PowerBook G4 (Gigabit Ethernet) - 550, 667 MHz

AppleCare

Updated : 04-06-2002

Take Apart

Troubleshooting

PowerBook G4 (Gigabit Ethernet)

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Symptom Charts

How to Use the Symptom Charts

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to the product.

The steps to solve a symptom are listed sequentially. You might not need to perform every step before the symptom is solved. Start with the first step, and then test for the symptom. If the symptom persists, replace any modules you removed, go to the next step, and test again. Continue down the list until the symptom is solved.

AirPort Card

AirPort Card not recognized	1 Use Software Update control panel or see the Apple Software Updates web page to make sure the latest version of AirPort software is installed. 2 Boot using Mac OS All extensions setting. 3 Reseat AirPort Card. 4 Remove and reinstall the AirPort software. 5 Replace with known-good AirPort Card. 6 Replace logic board.

Battery

Battery will not eject	1 Flip over the unit and release the battery latch by sliding the latch towards the PC Card button. 2 If the battery still will not eject, while holding the latch towards the PC Card button, use a small plastic flat-blade tool to pry the battery around the battery latch. 3 Verify proper latch operation, by exercising the latch. If it does not move smoothly or evenly, replace rib chassis assembly. 4 If the latch does exercise correctly, verify that the customer is not installing the battery with excessive force.

DVD-ROM Drive

DVD disc icon does not show up on desktop, or a dialog box appears to initialize disc	1 Use Software Update control panel to update firmware. 2 Try cleaning the disc. If it is dirty or scratched, it may not mount. 3 Try a different disc.

4 Select “Mac OS All” in the Extensions Manager control panel and restart.
5 Replace optical drive cable.
6 Replace optical drive.

Error Beeps

The computer automatically performs a power-on self test when it is turned on after being fully shut down (not a restart). This section describes what to do if beeps are heard during the startup.

Note: The PowerBook G4 has two memory expansion slots and accepts 1.5-inch (or shorter) PC-100 compliant, SO-DIMM memory cards; there is no RAM on the logic board itself. Refer to Customer-Installable-Parts Memory Replacement instructions for removal and installation.

Computer beeps once at startup

1 One beep means that no RAM is detected.

Note: There is no RAM on the logic board itself, so the computer will beep if no memory is installed in at least one of the RAM slots.

2 Put the original RAM that came with the computer back in, or put in known-good and compatible RAM and restart.
- If symptom does NOT repeat, replace RAM card/s.
- If symptom repeats, replace logic board.

Computer beeps twice at startup

1 Two beeps means that EDO memory is installed in the RAM expansion slot. The PowerBook does not accept EDO memory.
2 Replace RAM card/s with known-good and compatible RAM and restart.
- If symptom repeats, replace logic board.

Computer beeps three times at startup

1 Three beeps means that no RAM banks passed memory testing.
2 If a RAM card is installed in the upper expansion slot (if not, skip to next step), remove it and restart.
- If symptom does NOT repeat, replace RAM card.
- If symptom repeats, replace RAM in lower RAM slot with known-good and compatible RAM card and restart. If symptom repeats, replace logic board.

3 If a RAM card is NOT installed in the upper expansion slot, replace RAM in lower RAM slot with known-good and compatible RAM card and restart.
- If symptom repeats, replace logic board.

Computer beeps four times at startup	1 Four beeps indicates a bad checksum for the remainder of the boot ROM. The ROM (which is located on the logic board) is bad. 2 Replace RAM card/s with known-good and compatible RAM and restart. • If symptom repeats, replace logic board. Related articles: 58442: Power On Self-Test Beep Definition - Part 2 95132: PowerBook G4: Installing or Replacing Memory

Hard Drive

Hard drive will not initialize	1 Boot from PowerBook G4 Software Install CD and see if the hard drive mounts on the desktop. 2 Launch Drive Setup and update hard drive driver. 3 If no hard drive is found in Drive Setup, verify the hard drive cable connections. 4 Replace hard drive cable. 5 Replace hard drive. **Important:** If the computer is under warranty and data recovery is required, refer to Article 31077: Hard Drive Data Recovery & Warranty Implications, for important information.
The internal hard drive does not spin	1 Disconnect any connected peripherals. 2 Try known-good power outlet. 3 Try known-good power adapter and power cord. 4 Boot from a Mac OS system CD. 5 Verify Drive Setup does not recognize the hard drive. 6 Verify cable connections.

Modem

No modem dial tone	1 Verify known-good analog (not digital) telephone line. 2 Verify known-good RJ11 telephone cable. 3 Verify RJ11 cable is not plugged into Ethernet port. 4 Inspect RJ11 connector and modem port for pin damage. 5 Verify RJ11 telephone cable is firmly installed in the modem port. 6 If using Apple Remote Access, select Ignore Dial Tone in the Modem control panel. If the modem connects with this settings selected, try another phone line. If using a terminal or communications program, enter atx1 to disable tone detection. To reset the modem back to the factory settings, enter atz.

7 Verify RJ11 modem cable is plugged into modem correctly.
8 Replace modem.

PC Card

PC Card will not insert into the PC Card slot

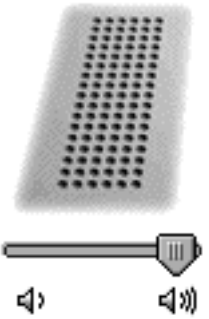
1 Make sure the PC Card eject button is in, before attempting to insert a PC Card.

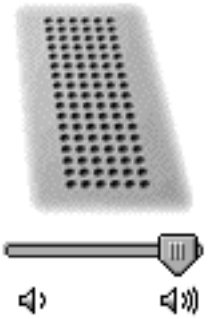
2 Make sure the PC Card is right side up (cards are keyed and cannot be inserted upside down).
3 Verify the PC Card is not warped or damaged in any way; if so replace the card.
4 Try a different PC Card.
5 Carefully raise the PC Card slot cover and check for a foreign object inside the slot.
6 Check to see if the AirPort Card antenna wire is protruding up into the PC Card slot opening from below. If so, open the computer to gain access to the AirPort Card location and reposition the antenna cable so that it does not sag down into the PC Card slot area (see AirPort Card Installation Instructions).
7 If the slot cover is preventing the card from being inserted, replace the top case.
8 Replace Card Cage, PCMCIA assembly.

Sound

No sound heard and the Speakers section of the Sound control panel indicates that an external device is plugged in (to the headphone jack or USB ports)

1 If there is nothing plugged into the headphone jack or USB ports, the picture in the Speakers section of the Sound control panel should be of the internal speakers, as shown here.





2 If not, and if nothing is plugged in, try plugging in headphones or external speakers. Restart the computer. Remove the device.
3 Reset PRAM (Press the power button, then hold down the Option-Command-P-R keys until you hear the startup chime at least one additional time after the initial startup chime).
4 Warning: Resetting the PRAM will permanently remove a RAM disk, if present, and all of its contents. You will also need to reset the date and time (using the Date & Time control panel).
5 Replace logic board.

Video

No display, or dim display, but computer appears to operate correctly

1 Remove any connected peripherals.
2 Try known-good power outlet, power adapter and power cord.
3 Press the F2 key (with the fn key pressed and not pressed) to increase the screen brightness settings.
4 Reboot the computer—hold down the Control and Command keys and press the Power button to restart the computer. Or, press and hold the Power button for 5 to 10 seconds to shut down the computer, then press the Power button to restart.
5 Verify inverter cable and LVDS cable connections are seated properly and that the cables are not damaged (refer display assembly replacement instructions).
6 Replace inverter board.
7 Replace display assembly.
8 Replace logic board.

Computer appears to work, but no video on external device connected to the TV out port (S-video out port)	1 The device must be connected to the S-video port while the PowerBook is sleeping or off for the device to be recognized. 2 If running Mac OS X, verify that this issue is also in Mac OS 9. 3 Verify monitor that is used in testing is known-good and is supported by this computer. 4 Try different cable(s). 5 Replace logic board.
No video on an external device connected to the External monitor port	1 In the Resolution control strip, see if the device is being recognized. If so select resolution. 2 If running Mac OS X, verify that this issue is also in Mac OS 9. 3 Verify monitor that is used in testing is known-good and is supported by this computer. 4 Try another VGA monitor cable. 5 Restart the computer and text again. 6 Replace logic board.

Misc. Symptoms

Latch not working	**Note:** When the display is being closed, a hook in the top of the display housing should be magnetically pulled down to the latch. When the latch button is pushed, the hook should release and retract into the display housing. 1 Verify hook operation by exercising the latch mechanism. 2 If the hook does not operate properly, replace the display assembly. 3 If the latch or latch button does not operate properly, replace the top case assembly.
The Date and Time settings reset all the time	**Note:** Resetting the power manager or PRAM resets the date and time. 1 Verify that the reset button is not stuck. 2 Do a backup battery test: • Set the date and time. • Perform a Shut Down from the Apple menu or Special menu. • Remove the main battery and disconnect the power adapter for 10 minutes. • Connect the power adapter, insert the battery, and power on the computer. • If the date and time were lost the backup battery may be dead or discharged.

	• Remove the main battery from the unit and leave the PowerBook plugged in for at least 5 hours. **Note:** If a discharged main battery is installed in the computer, recharging the backup battery may take up to 48 hours to completely charge. It is okay to use it while it is charging. • If the date and time still reset, replace the backup battery. 3 If not the backup battery, replace PMU Card. **Note:** For main and backup battery part numbers, refer to article 11751: Macintosh Family: Batteries and Part Numbers.
AirPort Card installed and received a -3278 error	1 Use Software Update control panel or see the Apple Software Updates web page to make sure the latest version of AirPort software is installed. 2 Boot using Mac OS All extensions setting. 3 Reseat AirPort Card. 4 Remove and reinstall the AirPort software. 5 Replace with known-good AirPort Card. 6 Replace logic board.
The microphone is not working	1 Check the Sound control panel and verify that the selection for input is the built-in microphone. 2 Check the signal level and level meter and adjust the gain. 3 Remove Sound Preferences from the Preferences folder and restart. 4 Reset PRAM (Press the power button, then hold down the Option-Command-P-R keys until you hear the startup chime at least one additional time after the initial startup chime). 5 If no sound as well as microphone is not working, verify cable connections. 6 Replace top case.
During startup boot sequence and before reaching Finder, the following dialog box appears: “The built-in memory test has detected an error”	1 If a RAM card is installed in the upper expansion slot (if not, skip to next step), remove it and restart. Refer to Customer-Installable-Parts Memory Replacement instructions. • If symptom does NOT repeat, replace RAM card. • If symptom repeats, replace RAM in lower RAM slot with known-good SDRAM SO-DIMM RAM card and restart. - If symptom repeats, replace logic board. 2 If a RAM card is NOT installed in the upper expansion slot, replace RAM in lower RAM slot with known-good SDRAM SO-DIMM RAM card and restart. Refer to Customer-Installable-Parts Memory Replacement instructions. • If symptom repeats, replace logic board.

LCD anomalies → **Go to : Pixel anomalies**

A certain number of pixel anomalies are inherent in liquid crystal display technology and vary by many factors, including type of technology.

Many anomalies observed by customers are considered normal or are the result of lint or dust particles resting on the front of the display. It is important to understand what type of anomaly a customer sees in order to determine whether further analysis is necessary. In many cases all that may be necessary is a gentle cleaning of the display face using the provided cleaning cloth.

IMPORTANT : **Providing a replacement display to satisfy a customer may not be effective because the replacement display may have more or different types of visible anomalies than the original display, and still be within specifications**.

Knowledge Base Article 22194 can be indicated to customers as public explanation from Apple side.

Industry standards used by all manufacturers are specifying a certain number of minor defects, as generally accepted or creating an acceptable situation. This means that the level of quality in the industry includes some level of pixel-defect.

The following sentences can be used with customers' complains

Copied from SONY documentation (Sony VAIO web Support)

- High precision technology is used to manufacture these LCDs to maintain a high standard of operation. However in all LCD panels there may be a small number of pixels that do not change color. This is a normal occurrence for all LCD displays from all manufacturers and should not be noticeable or objectionable under normal operation.
- Sometimes the pixels are noticeable only during booting or on an all white or all black screen.
- The LCD screen is manufactured using high precision technology. However, there may be some tiny black spots and/or bright spots (red, blue or green in colour) that constantly appear on the LCD screen. These spots occur normally in the manufacturing process and do not effect the recorded picture in any way. Effective number of pixels is 99.99% or more.

Copied from COMPAQ documentation (Compaq FAQ on Compaq's web Support)

- Note that if you have the smallest number of dead pixels, your replacement display panel may have more, use your judgement before deciding that you have a defective panel.

Copied from DELL documentation (Dell web : http://support.euro.dell.com/fr/fr/kb/document.asp?DN=FA1018431)

- The liquid crystal display (LCD) screens built into portable computers and flat-panel monitors are manufactured using rigid quality control standards. These manufacturing standards ensure that the LCD screen is clear and viewable.
- During the manufacturing process, it is not uncommon for one or more pixels to be fixed in an unchanging state. The visible result is a fixed pixel that appears as an extremely tiny discolored spot, either a dark spot or a bright spot.

Copied from TOSHIBA documentation (Toshiba web Support)

- Due to current manufacturing methods and the high number of transistors in the TFT Color LCD, a few nonconforming pixels may be visible. There are over a million transistors in a typical TFT screen. When any one of those transistors is not lighting as designed, the pixel is called nonconforming. Nonconforming pixels typically appear as tiny colored dots (red, blue, green, etc.) or as black dots in contrast to the projected background color of the LCD module.
- Quality inspections, performed by the LCD module manufacturers, include limits for nonconforming pixels. Nonconforming pixel limits (10 to 18 pixels) are set solely by the LCD module manufacturers and not by specific computer manufacturers. These limits are defined by the manufacturing processes and are specific to screen characteristics which include :
  - * physical size of module.
  - * display type (SVGA, XGA, VGA).
  - * screen resolutions available.
- LCD Module manufacturers continually strive to upgrade processes used in manufacturing as well as the Quality Specifications which include the limits on nonconforming pixels allowed for LCD modules for use in portable computer displays.

(**End**

Pixel anomalies → **Go to : LCD anomalies**

When speaking with Apple Technical Support, it may be necessary to use a pocket microscope, jeweler's loupe, or other magnifying device to properly identify and count each subpixel anomaly.

Displaying all white, red, green, and blue screens makes locating and viewing pixel anomalies easier.

A subpixel that is always on should be referred to as a bright subpixel anomaly. A subpixel that is always off should be referred to as a dark subpixel anomaly.

When necessary, portable and display products may be dispatched for evaluation by the Apple Repair Center.

(**End**

English

Keyboard

AppleCare

Replacement Instructions

Follow the instructions in this sheet carefully. Failure to follow these instructions could damage your equipment and void its warranty.

Note : Written and video instructions covering customer-installable parts are available at http://www.info.apple.com/install-parts/.

Warning : During this procedure, keep small parts away from children.

Tools Required

The only tool required for this procedure is a jeweler's flat-blade screwdriver (if keyboard is locked).

Removing the Installed Keyboard

Warning : Always shut down your computer before opening it to avoid damaging its internal components or causing injury. After you shut down the computer, the internal components can be very hot. Let the computer cool down before continuing.

1. Place your computer on a clean, flat surface.

2. Shut down your computer and wait thirty minutes before continuing.

3. Disconnect the power cord and any other cables connected to the computer.

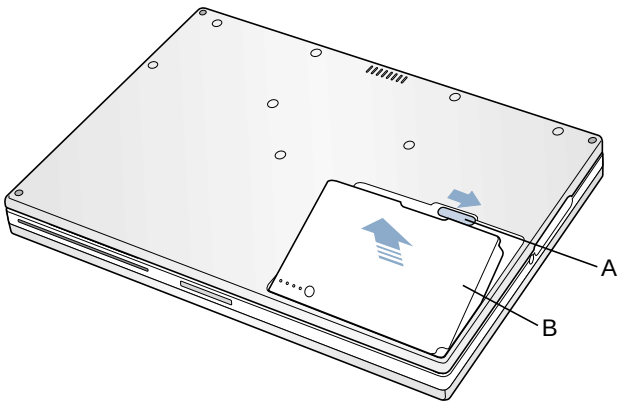
4. Close the computer and turn it over.

5. Slide the battery latch (**Figure 1A**) to the right to remove the battery (**Figure 1B**).

   Removing the battery will prevent you from accidentally turning on the computer.

   Warning : Removing the battery before shutting down your computer may result in data loss.

Figure 1



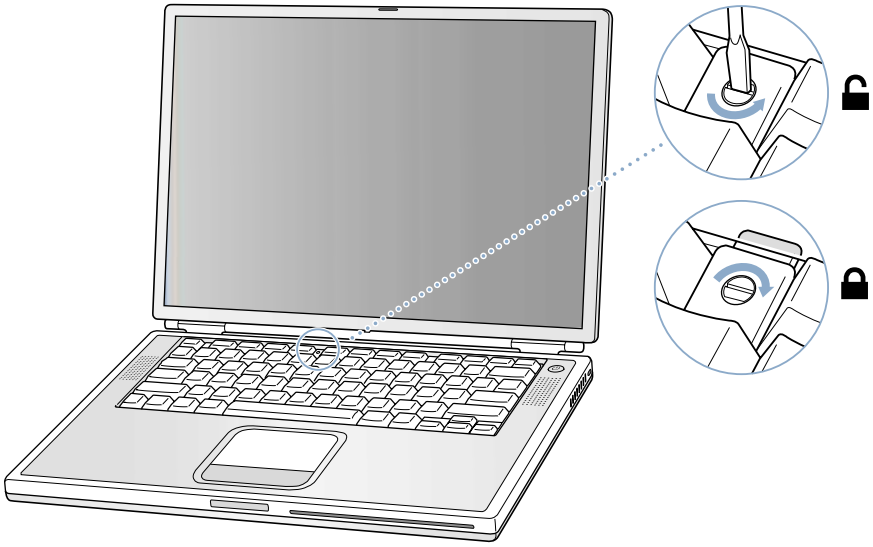
6. Turn over the computer.

7. Raise the display so you can access the keyboard.

8. Make sure the keyboard locking screw, located in the small plastic tab to the left of the Num Lock key (**Figure 2**), is not in the locked position. Your PowerBook comes with the keyboard unlocked, so unless you or someone else locked the keyboard, you can skip this step.

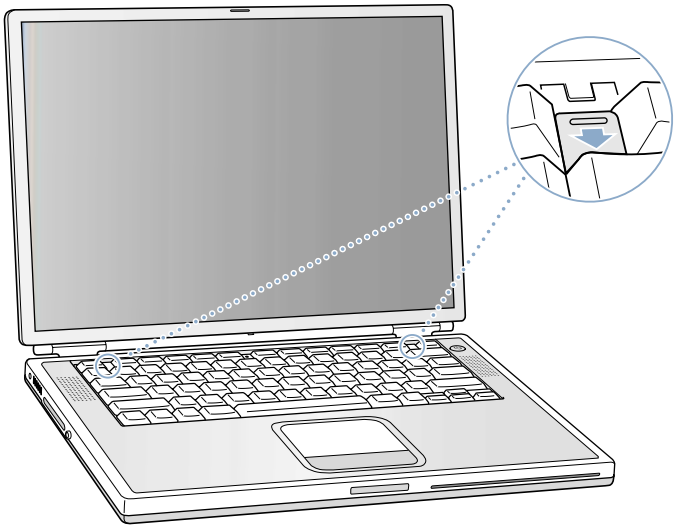
To unlock the keyboard, turn the screw 1/2 turn.

Figure 2



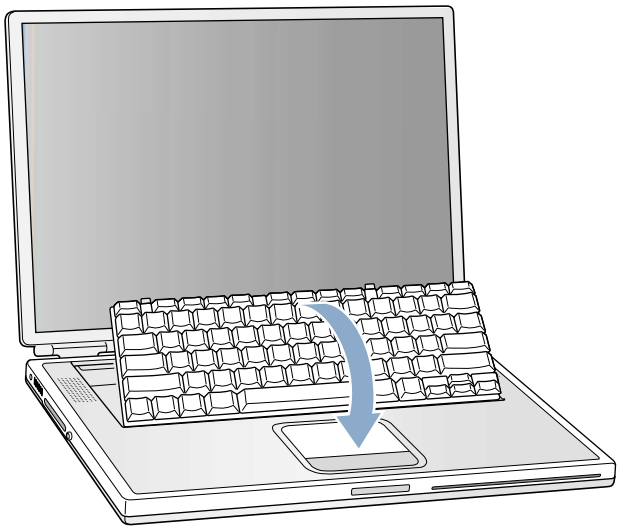
9. Release the keyboard by pulling down on the keyboard release tabs (located to the left of the F1 and F12 keys) (**Figure 3**), then lift the top portion of the keyboard up slightly, and toward the display.

Figure 3



10. Flip the keyboard over and lay it on the palm rests and trackpad (**Figure 4**).

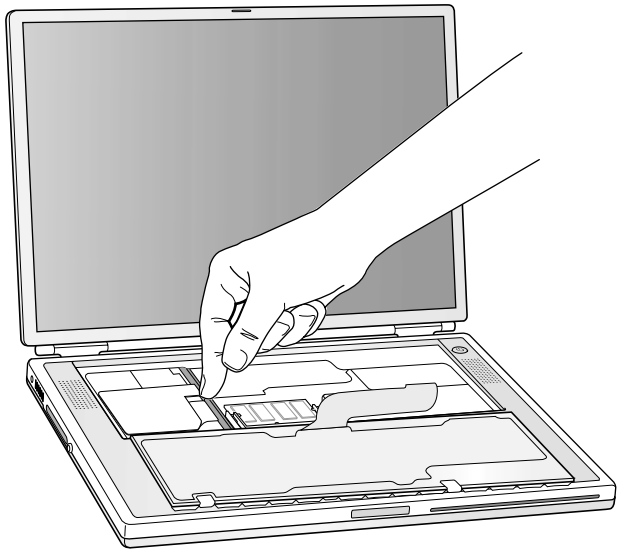
Figure 4



11. Touch the computer's inside framework (a dull gray conductive composite material) to discharge any static electricity, as shown (**Figure 5**).

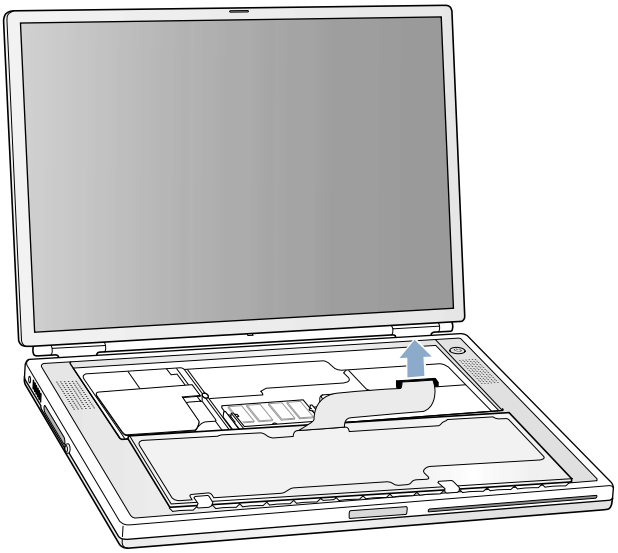
Important : To avoid electrostatic discharge damage, always ground yourself by touching the computer's framework before you touch any parts or install any components inside the computer. To avoid static electricity building back up in your body, do not walk around the room until you have completed your installation and closed the computer.

Figure 5



12. Locate the keyboard cable connector (**Figure 6**).

Figure 6



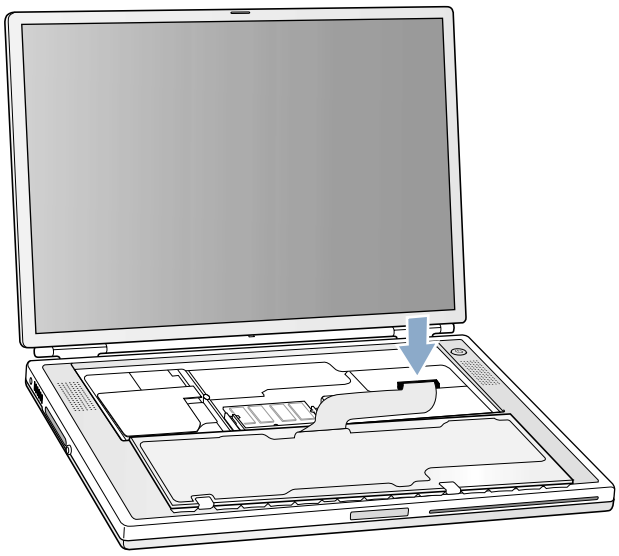
13. Pull up on the connector, from side to side if needed, to disconnect it from the computer.

14. Set the keyboard aside.

Installing the Replacement Keyboard

1. Lay the replacement keyboard in the correct orientation over the keyboard opening, then flip it toward you and lay it face down on the palm rests and trackpad to expose its connector cable (**Figure 7**).

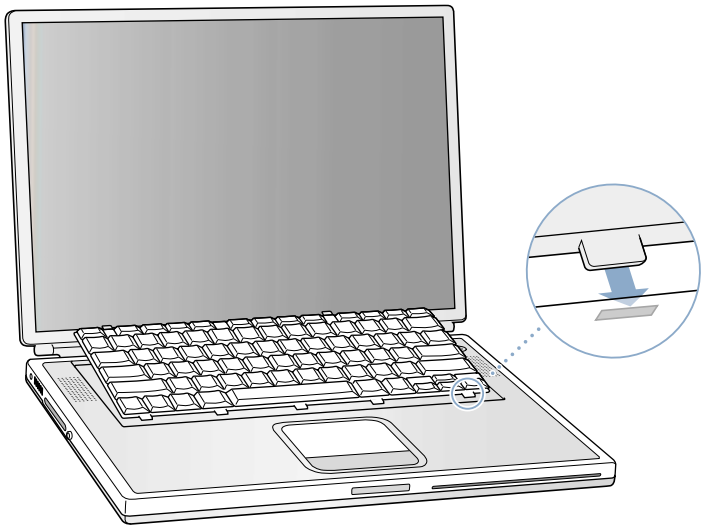
Figure 7



2. Firmly insert the keyboard cable connector into its connector on the computer.
3. Flip the keyboard back toward the keyboard opening in the case.
4. Hold the keyboard at an angle above the keyboard opening, and insert the tabs on the bottom edge of the keyboard into the slots below the edge of the opening (**Figure 8**).

   Important : Make sure that all the tabs are seated and that the keyboard rests flush against the edge of the opening.

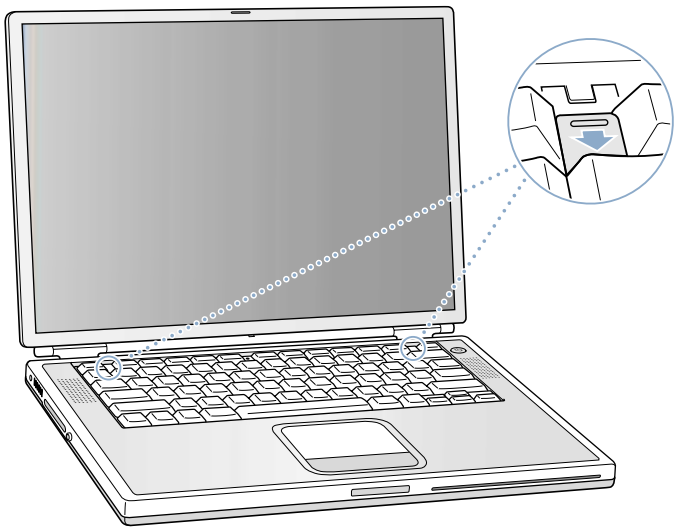
Figure 8



5. Lay the keyboard flat into the keyboard opening.

6. Pull down on the keyboard release tabs and then press down on the top portion of the keyboard (**Figure 9**).

Figure 9



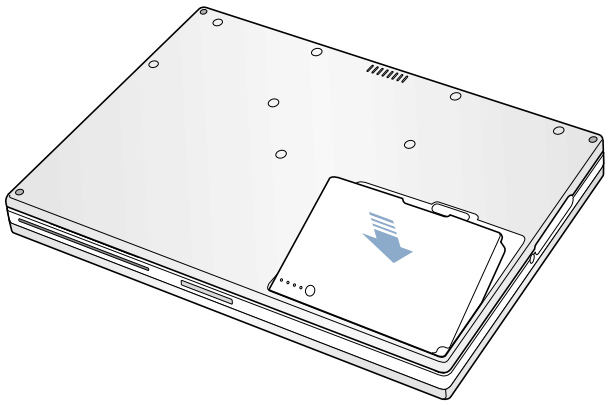
7. Release the tabs to secure the keyboard in place.

8. Close the display and turn the PowerBook over.

9. Replace the battery into the battery compartment (**Figure 10**).

Important : Make sure that the battery locks securely into place and that the battery latch is slid all the way into the locked position.

Figure 10



10. Reconnect the power cord and any other cables that were connected, and restart your computer.

Warning : Never turn on your computer unless all of its internal and external parts are in place and it is closed. Operating the computer when it is open or missing parts can damage your computer or cause injury.

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Apple Computer, Inc.
1 Infinite Loop
Cupertino, CA 95014-2084
USA
+ 1 408 996 1010
http://www.apple.com

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English

Memory

AppleCare

Replacement Instructions
Follow the instructions in this sheet carefully. Failure to follow these instructions could damage your equipment and void its warranty.

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Warning : During this procedure, keep small parts away from children.

Tools Required
The only tool required for this procedure is a jeweler's flat-blade screwdriver (if keyboard is locked).

Opening the Computer

Warning : Always shut down your computer before opening it to avoid damaging its internal components or causing injury. After you shut down the computer, the internal components can be very hot. Let the computer cool down before continuing.

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2. Shut down your computer and wait thirty minutes before continuing.

3. Disconnect the power cord and any other cables connected to the computer.

4. Close the computer and turn it over.

5. Slide the battery latch (**Figure 1A**) to the right to remove the battery (**Figure 1B**).

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   Warning : Removing the battery before shutting down your computer may result in data loss.

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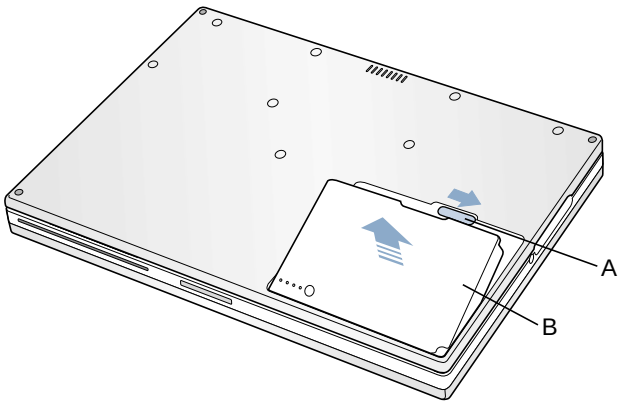

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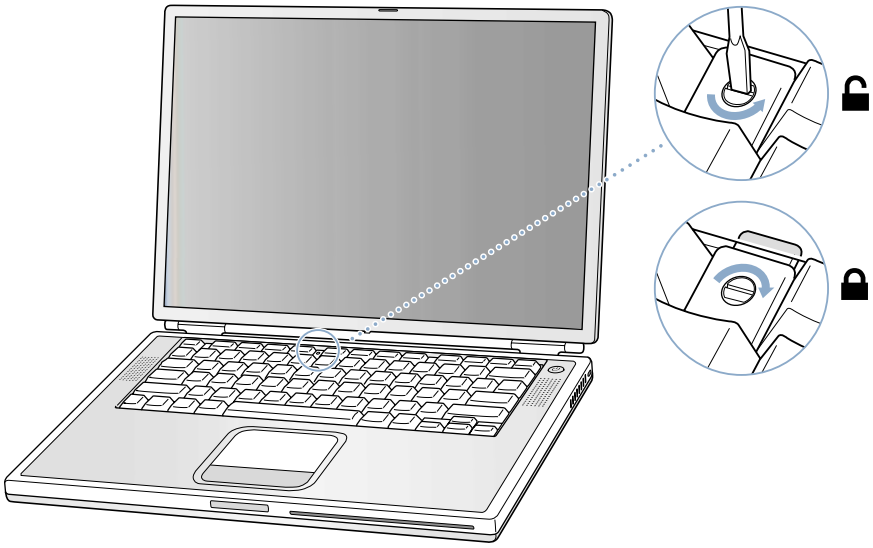
8. Make sure the keyboard locking screw, located in the small plastic tab to the left of the Num Lock key (**Figure 2**), is not in the locked position. Your PowerBook comes with the keyboard unlocked, so unless you or someone else locked the keyboard, you can skip this step.

To unlock the keyboard, turn the screw 1/2 turn.

Figure 2



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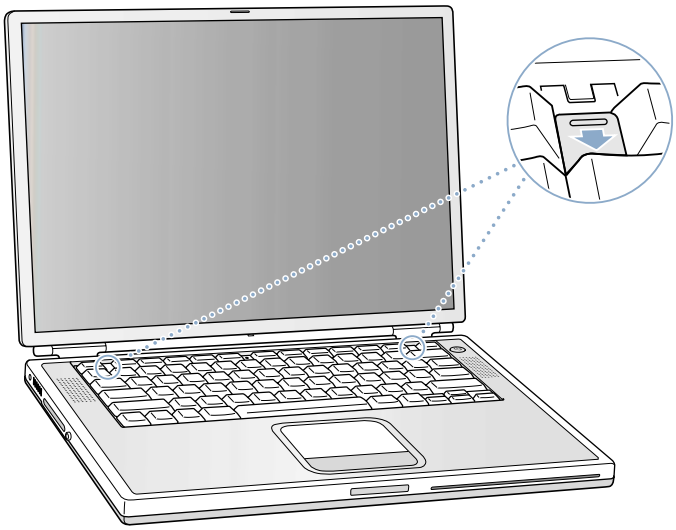

10. Flip the keyboard over and lay it on the palm rests and trackpad (**Figure 4**).

Figure 4

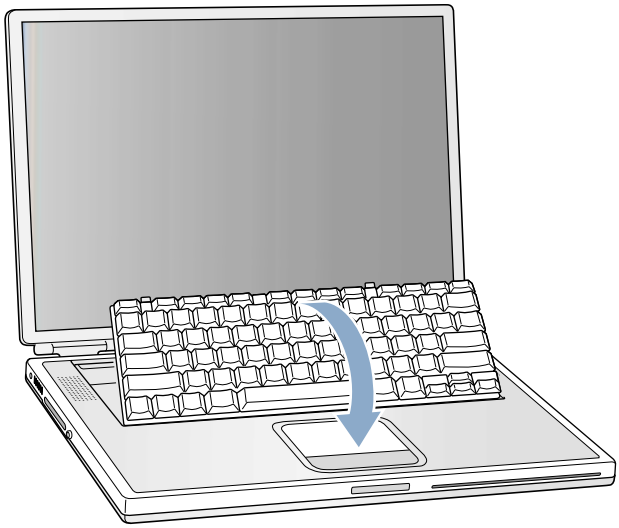

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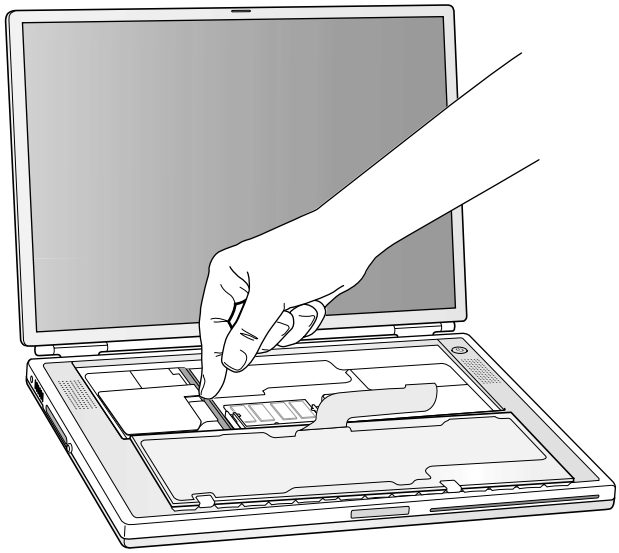
Figure 5

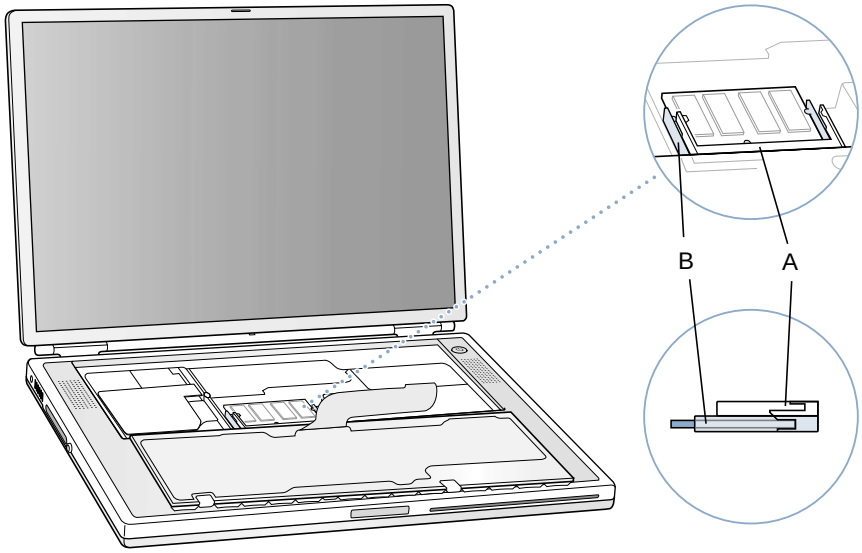


Removing the Installed Memory Card

1. To remove a memory card, locate the brackets that secure the card on both sides (**Figure 6**). Carefully spread the brackets apart until the card releases on each side. Pull the card up and out.

Note : If there is a memory card in the upper memory slot (**Figure 6A**), it must be removed before removing a card in the lower slot (**Figure 6B**).

Figure 6



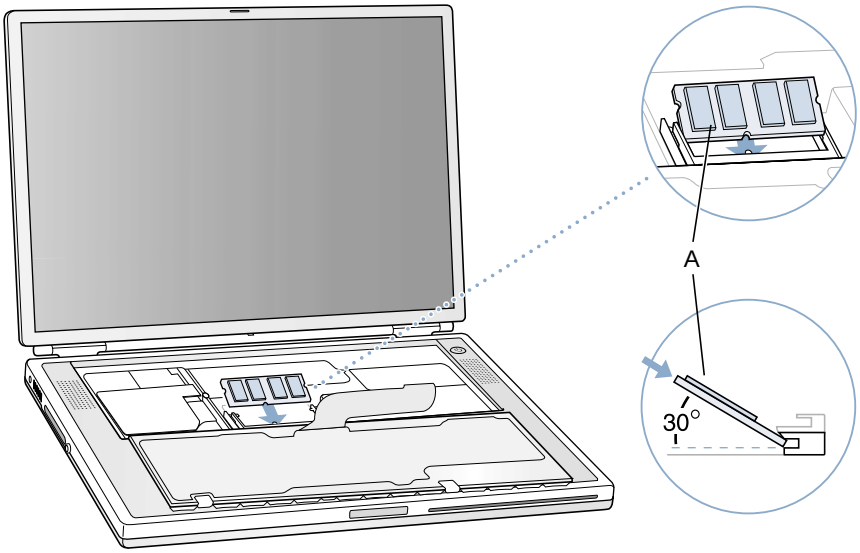
Installing the Replacement Memory Card

Warning : When handling a memory card, do not touch its gold connectors. Handle the card only by the edges.

1. To install the memory card, line up the notch in the card with the small tab in the memory slot. Hold the card at a 30-degree angle (**Figure 7A**), and then push the card into the slot until it is firmly seated.

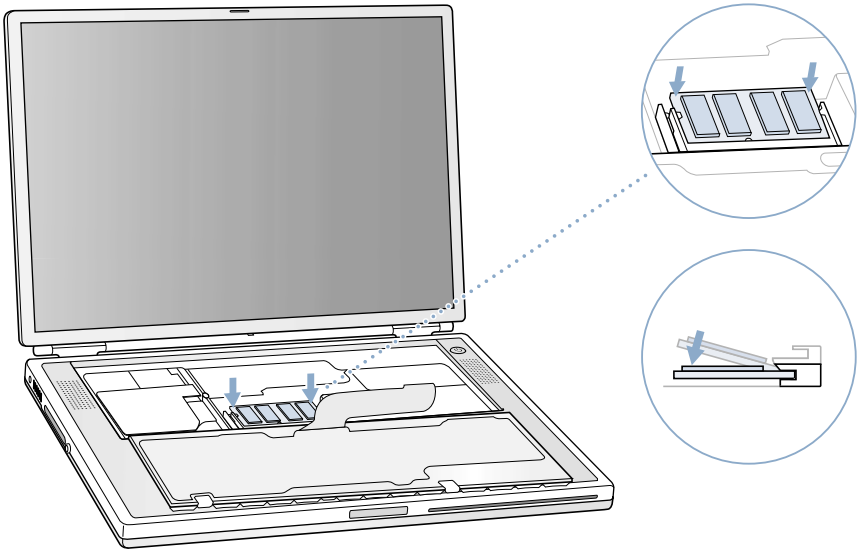
Note : You may feel some resistance. If you are having trouble inserting the card, try pushing one side at a time.

Figure 7



2. Gently push the card down until the two brackets on either side of the card lock into place (**Figure 8**).

Figure 8



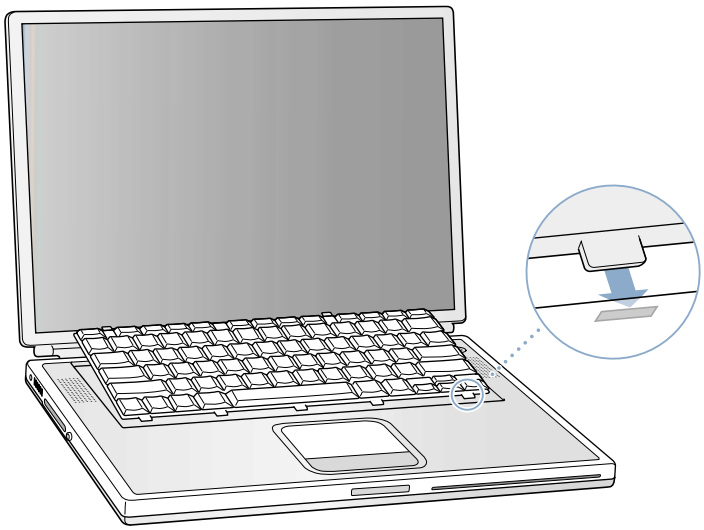
Closing the Computer

1. Flip the keyboard back toward the keyboard opening in the case.

2. Hold the keyboard at an angle above the keyboard opening, and insert the tabs on the bottom edge of the keyboard into the slots below the edge of the opening (**Figure 9**).

Important : Make sure that all the tabs are seated and that the keyboard rests flush against the edge of the opening.

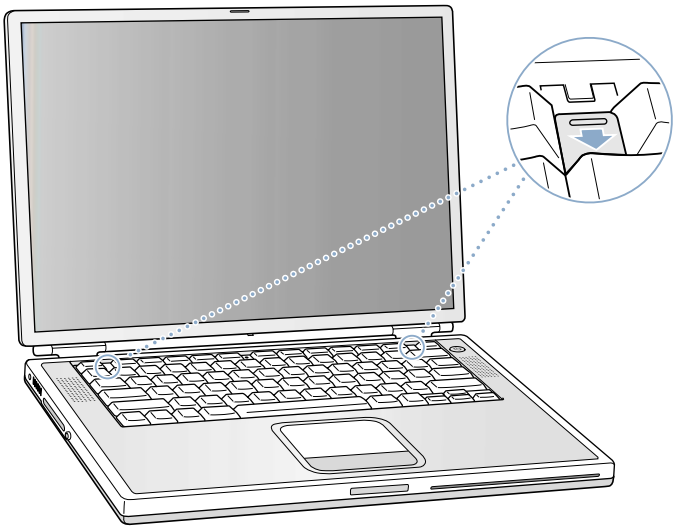
Figure 9



3. Lay the keyboard flat into the keyboard opening.

4. Pull down on the keyboard release tabs and then press down on the top portion of the keyboard (**Figure 10**).

Figure 10



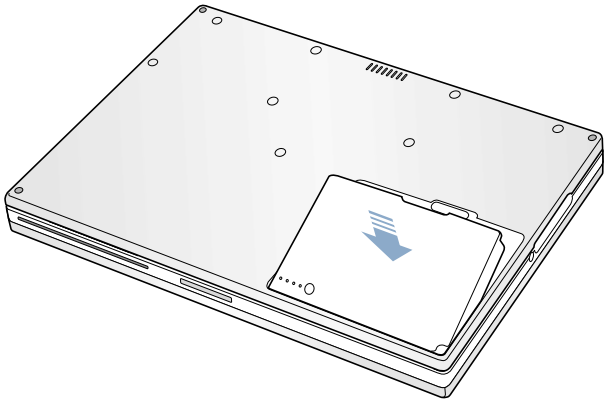
5. Release the tabs to secure the keyboard in place.

6. Close the display and turn the PowerBook over.

7. Replace the battery into the battery compartment (**Figure 11**).

Important : Make sure that the battery locks securely into place and that the battery latch is slid all the way into the locked position.

Figure 11



8. Reconnect the power cord and any other cables that were connected, and restart your computer.

Warning : Never turn on your computer unless all of its internal and external parts are in place and it is closed. Operating the computer when it is open or missing parts can damage your computer or cause injury.

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Cupertino, CA 95014-2084
USA
+ 1 408 996 1010
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English

Modem

AppleCare

Replacement Instructions
Follow the instructions in this sheet carefully. Failure to follow these instructions could damage your equipment and void its warranty.

Note : Written and video instructions covering customer-installable parts are available at http://www.info.apple.com/install-parts/.

Warning : During this procedure, keep small parts away from children.

Tools Required
- Jeweler's flat-blade screwdriver (if keyboard is locked)
- 5 mm wrench, 5 mm socket wrench, or needle nose pliers

Opening the Computer

Warning : Always shut down your computer before opening it to avoid damaging its internal components or causing injury. After you shut down the computer, the internal components can be very hot. Let the computer cool down before continuing.

1. Place your computer on a clean, flat surface.

2. Shut down your computer and wait thirty minutes before continuing.

3. Disconnect the power cord and any other cables connected to the computer.

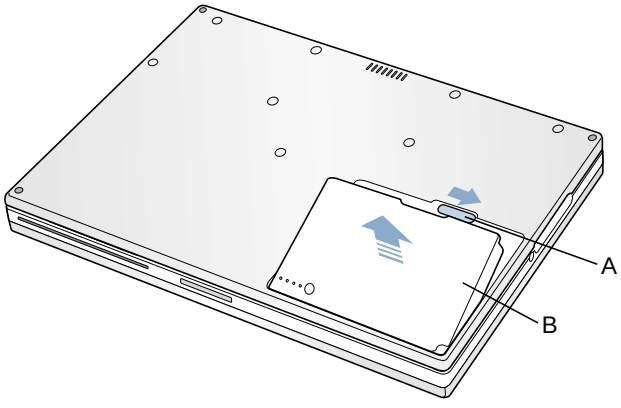
4. Close the computer and turn it over.

5. Slide the battery latch (**Figure 1A**) to the right to remove the battery (**Figure 1B**).

   Removing the battery will prevent you from accidentally turning on the computer.

   Warning : Removing the battery before shutting down your computer may result in data loss.

Figure 1



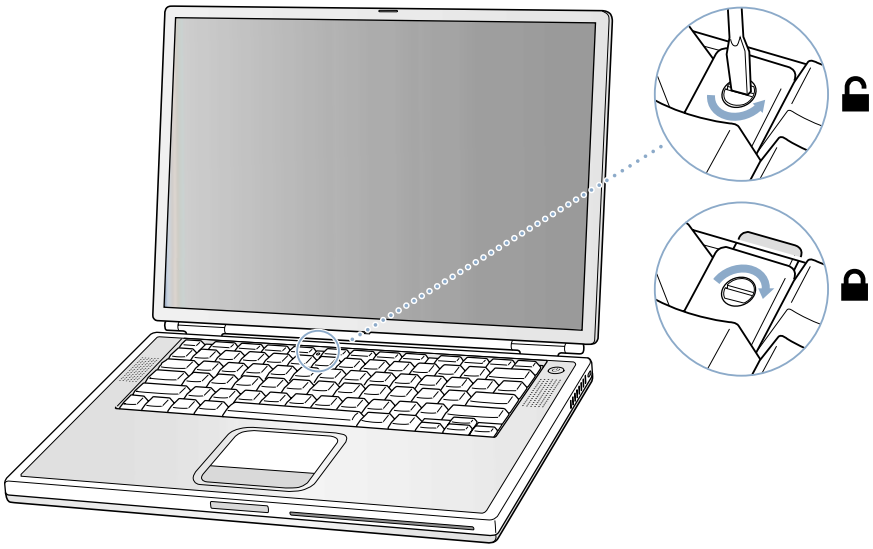
6. Turn over the computer.

7. Raise the display so you can access the keyboard.

8. Make sure the keyboard locking screw, located in the small plastic tab to the left of the Num Lock key (**Figure 2**), is not in the locked position. Your PowerBook comes with the keyboard unlocked, so unless you or someone else locked the keyboard, you can skip this step.

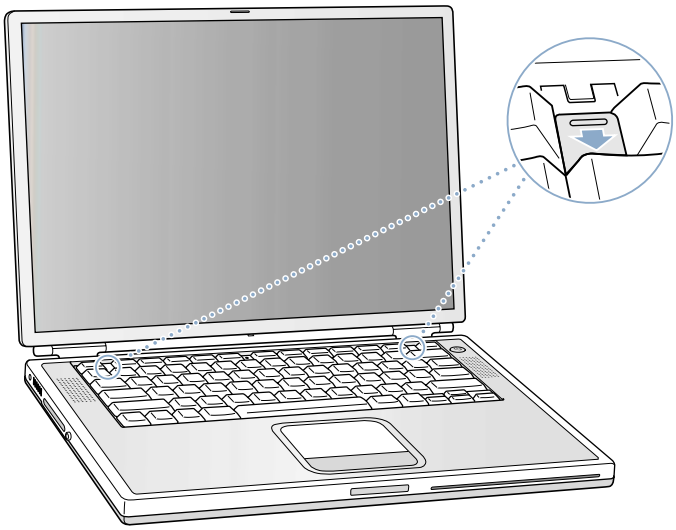
To unlock the keyboard, turn the screw 1/2 turn.

Figure 2



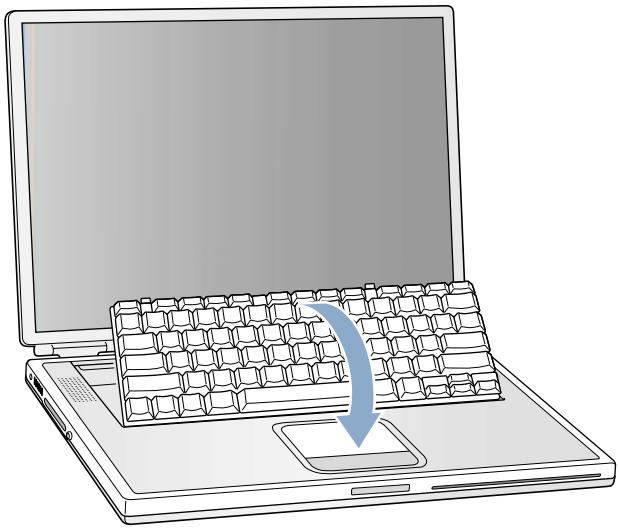
9. Release the keyboard by pulling down on the keyboard release tabs (located to the left of the F1 and F12 keys) (**Figure 3**), then lift the top portion of the keyboard up slightly, and toward the display.

Figure 3



10. Flip the keyboard over and lay it on the palm rests and trackpad (**Figure 4**).

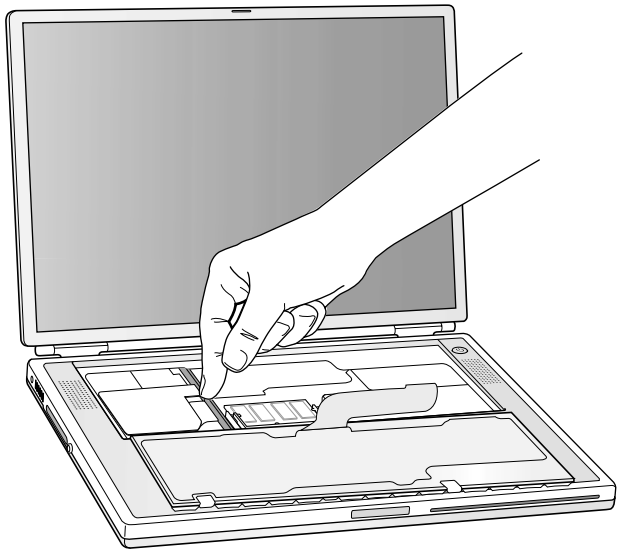
Figure 4



11. Touch the computer's inside framework (a dull gray conductive composite material) to discharge any static electricity, as shown (**Figure 5**).

Important : To avoid electrostatic discharge damage, always ground yourself by touching the computer's framework before you touch any parts or install any components inside the computer. To avoid static electricity building back up in your body, do not walk around the room until you have completed your installation and closed the computer.

Figure 5

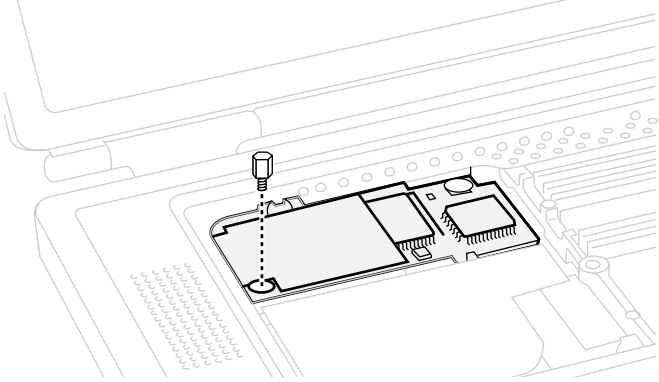


Removing the Installed Modem

Warning : You must remove and install the modem carefully to avoid damaging delicate parts, including the modem connector and connector cable.

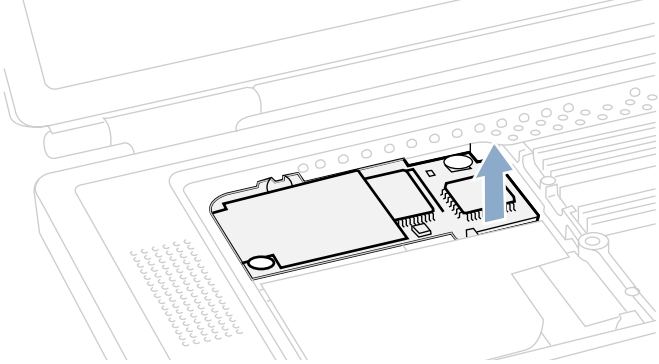
1. Locate the modem and remove the 5 mm hexnut screw (**Figure 6**).

Figure 6



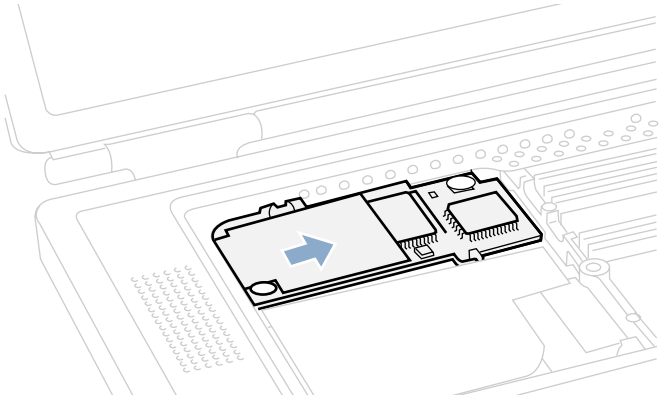
2. Pull up on the right, front corner of the modem to disconnect it from the logic board (**Figure 7**).

Figure 7



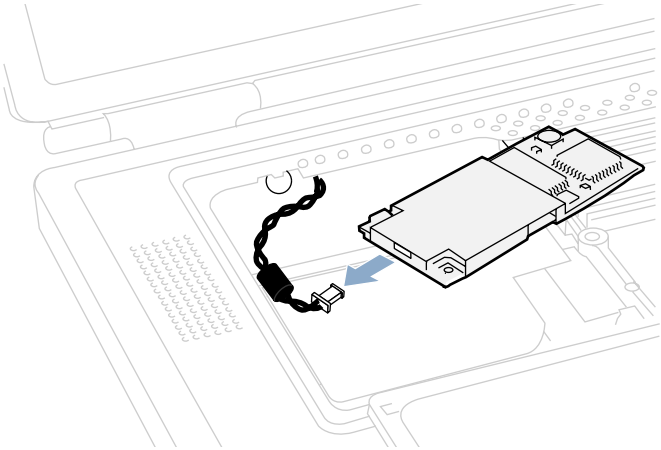
3. Pull the modem up and to the right slightly to reveal the modem connector cable attached to the left end of the modem (**Figure 8**).

Figure 8



4. Carefully disconnect the modem cable connector (**Figure 9**) and remove the modem from the computer.

Figure 9

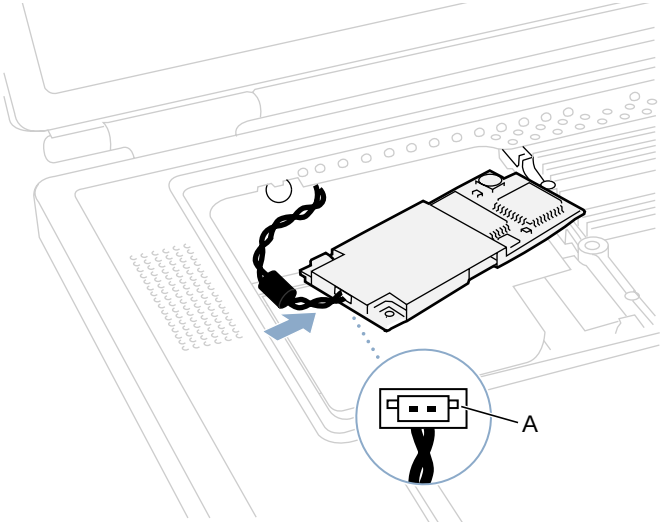


Installing the Replacement Modem

1. Connect the modem cable connector to the modem (**Figure 10**).

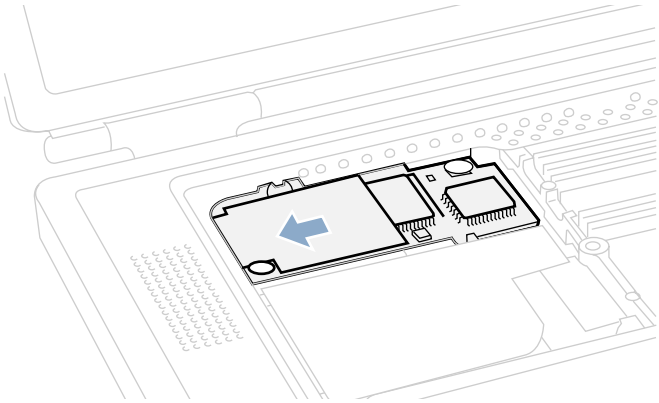
   Note : The connector plugs into the socket located on the top of the modem's circuit board. The connector and socket are keyed to fit with the keys up (**Figure 10A**) .

Figure 10



2. Carefully guide the cable into the space under the edge of the keyboard opening and lay the modem into the modem opening (**Figure 11**).

Figure 11



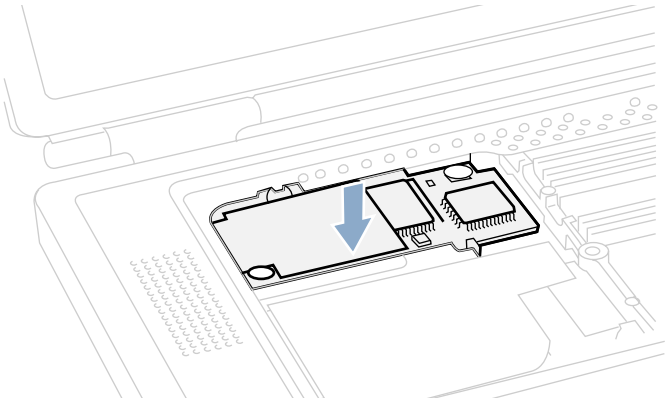
3. Line up the hexnut screw hole, in the left front corner of the modem, with the hole in the logic board. The modem should lie flat.

   Note : Visually verify that the modem connector cable is still attached.

4. Press down on the front edge of the modem, slightly left of center, to firmly connect it to the logic board (**Figure 12**).

   Note : You may need to maneuver the modem around slightly until you feel the connectors match up.

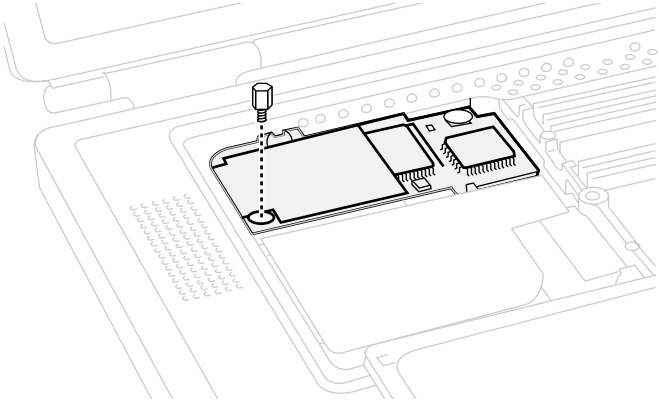
Figure 12



5. Install the hexnut screw (**Figure 13**).

   Note : It may be helpful to use a finger tip to hold the top of the screw straight and steady while turning the screw.

Figure 13

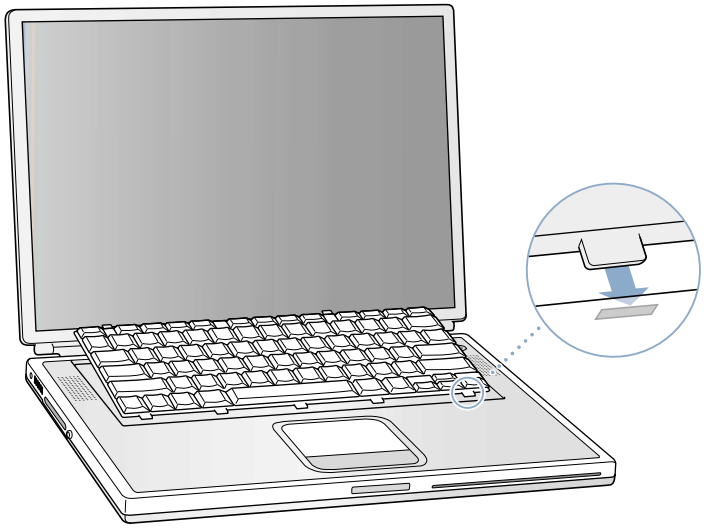


Closing the Computer

1. Flip the keyboard back toward the keyboard opening in the case.
2. Hold the keyboard at an angle above the keyboard opening, and insert the tabs on the bottom edge of the keyboard into the slots below the edge of the opening (**Figure 14**).

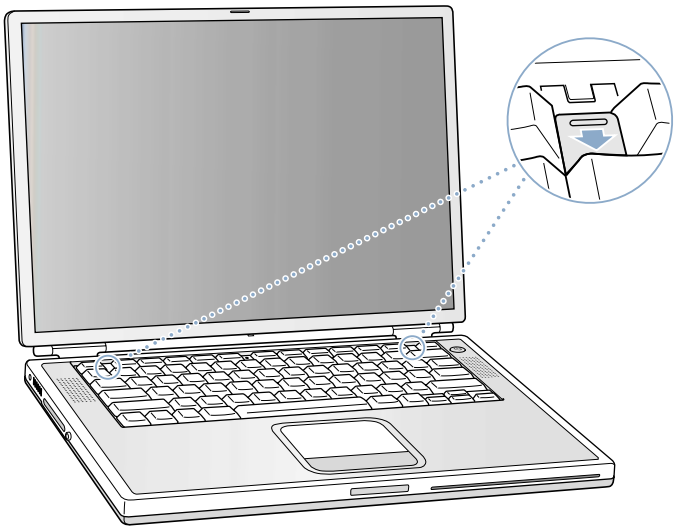
   Important : Make sure that all the tabs are seated and that the keyboard rests flush against the edge of the opening.

Figure 14



3. Lay the keyboard flat into the keyboard opening.
4. Pull down on the keyboard release tabs and then press down on the top portion of the keyboard (**Figure 15**).

Figure 15

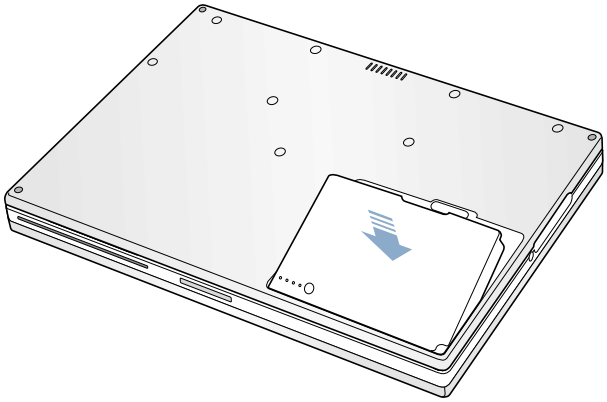


5. Release the tabs to secure the keyboard in place.
6. Close the display and turn the PowerBook over.

7. Replace the battery into the battery compartment (**Figure 16**).

Important : Make sure that the battery locks securely into place and that the battery latch is slid all the way into the locked position.

Figure 16



8. Reconnect the power cord and any other cables that were connected, and restart your computer.

Warning : Never turn on your computer unless all of its internal and external parts are in place and it is closed. Operating the computer when it is open or missing parts can damage your computer or cause injury.

Replacing International Modems

After you have replaced a modem in Europe or Asia, open the software utility Modem Country Selector and verify that the modem is set to the correct country. Modem Country Selector is located in the Apple Extras folder on your hard drive or can be downloaded as part of the Apple Modem Updater software bundle at http://asu.info.apple.com.

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English

Bottom Case

AppleCare

Replacement Instructions
Follow the instructions in this sheet carefully. Failure to follow these instructions could damage your equipment and void its warranty.

Note : Written and video instructions covering customer-installable parts are available at http://www.info.apple.com/install-parts/.

Warning : Sharp edges can exist inside your computer and on any parts being removed or installed. Use caution to avoid injury. Keep small parts away from children.

Tools Required
- Soft towel or cloth, larger than the PowerBook
- Torx T8 screwdriver

Removing the Bottom Case

Warning : Always shut down your computer before opening it to avoid damaging its internal components or causing injury. After you shut down the computer, the internal components can be very hot. Let the computer cool down before continuing.

1. Place your computer on a clean, flat surface.

2. Shut down your computer and wait thirty minutes before continuing.

3. Disconnect the power cord and any other cables connected to the computer.

4. Place a towel or soft cloth on a table in front of you (**Figure 1A**).

   The towel or cloth will protect the keyboard and display area of the PowerBook when you flip it over to remove the battery and bottom case. Make sure it covers an area large enough for your PowerBook and that it hangs over the edge of the table.

5. With the display open at an angle greater than 90 degrees, carefully flip the PowerBook over and lay it flat, fully on the table. Make sure the display hangs over the edge of the table and rests lightly on your lap (**Figure 1B**).

   Important : Do not open the display farther than the angle shown.

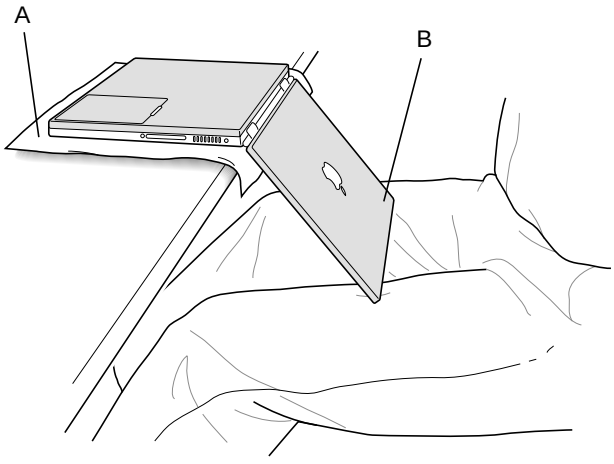


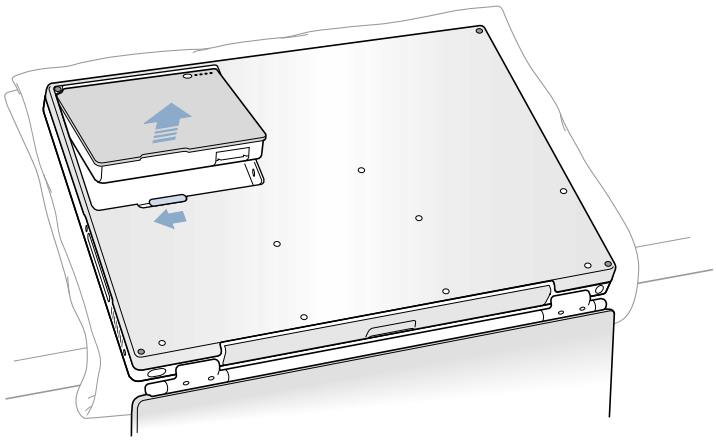
Figure 1

6. Remove the battery by sliding the battery latch to the left. Make sure to return the latch fully to the right (**Figure 2**).

Removing the battery will prevent you from accidentally turning on the computer.

Warning : Removing the battery before shutting down your computer may result in data loss.

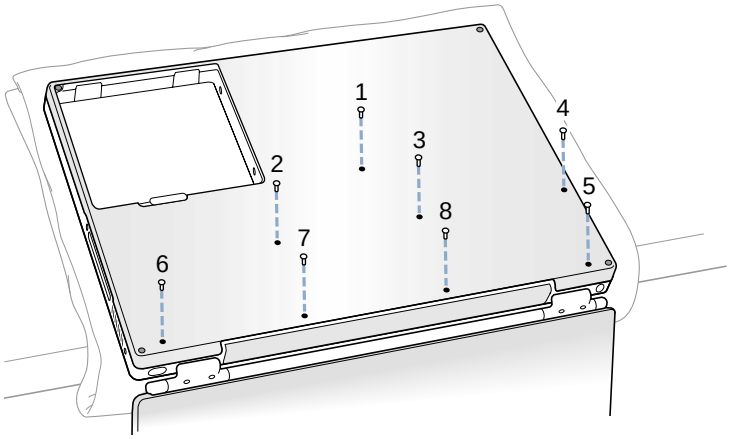
Figure 2



7. Using a Torx T8 screwdriver, remove the eight bottom case screws in the order shown in the illustration (**Figure 3**).

Important : To avoid damaging the case, be careful that the screwdriver tip does not slip out of the screw head during removal.

Figure 3

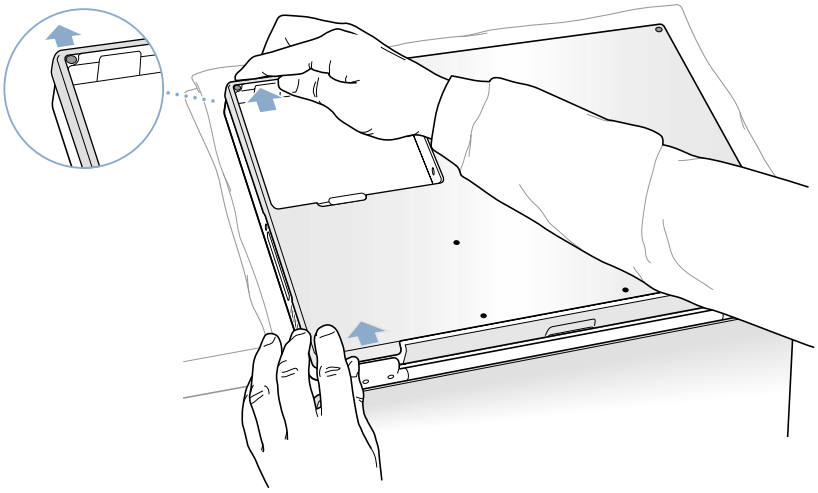


Note : The following three steps explain how to remove the bottom case by disengaging it at the left and right sides and then carefully pivoting it forward.

Important : During this procedure, do not push on the rubber feet of the bottom case.

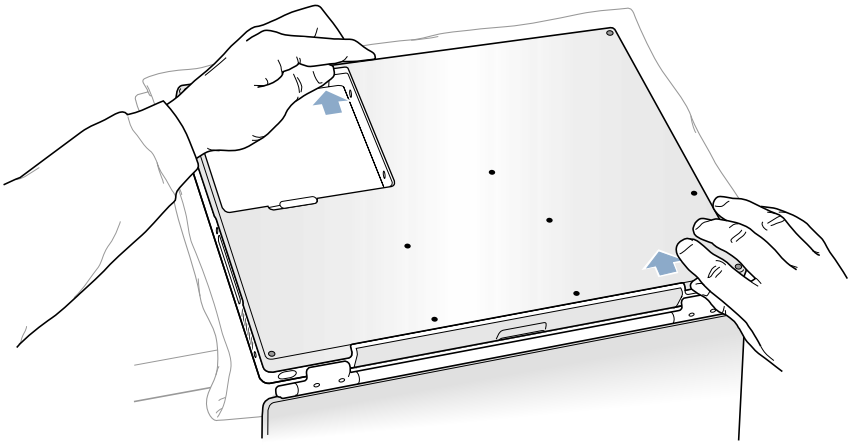
8. Place your hands on the bottom case as shown (**Figure 4**) and push away from you until the left side releases.

Figure 4



9. Place your hands on the bottom case as shown (**Figure 5**) and push away from you until the right side releases.

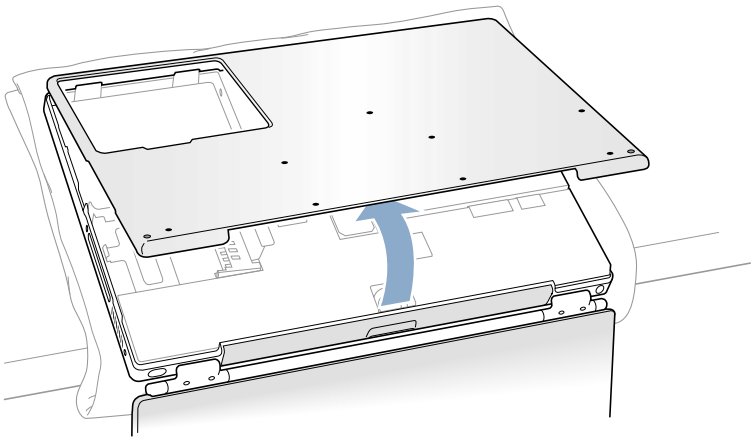
Figure 5



10. When both sides have released, lift up on the edge of the bottom case that is closest to you ; carefully and evenly pivot it over the front edge of the computer until it releases (**Figure 6**).

Important : Do not twist the bottom case from side to side. Slide the case forward completely before lifting it up. If you feel any resistance when lifting the bottom case, double-check to make sure the case is slid all the way forward and releases from the front edge.

Figure 6



Installing the Replacement Bottom Case

1. To install the new bottom case, place it over the bottom of the computer in the same orientation as the original bottom case.

2. Align the notches on the right and left sides of the case (some of these can be viewed through the battery opening). Then press down and toward you slightly to secure the case.

   Important : Make sure that the seams between the bottom case and the frame are closed. Verify that the case lies flat and fits properly around the battery latch and that the alignment tab that protrudes on the underside of the bottom case, shown in the illustration (**Figure 7A**), is seated properly.

   Note : To help with alignment, apply pressure to the bottom case at the back of the battery compartment opening, near the latch, and on the front and back outside edges of the case.

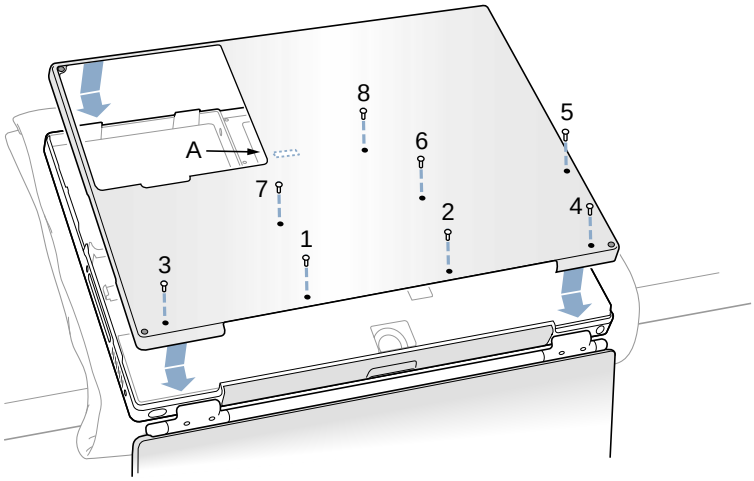
3. Check that the eight screw holes on the case align with the holes on the computer.

4. Replace the eight screws in the order shown in the illustration (**Figure 7**). Do not overtighten the screws or damage could result.

   Note : The screws must go in straight and easily ; if they do not, readjust the bottom case for proper alignment.

   Important : To avoid damaging the case, be careful that the screwdriver tip does not slip out of the screw head during tightening.

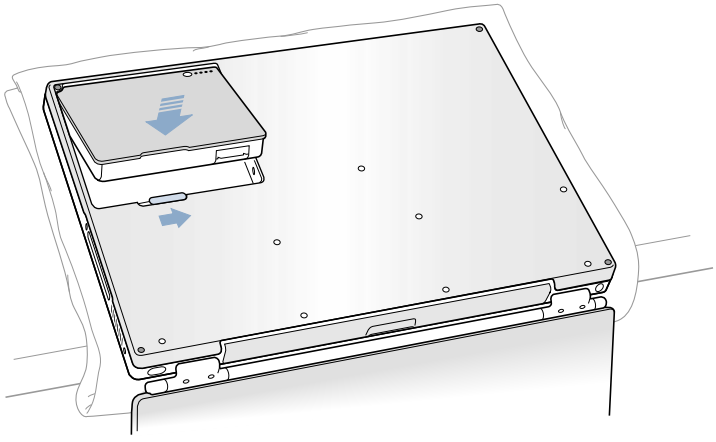
Figure 7



5. Replace the battery (**Figure 8**).

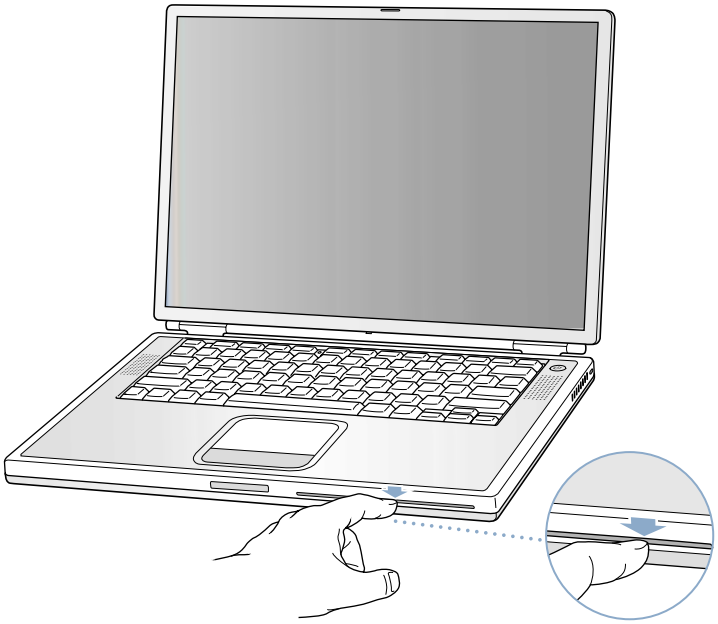
   Important : Make sure that the battery locks securely into place and that the battery latch is slid all the way into the locked position.

Figure 8



6. Turn the computer over so that the optical drive slot faces you. Verify that the bottom case is flush with the front edge of the slot. If the case is slightly bowed and there is a gap near the center of the slot, carefully pull the bottom edge of the slot until it clicks into place and becomes flush with the bottom case (**Figure 9**).

Figure 9



7. Reconnect the power cord and any other cables that were connected, and restart your computer.

Warning : Never turn on your computer unless all of its internal and external parts are in place and it is closed. Operating the computer when it is open or missing parts can damage your computer or cause injury.

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English

AirPort Card

AppleCare

Replacement Instructions
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Note : Written and video instructions covering customer-installable parts are available at http://www.info.apple.com/install-parts/.

Warning : Sharp edges can exist inside your computer and on any parts being removed or installed. Use caution to avoid injury. Keep small parts away from children.

Tools Required
- Soft towel or cloth, larger than the PowerBook
- Torx T8 screwdriver

Opening the Computer

Warning : Always shut down your computer before opening it to avoid damaging its internal components or causing injury. After you shut down the computer, the internal components can be very hot. Let the computer cool down before continuing.

To access the AirPort Card, you must first remove the battery and bottom case.

1. Place your computer on a clean, flat surface.

2. Shut down your computer and wait thirty minutes before continuing.

3. Disconnect the power cord and any other cables connected to the computer.

4. Place a towel or soft cloth on a table in front of you (**Figure 1A**).

   The towel or cloth will protect the keyboard and display area of the PowerBook when you flip it over to remove the battery and bottom case. Make sure it covers an area large enough for your PowerBook and that it hangs over the edge of the table.

5. With the display open at an angle greater than 90 degrees, carefully flip the PowerBook over and lay it flat, fully on the table. Make sure the display hangs over the edge of the table and rests lightly on your lap (**Figure 1B**).

   Important : Do not open the display farther than the angle shown.

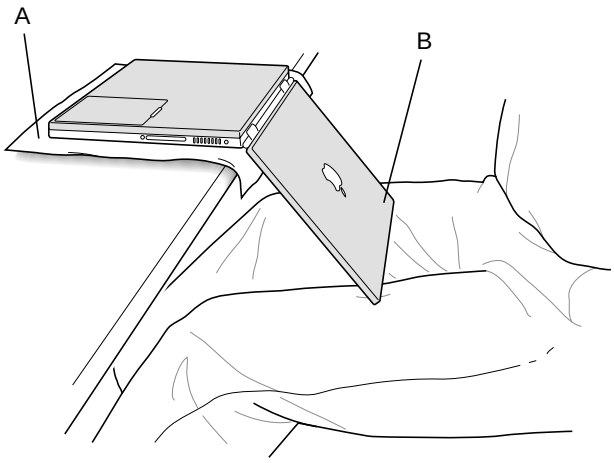
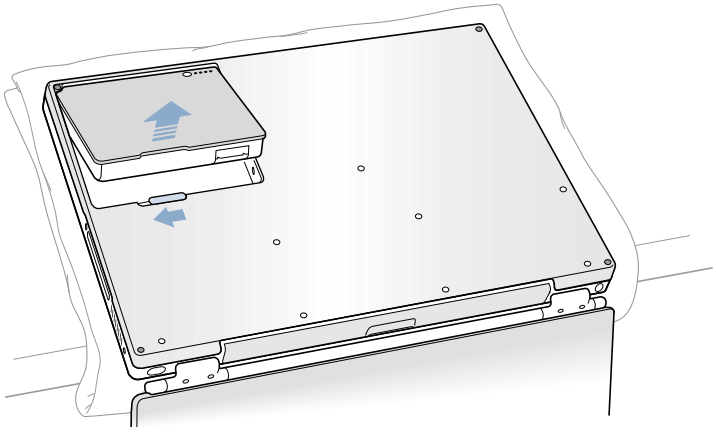


Figure 1

6. Remove the battery by sliding the battery latch to the left. Make sure to return the latch fully to the right (**Figure 2**). Removing the battery will prevent you from accidentally turning on the computer.

Warning : Removing the battery before shutting down your computer may result in data loss.

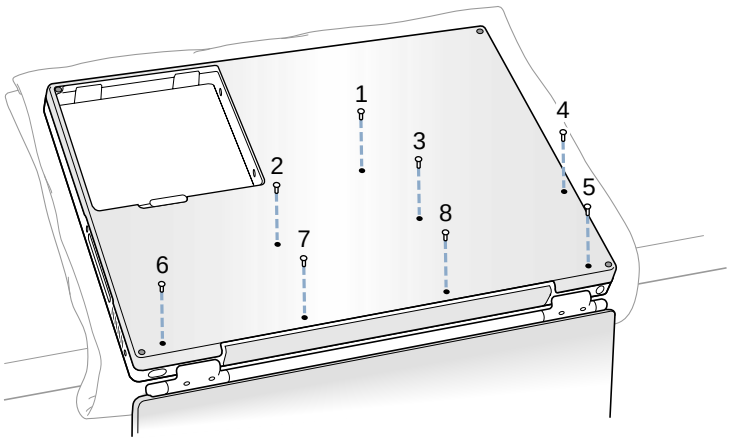
Figure 2



7. Using a Torx T8 screwdriver, remove the eight bottom case screws in the order shown in the illustration (**Figure 3**).

Important : To avoid damaging the case, be careful that the screwdriver tip does not slip out of the screw head during removal.

Figure 3

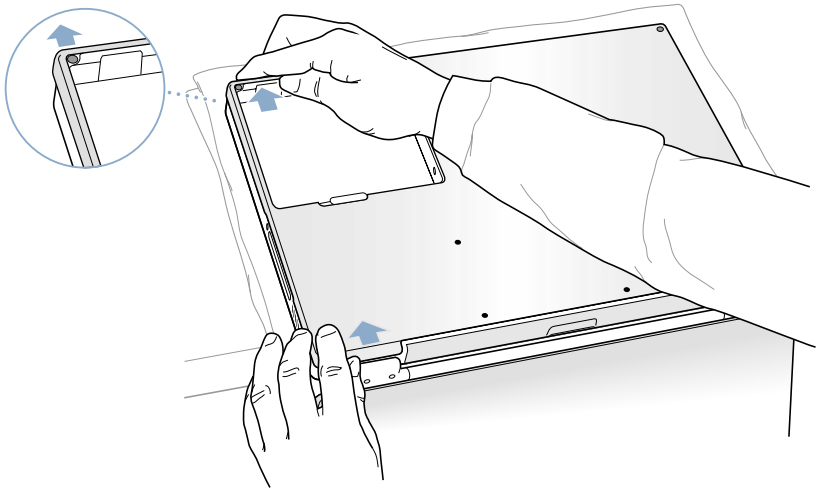


Note : The following three steps explain how to remove the bottom case by disengaging it at the left and right sides and then carefully pivoting it forward.

Important : During this procedure, do not push on the rubber feet of the bottom case.

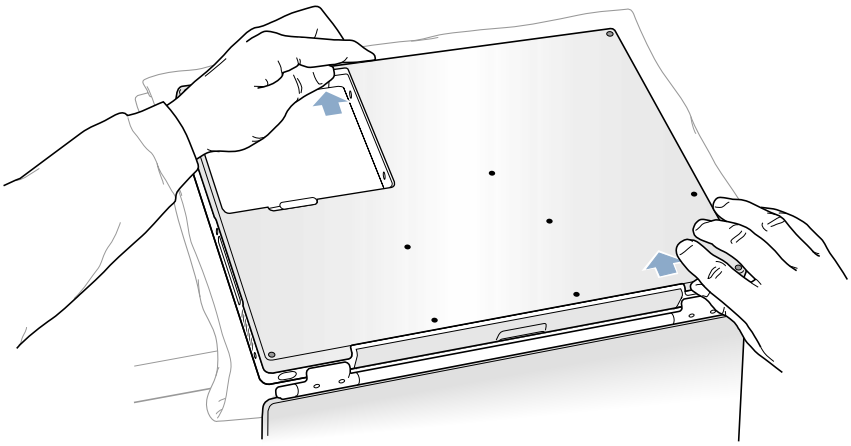
8. Place your hands on the bottom case as shown (**Figure 4**) and push away from you until the left side releases.

Figure 4



9. Place your hands on the bottom case as shown (**Figure 5**) and push away from you until the right side releases.

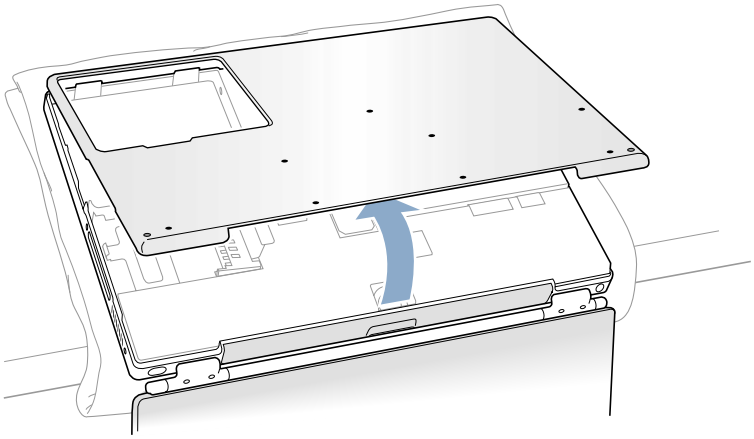
Figure 5



10. When both sides have released, lift up on the edge of the bottom case that is closest to you; carefully and evenly pivot it over the front edge of the computer until it releases (**Figure 6**).

Important : Do not twist the bottom case from side to side. Slide the case forward completely before lifting it up. If you feel any resistance when lifting the bottom case, double-check to make sure the case is slid all the way forward and releases from the front edge.

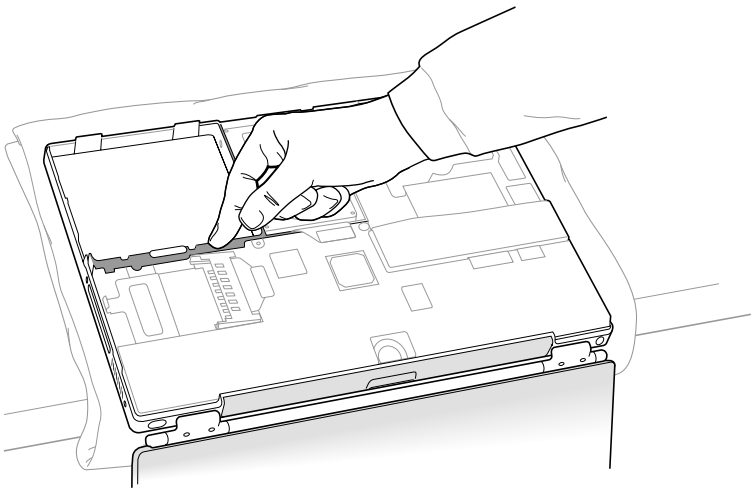
Figure 6



11. Touch the computer's inside framework (a dull gray conductive composite material) to discharge any static electricity, as shown (**Figure 7**).

Important : To avoid electrostatic discharge damage, always ground yourself by touching the computer's framework before you touch any parts or install any components inside the computer. To avoid static electricity building back up in your body, do not walk around the room until you have completed your installation and closed the computer.

Figure 7



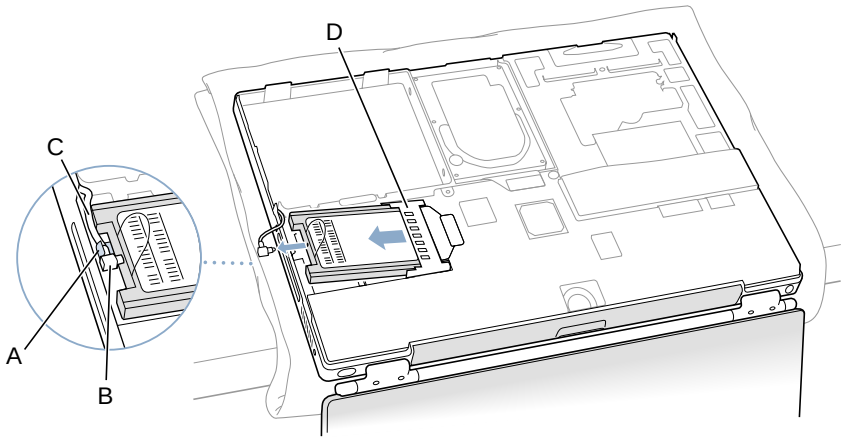
Removing the Installed AirPort Card

1. Pull back on the antenna clip (**Figure 8A**) to release the antenna cable connector (**Figure 8B**) and allow the card to rise up slightly.

2. Pull the card from the AirPort connector (**Figure 8D**).

3. Hold the AirPort Card with one hand and grasp the antenna cable connector with the other. While being careful not to strain the antenna cable (**Figure 8C**), firmly pull the connector straight out of the AirPort Card.

Figure 8



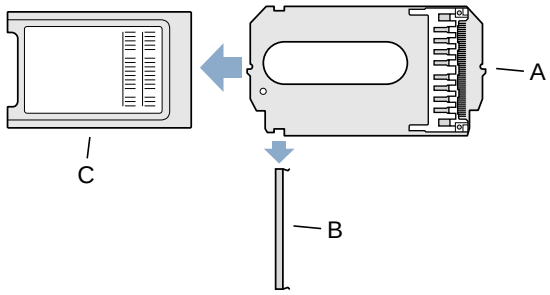
Important : If the AirPort Card is not being replaced right away, replace the antenna cable connector into its holder (**Figure 10B**) and pull the loop of the antenna cable up slightly and away from the edge of the computer case. This prevents the cable from interfering with the PC card slot, below, or getting pinched during reassembly.

Also, if the insertion end of the AirPort Card connector is rotated up, push it down into the level position. This allows the bottom case to install properly.

Installing the Replacement AirPort Card

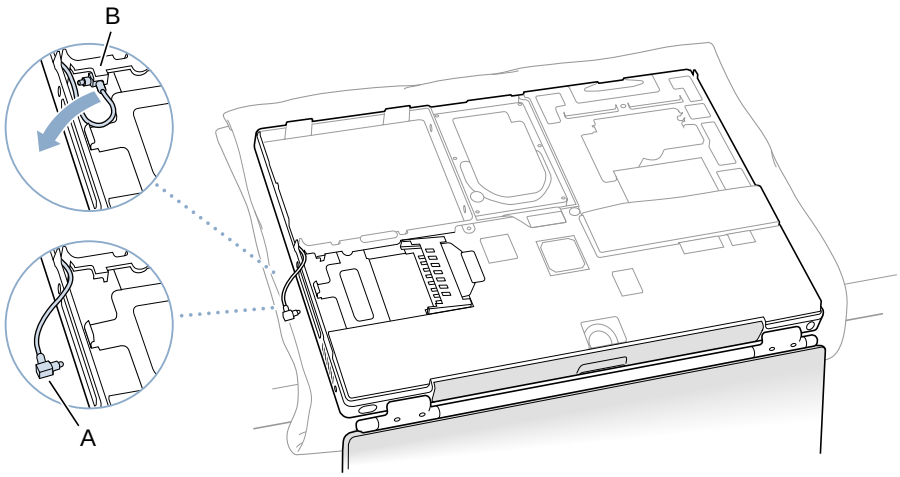
1. If the AirPort Card to be installed came with the AirPort adapter (**Figure 9A**), remove the metal clip (**Figure 9B**) and pull the AirPort Card (**Figure 9C**) from the adapter. (The adapter and metal clip are not used with your PowerBook.)

Figure 9



2. If necessary, pull the AirPort antenna cable connector (**Figure 10A**) from its holder (**Figure 10B**).

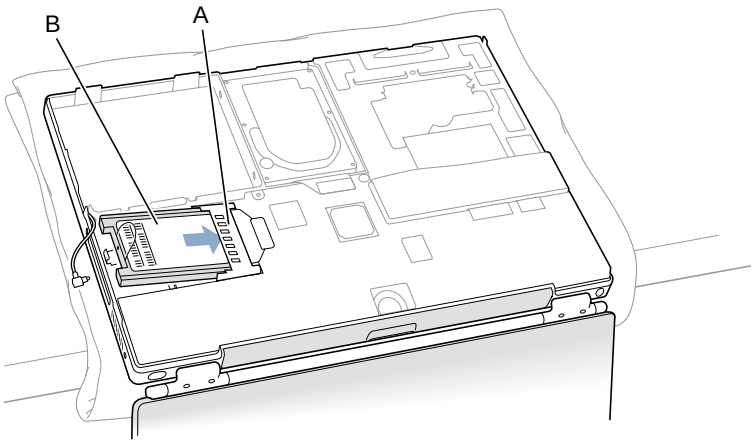
Figure 10



3. Pull up the insertion end of the AirPort Card connector (**Figure 11A**) to raise it up slightly, if it is not already up.

4. Position the AirPort Card (**Figure 11B**) with the AirPort ID numbers and bar code facing up and slide the card into the connector. Make sure to slide the card all the way in until the card is securely attached to the connector.

Figure 11



5. Lug the antenna cable connector (**Figure 12A**) into the port, which is located just below the plastic tab (**Figure 12B**), on the end of the AirPort Card. Make sure the connector is straight before inserting it into the card.

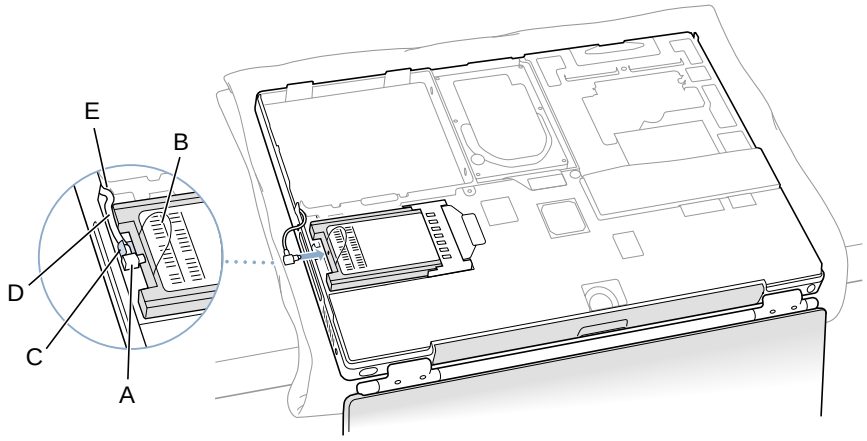
6. Push the AirPort Card down into its space until the antenna cable connector is secured by the small antenna clip (**Figure 12C**).

   Important : Route the antenna cable (**Figure 12D**) between the edge of the computer and the AirPort Card. Verify that the cable is away from the edge of the computer so that it will not be pinched during reassembly and that it does not sag down into the PC card slot area (below the AirPort Card). Take up any extra cable by tucking it in where shown (**Figure 12E**).

7. Fold the plastic tab (**Figure 12B**) on the AirPort Card over the top of the card.

   Note : The plastic tab must be folded over the card during the installation of the bottom case ; otherwise you will not be able to securely attach the bottom case to the computer.

Figure 12



Closing the Computer

1. To replace the bottom case, place it over the bottom of the computer in the same orientation as the original bottom case.

2. Align the notches on the right and left sides of the case (some of these can be viewed through the battery opening). Then press down and toward you slightly to secure the case.

   Important : Make sure that the seams between the bottom case and the frame are closed. Verify that the case lies flat and fits properly around the battery latch and that the alignment tab that protrudes on the underside of the bottom case, shown in the illustration (**Figure 13A**), is seated properly.

   Note : To help with alignment, apply pressure to the bottom case at the back of the battery compartment opening, near the latch, and on the front and back outside edges of the case.

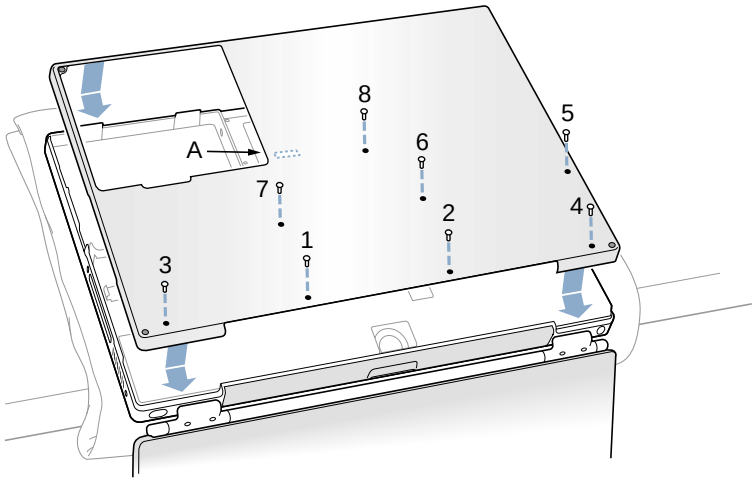
3. Check that the eight screw holes on the case align with the holes on the computer.

4. Replace the eight screws in the order shown in the illustration (**Figure 13**). Do not overtighten the screws or damage could result.

   Note : The screws must go in straight and easily; if they do not, readjust the bottom case for proper alignment.

   Important : To avoid damaging the case, be careful that the screwdriver tip does not slip out of the screw head during tightening.

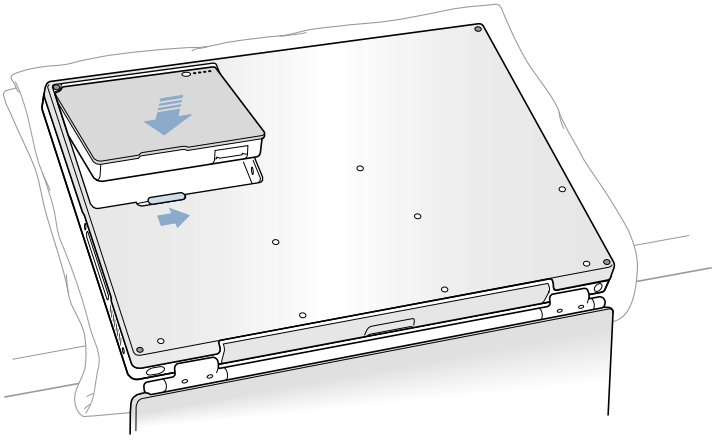
Figure 13



5. Replace the battery (**Figure 14**).

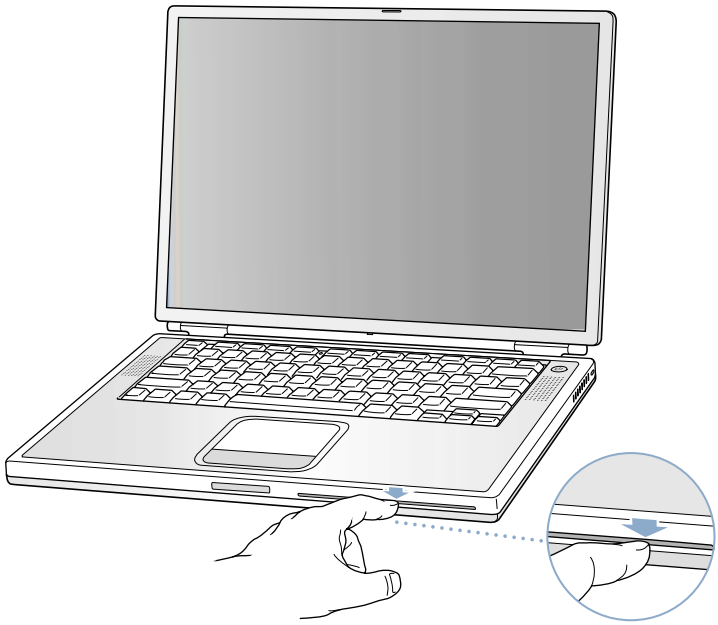
   Important : Make sure that the battery locks securely into place and that the battery latch is slid all the way into the locked position.

Figure 14



6. Turn the computer over so that the optical drive slot faces you. Verify that the bottom case is flush with the front edge of the slot. If the case is slightly bowed and there is a gap near the center of the slot, carefully pull the bottom edge of the slot until it clicks into place and becomes flush with the bottom case (**Figure 15**).

Figure 15



7. Reconnect the power cord and any other cables that were connected, and restart your computer.

Warning : Never turn on your computer unless all of its internal and external parts are in place and it is closed. Operating the computer when it is open or missing parts can damage your computer or cause injury.

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Apple Computer, Inc.
1 Infinite Loop
Cupertino, CA 95014-2084
USA
+ 1 408 996 1010
http://www.apple.com

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English

Hard Drive

AppleCare

Replacement Instructions
Follow the instructions in this sheet carefully. Failure to follow these instructions could damage your equipment and void its warranty.

Note : Written and video instructions covering customer-installable parts are available at http://www.info.apple.com/install-parts/.

Warning : Sharp edges can exist inside your computer and on any parts being removed or installed. Use caution to avoid injury. Keep small parts away from children.

Tools Required
- Soft towel or cloth, larger than the PowerBook
- Torx T8 screwdriver

Backing Up Your Data
Warning : Before replacing your hard drive, make sure you back up all data on the drive.

Opening the Computer

Warning : Always shut down your computer before opening it to avoid damaging its internal components or causing injury. After you shut down the computer, the internal components can be very hot. Let the computer cool down before continuing.

To access the hard drive, you must first remove the battery and bottom case.
1. Place your computer on a clean, flat surface.

2. Shut down your computer and wait thirty minutes before continuing.

3. Disconnect the power cord and any other cables connected to the computer.

4. Place a towel or soft cloth on a table in front of you (**Figure 1A**).
   The towel or cloth will protect the keyboard and display area of the PowerBook when you flip it over to remove the battery and bottom case. Make sure it covers an area large enough for your PowerBook and that it hangs over the edge of the table.

5. With the display open at an angle greater than 90 degrees, carefully flip the PowerBook over and lay it flat, fully on the table. Make sure the display hangs over the edge of the table and rests lightly on your lap (**Figure 1B**).

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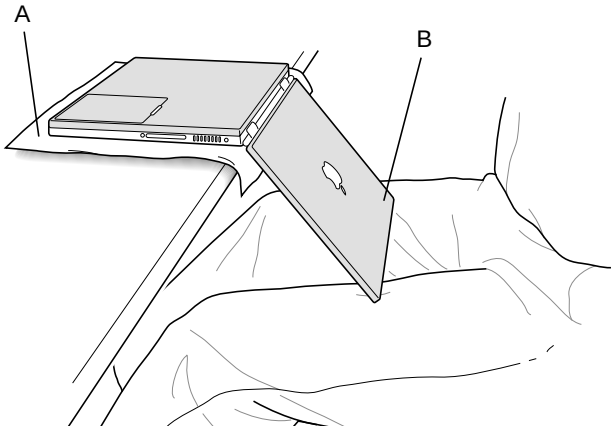
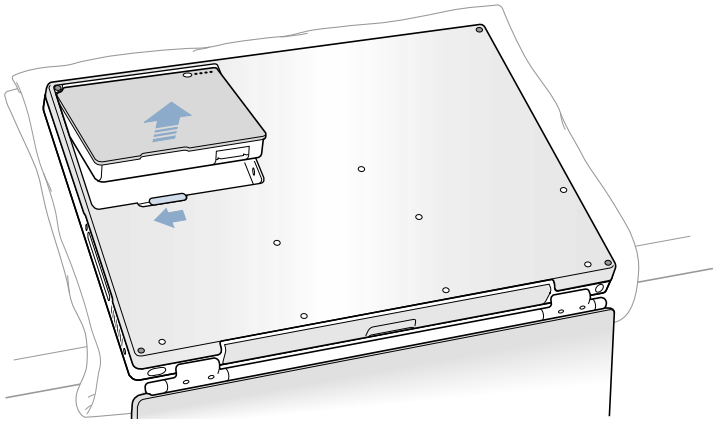


Figure 1

6. Remove the battery by sliding the battery latch to the left. Make sure to return the latch fully to the right (**Figure 2**). Removing the battery will prevent you from accidentally turning on the computer.

Warning : Removing the battery before shutting down your computer may result in data loss.

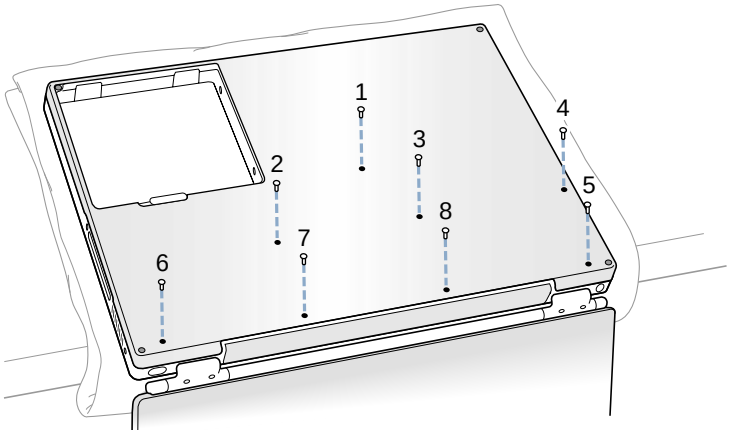
Figure 2



7. Using a Torx T8 screwdriver, remove the eight bottom case screws in the order shown in the illustration (**Figure 3**).

Important : To avoid damaging the case, be careful that the screwdriver tip does not slip out of the screw head during removal.

Figure 3

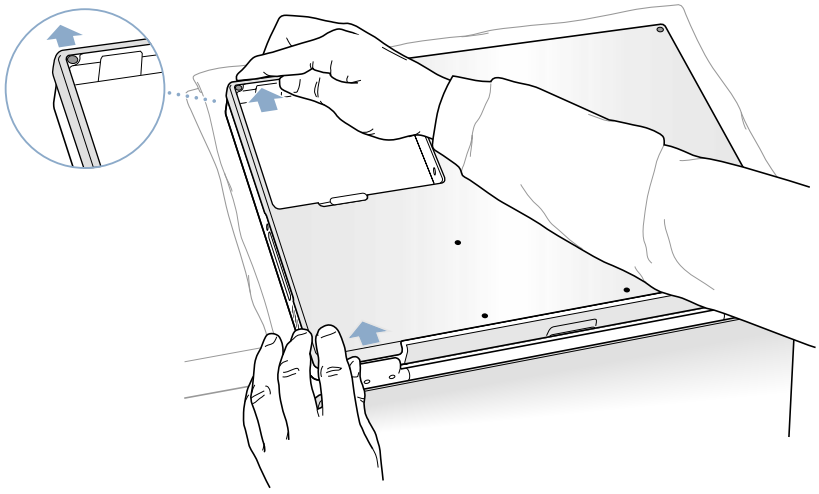


Note : The following three steps explain how to remove the bottom case by disengaging it at the left and right sides and then carefully pivoting it forward.

Important : During this procedure, do not push on the rubber feet of the bottom case.

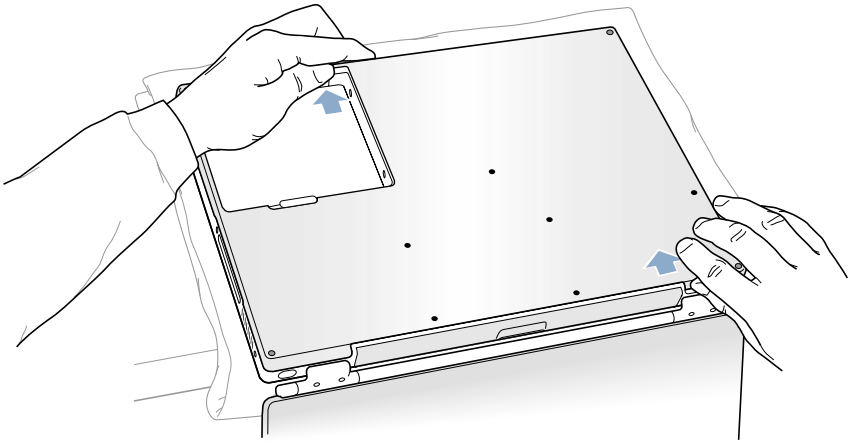
8. Place your hands on the bottom case as shown (**Figure 4**) and push away from you until the left side releases.

Figure 4



9. Place your hands on the bottom case as shown (**Figure 5**) and push away from you until the right side releases.

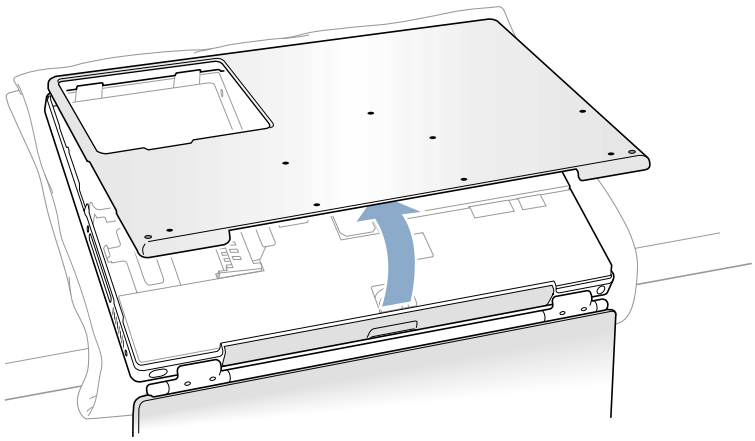
Figure 5



10. When both sides have released, lift up on the edge of the bottom case that is closest to you; carefully and evenly pivot it over the front edge of the computer until it releases (**Figure 6**).

Important : Do not twist the bottom case from side to side. Slide the case forward completely before lifting it up. If you feel any resistance when lifting the bottom case, double-check to make sure the case is slid all the way forward and releases from the front edge.

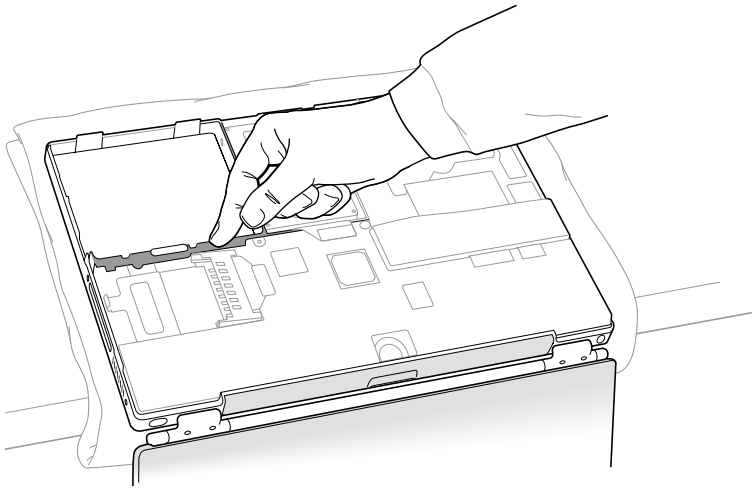
Figure 6



11. Touch the computer's inside framework (a dull gray conductive composite material) to discharge any static electricity, as shown (**Figure 7**).

Important : To avoid electrostatic discharge damage, always ground yourself by touching the computer's framework before you touch any parts or install any components inside the computer. To avoid static electricity building back up in your body, do not walk around the room until you have completed your installation and closed the computer.

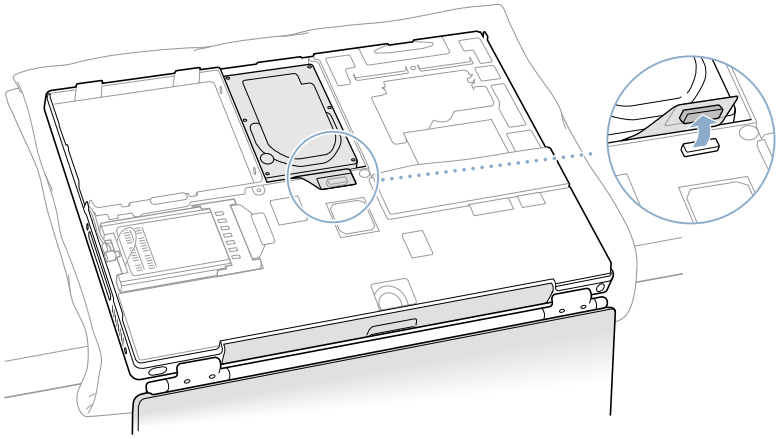
Figure 7



Removing the Installed Hard Drive

1. With your fingers, carefully pry up the hard drive cable connector (**Figure 8**) at its sides to disconnect it from the logic board. You may need to pry one side, then the other, in a rocking motion.

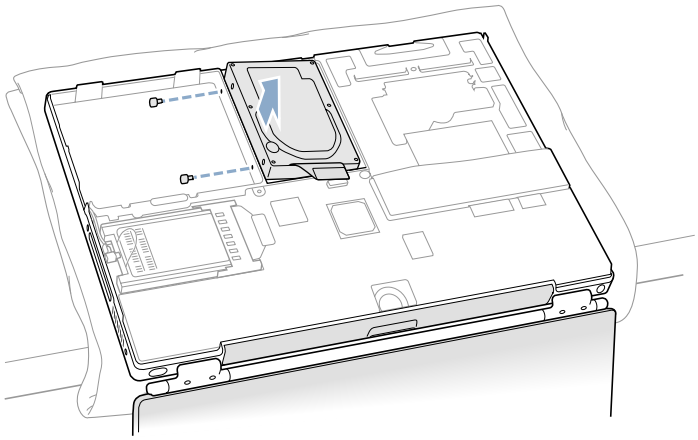
Figure 8



2. With a Torx T8 screwdriver, remove the two screws (**Figure 9**) that secure the hard drive to the mounting bracket and then gently remove the hard drive.

   Important : Do not pull on the connector cable or use the cable as a handle.

Figure 9



   Note : There are four rubber stoppers on the hard drive that fit over screws (two on each side). Remove any that may have fallen off or that remain in the holes in the mounting bracket inside the computer.

3. Replace the screws and rubber stoppers back onto the removed hard drive.

Installing the Replacement Hard Drive

Warning : To avoid potential injury, avoid touching or brushing against the thin strip of metal that extends up from the hard drive mounting bracket (Figure 10A).

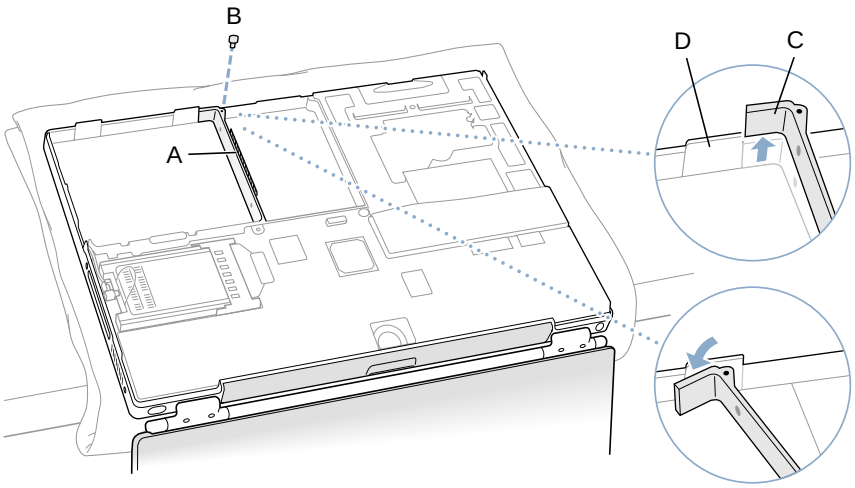
Important : Avoid touching the optical drive as you perform this procedure.

1. With a Torx T8 screwdriver, remove the screw from the top of the hard drive mounting bracket (**Figure 10B**).

2. Carefully lift the mounting bracket up (**Figure 10C**) and gently bend it around the first battery bay tab (**Figure 10D**). The tab holds the bracket out of the way.

   Warning : Lift the bracket just high enough to clear the battery bay tab. If you lift the bracket higher than the tab you risk damaging the bracket, and such damage is not covered by the limited warranty on your computer.

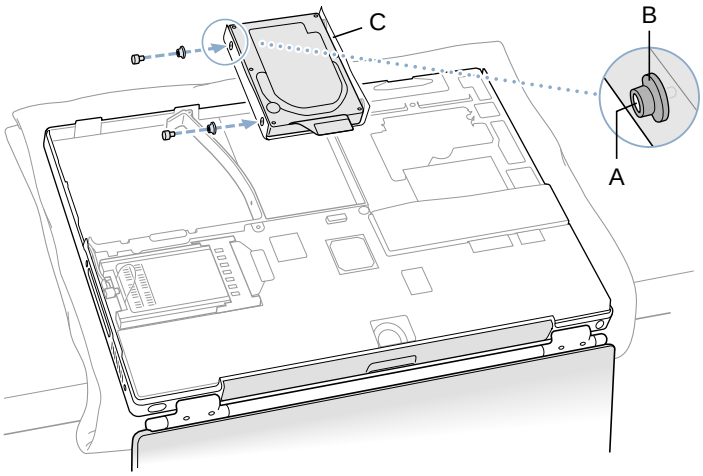
Figure 10



3. Verify that the replacement hard drive has four screws (**Figure 11A**), two on each side, with four rubber stoppers (**Figure 11B**) attached.

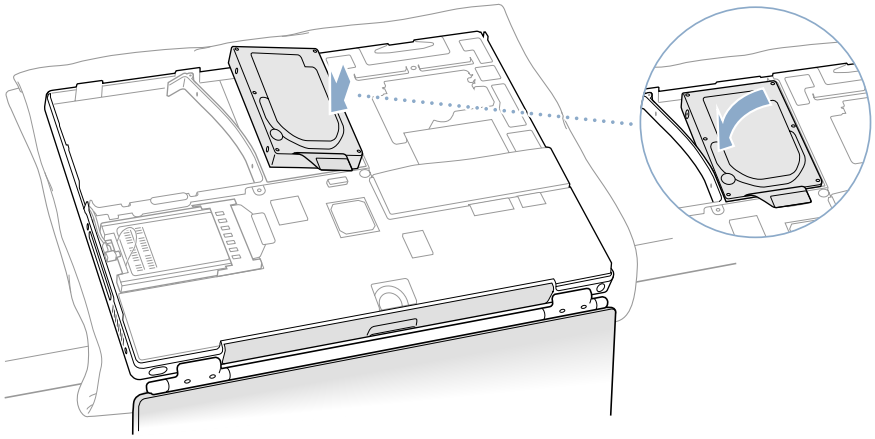
   Important : If any screws or stoppers have come off, screw the screws back onto the hard drive and then slide the rubber stoppers over them until they are against the drive. Make sure that the Mylar sheath (**Figure 11C**) wraps around the bottom and left and right sides of the drive, and that the rubber stoppers protrude through the holes in the sheath along the sides.

Figure 11



4. Insert the right side of the drive first, until the rubber stoppers fit securely into the holes in the bracket, and then insert the left side of the drive (**Figure 12**).

Figure 12



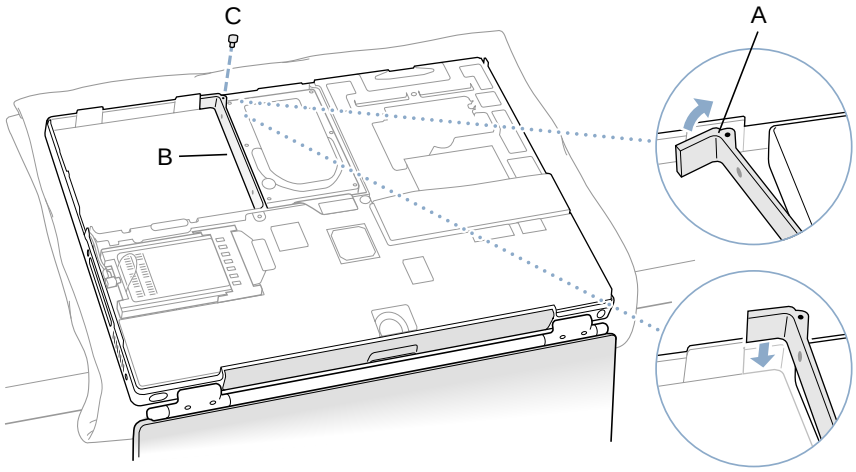
5. Lift the mounting bracket (**Figure 13A**) over the battery bay tab and lower it to its original position. Line up the rubber stoppers on the hard drive until they fully seat into the holes in the bracket.

   Note : To help with alignment, the Torx T8 screwdriver can be inserted into the screws on the hard drive through the holes in the mounting bracket.

   Important : Verify that the bottom of the mounting bracket clears and seats behind a thin metal ridge located along the bottom of the battery compartment (**Figure 13B**).

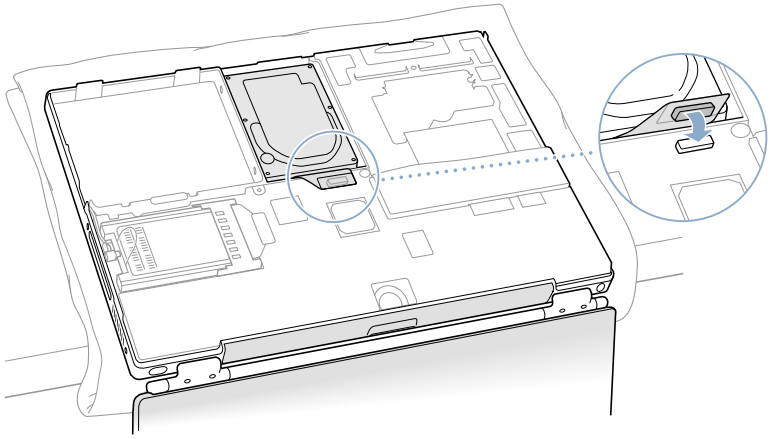
6. Replace the screw (**Figure 13C**) in the top of the mounting bracket, being careful not to overtighten it.

Figure 13



7. Connect the hard drive cable connector (**Figure 14**) to the logic board.

Figure 14



Closing the Computer

1. To replace the bottom case, place it over the bottom of the computer in the same orientation as the original bottom case.

2. Align the notches on the right and left sides of the case (some of these can be viewed through the battery opening). Then press down and toward you slightly to secure the case.

   Important : Make sure that the seams between the bottom case and the frame are closed. Verify that the case lies flat and fits properly around the battery latch and that the alignment tab that protrudes on the underside of the bottom case, shown in the illustration (**Figure 15A**), is seated properly.

   Note : To help with alignment, apply pressure to the bottom case at the back of the battery compartment opening, near the latch, and on the front and back outside edges of the case.

3. Check that the eight screw holes on the case align with the holes on the computer.

4. Replace the eight screws in the order shown in the illustration (**Figure 15**). Do not overtighten the screws or damage could result.

   Note : The screws must go in straight and easily; if they do not, readjust the bottom case for proper alignment.

   Important : To avoid damaging the case, be careful that the screwdriver tip does not slip out of the screw head during tightening.

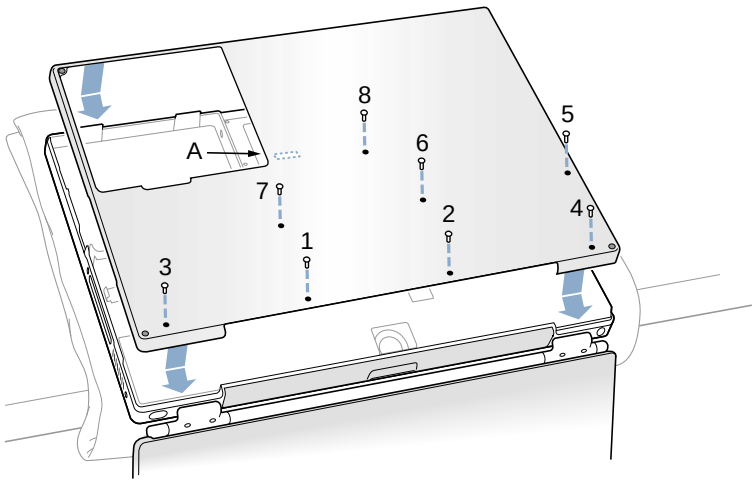


Figure 15

5. Replace the battery (**Figure 16**).

   Important : Make sure that the battery locks securely into place and that the battery latch is slid all the way into the locked position.

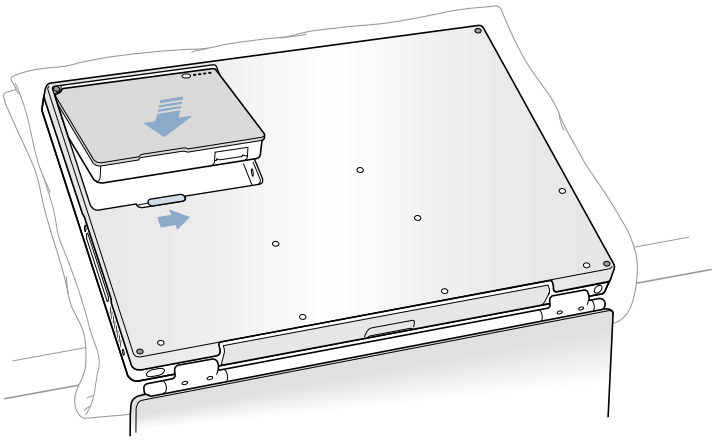
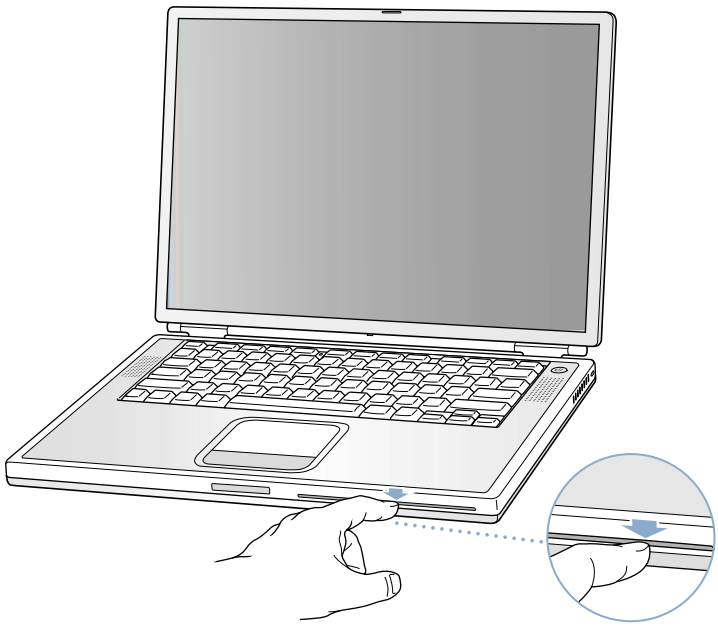


Figure 16

6. Turn the computer over so that the optical drive slot faces you. Verify that the bottom case is flush with the front edge of the slot. If the case is slightly bowed and there is a gap near the center of the slot, carefully pull the bottom edge of the slot until it clicks into place and becomes flush with the bottom case (**Figure 17**).

Figure 17



7. Reconnect the power cord and any other cables that were connected, and restart your computer.

   Warning : Never turn on your computer unless all of its internal and external parts are in place and it is closed. Operating the computer when it is open or missing parts can damage your computer or cause injury.

8. Restore the data from your backup to the new drive.

9. Check the operation of the optical drive. If the hard drive is installed incorrectly, the optical drive mechanism might not spin correctly and will result in mechanical noise when playing a disc.

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Apple Computer, Inc.
1 Infinite Loop
Cupertino, CA 95014-2084
USA
+ 1 408 996 1010
http://www.apple.com

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DVD-ROM Optical Drive
Replacement Instructions

The following instructions explain how to replace the DVD-ROM optical drive in the PowerBook G4 (Gigabit Ethernet) computer. The computer supports either a DVD-ROM drive or a CD-RW drive.

Tools

- Soft towel or cloth, larger than the PowerBook
- Black stick (or other nonconductive nylon or plastic tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Bottom case

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Procedure

1. With the computer open and sitting upright, use a black stick to pry up the EMI clip from the rib frame as shown. Reserve the clip for installation of the replacement drive.

2. **Important:** With the bottom case removed, be careful when turning over the computer. Some components could become loose and fall out.

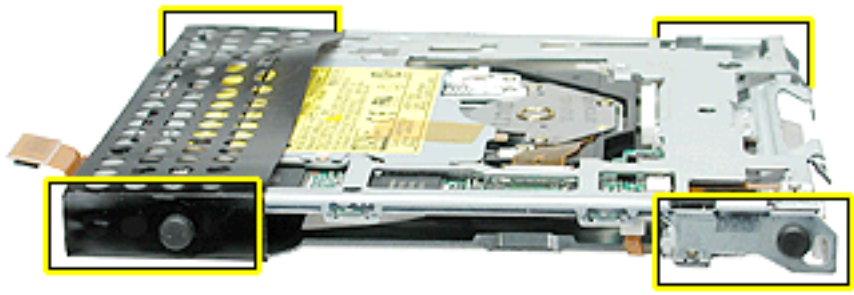
   Turn over the computer and carefully pry up the DVD-ROM drive cable connector to disconnect it from the logic board.

   Note: If tape is covering the cable connector, carefully peel the tape back to expose the connector. Reserve the tape for application on the replacement drive connector.

3. Locate the metal spacer that fits between the drive and the front bezel.
4. Remove the spacer by flexing the front bezel out while pulling up on the hinged metal spacer.

Note: When installing the replacement drive, insert the hooks on the metal spacer into the drive chassis, as shown.

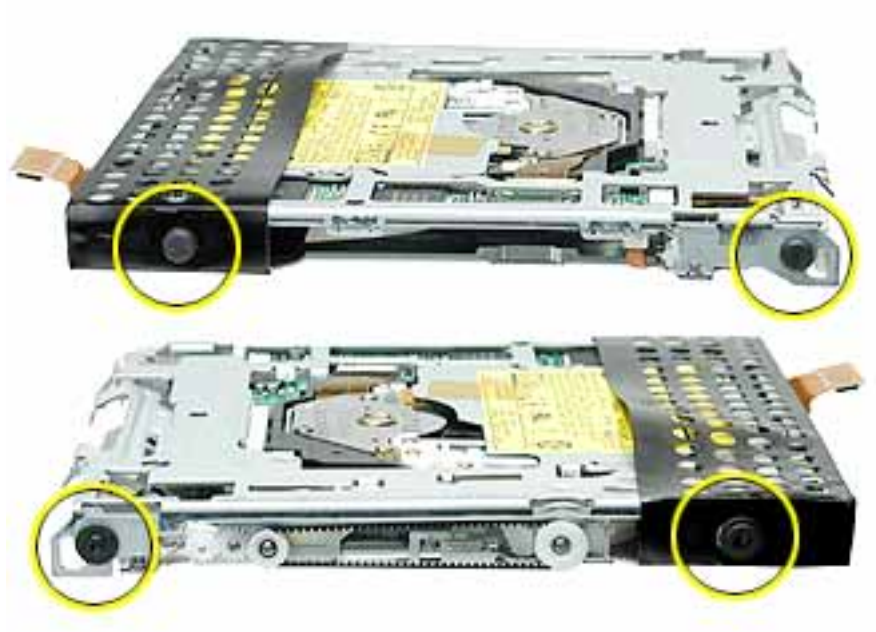
5. **Important:** To prevent damage to the optical drive, handle the drive only by the corners of the drive as shown by the highlighted safe areas.



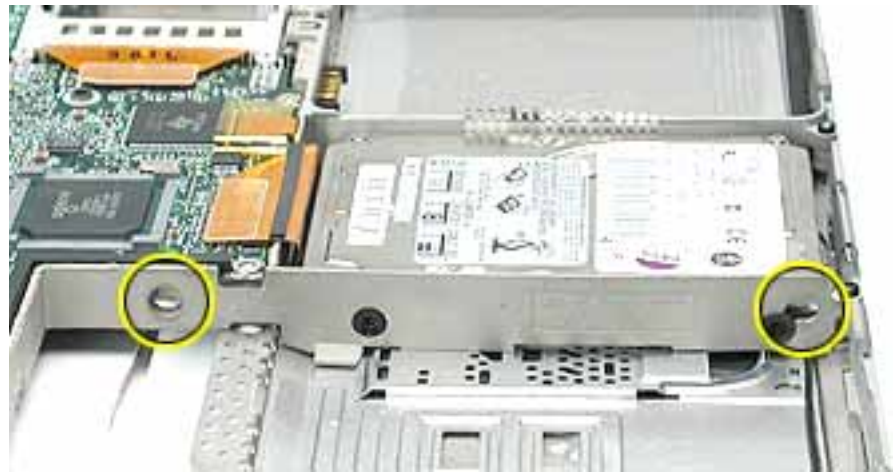
6. Gently pull up on the outer side of the drive to remove it.

Note: There are four rubber stoppers (two on each side) on the DVD-ROM drive that fit over screws. Remove any that may have fallen off inside the computer.

7. **Important:** Before installing the replacement drive, ensure that the rubber stoppers are in the correct locations. There are three types of rubber stoppers on the drive. The outer side of the drive has two identical rubber caps that completely hide the screws beneath them. The inner side of the drive has two different stoppers:
   - Flat rubber ring over the screw closest to the hard drive
   - Raised rubber ring over the screw closest to the logic board



When installing the replacement drive, first insert the stoppers on the inner side of the drive into the openings on the rib frame. Then while holding the inner side of the drive in place, carefully guide the rubber stoppers on the outer side of the drive past the edge of the rib frame.



Important: Verify that the DVD-ROM drive cable does not get caught on the rib frame as the drive is lowered into place. When the rubber stoppers are inserted, push down on the side. Press at all four corners of the drive to verify that it rests flat and is secure.

8. Reassemble and test the computer.

Important: Check the operation of the optical drive. If the drive is installed incorrectly, the optical drive mechanism might not spin correctly and will result in mechanical noise when playing a disc.

CD-RW Optical Drive
Replacement Instructions

The following instructions explain how to replace the CD-RW optical drive in the PowerBook G4 (Gigabit Ethernet) computer. The computer supports either a CD-RW drive or a DVD-ROM drive.

Tools

- Soft towel or cloth, larger than the PowerBook
- Black stick (or other nonconductive nylon or plastic tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Bottom case

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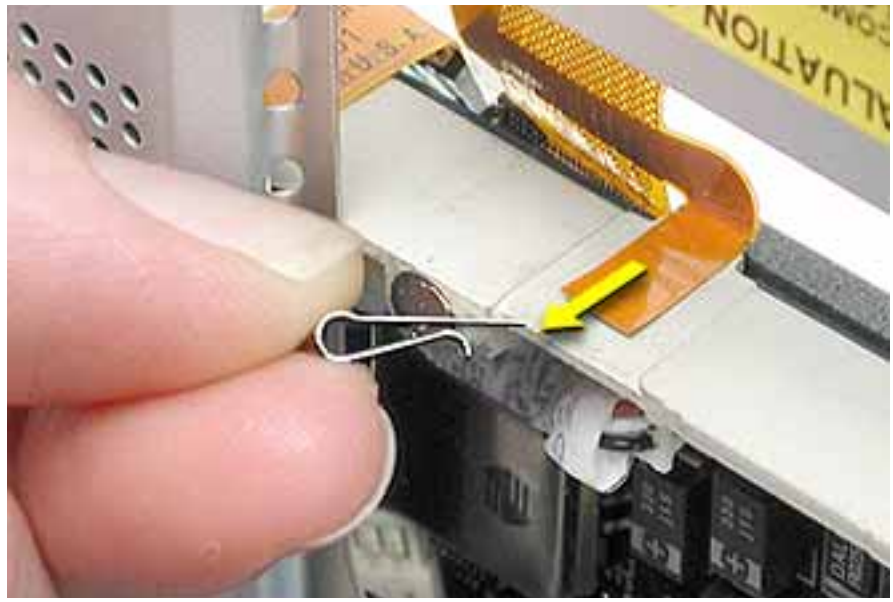
Procedure

1. With the computer open, slide the EMI clip off the rib frame as shown. Reserve the clip for installation of the replacement drive.



2. **Important:** With the bottom case removed, be careful when turning over the computer. Some components could become loose and fall out.

   Turn over the computer and carefully pry up the CD-RW drive cable connector to disconnect it from the logic board.

   Note: If tape is covering the cable connector, carefully peel the tape back to expose the connector. Reserve the tape for application on the replacement drive connector.

3. **Warning: To prevent damage to the optical drive, handle the drive only by the corners. Do not press on the body of the drive.**

   Gently pull up on the outer corners of the drive to remove it.

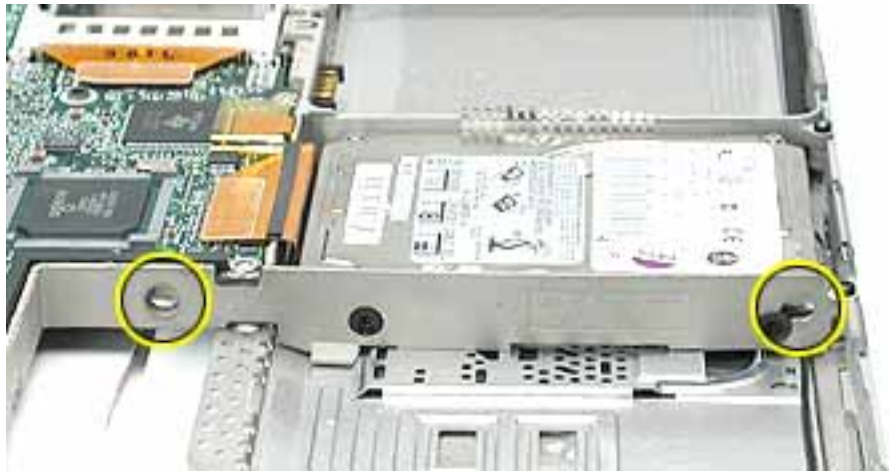
Note: There are four rubber stoppers (two on each side) on the DVD-ROM drive that fit over metal posts at the corners of the drive. Remove any that may have fallen off inside the computer.

4. **Important:** Before installing the replacement drive, ensure that the rubber stoppers are in the correct locations. There are three types of rubber stoppers on the drive. The inner side of the drive has two different stoppers:
   - Flat rubber ring fits over the post closest to the hard drive
   - Raised rubber ring fits over the post closest to the logic board

   The outer side of the drive has two identical rubber caps that completely hide the posts beneath them.

5. **Warning: To prevent damage to the optical drive, handle the drive only by the corners. Do not press on the body of the drive.**

   When installing the replacement drive, first insert the stoppers on the inner side of the drive into the openings on the rib frame. Then while holding the inner side of the drive in place, carefully guide the rubber stoppers on the outer side of the drive past the edge of the rib frame.



   Important: When the rubber stoppers are inserted, push down on all four corners of the drive to verify that the drive is level and secure.

6. Reassemble and test the computer.

7. **Important:** Check the operation of the optical drive. If the drive is installed incorrectly, the optical drive mechanism might not spin correctly and will result in mechanical noise when playing a disc.

Combination CD-RW/DVD-ROM Optical Drive
Replacement Instructions

The following instructions explain how to replace the combination CD-RW/DVD-ROM optical drive in the PowerBook G4 (Gigabit Ethernet) computer.

Note: Depending on the configuration of a customer's computer, the optical drive can be a CD-RW drive, a DVD-ROM drive, or a combination CD-RW/DVD-ROM drive.

Tools

- Soft towel or cloth, larger than the PowerBook
- Black stick (or other nonconductive nylon or plastic tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Bottom case

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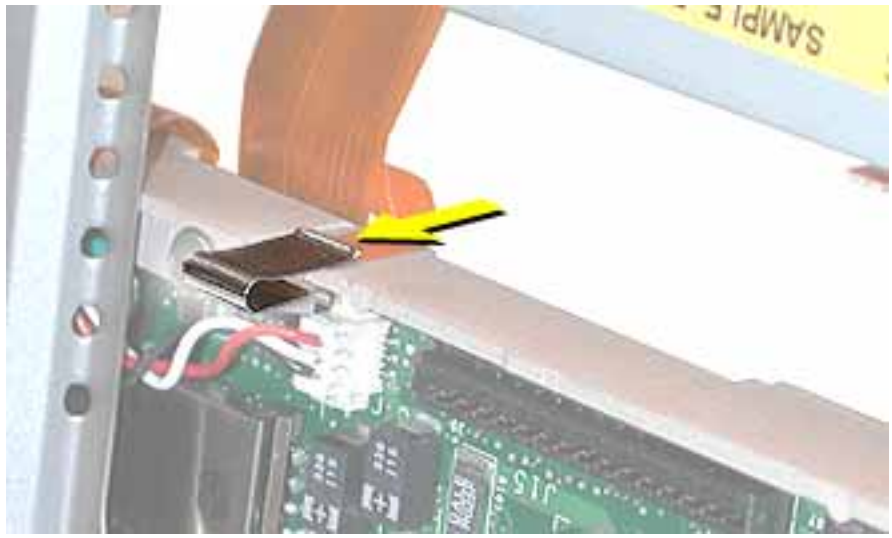
Procedure

1. With the computer open, slide the EMI clip off the rib frame as shown. Reserve the clip for installation of the replacement drive.



2. When installing the replacement drive, ensure that the flex cable folds over the rib frame before you install the EMI clip.

3. **Important:** With the bottom case removed, be careful when turning over the computer. Some components could become loose and fall out.

   Turn over the computer and carefully pry up the optical drive cable connector to disconnect it from the logic board.

   Note: If tape is covering the cable connector, carefully peel the tape back to expose the connector. Reserve the tape for application on the replacement drive connector.

4. **Warning: To prevent damage to the optical drive, handle the drive only by the corners. Do not press on the body of the drive.**

   Gently pull up on the outer corners of the drive to remove it.

   Note: There are four rubber stoppers (two on each side) on the drive that fit over metal posts at the corners of the drive. Remove any that may have fallen off inside the computer.

5. **Important:** If you notice that the felt strip for the slot-load area is torn or damaged, replace the felt strip with a new one before replacing the optical drive. Follow the instructions below to replace the felt strip:

   Locate the felt strip that came with the replacement drive. Before you remove the old felt strip, note the alignment of the felt strip over the slot-load area in the inner top case.

   Peel off the felt strip from the inner top case. If there is any residual adhesive on the top case, rub it away.

   Apply the new felt strip to the slot-load area. Make sure the new felt strip lies flat. Use a black stick to run the length of the slot to make sure that the felt strip does not block any of the slot.

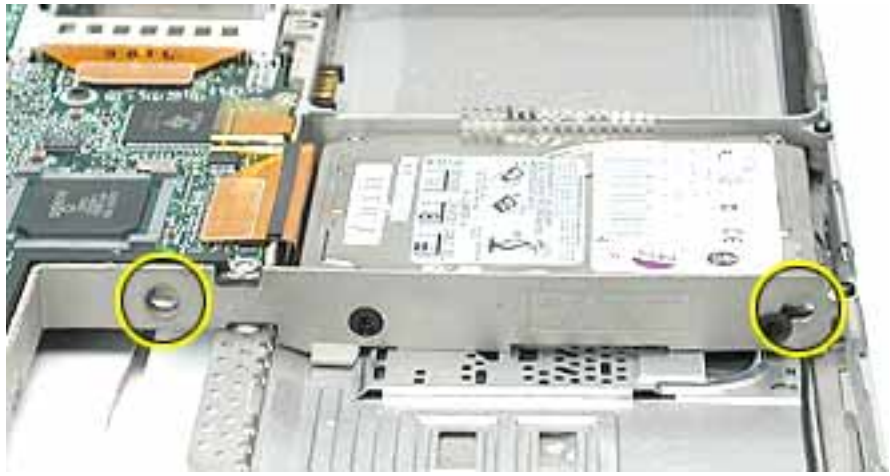
   Note: Following are the differences among the felt strips for the optical drives:
   - For the DVD-ROM drive, the strip is rounded at both ends and has an eject hole.
   - For the CD-RW drive and the combination drive, the felt strip is squared off at one end and has no eject hole.

6. **Important:** Before installing the replacement drive, ensure that the rubber stoppers are in the correct locations. There are three types of rubber stoppers on the drive. The inner side of the drive has two different stoppers:
   - Flat rubber ring fits over the post closest to the hard drive
   - Raised rubber ring fits over the post closest to the logic board

   The outer side of the drive has two identical rubber caps that completely hide the posts beneath them.

7. **Warning: To prevent damage to the optical drive, handle the drive only by the corners. Do not press on the body of the drive.**

   When installing the replacement drive, first insert the stoppers on the inner side of the drive into the openings on the rib frame. Then while holding the inner side of the drive in place, carefully guide the rubber stoppers on the outer side of the drive past the edge of the rib frame.



   Important: When the rubber stoppers are inserted, push down on all four corners of the drive to verify that the drive is level and secure.

8. Reassemble and test the computer.

9. **Important:** Check the operation of the optical drive. If the drive is installed incorrectly, the optical drive mechanism might not spin correctly and will result in mechanical noise when playing a disc.

Backup Battery
Replacement Instructions

The following instructions explain how to replace the backup battery in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth, larger than the PowerBook
- Black stick (or other nonconductive nylon or plastic tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Bottom case
- Optical drive

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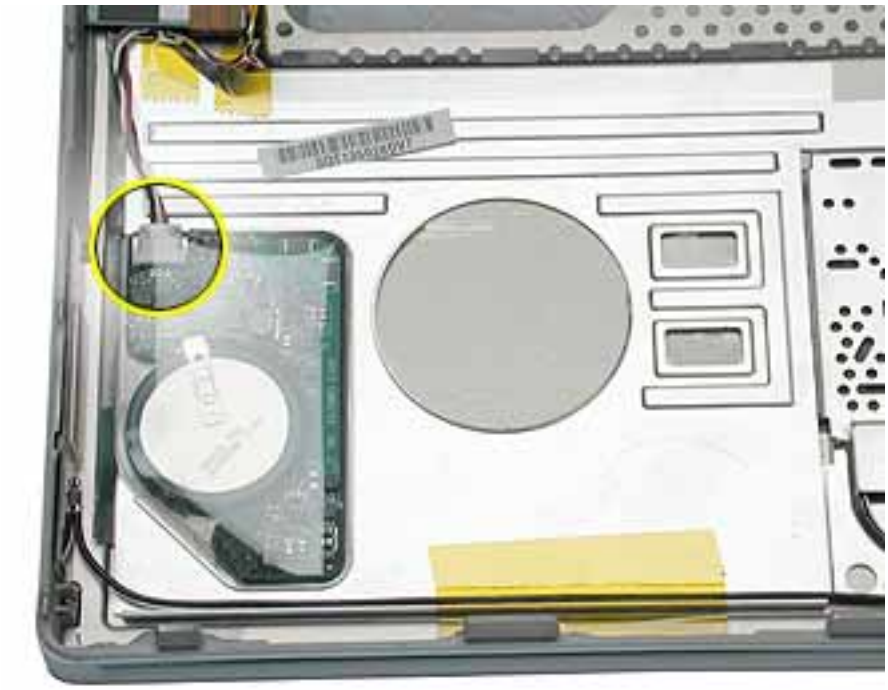
Procedure

1. Disconnect the backup battery cable from the backup battery.

   Note: If the cable connector gets caught on the ridged area of the top case, use a black stick to raise up the backup battery and then disconnect the cable.



2. **Note:** The backup battery is compressed between two thin plastic sheets. The battery is held in place with adhesive on the lower plastic sheet.

   Slide a black stick under and along the edge of the backup battery. Pry up the backup battery so that the entire battery—including the lower plastic sheet—is removed from the inner top case.

3. **Warning: The ridged area of the top case is sharp.**

   If there is any adhesive left on the surface of the inner top case, use a black stick to rub it away. Do not use solvents.

   Note: When installing the replacement backup battery, make sure the inner top case is clean and free of debris.

4. Peel off the cover sheet from the bottom surface of the replacement backup battery to expose the adhesive.
5. When positioning the replacement backup battery on the inner top case, make sure the battery fits within the ridged battery area of the inner top case.

6. Install the replacement backup battery, and reassemble and test the computer.

Logic Board
Replacement Instructions

The following instructions explain how to replace the logic board in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth, larger than the PowerBook
- Torx T8 screwdriver
- Black stick (or other nonconductive plastic or nylon tool)
- Razor blade
- Needlenose pliers (optional)

Note: To organize the screws you remove from the computer, use a tray with divided compartments (such as a plastic ice cube tray).

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)

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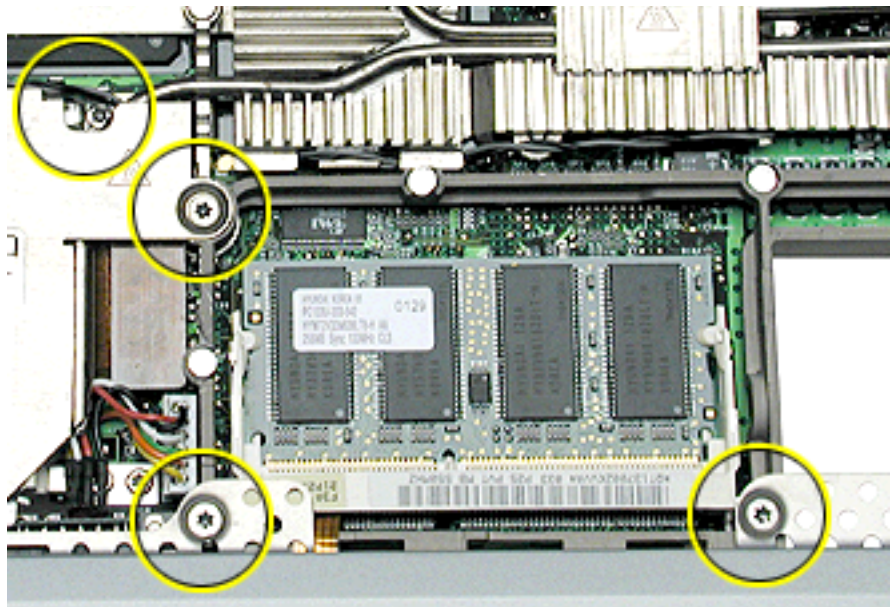
Procedure

1. With the computer open, remove the three identical Torx T8 screws that border the memory area of the logic board.
2. Remove the smaller Torx T8 screw near the heat pipe.



3. Disconnect the PC card flex cable connector and the keyed battery connector.

   Important: If the battery connector has not been disconnected before, the keyed connector may be tight. If necessary, use a black stick or needlenose pliers to loosen one side of the connector and then the other side. Then insert the black stick under the cables to pry up and disconnect the connector.

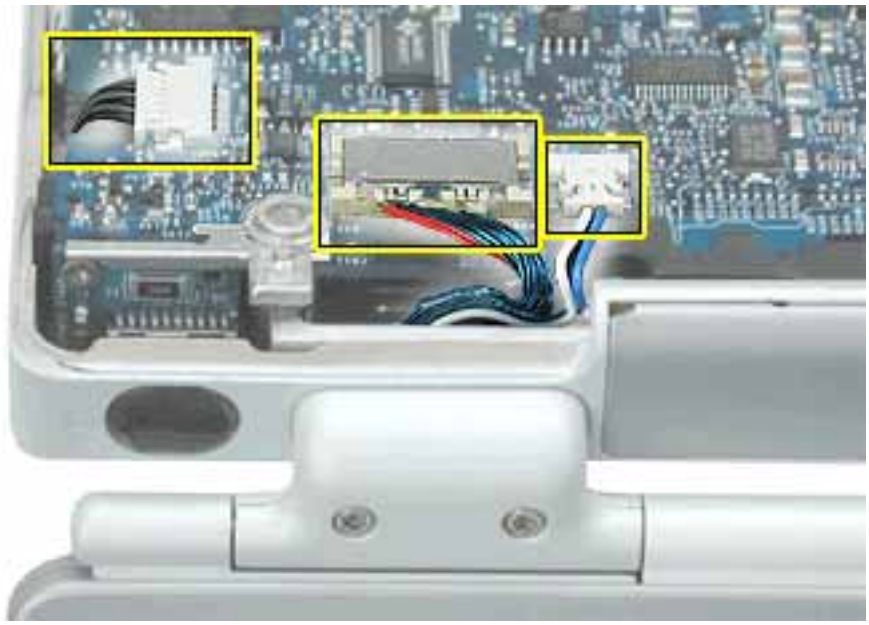
   Note: When reassembling the computer, tuck down the battery cables so they do not get in the way when the keyboard is installed.

4. Disconnect the shielded, 3-pin backup battery connector from the logic board.

5. **Important:** With the bottom case removed, be careful when turning over the computer. Some components could become loose and fall out.

   Warning: The thin cables connected to the LVDS (low voltage data signal) connector are extremely delicate. Do not pull or pinch the LVDS cables. Be especially careful when working near cables that attach to the display. If any of these cables are damaged, the entire display module must be replaced.

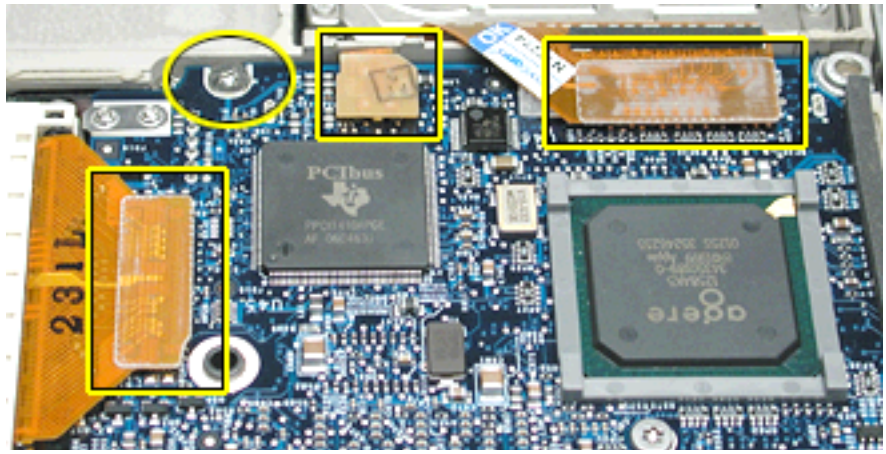
   Turn over the computer so the display rests lightly in your lap. At the left side of the logic board, disconnect the two-pin sleep LED cable connector, the LVDS connector, and the six-pin audio connector.



6. Disconnect the AirPort Card cage connector.
7. Remove the Torx T8 screw at the corner of the logic board.

   Important: When installing the replacement logic board, install this screw first. This screw helps the logic board align properly to the rib frame.
8. Disconnect the trackpad connector and the hard drive connector.

   Note: If tape is covering the trackpad connector, reserve the tape for installation of the replacement logic board.



9. Remove the two identical Torx T8 screws and their washers, located near the center of the board.

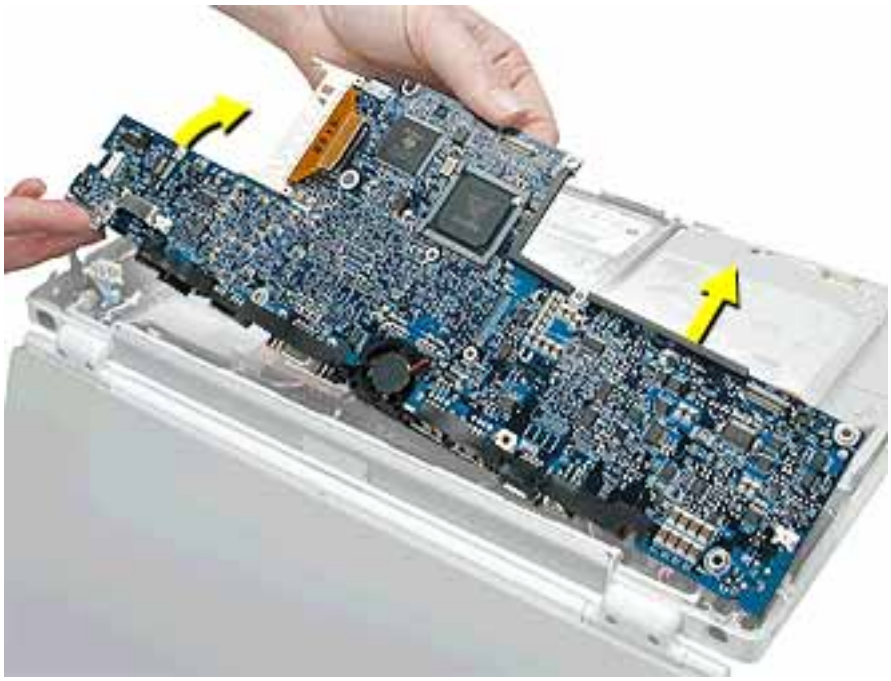
   Note: When reassembling the computer, do not overtighten the screws.

10. At the right side of the board, as shown, remove the Kapton tape (reserve it for reassembly) and disconnect
    - optical drive connector
    - inverter board connector

11. Remove the Kapton tape from the two-pin power switch connector at the right corner of the logic board. Disconnect the two-pin connector.

12. Grasp the logic board near the AirPort Card carrier. Gently tilt up the board, being careful where it catches on the back panel ports, integral mesh liner, and the disconnected cables.

    If necessary, open the panel door and press on the ports to free the logic board from the back panel.

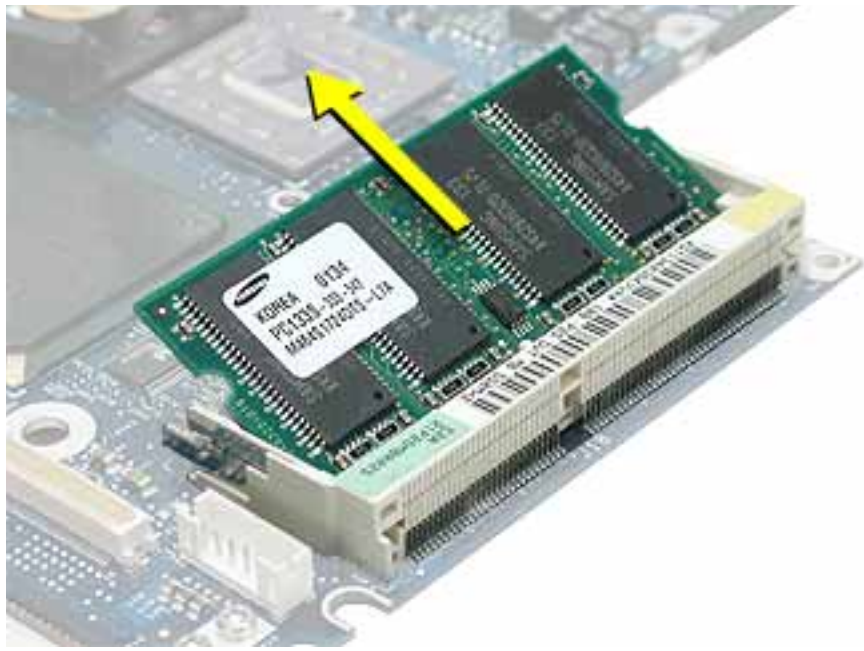


Note: When reassembling the computer, make sure the replacement logic board ports align completely with the openings in the back panel.

Note: When positioning the replacement logic board into the computer, check that cables and connectors do not get caught under the board. Tilt the logic board toward the back panel, and place the following cables into the notches in the board:

- Power switch cable (reapply tape over the cable, if applicable)
- Backlight cable
- LVDS cable
- Audio cable

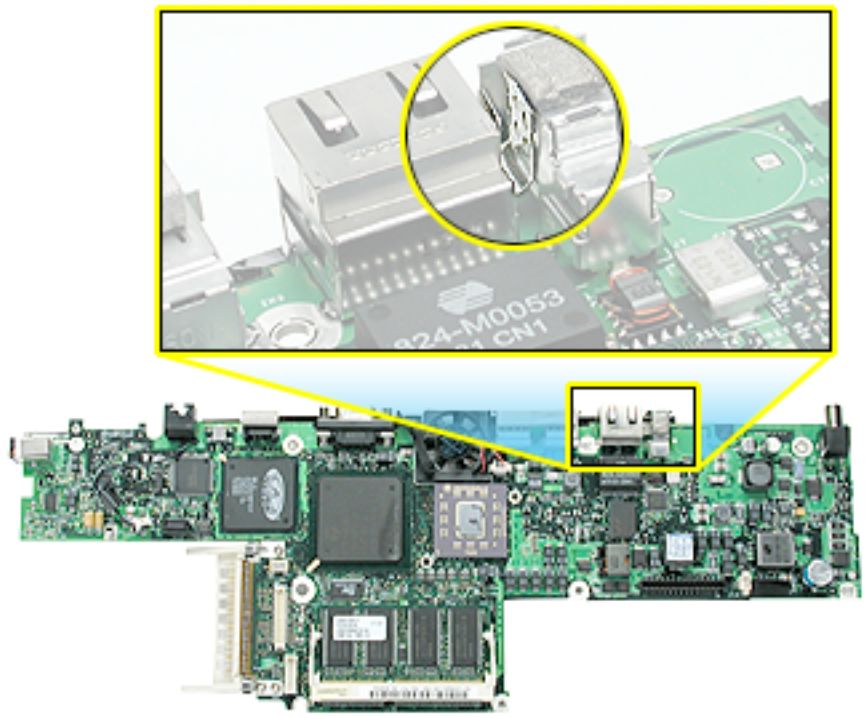
13. Remove existing memory cards from the logic board for installation on the replacement logic board.

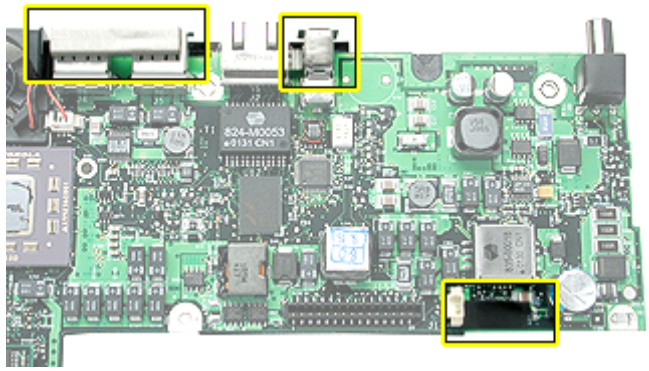


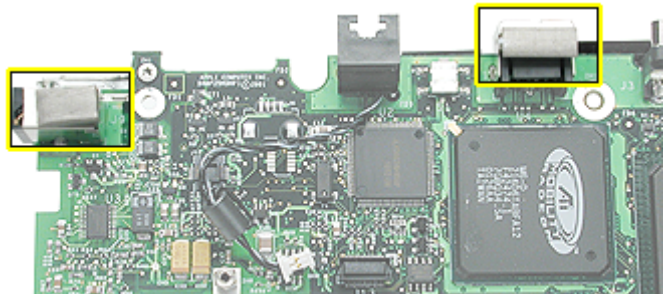
14. Remove the single Torx T6 screw from the metal bracket holding the infrared communications board.

15. Remove the infrared communications board for installation on the replacement logic board.

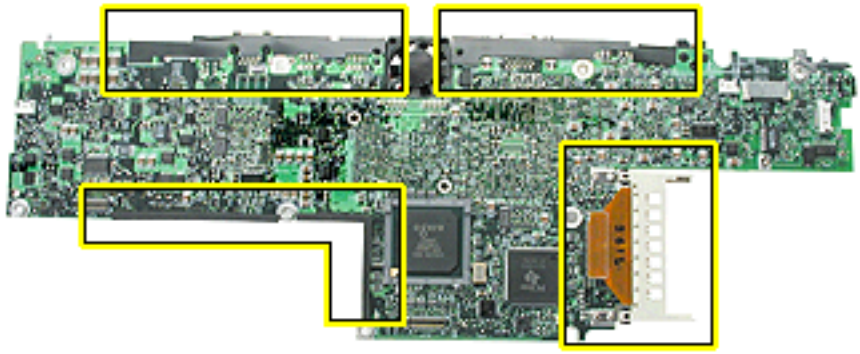
16. Make sure the top of the replacement logic board includes the following items. If not, transfer these items from the original logic board to the replacement board:
    - U-shaped shim between FireWire and Ethernet ports
    - Rectangular plastic shim near keyboard connector
    - Spongy mesh pads adhered to two USB ports, FireWire port, TV out port, and headphone port







17. Make sure the underside of the replacement logic board includes the following items:
    - Left and right plastic panels at ports
    - AirPort Card carrier
    - Adhesive foam strips

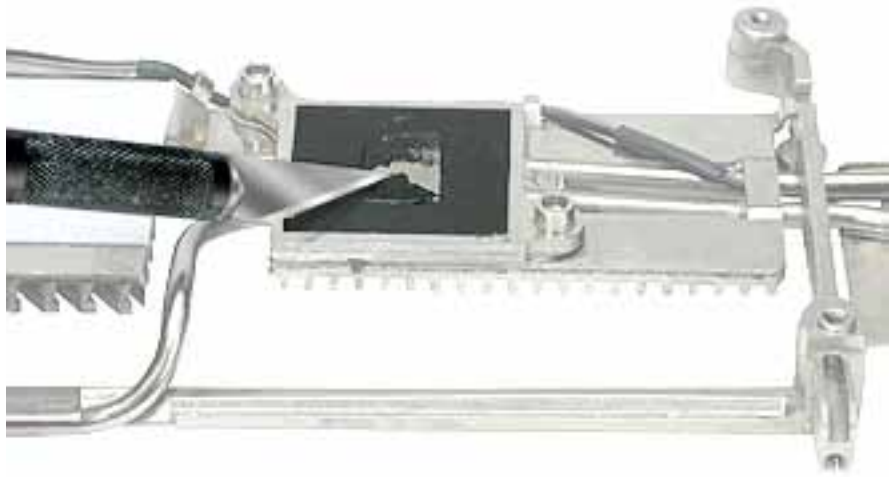


18. Check that the heat exchanger has two square thermal interface pads in place. If the pads are missing or damaged, replace them.

19. **Important:** If you have removed the logic board to access another part, and you will be placing the original logic board back in the computer, use a razor blade to gently scrape away any residual thermal transfer material from the heat exchanger and the microprocessor chip.

    Warning: When scraping away the thermal transfer material from the microprocessor chip, be careful not to nick the microprocessor chip.

    Apply new thermal transfer material to the microprocessor chip as described in the next step.



20. On the replacement logic board, center new thermal transfer material over the epoxy cap on the microprocessor chip. Press it into place.

21. Install the replacement logic board, and reassemble and test the computer.

Fan
Replacement Instructions

The following instructions explain how to replace the fan in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth, larger than the PowerBook
- Black stick (or other nonconductive nylon or plastic tool)
- Razor blade
- Needlenose pliers

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)
- Logic Board

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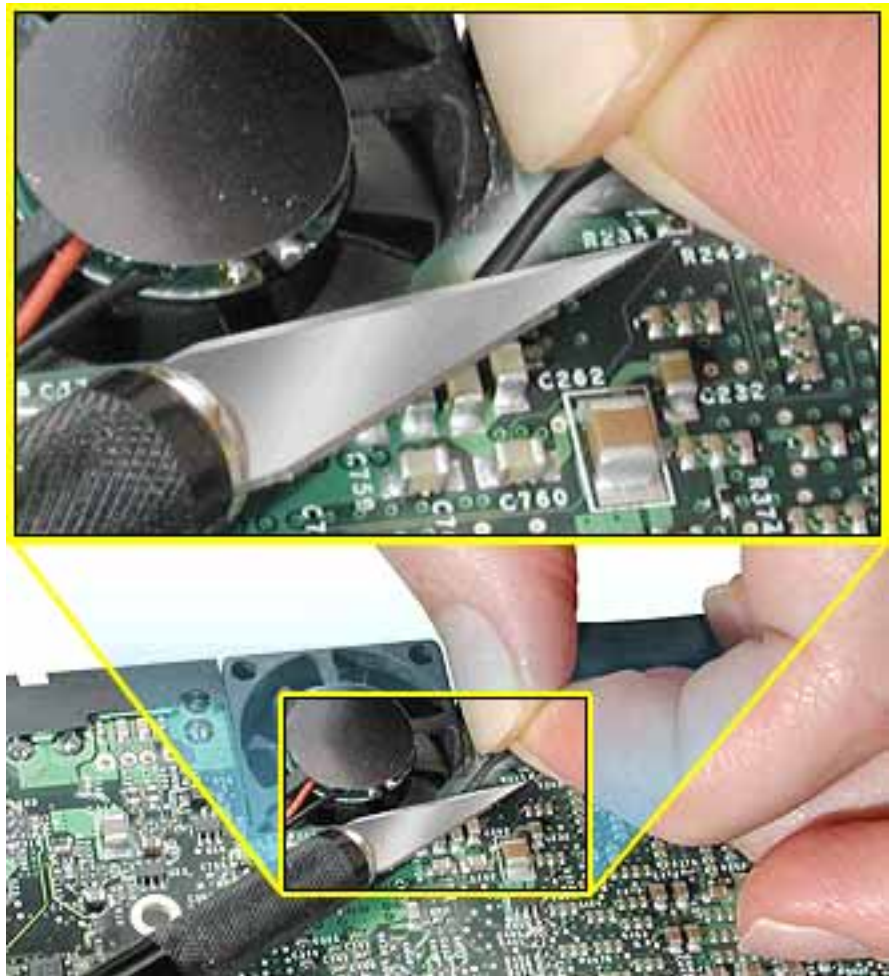
Procedure

1. With the logic board removed from the computer, disconnect the fan connector from the logic board.

2. Turn over the logic board, and locate the cone-shaped pin at the right corner of the fan. Pull the rubber pin tight. Use a razor blade to cut through the rubber pin.



3. Turn over the logic board, and tilt up the fan to remove it completely from the logic board.

   Note: The fan is secured to the logic board by a spongy, rubber adhesive lining on three sides of the bottom of the fan. If there is any adhesive stuck to the surface of the logic board, remove it by rubbing it away. Do not use solvents.

4. When installing the replacement fan, first use a black stick to push the cone-shaped rubber pin into the hole on the logic board. (If necessary, use needlenose pliers to pull the rubber pin through to the other side of the logic board.) Then, peel away the protective cover from the adhesive that lines the three sides of the fan. Align the fan over the logic board opening and press the fan into place.

   Note: If the cone-shaped rubber pin is too long, use a razor blade to cut the extra length.

5. With the replacement fan installed securely and the fan connector connected to the logic board, reassemble and test the computer.

PC Card Cage
Replacement Instructions

The following instructions explain how to replace the PC card cage in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth larger than the PowerBook
- Torx T8 screwdriver

Note: To organize the screws you remove from the computer, use a tray with divided compartments (such as a plastic ice cube tray).

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)
- Logic board

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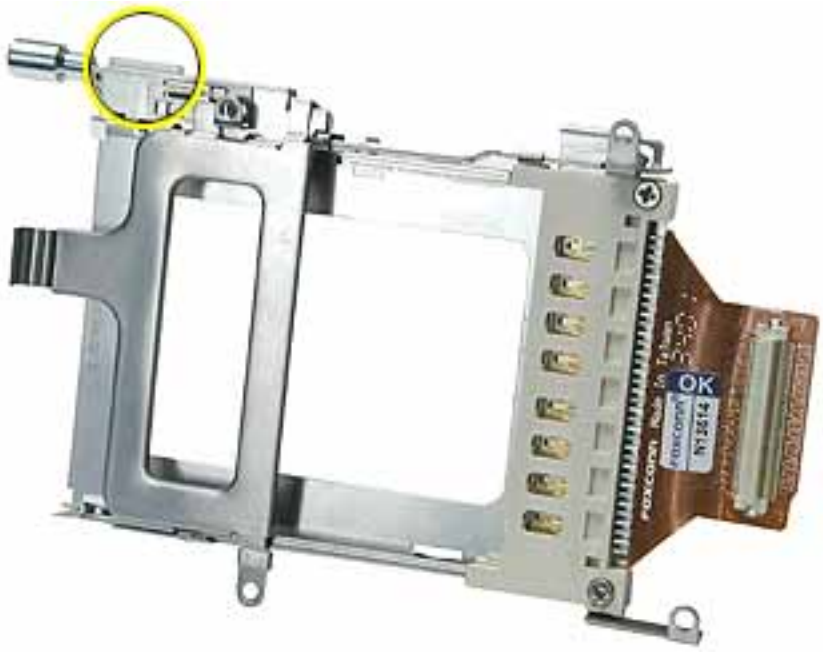
Procedure

1. With the computer on a soft cloth, remove the two screws that attach the PC card cage to the rib frame. (The longer screw is next to the battery connector.)

2. Lift out the PC card cage, being careful where it can catch on the PC card eject button.
3. Check that the replacement PC card cage includes a clear plastic shim on the outer frame near the PC card eject button. If the shim is not there, transfer the shim from the old PC card cage to the replacement PC card cage.



4. When installing the replacement PC card cage, ensure that the metal flange that is closest to the PC card eject button goes underneath the rib frame and metal liner at the battery latch.

5. Install the replacement PC card cage, and reassemble and test the computer.

Rib Frame and Heat Exchanger Replacement Instructions

The following instructions explain how to replace the rib frame and the heat exchanger in the PowerBook G4 (Gigabit Ethernet) computer.

Warning: Make sure you carefully follow these instructions, especially when working near cables that attach to the display module. If any of the cables are damaged, the entire display module must be replaced.

Tools

- Soft towel or cloth larger than the PowerBook
- Black stick (or other nonconductive nylon or plastic tool)
- Torx T8 screwdriver
- #1 Phillips screwdriver
- Torx T6 screwdriver

Note: To organize the screws you remove from the computer, use a tray with divided compartments (such as a plastic ice cube tray).

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)
- Hard drive
- Optical drive
- Logic board
- PC card cage

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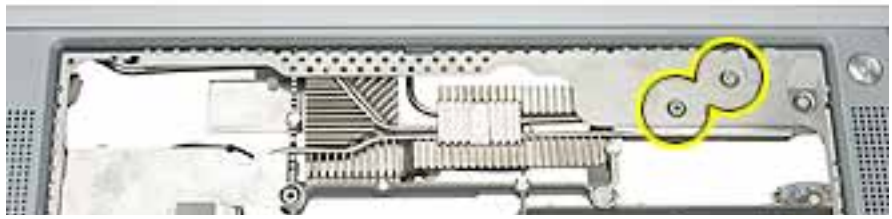
Procedure

1. With the computer on a soft cloth, remove the two identical screws from the top case.



2. Close the computer to an approximate 45-degree angle, and stand it on a soft cloth with the clutch covers facing up.
3. Remove the four identical Torx T8 screws from the clutch covers (two screws on each clutch cover).

4. Use a black stick to pry off the two clutch covers.

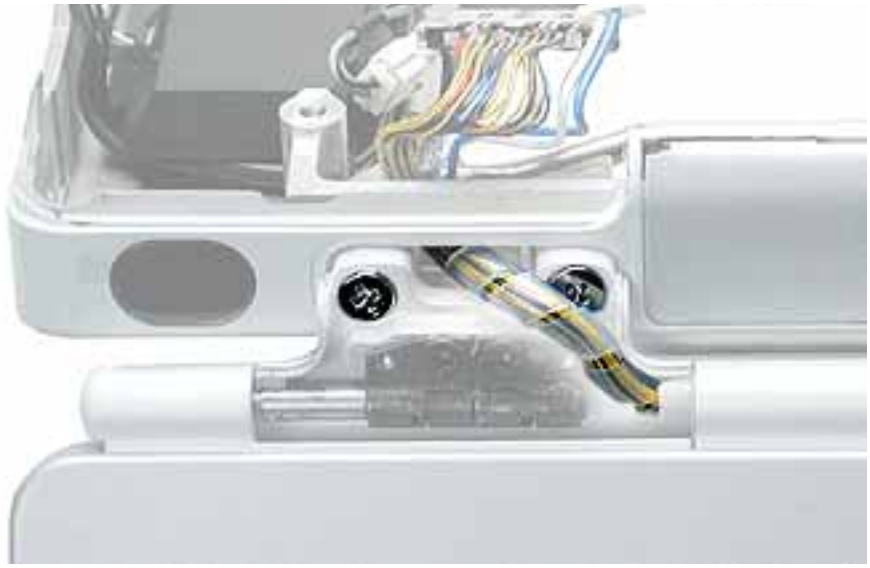
5. Open the computer so that the display rests in your lap and is protected by a soft cloth.
6. **Warning: Be especially careful when working near cables that attach to the display. If any of these cables are damaged, the entire display module must be replaced.**

   Warning: At the left clutch, the wrapped cable connected to the LVDS (low voltage data signal) connector is extremely delicate. Do not pull or pinch the LVDS cable. Do not allow the screwdriver to touch the LVDS cable.

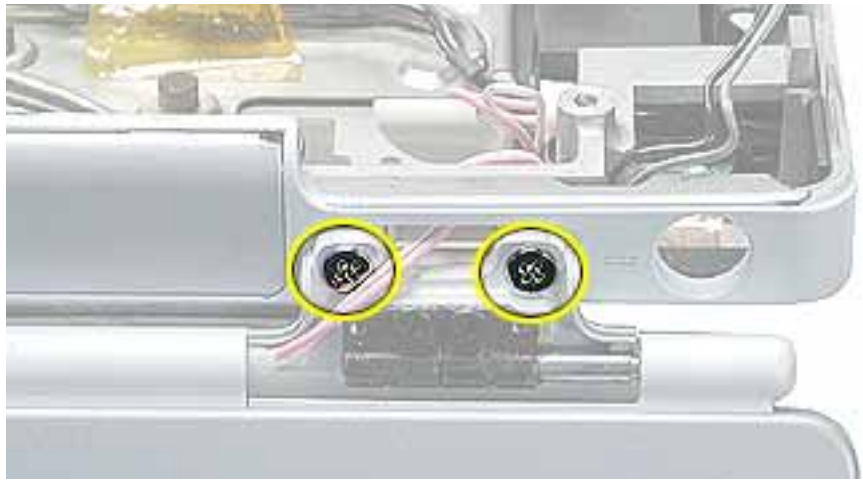
   Locate the two large silver-colored screws. Gently move aside the LVDS cable so you can access the screws.

   Remove the two silver-colored Phillips screws from the left clutch. Notice that the screw closest to the LVDS cable has a sloped screw head.

   Important: When installing the replacement display, make sure the screw closest to the LVDS cable is the screw with the sloped head.

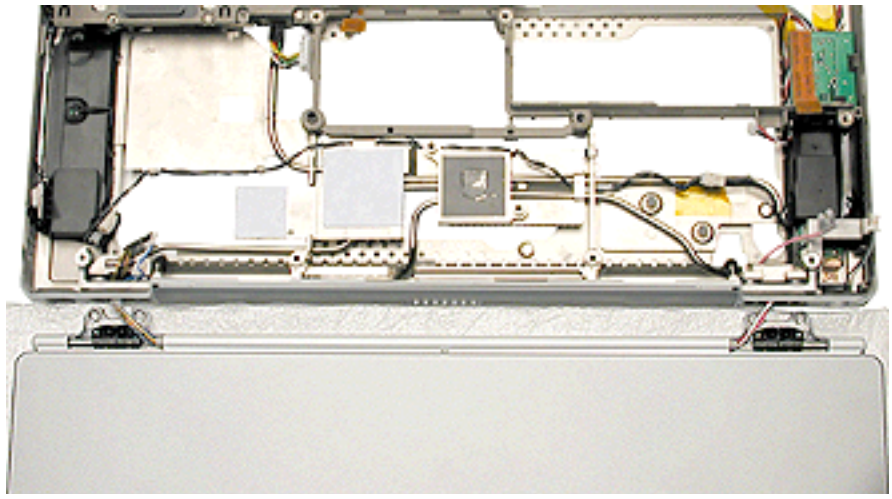


7. At the right clutch, note the routing of the inverter cable. Without straining the inverter cable, gently move it aside so you can access the two large silver-colored screws.
8. Support the display as you remove the two identical, large, silver-colored Phillips screws from the right clutch. (Do not remove the smaller screws.)



9. **Important:** With the display hinge disconnected, support the display as you place it face-down on a soft cloth in front of the computer chassis.

   Warning: Do not separate the display cables from the computer chassis. Do not strain the cables.

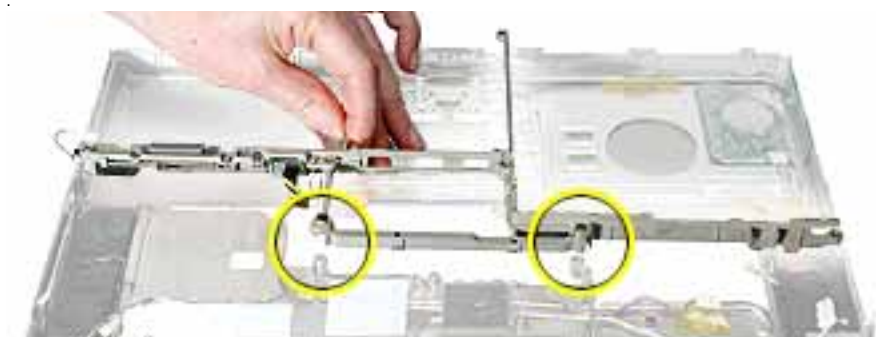


10. Open the I/O door, and remove the four identical Torx T6 screws.

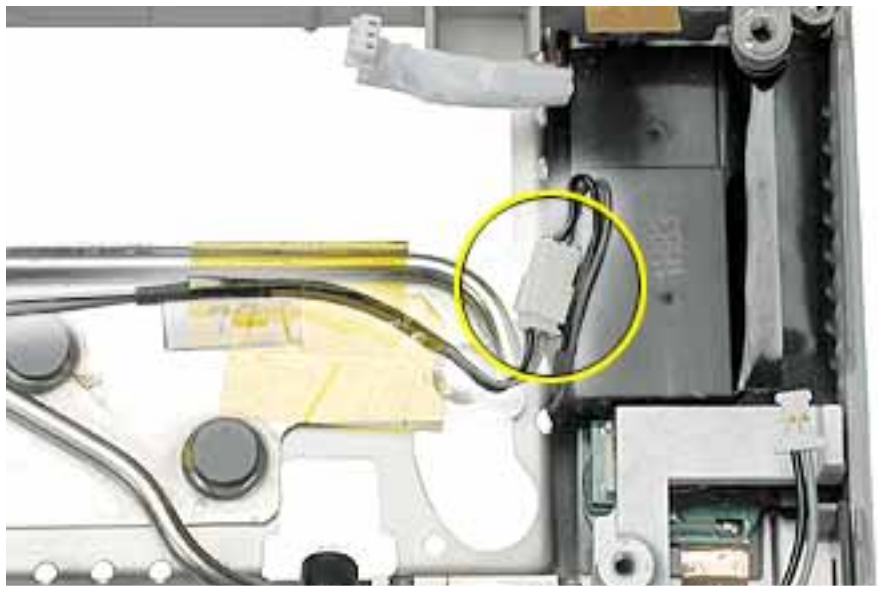
11. Lift out the two back panel mounts from the notches in the rib frame.

12. Remove the four identical black screws from the rib frame. (You might need to move aside the AirPort antenna cable to reach one of the screws.)

13. Lift the rib frame off of the heat exchanger. If the heat exchanger sticks to the rib frame, press gently on the heat exchanger near the two connection points shown.



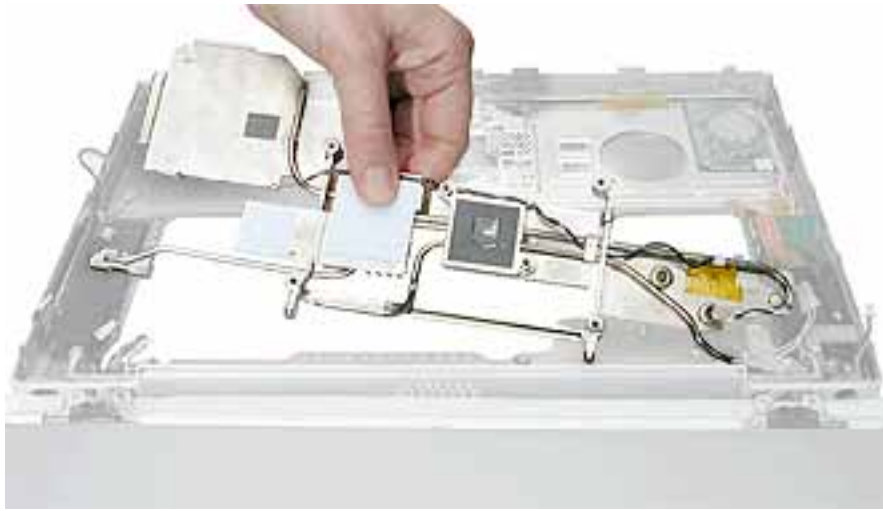
14. Disconnect the audio cable at each end of the heat exchanger.

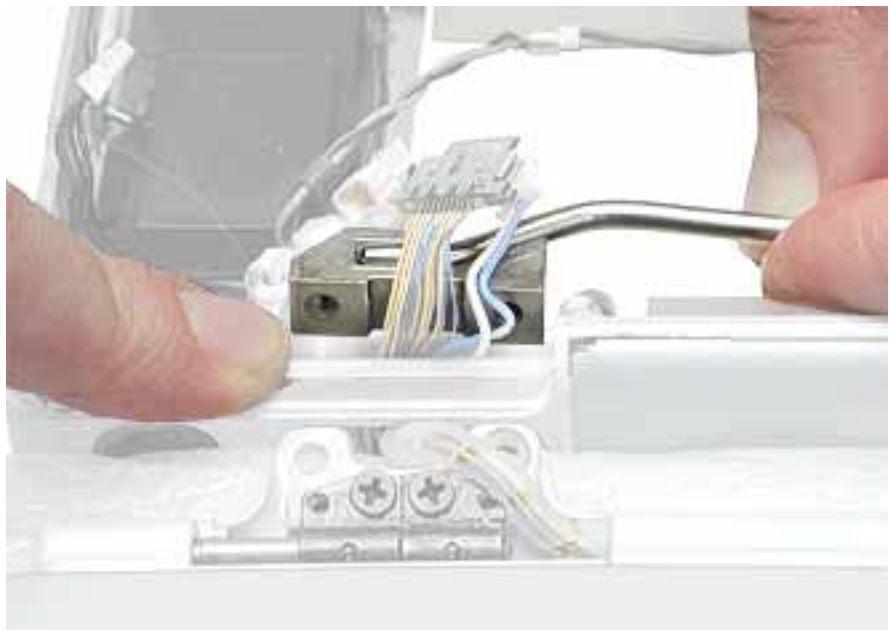


15. Pivot the heat exchanger out of the top case assembly. Be careful where it might catch at the LVDS cable.

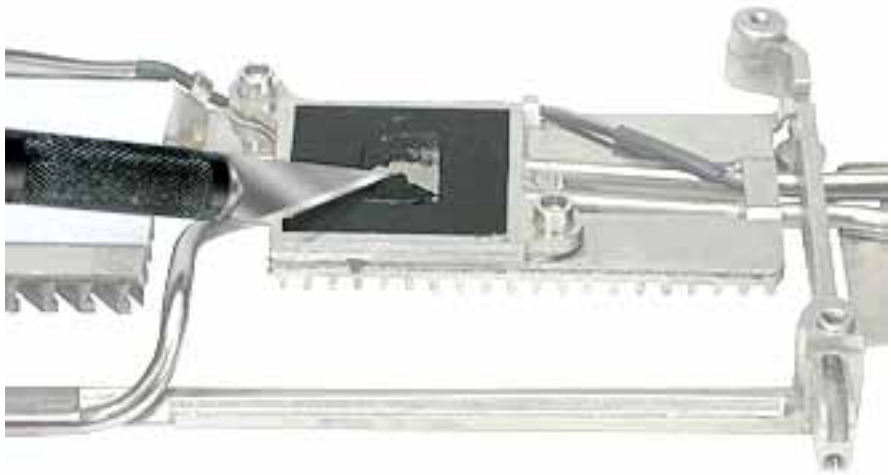
    Warning: At the left clutch, the wrapped cable connected to the LVDS connector is extremely delicate. Do not pull or pinch the LVDS cable.

    Warning: Do not bend the heat pipe.

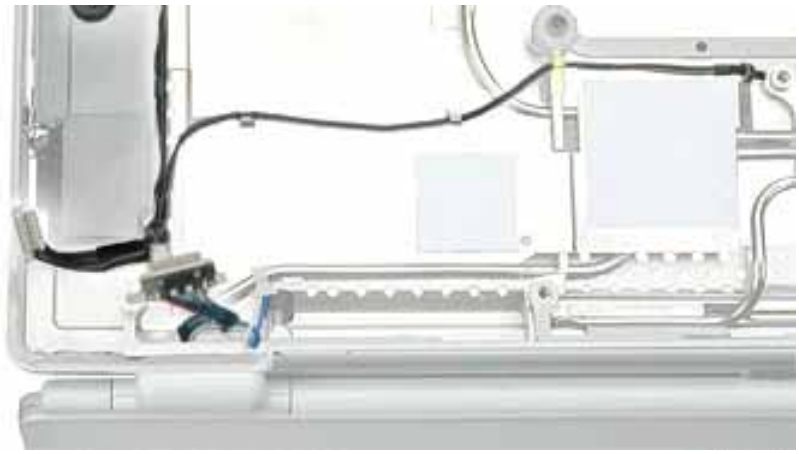


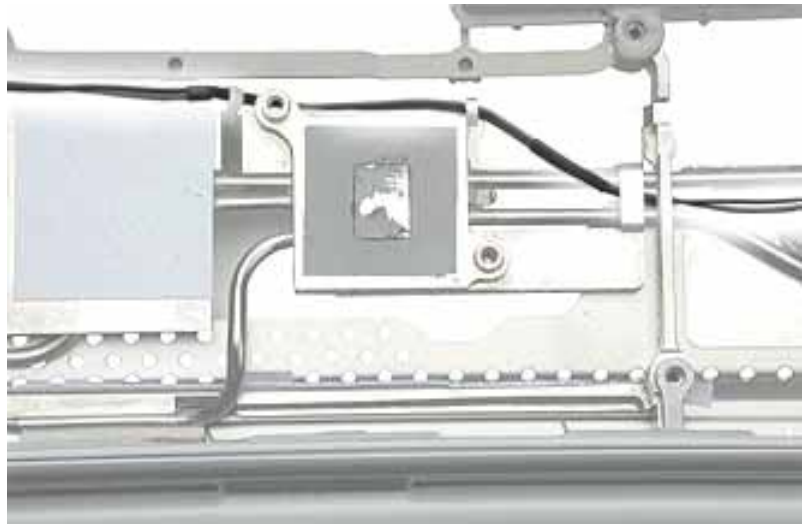


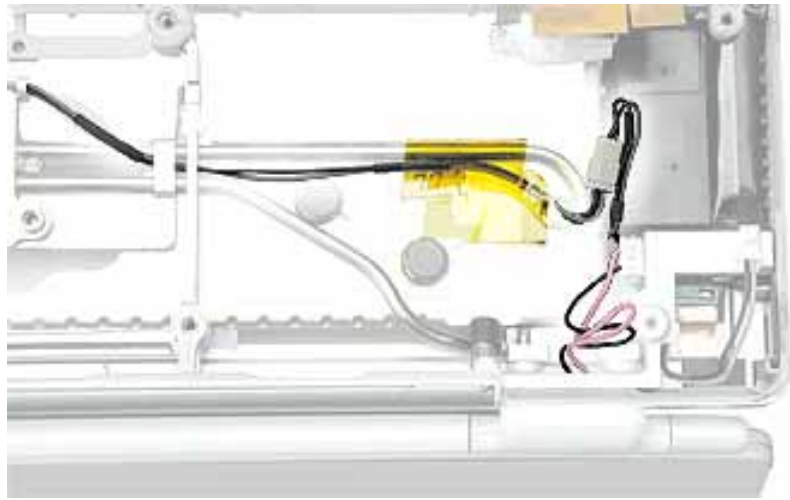
16. If replacing the rib frame but reusing the heat exchanger, scrape off the thermal transfer material residue from the area shown. Apply new thermal transfer material to the logic board chip.



17. When replacing the heat exchanger, check that the audio cable is routed as shown.







18. Install the replacement rib frame and/or heat exchanger, and reassemble and test the computer.

I/O Door
Replacement Instructions

The following instructions explain how to replace the I/O door in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth larger than the PowerBook
- Black stick (or other nonconductive plastic or nylon tool)
- Needlenose pliers

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)
- Logic board
- Rib frame and heat exchanger

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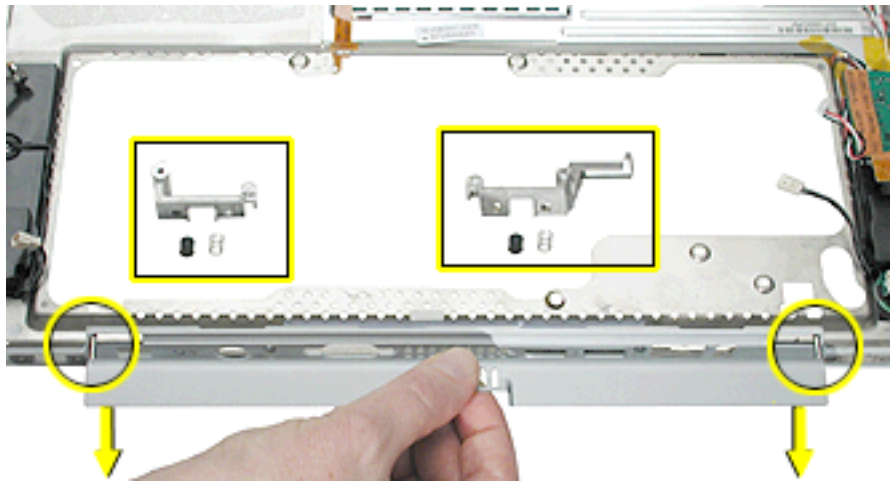
Procedure

1. Using needlenose pliers, pull off the rubber plugs at each end of the door. Remove the springs, and set aside the plugs and springs.

2. Lift off the inner clutch mounts, and pull door away from the top case.



3. Remove the L-shaped pin from each end of the I/O door.

   Note: The L-shaped pin has a knob at one end. The knobbed end holds the rubber plug onto the L-shaped pin.

4. When installing the replacement I/O door, make sure each L-shaped pin threads through the top case, inner clutch mount, spring, and plug.

   Note: You might need to use a black stick to compress the spring while installing the plug on each L-shaped pin.

5. Install the replacement I/O door, and reassemble and test the computer.

Display Module
Replacement Instructions

The following instructions explain how to replace the display module on the PowerBook G4 (Gigabit Ethernet) computer.

Warning: Make sure you carefully follow these instructions, especially when working near cables that attach to the replacement display module. If any of the cables are damaged, the entire display module must be replaced.

Tools

- Soft cloth
- Black stick (or other nonconductive nylon or plastic tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Bottom case
- Modem
- AirPort Card (if installed)
- Hard drive
- Optical drive
- Logic board
- PC card cage
- Rib frame and heat exchanger

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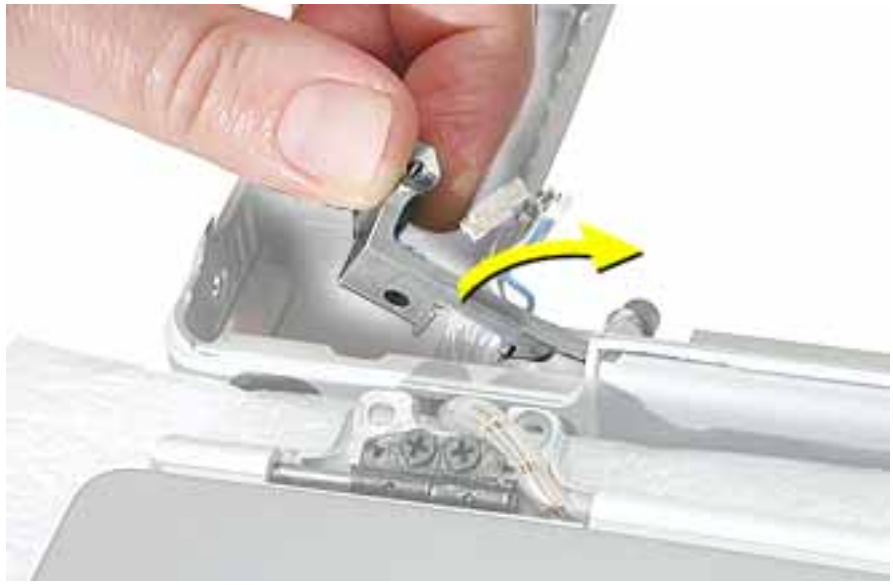
Procedure

1. With the rib frame and heat exchanger removed, make sure
   - The display is supported on a soft cloth in front of the top case
   - The display cables are not strained
2. **Warning: Be especially careful when working near cables that attach to the display. If any of these cables are damaged, the entire display module must be replaced.**

   Warning: At the left clutch, the wrapped cable connected to the LVDS (low voltage data signal) connector is extremely delicate. Do not pull or pinch the LVDS cable.

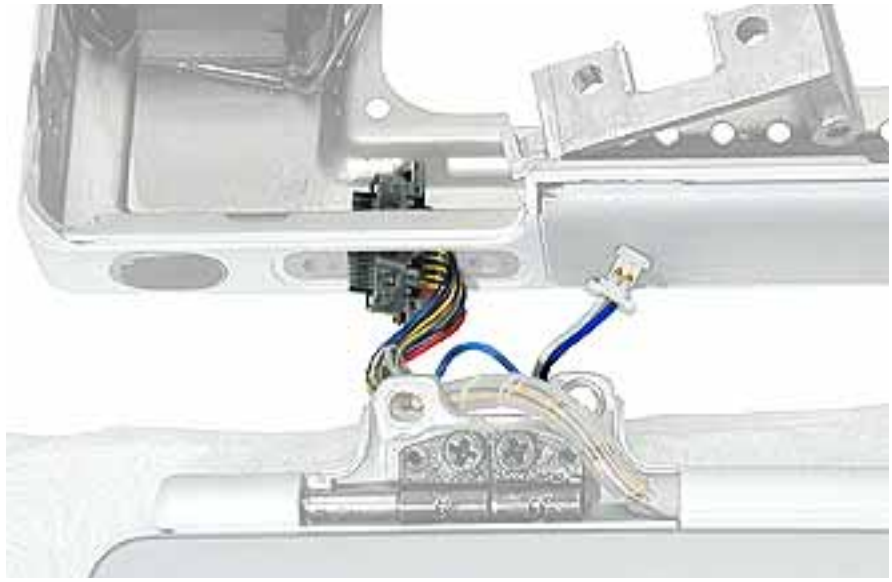
   Raise the inner clutch mount so it is pivoted away from the LVDS cable and LED sleep cable.



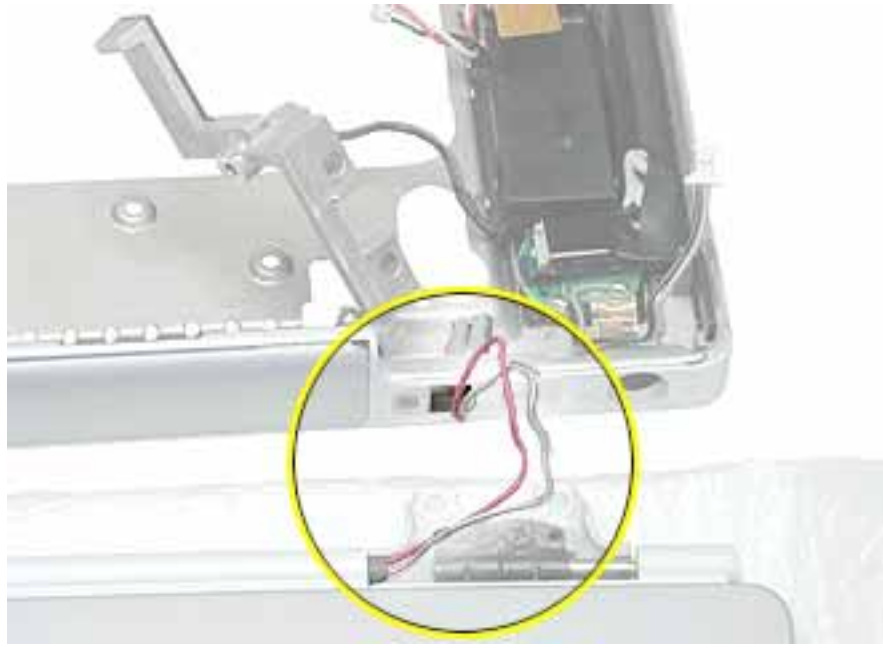
3. **Warning: The LVDS cable and connector are extremely delicate. Do not pull or pinch the LVDS cable or connector. If necessary, use a black stick or other nonconductive tool to guide the cables out of the top case.**

   Thread the two-pin LED sleep cable through the opening in the top case.

   Carefully guide the LVDS cable through the opening by looping the cable and turning the LVDS connector sideways, as shown, to fit through the opening.



4. At the right clutch, raise the inner clutch mount and disconnect the inverter cable. Carefully slide the inverter cable out through the opening in the top case.



5. The display module includes all three cables.

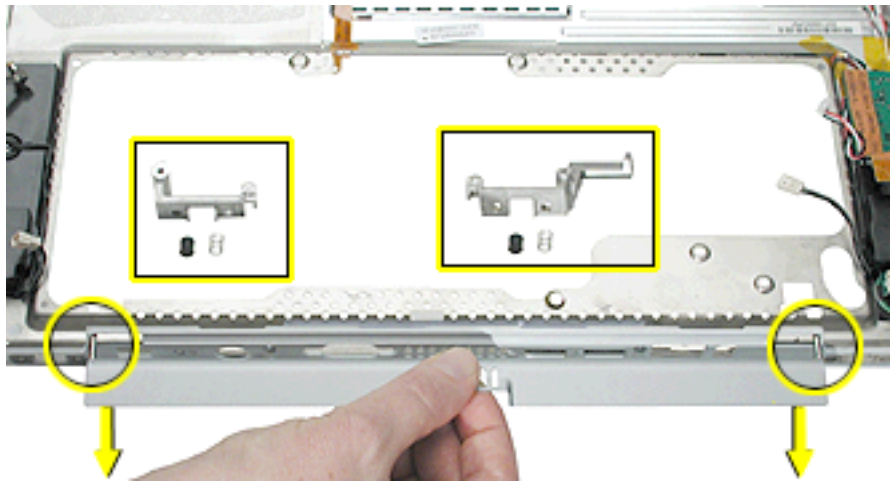
6. **Important:** When the replacement display module is installed, and before the clutch covers are installed, test that the display is seated properly. With the computer upright and closed, press the computer latch. The display module should pop up slightly if the module is properly seated.

7. Install the replacement display module, and reassemble and test the computer.

Procedure

1. Using needlenose pliers, pull off the rubber plugs at each end of the door. Remove the springs, and set aside the plugs and springs.

2. Lift off the inner clutch mounts, and pull door away from the top case.



3. Remove the L-shaped pin from each end of the I/O door.

   Note: The L-shaped pin has a knob at one end. The knobbed end holds the rubber plug onto the L-shaped pin.

4. When installing the replacement I/O door, make sure each L-shaped pin threads through the top case, inner clutch mount, spring, and plug.

   Note: You might need to use a black stick to compress the spring while installing the plug on each L-shaped pin.

5. Install the replacement I/O door, and reassemble and test the computer.

Inverter Board
Replacement Instructions

The following instructions explain how to replace the inverter board in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth larger than the PowerBook
- Black stick (or other nonconductive plastic or nylon tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)
- Hard drive
- Optical drive
- Logic board
- Rib frame and heat exchanger
- Display

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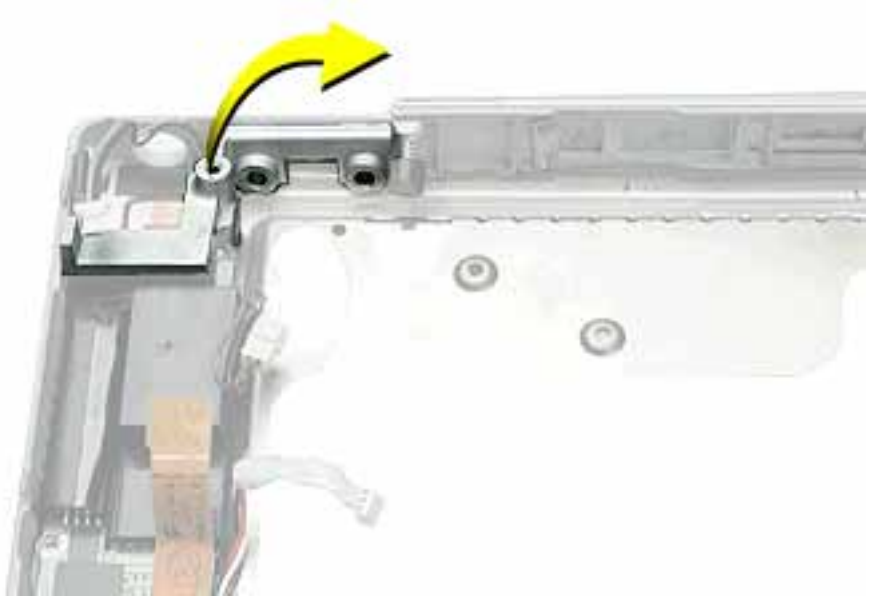
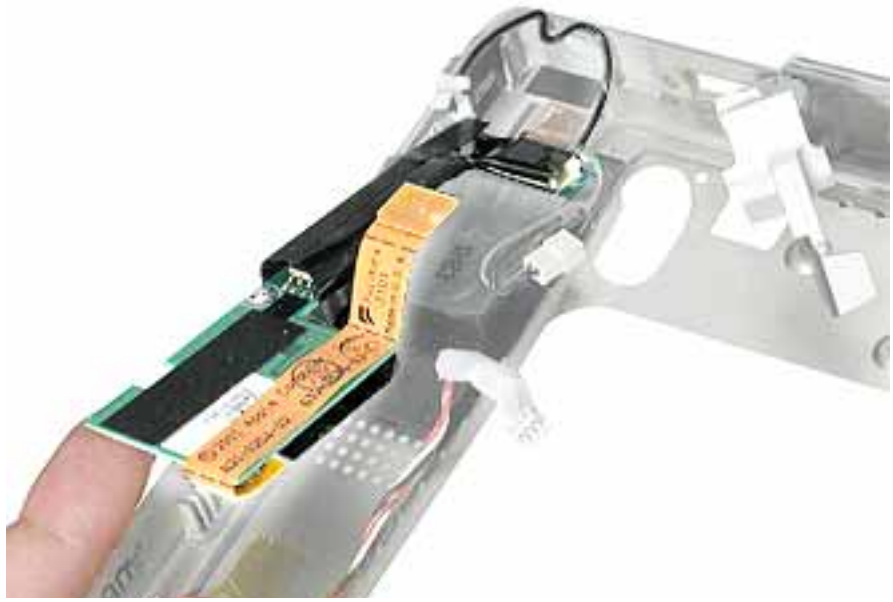
Procedure

1. With the computer on a soft cloth, move the inner clutch mount out of the way.



2. Tilt up the inverter board to lift it off of the top case.



3. Use a black stick to disconnect the flex cable. If the cable is in good condition, transfer it to the replacement inverter board. If the cable is damaged, connect a new flex cable to the inverter board.
4. Install the replacement inverter board, and reassemble and test the computer.

Top Case
Replacement Instructions

The following instructions explain how to replace the top case in the PowerBook G4 (Gigabit Ethernet) computer.

Tools

- Soft towel or cloth larger than the PowerBook
- Black stick (or other nonconductive plastic or nylon tool)

Preliminary Steps

Before you begin, remove the following:

- Battery
- Keyboard
- Modem
- Bottom case
- AirPort Card (if installed)
- Hard drive
- Optical drive
- Backup battery
- Logic board
- Rib frame and heat exchanger
- Display module
- Inverter board
- I/O door

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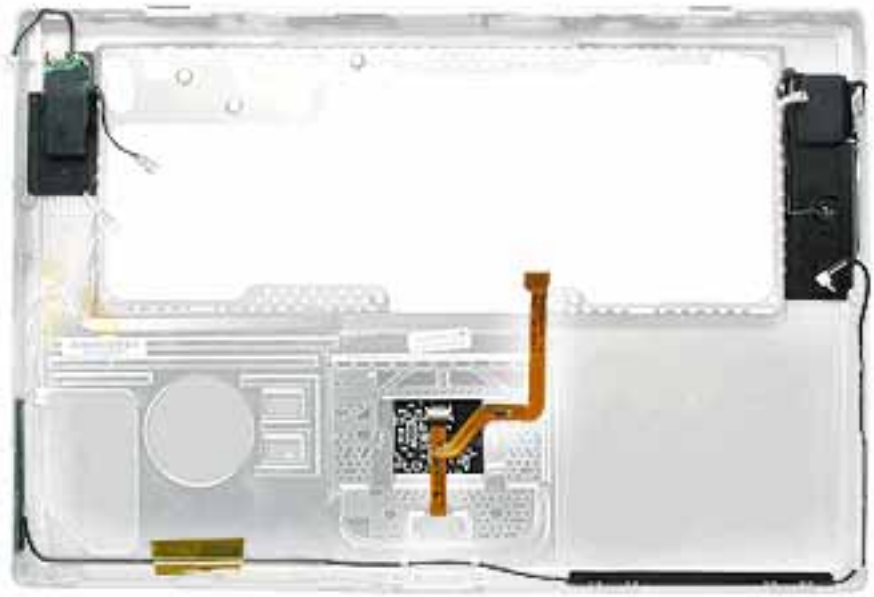
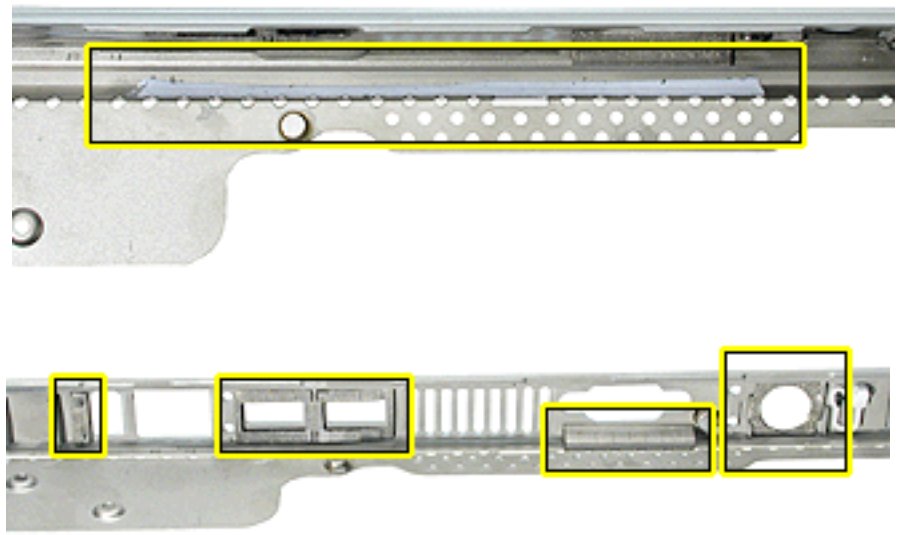
Procedure

1. With the preliminary steps completed, compare the original top case to the replacement top case.
2. Before installing the replacement top case, make sure it includes the following:
   - Speaker set and cables
   - Power button and board (heatstaked to top case)
   - AirPort antenna cable
   - Trackpad assembly with board and cable

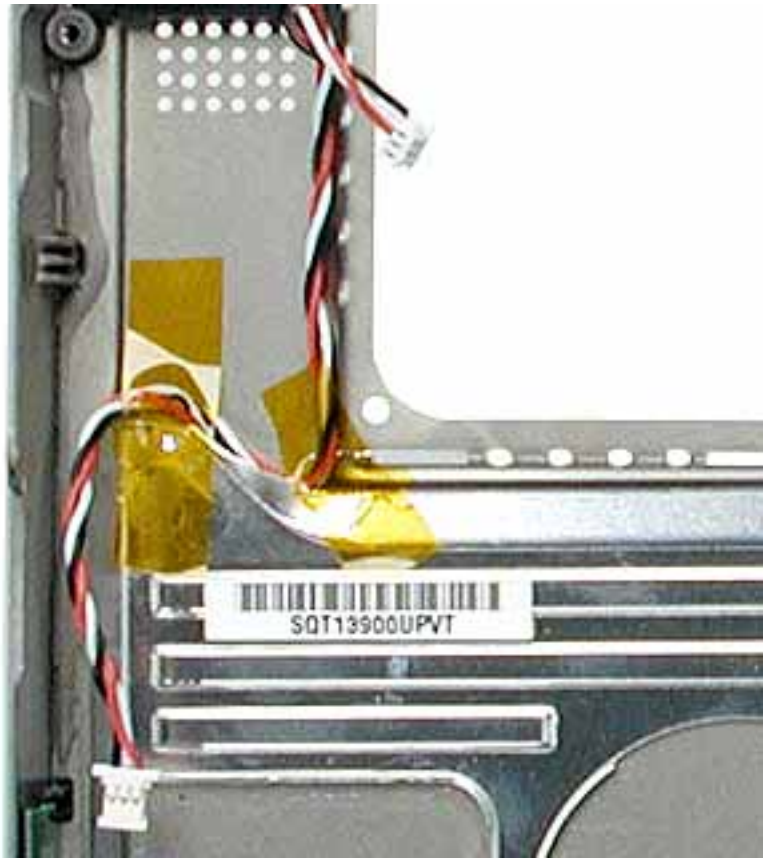


3. **Important:** Make sure you transfer the original serial number label from the old top case to the serial number panel on the replacement top case. You can use a black stick to carefully peel up a corner of the label. Then peel off the label completely and apply it to the serial number panel. Make sure that the label lies completely flat so it does not interfere with the battery compartment.

4. Confirm that the thermal strip and mesh liners are installed at the back panel.



5. **Important:** Make sure you transfer the backup battery cable from the original top case to the replacement top case. The backup battery cable adheres to the inner top case with two pieces of tape, and is routed as shown.



6. Install the replacement top case, and reassemble and test the computer.

PowerBook G4 (Gigabit Ethernet) Screw Locator - 1 of 4

Modem Replacement

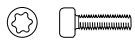
One 5 mm magnetic hex nut,
7 mm long

Bottom Case Replacement

Eight identical Torx T8,
8 mm long

Hard Drive Replacement

Four identical (black) Torx T8,
5 mm long



One (black) Torx T8,
9.5 mm long

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Updated: 2001-10-29

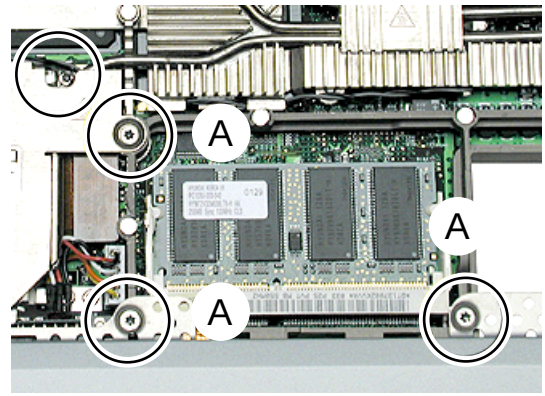
PowerBook G4 (Gigabit Ethernet) Screw Locator - 2 of 4

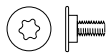
Logic Board Replacement

(A) - Three identical Torx T8,
4.5 mm long

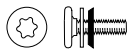
(B) - One Torx T8,
4.5 mm long

B





One Torx T8,
5 mm long

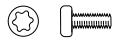


Two identical Torx T8,
8 mm long

One Torx T6,
4 mm long

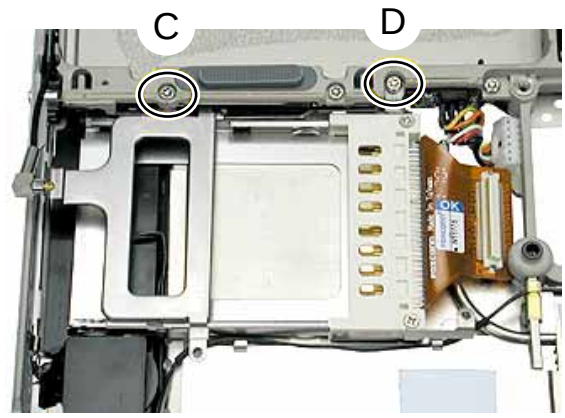
PowerBook G4 (Gigabit Ethernet) Screw Locator - 3 of 4

PC Card Replacement



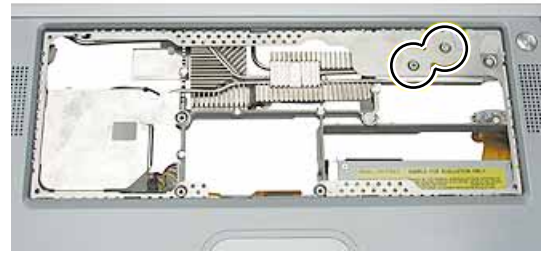
(C) - One Torx T8,
6.5 mm long

(D) - One Torx T8,
5 mm long



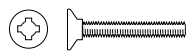
Rib Frame and Heat Exchanger Replacement

Two identical Torx T8,
4.5 mm long

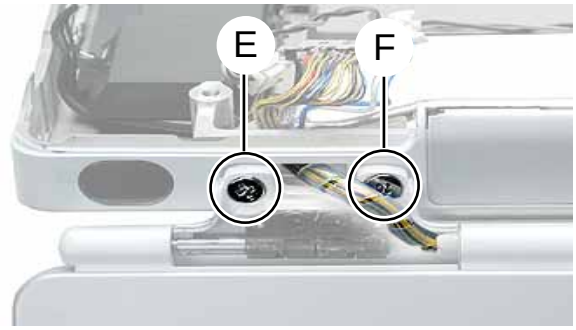


Four identical Torx T8,
5.5 mm long

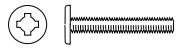
(E) - One Phillips,
16.5 mm long



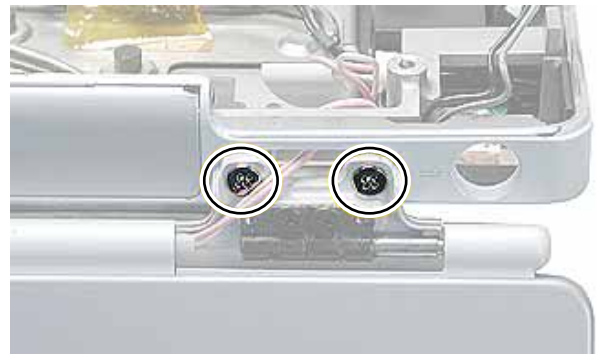
(F) - One Phillips,
16.5 mm long



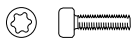
PowerBook G4 (Gigabit Ethernet) Screw Locator - 4 of 4



Two identical Phillips,
16.5 mm long



Four identical Torx T6,
4.5 mm long

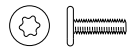


Four identical
(Black) Torx T8,
9.5 mm long

PowerBook G4 (Gigabit Ethernet) Screw Reference Sheet

This sheet shows the types of screws used in the PowerBook G4 (Gigabit Ethernet) computer. To see where the screws are located in the computer, refer to "PowerBook G4 (Gigabit Ethernet) Screw Locator."

Modem, magnetic 1 @ 7 mm

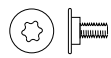
Bottom Case 8 @ 8 mm 

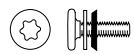
Hard Drive 4 @ 5 mm (black)

Hard Drive 1 @ 9.5 mm (black)

Logic Board 3 @ 4.5 mm

Logic Board 1 @ 4.5 mm

Logic Board 1@ 5 mm 

Logic Board 2 @ 8 mm 

Logic Board 1 @ 4 mm

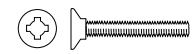
PC Card Cage 1 @ 6.5 mm

PC Card Cage 1 @ 5 mm

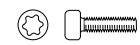
Rib Frame 2 @ 4.5 mm

Rib Frame, Clutch, 4 @ 5.5 mm

Rib Frame, Clutch, 3 @ 16.5 mm

Rib Frame, Clutch, 1 @ 16.5 mm 

Rib Frame, Back 4 @ 4.5 mm

Rib Frame 4 @ 9.5 mm (black) 

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Apple Computer, Inc.
1 Infinite Loop
Cupertino, CA 95014-2084
USA
+ 1 408 996 1010
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