CHAPTER 18

Storage and Related Peripherals

This section presents the requirements for storage and related peripherals, including DVD devices, under the Microsoft Windows family of operating systems.

Specific requirements for SCSI, IDE, and ATAPI peripherals are defined in the related chapters in Part 3 of this guide.

Version 1.1
Includes changes to items 2, 10, 20, 23, 24, 28, 32, 33, 35, 36, References and Resources for Storage, and Checklist for Storage, as previously published in the PC 97 FAQ on http://www.microsoft.com/hwdev/pc97.htm and the PC 97 OnNow Requirements on http://www.microsoft.com/hwdev/desguid/onnowpc97.htm

See also: Storage FAQs for WHQL Testing on http://www.microsoft.com/hwtest/faqs/faq_storage.stm

Contents

System Requirements for Storage Peripherals

This section summarizes both the basic hardware design features for storage peripherals and the specific features for PC 97.

Storage Peripherals Basic Features

This section summarizes the hardware requirements for storage peripherals.

1. Bus master capabilities
Recommended for hard disk controller and CD-ROM
Required for DVD-ROM
Bus master capabilities, if implemented, must meet the related specification for the particular controller. For example, the programming register set for PCI IDE bus master DMA is defined in Small Form Factor (SFF) 8038i.

Correctly implemented bus master support ensures improved performance and Windows-compatible device driver support.

Note This recommendation will become a requirement in 1998. This recommendation does not apply to legacy floppy disk controllers (FDC) and will not become a requirement for the FDC.

2. Media status notification support for removable media
Required
Version 1.1 Change:
Recommended
IDE removable storage devices must follow the Microsoft specification named Media Status Notification v. 1.03 or higher. SCSI removable devices must follow the Media Status Notification Specification for SCSI and ATAPI Devices (v. 1.0 or higher).

Version 1.1 Correction:
For CD-ROM and DVD-ROM drives implementing Media Status Notification:

MESN support is **not** required for PC 97. (Change date: November 5, 1997)

The latest version of packet-based Media Event Status Notification (MESN) is actually a subsection of the Mt. Fuji specification, which is the command set specification for DVD-ROM drives that will be released as document SFF 8090. It is recommended that CD-ROM and DVD-ROM manufacturers use the MESN specification contained within the Mt. Fuji specification.

Specifically, the device should comply with all provisions of the MESN support section of SFF 8090 for PC 97 compliance, which is defined in Chapter 8 of version 0.99 of this specification.

The draft of this specification is available from ftp://fission.dt.wdc.com/pub/standards/SFF/specs/. (This server is not under the control of Microsoft; please read our disclaimer before continuing.)
SFF 8090 will be available from the SFF Committee after it is approved. To obtain SFF documents, in the United States, call (800) 854-7179; in Canada, (613) 237-4250; or outside North America, (303) 792-2181.

Important: For CD-ROM and DVD-ROM devices, do not use *Media Status Notification, Version 1.03* or earlier. The version of the Media Status Notification specification that has been available on the Microsoft web site does not apply to optical storage devices. The specification on the web site was erroneously named v. 1.03 (this version was supposed to be v. 1.02 because it does not have the packet-based support in it). (Change date: December 18, 1996; version change and details, April 24, 1997; November 5, 1997)

3. Support Int 13h Extensions in option ROMs

Required

The Int 13h Extensions ensure correct support for high-capacity drives, consistent drive-letter mapping between real mode and protected mode, and other capabilities for both Windows 95 and Windows NT. Support for the "fixed disk access" subset of Int 13h Extensions must be provided in the system BIOS and in any option ROMs for storage devices that include BIOS support. The Int 13h Extensions are defined in "Int 13x Extension APIs" in the Layered Block Device Drivers section of the Windows 95 DDK.

4. General device requirements

Required

These include the standard requirements for a Plug and Play device identifier, automated software-only settings for device configuration, standard device drivers and Windows-based installation, and icons for external connectors. For more information, see the "Basic PC 97" chapter of this guide.

5. Device meets requirements for port or bus
Required

The device must meet all requirements for the port or bus to which it is attached. For example, a drive that uses the parallel port must meet all the requirements defined for legacy parallel peripherals (including requirements for ECP mode), as defined in the "Serial, Parallel, and Wireless Support" chapter in this guide. If the device uses a PCI, IDE, or SCSI connection, the device must meet the related requirements defined in Part 3 of this guide.

6. Easy installation for end user
Recommended

Ease-of-use requirements for installation and configuration are defined for SCSI peripherals and for IDE and ATAPI devices in Part 3 of this guide.

PC 97 Design for Storage Components

This section summarizes requirements related to Plug and Play and other bus- and resource-related design issues for storage devices.

Plug and Play and Bus Design for Storage Components

The items in this section are requirements for Plug and Play capabilities.

7. Plug and Play device identifier
Required

- For a non-bus specific system board device, there must be a device-specific identifier.
- Each bus-specific device must provide Plug and Play device identifiers in the manner required for the bus it uses, as defined in Part 3 of this guide. For example, a PCI add-on device must comply with PCI 2.1 requirements and also provide a Subsystem ID and Subsystem Vendor ID, as defined in the "PCI" chapter in Part 3 of this guide.

8. Conflict resolution and dynamic disable capabilities
Required

To ensure conflict resolution for resource allocation, the device must conform to the Plug and Play specifications for the bus it uses as described in Part 3 of this guide. The system must have a method for automatically disabling or relocating the resources used by the device if conflicts occur when an expansion card is added to the system.

Devices must be capable of being disabled with software settings only—that is, without requiring rebooting or jumper setting changes. Disabling the device must result in freeing all of its resources for use by other devices. DIP switches on boot devices can be used for an initial power-on default state or for non−Plug and Play system compatibility, but must be able to be overridden by software configuration after system power up.

The primary hard disk controller is an exception to the requirement for dynamic disable capabilities.

9. 3F7h and 377h unclaimed by devices
Required
To avoid having two devices in the system claim 3F7h and 377h, these addresses should not be claimed as resources in device registers, especially by IDE devices.

It is recognized that some FDC devices claim this range. Such devices can be implemented in a PC 97 system; however, the system manufacturer must ensure that only a single device in the system claims this range.

Power Management for Storage Components

This section summarizes the specific power management requirements for storage devices.

10. Compliance with "Device Class Power Management Reference Specification"
Required
The "Device Class Power Management Reference Specification" for the storage device class provides definitions of the OnNow device power states (D0−D3) for these devices. The specification also covers device functionality expected in each power state and the possible Wakeup event definitions for the class. Power states D0 and D3 are required.

Version 1.1 Clarification:

As of **July 1, 1997,** the device must meet the requirements defined in the *Storage Device Class Power Management Specification* and the *Default Device Class Power Management Specification*, as described in the clarifications to item 5 of the "Basic PC 97" chapter.

11. Support Wakeup Events defined in "Device Class Power Management Reference Specification"
Optional
For PC 97, the ability to cause a Wakeup event as defined in the "Device Class Power Management Reference Specification" for the storage device class is an optional feature.

Device Drivers and Installation for Storage

This section summarizes the basic requirements for device drivers and installation procedures for storage devices.

12. Device driver and installation meet Windows and Windows NT standards

Required

Each device requires drivers for both Windows 95 and Windows NT operating systems. The manufacturer does not need to supply a driver if a standard driver provided with the operating system can be used. If the manufacturer supplies drivers, the requirements for device drivers and installation include the following:

- All devices and drivers must pass testing by Microsoft WHQL.
- All configuration settings are stored in registry.
- The correct minidriver, VxD, or any other files specified in the device's INF must be installed in the correct locations.
- Driver installation and removal use Windows-based methods as defined in the Windows 95 and Windows NT DDKs.
- Driver files provided by the vendor must not use the same file names as used by files included in Microsoft operating systems, unless specifically agreed with Microsoft.
- Only 32-bit protected-mode components are installed. No real-mode or 16-bit protected-mode components are provided in order to operate under Windows.
- Driver supports Plug and Play IRPs (for WDM drivers) or messages (for VxDs).
- If support using WDM drivers is provided in the operating system, the driver supplied by the manufacturer must be a WDM minidriver.

For complete details about standard installation requirements for drivers, see "Basic PC 97" in Part 2 of this guide.

13. Device and file system run in protected mode after installation

Required

The device driver and the file system must be running in 32-bit, protected mode (not "compatibility mode") immediately after installation.

14. Applications provided with the device meet Windows standards

Required

Any Windows-based applications provided with the device must meet Microsoft requirements for software compatibility, as indicated by the "Designed for Microsoft Windows" logo. However, any software applications included with the device can be installed using an alternate Windows-based installation method as defined in the Win32 SDK.

15. Device driver for partitioned media supports FAT32 partitions
Required
Device drivers that support partitioned media must support the new FAT32 partition types (0xB and 0xC), in addition to the Extended Int 13h partition types (0xF and 0xE).

16. Block-mode device driver supports extended BPBs
Required
Storage subsystems that include an MS-DOS–based block mode device driver (for example, Aspidisk.sys) must support Extended BIOS Parameter Blocks (BPBs) in the Build BPB device driver function call and support category=48 in the generic IOCTL device driver interface calls, as specified in the mid-1996 update to the Windows 95 DDK.

Floppy Disk Drive Controller

This section describes the requirements for any floppy disk controller (FDC) provided with a PC 97 system.

A floppy disk controller is not a requirement for a PC 97. Although most systems include some form of floppy disk drive, some systems such as diskless workstations do not need one.

17. Floppy disk capabilities provided through expansion card or external bus
Recommended
To support migration away from legacy devices for PC 97, it is recommended that support for floppy disk drives be provided by using a solution based on an external bus such as USB, PC Card, or an expansion card for SCSI or IDE.

18. Legacy floppy disk controller built into system
Optional
If a legacy FDC is included on a PC 97 system, it must meet the requirements listed in this section.

19. FDC compliant with all general storage device requirements
Required
These are defined in the “System Requirements for Storage Peripherals” section earlier in this chapter.

20. Resource configuration for legacy FDC device
Required
The resource requirements must be met for each device of this type on the system, not shared among devices of the same type.

- Use static I/O addresses 3F2h, 3F4h, and 3F5h. Additional addresses can be provided in the event of conflict.
- Use IRQ 6.
- Use DMA Channel 2 if the FDC supports block data transfers to memory using the DMA controllers.

Version 1.1 Correction:

The correct resource assignments for legacy floppy disk controllers are: 3F0-3F5, 3F7, IRQ 6, DMA 2. (Change date: December 18, 1997)

21. Conflict resolution and dynamic disable capabilities for legacy FDC
Required
The FDC must be capable of being disabled. For example, if the FDC is located on the system board and an adapter card that includes an FDC is added to the system, the system-board FDC must be capable of being disabled to prevent conflicts with the new card. If the FDC is located on an expansion card, the expansion card must allow independent dynamic disabling of the FDC and the hard disk controller (HDC). In this case, the adapter will continue to function if the FDC is disabled because of conflicts, and vice versa.

Hard Disk Drives

This section summarizes specific requirements for hard disk drives.

Note In the "ATA and ATAPI" chapter in Part 3 of this guide, BIOS support is required for a logical block addressing (LBA) scheme compatible with the BIOS/CMOS and IDE register set constraints. This enables support for IDE disk drives larger than 528 MB.

22. Compliant with all general storage device requirements
Required
These are defined in the "System Requirements for Storage Peripherals" section earlier in this chapter.

Note The recommendation for bus mastering for hard disk controllers will become a requirement in 1998.

23. Drive spin-up time supports OnNow capabilities

Recommended

The hard disk drive should spin up and be able to complete a Read operation within six seconds of applying power and within three seconds of leaving the ATA Standby Immediate mode.

This recommendation supports the OnNow design initiative goals for a system that is “instantly” available when power is applied.

Version 1.1 Correction:
The recommended time for leaving the ATA Standby Immediate mode is 5 seconds, as defined in the Storage Device Class Power Management Reference Specification. (Change date: February 21, 1997)

24. IDE drive supports M, S, and CS settings

Required

Version 1.1 Correction:
Recommended

The IDE hard disk drive must be configurable as Master, Slave, or Cable Select.

Version 1.1 Change:

Change Requirements for Large EIDE Storage Drives:
For vendors who intend to sell EIDE storage devices in the retail upgrade market with greater than 4095 cylinders (that is, greater than 2.1 GB), the following is required in order to receive the "Designed for Windows NT and Windows 95" or "Designed for Windows NT" logo.
Note *Must* means required; *should* means recommended.

- The drive should be shipped in a configuration such that no additional work is needed when the drive is added to a system that has BIOS support for more than 4095 cylinders. Most shipping systems provide this support.
- For systems that do not have BIOS support, the vendor must allow an "easy" method of limiting the cylinders to less than 4095 cylinders (via a switch or jumpers, software, or clear documentation), and must include a software solution for addressing the full capacity of the drive that works with both Windows 95 and Windows NT.
- The drive must ship with a highly visible message with information on special instructions for this drive. A sticker or similar obstruction over the interface of the drive is preferred for end users. However, a brightly colored paper or similar method to flag the end user's attention will suffice. Information on this sticker or insert can point to the installation guide, where it must say something to the effect that “this device might cause a system lockup” or “problems might be solved by updating your BIOS from your system vendor.”
- The documentation must have clear descriptions and diagrams of the needed jumper settings (if a jumper is used) to properly access the full capacity of the drive if there is a problem with the shipped configuration. The documentation

must include clear instructions of what to do if (a) the system does not boot when the drive is installed and (b) the system does not recognize the drive once the drive is installed.

- If a jumper is used, the drive should have a diagram of the jumper settings on the actual drive in addition to the diagram in the installation guide.
- The vendor should ship a partial list of BIOS versions that are known to cause problems or that need the drive to have different jumper settings. This list does not need to be complete.
- The documentation must not list Microsoft, Windows 95, or Windows NT as possible sources of the problem. The documentation must not lead the user to prefer to call Microsoft phone support over that of the drive vendor or system vendor. The documentation should suggest that the user contact the system vendor for a BIOS upgrade.
- A sample of the highly visible message and the final documentation must be included in the drive submission to WHQL.

If this storage device is to be sold only to an OEM market, these requirements do not apply. In that case, the vendor must provide WHQL with written documentation stating that the device is for OEM sales only. Should the vendor at a later time make this device available to the retail market, it must be retested under the above requirements or face revocation of the logo rights by Microsoft Corporation. (Change date: June 30, 1997)

CD-ROM Peripherals

This section summarizes the requirements for CD-ROM peripherals and the specific features for PC 97.

25. Compliant with all general storage device requirements
Required

These are defined in the “System Requirements for Storage Peripherals” section earlier in this chapter.

Note The recommendation for bus mastering for CD-ROM will become a requirement in 1998.

26. Performance: 4x or higher
Required

The CD-ROM drive must perform at this minimum level when running in the Fully On power state. However, a device can spin slower when running in lower power states, as defined in the “Device Class Power Management Reference Specification” for the storage device class.

27. CD Enhanced compatible

Required

For PC 97, the CD-ROM drive must be able to mount multisession CD-ROM disks, even if track 1 is Red Book audio. Microsoft recommends use of the Sony ReadTOC method for SCSI-2 multisession support as noted in the ATAPI SFF 8020i rev. 2.5.

CD Enhanced support must be Blue Book compliant, as defined in Enhanced Music CD Specification v. 1.0.

28. Supports required CD formats
Required
At a minimum, the CD-ROM device must be compatible with these formats to ensure cross-media compatibility:

- Logical formats: CD Red Book, Yellow Book, White Book, and Blue Book.
- Physical formats: CD-E, CD-R2, CD-ROM, and CD-Audio.

CD-R (Orange Book format) can be implemented. There are no PC 97 requirements or recommendations.

Version 1.1 Change:
For CD-ROM and DVD devices, support will **not** be required for CD-R2 or CD-Erasable physical formats. (Change date: January 30, 1997; Change date for CD-E: May 13, 1997)

29. CD changer
Optional
If an ATAPI-compatible CD changer is present (seven discs or less capacity), the device must be compliant with ATAPI SFF 8020i v. 2.6 or higher.

30. System BIOS supports El Torito No Emulation mode if CD-ROM is the boot device
Required
For PC systems that use CD-ROM as the boot device, the system BIOS must support the No Emulation mode defined in the specification "El Torito—Bootable CD-ROM Format Specification Version 1.0," published by IBM and Phoenix.

Rewritable ATAPI Devices

This section summarizes specific requirements for optical storage devices.

31. Compliant with all general storage device requirements
Required
These are defined in the "System Requirements for Storage Peripherals" section earlier in this chapter.

32. Compliant with SFF 8020i v. 2.6 or higher
Required
This specification defines the requirements for ATAPI rewritable devices, including specifications for LUN implementation, media status notification, and device write protection.

Version 1.1 Correction:
The correct specification citation is SFF 8070i. (Change date: February 21, 1997)

33. Support Read Format Capacities command
Required
This requirement is defined in SFF 8020i v. 2.6.

Version 1.1 Correction:
The correct specification citation is SFF 8070i. (Change date: February 21, 1997)

DVD Devices

This section summarizes specific requirements for DVD devices.

The industry is currently involved in defining standards for DVD. Microsoft is working with the industry to define a command set for DVD. When this command set is adopted in the industry, support for this command set will be required for PC 97.

34. Compliant with all general storage device requirements

Required

These are defined in the "System Requirements for Storage Peripherals" section earlier in this chapter.

Note Bus mastering for DVD-ROM is a requirement for PC 97.

35. Meets minimum compatibility requirements

Required

At a minimum, the DVD device must be compatible with these formats to ensure that earlier media can be read by the DVD device:

- Logical formats: CD Red Book, Yellow Book, White Book, and Blue Book.
- Physical formats: CD-R2, CD-ROM, CD-Audio, and DVD-ROM.

Version 1.1 Change:
For CD-ROM and DVD devices, support will **not** be required for CD-R2 or CD-Erasable physical formats. (Change date: January 30, 1997; Change date for CD-E: May 13, 1997)

36. Compliant with command sets for DVD

Required

The device must be compliant with SFF 8020i v. 3.0 or higher for ATAPI DVD-ROM drivers. Specifications for SCSI or IEEE 1394 DVD-ROM drives are yet to be defined.

Version 1.1 Correction:
The device and driver must support the command set defined in SFF 8090 (Mt. Fuji specification). Specifically, the device and driver must support the commands in the following list. (Change date: February 21, 1997; command set added May 13, 1997)

Code	Command name	Code	Command name
12h	Inquiry	42h	Read subchannel
00h	Test unit ready	Beh	Read CD
03h	Request sense	B9h	Read CD MSF
55h	Mode select (10)	45h	Play audio (10)
5Ah	Mode sense (10)	47h	Play audio MSF

BDh	Mechanism status	4Bh	Pause/resume
25h	Read C/DVD capacity	4Eh	Stop play/scan
23h	Read formatted capacities	BAh	scan
Adh	Read DVD structure	28h	Read (10)
A8h	Read (12)	08h	ATAPI soft reset
A7h	Set read ahead	E5h	Check power mode
1Bh	Start/stop unit	90h	Execute drive diagnostic
1Eh	Prevent/allow medium removal	E1h	Idle immediately
2Bh	Seek	00h	NOP
4Ah	Get event status notification	A0h	ATAPI packet
A4h	Report key	A1h	ATAPI identify device
A3h	Send key	Efh	Set features
43h	Read TOC	E6h	Sleep
44h	Read header	E0h	Standby immediate

37. High-speed expansion bus

Required

The DVD hardware must use a bus that supports high-speed transfer of multiple data types. Any DVD controller must be capable of sustained rates of 12 megabits per second at a minimum.

38. System supports PC 97 DVD playback requirements, if DVD drive support video discs

Basic PC 97	*Workstation PC 97*	*Entertainment PC 97*
Required with DVD-Video	*Required with DVD-Video*	*Required*

Systems that support video discs must be capable of properly decoding and displaying or playing the appropriate data streams. For information about the PC 97 required support for DVD playback, see the “Video Components” chapter in Part 4 of this guide.

39. File system accessible from the Windows operating system
Required

The drive will support Universal Disk Format (UDF) as defined in the DVD Alliance specification.

40. Push-to-close design, if motorized capabilities are included
Required

A motorized design is not required, but if it is implemented, the device must be designed so the user has three options to close the device when inserting a disc:

- Physically push on the bay
- Physically push the close button on the bay housing
- Select software-supported option to close the device

41. Defect management
Required

The drive must support defect management that is transparent to the operating system according to industry standards.

42. Copy protection

Basic PC 97	*Workstation PC 97*	*Entertainment PC 97*
Recommended	*Recommended*	*Required*

The drive should support the copy protection of movie and software content.

References and Resources for Storage

This section lists resources for building storage hardware that works with the Windows operating system.

Plug and Play specifications
http://www.microsoft.com/hwdev/pnpspecs.htm

Microsoft Media Status Notification specifications
http://www.microsoft.com/hwdev/respec/

Multisession Compact Disc Specification
Enhanced Music CD Specification v. 1.0
Philips Consumer Electronics B.V.
Coordination Office Optical–Magnetic Media Systems
Building SWA-109, P.O. Box 80002
5600 JB Eindhoven, The Netherlands
Fax: (31) (40) 732113

Sony/Philips CD-ROM hardware logo program:
Bert Gall, Philips Consumer Electronics
Philips Consumer Electronics B.V.

IDE and SCSI Interface Specifications
Global Engineering Documents
U.S. and Canada: (800) 854-7179
Other locations: (303) 792-2181
Fax: (303) 792-2192

ATA 2 [X3T9.2 948D]
ATA Packet Interface for CD-ROMs, SFF 8020i
Small Computer Interface (SCSI-2)
Small Computer Interface (SCSI-3) Parallel Interface (SPI)
Small Form Factor Committee (SFF) Publications
FaxAccess: (408) 741-1600 (fax-back)

Windows 95 DDK and Windows NT DDK
MSDN Professional membership
The Windows 95 DDK includes the "Int 13h Extensions API."

Device Class Power Management Reference Specification
http://www.microsoft.com/hwdev/onnow.htm

Device driver support for FAT32 partitions
http://www.microsoft.com/hwdev/devdes/fat32.htm

Version 1.1 References Update:
ATA-2 [X3T9.2 948D], *ATA Packet Interface for CD-ROMs,* SFF 8020i, and other SFF Committee publications
ftp://fission.dt.wdc.com/pub/standards/SFF/specs/

Device Bay Interface Specification, Version 1.0
http://www.device-bay.org

Device driver support for storage devices and DVD white papers
http://www.microsoft.com/hwdev/devdes/

DVD Specification, Book A: Physical Specifications, Toshiba Corporation
http://www.toshiba.com

El Torito—Bootable CD-ROM Format Specification, Version 1.0
http://www.ptltd.com/techs/specs.html

FAT32 partition device driver support
http://www.microsoft.com/hwdev/devdes/

IDE and SCSI specifications
SFF Committee publications
FaxAccess: (408) 741-1600 (fax-back)
Fax: (408) 867-2115

Global Engineering Documents
Phone: (800) 854-7179 (US)
(613) 237-4250 (Canada)
(303) 792-2181 (Outside North America)
Fax: (303) 397-2740
ftp://ftp.symbios.com/pub/standards/io/

Media Status Notification Support Specification, Version 1.03
Plug and Play specifications
SMART IOCTL API Specification, Version 1.1
http://www.microsoft.com/hwdev/respec/

Multisession Compact Disc Specification
Enhanced Music CD Specification, Version 1.0
Philips Consumer Electronics B.V.
Coordination Office Optical–Magnetic Media Systems
Building SWA-109, PO Box 80002
5600 JB Eindhoven, The Netherlands
Fax: (31) (40) 732113

Sony/Philips CD-ROM hardware logo program:
Bert Gall, Philips Consumer Electronics
Philips Consumer Electronics B.V.

Storage Device Class Power Management Reference Specification, Version 1.0
http://www.microsoft.com/hwdev/onnow.htm

Universal Disk Format Specification, Version 1.02
http://www.osta.org

Universal Serial Bus Device Class Definition for Mass Storage Devices, Version 1.0
Phone: (503) 264-0590
Fax: (503) 693-7975
http://www.usb.org

WDM device driver support white papers
http://www.microsoft.com/hwdev/desinit/

Windows DDK, Windows NT DDK, and Win32 SDK
MSDN Professional membership
(The Windows DDK includes information about the Int 13h Extensions API.)

Checklist for Storage

Basic PC 97 *Workstation PC 97* *Entertainment PC 97*

System Requirements for Storage Peripherals

Storage Peripherals Basic Features

1. Bus master capabilities
Recommended for hard disk controller and CD-ROM
Required for DVD-ROM

2. Media status notification support for removable media
Recommended

3. Support Int 13h Extensions in option ROMs
Required

4. General device requirements
Required

5. Device meets requirements for port or bus
Required

6. Easy installation for end user
Recommended

PC 97 Design for Storage Components

7. Plug and Play device identifier
Required

8. Conflict resolution and dynamic disable capabilities
Required

9. 3F7h and 377h unclaimed by devices
Required

10. Compliance with "Device Class Power Management Reference Specification"
Required

11. Support Wakeup Events defined in "Device Class Power Management Reference Specification"
Optional

12. Device driver and installation meet Windows and Windows NT standards
Required

13. Device and file system run in protected mode after installation
Required

14. Applications provided with the device meet Windows standards
Required

15. Device driver for partitioned media supports FAT32 partitions
Required

16. Block-mode device driver supports extended BPBs
Required

Floppy Disk Drive Controller

17. Floppy disk capabilities provided through expansion card or external bus
Recommended

18. Legacy floppy disk controller built into system
Optional

19. FDC compliant with all general storage device requirements
Required

20. Resource configuration for legacy FDC device
Required

21. Conflict resolution and dynamic disable capabilities for legacy FDC
Required

Hard Disk Drives

22. Compliant with all general storage device requirements
Required

23. Drive spin-up time supports OnNow capabilities
Recommended

24. IDE drive supports M, S, and CS settings
Recommended

CD-ROM Peripherals

25. Compliant with all general storage device requirements
Required

26. Performance: 4x or higher
Required

27. CD Enhanced compatible
Required

28. Supports required CD formats
Required

29. CD changer
Optional

30. System BIOS supports El Torito No Emulation mode if CD-ROM is the boot device
Required

Rewritable ATAPI Devices

31. Compliant with all general storage device requirements
Required

32. Compliant with SFF 8020i v. 2.6 or higher
Required

33. Support Read Format Capacities command
Required

DVD Devices

34. Compliant with all general storage device requirements
Required

35. Meets minimum compatibility requirements
Required

36. Compliant with command sets for DVD
Required

37. High-speed expansion bus
Required

Basic PC 97	*Workstation PC 97*	*Entertainment PC 97*
38. System supports PC 97 DVD playback requirements, if DVD drive support video discs		
Required with DVD-Video	*Required with DVD-Video*	*Required*
39. File system accessible from the Windows operating system		
Required		
40. Push-to-close design, if motorized capabilities are included		
Required		
41. Defect management		
Required		
42. Copy protection		
Recommended	*Recommended*	*Required*