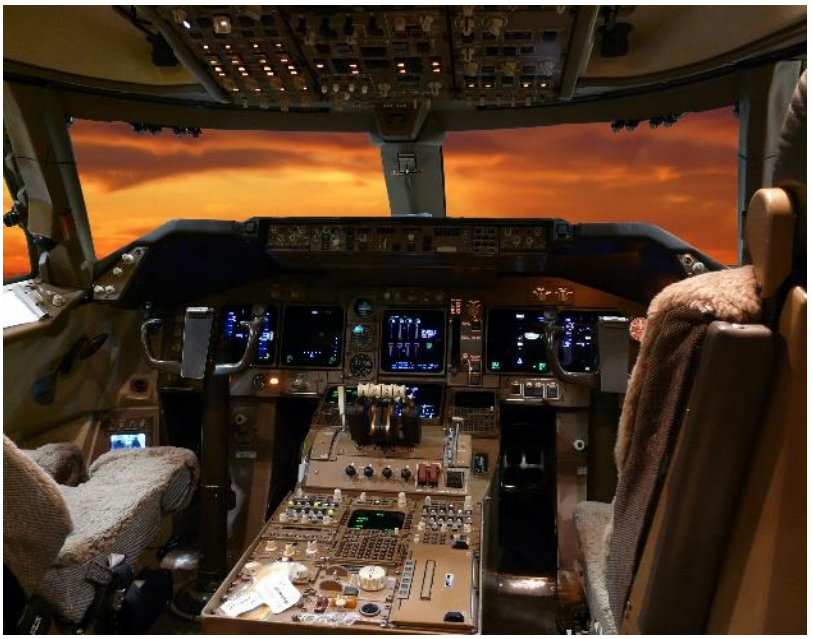

Product Brief

AMD Radeon ™ E8860 Embedded GPU

The latest evolution in AMD Radeon™ embedded GPUs leverages advanced Graphics Core Next architecture, delivering breakthrough performance and power efficiency gains.

PRODUCT OVERVIEW

The AMD Radeon™ E8860 Embedded 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.

Providing 2x higher 3D graphics performance[1] and 33% higher single-precision floating point performance than the AMD Radeon E6760 GPU, the AMD Radeon E8860 GPU[2] 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, and avionics.

BREAKTHROUGH PERFORMANCE AND POWER EFFICIENCY

The AMD Radeon E8860 GPU supports DirectX® 11.1, OpenGL 4.2, and OpenCL™ 1.2, enabling high-performance graphics and massive parallel processing. The AMD Radeon E8860 GPU delivers 92% higher 3D graphics performance per watt than the AMD Radeon E6760 GPU[3], and up to 22% higher 3D graphics performance and up to 61% higher performance per watt than power-comparable NVIDIA GeForce GPUs[4] 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. Low thermals help enable superior system cooling flexibility that helps developers conserve valuable board space and increase system ruggedization for harsh environments.

SUPERIOR MULTIDISPLAY VERSATILITY

The AMD Radeon E8860 GPU provides multi-display flexibility, supporting up to five 3840x2160 @30Hz displays simultaneously in clone mode and extended desktop in static screen. Competitive NVIDIA GPUs can only support up to four independent displays.[5]

The AMD Radeon E8860 GPU supporting AMD Eyefinity technology[6] can expand a high-resolution picture across multiple displays. In addition, one display of 4096x2160 @60Hz over one HDMI™ or DP1.2 interface can be supported, providing a superior viewing experience. This flexible, one-to-many system-to-display configuration capability enables ultra-immersive visual experiences via a single small form factor system.

OPTIMIZED FOR GRAPHICS-INTENSIVE APPLICATIONS

The AMD Radeon E8860 GPU was designed to increase multimedia processing performance and power efficiency for a range of embedded applications, including:

Digital gaming. Supporting rich 3D and 4K video graphics and advanced multi-display capabilities, the AMD Radeon E8860 GPU enables breathtaking gaming experiences and excellent display configuration flexibility for casino, arcade and pachinko/pachislot gaming.

Digital signage. Ultra-high resolution multimedia playback across multiple displays helps capture and hold viewers' attention like never before, with minimal strain on system power budget and form factor.

Medical imaging. The AMD Radeon E8860 GPU helps facilitate crisp, 360-degree medical image visualization and other advanced graphics-driven capabilities, which can help doctors provide improved care for patients.

Avionics. The high-performance graphics and parallel processing provided by the AMD Radeon E8860 GPU is an excellent choice for graphics-intensive avionics applications such as geographic information systems, 360-degree situational awareness, diminished vision enhancement, and more.

KEY BENEFITS

High-value benefits provided by the AMD Radeon E8860 GPU include:

- The underlying GCN architecture[7] enables the AMD Radeon E8860 GPU to efficiently manage workloads and programming languages traditionally handled exclusively by the main processor, and provides image quality-enhancing benefits including partially resident textures, improved anisotropic filtering, and improved DirectX 11 tessellation.
- The AMD Radeon E8860 GPU is a multi-chip module (MCM) consisting of GPU and GPU memory integrated on a single substrate, providing compatibility of GPU and memory for the lifetime of product supply. AMD is currently the only provider of such a solution on high-end embedded GPUs
- The AMD Radeon E8860 GPU supports seven-year product longevity[8], providing long-lifetime availability and support.
- The AMD Radeon E8860 GPU can be ordered for long term end of life storage and production supply from CoreAVI for up to 20 years after obsolescence.
- The AMD Radeon E8860 GPU features 2GB of GDDR5 frame buffer and delivers up to 80% more memory bandwidth than NVIDIA's sub-50W GeForce GPUs[9].
- The AMD Radeon E8860 GPU is available in multiple form factors to support a wide range of embedded applications. These include chip-down for custom platform designs and industry-standard MXM, PCIe®, and CompactPCIe.
- The AMD Radeon E8860 GPU supports AMD PowerPlay™ technology, AMD ZeroCore power technology[10], and AMD Enduro™ technology, which can enable the GPU to deliver full potential performance while conserving power.
- The AMD Radeon E8860 GPU is available screened to industrial temperature range limits of -40C to +85C, order part number 100-CG2514E from CoreAVI.
- The AMD Radeon E8860 GPU is supported by CoreAVI with real time, safety critical software drivers that are certifiable to FAA DO-178C, the drivers are compatible with industry leading real time operating systems and with popular safety critical HMI tools.

AMD Radeon™ E8860	
Package Dimension	37.5mm x 37.5mm MCM FCBGA
Thermal Design Power (W)	37
Graphics Processing Unit	
Process Technology	28nm
Graphics Clock (MHz)	625
CPU Interface	PCI Express® 3.0
Shader Processing Units	640
Floating-point Performance (single-precision, peak) (GFLOPS	768
3DMark® 11P Score	2689
Display Engine	GCN, AMD APP technology[11], AMD Eyefinity technology, and AMD HD3D technology[12]
DirectX® version	11.1
Shader Model version	5.0
OpenGL version	4.2
Compute	AMD APP technology, OpenCL™ 1.2, and DirectCompute 11.1
Unified Video Decoder (UVD)	UVD 4 for H.264, VC-1, MPEG-4, and MPEG-2
Video Compression Encoder	H.264
Internal Thermal Sensor	Yes
Memory	
Frame Buffer Frequency (MHz)	1125
Configuration Type	128-bit wide, 2048MB, Configuration Type GDDR5, 72Gbps
Display Interfaces	
Analog RGB	1x triple 10-bit DAC, 400MHz
DisplayPort 1.2	x5
HDMI™ 1.4a	x1
Single-/Dual-link DVI	4x Single-link DVI / 2x Dual-link DVI
Single-/Dual-link LVDS	1x Single-link / Dual-link
Number of Independent Displays	Up to two display outputs from VGA, Single-/Dual-link DVI, Single-/Dual-link LVDS, HDMI 1.4a, plus up to five display outputs

AMD EMBEDDED SOLUTIONS RADEON GRAPHICS

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

OPN	MODEL	OUTPUT	COOLING
100-CG2514	AMD E8860 GPU	N/A	N/A
100-K00190	AMD E8860 MXM 3.0 Type A	5 DisplayPort	Fansink
100-K00189	AMD E8860 MXM 3.0 Type A	5 DisplayPort	Heatpipe
100-438110	AMD E8860 PCIe®	2x DVI + mini DisplayPort	Fansink
100-438111	AMD E8860 PCIe	2x DVI + mini DisplayPort	Heatpipe
100-438148	AMD E8860 PCIe	5x mini DisplayPort	Fansink
100-438147	AMD E8860 PCIe	5x mini DisplayPort	Heatpipe
100-438116	AMD E8860 PCIe	4x mini DisplayPort LPX	Fansink
100-438115	AMD E8860 PCIe	4x mini DisplayPort LPX	Heatpipe
100-438117	AMD E8860 PCIe	4x mini DisplayPort LPX	Low-power Heatsink
100-CK4762E	CoreAVI E8860 GPU Temp Screened	N/A	N/A

www.CoreAVI.com sales@CoreAVI.com

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 HDD, and the AMD R-464L APU. The system ran Windows® 7 Ultimate (EMB-79).
2. The AMD Radeon E8860 GPU's single-precision floating point is 768 GFLOPS; the AMD Radeon E6760 APU's single-precision floating point is 576 GFLOPS (EMB-80).
3. AMD Radeon™ E8860 scored 2689 and AMD Radeon E6760 scored 1327 when running 3DMark® 11P benchmark paired with AMD R-464L APU. The performance-per-watt data was calculated by dividing the 3DMark 11P score by the GPU's thermal design power. The performance-per-watt delta was calculated based on the E8860 GPU's performance-per-watt score of 72.7 and the E6760 APU's performance-per-watt score of 37.9. The E8860 and E6760 used an AMD DB-FS1r2 motherboard with 8GB DDR3 memory, a 64GB Crucial M4 hard disk drive, and AMD R-464L. The system ran Windows® 7 Ultimate (EMB-81).
4. AMD Radeon™ E8860 scored 2689, AMD Radeon E6760 scored 1327, NVIDIA GeForce GT630 (Kepler) scored 1784, and NVIDIA GeForce GT640 (GDDR5) scored 2209 when running 3DMark® 11P benchmark paired with the AMD R-464L. The performance-per-watt data was calculated by dividing the 3DMark 11P score by the GPU's thermal design power. The performance delta was calculated based on the E8860 GPU's 3DMark11 score of 2689 and the GeForce GT640 (GDDR5)'s 3DMark11 score of 2209. The performance-per-watt delta was calculated based on the E8860 GPU's performance-per-watt score of 72.7 and the GeForce GT640 (GDDR5)'s performance-per-watt score of 45.1. AMD Radeon E8860, AMD Radeon E6760, NVIDIA GeForce GT630 (Kepler), and NVIDIA GeForce GT640 (GDDR5) used an AMD DB-FS1r2 motherboard with 8GB DDR3 memory, a 64GB Crucial M4 hard disk drive, and AMD R-464L APU. The system ran Windows® 7 Ultimate (EMB-82).
5. http://www.geforce.com/hardware/desktop-gpus/geforce-gtx-650/specifications
6. 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; confirm specifications with manufacturer before purchase. To enable more than 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 supported. See www.amd.com/ eyefinityfaq for full details.
7. The GCN Architecture and its associated features (AMD Enduro™, AMD ZeroCore Power technology, DDM Audio, and 28nm production) are exclusive to the AMD Radeon™ HD 7700M, HD 7800M and HD 7900M Series Graphics and select AMD A-Series APUs. Not all technologies are supported in all system configurations—check with your system manufacturer for specific model capabilities.
8. Planned seven-year availability. Additional availability possible under contract. Contact CoreACI for further information.
9. AMD Radeon™ E8860 scored 2689, AMD Radeon E6760 scored 1327, NVIDIA GeForce GT630 (Kepler) scored 1784, and NVIDIA GeForce GT640 (GDDR5) scored 2209 when running 3DMark® 11P benchmark paired with AMD R-464L. The performance-per-watt data was calculated by dividing the 3DMark 11P score by the GPU's thermal design power. The performance delta was calculated based on the E8860's 3DMark 11 score of 2689 and the GeForce GT640 (GDDR5)'s 3DMark 11 score of 2209. The performance-per-watt delta was calculated based on the E8860's performance-per-watt score of 72.7 and the GeForce GT640 (GDDR5)'s performance-per-watt score of 45.1. AMD Radeon E8860, AMD Radeon E6760, NVIDIA GeForce GT630 (Kepler), and NVIDIA GeForce GT640 (GDDR5) used an AMD DB-FS1r2 motherboard with 8GB DDR3 memory, a 64GB Crucial M4 hard disk drive, and AMD R-464L. The system ran Windows® 7 Ultimate (EMB-83).
10. AMD PowerTune, AMD ZeroCore Power and AMD PowerPlay™ are technologies offered by certain AMD Radeon™ products, which are designed to dynamically manage GPU power consumption and performance. Not all products feature all technologies – check with your component or system manufacturer for specific model capabilities.
11. AMD APP technology is a set of technologies designed to improve video quality and enhance application performance. Full enablement of some features requires support for OpenCL™ or DirectCompute (including AMD's Unified Video Decoder (UVD)).Not all products have all features and full enablement of some capabilities and some may require complementary products.
12. AMD HD3D is a technology designed to enable stereoscopic 3D support in games, movies, and/or photos. Additional hardware (e.g. 3D-enabled panels, 3D-enabled glasses/emitter, Blu-ray 3D drive) and/or software (e.g. Blu-ray 3D discs, 3D middleware, games) are required for the enablement of stereoscopic 3D. Not all features may be supported on all components or systems; check with your component or system manufacturer for specific model capabilities and supported technologies. A list of supported stereoscopic 3D hardware is available at www.amd.com/HD3D.