



Developer Note

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# Macintosh PowerBook 165



**Developer Note**

Developer Press

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# About This Developer Note

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This document describes the Macintosh PowerBook 165 computer, emphasizing those features that are new or different from other Macintosh PowerBook computers. It is written primarily for experienced Macintosh hardware and software developers who want to create products that are compatible with these new computers. If you are unfamiliar with Macintosh computers or would simply like more technical information, you may want to read the related technical manuals listed in the following section.

## Supplementary Documents

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To supplement the information in this document, you might wish to obtain related documentation such as *Guide to the Macintosh Family Hardware*, second edition; *Designing Cards and Drivers for the Macintosh Family*, third edition; and *Inside Macintosh*. For detailed information about the Motorola 68030 microprocessor used in these computers, refer to the *MC68030 Enhanced 32-Bit Microprocessor User's Manual*. All of these documents are available through APDA.

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## Conventions and Abbreviations

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This developer note uses typographical conventions and abbreviations that are standard in Apple publications.

### Typographical Conventions

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Computer-language text—any text that is literally the same as it appears in computer input or output—appears in `Courier` font.

### Standard Abbreviations

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Standard units of measure used in Apple reference books include:

A	amperes	MB	megabytes
GB	gigabytes	MHz	megahertz
Hz	hertz	ms	milliseconds
K	1024	ns	nanoseconds
KB	kilobytes	V	volts
mA	milliamperes	W	watts

Standard abbreviations used in Apple reference books include:

$\$n$	hexadecimal value $n$
AC	alternating current
ADB	Apple Desktop Bus
ASC	Apple Sound Chip
ASIC	application-specific integrated circuit
CLUT	color look-up table
DAC	digital-to-analog converter
FSTN	film supertwist nematic (a type of LCD)
IC	integrated circuit
LCD	liquid crystal display
MMU	memory-management unit
PSRAM	pseudostatic RAM
RAM	random-access memory
RAMDAC	random-access memory, digital/analog converter
ROM	read-only memory
RGB	red-green-blue (a video display system used by Apple computers)



## P R E F A C E

SCSI	Small Computer System Interface
SVGA	super VGA (a video display system used with PC-type computers)
SWIM	Super Woz Integrated Machine
TFT	thin film transistor (a type of LCD)
VGA	video graphics adapter (a video display system used with PC-type computers)
VRAM	video RAM



# Macintosh PowerBook 165

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The Macintosh PowerBook 165 computer is an enhanced version of the Macintosh PowerBook 160, operating at 33 MHz for increased performance. This developer note describes the major features of the Macintosh PowerBook 165 computer, emphasizing the similarities and differences between it and other Macintosh PowerBook computers.

**IMPORTANT**

Only the major differences between the PowerBook 165 and the PowerBook 160 are described in detail here. For a complete understanding of the PowerBook 165 computer, refer to the *Macintosh PowerBook 160 and Macintosh PowerBook 180 Developer Note*. ▲

## Features

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The major features of the Macintosh PowerBook 165 computer are:

- **Microprocessor:** Motorola 68030 running at 33 MHz. A 16 MHz power saving mode can be selected by the user.
- **Read-only memory (ROM):** 1 MB.
- **Random-access memory (RAM):** 4 MB of pseudostatic RAM (PSRAM).
- **RAM expansion:** a RAM expansion slot accommodates RAM expansion cards of up to 10 MB, for a total of 14 MB of RAM.
- **Liquid crystal display:** 4-bit video capability for 16 shades of gray on the built-in 640 x 400 pixel LCD. The PowerBook 165 uses a transmissive mode FSTN LCD, backlit by a cold cathode fluorescent lamp.
- **Video output:** 8-bit video output circuitry supports 256 colors on all Apple monitors up to 16-inches in size, and 16 shades of gray on the Apple Portrait monitor. VGA and some SVGA modes are supported with appropriate adapter cables.  
There are two video output modes: dual mode and mirror mode. In dual mode the LCD and external monitor are independent. In video mirror mode, the image on the external monitor is identical to what is displayed on the LCD, but in color.
- **Floppy disk:** one internal 1.4 MB Apple SuperDrive with Super Woz Integrated Machine (SWIM) interface.
- **Hard disk:** one internal 2.5-inch SCSI (Small Computer System Interface) hard disk drive. Disk capacities of 40, 80, and 120 MB are offered.
- **SCSI disk mode:** by connecting an HDI-30 SCSI Disk Adapter cable users can access the PowerBook's internal hard disk from another Macintosh.
- **I/O (input/output):** one HDI-30 connector for external SCSI devices, one 4-pin mini-DIN Apple Desktop Bus (ADB) port, two 8-pin mini-DIN serial ports, audio input and output jacks, and a custom video output connector with adapter for attaching standard Apple video cables.
- **Sound:** enhanced Apple Sound Chip (ASC) audio circuitry provides sound input and output through the built-in microphone and speaker. Stereo sound output can be heard through the headphone jack.

- Keyboard: built-in keyboard with integral 30-mm trackball.
- Modem: internal 20-pin connector for an optional modem card. This slot supports the Macintosh PowerBook Express Modem, the Macintosh PowerBook Fax/Data Modem, and compatible third-party serial modems.
- Battery: a rechargeable NiCad battery is included. A 3 V lithium battery provides backup power for the real-time clock and parameter RAM when the main battery is removed.
- Power supply: an external wall-mounted recharger/power adapter is included.
- Security connector: a connector on the back panel allows users to attach a security device.
- Weight: 6.8 pounds.
- Size: 11.3 inches wide, 9.3 inches deep, and 2.25 inches high.

## Compatibility Issues

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This section highlights key areas you should investigate in order to ensure that your products work properly with the PowerBook 165.

### RAM Expansion Slot

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The RAM expansion slot is compatible with RAM expansion cards meeting Apple design specifications for the Macintosh PowerBook 160/180 and earlier models. Developers must follow the design guidelines provided in the *Macintosh PowerBook 160 and Macintosh PowerBook 180 Developer Note* to assure compatibility with the PowerBook 165.

#### **IMPORTANT**

The mechanical design guidelines for PowerBook 165 and PowerBook 165c RAM expansion cards are different. Figure 1 on page 5 shows the design guide for PowerBook 165 RAM expansion cards. ▲

### Identifying the PowerBook 165

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The correct method for software to identify the Macintosh model it is running on is by using the Gestalt Manager routines described in *Inside Macintosh*.

The `gestaltMachineType` value returned by the PowerBook 165 is 84. This value can be used to obtain the machine name string as described in *Inside Macintosh*. Applications should not make decisions based on the machine type, but should use the appropriate Gestalt Manager routines to determine what features are available at runtime.

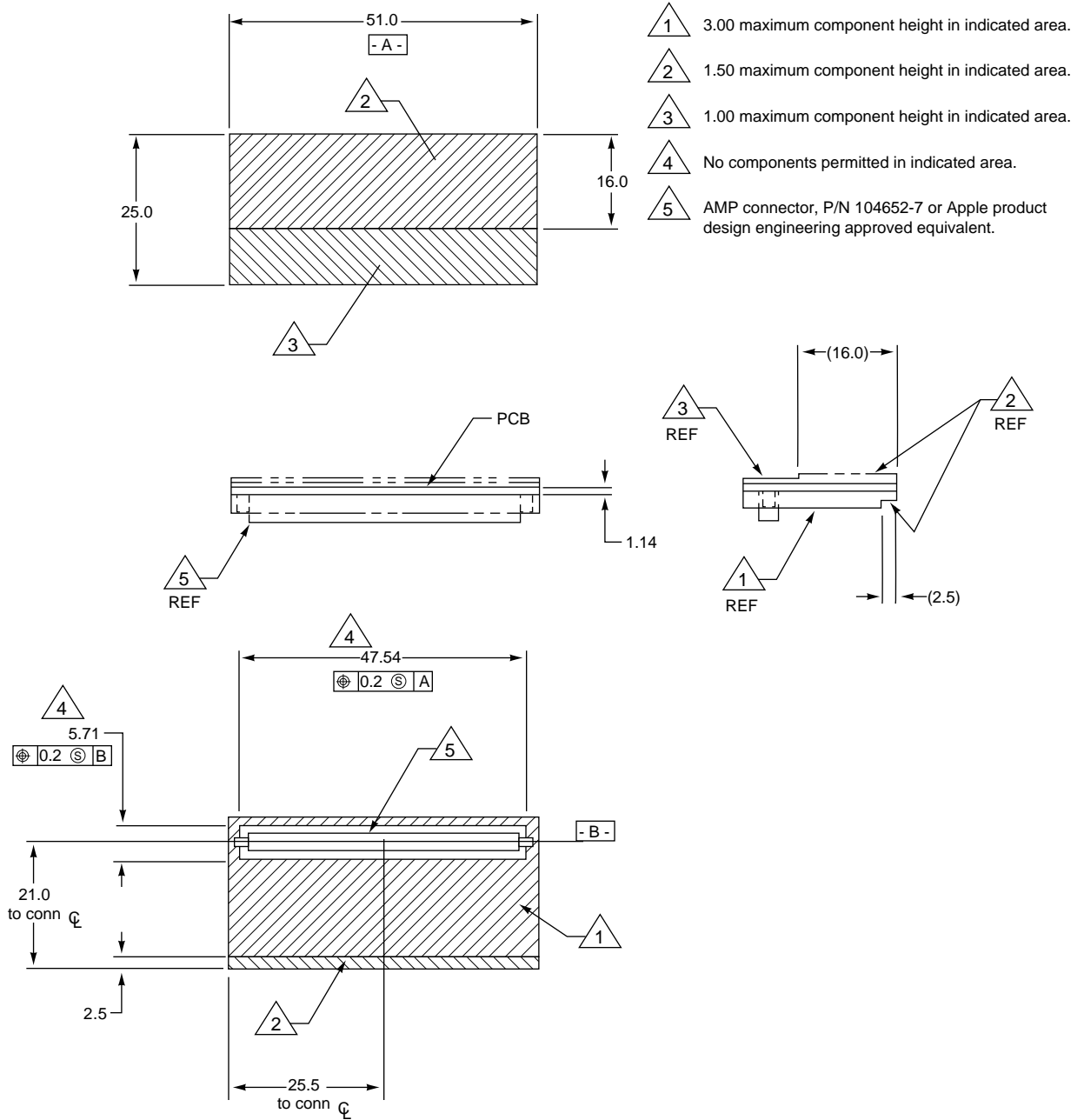
## RAM Expansion Interface

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The PowerBook 165 accommodates RAM expansion cards from 2 MB to 10 MB in capacity, for a total of 14 MB RAM. The RAM expansion interface is identical to that of the PowerBook 180. Refer to the *Macintosh PowerBook 160 and Macintosh PowerBook 180 Developer Note* for complete design guidelines.

Figure 1 shows the mechanical design guide for PowerBook 165 RAM expansion cards.

**Figure 1** RAM expansion card design guide



Dimensions are in millimeters.

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