source
- 2x HD-SDI 1080p30 inputs, or 1x 3G-SDI 1080p60 input
- 1x GigE Port
- RTOS drivers available
- No drivers required for H.264 encoder

Wolfe
PHONE 905-852-1163
EMAIL sales@wolf.ca
WEB www.wolf.ca
The AMD Radeon™ E6460 embedded discrete graphics processor unit (GPU) is AMD’s entry-level embedded graphics processor, enabling rich 3D graphics and outstanding HD multimedia. The advanced 3D graphics engine and programmable shader architecture support Microsoft® DirectX® 11 technology and OpenGL 4.1 for superior graphics rendering. The third generation unified video decoder enables dual HD decode of H.264, VC-1, MPEG4 and MPEG2 compressed video streams.

Speed time to market, reduce inventory costs, and enable multiple product categories. The AMD Radeon™ E6460 GPU ball grid array (BGA) is a subset of the AMD Radeon™ E6760 GPU BGA enabling embedded system designers to develop one system for both the AMD Radeon™ E6460 GPU and the high-performance AMD Radeon™ E6760 GPU.

AMD understands the unique requirements of the embedded market. With the graphics memory integrated onto the same BGA package, the AMD Radeon™ E6460 GPU saves development time plus AMD manages memory device obsolescence. The performance, flexibility, and easy design of the AMD Radeon™ E6460 GPU provides system designers with an exciting and innovative solution for their embedded graphics applications.
**MXM v3.0**
**AMD Radeon™ E6460 GPU**
- AMD Embedded Radeon™ 6460 GPU
- PCIe x16 Gen 2
- HDMI, 1920 x 1080
- DisplayPort, 2560 x 1600
- LVDS, 2048 x 1536
- Also available with fan or heatpipe

**MCM BGA**
**AMD Radeon™ E6460 GPU**
- AMD Embedded Radeon™ 6460 GPU
- PCIe x16 Gen 2
- DVI, 2560 x 1600
- HDMI, 1920 x 1080
- DisplayPort, 2560 x 1600
- LVDS, 2048 x 1536

**ATX - 4x DVI**
**AMD Radeon™ E6460 GPU**
- AMD Embedded Radeon™ 6460 GPU
- PCIe x16 Gen 2
- 4x DVI, 1600 x 1200
- Fanless (heatsink)

**ATX - 4x mDP**
**AMD Radeon™ E6460 GPU**
- AMD Embedded Radeon™ 6460 GPU
- PCIe x16 Gen 2
- 4x mDP, 2560 x 1600
- Fanless (heatsink)

**Rugged Graphics Mezzanine Card**
**XMCGA7**
- AMD Embedded Radeon™ 6460 GPU
- 512 MB GDDR5 SDRAM
- x8 PCIe Express (Gen 2 capable)
- Two independent output channels (Dual Head)
- Front and rear I/O options
- Air- and conduction-cooled variants

**Graphic Card PCIe-6460**
- AMD Embedded Radeon™ 6460 GPU
- Gaming, Digital Signage
- 2x DVI-I Connectors
- Support Active and passive dangle
- Heatsink + 2-BB Fan (1 x slot)
- PCIe Express 2.1 (x1, x2, x4, x8, x16)

**GE Intelligent Platforms**
- PHONE 1-800-433-2682
- WEB http://defense.ge-ip.com/

**IBASE**
- PHONE +886-2-2655-7588
- EMAIL sales@IBASE.com.tw
- WEB www.IBASE-usa.com
**MCM BGA ER91FL**
- AMD Embedded Radeon™ 6460 GPU
- 4 sets of Mini Display outputs
- Industrial-grade passive electronic components
- Memory: 512MB GDDR5
- Tested between -20 ~ 55°C

**TUL Corporation**
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- WEB www.tulembedded.com

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**ATX ER91F**
- AMD Embedded Radeon™ 6460 GPU
- 1x DVI-I, 2x Mini DP, 1x HDMI display output
- Memory: 512MB GDDR5
- Tested between -20 ~ 55°C
- Digital signage, digital gaming

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**MCM BGA ER91FLA**
- AMD Embedded Radeon™ 6460 GPU
- VGA, DVI and HDMI outputs
- Memory: 512MB GDDR5
- Tested between -20 ~ 55°C

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**ATX ER91FC**
- AMD Embedded Radeon™ 6460 GPU
- 1x Dual Link DVI-I, 1x Single Link DVI-I port
- Industrial-grade passive electronic components
- Memory: 512MB GDDR5
- Tested between -20 ~ 55°C

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**MXM v3.0 MXM-A6460**
- AMD Embedded Radeon™ 6460 GPU
- Up to 4 DP HD 1080P output
- DRAM Type: GDDR5
- Gaming, Server, Information Appliance, Medical, Digital Signage

**J&W IPC Technology Development CO., Ltd.**
- PHONE +86-0755-23981698
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- WEB http://en.jwipc.com/

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**MXM v3.0 EM91F**
- AMD Embedded Radeon™ 6460 GPU
- Industrial-grade passive electronic components
- Memory: 512MB GDDR5
- Tested between -20 ~ 55°C
- Industrial control and automation

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**MXM v3.0 EM91FL**
- AMD Embedded Radeon™ 6460 GPU
- 4 sets of Mini Display outputs
- Industrial-grade passive electronic components
- Memory: 512MB GDDR5
- Tested between -20 ~ 55°C

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Technology with a human touch.
More and more customers are not only requiring better graphics, more display options and interactivity, but are also demanding higher reliability and long-term availability from systems being deployed. AMD understands these challenges in the embedded digital signage market and has developed solutions that combine eye-catching graphics performance with a high-value feature set. So, whether your application requires basic 2D or 3D graphics and HD video on multiple displays, AMD Embedded Solutions can help deliver the performance, features and scalability to meet your needs.

Learn more at www.amd.com/digitalsignage