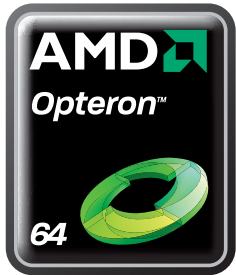


AMD Opteron™ 6000 Series Platform Quick Reference Guide

The AMD Opteron™ 6000 Series platform is the server platform you can count on as real-world workloads become increasingly complex and demanding.

AMD Opteron™ 6100 Series Processor



Direct Connect Architecture 2.0

- Quad Channel Memory Support
- Support for R/U-DDR3 up to 1333 Memory
- HyperTransport™ Technology Assist [HT Assist]
- HyperTransport™ 3.0 Technology (HT3)

AMD-P 2.0:

- Advanced Platform Management Link (APML)
- AMD CoolSpeed Technology
- CIE
- Support for LV-DDR3 Memory

AMD Virtualization™ (AMD-V™) Technology 2.0

- I/O Level Virtualization
- AMD-V with Rapid Virtualization Indexing
- Tagged TLB
- AMD-V Extended Migration

END USER BENEFITS

- **PERFORMANCE FOR DEMANDING WORKLOADS** — Match tough workloads with the right-fit server platform, and realize superior performance in memory and compute intensive workloads.
- **CONSISTENT PLATFORM THAT SCALES** — Take control now with Direct Connect 2.0 architecture consistency, including power, virtualization and memory innovations, and socket compatibility with planned AMD Opteron™ 6200 Series processor¹.
- **BUSINESS VALUE WITHOUT COMPROMISE** — Gain advantages normally reserved for high-end systems, with exceptional value, low total cost of ownership, and generational consistency.

PRODUCT FEATURES

DIRECT CONNECT ARCHITECTURE 2.0:

- **Quad Channel Memory** offers double the memory capacity and memory bandwidth of previous generations of AMD Opteron™ processors².
- **R/U-DDR3 Memory up to 1333** enables improved overall system performance compared to earlier memory technologies.
- **HyperTransport™ Technology Assist [HT Assist]** helps increase HyperTransport™ technology efficiency by reducing probe traffic and resolving probe issues.
- **HyperTransport™ 3.0 Technology (HT3) with 4th HT Link and increased speed, up to 6.4GT/s** provides superior system bandwidth between CPU's and I/O to help improve system balance and scalability.
- **Increased Cache and Core Count of up to 12 cores within the same package** offers improved performance and performance/watt compared to prior generations for multi-threaded environments such as virtualization, database and web serving.

NEW AMD-P 2.0 POWER SAVINGS FEATURES:

- **APML (Advanced Platform Management Link)**³ provides an interface for processor and Systems Management monitoring and controlling of system resources such as platform power consumption via p-state limits and CPU thermals to closely monitor power and cooling.
- **AMD CoolSpeed Technology** reduces p-states when a temperature limit is reached to allow a server to operate if the processor's thermal environment exceeds safe operational limits.
- **CIE** provides a sleep state that can equate to significant power savings in the datacenter depending on system configuration.
- **LV-DDR3 memory** support helps to reduce overall system power consumption.

AMD-V™ 2.0 supports I/O level virtualization to provide direct control of device by a VM⁴ and improve I/O performance within a virtual machine.

¹ BIOS update is required
² Based on quad channel DDR3-1333 for AMD Opteron™ 6100 Series processor vs. dual channel DDR2-800 for Six-Core AMD Opteron™ processor
³ In APML-enabled platforms
⁴ Enabled by the SR5690/SR5670/SR5650 chipsets

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AMD Opteron™ 6100 Series Processor Product Specifications

Model Number	Core Count	Core Frequency	I/O Bus Frequency*	Max I/O Bandwidth	CMOS Tech	L2 Cache	L3 Cache	ACP**
6176 SE	12	2.3GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	105 W
6174	12	2.2GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	80 W
6172	12	2.1GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	80 W
6168	12	1.9GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	80 W
6136	8	2.4GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	80 W
6134	8	2.3GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	80 W
6128	8	2.0GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	80 W
6164 HE	12	1.7GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	65 W
6128 HE	8	2.0GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	65 W
6124 HE	8	1.8GHz	1.8GHz	102.4GB/s	45 nm SOI	512KB/core	12MB	65 W

SR5650, SR5670, SR5690 Product Specifications—Northbridge

Model Number	Processor interface	PCI Express® PCI Express®	Number of PCIe® Ports/ engines	Virtualization	Error Detection/Isolation	Max. TDP/ Idle	Process Technology	Package
SR5650	Hyper Transport™ 3.0 technology (5.2GT/s)	2.0 v1.0	22 lanes/ 8 engines	AMD-Vi (IOMMU 1.2)	HyperTransport error handling, PCIe® Advanced Error Reporting, PCIe® end-to-end Cycle Redundancy Check	13W/7.1W	TSMC 65nm	29 x 29mm FCBGA
SR5670	Hyper Transport™ 3.0 technology (5.2GT/s)	2.0 v1.0	30 lanes/ 9 engines	AMD-Vi (IOMMU 1.2)	HyperTransport error handling, PCIe® Advanced Error Reporting, PCIe® end-to-end Cycle Redundancy Check	17W/7.3W	TSMC 65nm	29 x 29mm FCBGA
SR5690	Hyper Transport™ 3.0 technology (5.2GT/s)	2.0 v1.0	42 lanes/ 11 engines	AMD-Vi (IOMMU 1.2)	HyperTransport error handling, PCIe® Advanced Error Reporting, PCIe® end-to-end Cycle Redundancy Check	18W/7.5W	TSMC 65nm	29 x 29mm FCBGA

AMD Opteron™ 6100 Series Processor Product Specifications

Cache Sizes	Total Cache: 19.6MB (12 core), 17.1MB (8 core) L1 Cache: 64KB (Data) + 64KB (Instruction) (per core) L2 Cache: 512KB (per core) L3 Cache: 12MB (per socket)
Process Technology	45-nanometer SOI (silicon-on-insulator) technology
HyperTransport™ technology links	Four x16 links @ up to 6.4GT/s per link
Memory	Integrated DDR3 memory controller – With DDR3-133 support up to 42.7 GB/s memory bandwidth per CPU for Socket G34
Types of Memory	Support for unregistered DIMMs up to PC2 8500 (DDR2-1066MHz) and PC3 10600
Die Size	346mm ² per die
Packaging	Socket G34 - 1944-pin organic Land Grid Array (LGA)

SP5100 Product Specifications—Southbridge

USB ports	12 USB 2.0 + 2 USB 1.1
PCI Bus support	PCI rev 2.3
Serial ATA	SATA 3.0Gb/s with AHCI 1.1 SW RAID Support via DoTHill RAID Stac
SATA Ports	6 (can be independently disabled)
Max. TDP/Idle	4W/1W
Process technology	TSMC .13um
Package	528 ball FCBGA, 21x21mm, 0.8mm pitch

* Using HyperTransport™ technology
 ** ACP stands for Average CPU power. See www.amd.com/ACP