Service Source

PowerBook 190/5300 Series

Macintosh PowerBook 190/66, 190cs/66, 5300/100,
5300cs/100, 5300c/100, and 5300ce/117

Basics

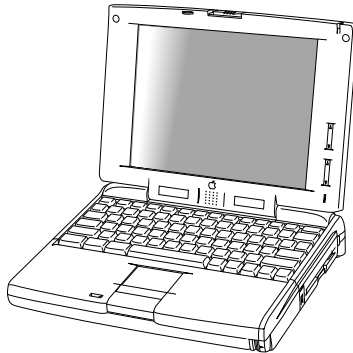PowerBook 190/5300 Series

Figure: PowerBook 190, PowerBook 5300

Product Overview

The PowerBook 5300 Series introduces a number of technology and design innovations to the PowerBook family of computers. The series features a Power PC 603e RISC microprocessor running at 100 or 117 MHz, built-in PC Card technology (formerly PCMCIA), infrared communication, and a video expansion board (to support external monitors). Also included in the series are

four different PowerBook displays: a monochrome FSTN display, a color FSTN display, and color TFT and TFT/SVGA displays.

The PowerBook 190 Series features a 68LC040 central processor running at 33 MHz and offers the infrared board, video board, logic board, and TFT display as upgrade options.

PowerBook 5300 Series Configurations

The PowerBook 5300 Series computers come in the following configurations:

PowerBook 5300
- Processor: 100 MHz PowerPC 603e
- RAM/Hard drive: 8 MB/500 MB
- Display: 9.5-inch greyscale
- Battery: 2.5–4-hour NiMH
- Weight: 5.9 pounds

PowerBook 5300cs
- Processor: 100 MHz PowerPC 603e
- RAM/Hard drive: 8 MB/500 MB or 16 MB/750 MB
- Display: 10.4-inch dual-scan color
- Battery: 2.5–4-hour NiMH
- Weight: 6.2 pounds

PowerBook 5300c
- Processor: 100/117 MHz PowerPC 603e
- RAM/Hard drive: 8 MB/500 MB or 16 MB/750 MB
- Display: 10.4-inch active-matrix color
- Battery: 2.5–4-hour NiMH
- Weight: 6.2 pounds

PowerBook 5300ce
- Processor: 100/117 MHz PowerPC 603e
- RAM/Hard drive: 32 MB/1 GB
- Display: 10.4-inch SVGA active-matrix color
- Battery: 2.5–4-hour NiMH
- Weight: 6.2 pounds

PowerBook 190 Series Configurations

The PowerBook 190 Series computers come in the following configurations:

PowerBook 190
- Processor: 66/33 MHz 68LC040
- RAM/Hard drive: 4 MB/500 MB or 8 MB/500 MB
- Display: 9.5-inch greyscale
- Battery: 2.5–4-hour NiMH
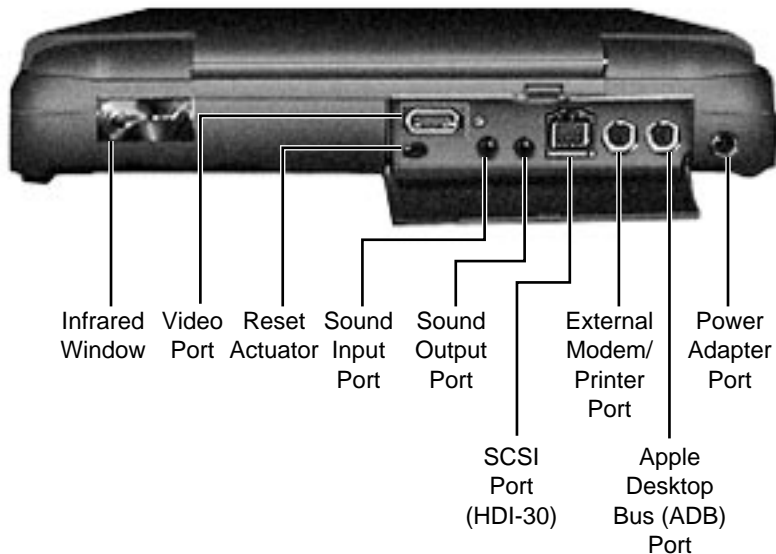- Weight: 6 pounds

PowerBook 190cs
- Processor: 66/33 MHz 68LC040
- RAM/Hard drive: 4 MB/500 MB or 8 MB/500 MB
- Display: 10.4-inch dual-scan color
- Battery: 2.5–4-hour NiMH
- Weight: 6.3 pounds

Rear Panel

The rear panel contains the I/O ports, reset actuator, and infrared window. The picture to the left shows the location of these features.

| Infrared Window | Video Port | Reset Actuator | Sound Input Port | Sound Output Port | | External Modem/ Printer Port | | Power Adapter Port |

SCSI Port (HDI-30)

Apple Desktop Bus (ADB) Port

1 Keyboard
2 Display, clutches
3 Display assembly
4 Hard drive
5 Video expansion board (internal)
6 CPU stiffener, hard drive bracket
7 Display bezel, inverter board, center clutch cover
8 Trackpad button & closure switch
9 Video expansion board (rear panel)
10 Floppy mechanism
11 Speaker
* May be patchlock

Order Screw Kit 076-0639

Screw Matrix

This screw matrix identifies the type and location of the screws used in the PowerBook 190/5300 Series computers.

Note: As part of the 190/5300 Repair Extension Program, some of the systems's original screws were replaced with patchlock screws.

Cable Matrix

For a matrix of cables that work with specific models of the PowerBook family of computers, select the PowerBook Cable Matrix located in Hardware/Compatibility Charts.

Power Information

Use the following information on the batteries and power adapter to ensure the best use of these systems and to recognize and prevent problems. For instructions on battery and power adapter verification, see the Additional Procedures chapter of this manual.

Battery Matrix

For a matrix of batteries that work with specific models of the PowerBook family of computers, select the PowerBook Battery Matrix located in Hardware/Compatibility Charts.

Battery-Handling Guidelines

The following are guidelines for properly handling the
PowerBook 190/5300 Series batteries:

Warning: NiMH batteries contain toxic materials. Send
undamaged, dead batteries to Apple for recycling—do not
discard dead batteries with other waste. If battery is
damaged, do not return it to Apple. Dispose of damaged
batteries according to local ordinances. Review battery
handling and disposal instructions in Safety Information in
Bulletins/Safety.

• Handle the battery carefully. Do not drop, puncture,
  disassemble, mutilate, or incinerate it.

• Do not short-circuit the battery terminals.

- Do not leave a battery in the computer for longer than a week without plugging in the power adapter.

- Keep the contact cover on the battery when the battery is not in the computer.

- Do not leave the battery in hot locations (such as the trunk of a car).

- Keep the battery in a cool, dark place; do not store it for longer than 6 months without recharging.

- Completely discharge and then recharge the battery once every 90 days.

- Fully charge a replacement battery before using it; Apple ships batteries in a partially charged state.

Nickel-Metal-Hydride Batteries

The PowerBook 190/5300 Series computers use nickel-metal-hydride (NiMH) batteries. Each battery provides power for up to 4 hours of work time, depending on the system configuration and battery conservation features employed.

PC Card Handling

Two PC Card slots (formerly PCMCIA) are a feature in the PowerBook 190/5300 Series. The two slots accept a variety of third-party PC Cards.

There are three types of PC Cards: Type I (3 mm), Type II (5 mm), and Type III (10.5 mm). Type I and Type II cards fit in either the upper or lower slot of the PC Card unit. Type III cards fit in the lower slot and take up both slots.

The following are guidelines for properly handling the PC Card:

• Use only cards that are compatible with the PC Card unit. Refer to the compatibility information that came with the card. If you cannot find the compatibility information, call the card vendor.

- Do not insert anything other than a PC Card into the card slots.

- The PC Card eject button functions regardless of whether the computer is on or off.

- Before ejecting a PC Card, make sure nothing is blocking the slot. To immediately reinsert the card, pull it out an inch or more and then push it back in.

- Eject a PC Card using the PCMCIA Eject control panel or the PCMCIA Quick Eject module in the computer's Control Strip.

Specifications

PowerBook 190/5300 Series

Processor

CPU

PowerBook 190 Series	Motorola 68LC040 microprocessor running at 33 MHz
PowerBook 5300 Series	PowerPC 603e RISC microprocessor running at 100 MHz (5300/100, 5300c/100, 5300cs/100) or 117 MHz (5300ce/117)
All Systems	Require system software version 7.5.2 or later with System enabler: PowerBook Enabler 5300/2300/190 version 1.01

Addressing   32-bit internal registers
                        32-bit address bus
                        32-bit data bus

Memory

RAM   RAM installed on the logic board:
              4–8   MB PB 190/66 and 190cs/66
              8   MB PB 5300/100
              8–16 MB PB 5300c/100 and 5300cs/100
              32   MB PB 5300ce/117
              Expandable up to 64 MB with third-party RAM expansion card

ROM   2– 4 MB soldered on the logic board

PRAM   256 bytes of parameter memory

VRAM

Logic Board   512K for passive display configurations; 512K and 1 MB for
                    active display configurations

Video Board   512K; will support 1 MB

Disk Storage

Floppy Drive   15 mm high, internal, 1.4 MB Apple SuperDrive

Hard Drives   2.5 in.; 500 MB, 750 MB, and 1.1 GB IDE capacities

I/O Interfaces

SCSI   HDI-30 SCSI port with 1.5 MB/sec. transfer rate
                     Supports up to six external SCSI devices
                     Connect SCSI device to computer with HDI-30 SCSI system cable.

Apple Desktop Bus Apple Desktop Bus (ADB) port
                     200 mA maximum current draw for all ADB devices

Serial   RS-422 serial port; mini DIN-8 connector

Sound   Stereo line-in port
                     Stereo sound-out headphone jack; standard 3.5 mm stereo
                        miniplugs

I/O Interfaces (Continued)

Video   Micro DV-14 video-out port; 8 bit, 256 color video output
                   (optional on PowerBook 190)
                   Supports most Macintosh monitors, VGA monitors, and SVGA
                   monitors

PC Card Slots Allow use of either two Type I and Type II cards, or one Type III
                   card

Infrared   Supports LocalTalk

Power Adapter Power adapter port

I/O Devices

Keyboard   Built-in keyboard with 12 function keys
                     76 keys domestic, 77 keys ISO
                     Two-level tilt adjustment (extending computer feet)

Trackpad   Solid-state trackpad

Microphone   Electret, omnidirectional
                     Output voltage of 4 mV, peak to peak

Sound

Sound Generator   Apple sound chip provides 16-bit sound capable of driving stereo
                        headphones or other stereo equipment through the sound jack

Video

PB 190/66 and 5300/ 100 Video Display	9.5-in. (24 cm) diagonal screen Backlit, FSTN greyscale display; 16 levels; 640x480 pixels
PB 190cs/66 and 5300cs/100 Video Display	10.4-in. (26 cm) diagonal screen Backlit, FSTN color display 256 colors; 640x480 pixels
PB 5300c/100 Video Display	10.4-in. (26 cm) diagonal screen Backlit, TFT active matrix color display; 512K of VRAM supports 256 colors; 1 MB VRAM supports thousands of colors; 640x480 pixels

PB 5300ce/117   10.4-in. (26 cm) diagonal screen
Video Display   Backlit, TFT/SVGA color display, thousands of colors; 800x600
                           pixels

Electrical

Main Battery
One nickel-metal-hydride (NiMH) battery
Up to 2.5–4 hours of use before recharging
Recharge time: 2 hours in shutdown or sleep mode, 4 hours while
  computer is running

Power Adapter
110–240 VAC line voltage
45 W, 50–60 Hz

Physical

Dimensions   Height: 2.0 in. (5.1 cm) monochrome displays
                              2.2 in. (5.6 cm) color displays
                      Width: 11.5 in. (29.2 cm)
                      Depth: 8.5 in. (21.6 cm)

Weight: 5.9 lb. (2.7 kg) PB 5300/100
                      6.0 lb. (2.7 kg) PB 190/66
                      6.2 lb. (2.8 kg) PB 5300c/100, 5300cs/100, 5300ce/117
                      6.3 lb. (2.9 kg) PB 190cs/66

Environmental

Operating Temperature   41° to 95° F (5° to 35° C)

Storage Temperature   14° to 140° F (-10° to 60° C) Nickel-metal-hydride
                                   -13° to 140° F (-25° to 60° C) Lithium-ion

Relative Humidity   20% to 80% noncondensing

Operating Altitude   0 to 10,000 ft. (0 to 3,048 m)

Maximum Storage Altitude   15,000 ft. (4,722 m)

Miscellaneous

Clock/Calendar   CMOS custom chip with long-life lithium battery

Security   Slot for third-party security equipment
                            Password protection software

Troubleshooting

PowerBook 190/5300 Series

General

In each product manual on Service Source, you will find Flowcharts and/or Symptom Charts designed to help you diagnose and repair Apple computers.

If you have narrowed the problem down to a particular symptom, start with the Symptom Charts. Because cures are listed in the order of most likely solution, try the first cure first. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure.

If you are not sure what the problem is, or if the Symptom Charts do not resolve the problem, refer to the Flowcharts.

If you require additional assistance, contact Apple Technical Support. Refer to the About topic under the Do menu for the Apple Technical Support phone number.

Symptom Charts

Startup

RAM failure occurs
(eight-tone error
chord sequence
sounds after startup
chord)

1　Remove RAM card (if present) and restart computer. If startup sequence is normal, replace RAM card and retest.
2　Reseat RAM card and check connection.
3　Replace RAM card.
4　Replace logic board.

Hardware failure occurs (four-tone error chord sequence sounds after startup chord)

1 Reset PRAM.
2 Remove floppy drive from media bay and restart computer. If startup sequence is normal, insert floppy drive and retest.
3 Replace floppy mechanism.
4 Disconnect hard drive cable and restart computer. If startup sequence is normal, reconnect cable and retest.
5 Replace hard drive.
6 Replace logic board.

Startup failure occurs when using minimum System Folder and System 7.5.2.

Upgrade to System Enabler 1.2.1 or later. Refer to Apple Software Updates on Service Source Companion CD.

Power

Note: In the 5300 Series computers, you will hear only the click of the power-on button when you attempt to start up a computer that lacks sufficient power to start.

Computer won't
power up

1 If sleep LED is continually on, backup battery power has been interrupted. Restart computer by holding down reset actuator 10-20 seconds. If computer doesn't restart, repeat 3–4 times.
2 Try known-good power adapter. (See Power Information in Basics chapter.)
3 Try known-good, charged battery.
4 Connect power adapter and restart computer in 3–4 minutes.
5 Replace power supply board (5300 Series only).
6 Replace logic board.

Screen is blank;
computer doesn't
respond

1 If sleep LED is continually on, backup battery power has
   been interrupted. Restart computer by holding down reset
   actuator 10-20 seconds. If computer doesn't restart, repeat
   3–4 times.
2 Restart computer.
3 Disconnect power adapter, remove battery, and restart
   computer in 3-4 minutes.
4 Check power adapter cable.
5 Try known–good, charged battery.
6 Test fuse on logic board to make sure it is not open.
7 Try known-good power adapter. (See Power Information in
   Basics chapter.)
8 Reset power manager.
9 Check all logic board cables and connections.
10 Replace keyboard.
11 Replace power supply board (5300 Series only).
12 Replace logic board.

After you remove battery, some Control Panel settings are different	1 Check keyboard and backup battery cables and connections.
	2 Replace backup battery.
	3 Replace logic board.

After you remove battery, some Control Panel settings are different

1 Check keyboard and backup battery cables and connections.
2 Replace backup battery.
3 Replace logic board.

Computer runs when plugged into wall outlet but not on battery power; battery voltage is within tolerance

1 Reset power manager.
2 Reseat battery to make sure battery is mating with contacts on logic board.
3 Try known-good battery.
4 Try known-good power adapter. (See Power Information in Basics chapter.)
5 Replace power supply board (5300 Series only).
6 Replace logic board.

Power adapter is plugged in, but Control Strip doesn't indicate adapter is connected

1 Verify that power adapter is connected correctly.
2 Try known-good power adapter. (See Power Information in Basics chapter.)
3 Replace logic board.

When Shutdown is selected with power adapter plugged in, computer shuts down but immediately powers back up

1 Reset PRAM.
2 Disconnect power adapter, remove battery, disconnect backup battery, and wait 15 minutes before retesting.

Low-power warning
appears

1 Attach power adapter and recharge battery.
2 Disconnect peripherals. If warning disappears when
   peripherals are disconnected, verify that peripherals are
   low-power.
3 Reduce use of floppy or hard drive, sound, backlight, or
   other power-consuming devices, or reconnect power adapter.
4 Try known-good, charged battery.
5 Try known-good power adapter. (See Power Information in
   Basics chapter.)
6 Inspect power adapter port: Verify that connector pin is not
   bent and that connector is not loose. If these situations exist,
   replace main logic board.
7 Replace power supply board (5300 Series only).
8 Replace logic board.

Video

Note: A certain number of defects are inherent in display technology and vary by many factors, including type of technology. If you suspect that your display contains an abnormal number of defects, call Apple Technical Support.

Partial or full row of pixels is always on or never comes on in an active matrix display

1   Check display and backlight cables and connections.
2   Replace display.
3   Replace logic board.

Display is very light or totally white

1   Adjust screen contrast and brightness settings.
2   Verify cable, inverter board, and logic board connections.
3   Replace inverter board.
4   Replace display.
5   Replace logic board.

Display stopped
working or dimmed
but is fine now

1 PowerBook 190 Series, 5300/100, 5300cs/100: If
   temperature is under 0° C or over 50° C, this reaction is
   normal. Let screen warm up for 30 minutes. If symptom
   persists, replace display.
2 PowerBook 5300c/100 and 5300ce/117: replace display.

Backlight doesn't
operate

1 Adjust screen contrast and brightness settings.
2 Verify that backlight cable connection is secure.
3 Check cable, inverter board, and logic board connections.
4 Verify that cables are not pinched or severed.
5 Replace inverter board.
6 Replace display.
7 Replace logic board.

No display, but computer appears to operate correctly

Note: If the sleep light is blinking and the computer is not in sleep mode, reset the power manager.

1   Insert a disk into the floppy drive and press Command–E (to eject a disk) to verify that computer is working.
2   Adjust screen contrast and brightness settings.
3   Verify display cable, inverter board, trackpad, keyboard, and logic board connections.
4   Connect power adapter.
5   Replace inverter board.
6   Replace display.
7   Replace logic board.

Thin white line is always on at middle of screen	1	PowerBook 190 Series, 5300/100, 5300cs/100: thin white line is normal.
	2	PowerBook 5300c/100 and 5300ce/117: change the desktop pattern; if the line remains, replace display.
An external monitor connected to the PowerBook shows no video	1	Verify cable and cable connections between monitor and video board.
	2	Reseat video board and retest.
	3	Replace video board.

An external monitor
connected to the
PowerBook shows
either horizontal or
vertical rolling, or
horizontal or
vertical distortion

1 Verify monitor using another computer.
2 Replace video board.

Sound

No sound from
speaker

1   Verify that volume setting in Control Panel is above 0.
2   Verify that no external speaker is plugged in.
3   Check display cable connections.
4   Check inverter board connections.
5   Replace display cable.
6   Replace inverter board.
7   Replace speaker.
8   Replace logic board.

Floppy Drive

Note: The floppy drive cable referred to in this section is the cable **inside** of the floppy drive case.

Audio and video present, but floppy drive in media bay does not operate

1 Try known-good floppy disk.
2 Check floppy drive cable connection.
3 Replace floppy drive cable.
4 Replace floppy drive.
5 Replace logic board.

Disk ejects while
booting; display
shows Mac icon with
blinking X

1   Try known-good system disk.
2   Verify that floppy disk is not locked.
3   Verify that trackpad and trackpad button are working.
4   Verify that keyboard is working.
5   Check floppy drive cable connection.
6   Replace floppy drive cable.
7   Replace floppy drive.
8   Replace logic board.

Disk does not eject

1 Switch off system and hold trackpad button down while you switch system on.
2 Eject disk manually by carefully inserting opened paper clip into hole near floppy drive slot.
3 Check floppy drive cable connection.
4 Replace floppy drive cable.
5 Replace floppy drive.
6 Replace logic board.

Disk initialization fails

1 Try known-good floppy disk.
2 Check floppy drive cable connection.
3 Replace floppy drive cable.
4 Replace floppy drive.
5 Replace logic board.

Read/write/copy
error

1 Try known-good floppy disk.
2 Check floppy drive cable connection.
3 Try to format a floppy disk.
4 Replace floppy drive cable.
5 Replace floppy drive.
6 Replace logic board.

Hard Drive

Internal hard drive
does not spin up

1 Make sure power adapter is connected.
2 Disconnect external SCSI devices.
3 Check hard drive cable connection.
4 Replace hard drive cable.
5 Use Hard Drive Format to reinitialize drive.
6 Replace hard drive.
7 Replace logic board.

PC Card Module (PCMCIA)

PC Card won't eject

1   Make sure computer is not in sleep mode.
2   Make sure PC Card slot is not blocked.
3   Insert straightened paper clip into hole next to slot.
4   Verify that PC Card is not warped or damaged in any way.
5   Replace PC Card cage.

PC Card is inserted but doesn't appear on desktop

Note: Modem and communication cards may not appear on desktop.

1   Try PC Card in the other slot.
2   Replace PC Card.
3   Replace PC Card cage.
4   Replace logic board.

Note: If "defective card" or "unrecognizable card" appears in place of card name in PCMCIA Eject control panel, card is damaged or computer does not have software required to support it. Eject card.

System with PC card performs poorly or hangs during floppy drive operations

Replace logic board.

Infrared Communication

Infrared
communication is not
working

1   Clean infrared window with soft lint-free cloth.
2   In 190 Series, verify that an infrared board is present by
    removing keyboard and looking for the white infrared flex
    cable routed on top of media bay and video card (if present).
3   Verify infrared cable connection.
4   Verify infrared signal is being received by host computer.
5   Replace infrared cable.
6   Replace infrared board.

Peripherals

After you connect
external SCSI device,
computer does not
boot

1 Verify that device and SCSI chain are terminated correctly.
2 Switch on external SCSI device before starting computer.
3 Check cable connections.
4 Try known-good SCSI cable.
5 Verify that SCSI ID select switch setting on external device is unique.
6 Try known-good external SCSI device.
7 Replace logic board.

Cursor does not move
when you are using
trackpad

1 Shut down computer, unplug adapter, and remove battery.
   Let computer sit for 1 minute before restarting.
2 Reset power manager.
3 Check trackpad connections.
4 Check keyboard and logic board connections.
5 Connect low-power mouse and try to move cursor. If cursor
   moves, try using trackpad and keyboard. If trackpad does not
   move cursor, replace trackpad. If keyboard does not respond,
   replace keyboard.
6 Replace logic board.

Cursor intermittently does not move or moves erratically

Note: User must touch trackpad with the surface of only one finger at a time and point directly down on the trackpad surface.

1 Clean trackpad surface (with computer off, using a non-static inducing material).
2 Check trackpad connections.
3 Replace trackpad.
4 Replace keyboard.
5 Replace logic board.

Cursor moves, but
clicking trackpad
button has no effect

1   Reset power manager.
2   Check trackpad connections.
3   Check keyboard and logic board connections.
4   Replace trackpad cable.
5   Replace trackpad.
6   Replace keyboard.
7   Replace logic board.

Cursor does not move when you are using mouse

1 Check mouse connection to ADB port.
2 Try a known-good low-power mouse. If the known-good mouse works, clean mouse ball and inside of original mouse and retest. If the original mouse still doesn't work, replace it.
3 Replace logic board.

No response to any key on keyboard

1 Verify that computer is on.
2 Reset the power manager.
3 Check keyboard connection by disconnecting and reconnecting keyboard cables.
4 Replace keyboard.
5 Replace logic board.

Known-good direct-
connect printer does
not print

1 Reset PRAM.
2 Verify that Chooser and Control Panel settings are correct.
3 Check cables.
4 Replace printer cable.
5 Try known-good printer.
6 Replace logic board.

Known-good network
printer does not print

1 Reset PRAM.
2 Verify that Chooser and Control Panel settings are correct.
3 Check cables.
4 Attach computer directly to printer, and retest.
5 Replace logic board.

I/O devices are
unrecognized, or
garbage is
transmitted or
received

1   Reset PRAM.
2   Check cables.
3   Verify that SCSI device is correctly terminated.
4   Verify that SCSI select switch setting on external device is
    unique.
5   Test device with known-good computer.
6   Replace logic board.

In disk mode,
computer does not
display SCSI icon
until host is booted,
or computer crashes
when host is shut
down

1   Verify that computer has a unique SCSI ID.
2   Check that SCSI disk mode cable is good and that connection is
    tight.
3   Replace logic board.

Miscellaneous

Sleep light won't come on	1 Verify that computer is in sleep mode and not powered off. 2 Reset power manager. 3 Replace inverter.
Screen goes blank and computer shuts down every few minutes	Computer is going into system sleep to conserve battery power. Adjust sleep delays in Control Panel or connect power adapter.
Application seems to run slower after a few seconds	Computer is switching to system rest. If system rest is interfering with operation of application, connect power adapter.
Hard drive is slow to respond, or screen goes blank too often	Adjust sleep delays in Control Panel or connect power adapter.

Troubleshooting Flowchart—Startup Problems

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                           ▼
              ┌──────────────────────┐
              │   Reset the          │
              │   Power Manager.     │
              └──────────────────────┘
                           │
                           ▼
              ┌──────────────────────┐
              │ Press power button to│
              │ begin boot sequence. │
              └──────────────────────┘
                           │
                           ▼
```

Do you hear the startup tones? — No → Does any video appear? — No →
1. Check the keyboard and display cables.
2. Replace the keyboard.
3. Replace the logic board.

Does any video appear? — Yes →
1. Check the volume.
2. Check the keyboard and display cables.
3. Replace the speaker.
4. Replace the logic board.

Do you hear the startup tones? — Yes ↓

Are the startup tones normal? — No → See "Startup" in the Symptom Charts.

Are the startup tones normal? — Yes ↓

Does a gray screen appear with pointer? — No →
1. Check display/inverter cable connections.
2. Replace the display and backlight cables.
3. Replace the inverter.
4. Replace the display.
5. Replace the logic board.

Does a gray screen appear with pointer? — Yes ↓

(1)

Troubleshooting Flowchart—Startup Problems

1

Go to Start

Does the PowerBook continue to boot to the desktop?

No →

Does the flashing question mark appear?

No →

1. Boot with extensions off.
2. Boot with *Disk Tools Update Driver*.
3. Replace the hard drive.
4. Replace the logic board.

Yes

Yes

1. Reset PRAM.
2. Boot from *Disk Tools*.
3. If hard drive appears, reinstall system software.
4. If hard drive doesn't appear, see if *Hard Drive Format* can reformat it.
5. Replace the hard drive cable.
6. Replace the hard drive.
7. Replace the logic board.

Do the trackpad and keyboard function?

No →

1. Reset PRAM.
2. Check the trackpad and keyboard cables.
3. Replace the trackpad and keyboard cables.
4. Replace the trackpad.
5. Replace the keyboard.
6. Replace the logic board.

Yes

Insert a known-good disk into the floppy disk drive and try to initialize it.

Does the disk initialize?

No →

1. Replace the floppy drive cable.
2. Replace the floppy drive.

Yes

END

Take Apart

PowerBook 190/5300 Series

Introduction

These take-apart procedures are designed for use in two
ways: At introduction, read through the entire chapter to
train yourself on the complete teardown of the computer;
and after you are familiar with the overall process, refer to
specific procedures for removal of individual parts.

Before You Begin

The PowerBook 190/5300 Series computers are the most compact and highest performance PowerBooks to date. It follows then that they are also the most intricate to take apart and reassemble. Use the information in this chapter to save time and frustration when disassembling and reassembling these computers.

Tools

Use the following tools for taking apart these computers:
- #8 Torx driver
- 2.3 mm jeweler's screwdriver
- #6 Torx driver (for floppy drive)
- #10 Torx driver (for hard drive bracket)
- #00 jeweler's screwdriver (for speaker)

Caution

The 190/5300 Series PowerBook computers contain the highest voltage of any PowerBooks. You **must** remove the battery and unplug the power adapter before performing any take-apart procedure!

Time-Saving Tips

Use the following information to save time when working on the 190/5300 Series computers.

- Ensure that all cables are routed exactly. Use all grooves and/or protrusions to align cabling. If the cable is improperly routed, you may not be able to reassemble the computer, or once reassembled, the computer may fail to function.

- Check that all cables are properly aligned in the

connectors and that the connections are tight.

- Take note of the type and location of screws in the computer. A variety of screws are used, and it is easy to confuse the type of screw needed in a particular location. If you need to identify a screw, refer to the screw matrix located in the Basics chapter.

Battery

No preliminary steps are required.

Caution: The 190/5300 Series PowerBook computers contain the highest voltage of any PowerBook. You **must** remove the battery and unplug the power adapter before performing any take-apart procedure!

Battery
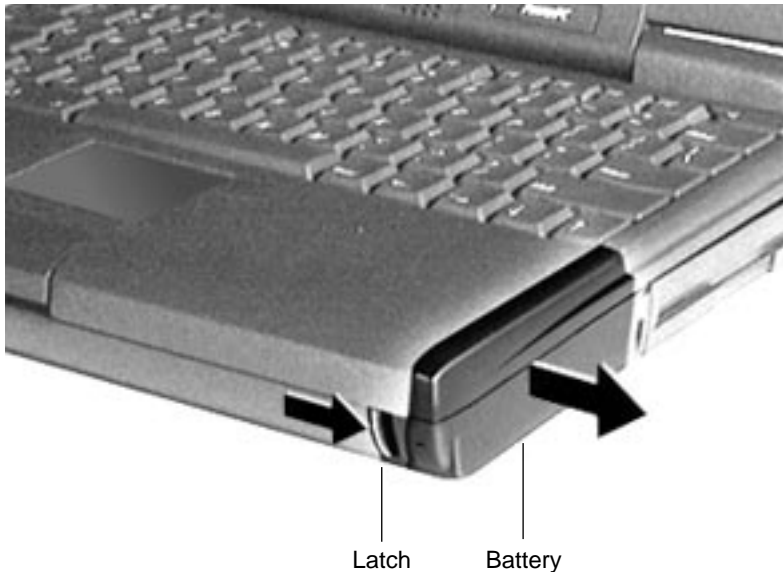
Latch   Battery

1 Push the button and slide the latch to the side.

2 Pull the battery out of the computer.

Caution: Always install the battery **before** connecting the power adapter.

Floppy Drive

No preliminary steps are required.

Floppy Drive

Release Button   Floppy Drive
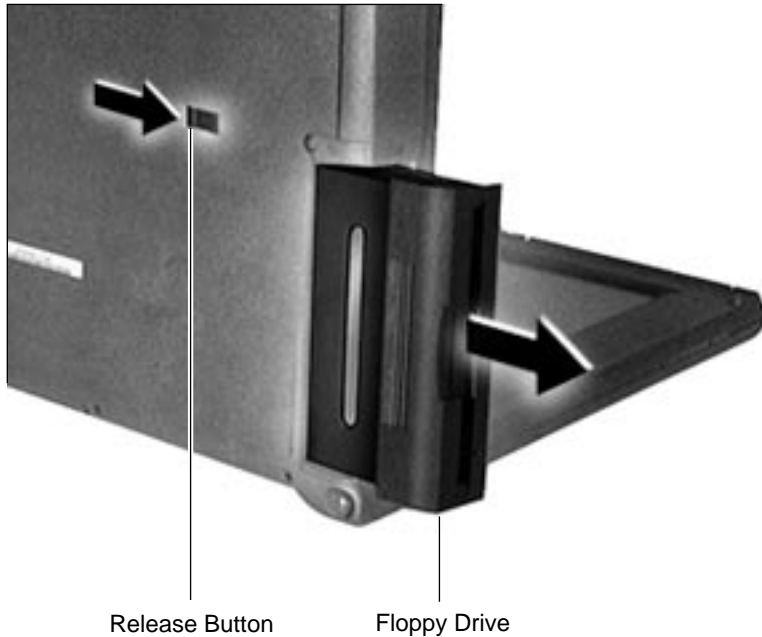
1 Slide the release button
   to the side.

2 Grasp the floppy drive
   by the ridged area on the
   bottom of the drive case
   and pull the drive from
   the media bay.

Note: Media bay devices
require approximately 7 lb.
pull strength.

Replacement Caution: Media
bay tolerances are tight.
Align media bay devices
carefully before inserting
them into the bay.

I/O Door

No preliminary steps are required.
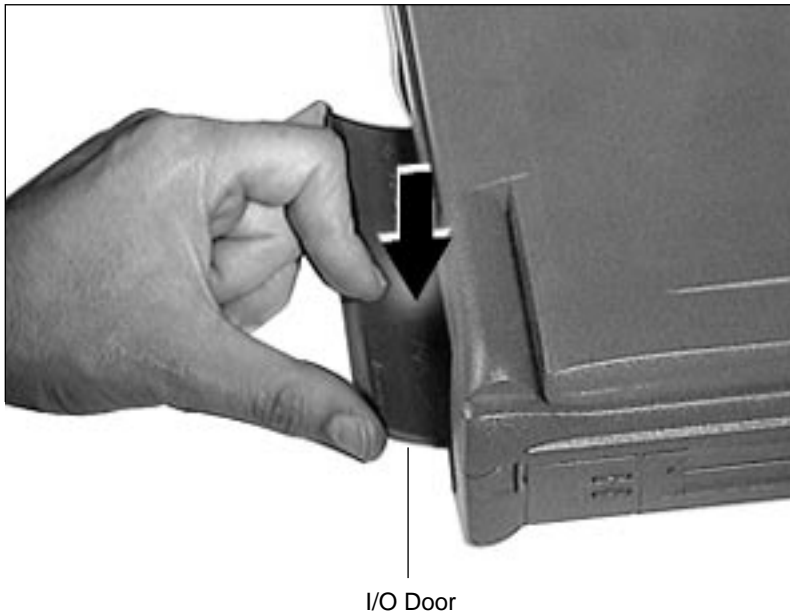
I/O Door

I/O Door

1. Open the I/O door (approximately 45° from the computer).

2. Placing a finger on each side of the door and one finger in the middle of the door, gently bend the door until the middle bows out away from the machine.

3. Unhinge one side of the door.

4. When the first side is free, lift the door from the remaining hinge.

Front Feet

No preliminary steps are required.

Note: Removing the front feet is not necessary for further take-apart.

Front Feet

Front Foot
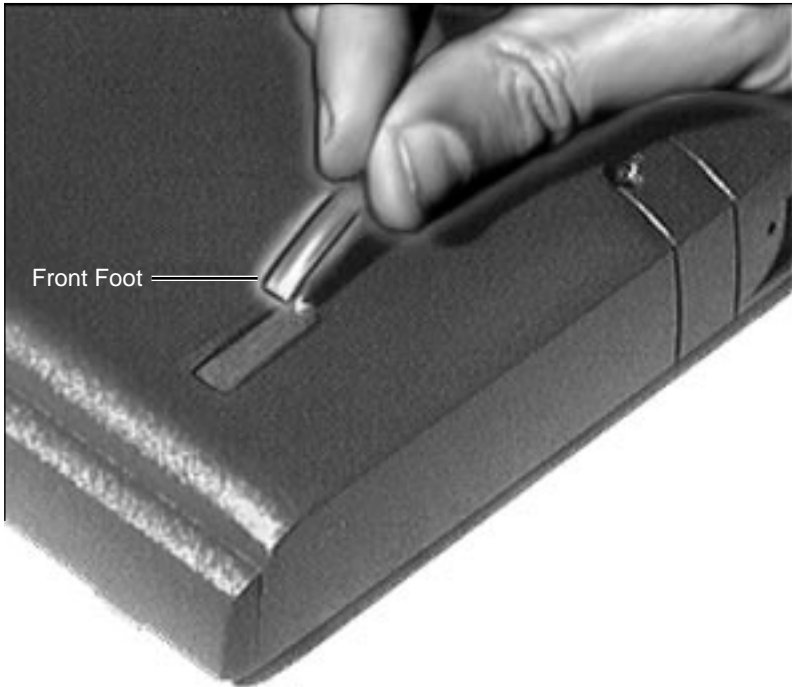
With a flat-blade screwdriver, pry up either end of the foot and remove it from the groove in the bottom plastic case.

Rear Feet

No preliminary steps are required.

Note: Removing the rear feet is not necessary for further take-apart.

Rear Feet

Foot Extension Button
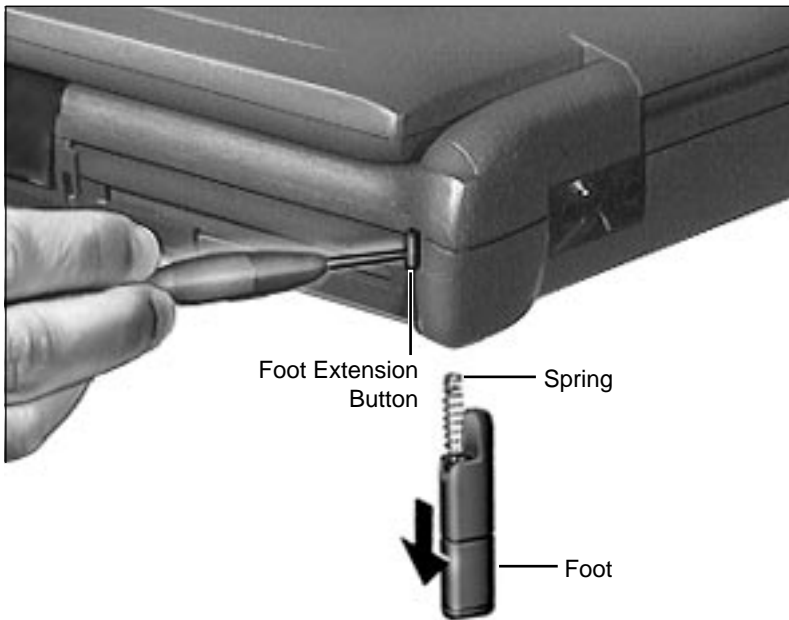
Spring

Foot

Using a flat-blade screwdriver, press in **completely** on the foot extension button and wait for the foot and spring to eject from the chamber in the CPU stiffener.

Replacement Note: The spring should be in the chamber of the foot and on the outer side of the computer.

Keyboard

Before you begin, remove the following:

- Battery
- Floppy Drive

Keyboard
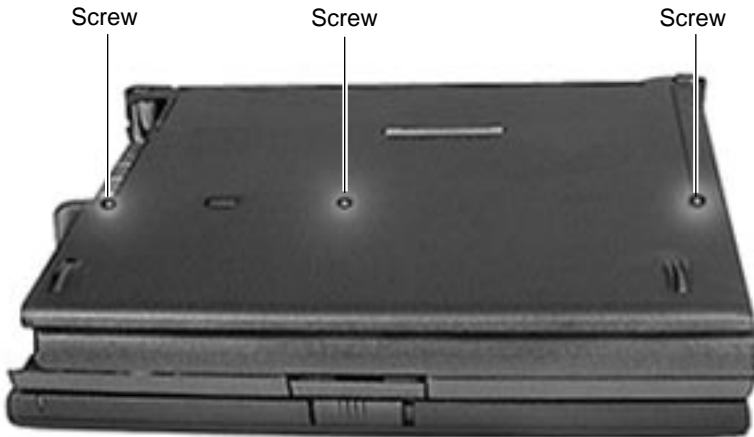
Screw   Screw   Screw

1 Close the computer and
   turn it upside down.

2 Remove the 3 screws on
   the bottom of the case.

Keyboard

Tabs   Tabs
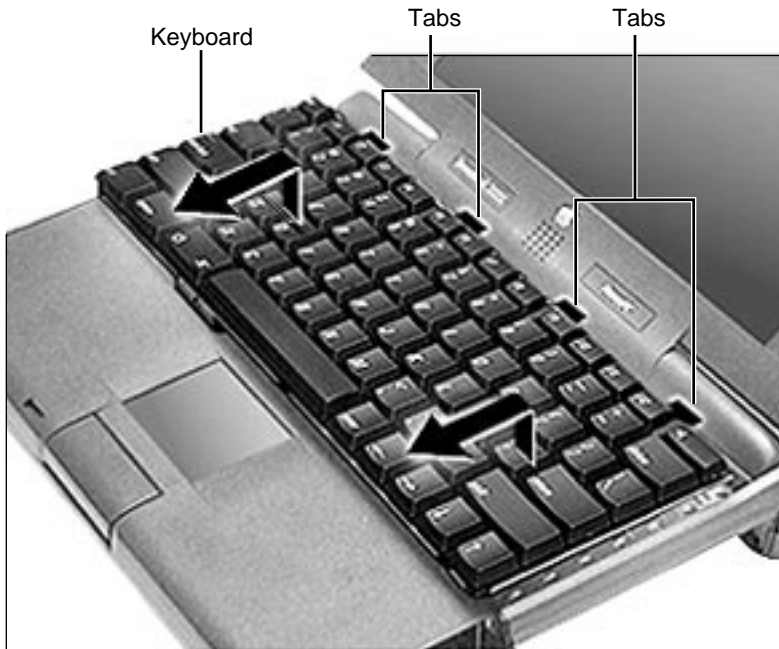
3 With the computer right side up and facing you, open the computer.

4 Carefully, lift the keyboard slightly up and toward you until you feel a slight resistance— STOP!

Caution: If you pull the keyboard too far toward you, you will rip the keyboard cables out of their connectors. Pull the keyboard just far enough toward you so that the keyboard tabs barely clear the inside of the case.

Keyboard Cable Connectors
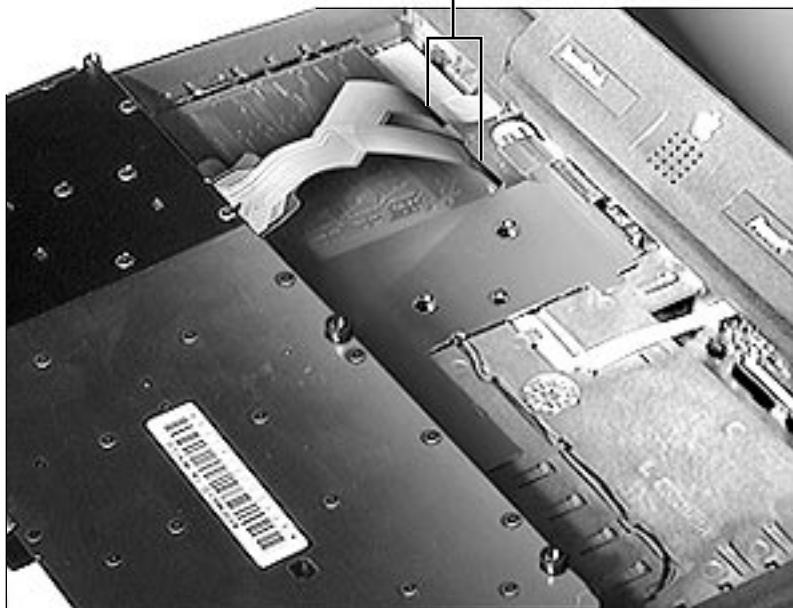
5 Gently, rotate the top of the keyboard toward you, and lay the keyboard upside down on the palm rest.

6 Using a flat-blade screwdriver, detach the 2 keyboard cables by gently lifting up their respective connector ears.
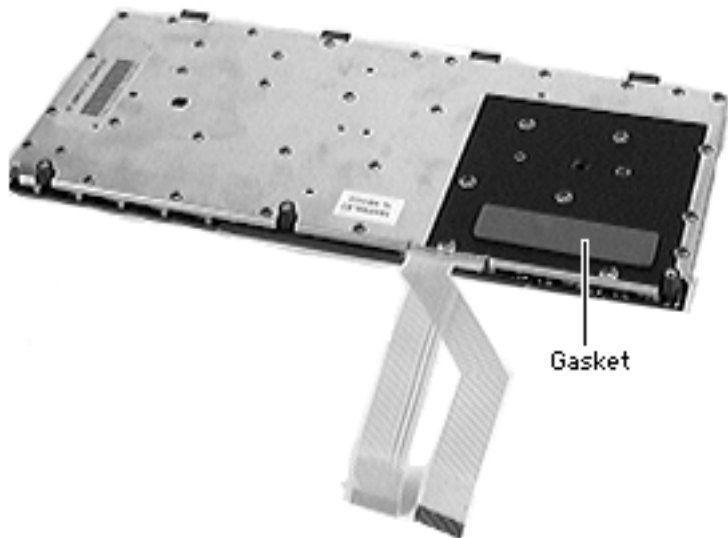
Gasket

7 If a foam gasket is not already installed on the bottom of the keyboard, install a gasket (part number 922-3103) as illustrated.

- **Replacement Cautions:** Carefully *angle* the keyboard into place. This will prevent the right-most keyboard tab from damaging the I/R cable.
- Holding the keyboard in place, turn the unit on its side and install the keyboard screws. You may have to apply

pressure to the keyboard for the screws to engage. Apply this pressure with care.

RAM Card

RAM Card

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard

Note: A foam gasket should be installed on the bottom of the keyboard to keep the RAM card firmly in place. If a gasket is not installed on the keyboard, see the "Keyboard" topic in this chapter.

RAM Card
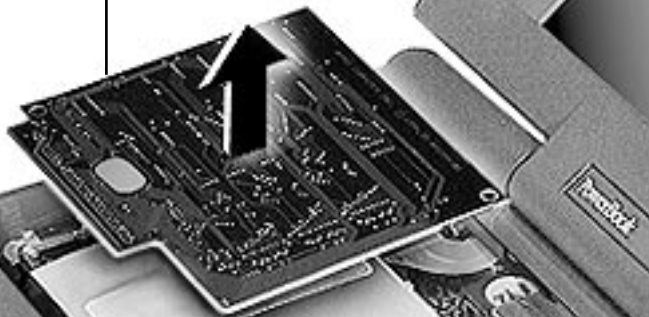
Grasp the RAM card by the corners closest to you—supporting the bottom left corner over the connector—and lift straight up.

Left Clutch
Cover

Right Clutch
Cover

Clutch Covers

Before you begin, remove
the following:

- Battery
- Floppy Drive
- Keyboard

Left
Clutch
Cover

Right
Clutch
Cover
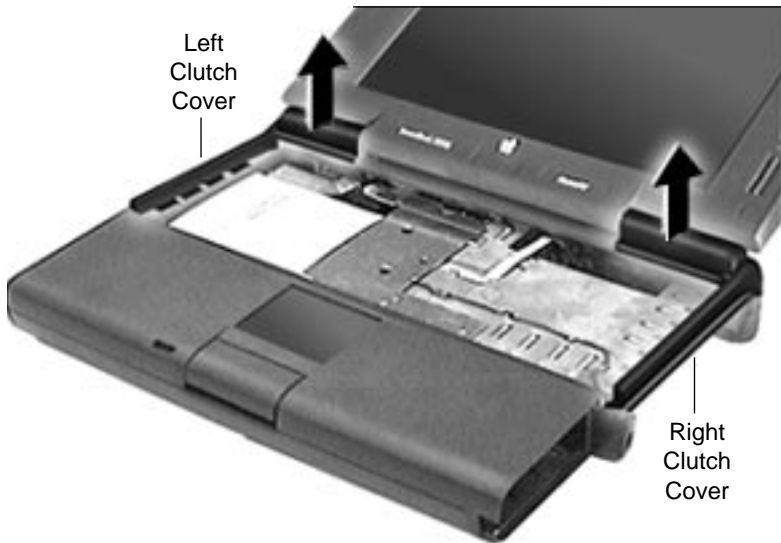
1. Position the display at 170 degrees from the body of the computer.

2. Grasp the clutch cover under the display. With a fingernail, pull up from the seam in the back plastics, gently rocking the cover until it releases.

3. When the clutch cover releases, pull straight up, watching to clear the bottom of the display.

Replacement Note: Install the palm rest before the clutch covers. (The plastic palm rest tabs fit under the clutch cover tabs.)

PC Switch Board (PCMCIA)

PC Switch Board (PCMCIA)

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- Clutch Covers

Note: Removing the PC switch board is not necessary for further take-apart; however, it should **not** be returned to Apple on the logic board.

PC Switch Board
(PCMCIA)
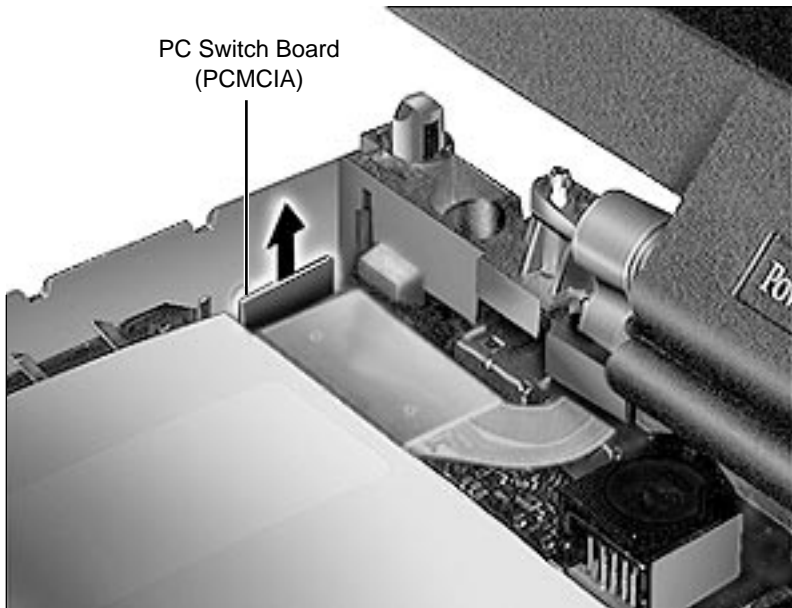
Remove the PC switch board
by gently pulling straight
up.

Caution: The PC switch
board connector is fragile.

Display Assembly ———

Display Assembly

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- Clutch Covers

Note: If you are going through these procedures step-by-step for complete disassembly of the computer, removing the display at this point is not necessary but makes further

PC Switch Board
(PCMCIA)
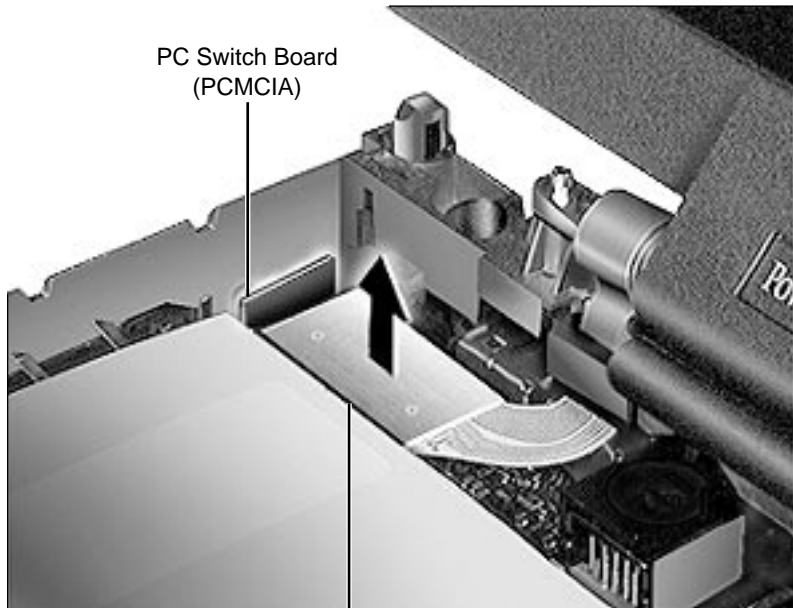
Display Cable Connector

take apart easier.

1 Disconnect the display
   cable from the logic
   board by gently lifting
   up on the hardened
   plastic backing of the
   cable.

Caution: The PC switch
board connector is fragile.
Focus effort on the side of
the display cable connector
away from the PC switch
board.

Screw   Screw
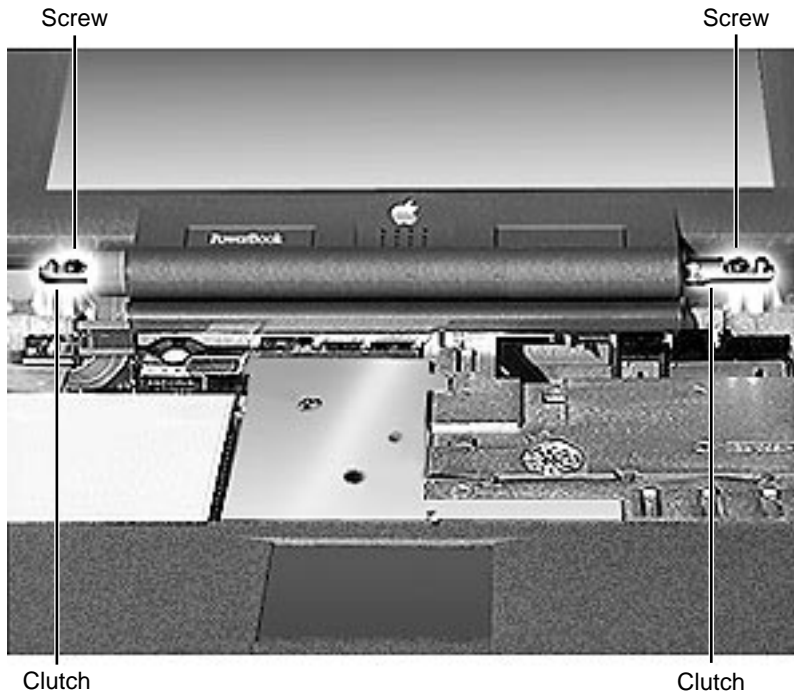
Clutch   Clutch

2 Tilt the display back
   170 degrees from the
   keyboard and remove the
   2 screws holding the
   metal clutches to the
   CPU stiffener.

Replacement Note: Perform
this test to confirm you
installed the display assem-
bly correctly: Try to insert
a 3.5" diskette between the
closed assembly and the top
case. If you can, this
indicates the clutch screws
are undertightened. Remove
the display assembly and
loosen the screws.

Palm Rest
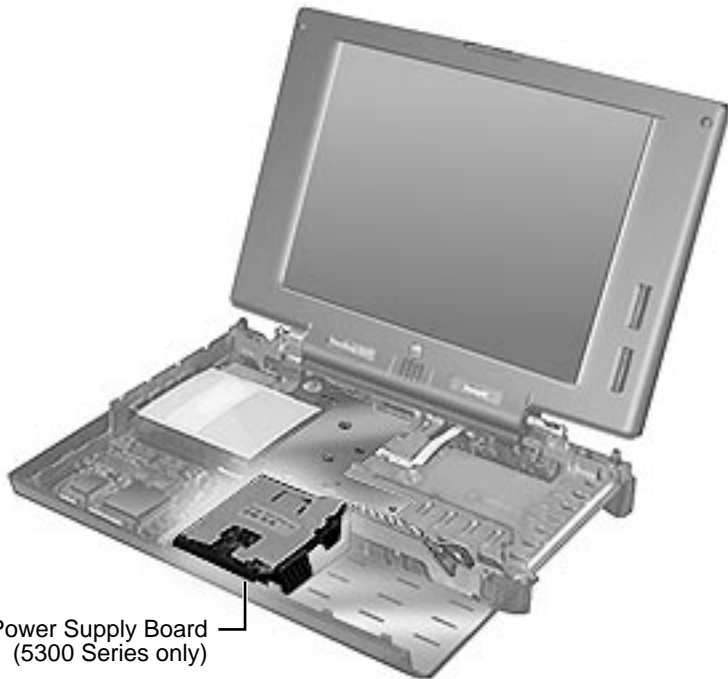
Palm Rest

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers

Tab

Palm Rest

Trackpad
Cable Connector

Tab
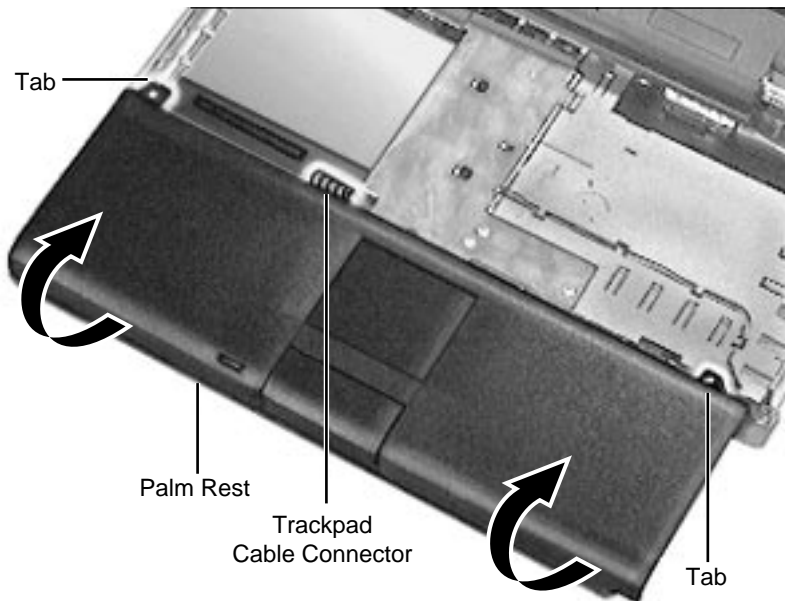
1 Slowly pull the palm rest toward you (to unlatch it from the bottom case) and then rotate the front of the palm rest over the back until the palm rest is laying upside down in the area the keyboard occupied.

Caution: Make certain that you do not pull the trackpad cable out of the connector as you rotate the palm rest.

2 Release the trackpad cable by lifting up the connector ears.

Replacement Notes:

• Before you reconnect the trackpad cable, check that the ferrite bead is on the cable and that both the cable and the bead fit correctly under the palm rest.

• Install the palm rest before the clutch covers. (The palm rest tabs fit under the clutch cover tabs.)
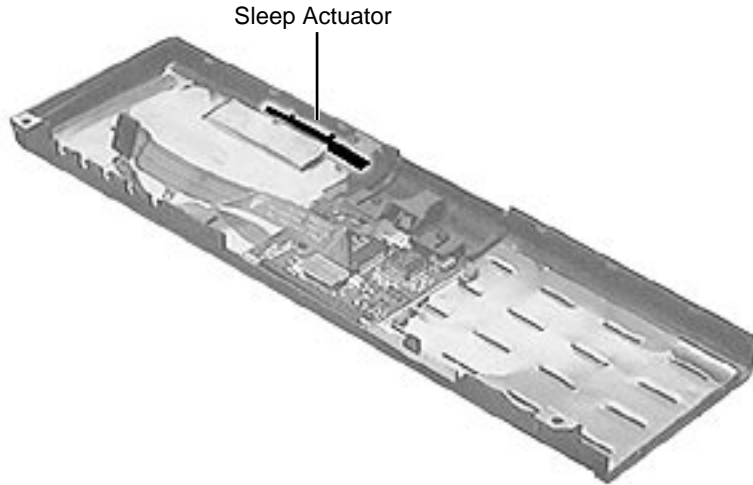
Sleep Actuator

Sleep Actuator

Before you begin, remove the following:

• Battery
• Floppy Drive
• Keyboard
• RAM Card
• Clutch Covers
• Palm Rest

Note: Removing the sleep actuator is not necessary for further take-apart

Pins

Sleep Actuator
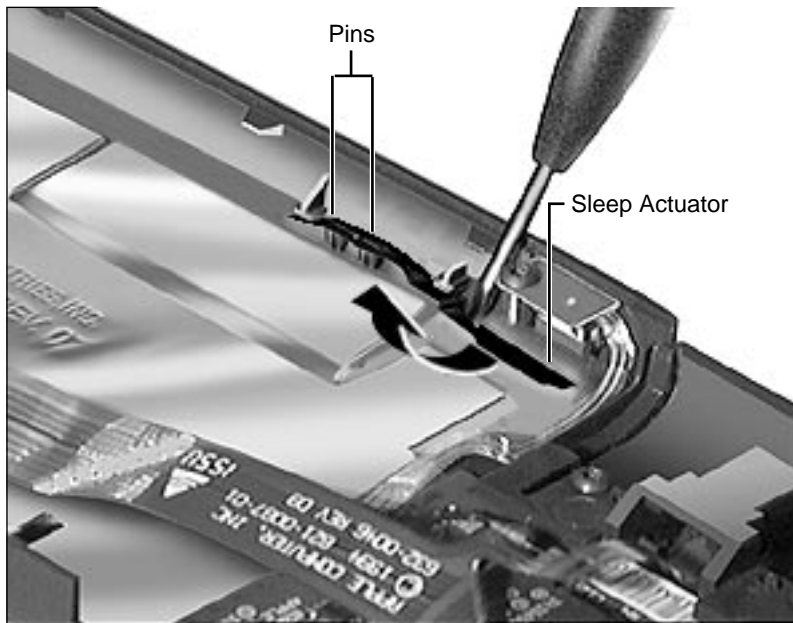
1 Place a flat-blade screwdriver blade behind the actuator and push the actuator away from the side of the palm rest.

2 Lift the actuator off the pins.

Trackpad

Trackpad

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest

Screw
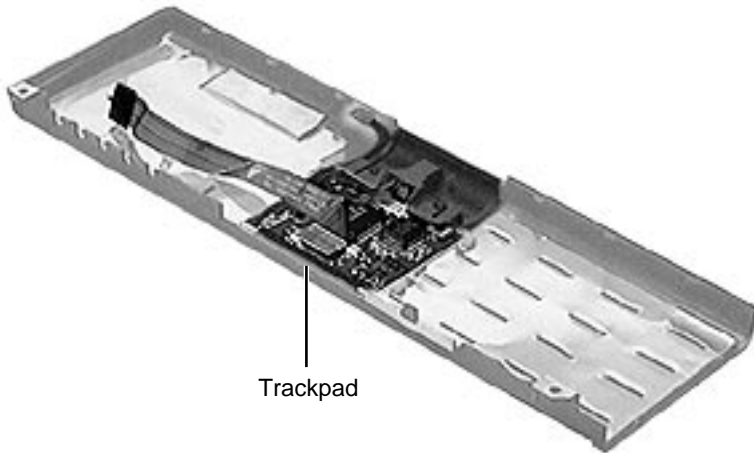
Closure
Switch
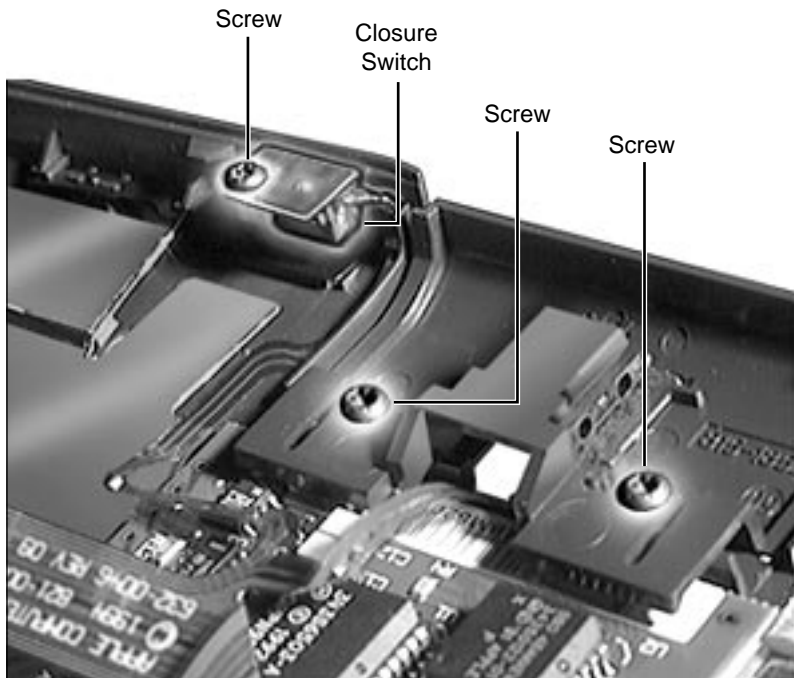
Screw

Screw

1   Remove the 3 screws
    holding the trackpad
    button and closure
    switch in place.

Tabs   Tabs

Trackpad Cable Connector   Trackpad Button Switch Board
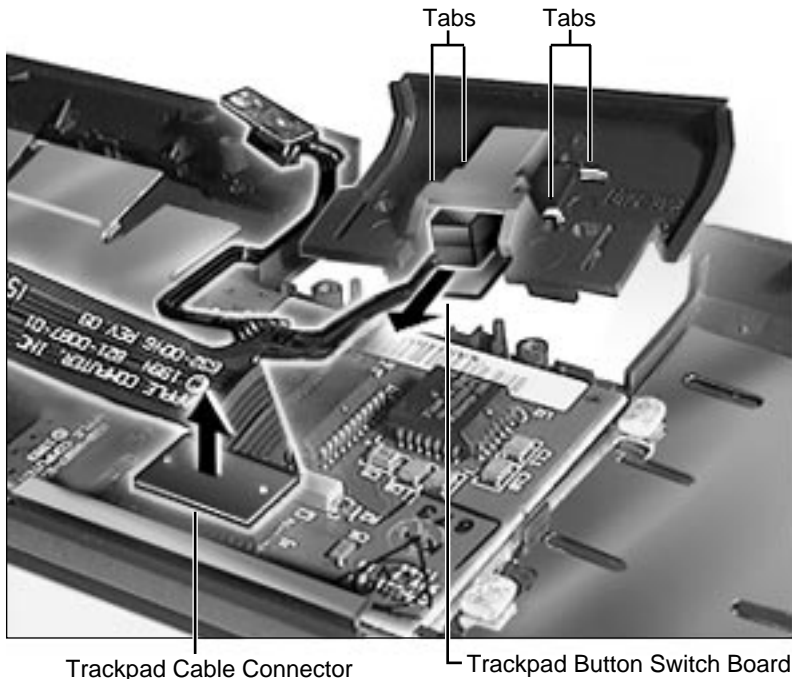
2 Grip the trackpad button switch **board** and slide it out between the four tabs holding it in place.

3 Disconnect the trackpad cable from the trackpad.

4 Lift the trackpad out from under the mounting ledge.

Replacement Note: Note the two tiny notches on the trackpad (near the button) and how they align with the tabs in the plastics.

Note: If you clean the trackpad surface, use a nonstatic inducing material and make certain that the computer is **off**.

Hard Drive

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest

Hard Drive

Hard Drive Bracket
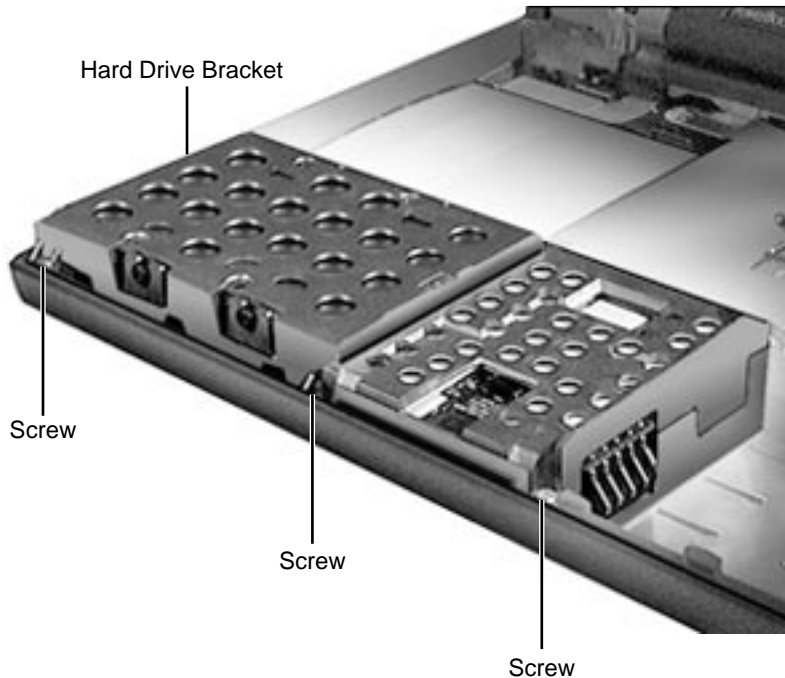
Screw

Screw

Screw

1 Remove the 3 screws connecting the hard drive bracket to the CPU stiffener.

2 Lift up the bracket until you feel a slight resistance—STOP! (The hard drive cable is attached to the logic board on the left side of the bracket.)

Heat Sink Leaf Spring

Screw

Screw

Screw

Screw

Hard Drive Cable Connector
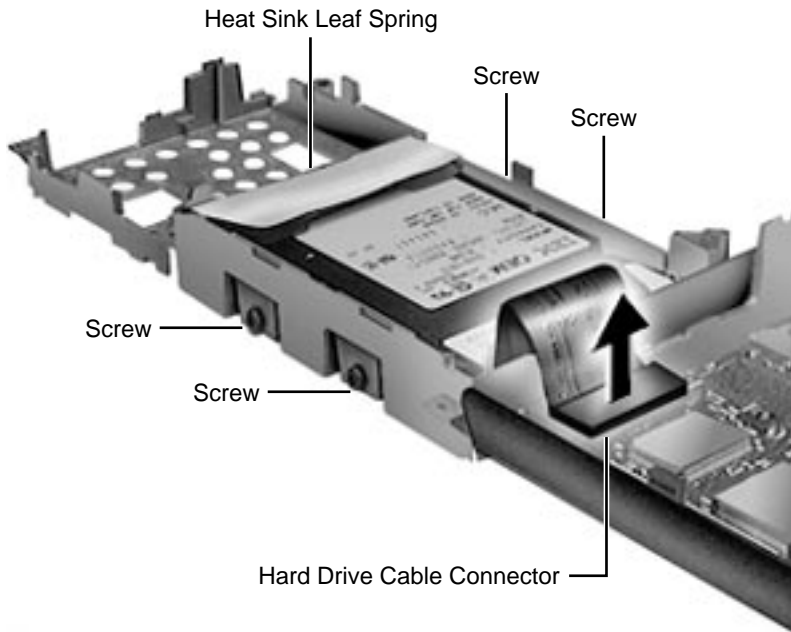
3 Rotate the right side of the hard drive bracket over the left so that the bracket is sitting upside down to the left of the computer.

4 Disconnect the hard drive cable from the logic board by carefully pulling straight up on hardened plastic back of the cable connector.

5 Remove the 4 screws holding the drive in the bracket.

Heat Sink
Leaf Spring

Hard Drive
EMI Shield
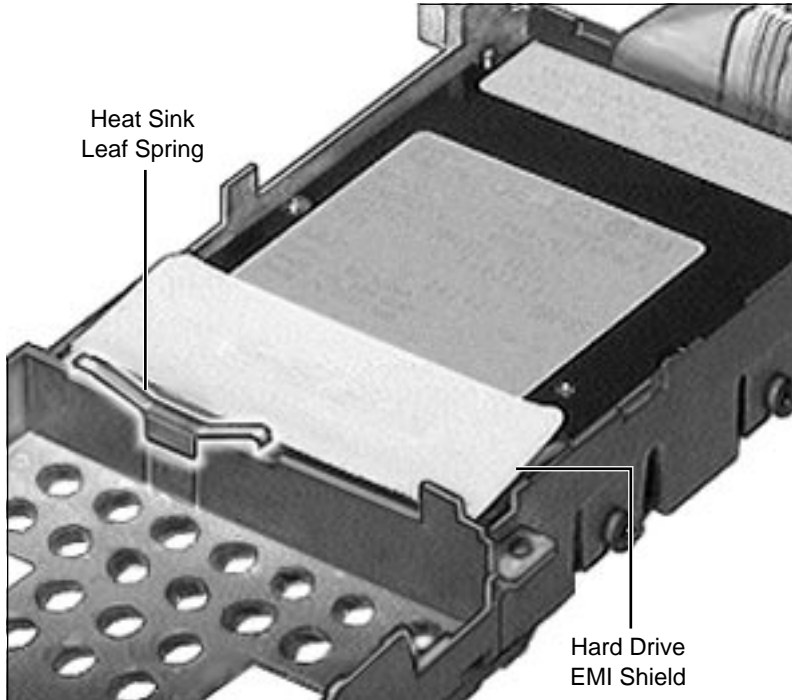
Replacement Notes:

- Make certain that you have installed the hard drive EMI shield and insulator before you return the hard drive to the bracket.

- Check that the heat sink leaf spring is in place before you fasten down the hard drive bracket.

Rear View   Notch   Hard Drive Bracket

CPU Stiffener
(corner of media bay)

Prongs   Backup Battery Cable
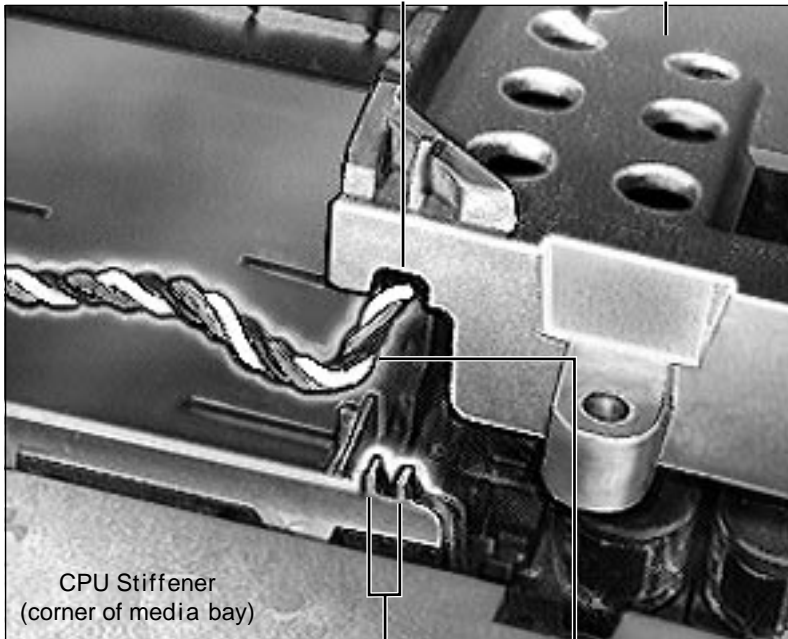
- Before you fasten down the hard drive bracket, verify that the backup battery cable is routed through the prongs on the CPU stiffener and under the notch in the hard drive bracket.

- If you have removed the heat sink, remember to replace it before you replace the hard drive bracket.

Power Supply Board (5300) Series Only)
(5300 Series only)

Power Supply Board (5300 Series Only)

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest
- Hard Drive
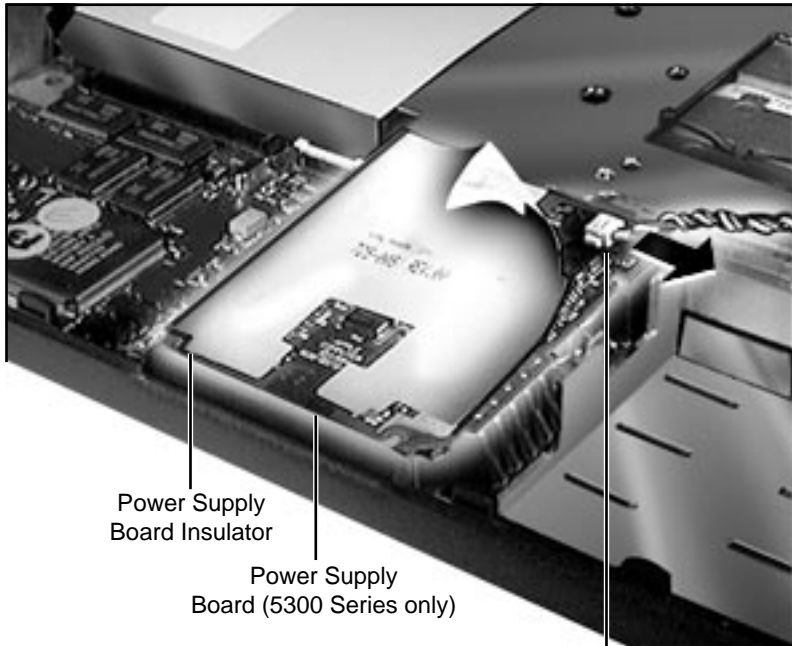
Power Supply
Board Insulator

Power Supply
Board (5300 only)

Backup Battery Cable Connector

1 Disconnect the backup battery cable from the power supply board by carefully pulling the male portion of the connector to the right.

2 Lift the power supply board straight up, supporting all sides of the board (the power supply board connector is under the backup battery connector).

Caution: Make certain that the power supply board insulator is present and correctly placed when you reinstall the board.
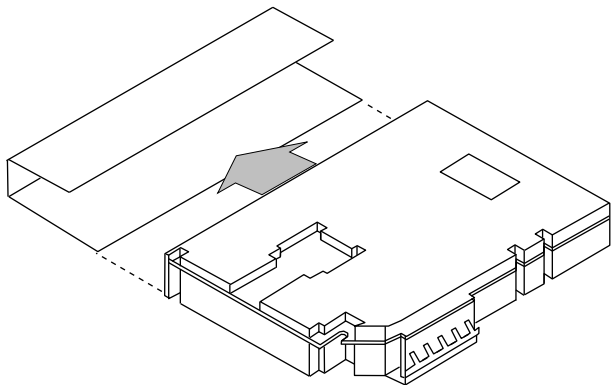
Note: As part of the 190/ 5300 Repair Extension Program, some PowerBook 5300 power supplies were upgraded with shields. The shields were installed on top of the power supply insulator.

3 Remove the power supply shield.
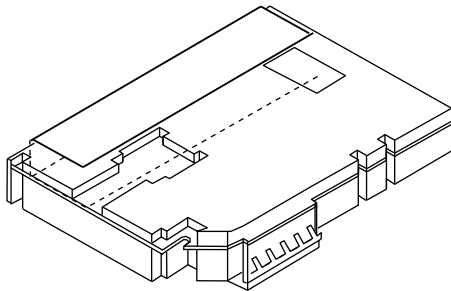
Replacement Caution:
Carefully fold the power supply shield at the perforations and install it as shown. Proper placement prevents the shield's edges from bending onto components on the power supply.

Backup Battery

Backup Battery

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
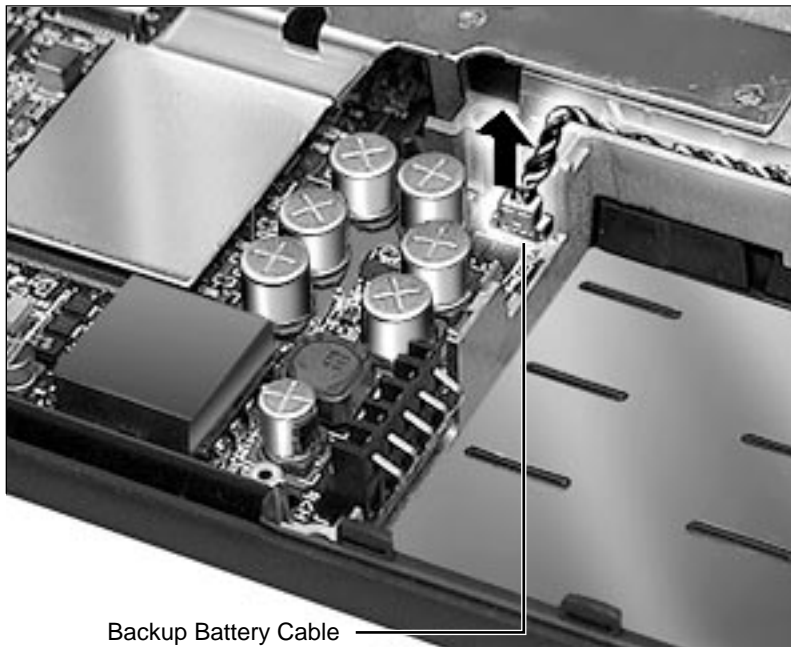
Backup Battery Cable
Connector (190 Series only)

1 In the 190 Series computers, disconnect the backup battery cable from the logic board by carefully pulling straight up on the male portion of the connector.
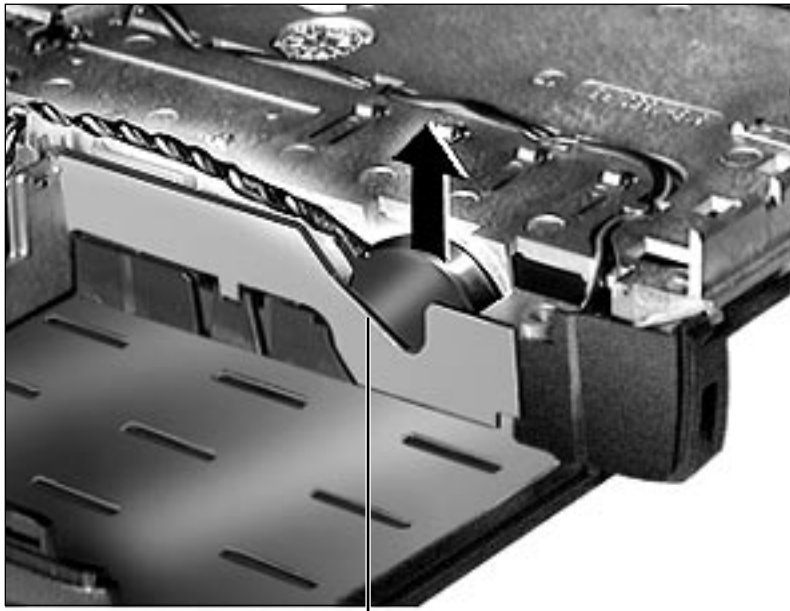
Backup Battery

2 For all 190/5300 Series computers, lift the backup battery out of its pocket in the CPU stiffener.

Replacement Note: Verify that the backup battery cable is routed through the prongs on the CPU stiffener and under the notch in the hard drive bracket before you fasten down the hard drive bracket. For correct routing position, see photo in "Hard Drive" procedure of this Take Apart.

Heat Sink

Heat Sink

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
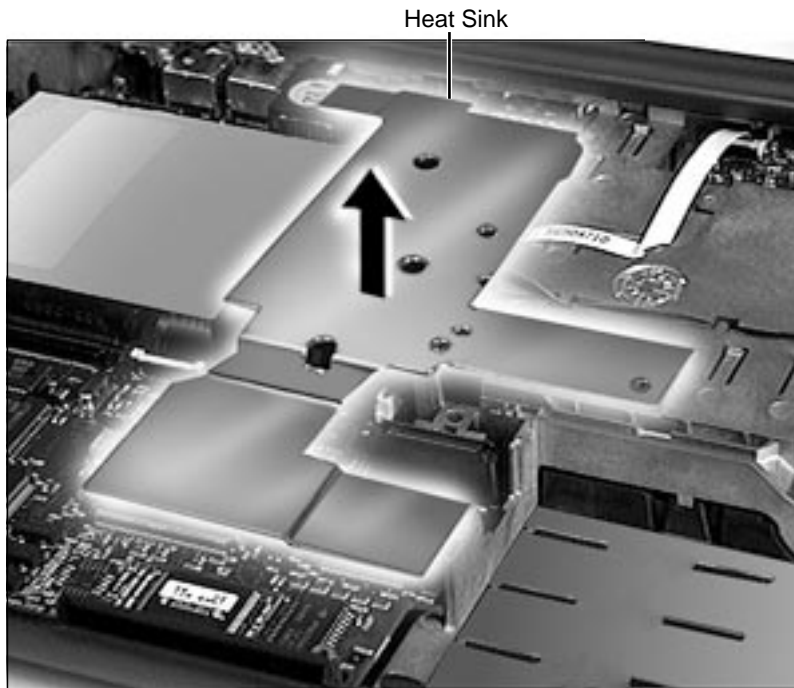
Heat Sink

Remove the heat sink by lifting up and slightly forward (to allow the back tabs to clear the port area).

Replacement Note: Replace the heat sink before you replace the hard drive bracket.

Video Board
(190 Series option)

Video Board (Optional on 190 Series)
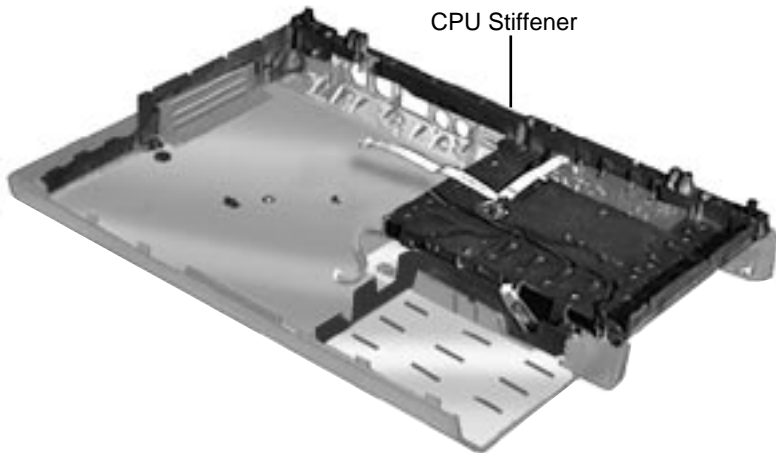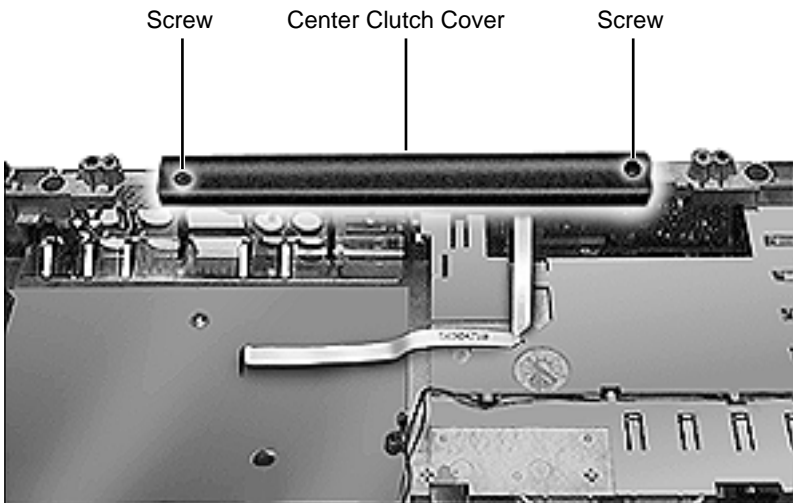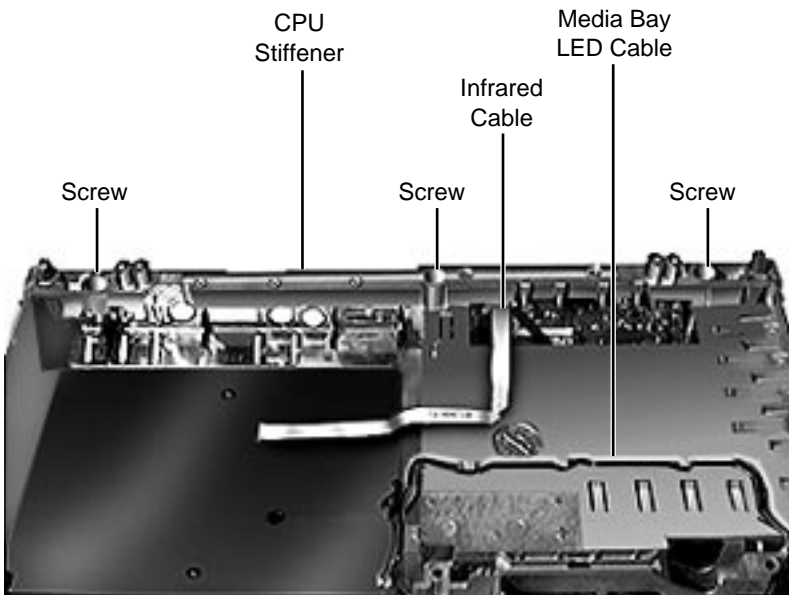
Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
- Heat Sink

Screw

1 Position the computer so that you are looking at the back port area.

2 Remove the screw between the video and sound input ports.
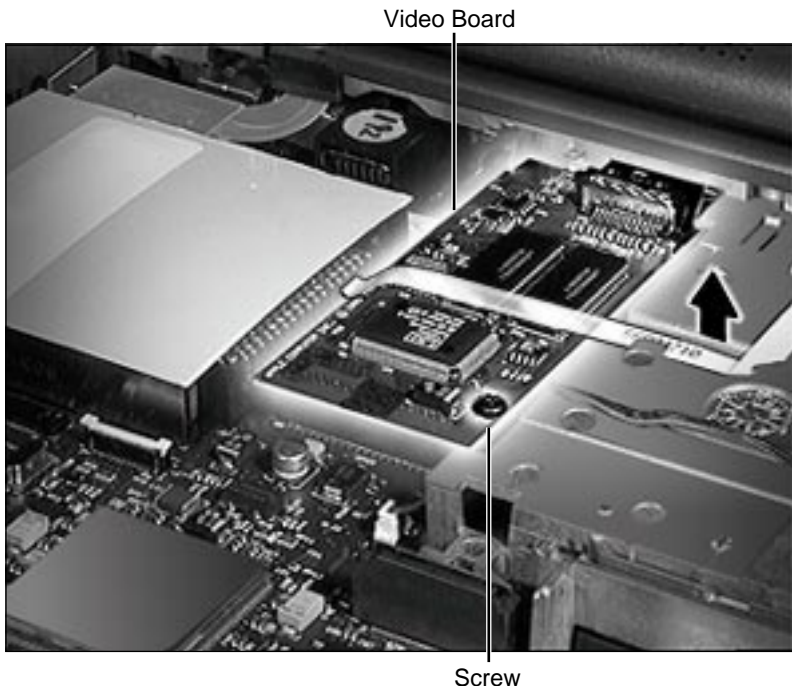
Video Board

Screw

3 Turn the computer so that it is facing you.

4 Remove the screw securing the video board.

5 Supporting the corners of the board closest to you (over the connector), lift the video board straight up and maneuver it out from under the infrared cable.

Replacement Note: Make certain that the plastic video board spacer is on the screw shaft before you tighten down the screw.

Logic Board

Logic Board

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
- Backup Battery
- Heat Sink
- Video Board (190 Series option)

Metal Prongs

Notches

Infrared Cable
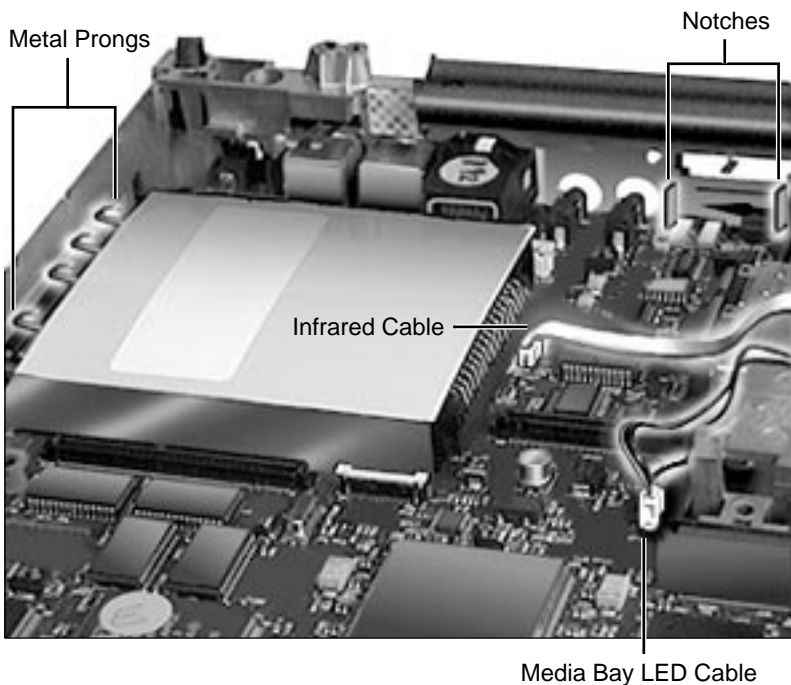
Media Bay LED Cable

1 Disconnect the infrared (if present) and media bay LED cables from the logic board.

2 Carefully, maneuver the logic board back and forth until the port connectors are free of the port holes in the back of the plastic case.

Note: The logic board often catches on a notch in the back of the plastic case near the media bay.

3 Pull the logic board toward you and slightly to the left.

Caution: Be careful that the logic board clears both the media bay and the PC Card bay.

Replacement Note: The logic board will snap into place when you align
1 the I/O port connectors
2 the metal prongs over the ledge for the PC Card bay and the PC Card module's sides under the ledge
3 the notches near the media bay

Replacement Caution: Make certain that you insert the infrared cable into the logic board connector correctly. When the connection is straight, the line on the infrared cable will align with the connector top. If the cable is incorrectly connected, you can blow a (soldered) fuse on the logic board.

Return Note: The entire PC Card module (including the white metal shield) remains on the logic board for return to Apple.
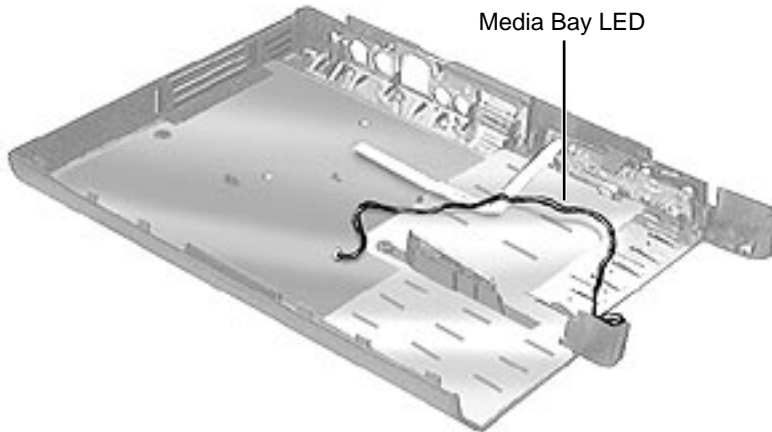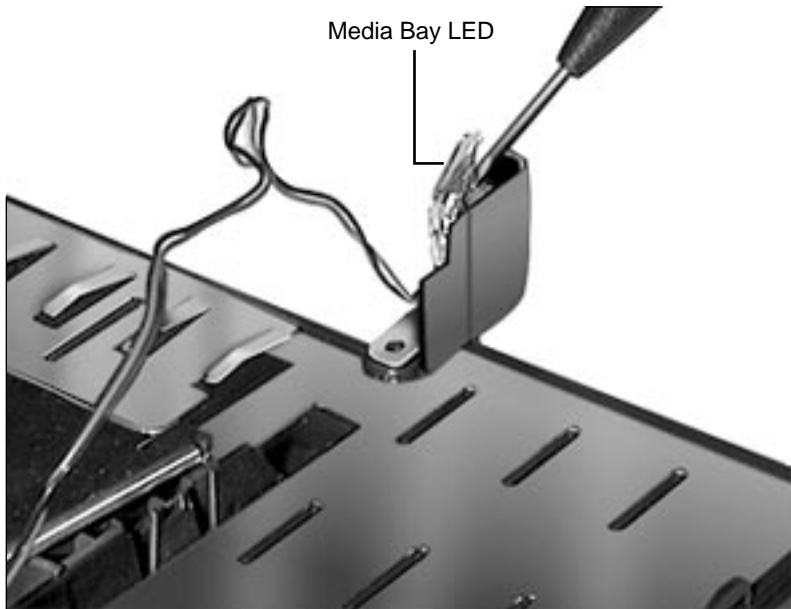
CPU Stiffener

CPU Stiffener

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Display Assembly
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
- Heat Sink
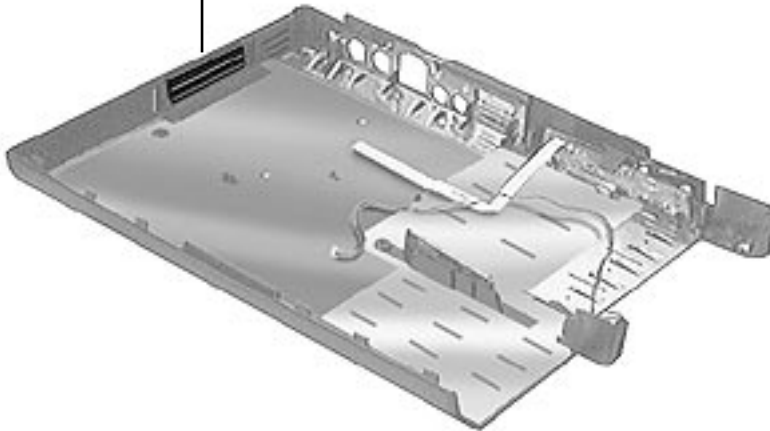- Video Board (190 Series Option)
- Logic Board

1 Remove the 2 screws
   holding the center
   clutch cover to the CPU
   stiffener.

Screw   Center Clutch Cover   Screw

CPU Stiffener

Media Bay LED Cable

Infrared Cable

Screw   Screw   Screw

2   Remove the 3 screws holding the CPU stiffener to the back of the bottom case.

3   Free the stiffener from the infrared and media bay cables.

4   Remove the CPU stiffener from the bottom case.

Replacement Tip: Make certain that the infrared board, infrared window, port EMI shield, and media bay LED cable are correctly aligned before tightening down the CPU stiffener.
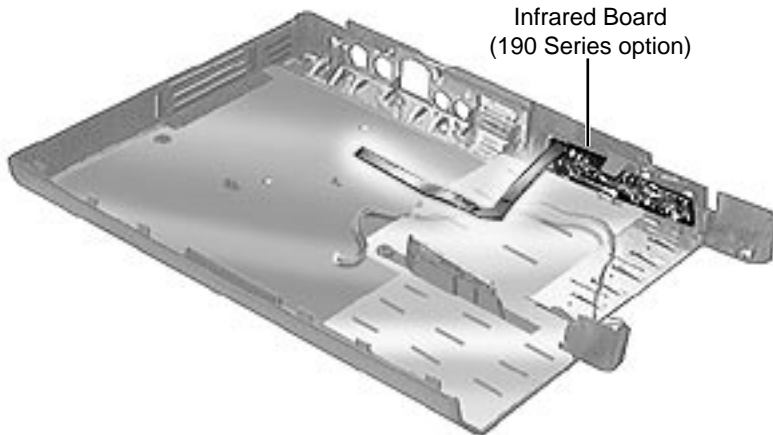
Infrared Board (Optional on 190 Series)

Infrared Board
(190 Series option)
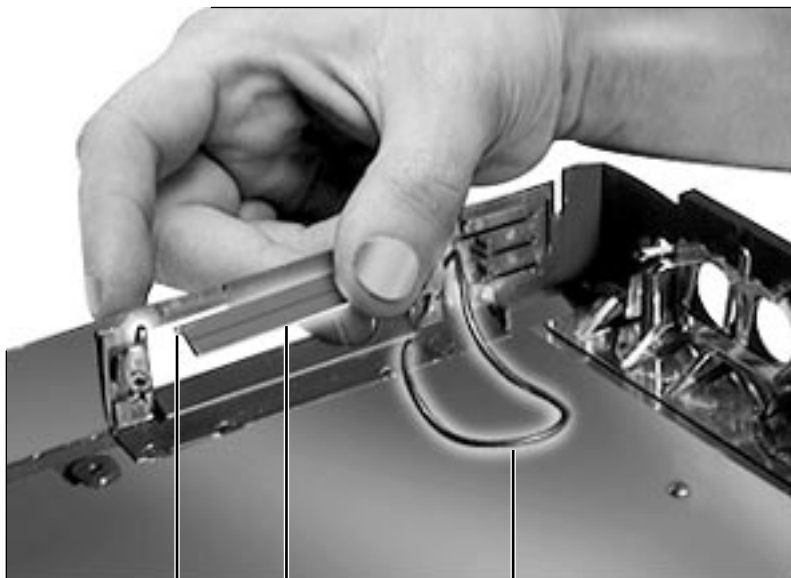
Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Display Assembly
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
- Heat Sink
- Video Board
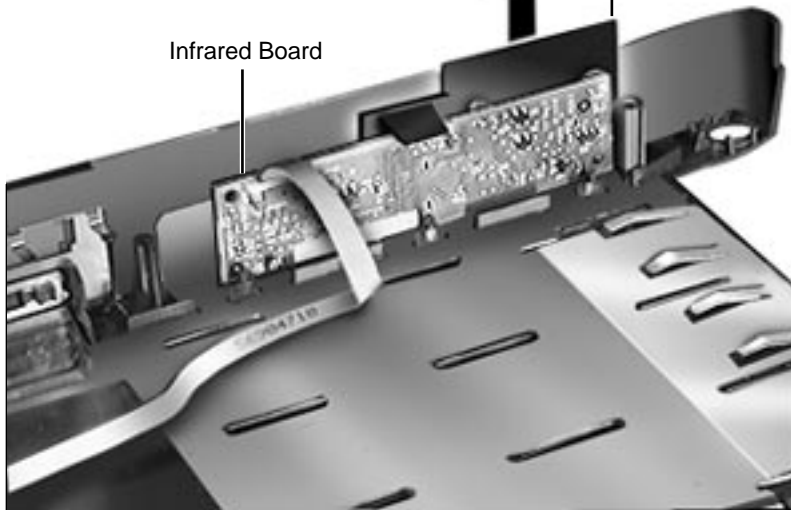
• Logic Board
• CPU Stiffener

Remove the infrared window from the back of the computer. The infrared board will fall out when you remove the window.

Replacement Caution: Make certain that you insert the infrared cable into the logic board connector correctly. When the connection is straight, the line on the infrared cable will align with the connector top. If the cable is incorrectly connected, you can blow a

Infrared Window

Infrared Board

(soldered) fuse on the logic board.

Replacement Notes:

- Do not leave fingerprints on the infrared window. If you touch the window, use a soft lint-free cloth to clean it before replacing it in the computer.

- Make certain that the infrared board and window are correctly aligned in the proper grooves before replacing the CPU stiffener.

Media Bay LED

Media Bay LED

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Display Assembly
- Palm Rest
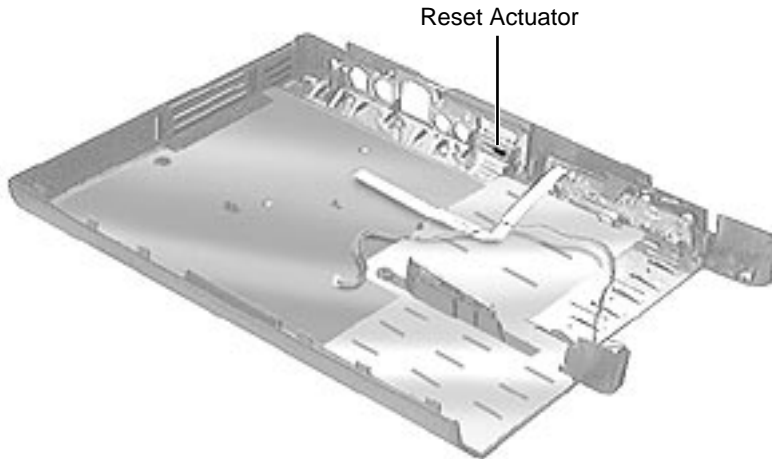- Hard Drive
- Power Supply Board (5300 Series only)
- Heat Sink
- Video Board (190 Series Option)
- Logic Board

Media Bay LED

• CPU Stiffener

Insert a flat-blade
screwdriver under the
crystal of the media bay
light pipe and gently pry up
until the LED assembly
dislodges.

PC Card Door
(PCMCIA)

PC Card Door
(PCMCIA)

Before you begin, remove
the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Display Assembly
- Palm Rest
- Hard Drive
- Power Supply Board
  (5300 Series only)
- Heat Sink
- Video Board (190
 Series Option)
- Logic Board

Hinge Pin   Door   Door Retainer O-Ring
            (top piece)

- CPU Stiffener

1 Remove the rubber door retainer O-ring.

2 Carefully bow the top piece of the door until the side hinge pin is free.

3 Repeat step 2 to remove the bottom piece of the door.

Caution: The door retainer O-ring is fragile. Remove it with care.
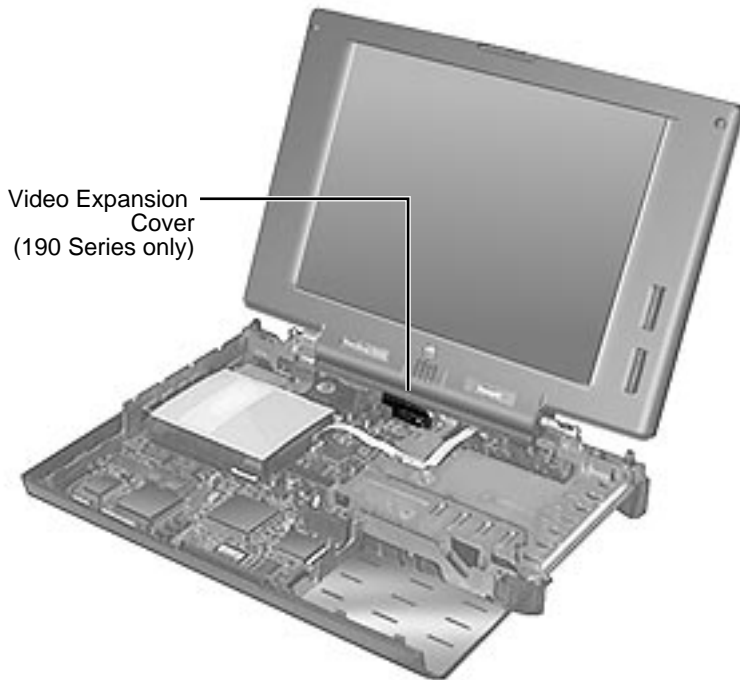
Video Expansion Cover (190 Series only)

Video Expansion Cover (Optional on 190 Series)

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
- Heat Sink

Video Expansion Cover
(190 Series only)
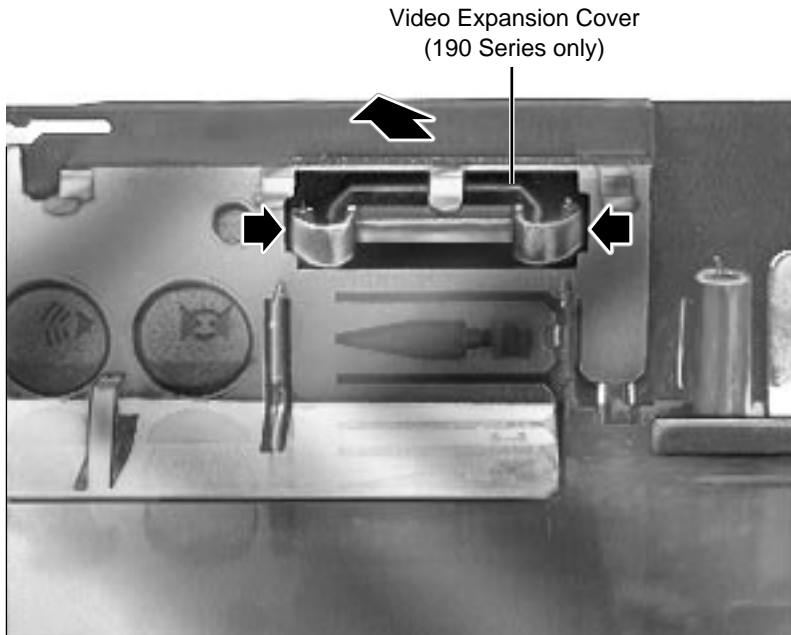
Squeeze both sides of the video expansion cover and push it through the video port hole.

Reset Actuator

Reset Actuator
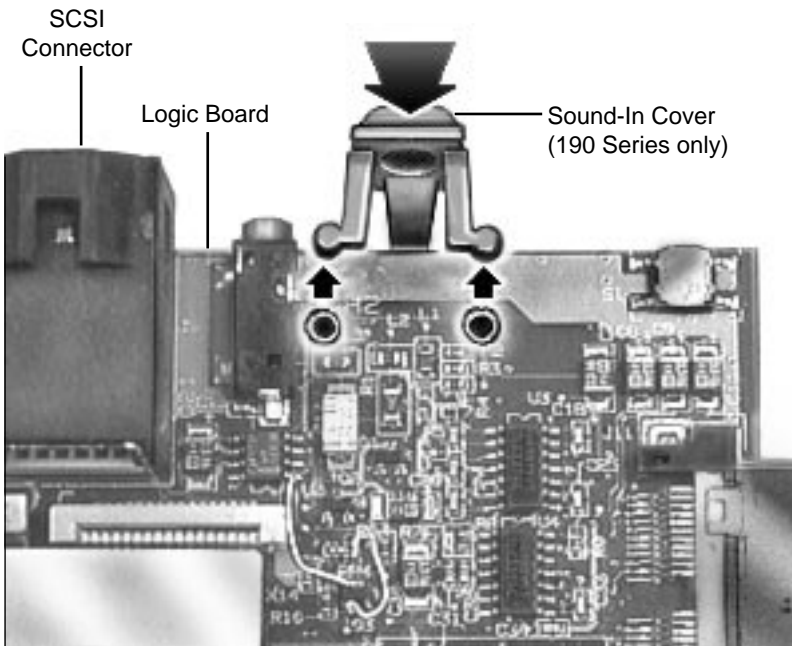
Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Display Assembly
- Palm Rest
- Hard Drive
- Power Supply Board (5300 Series only)
- Heat Sink
- Video Board (option)
- Logic Board
- CPU Stiffener
-

Front View

I/O EMI Shield   Reset Actuator
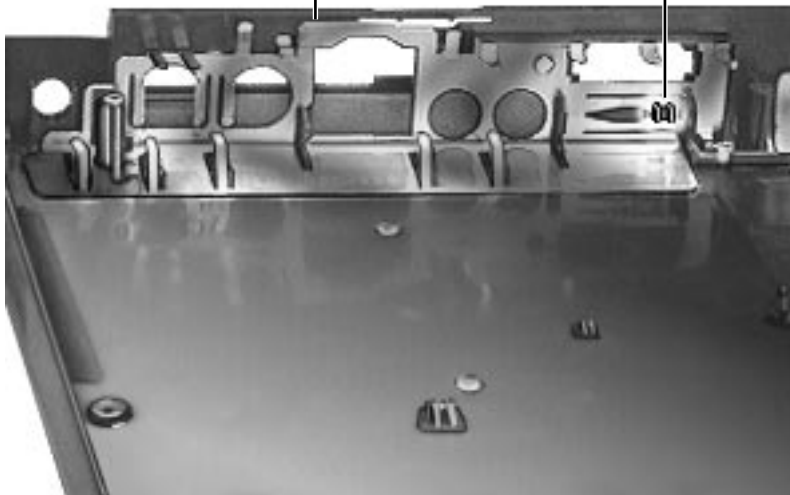
- Video Cover (190 Series only)

1 Lift off the I/O EMI shield.

Rear (Port) View
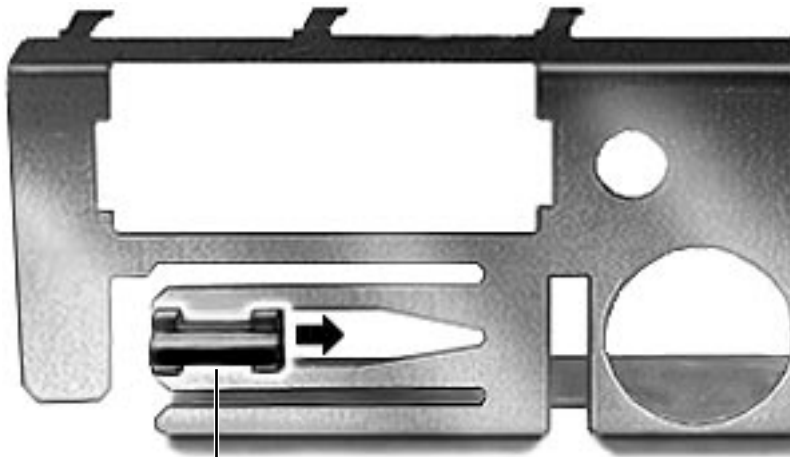
2 Slide the reset actuator to the right and lift it out of the EMI shield.
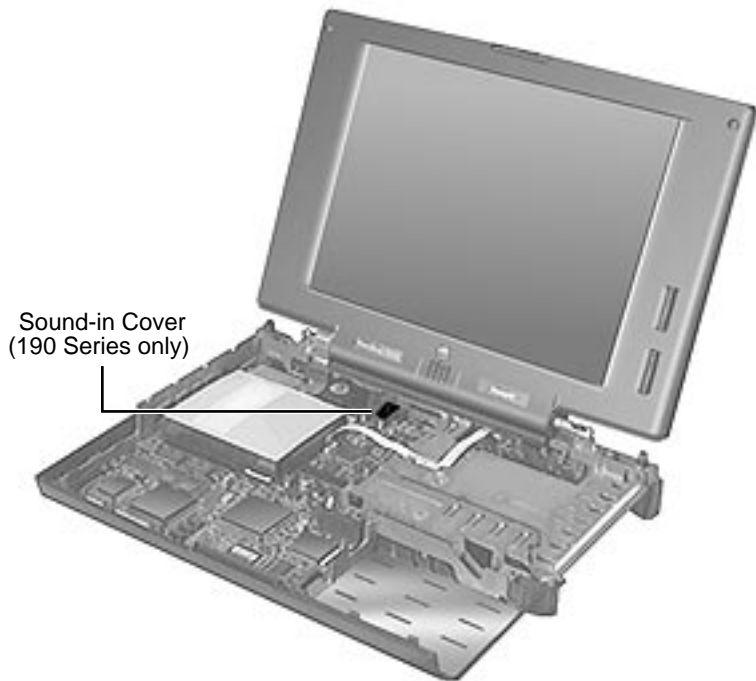
Reset Actuator

Sound-in Cover
(190 Series only)

Sound-In Cover
(190 Series Only)

Before you begin, remove
the following:

• Battery
• Floppy Drive
• Keyboard
• RAM Card
• Clutch Covers
• Display Assembly
• Palm Rest
• Hard Drive
• Power Supply Board
  (5300 Series only)
• Heat Sink
• Video Board (190
  Series Option)

SCSI
Connector

Logic Board

Sound-In Cover
(190 Series only)

• Logic Board

Simultaneously push down
on the sound-in cover while
sliding it off the logic board.

Media Bay Release Mechanism
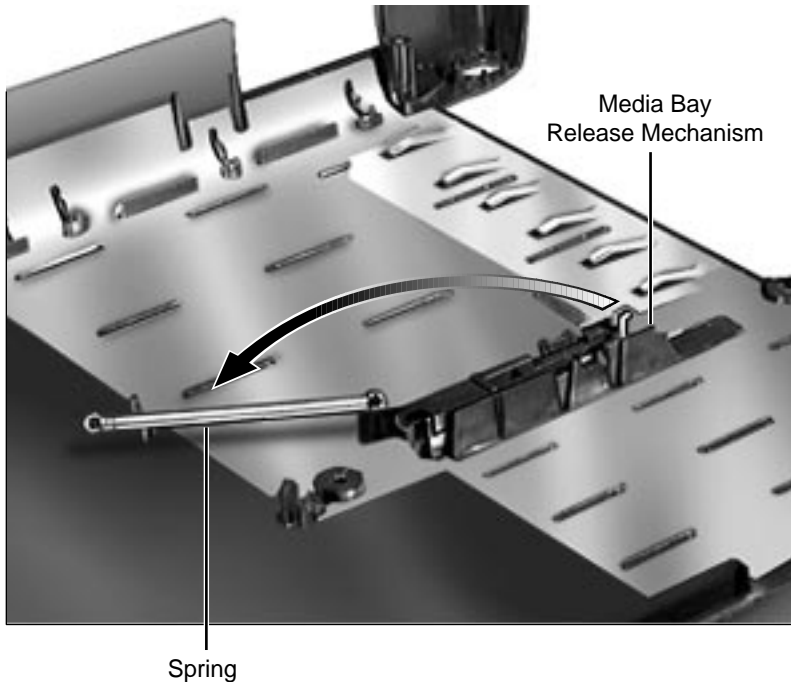
Media Bay Release Mechanism

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- RAM Card
- Clutch Covers
- Display Assembly
- Palm Rest
- Hard Drive
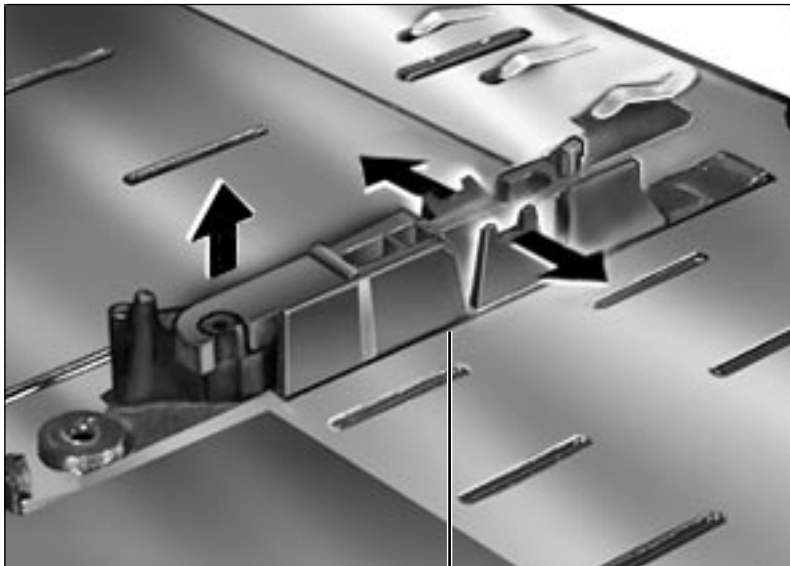- Power Supply Board (5300 Series only)
- Heat Sink
- Video Board (190
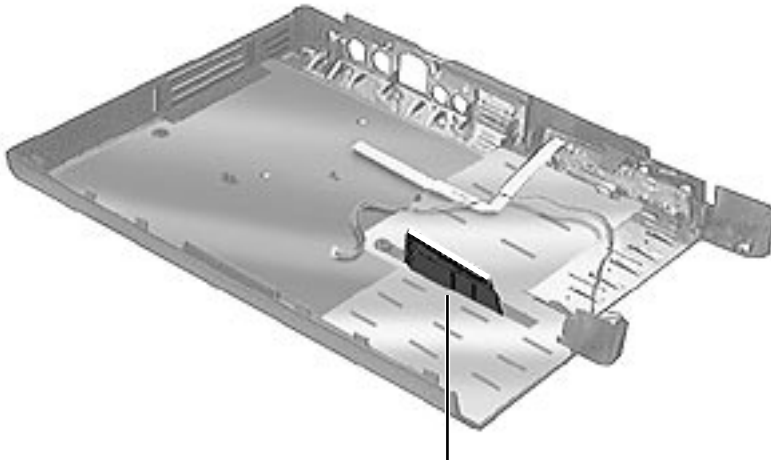
Series Option)
- Logic Board
- CPU Stiffener

1 Remove the spring from the top of the media bay release mechanism.

Media Bay
Release Mechanism

Spring

Media Bay Release Mechanism

2 Grasp the left side of the release mechanism and carefully lift up. The entire mechanism will pop out of its track.

Note: If the mechanism doesn't immediately pop out, pull back on the sides of the track to help free it (see arrows at left).

Replacement Note: Starting with the right side of the release mechanism, align the release mechanism with the track on the bottom case and push the mechanism back into the track until it snaps into place.
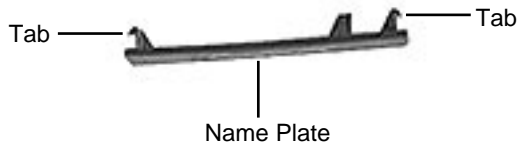
Display Housing

Display Housing

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- Clutch Covers
- Display Assembly

Tab

Tab

Name Plate

1 Using a plastic swizzle
   stick, remove the 2
   product name plates to
   expose the underlying
   screws.

Screw

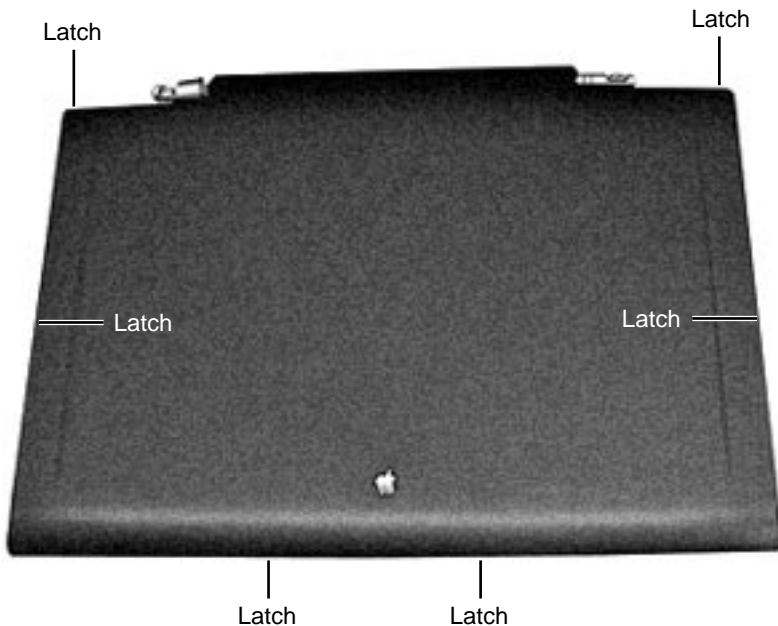Screw

Screw
(may be patchlock)

Note: As part of the PowerBook 190/5300 Repair Extension Program, the original bottom screws on some color displays were replaced with patchlock screws.

2 Remove the 4 screws holding the bezel to the back display housing.

Latch

Latch

Latch

Latch

Latch

Latch

3 Turn the display over, face down.

4 Starting at the bottom of the display housing, using a flat-blade screw-driver, **carefully** pry the plastics apart at the 6 inner latch locations.

Replacement Caution: Overtightening the lower 2 bezel screws can cause the bezel to crack. As a test, open and close the display assembly once the screws are installed. If the display creaks, loosen the bezel screws.
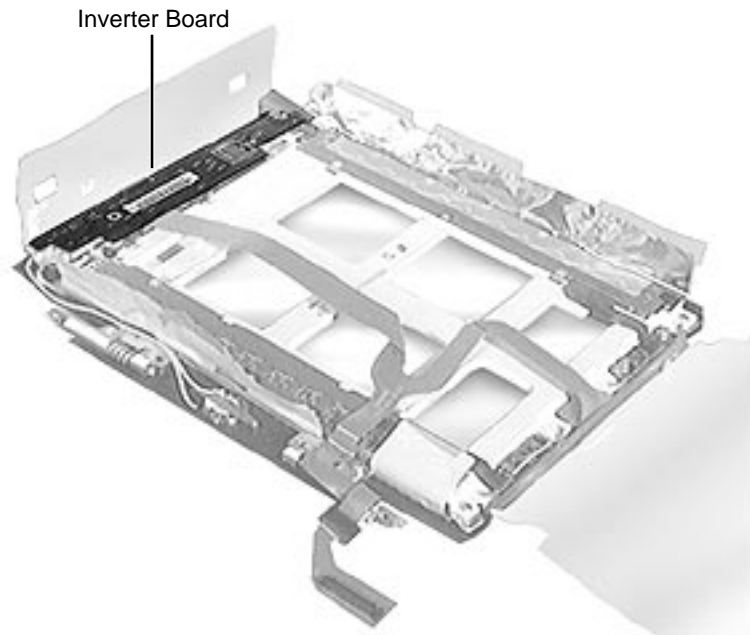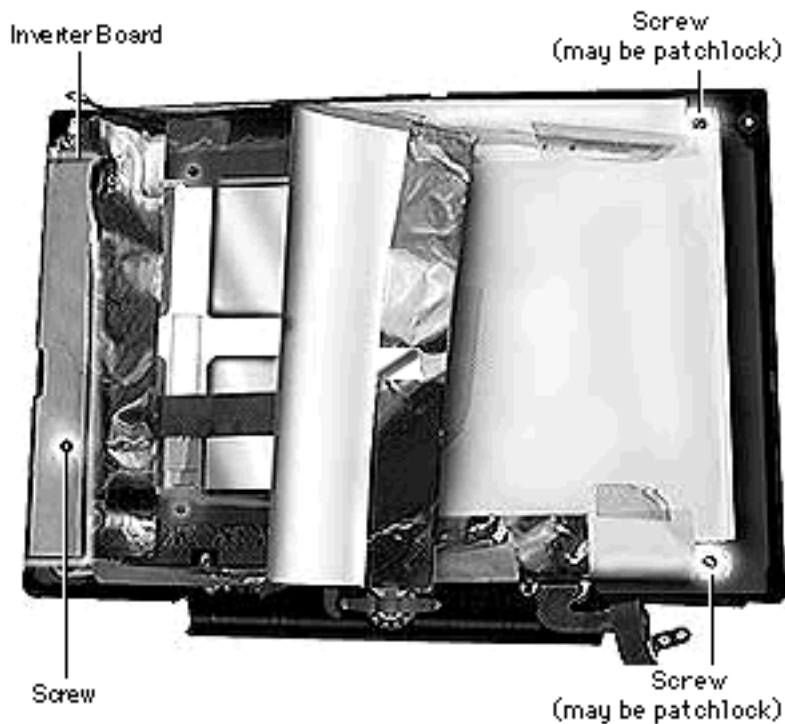
Inverter Board

Inverter Board

Before you begin, remove the following:

- Battery
- Floppy Drive
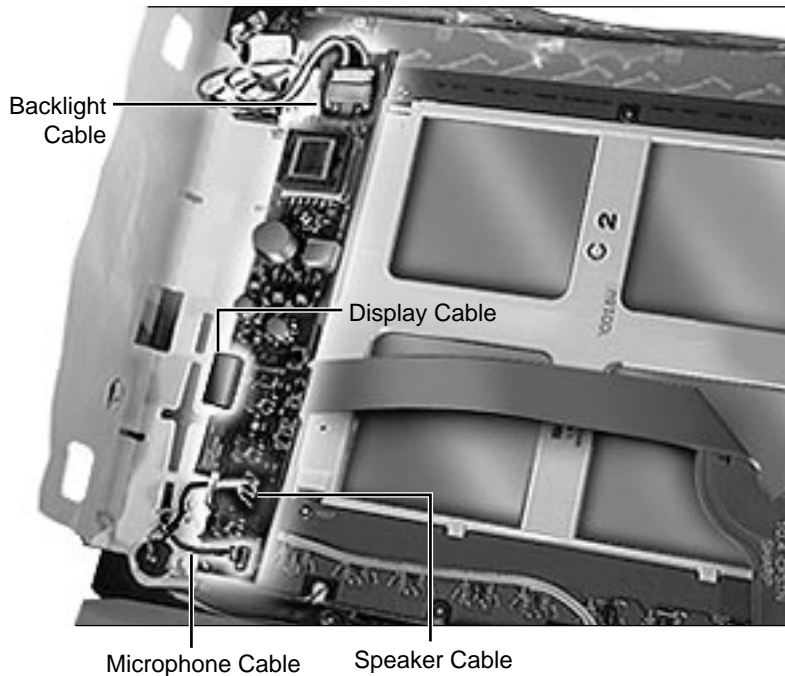- Keyboard
- Clutch Covers
- Display Assembly
- Display Housing

Note: As part of the PowerBook 190/5300 Repair Extension Program, the 2 rightmost screws on some displays were replaced with patchlock screws.

Inverter Board

Screw
(may be patchlock)

Screw

Screw
(may be patchlock)

1 Disconnect the 3 visible screws holding the display to the bezel.

2 Lay back the display EMI insulator and gently lift the inverter board—STOP! (4 cables are attached on three sides of the board.)
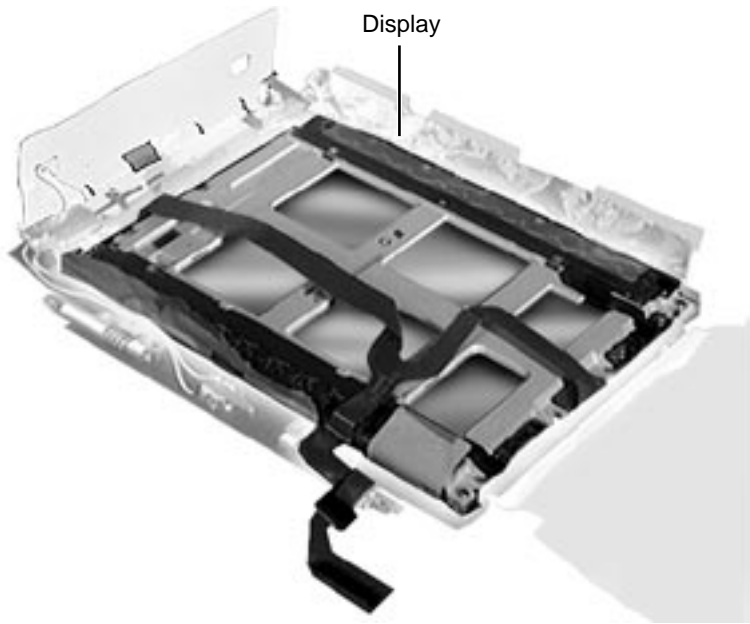
Backlight Cable

Display Cable

Microphone Cable   Speaker Cable

3 Carefully, rotate the inverter board so that it is lying face up near the middle of the display.

4 Disconnect the 4 cables from the inverter board.

Caution: Disconnect the 4 cables carefully. The connectors and cables on the inverter board are fragile, especially the microphone cable.
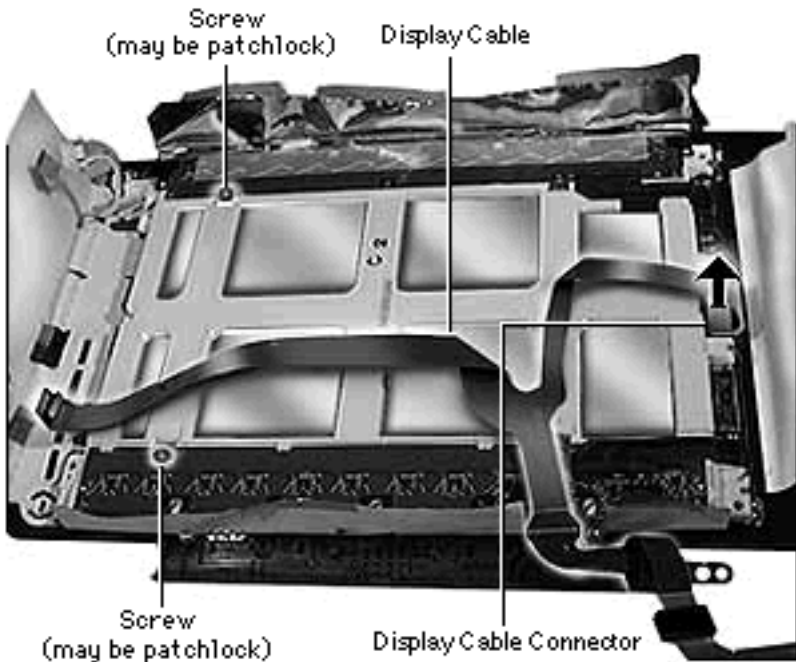
Display

Display

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- Clutch Covers
- Display Assembly
- Display Housing
- Inverter Board

Screw
(may be patchlock)

Display Cable

Display Cable Connector

Screw
(may be patchlock)

Note: As part of the PowerBook 190/500 Repair Extension Program, the original screws on some color displays were replaced with patchlock screws.

1 Remove the 2 remaining screws holding the display to the display bezel.

2 Disconnect the display cable from the display by gently pulling straight up on the reinforced backing of the cable.

3 Remove the display
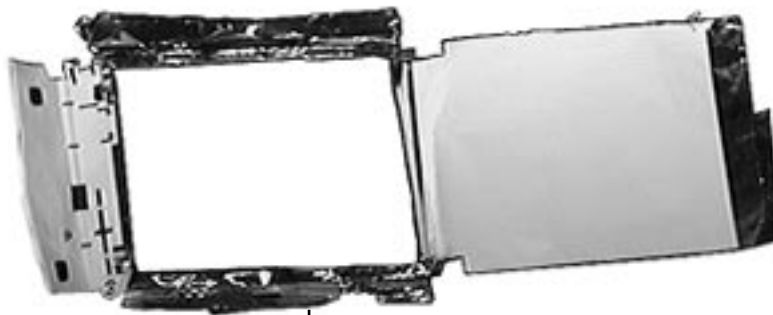
from the bezel.

4 Remove the display EMI insulator.

Replacement Notes:

- When installing the display cable over the left clutch, make sure that you route the cable over the pegs and **not** under the screw (see "Clutches" procedure in this Take Apart).
- Bend new display cables as shown in the picture on the previous page.
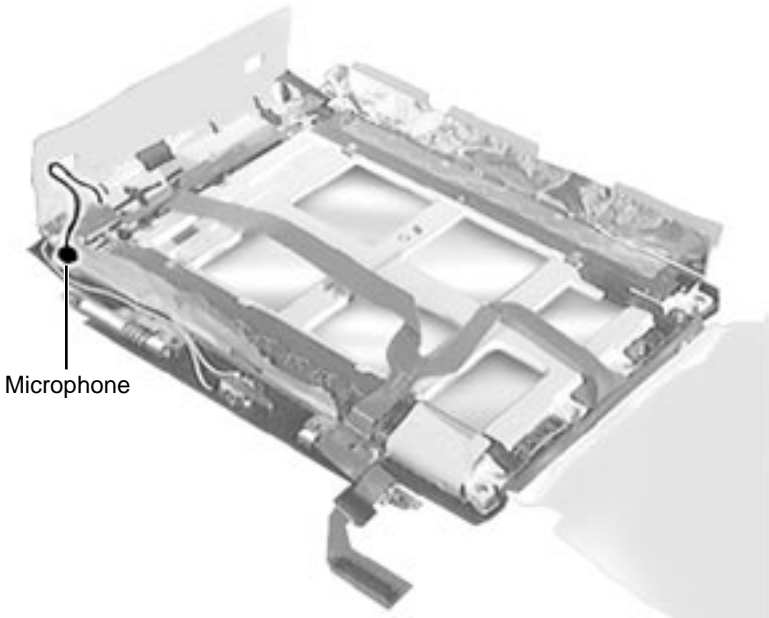
Display EMI Insulator

Microphone

Microphone

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- Clutch Covers
- Display Assembly
- Display Housing
- Inverter Board

Microphone

1 Remove the microphone from its housing in the bezel by pushing on any side of the microphone not encased in plastic.

Speaker

Speaker

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
- Clutch Covers
- Display Assembly
- Display Housing
- Inverter Board

Screw

Speaker Clip

Speaker

Screw

1 Using a #00 jeweler's screwdriver, remove one of the two small screws securing the speaker clip to the display bezel.
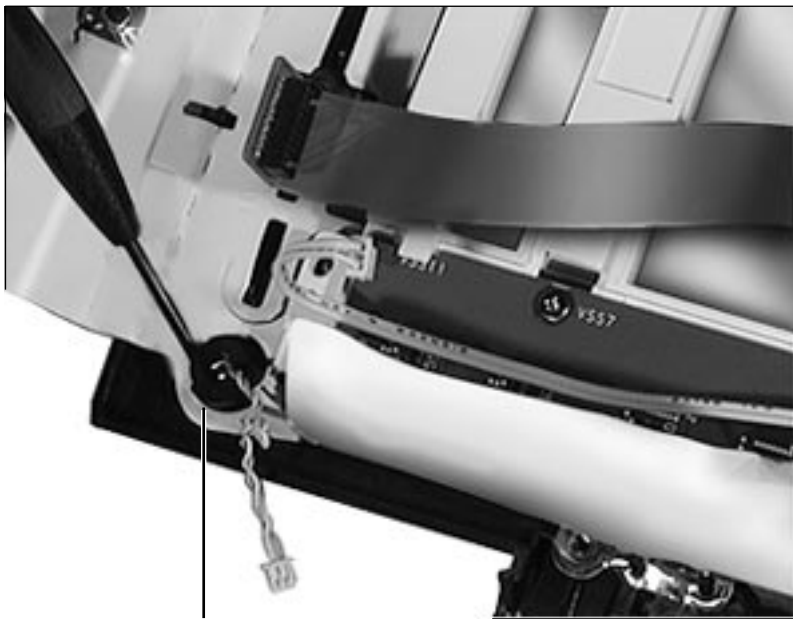
2 Slide the speaker out from under the clip.

Clutches

Before you begin, remove the following:

- Battery
- Floppy Drive
- Keyboard
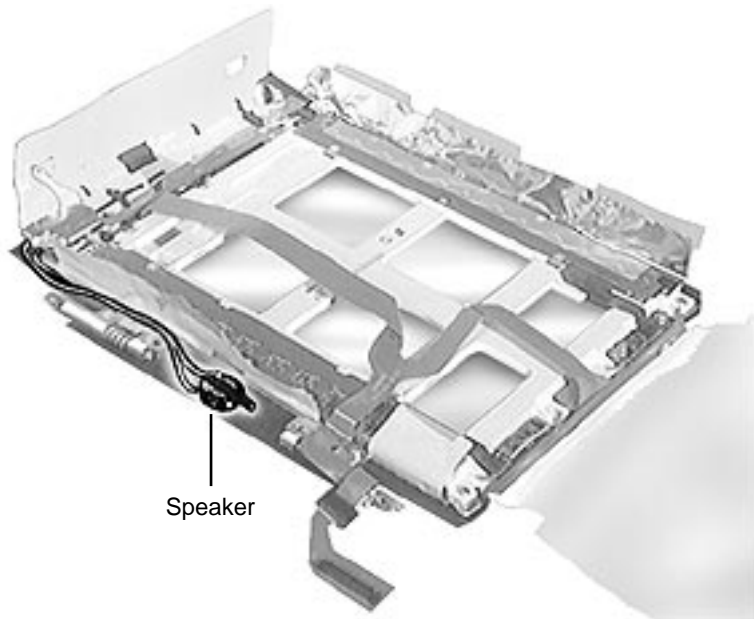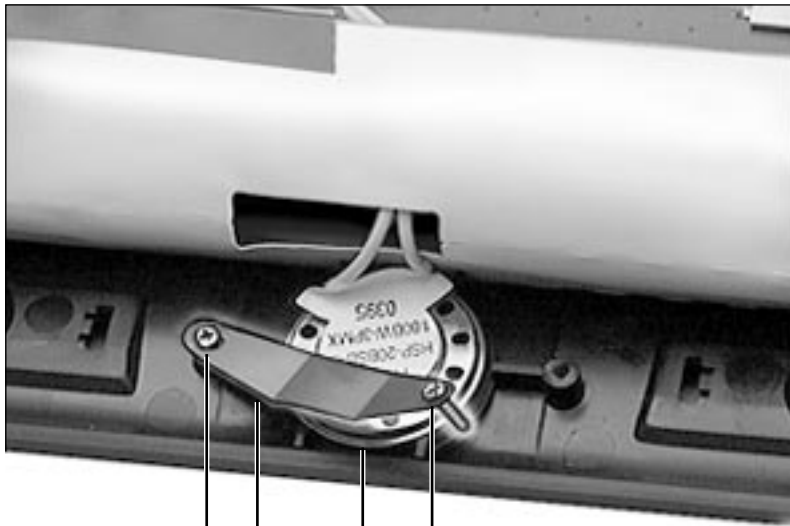- Clutch Covers
- Display Assembly
- Display Housing
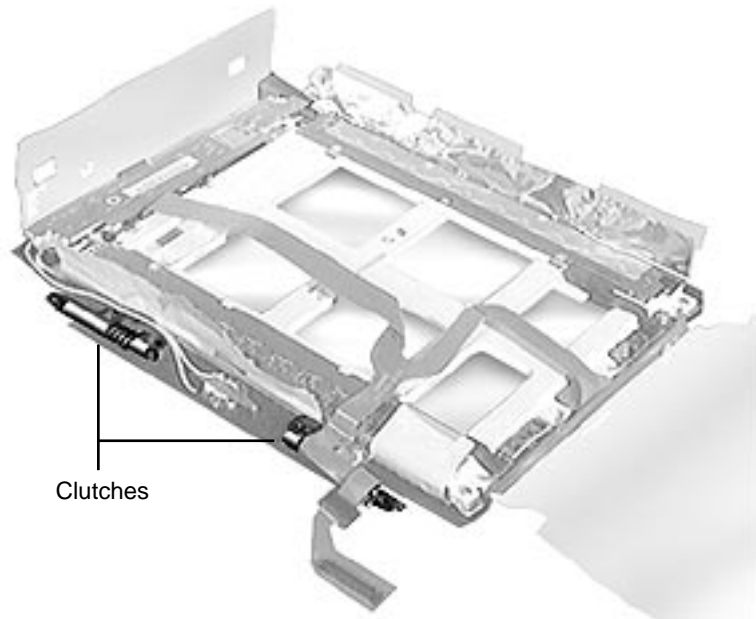
Clutches
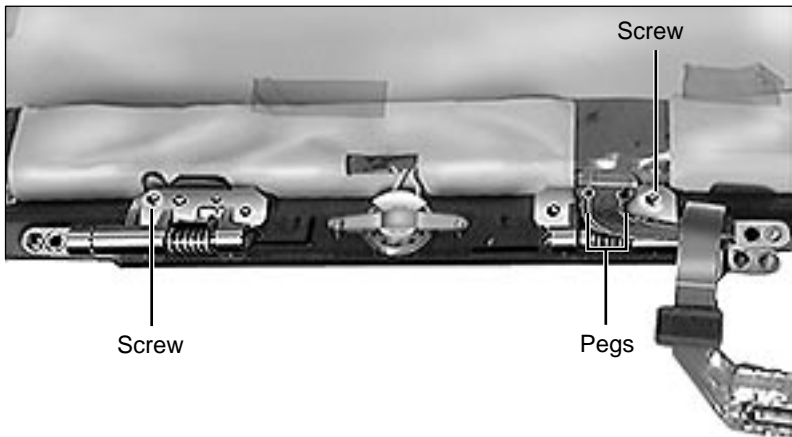
Note: As part of the PowerBook 190/5300 Repair Extension Program, the original screws on some clutches were replaced with patchlock screws.

1 Remove the screw securing the clutch to the display bezel.

Replacement Note: When installing the display cable over the left clutch, make sure that you route the cable over the pegs and **not** under the screw.

Floppy Drive

Floppy Drive Mechanism

Before you begin, eject the floppy drive from the media bay.

Screw

Floppy Drive Mechanism

Screw

Top Case

Screw

Screw
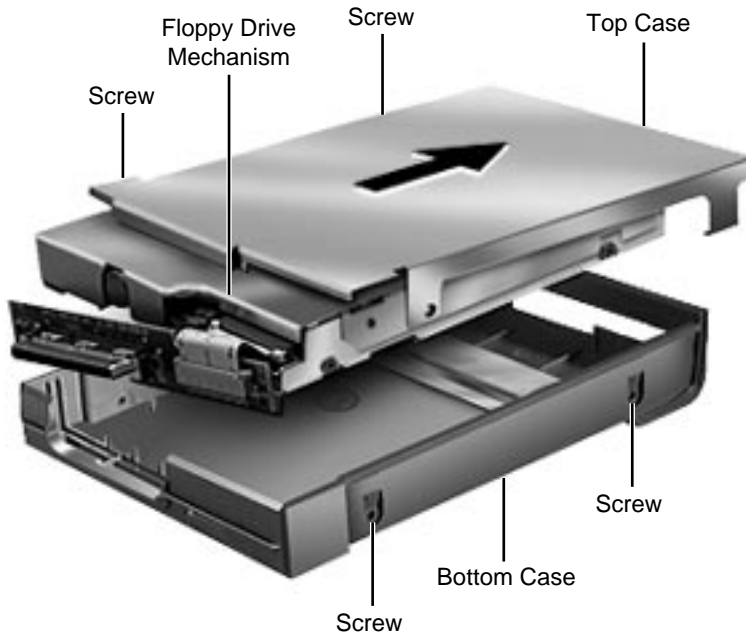
Bottom Case

Screw

1. Using a #6 torx driver, remove the 4 screws holding the floppy drive mechanism in its case.

2. Lift the floppy drive mechanism out of the bottom case.

3. Slide the top case away from the back connector, and the floppy drive mechanism will be free of the case.

Floppy Drive Cable
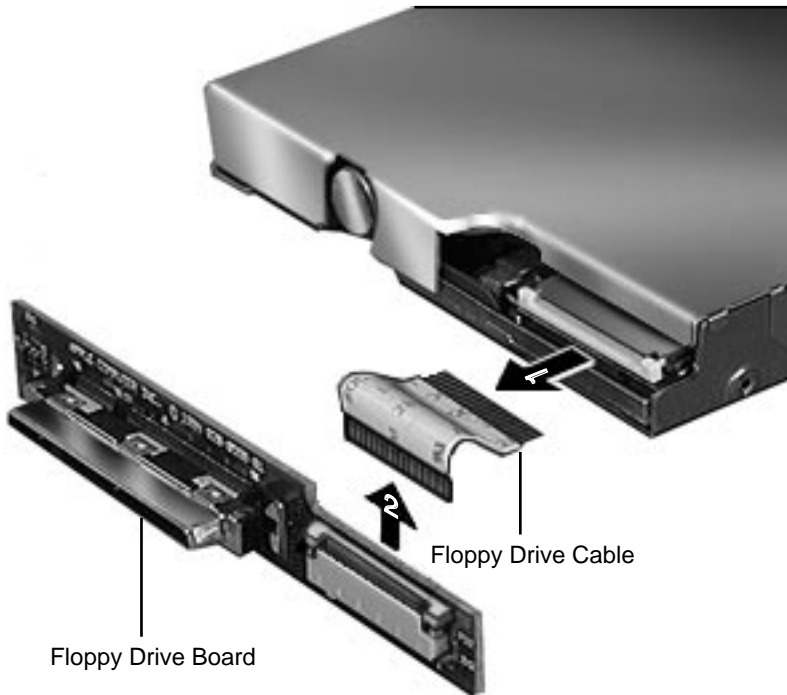
Floppy Drive Board

4	Disconnect the floppy drive cable and floppy drive board from the mechanism by carefully lifting up the ears of the connector with a flat-blade screwdriver.

5	Disconnect the floppy drive cable from the floppy drive board by releasing the cable from the connector on the board.

Upgrades

PowerBook 190/5300 Series

Upgrades for PowerBook 190 Series

The PowerBook 190 Series computers can achieve
PowerBook 5300 Series performance through upgrades.

Use the table below to decide which section of the Take Apart
chapter you will need to perform the desired upgrade.

Upgrade	Section of Take Apart Chapter Needed to Perform Upgrade
Video Board	Video Board
Infrared Board	Infrared Board
Logic Board	Logic Board
Display	Display

Additional Procedures

PowerBook 190 /5300

PowerBook 5300/190 Repair Extension Program

To obtain an overview of the REA program for the PowerBook 5300/190 and a list of its procedures, refer to the Ordering and Repairing section of the Programs tab. Use this path: Programs tab/Ordering & Repairing/Repair Extension Authorization (REA) Programs.

PRAM and Power Manager Reset

Caution: Resetting parameter RAM (PRAM) erases the contents of the RAM disk, if there is one. Resetting PRAM also restores the default settings in most control panels. After you reset PRAM, be sure to check any custom settings for the desktop pattern, memory, network, AppleTalk, trackpad, power conservation, and so forth.

Resetting PRAM

Reset/zap PRAM from the shutdown state. Note that resetting PRAM when the computer is shut down also resets the power manager.

Follow these steps to reset PRAM:

1   Unplug the AC adapter.

2   Power on the computer by pressing the Power key.

3   Immediately hold down the Option-Command-P-R keys.

4   Keep holding down these four keys until you have heard the startup chime at least one additional time after the initial startup chime.

(If the PowerBook emits multiple chimes when you are holding down the Option-Command-P-R keys, skip to Step 7.)

Note: Unlike other PowerBook models, these PowerBook computers often emit only a single startup chime. Then the screen goes dark/blank and the green sleep light stays on (it does not blink on and off as it does when the computer is in sleep mode).

5   Press the Reset button once and, after a brief pause, the PowerBook should start up.

Note: If the PowerBook powers off and the sleep display light stays a solid green with no blinking, press the Reset button again.

6 If the PowerBook does not power on from the Reset button, turn the PowerBook on by pressing the Power key.

7 After the computer has started up, select Shut Down from the Special menu.

8 Plug in the AC adapter. If the computer remains shut down, you will know that you have successfully reset the PRAM and power manager and your computer should now function normally. If, however, the computer powers on when you plug in the AC adapter, you need to reset the power manager.

Resetting the Power Manager

Follow these steps to reset the power manager:

1 Remove the battery.

2 Disconnect the AC adapter from the PowerBook and unplug it from the wall outlet.

3 Press and hold the Reset button for one minute.

4 Plug the AC adapter into the wall outlet.

5 Connect the AC adapter to the PowerBook. It should now behave normally when you choose Shut Down from the Special menu.

Battery

Negative
(black)
Probe

Positive
(red)
Probe

Battery Verification

The Control Strip on the PowerBook 190/5300 Series desktop indicates the battery charge and the rate at which the battery is being used. To determine the actual battery charge, use a voltmeter:

1 Set the voltmeter appropriately so it is able to measure 14 volts on the DC scale.

2 Hold the positive probe of the voltmeter to the positive battery terminal and the
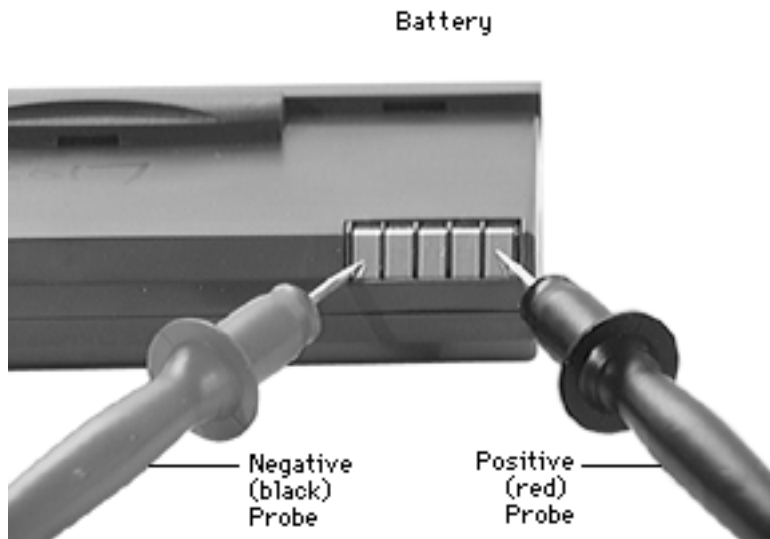
negative probe to the negative terminal.

3   A fully charged battery measures 14 volts; a PC fully
    discharged battery measures 7.8 volts.

Backup Battery Verification

The backup battery saves the PRAM and power management information on the logic board when the computer is shut down. To check that the backup battery is working, follow the procedures below.

1 Set the date and time.

2 Perform a Shut Down from the Apple Menu or Special menu.

3 Remove the main battery and disconnect the power adaptor for 10 minutes.

4 Connect the power adaptor, insert the battery, and power on the computer.

5 If the date and time were lost, the backup battery may be dead or discharged.

6   To recharge the backup battery, leave the PowerBook plugged in for 48 hours. It is ok to use it while it is charging.

7   If the backup battery appears dead or will not charge, replace the backup battery.
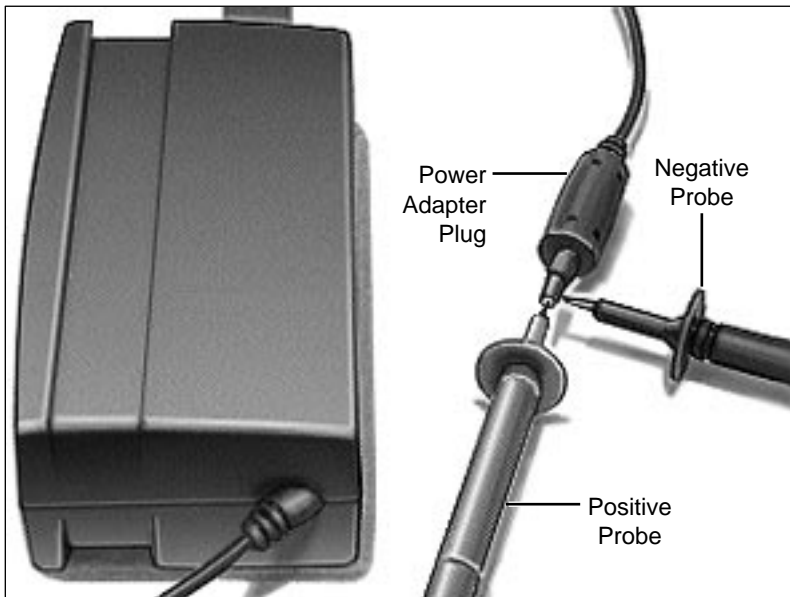
Power Adapter Verification

Follow the steps below to verify that a PowerBook 190/5300 Series power adapter is functioning correctly. **Do not** use these output voltages to verify any other PowerBook adapter.

1   Plug the AC adapter into a wall socket.

2   Set a voltmeter to the 10 volts DC scale.

3   Using the narrow test probes for the leads on

your voltmeter, touch the positive voltmeter probe to the inside of the adapter plug, and touch the negative voltmeter probe to the outside of the adapter plug. If the reading is not between 21.6–26.4 V, replace the adapter.

Exploded View

PowerBook 190/5300 Series

Exploded View

661-0935
Keyboard
Palm Rest

076-0503
Clutch Covers

922-1428
Trackpad Button

Display Back
(Bezel/Housing Kit)

661-0934 (5300)
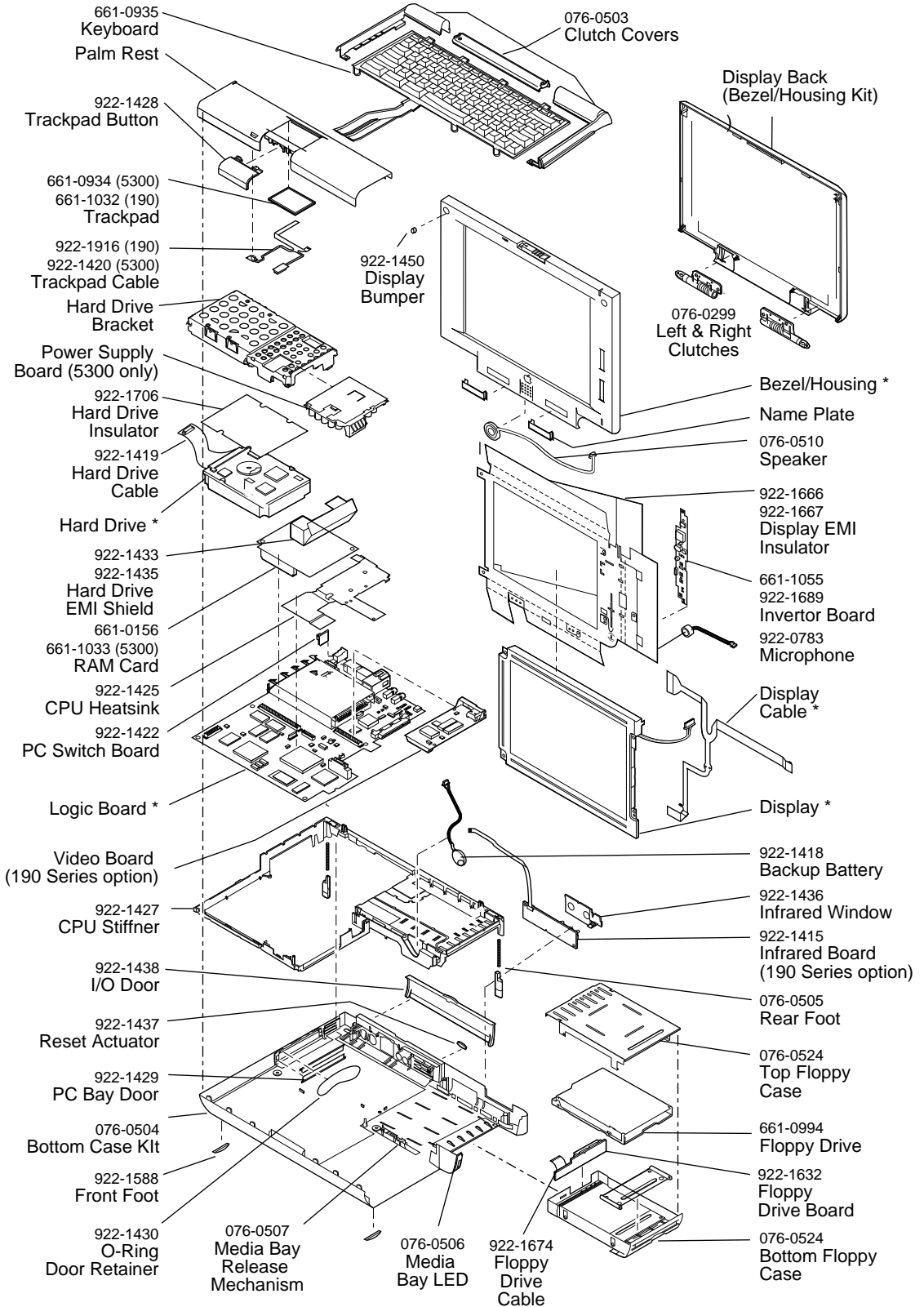661-1032 (190)
Trackpad

922-1916 (190)
922-1420 (5300)
Trackpad Cable

922-1450
Display
Bumper

Hard Drive
Bracket

Power Supply
Board (5300 only)

076-0299
Left & Right
Clutches

922-1706
Hard Drive
Insulator

Bezel/Housing *

Name Plate

076-0510
Speaker

922-1419
Hard Drive
Cable

Hard Drive *

922-1666
922-1667
Display EMI
Insulator

922-1433
922-1435
Hard Drive
EMI Shield

661-1055
922-1689
Invertor Board

661-0156
661-1033 (5300)
RAM Card

922-0783
Microphone

922-1425
CPU Heatsink

922-1422
PC Switch Board

Display
Cable *

Logic Board *

Video Board
(190 Series option)

Display *

922-1418
Backup Battery

922-1427
CPU Stiffner

922-1436
Infrared Window

922-1438
I/O Door

922-1415
Infrared Board
(190 Series option)

922-1437
Reset Actuator

076-0505
Rear Foot

922-1429
PC Bay Door

076-0524
Top Floppy
Case

076-0504
Bottom Case KIt

661-0994
Floppy Drive

922-1588
Front Foot

922-1632
Floppy
Drive Board

922-1430
O-Ring
Door Retainer

076-0507
Media Bay
Release
Mechanism

076-0506
Media
Bay LED

922-1674
Floppy
Drive
Cable

076-0524
Bottom Floppy
Case

* Multiple parts combinations. See parts lists for specific part configuration.

This is a generic representation of a product family. Configurations may vary.