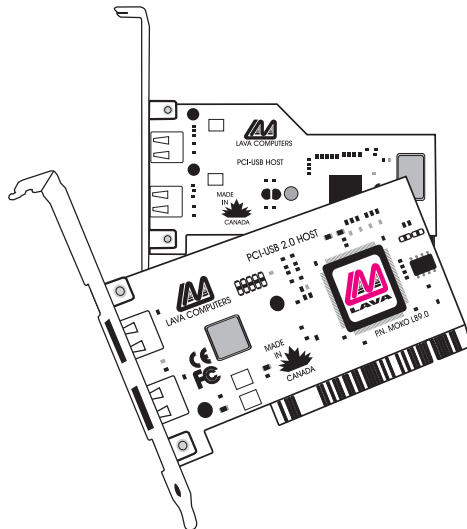




Choosing USB Host Adapters: USB 1.1 and USB 2.0 Compared





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Lava Computer MFG Inc.

This white paper compares the features of USB 1.1 and USB 2.0 host adapters, and suggests considerations for choosing between these technologies.

Introduction

The last year has seen the I/O landscape change with the introduction of USB 2.0, the follow-on technology to the popular but five-year old USB 1.1. More than anything else, USB 2.0 adds speed to USB. Choosing which host USB adapter technology to buy is not simply a matter of opting for speed, however. In some situations a USB 1.1 host adapter is still the logical choice.

USB 1.1 and USB 2.0 host adapters compared

The table below shows the major characteristics of USB 1.1 and USB 2.0 hosts, and allows easy comparison of these technologies.

TABLE 1. USB 1.1 and USB 2.0 host adapters compared

Feature	USB 1.1 host	USB 2.0 host
Speed	12 Mbps	480 Mbps
Daisy-chaining	yes	yes
Hot-plugging	yes	yes
Support in Windows 95	yes, with operating system patches	functions as USB 1.1 host with operating system patches
Support in Windows 98	yes, with operating system patches	functions as USB 1.1 host with operating system patches
Support in Windows 98SE	yes	functions as USB 1.1 host

When does a USB 1.1 host adapter make sense?

TABLE 1. USB 1.1 and USB 2.0 host adapters compared

Feature	USB 1.1 host	USB 2.0 host
Support in Windows Me	yes	functions as USB 1.1 host
Support in Windows NT4.0	no	no
Support in Windows 2000	yes	USB 2.0, with additional drivers
Support in Windows XP	yes	USB 2.0, with additional drivers
Support in Linux	yes (kernel 2.4+)	no
Support in Macintosh OS	yes (OS 8.6+)	no
Automatic configuration	yes	yes
Shared cables	shared with USB 2.0	shared with USB 1.1
Compatibility	USB 2.0 devices run at USB 1.1 speeds	backwards compatible with USB 1.1 devices
Power output	500 mA per port	500 mA per port

When does a USB 1.1 host adapter make sense?

PERIPHERAL CONSIDERATIONS

USB 1.1 host adapters, while slower than USB 2.0 host adapters, make sense when the peripherals being connected do not need the additional speed of USB 2.0. At present, this is the case with most scanners and printers, and virtually all digital still cameras, pointing devices, and POS devices on the market.

OPERATING SYSTEM SUPPORT

USB 1.1 hosts are also the logical choice where the operating system does not support USB 2.0 and is not likely to have USB 2.0 support added in the foreseeable future. This is the case with Windows 95, Windows 98, Windows 98SE, and Windows Me. Microsoft has stated that it has no intention of retrofitting these operating systems to support USB 2.0. Consequently, if a computer is not about to be upgraded to an operating system with USB 2.0 support, or is unable to support USB 2.0 in some other regard, a USB 1.1 host adapter still makes sense.

COST

Finally, USB 1.1 hosts are the best choice where cost is a prime consideration. While the price difference between USB 1.1 and USB 2.0 host adapters is decreasing, USB 1.1 hosts are and will continue to be less expensive.

When does a USB 2.0 host adapter make sense?

PERIPHERAL CONSIDERATIONS

USB 2.0's major advantage over USB 1.1 is speed. At 480 Mbps, its theoretical maximum speed is 40 times faster than USB 1.1. This additional speed is essential for a sub-

Lava USB host adapters

set of USB peripherals; in particular, the newest high resolution scanners and storage devices such as external hard disk, CD, and DVD drives. In such situations, USB 1.1 will either not work – causing buffer underruns when writing CDs, for example – or work unsatisfactorily.

At the same time it should be remembered that the 480 Mbps theoretical maximum will not be the actual throughput to any device: USB 2.0 hard disk drives, for example, still typically top out at about 15 Mbps when all the various factors of drive performance, bridge electronics, and software inefficiencies are put into the mix.

OPERATING SYSTEM SUPPORT

USB 2.0 is still limited in its operating system support. While this will change over time, at the moment only Windows 2000 and Windows XP offer USB 2.0 support. A USB 2.0 host adapter placed into a system with operating system support for USB 1.1 will operate as a USB 1.1 host. Users upgrading from an earlier version of Windows to Windows 2000 or XP will find it a good time to choose USB 2.0, as long as their peripherals are USB 2.0 peripherals.

COST

USB 2.0 host adapters remain more expensive than USB 1.1 hosts. For a user planning to use a USB 2.0 peripheral immediately, the premium will be worthwhile. Users buying USB 2.0 host adapters because they plan to use USB 2.0 peripherals *in the future* need to balance present against future costs, as with any purchase of future capability in a computer product.

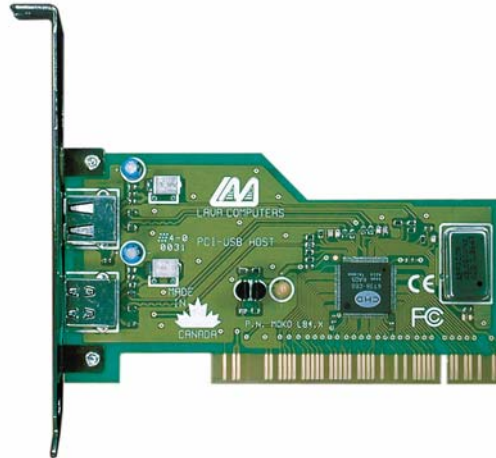
Lava USB host adapters

Lava designs and builds two PCI bus host adapters. Both are covered by the Lava Lifetime Warranty, and represent the best in host adapter technology.

The Lava USB 1.1 host adapter adds two USB 1.1 ports to PCI-bus equipped systems with USB 1.1 or USB 2.0 support.



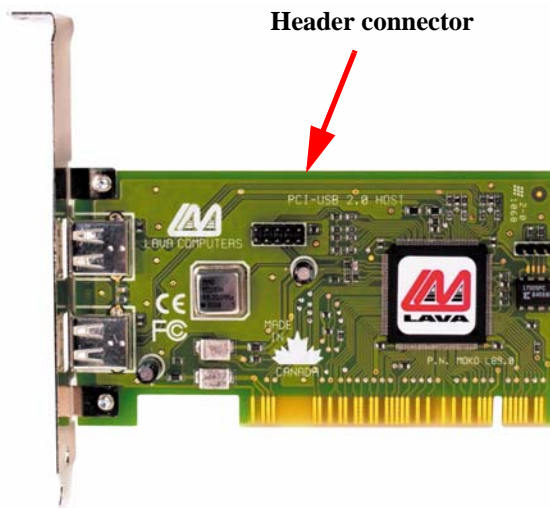
FIGURE 1. USB 1.1 PCI host adapter



The Lava USB 2.0 host adapter adds two USB 2.0 ports to PCI-bus equipped systems with USB 2.0 support. The USB 2.0 host adapter will operate as a USB 1.1 host on systems with only USB 1.1 support.

The Lava USB 2.0 host adapter can become a four-port USB 2.0 host adapter when an additional two ports are added by attaching a cable (not supplied) to the header connector near the top edge of the board.

FIGURE 2. USB 2.0 PCI host adapter



Summary

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Choosing a USB host adapter is a matter of balancing current and future needs. Users with immediate need for USB 2.0 connectivity will find a USB 2.0 host adapter ideal. Users expecting to move to USB 2.0 peripherals or planning to upgrade their operating system to Windows 2000 or XP need to assess timing and costs when choosing between these types of host adapters. Users without an upgrade path to USB 2.0 or with no foreseeable need for USB 2.0 peripherals should save their money and stick with a USB 1.1 host adapter when adding USB ports to a system.

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