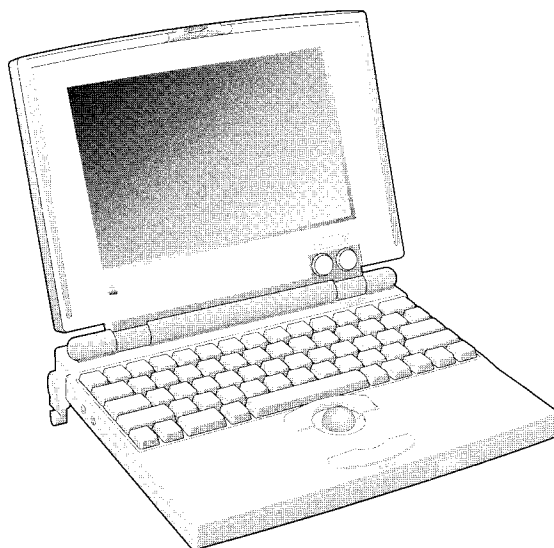


Macintosh PowerBook 100

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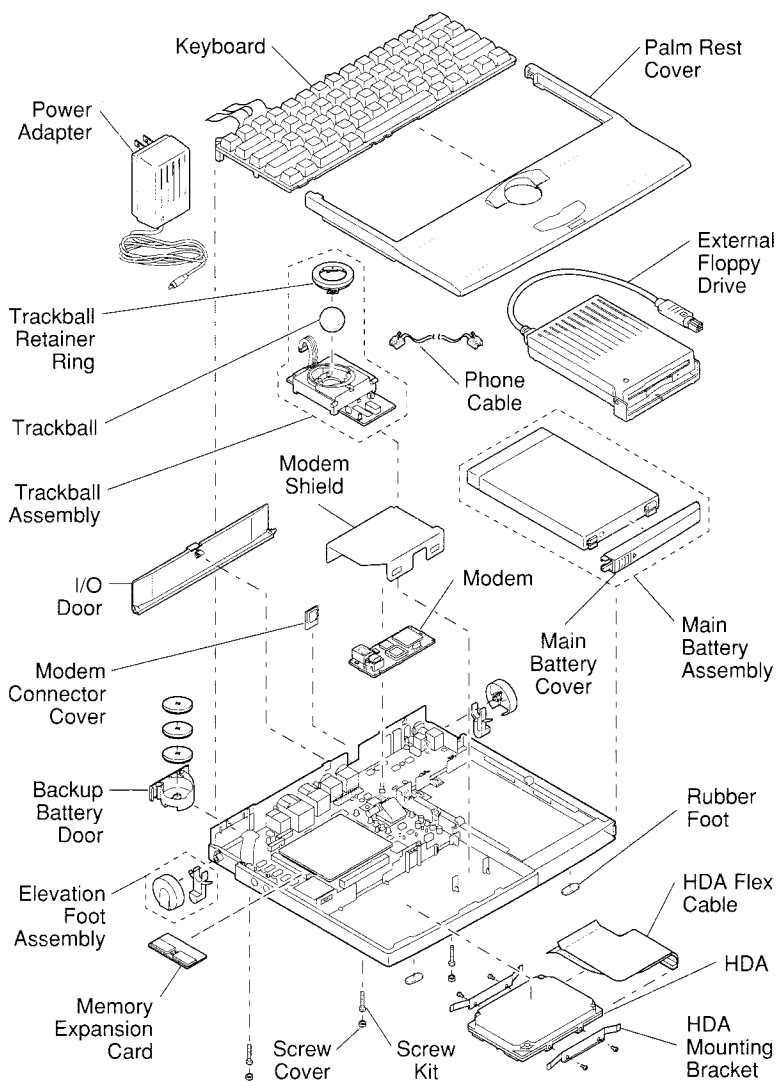
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Exploded View



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Parts List



Backup Battery Door	949-0336
Elevation Foot Assembly (two feet, four pieces)	076-0411
Fax/Data Modem (U.S., Canada, and Japan)	661-1621
Modem Connector Cover	949-0337
Modem Shield	949-0364
U.S. Telephone Cable	590-0590
Floppy Disk Drive	
1.4 MB Floppy Drive Mechanism, 19 mm	661-1623
Cable, Flex	821-0655
Cable, HDI-20, Drive-to-CPU	590-0719
Cable Interface Board	699-0479
Case Bottom	603-5121
Case Top	603-5120
Door	603-5010
Door Retainer Pins	603-5011
Service Packaging	602-0308
HDA, 2.5-Inch, 20 MB, HDI-30	661-1622
HDA, 2.5-Inch, 40 MB, HDI-30	661-1644
HDA Flex Cable (with shield)	076-0445
HDA Mounting Bracket	948-0149
HDA Mounting Bracket (for 40 MB drive)	948-0157
HDI-30 SCSI System Cable	590-0717
HDI-30 SCSI Disk Adapter Cable	590-0718
Service Packaging, HDA, 2.5-Inch Drives	602-0307
Input/Output Door	076-0412
Keyboard	661-0713
Main Battery Assembly	661-0723
Main Battery Cover	949-0365
Memory Expansion Kit, 2 MB	661-0715
Memory Expansion Kit, 4 MB	661-0714
Mouse, Low-Power	661-0585
Ferrite Bead, Low-Power Mouse	612-5019
Mouse Ball (21.9 mm diameter)	699-8038
Retainer, ADB Mouse Ball (38 mm diameter)	076-0231
Palm Rest Cover	076-0414
Power Adapter	699-0517
Rubber Foot (with peel-and-stick adhesive backing)	936-0039
Screw Kit (includes display assembly screws)	076-0557
Screw Cover, Bottom Cover	956-0030
Trackball Assembly	661-0676
Trackball Ball	949-0335
Trackball Retainer Ring	949-0334

Note: Sony and other battery manufacturers sell the backup batteries under the industry standard number CR-4230.



Macintosh PowerBook 100

Troubleshooting – Introduction

Before You Start

- Check the battery and power adapter.

Note: The parameter RAM battery does not support system RAM. Save RAM contents before removing the main battery.



CAUTION: The power adapters on the Macintosh Portable and the PowerBook computers are not interchangeable. You will damage the computer if you try to use the power adapters interchangeably.

- Check connections on internal and external cabling and on option cards.
- If the correct version of system software is not present, install it and verify the failure. Use system software 7.0.1 or later.
- Remove all option cards and disconnect external devices (printers, SCSI devices, additional ADB devices, and disk drives).
- Test the internal cables with known-good systems.

Things to Remember

- When running the *Hard Disk Test* diagnostic to test the hard disk, operate the computer from the power adapter and do not select looping.
- Follow all electrostatic discharge precautions when working on the PowerBook 100. The computer is **very sensitive to ESD**. Refer to the *You Oughta Know* tab in *Apple Service Technical Procedures* for additional information.
- When you attach the power adapter to the computer but do not plug the computer into a power source, a low-power dialog box appears .
- The PowerBook computers do not provide termination power. Terminate the first and last SCSI devices as in the table below.

	1 External SCSI Device	>1 External SCSI Device
PowerBook Without Internal Hard Drive	2 terminators, both on external device	1 terminator on 1st external device 1 terminator on last external device
PowerBook With Internal Hard Drive	1 terminator on external device	1 terminator on 1st external device 1 terminator on last external device

Macintosh PowerBook 100

Troubleshooting – Introduction



- The battery desk accessory is a general indicator of the battery charge level. Use a voltmeter to determine the actual charge.

Battery Verification

1. Disconnect the power adapter.

Note: Save RAM contents before removing the main battery. Otherwise, contents will be lost.



WARNING: Do not short the battery. The battery may become hot enough to burn you.

2. Remove the main battery.
3. Set the voltmeter range to 10 volts DC.
4. Touch and hold the **positive probe** of the voltmeter to the **positive side** of the battery.
5. Touch and hold the **negative probe** of the voltmeter to the **negative side** of the battery.
6. The reading for a good battery should be **above 5.7 volts**. If the battery falls below 5.7 volts, recharge the battery. If the battery will not recharge, replace it.

Adapter Verification

1. Plug the power adapter into the wall source.
2. Set the voltmeter range to 10 volts DC.
3. Touch and hold the **positive probe** of the voltmeter to the **inside** of the adapter plug.
4. Touch and hold the **negative probe** of the voltmeter to the **outside** of the adapter plug.
5. The reading for a good adapter should be **7.5–7.9 volts**. If the voltage is not in this range, replace the adapter.



CAUTION: The power adapters on the Macintosh Portable and the PowerBook computers are not interchangeable. You will damage the computer if you try to use the power adapters interchangeably.



Macintosh PowerBook 100

Symptom/Cure Chart

Power Problems

Solutions

Screen is blank;
computer does not
respond

1. Verify that storage switch is in the *on* position.
2. Reset computer.
3. Connect AC adapter and restart computer in 3-4 minutes.
4. Install known-good, charged main battery. If computer now works, replace main battery.
5. Verify that keyboard cable is connected securely.
6. Replace keyboard.
7. Return computer to Apple.

After changing main
battery, some Control
Panel settings are
different

- Replace backup batteries.

After removing
all power sources,
some Control Panel
settings are
different

- This condition is normal. If you disconnect AC adapter and remove main and backup batteries, you remove all power to computer. Removing all power affects some Control Panel settings (such as time) in parameter RAM.

AC adapter is
plugged in and
connected, but
battery DA does
not indicate charger
is connected

1. Verify that AC adapter is connected properly.
2. Try a known-good main battery. If battery now charges, replace main battery.
3. Verify adapter is good.
4. Replace AC adapter.
5. Return computer to Apple.

Low-power warning
appears soon after
starting computer

1. Battery needs recharging. Attach power adapter.
2. Make sure peripherals display low-power icon.
3. Extensive use of floppy or hard drives, modem, sound, backlight, or other power-consuming devices can produce low-power warning. Reduce use of these devices or connect AC adapter.

Computer runs when
plugged into wall out-
let, but does not run off
battery; battery voltage
is OK

- Fuse on motherboard may be blown. Return computer to Apple.

Video Problems

Solutions

Screen suddenly
goes blank

- Computer has gone into system sleep to conserve battery power.

Macintosh PowerBook 100

Symptom/Cure Chart



Screen goes blank and computer shuts down every few minutes	– Computer is going into system sleep to conserve battery power. If computer is going into system sleep too often, adjust sleep delays in Control Panel or connect AC adapter.
Pixel never comes on	– If more than five pixels do not come on, return computer to Apple.
Pixel is always switched on	– Return computer to Apple.
Row of pixels never comes on	– Return computer to Apple.
Partial or entire row of pixels is always on	– Return computer to Apple.
Very slight white line is always in middle of screen	– This is normal for PowerBook 100 FSTN screen.
Display is very light or all white	1. Adjust screen contrast and brightness settings. 2. Check interconnect cable connection to motherboard. 3. Return computer to Apple.
No display, but computer appears to operate correctly	1. Adjust screen contrast and brightness settings. 2. Check interconnect cable connection to motherboard. 3. Return computer to Apple.
Display shows rainbow colors from extreme viewing angles	– This effect is normal for PowerBook 100 FSTN screen.
Image is not uniform	– This effect is normal for PowerBook 100 FSTN screen.
Display stopped working (or dimmed) but shows no problems now	– If temperature or light was extreme during problem time (under 5° C or over 45° C), operation is normal for PowerBook 100 FSTN screen.
Backlight doesn't operate	1. Adjust screen brightness setting. 2. Check interconnect cable connection to motherboard. 3. Return computer to Apple.



Macintosh PowerBook 100

Symptom/Cure Chart

SCSI Hard Disk Drive Problems

Solutions

Internal hard disk does not operate

1. Verify that all external SCSI devices connected to computer are switched on.
2. Verify that internal SCSI hard drive cable is securely connected at both ends.
3. Use HD SC Setup (which is supplied with system software) to see whether drive is visible to program. If it is visible, update SCSI driver.
4. Reinstall system software.
5. Replace HDA flex cable that connects hard disk assembly to motherboard.
6. Replace hard disk assembly.
7. Return computer to Apple.

Hard disk is slow to respond, or screen goes blank too often

- Computer powers down the hard disk or goes into system sleep to conserve battery power. Adjust sleep delays in Control Panel or connect AC adapter.

Peripheral Problems

Solutions

After connecting an external SCSI device, computer no longer boots

1. Switch on external SCSI device before starting computer.
2. Verify that an Apple HDI-30 SCSI System Cable is connected between PowerBook computer and external SCSI device.
3. Verify that cable termination is correct.
4. Verify that no SCSI devices have the same device address.
5. Return computer to Apple.

Cursor does not move when you move trackball

1. Reset computer.
2. Check cable connection between trackball assembly and motherboard.
3. Replace trackball assembly.
4. Return computer to Apple.

Cursor intermittently does not move or moves erratically

1. Clean trackball ball and internal rollers.
2. Replace trackball assembly.

Cursor does not move when you move mouse.

1. Check mouse connection to ADB port.
2. Reset computer.
3. Clean mouse ball and inside of mouse.
4. Replace mouse.
5. Return computer to Apple.



Cursor moves, but clicking button has no effect

1. Check cable connection between trackball and motherboard.
2. Replace trackball assembly.
3. Return computer to Apple.

No response to any key on keyboard

1. Reset computer.
2. Connect AC adapter and restart computer in 3-4 minutes.
3. Install known-good, charged main battery. If computer now works, replace main battery.
4. Verify that keyboard cable is securely connected to motherboard.
5. Replace keyboard.
6. Return computer to Apple.

Known-good ImageWriter, ImageWriter II, or LQ does not print

1. Make sure system software is 7.0.1 or later.
2. Make sure Chooser is set correctly.
3. Verify that printer cable is attached securely.
4. Replace printer cable.
5. Return computer to Apple.

Known-good LaserWriter does not print

1. Make sure system software is 7.0.1 or later.
2. Make sure Chooser setting is correct.
3. Verify that all printer cabling is attached securely.
4. Try another printer. If that printer works, computer is OK. Refer to *Networks* tab manual on *Service Source* for further assistance.
5. Return computer to Apple.

Serial devices are unrecognized or garbage is transmitted and/or received

1. Make sure system software is 7.0.1 or later.
2. Verify that cabling is correct type and securely attached.
3. Attach device(s) in chain to known-good computer.
4. Return computer to Apple.

Internal Modem Problems

Solutions

Internal modem options do not appear in Control Panel window, but modem is installed

1. Reseat modem card.
2. Replace modem card.
3. Return computer to Apple.

Modem connects but does not communicate with remote modem

- Verify that remote modem needs error correction. If remote modem does not need error correction, disable error correction by typing **&Q0** (see the *Macintosh PowerBook Fax/Data Modem User's Guide*).



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Symptom/Cure Chart

Modem interferes with system sound

1. Replace modem card.
2. Return computer to Apple.

Modem has no sound output

- Replace modem card.

A strange mix of characters appears on screen

1. Verify that baud rate and data format settings of communications application are compatible with internal modem and remote modem.
2. Verify telephone cord is securely attached and working properly.
3. Replace modem card.

Modem does not respond properly to AT command set instructions

1. Verify that baud and data format settings of communications application are compatible with internal modem and remote modem.
2. Verify that telephone cord is attached securely and working properly.
3. Verify that phone line produces dial tone.
4. Replace modem card.

Miscellaneous Problems

Solutions

Some applications seem to run slower after a few seconds

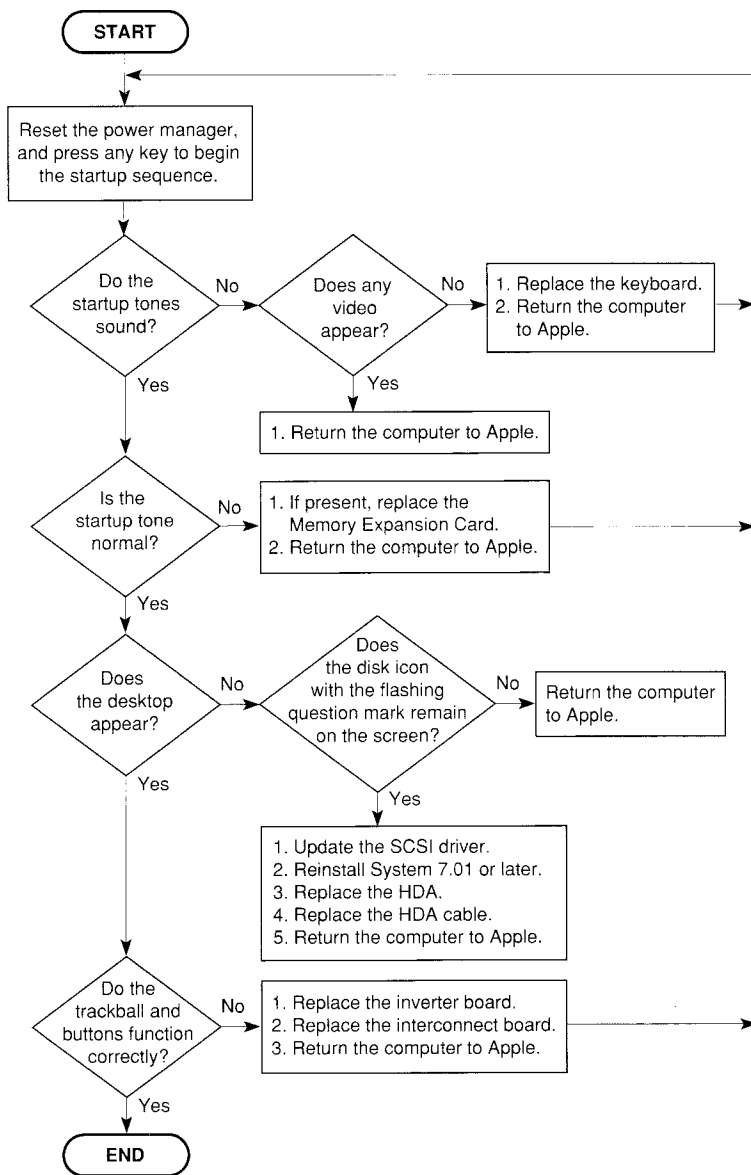
- PowerBook is switching to system rest. If system rest is interfering with operation of application, connect AC adapter.

No sound from speaker

1. Set volume (in Control Panel) to 1 or above.
2. Check speaker connection to motherboard.
3. Return computer to Apple.

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Troubleshooting - Startup Problems





Macintosh PowerBook 100

Specifications

Microprocessor	Type: MC68HC000, 16-bit CMOS Clock speed: 15.6672 MHz Addressing: 32-bit internal registers 24-bit address bus 16-bit data bus
Memory	Standard RAM: 128 bytes of system parameter RAM 32K of pseudostatic video display memory 2 MB pseudostatic RAM (four 512K x 8-bit chips; 100 ns access time; addressing supports 8 MB max) Expansion RAM: Optional 2 MB and 4 MB RAM expansion cards ROM: 256K (two 128K x 8-bit devices; 150 ns access time; addressing supports up to 4 MB)
Display	Type: Film-compensated SuperTwist Nematic (FSTN) backlit flat-panel display Resolution: 640 x 400 pixels, 75 dpi Size: 9" diagonal
I/O Devices (Standard)	Keyboard: Dimensions: 10.6" length, 3.5" width, .5" depth Pitch: 0.73" horizontal, 0.71" vertical Interface: ADB Trackball: Dual-button Apple Desktop Bus interface
I/O Devices (Optional)	Mouse: Low-power Apple Desktop Bus interface Floppy Disk Drive: Macintosh HDI-20 external 1.4 MB floppy drive 4.5 W startup power 1.25 W random operation 50 mW idle
Floppy Disk Interface	Apple SWIM chip MFM/GCR modes Supports the Macintosh HDI-20 external 1.4 MB floppy drive



20 MB Hard Drive	20 MB formatted capacity Apple SCSI interface 2.5-inch mechanism 23 msec average access time (max.) 5.0 W startup power 2.7 W random operation 1.5 W idle
40 MB Hard Drive	40 MB formatted capacity Apple SCSI interface 2.5-inch mechanism <19 msec average access time (max.) 5.0 W startup power 2.25–2.5 W random operation 1.3–1.5 W idle
SCSI Interface	HDI-30 SCSI connector 7.5 MB/second transfer rate Supports a maximum of five devices (Computer is device 3; SCSI hard drive is device 0.) Requires Apple HDI-30 SCSI System Cable for connecting external devices Requires Apple HDI-30 SCSI Adapter Cable for connecting to another computer Termination power is not supplied (see the table in "Troubleshooting – Introduction" for termination information)
Apple Desktop Bus	Low-speed serial interface
Serial Interfaces	Two RS-422 ports, one external and one internal 230.4 Kbaud minimum Asynchronous, synchronous, and AppleTalk protocols supported Internal connector supports Macintosh PowerBook Fax/Data modem
Mono Audio	Mono-to-stereo conversion at port; plays left-channel sound on both output channels Output impedance of 8 to 600 ohms Short-circuit protected Disables internal speaker when in use



Macintosh PowerBook 100

Specifications

Main Battery	Type: Sealed lead-acid Voltage: 7.0 volts Capacity: 2.5 hours max.
Backup Batteries	Three 3.5-V lithium cells Industry standard CR-4230 batteries
Power Adapter	AC input voltage: 85–270 VAC (100/240 nominal) 48–62 Hz (50/60 nominal) Output voltages: 7.0–7.6 volts (7.5 nominal) 5 milliamps–2.0 amps (1.5 nominal)
Sound	Apple Sound Chip 1- or 4-voice mono (1 or 2 voices in stereo) with 4-bit digital-to-analog conversion using a 22 KHz sampling rate Filtered by one Sony sound chip
Modem	Operating Modes: Auto or manual dial Auto or manual answer Protocol: Serial binary and asynchronous Character Length: 7 or 8 bits; 1 or 2 stop bits Parity: Odd, even, mark, space, or no parity Data Transmission Mode: Full Duplex, Asynchronous Transmission Rate: 110–300 bps Bell 103 1200 bps Bell 212A 1200 bps CCITT V.22 2400 bps CCITT V.22bis 110/300 bps CCITT V.21 1200/75 bps CCITT V.23 (Int.) Data Compression: MNP Class 5, CCITT V.42bis Error Control: MNP Class 4, CCITT V.42 Fax Compatibility: Group 3 Transmission Speeds: 2400 bps, 1200 bps, 300 bps Fax Transmission Mode: Half-Duplex Fax Transmission Rate: 2400/4800 bps CCITT V.27 7200/9600 bps CCITT V.29



Installation Procedure

1. Disconnect the AC adapter and remove the backup batteries, main battery, display assembly, keyboard, and palm rest cover.
2. Install the RAM expansion card (**see Figure**).
3. Replace the palm rest cover, keyboard, display assembly, main battery, and backup batteries.

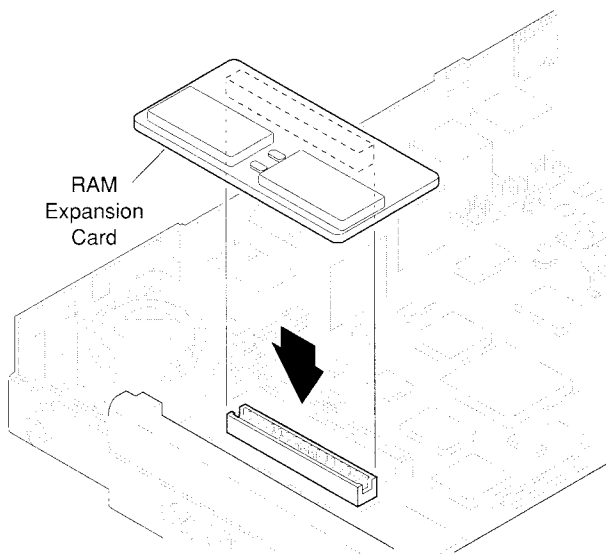


Figure: Macintosh PowerBook Memory Expansion

Installation Verification

1. Switch on the computer.
2. Pull down the Apple menu and select **About the Finder**.
3. Verify that the amount of RAM (**Total Memory**) is 4,096K (2 MB RAM Expansion Card) or 6,144K (4 MB RAM Expansion Card). If the amount of RAM is not correct, replace the RAM card. If replacing the RAM card does not solve the problem, return the computer to Apple.

Note: Eight MB is the maximum RAM upgrade for the PowerBook 100. A 6 MB RAM expansion card is necessary for the maximum upgrade.



Macintosh PowerBook 100

Fax/Data Modem

Installation Procedure

1. Disconnect the AC adapter and remove the backup batteries, main battery, display assembly, and keyboard.
2. Locate the metal prongs that retain the modem shield (**see Figure**). Push the metal prongs toward the back of the computer until you can lift the modem shield up and out of the bottom cover.
3. Locate the modem connector cover and lift it up and out of the bottom cover.
4. Position the fax/data modem so that connector J1 on the fax/data modem faces down and directly above connector J9 on the motherboard. Verify that the holes in the fax/data modem align with the plastic standoffs on the motherboard. Press down on the fax/data modem until the board locks in place on the plastic standoffs.
5. Replace the modem shield. The tabs that mount over the metal prongs belong between the metal prongs and the rear wall of the main battery cavity. The modem shield should not extend into the main battery cavity.
6. Replace the keyboard, display assembly, main battery, and backup batteries.
7. Peel the backing off the FCC and DOC labels and apply them to the left of the modem connector on the back panel of the computer.

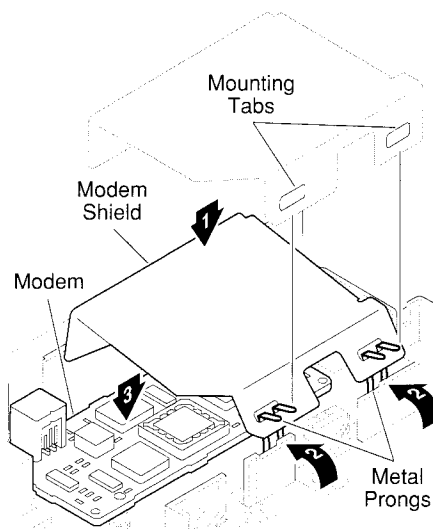


Figure: Internal Modem Installation

Macintosh PowerBook 100

Motherboard and Daughterboard

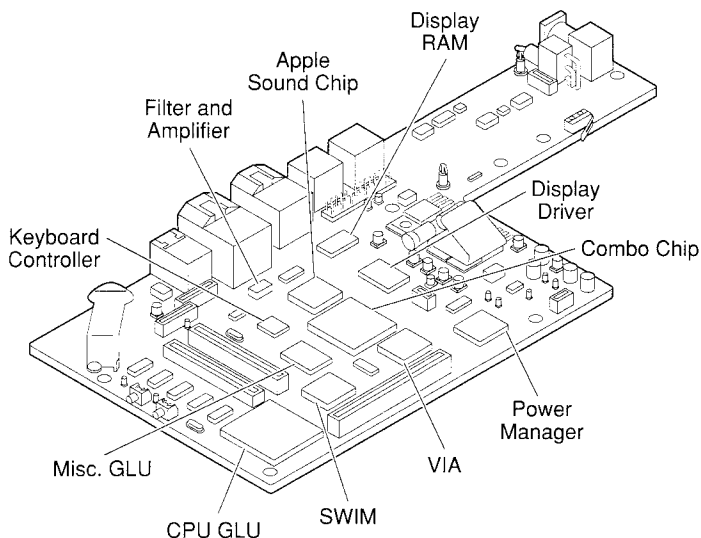


Figure: Macintosh PowerBook 100 Motherboard

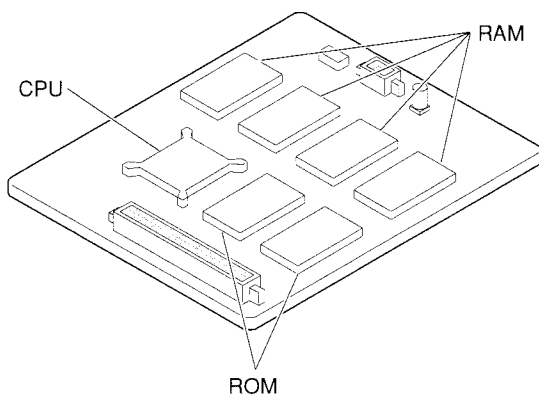


Figure: Macintosh PowerBook 100 Daughterboard