

Reducing embedded design costs with AMD64 technology



Next-generation performance for high-end embedded designs

Balance between processor performance, I/O bandwidth and power consumption are major concerns to high-end embedded systems architects. AMD currently offers three different processor families, providing design flexibility on an industry-standard platform for high-end embedded systems. Mobile AMD Sempron™ processors, AMD Opteron™ processors and AMD Turion™ 64 Mobile Technology are all available for embedded applications under the AMD Longevity Program that provides an extended availability period of five years.

Based on AMD64 technology, these 32- and 64-bit x86 processor families are designed with integrated ECC DDR DRAM memory controllers and native 16-lane HyperTransport™ technology, allowing high-end embedded designers to meet existing and next-generation design requirements. And with the AMD64 Longevity Program, system architects gain the confidence that the processor they choose will be there throughout the life of their embedded design.

System architects can also gain direct access to AMD64 expertise and comprehensive engineering support services through AMD's fee-based Professional Design Support Services program, which has helped many AMD customers bring complex embedded and multiprocessor systems to market quickly and effectively. With AMD, system designers have all they need for embedded applications, now and into the future.



Mobile AMD Sempron™ processors

With its integrated 64/72-lane unbuffered ECC DDR memory controller and single 16-lane (full duplex) 800MHz HyperTransport™ link, the Mobile AMD Sempron™ processor is the ideal solution for cost-sensitive platforms that demand excellent computing and I/O performance in the 32-bit world. Embedded applications ranging from thin client servers and point-of-sales scanners to single-board computers (SBC), embedded control systems and mobile equipment will all benefit from the Mobile AMD Sempron™ processor's outstanding value.

Features:

- At power-on/reset, delivers 800MHz of processing performance at 9-watts for processor and memory controller and can be dynamically scaled up to 2GHz at 25-watts
- 32-bit performance leverages AMD64 technology features with Direct Connect Architecture providing up to 6.4GB/s I/O bandwidth and up to 3.2GB/s memory bandwidth
- Designed with Enhanced Virus Protection*
- AMD PowerNow!™ technology providing optimized battery life, performance on demand and cooler system operations
- 3DNow!™ Professional technology and SSE2 instructions provide outstanding performance for digital content



AMD Turion™ 64 Mobile Technology

Where the combination of power and next-generation 32- and 64-bit computing performance is the paramount concern, the AMD Turion™ 64 Mobile Technology processor securely answers the call of embedded systems designers. With advanced features such as a 1MB L2 cache, ECC DDR unbuffered memory support up to 16GB and advanced power-up based on AMD PowerNow!™ technology, the AMD Turion 64 Mobile Technology processor is perfect for high-end thin client servers, communication blades, security and video on demand applications.

Features:

- Support for 32- and 64-bit applications
- Optimized for low-power operation and dynamic power states
- Based on AMD64 technology with Direct Connect Architecture and HyperTransport technology
- At power-on/reset, delivers 800 MHz processing performance at 8 watts for processor and memory controller and can be dynamically scaled up to 2GHz at 25-watts
- Designed with Enhanced Virus Protection*
- AMD PowerNow!™ technology providing optimal battery life, performance on demand and cooler operations
- 3DNow!™ Professional technology, SSE2 and SSE3 instructions enable stellar performance for digital content



AMD Opteron™ processors

Single- and Dual-Core AMD Opteron™ processors offer AMD's revolutionary Direct Connect Architecture featuring an integrated memory controller, HyperTransport technology and 64-bit capability, enabling dense, high-performance multiprocessor embedded designs without the usual real estate and power penalties associated with an external Northbridge used in traditional x86 design. This results in industry-leading x86 performance and performance-per-watt solutions. Designers of data and telecommunication blades, storage servers, appliances, medical imaging systems and military applications are embracing the AMD Opteron processor— and its unparalleled performance— as their platform of choice.

Features:

- Single- and dual-core processors
- Multi-processor scalability (up to 8 CPUs)
- Supports 32- and 64-bit applications
- Three coherent HyperTransport technology links
- ECC (Error Correcting Code) protection for L1 cache data and L2 cache data and tags, and DRAM with hardware scrubbing of all ECC protected arrays
- Designed with Enhanced Virus Protection*
- AMD PowerNow!™ technology with Optimized Power Management (OPM) provides performance on demand and cooler operations
- 3DNow!™ Professional technology and SSE2/SSE3 instructions provide outstanding performance for digital content

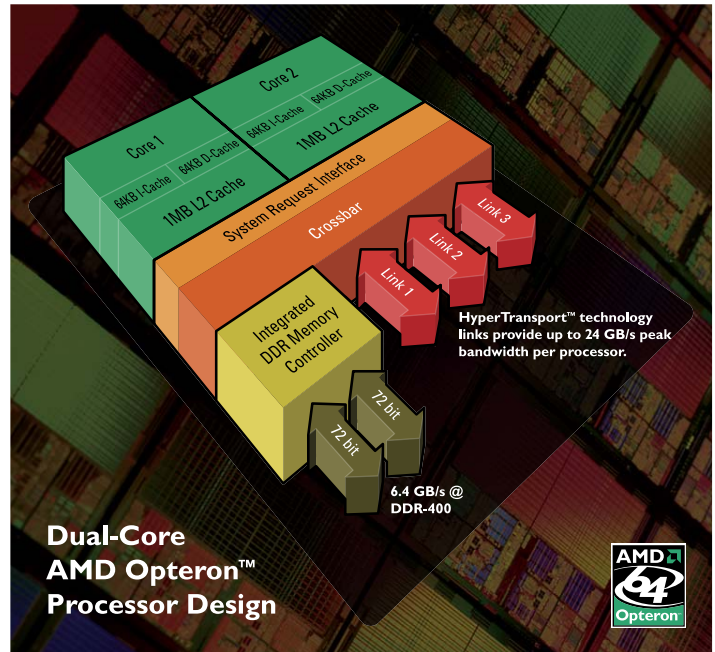
* Enhanced Virus Protection (EVP) is only enabled by certain operating systems including the current versions of Microsoft® Windows®, Linux, Solaris and BSD Unix. After properly installing the appropriate operating system release, users must enable the protection of their applications and associated files from buffer overrun

attacks. Consult your OS documentation for information on enabling EVP. Contact your application software vendor for information regarding use of the application in conjunction with EVP. AMD and its partners strongly recommend that users continue to use third-party anti-virus software as part of their security strategy.

AMD64 Technology: A dynamic platform for system design

AMD64 technology uniquely provides system designers with a highly scalable x86 platform. End users can deploy their existing 32-bit applications and operating systems while enjoying a migration path to 64-bit computing. Key components of AMD64 technology include:

- **Direct Connect Architecture** helps reduce the real challenges and bottlenecks of traditional system architectures as memory is directly connected to the CPU to optimize memory system performance; I/O is directly connected to the CPU for more balanced throughput I/O; and CPUs are connected directly to CPUs on the same die (native dual-core), allowing for additional latency reduction between processors
- **Integrated 128-bit wide DDR DRAM memory controller** allows the processor to directly access main memory, scaling with each additional processor, and increasing bandwidth while reducing memory latencies
- **HyperTransport™ technology** provides a scalable bandwidth interconnect between processor, I/O subsystems and other chipsets. HyperTransport™ technology offers up to 8.0GB/s bandwidth per link, providing sufficient bandwidth for supporting I/O technologies including PCI™, PCI-X™, PCI Express™, InfiniBand and 10G Ethernet—all with a low power consumption to help reduce a system's thermal budget



The AMD64 platform with Direct Connect Architecture helps reduce design complexities by lowering the overall chip count, increasing bandwidth and minimizing latency.

AMD Processor	Model	Power Envelope	Multi-CPU Scalability	Core Frequency	L2 Cache	HyperTransport Technology	Memory Interface	Package
Mobile AMD Sempron™ Processor	3300+ 3000+	25 watts (9 watts@reset)	1-way	2.0 GHz 1.8 GHz	1MB	One 16-lane@800MHz Full Duplex	Single 64/72 ECC DDR unbuffered	Lidless 754-pin μPGA
AMD Turion™ 64 Mobile Technology	MT-37	25 watts (8 watts@reset)	1-way	2.0 GHz	1MB	One 16-lane@800MHz Full Duplex	Single 64/72 ECC DDR unbuffered	Lidless 754-pin μPGA
Single-Core AMD Opteron™ Processor	852 848 HE 252 248 HE 244 EE 240 EE 152 148 HE 144 EE	95 watts 55 watts 95 watts 55 watts 30 watts 30 watts 95 watts 55 watts 30 watts	up to 8-way up to 8-way up to 2-way up to 2-way up to 2-way up to 2-way 1-way 1-way 1-way	2.6 GHz 2.2 GHz 2.6 GHz 2.2 GHz 1.8 GHz 1.4 GHz 2.6 GHz 2.2 GHz 1.8 GHz	1MB	Three 16-lane@1GHz Full Duplex	Dual 64/72 DDR Registered DIMMs ECC & Chip Kill	Lidded 940-pin μPGA
Dual-Core AMD Opteron™ Processor	865 865 HE 265 265 HE 165 165 HE	95 watts 55 watts 95 watts 55 watts 95 watts 55 watts	up to 8-way up to 8-way up to 2-way up to 2-way 1-way 1-way	1.8 GHz	1MB/core	Three 16-lane@1GHz Full Duplex	Dual 64/72 DDR Registered DIMMs ECC & Chip Kill	Lidded 940-pin μPGA

For more information on AMD's high-end embedded design programs, contact support.services_americas@amd.com or visit www.amd.com/amd64embedded



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