Developer Note

Macintosh PowerBook 165

Developer Note

Developer Press
© Apple Computer, Inc. 1993

Apple Computer, Inc.
© 1993, Apple Computer, Inc.
All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, electronic, photocopying, recording, or otherwise, without prior written permission of Apple Computer, Inc. Printed in the United States of America.

The Apple logo is a registered trademark of Apple Computer, Inc. Use of the "keyboard" Apple logo (Option-Shift-K) for commercial purposes without the prior written consent of Apple may constitute trademark infringement and unfair competition in violation of federal and state laws.

No licenses, express or implied, are granted with respect to any of the technology described in this book. Apple retains all intellectual property rights associated with the technology described in this book. This book is intended to assist application developers to develop applications only for Apple Macintosh computers.

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
408-996-1010

Apple, the Apple logo, APDA, AppleLink, LaserWriter, and Macintosh are trademarks of Apple Computer, Inc., registered in the United States and other countries.

Apple Desktop Bus, Apple SuperDrive, PowerBook, and QuickDraw are trademarks of Apple Computer, Inc.

Adobe Illustrator and PostScript are trademarks of Adobe Systems Incorporated, which may be registered in certain jurisdictions.

America Online is a service mark of Quantum Computer Services, Inc.

CompuServe is a registered service mark of CompuServe, Inc.

FrameMaker is a registered trademark of Frame Technology Corporation.

Helvetica and Palatino are registered trademarks of Linotype Company.

Internet is a trademark of Digital Equipment Corporation.

ITC Zapf Dingbats is a registered trademark of International Typeface Corporation.

NuBus is a trademark of Texas Instruments.

Simultaneously published in the United States and Canada.

LIMITED WARRANTY ON MEDIA AND REPLACEMENT

If you discover physical defects in the manual or in the media on which a software product is distributed, APDA will replace the media or manual at no charge to you provided you return the item to be replaced with proof of purchase to APDA.

ALL IMPLIED WARRANTIES ON THIS MANUAL, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF THE ORIGINAL RETAIL PURCHASE OF THIS PRODUCT.

Even though Apple has reviewed this manual, APPLE MAKES NO WARRANTY OR REPRESENTATION, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS MANUAL, ITS QUALITY, ACCURACY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. AS A RESULT, THIS MANUAL IS SOLD "AS IS," AND YOU, THE PURCHASER, ARE ASSUMING THE ENTIRE RISK AS TO ITS QUALITY AND ACCURACY.

IN NO EVENT WILL APPLE BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECT OR INACCURACY IN THIS MANUAL, even if advised of the possibility of such damages.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESS OR IMPLIED. No Apple dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Contents

Figure v

Preface About This Developer Note vii

Supplementary Documents vii
Conventions and Abbreviations viii
Typographical Conventions viii
Standard Abbreviations viii

Macintosh PowerBook 165 1

Features 2
Compatibility Issues 3
RAM Expansion Slot 3
Identifiying the PowerBook 165 3
RAM Expansion Interface 4

Figure

Macintosh PowerBook 165 1

Figure 1 RAM expansion card design guide 5

About This Developer Note

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

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.

APDA is Apple's worldwide source for over three hundred development tools, technical resources, training products, and information for anyone interested in developing applications on Apple platforms. To order products or to request a complimentary copy of the *APDA Tools Catalog*, contact

APDA
Apple Computer, Inc.
P.O. Box 319
Buffalo, NY 14207-0319

Telephone	800-282-2732 (United States) 800-637-0029 (Canada) 716-871-6555 (International)
Fax	716-871-6511
AppleLink	APDA
America Online	APDA
CompuServe	76666,2405
Internet	APDA@applelink.apple.com

Conventions and Abbreviations

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

Typographical Conventions

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

Standard Abbreviations

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)

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

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 PowerBook165 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

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

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

RAM Expansion Slot

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. ▲

Identifiying the PowerBook 165

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*.

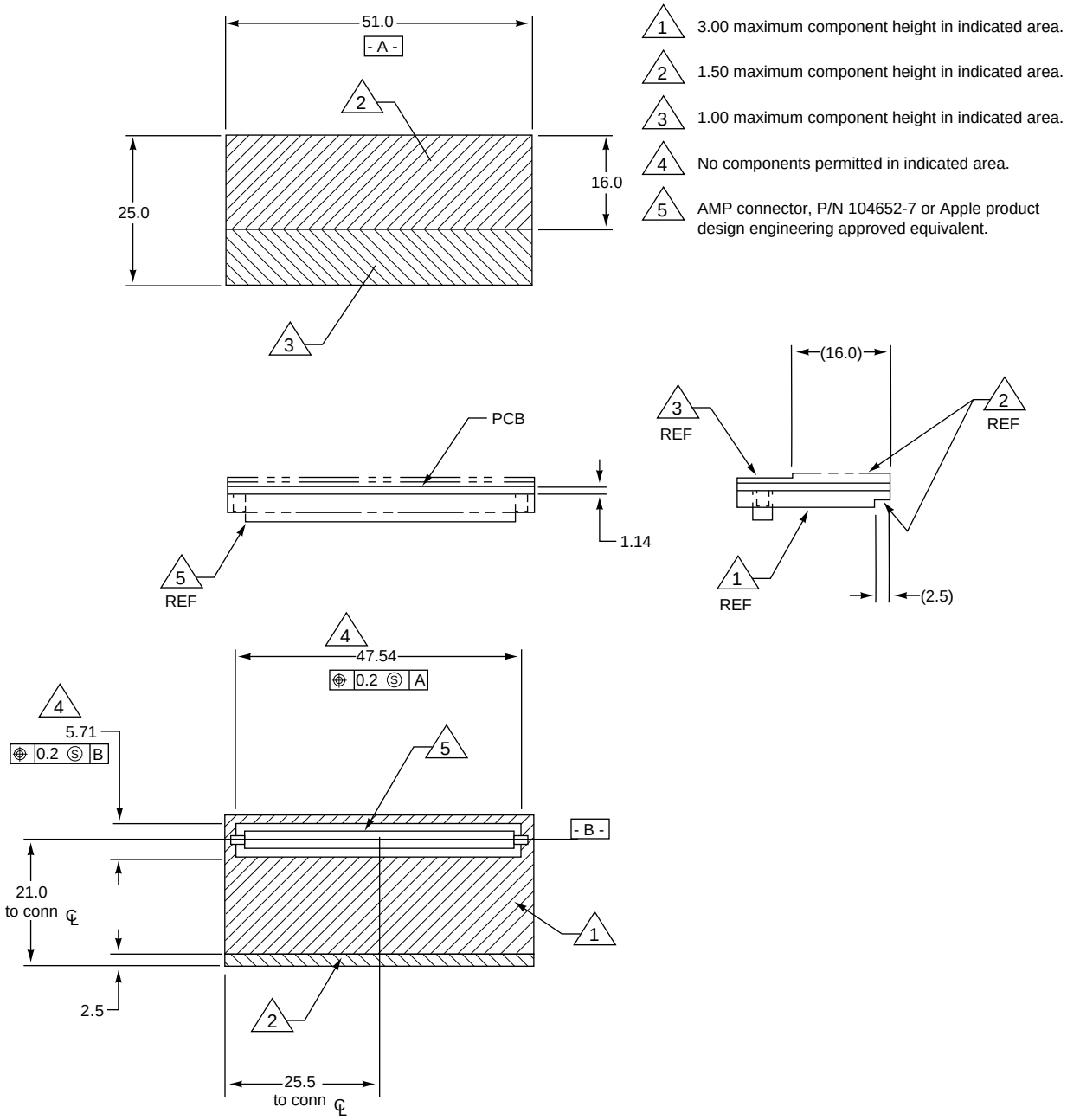
The `gestaltMachineType` value returned by the PowerBook 165 is 84. This value can be used to obtain the machine name string as described in *Inside Macintosh*. Applications should not make decisions based on the machine type, but should use the appropriate Gestalt Manager routines to determine what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

RAM Expansion Interface

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.

This Apple document was written, edited, and composed on a desktop publishing system using Apple Macintosh computers and FrameMaker software. Proof pages were created on an Apple LaserWriter IIg printer. Final pages were created on the Apple LaserWriter Pro 360. Line art was created using Adobe™ Illustrator. PostScript™, the page-description language for the LaserWriter, was developed by Adobe Systems Incorporated.

Text type is Palatino® and display type is Helvetica®. Bullets are ITC Zapf Dingbats®. Some elements, such as program listings, are set in Apple Courier.

WRITER
Mark Turner

EDITOR
Wendy Krafft

ILLUSTRATOR
Sandee Karr