AMD **Fusion**
FAMILY OF APUs
EMBEDDED TECHNOLOGY

AMD EMBEDDED SOLUTIONS:

Product Selection Guide

AMD Embedded: The Next Generation of Embedded Computing
AMD helps deliver the right balance of CPU, GPU and chipset capabilities, to give designers the solutions they need to create the next generation of embedded applications. Along with a broad range of varied solutions, AMD supports the x86 embedded marketplace with design tools and technology partnerships that offer simplicity and flexibility to help create high-performance, feature-rich, and customer-driven products. AMD has long been a leader in innovation with its continued focus on improving both x86 processor and graphics processor designs. AMD's embedded products offer designers a balanced foundation for overall system performance with the quick time-to-market typically offered by commercial off-the-shelf components. AMD embedded solutions give designers ample flexibility to design scalable, x86-based, cost-efficient and feature-rich products, and help drive energy conservation into their systems without compromising application performance or compatibility, graphics performance or features. AMD technology-based products are leading edge from enterprise-class servers and consumer systems to traditional embedded markets.

This brochure presents the full array of AMD's embedded solutions that help deliver maximum performance with low overall system power consumption and are supported by longer than standard availability[1], a full library of x86 software development applications, and hardware tools. It's time to design and produce the next-generation embedded systems your customers demand — quickly, easily, and efficiently.

AMD's unique processor designs help deliver high performance and balanced system design.
AMD's range of embedded solutions provides flexible features and a balanced performance approach for the overall system.

FEATURES INCLUDE

> Integrated low power processor and GPU[2]

> Industry-leading performance-per-watt

> Native eight-core processor design provides highly scalable performance gains within a consistent thermal envelope

> Lead-free, four-layer processes with maximum on-board space

> Efficient heat dissipation reduces or eliminates the need for heat sinks and reduces ambient cooling requirements

> Range of available packaging and pin counts meets variety of design requirements

Along with these and other technical features, embedded designers can enjoy long-term component availability, comprehensive design support, and AMD's commitment to continue offering new, customer-oriented products.

Tools and support for developers
AMD offers:

> A full range of RDK (Reference Design Kit) products designed to enable designers to go from concept to finished product quickly

> A broad array of development boards for creating efficient x86 system designs

> Industry collaborations with leading software and hardware specialists, fostering maximum choice for your unique design

Get to market faster with superior products
Ready to create high-performance, low-power embedded designs that give your innovative new products an edge in the marketplace? Experience the AMD advantage.

Note 1: Most models support a planned 5 year availability from Product Release. See *AES Product Roadmap: Backup - Product Longevity & Features* document for last time buy schedules on specific products.
Note 2: On some models

AMD

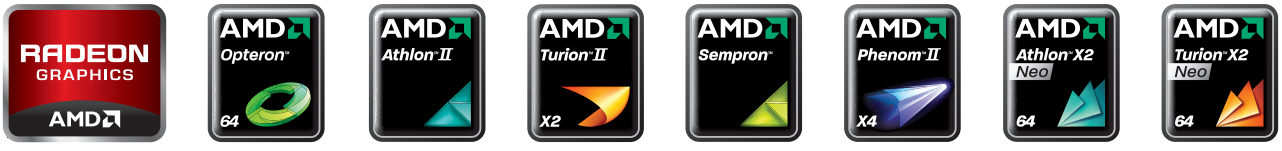
The AMD Fusion Family of Accelerated Processing Units (APU)
AMD Fusion is a new approach to processor design and software development, delivering powerful CPU and GPU capabilities for HD, 3D and data-intensive workloads in a single-die processor called an APU. APUs combine high-performance serial and parallel processing cores with other special-purpose hardware accelerators, enabling breakthroughs in visual computing, security, performance-per-watt and device form factor. The first introduction of this technology for embedded applications is the new AMD Embedded G-Series Family of APUs, targeted at delivering the ideal combination of price, power and performance for applications such as integrated digital signage, x86 set-top-box (xSTB), IP-TV, Thin Client, Point-of-Sale, Infotainment, and Casino Gaming markets.

The AMD64 embedded family: leading-edge technology for high-end embedded systems
AMD64 embedded solutions are each uniquely matched to a defined set of product applications. These solutions include high-performance dual-, quad-, six- and eight-core AMD Opteron™ processors and dual-core AMD Turion™ II Neo processors with Direct Connect Architecture for enterprise-class telecom, networking and storage equipment. The ASB1 (BGA) family of processors are designed with unique computing features and a thin, compact form factor to help enable new and uncompromising designs. The ASB2 processors are the second generation BGA platform, featuring the AMD Turion™ II Neo dual-core processors coupled with the AMD 785E chipset, are designed to deliver exceptional performance while maintaining low average solution power draw with greater levels of performance and power efficiency over the previous generation ASB1 (BGA) processor family.

The AMD64 solutions are each uniquely equipped to provide the processing needs for a large number of target markets. These solutions enable unique high-performance, smaller form factor products, with maximum versatility, and minimum design challenge.

AMD Geode™ LX processors: optimized for low-power, high-performance applications
AMD Geode™ LX processors are configured to deliver developers a versatile and flexible suite of x86 solutions that enable fast design cycles and short time-to-market roadmaps. Ideal for applications ranging from thin-client and set-top boxes to point-of-sale devices and kiosks. AMD has also introduced technology that allows the AMD Geode LX family to use DDR2 memory modules in an existing design. With a minor change in the memory voltage and an updated BIOS, a current AMD Geode LX processor based design can use a DDR2 memory module from AStint which helps ensure memory longevity and results in system level power efficiency. In addition to processors, the family includes a broad range of design tools including Development Boards (DBs) and Reference Design Kits (RDKs) to empower designers to make maximum use of the established world of x86 software applications.

The AMD Radeon™ embedded graphics family: game-changing graphics for embedded systems.
AMD Radeon™ graphics for embedded applications are designed to deliver exciting, desktop-level visual experiences to embedded systems. Built with advanced 3D graphics engines supporting Microsoft® DirectX® and OpenGL graphics APIs, AMD graphics solutions enable market-leading, rich, immersive images. Outstanding multimedia capabilities are supported by an integrated multi-standard video decoder delivering enhanced video quality from MPEG-2, H.264 or VC-1 video streams. The ultimate in display flexibility is provided by dual display controllers driving high-resolution displays through VGA, DVI, DisplayPort or HDMI interfaces. AMD graphics solutions are designed to perform, engineered to lead and built to win. With a product portfolio including AMD chipsets, discrete graphics processors, MXM modules and PC add-in boards, AMD provides system designers with exciting and innovative graphics solutions for their embedded systems.



AMD Embedded Solutions

Eight-Core AMD Opteron™ 6100 Series Processor - Socket G34

Model	OPN	Multi-CPU Scalability	Core Frequency	Cache	TDP	Memory Interface	HyperTransport™ Interface	Product Release
61KS	OE61KSWKT8EGO	up to 4	2.0GHz	L2 512KB x6; L3 12MB	115W[1]	DDR3-1333 4-ch Registered ECC & Chipkill	Four 16-lane @ up to 3.2GHz Full Duplex	Q1-10
61QS	OE61KSWKT8EGO	up to 4	2.3GHz	L2 512KB x6; L3 12MB	115W[1]	DDR3-1333 4-ch Registered ECC & Chipkill	Four 16-lane @ up to 3.2GHz Full Duplex	Q1-10

Note 1. Temperature is server part.

Six-Core and Four-Core AMD Opteron™ 4100 Series Processors - Socket C32

Model	OPN	Multi-CPU Scalability	Core Frequency	Cache	TDP	Memory Interface	HyperTransport™ Interface	Product Release
41KX HE	OE41KXOHU6DGOE	6 cores up to 2 sockets	2.2GHz	L2 512K x6; L3 6MB	65W	DDR3-1333 2-ch Registered ECC & Chipkill	Two 16-lanes@2.2GHz Full Duplex	Q3-10
41QS HE	OE41QSOHU4DGOE	4 cores up to 2 sockets	2.5GHz	L2 512K x4; L3 6MB	65W	DDR3-1333 2-ch Registered ECC & Chipkill	Two 16-lanes@2.2GHz Full Duplex	Q3-10
41LE HE	OE41LEOHU4DGOE	4 cores up to 2 sockets	2.3GHz	L2 512K x4; L3 6MB	65W	DDR3-1333 2-ch Registered ECC & Chipkill	Two 16-lanes@2.2GHz Full Duplex	Q3-10
41GL EE	OE41GLHKU6DGOE	6 cores up to 2 sockets	1.8GHz	L2 512K x6; L3 6MB	40W	DDR3-1333 2-ch Registered ECC & Chipkill	Two 16-lanes@2.2GHz Full Duplex	Q3-10

Six-Core AMD Opteron™ Processors - Socket F (1207)[A]

Model	OPN	Multi-CPU Scalability	Core Frequency	Cache	TDP	Memory Interface	HyperTransport™ Interface	Product Release
84QS	OE84QSWJS6DGNE	up to 8	2.4GHz	L2 512KB x6; L3 6MB	115W[1]	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.2GHz Full Duplex	Q1-10
84KS	OE84QSWJS6DGNE	up to 8	2.0GHz	L2 512KB x6; L3 6MB	79W[1]	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.2GHz Full Duplex	Q1-10
24QS	OE24QSWJS6DGNE	up to 2	2.4GHz	L2 512KB x6; L3 6MB	115W[1]	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.2GHz Full Duplex	Q1-10
24KS	OE24QSWJS6DGNE	up to 2	2.0GHz	L2 512KB x6; L3 6MB	79W[1]	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.2GHz Full Duplex	Q1-10

Note 1. Temperature is server part.

Quad-Core AMD Opteron™ Processors - Socket F (1207)[A]

Model	OPN	Multi-CPU Scalability	Core Frequency	Cache	Peak Power (worst case) TDP	Memory Interface	HyperTransport™ Technology	Product Release
83VS	OE83VSWHP4DGIE	Up to 8	2.8GHz	L2: 512KB x4 L3: 6MB	115W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.2GHz Full Duplex	Q3-09
83QS HE	OE83QSMAP4DGIE	Up to 8	2.4GHz		71W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.0GHz Full Duplex	Q3-09
23VS	OE23VSWHP4DGIE	Up to 2	2.8GHz		115W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.2GHz Full Duplex	Q3-09
23QS HE	OE23QSMAP4DGIE	Up to 2	2.4GHz		71W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.0GHz Full Duplex	Q3-09
23KS EE	OE23KSFLP4DGIE	Up to 2	2.0GHz		50W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@1.8GHz Full Duplex	Q3-09
13QS HE	OE13QSMAP4DGIE	Up to 1	2.4GHz		71W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@2.0GHz Full Duplex	Q3-09
13KS EE	OE13KSFLP4DGIE	Up to 1	2.0GHz		50W	DDR2-800 2-ch Registered ECC & Chipkill	Three 16-lane@1.8GHz Full Duplex	Q3-09

Dual-Core AMD Opteron™ Processors - Socket F (1207)[A]

Model	OPN	Multi-CPU Scalability	Core Frequency	L2 Cache/Core	Thermal Design Power	Memory Interface	HyperTransport™ Technology	Tcase	Product Release
8214 HE	OSP8214GAU6CYE	up to 8	2.2GHz	1MB x2	68W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	83°C	Q4-06
8210 EE	OSH8210GAS6CYE	up to 8	1.8GHz	1MB x2	45W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	80°C	Q4-06
2214 HE	OSP2214GAU6CXE	up to 2	2.2GHz	1MB x2	68W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	83°C	Q4-06
2210 EE	OSH2210GAS6CXE	up to 2	1.8GHz	1MB x2	45W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	80°C	Q4-06
2208 HE	OSP2208GAA5CXE	up to 2	1.8GHz	512KB x2	68W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	76°C	Q4-06
1214 HE	OSP1214GAU6DGE	1	2.2GHz	1MB x2	68W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	83°C	Q4-06
1210 EE	OSH1210GAS6DGE	1	1.8GHz	1MB x2	45W	DDR2-667, 2-ch Registered ECC & Chipkill	Three 16-lane@1GHz Full Duplex	80°C	Q4-06

Note A: AMD Opteron processors in Socket F (1207) type is packaged in Lidded 1207 pad LGA package.

All AMD Opteron processors in socket F (1207) generation support DDMP, AMD CoolCore™ technology, enhanced PowerNow!™ technology, AMD wide floating point accelerator, AMD memory optimizer technology, AMD balanced smart cache, AND-V with Rapid Virtualization Indexing, EVP and OPMA support.

AMD Embedded Solutions, cont.

AMD G-Series Accelerated Processing Units

Model	OPN	Package	CPU Cores	L2 Cache /Core	Memory Interface	CPU Core Frequency	Discrete Class Graphics	GPU Core Frequency	Graphics	Hardware Video Acceleration[12]	Display Outputs[13]	Display Resolutions	Thermal Design Power	Tcase	Product Release
T56N	GET56NGBB22GTE	19mm FCBGA	2	512KB	DDR3-1066, Unbuffered	1.6GHz	AMD Radeon™ HD 6310	500MHz	DirectX® 11 Shader Model 5 Open CL™ 1.1 OpenGL 3.2, 2.1	UVD 3 for H.264, VC-1 and MPEG2 with Blu-ray support	Dual independent display controllers 2 active outputs from: 1x VGA 2x single-link DVI 1x single-link LVDS 2x DisplayPort v1.1a 1x HDMI 1x DVO	VGA: 2560x1600 (HD 6310) or 1920x1200 (HD 6250) 30 bpp Single-link DVI: 1920x1200 24 bpp HDMI™: 1920x1080p 36 bpp Single-link LVDS[14]: 1400x1050 18 bpp DisplayPort v1.1a: 2560x1600 (HD 6310) or 1920x1200 (HD 6250) @ 30 bpp	18W	90°C	Q1-11
T48N	GET48NGBB22GTE		2	512KB	DDR3-1066, Unbuffered	1.4GHz	AMD Radeon™ HD 6310	500MHz		UVD 3 for H.264, VC-1 and MPEG2 with Blu-ray support			18W	90°C	Q1-11
T40N	GET40NFPB22GTE		2	512KB	DDR3-1066, Unbuffered[15]	1.0GHz	AMD Radeon™ HD 6250	280MHz		UVD 3 for H.264, VC-1 and MPEG2			9W	90°C	Q1-11
T52R	GET52RGBB12GTE		1	512KB	DDR3-1066, Unbuffered	1.5GHz	AMD Radeon™ HD 6310	500MHz		UVD 3 for H.264, VC-1 and MPEG2 with Blu-ray support			18W	90°C	Q1-11
T44R	GET44RFPB12GTE		1	512KB	DDR3-1066, Unbuffered[15]	1.2GHz	AMD Radeon™ HD 6250	280MHz		UVD 3 for H.264, VC-1 and MPEG2			9W	90°C	Q1-11

AMD G-Series Platform Controller Hubs

Model	OPN	CPU Interface	Package	PCI Express	PCI	SATA	FIS-Based Switching	Ethernet MAC	EEE	USB	HD Audio	LPC SPI SMBus	Max GPIOs	APU Fan Control	APU Clock Gen	Power[16]
A50M	100-CG2198	1X4 Gen 1	23mm FCBGA	4x1 Gen 2	No	6x 6Gb/s	No	No	No	14 v2.0 2 v1.1	Up to 4-channels	Yes	102	Yes	Yes	2.7W-5.9W
A55E	100-CG2188	1X4 Gen 2	23mm FCBGA	4x1 Gen 2	33MHz 4 Slots	6x 6Gb/s with RAID 0,1,5,10	Yes	Yes	Yes	14 v2.0 2 v1.1	Up to 4-channels	Yes	102	Yes	Yes	2.7W-5.9W

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

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

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

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

16: Configuration dependant. See product databook for configurations.

AMD Embedded Solutions, cont.

Socket AM3/AM2[1]

Model	OPN	Number of Cores	Core Frequency	Cache	Thermal Design Power[3]	Memory Interface	HyperTransport™ Interface	Package	Product Release
AMD Phenom II XLT Q54L	HEQ54LOEK4DGME	4	2.2/0.8GHz[2]	L2 512K x4; L3 6MB	65/36.5W[2]	DDR3-1333, 2-ch Unbuffered ECC	One 16-lane@1.8GHz Full Duplex	AM3	Q2-10
AMD Athlon™ II XL - V66C	AEV66CHDK23GME	2	2.8GHz	1MB x2	45W	DDR3-1333, 2-ch Unbuffered ECC	One 16-lane@2GHz Full Duplex	AM3	Q2-10
AMD Athlon™ II XLT - V64L	AEV64LHFK23GME	2	2.7GHz	1MB x2	45W	DDR3-1066, 2-ch Unbuffered ECC	One 16-lane@2Ghz Full Duplex	AM3	Q2-10
AMD Athlon™ II XLT - V50L	AEV50LSCK23GME	2	2.2/0.8GHz[2]	1MB x2	25/13.8W[2]	DDR3-1066, 2-ch Unbuffered ECC	One 16-lane@2Ghz Full Duplex	AM3	Q2-10
AMD Athlon™ X2 4200+	ADD4200IAA5DOE	2	2.2GHz	512KB x2	35W	DDR2-800, 2-ch nbuffered ECC	One 16-lane@1000MHz Full Duplex	AM2	Q2-08
AMD Athlon™ X2 3600+	ADD3600IAA5DOE	2	1.9GHz	512KB x2	35W	DDR2-800, 2-ch Unbuffered ECC	One 16-lane@1000MHz Full Duplex	AM2	Q2-08
AMD Athlon™ X2 3400e	ADJ3400IAA5DOE	2	1.8/1.0GHz[2]	512KB x2	22/10.8W[2]	DDR2-800, 2-ch Unbuffered ECC	One 16-lane@1000MHz Full Duplex	AM2	Q2-08
AMD Athlon™ 3100+	ADS3100IAR4DRE	1	2.0GHz	512KB	25W	DDR2-667, 2-ch Unbuffered ECC	One 16-lane@1000MHz Full Duplex	AM2	Q4-07
AMD Athlon™ 2600+	ADG2600IAV4DRE	1	1.6GHz	512KB	15W	DDR2-667, 2-ch Unbuffered ECC	One 16-lane@800MHz Full Duplex	AM2	Q4-07
AMD Athlon™ 2000+	ADF2000IAV4DRE	1	1.0GHz	512KB	8W	DDR2-667, 2-ch Unbuffered ECC	One 16-lane@1000MHz Full Duplex	AM2	Q4-07

Note 1. Socket AM3 processors can operate in Socket AM2 board designs with DDR2 memory. Socket AM2 processors cannot operate in Socket AM3 board designs with DDR3 memory.
Note 2. While operating at the max/min P-States which can be dynamic or fixed through BIOS.
Note 3. TDP specified in dual-plane platform.

Socket S1

Model	OPN	Number of Cores	Core Frequency	L2 Cache/Core	Thermal Design Power	Memory Interface	HyperTransport™ Technology	Tcase	Product Release
AMD Turion™ 64 X2 TL-62	TMDTL62HAX5DME	2	2.1GHz	512KB x2	35W	DDR2-800, 2-ch Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-07
AMD Turion™ 64 X2 TL-56	TMDTL56HAX5DME	2	1.8/0.8GHz[1]	512KB x2	31/9.4W[1]	DDR2-800, 2-ch Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-07
AMD Sempron 3700+	SMS3700HAX4DQE	1	2.0GHz	512KB	25W	DDR2-800, 2-ch Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-07
AMD Sempron 2100+	SMF2100HAX3DQE	1	1.0GHz	256KB	8W	DDR2-800, 2-ch Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-07

Note 1. While operating at the max/min P-States which can be dynamic or fixed through BIOS.

ASB2 BGA

Model	OPN	Number of Cores	Core Frequency	L2 Cache/Core	Thermal Design Power	Memory Interface	HyperTransport™ Technology	Tcase	Product Release
AMD Turion™ II Neo - N54L	TEN54LSDV23GME	2	2.2GHz	1MB x2	25W	DDR3-800, 2-ch Unbuffered ECC	One 16-lane@1.6GHz Full Duplex	95˚C	Q2-10
AMD Turion™ II Neo - N40L	TEN40LGAV23GME	2	1.5GHz	1MB x2	15W	DDR3-800, 2-ch Unbuffered ECC	One 16-lane@1.6GHz Full Duplex	95˚C	Q2-10
AMD Athlon™ II Neo - N36L	AEN36LLAV23GME	2	1.3/0.8GHz[1]	1MB x2	12/8W[1]	DDR3-800, 2-ch Unbuffered ECC	One 16-lane@1GHz Full Duplex	95˚C	Q2-10
AMD Athlon™ II Neo - R44L	AER44LLAV13GME	1	1.7GHz	1MB	12W	DDR3-800, 2-ch Unbuffered ECC	One 16-lane@1GHz Full Duplex	95˚C	Q2-10
AMD Athlon™ II Neo - R34L	AER34LFCV13GME	1	1.0GHz	1MB	8W	DDR3-800, 2-ch Unbuffered ECC	One 16-lane@1GHz Full Duplex	95˚C	Q2-10

Note 1. While operating at the max/min P-States which can be dynamic or fixed through BIOS.

ASB1 BGA

Model	OPN	Number of Cores	Core Frequency	L2 Cache/Core	Thermal Design Power	Memory Interface	HyperTransport™ Technology	Tcase	Product Release
AMD Turion™ Neo X2 L625	TMZL625OAX5DYE	2	1.6/0.8GHz[1]	512KB x2	18/10.1W[1]	DDR2-667, 2-ch Unbuffered ECC	One 16-lane@800MHz Full Duplex	95˚C	Q3-09
AMD Turion™ Neo X2 L325	AMZL325OAX5DYE	2	1.5GHz[1]	512KB x2	18W[1]	DDR2-667, 2-ch Unbuffered ECC	One 16-lane@800MHz Full Duplex	95˚C	Q3-09
AMD Sempron™ 210U	SMG210UOAX3DVE	1	1.5GHz	256KB	15W	DDR2-400, Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-08
AMD Sempron™ 208U	SML208UOAX3DVE	1	1.4GHz	256KB	12W	DDR2-400, Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-08
AMD Sempron™ 200U	SMF200UOAX3DVE	1	1.0GHz	256KB	8W	DDR2-400, Unbuffered	One 16-lane@800MHz Full Duplex	95˚C	Q4-08

Note 1. While operating at the max/min P-States which can be dynamic or fixed through BIOS.

AMD Embedded Solutions, cont.

AMD Embedded Discrete Graphics

Model	Process	Package	TDP	# Shaders	Interface	Memory	Engine/ Memory Clock (MHz)	OS	Compute	Graphics	Video	Display Outputs	Display Resolutions	Product Release
ATI Radeon™ E2400 Discreet GPU	65 nm	GPU + memory 31 x 31 mm BGA	13W[2]	40	PCIe® 1.1 (x1, x2, x4, x8, x16)	64-bit wide 128 MB GDDR3	600/700	Windows® XP/ XPe/ Vista®/7 Linux® (x86 32/64)	Single Precision FP Performance: 48 GFLOPS	DirectX® 10 Shader Model 3.0 Open GL® 2.0 3D Mark 05 4061 @ 13W	Unified Video Decoder (UVD) for H.264, VC-1 MPEG 1/2/4 decode & encode acceleration	Avivo™ Display System Dual independent display controllers 2 active outputs from: 2x VGA, 1x Comp/YC/YPbPr, 2x single-link DVI, 1x dual-link DVI, 1x single / dual-link LVDS, 1x HDMI™, 1x DVO	VGA: 400 MHz pixel clk Comp/YC: NTSC, PAL YPbPr: 480i/p, 576i/p, 720p, 1080i Single-link DVI: 1600x1200 60 Hz 24 bpp Dual-link DVI: 2048x1536 60 Hz 24 bpp Single-link LVDS: 1280x1024 60 Hz 24 bpp Dual-link LVDS: 2048x1536 60 Hz 24 bpp HDMI™: 1920x1080i 60 Hz 24 bpp DVO: 220 MHz pixel clk	Q1-08
ATI Radeon™ E2400 MXM-II Module		MXM 2.1a Type II module 73 x 78 mm	18W[3]			64-bit wide 256 MB GDDR3				DirectX® 10 Shader Model 3.0 Open GL® 2.0		Avivo™ Display System Dual independent display controllers Available on MXM 2.1a connector 2 active outputs from: 2x VGA, 1x Comp/YC/YPbPr, 2x single-link DVI 1x dual-link DVI, 1x single / dual-link LVDS, 1x HDMI™ 1x DVO on header		Q2-08
ATI Radeon™ E2400 PCIe® Add-in Board		PCIe® Add-in Board 16 x 11 cm	18W[4]			64-bit wide 128 MB GDDR3						Avivo™ Display System Dual independent display controllers Available on dual DVI-I connectors 2 active outputs from: 2x VGA, 2x single-link DVI, 1x dual-link DVI, 1x HDMI™		Q2-10
ATI Radeon™ E4690 Discreet GPU	55 nm	GPU + memory 35 x 35 mm BGA	25W[6]	320	PCIe® 2.0 (x1, x2, x4, x8, x16)	128-bit wide 512 MB GDDR3	600/700	Window®® XP/ XPe/ Vista®/7 Linux® (x86 32/64	Single Precision FP Performance: 384 GFLOPS	DirectX® 10.1 Shader Model 4.0 Open GL 3.0 3D Mark 06 6686 @ 25W	2nd Generation Unified Video Decoder (UVD2) for H.264, VC-1, MPEG2 decode SD & HD HQV™ processing Blu-Ray	Avivo™ Display System Dual independent display controllers 2 active outputs from: 2x VGA, 1x Comp/YC/YPbPr, 5x single-link DVI 3x dual-link DVI, 1x single / dual-link LVDS, 5x DisplayPort v1.1a, 1x HDMI™, 1x DVO	VGA: 400 MHz pixel clk Comp/YC: NTSC, PAL YPbPr: 480i/p, 576i/p, 720p, 1080i/p Single-link DVI: 1600x1200 60 Hz 24 bpp Dual-link DVI: 2048x1536 60 Hz 24 bpp Single-link LVDS: 1280x1024 60 Hz 24 bpp Dual-link LVDS: 2048x1536 60 Hz 24 bpp DisplayPort v1.1a: 2560x1600 60 Hz 24 bpp HDMI™: 1920x1080p 60 Hz 24 bpp DVO: 220 MHz pixel clk	Q2-09
ATI Radeon™ E4690 MXM		MXM 3.0 Type A module 70 x 82 mm	32W[7]							DirectX® 10.1 Shader Model 4.0 Open GL 3.0		Avivo™ Display System Dual independent display controllers Available on MXM 3.0 connector 2 active outputs from: 2x VGA, 4x single-link DVI, 2x dual-link DVI, 1x single / dual-link LVDS, 4x DisplayPort v1.1a, 1x HDMI™		Q1-10
ATI Radeon™ E4690 PCIe® Add-in Board		PCIe® Add-in Board 18 x 11 cm	32W[8]									Avivo™ Display System Dual independent display controllers Available on dual DVI-I connectors 2 active outputs from: 2x single / dual-link DVI, 1x HDMI™, 2x VGA		Q1-10
ATI Radeon™ HD 5770 Graphics Board	40 nm	PC Add-in Board 23.5 x 11.2 cm	108W[10]	800	PCIe® 2.1 (x1, x2, x4, x8, x16)	128-bit wide 1 GB GDDR5	850/4.8Gbps		ATI Stream Technology OpenCL™ 1.1 DirectCompute 11 Single Precision FP Performance: 1.36 TFLOPS	DirectX® 11 Shader Model 5.0 Open GL® 3.2 OpenCL™ 1.0 3D Mark Vantage (P) 10141 @ 108W	2nd Generation Unified Video Decoder (UVD2) for H.264, VC-1, MPEG4, MPEG2 decode Dual HD 1080p decode HQV Benchmark 2.0 score 175	ATI Eyefinity Avivo™ Display System Three independent display controllers 3 active outputs from: 2x dual-link DVI, 1x DisplayPort v1.1a, 1x HDMI™ 1.3	VGA: 2048x1536 Dual-link DVI: 2560x1600 DisplayPort v1.1a: 2560x1600 HDMI™ 1.3: 1920x1200p	Q2-10

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

2: System configuration: 3DMark05, 1280x1024, ASUS MB - ASUS 790 M3A32 – MVP Deluxe, CPU – Quad-Core AMD Phenom™ processor, 4x 2.3GHz, Memory – 4x 512MB DDR2-800, Windows® XP (8.61).

3: System configuration: 3DMark03, 1600x1200, 32bpp, 60Hz. For additional information see ATI Radeon™ E2400 MXM-II Module Specification.

4: System configuration: Estimate same as MXM 2.1a Type II module.

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

6: System configuration: 3DMark06, 1280x1024, ASUS M4A79T DeLuxe Motherboard, CPU - Quad-Core AMD Phenom™ processor , 4x 2.3GHz, Memory – 2x 2GB Corsair DDR310200 , Windows® XP SP3.

7: System configuration: 3DMark01, 1600x1200, 32bpp, 60 Hz. For additional information see ATI Radeon™ E4690 MXM 3.0 Module Specification.

8: Estimate same as MXM 3.0 Type A module.

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

10: System configuration: 3DMark Vantage (P), CPU: AMD Phenom™ II 965 (3.4GHz), Motherboard: Asus M3A79-T(790)/ ASUS M3N-HT DLX (780a), Memory: 4GB DDR2-800 5-5-5-18, OS: Windows 7 RTM 64bit, GPU: 1G GDDR5, 850e/1200m, 8.732RC1-100504a-099648E-ATI.

11: See www.KITGURU.net

AMD Embedded Solutions, cont.

AMD Embedded Chipsets

Model	Devices	CPU Interface	Package	PCI Express®	PCI	Graphics	ATI Hybrid CrossFireX™	DVI/ HDMI	Display Port	LVDS	TV	DVO	SATA II	IDE	Power	Ethernet MAC	USB	Audio	LPC SPI SMBus	Max GPIOs	Display: Max Resol.[1]
AMD M69OT	M690T/ SB600	1GHz HyperTransport™	21mm FCBGA/ 23mm FCBGA	1x8, 4x1 Gen 1	v2.3	DirectX® 9.0 WMV9	No	1 @ 1080i[2]	No	24-bit Dual-Channel	Yes	DVI & LVDS Transmitter Support[3]	4, RAID 0, 1, 10 meets 1.0a spec	ATA 133	8W	No	10 v2.0	HD Audio, AC97 v2.3	Yes	73	2048 x 1536
AMD M69OE	M690E/ SB600	1GHz HyperTransport™	21mm FCBGA/ 23mm FCBGA	1x8, 4x1 Gen 1	v2.3	DirectX® 9.0 WMV9	No	2 @ 1080i[4]	No	24-bit Dual-Channel	No	DVI & LVDS Transmitter Support[3]	4, RAID 0, 1, 10 meets 1.0a spec	ATA 133	8W	No	10 v2.0	HD Audio, AC97 v2.3	Yes	73	2048 x 1536
AMD 780E	780E/ SB710	2.6GHz HyperTransport™ 3.0	21mm FCBGA/ 23mm FCBGA	2x8 or 1x16, 6x1 Gen 2	v2.3	DirectX® 10.0 OpenGL 2.0, UVD 2.0	Yes	2@ 1080P[4]	Yes	24-bit Dual-Channel	No	No	6, RAID 0, 1, 10 meets 2.5 spec	ATA 133	13W	No	12 v2.0, 2 v1.1	HD Audio, AC97 v2.3	Yes	73	2560 x 1600
AMD 785E	785E/ SB8XX	2.6GHz HyperTransport™ 3.0	21mm FCBGA/ 23mm FCBGA	2x8 or 1x16, 6x1 Gen 2, 2x1 Gen 1	v2.3	DirectX® 10.1 OpenGL 2.0, UVD 2.0	Yes	2@ 1080P[4]	Yes	24-bit Dual-Channel	No	No	6, RAID 0, 1, 5[5], 10[5], 6GBPS	No	6.4 - 13W	Yes[5]	14 v2.0, 2 v1.1	HD Audio, AC97 v2.3	Yes	73	2560 x 1600
AMD SR5690, SR5670, SR5650	SR56x0/ SP5100	HyperTransport™ 3.0 (5.2GT/s) Backward Compatible with HT 1.0	29x29mm FCBGA/ SP5100: 21x21mm FCBGA	Gen 2 v1.0; SR5690: 42 lanes/ 11 engines SR5670: 30 lanes/ 9 engines SR5650: 22 lanes/ 8 engines	v2.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6, RAID 0, 1, 10 meets 2.5 spec	ATA 133	SR5690: 18W SR5670: 17W SR5650: 13W SP5100: 4W	No	12 v2.0, 2 v1.1	HD Audio, AC97 v2.3	Yes	73	N/A

Note 1. Capable display resolutions are influenced by the operating system driver, processor and memory selection.
Note 2. The PCI Express® x8 interface is multiplexed with a TMDS interface, enabling DVI or HDMI 1.2 with HDCP 1.1 support.
Note 3. The sideport memory interface of the M690T and M690E can be configured as a DVO to attach to an additional DVI, LVDS, or CRT transmitter.
Note 4. The LVDS interface of the M690E and 780E is multiplexed with a TMDS interface, enabling DVI or HDMI 1.2 (for the M690E) or HDMI 1.3b (for the 780E) with HDCP 1.1 support. This enables support for native dual DVI; however, only one HDMI interface may be enabled at a time.
Note 5. Avalable on the SB850.

AMD Development Boards

Name	Processor (* Denotes Processor shipped in Kit)	Chipset	Form Factor	Display Output	OS[1]						I/O Connectors																Typical Kit Contents	
					Windows® 7 / Windows® Embedded Standard 7	Windows® Embedded Standard 2009	Windows® XP/XPe	Windows® CE 5.0	Windows® CE 6.0	Linux	Audio Out Channels	USB	PCI Express® Slots	PCI Express Mini Card	PCI Slots	Mini-PCI	LPC Slots or Headers	Super I/O on Board	Ethernet on Board	Power	Serial ATA	IDE UDMA	Serial Ports	PS/2 Keyboard/Mouse	Parallel Port	IrDA	DVI/HDMI Adapter Board	CD-ROM/Std. Documentation
AMD GEODE™ SOLUTIONS BASED DEVELOPMENT BOARDS																												
LX DB800	AMD Geode™ LX 800@0.9W[2]	AMD CS5536	Mini-ITX/ETX	CRT, TFT	•		•	•		•	2	4			1[3]		1	1	1	ATX		•	3	1	1	1		•
AMD64 BASED DEVELOPMENT BOARDS																												
AMD DB-FT1 Development Board	G-Series T56N (DBFT1-00-E1-EVAL-KT) Or G-Series T40N (DBFT1-01-EVAL-KT	A55E	Mini-ITX	VGA, single-link DVI-D support	•	•	•			•	2	8	1 x1		1			•	1 RJ45	ATX	4, 3Gbps ports		4					•
S1 DBM690T/E	Mobile AMD Sempron™ 3500+* and 2100+, AMD Turion™ 64 X2 TL-52, AMD Sempron™ 2100+	AMD M690T or M690E, SB600	ATX	CRT, DVI/HDMI, LVDS	•		•		•	•	7.1	9	1x16[4] 1x1	•	3	•	1	1	1	ATX	4	•	1	1	1		•	
AM2+ DB780E	AMD Phenom™ 9350e, AMD Athlon™ X2 4200+ and 3400e, AMD Athlon™ 3100+ and 2000+, AMD Athlon™ II XLT, AMD Phenom™ II XLT	AMD 780E, SB710	ATX	CRT, DVI	•		•			•	7.1	12	1x16, 1x4		1			1	1	ATX	6	•	1				•	

Note 1. OS support typically includes BIOS and drivers for audio, display, and bootloader if required.
Note 2. The Geode LX 800@0.9W processor operates at 500MHz. Model numbers reflect performance as described here: http://www.amd.com/connectivitysolutions/geodelxbenchmark. DDR2 versions available - please talk with your AMD representative
Note 3. The Geode LX DB800 has one 32-bit, 66/33MHz, 3.3V (non-5V tolerant) PCI slot. Additionally, a bridge card that offers two 32-bit, 66/33MHz, 3.3V (5V tolerant) slots is shipped with the development board. The bridge card occupies the one slot on the main board.
Note 4. The S1 DBM690T/E has one x16 PCI Express® slot that is supported by a 1x8 PCI Express interface.

AMD Embedded Solutions, cont.

AMD Geode™ Processors

Processor Family	Device Number	Chipset	Package/ Operating Case Temp.	Core Freq. (Perform. Rating)	Core Volt	Thermal Design Power	Power Mgmt./ Rating	FPU	Memory Support	PCI	Ethernet	IDE	USB	LPC	Audio	UART/ IR	Serial/ Parallel Interfaces	RTC	Max. GPI0s	Security	Display: Max Res.
AMD Geode™ LX Processors (Integrated North Bridge/ Graphics)	LX900@ 1.5W	AMD CS5536	BGU481 0˚C to 80˚C	600MHz (900)	1.4V	5.1W	ACPI v2.0	MMX™, AMD 3DNow!™ Technology	DDR-400	v2.2	No	1 Ch., UDMA-100	4 Ports, v2.0	1 LDRQ	AC97 v2.3	2/1	ACCESS.bus w/2 Ports	1	32	28-Bit AES w/Optional In-package EEPROM	CRT: 1920x1440 TFT: 1600x1200 VIP/VOP = 1.1, 2.0
	LX800@ 0.9W		BGU481 0˚C to 85˚C and -40˚C to 85˚C[2]	500MHz (800)	1.25V	3.6W			DDR-400												
	LX700@ 0.8W		BGU481 0˚C to 85˚C	433MHz (700)	1.2V	3.1W			DDR-333												
	LX600@ 0.7W		BGU481 0˚C to 85˚C	366MHz (600)	1.2V	2.8W			DDR-266											28-Bit AES	

AMD Geode™ Solutions Based Reference Design Kits

Name	Processor	Companion Device	Form Factor (Inches)	Video Output	OS[1]			I/O Connectors													
					Windows® XP/XPe	Windows CE	Linux®	Audio Out Channels	USB	PCI Slots	LPC Slots or Headers	Super I/O on Board	Ethernet on Board	Power Input	Serial ATA	IDE UDMA	Serial Ports	PS/2 Keyboard/Mouse	Parallel Port	IrDA
LX ETX	AMD Geode™ LX 800@0.9W[2]	AMD CS5536	3.7x4.5	CRT/TFT	•	5.0	•		4				1	SVDC thru ETX conn.						
LX Ultra Value Client	AMD Geode™ LX 800@0.9W[2]	AMD CS5536	5.5x5	CRT	•	•	•	1	4		1		1	12VDC		•				
LX EPIC Single Board Computer	AMD Geode™ LX 800@0.9W or LX 700@0.8W[2]	AMD CS5536	4.5x6.5	CRT/TFT/LVDS	•	5.0	•	2	4	Mini PCI		•	1	Mini-ITX		•	2	•	•	
LX Network Attached Storage Processor	AMD Geode™ LX 800@0.9W or LX 700@0.8W[2]	AMD CS5536	Mini-ITX	CRT for debug only	•		•		3				1	ATX	1	•	2			

Note 1. OS support typically includes BIOS and drivers for audio, display, and bootloader if required.
Note 2. The Geode LX 800@0.9W processor operates at 500MHz and the Geode LX 700@0.8W processor operates at 433MHz. Model numbers reflect performance as described here: http://www.amd.com/connectivitysolutions/geodelxbenchmark

AMD64 Reference Design Kits

Name	Processor Support	Chipset	Form Factor	Topology	OS		I/O Connectors								Electrical/Mechanical		
					Windows XP/ XPe/ 7/ WES 7	Linux®	Display	Ethernet	Aux Slots	IDE	SAS	Audio	USB	Serial	Standard	NEBS	Compliance
High Performance Embedded Graphics RDK	AMD Athlon™ II XL/XLT Processors AMD Phenom™ II XLT Processors	AMD 780E , AMD SB710, and ATI Radeon™ E4690 GPU	203mm x 122mm custom form factor	N/A	•	•	4 HDMI connectors, Supports CES-861B video modes, including 4800, 720p, 1980i and 1080p	1Gb	None	No	2 internal SATA II, 3Gbps ports 1 External eSATA 3 Gbps	2 channel HDaudio: 1 analog line in, 1 analog line out	2	2	Custom form factor	N/A	RoHS Compliant
Second-Generation AMD Opteron™ Processor-based AdvancedTCA® Blade	AMD Opteron™ Model 2210 EE Processor	Broadcom HT-2100, HT-1000	ATCA® Blade	Dual Star Backplane or 5 slot Full Mesh		•		Dual 1G to Fabric, Dual 1G to Base	AMC® x2 Half Height		•		2	1	Core Specification PICMG 3.0	NEBS Level-3 and ETSI Installations	RoHS Compliant
AMD Socket S1 Processor COM Express	AMD Turion™ 64 X2, Mobile AMD Sempron™ Processors	AMD M690T/E with ATI Radeon™ X1250 Graphics	COM Express Type 2	N/A	•	•	DVI, LVDS, Analog VGA, TV	1Gb	3x1 PCIe,® 1x8 PCIe, PCI	2Ch		HD	8		COM.0		RoHS Compliant
AMD Socket AM2 Processor Storage Bridge Bay	AMD Athlon™ and AMD Athlon™ X2 Processors	Broadcom HT-2100, HT-1000	SBB 2.0	N/A		•	Analog VGA	GbE to back plate, GbE to mid-plane	1x8 PCIe	•	•		1	1	SBB 2.0		RoHS Compliant
AMD Sempron™ 210U/200U Processor Mini-DTX	ABS1 BGA Processors	AMD M690E with ATI Radeon™ X1250 Graphics	Mini-DTX	N/A	•	•	DVI VGA	1Gb	2x1 PCIe	•		HD	6		Mini-DTX		RoHS Compliant

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