

# Quad-Core AMD Opteron™ Processor Quick Reference Guide

Generations  
Ahead



## Offering Industry-Leading Performance-Per-Watt and Superior Virtualization Capabilities

Quad-Core AMD Opteron™ processors are designed to enable higher productivity in your business and to help reduce your total cost of ownership. Plus, they are designed for seamless upgradeability from previous generations of AMD Opteron™ processors with DDR2 memory so you can maintain your existing infrastructure and investments.

### OPTIMAL VIRTUALIZATION

Scalable, efficient, and high performing, Quad-Core AMD Opteron™ processors are designed to maximize the efficiencies and benefits of virtualization.

- **AMD Virtualization™ Technology with Rapid Virtualization Indexing now further enhanced with 45nm** – provides a balanced approach to improve virtualization efficiency, enabling more virtual machines to run per server for greater server consolidation and improved manageability.
  - Increased performance for many virtual workloads, allowing for a higher performing, more flexible virtual environment.
  - AMD Extended Migration provides full live migration compatibility between single-core through quad-core AMD Opteron™ processor-based solutions enabling a more reliable, more adaptable IT environment.
  - Tagged TLB delivers fast and efficient switching between virtual machines.

### ENHANCED POWER EFFICIENCY

AMD's advanced 45nm technology produces the most energy efficient AMD Opteron™ processor ever. It also helps reduce CPU idle power by up to 35 percent. Additional performance-per-watt enhancing features of 45nm Quad-Core AMD Opteron™ processors include:

- **Enhanced AMD PowerNow!™ Technology**
  - Works with the operating system to deliver performance-on-demand capabilities for optimum performance-per-watt and power savings.
  - Delivers optimum power and performance for each core depending on core workloads, without compromising performance.
- **Dual Dynamic Power Management™ (DDPM)**
  - Provides more of what you want and less of what you don't. Intelligent platform design simultaneously enables increased memory controller frequency and independent control of power to the processing cores and the integrated memory controller, enabling more granular power management capabilities.
- **AMD CoolCore™ Technology**
  - Reduces processor energy consumption by turning off unused parts of the processor.
  - Works automatically without the need for drivers or BIOS enablement.
  - Power can be switched on or off within a single clock cycle, saving energy with no impact to performance.
- **AMD Smart Fetch Technology**
  - Can reduce CPU power consumption by up to 21% during processing idle times.

### INVESTMENT PROTECTION

- Same Socket Technology enables seamless hardware upgrades by maintaining consistent thermal properties across multiple CPU generations to help hardware longevity and performance-per-watt, while easing facilities planning.
- Common Core Strategy eases technology transitions, and can help reduce maintenance costs and preserve your IT software image by allowing for fewer upgrade disruptions.

### BALANCED PERFORMANCE

Quad-Core AMD Opteron™ processors deliver balanced performance, thanks to:

- **Direct Connect Architecture** helps improve system performance and efficiency by directly connecting the processors, the memory controller, and the I/O to the CPU. Tested and proven architecture in market since 2003 introduced by AMD.
  - Designed for multi-threaded and multi-tasking environments and can be deployed on a single platform for simplified manageability and low TCO with industry-leading processor performance.
  - High-bandwidth integrated memory controller combined with a quad-core optimized cache structure results in leading-edge performance and throughput for multi-threaded and multi-tasking environments.
  - 45nm technology produces much higher clock frequencies for far greater application performance<sup>1</sup>, but with no increase to processor average power consumption.
- **AMD Memory Optimizer Technology** is designed to match the increased demands of quad-core processing. AMD Memory Optimizer Technology helps maximize the amount of memory bandwidth attainable from Quad-Core AMD Opteron™ processors.
  - 128-bit memory channel can be divided into two independent 64-bit memory channels for improving memory bandwidth.

<sup>1</sup> Compared to Dual-Core AMD Opteron™ processors.

## BALANCED PERFORMANCE (cont.)

- **AMD BALANCED SMART CACHE** provides exceptional support for multi-threaded environments through a highly efficient cache structure
  - Dedicated 64K L1 instruction cache can load two 128-bit instructions per cycle.
  - Shared 6MB L3 cache to facilitate data transfer and help improve performance.
  - 45nm Quad-Core AMD Opteron™ processors offer twice the total cache size compared to 65nm Quad-Core AMD Opteron™ processors.

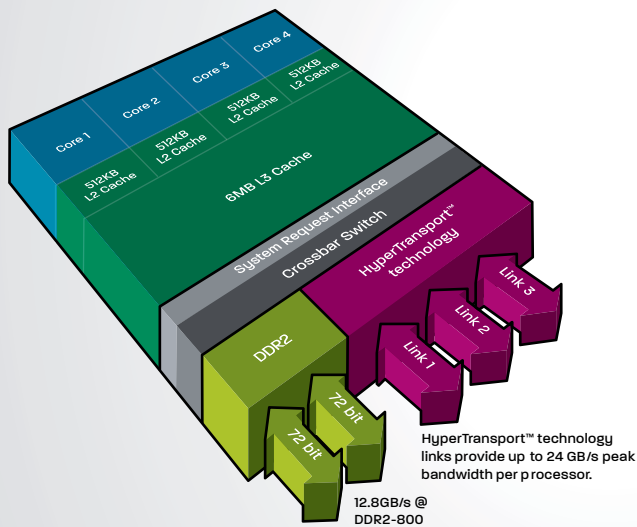
## ■ AMD Wide Floating-Point Accelerator

- 128-bit SSE floating-point capabilities enable each processor core to simultaneously execute up to four flops per clock (four times the floating-point capabilities of previous AMD Opteron™ processors) for significantly improved performance in compute-intensive and workstation applications.

## ROBUST SOFTWARE ECOSYSTEM

To provide users with world-class innovation and choice, AMD solutions are supported by a robust ecosystem of leading software companies, such as Microsoft, Novell, Oracle Red Hat, Parallels, Virtual Iron, VMware, Xen and Sun.

## QUAD-CORE AMD OPTERON™ PROCESSOR 2300/8300 SERIES ("Shanghai")



### Benefits of Balanced System Approach

- Integrated memory controller optimizes memory performance and scales bandwidth per CPU.
- Direct Connect Architecture provides the bandwidth to help reduce I/O and memory bottlenecks.
- HyperTransport™ technology enables high bandwidth and high performance.