USB 2.0

- USB 2.0 Adopter's Agreement - USB 2.0 Adopters Agreement allows a signing company to participate in a reciprocal, royalty-free licensing arrangement for compliant products. Please review the agreement terms for specific details.
- USB 2.0 Backgrounder - USB Specification Expanding, Boosting Performance Up to 40 Times Beyond Current Capability.
- USB 2.0 Press Release - Target speed for USB 2.0 announced by industry leaders.
- FAQ - These questions are compiled from a list of most common questions asked on USB 2.0 topic.
- An Introduction to USB 2.0 - (151kb .pdf file, includes graphs)
- An Introduction to USB 2.0 - (21kb .pdf file, text only version)

USB Specification Expanding, Boosting Performance Up to 40 Times Beyond Current Capability

Compaq, Hewlett-Packard, Intel, Lucent, Microsoft, NEC and Philips Are Leading Development

The PC industry leaders who brought Universal Serial Bus (USB) technology from concept to its current mainstream market acceptance are developing a next generation USB 2.0 specification that will extend performance by up to 40 times over existing capabilities. USB 2.0 will be fully compatible with USB 1.1, and use the same cables and connectors. Compaq, Hewlett-Packard, Intel, Lucent, Microsoft, NEC and Philips are jointly leading this initiative which will enable new classes of high performance PC peripherals.

Earlier this year, the USB 2.0 Promoter group announced an early speed estimate at between 10 to 20 times faster than USB 1.1. At the USB 2.0 Developer Conference in October, the group revised the target upward to 40 times faster than USB 1.1. This was a result of engineering studies and test silicon that concluded 480 Mbs (megabits per second) could be achieved while still maintaining full compatibility with USB 1.1. This speed is expected to be sufficient to satisfy the bandwidth requirements for the most demanding PC user applications leading into the future.

With the increased availability of USB-enabled PCs and USB peripherals on the market today, the need for legacy dependent input/output (I/O) connectivity is decreasing significantly. USB 2.0 will be a significant step toward providing additional I/O bandwidth and broadening the range of peripherals that may be attached to the PC.

USB: Developed to Simplify PC Peripheral Connections

The Universal Serial Bus (USB) specification is a standardized peripheral connection developed by leading PC industry companies. USB makes plugging in new peripherals easy with plug and play, is nearly 100 times faster than the original serial port, and supports multiple device connectivity. Because of these benefits, USB is enjoying broad market acceptance today.

USB allows expandability of the PC's capabilities via an external port, eliminating the need for users or integrators to open the system chassis. Since USB supports multiple peripheral devices simultaneously, it allows users to run numerous devices such as printers, scanners, digital cameras and speakers from a single PC. USB also allows for automatic device detection and installation, making connectivity a true plug-and-play experience for end users. USB's quick proliferation as the replacement for the serial port and other PC ports for I/O devices such as digital joysticks, phones, scanners and digital cameras has accelerated the production and availability of such devices. Several hundred of these devices are in the marketplace today, with many more on their way. In addition, virtually every new PC today has one or more USB ports, quickly moving the installed base of USB-capable PCs to the range of hundreds of millions.

USB 2.0: An "Evolution" Underway

USB 2.0 will extend the speed of the connection from 12 Mbps on USB 1.1 up to 480 Mbps on USB 2.0, providing an attachment point for next-generation peripherals which will complement higher performance PCs and user applications. USB 2.0 will be both forward and backward compatible with USB 1.1, resulting in a seamless transition process for the end user. In fact, USB 2.0 will use the same cables and connectors as USB 1.1. USB 2.0 offers a compelling opportunity for peripherals vendors to migrate their USB peripherals to higher performance, while still being able to sell the same peripherals into the huge installed base of USB-capable PCs. USB 2.0 is also expected to lead to the development of higher performance peripherals that will bring new applications to the PC.

USB 1.1's data rate of 12 Mbps is sufficient for many PC peripherals such as telephones, keyboards, mice, digital joysticks, floppy drives, digital speakers, and low-end printers. These peripherals will continue to operate with no change in USB 2.0 systems. The higher bandwidth of USB 2.0 will permit PC peripherals with more functionality, including higher resolution video conferencing cameras, next generation scanners and printers, fast storage units, and faster broadband Internet connections. It will make today's user applications more productive, such as taking the time to download a "roll" of digital photos from a few minutes on USB 1.1 down to a few seconds on USB 2.0. In addition, the higher bandwidth will support the

most demanding PC user applications, such as digital image creation and interactive gaming, where multiple high-speed peripherals will be running simultaneously. The higher data rate of USB 2.0 will also open up the possibilities of new and exciting peripherals.

As with USB 1.1, USB 2.0 is expected to eventually be in industry chipsets. Once these chipsets reach high volume, it is expected that USB 2.0 will be about the same cost as USB is today. Because of this, USB 2.0 is expected to supercede USB 1.1, which is already a ubiquitous connector on PC systems today. Also like USB 1.1, USB 2.0 will satisfy the peripheral-interface needs of desktops, mobile systems and other classes of host platforms. To satisfy the needs of power-sensitive applications such as notebook computers, USB 2.0 will provide the same power-management mechanisms as USB 1.1 to allow aggressive management of I/O power consumption. This is expected to allow USB 2.0 to find use even in demanding low-power systems.

USB 2.0 and 1394

I/O connectivity is being further advanced with the IEEE 1394 standard. USB 2.0 and 1394 primarily differ in terms of application focus. The USB 2.0 Promoter group expects USB 2.0 to be the preferred connection for most PC peripherals, whereas IEEE 1394's primary target is audio/visual consumer electronic devices such as digital camcorders, digital VCRs, DVDs, and digital televisions. Both USB 2.0 and 1394 are expected to co-exist on many consumer systems in the future.

USB 2.0 and 1394 differ in application focus because of continuous evolution of the current environment. Today, there is a large and rapidly increasing installed base of USB-capable PCs, and hundreds of USB peripherals in the marketplace that connect to the PC. It is a natural evolution to increase the speed of USB and provide an easy migration path for existing USB peripherals. In the A/V consumer electronics equipment industry, IEEE 1394 is on its way to becoming the dominant connector. Therefore, if a PC wants to connect to one of these devices, it needs an IEEE 1394 connection.

They also support different connection models. USB 2.0 continues to use a low cost host-centric connection model, which is the best solution for a PC connection to PC peripherals. The added capability of a peer-to-peer connection enabled by IEEE 1394, however, allows a PC to connect to a cluster of consumer electronics devices, such as one that might exist in the family room.

Leading the Development of USB 2.0

The companies that are leading the development of USB 2.0 have the expertise needed to focus on a specification that supports higher functionality peripherals. The USB 2.0 core team includes four members of the original USB core team (Compaq, Intel, Microsoft, and NEC), and three new members (Hewlett Packard, Lucent and Philips). As with USB 1.1, members of this promoters group will not charge royalties for essential patents required to implement products compliant with the USB 2.0 specification.

The USB 2.0 specification draft was released at the USB 2.0 Developer Conference in October. The final specification is scheduled for release in the first quarter of 2000 with systems and peripherals anticipated in the marketplace in the second half of 2000.

For more information, see the USB Implementers Forum web site at www.usb.org.

Press Release

TARGET SPEED FOR USB 2.0 ANNOUNCED BY INDUSTRY LEADERS

480 Mbs Announcement Coincides With Specification Draft Release to Industry

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USB 2.0 DEVELOPER CONFERENCE, Coronado, Calif., Oct. 12, 1999 - A group of seven PC industry leaders announced today that the target speed of Universal Serial Bus (USB) 2.0 is 40 times faster than the existing USB 1.1. The achievement is anticipated to further build on the momentum of USB into more demanding user applications, such as image creation and interactive gaming.

The target speed of USB 2.0 is 480 Megabits per second (Mbs), as announced by the USB 2.0 Promoter Group, consisting of Compaq, Hewlett-Packard, Intel, Lucent, Microsoft, NEC and Philips. The target speed announcement coincides with the release of the USB 2.0 specification draft to industry developers here. The specification draft enables vendors to begin their product planning and development of USB 2.0 products.

"The revised and significantly higher target rate provides an effective upgrade path for today's USB peripherals. It is the result of engineering studies and test silicon that concluded that 480 Mbs can be achieved while still maintaining full compatibility with USB 1.1," said Jim Pappas, director of Intel's technology initiatives.

The previous target speed range of between 360 and 480 Mbs was announced by the Promoter Group in August at the Intel Developer Forum.

Benefits of USB 2.0

The increased bandwidth of USB 2.0 opens the door for PC peripherals with more functionality, including faster broadband internet connections, higher resolution video conferencing cameras, next generation printers and scanners and fast external storage units. USB 2.0 also will make today's applications more productive. For example:

- Consumers with digital cameras using USB 2.0 technology will be able to download a "roll" of digital film in seconds, compared to minutes on the earlier version of USB.
- Consumers can back up a gigabyte of data from their PC hard drive in less than a minute on USB 2.0 versus about a half-hour on USB 1.1.
- Scanners can create a high-resolution digital image in seconds on USB 2.0, versus minutes on USB 1.1.

Because USB 2.0 is an evolution of the existing USB 1.1 specification, it will be fully forward and backward compatible with current USB systems and peripherals. Even with the new speed target, USB 2.0 will work with existing cables and connectors.

"Compatibility brings added benefits," Pappas said. "Consumers can continue to use the same peripherals and cables that were purchased for USB 1.1, so their investments are protected. On the other side of the retail counter, peripheral vendors will see additional sales opportunities as they can sell new high-speed peripherals into the entire installed base of USB-capable systems."

What's Next

The USB 2.0 specification is expected to be finalized in the first quarter of 2000. Leading systems and peripherals are anticipated in the marketplace in the second half of 2000, according to the promoter group. More information is available at www.usb.org.

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2.0 Frequently Asked Questions

Q: When will USB 2.0 be available for me as a developer?
A: The USB 2.0 specification draft has been released to all USB-IF members that wish to adopt the Spec. It is posted in the Members-only section of the USB-IF website (you will need to input your USB-IF username and password to access it). The final specification is scheduled for release in Q1 2000. Vendors must sign an Adopters Agreement to participate in royalty-free licensing for USB 2.0 compliant products.

Q: When will I be able to develop shippable products for USB 2.0?
A: If you are a USB-IF member you may access the Spec at USB 2.0 specification draft now as described above. Some development may be done based on that early version of the Spec, but you must remember that it is not final and products designed solely to the USB 2.0 specification draft may not be USB 2.0 compliant. The final specification will be published in Q1 2000. We expect systems and peripherals to be shipping by 2nd half of 2000.

Q3: How can I learn more about USB 2.0?
A: Presentations from the USB 2.0 Developers Conference in October 1999 will be available on the Members-only site to help train USB developers on the new spec (you will need to input your USB-IF username and password to access it). Look on this website in the coming months for information about the next USB 2.0 Developer Conference, to be scheduled sometime in early 2000.