USB Basics

Imagine a network based on inexpensive, high volume chipsets, with data rates up to 12Mbit/second and a 25 meter distance capacity, designed from the start with "plug and play" in mind. Add 5 Volt power, with up to 500mA current capacity, and compatibility with many consumer products.

What we just described is Universal Serial Bus (USB)—an external-connectivity communications technology for linking peripherals such as mice, keyboards, modems, joysticks, video, etc. to Macintosh and PC computers. It has gained favor commercially and privately since 1996.

It is included with all new PC's, quickly replacing PC serial ports, and it's driven by some of the largest manufacturers in the electronics industry. It's inevitable that USB will become a factor in the industrial, retail and data
collection worlds too.

Where USB Came From

USB grew from the requirement for a simple, inexpensive expansion bus for PCs. PCI solved many speed and compatibility problems that existed with the ISA bus, but the need to take the cover off the PC to add a peripheral was a real problem. And though PCI made Windows' "Plug-n-Play" possible, we've all experienced the frequent reality of "Plug-n-Pray."

USB is serial (less costly than parallel) and permits you to "hot-swap" without rebooting the PC. In USB, the PC is the master of the network and controls all bus traffic. Peripherals are simpler and less costly to implement.

A USB master does not have to be a PC, but usually is. All recent versions of Windows and Linux support USB. An embedded device, of course, is a computer that doesn't look like a computer. But only sophisticated embedded devices with full operating systems will be USB masters.

"Can I add USB to a computer that does not have a USB port?"

Most new PC's come with USB ports, often built right into the motherboard. But many computers don't have them. You can add USB by installing a PCI add-in card. (You may need to upgrade the computer's Operating System and BIOS for it to work properly.)

Are you running out of PCI or ISA slots? With USB you can forget about setting COM ports and IRQ's, just plug in a USB to RS-232, RS-422, RS-485 or parallel converter.

USB comes in different variations:

USB 1.1 (also called USB Basic Speed), the most common version that gives data-transfer rates of 1.5–12 megabits per second (Mbps)
USB 2.0 (also called USB Hi-Speed), the high-speed version of 1.1 that gives 480 Mbps data-transfer rates
USB OTG ("on the go"), allows mobile devices to be connected without going through a PC, including laptops.

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