

The Importance of USB

THOSE OF YOU WHO'VE BEEN FOLLOWING THIS COLUMN FOR THE PAST COUPLE OF MONTHS KNOW THAT WE'VE BEEN COVERING SOME OF THE YEAR'S COMING CPUS. NOW, WHILE WE'VE DETAILED OFFERINGS FROM INTEL, AMD, AND CYRIX,

there are still some other contenders in the market to explore. However, rather than let this column turn into a processor forum, we'll shift gears this month to another aspect of modern computing. Count on a look at chips used in new Macintosh machines, as well as glances at other Intel competitors and high-end server vendors, in future installments of *Computer Connections*.

Incidentally, on the topic of silicon manufacturers, Intel was one of the initial companies to work on the development of this month's feature technology, and was the first company to provide silicon for its implementation on motherboards. The technology? Universal Serial Bus, or USB.

Fast and Easy Connectivity

USB is a wonderful interface that took some time to "arrive." Providing automatic switching between two bandwidths (1.5 and 12 Mbps), the interface could handle everything from mice and keyboards (low bandwidth) to scanners and digital cameras (high bandwidth).

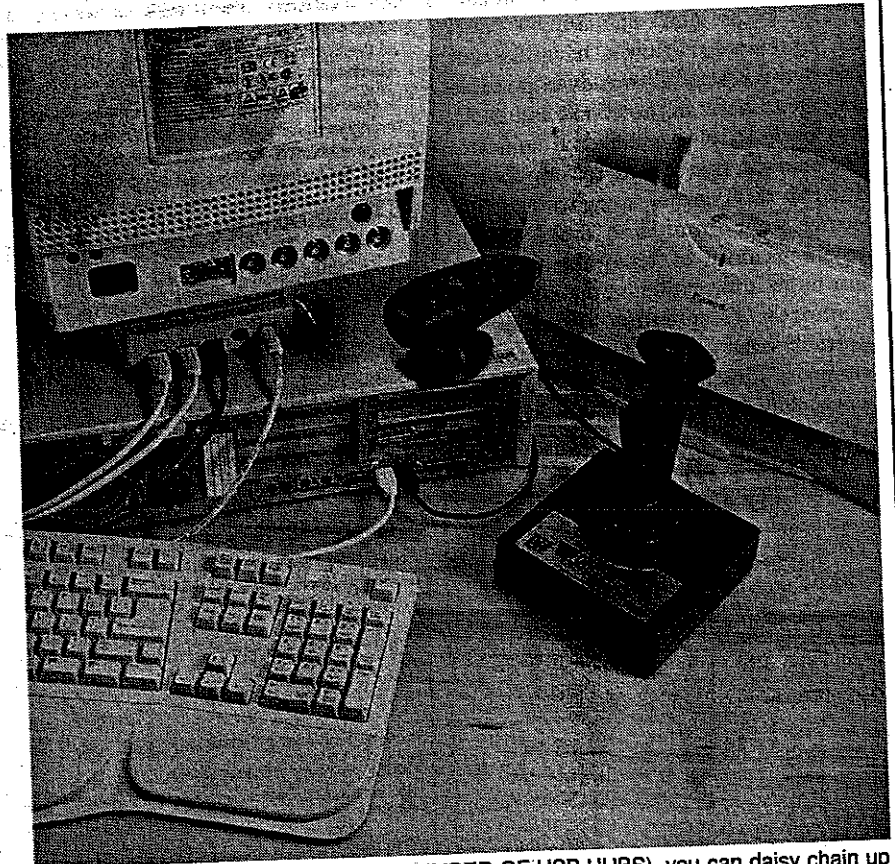
While available for a couple of years, USB was essentially useless before the arrival of Windows 98 (iMac computers can also use the bus, thanks to Mac OS 8.1, but more on that later). The highest revision of Windows 95, OSR (OEM Service Release) 2.1, was allegedly able to use the interface, but hardware manufacturers had to write their own drivers, and it was a complicated process

getting USB devices to work.

The reason the latter fact was so disastrous was it went against some of the intended benefits of the high-speed interface, namely: hot swapability and

true Plug-and-Play. With Windows 98, however, USB devices can be recognized even if they're plugged in while the machine's running. You can then unplug said device while the system is on, and "hot swap" it for another peripheral.

Of course, you probably won't have to swap many USB peripherals, because one of the biggest benefits of the interface is that you can daisy chain up to 127 USB devices on a single computer. These multiple connections can be made in one of two ways.



WITH USB (AND AN APPROPRIATE NUMBER OF USB HUBS), you can daisy chain up to 127 peripherals to your computer, including printers, joysticks, digital cameras, keyboards, and mice.

First, you can physically chain together devices that come with both upstream and downstream ports. For example, you might get a USB keyboard that has an upstream port for connecting a USB mouse. That allows you to have more than one device attached to a single USB port on your computer. As a result of daisy chaining, you'll find yourself reaching for the back of your system's case less often. Unfortunately, not many USB devices come with a passthrough or upstream port.

To get the most out of the (usually two) ports on the back of your machine, you'll want to invest in a good quality *powered* hub. Often coming in four- to seven-port versions, hubs allow you to connect multiple devices. By chaining hubs you could, in theory, reach the 127-peripheral limit of USB (just keep in mind that each hub counts as a device).

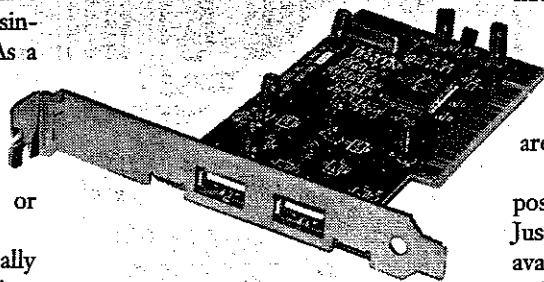
You might have noticed our emphasis of the word "powered" in the last paragraph. Many USB devices take their power from the bus itself. While this is great for your power strip, which can become less cluttered, it's not so good for your system. The ports in your PC provide about 500 mA of power and will quickly max out if you add a couple of high-drain devices. Expect system bug-giness if the latter occurs. To prevent it, use a powered hub that provides current for its devices through a separate AC supply.

A good powered hub to consider is Belkin Components' ExpressBus 4 Port, which, as its name implies, provides you with four upstream ports. It's a dependable investment at \$79 (MSRP)—for more connectivity, an ExpressBus 7 Port retails for \$109. As with all list prices, shopping around should yield lower street prices.

Another way to get a hub is as part of a USB monitor. Now, while these displays come with USB ports and do connect to your PC's USB port, they still need a standard VGA-cable connection to your system's video card. USB's bandwidth is too limited to handle this type of video; so, in other words, a USB monitor is a standard monitor with a USB hub, and possibly some software control of onscreen settings such as brightness and contrast.

Having just gone into the need for more and more ports, we might have raised the question of why you need

them at all. The answer's simple: To take advantage of the expected 250-plus devices that will run on the high-speed interface. In addition to keyboards, mice, scanners, and cameras, you can get



BELKIN'S BUSPORT CARD lets you add USB capability to any Pentium-class or better PC running Windows 98, or Apple machine running Mac OS 8.1 or higher. Just make sure the computer has an open PCI slot.

simple network solutions (e.g. connect two computers with a special USB cable), security sensors (like a thumb-print scanner), printers, external CD-ROM and other drives, joysticks, modems, MPEG-2 digitizers, and more. All usable without opening your system case.

Unless....

Adding USB to a PC

Does your PC have USB? If it's more than a year old, there's about a 50-50 chance it doesn't, and if it's more than two years old we'd bet it's USB-free. Not certain? Take a look at the back of the case. You should notice one or two thin sockets that look as if they'd just fit the tip of a thick flathead screwdriver. The symbol next to the ports should resemble a trident. Those are your USB ports.

What? Your Pentium-class or better machine doesn't have them? No problem, all post-486 PCs with an open PCI slot can be upgraded to USB using a card like Belkin's BusPort. You'll just need to be willing to upgrade your OS to Windows 98. Of course, that's a judgment call on your part. Win 98 doesn't run very well on machines that are slower than 133 MHz (do ignore the recommended minimum on the OS package), and the OS really needs 166 MHz plus 32MB of RAM to be ... *tolerable*.

If your Pentium-class machine will handle Win 98, the upgrade to USB is a simple one. Turn off your PC and open its case. Insert the BusPort or similar adapter and turn on your computer.

Follow the onscreen instructions, insert the accompanying disk, and you're set. It's really that simple (we installed a couple of different types of these cards for a roundup a few of months ago and never had a glitch).

This upgraded version of USB still possesses all the features of a factory-installed interface. The speed, hot swappability, and daisy chaining are all there for the using.

Though we haven't done it, it is also possible to install the BusPort in a Mac. Just make sure the computer has an available slot and is running Mac OS 8.1 or higher.

The BusPort retails for \$49. Depending on your needs, installing it, or a card like it, may be the last time you have to open up your computer's case for expansion. Unless you want to add an IEEE-1394 adapter for high-speed video transfer, but that's a topic for another month.

Expanding the iMac

While Microsoft's Windows 98 was much anticipated for its PC USB support, the Windows/PC platform was not the one that really guaranteed USB's

VENDOR INFORMATION

Belkin Components
501 West Walnut Street
Compton, CA 90220
Tel: 800-2-BELKIN
Web: usb.belkin.com

CompuCable Corporation
210-A McCormick Ave.
Costa Mesa, CA 92626
Tel: 714-557-5510
Web: compucable.com

Intel Corp.
2200 Mission College Blvd.
Santa Clara, CA 95052-8119
Tel: 408-765-8080
Web: www.intel.com

success in the marketplace. Apple threw the Wintel world a bit of a curveball last year.

Called the iMac, it was a computer sensation. You couldn't watch a half-hour of TV without seeing an ad for it, and not a computer store would dare claim to not have it in stock. While not the fastest computer (it has a 233-MHz G3 processor) it's cheap (now about \$1000), attractive, and neatly packaged in an all-in-one design. Unfortunately, it is also a bit flimsy (dropping the keyboard a foot causes many keys to pop

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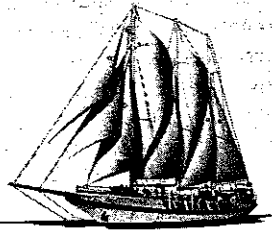


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heard without the use of head-phones."

Those with current plant experience will view, with fascination and horror, scenes like the one showing a capacitor plate operator at work with hands inches from the unprotected jaws of his large punch press and no safety interlocks in sight. Not only was there definitely no OSHA presence then, but the child labor laws must have been quite a bit more lax. The back cover of this reprint shows a round-cheeked lad who looks no more than 12 (though wearing a very adult looking vest) working on variometer rotors.

That's all for now. I certainly would like to hear from new and old readers with their ideas and comments regarding this column! Regretfully time limitations do not always permit me to respond individually. But all correspondence will be read with interest and acknowledged in the column. Request for technical assistance, schematics, etc. will be referred to the readers of the column in special "mailbag" editions published from time to time.

I'm also interested in hearing about your restorations and collecting activities—and be sure to include pictures! These, too, will appear in the occasional "mailbag" columns.

You can contact me at "Antique Radio," c/o Electronics Now, 500 Bi-County Blvd., Farmingdale, NY 11735. I'm also reachable through my personal e-mail address: ellis@interaces.com. **EN**

Q & A

continued from page 5

*hobbyist to build this at home? — D. H.,
Columbia City, IN*

A The advertisement that you enclosed describes a \$679.99 charger for 12-volt car batteries. It says, "Pulse charger revives batteries you think are dead and useless... Ferro-resonant pulse technology eliminates sulfation, extends battery life and increases battery efficiency."

It's a product of PulseTech (<http://www.pulsetech.com>). How well it works, we can't say. It has been known for some time that an aging rechargeable battery will often benefit from brief charging at a higher than normal rate, or charging from pulsating DC, or both.

The \$680 price tag does make us a bit wary. The charger could surely be built for considerably less—if you knew what

to build, and if you could do it without violating PulseTech's patents.

Writing to Q&A

As always, we welcome your questions. The most interesting ones are answered in print. Please be sure to include plenty of background information (we'll shorten your letter for publication) and give your full name and address (we'll only print your initials). *If you are asking about a circuit, please include a complete diagram.* Due to the volume of mail, we regret that we cannot give personal replies. Questions can be sent to Q&A, Electronics Now Magazine, 500 Bi-County Blvd. Farmingdale, NY 11735. They can also be e-mailed to Q&A@gernsback.com, but please do not expect an immediate reply and please don't send graphics files larger than 100K. **EN**

COMPUTER CONNECTIONS

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off), has only a CD-ROM (no floppy drive), and possesses limited expandability options.

The latter, was a single—gasp!—USB port. As the only way to connect, well, anything to the machine, that USB port got a lot of vendor support real fast. The *only* version of a peripheral that iMac users could buy had to be a USB version. Consider that over 800,000 iMacs were sold, and you'll quickly figure out why the small computer helped USB in a big way.

What about all those iMac owners who have old Apple peripherals sitting around going to waste? Good news. CompuCable has released iDock, a new six-port hub that lets an iMac interface with both USB and non-USB devices.

Your iMac's one port will transform into two Apple serial ports, one parallel port, and three extra USB ports if you add an iDock to your system. It's got the same "Bondi-Blue" color as the iMac, and even functions as an adjustable monitor stand. The iDock retails for \$199.

That about wraps it up for this month. If you'd like to get in touch you can send e-mail to connections@gernsback.com, or snail-mail to *Computer Connections, Electronics Now, 500 Bi-County Blvd., Farmingdale, NY 11735.* **EN**