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## A P P E N D I X F

# PC 98 Master Checklist

If a recommended feature is implemented, it must meet the PC 98 requirements for that feature as defined in this document.

## Checklist for Basic PC 98

Consumer PC 98	Office PC 98	Entertainment PC 98
1. System performance meets PC 98 minimum requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
2. System design meets ACPI 1.0 specification and PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
3. Hardware design supports OnNow initiative <i>Required</i>	<i>Required</i>	<i>Required</i>
4. BIOS meets PC 98 requirements for OnNow support <i>Required</i>	<i>Required</i>	<i>Required</i>
5. BIOS meets PC 98 requirements for boot support <i>Required</i>	<i>Required</i>	<i>Required</i>
6. All expansion slots in the system are accessible for users to insert cards <i>Required</i>	<i>Required</i>	<i>Required</i>
7. Audible noise meets PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
8. System and component design practices follow accessibility guidelines <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
9. Internal system modification capabilities are not accessible to end users <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
10. System design provides physical security <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
11. Each device and driver meets PC 98 device requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
12. Each bus and device meets Plug and Play specifications <i>Required</i>	<i>Required</i>	<i>Required</i>

Consumer PC 98	Office PC 98	Entertainment PC 98
13. Unique Plug and Play device ID provided for each system device and add-on device <i>Required</i>	<i>Required</i>	<i>Required</i>
14. Option ROMs meet Plug and Play requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
15. “PNP” vendor code used only to define a legacy device’s <i>Required</i>	<i>Required</i>	CompatibleID <i>Required</i>
16. Device driver and installation meet PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
17. Minimal user interaction needed to install and configure devices <i>Required</i>	<i>Required</i>	<i>Required</i>
18. Connections use icons plus keyed or shrouded connectors <i>Required</i>	<i>Required</i>	<i>Required</i>
19. Hot-plugging capabilities for buses and devices meet PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
20. Device Bay-capable bay and peripherals meet Device Bay specification <i>Required</i>	<i>Required</i>	<i>Required</i>
21. Multifunction add-on devices meet PC 98 device requirements for each device <i>Required</i>	<i>Required</i>	<i>Required</i>
22. All devices support correct 16-bit decoding for I/O port addresses <i>Required</i>	<i>Required</i>	<i>Required</i>
23. System-board devices use ISA-compatible addresses <i>Required</i>	<i>Required</i>	<i>Required</i>
24. Each bus meets written specifications and PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
25. System includes USB with one USB port, minimum <i>Required</i>	<i>Required</i>	<i>Required, with 2 USB ports</i>
26. System includes support for other high-speed expansion capabilities <i>Recommended</i>	<i>Recommended</i>	<i>Required, with 2 IEEE 1394 ports</i>
27. If present, PCI bus meets PCI 2.1 or higher, plus PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
28. System does not include ISA expansion devices <i>Required</i>	<i>Required</i>	<i>Required, with no ISA slots</i>
29. System includes keyboard connection and keyboard <i>Required</i>	<i>Required</i>	<i>Required; USB or wireless</i>
30. System includes pointing-device connection and pointing device <i>Required</i>	<i>Required</i>	<i>Required; USB or wireless</i>
31. System includes connection for external parallel devices <i>Required</i>	<i>Required</i>	<i>Required</i>
32. System includes connection for external serial devices <i>Required</i>	<i>Required</i>	<i>Required</i>

Consumer PC 98	Office PC 98	Entertainment PC 98
33. System includes wireless capabilities <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
34. System includes support for operating system installation <i>Required</i>	<i>Required</i>	<i>Required</i>
35. System audio support meets PC 98 requirements <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
36. System includes communications device <i>Required; modem</i>	<i>Required; network adapter</i>	<i>Required; modem</i>
37. System includes smart card support <i>Not applicable</i>	<i>Recommended</i>	<i>Not applicable</i>
38. Graphics adapter meets PC 98 minimum requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
39. Adapter supports television output if system does not include a large-screen monitor <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
40. Color monitor is DDC-compliant with unique EDID identifier <i>Required</i>	<i>Required</i>	<i>Required</i>
41. System meets PC 98 DVD-Video and MPEG-2 playback requirements <i>Required</i>	<i>Required with DVD-Video</i>	<i>Required</i>
42. System supports PC 98 analog video input and capture capabilities <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
43. System includes analog television tuner <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
44. System BIOS and option ROMs support Int 13h Extensions <i>Required</i>	<i>Required</i>	<i>Required</i>
45. Host controller for storage device meets PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
46. Host controllers and devices support bus mastering <i>Required</i>	<i>Required</i>	<i>Required</i>
47. Hard drive meets PC 98 requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
48. Removable media support media status notification <i>Required</i>	<i>Required</i>	<i>Required</i>
49. Floppy disk capabilities are provided using an expansion card or external bus <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
50. System supports WHIIG <i>Not applicable</i>	<i>Required</i>	<i>Not applicable</i>
51. System includes driver support for WMI <i>Not applicable</i>	<i>Required</i>	<i>Not applicable</i>
52. Management information service provider enabled by default <i>Not applicable</i>	<i>Required</i>	<i>Not applicable</i>
53. Expansion devices can be remotely managed <i>Not applicable</i>	<i>Required</i>	<i>Not applicable</i>

## Checklist for Workstation PC 98

1. Workstation meets all requirements for Office PC 98  
*Required*
2. Workstation meets requirements for optimal performance  
*Required*
3. Workstation supports multiple processors  
*Recommended*
4. Workstation RAM can be expanded  
*Recommended*
5. Workstation system memory includes ECC memory protection  
*Required*
6. Workstation includes APIC support  
*Required*
7. Workstation includes high-performance components  
*Recommended*
8. Workstation supports 64-bit I/O bus architecture  
*Recommended*
9. Workstation does not include ISA expansion slots  
*Recommended*
10. Graphics subsystem supports workstation performance demands  
*Required*
11. Workstation meets PC 98 DVD-Video and MPEG-2 playback requirements  
*Required, with DVD-Video*
12. Storage components rely on SCSI controller  
*Recommended*
13. Workstation includes multiple hard drives  
*Recommended*

## Checklist for Entertainment PC 98

1. Entertainment PC 98 system includes two USB ports, with at least one easily accessible connector  
*Required*
2. Entertainment PC 98 system includes two IEEE 1394 ports, with at least one easily accessible connector  
*Required*
3. Entertainment PC 98 system does not include ISA expansion slots  
*Required*
4. All Entertainment PC 98 input devices meet USB HID specifications  
*Required*
5. Entertainment PC 98 includes remote-control pointing device  
*Recommended*
6. All Entertainment PC 98 pointing devices support DirectInput and work simultaneously  
*Required*
7. Entertainment PC 98 includes data/fax/voice modem that supports V.pcm  
*Required*
8. Entertainment PC 98 includes DVD-ROM drive and DVD-Video playback  
*Required*
9. Audio support meets PC 98 audio and Entertainment PC 98 requirements  
*Required*
10. Graphics adapter uses AGP  
*Required*
11. Entertainment PC 98 graphics subsystem includes PC 98 hardware acceleration for 2-D and 3-D graphics  
*Required*
12. Entertainment PC 98 graphics subsystem includes support for television output if the system doesn't have a large-screen monitor  
*Recommended*
13. Entertainment PC 98 includes large-screen DDC2B color entertainment monitor  
*Recommended*
14. Entertainment PC 98 DVD-Video and MPEG-2 playback meet PC 98 requirements  
*Required*
15. Entertainment PC 98 supports PC 98 analog video input and capture capabilities  
*Required*
16. Entertainment PC 98 includes analog television tuner  
*Required*
17. Entertainment PC 98 includes digital broadcast satellite subsystem  
*Recommended*
18. Entertainment PC 98 includes DTV support  
*Required*

## Checklist for Mobile PC 98

1. Mobile PC performance meets PC 98 minimum requirements  
*Required*
2. Mobile PC supports Smart Battery or ACPI-specified battery  
*Required*
3. Expansion capabilities of mobile PC are accessible to users  
*Required*
4. Mobile PC connections use icons plus keyed or shrouded connectors  
*Required*
5. Mobile PC includes a USB port  
*Required*
6. Mobile PC includes an IEEE 1394 port  
*Recommended*
7. USB-connected device does not maintain fully on power state  
*Required*
8. Mobile PC includes CardBus  
*Required*
9. Mobile PC keyboard and pointing device meet PC 98 requirements  
*Required*
10. Mobile PC includes wireless capabilities  
*Recommended*
11. Mobile PC includes support for installing the operating system  
*Required*
12. Mobile PC audio meets PC 98 audio requirements  
*Recommended*
13. Mobile PC includes communications device  
*Recommended*
14. Built-in display adapter meets PC 98 minimum requirements  
*Required*
15. Mobile system supports hot pluggable devices and alternative server connections  
*Recommended*
16. Mobile PC/docking station combination meets PC 98 requirements  
*Required*

17. Docking station meets all Basic PC 98 requirements

*Required*

18. Docking station interface is supported using ACPI-defined mechanisms

*Required*

19. Mobile PC/docking station combination supports automatic resource assignment and dynamic disable capabilities

*Required*

20. Docking station supports warm docking

*Required*

21. Docking system supports fail-safe docking

*Required*

22. Port replicator supports automatic resource assignment and dynamic disable capabilities for replacement devices

*Required*

23. Port replicator supports warm docking

*Required*

24. Mini-notebook performance meets PC 98 minimum requirements

*Required*

## Checklist for USB

1. USB included on PC 98 system

*Required*

2. All USB hardware complies with USB 1.0 specifications

*Required*

3. Connections use USB icon

*Required*

4. Devices and drivers support maximum flexibility of hardware interface options

*Recommended*

5. USB host controller meets either OpenHCI or UHCI specification

*Required*

6. USB host controller can wake the system

*Required*

7. System and devices comply with USB power management requirements

*Required*

8. USB devices meet requirements in related USB device class specification

*Required*

## Checklist for IEEE 1394

1. Controllers and devices support IEEE 1394-1995 standards  
*Required*
2. Controllers comply with OpenHCI for IEEE 1394  
*Required*
3. OpenHCI controllers and devices support advances defined in IEEE 1394A  
*Required*
4. Host supports peak data rate of 400 Mb/s, minimum  
*Required*
5. Design avoids excessive currents resulting from ground-fault potential among devices  
*Recommended*
6. Device command protocols conform to standard device class interfaces  
*Required*
7. Devices support peak data rate of 400 Mb/s, minimum  
*Recommended*
8. Devices requiring support for high-bandwidth data transfer use IEEE 1394  
*Recommended*
9. Plug and Play devices demonstrate interoperability with other devices  
*Required*
10. Topology faults do not cause the bus to fail  
*Required*
11. Removable media devices support media status notification  
*Required*
12. Devices that can initiate peer-to-peer communications also support remote programming  
*Required*
13. Device provides a configuration ROM for unique device identification  
*Required*
14. Device configuration ROM implements general ROM format  
*Required*
15. Bus information block implemented at a base address offset of 0404h  
*Required*
16. Configuration ROM provides globally unique device ID  
*Required*
17. Root directory is located at a fixed address following the bus information block  
*Required*
18. Configuration ROM includes a unit directory for each independent device function  
*Required*
19. Each unit directory provides a valid Unit\_Spec\_Id and Unit\_Sw\_Version  
*Required*



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20. Each unit directory provides a pointer to a unit-dependent directory  
*Required*
  21. Vendor and model leaves support textual descriptor leaf format  
*Required*
  22. Unit-dependent directory provides a pointer to the unit's CSRs  
*Required*
  23. Device provides three connector ports  
*Recommended*
  24. Device uses standard 6-pin IEEE 1394 connector  
*Required*
  25. Self-powered devices propagate the power bus through each connector  
*Required*
  26. Only single-port leaf-node devices use 4-pin connectors  
*Required*
  27. Device connectors exhibit common speed and power characteristics  
*Required*
  28. Standard 400-Mb/s rated IEEE 1394 cable provided with devices  
*Required*
  29. Devices power their PHY at all times  
*Required*
  30. Devices report power source and cable power consumption in Self\_id packet  
*Required*
  31. Devices implement link power control  
*Required*
  32. Device requiring power increments in excess of Link\_on implements unit-power CSRs  
*Required*
  33. Devices that source cable power must report this capability  
*Required*
  34. IEEE 1394-enabled PC sources cable power  
*Required*
  35. Power source supplies a minimum of 20 volts at 15 watts  
*Recommended*
  36. Devices notify the power manager of power change requests  
*Required*
  37. Devices and controllers comply with Cable Power Distribution specification  
*Required*
  38. Devices and controllers comply with IEEE 1394 power specification  
*Required*

## Checklist for PCI

1. All components comply with PCI 2.1  
*Required*
2. System does not contain ghost cards  
*Required*
3. System uses standard method to close BAR windows on nonsubtractive decode PCI bridges  
*Required*
4. System supports PCI docking through a bridge connector  
*Recommended*
5. PCI chip sets support Ultra DMA/33  
*Required*
6. System-board bus complies with PCI 2.1  
*Required*
7. Bus master privileges are supported for all connectors  
*Required*
8. ISA Write Data Port address is propagated to the ISA bus at power up  
*Required*
9. Functions in a multifunction PCI device do not share writable PCI Configuration Space bits  
*Required*
10. Devices use PCI 2.1 Configuration Space register for Plug and Play device ID  
*Required*
11. Device IDs include PCI 2.1 Subsystem IDs  
*Required*
12. Configuration Space is correctly populated  
*Required*
13. Interrupt routing supported using ACPI  
*Required*
14. BIOS does not configure I/O systems to share PCI interrupts  
*Recommended*
15. BIOS configures boot device IRQ and writes to the interrupt line register  
*Required*
16. Hot swapping for any PCI device uses ACPI-based methods  
*Required*
17. All PCI components comply with PCI Bus Power Management Interface specification  
*Required*

## Checklist for IDE and ATAPI

1. Controller complies with ATA-2 specification  
*Required*
2. Bootable IDE controller supports El Torito No Emulation mode  
*Required*
3. System BIOS and option ROMs support Int 13h Extensions  
*Required*
4. Controller and peripherals support media status notification  
*Required*
5. Dual IDE adapters use single FIFO with asynchronous access or dual FIFOs and channels  
*Required*
6. System BIOS and devices support LBA  
*Required*
7. Controller and peripherals support PCI IDE bus mastering  
*Required*
8. Controller and peripheral connections include Pin 1 cable designation with keyed and shrouded connectors  
*Required*
9. Peripherals comply with SFF 8020i, Version 2.5 or higher  
*Required*
10. BIOS enumeration of all ATAPI devices complies with SFF 8020i, Version 2.5 or higher  
*Required*
11. Devices support ATAPI RESET command  
*Recommended*
12. IDE/ATAPI controllers and devices support Ultra DMA/33  
*Required*
13. Operating system recognizes the boot drive in a multiple-drive system  
*Required*
14. Each device has a Plug and Play device ID  
*Required*
15. Dynamic resource configuration supported for all devices  
*Required*
16. Resource configuration meets bus requirements  
*Required*
17. ISA address ranges 3F7h and 377h are not claimed by IDE controllers  
*Required*
18. Device supports ATA STANDBY command  
*Required*
19. Bus and device meet PC 98 power management requirements  
*Required*

## Checklist for SCSI

1. Host controller supports bus mastering  
*Required*
2. Option ROMs support Int 13h Extensions  
*Required*
3. Option ROMs support virtual DMA services  
*Required*
4. Bus type is clearly indicated on connectors for all adapters, peripherals, and terminators  
*Required*
5. Differential devices support DIFFSENS as defined in SCSI-3  
*Required*
6. Automatic termination circuit meets SCSI-3 specification  
*Required*
7. SCSI terminator built onto internal cables meets SCSI-3 specification  
*Required*
8. Terminator power is supplied to the SCSI bus, with over-current protection  
*Required*
9. High-density external connector meets SCSI-2 specification  
*Required*
10. Internal terminator is close as possible to the last peripheral on the cable  
*Recommended*
11. SCSI bus parity signal meets SCSI-2 specification  
*Required*
12. Cables meet SCSI-3 Clause 6 requirements  
*Required*
13. User cannot incorrectly plug in cables for internal connections  
*Required*
14. Internal SCSI peripherals do not terminate the SCSI bus  
*Recommended*
15. External connectors use automatic termination or an accessible on-board termination switch  
*Required*
16. High-density, shielded device connector meets SCSI-2 specification  
*Recommended*
17. Removable media includes media status notification support  
*Recommended*
18. All components comply with Plug and Play SCSI specifications  
*Required*
19. Each device has a Plug and Play device identifier  
*Required*

20. Automatic resource assignment and dynamic disable capabilities are supported for all devices

*Required*

21. Bus and device meet PC 98 power requirements

*Required*

22. Hardware supports the STOP/START UNIT command as defined in SCSI-2

*Required*

23. STOP/START UNIT command can be used to decrease power consumption

*Recommended*

## Checklist for PC Card

1. All devices comply with the PC Card standards

*Required*

2. System and ZV-compatible PC Card 16 cards comply with ZV standard definitions

*Required*

3. Controller supports industry-standard ExCA register set

*Required*

4. System maintains mapping of IRQ Routing Register bits to system interrupt vectors

*Required*

5. IRQ connections can be determined by using the 0805 register

*Required*

6. CardBus controllers support both ISA and PCI interrupts

*Required*

7. System supports industry-standard definition for CardBus bridges

*Required*

8. BIOS initializes CardBus controller in 82365-compatible mode and supports backward compatibility

*Recommended*

9. CardBus controllers do not share writable PCI Configuration Space bits

*Required*

10. Each PC Card 16 memory window in CardBus controller has its own page register

*Required*

11. Card supports required I/O card tuples

*Required*

12. Configuration table entry tuples listed in priority order

*Required*

13. Card specifies maximum configuration options

*Required*

14. Configuration space meets Common Silicon Guidelines

*Required*

- 15. RESERVED fields comply with PCI 2.1  
*Required*
- 16. CardBus card implements required and recommended tuples  
*Required*
- 17. Socket controller complies with device class power management reference specification  
*Required*
- 18. PC Card 16 cards implement power-related events using ReqAttn bit and #STSCHG mechanism  
*Required*
- 19. CardBus controllers and cards implement power management specifications  
*Required*
- 20. No user intervention required for correctly installing devices  
*Required*
- 21. Device is immediately functional without restarting the system  
*Required*
- 22. ZV-compatible PC Card driver uses DirectDraw LVE  
*Required*
- 23. PC Card 16 card driver supports sharing of level-mode interrupts  
*Required*

Checklist for I/O Ports and Devices

Consumer PC 98	Office PC 98	Entertainment PC 98
1. System includes connection for external serial devices <i>Required</i>	<i>Required</i>	<i>Required</i>
2. System includes connection for external parallel devices <i>Required</i>	<i>Required</i>	<i>Required</i>
3. System includes external connection for keyboard <i>Required</i>	<i>Required</i>	<i>Required</i>
4. System includes external connection for pointing device <i>Required</i>	<i>Required</i>	<i>Required</i>
5. System includes USB game pad or joystick <i>Recommended</i>	<i>Recommended</i>	<i>Recommended; wireless</i>
6. System includes built-in wireless capabilities <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
7. Devices use USB or external bus connections rather than legacy serial or parallel ports <i>Required</i>	<i>Recommended</i>	<i>Required</i>
8. All devices meet PC 98 general device requirements <i>Required</i>	<i>Required</i>	<i>Required</i>
9. Serial port meets device class specifications for its bus <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
10. Legacy serial port is implemented as 16550A UART or equivalent and supports 115.2K baud <i>Required</i>		
11. Legacy serial port supports flexible resource configuration and dynamic disable capabilities <i>Required</i>		
12. Conflict resolution for legacy serial port ensures availability of at least one serial port <i>Required</i>		
13. Parallel port meets device class specifications for its bus <i>Required</i>		
14. Flexible resource configuration supported for each parallel port <i>Required</i>		
15. EPP support does not use restricted I/O addresses <i>Required</i>		
16. Compatibility, nibble mode, and ECP protocols meet IEEE 1284-1994 specifications <i>Required</i>		
17. Port connectors meet IEEE 1284-I specifications, minimum <i>Required</i>		
18. IEEE 1284 peripherals have Plug and Play device IDs <i>Required</i>		
19. Device identification string provides CompatibleID key <i>Recommended</i>		
20. Pointing-device connection meets requirements for its bus class <i>Required</i>		
21. Remote control provides PC 98 minimum support <i>Recommended</i>		
22. Keyboard connection meets requirements for its bus class <i>Required</i>		
23. No interference occurs between multiple keyboards <i>Required</i>		
24. Keyboard includes Windows and Application logo keys <i>Recommended</i>		
25. Device meets USB HID class specification requirements <i>Required</i>		
26. IR device uses NDIS 5.0 miniport driver <i>Required</i>		
27. IR device meets IrDA specifications <i>Required</i>		
28. IR device meets IrDA Control IR specification <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
29. IR device meets PC 98 bus and port specifications <i>Required</i>		
30. IR device meets USB guidelines for interfacing with IrDA and Control IR devices <i>Required</i>		
31. IR device supports flexible resource configuration and dynamic disable capabilities <i>Required</i>		
32. System supports standard input speeds of 4 Mb/s <i>Recommended</i>		
33. System differentiates command streams if transceiver includes legacy consumer IR support <i>Required</i>		
34. Each device has a unique Plug and Play device ID <i>Required</i>		
35. Automatic resource assignment and dynamic disable capabilities are supported <i>Required</i>		
36. Each device complies with its device class power management reference specification <i>Required</i>		
37. Device supports wake-up events <i>Required for wireless input; optional for other devices</i>		
38. Device drivers and installation meet PC 98 requirements <i>Required</i>		

## Checklist for Graphics Adapters

Consumer PC 98	Office PC 98	Entertainment PC 98
1. Graphics adapter uses PCI, AGP, or another high-speed bus <i>Required</i>	<i>Required</i>	<i>AGP required</i>
2. System uses WC with higher-performance processors <i>Required</i>	<i>Required</i>	<i>Required</i>
3. Primary graphics adapter works normally with default VGA mode driver <i>Required</i>	<i>Required</i>	<i>Required</i>
4. Adapter and driver support multiple adapters and multiple monitors <i>Required</i>	<i>Required</i>	<i>Required</i>
5. Adapter supports television output if system does not include large-screen monitor <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>



Consumer PC 98	Office PC 98	Entertainment PC 98
6. Adapter meets PC 98 general device requirements <i>Required</i>		
7. Screen resolution and local memory capacity meet PC 98 minimum requirements <i>Required</i>		
8. Adapter meets VESA specifications for ergonomic timing rates <i>Required</i>		
9. All supported color depths are enumerated <i>Required</i>		
10. Graphics operations use relocatable registers only <i>Required</i>		
11. Adapter supports downloadable RAMDAC entries for image color matching <i>Required</i>		
12. Adapter supports DDC monitor detection <i>Required</i>		
13. Adapter supports video overlay surface with scaling <i>Required</i>		
14. Hardware supports VGA destination color keying for video rectangle <i>Required</i>		
15. Video port meets PC 98 specifications if present on graphics adapter <i>Required</i>		
16. Adapter supports MPEG-2 motion compensation acceleration <i>Recommended</i>		
17. Extended resources can be dynamically relocated after system boot <i>Required</i>		
18. VGA resources can be disabled by software <i>Required</i>		
19. Frame buffer can be accessed directly by applications <i>Required</i>		
20. Adapter and driver support linear-mapped, low-resolution modes <i>Required</i>		
21. Adapter supports transparent blter <i>Required</i>		
22. Hardware supports double buffering with no tearing <i>Required</i>		
23. Hardware supports programmable blter stride <i>Required</i>		
24. Hardware supports RGB rasterization <i>Required</i>		
25. Hardware supports multi-texturing <i>Recommended</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
26. Hardware supports texture formats <i>Required</i>	<i>Required</i>	<i>Required</i>
27. Hardware complies with texture size limitations <i>Required</i>	<i>Recommended</i>	<i>Required</i>
28. Hardware supports destination RGB alpha blending <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
29. Hardware supports Z comparison modes and Direct3D-compatible formats <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
30. Hardware meets PC 98 3-D accelerator performance requirements <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
31. Adapter supports both NTSC and PAL output <i>Recommended</i>		
32. Default boot mode supports appropriate locale <i>Required</i>	<i>Required</i>	<i>Required</i>
33. Adapter supports underscan scaling <i>Required</i>	<i>Recommended</i>	<i>Required</i>
34. Adapter supports flicker filter <i>Required</i>		
35. Adapter provides proper termination <i>Required</i>		
36. Adapter supports RCA-style composite video and S-Video connectors <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
37. Adapter supports both VGA and television output <i>Required</i>		
38. Software supports positioning <i>Required</i>	<i>Recommended</i>	<i>Required</i>
39. Software supports detection of television connection <i>Required</i>	<i>Recommended</i>	<i>Required</i>
40. Each device has a Plug and Play device ID <i>Required</i>		
41. System supports conflict resolution, VGA compatibility, and extended registers <i>Required</i>		
42. Chips support linear packed-pixel frame buffer, relocatable above 16 MB <i>Required</i>		
43. Option ROM supports DDC2B <i>Required</i>		
44. BIOS setup utility provides option to force use of system-board graphics <i>Recommended</i>		
45. BIOS supports large frame buffers for graphics adapters <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
46. AGP meets PC 98 implementation guidelines <i>Required</i>		
47. PCI graphics device supports IRQ and correctly populates PCI BARs <i>Required</i>	<i>Recommended</i>	<i>Required</i>
48. PCI system-board graphics device is not hidden from Plug and Play enumeration <i>Required</i>		
49. Graphics adapter complies with device class power management reference specification <i>Required</i>		
50. Graphics adapter complies with VBE/Core 2.0 extensions for power management <i>Required</i>		
51. Device drivers and installation meet PC 98 requirements <i>Required</i>		
52. Driver does not bypass any Microsoft-provided system components <i>Required</i>		
53. Applications provided with device meet Win32 requirements <i>Required</i>		
54. Driver supports dynamic color bit-depth change <i>Required</i>		

## Checklist for Video and Broadcast Components

Consumer PC 98	Office PC 98	Entertainment PC 98
1. System meets PC 98 requirements for DVD-Video and MPEG-2 playback <i>Required</i>	<i>Required with DVD-Video</i>	<i>Required</i>
2. System supports PC 98 analog video input and capture capabilities <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
3. System includes analog television tuner <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
4. System includes digital broadcast or satellite subsystem <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
5. System includes DTV support <i>Recommended</i>	<i>Recommended</i>	<i>Required (U.S. only)</i>
6. Video input, capture, and broadcast device support is based on DirectX foundation class and WDM Stream class <i>Required</i>	<i>Required</i>	<i>Required</i>
7. Hardware MPEG-2 decoder uses video port for video data <i>Required</i>	<i>Required</i>	<i>Required</i>
8. PCI-based tuners and decoders support bus mastering with scatter/gather DMA <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
9. Background tasks do not interfere with MPEG-2 playback <i>Required</i>	<i>Recommended</i>	<i>Required</i>
10. All components meet PC 98 general device requirements <i>Required</i>		
11. System warns users if it cannot play DVD movies <i>Required</i>	<i>Required if no DVD-Video</i>	<i>Required</i>
12. MPEG-2 playback meets PC 98 requirements <i>Required</i>	<i>Required with DVD-Video</i>	<i>Required</i>
13. Retail adapters with hardware MPEG-2 decoders enable a standard video port connection to the graphics adapter <i>Required</i>		
14. MPEG-2 decoder supports pull-down algorithm <i>Recommended</i>		
15. DVD decoder driver correctly handles media types, time discontinuity, and decode-rate adjustment <i>Required</i>		
16. DVD decoder supports subpicture compositing and closed captioning <i>Required</i>		
17. Subpicture decoder correctly handles subpicture properties and other functions <i>Required</i>		
18. System supports seamless DVD-Video 1.0 navigation <i>Required</i>		
19. System provides a licensed CSS copyright protection scheme <i>Required</i>		
20. Video input or capture device supports capture of NTSC/PAL picture quality <i>Required</i>		
21. Analog video capture device outputs video data rate of 3.7 MB per second, minimum <i>Required</i>		
22. Video input or capture device supports time-code reading <i>Recommended</i>		
23. Digital video camera uses external bus support <i>Required</i>		
24. Television tuner supports PC 98 audio and video performance <i>Required</i>		
25. Television tuner includes stereo tuner and supports SAP <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
26. VBI capture oversamples VBI data at least four times <i>Required</i>		
27. VBI capture detects validity of scan-line data <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
28. VBI capture makes VBI data available to the CPU for processing <i>Required</i>		
29. Digital broadcast card can receive all video, audio, data, and other streams <i>Required</i>		
30. Digital broadcast card can receive full bandwidth from each frequency <i>Required</i>		
31. Digital broadcast card can receive a minimum of eight simultaneous streams <i>Required</i>		
32. System includes multiple digital broadcast tuner cards <i>Recommended</i>		
33. Digital broadcast card provides support for legacy conditional access <i>Required</i>		
34. Digital broadcast card provides signal quality and other diagnostic information <i>Required</i>		
35. Digital broadcast card supports general-purpose data cryptography <i>Recommended</i>		
36. Digital broadcast card supports substream filtering <i>Required</i>		
37. ATSC DTV tuner is fully implemented <i>Required</i>		
38. Stream splitting is supported using DirectShow filters <i>Recommended</i>		
39. MPEG-2 decoder and video port support ATSC DTV standard <i>Required</i>		
40. Each device has a Plug and Play device ID <i>Required</i>		
41. Conflict resolution and dynamic disable capabilities are supported <i>Required</i>		
42. Dependent video device is not independently enumerated <i>Required</i>		
43. Device drivers and installation meet PC 98 requirements <i>Required</i>		
44. Software drivers are installed during hardware driver installation <i>Required</i>		
45. Applications provided with device meet Win32 requirements <i>Required</i>		
46. NDIS 5.0 driver provided for digital broadcast receiver <i>Required</i>		

## Checklist for Monitors

Consumer PC 98	Office PC 98	Entertainment PC 98
1. Color monitor is DDC2B-compliant with unique EDID identifier		
<i>Required</i>	<i>Required</i>	<i>Required</i>
2. Monitor supports ICC color matching		
<i>Required</i>		
3. Monitor meets all PC 98 general device and driver requirements		
<i>Required</i>		
4. Monitor meets minimum graphics resolution, based on monitor size		
<i>Required</i>		
5. Monitor supports ergonomic timing standards		
<i>Required</i>		
6. Large-screen monitor is 20 inches or larger, if included with an Entertainment PC system		
<i>Required</i>		
7. Large-screen monitor is 16:9, if included with PC system		
<i>Recommended</i>		
8. Entertainment monitor supports 800 × 600 at 60 Hz refresh rate		
<i>Required</i>		
9. Entertainment monitor's host control is DDC2B-compliant, with digitally controlled geometry		
<i>Recommended</i>		
10. External monitor meets DDC2B and EDID standards		
<i>Required</i>		
11. Monitor complies with device class power management reference specification		
<i>Required</i>		

## Checklist for Audio Components

Consumer PC 98	Office PC 98	Entertainment PC 98
1. PC system includes PC 98 audio capabilities <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
2. Audio device does not connect to ISA bus <i>Required</i>	<i>Required</i>	<i>Required</i>
3. Audio performance meets PC 98 requirements <i>Required</i>		
4. Audio system provides support for basic data formats <i>Required</i>		
5. Audio system reports sample position for stream synchronization <i>Required</i>		
6. Audio system provides sufficient externally accessible inputs and outputs <i>Required</i>		
7. Audio system connectors are labeled with icons as defined for PC 98 <i>Required</i>		
8. Audio performance meets PC 98 advanced recommendations <i>Recommended</i>		
9. Audio system supports full-duplex operation at independent sampling rates <i>Recommended</i>		
10. Audio system provides hardware or software support for the Downloadable Samples specification <i>Recommended</i>		
11. Audio system supports AEC reference inputs <i>Recommended</i>		
12. Audio system provides hardware filtering of HRTF 3-D filters <i>Optional</i>		
13. CD, DVD, and broadcast audio playback meet PC 98 requirements <i>Required with DVD Video</i>		
14. Audio system provides consistent volume levels for different devices <i>Optional</i>		
15. Each device has a unique Plug and Play device ID <i>Required</i>		
16. Automatic resource assignment and dynamic disable capabilities are supported <i>Required</i>		
17. PCI device conforms to PCI 2.1 and additional PC 98 requirements <i>Required</i>		
18. PCI device supports initiator, target, and block transfer <i>Required</i>		
19. PCI audio components use a suitable configuration scheme if using ISA resources <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
20. PCI device is digital ready <i>Required</i>		
21. Audio meets USB specification and USB audio device class specification <i>Required</i>		
22. Audio meets PC 98 requirements for IEEE 1394 <i>Required</i>		
23. System and device comply with PCI bus power management specification <i>Required</i>		
24. Audio device complies with device class power management reference specification <i>Required</i>		
25. Device supports wake-up events <i>Optional</i>		
26. Device drivers and installation meet PC 98 requirements <i>Required</i>		
27. Audio meets PC 98 requirements for WDM driver support <i>Required</i>		
28. Applications provided with device meet Win32 requirements <i>Required</i>		

## Checklist for Storage and Related Peripherals

Consumer PC 98	Office PC 98	Entertainment PC 98
1. Storage device and controller support bus master capabilities <i>Required</i>		
2. Removable media includes media status notification support <i>Required</i>		
3. Option ROMs support Int 13h Extensions <i>Required</i>		
4. Device meets PC 98 general device requirements <i>Required</i>		
5. Device meets PC 98 requirements for ports or buses <i>Required</i>		
6. Device Bay storage device meets PC 98 requirements <i>Required</i>		
7. IDE/ATAPI devices supported on IEEE 1394 <i>Recommended</i>		
8. IDE/ATAPI devices and controllers support Ultra DMA/33 <i>Required</i>		



Consumer PC 98	Office PC 98	Entertainment PC 98
9. USB-based mass storage device meets PC 98 requirements for USB <i>Required</i>		
10. System BIOS or option ROM supports El Torito No Emulation mode <i>Required</i>		
11. Floppy disk capabilities provided through expansion card or external bus <i>Recommended</i>		
12. IDE floppy drive complies with SFF 8070 <i>Required</i>		
13. Legacy FDC built into system <i>Optional</i>		
14. Legacy FDC device meets resource configuration requirements <i>Required</i>		
15. System supports conflict resolution and dynamic disable capabilities for legacy FDC <i>Required</i>		
16. IDE hard drive is SMART-compliant and uses SMART IOCTL API <i>Required</i>		
17. IDE hard drive spin-up time supports OnNow capabilities <i>Recommended</i>		
18. CD-ROM drive provides 8x or higher performance <i>Required</i>		
19. CD-ROM drive is CD-Enhanced-compatible <i>Required</i>		
20. CD-ROM drive supports specified logical and physical CD formats <i>Required</i>		
21. IDE/ATAPI CD-ROM drive complies with SFF 8020i, Version 1.2 <i>Required</i>		
22. CD-ROM drive supports multisession and compatibility forms of the READ_TOC command <i>Required</i>		
23. IDE/ATAPI CD changer meets SFF 8070 specification <i>Required</i>		
24. ATAPI rewritable device meets SFF 8070i specification <i>Required</i>		
25. DVD drive supports bus master DMA transfers <i>Required</i>		
26. DVD drive meets minimum compatibility requirements <i>Required</i>		
27. Device and driver support DVD command sets <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
28. DVD device meets SFF 8090 specification <i>Required</i>		
29. DVD device uses high-speed expansion bus <i>Required</i>		
30. DVD drive supports UDF <i>Required</i>		
31. DVD device uses push-to-close design <i>Recommended</i>		
32. DVD device supports defect management <i>Required</i>		
33. DVD device supports copyright protection <i>Required</i>		
34. Each device has a Plug and Play device ID <i>Required</i>		
35. Conflict resolution and dynamic disable capabilities supported for all devices <i>Required</i>		
36. 3F7h and 377h are unclaimed by devices <i>Required</i>		
37. Physical security is provided for storage devices <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
38. Device and controller comply with device class power management reference specification <i>Required</i>		
39. Device supports wake-up events <i>Optional</i>		
40. Device drivers and installation meet PC 98 requirements <i>Required</i>		
41. Device and file system run in protected mode following installation <i>Required</i>		
42. Applications provided with the device meet Win32 requirements <i>Required</i>		
43. Driver for partitioned media supports all Windows and Windows NT partition types <i>Required</i>		
44. Driver for block-mode device supports extended BPBs <i>Required</i>		

## Checklist for Modems

Consumer PC 98	Office PC 98	Entertainment PC 98
1. Modem device is provided with PC system <i>Required</i>	<i>Required, if no network adapter</i>	<i>PCM modem required, upgradable to V.pcm</i>
2. Modem supports TIA-602 Hayes-compatible command set <i>Required</i>		
3. Data modem supports 33.6 Kbps (V.34-1996) with V.42 and V.42bis protocol <i>Required</i>		
4. Data modem supporting speeds faster than 33.6 Kbps can be upgraded to V.pcm <i>Required</i>		
5. Fax modem supports 14.4 Kbps (V.17) with Class 1 (TIA-578-A) command set <i>Required</i>		
6. Data modem supports V. 80 for synchronous access <i>Recommended</i>		
7. Modem supports adaptive connection, V.25, V.8, and V.8bis call control signaling with V.25ter Annex A modem commands <i>Recommended</i>		
8. Modem supports delayed and blacklisted number clearing <i>Recommended</i>		
9. Modem supports TDD, meeting V.18-1996 with V.25ter AT commands <i>Recommended</i>		
10. PCM modem supports ITU-T V.pcm <i>Required</i>		
11. Modem controller meets PC 98 requirements <i>Required</i>		
12. Voice modem supports TIA-695 (AT+V) <i>Recommended</i>	<i>Recommended</i>	<i>Required</i>
13. Voice modem support includes PC 98 recommendations <i>Recommended</i>		
14. Voice modem supports local telset interfaces <i>Recommended</i>		
15. Voice modem supports simultaneous voice/data integration capabilities <i>Recommended</i>		
16. Voice modem supports speakerphone <i>Recommended</i>		
17. Voice modem supports full-duplex voice I/O <i>Recommended</i>		
18. Wireless support implemented for modems <i>Recommended</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
19. Digital cellular phone support is implemented for modems <i>Recommended</i>		
20. ISDN modem supports required command set <i>Required</i>		
21. ISDN modem supports auto-SPID detection algorithms and standard SPID format <i>Required</i>		
22. ISDN modem supports CHAP in firmware if B channels are not exposed <i>Required</i>		
23. ISDN modem exposes both B channels <i>Recommended</i>		
24. ISDN modem supports multilink PPP <i>Recommended</i>		
25. ISDN modem supports asynchronous-to-synchronous conversion <i>Required</i>		
26. ISDN modem uses high-speed port <i>Recommended</i>		
27. ISDN driver supports switch detection <i>Recommended</i>		
28. ISDN driver supports unattended installation, with limitations <i>Required</i>		
29. Each device has a unique Plug and Play device ID <i>Required</i>		
30. Each device has a compatible Plug and Play device ID <i>Required</i>		
31. Automatic resource assignment and dynamic disable capabilities are supported <i>Required</i>		
32. PCI modem meets PCI 2.1 requirements <i>Required</i>		
33. USB modem meets USB specifications <i>Required</i>		
34. Device Bay modem meets PC 98 requirements <i>Required</i>		
35. Device complies with device class power management reference specification <i>Required</i>		
36. Device supports wake-up events <i>Required</i>		
37. Device drivers and installation meet PC 98 requirements <i>Required</i>		
38. Driver supports Unimodem <i>Required</i>		
39. Applications provided with device meet Win32 requirements <i>Required</i>		

## Checklist for Network Communications

Consumer PC 98	Office PC 98	Entertainment PC 98
1. PC system includes network adapter <i>Recommended</i>	<i>Required, if no modem</i>	<i>Recommended</i>
2. PC system includes internal or external ISDN device <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
3. PC system includes cable modem <i>Optional</i>	<i>Optional</i>	<i>Optional</i>
4. PC system includes ATM adapter <i>Optional</i>	<i>Optional</i>	<i>Optional</i>
5. PC system includes ADSL adapter <i>Optional</i>	<i>Optional</i>	<i>Optional</i>
6. PC system includes satellite or broadcast receiver with NDIS driver <i>Recommended</i>	<i>Recommended</i>	<i>Recommended</i>
7. Adapter uses NDIS 5.0 miniport driver <i>Required</i>		
8. Full-duplex adapter automatically detects and switches to duplex mode <i>Required</i>		
9. Adapter automatically senses presence of functional network <i>Required</i>		
10. Adapter automatically senses transceiver type <i>Required</i>		
11. Adapter supports quadword buffer alignment for receive and byte buffer alignment for send <i>Required</i>		
12. Adapter communicates with driver across any bridge <i>Required</i>		
13. Adapter supports filtering for 32 multicast addresses, at minimum <i>Required</i>		
14. Adapter is compatible with remote new system setup capabilities if used as boot device <i>Required</i>		
15. Device Bay network adapter meets PC 98 requirements <i>Required</i>		
16. Internal ISDN device meets PC 98 network adapter requirements <i>Required</i>		
17. Internal ISDN device supports synchronous HDLC framing <i>Required</i>		
18. Internal ISDN device uses NDIS WAN miniport driver <i>Required</i>		
19. Internal ISDN device includes connection for analog phone <i>Recommended</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
20. ISDN device supports auto-SPID detection algorithms and standard SPID format <i>Required</i>		
21. ISDN driver supports switch detection <i>Recommended</i>		
22. ISDN driver supports unattended installation, with limitations <i>Required</i>		
23. ISDN device includes built-in NT-1 <i>Recommended</i>		
24. ATM adapter meets PC 98 network adapter requirements <i>Required</i>		
25. ATM adapter supports a minimum number of active connections <i>Required</i>		
26. ATM adapter supports all service types defined by the ATM Forum <i>Recommended</i>		
27. ATM adapter supports a minimum number of simultaneously active rt-VBR/nrt-VBR/CBR connections <i>Required</i>		
28. ATM adapter supports traffic shaping <i>Required</i>		
29. ATM adapter supports external clocking <i>Required</i>		
30. ATM adapter supports OAM <i>Recommended</i>		
31. ATM adapter supports buffer chaining (Tx + Rx) <i>Recommended</i>		
32. ADSL device meets PC 98 network adapter requirements <i>Required</i>		
33. ATM/ADSL solution is implemented <i>Recommended</i>		
34. ADSL device supports RADSL <i>Recommended</i>		
35. Each device has a unique Plug and Play device ID <i>Required</i>		
36. Automatic resource assignment and dynamic disable capabilities are supported <i>Required</i>		
37. Plug and Play capabilities support multiple adapters <i>Required</i>		
38. All resource settings are reported in the user interface <i>Required</i>		
39. Device complies with device class power management reference specification <i>Required</i>		

Consumer PC 98	Office PC 98	Entertainment PC 98
40. Device supports wake-up events <i>Required</i>		
41. Device drivers and installation meet PC 98 requirements <i>Required</i>		
42. Driver supports promiscuous mode <i>Required</i>		
43. Driver works correctly with Microsoft network clients and protocols <i>Required</i>		
44. NDIS miniport driver does not make operating system-specific kernel calls <i>Required</i>		
45. NDIS 5.0 driver uses new INF format <i>Required</i>		

## Checklist for Printers

1. IEEE 1394 printer meets PC 98 requirements for IEEE 1394  
*Required*
2. USB printer meets PC 98 requirements for USB devices  
*Recommended*
3. IEEE 1284 printer supports compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I  
*Required*
4. IEEE 1284 printer meets IEEE 1284-II requirements  
*Recommended*
5. ECP printer works correctly when ECP mode is turned off  
*Required*
6. IEEE 1284 hardware supports error notification  
*Required*
7. Implement Plug and Play support for all supported buses  
*Required*
8. Peripheral device meets IEEE 1284 requirements  
*Required*
9. Printer INF file and installation meet PC 98 requirements  
*Required*
10. Driver correctly reports device capabilities  
*Required*
11. Driver supports error notification  
*Required*
12. Driver supports ICC color matching  
*Required*
13. Port monitor software meets DDK guidelines  
*Required*

- 14. Driver supports point-and-print network installation  
*Required*
- 15. Device available immediately following installation  
*Required*
- 16. Device supports accurate printable regions  
*Required*
- 17. Driver supports required DDIs  
*Required*
- 18. Driver based on unidriver  
*Recommended*

## Checklist for Scanners and Digital Cameras

- 1. Device uses PC 98 compatible port connection  
*Required*
- 2. Icons provided for port and peripheral connectors  
*Required*
- 3. Device supports ICC color matching  
*Required*
- 4. IR device meets PC 98 IR requirements  
*Required*
- 5. SCSI device meets PC 98 SCSI requirements  
*Required*
- 6. SCSI device attaches to any PC 98-compliant SCSI controller  
*Required*
- 7. USB device meets PC 98 USB requirements  
*Required*
- 8. USB device supports string descriptors  
*Required*
- 9. IEEE 1394 device meets PC 98 requirements for IEEE 1394  
*Required*
- 10. Plug and Play capabilities implemented for all supported buses  
*Required*
- 11. Each device has a Plug and Play device ID  
*Required*
- 12. Device supports power management requirements for its bus  
*Required*
- 13. Device drivers and installation meet PC 98 requirements  
*Required*
- 14. Driver support is implemented under Still Image architecture  
*Required*
- 15. Applications provided with the device meet Win32 specifications  
*Required*