

# PCs Head Toward Appliance Status

## New Microsoft Plan Will Change How PCs Are Designed

by Peter N. Glaskowsky

Microsoft's "Simply Interactive PC" (SIPC) initiative, announced at WinHEC '96, is intended to make the PC as easy to use, and as popular, as the television. SIPC will make it possible to build sealed-case PCs that boot up in seconds, and that users can expand externally with true plug-and-play peripherals.

SIPC is a framework that incorporates several key technologies. New standards that are part of SIPC include OnNow, for better system-level power management, and a new mechanism called DeviceBay for adding and removing physical devices from the system. Existing standards endorsed as part of SIPC include Universal Serial Bus (USB), IEEE-1394 (also known as FireWire), Digital Video Disk (DVD, also known as Digital Versatile Disk), and Dolby AC-3 audio.

Microsoft also released its PC 97 specification. To carry the "Designed for Microsoft Windows" logo in 1997, all PCs must support this collection of system definitions and requirements. New in this edition is a definition for an entertainment PC, a multimedia system optimized for TV viewing and for connecting to consumer appliances (stereo, VCR, etc.). These systems must meet certain additional criteria.

### OnNow Reduces Boot Time

Microsoft's OnNow is intended to eliminate one of the major inconveniences of personal computers: waiting for the system to boot every time it's used. OnNow is a far-reaching initiative that will affect the design of chip sets, peripheral devices, power supplies, and power distribution devices. With OnNow, the system is left in a low-power "sleep" condi-

tion between uses instead of being completely off. The system appears to be off: no noise, no lights. When the user hits the "on" button, however, the system is ready to use within a few seconds.

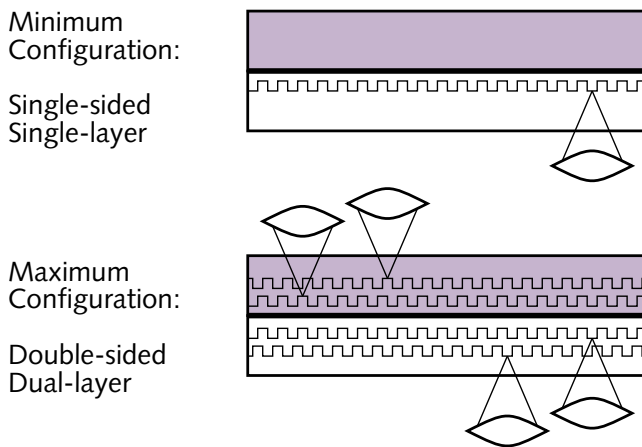
OnNow provides two system states between the conventional On and Off conditions. When Sleeping, the system is ready to return to full operation within a few seconds. A Soft Off state allows the system to be shut down under software control and restarted in response to external events. When a full reboot is required, OnNow specifies that Power-On Self Test (POST) code must execute within 10 seconds, and that the system may display only a splash screen during the boot process. A keyboard override is allowed to display all of the usual memory-test and device-driver messages for debugging.

OnNow incorporates Microsoft's Advanced Configuration and Power Interface (ACPI) standard for managing the power consumption of individual devices, using a parallel set of states referred to as On, Standby, Suspend, and Off. For optimum efficiency, all components of the system must be designed to participate in power management, from the physical devices up to the applications software. OnNow and ACPI are mandatory features in the PC 97 specification.

### DeviceBay Eases Expandability

DeviceBay is a fairly vague proposal at this point. It is part of the "sealed-case PC" concept believed essential for widespread consumer acceptance of personal computers. If a PC, like a VCR, truly has no user-serviceable parts inside, there must be some way for the user to expand the system in the future. USB and IEEE-1394 are a good answer for most peripherals but won't work for some (like batteries) and are either too slow or too expensive for others (like IDE hard disks).

The current DeviceBay proposal suggests that the host PC must provide all of the following connections to the DeviceBay: power in and out, a PCI 2.1 bus-master slot, USB,



**Figure 1.** DVD disks are two 0.6-mm-thick platters bonded together. Data may be recorded on one or both platters, in one or two layers.

Media type	Single-sided single-layer	Single-sided dual-layer	Double-sided dual-layer
DVD-ROM read-only	4.7G	8.5G	17G
DVD-R write-once	3.9G	TBD	TBD
DVD-RAM rewritable	2.6G	TBD	TBD

**Table 1.** The DVD standard defines read-only, write-once, and rewritable disks to support software distribution, archiving and backup, and secondary mass storage applications. (TBD indicates standard not yet defined.)

### New Analyst Joins MDR

Peter N. Glaskowsky has recently joined MicroDesign Resources as a senior analyst for the Technology Roadmap (TRM) service.

Peter focuses on system technology and trends, especially in the areas of memory, chip sets, networking, and the Internet. He is responsible for Technology Trend and System Analysis reports for TRM, and will also be contributing to *Microprocessor Report* on these topics.

Peter received his B.S.E.E. from the University of Miami. He comes to MDR from Integrated Device Technology, where he was a chief engineer with the Systems Technology Group, involved in product definition and system-level design analysis.

video, and IDE. A DeviceBay will not provide audio, floppy, IEEE-1394, or ISA connectivity, however, nor can it be used to expand system memory.

It's not clear what advantages DeviceBay would have over existing options like the latest PC Card standard from PCMCIA, which incorporates a low-cost ISA-style mode as well as high-performance PCI operation. A new form factor would be required to allow installation of larger devices like the 5.25" and 3.5" drives that are anticipated for DeviceBay, as well as a mechanical interlock to prevent unexpected removal, but these are not serious technical obstacles.

### Existing Standards Also Crucial for SIPC

Microsoft has taken the next step with Universal Serial Bus (USB), making it a required feature in the PC 97 specification. Only Intel's Universal Host Controller Interface (UHCI) and the similar OpenHCI standard (from Compaq, Microsoft, and National Semiconductor) will be supported by Microsoft. Hardware vendors who use one of these two standard interfaces will not need to provide device drivers for the USB bus controller. Microsoft will also provide drivers for common device classes, like hubs, keyboards, mice, and joysticks.

In future Windows PCs, IEEE-1394 at first will be used mostly for connecting multimedia devices, such as Digital Video Cassette (DVC) camcorders, to the PC. As such, it is required only in the Entertainment PC 97 specification.

We expect IEEE-1394 to eventually replace SCSI and most other high-speed external connections local to a single PC. Microsoft and some other WinHEC presenters described ways for IEEE-1394 to be used as a LAN in the home and small-office environments, but this is probably a misapplication of the technology. Sharing a single IEEE-1394 bus among multiple desktop computers would produce unacceptable performance degradation for local peripherals like hard disks. Also, the cost of the interconnect is disproportionately high for LAN applications.

### For More Information

Additional information on the standards described in this article is available from Microsoft on the Web at [www.microsoft.com/windows/thirdparty/hardware](http://www.microsoft.com/windows/thirdparty/hardware).

IEEE-1394 supports a maximum rate of 400 Mbps over 4.5-meter cables (or over longer cables at slower rates). Current IEEE-1394 devices like Sony's DCR-VX1000, which has been commercially available for several months, run at lower rates of 100 or 200 Mbps. Work is in progress on a faster version of the specification, currently known as 1394.1, which will run at 1 to 2 Gbps, possibly over longer cables. Microsoft strongly recommends 400-Mbps support for all future IEEE-1394 peripherals and host adapters.

### DVD Ready for 2H96 Systems

DVD, another emerging technology, will also be well supported on future Windows PCs. Microsoft's Windows OEM Service Release 3.0, due out in the second half of 1996, will provide specific support for DVD drives and decoding hardware, in time for the arrival of these products on the market.

The DVD standard encompasses several types of DVD media and drives, as Figure 1 and Table 1 show. Capacity can be enhanced by recording data on both sides of the disc, and by adding another layer of data on each side, which is accessed by changing the focus of the optical read head. The second layer of data stores less data than the first, so the maximum capacity of a double-sided double-layer disc is not quite four times the capacity of a single-sided single-layer disc.

Read-only discs and drives will be the first to hit the market, probably late this year. This will be the most common format on personal computers, ultimately replacing the standard CD-ROM drive. These drives will initially be much more expensive than CD-ROM drives, due to the more expensive read-channel silicon, but prices should decline rapidly as production volume increases.

Write-once and rewritable discs and drives are expected to arrive in 1997, once those parts of the standard are finalized. These drives will be more expensive to manufacture and will command a significant price premium over DVD-ROM drives.

Microsoft also announced an alliance with Dolby Laboratories to bring Dolby's Surround Sound audio and digital AC-3 decoding technology to the desktop. No specific product announcements were made, but this is an essential first step toward software and hardware support of AC-3 on Windows PCs.

Current desktop CPUs are not powerful enough to perform MPEG-2 and AC-3 decompression in software. For the time being, systems using DVD drives for video playback will require hardware accelerators. In some cases, this circuitry

will be included in the drive itself, making DVD drives even more expensive relative to CD-ROM drives.

When CPUs are fast enough, perhaps with Intel's future Klamath and Deschutes derivatives of Pentium Pro, MPEG-2 and AC-3 support will be provided in software by Windows, thereby reducing the cost of DVD audio/video support.

### **New Requirements for PC 97**

Microsoft's PC 97 specification provides additional requirements for OEMs that wish to use the "Designed for Microsoft Windows" logo on PCs in 1997. One standard on the way out of favor is the ISA bus. ISA is not recommended for Windows PCs in 1997, and no Entertainment PC system with ISA devices will be eligible for the Microsoft logo in 1997. However, ISA slots are allowed so end users can install legacy expansion cards.

Microsoft is taking steps to make internal expansion of the PC easier for end users. Connectors must be designed so that incorrect installation is not possible. For example, keys and/or shrouds should be provided. Connectors must also prevent the user from mistakenly attaching a cable to the wrong port.

Even the aging SCSI specification is subject to new conditions. For example, internal SCSI devices must not be terminated. SCSI termination must be provided using an automatic terminator on the host adapter and a device that plugs into the end of the cable or into the external connector if one is present. A system that depends on removable

resistor packs or jumpers will not qualify for the Windows logo.

On both ISA and PCI slots, Microsoft now requires that no other devices in the system can block any of the slots. This amounts to an endorsement of Intel's ATX motherboard physical design specification, which moves the CPU and memory SIMMs out of the way of the expansion slots.

The main-memory requirement has been increased to 16M, with 32M required for workstation PCs. A full 32M is recommended, 64M for workstations.

Entertainment PCs are required to provide an infrared or RF-based remote control to manage basic system operations. Infrared devices must comply with the Irda standard, and 4-Mbps operation is recommended. Entertainment PCs are also required to be quiet when operating: no more than 35 dBA, or ideally under 25 dBA.

### **A Move in the Right Direction**

Some of the more substantial ease-of-use problems with Windows today are not addressed by SIPC. One of the reasons consumers never have to service their own VCRs is that VCRs have their software in ROM and never crash. Windows 95 should be able to boot from CD-ROM or other protected storage and should provide better immunity to crashes from poorly behaved drivers and applications.

Nevertheless, SIPC and the other elements of PC 97 will help make PCs more useable and more attractive to a much wider audience than today's systems. 