NEWS RELEASE

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Leading Server I/O Silicon and Add-In Card Manufacturers Plan Rapid Adoption of PCI-X 2.0

Server Platforms Drive Need for Increased Bandwidth Now

PORTLAND, Ore, May 6, 2002 –Fourteen leading server I/O silicon and add-in card manufacturers today announced support for PCI-X 2.0, a high-performance extension to the PCI-X specification that offers next-generation performance and backward compatibility to current PCI-based systems. Today's announcement follows the recent release of the draft PCI-X 2.0 specification to the PCI-SIG membership for review. Although the final spec is due to be released to the public in approximately 60-days, companies are already lining up to produce products based on the new spec.

According to Roger Tipley, president and chairman of the PCI-SIG, "Server platforms have an intense need to increase I/O bandwidth as soon as it is physically possible to do so. Since PCI-X 2.0 is an evolutionary upgrade to the current PCI-X 1.0 standard, designers will be able to move from PCI-X 66 (66 MHz) and PCI-X 133 – encompassed in the PCI-X 1.0 standard – to PCI-X 266 and PCI-X 533 with minimal effort to redesign. Moreover, PCI-X 2.0 is fully backward compatible with PCI-X 1.0, so most new designs will start with PCI-X 2.0 as soon as the spec is

finalized. However, the silicon and add-in card vendors are key to implementing this new standard in servers. Under current market conditions, it's no wonder we're seeing so many companies touting their support."

Broad IHV Support

PCI-X 2.0 has quickly gained broad industry support within the Independent Hardware Vendors (IHV) community. PCI-X 2.0 functionality is already being added to core logic controllers, network interface cards (NICs) and other add-in cards from leading vendors.

?? **Ram Jayam, vice president and general manager of Storage Networking Group, Adaptec:** "Adaptec is deeply committed to making technology transitions simple for our customers. The backward-compatibility features built into PCI-X 2.0 will let our customers mix and match our next-generation 10 Gigabit iSCSI devices with our current one Gigabit offerings. It doesn't get any simpler than that."

?? **Kevin Burbank, Fibre Channel marketing manager for Storage Networking Business Unit, Agilent:** We are committed to meeting our customer's need for higher I/O bandwidth and backward compatibility. Solutions such as PCI-X 2.0 and other future enhancements will improve the performance of storage area networks."

?? **Eric Johnson, vice president of marketing and business development, Banderacom:** "As the first company to bridge 10 Gb InfiniBand to PCI-X, Banderacom recognizes the opportunity and benefits which can be obtained by extending its high performance silicon to take advantage of PCI-X 2.0's dramatically enhanced throughput capabilities."

?? **Martin Colombatto, vice president/general manager of Networking Business Unit, Broadcom:** "The PCI-X 2.0 specification is arriving at just the right time for servers to scale to 10 Gigabit Ethernet speeds. The PCI-X 2.0 bus operates at speeds up to 533 MegaTransfers per second providing burst transfer rates above 4.3 Gigabytes per second, which enables 10 Gigabit Ethernet to run at wire speed. These two technologies have a bright future together."

?? **Mike Smith, executive vice president of Worldwide Marketing, Emulex Corporation:** "Emulex continues to work closely with the industry's leading server and storage manufacturers to drive the performance and scalability of enterprise storage solutions. We maintain our commitment to providing leadership SAN connectivity products that are compliant with the leading industry standard bus interfaces, like PCI-X 2.0."

?? **Richard Busch, director of Storage Networking, IBM Microelectronics:** "The movement to high-speed I/O solutions demands more bandwidth from the interfaces used to connect I/O subsystems to the processor complex. With the adoption of PCI-X 2.0 the I/O bus should not limit system performance for many years to come."

?? **KK Rao, chief technology officer of Mylex Storage Systems Unit, IBM:** "Storage bandwidth growth trends will overwhelm the capabilities of PCI and PCI-X. PCI-X 2.0 provides a simple, direct path to increase bandwidth up to four times over the current PCI-X spec while maintaining compatibility with existing host-based RAID storage solutions."

?? **Shaun Walsh, vice president of marketing, JNI Corporation:** "JNI plans to adopt PCI-X 2.0 for its next generation Fibre Channel host bus adapters, its InfiniBand HCA Modules and other products where appropriate. PCI-X 2.0 provides a straightforward transition that enables the server to take full advantage of I/O transition to 10 Gb. We commend the PCI-SIG working group for creating a PCI-X 2.0 specification that offers backward compatibility while quadrupling the system bus bandwidth."

?? **David Steele, Director of Product Planning and Management, LSI Logic Storage Standard Products Division:** "Today, high performance applications require ever increasing I/O bandwidth. PCI-X 2.0 gives us the headroom we need on the host interface to remove I/O bottlenecks between the edge devices while maintaining a compatible driver interface."

?? **Kevin Deierling, vice president of product marketing, Mellanox Technologies:** "PCI-X 2.0 offers a quick time-to-market and straight forward approach in improving local I/O bandwidth, while maintaining backwards compatibility. InfiniBand technology makes usable 10Gb/sec available today and will certainly benefit from the improved local interconnect bandwidth offered by PCI-X 2.0."

?? **Hiro Hashimoto, senior vice president and executive general manager of the System LSI Operations Unit, NEC Electronic Devices, NEC Corp.:** "NEC has already added a PCI-X 2.0 cell its 0.13-micron CB-12 ASIC library. The new cell required only minor modifications to our existing PCI-X 1.0 cell, so customers using the new macro will benefit from a proven, robust design and the extensive manufacturing capability of a world leader in this advanced technology."

?? **Amit Vashi, director of product marketing, Network Storage Group, Qlogic:** "As the first company to implement the PCI-X 1.0 specification, we appreciate the straightforward but elegant manner in which the PCI SIG added DDR and QDR modes to the original definition. This approach really simplifies the work needed to take advantage of the new 2.0 standard."

?? **Sujith Arramreddy, chief technology officer, ServerWorks:** "The PCI-X 2.0 bus operates at speeds up to 533 MegaTransfers per second, providing burst transfer rates above 4.3 Gigabytes per second, eight times the rate of the most common PCI-X implementations today. PCI-X 2.0 builds on the enhanced protocol of PCI-X to increase the efficiency of data transfer and to simplify electrical timing requirements, an important factor at higher clock frequencies."

?? **Rick O'Connor, chief technology officer, Tundra Semiconductor:** "PCI-X 2.0 allows designers to continue their investment in PCI-X, knowing they have a migration path to next generation I/O technologies. This is in alignment with the Tundra strategy to develop system interconnect silicon that allows customers to evolve their existing architectures to increase bandwidth, while preserving existing infrastructure investment."

About PCI-X 2.0

PCI-X 2.0 is a high-performance extension to the PCI Local Bus specification that facilitates connections to add-in cards for 10 Gigabit Ethernet, 10 Gigabit Fibre Channel, Serial Attached SCSI, Serial ATA (SATA), 4X and 12x InfiniBand, RAID and cluster interconnects for servers and workstations. PCI-X 2.0 defines two new versions of PCI-X add-in cards: PCI-X 266 and PCI-X 533. The first, PCI-X 266 runs at speeds up to 266 MegaTransfers per second using Double Data Rate (DDR) techniques, enabling sustainable PCI bandwidth of more than 2.1 Gigabytes/second. PCI-X 533 runs at speeds up to 533 MegaTransfers per second using Quadruple Data Rate (QDR) techniques enabling bandwidth of more than 4.3 Gigabytes/second. The specification also provides increased reliability through Error Checking and Correction (ECC). PCI-X 2.0 will provide customers with needed I/O bandwidth along with investment protection because of its backward compatibility with existing systems.

Join the PCI-SIG

Membership in the PCI-SIG enables early access to the new PCI Express and PCI-X 2.0 specifications, as well as opportunities to provide feedback on the specification before its final approval. For more information, visit the PCI-SIG Web site at www.pcisig.com. Another source for detailed information and practical implementations of PCI Express and PCI-X 2.0 is the upcoming 2002 PCI-SIG Developers Conference, the premier technology-training event for systems architects, designers, engineers and engineering managers. The conference will be held June 3-4 at the San Jose Convention Center. Register online at http://www.pcisig.com/events/devcon.

About the PCI-SIG

The PCI-SIG is the industry organization that owns and manages PCI specifications as open industry standards. The organization defines and implements new industry standard I/O (Input/Output) specifications as the industry's local I/O needs evolve. The PCI Special Interest

Group was formed in 1992, and the organization became a nonprofit corporation, officially named "PCI-SIG" in the year 2000. Currently, more than 740 industry-leading companies are active PCI-SIG members. The PCI-SIG's current directors are employed by the following PCI-SIG member companies: AMD, Compaq, HP, IBM, Intel, Microsoft, Phoenix Technologies, ServerWorks and TI. For more information about the PCI-SIG, PCI-SIG membership benefits or the June 3-4 PCI-SIG Developer's Conference, contact the PCI-SIG by phone, at (800) 433-5177 (within the United States), or by fax at (503) 297-1090, or visit the PCI-SIG web site at: http://www.pcisig.com

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