AMD Server Solutions Playbook
A Comprehensive Guide to the AMD Opteron™ 6000, 4000 and 3000 Series Server Platforms
This AMD Server Solutions playbook was created to help our component channel sales partners choose the right server platforms for their customers to help them meet their business needs today and tomorrow. It includes AMD Opteron™ processor-specific information to help you in making recommendations, comparing competitive offerings, positioning AMD solutions for specific workload needs, referencing specific partner motherboard and barebones solutions, etc.

Table Of Contents

Choose the server platform that's right for your customer
> AMD Opteron™ Processors ........................................................................................................................................... 1
> How AMD Compares to the Competition .......................................................................................................................... 2
> Workload-Focused Product Strategy .................................................................................................................................. 3

How AMD Opteron™ benefit your customer's workload needs
> Virtualization ........................................................................................................................................................................... 4
> Database .................................................................................................................................................................................. 5
> Cloud Computing .................................................................................................................................................................. 6
> High Performance Computing .............................................................................................................................................. 9
> IT Infrastructure .................................................................................................................................................................... 17

AMD Opteron™ 6300 Series Processor Parts & Specifications .................................................................................................. 18
AMD Opteron™ 6200 Series Processor Parts & Specifications .................................................................................................. 21
AMD Opteron™ 4300 Series Processor Parts & Specifications .................................................................................................. 24
AMD Opteron™ 4200 Series Processor Parts & Specifications .................................................................................................. 27
AMD Opteron™ 3300 Series Processor Parts & Specifications .................................................................................................. 30
AMD Opteron™ 3200 Series Processor Parts & Specifications .................................................................................................. 32
AMD Opteron™ Processor Product Feature Details .................................................................................................................. 35
AMD Opteron™ Chipset Specifications .................................................................................................................................... 36

Motherboards and Barebones
> ASUS ..................................................................................................................................................................................... 37
> MSI ....................................................................................................................................................................................... 41
> Supermicro ........................................................................................................................................................................... 42
> Tyan ...................................................................................................................................................................................... 59

AMD Distributors .................................................................................................................................................................... 69
Server Resources ........................................................................................................................................................................ 70
Choose the server platform that's right for your customer
AMD OPTERON™ 6000, 4000 AND 3000 SERIES PLATFORMS

AMD OPTERON™ PROCESSORS

High Core Count
High Memory Bandwidth
Application Scalability

Virtualization

Database/Biz Apps

Web Hosting

Email/ Collaboration

IT Infrastructure

Substantiation

1. Estimate based on preliminary measurements of server side Java performance in AMD labs as of August 30, 2012. 1,199,838 operations per second using 2 x AMD Opteron™ processors Model 6278. 1,489,668 operations per second using 2 x AMD Opteron™ processors Model 6380. SVR-168

2. Comparison based on 2P SPECpower_ssj2008 data submitted to SPEC as of Nov 27, 2012: 60.9W at Active Idle, 256W and 971,064 ssj_ops at 100% of target load, and 3052 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 4386 in Tyan YR190B8228 server, 32GB (4 x 8GB DDR3-1600) memory, YM-2451C power supply, 128GB SATA SSD disk drive, Microsoft® Windows Server® 2008 x64 Enterprise Edition. 61.8W at Active Idle, 299W and 870,780 ssj_ops at 100% of target load, and 2453 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 4284 in Tyan YR190B8228 server, 32GB (4 x 8GB DDR3-1600) memory, YM-2451C power supply, 128GB SATA SSD disk drive, Microsoft® Windows Server® 2008 x64 Enterprise Edition. SPEC, SPECpower and SPECpower_ssj are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org. SVR-312

AMD Opteron™ 6000 Series Processors

AMD Opteron 6100 Series processor
8 and 12 cores

AMD Opteron 6200 Series processor
4, 8, 12 and 16 cores

AMD Opteron 6300 Series processor
4, 8, 12 and 16 cores

AMD Opteron™ 4000 Series Processors

AMD Opteron 4100 Series processor
4 and 6 cores

AMD Opteron 4200 Series processor
6 and 8 cores

AMD Opteron 4300 Series processor
4, 6 and 8 cores

AMD Opteron™ 3000 Series Processors

AMD Opteron 3200 Series processor
4 and 8 cores

AMD Opteron 3300 Series processor
4 and 8 cores

AMD Opteron™ 3300 Series Processors

> Ideal for low cost servers
> 4 and 8 cores available
> 1 socket, 2 memory channels
> Server-class performance in a 1P platform
> AM3+ socket platform
> Low acquisition cost for fast amortization
> AMD SRS600 Series Chipset
> Cost-effective and low power

AMD Opteron™ 4300 Series Processors

> Ideal for power and cost efficiency
> 4, 6 and 8 cores available
> 1/2 socket, 2 memory channels
> Up to 24% higher performance per watt than previous generations
> Easily integrated into existing AMD Opteron 4000 Series platform
> G32 socket platform
> AMD SR5600 Series Chipset

AMD Opteron™ 3000 Series Processors

> Ideal for Web/Cloud
> 4 and 8 cores
> Low acquisition cost for fast amortization
> AMD SRS600 Series Chipset
> Cost-effective and low power

AMD Opteron™ 6300 Series Processors

> Ideal for performance and scalability
> 4, 8, 12, and 16 cores available
> 1/2 socket, 4 memory channels
> Deliver up to 24%+ higher performance
> Easily integrated into existing AMD Opteron 6000 Series platform
> G34 socket platform
> AMD SR5600 Series Chipset

AMD Opteron™ 6000 Series Processors

> Ideal for performance and scalability
> 4, 8, 12, and 16 cores available
> 2/4 socket, 4 memory channels
> Deliver up to 24%+ higher performance
> Easily integrated into existing AMD Opteron 6000 Series platform
> G34 socket platform
> AMD SR5600 Series Chipset

AMD Opteron™ 4000 Series Processors

> Ideal for power and cost efficiency
> 4, 6 and 8 cores available
> 1/2 socket, 2 memory channels
> Up to 24% higher performance per watt than previous generations
> Easily integrated into existing AMD Opteron 4000 Series platform
> G32 socket platform
> AMD SR5600 Series Chipset

AMD Opteron™ 3000 Series Processors

> Ideal for Web/Cloud
> 4 and 8 cores
> Low acquisition cost for fast amortization
> AMD SRS600 Series Chipset
> Cost-effective and low power

AMD Opteron™ 6000 Series Processors

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> 4, 8, 12, and 16 cores available
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> Deliver up to 24%+ higher performance
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> G32 socket platform
> AMD SR5600 Series Chipset

AMD Opteron™ 3000 Series Processors

> Ideal for Web/Cloud
> 4 and 8 cores
> Low acquisition cost for fast amortization
> AMD SRS600 Series Chipset
> Cost-effective and low power
### Processor Comparison

<table>
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<tr>
<th></th>
<th>AMD Opteron™ 6200 Series Processor</th>
<th>AMD Opteron™ 6300 Series Processor</th>
<th>Intel Xeon E7-4800 Series Processor</th>
<th>Intel Xeon E5-4600 Series Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target configurations</strong></td>
<td>1P, 2P or 4P</td>
<td>1P, 2P or 4P</td>
<td>4P</td>
<td>4P</td>
</tr>
<tr>
<td><strong>Cores per processor</strong></td>
<td>4, 8, 12 and 16 cores</td>
<td>4, 8, 12 and 16 cores</td>
<td>6, 8 and 10 cores</td>
<td>4, 6 and 8 cores</td>
</tr>
<tr>
<td><strong>Max memory speed (MHz)</strong></td>
<td>1600</td>
<td>1866**</td>
<td>1066</td>
<td>1600</td>
</tr>
<tr>
<td><strong>Minimum TDP per core</strong></td>
<td>5.31</td>
<td>5.31</td>
<td>13</td>
<td>11.88</td>
</tr>
<tr>
<td><strong>Top bin processor price</strong></td>
<td>$1,265</td>
<td>$1,392</td>
<td>$4,394</td>
<td>$3,616</td>
</tr>
<tr>
<td><strong>Lowest cost processor option</strong></td>
<td>$266</td>
<td>$293</td>
<td>$890</td>
<td>$551</td>
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<tr>
<td><strong>Cores per processor</strong></td>
<td>4, 8, 12 and 16 cores</td>
<td>2, 4, 6 and 8 cores</td>
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<td>4, 6 and 8 cores</td>
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<td><strong>Max memory speed (MHz)</strong></td>
<td>1600</td>
<td>1866**</td>
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<td><strong>Minimum TDP per core</strong></td>
<td>5.31</td>
<td>8.75</td>
<td>4.38</td>
<td>8.75</td>
</tr>
<tr>
<td><strong>Top bin processor price</strong></td>
<td>$1,265</td>
<td>$2,057</td>
<td>$4,440</td>
<td>$501</td>
</tr>
<tr>
<td><strong>Lowest cost processor option</strong></td>
<td>$266</td>
<td>$198</td>
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<td><strong>Target configurations</strong></td>
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<td>2 or 4 cores</td>
</tr>
<tr>
<td><strong>Max memory speed (MHz)</strong></td>
<td>1866**</td>
<td>1866**</td>
<td>1800</td>
</tr>
<tr>
<td><strong>Minimum TDP per core</strong></td>
<td>8.13</td>
<td>6.3</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Top bin processor price</strong></td>
<td>$229</td>
<td>$229</td>
<td>$294</td>
</tr>
<tr>
<td><strong>Lowest cost processor option</strong></td>
<td>$99</td>
<td>$125</td>
<td>$189</td>
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**Notes:**
- **1866MHz supported only with a single physical DIMM per memory channel.**
## Workload-Focused Product Strategy

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<th>Public Cloud</th>
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<td>Web Services</td>
<td>Virtualized IT</td>
<td>Hadoop</td>
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<td>Hosted Applications</td>
<td>Infrastructure</td>
<td>HPC apps include</td>
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<td>Search and Social Media Applications</td>
<td>VDI (Virtual Desktop Infrastructure)</td>
<td>LS Dyna</td>
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<td>Web Services</td>
<td>Physics</td>
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<tr>
<td></td>
<td>Database</td>
<td>Life Sciences</td>
</tr>
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<td></td>
<td>Molecular Dynamics</td>
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### Workload Apps

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</table>

### Thread Density

| AMD Opteron™ 6000 Series Processors | Enterprise virtualization | Cloud app layer, memcache, back end | Performance HPC clusters |

### Thread Power Efficiency

| AMD Opteron™ 4000 Series Processors | SMB/Branch office virtualization | Low power cloud front end, app layer |

### Thread Cost

| AMD Opteron™ 3000 Series Processors | Dedicated hosting and small business servers |
How AMD Opteron™ processors benefit your customer’s workload needs
VIRTUALIZATION

STRIKING THE BALANCE BETWEEN PERFORMANCE AND PRICE

Meet your customer’s datacenter and bottom line requirements with a balance of consistent performance, dependability, and price for their virtualization & private cloud computing deployments. AMD-powered clouds deliver the compute power they need on an efficient and rock-solid platform for virtualization and private cloud environments that make smart business sense and deliver real-world results.

<table>
<thead>
<tr>
<th>Workload Need</th>
<th>AMD Platform Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance of price and performance</td>
<td>4P servers with up to 64 cores allow for 4P performance at 2P prices in the AMD Opteron 6000 series processors.¹</td>
</tr>
<tr>
<td>Consolidate to save</td>
<td>More cores per processor (up to 16 cores/CPU) with up to four memory channels per CPU and virtualization hardware enhancements such as AMD Virtualization (AMD-V™) Technology help to support more core dense servers, which can result in greater ROI. Ideal for virtualization solutions that your customers are using, such as VMware vSphere™, Windows® Hyper-V Server, Citrix XenServer™, and Red Hat Enterprise Virtualization. Scale during peak cycles with more cores, memory channels and I/O capabilities.</td>
</tr>
<tr>
<td>Reduce power and space</td>
<td>AMD Opteron™ 6300 Series processor-based servers allow you to run up to twice the VMs per CPU as Intel Xeon E5-2600 Series-based servers, deploying up to 672 VMs in as little as 6 square feet of floor space.² Innovative power-saving features such as AMD-P 2.0 technology, C6, and TDP Power Capping allow for superior power efficiency and more control of your power and cooling costs; rack dense servers and blades reduce space requirements. Control your power budget and get more flexible, dense deployments – use TDP Power Cap to set TDP ceiling. Optimize performance per watt at load/idle – monitor, adjust processor power states, and turn off unused parts of the processor with AMD-P 2.0 technology.</td>
</tr>
<tr>
<td>Run application at near native performance</td>
<td>Reduce latency associated with virtualization via hardware enhancements found in AMD Virtualization (AMD-V™) 2.0 Technology. See product specs for more information on AMD-V™ technology. Run more or more robust VMs or virtual desktops per server – AMD Opteron 6300 Series processors offer up to 100% more cores than Intel Xeon E5-2600 series processors.³ High Memory throughput to support multiple VMs and help reduce latency – 4 channels of up to 1866™ MHz.</td>
</tr>
<tr>
<td>Seamless migration</td>
<td>Consistent features, images, and software between the AMD Opteron™ 6000 and 4000 Series Platforms. Consistency across the AMD Opteron™ 6000 and 4000 series processors for easy upgradeability and backwards compatibility between generations.</td>
</tr>
<tr>
<td>I/O Virtualization</td>
<td>Help improve performance by assigning a virtual machine to an I/O device. Protect virtual machine memory from peripheral-based attacks and provide increased integrity and security.</td>
</tr>
</tbody>
</table>

HOW TO SELL

> Understand how the customer is using virtualization. Every situation is unique, the business drivers will dictate what platforms to deploy. It is important to have an in depth conversation with your customer to see what the right fit is for them.

> Understand what virtualization solution they are looking at, is it VMware or Microsoft® with Hyper-V?

> Focus on presenting the price/performance and cost/VM advantages of AMD servers rather than just raw performance.

SUBSTANTIATION:

1. Based on 2P capable Six-Core AMD Opteron™ processor Model 2435 1ku pricing of $989 as of 10-19-09 vs. 4P capable AMD Opteron™ processor Model 6172 1ku pricing of $989 as of 4-25-11. SVR-22

2. Based on a 1 VMcore model. AMD Opteron™ 6300 Series-based servers have up to 16 cores per processor. 672 VMs equals a 42U rack of (21) 2P 2U servers. Intel Xeon E5-2600-based servers have up to 8 cores per processor as of 4/30/12 at www.intc.com/pricelist.cfm which yields up to 336 VMs in a 42U rack of (21) 2P servers. The square footage of a standard rack is 6 ft (2ft x 3ft). SVR-136

3. AMD Opteron™ 6300 Series processors have up to 16 cores. Intel Xeon E5-2600 Series processors have up to 8 cores per processor. Intel Xeon E7-4800 Series has up to 10 cores per processor. See www.intc.com/pricelist.cfm as of 4/2/12. SVR-140

**1866MHz supported only with a single physical DIMM per memory channel**
DATABASE WORKLOADS

STRIKING THE BALANCE BETWEEN PERFORMANCE AND PRICE

More Memory Channels Enable:
> Fast access to data tables that reside in memory.
> Fast read and write operations.
> A database to load a larger number of records into memory for fast processing rather than swapping data back and forth from hard drives.

<table>
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<th>Workload Need</th>
<th>AMD Platform Benefits</th>
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<tr>
<td>Scale during peak cycles</td>
<td>&gt; Up to 64 cores, 16 memory channels, and I/O capabilities (PCI Express Gen 2 for high speed I/O peripherals) in 4P</td>
</tr>
<tr>
<td></td>
<td>&gt; Faster memory bandwidth – 78% faster in 4P for the AMD Opteron 6200 series processors, for fast data access to improve performance.</td>
</tr>
<tr>
<td></td>
<td>&gt; Tackle peak demands – unlock power headroom and boost clock speed with AMD Turbo CORE technology.</td>
</tr>
<tr>
<td>Handle data management and analysis on same platform</td>
<td>&gt; Up to 16 cores with 4 memory channels and 16MB of L3 cache per CPU for updating, searching, and analyzing data.</td>
</tr>
<tr>
<td>Consolidate databases to save cost</td>
<td>&gt; More cores per processor (up to 16 cores/CPU) to drive multiple databases per server.</td>
</tr>
<tr>
<td>Reduce power consumption during low usage</td>
<td>&gt; The innovative AMD-P 2.0 technology suite of power saving features allow consolidation with great power efficiency.</td>
</tr>
<tr>
<td></td>
<td>&gt; AMD Opteron™ 6300 Series processors support ultra low voltage memory, which has 17% lower voltage than standard memory.</td>
</tr>
</tbody>
</table>

HOW TO SELL
> Understand how the customer is using database.
> Understand what database platforms the customer is using.

SUBSTANTIATION:
1. SVR-22: Based on 2P capable Six-Core AMD Opteron™ processor Model 2435 1ku pricing of $989 as of 10-19-09 vs. 4P capable AMD Opteron™ processor Model 6172 1ku pricing of $989 as of 4-25-2011.
2. For AMD Opteron™ processors supporting a maximum memory speed of DDR3-1600, theoretical memory bandwidth = 12.8GB/s x number of memory channels per server. For AMD Opteron™ processors supporting a maximum memory speed of DDR3-1333, theoretical memory bandwidth = 10.667GB/s x number of memory channels per server. The max theoretical bandwidth for four AMD Opteron™ processor Model 6282 SE is 205 GB/s. For Intel Xeon processors, theoretical memory bandwidth = SMI speed x 9 bits per SB lane x 16 lanes. The max theoretical bandwidth for four Intel Xeon processor Model E7-4870 is 115 GB/s. For more information, please see page 7 of http://www.intel.com/Assets/PDF/datasheet/322824.pdf. SVR-101.
3. AMD Opteron™ 6300 Series processors support ultra low voltage (1.25V) memory and they also support standard memory (1.5V). SVR-141
CLOUD COMPUTING WORKLOADS

STRIKING A BALANCE BETWEEN PERFORMANCE AND PRICE
With AMD processor-based solutions, your customer’s company has a highly scalable and dependable server platform that can fulfill all their cloud data center requirements at a great value. By using AMD Opteron™ processors as the foundation of their data center, they have the compute power and flexibility to efficiently handle the demands of running a cloud environment while meeting their bottom-line requirements with a balance of performance, efficient power consumption, and price.

WHY MORE MEMORY CHANNELS MATTER FOR WEB/CLOUD COMPUTING
With the growing popularity of virtualized Web servers, it is important to have memory resources (at least 2GB) for each virtual machine (VM). AMD Opteron™ processor-based server platforms support up to four memory channels. More memory channels enable:
- Increased paths to access the information in memory.
- Reading and writing more information simultaneously over the channels.

With more memory, large data applications such as Memcached and Apache Hadoop help:
- Cloud applications run faster.
- Distribute the processing power across a larger number of nodes with more memory.

Large memory footprints and more channels of high performance memory help with:
- Cloud computing challenges.
- Driving better performance and lower latency for memory access.

HOW TO SELL
> Balanced platforms (performance, power, and price) designed for internet-based computing.
> Specialized ultra-low power platform to optimize energy efficiency.
> High core density allows for fewer physical servers to manage and superior use of floor space.
## CLOUD COMPUTING WORKLOADS

### DEDICATED WEB HOSTING

<table>
<thead>
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<th>Workload Need</th>
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<td>Enterprise Class</td>
<td>&gt; Delivering performance and flexibility with worry-free, enterprise class reliability, software and OS certification and manageability.</td>
</tr>
<tr>
<td>Fast Payback</td>
<td>&gt; AMD Opteron™ 3300 Series processors offer up to 61% lower cost per core than Intel Xeon E3-12xxLv2 Series processors.¹</td>
</tr>
<tr>
<td>Cores</td>
<td>&gt; Delivering more cores and better price performance in the AMD Opteron 3000 series processors.²³</td>
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**Workload Need**

1. **Enterprise Class**: Delivering performance and flexibility with worry-free, enterprise class reliability, software and OS certification and manageability.
2. **Fast Payback**: AMD Opteron™ 3300 Series processors offer up to 61% lower cost per core than Intel Xeon E3-12xxLv2 Series processors.¹
3. **Cores**: Delivering more cores and better price performance in the AMD Opteron 3000 series processors.²³

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**Table Notes**

1. Intel Xeon processor Model E3-1265Lv2 has 4 cores and a price of $294 as of 10/17/12 at www.intc.com/pricelist.cfm. AMD Opteron™ processor Models 3380 has 8 cores and a preliminary price of $229. SVR-307
2. Intel Xeon processor Model E3-1230Lv2 has 2 cores and E3-1235 has 4 cores as of 1/9/12 at www.intc.com/pricelist.cfm. AMD Opteron™ processor Models 3250, 3260, and 3280 have 4, 4, and 8 cores respectively. SVR-110
3. AMD Opteron™ 3200 Series processors provide up to 60% better performance per $ than Intel Xeon E3-12xxL Series processors. Comparison drawn between the Intel Xeon E3-12xxL and AMD Opteron 3200 Series processors with the highest SPECint_rate2006 to price ratio. The estimated SPECint_rate2006 scores for the AMD Opteron 3200 Series processors reflect current expectations based on the performance of AMD Opteron 4200 Series processors and are subject to change. The results for the Intel Xeon processors reflect the highest 1P results published on http://www.spec.org/cpu2006/results as of Jan 9, 2012 with each processor operating at its default frequency.

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Configuration</th>
<th>Result</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate2006</td>
<td>1 x Intel Xeon processor Model E3-1220L in IBM System x3250 M4 (Intel Xeon E3-1220L), 16 GB (2 x 8 GB 2Rx8 PC3-10600E-9, ECC), Red Hat Enterprise Linux Server Release 6.1, Kernel 2.6.32-131.0.15.el6.x86_64, C/C++: Version 12.1.0.225 of Intel Compiler XE Build 20110803, <a href="http://www.spec.org/cpu2006/results/res2011q4/cpu2006-20111121-18865.html">http://www.spec.org/cpu2006/results/res2011q4/cpu2006-20111121-18865.html</a>.</td>
<td>70.3</td>
<td></td>
</tr>
<tr>
<td>SPECint_rate2006</td>
<td>1 x AMD Opteron™ processor Model 3250.</td>
<td>SPECint_rate score= 75 (est.)</td>
<td></td>
</tr>
<tr>
<td>SPECint_rate2006</td>
<td>1 x AMD Opteron™ processors Model 3280.</td>
<td>SPECint_rate score= 117 (est.)</td>
<td></td>
</tr>
<tr>
<td>SPECint_rate2006</td>
<td>1 x AMD Opteron™ processors Model 3260.</td>
<td>SPECint_rate score= 91 (est.)</td>
<td></td>
</tr>
</tbody>
</table>

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**SPEC and SPECint®** are registered trademarks of the Standard Performance Evaluation Corporation. For the latest SPECint_rate2006 results, visit http://www.spec.org/cpu2006/results. SVR-114

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1. Intel Xeon processor Model E3-1220L is $189 as of 1/9/12 at www.intc.com/pricelist.cfm.
2. Intel Xeon processor Model E3-1260L is $294 as of 1/9/12 at www.intc.com/pricelist.cfm.
3. AMD Opteron™ processor Model 3250 has a preliminary price of $99 as of 1/9/12.
4. AMD Opteron™ processor Model 3260 has a preliminary price of $229 as of 1/9/12. SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. For the latest SPECint_rate2006 results, visit http://www.spec.org/cpu2006/results. SVR-114
### Workload Need

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<thead>
<tr>
<th><strong>AMD Platform Benefits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable platforms with balance of CPU, I/O, and power</td>
</tr>
<tr>
<td>&gt; Superior price/performance and expandability (AMD Opteron™ 6300 Series) and/or performance / per watt (AMD Opteron™ 4300 Series).</td>
</tr>
<tr>
<td>&gt; Intel will lead with price, while AMD will lead with price AND platform functionality.</td>
</tr>
<tr>
<td>&gt; Up to 78% higher memory bandwidth in 4P AMD Opteron 6200 series processors for fast data access and to improve performance.</td>
</tr>
<tr>
<td>Low power servers</td>
</tr>
<tr>
<td>&gt; The lowest two-socket server TDP (35W) (AMD Opteron™ 4300 Series).</td>
</tr>
<tr>
<td>&gt; Offering parts that are specifically designed for servers - Intel may use desktop or laptop components for low power web/cloud bids.</td>
</tr>
<tr>
<td>&gt; Extremely low TDP per core – 5.3W for AMD Opteron processor Model 6262 HE and 4.4W for AMD Opteron processor Model 4258 EE.</td>
</tr>
<tr>
<td>&gt; Higher performance/watt – AMD Opteron™ 6300 Series processors offer up to 40% higher performance/watt than AMD Opteron 6200 Series processors.</td>
</tr>
<tr>
<td>&gt; Run more cores in the same power/thermal envelope – up to 60-100% more cores.³</td>
</tr>
<tr>
<td>&gt; Control your power budget and get more flexible, denser deployments – use TDP Power Cap to set TDP ceiling.</td>
</tr>
<tr>
<td>&gt; Optimize performance per watt at load/idle – monitor, adjust processor power states, and turn off unused parts of the processor with AMD-P 2.0.</td>
</tr>
<tr>
<td>Handle large quantity of transactions while keeping user response time low</td>
</tr>
<tr>
<td>&gt; Up to 64 Cores, 16 memory channels, and I/O capabilities to handle heavy user demand; I/O capabilities include PCI Express® Gen 2 for high speed I/O peripherals in 4P offerings.</td>
</tr>
</tbody>
</table>

---

**SUBSTANTIATION**

1. For AMD Opteron™ processors supporting a maximum memory speed of DDR3-1600, theoretical memory bandwidth = 12.8GB/s x number of memory channels per server. For AMD Opteron™ processors supporting a maximum memory speed of DDR3-1333, theoretical memory bandwidth = 10.667GB/s x number of memory channels per server. The max theoretical bandwidth for four AMD Opteron™ processor Model 6282 SE is 205 GB/s. For Intel Xeon processors, theoretical memory bandwidth = SMI speed x 9 bits per SB lane x 16 lanes. The max theoretical bandwidth for four Intel Xeon processor Model E7-4870 is 115 GB/s. For more information, please see page 7 of http://www.intel.com/Assets/PDF/datasheet/322824.pdf. SVR-101.

2. Comparison based on 2P SPECpower_ssj2008 data as of Oct 16, 2012: 77.9W at Active Idle, 308W and 1,636,298 ssj_ops at 100% of target load, and 4,040 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 6380 in Supermicro 1022G-NTF server, 64GB (8 x 8GB DDR3-1600) memory, Supermicro PWS-563-1H20 power supply, 240GB SATA disk drive, Microsoft® Windows Server® 2008 R2 x64 Enterprise Edition. 82.6W at Active Idle, 320W and 1,233,423 ssj_ops at 100% of target load, and 2,892 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 6278 in Supermicro 1022G-NTF server, 64GB (8 x 8GB DDR3-1600) memory, Supermicro PWS-665-1400 power supply, 240GB SATA disk drive, Microsoft® Windows Server® 2008 R2 x64 Enterprise Edition, SPEC and SPECcpu are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org. SVR-305

3. AMD Opteron™ 6300 Series processors have up to 16 cores. Intel Xeon E7-2800 Series processors have up to 8 cores per processor. Intel Xeon E7-4800 Series has up to 10 cores per processor. See www.intel.com/ptatialc1dm as of 4/2012. SVR-140
SCALABLE SOLUTIONS FOR ANY SIZE PROBLEM

AMD is recognized as a leader in high performance computing (HPC), recently receiving two awards from HPCwire: a Readers’ Choice Award for ‘Best HPC Collaboration between Government and Industry’ and an Editors’ Choice Award for ‘Top Five Vendors to Watch.’ These awards further underscore AMD’s leadership position in supercomputing with its AMD Opteron™ processor family and its recent addition of the high performance AMD Opteron™ 6300 Series processor.

AMD provides massive compute capability, performance and flexibility to power the world’s number one ranked supercomputer. This ranking, the sixth number-one spot for AMD-based supercomputers in the last five years, highlights AMD’s commitment to enabling indispensable computing technology by offering competitive performance at low cost.

NEW CORE ARCHITECTURE

With the new AMD Opteron architecture, customers are provided the flexibility to optimally tune codes based on workload requirements. This architecture is based on a building block called a module. Each module has two tightly coupled x86 processing engines that are called cores.

Each integer core has its own dedicated resource.
  > Integer Scheduler
  > Execution Engine
  > L1 Cache

Each pair of cores in a module share some resources.
  > Instruction Fetch
  > Decode
  > Floating Point Unit
  > L2 Cache

Processors can boost core frequencies by allocating more power to individual cores.
  > Cores that are idle can “go to sleep” and turn off their power draw, allocating more power to the active cores.

   December 2012
2. Taken from http://www.top500.org/lista/2012/11/ as of December 2012
TODAY’S AMD OPTERON™ 6300 SERIES PROCESSORS

Greater Performance

- Agile compute module x8B processor:
  - Scalable up to 4 sockets with up to 16 cores.
  - Four DDR-3 memory channels: up to 1866 MHz memory and 1.5 TB capacity in 4P systems.
  - Up to 3.5 GHz base frequency.
- Up to 24% higher Java performance over previous generation.

Greater Efficiency

- Up to 40% higher performance per watt than previous generation.\(^1\)
- C6 power state enables ultra low power by gating power to idle cores.
- Flexible power management.
- Consistency with AMD Opteron™ 6200 Series:
  - Same power/thermals.
  - Same socket.
  - Same software certifications.

Next Generation “Piledriver” Core

---


2. SVR-305 - Comparison based on 2P SPECpower_ssj2008 data as of Oct 16, 2012: 77.9W at Active Idle, 308W and 1,636,298 ssj_ops at 100% of target load, and 4,040 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 6380 in Supermicro 1022G-NTF server, 64GB (8 x 8GB DDR3-1600) memory, Supermicro PWS-603-1H20 power supply, 240GB SATA disk drive, Microsoft® Windows Server® 2008 R2 x64 Enterprise Edition X64. 82.6W at Active Idle, 320W and 1,233,423 ssj_ops at 100% of target load, and 2,892 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 6278 in Supermicro 1022G-NTF server, 64GB (8 x 8GB DDR3-1600) memory. SPEC and SPECjbb are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org.
HIGH PERFORMANCE COMPUTING WORKLOADS

COMPETITIVE PERFORMANCE AT LOWER COST

Driving HPC Adoption

> Competitive raw performance
> Significantly better performance/$
> Easy upgrade path for existing customers

More Compute per dollar for technical workloads

<table>
<thead>
<tr>
<th></th>
<th>Intel Xeon E5-2690 ($2057)</th>
<th>AMD Opteron 6380 ($1088)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STREAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAMMPS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAMD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BENCHMARK SCORES AND CONFIGURATION:

**STREAM:**
75 GB/s with 2 x AMD Opteron™ processors Model 6380 in Supermicro H8DGT server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP2 64-bit
77 GB/s with 2 x Intel Xeon processors Model E5-2690 in Supermicro X9DRT-HIBFF server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP2 64-bit

**LAMMPS:**
304 rating with 2 x AMD Opteron™ processors Model 6380 in Supermicro H8DGT server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP2 64-bit, GCC 4.7.3 Compiler, OMP1 1.5.3 Compiler Flags: -O3 -fno-alias -ip -unroll0 -no-prec-div
301 rating with 2 x Intel Xeon processors Model E5-2690 in Supermicro X9DRT-HIBFF server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP2 64-bit, Intel Professional Compiler v12.1.3, OMP1 1.5.3, GCC 4.7.3 Compiler Flags: -O3 -march=bdver1 -Davx -march=bdver1 -no-prec-div

**NAMD:**
2268 rating with 2 x AMD Opteron™ processors Model 6380 in Supermicro H8DGT server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP2 64-bit, GCC 4.7.0 Compiler, OMP1 1.5.3, GCC 4.7.0 Compiler Flags: -O3 -m64 -march=bdver1 -march=bdver1 -no-prec-div
2193 rating with 2 x Intel Xeon processors Model E5-2690 in Supermicro X9DRT-HIBFF server, 64GB (8 x 8GB DDR3-1600) memory, SuSE Linux® Enterprise Server 11 SP2 64-bit, Intel Professional Compiler v12.1.3, OMP1 1.5.3, GCC 4.7.3 Compiler Flags: -O3 -march=bdver1 -Davx -march=bdver1 -no-prec-div

Intel pricing as of October 15, 2012
AMD pricing as of December, 2012

www.amd.com/playbook
**MULTI-CHIP MODULE (MCM) PACKAGE**

The AMD Opteron™ 6300 series processor is organized as a Multi-Chip Module (two CPU dies in the package), interconnected using a HyperTransport link. Each die has its own memory controller interface to allow external connection of up to two memory channels per die. This memory interface is shared among all the CPU core pairs on each die. Each core pair appears to the operating system as two completely independent CPU cores. Thus, to the OS, the device shown below appears as 16 CPUs.
**Scenario One: Two Integer Cores**

Agile compute unit.  
**Scenario one:** A dedicated Integer pipe for each thread.

**Efficient hardware paths:**
- Shared L1 Cache, Fetch and Decoders, L2 cache, L3 cache for all the threads
- Dedicated integer scheduler
- Dedicated integer pipes

**Workload types:**
- Exchange Server
- File Server
- Virtualization workloads for VDI
- Transactions with small to moderate data
- Search algorithms requiring small to moderate data
**Scenario Two: Two General Purpose Cores**

Agile compute unit.

**Scenario two:** Threads sharing all resources.

**Efficient hardware paths:**
- Shared L1 Cache, Fetch and Decoders, Floating point scheduler and floating point pipes, L2 cache, L3 cache for all the threads
- Dedicated integer scheduler
- Dedicated integer pipes

**Workload types:**
- Excel runner, code produced by Mathworks, Wolfram Mathematica
- Virtualization workloads for back-office and front office
- Transactions with small to moderate data size
- Search with compute algorithms
**SCENARIO THREE: SINGLE HEAVY LIFTING CORE**

Agile compute unit. **Scenario three: Focused** single thread performance.

**Dedicated processor:**
- L1 Cache
- Fetch and Decoder
- Integer Scheduler
- FP Scheduler (2 x MMX, FMAC)
- L2 Cache
- L3 Cache shared but with half the threads

**Workload examples:**
- Engineering Analysis
- Systemic Analysis
- Biomechanical Analysis
- Genomics
- Transactions with moderate to moderate large data requirements
- Search with compute algorithms with larger data
## High Performance Computing Workloads

<table>
<thead>
<tr>
<th>Workload Need</th>
<th>AMD Platform Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Memory Footprints</td>
<td>&gt; Flexible large memory footprints with 4P servers.</td>
</tr>
<tr>
<td></td>
<td>&gt; Flexible Positioning.</td>
</tr>
<tr>
<td></td>
<td>&gt; “Agile Compute Unit.”</td>
</tr>
<tr>
<td></td>
<td>&gt; Up to 4 memory channels and 3 DIMMs per channel, which allows for more robust memory configurations.</td>
</tr>
<tr>
<td></td>
<td>&gt; <strong>Superior Price/Performance</strong> - One of the most compelling factors to highlight for HPC with your customers is value. Work a price/performance analysis based on the customer's workloads.</td>
</tr>
<tr>
<td></td>
<td>&gt; NUMA (Non-Uniform Memory Access) architecture - AMD’s architecture is NUMA aware if supported in the OS being used.</td>
</tr>
<tr>
<td>Cache Friendly Codes</td>
<td>&gt; <strong>Sizeable caches</strong> – L2/core and L3/die support cache friendly codes shown in scenario three in previous page.</td>
</tr>
<tr>
<td>Integer-based Codes</td>
<td>&gt; Up to 16 dedicated integer cores per CPU provides core density for integer-based codes. (Up to 64 dedicated integer cores in 4P server)</td>
</tr>
<tr>
<td>Dense Floating Point capabilities for complex math algorithms</td>
<td>&gt; Typical Application Code.</td>
</tr>
<tr>
<td></td>
<td>&gt; Up to sixteen 128-bit floating point units per processor or eight 256-bit floating point units per processor.</td>
</tr>
<tr>
<td></td>
<td>&gt; Floating point scheduler with two 128-bit fused multiply-accumulate-capable units.</td>
</tr>
<tr>
<td></td>
<td>&gt; AMD Opteron™ 6300 Series offer up to 93% more GFLOPS per rack than the competition when running 128-bit HPC code.3</td>
</tr>
</tbody>
</table>

### Substantiation

1. In 128-bit mode, the AMD Opteron™ processor Model 6386 SE is expected to have a max theoretical GFLOPS per rack equal to (21) 2P 2U servers per rack x 2 processors per server x 2.8GHz x 16 floating point processing unit per processor x (4) 32-bit operations/cycle. Thisequals to 7,526 GFLOPS/rack. In 128-bit mode, the Intel Xeon processor Model XE-5690 has a max theoretical GFLOPS of (21) 2P 2U servers per rack x 2 processors per server x 2.9GHz x 8 floating point processing units per processor x (4) 32-bit operations/cycle. This equals to 3,898 GFLOPS/rack. Intel spec info available at www.intc.com/pricelist.cfm as of 4/6/12. SVR-139
STRIKING THE BALANCE BETWEEN PERFORMANCE AND PRICE

With the growing popularity of virtualized infrastructure servers, it is important to have core resources for each VM. More cores enable you to:

> Help the server to run more VMs simultaneously.
> Consolidate file, print, or email servers, helping to save server cost, operational cost, and data center floor space.

WHY MORE MEMORY CHANNELS MATTER FOR INFRASTRUCTURE

Infrastructure servers are the backbone of most networking services that drive today’s businesses. Increasingly, infrastructure servers are being consolidated and virtualized in order to help reduce costs.

> The greater the consolidation, the greater potential for efficiency and cost savings.
> To get the best performance for these virtual servers, there needs to be enough memory in the physical server — typically a minimum of 2GB per VM.
> Supporting more memory channels gives the processor increased paths to access the information in memory, both reading and writing more information simultaneously over the channels.

<table>
<thead>
<tr>
<th>Workload Need</th>
<th>AMD Platform Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce cost and power consumption while maintaining efficient file and print services</td>
<td>&gt; Low cost (as low as $25 processor)¹ and power efficient (HE models) processors that help to reduce total cost of ownership (TCO).</td>
</tr>
</tbody>
</table>
| Handle growing quantity and size of emails and network traffic | > More cores and memory channels per processor (up to 16 cores and 4 memory channels per processor).
> AMD Opteron™ 6300 Series processors offer up to 100% more cores than Intel Xeon E5-2600 Series processors.²
> Getting more for your dollar with AMD — Don’t get fooled by only looking at “raw” performance, as cost and power efficiency are often top customer concerns. |
| Consolidate Microsoft™ Exchange servers           | > AMD CPU architecture and virtualization enablement allows for near native performance while consolidating servers. |

HOW TO SELL

> Low cost, power efficient 2P servers with a range of core and memory options to handle growing demands of email and collaboration.

> Consolidate older 2P email and infrastructure servers with new 4P solutions that can be more cost effective, energy efficient and provide room for your business to continue to grow.

> AMD-based servers that run Microsoft Windows® handle the business needs of today with additional capacity to support the growing workloads of tomorrow.

SUBSTANTIATION

² AMD Opteron™ 6300 Series processors have up to 16 cores. Intel Xeon E5-2600 Series processors have up to 10 cores per processor. Intel Xeon E7-4800 Series has up to 15 cores per processor.

See www.intc.com/pricelist.cfm as of 4/2/12. SVR-140
AMD Opteron™ Processor Parts and Specifications
### AMD OPTERON™ 6300 SERIES PROCESSOR PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>OPN</th>
<th>CORE COUNT</th>
<th>CORE FREQUENCY</th>
<th>ALL-CORE TURBO FREQUENCY</th>
<th>AMD TURBO CORE MAX FREQUENCY</th>
<th>BUS SPEED</th>
<th>CMOS TECH</th>
<th>L2 CACHE</th>
<th>L3 CACHE</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>6386 SE</td>
<td>OS6386YETGGHK</td>
<td>16</td>
<td>2.8 GHz</td>
<td>3.2 GHz</td>
<td>3.5 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>8 x 2 MB</td>
<td>16 MB</td>
<td>140W</td>
</tr>
<tr>
<td>6380</td>
<td>OS6380WKTGGHK</td>
<td>16</td>
<td>2.5 GHz</td>
<td>2.8 GHz</td>
<td>3.4 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>8 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6378</td>
<td>OS6378WKTGGHK</td>
<td>16</td>
<td>2.4 GHz</td>
<td>2.7 GHz</td>
<td>3.3 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>8 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6376</td>
<td>OS6376WKTGGHK</td>
<td>16</td>
<td>2.3 GHz</td>
<td>3.2 GHz</td>
<td>3.3 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>8 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6348</td>
<td>OS6348WKTCGHK</td>
<td>12</td>
<td>2.8 GHz</td>
<td>3.1 GHz</td>
<td>3.4 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>6 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6344</td>
<td>OS6344WKTCGHK</td>
<td>12</td>
<td>2.6 GHz</td>
<td>2.9 GHz</td>
<td>3.2 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>6 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6328</td>
<td>OS6328WKT8GHK</td>
<td>8</td>
<td>3.2 GHz</td>
<td>3.5 GHz</td>
<td>3.8 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>4 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6320</td>
<td>OS6320WKT8GHK</td>
<td>8</td>
<td>2.8 GHz</td>
<td>3.1 GHz</td>
<td>3.3 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>4 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6308</td>
<td>OS6308WKT4GHK</td>
<td>4</td>
<td>3.5 GHz</td>
<td>N/A</td>
<td>N/A</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>2 x 2 MB</td>
<td>16 MB</td>
<td>115W</td>
</tr>
<tr>
<td>6388 HE</td>
<td>OS6388VATGGHK</td>
<td>16</td>
<td>1.8 GHz</td>
<td>2.3 GHz</td>
<td>3.1 GHz</td>
<td>6.4 GTS</td>
<td>32 NM</td>
<td>8 x 2 MB</td>
<td>16 MB</td>
<td>85W</td>
</tr>
</tbody>
</table>
### AMD OPTERON™ 6300 SERIES PROCESSOR PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cache Sizes</td>
<td>Total Cache: 32MB (16 core), 28MB (12 core), 24MB (8 core), 20MB (4 core)</td>
</tr>
<tr>
<td></td>
<td>L1 Cache: 16KB Data per core + 64KB Instruction (per module)</td>
</tr>
<tr>
<td></td>
<td>L2 Cache: 1MB (per core)</td>
</tr>
<tr>
<td></td>
<td>L3 Cache: 16MB (per socket)</td>
</tr>
<tr>
<td>Process Technology</td>
<td>32-nanometer SOI (silicon-on-insulator) technology</td>
</tr>
<tr>
<td>Hypertransport™ Technology Links</td>
<td>Four x16 links @ up to 6.4GT/s per link</td>
</tr>
<tr>
<td>Memory</td>
<td>Supports R/U DDR3, LV DDR3, ULV DDR3 and LR DDR3</td>
</tr>
<tr>
<td></td>
<td>Up to 1.5 TB memory capacity, supports up to 12 DIMMs per CPU</td>
</tr>
<tr>
<td>Memory channels per processor</td>
<td>4</td>
</tr>
<tr>
<td>Memory Speed</td>
<td>Up to 1866 MHz</td>
</tr>
<tr>
<td>Memory Types</td>
<td>1.25, 1.35, 1.5 Volts of DDR3 memory in either UDIMM or RDIMM</td>
</tr>
<tr>
<td>Die Size</td>
<td>316mm² per die</td>
</tr>
<tr>
<td>Packaging</td>
<td>Socket G34 — 1944-pin organic Land Grid Array (LGA)</td>
</tr>
</tbody>
</table>

### End User Benefits:

> Unleash unprecedented performance of highly threaded applications through massive, industry leading core density.

> AMD Opteron™ 6300 Series processors offer up to 60-100% more cores than Intel Xeon processors.

> Bring unparalleled efficiency to your processing, power and financial budgets.

### Substantiation

1. AMD Opteron™ 6300 Series processors have up to 16 cores. Intel Xeon E5-2600 Series processors have up to 8 cores per processor. Intel Xeon E7-4800 Series has up to 10 cores per processor. See www.intc.com/pricelist.cfm as of 4/2/12. SVR-140
NEW KEY FEATURES:

> **2nd Generation Core Architecture** – designed to drive more core density and greater throughput.

> **AMD Turbo CORE Technology** – AMD Opteron™ 6300 Series processors have a 44% higher max boost than Intel Xeon E5-2600 Series processors.¹

> **Flex FP** – delivers up to sixteen 128-bit floating point units per processor.

> **AMD Virtualization™ (AMD-V™) Technology 2.0** – heightens virtualization efficiency with new enhancements to the AMD-V suite of virtualization to optimize data center rack space and help minimize management tasks.

> **Processor Cores** – Delivering 60-100% more cores² – over the competition – for scalable systems.

> **Memory bandwidth** – Quad memory channels and high memory capacity for robust configurations.

> **Performance** – 60-100% more cores than our competition.² FMAC units in the Flex FP help drive more performance by executing FMA4 instructions that execute complex calculations in half the cycles as the competition.

> **AMD-P 2.0 Technology** – Power-saving features like C6 Power State and TDP Power Cap along with 1.25 (volt) ULV-DIMM. C6 Power State shuts down power to idle cores. TDP Power Cap gives you the flexibility to set power limits without capping processor frequency.

SUBSTANTIATION:

1. As of 4/2/12 AMD Opteron™ 6300 Series processors are expected to have a max boost of 1.3 GHz over base frequency.

   Intel Xeon E5-2600 Series processors have a max boost of 0.9 GHz over base frequency according to http://ark.intel.com/compar...49583.49584.49585.49587.49588.49589.49590.49591.49592.49593.49594.49595.49596 as of 4/2/12. SVR-143

2. AMD Opteron™ 6300 Series processors have up to 16 cores. Intel Xeon E5-2600 Series processors have up to 8 cores per processor. Intel Xeon E7-4800 Series has up to 10 cores per processor. See www.intel.com/pricelist.cfm as of 4/2/12. SVR-140
## AMD OPTERON™ 6200 SERIES PROCESSOR PRODUCT SPECIFICATIONS

### AMD OPTERON™ 6200 SERIES PROCESSOR PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>OPN</th>
<th>Core Count</th>
<th>Core Frequency</th>
<th>All-Core Turbo Frequency</th>
<th>AMD Turbo Core Max Frequency</th>
<th>Bus Speed</th>
<th>CMOS Tech</th>
<th>L2 Cache</th>
<th>L3 Cache</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>6284 SE</td>
<td>OS6284YETGGGU</td>
<td>16</td>
<td>2.7GHz</td>
<td>3.1GHz</td>
<td>3.4GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>8 x 2MB</td>
<td>16MB</td>
<td>140W</td>
</tr>
<tr>
<td>6282 SE</td>
<td>OS6282YETGGGU</td>
<td>16</td>
<td>2.6GHz</td>
<td>3.0GHz</td>
<td>3.3GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>8 x 2MB</td>
<td>16MB</td>
<td>140W</td>
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<tr>
<td>6278</td>
<td>OS6278WKTGGGU</td>
<td>16</td>
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<td>2.7GHz</td>
<td>3.3GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>8 x 2MB</td>
<td>16MB</td>
<td>115W</td>
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<tr>
<td>6276</td>
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<td>16</td>
<td>2.3GHz</td>
<td>2.6GHz</td>
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<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>8 x 2MB</td>
<td>16MB</td>
<td>115W</td>
</tr>
<tr>
<td>6274</td>
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<td>16</td>
<td>2.2GHz</td>
<td>2.5GHz</td>
<td>3.1GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>8 x 2MB</td>
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<td>115W</td>
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<tr>
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<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>8 x 2MB</td>
<td>16MB</td>
<td>115W</td>
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<td>2.9GHz</td>
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<td>6238</td>
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<td>3.2GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>6 x 2MB</td>
<td>16MB</td>
<td>115W</td>
</tr>
<tr>
<td>6234</td>
<td>OS6234WKTGGGU</td>
<td>12</td>
<td>2.4GHz</td>
<td>2.7GHz</td>
<td>3.0GHz</td>
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<td>32nm SOI</td>
<td>6 x 2MB</td>
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<tr>
<td>6220</td>
<td>OS6220WKT8GGU</td>
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<td>3.0GHz</td>
<td>3.3GHz</td>
<td>3.6GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>16MB</td>
<td>115W</td>
</tr>
<tr>
<td>6212</td>
<td>OS6212WKT8GGU</td>
<td>8</td>
<td>2.6GHz</td>
<td>2.9GHz</td>
<td>3.2GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>16MB</td>
<td>115W</td>
</tr>
<tr>
<td>6204</td>
<td>OS6204WKT4GGU</td>
<td>4</td>
<td>3.3GHz</td>
<td>N/A</td>
<td>N/A</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>2 x 2MB</td>
<td>16MB</td>
<td>115W</td>
</tr>
</tbody>
</table>

The industry’s only solution with 16 physical cores.
The only solution offering a choice of 4, 8, 12 and 16 cores.

[WWW.AMD.COM/PLAYBOOK]
<table>
<thead>
<tr>
<th>AMD OPTERON™ 6000, 4000 AND 3000 SERIES PLATFORMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD OPTERON™ 6200 SERIES PROCESSOR PRODUCT SPECIFICATIONS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cache Sizes</th>
<th>Total Cache: 32MB (16 core), 28MB (12 core), 24MB (8 core), 20MB (4 core)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L1 Cache: 16KB/core + 64KB instruction/module</td>
</tr>
<tr>
<td></td>
<td>L2 Cache: 1MB (per core)</td>
</tr>
<tr>
<td></td>
<td>L3 Cache: 16MB (per socket)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Technology</th>
<th>32-nanometer SOI (silicon-on-insulator) technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertransport™ Technology Links</td>
<td>Four x16 HT3 links at up to 6.4GT/s per link</td>
</tr>
<tr>
<td>Memory</td>
<td>Integrated DDR3 memory controller — Up to 102.4 GT/s memory bandwidth per CPU for Socket G34</td>
</tr>
<tr>
<td>Memory channels per processor</td>
<td>4</td>
</tr>
<tr>
<td>Memory Speed</td>
<td>Up to 1800 MHz</td>
</tr>
<tr>
<td>Memory Types</td>
<td>1.25, 1.35, 1.5 Volts of DDR3 memory in either UDIMM or RDIMM</td>
</tr>
<tr>
<td>Die Size</td>
<td>316mm² per die</td>
</tr>
<tr>
<td>Packaging</td>
<td>Socket G34 — 1944-pin organic Land Grid Array (LGA)</td>
</tr>
</tbody>
</table>

**END USER BENEFITS:**

> Unleash unprecedented performance of highly threaded applications through massive, industry-leading core density.

> Today’s highly threaded applications demand more scalability and the AMD Opteron 6200 Series processors are the world’s only 16-core x86 processor, delivering 60-160% more cores than competing processors.¹

> Bring unparalleled efficiency to your processing, power and financial budgets.

---

NEW KEY FEATURES:

> **2nd Generation Core Architecture** – designed to drive more core density and greater throughput.

> **AMD Turbo CORE Technology** – allows processors to independently boost their clock speeds, scaling frequency up 500MHz-1GHz automatically to respond to the need for more application performance.\(^1\)

> **Flex FP** – delivers up to sixteen 128-bit integer units per processor.

> **AMD Virtualization™ (AMD-V™) Technology 2.0** – these are platform-based virtualization features that reduce virtualization overhead and provide near native performance. This heightens virtualization efficiency with new enhancements to the AMD-V suite of virtualization to optimize data center rack space and help minimize management tasks.

> **Processor Cores** – Delivering 60% more cores in 4p\(^2\) – over the competition – for scalable systems.

> **Processor Cache** – Twice the L2 cache per core over previous generation.

> **Memory bandwidth** – 33% higher memory bandwidth\(^3\) and new 1.25V ULV memory offering.

> **Performance** – Up to 51% greater throughput than our previous generation,\(^4\) 60% more cores in 4p than our competition.\(^2\) FMAC units in the Flex FP help drive more performance by executing FMA4\(^5\) instructions that execute complex calculations in half the cycles as the competition.

> **AMD-P 2.0 Technology** – New power-saving features like C6 Power State and TDP Power Cap along with 1.25 (volt) ULV-DIMM. C6 Power State shuts down power to idle cores. TDP Power Cap gives you the flexibility to set power limits without capping processor frequency.
## AMD Opteron™ 4300 Series Processor Product Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>OPN</th>
<th>Core Count</th>
<th>Core Frequency</th>
<th>All-Core Turbo Frequency</th>
<th>AMD Turbo Core Max Frequency</th>
<th>Bus Speed</th>
<th>CMOS Tech</th>
<th>L2 Cache</th>
<th>L3 Cache</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4386</td>
<td>OS4386WLU8KHK</td>
<td>8</td>
<td>3.1GHz</td>
<td>3.4GHz</td>
<td>3.8GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4340</td>
<td>OS4340WKU6KHK</td>
<td>6</td>
<td>3.5GHz</td>
<td>3.7GHz</td>
<td>3.8GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4334</td>
<td>OS4334WKU6KHK</td>
<td>6</td>
<td>3.1GHz</td>
<td>3.3GHz</td>
<td>3.5GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4376 HE</td>
<td>OS4376OFU8KHK</td>
<td>8</td>
<td>2.6GHz</td>
<td>2.9GHz</td>
<td>3.6GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>4332 HE</td>
<td>OS4332OFU6KHK</td>
<td>6</td>
<td>3.0GHz</td>
<td>3.3GHz</td>
<td>3.7GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>4310 EE</td>
<td>OS4310HPC4KHK</td>
<td>4</td>
<td>2.2GHz</td>
<td>2.4GHz</td>
<td>3.0GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>2 x 2MB</td>
<td>8MB</td>
<td>35W</td>
</tr>
</tbody>
</table>
### Cache Sizes
- **Total Cache:** 16MB (8-core), 14MB (6-core) and 12MB (4-core)
- **L1 Cache:** 16KB/core + 64KB Instruction/module
- **L2 Cache:** 1MB (per core)
- **L3 Cache:** 8MB (per socket)

### Process Technology
- 32-nanometer SOI (silicon-on-insulator) technology

### Hypertransport™ Technology Links
- Two x16 links at up to 6.4GT/s per link

### Memory
- Supports R/U DDR3, LV DDR3, ULV DDR3 and LR DDR3
- Up to 384 GB memory capacity, supports up to 6 DIMMs per CPU

### Memory channels per processor
- 2

### Memory Speed
- Up to 1866 MHz*  
  *1866MHz supported only with a single physical DIMM per memory channel

### Die Size
- 316mm² per die

### Packaging
- Socket C32 — 1207-pin Organic Land Grid Array (OLGA)

---

**END USER BENEFITS:**

> Unleash unprecedented performance of highly threaded applications through massive, industry leading core density.

> AMD Opteron™ 4300 Series processors offer up to 15% higher performance than the previous generation.¹

> Bring unparalleled efficiency to your processing, power and financial budgets.

---

**SUBSTANTIATION**

1. Comparison based on 3P SPECint_rate2006 data submitted to SPEC as of Nov 27th, 2012. 329, 2 x AMD Opteron™ processors Model 4386 in Tyan YR190-B8228 server, 64GB (4 x 16GB DDR3-1600) memory, Red Hat Enterprise Linux® Server release 6.3 64-bit, x86 Open64 4.5.2 Compiler Suite. 285, 2 x AMD Opteron™ processors Model 4284 in Dell PowerEdge R515 server, 32GB (8 x 4GB DDR3-1600) memory, Red Hat Enterprise Linux® Server release 6.1 64-bit, x86 Open64 4.2 3.2 Compiler Suite. SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org. SVR-311
NEW KEY FEATURES:

> **2nd Generation Core Architecture** – designed to drive more core density and greater throughput.

> **AMD Turbo CORE Technology** – allows processors to independently boost their clock speeds, scaling frequency up to 300MHz automatically to respond to the need for more application performance.¹

> **C6 Power State** – Low power state that helps reduce power consumption while servers are at idle.

> **AMD Virtualization™ (AMD-V™) Technology 2.0** – heightens virtualization efficiency with new enhancements to the AMD-V suite of virtualization to optimize data center rack space and help minimize management tasks.

> **Energy Efficient Processor Cores** – AMD Opteron™ 4300 Series features processors offer 24% higher performance per watt than AMD Opteron 4200 Series processors.²

> **AMD-P 2.0 Technology** – Power-saving features like C6 Power State and TDP Power Cap along with 1.25 (volt) ULV-DIMM. C6 Power State shuts down power to idle cores. TDP Power Cap gives you the flexibility to set power limits without capping processor frequency.

SUBSTANTIATION

1. AMD Opteron 4300 Series processors experience all core boost of up to 300 MHz (P2 base to P1 boost state) and up to 1 GHz max turbo boost (half or fewer cores boost from P2 to P0 boost state). SVR-204.

2. Comparison based on 2P SPECpower_ssj2008 data submitted to SPEC as of Nov 27, 2012: 61.8W at Active Idle, 299W and 875,360 ssj_ops at 100% of target load, and 2643 overall ssj_ops/watt using 2 x AMD Opteron™ processors Model 4386 in Tyan YR190B8228 server. 32GB (4 x 8GB DDR3-1600) memory, YM-2451C power supply, 128GB SATA SSD disk drive, Microsoft® Windows Server® 2008 x64 Enterprise Edition SP1. SPECpower and SPECpower_ssj are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org. SVR-312
## AMD OPTERON™ 4200 SERIES PROCESSOR PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>OPN</th>
<th>Core Count</th>
<th>Core Frequency</th>
<th>All-Core Turbo Frequency</th>
<th>AMD Turbo Core Max Frequency</th>
<th>Bus Speed</th>
<th>CMOS Tech</th>
<th>L2 Cache</th>
<th>L3 Cache</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4284</td>
<td>OS4284WLUBKGU</td>
<td>8</td>
<td>3.0GHz</td>
<td>3.3GHz</td>
<td>3.7GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4280</td>
<td>OS4280WLUBKGU</td>
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<td>2.8GHz</td>
<td>3.1GHz</td>
<td>3.5GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4278 HE</td>
<td>OS4278OFUBKGU</td>
<td>8</td>
<td>2.6GHz</td>
<td>2.9GHz</td>
<td>3.6GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>4274 HE</td>
<td>OS4274OFUBKGU</td>
<td>8</td>
<td>2.5GHz</td>
<td>2.8GHz</td>
<td>3.5GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>4 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>4256 EE</td>
<td>OS4256HJUBKGU</td>
<td>8</td>
<td>1.6GHz</td>
<td>1.9GHz</td>
<td>2.8GHz</td>
<td>6.4 GT/s</td>
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<td>4 x 2MB</td>
<td>8MB</td>
<td>35W</td>
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<tr>
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<td>3.4GHz</td>
<td>3.6GHz</td>
<td>3.8GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4238</td>
<td>OS4238WLUBKGU</td>
<td>6</td>
<td>3.3GHz</td>
<td>3.5GHz</td>
<td>3.7GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4234</td>
<td>OS4234WLUBKGU</td>
<td>6</td>
<td>3.1GHz</td>
<td>3.3GHz</td>
<td>3.5GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>95W</td>
</tr>
<tr>
<td>4230 HE</td>
<td>OS4230OFUBKGU</td>
<td>6</td>
<td>2.9GHz</td>
<td>3.2GHz</td>
<td>3.7GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>4226</td>
<td>OS4226WLUBKGU</td>
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<td>2.7GHz</td>
<td>2.9GHz</td>
<td>3.1GHz</td>
<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>4228 HE</td>
<td>OS4228OFUBKGU</td>
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<td>6.4 GT/s</td>
<td>32nm SOI</td>
<td>3 x 2MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
</tbody>
</table>

**The world’s lowest-power-per-core server processor.**

[WWW.AMD.COM/PLAYBOOK](http://WWW.AMD.COM/PLAYBOOK)

---

**Substantiation:**

1. SVR-58: As of March 16, 2012 AMD Opteron™ processor Models 4200 EE have the lowest known power per core of any x86 server processor, at 35W TDP (35W/8 = 4.375W/core). Intel’s lowest power per core server processor, Intel Xeon E5-2650L, is 70W TDP (70W/8 = 8.75W/core). See www.intc.com/pricelist.cfm as of 3/16/12. Previous record held by AMD Opteron processor Models 4100 EE at 35W TDP / 6 cores = 5.83 W/core.
### AMD OPTERON™ 4200 SERIES PROCESSOR PRODUCT FEATURE DETAILS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cache Sizes</strong></td>
<td>Total Cache: 16MB (8 core), 14MB (6 core)</td>
</tr>
<tr>
<td></td>
<td>L1 Cache: 16KB/core + 64KB Instruction/module</td>
</tr>
<tr>
<td></td>
<td>L2 Cache: 1MB (per core)</td>
</tr>
<tr>
<td></td>
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<tr>
<td><strong>Process Technology</strong></td>
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<td><strong>Hypertransport™ Links</strong></td>
<td>Two x16 HT3 links at up to 6.4 GT/s per link</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Integrated DDR3 memory controller — Up to 6.4 GT/s memory bandwidth per CPU for Socket C32</td>
</tr>
<tr>
<td><strong>Memory Channels per Processor</strong></td>
<td>up to 2</td>
</tr>
<tr>
<td><strong>Memory Speed</strong></td>
<td>1600MHz</td>
</tr>
<tr>
<td><strong>Memory Types</strong></td>
<td>1.25, 1.35, 1.5 Volts of DDR3 memory in either UDIMM or RDIMM</td>
</tr>
<tr>
<td><strong>Die Size</strong></td>
<td>316mm²</td>
</tr>
<tr>
<td><strong>Packaging</strong></td>
<td>Socket C32 — 1207 Organic Land Grid Array (OLGA)</td>
</tr>
</tbody>
</table>

### END USER BENEFITS:

- **Designed for enterprise workloads while still delivering a performance punch**
  A 33% increase in core count packs plenty of processing performance into a smaller, more efficient, 8-core design while maintaining very aggressive power/thermal ranges.1,2

- **Delivering new levels of enterprise scalability for demanding cloud applications and SMB/Infrastructure applications**
  Scale your cloud workload with up to 8 cores in a low power processor.

- **Bringing unparalleled efficiency to your processing, power and financial budgets**
  The lowest enterprise-class power per core with up to 8 cores in only 35W of power, shattering the previous record.3

---

1. SVR-46: Based on AMD Opteron 4100 Series processor at 346 mm² vs. AMD Opteron 4200 Series processor at 316 mm²
2. SVR-59: Based on 8-core AMD Opteron™ 4200 Series processors at 35W, 65W and 95W TDP compared to 6-core AMD Opteron™ 4100 Series processors at 35W, 65W and 95W TDP when utilizing “1VM per core” loading rate.
3. SVR-58: As of March 16, 2012, AMD Opteron™ processor Models 4200 EE have the lowest-known power per core of any x86 server processor, at 35W TDP (70W/8 = 8.75W/core). Intel's lowest-power per core server processor, Intel Xeon E5-2650L, is 70W TDP (70W/8 = 8.75W/core). See www.intc.com/pricelist.cfm as of 3/16/12. Previous record held by AMD Opteron processor Models 4100 EE at 35W TDP / 6 cores = 5.83 W/core.
NEW KEY FEATURES:

> **2nd Generation Core Architecture** – designed to drive more core density and greater throughput.

> **AMD Turbo CORE Technology** – allows processors to independently boost their clock speeds, scaling frequency up 300MHz automatically to respond to the need for more application performance.¹

> **C6 Power State** – Reduces processor power consumption at active idle by up to 39%.²

> **AMD Virtualization™ (AMD-V™) Technology 2.0** – heightens virtualization efficiency with new enhancements to the AMD-V suite of virtualization to optimize data center rack space and help minimize management tasks.

> **Energy Efficient Processor Cores** – AMD Opteron 4200 Series features 46% lower power per core than the competition.³

> **Energy Efficient Processor Cache** – Twice the L2 cache per core over previous generation.⁴

> **Performance** – FMAC units in the Flex FP help drive more performance by executing FMA4⁵ instructions that execute complex calculations in half the cycles as the competition.

> **AMD-P 2.0 Technology** – New power-saving features like C6 Power State and TDP Power Cap along with 1.25 (volt) ULV-DIMM. C6 Power State shuts down power to idle cores. TDP Power Cap gives you the flexibility to set power limits without capping processor frequency.

SUBSTANTIATION

1. SVR-63: AMD Opteron 4200 Series processors experience all core boost of up to 300 MHz (P2 base to P1 boost state) and up to 1.2 GHz max turbo boost (half or fewer cores boost from P2 to P0 boost state).

2. SVR-62: Based on testing in AMD Performance Labs as of March 2012, an AMD Opteron™ processor model 4174 (6-core 2.3GHz) consumes 6.47W in the active idle C1E power state while an AMD Opteron™ processor model 4284 (8-core 3.0GHz) consumes only 3.977W in the active idle C1E power state with new C6 power gating employed. System configuration: “Kruger-P” reference design kit, 32GB (4x 8GB DDR3-1066) memory, Seagate ST350413AS SATA disk drive, Microsoft® Windows Server 2008 x64 Enterprise Edition R2 SP1.

3. SVR-61: Based on AMD Opteron™ 6200 Series processor with 16 cores at 85W TDP (5.3125W/core) versus lowest wattage, highest core Intel Xeon processor with 8 cores at 60W TDP (10W/core) according to www.intel.com as of November, 2011.

4. SVR-49: AMD Opteron 4200 Series processors have 1024 KB L2 cache per core while AMD Opteron 4100 Series processors have 512 KB L2 cache per core.

5. SVR-41: FMAC can execute an FMA4 execution (a=b+c*d) in one cycle vs. 2 cycles that would be required for FMA3 or standard SSE floating point calculation.
## AMD Opteron™ 3300 Series Processor Product Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>OPN</th>
<th>Core Count</th>
<th>Core Frequency</th>
<th>All-Core Turbo Frequency</th>
<th>AMD Turbo Core Max Frequency</th>
<th>Bus Speed</th>
<th>CMOS Tech</th>
<th>L2 Cache</th>
<th>L3 Cache</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>3380</td>
<td>OS3380OLW8KHK</td>
<td>8</td>
<td>2.6GHz</td>
<td>2.9GHz</td>
<td>3.6GHz</td>
<td>5.2GT/s</td>
<td>32nm SOI</td>
<td>8MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>3350 HE</td>
<td>OS3350HOW4KHK</td>
<td>4</td>
<td>2.8GHz</td>
<td>3.1GHz</td>
<td>3.8GHz</td>
<td>5.2GT/s</td>
<td>32nm SOI</td>
<td>4MB</td>
<td>8MB</td>
<td>45W</td>
</tr>
<tr>
<td>3320 EE</td>
<td>OS3320JW4KHK</td>
<td>4</td>
<td>1.9GHz</td>
<td>2.1GHz</td>
<td>2.5GHz</td>
<td>5.2GT/s</td>
<td>32nm SOI</td>
<td>4MB</td>
<td>8MB</td>
<td>25W</td>
</tr>
</tbody>
</table>
### New Key Features:

> **Great value** with up to 61% lower processor cost,¹ up to 18% better price/performance,² up to 26% lower watts per core (TDP),³ and up to 100% more cores⁴ to deliver cost effective, multi-core solution versus the competition.

> Enterprise class processors giving you **true server functionality** with ECC and reliability features, enterprise OS support, and manageability.

### AMD Opteron™ 3300 Series Processor Product Feature Details

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cache Sizes</td>
<td></td>
</tr>
<tr>
<td>Total Cache:</td>
<td>16MB (8 core), 12MB (4 core)</td>
</tr>
<tr>
<td>L2 Cache:</td>
<td>up to 8MB total</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>up to 8MB total</td>
</tr>
<tr>
<td>Process Technology</td>
<td>32 nm SOI</td>
</tr>
<tr>
<td>Hypertransport™ Technology Links</td>
<td>1 non-coherent HT3 link @ 5.2GT/s</td>
</tr>
<tr>
<td>Memory</td>
<td>Dual Channel DDR3 ECC UDIMM, SODIMM support</td>
</tr>
<tr>
<td>Memory channels per processor</td>
<td>2</td>
</tr>
<tr>
<td>Memory Speed</td>
<td>Up to 1866*</td>
</tr>
<tr>
<td>Die Size</td>
<td>315mm²</td>
</tr>
<tr>
<td>Packaging</td>
<td>AM3+</td>
</tr>
</tbody>
</table>

### New Key Features:

1. Intel Xeon processor Model E3-1265Lv2 has 4 cores and a price of $294 as of 10/17/12 at www.intc.com/pricelist.cfm. AMD Opteron™ processor Models 3380 has 8 cores and a preliminary price of $229. SVR-307
2. Comparison drawn between the Intel Xeon E3-12xxL and AMD Opteron 3300 Series processors with the lowest ratio of price to SPECint_rate2006 score. The estimated SPECint_rate2006 scores for the AMD Opteron 3300 Series processors reflect current expectations based on a 10% uplift in performance over the AMD Opteron 3200 Series and are subject to change. The results for the Intel Xeon processors reflect the highest 1P results published on http://www.spec.org/cpu2006/results as of Oct 19, 2012 with each processor operating at its default frequency. – 176
3. Intel Xeon processor Model E3-1220Lv2 has 2 cores and 17W TDP, which equals 8.5 watts/core. TDP values as of 10/17/12 at www.intc.com/pricelist.cfm. The AMD Opteron™ processor Models 3320 EE has 2 cores and 25W TDP, which equals 12.5 watts/core. SVR-200
4. Intel Xeon processor Model E3-1220Lv2 has 2 cores and E3-1265Lv2 has 4 cores as of 5/24/12 at www.intc.com/pricelist.cfm. AMD Opteron™ 3300 Series processors offer 4, 4, and 8 cores respectively. SVR-200
### AMD OPTERON™ 3200 SERIES PROCESSOR PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>OPN</th>
<th>CORE COUNT</th>
<th>CORE FREQUENCY</th>
<th>ALL-CORE TURBO FREQUENCY</th>
<th>AMD TURBO CORE MAX FREQUENCY</th>
<th>BUS SPEED</th>
<th>CMOS TECH</th>
<th>L2 CACHE</th>
<th>L3 CACHE</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>3280</td>
<td>OS3250HOW4MGU</td>
<td>8</td>
<td>2.4GHz</td>
<td>2.7GHz</td>
<td>3.4GHz</td>
<td>N/A</td>
<td>32nm SOI</td>
<td>8MB</td>
<td>8MB</td>
<td>65W</td>
</tr>
<tr>
<td>3280</td>
<td>OS3260HOW4MGU</td>
<td>4</td>
<td>2.7GHz</td>
<td>3.0GHz</td>
<td>3.7GHz</td>
<td>N/A</td>
<td>32nm SOI</td>
<td>4MB</td>
<td>4MB</td>
<td>45W</td>
</tr>
<tr>
<td>3250</td>
<td>OS3280OLW8K3U</td>
<td>4</td>
<td>2.5GHz</td>
<td>2.8GHz</td>
<td>3.5GHz</td>
<td>N/A</td>
<td>32nm SOI</td>
<td>4MB</td>
<td>4MB</td>
<td>45W</td>
</tr>
</tbody>
</table>
### AMD OPTERON™ 3200 SERIES PROCESSOR PRODUCT FEATURE DETAILS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cache Sizes</strong></td>
<td>Total Cache: 16MB (8 core), 8MB (4 core)</td>
</tr>
<tr>
<td></td>
<td>L2 Cache: up to 8MB total</td>
</tr>
<tr>
<td></td>
<td>L3 Cache: up to 8MB total</td>
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<td><strong>Process Technology</strong></td>
<td>32 nm SOI</td>
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<td><strong>Hypertransport™ Technology Links</strong></td>
<td>1 non-coherent HT3 link @ 5.2GT/s</td>
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<tr>
<td><strong>Memory</strong></td>
<td>Dual Channel DDR3</td>
</tr>
<tr>
<td><strong>Memory channels per processor</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Memory Speed</strong></td>
<td>Up to 1866¹</td>
</tr>
<tr>
<td><strong>Memory Types</strong></td>
<td>ECC UDIMM</td>
</tr>
<tr>
<td><strong>Die Size</strong></td>
<td>315mm²</td>
</tr>
<tr>
<td><strong>Packaging</strong></td>
<td>AM3+</td>
</tr>
</tbody>
</table>

---

1. 1866MHz supported only with a single physical DIMM per memory channel
NEW KEY FEATURES:

> **Great value** with up to 48% lower processor cost,¹ up to 14% better price/performance,² up to 4% less power per core,³ and up to 100% more cores⁴ to deliver cost effective, multi-core solution.

> **Fast payback** – In as few as 7 months – up to 14% quicker than with the competition – hosting fees can cover your server hardware costs.⁵

> **Enterprise class processors giving you true server functionality** with ECC and reliability features, enterprise OS support, and manageability.

SUBSTANTIATION

1. 1kU price for Intel Xeon E3-1220L (2-core) is $189 as of 12/22/11 at www.intc.com/pricelist.cfm. AMD Opteron™ 3250 (4-core) 1kU preliminary price is $99. SVR-109 ($99/4 cores = less than $25 per core.)

2. Comparison drawn between the Intel Xeon E3-12xxL and AMD Opteron™ 3200 Series processors with the lowest price to SPECint® rate2006 score ratio. The results for the AMD Opteron and Intel Xeon processors reflect the highest 1P results published on http://www.spec.org/cpu2006/results as of 8/2/12 with each processor operating at its default frequency. Intel Xeon processor Model E3-1265Lv2 is $294 with a SPECint_rate2006 score of 176 as of 8/2/12 at www.intc.com/pricelist.cfm and http://www.spec.org/cpu2006/results/res2012q2/cpu2006-20120522-22302.html. SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. For the latest SPECint_rate2006 results, visit http://www.spec.org/cpu2006/results. SVR-114

3. Intel Xeon processor Model E3-1200, has 2 cores and 20W TDP, which equals 10 watts/core. Intel Xeon processor Model E3-1260L has 4 cores and 45W TDP, which equals 11.25 watts/core. Pricing and TDP values as of 1/9/12 at www.intc.com/pricelist.cfm. Both the AMD Opteron™ processor Models 3250 and 3280 have 4 cores and 45W TDP, which equals 11.25 watts/core. AMD Opteron™ processor Model 3280 has 8 cores and 65W TDP, which equals 8.1 watts/core. SVR-112

4. Intel Xeon processor Model E3-1200, has 2 cores and E3-1250L has 4 cores as of 1/9/12 at www.intc.com/pricelist.cfm. AMD Opteron™ processor Models 3250, 3260, and 3280 have 4, 4, and 8 cores respectively. SVR-110

5. In as few as 7 months - up 14% quicker than with the competition - hosting fees can cover your server hardware costs. Calculation based on the time it takes for monthly hosting fees of $89.99 to sum up to the cost of an AMD Opteron™ 3200 Series processor-based server (est. $573) vs. an Intel Xeon E3-12xxL processor-based server (est. $643). It does account for software, deployment, management, and power costs. Not accounting for licensing, deployment, management, or power costs, it takes seven months of hosting revenue to pay back the cost of an AMD Opteron™ processor Model 3250-based server and eight months of hosting revenue to pay back the cost of an Intel Xeon processor Model E3-1250L-based server. This assumes receiving $89.99 dedicated hosting monthly fees, which is in between the pricing for the Server 4 and Server 4-Standard Application L packages as of 12/22/11 at www.1and1.com. AMD Opteron 3250-based server costs $573 (est.) and an Intel Xeon E3-1200L based server costs $643 (est.). The processor and motherboard make up the cost differences between an AMD Opteron 3200 Series processor-based server and an Intel Xeon E3-1200L Series based server. The costs for chassis, drive, and memory are expected to be the same in a like-for-like configuration. Low-end processor costs: AMD Opteron™ 3250 1kU preliminary price is $99 and Intel Xeon E3-1220L is $189 as of 12/22/11 at www.intc.com/pricelist.cfm. MSI motherboard for Intel (MS-S012): approximately $170 as of 12/20/11. MSI motherboard for AMD (MS-8023): approximately $190 as of 12/22/11. Chassis: Antec Sonata Pro No Power Supply ATX Mid Tower Case (Black) - SONATA PROTO BLACK $63.99 as of 12/22/11 at http://www.superbia.com/detail.php?p=CA-SONATAT&c=pw&hash=5efdcBmU0Y8T1mgEYZeWu3W7ae1goOVs6iHd1Zx3H40dumgkEYh%2BuMKcEZZ8JVMKn4%2BmpaTc5koTCFpcooi3vj5GJGvI61%2FdXuNXKJqZ%2FNfES0xTXNJs8R9%2Fw. Hard drive: 1TB SATA2 7200rpm 64MB Enterprise Hard Drive $124.32 pricing as of 12/16/11 at http://www.worldsale.com/western-digital-re4-wd1003fbyx-1tb-sata3-7200rpm-64mb-enterprise-hard-drive35_8733_64564.html. Memory: 4GB x 2 Unbuffered, 1.5V 2 Rank $95.99 pricing as of 12/18/11 at http://www.crucial.com/solutions/partspca.aspx?YMODULE=CT201213728A1339. SVR-116
**AMD OPTERON™ 4200 AND 6200 SERIES PROCESSORS OS AND HYPERVISOR MAINSTREAM SUPPORT SUMMARY**

**ENABLED**

Optimized to support some or all of AMD’s 2nd generation core architecture new features and new instructions

- Linux kernel 2.6.37 +; 3.0 +
- Novell SLES 11 SP2 (includes Xen 4.1)
- RHEL 6.2 with KVM (with z-stream updates)
- RHEL 6.3 Release Candidate with KVM
- RHEL derivatives including CentOS 6.2 and Scientific Linux 6.2
- Ubuntu 11.04; 12.04 (includes KVM)
- Windows® Server 2008 R2 SP1 (scheduler patch available) Windows Server 2012 Release Candidate (includes Hyper-V)
- Xen 4.1 +

Also include latest software advances.

**COMPATIBLE**

Will boot and run but not take advantage of AMD’s 2nd generation core architecture new features outside of new instructions

Includes new instruction support:
- Linux kernel 2.6.32 – 2.6.36
- Novell SLES 11 SP1 (with latest updates and upgrade to Xen 4.0.2_25111_02-0.7.1)
- RHEL 6.1 with KVM (with z-stream updates)
- RHEL derivatives including CentOS 6.1 and Scientific Linux 6.1
- Ubuntu 10.10

Does not support new instructions for either Bulldozer or Sandy Bridge:
- Hyper-V R1, Hyper-V R2, Hyper-V R2 SP1 (must be patched)
- Novell SLES 10 SP4 (includes Xen 3.2.3)
- RHEL 5.7 – 5.8 (includes KVM) and RHEL derivatives including CentOS, Scientific Linux
- Solaris 10u6, 11
- VMware vSphere 4.1u2
- Windows Server 2003 R2 SP2
- Windows Server 2008 R2
- Xen 3.4.4

Will run but not necessarily provide performance uplift.

**NOT SUPPORTED**

Will not run on AMD’s 2nd generation core architecture platforms and/or will not be supported by OSV

- Linux kernel 2.6.31 or earlier
- Novell SLES 10 thru SP3
- Novell SLES 11
- RHEL 4.x
- RHEL 5.0 – 5.5
- RHEL 5.6 (can run with patches but is not supported by Red Hat)
- RHEL 6.0
- Solaris 10 – 10u8
- VMware ESX 3.5
- VMware ESX 4.0 – 4.1u1
- Windows Server 2003 versions prior to R2 SP2

*Please note: For proper support of available features/processors, the latest updates/patches always need to be installed.*
There are three different I/O bridge chipset options on AMD Server Platforms, all featuring the AMD SP 5100 Southbridge Chipset.
Motherboards and Barebones
ASUS Motherboards
ASUS Rack Servers

Information is provided for reference only. Please confirm specifications with your vendor before purchase.
### ASUS MOTHERBOARDS—AMD OPTERON™ 6000 SERIES PLATFORM

#### KGNH-D16

**Key Positioning:** Half-Sized server boards for high density data center environments

**Workloads:** High Density Data Center, High Performance Computing

**Socket:** G34 – 2 socket

**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

**Chipset:** AMD SR5650 & SP5100

**Form Factor:** Half SSI, 6.8" x 18.7"

**Memory:**
- 16 (4-channel per CPU)
- DDR3 800/1066/1333/1600* UDIMM with ECC/non ECC
- DDR3 600/1066/1333/1600* RDIMM
- *DDR3 1600 can only be supported with AMD Opteron™ 6200 Series processor
- Max 256GB (RDIMM) / 64GB (UDIMM)*

**Expansion Slots:**
- 1 * PCIe x16 (Gen2 X16 Link)

**Storage:**
- AMD SP5100: 6 SATA2 300MB/s ports

**LAN:**
- 2* Intel 82574L + 1* Mgmt LAN

**VGA:**
- ASPEED AST2050 8MB

**Management:**
- Optional ASMB4-iKVM for KVM-over-Internet

---

#### KGMH-D16/QDR

**Key Positioning:** Half-Sized SSI Serverboards with high I/O Bandwidth

**Workloads:** High Performance Computing

**Socket:** G34 – 2 socket

**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

**Chipset:** AMD SR5670 & SP5100

**Form Factor:** 6.8" x 18.7"

**Memory:**
- 16 (4-channel per CPU)
- DDR3 800/1066/1333/1600 RDIMM
- *DDR3 1600 can only be supported with AMD Opteron™ 6200 Series processor

**Expansion Slots:**
- Slot 1: PCIe x16 (Gen2 X16 Link)

**Storage:**
- 6* SATA2 300MB/s ports

**LAN:**
- 2* Intel 82574L GbE LAN + 1* Management LAN

**VGA:**
- ASPEED AST2050 8MB

**Management:**
- Optional ASMB4-iKVM
**ASUS MOTHERBOARDS—AMD OPTERON™ 6000 SERIES PLATFORM**

**KGPE-D16**

**Key Positioning:** G34 Mainstream Solution for Performance and Power Efficiency

**Workloads:** High Performance Computing, Professional Workstation, GPU Computing, Cloud Computing

**Socket:** G34 – 2 socket CPU: AMD Opteron™ 6100/6200/6300 Series Processors

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5690 &amp; SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>12” x 13”</td>
</tr>
<tr>
<td>Memory</td>
<td>16 (4-channel per CPU) DDR3 600/1066/1333/1866 RDIMM DDR3 1866 can only be supported with AMD Opteron™ 6200 Series processor</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>Slot 6: PCIe x16 (Gen2 x16 Link for 1U FH/FL Card) (Auto turn off if slot 5 is occupied, MIO supported) Slot 5: PCIe x8 (Gen2 x8 Link) Slot 4: PCIe x8 (Gen2 x4 Link) Slot 3: PCIe x16 (Gen2 x8 Link) (Auto switch x8 Link if slot 2 is occupied) Slot 2: PCIe x16 (Gen2 x8 Link) Slot 1: PCI 32bit / 33 MHz</td>
</tr>
<tr>
<td>Storage</td>
<td>6* SATA2 300MB/s ports (AMD SP5100) Optional ASUS PIKE SAS storage card</td>
</tr>
<tr>
<td>LAN</td>
<td>2* Intel 82574L GbE LAN + 1* Management LAN</td>
</tr>
<tr>
<td>VGA</td>
<td>ASPEED AST2050 SMB</td>
</tr>
<tr>
<td>Management</td>
<td>ASMB5-iKVM onboard</td>
</tr>
</tbody>
</table>

**RS704DA-E6/PS4**

**Key Positioning:** Duo High Computing Node in 1U with AMD G34

**Workloads:** High Performance Computing

**Socket:** G34 – 2 socket CPU: AMD Opteron™ 6100/6200/6300 Series Processors

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5670 + SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>28” x 17.5” x 1.72”</td>
</tr>
<tr>
<td>Memory</td>
<td>16 DIMMs per Node (4-channel per CPU, 8 DIMMs per CPU) DDR3 1066/1333/1866 Reg DIMM/ Unbuffered DIMM with ECO Max. 256GB(RDIMM) / 64GB(UDIMM)</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1 per node PCIe G2x16 slot (x16 link) (Low profile/HL) per node</td>
</tr>
<tr>
<td>Storage</td>
<td>AMD SP5100: 6 SATA2 300MB/s ports Optional: ASUS PIKE 2008 8-port SAS2 6G RAID card 2* Hot-swap 3.5&quot; HDD Bays per Node (Total 4x 3.5&quot; HDD)</td>
</tr>
<tr>
<td>LAN</td>
<td>2* Intel PCIe GbE LAN (82574L) + 1 Mgmt LAN per Node 1* Single Port Mellanox ConnectX QDR InfiniBand with QSFP Interface</td>
</tr>
<tr>
<td>VGA</td>
<td>Aspeed AST2050 SMB</td>
</tr>
<tr>
<td>Management</td>
<td>ASWM2.0; Optional ASMB4-iKVM for KVM-over-IP support (ASMB4 default for North America)</td>
</tr>
</tbody>
</table>
RS500A-S6/PS4

**Key Positioning:** AMD G34 High Computing node for intense Memory Demands

**Workloads:** Enterprise/Database Servers, High Performance Computing, Virtualization Servers

**Specifications**
- **Socket:** G34 – 2 socket
- **CPU:** AMD Opteron™ 6100/6200/6300 Series Processors
- **Chipset:** AMD SR5690 + SP5100
- **Form Factor:** 24.21" x 17.5" x 1.72"
- **Memory:** 24 DIMMs (4-channel per CPU) DDR3 1066/1333/1600 Reg DIMM/Unbuffered DIMM with ECC Max. 256GB(RDIMM) / 64GB(UDIMM)
- **Expansion Slots:** 1 PCIe G2x16 (G2 x16 link) (FH/HL)
- **LAN:** 1* Intel 82580EB (Quad port) + 1* Mgmt LAN
- **VGA:** Aspeed AST2050 8MB
- **Management:** ASWM2.0, Optional ASMB4-IKVM for KVM-over-IP support (ASMB4 default for North America)

RS500A-E6/PS4

**Key Positioning:** Mainstream High Speed Computing Node

**Workloads:** Enterprise/Database Servers, Web/Email Servers, Cloud Computing

**Specifications**
- **Socket:** G34 – 2 socket
- **CPU:** AMD Opteron™ 6100/6200/6300 Series Processors
- **Chipset:** AMD SR5650 + SP5100
- **Form Factor:** 24.21" x 17.5" x 1.72"
- **Memory:** 16 DIMMs (4-channel per CPU) DDR3 1066/1333/1600 Reg DIMM/Unbuffered DIMM with ECC Max. 256GB(RDIMM) / 64GB(UDIMM)
- **Expansion Slots:** 1 PCIe G2x16 (G2 x16 link) (FH/HL)
- **LAN:** 2* Intel PCIe 6GbE LAN (82574L) + 1* Mgmt LAN
- **VGA:** Aspeed AST2050 8MB
- **Management:** ASWM2.0, Optional ASMB4-IKVM for KVM-over-IP support (ASMB4 default for North America)
FOR SUPPORT SERVICES, CALL:

Component Support:
(812) 282-2787

Systems Support:
(888) 678-3688

Or visit HTTP://SERVICE.ASUS.COM/PRODUCTS_SER.HTML for more information

Company Overview:
> Founded in 1989, ASUS is now a $10 billion brand with 10,000 employees worldwide.
> Historically ASUS was the R&D and manufacturing behind many of the big brands – we have a world-class R&D team of 3,000 engineers.
> ASUS is the maker of the world’s bestselling and most award winning motherboards.
> BusinessWeek has ranked ASUS among its InfoTech 100 for the 12th straight year.
> ASUS won 3,398 distinguished product awards in 2010 (9 per day).
MSI Motherboards

Information is provided for reference only. Please confirm specifications with your vendor before purchase.
## MSI Motherboards—AMD Opteron™ 4000 Series Platform

### MS-91F7

**Key Positioning:** Value DP Server  
**Workloads:** Pedestal or Rackmount

### MS-96D7

**Key Positioning:** Entry UP Server/Workstation  
**Workloads:** Pedestal or Rackmount

<table>
<thead>
<tr>
<th><strong>Socket: C32 – 2 socket</strong></th>
<th><strong>Socket: C32 – 1 socket</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Chipset</strong></th>
<th>AMD SR5650 + SPS100</th>
<th>AMD SR5650 + SPS100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form Factor</strong></td>
<td>CEB, 12&quot; x 10.2&quot;</td>
<td>ATX, 12&quot; x 9.6&quot;</td>
</tr>
</tbody>
</table>
| **Memory** | 8 x DDR3 DIMM slots  
DDR3 (800/1066/1333) ECC / LV U/R DIMM (1.5V, 1.35V) | 6 x DDR3 DIMM slots  
DDR3 (800/1066/1333) ECC U/R DIMM |
| **Expansion Slots** | 1 x PClex16  
3x PClex8 (one for x4 Signal), (option one PCIe x8 for SR5670)  
1 x PCI | 1 x PClex16 (PClex8 slot)  
2 x PClex8 (PClex4 slot)  
3 x PCI |
| **Storage** | 6 x SATA from SPS100  
Supports 6 SATAII devices  
Supports up to 3Gb/s data transfer rate | 6 x SATA from SPS100  
Supports 6 SATA devices  
Supports up to 3Gb/s data transfer rate |
| **LAN** | Supports dual Gb LAN by Intel 82574 | Supports dual Gb LAN by Intel 82574 Gb Ethernet controller |
| **VGA** | AST1100/2050 | AST1100 |
| **Management** | Aspeed AST1100 BMC controller (option AST2050 IPMI with iKVM) | Aspeed AST1100 BMC controller with IPMI |
Supermicro A+ Motherboards
Supermicro A+ Servers

Information is provided for reference only. Please confirm specifications with your vendor before purchase.
### SUPERMICRO A+ MOTHERBOARDS—AMD OPTERON™ 6000 SERIES PLATFORM

#### H8DGT-HL(1IBQ)F

**Key Positioning:** High Performance Twin Server w/ 40Gb/s IB option

**Workloads:** HPC, Data center, Quantum chemistry, Financial simulation, Genomics, Astrophysics and Oil and Gas

<table>
<thead>
<tr>
<th>Socket: G34 – 2 socket</th>
<th>CPU: AMD Opteron™ 6100/6200/6300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5690/SP5100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>Proprietary 8.8” x 16.64”</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB ECC Registered or 64 GB unbuffered ECC/non-ECC DDR3 1866/1860/1333/1066 SDRAM in 8 DIMMs</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1 PCI-E 2.0 x16, 1 PCI-E 2.0 x8 (using x4 slot) for SAS daughter board support</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA2 ports, RAID 0, 1, 10 (via daughter board)</td>
</tr>
<tr>
<td>LAN</td>
<td>Dual LAN with Intel 82576 Gigabit Ethernet</td>
</tr>
<tr>
<td>VGA</td>
<td>Matrox G200eW graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III</td>
</tr>
<tr>
<td>Other</td>
<td>MELLANOX CONNECT-X2 IB W SINGLE OSFP CONNECTOR SUPPORT (H8DGT-HLIBQF) BUILT-IN EIDE/USB PORTS: Up to 5 USB 2.0 ports OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports, TPM header MONITORS: CPU core &amp; DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +5V, +12V, +3.3Vcc, +Vbat, and HyperTransport™ technology voltage 1.2V, and total of 2-fan status, supports system management utility THERMAL CONTROL: Fan speed control &amp; overhear LED indication BIOS: AMI 16 Mb SPI Flash ROM OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss</td>
</tr>
</tbody>
</table>

#### H8DGU(-F)

**Key Positioning:** High Performance Supermicro UIO Server

**Workloads:** Appliance server, Application server, HPC, Storage and Database

<table>
<thead>
<tr>
<th>Socket: G34 – 2 socket</th>
<th>CPU: AMD Opteron™ 6100/6200/6300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5670/SP5100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>Proprietary 12.1” x 13”</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM in 16 DIMMs</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1U Left Slot: 1 PCI-E 2.0 x16 and UIO; or 2 PCI-E 2.0 x8; or 1 PCI-E 2.0 x16; or 1 PCI-E 2.0 x8 and UIO 2U Left Slot: 2 PCI-E 2.0 x8 and UIO; or 3 PCI-E 2.0 x8; or 1 PCI-E 2.0 x8 and UIO</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA2 ports, RAID 0, 1, 10</td>
</tr>
<tr>
<td>LAN</td>
<td>Dual LAN with Intel 82576 Gigabit Ethernet</td>
</tr>
<tr>
<td>VGA</td>
<td>Matrox G200eW graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0 + KVM with dedicated LAN (-F version only), Watch Dog, SuperDoctor III</td>
</tr>
<tr>
<td>Other</td>
<td>BUILT-IN EIDE/USB PORTS: Up to 7 USB 2.0 ports OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports PS/2 mouse &amp; keyboard conn., 1 SATA DOM power connector, TPM header MONITORS: CPU core &amp; DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +5V, +12V, +3.3Vcc, +Vbat, and HyperTransport™ technology voltage 1.2V, and total of 8-fan status, supports system management utility, chassis intrusion header THERMAL CONTROL: Fan speed control &amp; overhear LED Indication BIOS: AMI 16 Mb SPI Flash ROM OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss</td>
</tr>
</tbody>
</table>

#### Optimized Chassis

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1U: SC21STG-720UB/563UB, SC21STG-700UB/563UB</td>
</tr>
</tbody>
</table>

www.amd.com/playbook
### AMD Opteron™ 6000, 4000 and 3000 Series Platforms

#### Supermicro A+ Motherboards—AMD Opteron™ 6000 Series Platform

**H8QG6-F/H8QGi-F**  
**H8QG6+-F/H8QGi+-F**

**Key Positioning:** Maximum Performance / Dual GPU Ready

**Workloads:** High-end HPC, High-end enterprise server, SQL server, high performance computer cluster (HPCC), Medical, Engineering intensive and Laboratory applications

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**H8DGU-LN4F**

**Key Positioning:** Flexible GbE Networking and GPU support

**Workloads:** High-end enterprise server, SQL server, high performance computer cluster (HPCC)

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### Socket: G34 – 4 socket  
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

| Chipset          | AMD SR5690/SR5670 & SP5100  
|                  | AMD SR5690/SP5100 (+ version only) |
| Form Factor      | SWTX 16.48" x 13"  
| Memory           | 1 TB ECC Registered or 256 GB unbuffered ECC/non-ECC DDR3  
|                  | 1600/1333/1066 SDRAM in 32 DIMMs |
| Expansion Slots  | H8QG6-F/H8QGi-F: 2 PCI Express 2.0 x16  
|                  | 1 PCI Express 2.0 x8  
|                  | 1 PCI Express 2.0 x8 or 1 Universal I/O slot  
|                  | H8QG6+-F/H8QGi+-F: 1 PCI Express 2.0 x16  
| Storage          | LSI 2008 SAS2 Controller for 8 SAS2 / SATA ports, RAID 0, 1, 10; Optional RAID 5 support with AOC-SAS2-RAIDS-KEY (H8QGiF(+)-F only): 6 SATA2 ports, RAID 0, 1, 10 |
| LAN              | Dual LAN with Intel 82576 Gigabit Ethernet  
| VGA              | Matrox G200eW graphics controller  
| Management       | IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III  
| Other            | BUILT-IN IDE/EUSB PORTS: Up to 7 USB 2.0 ports  
|                  | OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports PS/2 mouse & keyboard conn., 1 SATA DOM power connector, TPM header  
|                  | MONITORS: CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +5V, +12V, +3.3Vcc, +3.3Vsb, Vbat, and total of 9-fan status, supports system management utility, chassis intrusion header  
|                  | THERMAL CONTROL: Fan speed control & overheat LED Indication  
|                  | BIOS: AMI 16 Mb SPI Flash ROM  
|                  | OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss  
| Optimized Chassis| H8QG6-F/H8QGi-F: 1U: SC818TQ-1400LPB  
|                  | H8QG6+-F/H8QGi+-F: 2U: SC828TQ+-R1400LPB  
|                  | 4U: SC748TQ-R400GB, SC848A-R1800B |

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### Socket: G34 – 2 socket  
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

| Chipset          | AMD SR5690/SPS100  
| Form Factor      | Proprietary 12.5" x 16.5"  
| Memory           | 768 GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3  
|                  | 1600/1333/1066 SDRAM in 24 DIMMs |
| Expansion Slots  | 1U Left Slot: 1 PCI-E 2.0 x8 and UIO; or 2 PCI-E 2.0 x8 and UIO; or 1 PCI-E 2.0 x8 and UIO  
|                  | 2U Left Slot: 2 PCI-E 2.0 x8 and UIO; or 3 PCI-E 2.0 x8 and UIO; or 1 PCI-E 2.0 x8 and UIO  
|                  | 2U Right Slot: 3 PCI-E 2.0 (x4 + x1 + x1) (via RSC-R2U2-2E2E4R Riser Card)  
| Storage          | 6 SATA2 ports, RAID 0, 1, 10  
| LAN              | Quad LAN with two Intel 82576 Gigabit Ethernet  
| VGA              | Matrox G200eW graphics controller  
| Management       | IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III  
| Other            | BUILT-IN IDE/EUSB PORTS: Up to 7 USB 2.0 ports  
|                  | OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports PS/2 mouse & keyboard conn., 1 SATA DOM power connector, TPM header  
|                  | MONITORS: CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +5V, +12V, +3.3Vcc, HyperTransport™ technology voltage 1.2V, and total of 8-fan status, supports system management utility, chassis intrusion header  
|                  | THERMAL CONTROL: Fan speed control & overheat LED Indication  
|                  | BIOS: AMI 16 Mb SPI Flash ROM  
|                  | OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss  
| Optimized Chassis| 1U: SC819TQ-R700UB, SC119TQ-R700UB  
|                  | 2U: SC829TQ-R920UB, SC219A-R920UB |

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**Optimized Chassis**

**H8QG6-F/H8QGi-F:**

- 1U: SC818TQ-1400LPB
- 2U: SC828TQ+-R1400LPB
- 4U: SC748TQ-R400GB, SC848A-R1800B

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**H8QG6+-F/H8QGi+-F:**

- 1U: SC818TQ-1400LPB
- 2U: SC828TQ+-R1400LPB
- 4U: SC748TQ-R400GB, SC848A-R1800B
**SUPERMICRO A+ MOTHERBOARDS—AMD OPTERON™ 6000 SERIES PLATFORM**

### H8QGL-6F(+)
**Key Positioning:** Maximum Performance
**Workloads:** High-end database server, SQL server, high performance computer cluster (HPCC), Storage, Video editing
**Socket:** G34 – 4 socket
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors
**Form Factor:** SWTX 16.48” x 13”
**Chipset:** Dual AMD SR5690/SP5100
**Expansion Slots:** 2x PCI-E 2.0 x16, 2x PCI-E 2.0 x8 (in x16 slot)
**Memory:** 2GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3 1866/1333/1066 SDRAM in 16 DIMMs
**Storage:** LSI 2008 SAS2 Controller for 8 SAS2 / SATA ports, RAID 0, 1, 10; Optional RAID 5 support with AOC-SAS2-RAID5-KEY (H8QGL-6F(+) only)
**LAN:** Dual LAN with Intel 82576 Gigabit Ethernet
**VGA:** Matrox G200eW graphics controller
**Management:** IPMI 2.0 + KVM with dedicated LAN, WatchDog, SuperDoctor III

### H8DG6(-F)
**Key Positioning:** High Performance with 6Gb/s SAS option
**Workloads:** High-end database server, SQL server, high performance computer cluster (HPCC), Storage, Video editing
**Socket:** G34 – 2 socket
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors
**Form Factor:** EATX 12” x 13”
**Chipset:** Dual AMD SR5690/SP5100
**Expansion Slots:** 3 PCI Express 2.0 x16, 2 PCI Express 2.0 x4 (using x8 slot)
**Memory:** 512 GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3 1866/1333/1066 SDRAM in 16 DIMMs
**Storage:** LSI 2208 SAS2 / 4 GbE LAN
**LAN:** Dual LAN with Intel 82576 Gigabit Ethernet
**VGA:** Matrox G200eW graphics controller
**Management:** IPMI 2.0 + KVM with dedicated LAN, WatchDog, SuperDoctor III

### H8QG7(-)-LN4F
**Key Positioning:** Maximum Performance
**Workloads:** High-end HPC, High-end enterprise server, SQL server, high performance computer cluster (HPCC), Medical, Engineering intensive and Laboratory applications
**Socket:** G34 – 4 socket
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors
**Form Factor:** SWTX 16.48” x 13”
**Chipset:** AMD SR5690/SP5670 & SP5100
**Expansion Slots:** 2 PCI-Express 2.0 x16, 2 PCI-Express 2.0 x8 (in x16 slot)
**Memory:** 1TB ECC Registered or 256 GB unbuffered ECC/non-ECC DDR3 1866/1333/1066 SDRAM in 32 DIMMs
**Storage:** LSI 2208 SAS2 Controller for 8 SAS2 / SATA ports, HW RAID 0, 1, 5, 6, 10, 50, 60 support (H8QG7(-)-LN4F only), 6 SATA2 ports, RAID 0, 1, 10
**LAN:** Four LAN with Intel® I350 Gigabit Ethernet
**VGA:** Matrox G200eW graphics controller
**Management:** IPMI 2.0 + KVM with dedicated LAN, WatchDog, SuperDoctor III

### H8QGi(-)-LN4F
**Key Positioning:** Maximum Performance / LSI 2206 SAS2 / 4 GbE LAN
**Workloads:** High-end database server, SQL server, high performance computer cluster (HPCC), Storage, Video editing
**Socket:** G34 – 2 socket
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors
**Form Factor:** SWTX 16.48” x 13”
**Chipset:** AMD SR5690/SP5670 & SP5100
**Expansion Slots:** 2 PCI-Express 2.0 x16, 2 PCI-Express 2.0 x8 (in x16 slot)
**Memory:** 1TB ECC Registered or 256 GB unbuffered ECC/non-ECC DDR3 1866/1333/1066 SDRAM in 32 DIMMs
**Storage:** LSI 2206 SAS2 Controller for 8 SAS2 / SATA ports, HW RAID 0, 1, 10
**LAN:** Dual LAN with Intel® I350 Gigabit Ethernet
**VGA:** Matrox G200eW graphics controller
**Management:** IPMI 2.0 + KVM with dedicated LAN, WatchDog, SuperDoctor III

### Alternate Processors
**Expansion Slots:** 2 PCI-Express 2.0 x16, 2 PCI-Express 2.0 x8 (in x16 slot)
**Memory:** 512 GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3 1866/1333/1066 SDRAM in 16 DIMMs
**Storage:** LSI 2208 SAS2 Controller for 8 SAS2 / SATA ports, RAID 0, 1, 10; Optional RAID 5 support with AOC-SAS2-RAID5-KEY (H8QGL-6F(+) only)
**LAN:** Dual LAN with Intel® I350 Gigabit Ethernet
**VGA:** Matrox G200eW graphics controller
**Management:** IPMI 2.0 + KVM with dedicated LAN, WatchDog, SuperDoctor III

**Optimized Cheassis**
**H8QGL-6F(-)/H8QGL-iF(-)/H8DG6(-F)/H8QG7(-)/H8QGi(-)-LN4F:**
- **2U:** SC828TO-R750LPB, SC813A-R900LPB, SC216A-R900LPB
- **3U:** SC828TO-R2600B, SC835TO-R2600B
- **4U:** SC745TO-R1400, SC745TO-R860B, SC743TO-R965B

**Optimized Cheassis**
**H8QGi(-)-LN4F:**
- **2U:** SC828TO-R750LPB, SC813A-R900LPB, SC216A-R900LPB
- **3U:** SC828TO-R2600B, SC835TO-R2600B
- **4U:** SC745TO-R1400, SC848A-R960B

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SUPERMICRO A+ MOTHERBOARDS—AMD OPTERON™ 6000 SERIES PLATFORM

H8SGL(-F)

**Key Positioning:** High Performance Entry Level

**Workloads:** File/print server, firewall applications, ISP mail server, web server for small business

Socket: G34 – 1 socket
CPU: AMD Opteron™ 6100/6200/6300 Series Processors

Chipset: AMD SR5650/SP5100
Form Factor: ATX 12" x 8"
Memory: 256 GB ECC Registered or 64 GB unbuffered ECC/ non-ECC DDR3 1600/1333/1066 SDRAM in 8 DIMMs
Expansion Slots: 1 PCI Express 2.0 x8 (using x16 slot), 1 PCI Express 2.0 x8, 1 PCI Express x4 (using x8 slot), 3 32-bit PCI
Storage: 6 SATA2 ports, RAID 0, 1, 10
LAN: Dual LAN with two Intel 82574L Controllers
VGA: Matrox G200eW graphics controller
Management: IPMI 2.0 + KVM with dedicated LAN (-F version), Watch Dog, SuperDoctor III
Other: BUILT-IN EIDE/USB PORTS: Single ATA133/100, Up to 8 USB 2.0 ports

H8DGT-HF

**Key Positioning:** High Density, Flexible IT Infrastructure

**Workloads:** HPC cluster computer nodes, datacenter, cloud computing, data farm, front end server and other computing intensive applications

Socket: G34 – 2 socket
CPU: AMD Opteron™ 6100/6200/6300 Series Processors

Chipset: AMD SR5670/SP5100
Form Factor: Proprietary 6.8" x 16.64"
Memory: 512 GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM in 16 DIMMs
Expansion Slots: 3 PCI Express 2.0 x16
Storage: 6 SATA2 ports, RAID 0, 1, 10 (via daughter board)
LAN: Dual LAN with Intel 82576 Gigabit Ethernet
VGA: Matrox G200eW graphics controller
Management: IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III
Other: MELLANOX CONNECT-X2 40GBPS INFINIBAND (H8DGT-HIBQF ONLY)

H8DGG-QF

**Key Positioning:** GPU Solution

**Workloads:** Specialized HPC cluster nodes, video editing, medical imaging, oil and gas simulation, quantum chemistry, financial simulation, astrophysics

Socket: G34 – 2 socket
CPU: AMD Opteron™ 6100/6200/6300 Series Processors

Chipset: Dual AMD SR5680/SP5100
Form Factor: Proprietary 7.74" x 16.64"
Memory: 512 GB ECC Registered or 128 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM in 16 DIMMs
Expansion Slots: 3 PCI Express 2.0 x8
Storage: 6 SATA2 ports, RAID 0, 1, 10
LAN: Dual LAN with Intel 82576 Gigabit Ethernet
VGA: Matrox G200eW graphics controller
Management: IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III
Other: BUILT-IN EIDE/USB Ports: Up to 4 USB 2.0 ports

Optimized Chassis

Mini ITX: SC512F-350B
1U: SCB8MT-350B, SCB8IT-350B, SCB8MT-330B
Mid-Tower: SC733E-500B, SC733I-500B, SC733T-500B, SC733CT-500B
Optimized Chassis

Optimized Chassis

1U: SC818G-1400B, SC118G-1400B
## H8SCM(-F)

**Key Positioning:** Energy Efficient UP server  
**Workloads:** ISP, Application server, Appliance server, General servers, and Entry level server

<table>
<thead>
<tr>
<th>Socket: C32 – 1 socket</th>
<th>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5650/SPS100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>Micro-ATX 9.6&quot; x 9.6&quot;</td>
</tr>
<tr>
<td>Memory</td>
<td>128 GB ECC Registered or 32 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM In 4 DIMMs</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1 PCI-E 2.0 x8 (using x8 slot), 1 PCI-E 2.0 x8, 1 PCI-E 2.0 x4 (using x8 slot), 1 32-bit PCI</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA2 ports, RAID 0, 1, 10</td>
</tr>
<tr>
<td>LAN</td>
<td>Dual LAN with two Intel 82574L Gigabit Ethernet</td>
</tr>
<tr>
<td>VGA</td>
<td>Matrox G200eW graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0 + KVM with dedicated LAN (-F version only), Watch Dog, SuperDoctor III</td>
</tr>
</tbody>
</table>
| Other Features          | BUILT-IN EIDE/USB PORTS: Single ATA133/100 Up to 7 USB 2.0 ports  
OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports, PS2 mouse & keyboard conn., 1 SATA DOM power connector, TPM header  
PC HEALTH MONITORING: Monitors CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +3.3Vcc, +3.3Vsb, Vbat, and HyperTransport™ technology voltage 1.2V, and total of 5-fan status, supports system management utility, chassis intrusion header  
THERMAL CONTROL: Fan speed control & overhear LED indication  
BIOS: AMI 16Mb SPI Flash ROM  
OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss |

## H8DCL-6(F)

**Key Positioning:** Cost optimized ATX DP platform with 6Gb/s SAS option  
**Workloads:** Database server, SQL server, HPC, Storage, Video editing

<table>
<thead>
<tr>
<th>Socket: C32 – 2 socket</th>
<th>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5690/SPS100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>ATX 12&quot; x 10&quot;</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB ECC Registered or 64 GB unbuffered ECC/non-ECC 1600/1333/1066 SDRAM In 8 DIMMs</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1 PCI-E 2.0 x8 (using in x8 slot), 3 PCI-E 2.0 x8, 1 PCI-E 2.0 x4 (using in x8 slot), 1 32-bit PCI</td>
</tr>
</tbody>
</table>
| Storage                 | LSI 2008 SAS2 Controller for 8 SAS; Optional RAID 5 support with AOC-SAS2-RAID5-KEY (H8DCL-6(F) only)  
8 SATA2 ports, RAID 0, 1, 10 |
| LAN                     | Dual LAN with two Intel 82574L Gigabit Ethernet       |
| VGA                     | Matrox G200eW graphics controller                     |
| Management              | IPMI 2.0 + KVM with dedicated LAN (-F version only), Watch Dog, SuperDoctor III |
| Other Features          | BUILT-IN EIDE/USB PORTS: Up to 7 USB 2.0 ports  
OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports, PS2/2 mouse & keyboard conn., 1 SATA DOM power connector, TPM header  
PC HEALTH MONITORING: Monitors CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +3.3Vcc, +3.3Vsb, Vbat, and HyperTransport™ technology voltage 1.2V, and total of 6-fan status, supports system management utility, chassis intrusion header  
THERMAL CONTROL: Fan speed control & overhear LED indication  
BIOS: AMI 16 Mb SPI Flash ROM  
OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss |

## Optimized Chassis

**H8SCM(-F)**  
Mini-1U: SC512F-350B  
1U: SC113MTQ-350CB, SC113MTQ-350B, SC113MTQ-330CB, SC113MTQ-330CB, SC113MTQ-360CB  
Mini-Tower: SC731D/i-300B

**H8DCL-6(F)**  
3U: SC835TQ-R920B, SC936A-R900B/1200B  
4U: SC842TQ-665/865  
Mid-Tower: SC735i-300B
### H8DCT-HLN4F

**Key Positioning:** Cost Optimized Twin Server with 40Gb/s IB or 4 GbE LAN option

**Workloads:** HPC, Data center, Quantum chemistry, Financial simulation, Genomics, Astrophysics and Oil and Gas

**Socket:** C32 – 2 socket

**CPU:** AMD Opteron™ 4100/4200/4300 Series Processors

**Chipset:** AMD SR5670/SP5100 (H8DCT-HLN4F)

**Form Factor:** Proprietary 6.5” x 16.64”

**Memory:** 192 GB ECC Registered or 64 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM in 12 DIMMs

**Expansion Slots:** 1 PCI Express 2.0 x16, 1 PCI Express 2.0 x8 (using x4 slot for Supermicro SAS adapter)

**Storage:** 6 SATA2 ports, RAID 0, 1, 10

**LAN:** Dual LAN with Intel I350 Gigabit Ethernet (H8DCT-HIBQF) Quad LAN with Intel I350 Gigabit Ethernet (H8DCT-HLN4F)

**VGA:** Matrox G200eW graphics controller

**Management:** IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III

**Other Features:** MELLANOX CONNECT-X2 IB W/ SINGLE QSFP CONNECTOR SUPPORT (H8DCT-HIBQF) BUILT-IN EIDE/USB PORTS: Up to 4 USB 2.0 ports OTHER ONBOARD I/O DEVICES: 1 fast UART 16550 serial port, TPM header PC HEALTH MONITORING: Monitors CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +5V, +12V, +3.3Vcc, +Vbat, and HyperTransport™ technology voltage 1.2V, and total of 2-fan status, supports system management utility THERMAL CONTROL: Fan speed control & overheat LED Indication BIOS: AMI 16Mb SPI Flash ROM OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss

**Optimized Chassis:** 2U: SC217HQ-R1620B, SC827H-R1620B, SC827H-R1400B, SC827HD-R1400B

---

### H8DCT-IBQF

**Key Positioning:** Cost Optimized Twin Server with 40Gb/s IB option

**Workloads:** HPC, Data center, Quantum chemistry, Financial simulation, Genomics, Astrophysics and Oil and Gas

**Socket:** C32 – 2 socket

**CPU:** AMD Opteron™ 4100/4200/4300 Series Processors

**Chipset:** AMD SR5670/SP5100

**Form Factor:** Proprietary 6.5” x 16.64”

**Memory:** 192 GB ECC Registered or 64 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM in 12 DIMMs

**Expansion Slots:** 1 PCI Express 2.0 x16

**Storage:** 4 SATA2 ports, RAID 0, 1, 10

**LAN:** Dual LAN with Intel 82576 Gigabit Ethernet

**VGA:** Matrox G200eW graphics controller

**Management:** IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III

**Other Features:** MELLANOX CONNECT-X2 IB W/ SINGLE QSFP CONNECTOR SUPPORT (H8DCT-IBQF) BUILT-IN EIDE/USB PORTS: Up to 4 USB 2.0 ports OTHER ONBOARD I/O DEVICES: 2 fast UART 16550 serial ports, TPM header PC HEALTH MONITORING: Monitors CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +5V, +12V, +3.3Vcc, +Vbat, and HyperTransport™ technology voltage 1.2V, and total of 2-fan status, supports system management utility THERMAL CONTROL: Fan speed control & overheat LED Indication BIOS: AMI 16 Mb SPI Flash ROM OTHERS: ACPI power management, WOL, control of power-on mode for recovery from AC power loss

**Optimized Chassis:** 1U: SC808T-780B, SC809TQ-780B 2U: SC827H-R1620B, SC827H-R1400B
### H8SML-7(F)

**Key Positioning:** Energy Efficient UP server w/ LSI 2308 SAS2

**Workloads:** ISP, Application server, Appliance server, General servers, and Entry level server

**Socket:** AM3+ – 1 socket

**CPU:** AMD Opteron™ 3000 Series Processors

**Chipset:** AMD SR5650/SP5100

**Form Factor:** Micro-ATX 9.6” x 9.6”

**Memory:** 32 GB unbuffered ECC/non-ECC DDR3 1600/1333/1066 SDRAM in 4 DIMMs

**Expansion Slots:** 1 PCI-Express 2.0 x8 (H8SML-i(F) only) (using x16 slot), 1 PCI-Express 2.0 x4 (using x8 slot), 1 PCI-Express 2.0 x8

**Storage:** LSI 2308 SAS2 Controller for 8 SAS2/ SATA ports SW RAID 0, 1, 10 support (H8SML-7(F) only), 6 SATA2 ports, RAID 0, 1, 10

**LAN:** Dual LAN with two Intel® 82574 Gigabit Ethernet

**VGA:** Matrox G200eW graphics controller

**Management:** IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III

**Other:** BUILT-IN EIDE/USB PORTS: Up to 7 USB 2.0 ports

**OTHER ONBOARD I/O DEVICES:** 1 SATA DOM power connector, TPM header

**PC HEALTH MONITORING:** Monitors CPU core & DIMM voltage, SR56x0 chipset voltage 1.1V, +1.8V, +5V, +12V, -12V, +3.3Vcc, +3.3Vsb, Vbat, and HyperTransport™ technology voltage 1.2V, and total of 5-fan status, supports system management utility, chassis intrusion header

**THERMAL CONTROL:** Fan speed control & overheat LED indication

**BIOS:** AMI 16 Mb SPI Flash ROM

**OTHERS:** ACPI power management, WOL, control of power-on mode for recovery from AC power loss

**Optimized Chassis:** Mini 1U: SCS12F-350B

### A+ Server 1022GG-TF

**Key Features:**
- Support up to 2 GPU cards
- 512 GB DDR3 1600/1333/1066 SDRAM
- 2 Gigabit Ethernet ports
- IPMI 2.0 management
- 1400W Gold Level high-efficiency power supply

**Workloads:** Specialized HPC cluster nodes, medical imaging, oil and gas simulation, quantum chemistry, financial simulation, astrophysics

| SERVERBOARD: H8DGG-OF / HyperTransport™ technology |
| Socket: G34 – 2 socket |
| CPU: AMD Opteron™ 6100/6200/6300 Series Processors |

#### Chipset
- Dual AMD SR5690/SP5100

#### Form Factor
- 1U Rackmount
- 437 x 43 x 716mm (17.2” x 1.7” x 28.2”)

#### Memory
- 512 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 16 DIMMs

#### Expansion Slots
- 2 PCI Express 2.0 x16
- 1 PCI Express 2.0 x8 in x16 slot (accommodates AOCs up to 5.9” in length)

#### Storage
- SATA: 9 TB

#### Connectivity/VGA/Audio
- Dual LAN with Intel 82576 Gigabit Ethernet controller
- Matrox G200eW graphics controller

#### Management
- IPMI 2.0, SuperDoctor III, Watch Dog

#### Other Features
- ONBOARD SAS/SCSI/SATA/IDE/RAID: AMD SPS100 for 3 SATA RAID SUPPORT: 0,1
- DRIVE BAYS: 3 x 3.5” hot-swap SATA drive bays
- PERIPHERAL BAYS: Yes, optional optical drive
- POWER SUPPLY: 1400W Gold Level high-efficiency power supply
- COOLING SYSTEM: 8 x 4cm heavy duty counter-rotating fans with air shroud & optimal fan speed control

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### A+ Server 1122GG-TF

**Key Features:**
- Support up to 2 GPU cards
- 512 GB DDR3 1600/1333/1066 SDRAM
- Support 6 2.5” HDDs
- 2 Gigabit Ethernet ports
- IPMI 2.0 management
- 1400W Gold Level high-efficiency power supply

**Workloads:** Specialized HPC cluster nodes, medical imaging, oil and gas simulation, quantum chemistry, financial simulation, astrophysics

| SERVERBOARD: H8DGG-OF / HyperTransport™ technology |
| Socket: G34 – 2 socket |
| CPU: AMD Opteron™ 6100/6200/6300 Series Processors |

#### Chipset
- AMD SR5690/SP5100

#### Form Factor
- 1U Rackmount
- 437 x 43 x 716mm (17.2” x 1.7” x 28.2”)

#### Memory
- 512 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 16 DIMMs

#### Expansion Slots
- 2 PCI Express 2.0 x16
- 1 PCI Express 2.0 x8 in x16 slot (accommodates AOCs up to 5.9” in length)

#### Storage
- SATA: 6 TB

#### Connectivity/VGA/Audio
- Dual LAN with Intel 82576 Gigabit Ethernet controller
- Matrox G200eW graphics controller

#### Management
- IPMI 2.0, SuperDoctor III, Watch Dog

#### Other Features
- ONBOARD SAS/SCSI/SATA/IDE/RAID: AMD SPS100 for 6 SATA RAID SUPPORT: 0,1, 10 (6 SATA2 ports)
- DRIVE BAYS: 6 x 2.5” hot-swap SATA drive bays
- PERIPHERAL BAYS: N/A
- POWER SUPPLY: 1400W Gold Level high-efficiency power supply
- COOLING SYSTEM: 8 x 4cm heavy duty counter-rotating fans with air shroud & optimal fan speed control
SUPERMICRO A+ SERVERS—AMD OPTERON™ 6000 SERIES PLATFORM

A+ Server 1022G-URF
A+ Server 1022G-NTF

Key Features:
> 4 SAS/SATA hard drive bays
> Universal I/O slot and PCI Express
> 512 GB DDR3 1600/1333/1066 SDRAM
> 2 Gigabit Ethernet ports
> IPMI 2.0 management
> 700W Gold Level high-efficiency redundant power supply (1022G-URF) 560W Gold Level high-efficiency power supply (1022G-NTF)

Workloads: High-end enterprise server, SQL server, high-performance computer cluster (HPCC)

Serverboard: H8DGU-F / HyperTransport™ technology
CPU: AMD Opteron™ 6100/6200/6300 Series Processors
Chipset: AMD SR5670/SP5100
Form Factor: 1U Rackmount 437 x 43 x 650mm (17.2” x 1.7” x 25.6”)
Memory: 512 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 16 DIMMs
Expansion Slots: 1 Universal I/O (UIO) slot (1022G-URF only)
> 1 PCI Express 2.0 x8 (1022G-URF only)
> 2 PCI Express 2.0 x8 (1022G-NTF only)
Storage: SAS: 12 TB (with UIO)
SATA: 12 TB
Connectivity/VGA/Audio: Dual LAN with Intel 82576 Gigabit Ethernet controller
Matrox G200eW graphics controller
Management: IPMI 2.0, SuperDoctor III, Watch Dog
Other Features: ONBOARD SAS/SCSI/SATA/IDE/RAID: UIO SAS 4 port controller* (1022G-URF only), AMD SPS100 for 4 SATA
RAID SUPPORT: RAID 0, 1, 5, 10 available with Supermicro™ UIO card (1022G-URF only), RAID 0, 1, 10 with AMD SPS100
DRIVE BAYS: 4 x 3.5” hot-swap SAS or SATA drive bays
PERIPHERAL BAYS: 1 slim DVD-ROM drive
POWER SUPPLY: 700W Gold Level high-efficiency redundant power supply (1022G-URF only)
560W Gold Level high-efficiency power supply (1022G-NTF only)
COOLING SYSTEM: 4 x 4cm heavy duty counter-rotating fans with air shroud & optimal fan speed control

A+ Server 1012G-MTF

Key Features:
> Short depth chassis
> Four 3.5” SATA drive bays
> 256 GB DDR3 1600/1333/1066 SDRAM
> 350W Gold Level high-efficiency power supply
> IPMI 2.0 management
> Cost-effective

Workloads: Fileprint server, firewall applications, mail server, web server for small business, server appliance, cluster node, ISP

Serverboard: HBSGL-F / HyperTransport™ technology
Socket: G34 – 1 socket
CPU: AMD Opteron™ 6100/6200/6300 Series Processors
Chipset: AMD SR5650/SP510
Form Factor: 1U Rackmount 437 x 43 x 503mm (17.2” x 1.7” x 19.8”)
Memory: 256 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 8 DIMMs
Expansion Slots: 1 PCI Express 2.0 x8 (in x16 slot)
Storage: SATA: 12 TB
Connectivity/VGA/Audio: Dual LAN with two Intel 82574L Gigabit Ethernet controllers
Matrox G200eW graphics controller
Management: IPMI 2.0, SuperDoctor III, Watch Dog
Other Features: ONBOARD SAS/SCSI/SATA/IDE/RAID: AMD SP5100 for 4 SATA
RAID SUPPORT: 0,1,10
DRIVE BAYS: 4 x 3.5” hot-swap SATA drive bays
PERIPHERAL BAYS: 1 slim DVD-ROM drive
POWER SUPPLY: 350W Gold Level high-efficiency power supply
COOLING SYSTEM: 4 x 4cm heavy duty fans with air shroud & optimal fan speed control

*Supermicro UIO Card must be installed
### A+ Server 2122TG-HTRF
#### A+ Server 2122TG-HIBQRF

**Key Features:**
- Excellent performance per watt
- Four hot-swappable nodes in 2U
- 8 2.5" HDDs per node, total 24 HDDs
- Up to 128 Cores in 2U
- More than double computing density (compared to standard 1U servers)
- Independent power control
- Independent cooling control
- Hot-pluggable high-efficiency redundant power
- Save maintenance/management costs
- Improved efficiency through shared resources

**Workloads:** HPC cluster computer nodes, datacenter, data farm, front-end server and other computing intensive applications

---

### A+ Server 2022TG-HTRF
#### A+ Server 2022TG-HIBQRF

**Key Features:**
- Excellent performance per watt
- Four hot-swappable nodes in 2U
- Up to 128 Cores in 2U
- More than double computing density (compared to standard 1U servers)
- Independent power control
- Independent cooling control
- Hot-pluggable high-efficiency redundant power reduce power cables and power strips
- Save maintenance/management costs
- Improved efficiency through shared resources

**Workloads:** HPC cluster computer nodes, datacenter, data farm, front-end server and other computing intensive applications

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### Serverboard: H8DGT-HF/HIBQF / HyperTransport™ technology

**Socket:** G34 – 2 socket

**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

**Chipset**
- AMD SR5670/SPS100

**Form Factor**
- Quad sets of dual LAN w/ Intel 82576 GbE controller
- Quad sets of Mellanox Connect-X2 40Gbps InfiniBand (HIBQRF only)
- Quad sets of Matrox G200eW graphics controller

**Connectivity/VGA/Audio**
- IPMI 2.0, SuperDoctor III, Watch Dog

**Management**
- IPMI 2.0, SuperDoctor III, Watch Dog

**Other Features**
- ONBOARD SAS/SCSI/SATA/IDE/RAID: Quad sets of AMD SP5100 for 6 SATA RAID SUPPORT: 0,1,0
- DRIVE BAYS: Quad sets of 6 x 2.5" hot-swap SATA drive bays
- PERIPHERAL BAYS: N/A
- POWER SUPPLY: 1400W Gold Level high-efficiency redundant power supply with PMBus
- COOLING SYSTEM: Twin sets of 2 x 8cm heavy duty counter-rotating fans with air shroud & optimal fan speed control

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### Serverboard: H8DGT-HF/HIBQF / HyperTransport™ technology

**Socket:** G34 – 2 socket

**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

**Chipset**
- AMD SR5670/SPS100

**Form Factor**
- Quad sets of dual LAN w/ Intel 82576 GbE controller
- Quad sets of Mellanox Connect-X2 40Gbps InfiniBand (HIBQRF only)
- Quad sets of Matrox G200eW graphics controller

**Connectivity/VGA/Audio**
- IPMI 2.0, SuperDoctor III, Watch Dog

**Management**
- IPMI 2.0, SuperDoctor III, Watch Dog

**Other Features**
- ONBOARD SAS/SCSI/SATA/IDE/RAID: Quad sets of AMD SP5100 for 3 SATA RAID SUPPORT: 0,1
- DRIVE BAYS: Quad sets of 3 x 3.5" hot-swap SATA drive bays
- PERIPHERAL BAYS: N/A
- POWER SUPPLY: 1400W Gold Level high-efficiency redundant power supply with PMBus
- COOLING SYSTEM: Twin sets of 2 x 8cm heavy duty counter-rotating fans with air shroud & optimal fan speed control
A+ Server 2022G-URF4+

**Key Features:**
- Resource optimized system solution
- 4 Gigabit Ethernet ports
- 768 GB DDR3 1600/1333/1066 SDRAM in 24 DIMMs
- Full-Height Full-Length expansion cards
- IPMI 2.0 management
- 920W Platinum-Level redundant power supply

**Workloads:** High-end enterprise server, SQL server, high-performance computer cluster (HPCC)

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A+ Server 2022G-URF

**Key Features:**
- 8 x 3.5" SATA / SAS drive bays*
- Universal I/O slot and PCI Express
- 512 GB DDR3 1600/1333/1066 SDRAM in 16 DIMMs
- 2 Gigabit Ethernet ports
- IPMI 2.0 management
- 720W high-efficiency redundant power supply

**Workloads:** High-end enterprise server, SQL server, high-performance computer cluster (HPCC)

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### Supermicro A+ Servers—AMD Opteron™ 6000 Series Platform

<table>
<thead>
<tr>
<th>A+ Server 2022G-URF4+</th>
<th>A+ Server 2022G-URF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serverboard:</strong> H8DGU-LN4F+ / HyperTransport™ technology</td>
<td><strong>Serverboard:</strong> H8DGU-F / HyperTransport™ technology</td>
</tr>
<tr>
<td><strong>Socket:</strong> G34 – 2 socket</td>
<td><strong>Socket:</strong> G34 – 2 socket</td>
</tr>
<tr>
<td><strong>CPU:</strong> AMD Opteron™ 6100/6200/6300 Series processors</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Chipset</strong></th>
<th>AMD SR5690/SP5100</th>
</tr>
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<tbody>
<tr>
<td><strong>Form Factor</strong></td>
<td>2U Rackmount 437 x 89 x 648mm (17.2&quot; x 3.5&quot; x 27.75&quot;)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>768 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 24 DIMMs</td>
</tr>
<tr>
<td><strong>Expansion Slots</strong></td>
<td>3 PCI Express 2.0 x8 (FH/HL) 1 Universal I/O (UIO) slot</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>SAS: 24 TB (with UIO) SATA: 24 TB</td>
</tr>
<tr>
<td><strong>Connectivity/VGA/Audio</strong></td>
<td>Four LAN with two Intel 82576 Gigabit Ethernet controllers Matrox G200eW graphics controller</td>
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<td><strong>Management</strong></td>
<td>IPMI 2.0, SuperDoctor III, Watch Dog</td>
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<tr>
<td><strong>Other Features</strong></td>
<td>ONBOARD SAS/SCSI/SATA/IDE/RAID: UIO SAS 8 port controller* AMD SP5100 for 6 SATA RAID SUPPORT: RAID 0, 1, 5, 6,10,50,60 available with Supermicro™ UIO card, RAID 0, 1, 10 with AMD SP5100 DRIVE BAYS: 8 x 3.5&quot; hot-swap SAS or SATA drive bays PERIPHERAL BAYS: 1 slim DVD-ROM drive POWER SUPPLY: 920W Platinum Level high-efficiency redundant power supply with iC built-in COOLING SYSTEM: 4 x 8cm heavy duty fans with air shroud &amp; optimal fan speed control</td>
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<tr>
<td><strong>Memory</strong></td>
<td>512 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 16 DIMMs</td>
</tr>
<tr>
<td><strong>Expansion Slots</strong></td>
<td>1 Universal I/O (UIO) slot 3 PCI Express 2.0 x8 (full size)</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>SAS: 24 TB (with UIO) SATA: 24 TB</td>
</tr>
<tr>
<td><strong>Connectivity/VGA/Audio</strong></td>
<td>Dual LAN with Intel 82576 Gigabit Ethernet controller Matrox G200eW graphics controller</td>
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</tr>
</tbody>
</table>

*UIO Card is needed for SAS functionality
### A+ Server 4022G-6F

**Key Features:**
- Mainstream system in 4U/Tower form factor
- 100% cooling redundancy
- 512 GB DDR3 1600/1333/1066 SDRAM in 16 DIMMs
- 6 PCI Express 2.0 expansion slots
- IPMI 2.0 management
- 920W Platinum level power supply

**Workloads:**
- High-end enterprise server, SQL server, high-performance computer cluster (HPCC)

### A+ Server 1042G-TF

**Key Features:**
- 3 x 3.5" SATA drive bays
- 1TB DDR3 1600/1333/1066 SDRAM in 32 DIMMs
- 1400W Gold-Level redundant power supply
- IPMI 2.0 management

**Workloads:**
- High-end database server, SQL server, high-performance computer cluster (HPCC)

<table>
<thead>
<tr>
<th>Serverboard: H8DG6-F / HyperTransport™ technology</th>
<th>Serverboard: H8QGi+-F / HyperTransport™ technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socket:</strong> G34 - 2 socket</td>
<td><strong>Socket:</strong> G34 - 4 socket</td>
</tr>
<tr>
<td><strong>CPU:</strong> AMD Opteron™ 6100/6200/6300 Series Processors</td>
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</tr>
<tr>
<td><strong>Chipset</strong></td>
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</tr>
<tr>
<td>Dual AMD SR5690/SPS900</td>
<td>AMD SR5690/SPS900</td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
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</tr>
<tr>
<td>4U Rackmount/Tower</td>
<td>1U Rackmount</td>
</tr>
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<td>437 x 178 x 648mm (17.2&quot; x 7&quot; x 25.5&quot;)</td>
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<tr>
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<tr>
<td>512 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 16 DIMMs</td>
<td>1 TB ECC Registered DDR3 1600/1333/1066 SDRAM in 32 DIMMs</td>
</tr>
<tr>
<td><strong>Expansion Slots</strong></td>
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</tr>
<tr>
<td>3 PCI Express 2.0 x16</td>
<td>1 PCI Express 2.0 x16</td>
</tr>
<tr>
<td>1 PCI Express 2.0 x8</td>
<td>2 PCI Express 2.0 x4 (low profile)</td>
</tr>
<tr>
<td>2 PCI Express 2.0 x4 (using x8 slots)</td>
<td></td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td><strong>Storage</strong></td>
</tr>
<tr>
<td>SAS: 24 TB</td>
<td>SATA: 9TB</td>
</tr>
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<td>SATA: 24 TB</td>
<td></td>
</tr>
<tr>
<td><strong>Connectivity/VGA/Audio</strong></td>
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</tr>
<tr>
<td>Dual LAN with Intel 82576 Gigabit Ethernet controller</td>
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</tr>
<tr>
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</tr>
<tr>
<td>ONBOARD SAS/SCSI/SATA/IDE/RAID: LSI 2008 SAS2 Controller with RAID 5, AMD SP5100 for 6 SATA</td>
<td>ONBOARD SAS/SCSI/SATA/IDE/RAID: AMD SP5100 for 3 SATA</td>
</tr>
<tr>
<td>RAID SUPPORT: AMD SP5100 (RAID 0, 1, 10); LSI 2008 (RAID 0, 1, 10, RAID 5 Optional)</td>
<td>RAID SUPPORT: RAID 0, 1</td>
</tr>
<tr>
<td>DRIVE BAYS: 8 x 3.5&quot; hot-swap SAS or SATA drive bays</td>
<td>DRIVE BAYS: 3 x 5.5&quot; hot-swap SAS/SATA drive bays</td>
</tr>
<tr>
<td>PERIPHERAL BAYS: 3 x 5.25&quot; drive bays optional floppy drive</td>
<td>PERIPHERAL BAYS: 1 slim DVD-ROM drive optional</td>
</tr>
<tr>
<td>POWER SUPPLY: 920W Platinum Level high-efficiency power supply with PMBus</td>
<td>POWER SUPPLY: 1400W Gold Level Power supply</td>
</tr>
<tr>
<td>COOLING SYSTEM: 3 x 8cm hot-swap cooling fans &amp; 2 x 8cm exhaust fans with air shroud &amp; optimal fan speed control</td>
<td>COOLING SYSTEM: 6 x 4cm heavy duty counter rotating fans with fan speed control</td>
</tr>
</tbody>
</table>
### A+ Server 4042G-6RF/
A+ Server 4042G-TRF

**Key Features:**
- Enterprise level 4-way system
- Up to 5+5 (with optional drive carrier) SAS/SATA Drive Bays
- 2 PCI Express x8 and HyperTransport
- 1 TB DDR3 1600/1333/1066 SDRAM in 32 DIMMs
- 2 Gigabit Ethernet ports
- IPMI 2.0 management with dedicated LAN
- Redundant 1400W Gold-Level power supply

**Workloads:** Mission-critical applications, enterprise server, large database, e-business, Internet, online transaction processing

### A+ Server 2042G-6RF/
A+ Server 2042G-TRF

**Key Features:**
- 6 x 3.5" hot-swap SATA/SAS drive bays
- 1 TB DDR3 1600/1333/1066 SDRAM In 32 DIMMs
- 2 Gigabit Ethernet ports
- 1400W Gold-Level redundant power supply
- IPMI 2.0 management over dedicated LAN

**Workloads:** High-end HPC, High-end enterprise server, SQL server, high-performance computer cluster (HPCC), Medical, Engineering intensive and Laboratory applications

### Serverboard:
**H8QG6-F/i-F / HyperTransport™ technology**
**Socket: G34 - 4 socket**
**CPU: AMD Opteron™ 6100/6200/6300 Series Processors**

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5690/SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>4U Rackmount/Tower</td>
</tr>
<tr>
<td>Memory</td>
<td>1 TB ECC Registered DDR3 1600/1333/1066 SDRAM in 32 DIMM</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>2 PCI Express 2.0 x8, 1 Universal I/O or PCI Express 2.0 x8</td>
</tr>
<tr>
<td>Storage</td>
<td>SAS: 15 TB (30 TB w/ optional drive carrier), SATA: 15 TB (30 TB w/ optional drive carrier)</td>
</tr>
<tr>
<td>Connectivity/VGA/Audio</td>
<td>Dual LAN with Intel 82576 Gigabit Ethernet controller, Matrox G200eW graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0, SuperDoctor III, Watch Dog</td>
</tr>
<tr>
<td>Other Features</td>
<td>ONBOARD SAS/SCSI/SATA/ide/RAID: LSI® 2008 SAS Controller for 8 SAS/SATA ports (4042G-6RF only), AMD SP5100 for 6 SATA (4042G-TRF only), RAID SUPPORT: AMD SP5100 (RAID 0, 1, 10), LSI 2008 (RAID 0, 1, 10, RAID 5 Optional), DRIVE BAYS: Default 1 mobile rack (5 drives) Support up to 2 mobile racks (10 drives), POWER SUPPLY: 1400W Gold Level high efficiency redundant power supply with PFC built-in COOLING SYSTEM: 3 x 8cm hot-swap cooling fans &amp; 3 x 8cm exhaust fans with air shroud &amp; optimal fan speed control</td>
</tr>
</tbody>
</table>

---

### Serverboard:
**H8QG6-F / HyperTransport™ technology**
**Socket: G34 – 4 socket**
**CPU: AMD Opteron™ 6100/6200/6300 Series processors**

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5690/SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>2U Rackmount</td>
</tr>
<tr>
<td>Memory</td>
<td>1 TB ECC Registered DDR3 1600/1333/1066 SDRAM in 32 DIMM</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>2 PCI Express 2.0 x8, 1 Universal I/O or PCI Express 2.0 x8</td>
</tr>
<tr>
<td>Storage</td>
<td>SAS: 18 TB, SATA: 18 TB</td>
</tr>
<tr>
<td>Connectivity/VGA/Audio</td>
<td>Dual LAN with Intel 82576 Gigabit Ethernet controller, Matrox G200eW graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0, SuperDoctor III, Watch Dog</td>
</tr>
<tr>
<td>Other Features</td>
<td>LSI 2008 SAS2 Controller for 8 SAS/SATA ports (2042G-6RF only), AMD SP5100 for 6 SATA (2042G-TRF only), RAID SUPPORT: AMD SP5100 (RAID 0, 1, 10), LSI 2008 (RAID 0, 1, 10, RAID 5 Optional), DRIVE BAYS: 6 x 3.5&quot; hot-swap SAS/SATA drive bays, POWER SUPPLY: 1400W Gold Level high-efficiency redundant power supply with 120V built-in COOLING SYSTEM: 6 x 8cm heavy duty fans with fan speed control</td>
</tr>
</tbody>
</table>

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54
### A+ Server 2042G-72RF4

**Key Features:**
- 6 x 3.5” SATA drive bays + 1 x 3.5 hidden bay
- 1TB DDR3 1600/1333/1066 SDRAM in 32 DIMMs
- 4 Gigabit Ethernet ports
- 1400W Platinum Level 94% high efficiency redundant power supplies
- IPMI 2.0 management

**Workloads:** Mission-critical applications, enterprise server, large database, e-business, Internet, online transaction processing, High performance computer cluster (HPCC)

---

### A+ Server 4042G-72RF4

**Key Features:**
- 5 x 3.5” SATA drive bays + 3 x 5.25 Peripheral Drive Bay
- 1TB DDR3 1600/1333/1066 SDRAM in 32 DIMMs
- 4 Gigabit Ethernet ports
- 1400W Platinum Level 94% high efficiency redundant power supplies
- IPMI 2.0 management

**Workloads:** Mission-critical applications, enterprise server, large database, e-business, Internet, online transaction processing, High performance computer cluster (HPCC)

---

### Serverboard: H8QG7-7F, HyperTransport™ technology

**Socket:** G34 – 4 socket

**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

---

### Serverboard: H8QG7-7F, HyperTransport™ technology

**Socket:** G34 – 4 socket

**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors

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### Chipset

**AMD SR5690/SR5670 + SP5100**

---

### Chipset

**AMD SR5690/SR5670 + SP5100**

---

### Form Factor

2U Rackmount

---

### Form Factor

4U Rackmount/Tower

---

### Memory

1TB of DDR3 Registered ECC 1600/1333/1066 SDRAM in 32 DIMMs

---

### Memory

1TB of DDR3 Registered ECC 1600/1333/1066 SDRAM in 32 DIMMs

---

### Expansion Slots

2 PCI Express 2.0 x8 (low profile)

---

### Expansion Slots

2 PCI Express 2.0 x8 (low profile)

---

### Storage

SAS: 18 TB

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### Storage

SAS: 15 TB (30 TB w/ optional drive carrier)

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### Connectivity/VGA/Audio

Quad LAN with Intel i350 Gigabit Ethernet Controller

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### Connectivity/VGA/Audio

Quad LAN with Intel i350 Gigabit Ethernet Controller

---

### Management

IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III

---

### Management

IPMI 2.0 + KVM with dedicated LAN, Watch Dog, SuperDoctor III

---

### Other Features

ONBOARD SAS/SCSI/SATA/IDE/RAID: LSI 2208 SAS2 Controller, AMD SPS100 for 6 SATA RAID SUPPORT: HW RAID 0, 1, 5, 6, 10, 50 with LSI 2208; RAID 0, 1, 10 with AMD SPS100

---

### Other Features

ONBOARD SAS/SCSI/SATA/IDE/RAID: LSI 2208 SAS2 Controller, AMD SPS100 for 6 SATA RAID SUPPORT: HW RAID 0, 1, 5, 6, 10, 50, 60 <optional drive carrier required> with LSI 2208; RAID 0, 1, 10 with AMD SPS100

---

### Other Features

POWER SUPPLY: 1400W Platinum Level 94% redundant digital power supplies

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### Other Features

POWER SUPPLY: 1400W Platinum Level 94% redundant digital power supplies

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### Other Features

COOLING SYSTEM: 6 x 8cm heavy duty counter rotating fans with fan speed control

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### Other Features

COOLING SYSTEM: 6 x 8cm heavy duty counter rotating fans with fan speed control

---

### Other Features

COOLING SYSTEM: 3 x 8cm hot-swap cooling fans & 3 x 8cm exhaust fans

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### A+ Server 1012C-MRF

**Key Features:**
- Optimized for shallow racks
- Eight-Core processor support
- 128 GB DDR3 1600/1333/1066 SDRAM in 4 DIMMs
- PCI Express 2.0 x8 support
- 2 GbE Gigabit Ethernet ports
- Cost-effective

**Workloads:** File/print server, firewall applications, mail server, web server for small business, server appliance, cluster node

### A+ Server 2022TG-H6RF

**Key Features:**
- Excellent performance per watt
- Four hot-swappable nodes in 2U
- 6 x 2.5” SAS HDD per node
- Up to 128 cores in 2U
- LSI SAS 2018 controller (RAID 0, 1, 10, 5, S, and 6 support)

**Workloads:** HPC cluster compute nodes, datacenter, data farm, front-end server and other computing intensive applications

### A+ Server 2122TG-H6RF

**Key Features:**
- Excellent performance per watt
- Four hot-swappable nodes in 2U
- 6 x 2.5” SAS HDD per node
- Up to 128 cores in 2U
- LSI SAS 2018 controller (RAID 0, 1, 10, 5, S, and 6 support)

**Workloads:** HPC cluster compute nodes, datacenter, data farm, front-end server and other computing intensive applications

### Serverboard: H8SCM-F motherboard / HyperTransport™ technology

**Chipset:** AMD SR5650/SP5100

**Form Factor:** Mini 1U Rackmount 437 x 43 x 369mm (17.2” x 1.7” x 14.5”)

**Memory:** 128 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 4 DIMMs

**Storage:** SATA: 6 TB

**Connectivity/VGA/Audio:** Dual LAN w/ two Intel 82574L Gigabit Ethernet controllers

**Management:** IPMI 2.0, SuperDoctor III, Watchdog

**Other:** ONBOARD BAS/SCSISATA/RAID: AMD SPS100 for 2 SATA

**DRIVE BAYS:** 2 x 3.5” internal drive bays

**PERIPHERAL BAYS:** Optional 1 slim DVD-ROM drive

**POWER SUPPLY:** 350W Gold Level high-efficiency power supply

**COOLING SYSTEM:** 2 x 4cm heavy duty counter-rotating fans with air shroud & optimal fan speed control

---

### Serverboard: H8DGT-HLF/HLIBQF / Hypertransport™ technology

**Chipset:** AMD SR5670/SP5100

**Form Factor:** 2U Rackmount 438 x 88 x 724mm (17.25” x 3.47” x 28.5”)

**Memory:** Quad sets of 256 GB ECC Registered DDR3 1866/1600/1333/1066 SDRAM in 8 DIMMs

**Storage:** LSI SAS 3018 controller

**Connectivity/VGA/Audio:** Quad sets of dual LAN w/ Intel 82576 controller

**Management:** IPMI 2.0, SuperDoctor III, Watchdog

**Other:** Quad sets of 3 x 3.5” hot swap SAS drive bays

---

### Serverboard: H8DGT-HLF/HLIBQF / Hypertransport™ technology

**Chipset:** AMD SR5670/SP5100

**Form Factor:** 2U Rackmount 438 x 88 x 724mm (17.25” x 3.47” x 28.5”)

**Memory:** Quad sets of 256 GB ECC Registered DDR3 1866/1600/1333/1066 SDRAM in 8 DIMMs

**Storage:** LSI SAS 3018 controller

**Connectivity/VGA/Audio:** Quad sets of Mellanox Connect-X2 40Gbps InfiniBand

**Management:** IPMI 2.0, SuperDoctor III, Watchdog

**Other:** Quad sets of 6 x 2.5” hot swap SAS drive bays

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### AMD Opteron™ 6000, 4000 AND 3000 SERIES PLATFORMS

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**SUPERMICRO A+ SERVERS—AMD OPTERON™ 4000 SERIES PLATFORM**

### A+ Server 2022TC-HTRF4

**Key Features:**
- Excellent Performance per watt
- Four hot-swappable nodes in 2U
- 3 3.5" SAS HDD per node
- Up to 64 cores in 2U
- Quad port Ethernet

**Workloads:** HPC cluster compute nodes, datacenter, data farm, front-end server and virtualization

<table>
<thead>
<tr>
<th>Serverboard: HBDCT-HLN4F</th>
<th>Hypertransport™ technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5670/SPS100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>2U Rackmount 438 x 88 x 724mm (17.25&quot; x 3.47&quot; x 28.5&quot;)</td>
</tr>
<tr>
<td>Memory</td>
<td>Quad sets of 192 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 12 DIMMs</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>Quad sets of PCI Express 2.0 x8 (low profile)</td>
</tr>
<tr>
<td>Storage</td>
<td>9 TB per node</td>
</tr>
<tr>
<td>LAN</td>
<td>4 sets of Intel I350-AM4 Quad port Gigabit Ethernet</td>
</tr>
<tr>
<td>VGA</td>
<td>Matrox G200Ew graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0, SuperDoctor III, Watchdog</td>
</tr>
<tr>
<td>Other Features</td>
<td>Quad sets of 3 x 3.5&quot; hot swap SATA drive bays 1620W Platinum level redundant power supply Twin sets of 2x 8cm heavy duty counter rotating fans with air shroud &amp; optimal fan speed control AMD SPS100 (RAID 0, 1)</td>
</tr>
</tbody>
</table>

### A+ Server 2122TC-H6RF4

**Key Features:**
- Excellent Performance per watt
- Four hot-swappable nodes in 2U
- 6 x 2.5" SAS HDD per node
- Up to 64 cores in 2U
- Quad port Ethernet
- LSI SAS 2108 controller (RAID 0, 1, 10, 5, 50, and 6)

**Workloads:** HPC cluster compute nodes, datacenter, data farm, front-end server and virtualization

<table>
<thead>
<tr>
<th>Serverboard: HBDCT-HLN4F</th>
<th>Hypertransport™ technology</th>
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<tbody>
<tr>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td></td>
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<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5670/SPS100</th>
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</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>2U Rackmount 438 x 88 x 724mm (17.25&quot; x 3.47&quot; x 28.5&quot;)</td>
</tr>
<tr>
<td>Memory</td>
<td>Quad sets of 192 GB ECC Registered DDR3 1600/1333/1066 SDRAM in 12 DIMMs</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>Quad sets of PCI Express 2.0 x8 (low profile)</td>
</tr>
<tr>
<td>Storage</td>
<td>9 TB per node</td>
</tr>
<tr>
<td>LAN</td>
<td>4 sets of Intel I350-AM4 Quad port Gigabit Ethernet</td>
</tr>
<tr>
<td>VGA</td>
<td>Matrox G200Ew graphics controller</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0, SuperDoctor III, Watchdog</td>
</tr>
<tr>
<td>Other Features</td>
<td>Quad sets of 6 x 2.5&quot; hot swap SAS drive bays 1620W Platinum level redundant power supply Twin sets of 2x 8cm heavy duty counter rotating fans with air shroud &amp; optimal fan speed control</td>
</tr>
</tbody>
</table>

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57
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Hours:  9am - 6pm Pacific Time (Monday - Friday)
Email:  support@supermicro.com

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G34 Servers:  http://www.supermicro.com/G34/AMD_G34.cfm?pg=SS
G34 Motherboards:  http://www.supermicro.com/G34/AMD_G34.cfm?pg=MOBO

Company Overview:
Supermicro is the market leader in server technology innovation and pioneer in green computing. Our application-optimized high-efficiency server, blade, GPU, storage and workstation systems are deployed globally to support a broad range of critical IT infrastructures.
TYAN Motherboards
TYAN Server/Workstation Solutions

Information is provided for reference only. Please confirm specifications with your vendor before purchase.
## TYAN MOTHERBOARDS—AMD OPTERON™ 6000 SERIES PLATFORM

### S8236-IL Series

**Key Positioning:** High-Performance and GPU Computing  
**Workloads:** High-Performance Computing – GPU Workstation

**Socket:** G34 – 2 sockets  
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors  
See below for SKU options

**Chipset:** AMD SR5690 + SP5100  
**Form Factor:** 12” x 13” EATX  
**Memory:** 4 memory channels per CPU  
8+8 DDR-III DIMM slots  
Up to 128GB R-DIMM or 64GB U-DIMM with total (16) DDR3 DIMM slots

- **Expansion Slots:** 2 PCIe 2.0 x16 for S8236(W)GM3NR-IL  
3 PCIe 2.0 x16 for S8236WGM3NR-HE-IL
- **Storage:** 6 SATA (3 Gb/s) ports w/ RAID 0/1/10/5  
8 LSI 2008 SAS (6Gb/s) w/ RAID 0/1/1E
- **LAN:** 3 GbE Ports (Intel 82576EB + 82574L)
- **VGA:** Integrated AST2050 graphics
- **Management:** Integrated IPMI 2.0 w/ iKVM
- **Other:** 7 USB 2.0 ports (2 + 4 + 1)

**Compatible Chassis:**  
TYAN GT24 (1U, 4x 3.5” HDDs, SPS/ RPSU)  
TYAN GT62A (1U, 10x 2.5” HDDs, SPS/ RPSU)  
TYAN GN70 (2U, 8x 3.5” HDDs, SPS/RPSU)

**SKU Options:**  
SB236GM3NR-IL CHIPSET: SR5690  
Pcie 2.0 – x16/x8/x4: 2/0/0; IMPI 2.0; NO SAS  
SB236WGM3NR-IL CHIPSET: SR5690  
Pcie 2.0 – x16/x8/x4: 2/0/0; IMPI 2.0; SAS  
SB236WGM3NR-HE-IL CHIPSET: SR5690  
+ SR5650; PCIe 2.0 – x16/x8/x4: 3/0/0; IMPI 2.0; SAS

### S8812 Series

**Key Positioning:** 4-Way High-Performance  
**Workloads:** High-Performance Computing – CPU Intensive

**Socket:** G34 – 4 socket  
**CPU:** AMD Opteron™ 6100/6200/6300 Series Processors  
See below for SKU options

**Chipset:** AMD SR5690 + SP5100  
**Form Factor:** 16.2” x 13” MEB  
**Memory:** 4 Channel with 8 DIMMs / CPU

- **Expansion Slots:** 1x PCIe 2.0 x16 or 1 x8 (in x16) + 1 x8 slots  
2x PCIe x8 slots (#1 and #2)
- **Storage:** 6 SATA (3 Gb/s) with RAID 0/1/5/10  
LSI 2008 SAS (6 Gb/s) with RAID 0/1/1E/10
- **LAN:** Quad 1-Gbit LAN (Intel 82576EB + 2x 82574L)
- **VGA:** Integrated AST2050 graphics
- **Management:** IPMI 2.0 w/ iKVM
- **Other:** N/A

**Compatible Chassis:**  
TYAN FT48 (4U 8 3.5” HDD, RPSU)  
FT48-B8812 “Barebone Solution”

**SKU Options:**  
BB12WGM3NR
## TYAN Motherboards—AMD Opteron™ 6000 Series Platform

### S8232 Series

**Key Positioning:** Maximum Memory  
**Workloads:** High-Performance Computing - CPU and Memory Intensive

| Socket: G34 – 2 socket  
| CPU: AMD Opteron™ 6100/6200/6300 Series Processors  
| See below for SKU options |

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD (2) SR5690 + SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>16&quot; x 13&quot; MEB</td>
</tr>
</tbody>
</table>
| Memory | Up to 192 GB DDR3 RDIMM 1333/1066/800 MHz  
| 4 Channel with 12 DDR3 DIMMs / CPU |
| Expansion Slots | 4x PCIe 2.0 x16, 2 xB, 1 PCI slots |
| Storage | 6 SATA (3 Gb/s) with RAID 0/5/10  
| LSI 2008 SAS (6 Gb/s) with RAID 0/1E/10 |
| LAN | Quad 1-Gbit LAN (Dual Intel 82576EB) ports |
| VGA | Integrated AST2050 graphics |
| Management | Integrated IPMI 2.0 w/ iKVM |
| Other | 7 USB 2.0 ports (2 + 4 + 1) |
| Compatible Chassis | 9 USB 2.0 ports (4 + 1 + 4)  
| Optional: Audio, IEEE 1394a, TPM |
| SKU Options | S8232WAG4NRF |

### S8238-HE Series

**Key Positioning:** High-Density Dual-Node Server  
**Workloads:** High-Performance Computing and Cloud Computing

| Socket: G34 – 2 socket  
| CPU: AMD Opteron™ 6100/6200/6300 Series processors  
| See below for SKU options |

<table>
<thead>
<tr>
<th>Chipset</th>
<th>AMD SR5670 / SR5650 + SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>6.3&quot; x 18&quot; half-width design</td>
</tr>
</tbody>
</table>
| Memory | Up to 96 GB DDR3 RDIMM 1333/1066/800 MHz  
| (8 + 4) DIMMs, 4 Channel / CPU |
| Expansion Slots | 1x PCIe 2.0 x16 slot |
| Storage | 4 SATA (3 Gb/s) with RAID 0/1/5/10 |
| LAN | Dual 1-Gbit LAN (Intel 82576EB) ports |
| VGA | Integrated AST2050 graphics |
| Management | Integrated IPMI 2.0 w/ iKVM |
| Other | 1 QDR Infiniband QFSP (ConnectX-2) |
| Compatible Chassis | TYAN YR190 (1U 2-Node, 4 2.5" HDD)  
| TYAN YR290 (2U, 4-Node, 4 2.5" HDD)  
| YR190-B8238 “Barebone Solution” |
| SKU Options | S8238GM2NRI  
| Chipset: AMD SR5650 Mellanox QDR  
| Infiniband: Yes  
| S8238GM2NRI-LE  
| Chipset: AMD SR5670 Mellanox CDR  
| Infiniband: No |
### AMD OPTERON™ 6000 Series

**S8230 Series**

**Key Positioning:** General Purpose and IT Infrastructure

**Workloads:** 12-Core Performance

<table>
<thead>
<tr>
<th>Socket: G34 – 2 socket</th>
<th>CPU: AMD Opteron™ 6100/6200/6300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5690 / SR5670 + SP5100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>12&quot; x 13&quot; EATX</td>
</tr>
<tr>
<td>Memory</td>
<td>Up to 128 GB RDIMM or 64 GB UDIMM</td>
</tr>
<tr>
<td></td>
<td>4 Channel with 8 DDR3 DIMMs / CPU</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>PCIe 2.0 x8 slot (w/ x4 link) + (1) PCIe 2.0 x8 slot + (1) PCIe 2.0 x16 slot (w/ x8 or x8 link) + (1) PCIe 2.0 x8 slot (w/ x0 or x8 link)</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA (3 Gb/s) ports</td>
</tr>
<tr>
<td></td>
<td>8 LSI 2008 SAS (6 Gb/s) (-W only)</td>
</tr>
<tr>
<td>LAN</td>
<td>4x 1-Gbit LAN (Intel B2576EB + 2x B2574L)</td>
</tr>
<tr>
<td>VGA</td>
<td>Integrated AST2050 graphics</td>
</tr>
<tr>
<td>Management</td>
<td>Integrated IPMI 2.0 w/ iKVM</td>
</tr>
<tr>
<td>Other</td>
<td>8 USB 2.0 ports (2 + 2 + 4)</td>
</tr>
<tr>
<td>Compatible Chassis</td>
<td>TYAN GT62 (1U, 8x 2.5&quot; hot-swap HDD and RPSU)</td>
</tr>
<tr>
<td></td>
<td>TYAN GT62-B8230 &quot;Barebone Solution&quot;</td>
</tr>
<tr>
<td>SKU Options</td>
<td>S8230GM4NR</td>
</tr>
<tr>
<td></td>
<td>CHIPSET: SR5690</td>
</tr>
<tr>
<td></td>
<td>PCIe 2.0 – X16/X8/X4: 1/1/1 or 0/2/1</td>
</tr>
<tr>
<td></td>
<td>IPMI 2.0: YES</td>
</tr>
<tr>
<td></td>
<td>SAS: NO</td>
</tr>
<tr>
<td></td>
<td>S8230WGM4NR</td>
</tr>
<tr>
<td></td>
<td>CHIPSET: SR5690</td>
</tr>
<tr>
<td></td>
<td>PCIe 2.0 – X16/X8/X4: 1/1/1 or 0/2/1</td>
</tr>
<tr>
<td></td>
<td>IPMI 2.0: YES</td>
</tr>
<tr>
<td></td>
<td>SAS: YES</td>
</tr>
</tbody>
</table>

**S8236 Series**

**Key Positioning:** High-Performance and GPU Computing

**Workloads:** High-Performance Computing – GPU Workstation

<table>
<thead>
<tr>
<th>Socket: G34 – 2 socket</th>
<th>CPU: AMD Opteron™ 6100/6200/6300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5690 + SP5100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>12&quot; x 13&quot; EATX</td>
</tr>
<tr>
<td>Memory</td>
<td>Up to 128 GB RDIMM or 64 GB UDIMM</td>
</tr>
<tr>
<td></td>
<td>4 Channel with 8 DDR3 DIMMs / CPU</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>PCIe 2.0 x8 in 1U or 2U + (2x PCIe 2.0 x16 (slots #6, #6.5))</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA (3 Gb/s) ports</td>
</tr>
<tr>
<td></td>
<td>8 LSI 2008 SAS (6 Gb/s) (-W only)</td>
</tr>
<tr>
<td>LAN</td>
<td>3x 1-Gbit LAN (Intel B2576EB + B2574L)</td>
</tr>
<tr>
<td>VGA</td>
<td>Integrated AST2050 graphics</td>
</tr>
<tr>
<td>Management</td>
<td>Integrated IPMI 2.0 w/ iKVM</td>
</tr>
<tr>
<td>Other</td>
<td>7 USB 2.0 ports (2 + 4 + 1)</td>
</tr>
<tr>
<td>Compatible Chassis</td>
<td>TYAN GT24 (1U, 4x 3.5&quot; HDD and RPSU)</td>
</tr>
<tr>
<td></td>
<td>TYAN GT62 (1U, 8x 2.5&quot; HDD and RPSU)</td>
</tr>
<tr>
<td></td>
<td>TYAN GNN70 (2U, 8x 2.5&quot; HDD and RPSU)</td>
</tr>
<tr>
<td>SKU Options</td>
<td>S8236GM3NR</td>
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<tr>
<td></td>
<td>CHIPSET: SR5670</td>
</tr>
<tr>
<td></td>
<td>PCIe 2.0 – X16/X8/X4: 2/0/0</td>
</tr>
<tr>
<td></td>
<td>IPMI 2.0: YES</td>
</tr>
<tr>
<td></td>
<td>SAS: NO</td>
</tr>
<tr>
<td></td>
<td>S8236GM3NR-HE*</td>
</tr>
<tr>
<td></td>
<td>CHIPSET: SR5690 + SR5650</td>
</tr>
<tr>
<td></td>
<td>PCIe 2.0 – X16/X8/X4: 2/0/0</td>
</tr>
<tr>
<td></td>
<td>IPMI 2.0: YES</td>
</tr>
<tr>
<td></td>
<td>SAS: YES</td>
</tr>
</tbody>
</table>

**Notes:**

* S8236 Series: HE version not available as a standard product. Build to order only.
### S8228 Series

**Key Positioning:** Power Efficient, High-Density Dual-Node Server  
**Workloads:** IPDC and Cloud Computing

- **Socket:** C32 – 2 socket  
- **CPU:** AMD Opteron™ 4100/4200/4300 Series processors  
- **Chipset:** AMD SR5650 + SP5100  
- **Form Factor:** 6.3” x 16.4” half-width design  
- **Memory:** 64 GB RDIMM in 2 Ch with 3 DIMM / Ch  
- **Expansion Slots:** 1x PCI Express 2.0 x16 slot  
- **Storage:** 4 SATA ports (3 Gb/s) with RAID 0/1/5/10  
- **LAN:** Three Gbit LAN ports (Intel 82576EB + 82574L)  
- **VGA:** Integrated AST2050 Graphics  
- **Management:** iKVM and IPMI 2.0  
- **Other:** 8 USB 2.0 ports (2 + 2 + 4)

* S8228 Series: HE version not available as a standard product. Build to order only.

### S8010 Series

**Key Positioning:** Cost-Effective, Power-Efficient with Leading Price/Performance  
**Workloads:** General Purpose, Storage, and Appliance Server

- **Socket:** C32 – 1 Socket  
- **CPU:** AMD Opteron™ 4100/4200/4300 Series Processors  
- **Chipset:** AMD SR5670 + SP5100  
- **Form Factor:** 12” x 9.6” ATX  
- **Memory:** 64 GB RDIMM in 2 Ch with 3 DIMM / Ch  
- **Expansion Slots:** 1x PCIe 2.0 x8 (in x16) slot (#6)  
- **Storage:** 6 SATA ports (3 Gb/s) with RAID 0/1/5/10  
- **LAN:** Two Gbit LAN ports (Intel 82574L)  
- **VGA:** Integrated ASPEED AST2050 Graphics  
- **Management:** Integrated IPMI 2.0 w/ iKVM  
- **Other:** 5 USB 2.0 ports (2 + 2 + 1)

### S8228

**Key Positioning:** Power Efficient, High-Density Dual-Node Server  
**Workloads:** IPDC and Cloud Computing

- **Socket:** C32 – 2 sockets  
- **CPU:** AMD Opteron™ 4100/4200/4300 Series processors  
- **Chipset:** AMD SR5650 + SP5100  
- **Form Factor:** 6.3” x 16.4” SFF (half-width design)  
- **Memory:** 2 memory channels per CPU (6+6) DDR-III DIMM slots  
- **Expansion Slots:** 1 PCIe 2.0 x16  
- **Storage:** 4 SATA (3 Gb/s) ports w/ RAID 0/1/10/5  
- **LAN:** 3 GbE Ports (Intel 82576EB + 82574L)  
- **VGA:** Integrated AST2050 graphics  
- **Management:** Integrated IPMI 2.0 w/ iKVM  
- **Other:** 5 USB 2.0 ports (2 + 2 + 1)

**SKU Options**  
S8228GM3NR  
S8010GM2NR  
S8010GM2NR  
S8228GM3NR

* AMD OPTERON™ 6000, 4000 AND 3000 SERIES PLATFORMS

**TYAN MOTHERBOARDS—AMD OPTERON™ 4000 SERIES PLATFORM**

**S8228 Series**

- **Key Positioning:** Power Efficient, High-Density Dual-Node Server  
- **Workloads:** IPDC and Cloud Computing

**S8010 Series**

- **Key Positioning:** Cost-Effective, Power-Efficient with Leading Price/Performance  
- **Workloads:** General Purpose, Storage, and Appliance Server

**S8228**

- **Key Positioning:** Power Efficient, High-Density Dual-Node Server  
- **Workloads:** IPDC and Cloud Computing

**Socket:** C32 – 2 socket  
**CPU:** AMD Opteron™ 4100/4200/4300 Series processors  
**Chipset:** AMD SR5650 + SP5100  
**Form Factor:** 6.3” x 16.4” half-width design  
**Memory:** 64 GB RDIMM in 2 Ch with 3 DIMM / Ch  
**Expansion Slots:** 1x PCI Express 2.0 x16 slot  
**Storage:** 4 SATA ports (3 Gb/s) with RAID 0/1/5/10  
**LAN:** Three Gbit LAN ports (Intel 82576EB + 82574L)  
**VGA:** Integrated AST2050 Graphics  
**Management:** iKVM and IPMI 2.0  
**Other:** 8 USB 2.0 ports (2 + 2 + 4)

**SKU Options**  
S8228GM3NR  
S8010GM2NR  
S8010GM2NR

* AMD OPTERON™ 6000, 4000 AND 3000 SERIES PLATFORMS
### S8239-IL

**Key Positioning:** High-Density Dual-Node Server motherboards  
**Workloads:** High-Performance Computing and GPU Computing

| Socket: G34 – 2 sockets  
| CPU: AMD Opteron™ 6100/6200/6300 Series processors |
|-----------------|-----------------------------------------------|
| Chipset         | AMD SR5670 + SPS100                          |
| Form Factor     | 6.3” x 18” half-width design                 |
| Memory          | Up to 128 GB DDR3 U/RDIMM 1333/1066/800 MHz (4 + 4) DIMMs, 4 Channel / CPU |
| Expansion Slots | 1x PCIe 2.0 x16 slot                         |
| Storage         | 4 SATA (3 Gb/s) with RAID 0/1/5/10           |
| LAN             | Dual 1-Gbit LAN (Intel 82576EB) ports        |
| VGA             | Integrated AST2050 graphics                 |
| Management      | Integrated IPMI 2.0 w/ iKVM                  |
| Other           | N/A                                           |
| Optimized Chassis | TYAN YR292 (2U 2-Node, 8 2.5” HDD / per node) |

### YR292-S8239-IL

**Key Positioning:** Dual-nodes server with GPU supporting  
**Workloads:** High-Density Cloud Platforms delivers high performance

| Socket: G34 – 2 Sockets  
| CPU: AMD Opteron™ 6100/6200/6300 Series Processors |
|-----------------|-----------------------------------------------|
| Chipset         | AMD SR5670 + SPS100                          |
| Form Factor     | 1U with dual two-socket nodes                 |
| Memory          | Up to 128 GB DDR3 U/RDIMM 1333/1066/800 MHz (4 + 4) DIMMs, 4 Channel / CPU (per node) |
| Expansion Slots | 1x PCIe 2.0 x16 slot (per node)               |
| Storage         | 4 hot-swap SATAII (per node)                  |
| LAN             | Dual 1-Gbit LAN (Intel 82576EB) ports (per node) |
| VGA             | Integrated AST2050 graphics                 |
| Management      | Integrated IPMI 2.0 w/ iKVM                  |
| Other           | N/A                                           |
| Optimized Chassis | TYAN VR292 (2U 2-Node, 8 2.5” HDD / per node) |
## AMD Opteron™ 6000, 4000 and 3000 Series Platforms

### TYAN Server/Workstation Solutions—AMD Opteron™ 6000 Series Platform

<table>
<thead>
<tr>
<th>Model</th>
<th>Key Features</th>
<th>Workloads</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN70-B8236-IL</td>
<td>2U rackmount server with dual GPU support</td>
<td>High-Performance and GPU Computing</td>
</tr>
<tr>
<td>YR190-B8028-X2</td>
<td>Cost-effective dual-node server</td>
<td>High-density IPDC and Cloud Computing</td>
</tr>
</tbody>
</table>

### barebone

<table>
<thead>
<tr>
<th>Serverboard: B8236GN70WBHR-HE</th>
<th>Socket: G34 - 2 sockets</th>
<th>CPU: AMD Opteron™ 6100/6200/6300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5690 + SP5100</td>
<td>Form Factor</td>
</tr>
<tr>
<td>Form Factor</td>
<td>1U with dual single-socket nodes</td>
<td>1U (28.74&quot; depth)</td>
</tr>
<tr>
<td>Memory</td>
<td>96GB RDIMM DDR3 per blade</td>
<td>Memory</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1 HH/HL PCIe 2.0 x16 slot (per node)</td>
<td>Memory</td>
</tr>
<tr>
<td>Storage</td>
<td>4 hot-swap SATAII per node</td>
<td>Expansion Slots</td>
</tr>
<tr>
<td>LAN</td>
<td>3 GbE (Intel 82576EB + 82574L) per node</td>
<td>8 hot-swap 6Gbps SAS (or SATAII)</td>
</tr>
<tr>
<td>VGA</td>
<td>ASPEED AST2050 integrated graphics</td>
<td>VGA</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0 with iKVM</td>
<td>Management</td>
</tr>
<tr>
<td>Other</td>
<td>N/A</td>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serverboard: B8028Y190X2-04SV4H</th>
<th>Socket: G34 - 1 socket/blade, 2 blades</th>
<th>CPU: AMD Opteron™ 6100/6200/6300 Series Processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>AMD SR5650 + SP5100</td>
<td>Form Factor</td>
</tr>
<tr>
<td>Form Factor</td>
<td>1U (28.74&quot; depth)</td>
<td>Form Factor</td>
</tr>
<tr>
<td>Memory</td>
<td>256GB Reg. DDR3 1333/1066/800</td>
<td>Memory</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>3 FH/FL PCIe 2.0 x16 slots</td>
<td>Expansion Slots</td>
</tr>
<tr>
<td>Storage</td>
<td>8 hot-swap 6Gbps SAS (or SATAII)</td>
<td>Storage</td>
</tr>
<tr>
<td>LAN</td>
<td>3 GbE (Intel 82576EB + 82574L)</td>
<td>LAN</td>
</tr>
<tr>
<td>VGA</td>
<td>ASPEED AST2050 integrated graphics</td>
<td>VGA</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0 with iKVM</td>
<td>Management</td>
</tr>
<tr>
<td>Other</td>
<td>N/A</td>
<td>Other</td>
</tr>
</tbody>
</table>
### AMD Opteron™ 6000, 4000 and 3000 Series Platforms

#### TYAN Server/Workstation Solutions — AMD Opteron™ 6000 Series Platform

<table>
<thead>
<tr>
<th>Model</th>
<th>Barebone Details</th>
<th>Key Features</th>
<th>Workloads</th>
</tr>
</thead>
</table>
| FT48-B8812 | Barebone Serverboard: B8812F48WSBHR  
Socket: G34 - 4 sockets  
CPU: AMD Opteron™ 6100/6200/6300 Series Processors | 4-Way High-Performance                         | High-Performance Computing, CPU Intensive |
| GT24-B8236-IL | Barebone Serverboard: BB236G24W4H (or BB236G24V4H without SAS)  
Socket: G34 - 4 sockets  
CPU: AMD Opteron™ 6100/6200/6300 Series Processors | 1U Rack Server with 48 HT3 Links               | High-Performance Computing and Virtualization |
| YR190-B8238-X2 | Barebone Serverboard: BB238Y190X2-04SV4HI  
Socket: G34 - 2 sockets per node, dual-node  
CPU: AMD Opteron™ 6100/6200/6300 Series Processors | Dual-node server with Infiniband              | High-Performance Computing and Virtualization |

<table>
<thead>
<tr>
<th>Feature</th>
<th>FT48-B8812</th>
<th>GT24-B8236-IL</th>
<th>YR190-B8238-X2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barebone Serverboard</td>
<td>B8812F48WSBHR</td>
<td>BB236G24W4H</td>
<td>BB238Y190X2-04SV4HI</td>
</tr>
<tr>
<td>Socket</td>
<td>G34 - 4 sockets</td>
<td>G34 - 4 sockets</td>
<td>G34 - 2 sockets per node, dual-node</td>
</tr>
<tr>
<td>CPU</td>
<td>AMD Opteron™ 6100/6200/6300 Series Processors</td>
<td>AMD Opteron™ 6100/6200/6300 Series Processors</td>
<td>AMD Opteron™ 6100/6200/6300 Series Processors</td>
</tr>
<tr>
<td>Chipset</td>
<td>Two AMD SR5690 + SP5100</td>
<td>AMD SR5690 + SP5100</td>
<td>AMD SR5670 + SP5100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>4U rackmount/tower (27.5” depth)</td>
<td>1U (25.4” depth)</td>
<td>1U with dual two-socket nodes</td>
</tr>
<tr>
<td>Memory</td>
<td>256GB Reg, DDR3 1333/1066/800</td>
<td>128GB Reg, DDR3 1333/1066/800</td>
<td>96GB RDIMM DDR3 per blade</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>1 x16 and 3 x8 FH/FL PCIe 2.0</td>
<td>2 FH/FL PCIe 2.0 x16 slots</td>
<td>1 HHHL PCIe 2.0 x16 slot (per node)</td>
</tr>
<tr>
<td>Storage</td>
<td>8 hot-swap 6Gbps SAS</td>
<td>4 hot-swap 6Gbps SAS (or SATAII)</td>
<td>4 hot-swap SATAII per node</td>
</tr>
<tr>
<td>LAN</td>
<td>3 GbE (Intel 82576EB + 82574L)</td>
<td>3 GbE (Intel 82576EB + 82574L)</td>
<td>2 GbE (Intel 82574L) per node</td>
</tr>
<tr>
<td>VGA</td>
<td>ASPEED AST2050 Integrated graphics</td>
<td>ASPEED AST2050 Integrated graphics</td>
<td>ASPEED AST2050 Integrated graphics</td>
</tr>
<tr>
<td>Management</td>
<td>IPMI 2.0 with iKVM</td>
<td>IPMI 2.0 with iKVM</td>
<td>IPMI 2.0 with iKVM</td>
</tr>
<tr>
<td>Other</td>
<td>Integrated LSI 2008 SAS Controller</td>
<td>Integrated LSI 2008 SAS Controller</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Form Factor:**
- 4U rackmount/tower (27.5” depth)
- 1U (25.4” depth)
- 1U with dual two-socket nodes

**Memory:**
- 256GB Reg, DDR3 1333/1066/800
- 128GB Reg, DDR3 1333/1066/800
- 96GB RDIMM DDR3 per blade

**Expansion Slots:**
- 1 x16 and 3 x8 FH/FL PCIe 2.0
- 2 FH/FL PCIe 2.0 x16 slots
- 1 HHHL PCIe 2.0 x16 slot (per node)

**Storage:**
- 8 hot-swap 6Gbps SAS
- 4 hot-swap 6Gbps SAS (or SATAII)
- 4 hot-swap SATAII per node

**LAN:**
- 3 GbE (Intel 82576EB + 82574L)
- 3 GbE (Intel 82576EB + 82574L)
- 2 GbE (Intel 82574L) per node

**VGA:**
- ASPEED AST2050 Integrated graphics
- ASPEED AST2050 Integrated graphics
- ASPEED AST2050 Integrated graphics

**Management:**
- IPMI 2.0 with iKVM
- IPMI 2.0 with iKVM
- IPMI 2.0 with iKVM

**Other:**
- Integrated LSI 2008 SAS Controller
- Integrated LSI 2008 SAS Controller
- N/A

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**AMD Opteron™ 6000, 4000 and 3000 Series Platforms**

**TYAN Processor**

**WWW.AMD.COM/PLAYBOOK**

65
# AMD Opteron™ 4000 Series Platform

## TYAN Motherboards—AMD Opteron™ 4000 Series Platform

### S8225 Series

**Key Positioning:** GPGPU and Workstation Solution

**Workloads:** Graphics Workstation and Personal Supercomputing

### S8226 Series

**Key Positioning:** Power-Efficient 1U Optimized Form Factor

**Workloads:** High-Performance and GPU Computing

<table>
<thead>
<tr>
<th>S8225 Series</th>
<th>S8226 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket: C32 – 2 socket</td>
<td>Socket: C32 - 2 sockets</td>
</tr>
<tr>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
</tr>
<tr>
<td>Chipset</td>
<td>AMD (2) SR5690 + SP5100</td>
</tr>
<tr>
<td>Form Factor</td>
<td>12&quot; x 13&quot; EATX</td>
</tr>
<tr>
<td>Memory</td>
<td>Dual memory channels per CPU 4+4 DDR-III DIMM slots Up to 128 GB R-DIMM with total (8) DDR3 DIMM slots</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>4x PCIe 2.0 x16 slots 1x PCIe 2.0 x8, 1x x4 slot, and 1 PCI-32</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA ports (3 Gb/s) with RAID 0/1/5/10 8 SAS ports (6 Gb/s) via LSI 2008 Controller (-W only)</td>
</tr>
<tr>
<td>LAN</td>
<td>Quad Gbit LAN ports (Intel 82576EB + 2x 82574L)</td>
</tr>
<tr>
<td>VGA</td>
<td>Integrated AST2050 Graphics</td>
</tr>
<tr>
<td>Management</td>
<td>iKVM and IPMI 2.0</td>
</tr>
<tr>
<td>Other</td>
<td>Optional Features Integrated audio and IEEE 1394a support TPM 1.2 support</td>
</tr>
<tr>
<td>Compatible Chassis</td>
<td>TYAN FT48 (4U with hot-swap HDD and RPSU) FT48-BB225 &quot;Barebone Solution&quot;</td>
</tr>
<tr>
<td>SKU Options</td>
<td>S8225AGM4NRF S8225WAGM4NRF</td>
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</table>

<table>
<thead>
<tr>
<th>S8226 Series</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket: C32 - 2 sockets</td>
<td></td>
</tr>
<tr>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td></td>
</tr>
<tr>
<td>Chipset</td>
<td>AMD SR5690 + SR5650 + SP5100 (2U)+ AMD SR5690 + SP5100 (1U)</td>
</tr>
<tr>
<td>Form Factor</td>
<td>12&quot; x 13&quot; EATX</td>
</tr>
<tr>
<td>Memory</td>
<td>Dual memory channels per CPU 6+6 DDR-III DIMM slots Up to 128 GB R-DIMM with total (12) DDR3 DIMM slots</td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>22x PCIe 2.0 x16 slots (Slot #8, #8.5) 3x PCIe 2.0 x16 slots with SR5650 (-HE version only)</td>
</tr>
<tr>
<td>Storage</td>
<td>6 SATA ports (3 Gb/s) with RAID 0/1/5/10 8 SAS ports (6 Gb/s) via LSI 2008 Controller (-W only)</td>
</tr>
<tr>
<td>LAN</td>
<td>Three Gbit LAN ports (Intel 82576EB + 82574L)</td>
</tr>
<tr>
<td>VGA</td>
<td>Integrated AST2050 Graphics</td>
</tr>
<tr>
<td>Management</td>
<td>iKVM and IPMI 2.0</td>
</tr>
<tr>
<td>Other</td>
<td>N/A</td>
</tr>
<tr>
<td>Compatible Chassis</td>
<td>TYAN GT24 (1U, 4x 3.5&quot; hot-swap HDD and RPSU) GT24-BB226 &quot;Barebone Solution&quot;</td>
</tr>
<tr>
<td>SKU Options</td>
<td>S8226GM5NR S8226WGM5NR S8226WGM5NR-HE*</td>
</tr>
</tbody>
</table>

* S8226 Series: HE version not available as a standard product. Build to order only.
### TYAN SERVER/WORKSTATION SOLUTIONS—AMD OPTERON™ 4000 SERIES PLATFORM

#### YR190-B8228-X2
- **Key Features:** 2U rackmount server with dual GPU support
- **Workloads:** Cloud Computing, IPDC, and Virtualization

<table>
<thead>
<tr>
<th>Barebone</th>
<th>Chipset</th>
<th>AMD SR5650 + SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serverboard</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Socket</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Form Factor</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Expansion Slots</td>
<td>AMD SR5690 + SP5100</td>
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</tr>
<tr>
<td>Storage</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>LAN</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>VGA</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
</tbody>
</table>

#### GT24-B8226
- **Key Features:** 1U power-efficient rackmount server
- **Workloads:** General purpose, datacenter, virtualization

<table>
<thead>
<tr>
<th>Barebone</th>
<th>Chipset</th>
<th>AMD SR5690 + SP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serverboard</td>
<td>AMD SR5690 + SP5100</td>
<td></td>
</tr>
<tr>
<td>Socket</td>
<td>AMD SR5690 + SP5100</td>
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</tr>
<tr>
<td>Form Factor</td>
<td>AMD SR5690 + SP5100</td>
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</tr>
<tr>
<td>Memory</td>
<td>AMD SR5690 + SP5100</td>
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<tr>
<td>Expansion Slots</td>
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<tr>
<td>Storage</td>
<td>AMD SR5690 + SP5100</td>
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<tr>
<td>LAN</td>
<td>AMD SR5690 + SP5100</td>
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<tr>
<td>VGA</td>
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<td>Management</td>
<td>AMD SR5690 + SP5100</td>
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<td>Other</td>
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<td>CPU: AMD Opteron™ 4100/4200/4300 Series Processors</td>
<td>AMD SR5690 + SP5100</td>
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- **Serverboard:** B8228Y190X2-045V4H
- **Socket:** C32 - 2 sockets per node, dual node
- **CPU:** AMD Opteron™ 4100/4200/4300 Series Processors

- **Chipset:** AMD SR5650 + SP5100
- **Form Factor:** 1U with dual single-socket nodes
- **Memory:** 96GB RDIMM DDR3 per blade
- **Expansion Slots:** 1 HH/HL PCIe 2.0 x16 slot (per node)
- **Storage:** 4 hot-swap SATAII per node
- **LAN:** 2 GbE (Intel 82574L) per node
- **VGA:** ASPEED AST2050 integrated graphics
- **Management:** IPMI 2.0 with iKVM
- **Other:** N/A

- **Serverboard:** B8226G24W4H (or B8226G24V4H without SAS)
- **Socket:** C32 - 2 sockets
- **CPU:** AMD Opteron™ 4100/4200/4300 Series Processors

- **Chipset:** AMD SR5690 + SP5100
- **Form Factor:** 1U (25.4" depth)
- **Memory:** 96GB Reg. DDR3 1333/1066/800
- **Expansion Slots:** 2 FH/FL PCIe 2.0 x16 slots
- **Storage:** 4 hot-swap 6Gbps SAS (or SATAII)
- **LAN:** 3 GbE (Intel 82576EB + 82574L)
- **VGA:** ASPEED AST2050 integrated graphics
- **Management:** IPMI 2.0 with iKVM
- **Other:** N/A
FOR MORE INFORMATION, VISIT:

www.tyan.com
Or contact Michael Kalodrich, Sales Manager at michaelk@tyan.com or (510) 651-8868.

Company Overview:
Created in 1989, TYAN designs, manufactures and markets advanced x86 server/workstation platforms.
TYAN’s products are sold to OEMs, VARs, System Integrators, and Resellers around the world for a wide range of applications. As a leading server brand asset owned by MiTAC International Corporation, TYAN is to be deeply enhanced and further developed through the synergy and innovation of the new MiTAC. Products from TYAN feature design enhancements specifically developed for enterprise computer room and data center environments. These highly stable, space-efficient products are very attractive to OEMs and System Integrators designing next generation rackmount server solutions for a wide array of applications.
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<td>(949) 716-8831</td>
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### Country: Canada

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<td>(647) 703-8990</td>
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