

# PC99 SYSTEM COMPLIANCE STANDARDS

## APPENDIX AT A GLANCE

PC99 Basic Checklist	1
PC99 Workstation Checklist	4
PC99 Entertainment Checklist	4
PC99 Mobile Checklist	5

In the early days of PC development, there were few meaningful standards for computer makers to adhere to. This lack of direction often resulted in incompatibilities as operating systems, hardware devices, and drivers all meshed together. Some years ago, the leading PC makers established the MPC standards that loosely defined the minimum system requirements for a multimedia PC. Around the time that Windows 95 was first released, those early MPC standards were replaced by a more comprehensive set of “system-wide” characteristics dubbed PC95. Roughly each year, the “PC” standard evolves to embrace the improvements that take place in the industry. This appendix outlines the PC99 standards as defined in the Microsoft/Intel “PC99 System Design Guide.” You can learn more about PC99 at [developer.intel.com/design/desguide/index.htm](http://developer.intel.com/design/desguide/index.htm).

## PC99 Basic Checklist

The following checklist outlines basic system requirements:

- System performance must meet PC99 minimum requirements:

Consumer	300 MHz	32MB
Office	300 MHz	64MB
Mobile	233 MHz	32MB
Workstation	400 MHz	128MB
Entertainment	300 MHz	64MB

- System design must meet ACPI 1.0 specification and PC99 requirements. This is required for all system types (with exceptions for mobile PCs).
- The hardware design must support OnNow and Instantly Available PC initiatives. This is required for all system types (with exceptions for mobile PCs).
- The BIOS must meet PC99 requirements for OnNow support. This is required for all system types.
- The BIOS must meet PC99 requirements for boot support. This is required for all system types (with exceptions for mobile PCs).
- All expansion slots in the system must be accessible for users to insert cards. This is required for all system types, and there are extra guidelines for mobile PCs.
- Audible noise must meet PC99 requirements. This is required for all system types.
- The system and component design practices must follow accessibility guidelines. This is recommended for all system types.
- The internal system modification capabilities should not be accessible to end-users. This is recommended for all system types.
- The system design must provide physical security. This is recommended for all system types.
- Each hardware device and driver must meet PC99 device requirements. This is required for all system types.
- Each bus and device must meet plug-and-play specifications. This is required for all system types.
- A unique plug-and-play device ID must be provided for each system device and add-on device. This is required for all system types.
- Option ROMs must meet plug-and-play requirements. This is required for all system types.
- A “PNP” vendor code is used only to define a legacy device’s compatible ID. This is required for all system types.
- Device drivers and installation techniques must meet PC99 requirements. This is required for all system types.
- Minimal user interaction should be needed to install and configure devices. This is required for all system types.
- Connections should use icons, plus keyed or shrouded connectors with color coding. This is required for all system types (with exceptions for mobile PCs).
- “Hot-pluggable” capabilities for buses and devices must meet PC99 requirements. This is required for all system types.
- System should include a Device Bay 1.0-compatible bay. This is recommended for all system types.
- Multifunction add-on devices must meet PC99 device requirements for each device. This is required for all system types.
- All devices must support the correct 16-bit decoding scheme for I/O port addresses. This is required for all system types.
- All PC99 input devices must support Microsoft DirectInput technology and work simultaneously. This is required for all system types.
- Each bus must meet written specifications and PC99 requirements. This is required for all system types.

- The system should include USB support with two USB ports (minimum). This is required for all system types (with exceptions for mobile PCs).
- The system should include support for IEEE 1394 (FireWire). This is recommended for all system types (with three ports recommended for entertainment PCs).
- The PCI bus architecture should meet PCI 2.1 or later (plus PC99 requirements). This is required for all system types.
- The system should *not* include ISA expansion devices or slots. This is required for all system types.
- The system must include a keyboard connection and keyboard support. This is required for all system types.
- The system must include a pointing device connection and pointing device support. This is required for all system types.
- The system must include a connection for external parallel port device(s). This is required for all system types.
- The system must include a connection for external serial port devices(s). This is required for all system types.
- The system should include an IrDA-compliant device. This is recommended for all system types.
- The system should include a PC99-compatible CD or DVD drive and controller.
- The system should include audio support that meets PC99 requirements.
- The system should include a modem or other public network communications support.
- The system may include a network adapter.
- The system may include smartcard support. This is recommended for all system types.
- The system's graphics adapter must meet PC99 minimum requirements (with specific guidelines for each system type).
- A color monitor must be DDC-compliant with a unique EDID identifier. This is required for all system types (with exceptions for mobile PCs).
- The system must meet PC99 DVD-Video and MPEG-2 playback requirements (if the system supports DVD-Video).
- The video adapter should support television output if the system does not include a "large-screen" monitor. This is recommended for all system types.
- The system should support PC99 analog video input and capture capabilities. This is recommended for all system types.
- The system should include an analog television tuner.
- The system BIOS and option ROMs should support INT 13h Extensions (hard drive access).
- The host controller for storage devices must meet PC99 requirements.
- The host controllers and hard disk devices must support bus mastering. This is required for all system types.
- All hard drives must meet PC99 requirements.
- The operating system must recognize the boot drive in a multiple-drive system.
- Any floppy disk capabilities (if implemented) should not use a legacy floppy disk controller.

- The system should support WHIIG.
- The system should include driver support for WMI.
- A management information service provider should be enabled by default.
- The system's expansion devices should support remote management.
- SMBIOS 2.2 static table support should be provided.

## PC99 Workstation Checklist

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If the system is intended to serve as a network workstation, it should adhere to the following requirements:

- The workstation must meet all requirements for Office PC99.
- The workstation's performance must meet Workstation PC99 minimum requirements.
- The workstation should support multiple processors (recommended).
- Workstation RAM should be expandable.
- Workstation system memory should include ECC memory protection.
- The workstation should include APIC support.
- The workstation should include high-performance components.
- The workstation must support 64-bit I/O bus architecture (required for 64-bit platforms).
- The workstation does *not* include ISA expansion slots (required).
- The graphics subsystem must support workstation performance demands.
- Storage components should rely on a SCSI controller (recommended).
- The workstation should include multiple hard drives.

## PC99 Entertainment Checklist

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If the system is intended to serve as an entertainment platform, it should meet or exceed the following requirements:

- System performance should meet Entertainment PC99 minimum requirements.
- The entertainment PC should include three IEEE 1394 ports, with at least one easily accessible connector (recommended).
- All entertainment PC input devices should meet USB HID specifications.
- An entertainment PC should include a remote-control pointing device (recommended).
- An entertainment PC audio subsystem must meet PC99 audio requirements.
- The graphics subsystem must meet entertainment PC99 requirements for 3D acceleration.
- An entertainment PC should include support for television output if the system doesn't have a "large-screen" monitor.
- An entertainment PC should include a "large-screen" DDC2B color entertainment monitor.
- An entertainment PC should offer DVD and TV playback that meet PC99 requirements.

- An entertainment PC should include analog video input and capture capabilities.
- An entertainment PC should include an analog television tuner.
- An entertainment PC should include a digital broadcast satellite subsystem.
- An entertainment PC should include DTV support.

## **PC99 Mobile Checklist**

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A laptop, notebook, or other mobile computing platform should meet or exceed the following requirements:

- A mobile PC's performance must meet Mobile PC99 minimum requirements.
- The mobile PC must support a "smart battery" or "ACPI Control Method" battery.
- The expansion capabilities of a mobile PC must be accessible to users.
- Mobile PC connections must use icons plus keyed or shrouded connectors.
- A mobile PC must include one USB port.
- USB-connected devices must not maintain a "fully-on" power state.
- A mobile PC should include an IEEE 1394 port.
- A mobile PC must include CardBus support.
- A mobile PC keyboard and pointing device must meet PC99 requirements.
- A mobile PC should include IR devices compliant with IrDA specifications.
- A mobile PC must include support for installing the operating system.
- A mobile PC should include audio support that meets Mobile PC99 audio requirements.
- A mobile PC should include a communications device.
- The mobile system should support "hot-pluggable" devices and alternative network connections.
- The mobile system should meet Mobile Power Guidelines '99.
- The mobile system should include a CD or DVD drive.
- A mobile system should meet Manageability Baseline requirements.
- The built-in display adapter must meet Mobile PC99 minimum capability.
- The built-in display adapter with 3D hardware acceleration capabilities must meet Mobile PC99 minimum capability.
- The mobile system must meet Mobile PC99 requirements for supporting multiple adapters and multiple monitors.
- An external graphics adapter interface must support DDC monitor detection.
- A mobile system with MPEG-2 or DVD playback features must meet Mobile PC99 requirements for video playback.
- A mobile system with AGP support must meet Mobile PC99 requirements.
- A mobile system must implement television output.
- The built-in mobile display must support ICC color management.
- The system should support PCI docking through a bridge connector.

- A docked mobile PC must support state change notification using ACPI.
- A docked mobile PC must have the ability to identify the specific model of a dock.
- A docked mobile PC must have the ability to uniquely identify the dock.
- A mobile PC/docking station combination must meet PC99 requirements.
- A docking station must meet all PC99 system requirements.
- The mobile/docking station interface must be supported using ACPI-defined mechanisms.
- A mobile PC/docking station combination must support automatic resource assignment and “dynamic disable” capabilities.
- The docking station must support “warm” docking.
- A docking system must support “fail-safe” docking.
- A docking station should include an IEEE 1394 port.
- The docking station/mobile system pair should meet PC99 audio requirements.
- Mini-dock systems must support automatic resource assignment and “dynamic disable” capabilities for replacement devices.
- The mini-dock scheme must support “warm” docking.
- The mini-dock scheme should support “fail-safe” docking.
- Mini-dock support should include an IEEE 1394 port.
- Mini-notebook performance must meet PC99 minimum requirements.