

# GRAPHSTREAM

## P2X12B-R1B GPU Computing Server



P2X12B-R1B is a 1RU-rackmount server unit that can support GPU-computing applications more efficiently than currently available alternatives.

With available Intel Xeon 5500 series CPUs and NVIDIA Tesla GPU modules, P2X12B-R1B supports up to 1.9 TFLOP/sec aggregate peak single-precision (SP) floating-point throughput, for maximum clustering density of over 76.5 TFLOP/sec peak-SP per rackmount enclosure, and over 612 TFLOP/sec peak-SP per eight-rack row.

- 16way-SMP, via two Intel Xeon 5500 series quad-core CPUs supporting two threads per core
- Up to 96 GBytes main memory, using standard Commercial Off-The-Shelf (COTS) DIMM units
- Two NVIDIA Tesla GPUs, each with up to 4 GBytes local memory
- I/O capacity superior to competing offerings:
  - 16+16 GByte/sec aggregate peak full-duplex PCIe throughput between CPUs and GPUs
  - 2+2 GByte/sec aggregate peak network throughput via optional InfiniBand-QDR or 10 Gigabit Ethernet interfaces
- Easy-swap 1400W power supply module, 93% efficiency
- Advanced standards-based remote monitoring and management: IPMI v2.0, providing remote power/reset control, serial console over LAN, and KVM-over-IP
- Full compatibility with Linux and Windows operating systems and applications assured via use of pure mainstream open-standard architecture, standard interfaces, and mainstream COTS components
- Final assembly and test done alongside "Tier-1" name-brand server products in ISO-certified manufacturing facilities, using premium-quality, cost-efficient COTS components made by leading high-volume server component manufacturers, including Supermicro ([www.supermicro.com](http://www.supermicro.com))
- Supported by GraphStream as a single fully integrated system

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## System

Weight	
Minimum config, 2pc HDD	38.0 lb / 17.3 kg
Temperature	
Operating	+50 to +95 degF / +10 to +35 degC
Non-operating	-40 to +158 degF / -40 to +70 degC
Humidity (non-condensing)	
Operating	8% to 90%
Non-operating	5% to 95%
Server platform make/model	
Supermicro SYS-6016GT-TF	
<a href="http://www.supermicro.com/gpu/">www.supermicro.com/gpu/</a>	

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## Chassis

Configuration	
1RU rackmount, compliant with EIA RS-310D standard	
Dimensions	
Height	1.7" / 43mm / 1RU
Width	17.2" / 437mm
Depth	28.2" / 716mm
Mounting	
Integrated roller-bearing full-extension sliding rail mounting system	
Snap-in quick-release outer rails for simplified cabinet installation	
Make/model	
Supermicro CSE-818G-1400B	
<a href="http://www.supermicro.com/products/chassis/1U/818/SC818G-1400.cfm">www.supermicro.com/products/chassis/1U/818/SC818G-1400.cfm</a>	

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## Power supply

Configuration	
Easy-swap module	
93% efficiency, 80 Plus Gold level certified	
AC input	
For 1200W max DC output: 100-140VAC, 50-60Hz, 10.5-14.7A	
For 1400W max DC output: 180-240VAC, 50-60Hz, 7.2-9.5A	
Max DC output current per rail	
+5Vsb	6.0A
+12V	100.0A single-rail @ 100-140VAC 117.0A single-rail @ 180-240VAC
Agency certifications for safety/EMC	
USA: UL listed, FCC	
Canada: CUL listed	
Europe: CE Mark	
Germany: TUV Certified	
EN 60950 / IEC 60950-Compliant	
Make/model	
Supermicro PWS-1K41F-1R / PDB-PT818-S2068	

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## Cooling

8pc easy-swap 40mm x 56mm mid-chassis cooling fan module	
4-wire PWM; max 12000 RPM; up to 23 CFM per module	
Supermicro FAN-0102L4	
Supermicro FAN-0087L4	
2pc passive copper CPU cooler	
Supermicro SNK-P0037P	
<a href="http://www.supermicro.com/support/resources/Thermal/index.cfm">www.supermicro.com/support/resources/Thermal/index.cfm</a>	

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## Mainboard

Make/model	
Supermicro MBD-X8DTG-DF	
<a href="http://www.supermicro.com/products/motherboard/QPI/5500/X8DTG-DF.cfm">www.supermicro.com/products/motherboard/QPI/5500/X8DTG-DF.cfm</a>	

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## CPU options

Capacity	
2pc LGA1366 socket for Intel Xeon 5500 series CPU	
Example CPU configuration	
2pc Intel Xeon X5570 2.93GHz quad-core CPU	
<a href="http://ark.intel.com/cpu.aspx?groupId=37111">ark.intel.com/cpu.aspx?groupId=37111</a>	

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## Memory options

Capacity	
12pc 240-pin DDR3 registered ECC DIMM	
Up to 96GB using 8GB modules	

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## I/O

Mainboard I/O controllers	
1pc Intel 5520 IOH-36D I/O Hub	
1pc Intel ICH10R I/O Hub	
1pc Intel 82576 2port Gigabit Ethernet	
1pc Matrox G200eW graphics	
1pc Winbond WPCM450 BMC	

Internal ports	
3pc configurable expansion-card bay (Left, Right, Center)	
Left bay options (select one of two available riser-card models)	
1pc PCI Express x16-Gen2 slot, for 1pc 2slot-wide GPU card	
2pc PCI Express x8-Gen2 slot (x16 conn), for 2pc full-height card	
Right bay options	
Same as Left bay options	
Center bay	
1pc PCI Express x4-Gen2 slot (x16 conn), for 1pc low-profile card	
6pc SATA port, supporting 3Gb/s, NCQ, RAID	
External ports (front panel)	
2pc USB 2.0/1.1 (optional)	
External ports (rear panel)	
2pc RJ45 Gigabit Ethernet	
1pc RJ45 dedicated Ethernet for BMC	
2pc USB 2.0/1.1	
1pc DB9M serial fast UART 16550	
1pc HD15 VGA	

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## Network options

Example optional network expansion cards (max 5pc)	
PCI Express x8-Gen2 to dual-port 10+10 Gbps Ethernet 10GBASE-T Mellanox MNTH29B-XTC	
<a href="http://www.mellanox.com/related-docs/prod_adapter_cards/PB_ConnectXEnt_Card.pdf">www.mellanox.com/related-docs/prod_adapter_cards/PB_ConnectXEnt_Card.pdf</a>	
PCI Express x8-Gen2 to single-port 32+32 Gbps InfiniBand-QDR Mellanox MHQH19-XTC	
<a href="http://www.mellanox.com/related-docs/prod_adapter_cards/PB_ConnectX_VPI.pdf">www.mellanox.com/related-docs/prod_adapter_cards/PB_ConnectX_VPI.pdf</a>	

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## GPU options

Capacity	
Up to 2 internal high-end GPU cards (NVIDIA Tesla, Quadro, GeForce)	
Up to 4 GPU cards in external chassis (NVIDIA Tesla, Quadro Plex)	
Example max configurations	
Internal 2GPU (compute): 2pc NVIDIA Tesla C1060	
<a href="http://www.nvidia.com/object/product_tesla_c1060_us.html">www.nvidia.com/object/product_tesla_c1060_us.html</a>	
External 4GPU (compute): 1pc NVIDIA Tesla S1070	
<a href="http://www.nvidia.com/object/product_tesla_s1070_us.html">www.nvidia.com/object/product_tesla_s1070_us.html</a>	
Internal 2GPU/4DVI (graphics) 2pc NVIDIA Quadro FX 5800	
<a href="http://www.nvidia.com/object/product_quadro_fx_5800_us.html">www.nvidia.com/object/product_quadro_fx_5800_us.html</a>	
External 4GPU/8DVI (graphics): 2pc NVIDIA Quadro Plex 2200-D2	
<a href="http://www.nvidia.com/page/quadroplex.html">www.nvidia.com/page/quadroplex.html</a>	
Internal 4GPU/4DVI (graphics+compute): 2pc NVIDIA GeForce GTX 295	
<a href="http://www.nvidia.com/object/product_geforce_gtx_295_us.html">www.nvidia.com/object/product_geforce_gtx_295_us.html</a>	

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## Storage options

3pc hot-swappable SAS/SATA 3.5"/2.5" HDD/SSD carrier	
1pc slim DVD/CD drive (optional)	
Example optional HDD/SSD controller w/ Battery Backup, RAID acceleration LSI SAS8888ELP / IBBU05 (max 5 pc)	
<a href="http://www.lsi.com/storage_home/products_home/internal_raid/megaraid_sas/megaraid_sas_8888elp/index.html">www.lsi.com/storage_home/products_home/internal_raid/megaraid_sas/megaraid_sas_8888elp/index.html</a>	
Example max storage configuration	
3pc Western Digital WD2002FYPS 2000GB 7200 RPM SATA	
<a href="http://www.wdc.com/en/products/products.asp?driveid=610">www.wdc.com/en/products/products.asp?driveid=610</a>	

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## Platform monitoring and management

Mainboard-integrated IPMIv2.0 Baseboard Management Controller (BMC)	
Advanced Lights-Out Management feature set	
OS-independent implementation; supports Windows, Linux/GNU, other	
Dedicated management Ethernet interface for maximum reliability	
Reliable remote power on/off and hard-reset control	
Serial console over LAN (SOL)	
KVM over IP (mainboard graphics controller only)	
Remote monitoring of system health parameters	
Flexible event triggers; notification via email and/or SNMP	
Embedded Web server; full access without special client software	
Command Line Interface (CLI) can run on any remote Linux client	
Monitored parameters	
CPU and chassis temperatures	
System voltages	
Cooling fan speeds	
Power supply module failure	
Chassis intrusion (optional)	

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## Operating system compatibility

Standards-based platform	
P2X12B-R1B is a mainstream platform that is broadly compatible with operating system software that supports the industry-standard X86_64 64-bit/32-bit architecture.	
<a href="http://www.supermicro.com/support/resources/OS/5500.cfm">www.supermicro.com/support/resources/OS/5500.cfm</a>	
Example configurations	
Microsoft Windows x64 XP, Server 2003, Server 2008	
Red Hat Enterprise Linux x64 v4, v5	
OpenSolaris 2009.06	