

ACSE Update 1999 PowerBook G3 Series



1

Notes

Copyright

© 1999 Learning Associates International bv. All rights reserved

Notice of Rights

All rights reserved. No part of this book/course may be reproduced or transmitted in any form by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher.

Notice of Liability

The information in this book is distributed on an "As Is" basis, without warranty. While every precaution has been taken in the preparation of the book/course, neither the author nor Learning Associates International shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the instructions contained in this book/course or by the computer software and hardware products described in it.

Publisher

Learning Associates International bv
Westerkade 18
3116 GK, Schiedam
The Netherlands
T: +31 (0)10 2042220
F: +31 (0)10 2042221
E: training@lai.nl
W: www.lai.nl

Contents

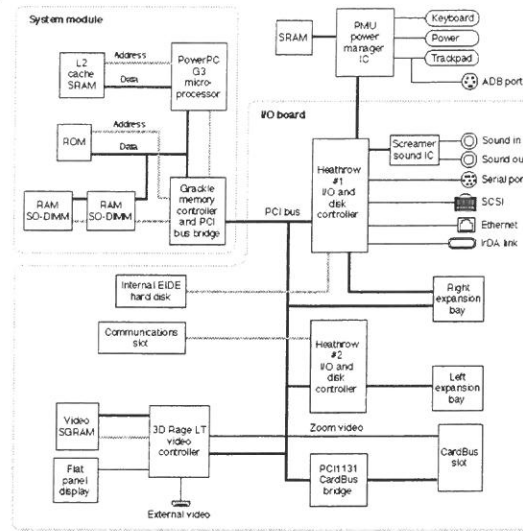
- Architecture
- Technologies
- Support Items
- Service Items
- Disassembly

2

Notes

Architecture

- G3
- PCI bus



Notes

Design

The Macintosh PowerBook G3 Series computers have a scalable design that encompasses a high-performance laptop computer as well as a low-cost laptop computer with many of the same features. This chapter summarizes the features of the Macintosh PowerBook G3 Series computers, lists available peripheral devices, and points out issues affecting compatibility.

Architecture

The architecture of the Macintosh PowerBook G3 Series computers is designed around two main circuit boards: the system module and the I/O board. The devices on the system module communicate with the devices on the I/O board by way of the PCI bus. Above is a block diagram showing the major components and the relationship of the system module and the I/O board.

System Module

The system module contains the high-speed components: the microprocessor, the backside cache, the main memory, and the IC that contains the memory controller and the PCI bus bridge.

I/O Board

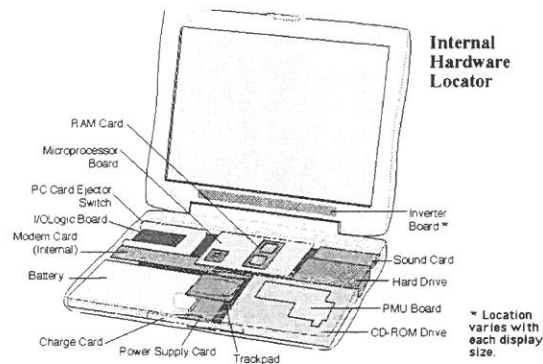
All the I/O interfaces, the video and display support, the expansion bays, and the CardBus slots are on the I/O board. The controller ICs on the I/O board are connected to the PCI bus.

I/O Controller ICs

The Macintosh PowerBook G3 Series computers have two Heathrow I/O controller ICs. The Heathrow IC is an integrated I/O controller and DMA engine for use in Power Macintosh computers with a PCI bus. It integrates most of the standard Macintosh I/O controllers, including SCSI, SCC, IDE, floppy disk, sound, Ethernet, and VIA.

Boards and Cards

- I/O Logic Board
- Microprocessor Board
 - Processor
 - L2 Cache
 - Memory
- PMU Board
 - Power control



Notes

I/O Logic Board

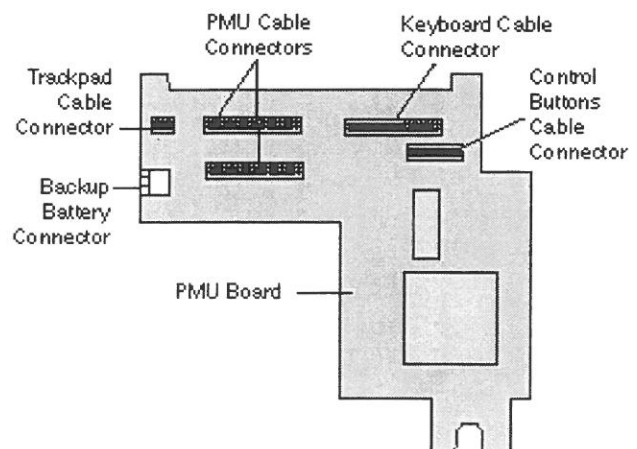
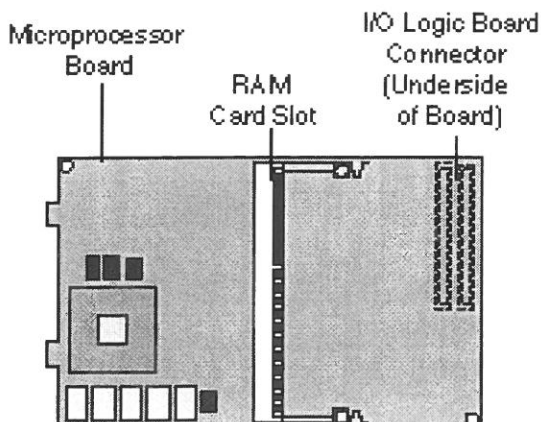
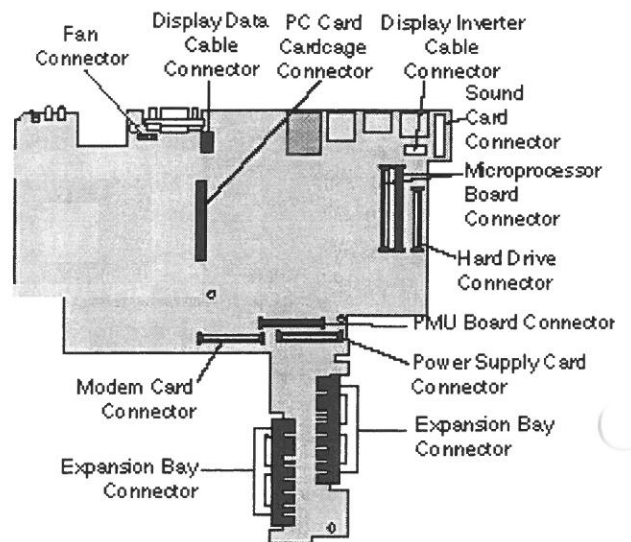
The I/O logic board includes all the I/O interfaces, video and display support, and expansion bays. The PC Card card cage mechanism (CardBus slots) is a separate part that connects to the I/O logic board. The I/O logic board also includes two I/O controller ICs that integrate most of the standard Macintosh I/O controllers such as SCSI, SCC, IDE, floppy disk, sound, Ethernet, and VIA.

Microprocessor Board

The microprocessor board contains the high-speed components: the microprocessor, backside cache, main memory, system ROM, and the IC that contains the memory controller and the PCI bus bridge.

PMU Board

The PMU board controls the sleep and power on and off sequences, power to the other ICs, and brightness of the display.



Features

- 233-300 MHz PowerPC 750
- 0 - 1 MB Backside L2 Cache
- 32 - 192 MB RAM
- 2 - 8 GB Hard Disk
- 12.1" SVGA (CSTN) - 14.1" XGA (TFT)
- 10baseT Ethernet, 56k Modem (optional)



5

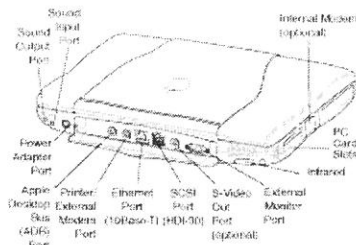
Notes

•Features (first generation)

- Processor: the microprocessor in the Macintosh PowerBook G3 Series computers is a PowerPC G3 microprocessor running at a clock speed of 233,250, or 292 MHz.
- Cache: the 250 and 292 MHz models have a backside L2 cache consisting of 1 MB of fast static RAM. The clock speed of the backside cache is half the clock speed of the microprocessor.
- Memory: the Macintosh PowerBook G3 Series computers have two standard SO-DIMM expansion slots for SDRAM modules. The computers come with 16, 32, or 64 MB of SDRAM installed. RAM is expandable up to 192 MB with currently available memory devices.
- Hard disk storage: the Macintosh PowerBook G3 Series computers have built-in hard disk drives with capacities of 2, 4, or 8 GB. The hard drive is removable.
- Display: the Macintosh PowerBook G3 Series computers have either a 13.3 or 14.1-inch TFT display with XGA resolution (1024 x 768 pixels) or a 12.1-inch STN display with SVGA resolution (800 x 600 pixels). Each display is backlit by a cold cathode fluorescent lamp (CCFL).
- External monitor: all configurations have a standard VGA video connector for an external video monitor with XGA resolution (up to 1280 x 960 pixels). In addition, the 13.3 and 14.1-inch models have an S-video connector that supports PAL and NTSC video monitors.
- Video RAM: the Macintosh PowerBook G3 Series computers come with 2 or 4 MB of video SGRAM, which supports up to millions of colors.
- External monitor Graphics acceleration: the video circuits provide built-in 2D and 3D acceleration.
- Expansion bays: all configurations have two expansion bays for batteries, floppy disk drive, CD-ROM drive, DVD drive, and other IDE or PCI devices. Storage devices in the expansion bays can be removed and replaced while the computer is operating.
- CardBus slot: all configurations have a CardBus slot that accepts one Type III or two Type II CardBus cards or PC Cards. The cards can be removed and replaced while the computer is operating. The slot supports Zoomed Video.

Features (cont)

- Expansion Bay
 - CD/DVD ROM Player
 - Floppy Drive (optional with CD models)
- Infra Red (4 Mbit)
- VGA Video out
- TV out (13.3" and 14.1" models)

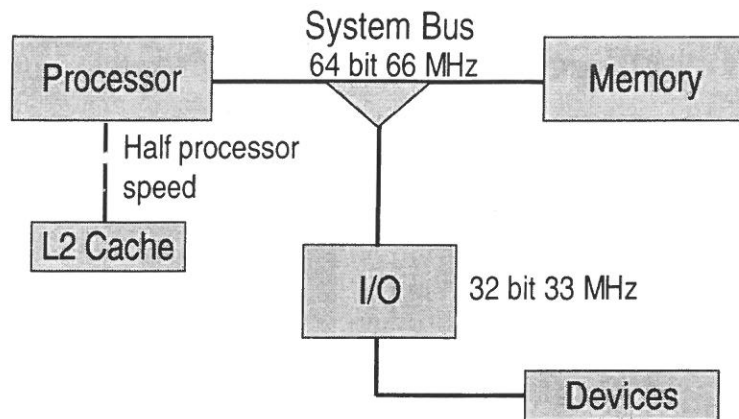


Notes

Features (cont)

- Standard I/O ports: all configurations have the standard Macintosh input and output ports:
 - External SCSI with an HDI-30 connector;
 - Serial port with GeoPort capability
 - Audio input and output ports
 - ADB port for external keyboard or mouse
- Modem: some configurations have a built-in modem with K56flex data rate.
- Ethernet: all configurations have a built-in Ethernet port with a 10BaseT connector.
- Infrared link: all configurations have an infrared link for up to 4 Mbit-per-second IrDA data transfer.
- Sound: all configurations have a built-in microphone and speakers as well as a line-level stereo input jack and a stereo headphone jack.
- Keyboard: the keyboard is a new design with an embedded numeric keypad and inverted-T arrow keys.
- Trackpad: the integrated flat pad includes tap/double tap and drag features.
- Weight: a Macintosh PowerBook G3 Series computer weighs 3.45 kg (7.6 pounds) with the battery and CD-ROM drive installed in the expansion bays.
- Size: A Macintosh PowerBook G3 Series computer is 323 mm (12.83 inches) wide, 265 mm (10.43 inches) deep, and 51 mm (2.01 inches) thick.

System Bus - definition



Notes

Processor

The processor is typically a PowerPC.

Memory

Memory consists of ROM and RAM, and can be expanded by inserting SIMMs or DIMMs. Some computers have also second-level cache as an addition to memory.

System Bus

The Processor and Memory are connected to each other with a System Bus. This bus is sometimes also referred to as Processor bus or Frontside bus.

L2 Cache Bus

The second-level cache is connected to the processor through a cache bus. In the PowerPC 750, this bus is on the processor card, and typically this bus runs at half the processor speed.

I/O bus

There are several Input/Output (I/O) busses in the computer. The way the different I/O busses are connected to the system bus and to each other can be different for each computer. Typical I/O busses are NuBus, PCI, USB, etc.

I/O devices

The I/O devices cover a wide range of hardware products, from mouse and keyboard to hard disks.

The importance and consequences of bus sizes and speeds

Each bus has its own specifications. The two most important features are the bus width and bus speed. Those two figures indicate the maximum theoretical data throughput for that bus. The throughput of each bus and the way the different busses are connected to each other are very important for the overall speed of the computer.

A typical value for the system bus is 64 bit wide, at 66 MHz. The PCI I/O bus is 32 bit wide and runs at 33 MHz.

Bus Speeds

- 233, 266, and 300 MHz
 - System bus 66 MHz
- 250 and 292 MHz
 - System bus 83 MHz

Speed (MHz)	233	250	266	292	300
L2 Cache (KB)	0 / 512	1024	1024	1024	1024
L2 Cache (MHz)	117	125	133	146	150
Systembus (MHz)	66	83	66	83	66

8

Notes

Please note that the Service Source CD (September version) is NOT CORRECT on this point.

System Software

- Mac OS 8.1
- PowerBook G3 series Enabler v1.1
- Mac OS 8.5: no enabler

9

Notes

Mac OS

The system software that comes with the Macintosh PowerBook G3 Series computers is Mac OS 8.1 with the addition of the extensions and control panels required by product-specific features.

Keyboard

- Function key
- Fn F5: numeric keypad
 - Num lock LED
- Reset Power Manager: Shift-Fn-Ctrl-Power

10

Notes

Keyboard

On the Macintosh PowerBook G3 Series computers, the keyboard has a new layout with an embedded numeric keypad. The embedded keypad is activated by a new function key that is located in the lower left corner of the keyboard.

To activate the embedded numeric keypad, the user holds down the function key and presses the F5 (num lock) key. The num lock LED comes on to indicate that the numeric keypad is active. In that mode of operation, only the numeric keypad, the modifier keys, and certain other special functions are active. While the keyboard is in the keypad mode, the user can type alphabetical information by holding down the function key.

In addition to the embedded numeric keypad, the keypad mode gives several other keys special functions. To see the effects of the keypad mode on individual keys, the user can use the Key Caps utility in the Apple menu.

The Macintosh PowerBook G3 Series computers use a new key combination for forcing a reset and power off. The user should hold down the shift, function, and control keys and press the power key. This key combination also forces a reset of the parameter RAM, so it should be used only as a last resort. To force a reset without turning off the power, the user should hold the control and command keys and presses the power key.

Technologies

11

Notes

Expansion Media Bays

- Left bay
 - Battery
 - Floppy
- Right bay also 5 1/4" PCI devices
 - CD/DVD
 - Third-party options (ZIP, Optical, Hard Disk, etc.)
- Hot Swappable (not at startup)
- Left battery is charged first



12

Notes

Expansion Bay

The expansion bays are openings on the right and left sides of the computer that accept expansion modules containing either power devices or storage devices. Either expansion bay can accommodate a battery, a floppy-disk drive, or some other 3.5-inch storage device. The expansion bay on the right side can also accommodate a 5.25-inch device such as a CD-ROM drive or a DVD-ROM drive.

The expansion bays are similar in that both have battery connectors and both support IDE devices such as a 3.5-inch floppy disk drive. In the 13.3 and 14.1-inch models, the expansion bay on the right side supports PCI-based devices as well as IDE devices, though not at the same time.

Connectors

Each expansion bay has two connectors: a five-contact connector for batteries and a 90-pin connector for data devices. This section only describes the 90-pin data connector.

The connector in the left expansion bay is mechanically the same as the one in the right expansion bay, but electrically it provides only IDE support and not PCI bus support.

Third-Party Options

<http://www.apple.com/powerbook/accessories.html>

DVD Video Kit

- DVD ROM module plus PC Card
- Zoomed Video
 - Lower slot
- TFT Display required
- Apple DVD Software Update 1.1
- Region Codes



DVD PC Card



13

Notes

Apple DVD Software Update 1.1

This software update lets you resume movie playback at the current scene after waking your computer from system sleep; stopping playback by selecting STOP, then quitting and restarting the Apple DVD Player application; and stopping playback by selecting STOP, then shutting down and restarting the computer

Region Codes

Motion picture studios want to control the home release of movies in different countries because theater releases are not simultaneous (a movie may come out on video in the U.S. when it's just hitting screens in Europe). Also, studios sell distribution rights to different foreign distributors and would like to guarantee an exclusive market.

Therefore they have required that the DVD standard include codes that can be used to prevent playback of certain discs in certain geographical regions.

Each player is given a code for the region in which it's sold. The player will refuse to play discs that are not allowed in that region. This means that discs bought in one country may not play on players bought in another country.

Regional codes are entirely optional for the maker of a disc. Discs without codes will play on any player in any country. It's not an encryption system, it's just one byte of information on the disc that the player checks. Some studios have announced that only their new releases will have regional codes, but so far almost all releases play in only one region.

There are 6 regions (also called "locales"). Players and discs are identified by the region number superimposed on a globe. If a disc plays in more than one region it will have more than one number on the globe.

1: Canada, U.S., U.S. Territories

2: Japan, Europe, South Africa, Middle East (including Egypt)

3: Southeast Asia, East Asia (including Hong Kong)

4: Australia, New Zealand, Pacific Islands, Central America, Mexico, South America, Caribbean

5: Former Soviet Union, Indian subcontinent, Africa (also North Korea, Mongolia)

6: China

If the number of the region where you bought your player is not shown, then the DVD will not work with your player.

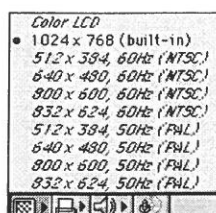
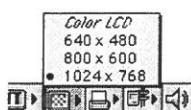
More Information

<http://www.apple.com/dvd/>

<http://www.dvdresource.com/dvdfaq/dvdfaq.shtml>

Video

- ATI Rage LT or LT Pro video controller
 - 2 MB or 4MB SGRAM
- 13.3" and 14.1" models have S-Video (TV) out
 - Adapter for Composite
- Resolutions up to 1280 x 1024
- Zoomed Video
 - Bottom slot only



Notes

Video Controller

On the first generation 233 MHz models (without L2 Cache) the video controller is an ATI Rage LT with 2 MB SGRAM, on the others it is an ATI Rage LT Pro with 4 MB SGRAM.

PC Cards

The PC Card slots on the new PowerBook G3 are CardBus slots. This means that they can accept newer 32-bit PC Cards. The lower PC Card slot has circuitry for handling video signals (zoom video). Although a zoom video card is a Type II card, it can only be used in the lower slot.

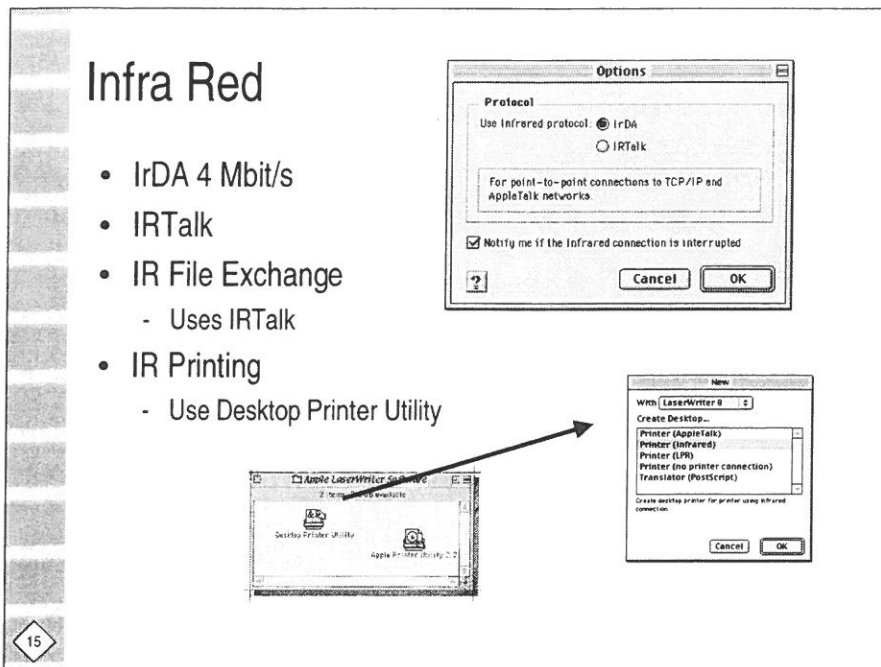
Zoomed Video

Zoomed Video is a method of displaying video signals sent from a PC card.

CardBus

CardBus is a 32-bit version of the PCMCIA PC Card standard. In addition to supporting a wider bus (32 bits instead of 16 bits), CardBus also supports bus mastering and operation speeds up to 33 MHz. The slot supports both older 16-bit PC Cards that work in other PowerBook models, and 32-bit CardBus Cards

Resolution	2 MB Video RAM	4 MB Video RAM
512 x 384	24 bpp (millions)	24 bpp (millions)
640 x 480	24 bpp (millions)	24 bpp (millions)
800 x 600	16 bpp (thousands)	24 bpp (millions)
832 x 624	16 bpp (thousands)	24 bpp (millions)
1024 x 768	16 bpp (thousands)	24 bpp (millions)
1152 x 870	8 bpp (256)	24 bpp (millions)
1280 x 960	8 bpp (256)	16 bpp (thousands)
1280 x 1024	8 bpp (256)	16 bpp (thousands)



Notes

IR

The PowerBook G3 Series (M4753) has built-in infrared that supports two types of transmissions:

- IrDA - up to 4 MB/second - AppleTalk and TCP/IP
- IRTalk - 230 kB/second - AppleTalk Only

There are two main differences between IRTalk and IrDA:

1. IrDA is an industry standard, while IRTalk is an Apple-only technology.
2. IrDA supports TCP/IP and AppleTalk, where IRTalk only supports AppleTalk. The Infrared Control Panel will give information about any Infrared connections that are established as well as what type of infrared the PowerBook is currently set to use. In the window below, IrDA is selected and there are no other Infrared devices in range.

For infrared options to work there are three drivers that must be in the Control Panels or Extensions folder:

- Infrared Control Panel
- IrDALib Extension
- IrLanScannerPPC Extension

The control panel and the extensions are usually installed by default. If they are not present or disabled, you will not be able to make infrared connections from the PowerBook.

If you have used infrared communications with other Apple products, you will notice a difference with this PowerBook. The lens in the rear of the PowerBook has been updated to support IrDA. The new lens has a viewing angle of about 30 degrees. There is also a minimum 3 foot distance for recognizing other Infrared devices.

More Information

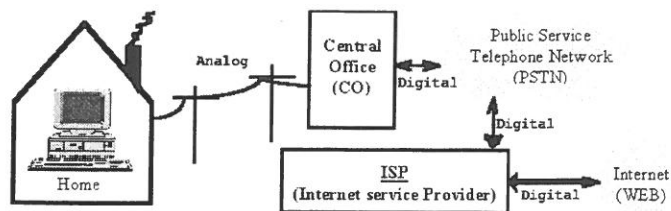
<http://til.info.apple.com/techinfo.nsf/artnum/n28509>

<http://til.info.apple.com/techinfo.nsf/artnum/n20928>

<http://til.info.apple.com/techinfo.nsf/artnum/n30861> (PowerBook: Printing to an IrDA Printer)

56K Modem

- 56Kbits/s max
- V.90 standard
 - V.90 includes 56Kflex and X2 technologies
- 56K only possible if ISP has appropriate technologies
 - Usually 36.6 max



Notes

Modem

Some configurations of the Macintosh PowerBook G3 Series computers come with a modem card installed in the internal communication slot. The modem card has an RJ-45 connector that is accessible through an opening in the left side of the computer's case.

The modem card has the following features:

- K56flex technology (US modem)
- Modem bit rates up to 56 Kbps
- Fax modem bit rates up to 14.4 Kbps

Facsimile applications must support Class 1 fax; a Class 1 fax application comes with the computer. The modem appears to the system as a serial port that responds to the typical AT commands. The modem card provides a sound output for monitoring the progress of the modem connection.

V.90

By viewing the public switched telephone network as a digital network, V.90 technology is able to accelerate data downstream from the Internet to your computer at speeds of up to 56Kbps *. Thus, V.90 technology is different from other current standards, because it digitally encodes downstream data instead of modulating it as analog modems do. The data transfer is asymmetrical, so upstream transmissions (mostly keystroke and mouse commands from your computer to the central site, which require less bandwidth) continue to flow at the conventional rates of up to 33.6Kbps. In other words, upstream data (data sent from your modem) is sent as an analog transmission that mirrors the V.34 Standard. Only the downstream data transfer takes advantage of the high speed V.90 rates

More Information

<http://www.v90.com/>

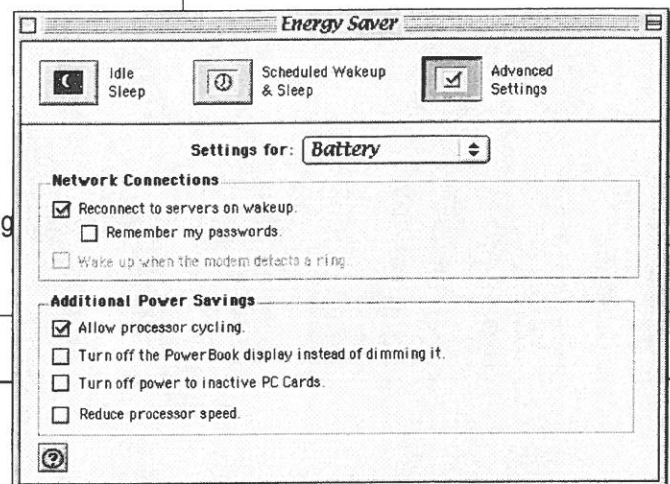
<http://til.info.apple.com/techinfo.nsf/artnum/n24482>; 56Kbps Modems: Getting The Fastest Connection

Power Management

- Li-Ion
 - Indicator LEDs
 - 49 Wh
- Charging takes 2 hours, about 3.5 hours battery life
 - Left battery is charged first
- Settings
- Backup Battery
 - 4 minutes sleep mode
 - 48 hours to charge fully
 - Test: remove main battery and power, PRAM setting be saved for at least 10 minutes.

17

Notes



Energy Saver Control Panel

Under the Network Connections settings, there are the same features that were available under AutoRemounter, that is the ability to reestablish network connections with mounted servers after coming out of sleep mode.

There is the feature of Wakeup when the modem detects a ring. This is not a supported features of the PowerBook G3 Series (M4753) and will remain disabled.

In the Additional Power Savings section, there are options to allow processor cycling which will slow down the processor Megahertz when its not being used or when the PowerBook detects there has not been any mouse or keyboard activity for some time. This feature works in the same way as with previous PowerBooks.

Turning off the display instead of dimming it allows for greater power savings when using a battery.

Turning off power to inactive PC cards will cut the power to installed PC cards completely. Many PC cards will draw power even when they are not being used. Just having some of these cards inserted into the PowerBook will cause them to be powered. By checking this feature, the power can be cut off to the cards that have been inserted. This may save battery power with some PC cards, but not not all cards may be able to use this feature.

Reduce processor speed

This option is new to the PowerPC G3 processors. When this option is selected, the processor drops down from its original speed to approximately 25 MHz. This allows for some battery savings as the processor is not constantly using a higher speed.

The PowerBook does not need to be restarted for this feature to take effect. The setting will become active when the Energy Saver control panel is closed.

If you are having an issue where your PowerBook is running a lot slower than it seems it should, you should select this option. If it is selected and you do not need the battery savings then deselect it. Make sure you check both the battery and power adapter settings.

More Information

<http://til.info.apple.com/techinfo.nsf/artnum/n24610> : PowerBook G3 Series: Battery FAQ



Support Items

18

Notes

Mac OS 8.5

- Drive Setup 1.6.1
 - For PwB 5300/2300 in SCSI disk mode
 - 1.6.2 included in 8.5.1
- System Profiler 2.1.2
 - More information; scriptable

19

Notes

Summary of New Features in ASP 2.1.2

Apple System Profiler 2.1.2 provides many new features and enhancements over previous versions. It also adds support for new PowerPC G3-based Macintosh computers, and for iMac.

ASP is now scriptable, and many features are recordable with the Apple Script Editor.

The Devices and Volumes screen now links volumes with associated drive devices, and displays this information in a graphical format.

Information about built-in video or display cards is now linked to displays.

Known issues

ASP 2.0 and later is not compatible with the Apple Displays Software 1.6.1 and earlier on some configurations, notably PowerBook models. When the ASP application is opened on these configurations, you are likely to get one of the following messages on your screen:

"The application 'Apple System Profiler' could not be opened because an unexpected error occurred." or

"The application 'Apple System Profiler' could not be opened because 'ControlsLib' could not be found."

Disk Drives

- Mac OS Extended (HFS+) default
- SCSI Disk mode: Mac OS 8.1 required
- HFS+ Time issue for files
 - SuppN98-19
- Password Security
 - Password lost: Call Apple
 - SuppN98-20

20

Notes

SuppN98 19 - Mac OS 8.1: Mac OS Extended Volumes and File Dating

The reason the times change is that Mac OS Extended stores the creation and modification times in GMT. The offset from GMT is stored in PRAM. This value is added to the time stored for the file to determine the correct creation or modification time.

The GMT offset is stored when you select a time zone in the Date & Time control panel. This offset is modified when Daylight Saving Time is checked. Since the value is stored as seconds, 3600 is either added to or subtracted from the GMT offset depending upon entering or exiting Daylight Saving Time respectively.

Changing time zones will also affect the creation and modification dates.

Drawbacks of this are that aliases may break and incremental backups may become full backups since every file appears to have been modified.

SuppN98 - 20 Unlocking PowerBook Apple password security

When a customer has lost his security password for his powerbook, no data access is possible without a direct support from Apple Assistance. The Apple Password security feature (control panel) installed by Apple computer onto some Powerbooks is only recoverable by an Apple Assistance center.

Solutions:

Only Apple Assistance can help an AASP to recover user access to a PowerBook on which Apple password security has been lost. The end user should contact the AASP with the locked PowerBook password. The AASP should verify that the customer is the owner of the PowerBook (proof of purchase by the customer and list of precise data recorded onto the hard disk that can be checked once the password has been recovered). The AASP should contact Apple Assistance (requires the use of his AASE CIC account number). The AASE will then be directly contacted by phone by an Apple Assist agent to unlock the Apple password security.

Formatting the hard disk:

The AASP, dealer, or customer can also format the protected hard disk. Notice that in doing so all data stored on the hard disk will be lost. New system software needs to be installed, applications need to be reinstalled, and a backup of the documents (if it exist) needs to be restored.

Software Updates

- Mac OS 8.5.1
- ATI Driver Update (1.4.7)
 - Solves slow scrolling after sleep
 - More external resolutions in Simulscan
- ARA Client Update (3.0.1)
 - Solves connection issue 'Starting ARAP...'
 - For PowerBook G3 series only
- G3 Ethernet (Built-In) driver (2.0.4)
 - Version 2.1 Included in Mac OS 8.5

Multiple Scan Display
 640 x 480 (built-in)
 640 x 480, 60Hz
 640 x 480, 60Hz (simulscan)
 640 x 480, 67Hz
 640 x 480, 72Hz
 640 x 480, 75Hz
 800 x 600 (built-in)
 800 x 600, 60Hz
 800 x 600, 60Hz (simulscan)
 800 x 600, 72Hz
 800 x 600, 75Hz
 832 x 624, 75Hz
 1024 x 768 (built-in)
 1024 x 768, 60Hz
 1024 x 768, 60Hz (simulscan)
 1024 x 768, 70Hz
 1024 x 768, 74.9Hz
 1024 x 768, 75Hz
 1152 x 870, 75Hz
 1280 x 960, 75Hz
 1280 x 1024, 60Hz
 1280 x 1024, 75Hz

Multiple Scan Display
 640 x 480 (built-in)
 640 x 480, 60Hz
 640 x 480, 67Hz
 640 x 480, 72Hz
 640 x 480, 75Hz
 800 x 600 (built-in)
 800 x 600, 60Hz
 800 x 600, 72Hz
 800 x 600, 75Hz
 832 x 624, 75Hz
 1024 x 768 (built-in)
 1024 x 768, 60Hz
 1024 x 768, 60Hz (simulscan)
 1024 x 768, 70Hz
 1024 x 768, 74.9Hz
 1024 x 768, 75Hz
 1152 x 870, 75Hz
 1280 x 960, 75Hz
 1280 x 1024, 60Hz
 1280 x 1024, 75Hz

Notes

ATI Driver Update 1.4.7

Simulscan is a mode on PowerBook computers in which the same image is displayed on the built-in display as is displayed on an external monitor. Previously, PowerBook G3 Series computers were able to access only one screen resolution in Simulscan mode. The ATI Driver Update 1.4.7 allows PowerBook G3 Series computers with screen resolution switching capabilities to use additional screen resolutions in Simulscan mode. With the ATI Driver Update 1.4.7 installed, PowerBook computers with a 14" screen can access screen resolutions of 640 x 480 and 800 x 600 in addition to the 1024 x 768 resolution already available. PowerBook computers with a 12" screen can now use the 640 x 480 resolution in addition to the 800 x 600 resolution already available.

Monitor options before installing ATI 1.4.7 are shown at the right of the slide.

ARA 3.0.1 Client Updater for PowerBook G3 Series

The following problem has been discovered when using ARA 3.0 on a PowerBook G3 Series computer. After a PowerBook G3 Series computer is brought out of sleep mode, it will not successfully connect to a remote access server using ARAP. The modem will dial and establish a connection but the connection never gets beyond the status message which states "Starting ARAP..." The connection will eventually time out with an alert. The connection attempt can also be terminated by using the Cancel button.

This problem does not occur with ARA 2.1.

Connections made via PPP will work whether the PowerBook has been put to sleep or not.

The ARA 3.0.1 Client Updater fixes the problem described above. Apple recommends that all PowerBook G3 Series customers use this utility to update the ARA 3.0 Client.

Power Macintosh G3 Ethernet (Built-in) driver version 2.0.4

When using the 2.0, 2.0.1, 2.0.2, or 2.0.3 driver, there is a possibility that the system could lose network services when the built-in Ethernet interface is used.

In some situations a dialog might be displayed:

Access to your AppleTalk Network is no longer available.

When the network becomes available again, a message on your screen will notify you."

Software Updates

- PowerBook G3 Series Modem (1.0.1)
 - In sleep mode modem is turned off
 - Included in 8.5
- Modem Updater Z-1.3
 - For Europe; adds stability and V.90 support
 - US use v1.3.5



22

Notes

Modem Update Z-1.3

The Apple Modem Updater will update the modem in the iMac as well as the modem in the PowerBook G3 Series (both the K56flex-only modem shipping in earlier PowerBook G3 Series and the V.90 compliant modem currently shipping in the PowerBook G3 Series). The updater installs version 2.2 of the Rockwell firmware which contains the latest versions of both the V.90 and the K56flex protocols. The modems can use either the K56flex or V.90 protocols and will automatically negotiate with the service provider to use the appropriate one.

Modem Update 1.3.5 (US Only)

The Apple Modem Updater will update all modems in the iMac and the PowerBook G3 Series computers (both the K56flex-only modem shipping in earlier PowerBook G3 Series and the V.90 compliant modem currently shipping in the PowerBook G3 Series). The updater installs version 2.2 of the Rockwell firmware which contains the latest versions of both the V.90 and the K56flex protocols. The modems can use either the K56flex or V.90 protocols and will automatically negotiate with the service provider to use the appropriate one.

PowerBook G3 Series Modem Extension, v1.0.1

The PowerBook G3 continues to supply power to the built-in modem for 30 seconds after an application has used the modem. This minimizes the time it takes to start the next connection.

With version 1.0 of the Modem extension, if the PowerBook G3 is put to sleep immediately after terminating a connection, the modem will continue to draw power, which reduces the amount of charge left in the battery.

Version 1.0.1 corrects this problem by turning power off to the modem when the PowerBook G3 is put to sleep.

All PowerBook G3 Series computers with the Apple built-in modem should upgrade to version 1.0.1 of the Modem extension.

Support Notices

- SuppN98-25 PowerBook G3 Series and Swedish Keyboard
 - In KeyCaps @ is switched with ä
- SuppN98-36 Incorrect label on PowerBook G3 packaging
 - 12" display is called XGA but it is SVGA

23

Notes

SuppN98 25 - G3 series PowerBook and Swedish keyboard

Customers using the Apple G3 Series PowerBook computer with Swedish OS will experience difficulty in locating the '@' symbol. The '@' symbol on a Swedish system can usually be located by using Key Caps under the Apple Menu. The '@' symbol is visible while depressing the 'alt' key (depending on which font is selected).

If an external Swedish keyboard is connected to the PowerBook using the ADB port on the back and Key Caps is launched, Key Caps opens with a different keyboard map setting to reflect the larger external keyboard. When the user presses the 'alt' key (the standard modifier key used to find keys not on the default keyboard mapping) the '@' symbol is clearly visible then.

It is expected that experienced users will already know the key combination, so the impact of this issue is considered low. This issue will be resolved in the next revision of the software.

SuppN98 36 - Incorrect label on PowerBook G3 packaging

We have just become aware of errata on the new 12-inch TFT PowerBook G3 (M7229*/A & M7108*/A) packaging feature label. The label incorrectly indicates that the 12-inch active matrix display has an XGA display when it actually has the SVGA display.

All other product information and marketing materials on this 12" PowerBook correctly refer to the SVGA display.

This PowerBook features an SVGA screen, but the reference to the display on the feature label by the handle reads:

12.1-inch (diagonal) active-matrix XGA color display.

It SHOULD READ:

12.1-inch (diagonal) active-matrix SVGA color display.

Apple Computer is working to correct this label effective with shipments beginning next week (2 October 1998).



Service Items

Notes

Authorization

- Tool set required
 - Torque control driver
 - T6 and long T8 bit
 - Alignment tool for PC Card cage
 - Flat-blade Nylon Tool
- Qualified engineers
 - At least 2 ACSEs should have passed the test

25

Notes

Service Authorization

The repair strategy for the new PowerBook G3 series will be Centralized Same Unit Repair FOR THE FIRST 3 MONTHS after introduction. These units will be handled/repared by the ECPRC (European Central Product Repair Center) that will offer same-unit repair to Apple Authorized Service Providers in Europe (not valid for IMCs).

After the first 3 months, Apple Computer will offer AASPs with staff trained during this period (and equipped with the right tools) the possibility to service the PowerBook G3 series themselves by means of modules/parts replacement.

This Centralized Same Unit Repair will not be valid for certain defective parts that easily accessible without taking the unit apart. These parts can be ordered and serviced by the AASPs.

Available parts are:

661-1516 CD-ROM 20X

661-2048 Floppy disk

661-2069 Battery LiON recharge

922-3535 Adapter 45W PBG3 3 prongs

x922-3348 KYBD PBG3 Series (x letter define countries)

The approved packaging to be used to ship a 'PowerBook G3 Series' will be available from European Service Operations (ESOs) as of 18 January 1999:

070-1595 SERVICE PACKAGING PB G3

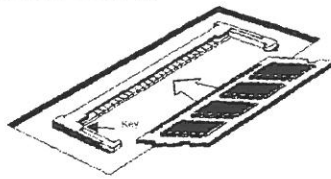
This packaging was already announced in an earlier Service Notice:

"AASPs MUST USE THE APPROVED PACKAGING SUPPLIED BY APPLE FOR RETURN OF UNITS FOR REPAIR. USE OF NON APPLE APPROVED PACKAGING IS CAUSE FOR VOIDING THE WARRANTY.

To become certified, an AASP should have at least two service engineers that have passed the PowerBook G3 series test and buy the tools specified. All items are available from LAI.

Memory Expansion

- Lower Slot (32 or 64 MB standard)
 - Max 1.5 inch
- Upper Slot (empty, upgradable to 128 MB)
 - Max 2.0 inch
- SO-DIMM
 - Small Outline Dual Inline Memory Module
 - 144 pin, 64 bit, 3.3 V, 7 ns, 100 MHz SDRAM



26

Notes

SO-DIMM technology introduced an industry standard for notebooks.

SO-DIMMs or Small-Outline DIMMs are ultra-thin, compact, and lightweight.

They are one-half the size of standard SIMMs, one-third the thickness, and one-third the weight of conventional SIMM modules (59.69 x 25.40 x 3.81 mm).

The modules are installed in computers that feature “swing-down” type sockets.

Current models (iMac, PowerBook 2400) use the 144 pin 64 bit SO-DIMM which upgrade with a single SO-DIMM.

Memory Expansion

The Macintosh PowerBook G3 Series computers have two RAM expansion slots that accommodate standard SO (small outline) DIMMs using SDRAM devices.

One slot is located at the bottom of the system module and is normally occupied by the factory-installed SO-DIMM. The other slot is located at the top of the system module and is available for a user-installed SO-DIMM. RAM expansion SO-DIMMs for the Macintosh PowerBook G3 Series computers must use SDRAM devices. If the user installs an SO-DIMM that uses EDO devices, the death chimes will sound when the user attempts to restart the computer.

A SO-DIMM for the Macintosh PowerBook G3 Series can have either 16, 32, 64, or 128 MB of memory. Because of space limitations, a 128 MB SO-DIMM will fit only in the top slot.

Total RAM capacity using the highest-density devices available is 192 MB and is limited by the space available for the SO-DIMMs. The bottom slot can accommodate a 1.5-inch SO-DIMM with up to 64 MB of SDRAM. The top slot can accommodate a 2.0-inch SO-DIMM with up to 128 MB of SDRAM.

Note

Future devices with higher density may allow expansion beyond the current 192 MB limit.

MacTest Pro

- Required version
 - PowerBook series Test 3.3 (current version is 3.4.1)
 - DiagModem, DiagModem.prm files
- 8.5 not compatible
 - Boot from MacTest Pro CD (SSCD November)
 - MacTest Pro 1.0.8 is compatible
 - Or use January MacTest Pro CD

27

Notes

From the ReadMe MTP/G3+iMac 9/98

"PowerBook Series Tests (PPC)" v3.4 adds support for new PowerBook G3 Series computers.

"Serial Loopback Tests (PPC)" v1.1.1 adds support for Power Macintosh G3 and PowerBook G3 computers and improves test reliability when looping.

Running the audio tests from "CD/DVD/DAT Tests (PPC)" v1.0 on some Power Macintosh G3 or PowerBook G3 configurations equipped with an ATAPI CD-ROM will not produce audible sound tests, even though each audio test may pass. This is a known bug and will be addressed in a future version of MacTest Pro.

PowerBook Series Tests (PPC)

To run "PowerBook Series Tests (PPC)" v3.4, you should always boot from the CD. If you do not, the SCC subtest will be deselected. The SCC subtest can be reselected, however an alert message will instruct you to turn off AppleTalk and reboot.

The "PowerBook Series Tests (PPC)" test module makes use of special applications (named "DiagCarbonModem" and "DiagLeapModem") as well as associated files (named "DiagCarbonModem.Prm" and "DiagLeapModem.Prm") to perform modem tests. In order to use these applications and files, they must be located in the Test Modules folder. If these applications and files are not placed in the Test Modules folder, the modem test option will not be available (grayed out) in the setup window for "PowerBook Series Tests (PPC)", and the modem test cannot be performed.

Before looping "PowerBook Series Tests (PPC)" v3.4 on a PowerBook G3 series, turn off sleep mode via the control panel; otherwise, you may not be able to correctly wake-up your PowerBook when all tests have been completed and the PowerBook goes to sleep. If you intend to run the SCC and/or IR tests from "PowerBook Series Tests (PPC)" v3.4, you must perform ONE of the following three steps before you launch MacTest Pro: (1) Boot from the MacTest Pro CD; or (2) set AppleTalk to inactive and restart; or (3) go to the Extensions Manager and verify that the Extensions Set being used is the standard (locked) "Base Extensions Set". Then restart to insure that only the standard base set of extensions are loaded.

NOTE: When testing any PowerBook you MUST have the Power Adapter attached and plugged in, otherwise you may see false failures.

Warranty for Displays









- Service Notice ServN98-31
 - LCD Specifications 2.0.pdf file included
 - Specifies number of bad pixels allowed
- Reminder
 - SVGA color display has 800x600x3 pixels
 - About 1.5 million pixels
- Use Display Service Utility 4.1 or better

28

Notes

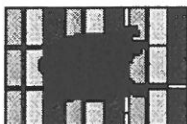
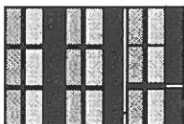
Highlights from the LCD Specifications 2.0.pdf file

6.1-Missing dots within a pixel:

Anomaly	Test Screen	Criteria	Accept	Reject
 -missing red subpixels	 on Red screen	1 Sub-pixel	9	10
 -Blue dots	 on Blackscreen	1 Sub-pixel	6	7
 -or Green dots	 on Blackscreen	1 Sub-pixel	2	3
 -or Red Dots	 on Blackscreen	1 Sub-pixel	6	7

In all those cases, there should be no more than 2 dot defects in a 10 mm² area

6.2-Spots

Anomaly	Test Screen	Criteria	Accept	Reject
 -Black Spot	 on White screen	diameter < 0,4mm diameter > 0,4mm	4 0	5 1

Disassembly

29

Notes

Tools

- Torx T8 and T6, Phillips
 - Magnetic useful
- Torque control driver
 - 2.0 inch pound for PC Card Cage
 - 2.5 inch pound for Top Case Assembly
- Alignment tool for PC Card cage
- Flat-blade Nylon Tool

30

Notes

Tools

Use the following tools for procedures in this chapter:

- #8 Torx driver (for most screws)
- #6 Torx driver (for the PC Card cardcage)
- PC Card cardcage alignment tool (077-0160)
- Phillips screwdriver (for the heat sink and modem)
- Flat-blade nylon or plastic tool
- Dental pick or hook tool (to open flex connectors)
- Torque screwdriver (required for some replacement procedures)

Caution: If you use a magnetic Torx driver, do not use it around the hard drive or the sleep reed switch.

Special Procedures

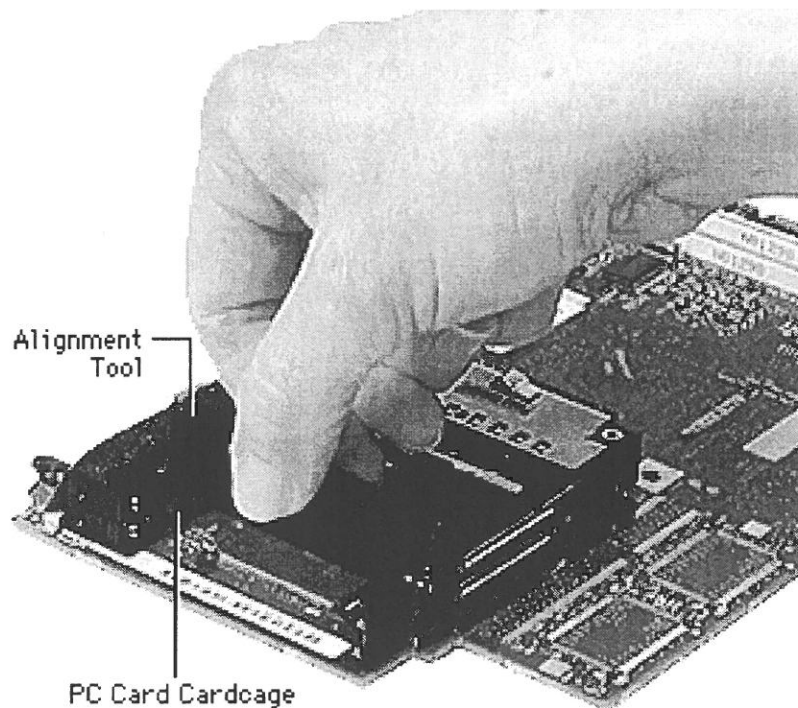
- PC Cardcage
 - Alignment tool
 - Torque Driver 2.0 inch pound
 - Torx T6
- KeyCaps
 - 2 types
 - See SSCD
- Reset Power Manager
 - Shift-Fn-Ctrl-Power

31

Notes

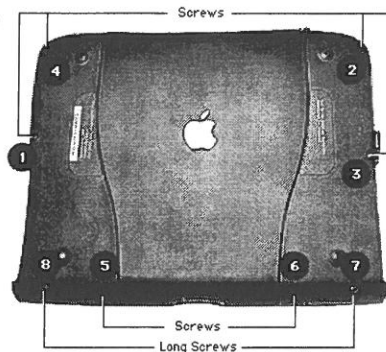
PC Card Cage replacement

Adjust the width of the Card Cage before tightening the last screw.



Top Case Assembly

- Order of screws
- Torx T8 at 2.5 inch pound
- Expansion bay flip door
- Test expansion bay
- Speaker cable



32

Notes

Replacement Caution:

When reassembling the PowerBook, the two long screws go into the outside holes on the front edge. Installing them in any of the other screw holes could cause the screws to push through the plastic or cause the plastic to dimple.

Order

Replace the screws in the order shown. Do not overtighten the screws.

Using a torque screwdriver, tighten the screws to a torque of 2.5 inch pounds. Test screw tightness by installing a battery in both expansion bays. If the batteries do not fit properly or the expansion bays will not lock, loosen the closest screw(s) a 1/4 turn and try the test again.

Expansion bay flip door

To make sure the expansion bay flip door is aligned properly, push it inwards when replacing the screw near the expansion bay flip door.

Speaker Cable

Check that the speaker cable is routed away from the power button and that the power button functions properly.

Identification of Circuit boards

- Like-for-like exchange

Part	Description	ID code or characteristic
Microprocessor Board	233 MHz/0 cache 233 MHz/512K cache 250 MHz/1 M cache 266 MHz/1 M cache 292 MHz/1 M cache 300 MHz/1 M cache	BKF DW3 BKE EE8 BAD DW4
I/O Logic Board	2 MB VRAM, no TV out 2MB VRAM, TV out 4 MB VRAM (ATI PRO Rage), TV out 4 MB VRAM (ATI LT PRO), TV out	BKG, DGK, DFL DW6 B9B or DGL DW7
Modem	Modem, 56K, Americas, GV Modem, K56flex/V.90, North America/Asia	white insulator E3J
Battery	Bottom and side shims Bottom shim only	AXW or E7L E3W or E7M

33

Notes

ID codes on parts

The ID codes listed in the table below can be found as part of the serial numbers that are labeled on the circuit boards. They are not part of the whole unit serial number that is labeled on the bottom of the PowerBook.

These serial numbers are situated at the following locations:

Microprocessor Board

Follow the instructions in Service Source for removing the microprocessor card. With the card removed, look at the serial number/bar code label on the SO-DIMM connector on the bottom side of the card.

I/O Logic Board

This serial number label is viewable from the opening for the PC Card slots. You do not need to disassemble the PowerBook to see it. Gently push in the PC Card slot doors and look inside the opening. You should see the serial number/bar code label. You may need to use a small flashlight to see the lettering on the label.

The ID code is the last three characters but one in the serial number. For example, if the serial number is *CK8xxxxxyyyx* then the ID code would be "yyy".

Identification

The serial number labels are printed in one of two ways: the ID codes are the last three characters but one in the serial number. For example, if the serial number is *CK8xxxxxyyyx* then the ID code would be "yyy".

-OR-

A different type of serial number label has "Singapore" printed directly after the serial number. In this case, the ID codes are within the last 5 characters of the serial number on the label. For example, if the serial number is *KC8xxxxxyyyxx* then the ID code would be yyy.

Exchange Parts Like for Like

Unless directed otherwise in the Service Parts Database, exchange parts like for like. Refer to the following table for the listing of ID Codes.

Service Notices

- ServN98 24 - PowerBook G3 series: Centralized Same Unit Repair
 - See Authorization chapter
- ServN99 09 - PowerBook G3 series internal modem
 - If all updates fail: replace modem

34

Notes

ServN99 09 - PowerBook G3 series internal modem

In case the installation of the modem firmware update, modem scripts, and Modem extension does not improve the communication, exchange the internal modem (only possible for certified AASP)* under the following part references, depending on PowerBook serial number and country model:

- If the PowerBook serial number barcode ends with D3E, BAA or CV5 :

French PowerBook: exchange the modem under the F661-1504 reference

German PowerBook: exchange the modem under the D661-1504 reference

British PowerBook: exchange the modem under the B661-1504 reference

- If the PowerBook serial number ends with E6A,EF7,EOF,EVO,ER7,EFD,E6D,EF6,EOG, EV1,EFC,EEY,EF8,EOJ,EV2,EFB,E25,E26,E27,ERM,EV3,ERY,ESP,ES7,FA6,F5H,FGU:

Exchange the modem under the 661-2099 reference.

References on the Internet

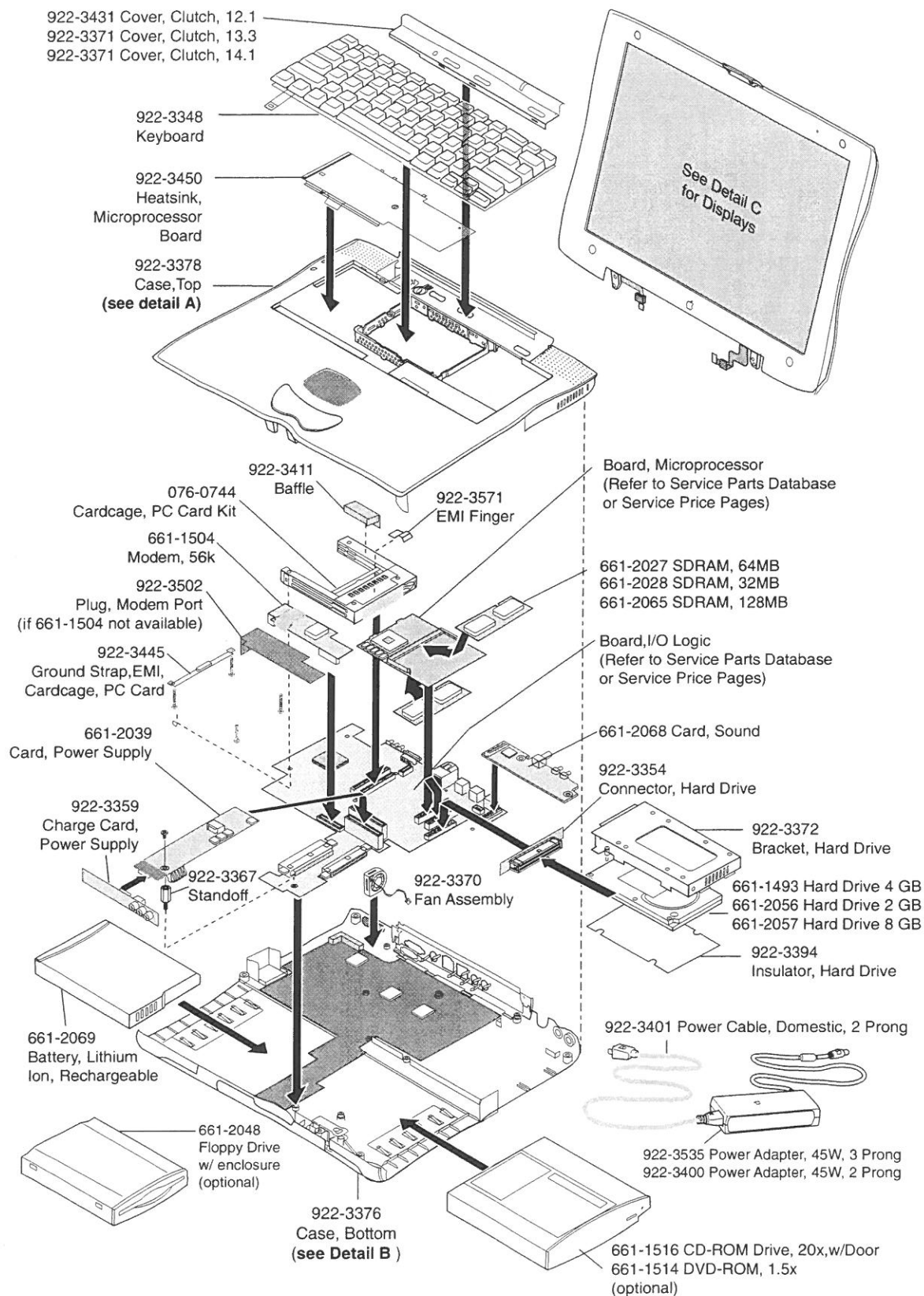
- Training References
 - http://www.lai.nl/html/lkc_references.html
- Marketing
 - <http://www.apple.com/powerbook/>
- Developer Note
 - http://developer.apple.com/techpubs/hardware/Developer_Notes/Macintosh_CPUs-G3/PowerBookG3Series.pdf

35

Notes

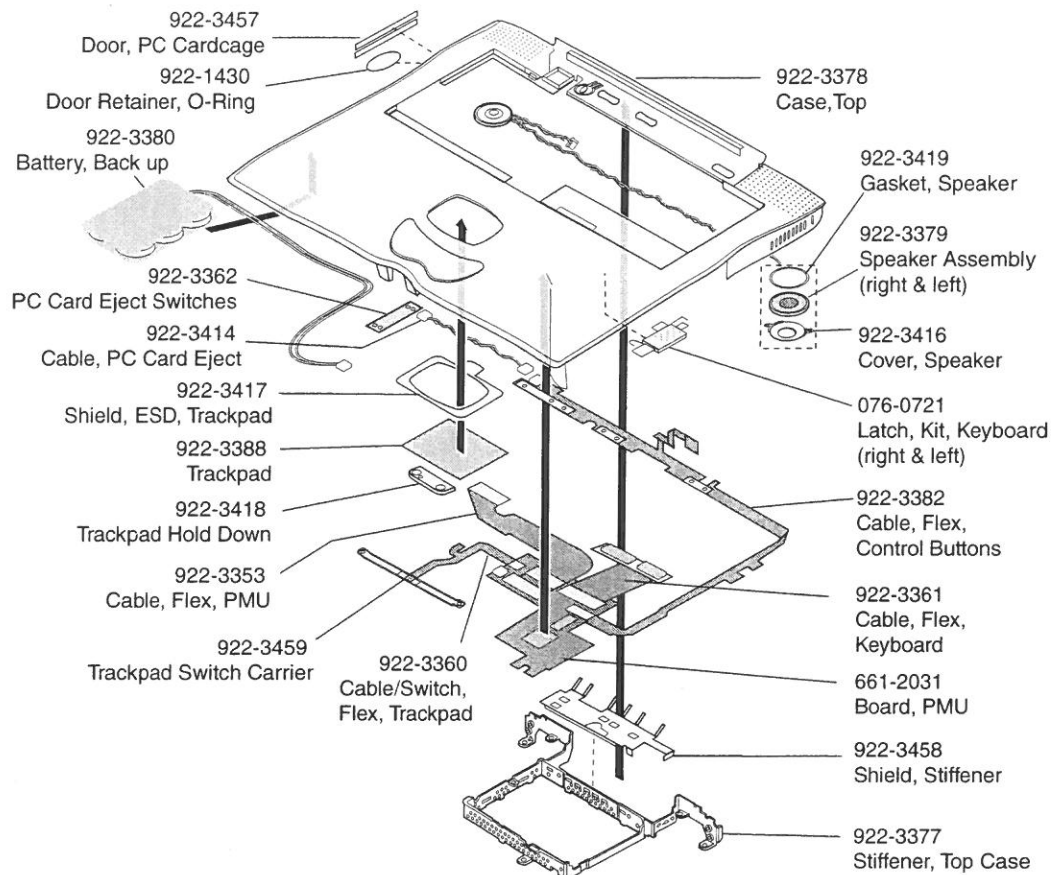


PowerBook G3 Series Main Exploded View

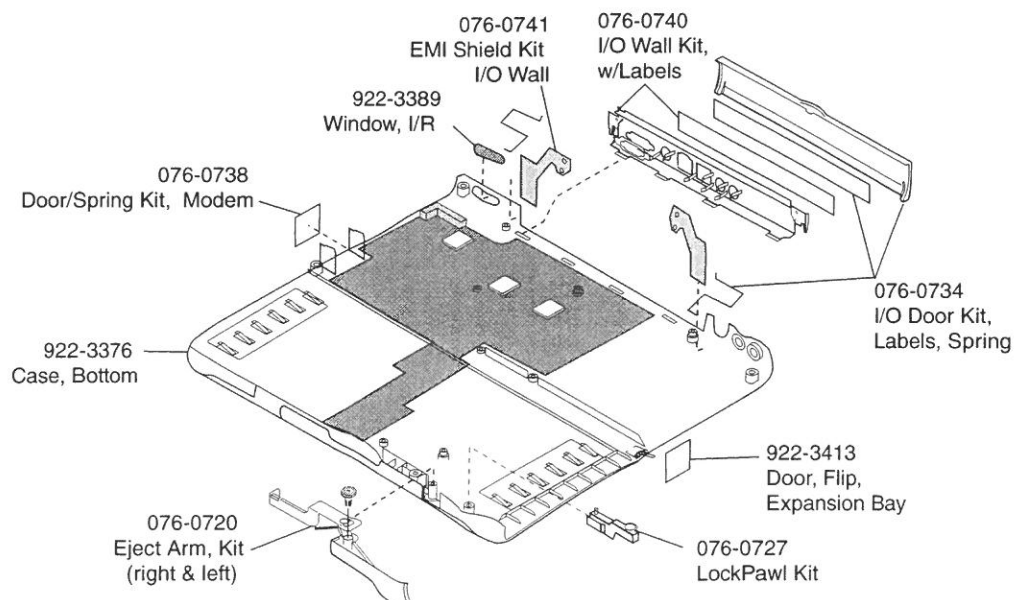


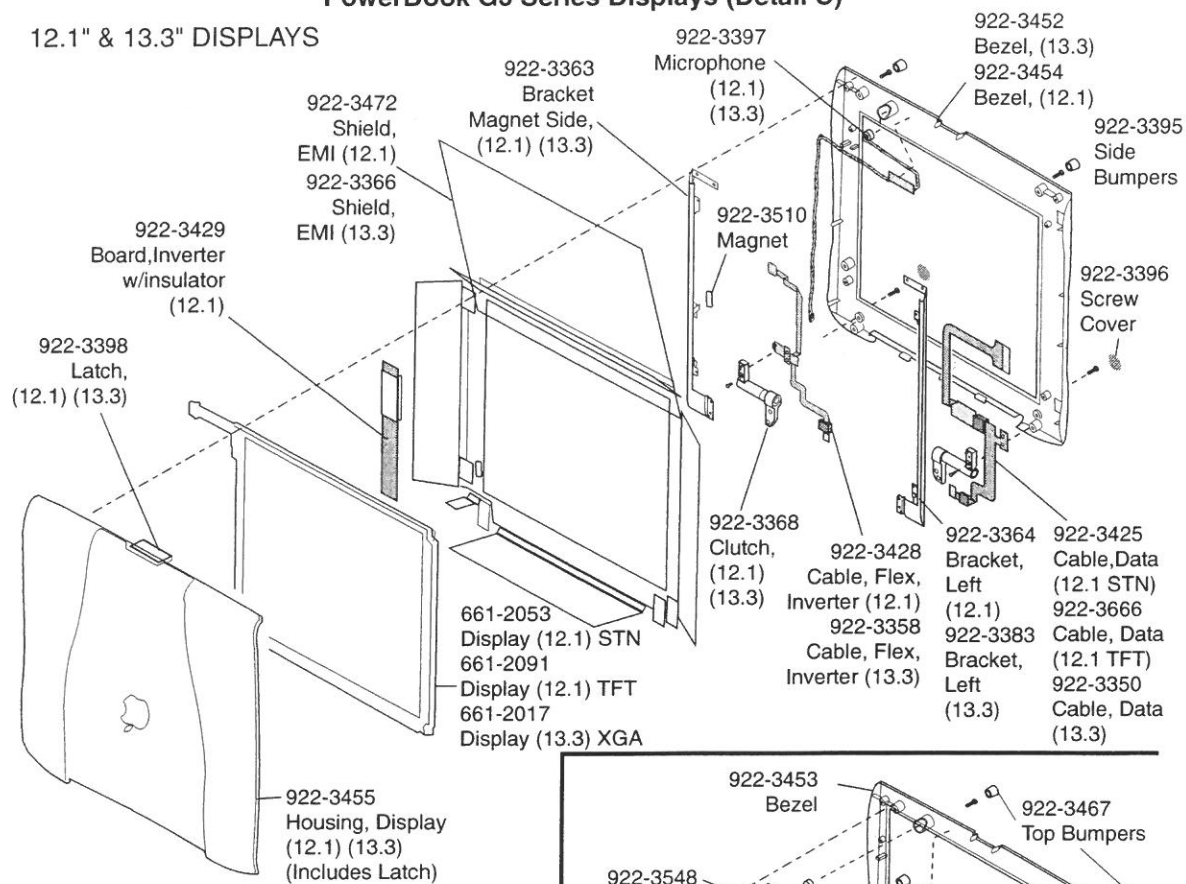
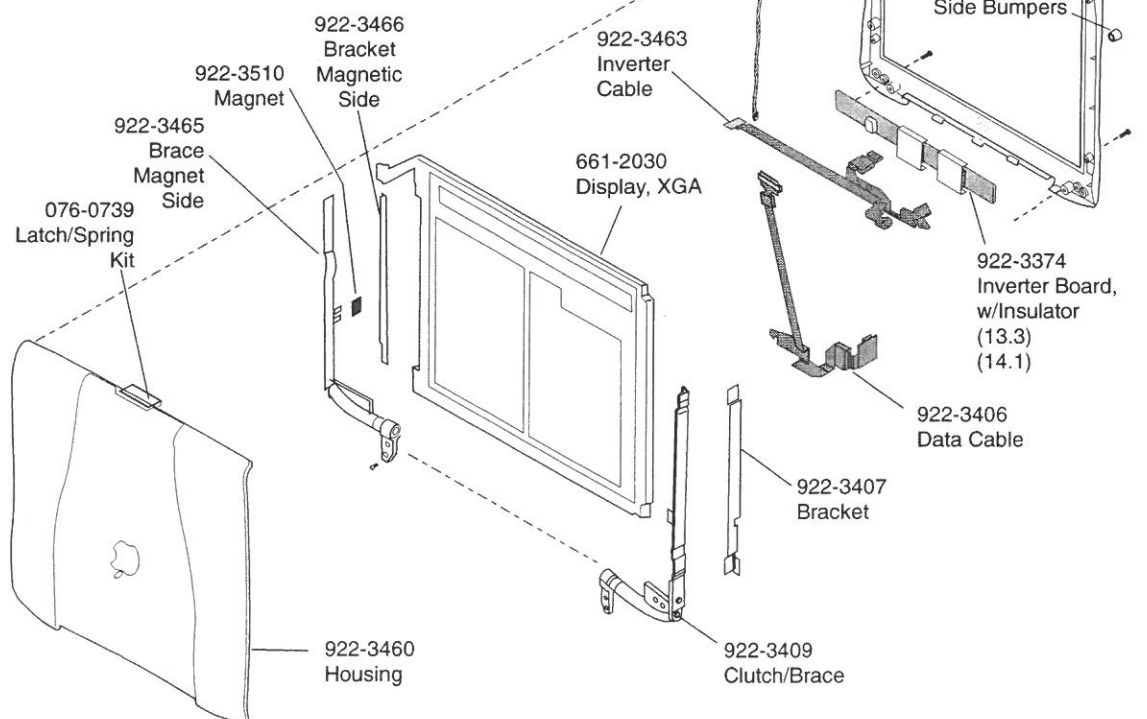


Top Case Assembly (Detail A) Exploded View



Bottom Case, Assembly (Detail B)

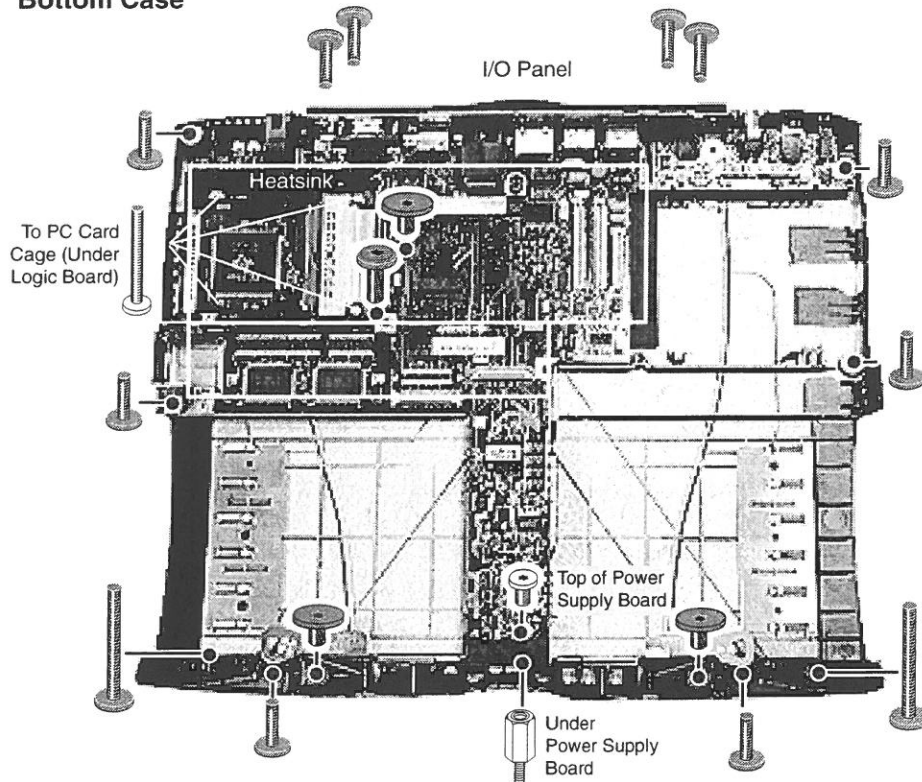


**PowerBook G3 Series Displays (Detail C)****12.1" & 13.3" DISPLAYS****14.1" DISPLAY**

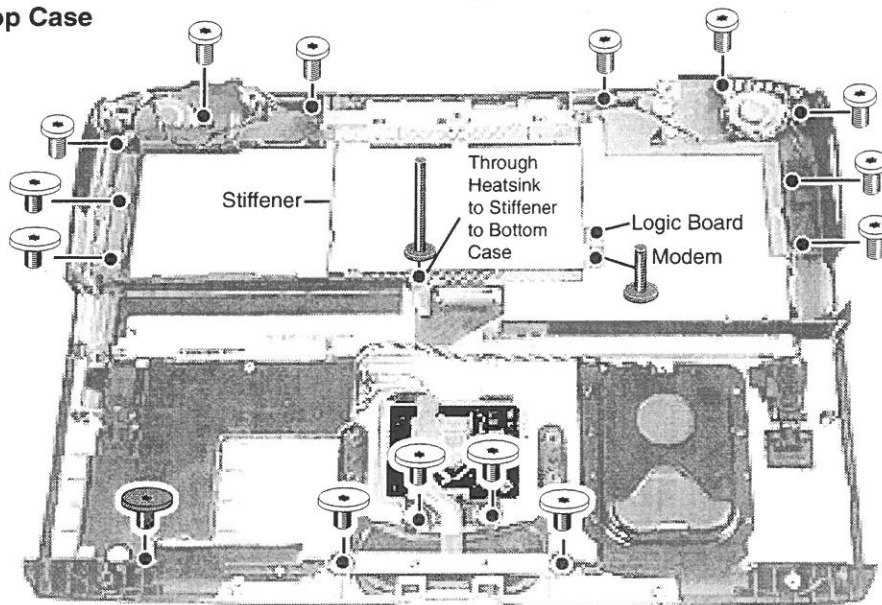


PowerBook G3 Series: Screw Locations for Case

Bottom Case



Top Case



Note: Screws shown are actual size in relative locations

