Service Source

Power Mac G4/
Macintosh Server G4

Power Mac G4 (AGP Graphics/Gigabit Ethernet/Digital Audio/
QuickSilver), Power Mac G4 (PCI Graphics),
Macintosh Server G4 with Mac OS X Server,
Macintosh Server G4

Basics

Power Mac G4/
Macintosh Server G4

Overview

Product Description

The Power Mac G4 is the first Power Mac computer based on the PowerPC G4 processor. Some configurations also include support for wireless networking, dual-channel USB, Gigabit Ethernet, dual processing, digital audio, and a wake/sleep power management feature.

Power Mac G4 (QuickSilver)

Other Power Mac G4 Models

Identifying Versions of the Power Mac G4

There are five models of Power Mac G4 computers: AGP Graphics, PCI Graphics, Gigabit Ethernet, Digital Audio, and QuickSilver.
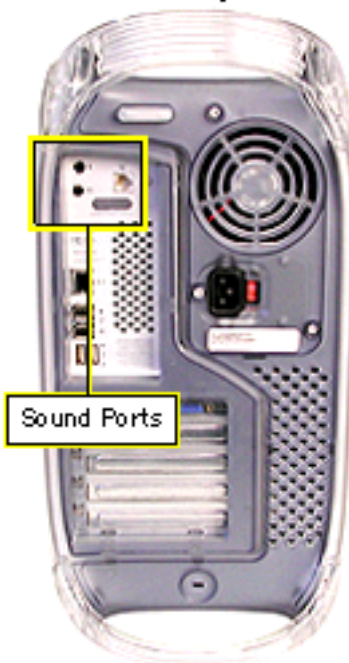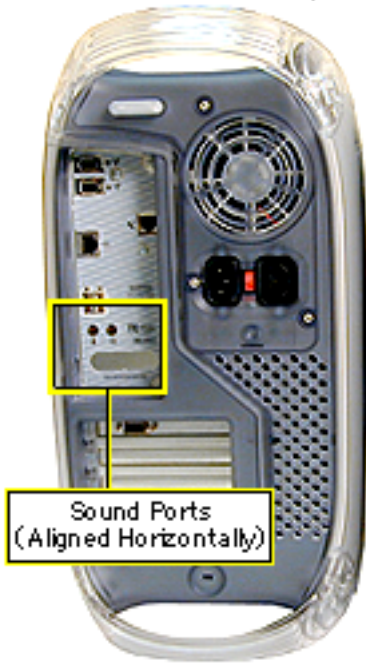
Power Mac G4 (QuickSilver) is easy to identify. Unlike the other Power Mac G4 models, it has a silver-colored case. It also has a recessed speaker on the front panel.

To identify the other Power Mac G4 models, check the

Power Mac G4 (PCI Graphics) Power Mac G4 (Digital Audio)

Sound Ports
(Aligned Horizontally)

Sound Ports

Power Mac G4 (AGP Graphics)

Sound Ports
(Aligned Vertically)

J9

I/O panel at the back of the computer. The sound ports align horizontally in the lower half of the I/O panel on PCI Graphics models and vertically on AGP Graphics/ Gigabit Ethernet models. On Digital Audio models, the sound ports are in the upper half of the I/O panel. In addition, Digital Audio models include four expansion slots, instead of three slots on PCI/AGP Graphics/Gigabit Ethernet models.

To further distinguish Gigabit Ethernet models from AGP Graphics models, check the logic boards. AGP Graphics boards include an internal FireWire connector at J9; Gigabit Ethernet boards do not include the connector.

Note: Except where indicated, the following procedures apply to all five models of the Power Mac G4.

New Technologies

While the Power Mac G4 family of computers all use the innovative PowerPC G4 processor, they also include a range of other new hardware and architectures. For information on the latest technolgies, check the Apple Knowledge Base.
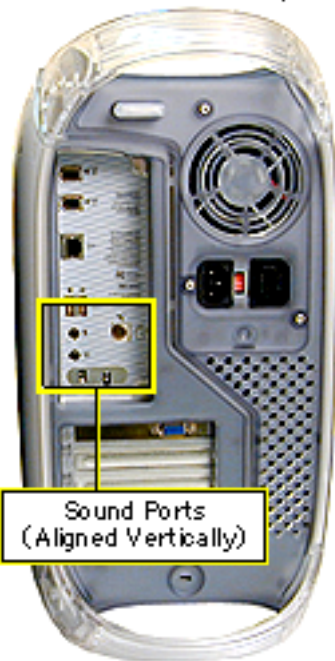
Features

Standard Configurations

Processor

- 350-, 400-, 450-, 466-, 500-, 533, 733-, 800-, or 867-MHz PowerPC G4 processor; dual processors on some configurations
- Velocity Engine vector processing unit with 162 integrated Single Instruction Multiple Data (SIMD) instructions
- Full 128-bit internal memory data paths
- Powerful floating-point unit supporting single-cycle, double-precision calculations
- Data stream prefetching operations supporting four simultaneous 32-bit data streams

- L2 or L3 cache
- 100-MHz system bus (PCI Graphics/AGP Graphics/ Gigabit Ethernet) or 133-MHz system bus (QuickSilver/Digital Audio)

Memory

- 64, 128, 256, or 512 MB of PC-100 SDRAM (PCI Graphics/AGP Graphics/Gigabit Ethernet) or 64, 128, 256, or 512 MB of PC-133 SDRAM (QuickSilver/Digital Audio)
- Four DIMM slots (PCI Graphics/AGP Graphics/Gigabit Ethernet) or three DIMM slots (QuickSilver/Digital Audio)

Storage

- One of the following hard drives: 10, 13, 20, 27, 30, 40, 60, or 80 GB Ultra ATA
- One of the following optical drives:
  – CD-ROM drive
  – CD-RW drive
  – DVD-ROM drive
  – DVD-RAM drive
  – DVD-R/CD-RW drive
  – DVD/CD-RW drive
- Optional 100 or 250 MB Zip drive
- Three 3.5-inch hard drive expansion bays
  – One ATA drive preinstalled in standard configurations
  – Support for up to two internal ATA drives
  – Support for up to three internal SCSI drives

Graphics Support

- Video card installed in a dedicated graphics slot (either a PCI slot or an AGP slot)
- Support for up to 1,600 by 1,200 pixel resolution at 32 bits per pixel and up to 85-Hz refresh rate
- 15-pin mini D-Sub VGA connector
- ADC connector for digital flat-panel display (not available on PCI Graphics computers)
- Support for independent video output to two monitors (with NVIDIA GeForce2 MX TwinView video card)

Electrical Requirements and Agency Approvals

• Line voltage: 115V AC (90V to 132V AC) or 230V AC (180V to 264V AC)
• Frequency: 47 to 63 Hz, single phase
• Maximum continuous power (not including display): 200W EPA ENERGY STAR and Blue Angel compliant (some configurations)

Environmental Requirements

• Operating temperature: 50° to 95° F (10° to 35° C)
• Storage temperature: -40° to 116° F (-40° to 47° C)
• Relative humidity: 5% to 95% noncondensing
• Maximum altitude: 10,000 feet (3,048 m)

Size and Weight

- Height: 17.0 inches (43.2 cm)
- Width: 8.9 inches (22.6 cm)
- Depth: 18.4 inches (46.7 cm)
- Weight: 30.0 pounds (13.6 kg)

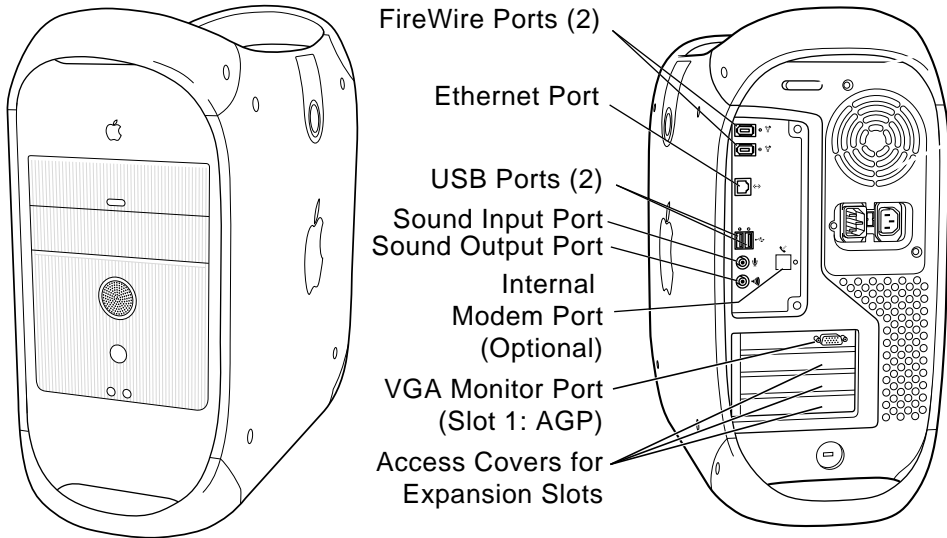**Note:** Storage devices and interfaces vary among configurations.

Configure-to-Order Options

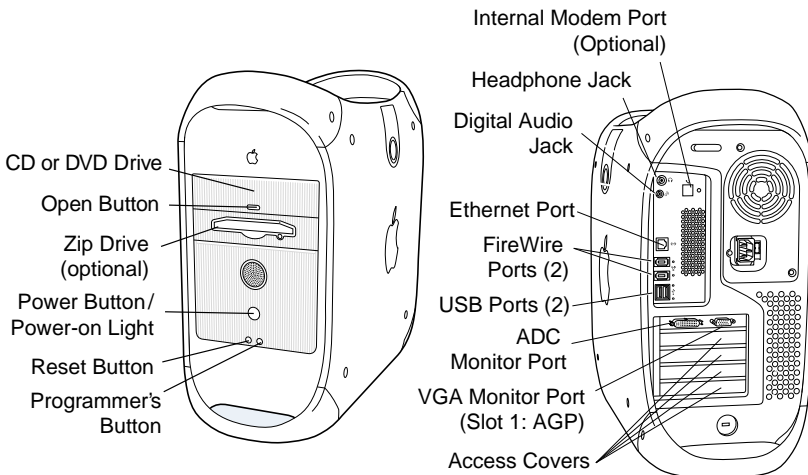The configure-to-order options are available from the Apple Store. For more information, view the options online at http://store.apple.com.

Views

Power Mac G4 (AGP Graphics/Gigabit Ethernet) Views

FireWire Ports (2)

Ethernet Port

USB Ports (2)
Sound Input Port
Sound Output Port
Internal
Modem Port
(Optional)

VGA Monitor Port
(Slot 1: AGP)

Access Covers for
Expansion Slots

Power Mac G4 (Digital Audio) Views

Internal Modem Port
(Optional)

Headphone Jack

Digital Audio
Jack

CD or DVD Drive

Open Button

Zip Drive
(optional)

Power Button/
Power-on Light

Reset Button

Programmer's
Button

Ethernet Port

FireWire
Ports (2)

USB Ports (2)

ADC
Monitor Port

VGA Monitor Port
(Slot 1: AGP)

Access Covers

Power Mac G4 (AGP Graphics/Gigabit Ethernet) Internal Locator

Drive Bay 1
Drive Bay 2
Drive Bay 3

PCI Slots (3)

AGP Slot

SDRAM
Slots (4)
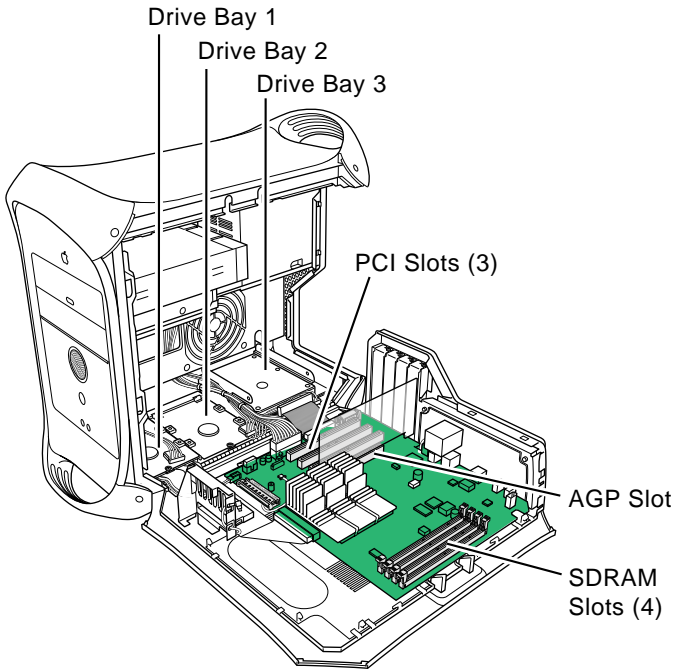
Power Mac G4 (QuickSilver/Digital Audio) Internal Locator

Drive Bay 3
Drive Bay 2
Drive Bay 1

PCI Slots (4)

AGP Slot

SDRAM Slots (3)

PowerMac G4 (AGP Graphics/Gigabit Ethernet) Logic Boards

PMU Button

Battery

Ultra ATA Connector

Power

Modem Connector

Front Panel Board

Speaker

PCI Slots

Monitor Card Slot

Sound In

Sound Out

USB Ports A & B

Ethernet Connector

FireWire Ports (2)

Internal FireWire Port (not included on Gigabit models)

AirPort Connector

IDE Connector

Processor Plug-In Slot

SDRAM DIMM Slots

PowerMac G4 (QuickSilver/Digital Audio) Logic Board

Power Mac G4 (PCI Graphics) Logic Board

Monitor Card Slot

Sound In & Sound Out Ports

USB Ports A & B

Ethernet Connector

PCI Slots

J1 ATA-3 (CD/DVD-ROM and Zip Drive

Firewire Ports (2)

Firewire Card

J15 Ultra DMA/33 (ATA Drives)

Modem Connector

J23 Power

S5 Power Button

S4 Cuda Button

Battery

SDRAM DIMM Slots

J8 CD Audio

J31 Front Panel Board

Processor Plug-In Slot

J34 Speaker

J25 Jumper Block (w/sticker)

J2 Firewire Power
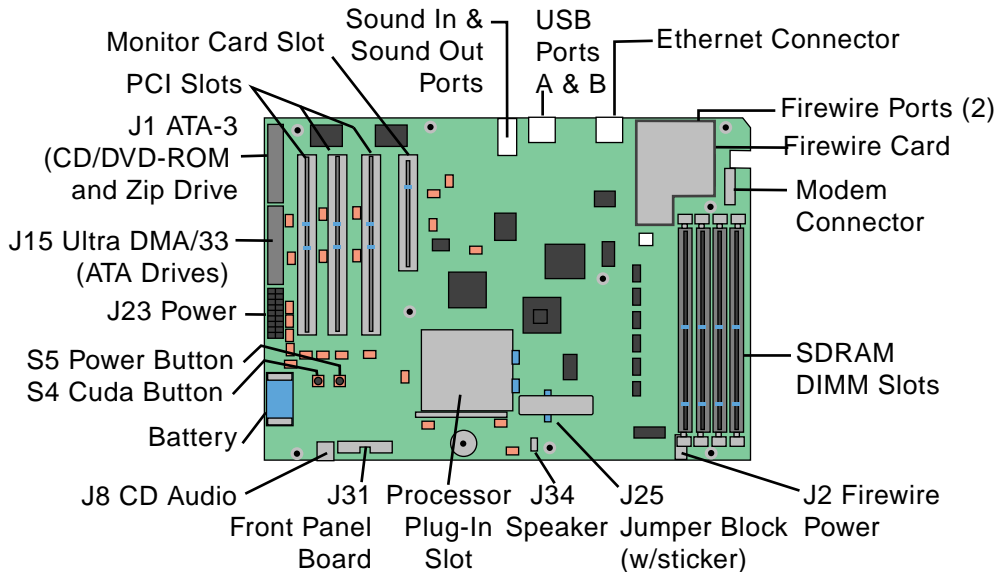
Repair Strategy/Warranty

Strategy and Ordering

Service Power Mac G4 computers through module exchange and parts replacement.

Apple-authorized service providers planning to support the computer systems covered in this manual may purchase service modules and parts to develop servicing capability. To order parts, use the AppleOrder (U.S. only) or ARIS (Canada only) system and refer to the Power Mac G4 Service Price Pages.

Large businesses, universities, and K-12 accounts must provide a purchase order on all transactions, including orders placed through the AppleOrder (U.S. only) or ARIS (Canada only) system.

USA Ordering

U.S. service providers not enrolled in AppleOrder may fax their orders to Service Provider Support (512-908-8125) or mail them to:

Apple Computer, Inc.
Service Provider Support / MS 212-SPS
2323 Ridgepoint Drive
Austin, TX 78754

For U.S. inquiries, please call Service Provider Support (800-919-2775, option #1).

Canadian Ordering

Canadian service providers not enrolled in ARIS may fax their orders to Service Provider Support in Canada (800-903-5284). For Canadian inquiries, please call Service Provider Support (800-217-9517).

Warranty

U.S. Only

Power Mac G4 computers are covered under the Apple One-Year Limited Warranty. The AppleCare Protection Plan is also available for these products. Service providers are reimbursed for warranty and AppleCare Protection Plan repairs. For pricing information, refer to Service Price Pages.

Canada Only

Power Mac G4 computers are covered under the Apple One-Year Limited Warranty. The AppleCare Protecion Plan is also available for these products. Service providers are reimbursed for warranty and AppleCare Protection Plan repairs. For pricing information, refer to Service Price Pages.

Service Source

Specifications

Power Mac G4/
Macintosh Server G4

Introduction

Specifications information for this product can be found in the Spec Database, which you can access at Service Source Online (http://service.info.apple.com) or on Service Source CD.

Spec Database at Service Source Online

From the Service Source Online home page, click Troubleshoot and Repair to access the main repair procedures page. Then click either Apple Spec in the navigation table in the upper right corner of the page, or click Apple Spec Database from the list of reference tools below.

Spec Database on Service Source CD

Open the CD and double-click the Apple Spec Database alias located at the top level of the CD.

Service Source

Take Apart

Power Mac G4 / Macintosh
Server G4

Power Mac G4 (QuickSilver)   Other Power Mac G4 Models

General

Identifying Models of the Power Mac G4

There are five models of Power Mac G4 computers: AGP Graphics, PCI Graphics, Gigabit Ethernet, Digital Audio, and QuickSilver.

Power Mac G4 (QuickSilver) is easy to identify. Unlike the other Power Mac G4 models, it has a silver-colored case. It also has a recessed speaker on the front panel.

Power Mac G4 (PCI Graphics)   Power Mac G4 (Digital Audio)

Sound Ports
(Aligned Horizontally)
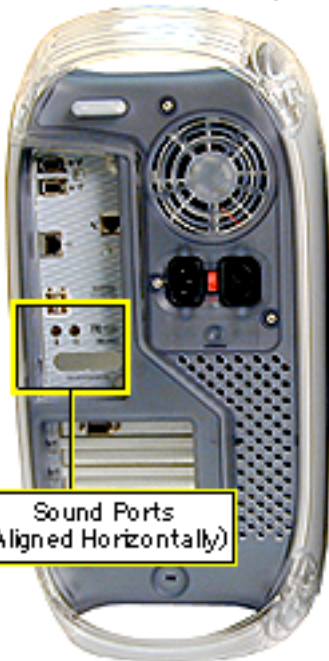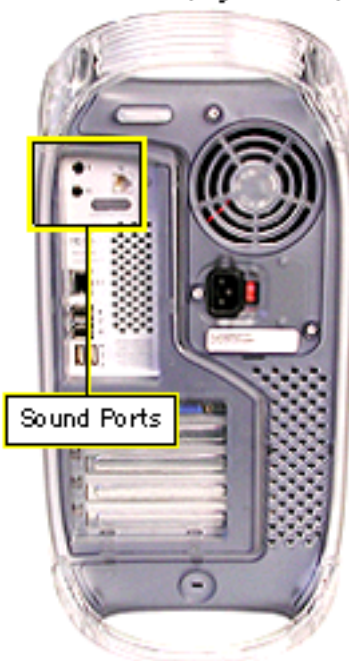
Sound Ports

To identify the other Power Mac G4 models, check the I/O panel at the back of the computer. The sound ports align horizontally in the lower half of the I/O panel on PCI Graphics models and vertically on AGP Graphics/Gigabit Ethernet models. On Digital Audio models, the sound ports are in the upper half of the I/O panel. In addition, Digital Audio models include four expansion slots, instead of three slots on PCI/AGP Graphics/Gigabit Ethernet models.

Power Mac G4 (AGP Graphics)
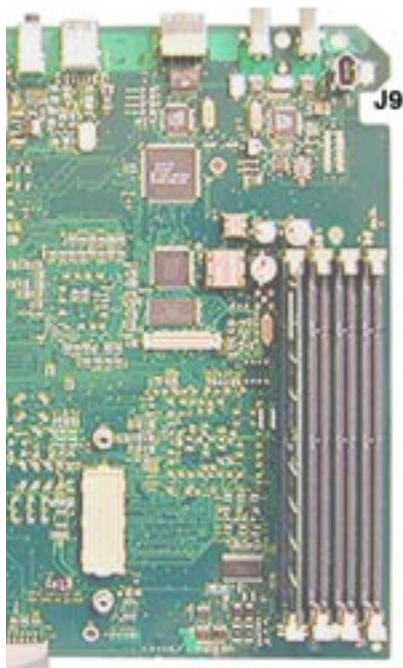
Sound Ports
(Aligned Vertically)

To further distinguish Gigabit Ethernet models from AGP Graphics models, check the logic boards. AGP Graphics boards include an internal FireWire connector at J9; Gigabit Ethernet boards do not include the connector.

Note: Except where indicated, the following procedures apply to all five models of the Power Mac G4.

Tools

- Flatblade screwdriver
- Phillips screwdriver
- Allen wrench (2.5 mm) to remove the power supply, side panels, top and rear handles, and front and rear supports
- Jeweler's screwdriver to remove the I/O panel cover and antenna
- Needlenose pliers to remove the right and left side panels
- ESD mat

Procedures

Opening the Computer

No preliminary steps are required before you begin this procedure.

1. Lift the latch to unlock the right side access panel.

   Note: Make sure the security bar is in the unlock position.

2. Gently lower the side panel onto a clean, ESD-safe mat to avoid scratching the case. Lower the side panel until it lies flat.
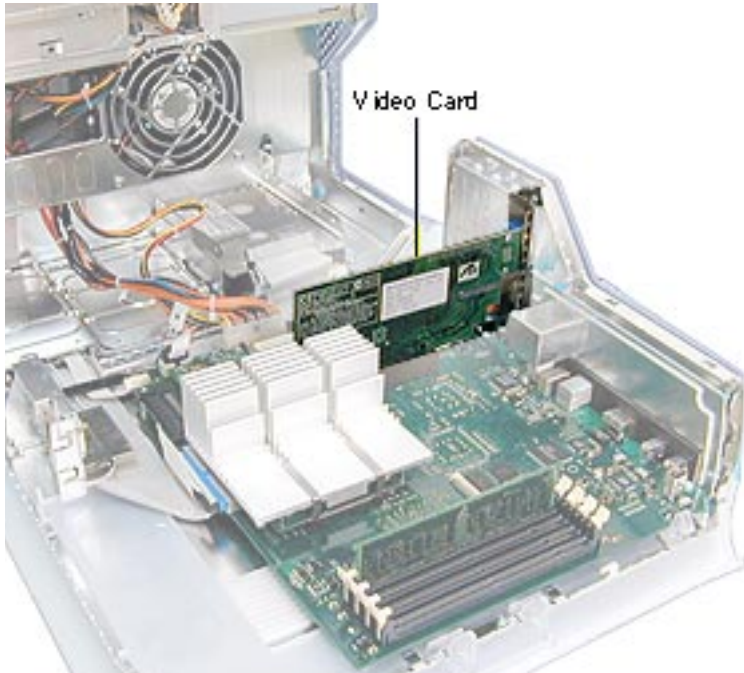
Video Card

Before you begin, do the following:

- Open the side access panel.
- Remove the external video cable.

Note: The AGP video card is always installed in slot 1 (short slot). The DVD decoder module is used only in Power Mac G4 (PCI Graphics) computers.
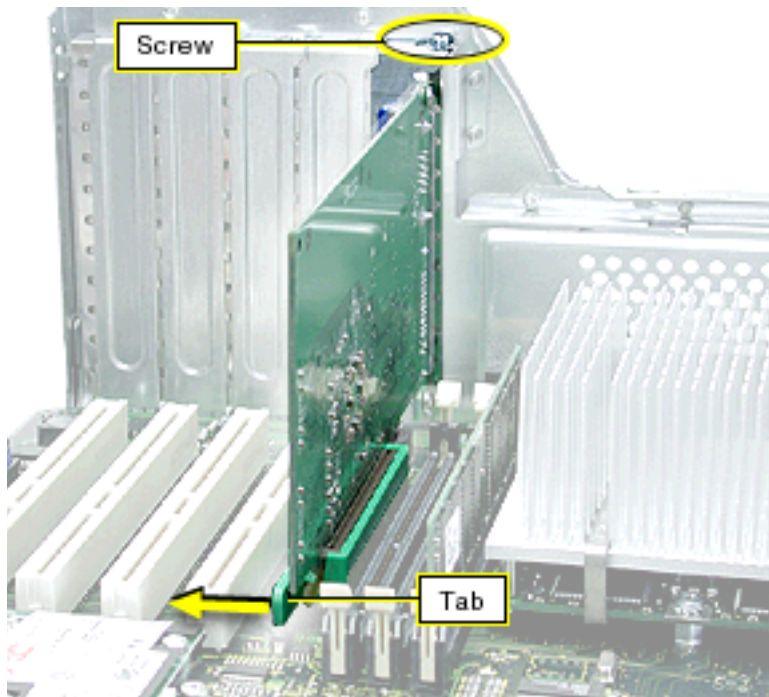
1. Remove the video card mounting screw.

2. If a plastic clip surrounds the video card connector, gently pull back the clip's tab to release the card. Then gently pull the card up, and remove it from the AGP slot.

3. Power Mac G4 (PCI Graphics): If you are replacing the DVD decoder module, pull it straight off the card.
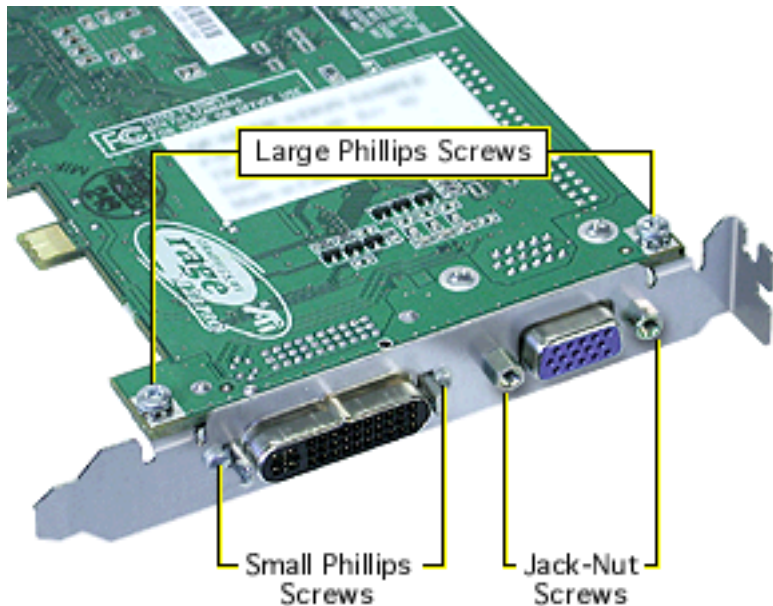
Replacement Note: If the replacement card does not have a fence already installed, attach the fence enclosed in the box. Using a Phillips screwdriver, install the two small Phillips screws on either side of the ADC connector and the two large Phillips screws on the fence side tabs. Using pliers, install the two jack-nut screws on either side of the VGA connector.
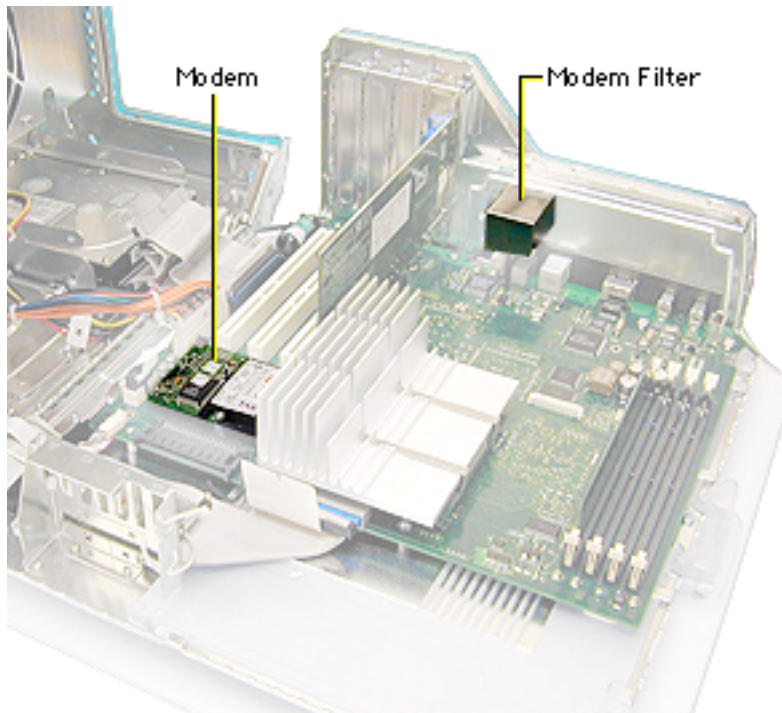
Modem, AGP Graphics/Gigabit Ethernet/Digital Audio/QuickSilver

Note: The Power Mac G4 (AGP Graphics/Gigabit Ethernet/Digital Audio/QuickSilver) modem requires a modem filter; the two are separate parts. To remove the modem, you do not need to remove the modem filter.

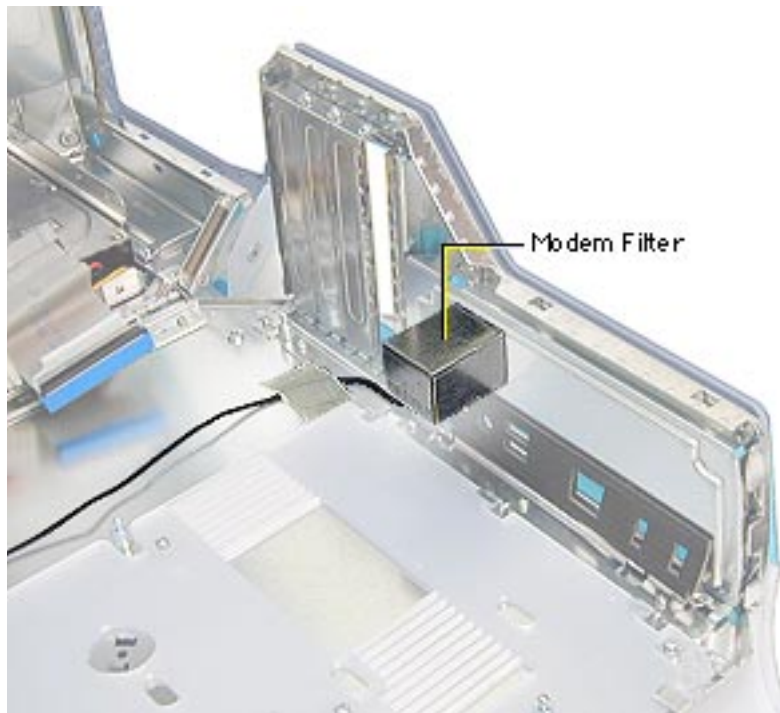Before you begin, open the side access panel.
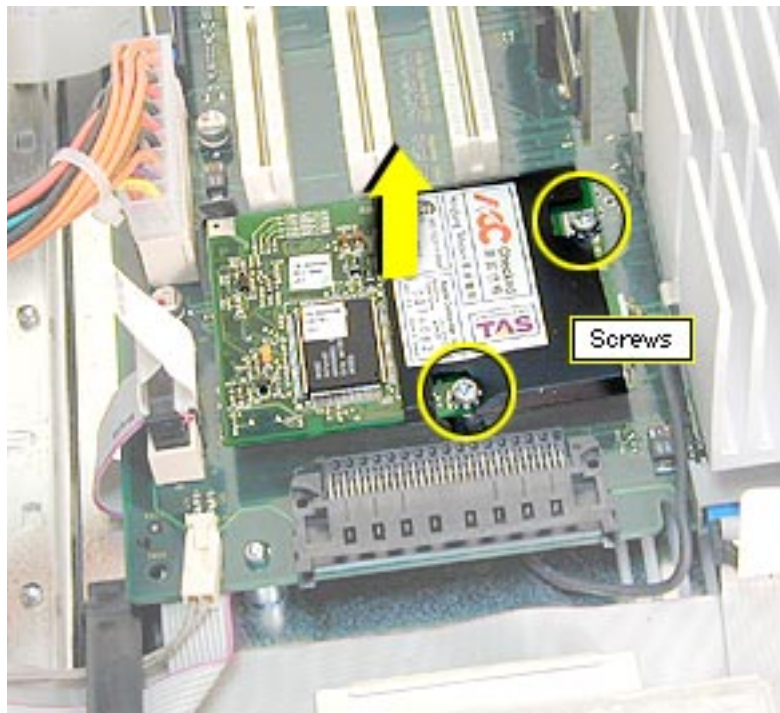
1. Remove the two modem mounting screws.

2. Lift the modem straight up to disconnect it from the logic board.

Modem Filter Connector
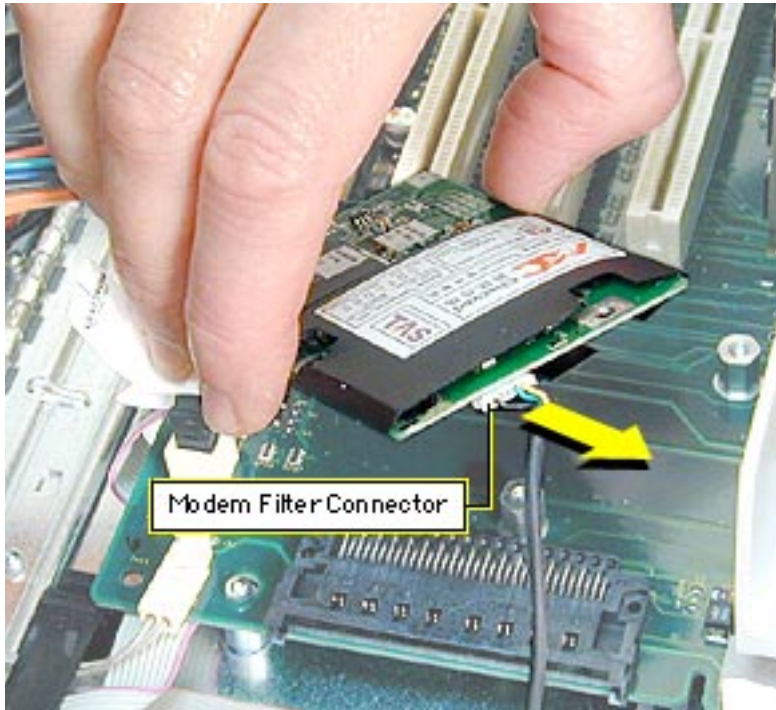
3. Disconnect the modem filter cable from the modem.

4. Remove the modem from the computer.

Replacement Note: After replacing an international modem, use the Modem Country Selector utility to set the modem to the correct country.
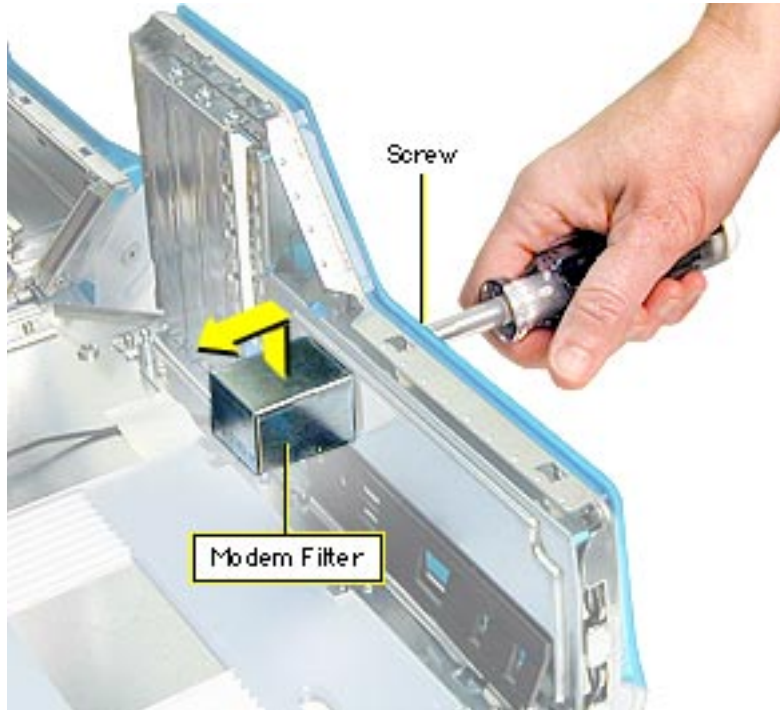
Modem Filter

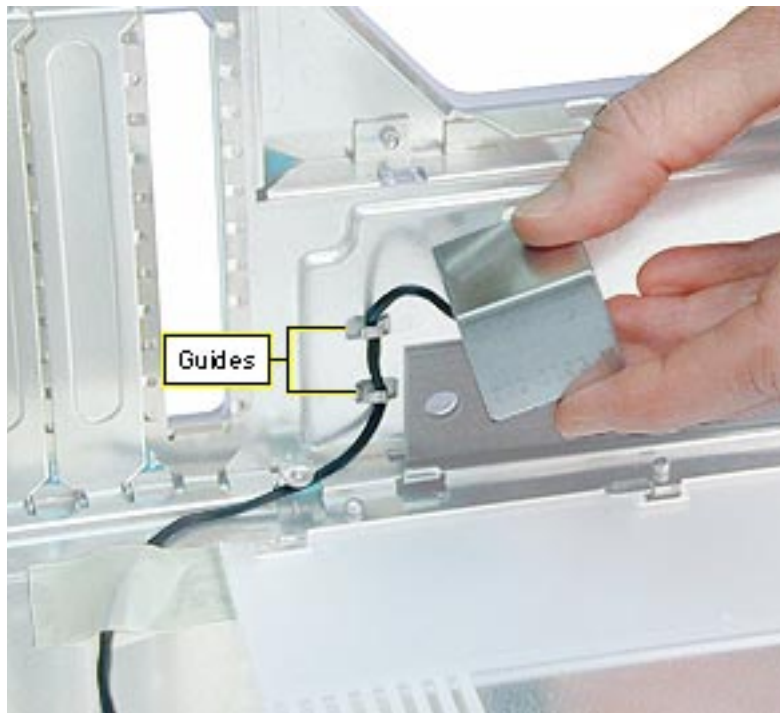## Modem Filter, AGP Graphics/Gigabit Ethernet/Digital Audio/QuickSilver

Before you begin, do the following:

- Open the side access panel.
- Remove the logic board.

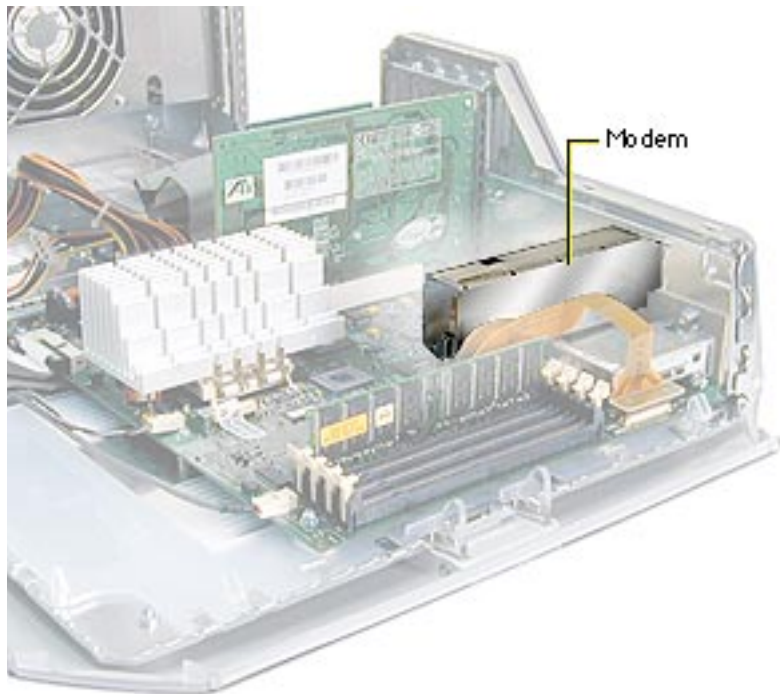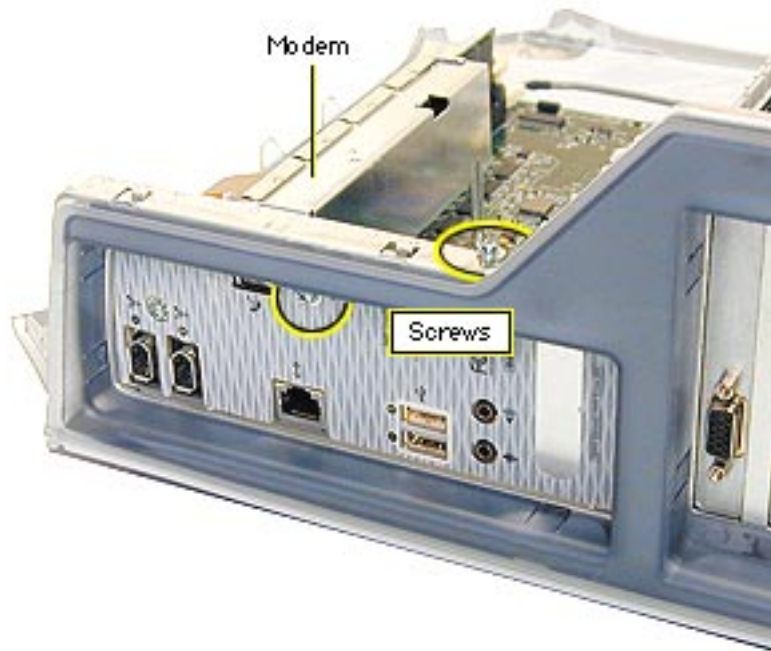1. Remove the screw that secures the modem filter to the I/O panel.

2. Free the modem filter cable from the chassis guides and remove the modem filter from the computer.
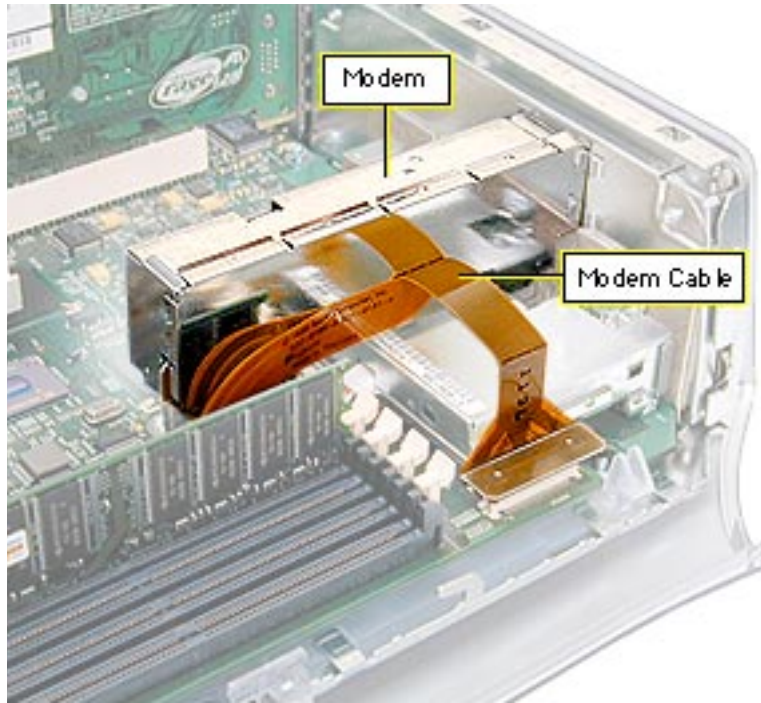
Modem

Modem, PCI Graphics

Before you begin, open the side access panel.

Modem

Screws

1. Remove the screw (located next to the modem port) that secures the modem to the I/O panel.

2. Remove the screw that secures the modem leg standoff to the logic board.

3. Carefully disconnect the flexible modem cable from the logic board. **Important:** The modem cable is very fragile.

4. Gently lift up the modem to remove it from the logic board.

   Note: If you are replacing the modem, continue with the Take Apart procedures to remove the modem from the bottom modem shield.

Modem Cable
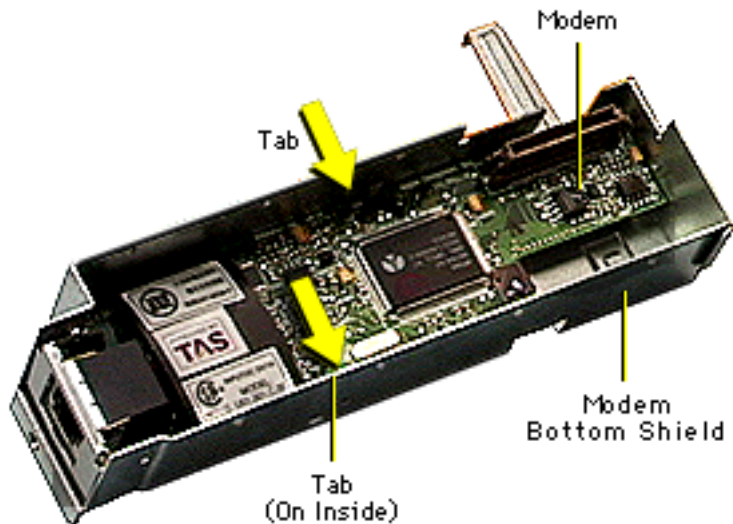
Top Shield

Metal Tabs
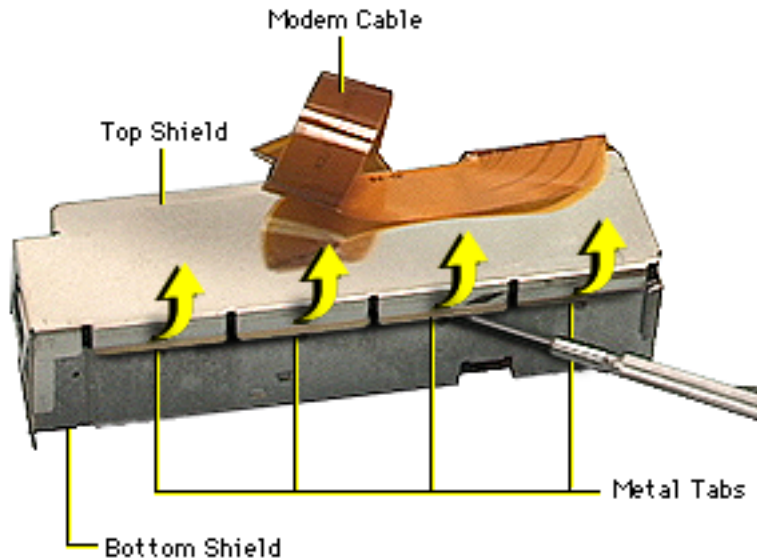
Bottom Shield

5. With a jeweler's screwdriver, pry up the metal tabs on the top shield.

6. Carefully disconnect the flexible modem cable from the modem board.

7. Remove the screw securing the modem to the bottom shield.


Modem

Modem Bottom Shield

Modem Screw
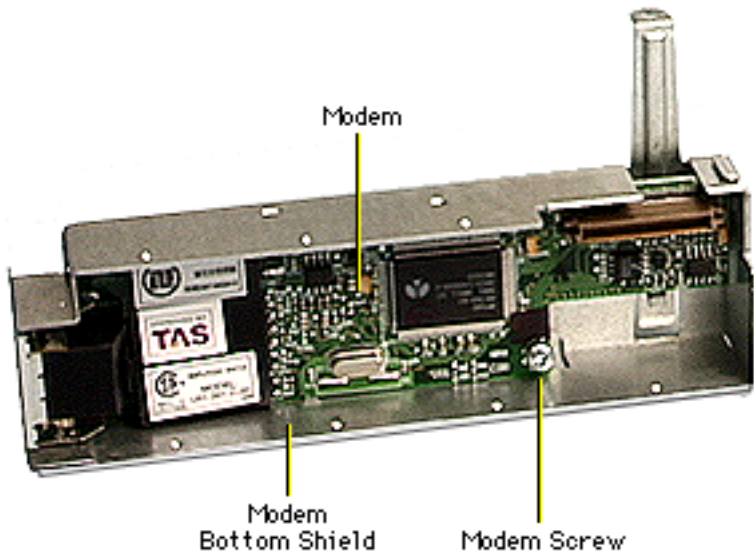
8. **Note:** There are two tiny metal tabs on the inside of the bottom shield. The modem rests on these tabs so it does not make contact with the bottom shield.

   With a needlenose pliers, pinch the tiny metal tabs flat so the modem board can be removed from the bottom shield.

Modem
Bottom Shield
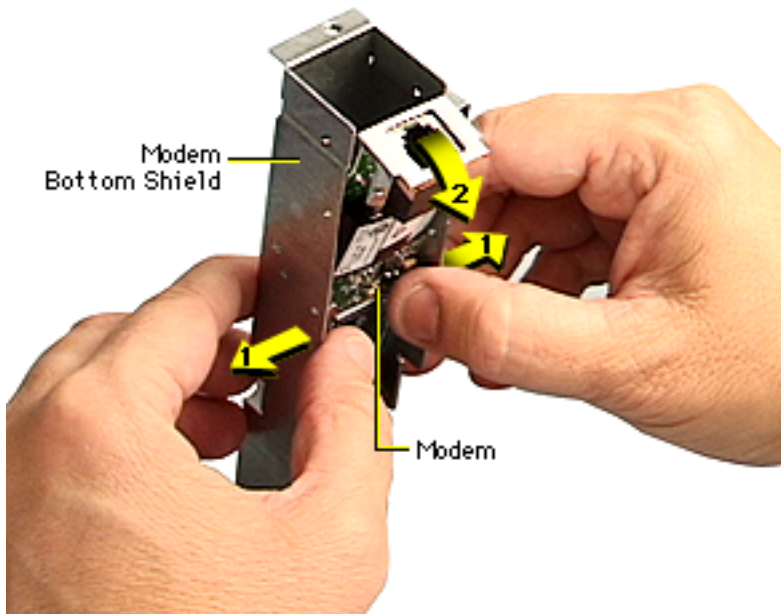
Modem

9. Carefully spread the sides of the bottom shield out just enough so the modem clears the tabs, and starts to fall out of the bottom shield.

10. Carefully remove the modem from the bottom shield.

Replacement Note: After replacing an international modem, use the Modem Country Selector utility to set the modem to the correct country.
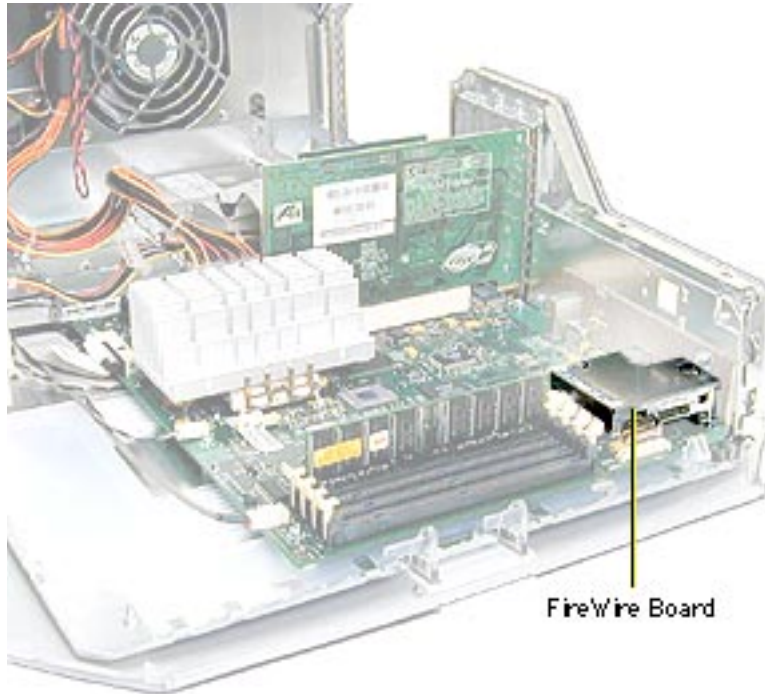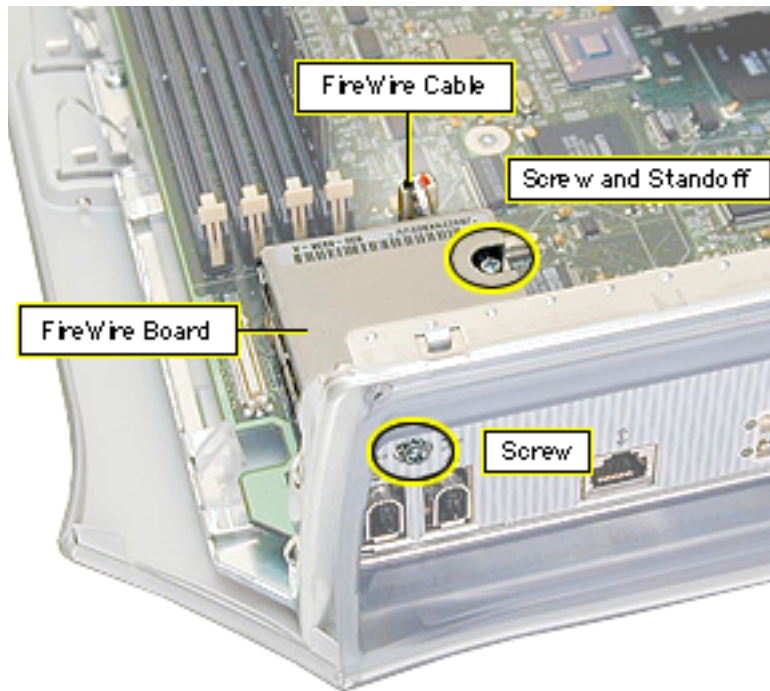
FireWire Board

FireWire Board, PCI Graphics

Note: The FireWire board is used only in Power Mac G4 (PCI Graphics) computers. Power Mac G4 (AGP Graphics/Gigabit Ethernet/ Digital Audio/QuickSilver) computers have FireWire built into the logic board.

Before you begin, do the following:

- Open the side access panel.
- Remove the modem.

1. Remove the screw securing the FireWire board to the I/O panel.

2. Remove the screw that secures the FireWire board to the metal standoff.

3. Disconnect the FireWire cable, the short 3-pin cable from the back of the FireWire board or logic board.

4. Gently lift up the FireWire board to remove it from the logic board connector.

Processor Fan, Power Mac G4 (QuickSilver)

Before you begin, open the side access panel.
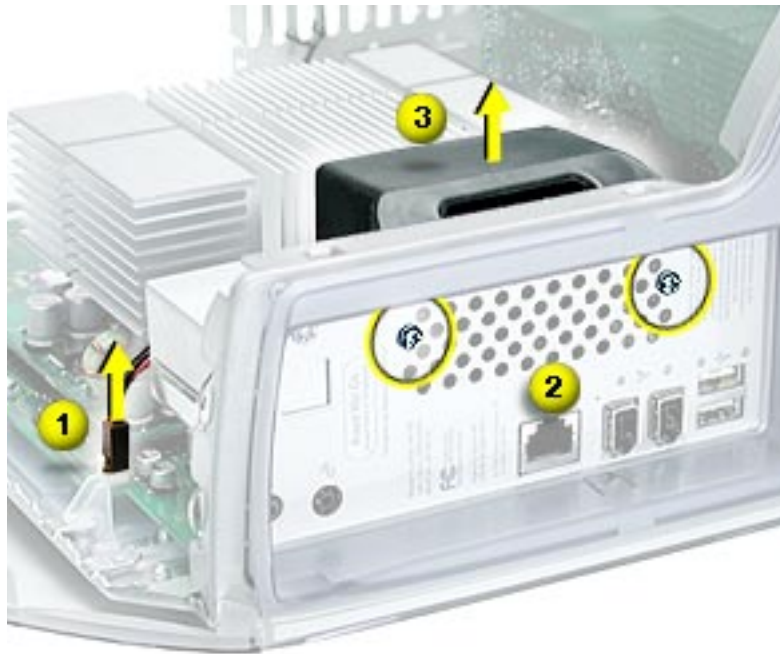
1. Disconnect the processor fan cable from the logic board.

2. Remove the two fan mounting screws.

3. Lift the processor fan out of the computer.

Processor Module, Power Mac G4 (QuickSilver)

Before you begin, do the following:

- Open the side access panel.
- Remove the processor fan.

⚠ Warning: The heatsink covering the processor may be hot. If the computer has been recently operating, allow it to cool down before performing this procedure.

1. Release the right heat-sink clip by pressing down on the top of the clip while using a small flatblade screwdriver to lift up and out on the clip's front tab. Repeat for the left heatsink clip.

2. Remove both clips and lift the heatsink off the processor module.

   ⚠Warning: When removing the heatsink, be careful not to bend the processor module beneath it.
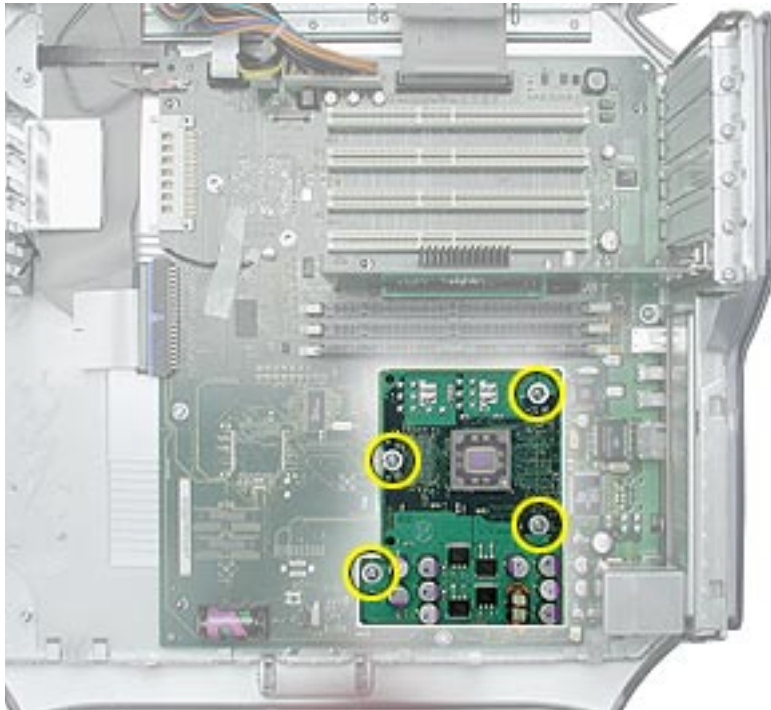
Warning: Double-check that the computer is turned off before performing this procedure. The screw in the bottom left circle of the illustration conducts 12 V and could spark if grounded while the computer is on.

3. Remove the four mounting screws.

   Replacement Note: Be sure to tighten all screws snuggly, but not so tightly as to damage the processor module. If the conducting screw is loose, arcing can occur,

damaging the processor.

4. To disconnect the processor from the logic board, hold it by the long edges, gently rock the processor right to left, and lift straight up.

⚠Warning: Hold the module as shown when removing or installing it to avoid bending the processor connector pins.
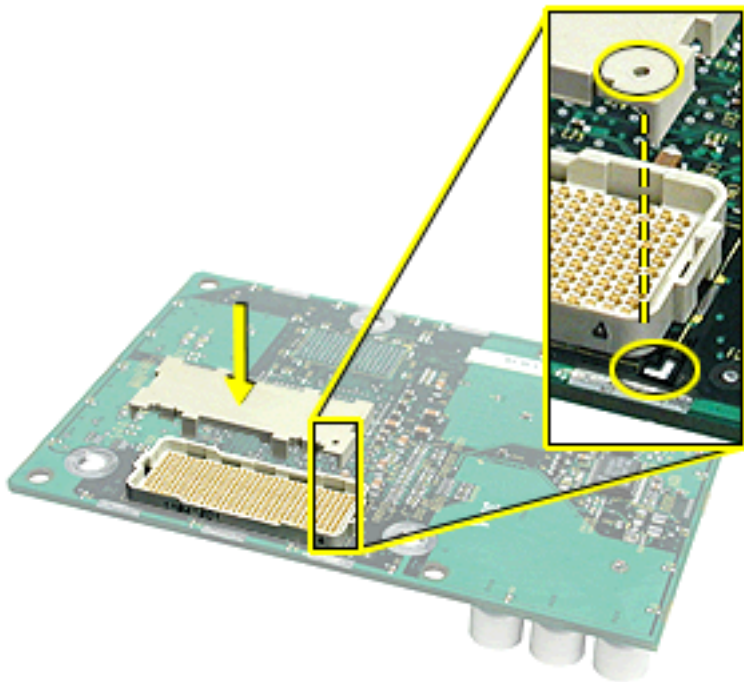
Important: If you are replacing the processor module, you must also transfer the replacement module's connector cover to the connector on the original module before returning it to Apple.
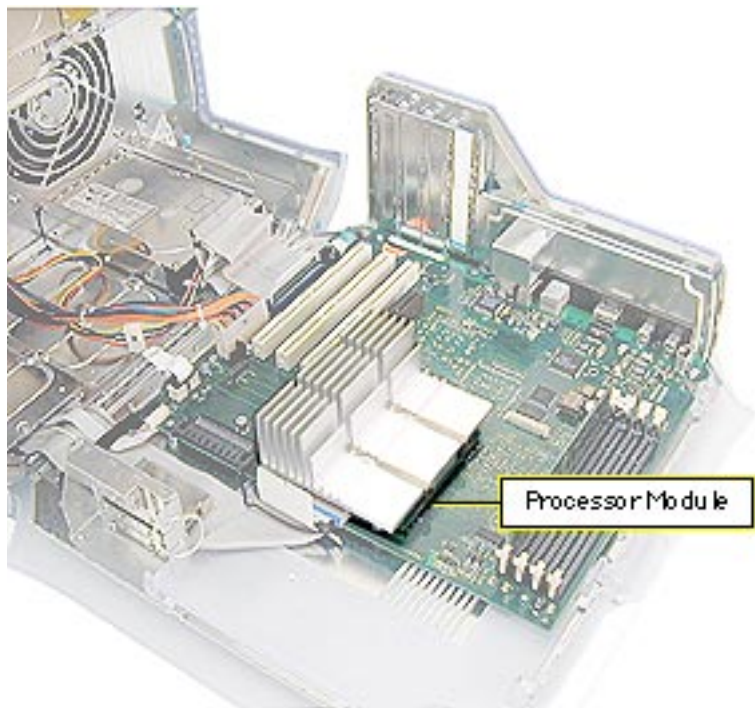
Processor Module, AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, open the side access panel.

Warning: The heatsink covering the processor may be hot. If the computer has been recently operating, allow it to cool down before performing this procedure.
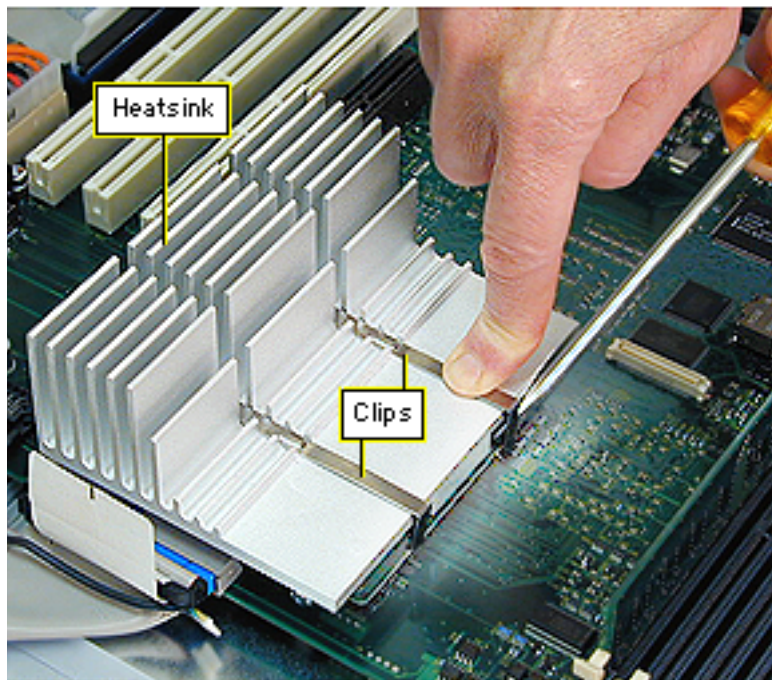
Processor Module

1. While pressing down on the top of the heatsink clip, use a small flatblade screwdriver to lift up and out on the front tab of the clip to release it.

2. Remove the heatsink clip and lift the heatsink off the processor module.

   ⚠ **Warning:** When removing the heatsink, be careful not to bend the processor module beneath it.

3. Remove the processor mounting screws.

4. To disconnect the processor from the logic board, hold it by the edges nearest the two opposing screw holes (on either side of the connector), gently rock the processor right to left, and lift straight up.

Warning: Hold the module as shown when removing or installing it to avoid bending the processor connector pins.
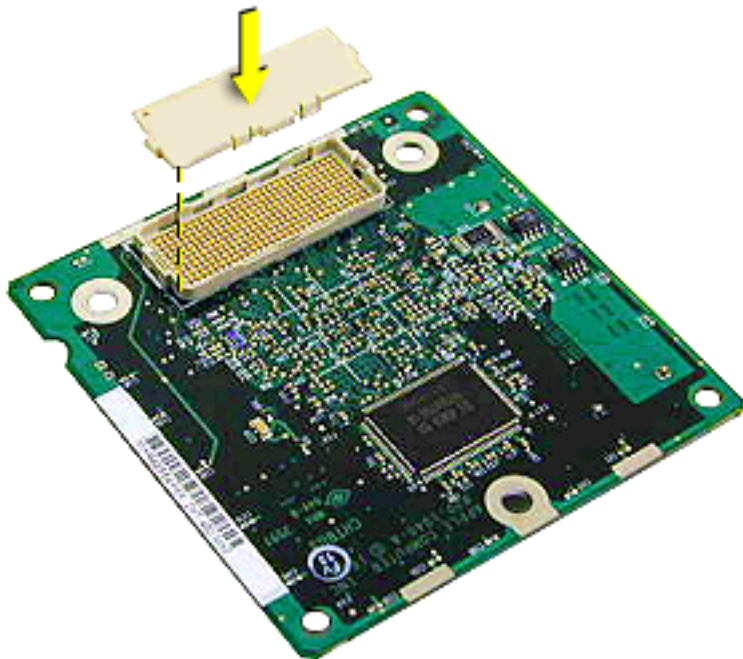
Important: If you are replacing the processor module, you must also transfer the replacement module's connector cover to the connector on the original module before returning it to Apple. Make sure the hole in the cover aligns with pin one (marked by a white V) on the connector.
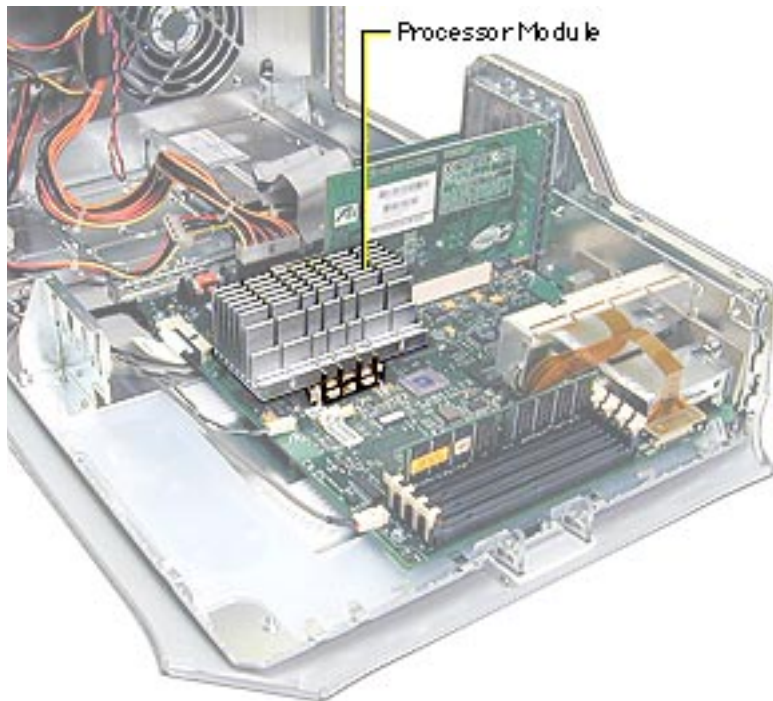
Processor Module, PCI Graphics

Before you begin, open the side access panel.

Note: The Power Mac G4 (PCI Graphics) processor requires a jumper installed at J25 on the logic board.

Note: While the heatsink in your unit may look different from the one pictured here, the procedure for removing it is the same.
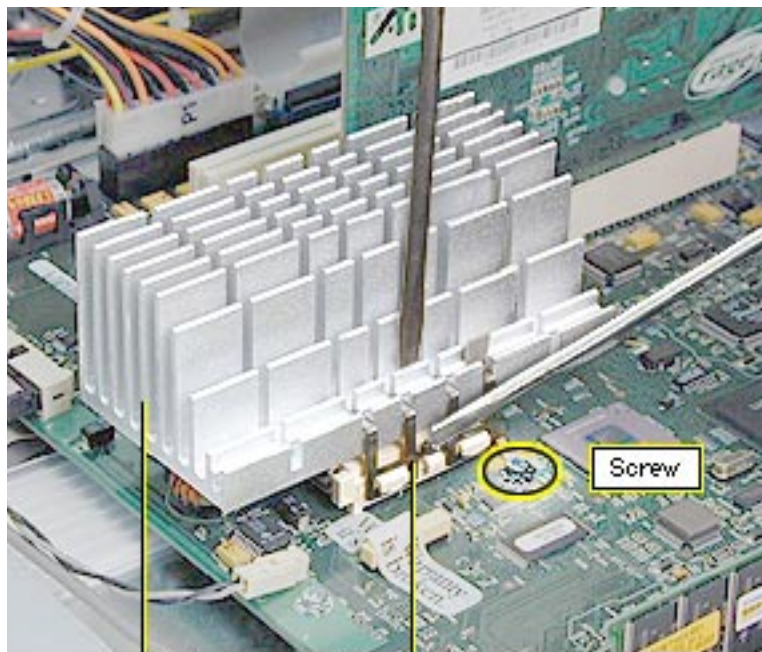
Heatsink   Heatsink Clip

1. Remove the screw that attaches the heatsink ground wire to the logic board.

Warning: The heatsink may be hot to the touch. If the computer has been operating, allow it to cool down before continuing.

2. While pressing down on the top of the heatsink clip, use a small flatblade screwdriver to release the clip by lifting up and out on its center front tab.

Lever   Processor Module
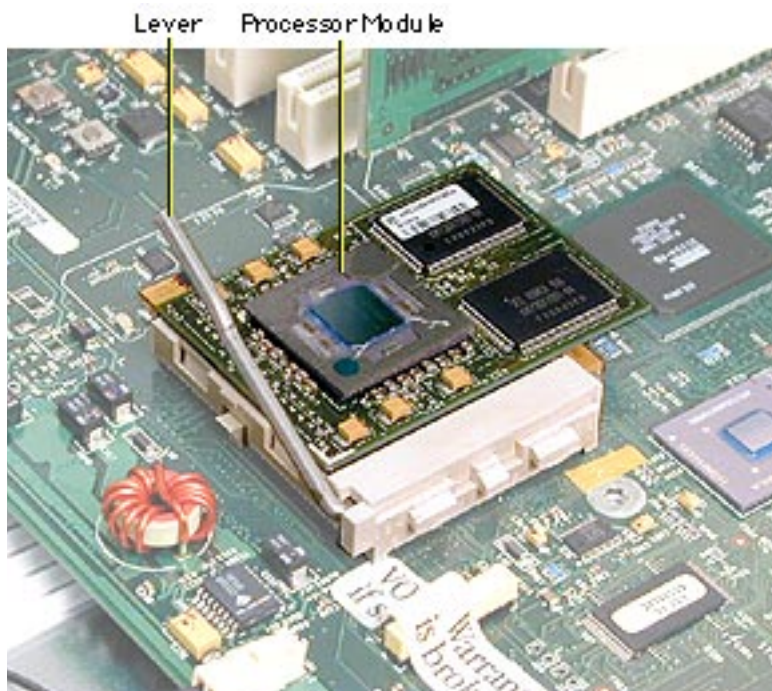
3. Remove the heatsink clip and lift the heatsink off the processor module.

4. Lift the lever to release the processor module.
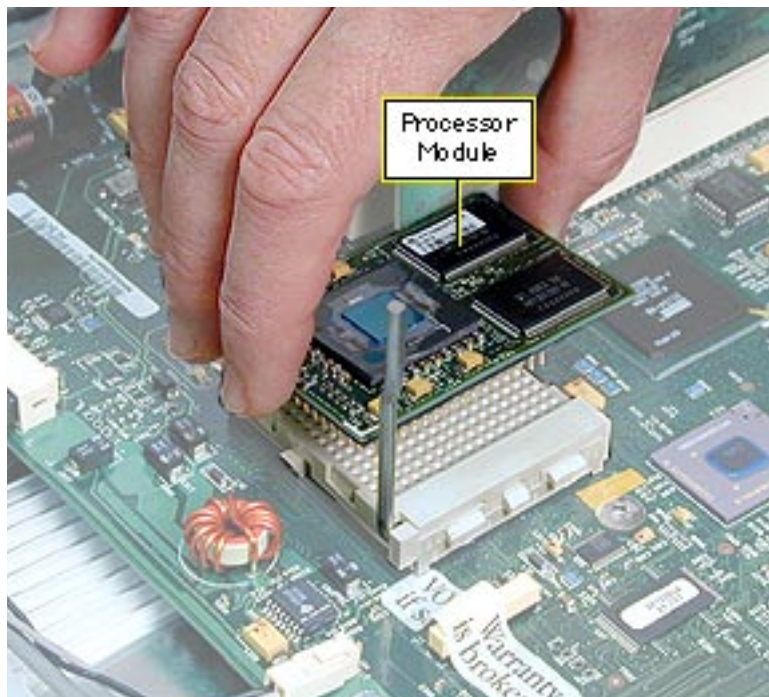
5. Holding the processor by the edges, gently lift it straight up to disconnect it from the logic board.

   Caution: Be careful not to bend the pins underneath the module.

Important: If you are only replacing the processor module, stop here. If, however, you are removing the processor module to replace the logic board, continue with the next page.

6. Remove the warranty sticker and jumper block only if you are replacing the logic board.

   White jumper: 400 MHz
   Blue jumper: 350 MHz

Caution: When removing the jumper, be sure not to leave its inner metal clips on the old jumper connector. If the clips are left behind, install a new jumper on the new board. If you use a jumper without clips, or improperly install the jumper, the unit could fail to start up.

7. Install the jumper block with the gold connector pins facing toward the board. Be sure the pins are covered as shown.

Processor   Jumper Block   400 MHz White   350 MHz Blue

Gap Filler — Capacitor
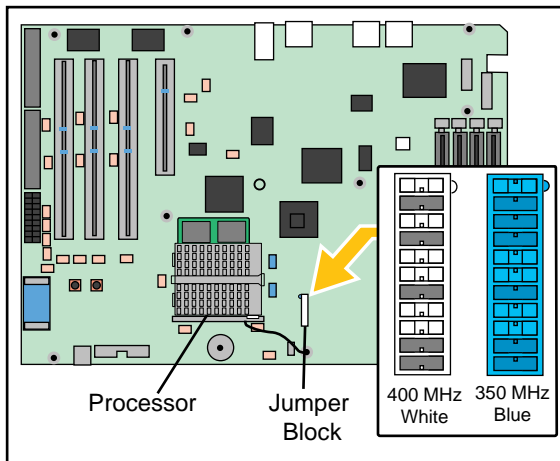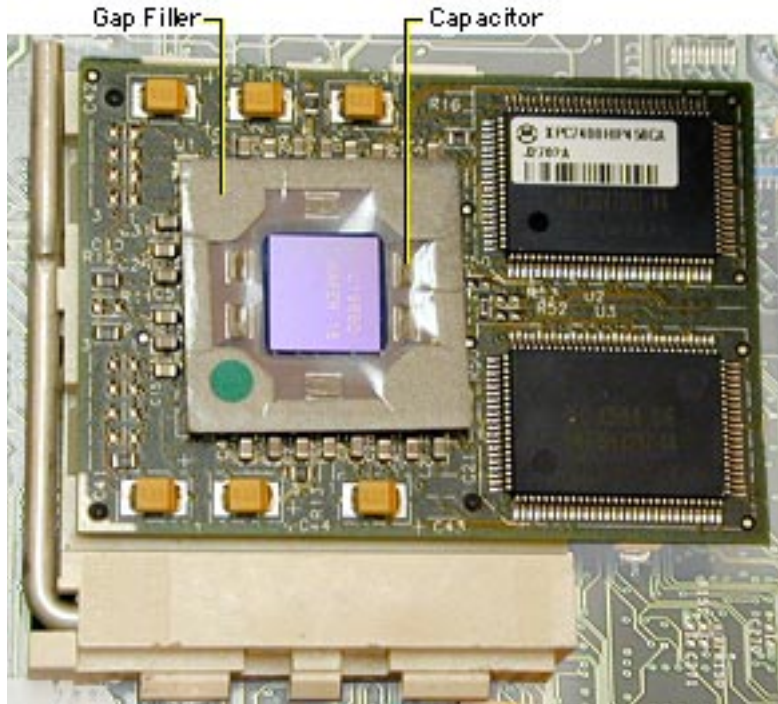
Replacement Note: Position the processor module over the slot, seat it evenly, and press down gently on the module to install it. If you are installing a new processor, install a gap filler on it as illustrated.

Caution: On modules with capacitors, make sure all capacitors show through the opening in the gap filler.
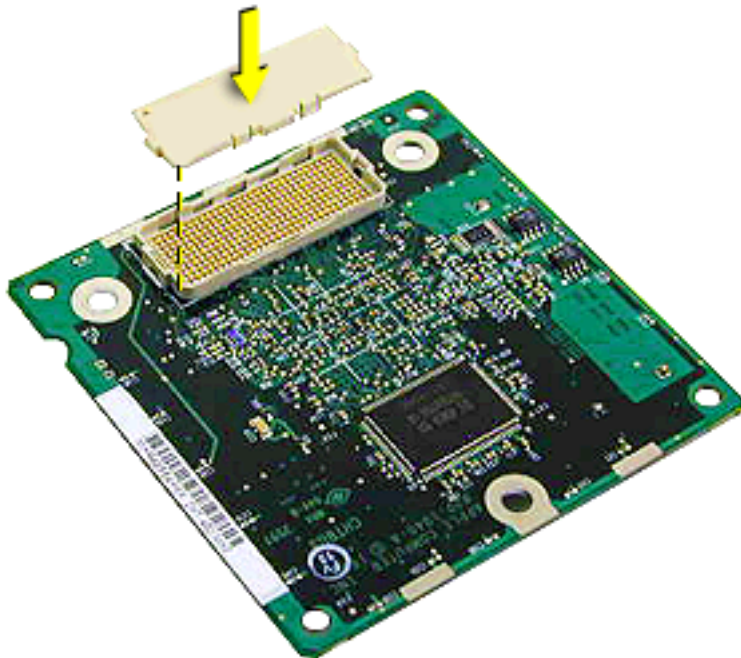
Important: If you are replacing the processor module, you must also transfer the replacement module's connector cover to the connector on the original module before returning it to Apple. Make sure the hole in the cover aligns with pin one (marked by a white V) on the connector.

Logic Board, Power Mac G4 (QuickSilver)

Before you begin, open the side access panel and remove the following:

- video card
- processor fan
- processor module
- PCI cards (if present)
- modem (if present)
- AirPort card (if present)

1. Disconnect all cables from the logic board.

2. Using a Phillips screwdriver, remove the four logic board mounting screws.

3. Remove the three processor module standoffs.

4. Slide the logic board away from the I/O panel to clear the board guides.

5. Tilt the logic board so that the ports clear the openings in the I/O panel and lift the board out of the computer.

Important: If you are replacing the logic board, transfer the processor module, video card, PCI cards, AirPort card, memory cards, and modem from the original logic board to the replacement board.
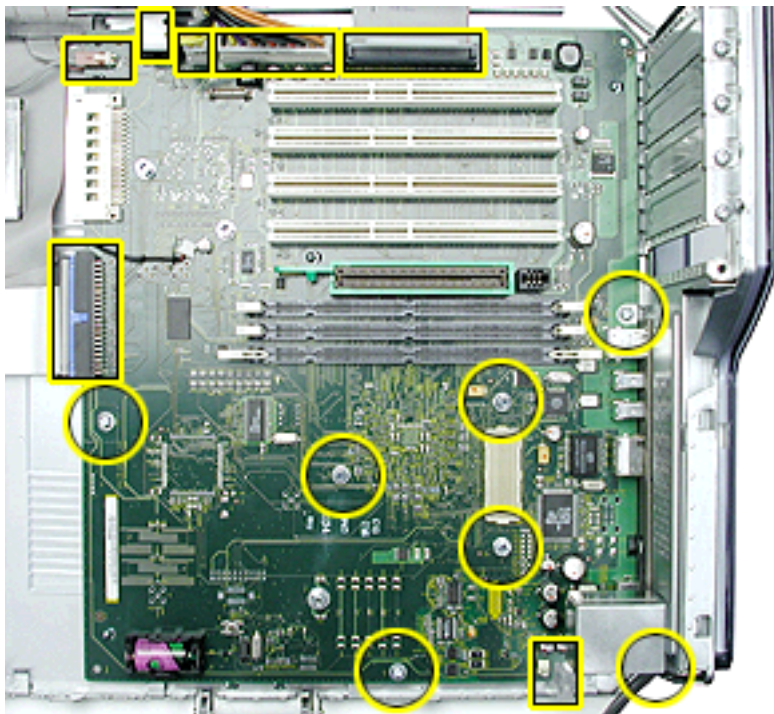
If you are replacing the logic board, you must also transfer the replacement board's connector cover to the connector on the original board before returning it to Apple. Make sure the hole in the cover aligns with pin one (marked by a gold V) on the connector.
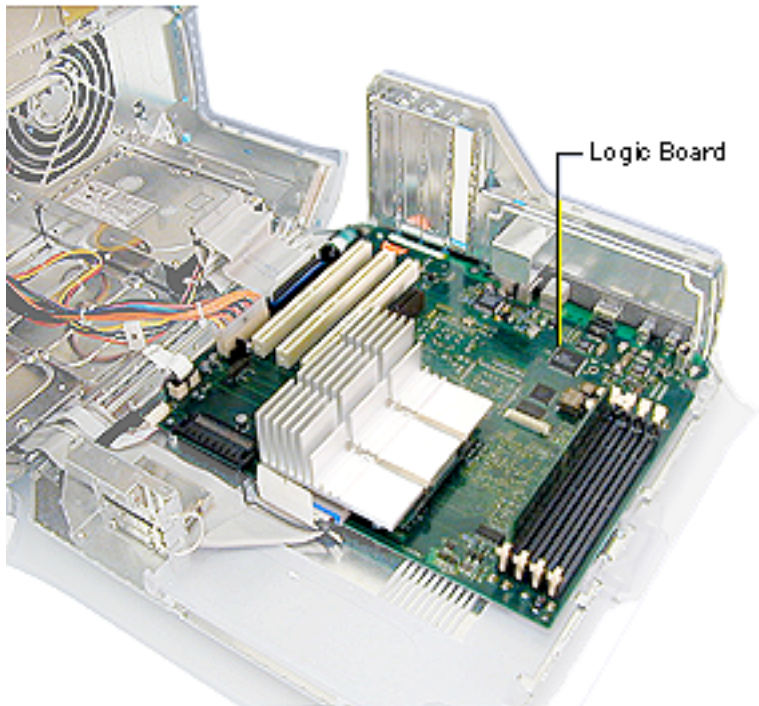
Logic Board, AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, open the side access panel and remove the following:

- video card
- processor module
- PCI cards (if present)
- modem (if present)
- AirPort card (if present)

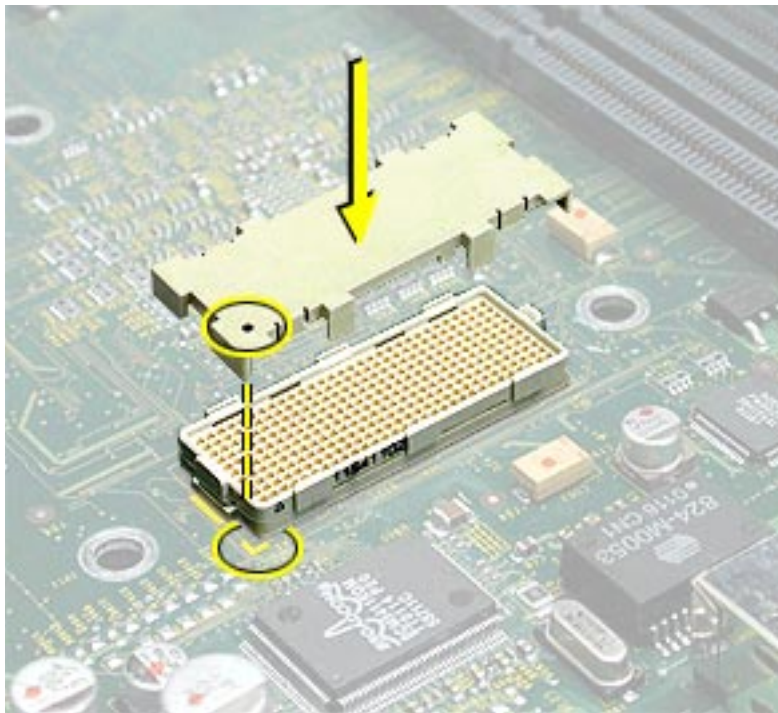**Note:** While the layout of the Power Mac G4 (Digital Audio) logic board differs from the logic board layout in the illustrations for this

procedure, the steps for removing the board are the same.

1. Disconnect all cables from the logic board.

2. Using a Phillips screwdriver, remove the three logic board mounting screws.

3. For Power Mac G4 (Gigabit Ethernet/ Digital Audio) computers, remove the three processor module standoffs.

4. Slide the logic board away from the I/O panel to clear the board guides.

5. Tilt the logic board so that the ports clear the openings in the I/O panel and lift the board out of the computer.

Important: If you are replacing the logic board, transfer the processor module, video card, PCI cards, AirPort card, memory cards, modem, and video card connector clip (if present) from the original logic board to the
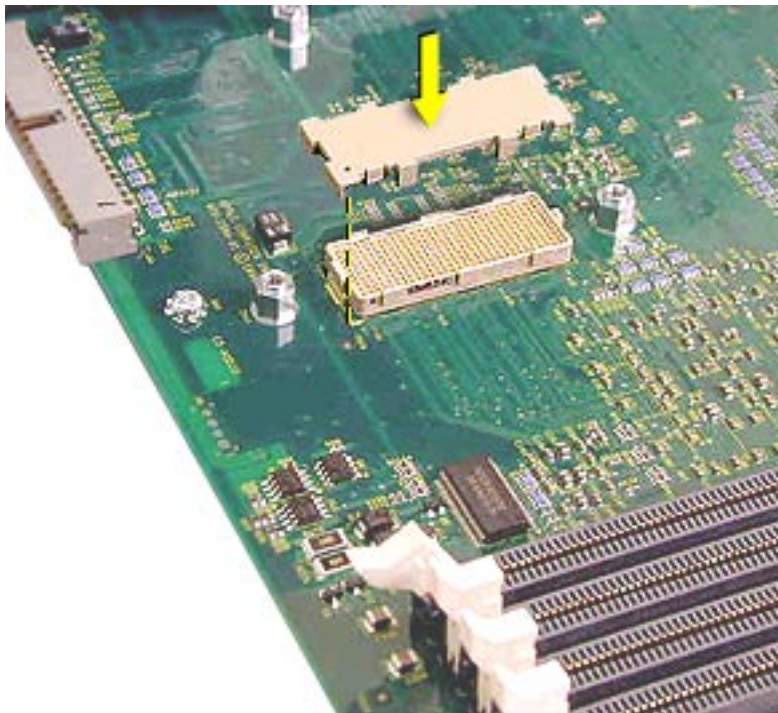
replacement board.

If you are replacing the logic board, you must also transfer the replacement board's connector cover to the connector on the original board before returning it to Apple. Make sure the hole in the cover aligns with pin one (marked by a gold V) on the connector.
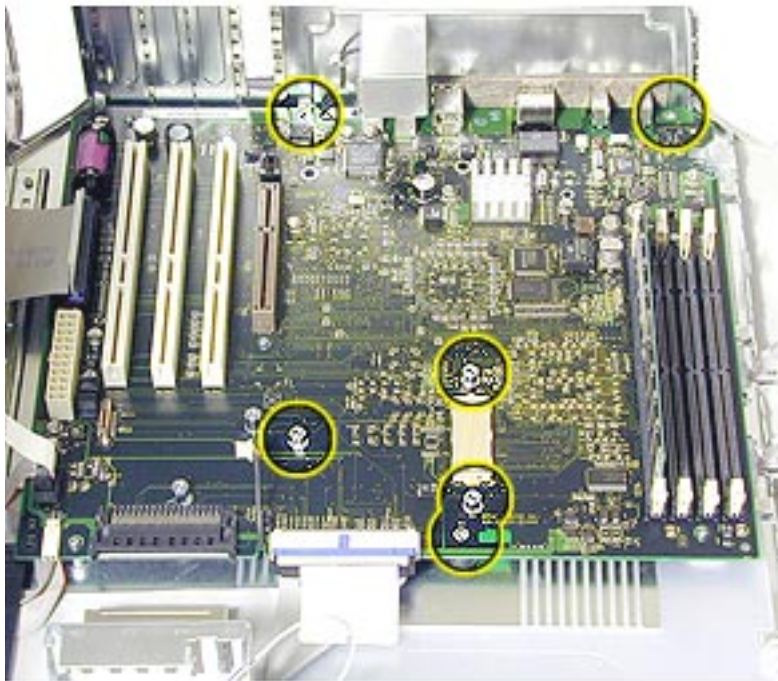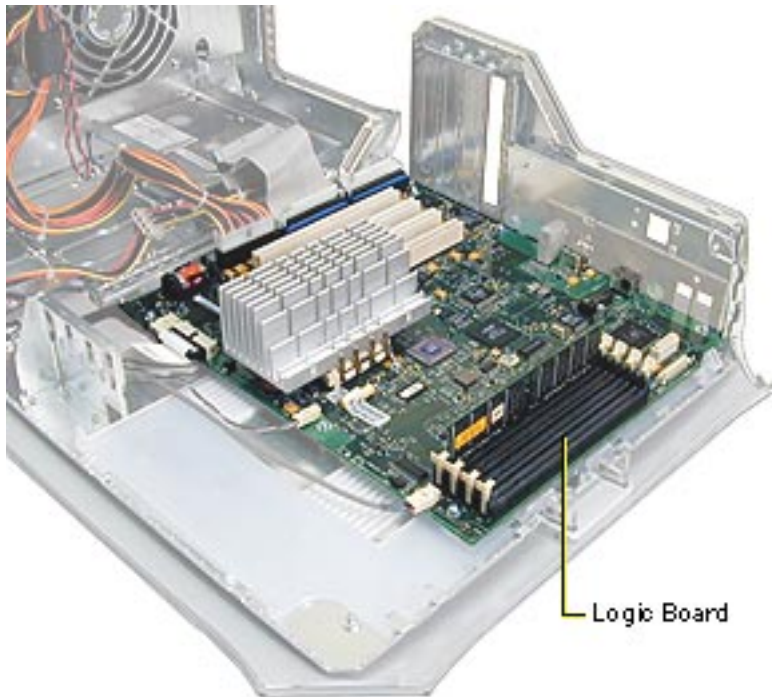
Logic Board

Logic Board, PCI Graphics

Before you begin, open the side access panel and remove the following:

- video card
- PCI cards (if present)
- modem (if present)
- FireWire board
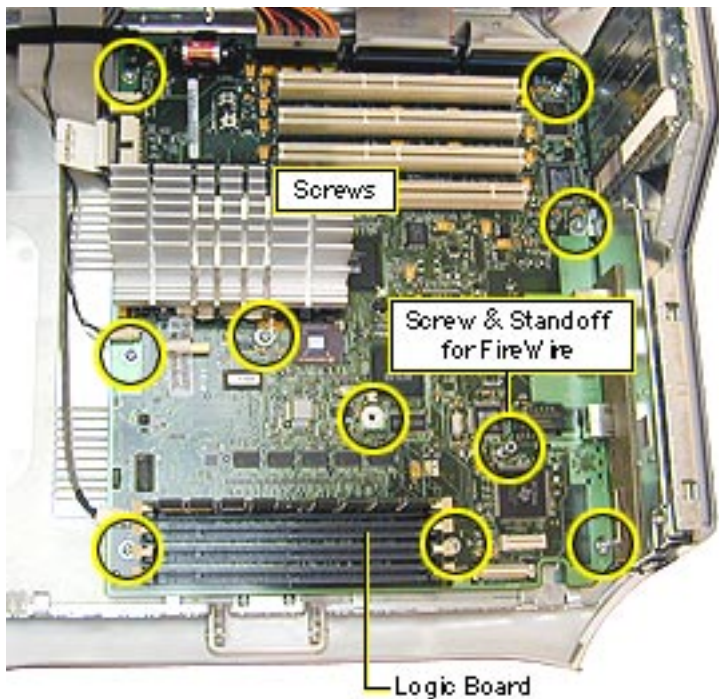
1. Disconnect all cables from the logic board.

2. Using a Phillips screwdriver, remove the logic board mounting screws.

3. Remove the standoff that attaches to the FireWire board.

4. Tilt the logic board so that the ports clear the openings in the I/O panel.

5. Lift the board out of the computer.

Important: If you are replacing the logic board, you must transfer the processor module, jumper, video card, PCI cards, memory cards, FireWire board, and modem from the original logic board to the replace-ment board. You must also cover the processor jumper with a
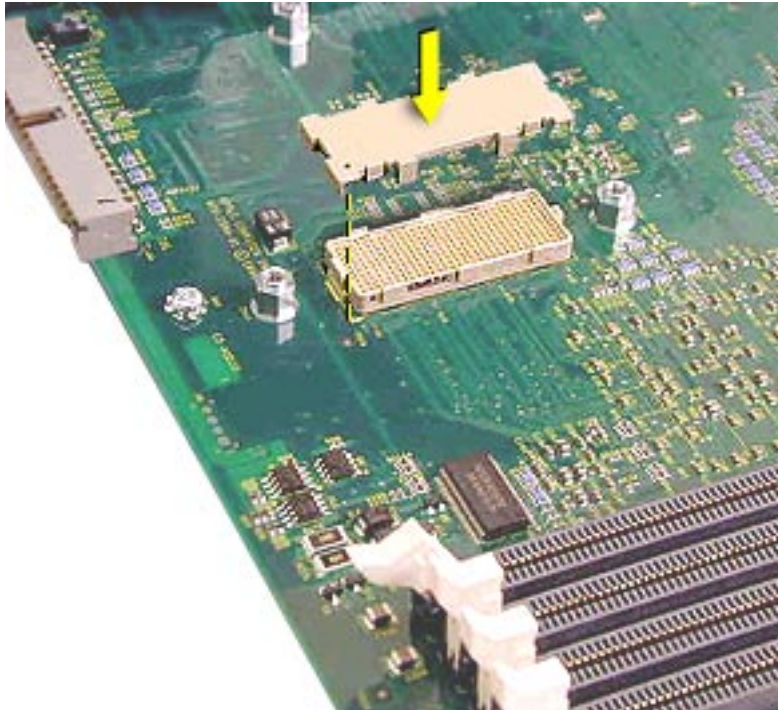
new warranty sticker, which comes with the replacement logic board. See the Take Apart topic "Processor Module, Power Mac G4 (PCI Graphics)."

If you are replacing the logic board, you must also transfer the replacement board's connector cover to the connector on the original board before returning it to Apple. Make sure the hole in the cover aligns with pin one (marked by a gold V) on the connector.

SDRAM DIMM

Before you begin, open the side access panel.

SDRAM DIMM
(Four Slots)
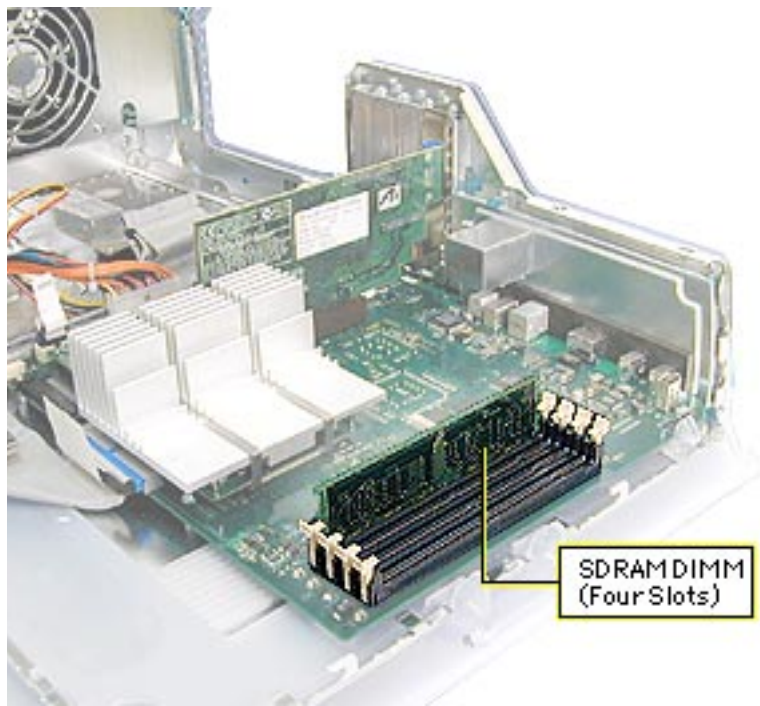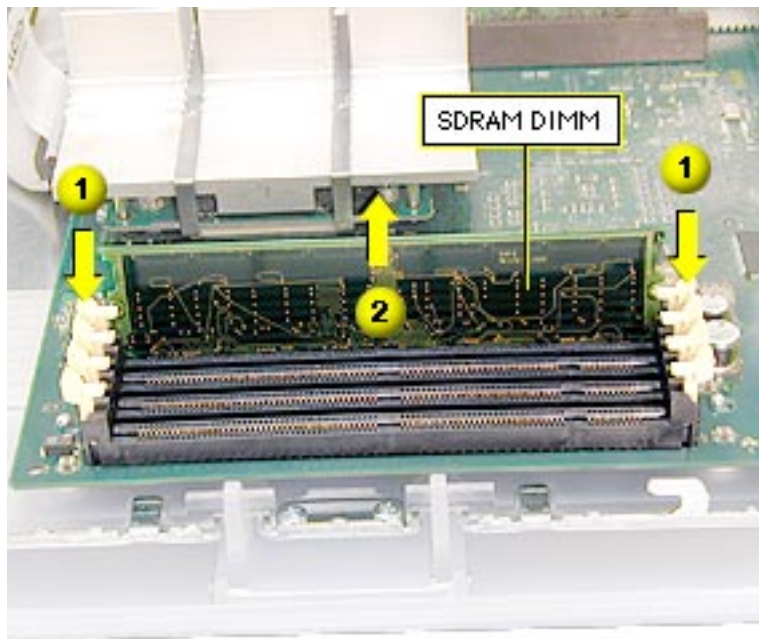
1. Push down on the connector clips to unlock the DIMM.

2. Lift the DIMM out of the slot.
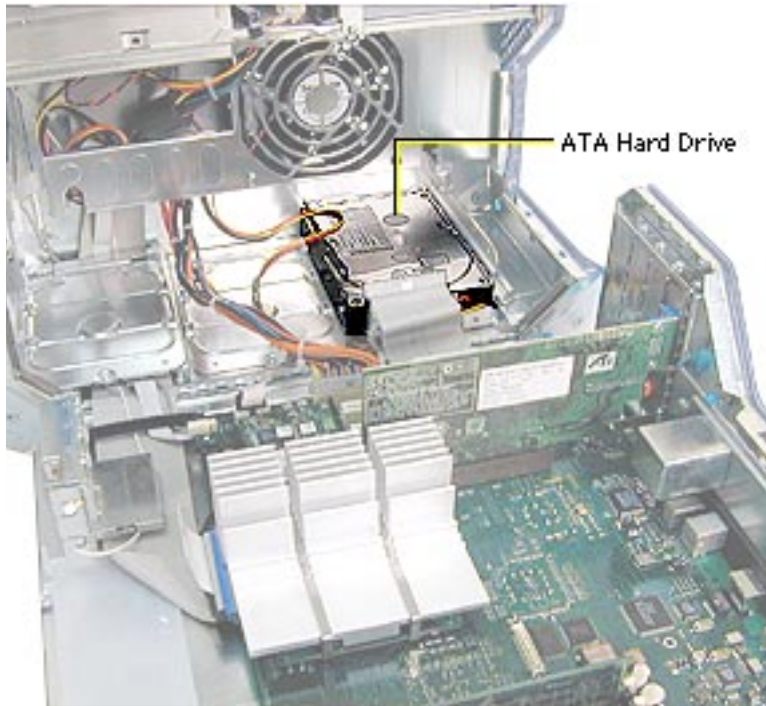
ATA Hard Drive

Hard Drive, IDE /ATA

Before you begin, open the side access panel.

Note: The Power Mac G4 supports a total of three internal hard drives. It can accommodate up to two Ultra ATA drives in drive bay 3, near the rear of the computer. ATA drives are not supported in drive bay 1 or 2.

Note: You must assign a SCSI ID number to every additional hard drive and the number must not conflict

with the ID number already assigned to another drive. One factory-installed drive has ID 0; a second factory-installed drive has ID 1.

ATA Hard Drive

Hard Drive Power Cable

ATA Hard Drive Data Cable
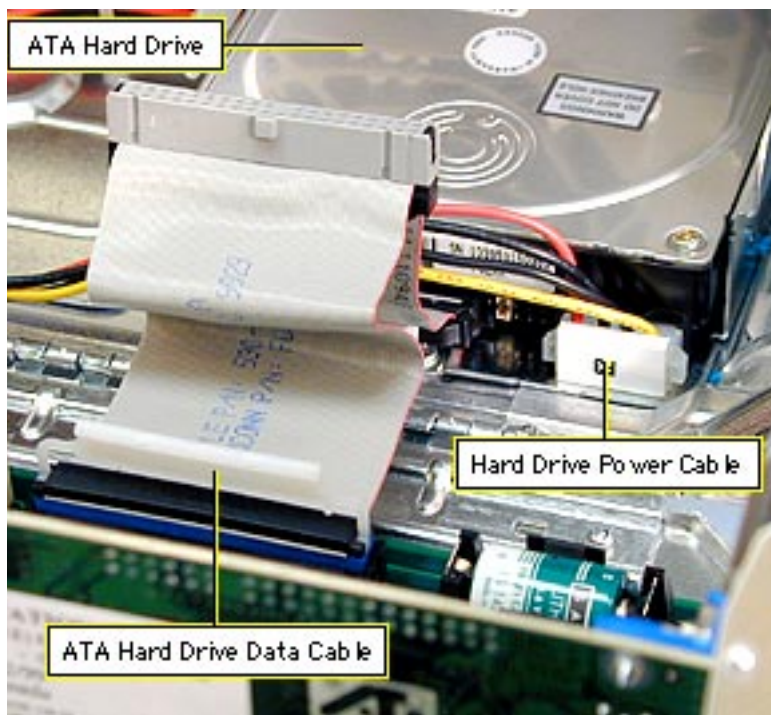
1. Disconnect the Ultra ATA hard drive data cable and the hard drive power cable (P3) from the hard drive.
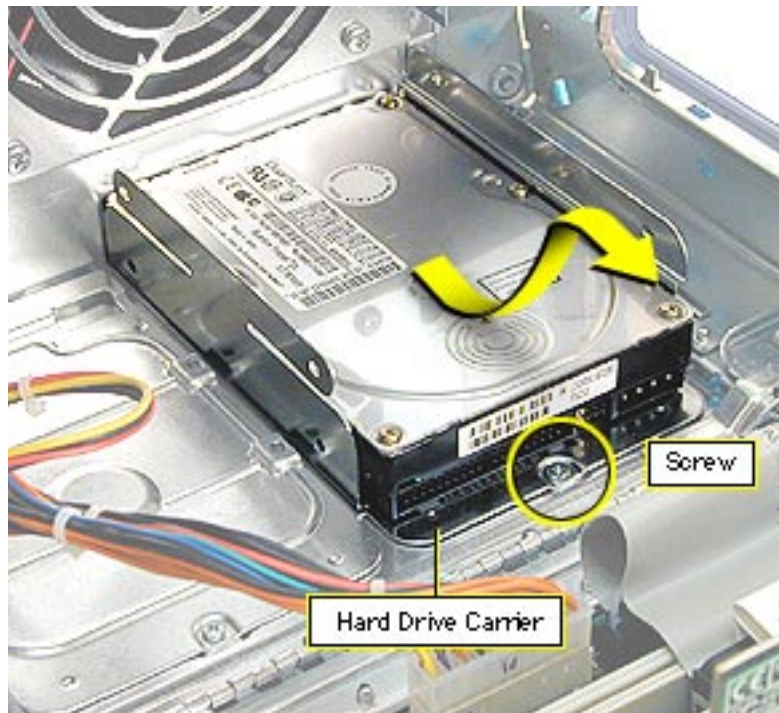
2. Remove the hard drive carrier mounting screw.

3. Pull the drive carrier back and lift up at an angle to release the carrier tabs from the slots in the chassis.

4. Remove the carrier and drive from the computer.

Screws
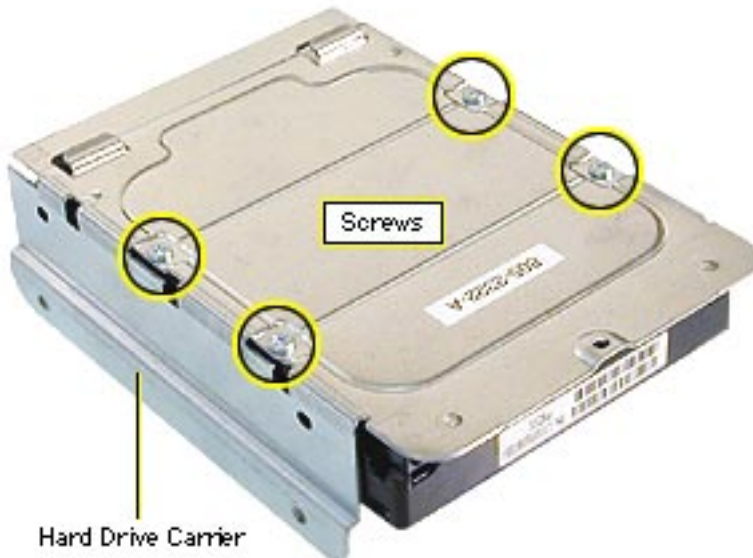
Hard Drive Carrier

5. If you're returning the drive to Apple, remove the screws that mount the hard drive to the carrier.

6. Lift the hard drive from the carrier.

Note: Drives must be returned to Apple in Apple packaging, without cables or carriers. Failure to comply with this requirement may result in a packaging noncompliance charge. For more information, refer to the service parts database.
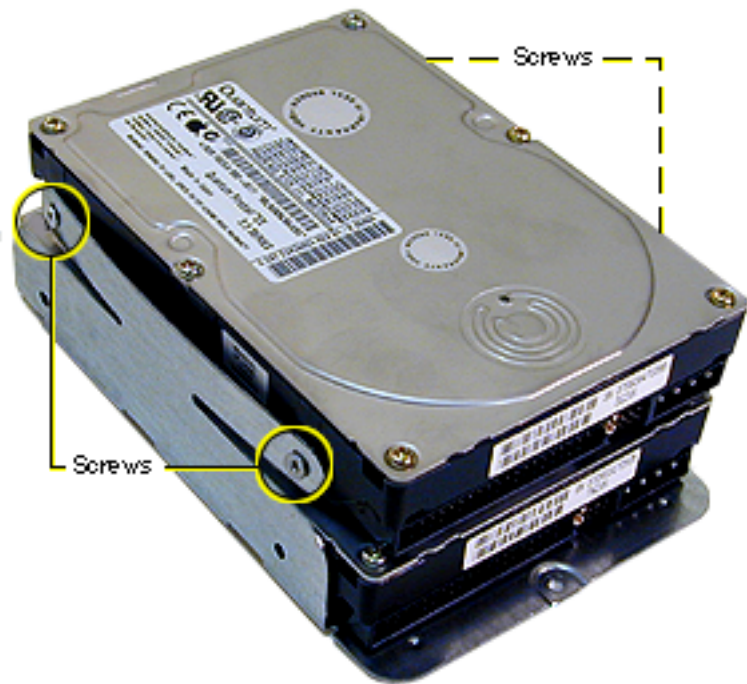
Replacement Note: To install two drives in the U-shaped carrier, install the first drive in the bottom of the carrier. Then place the second drive in the carrier's upper bay and attach screws through the sides of the carrier into the sides of the drive. Note that tightening screws on the left side of the carrier bends the arms of the carrier into the drive, holding it securely.
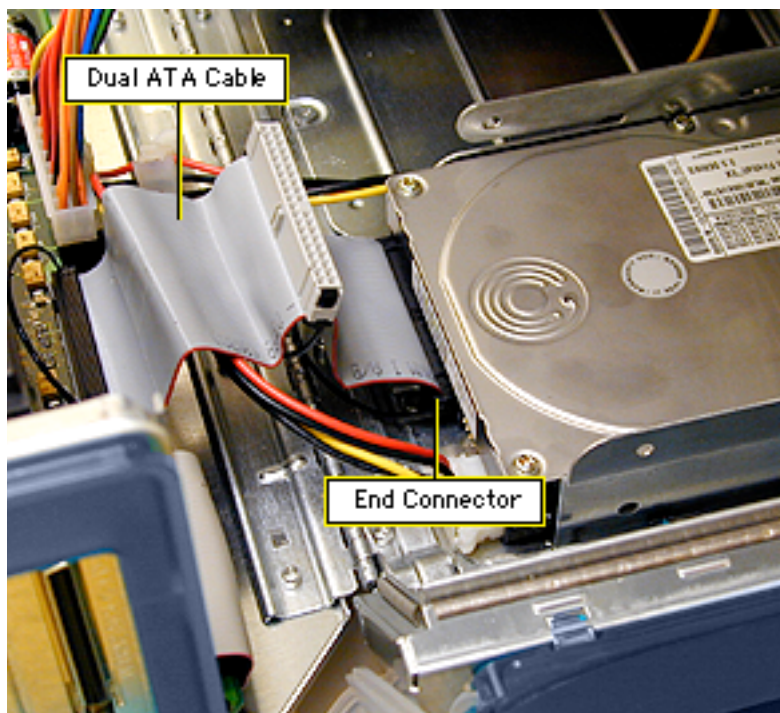
Replacement Note: When reconnecting a dual-drive ATA cable to drives installed in a U-shaped carrier, be sure to attach the end connector to the drive in the bottom of the carrier.
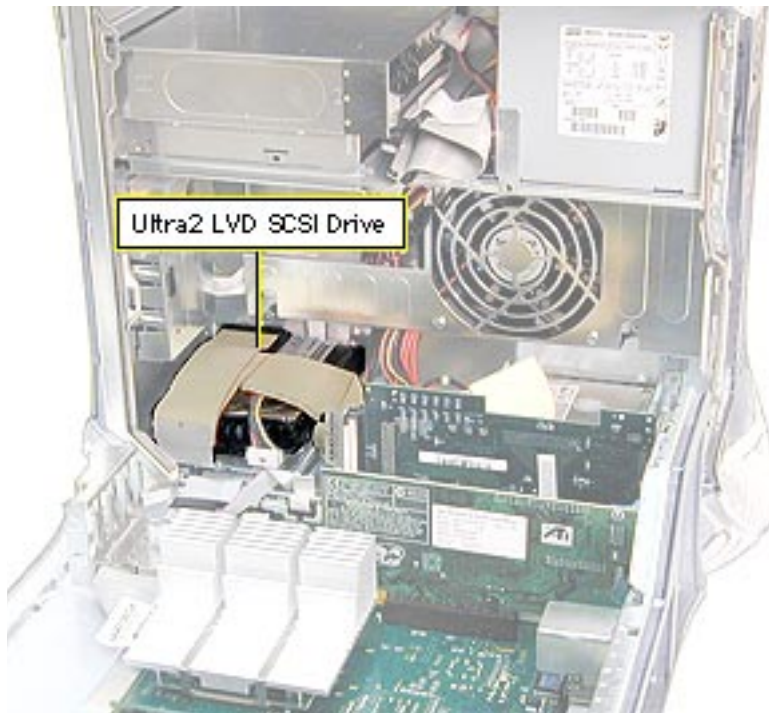
Hard Drive, Ultra2 LVD SCSI

Before you begin, open the right side access panel.

Note: This computer supports a total of three internal hard drives. If a unit has at least one internal Ultra2 LVD SCSI drive, an Ultra2 LVD SCSI PCI card, and a SCSI data cable, you can connect additional internal and external Ultra2 LVD SCSI devices. The unit's SCSI data cable supports three internal SCSI drives;

this cable has a built-in terminator so you don't need to add one. You can connect external Ultra2 LVD SCSI devices to the port on the rear of the computer.

If the computer came with one Ultra2 LVD SCSI drive, it's installed in drive bay 1, near the front of the computer. If it came with two drives, the second one is installed in bay 2. If a third drive is installed, it's in bay 3. Usually the computer uses the drive in bay 1 to start up.

You must assign a SCSI ID number to every additional hard drive and the number must not conflict with the ID number already assigned to a drive on the SCSI chain. One factory-installed drive has ID 0; a second factory-installed drive has ID 1; a third drive has ID 2. The SCSI PCI card has ID 7.
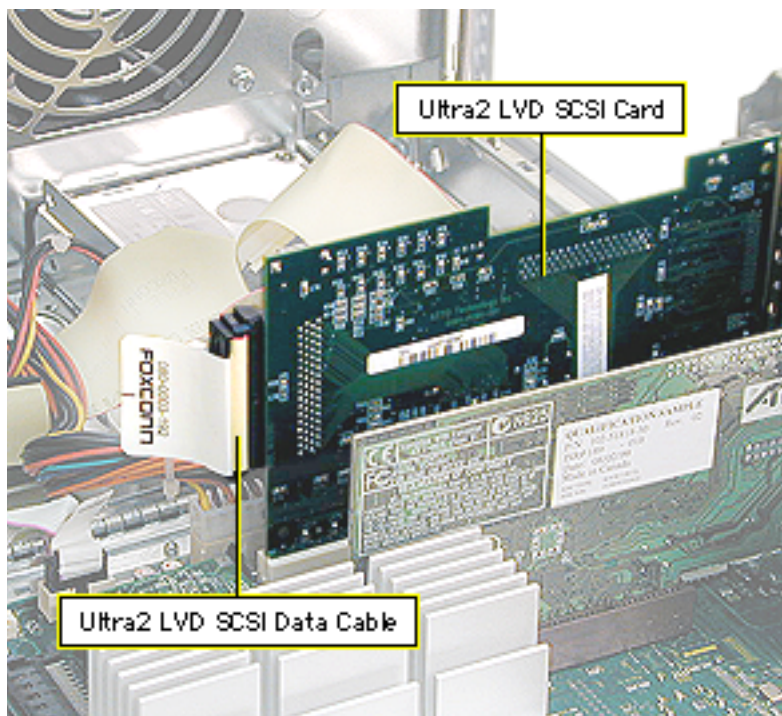
1. Disconnect the Ultra2 LVD SCSI cable from the Ultra2 LVD SCSI card.

Ultra2 LVD SCSI Data Cable

Ultra2 LVD SCSI Power Cable (P5)
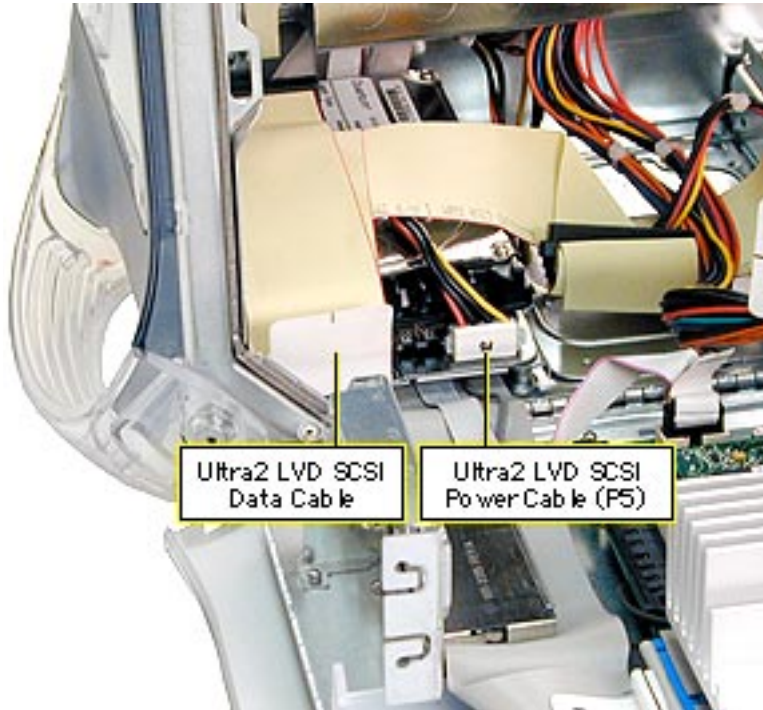
2. Disconnect the SCSI hard drive power cable (P5).

   Caution: Pull the SCSI power cable straight out of the connector on the drive. Any up or down motion to the connector could damage the drive.

   Replacement Note: The power cables attach to drives as follows:
   P5 attaches to bay 1
   P2 attaches to bay 2
   P3 attaches to bay 3

3. Disconnect the Ultra2 LVD SCSI data cable from the hard drive.
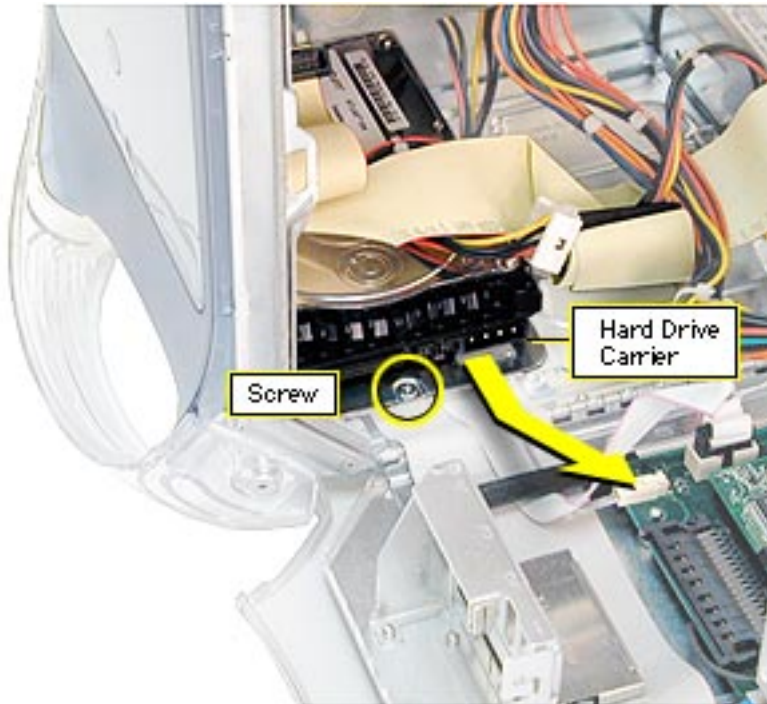
4. Remove the hard drive carrier mounting screw.

5. Pull the drive carrier back and lift up at an angle to release the carrier tabs from the slots in the chassis.

6. Remove the carrier and drive from the computer.

Ultra2 LVD SCSI
Data Cable and
Terminator
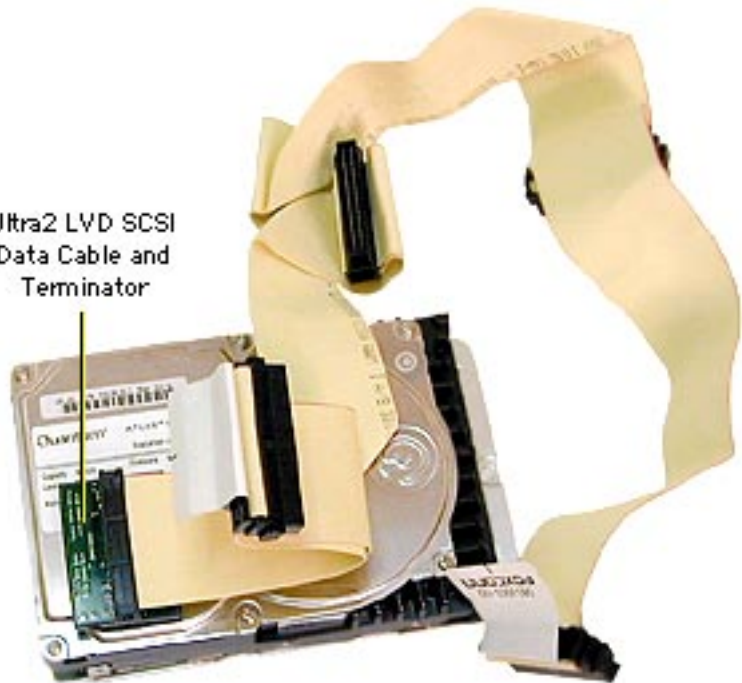
7. If you're returning the drive to Apple, remove the SCSI data cable and terminator (black plastic housing) from the top of the drive. The cable and terminator are attached to the drive with double-stick foam tape.

Drive Carrier   Screws
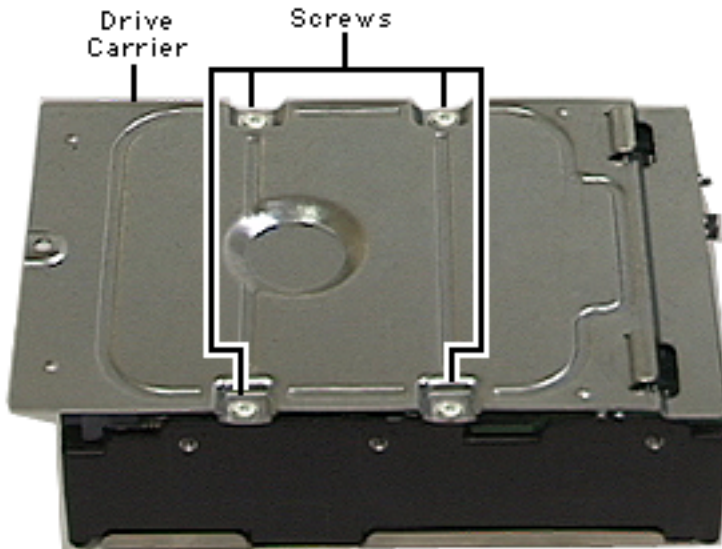
8. If you're returning the drive to Apple, you must also remove the hard drive carrier. Remove the four screws from the carrier and lift out the drive.

Note: Drives must be returned to Apple in Apple packaging, without cables or carriers. Failure to comply with this requirement may result in a packaging noncompliance charge. For more information, refer to the service parts database.

Thermal Pad
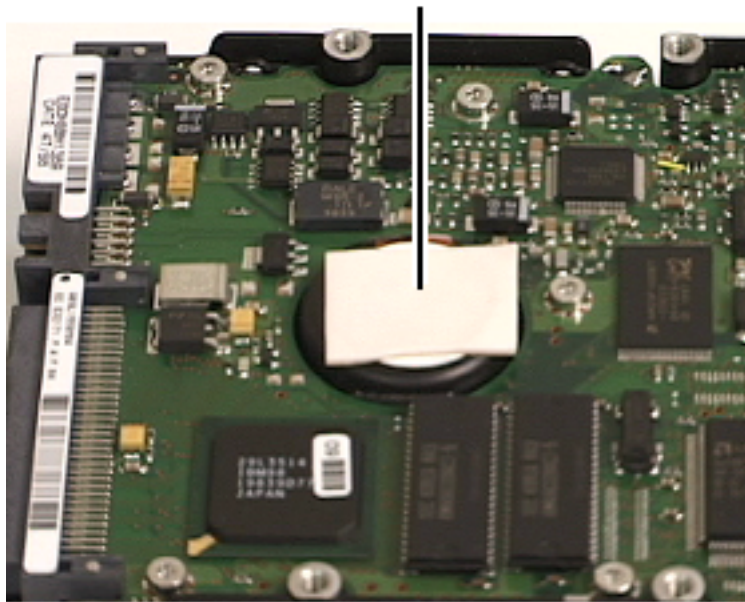
9. If you're replacing the thermal pad on the drive, remove the old pad and apply the new pad to the same area on the drive.

   Important: Before installing a new 36 GB Ultra2 LVD SCSI IBM drive, you must apply a thermal pad, part number 922-3863.

Ultra2 LVD SCSI Card

Before you begin, open the side access panel.
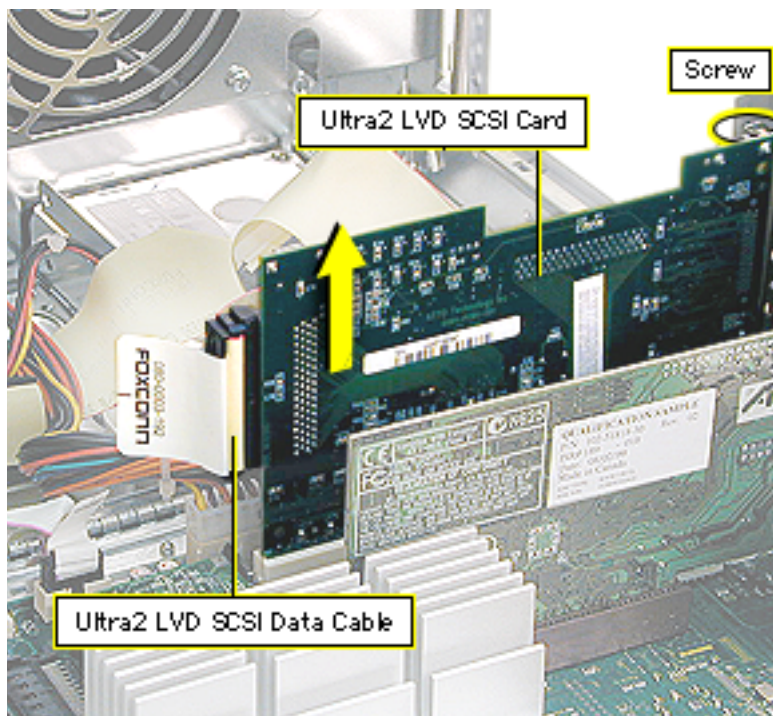
1. Remove the Ultra2 LVD SCSI card mounting screw.

2. Disconnect the Ultra2 LVD SCSI cable from the PCI card.

   Note: Make sure no external cable is attached to the card.

3. Gently lift up on the Ultra2 LVD SCSI card to remove it from the PCI slot.
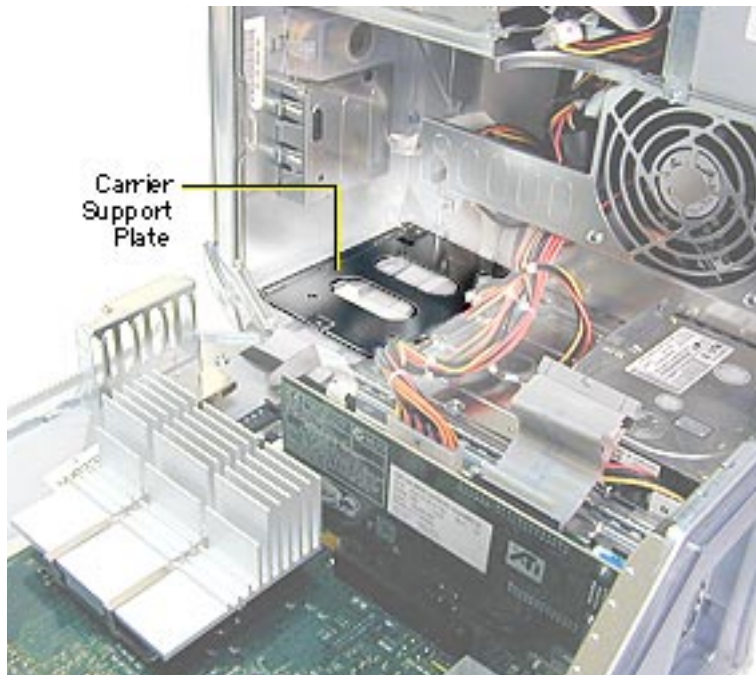
Carrier Support Plate

Note: Perform this procedure only if you must replace the support plate or the cables below the plate.

Before you begin, do the following:

- Open the side access panel.
- Remove the hard drive carrier in drive bay 1.

1. Remove the two support plate mounting screws from the bottom of the unit.

Screws
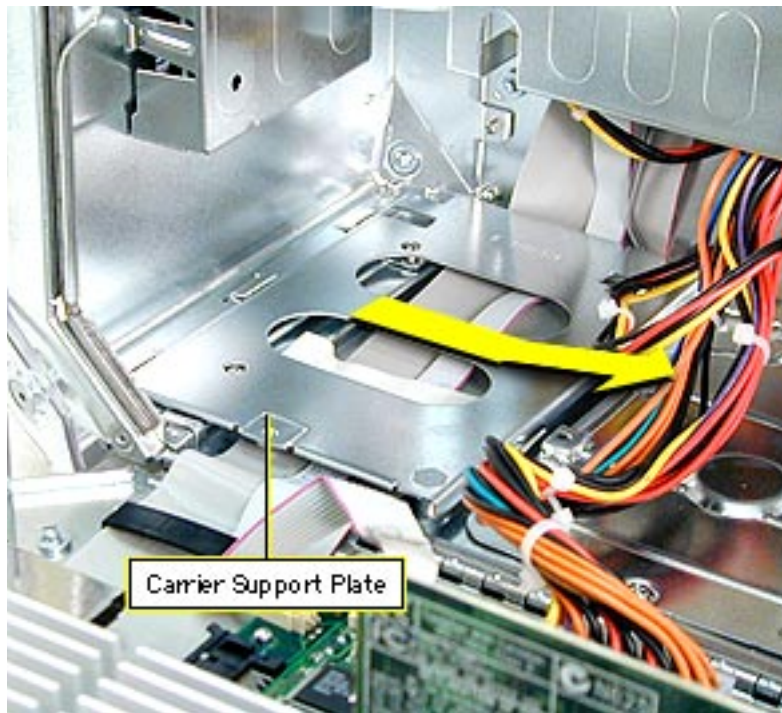
2. Lift the plate at an angle and remove it from the computer.

Carrier Support Plate

CD/DVD Drive, Power Mac G4 (QuickSilver)

Before you begin, open the side access panel.

Note: You remove the drive carrier from the computer with the drives attached to the carrier.

1. Remove the four screws that attach the drive carrier to the chassis.

Screw

2. Supporting the bottom of the carrier, slide it back and rotate it so you can reach the drive cables.
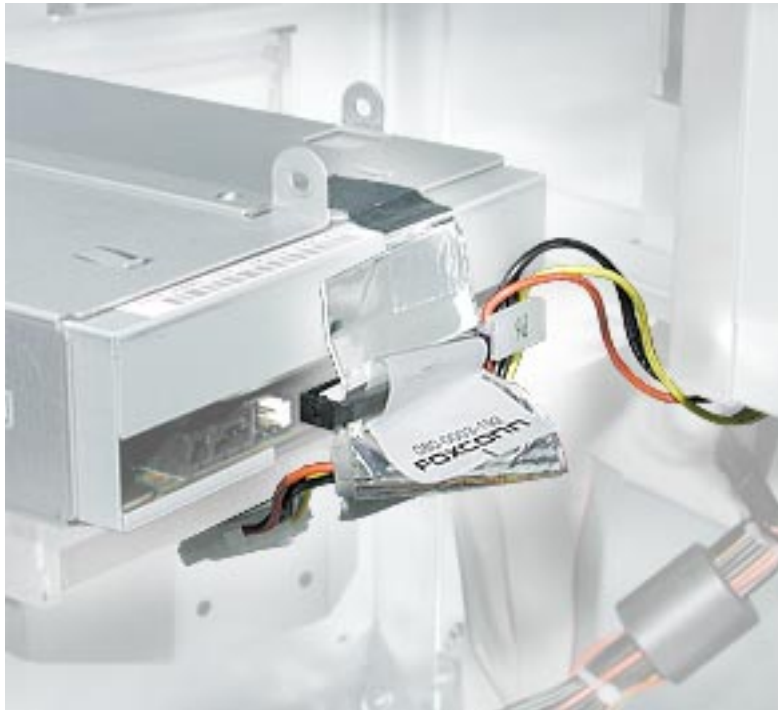
3. Carefully detach the ribbon cable tape from the top of the carrier.

4. Disconnect the following cables from the back of the CD/DVD/Zip drives:
   - •ribbon cable from the CD/DVD and Zip drives
   - •power cable (P6) from the CD/DVD drive
   - •power cable (P7) from the Zip drive

5. Remove the carrier and drives from the computer.

6. Using a Phillips screwdriver, remove the four CD/DVD drive carrier mounting screws.

7. Slide the drive out of the carrier.

Replacement Note: When inserting the drive carrier into the computer, make sure the pegs on the bottom of the carrier fit into the two notches in the drive shelf.

Zip Bezel/Blank Bezel, Power Mac G4 (QuickSilver)

Before you begin, open the side access panel.

1. From inside the chassis, behind the front panel, push the bezel tab forward to release the right side of the bezel.

2. Disconnect the hook on the left side of the bezel from the front panel and remove the bezel from the computer.

Zip Drive, Power Mac G4 (QuickSilver)

Before you begin, open the side access panel.

Note: You remove the drive carrier from the computer with the drives attached to the carrier.

1. Remove the four screws that attach the drive carrier to the chassis.

Screw

2. Supporting the bottom of the carrier, slide it back and rotate it so you can reach the drive cables.
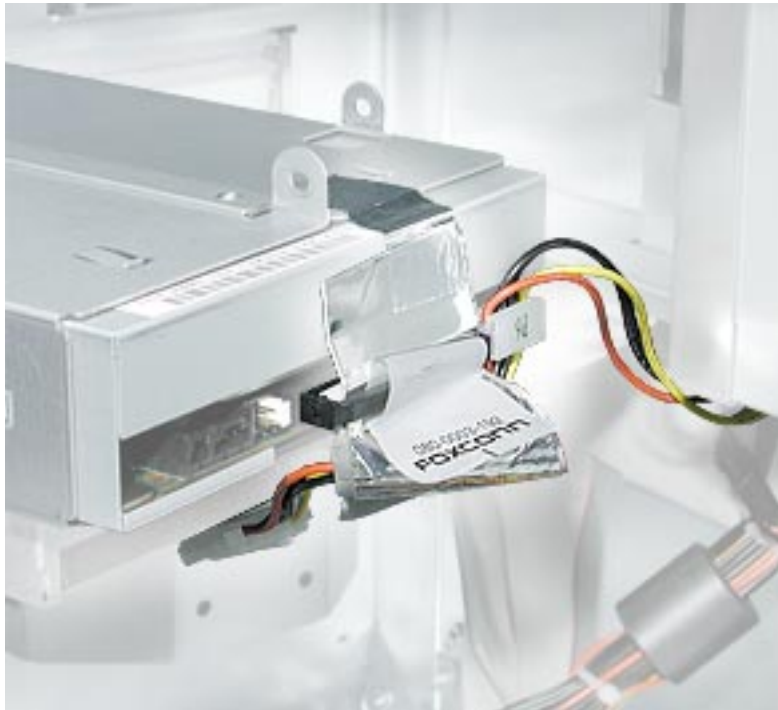
3. Carefully detach the ribbon cable tape from the top of the carrier.

4. Disconnect the following cables from the back of the CD/DVD/Zip drives:
   - ribbon cable from the CD/DVD and Zip drives
   - power cable (P6) from the CD/DVD drive
   - power cable (P7) from the Zip drive

5. Remove the carrier and drives from the computer.

6. Slide the Zip drive carrier off the main carrier.

7. Using a Phillips screwdriver, remove the four Zip drive mounting screws.

8. Slide the drive out of the carrier.

Replacement Note: When inserting the drive carrier into the computer, make sure the pegs on the bottom of the carrier fit into the two notches in the drive shelf.

CD/DVD — Zip Bezel

CD/DVD Bezel, PCI/AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, open the side access panel.
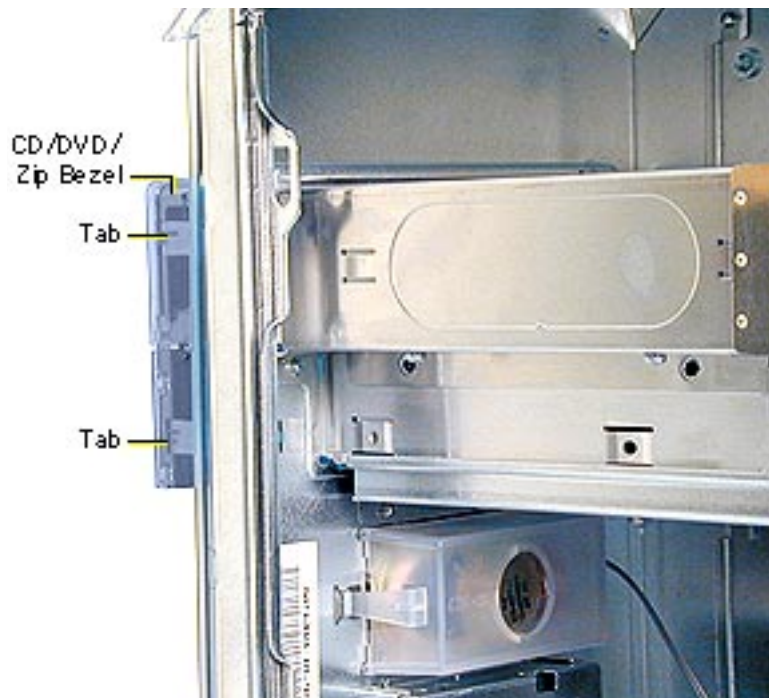
1. From inside the chassis, behind the front panel, push the two bezel tabs forward to release the drive bezel from the front panel.

2. Disconnect the bezel from the hinges on the front left side and remove the bezel from the computer.

CD/DVD Drive, PCI/ AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, do the following:

- Open the side access panel.
- Remove the CD/DVD drive bezel.
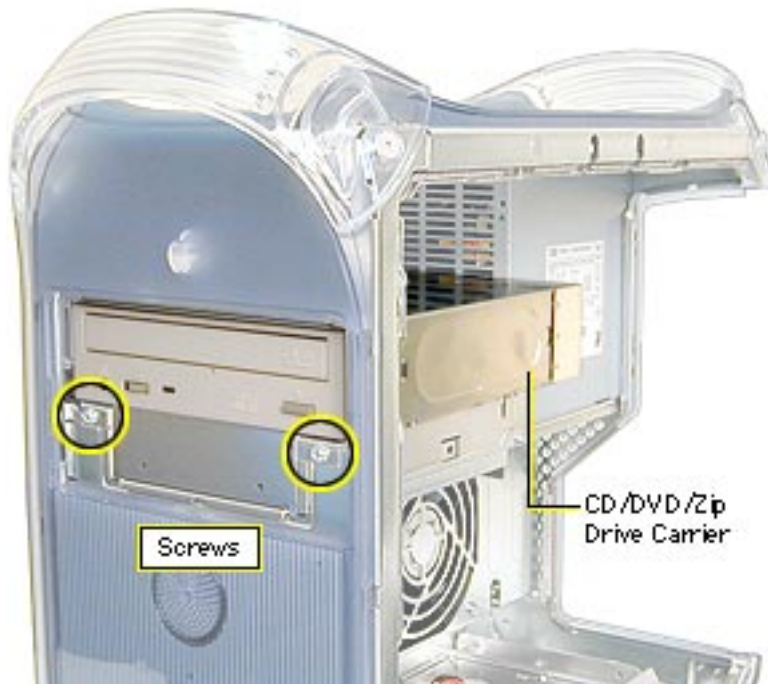
Note: You remove the drive carrier from the computer with the drives attached to the carrier.

1. Remove the two screws on the drive carrier.

2. From inside the chassis, push the drive carrier forward about 1 inch.

Important: The carrier may be difficult to push forward due to EMI tape on the carrier's underside holding it in place. Continue pushing forward until the carrier is released.

CD/DVD Audio Cable — IDE Cable — CD/DVD Power Cable (P-7)

CD/DVD/Zip Drive Carrier — IDE Cable — Zip Power Cable (P-6) (Connector Underneath)
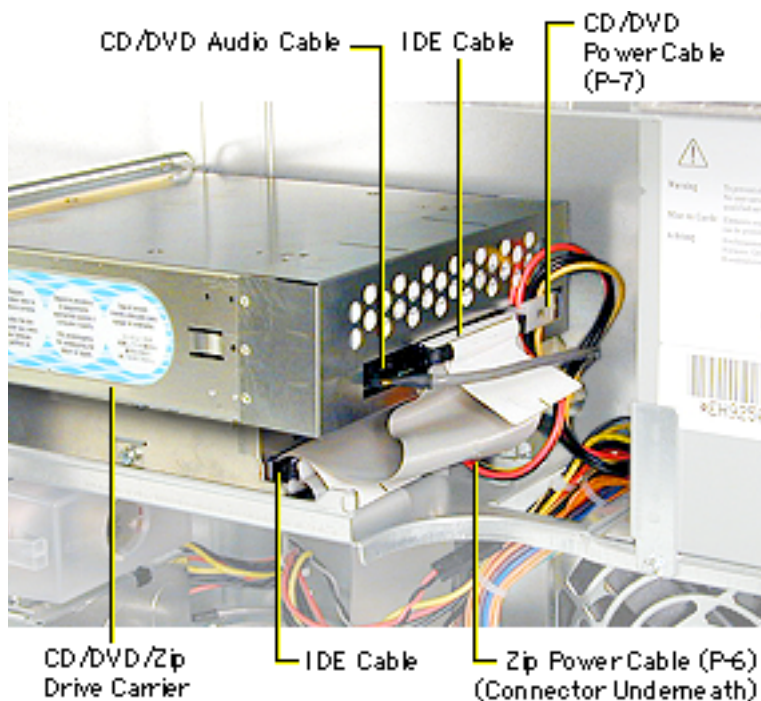
3. Disconnect the following cables from the back of the CD-ROM, DVD-ROM, or DVD-RAM drive:
   • power cable (P7)
   • IDE data cable
   • Power Mac G4 (PCI Graphics): audio cable

4. If shielding tape connects the ribbon cable and the carrier, detach the tape from the carrier.

5. Disconnect the following cables from the back of the Zip drive:
   • power cable (P6)
   • IDE data cable

EMI Shield
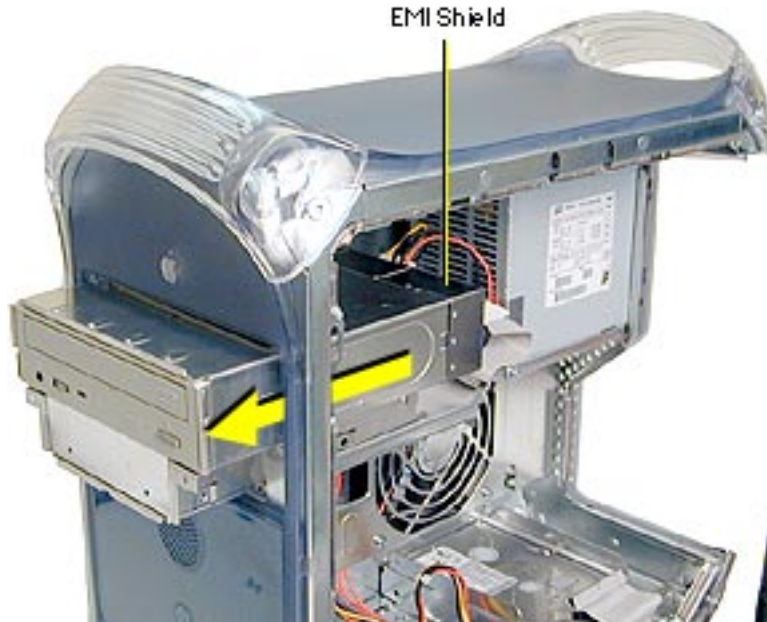
6. Continue sliding the drive carrier out of the computer. **Important:** The drive carrier may be difficult to push forward due to the EMI gasket and tape located on the underside of the carrier (directly below the Zip drive).

7. When the carrier is out of the computer, remove the EMI shield from the back of the CD-ROM, DVD-ROM, or DVD-RAM drive.
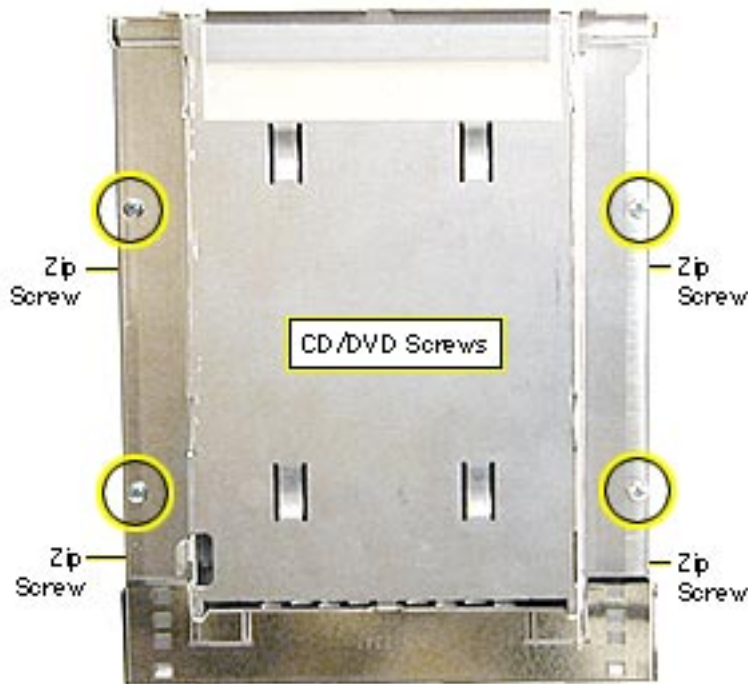
Note: Perform the following procedure if you are replacing the CD-ROM, DVD-ROM, DVD-RAM, or Zip drive.

8. Using a Phillips screwdriver, remove the drive carrier mounting screws.

9. Slide the drive(s) out of the carrier.

Replacement Note: The DVD-RAM drive is not as tall as the CD-ROM and DVD-ROM drives. Before screwing the DVD-RAM

drive back into the carrier, lift the back of the drive slightly so that the drive is flush against the carrier.

Replacement Note: When inserting the drive carrier into the computer, make sure the carrier tab slides into the hole on the stationary drive shelf.

Zip Drive

Zip Drive, PCI/AGP Graphics/Gigabit Ethernet/Digital Audio

If removing the Zip drive, follow the procedures for removing the CD/DVD Drive.

Important: After you remove the screws mounting the Zip/CD/DVD carrier to the chassis, the carrier may be difficult to push forward due to EMI tape on the carrier's underside holding it in place. Continue pushing forward until the carrier is released.

Fan, Power Mac G4 (QuickSilver)

Before you begin, open the side access panel.
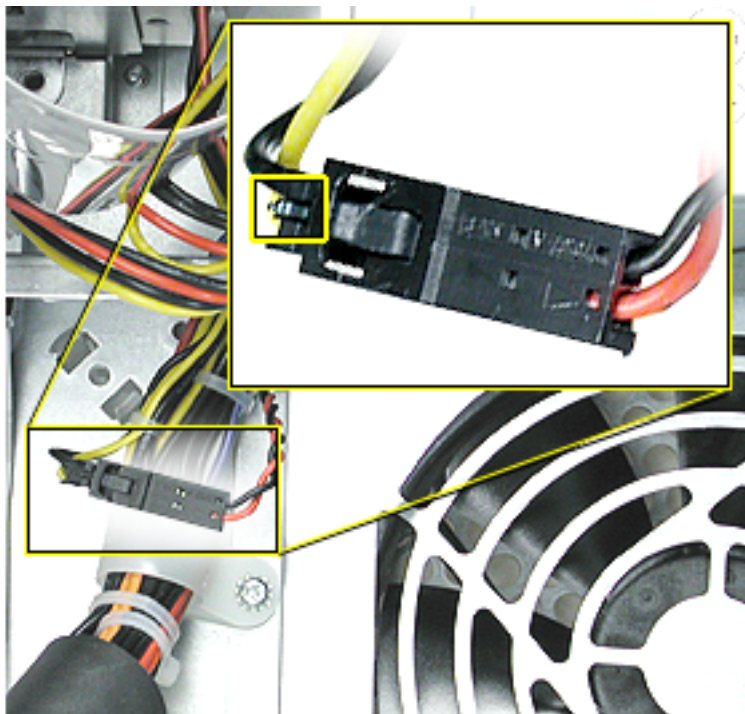
1. Press the small locking tab on the power-to-fan cable connector and disconnect the cable.
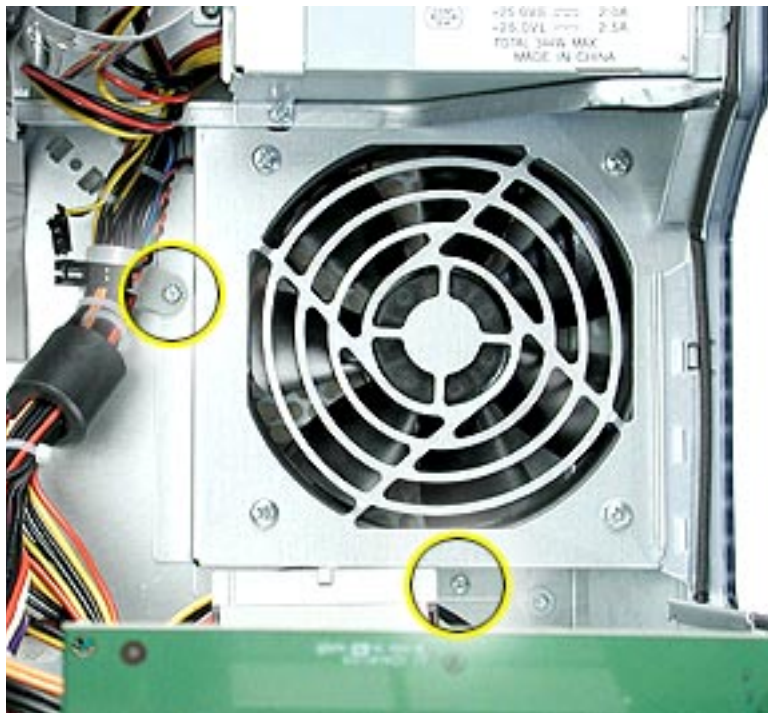
2. Remove the two screws that mount the fan bracket to the chassis.

   Replacement Note: Use the longer of the two screws to secure the cable holder and the fan bracket.

3. Lift the fan bracket out of the computer.

Perform the following procedure only if you are replacing the fan.

4. Using a Phillips screwdriver, remove the four screws securing the fan to the fan bracket.

5. Lift the fan from the fan bracket.
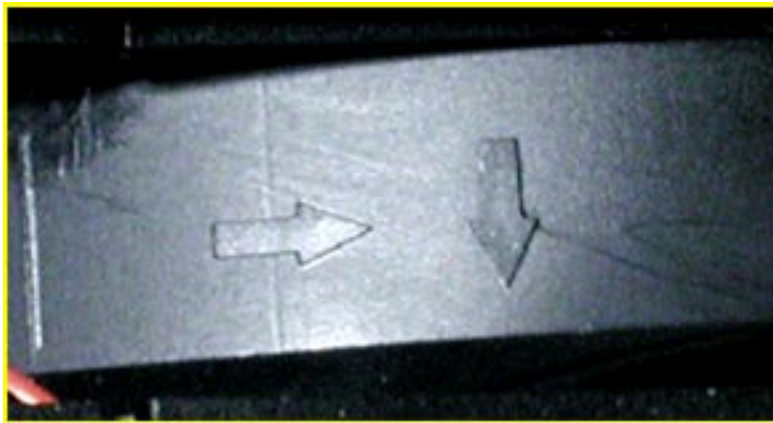
Replacement Note: When replacing the fan in the bracket, make sure the arrows on the side of the fan point away from the bracket.
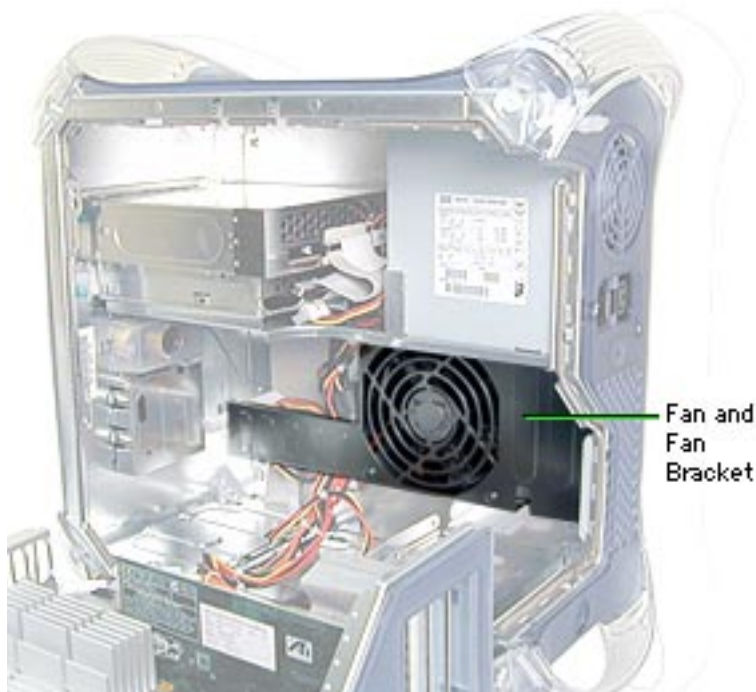
Fan, PCI Graphics, AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, open the side access panel.

Fan and Fan Bracket

Fan Connector
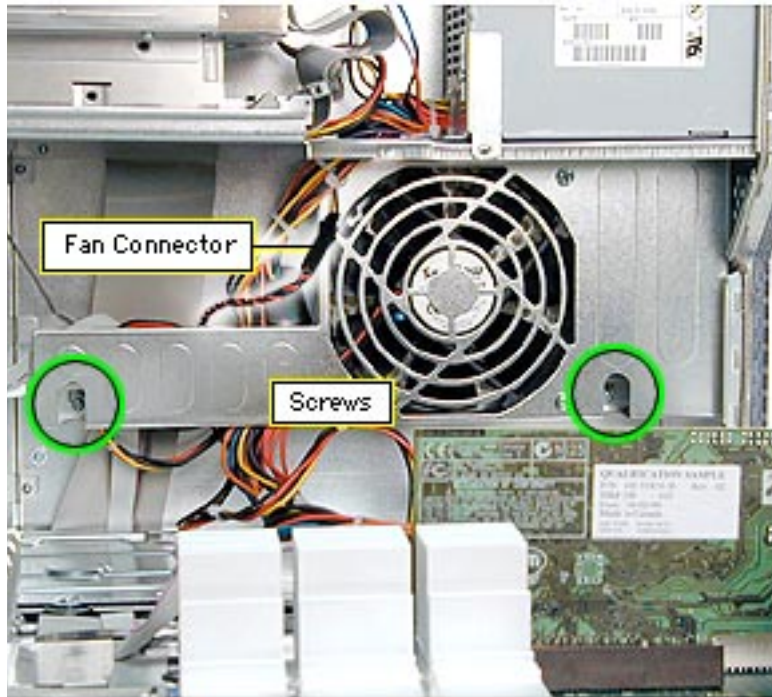
Screws

1. Remove the two screws on the fan bracket.

2. Pull the fan bracket down to access the power-to-fan connector.

3. Disconnect the power-to-fan connector.
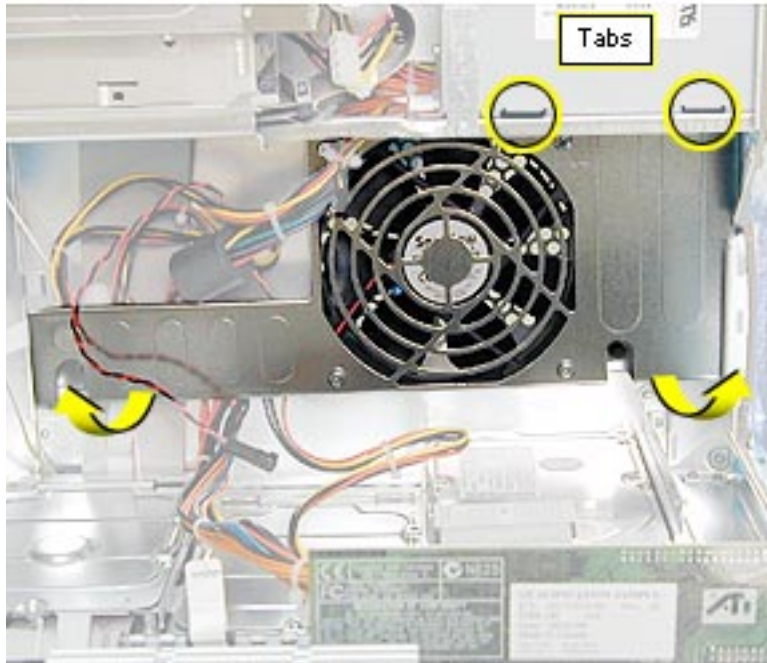
4. Lift the fan bracket out of the computer.

Replacement Note: The fan bracket has two holes (on the top) that join with two tabs on the chassis. If the tabs aren't inserted into the holes, the screws that secure the fan bracket to the chassis won't align properly.

Screws

Fan Bracket

Perform the following procedure only if you are replacing the fan.

5. Using a Phillips screwdriver, remove the four screws securing the fan to the fan bracket.

6. Lift the fan from the fan bracket.
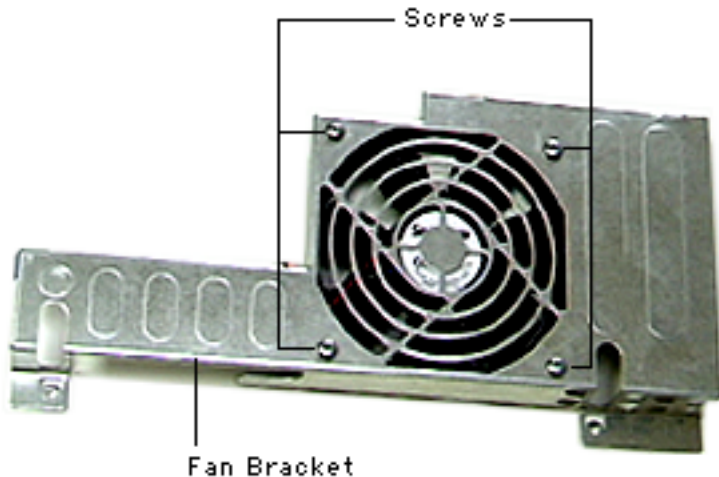
Power Supply, Power Mac G4 (QuickSilver)

Before you begin, do the following:

- Open the side access panel.
- Remove the CD/DVD/Zip drive carrier.
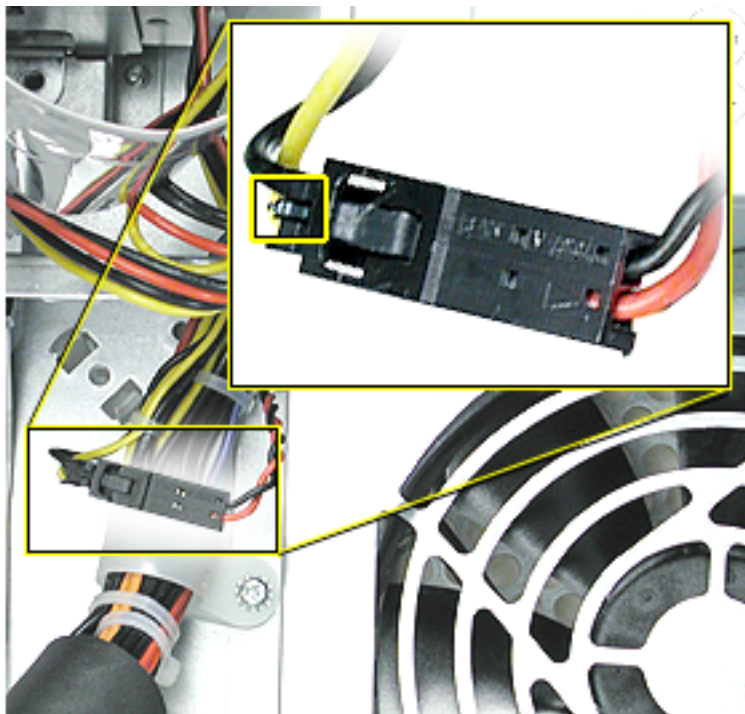
1. Press the small locking tab on the power-to-fan cable connector and disconnect the cable.
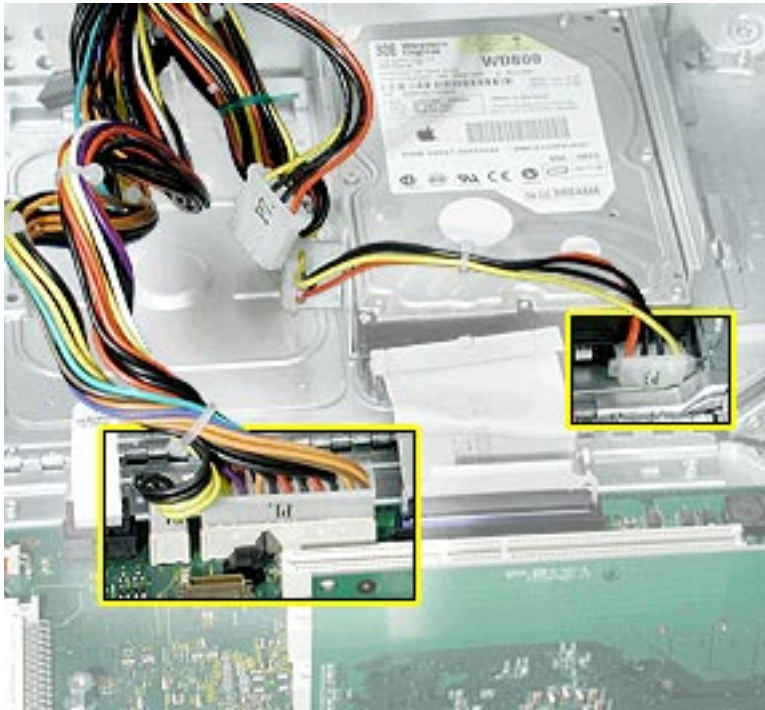
2. Disconnect the main power cable from the logic board and the power cables to any hard drives.

3. Using a 2.5 mm Allen wrench, remove the three screws on the rear vented panel.

4. Remove the four screws that attach the power supply and main power supply cable to the chassis.

5. Slide the power supply toward the front of the computer until it clears the security bar on the upper inside corner of the chassis.

6. Maneuver the power supply and its cables out of the chassis.

Replacement Note: If you are replacing the power supply, remove the power supply bracket and reattach it to the new power supply.

Replacement Note: You must set the power supply voltage switch to the correct setting (115 V in North America) to avoid damaging the computer.

Power Supply

Power Supply, PCI/ AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, do the following:

- Open the side access panel.
- Remove the CD/DVD drive bezel.
- Move the CD/DVD/Zip drive carrier forward 1 inch.

Power-to-Fan Connector
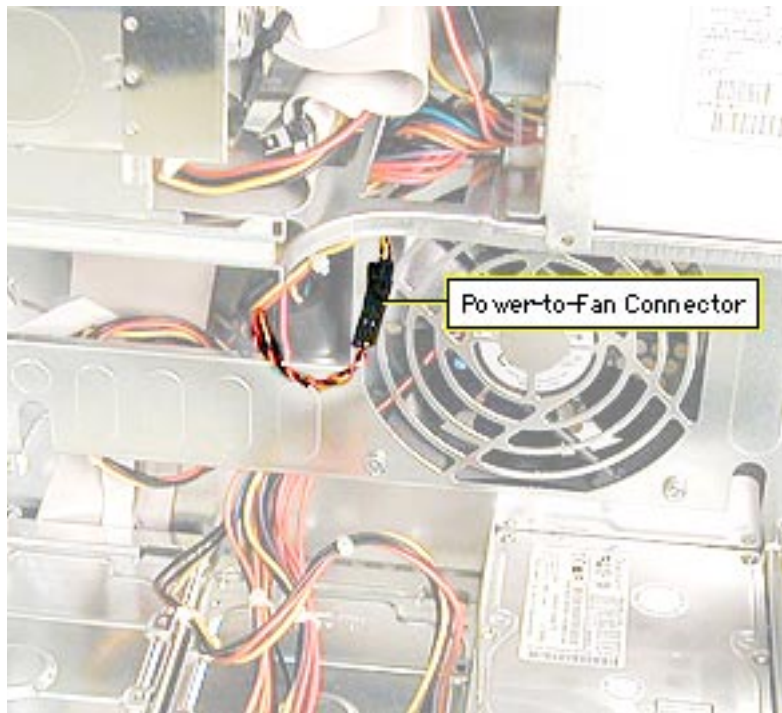
1. Disconnect the power-to-fan connector.
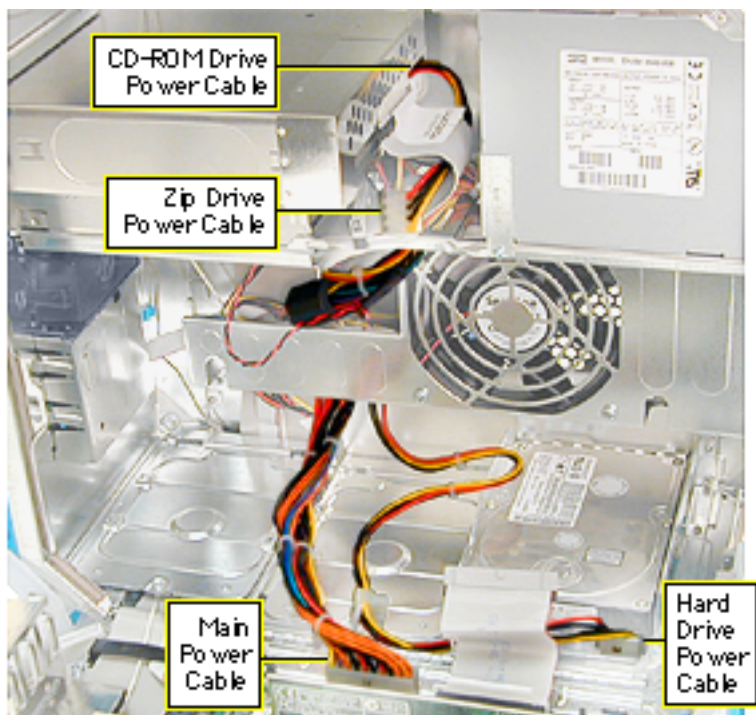
2. Disconnect the following power cables:
   - cables P6 and P7 from the CD-ROM/Zip drive
   - Power Mac G4 (PCI Graphics): cable P4 from the front panel board
   - main power cable from the logic board
   - cable(s) to hard drives

Allen Screw

3. Using a 2.5 mm Allen wrench, remove the three screws on the rear vented panel.

Power Supply

Screw

Shelf

4. On the inside of the chassis, remove the screw that attaches the power supply to the power supply shelf.

5. Slide the power supply forward toward the front of the computer. Maneuver the power supply (clearing the security bar on the inside and upper chassis) and its cables out of the chassis.

Note: If you are replacing the power supply, remove the power supply bracket

Voltage Switch

and reattach it to the new power supply.

Replacement Note: You must set the power supply voltage switch to the correct setting (115 V in the U.S.) to avoid damaging the computer.

Speaker, Power Mac G4 (QuickSilver)

Before you begin, do the following:

- Open the side access panel.
- Remove the carrier support plate.
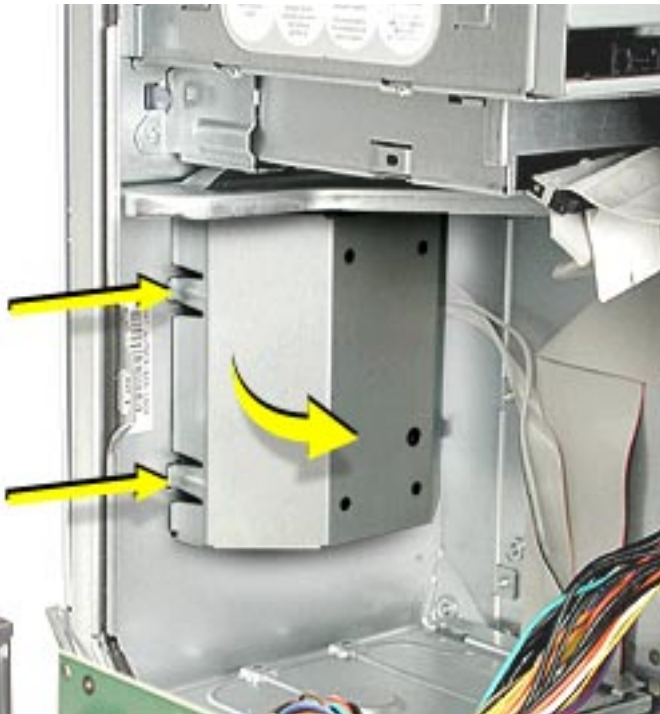
1. Using your thumbs, press the tabs in on the speaker shield.

2. Rotate the shield and remove it from the chassis.
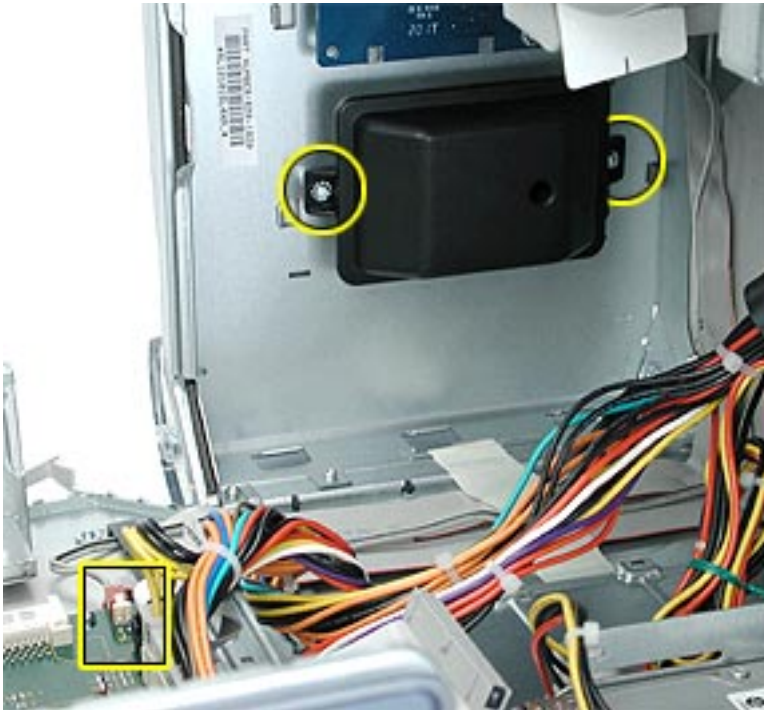
3. Disconnect the speaker cable from the logic board.

4. Remove the two speaker mounting screws.

5. Remove the speaker and cable from the computer.

Speaker, PCI/AGP Graphics/Gigabit Ethernet/Digital Audio

Before you begin, do the following:

- Open the side access panel.
- Remove the carrier support plate.
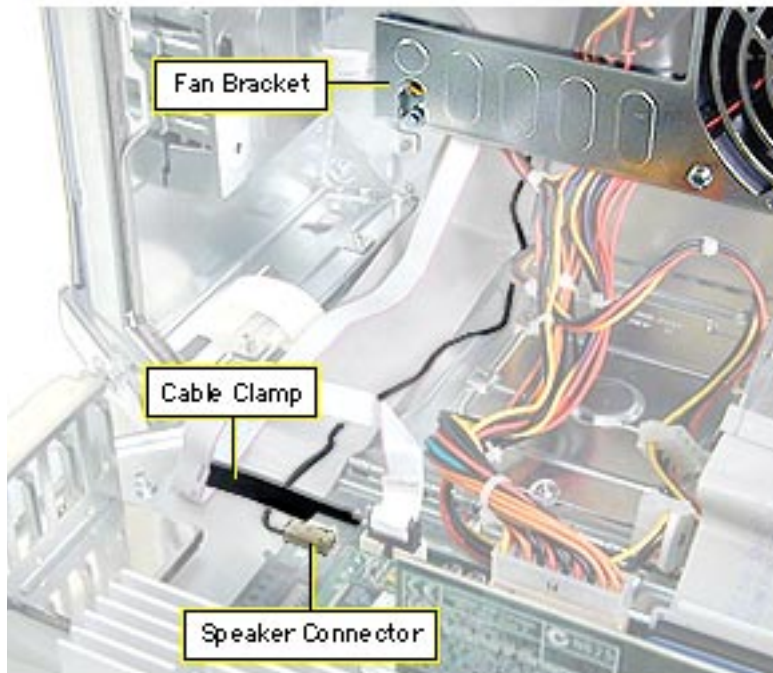
1. Disconnect the speaker cable from the logic board.

2. Free the cable from the cable clamp and the fan bracket.
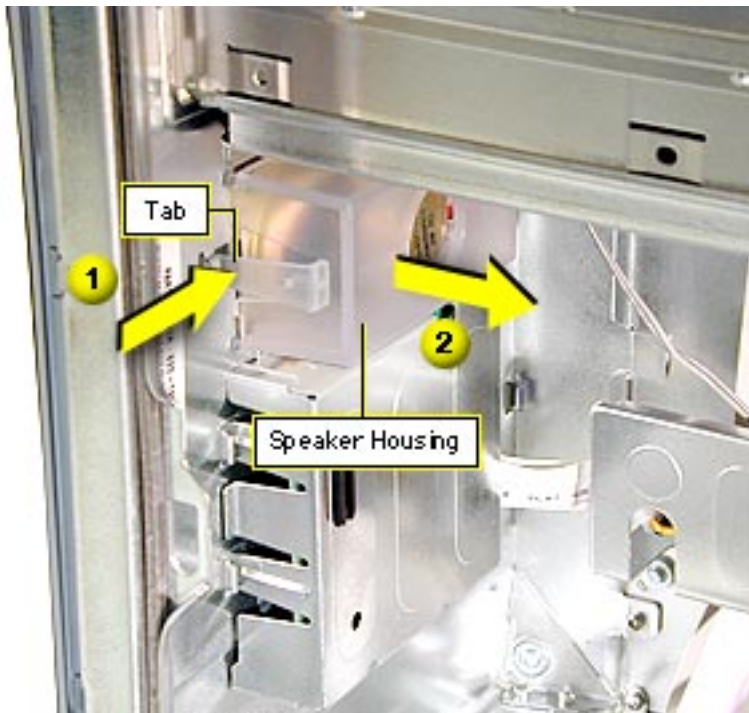
3. Push the speaker tab in and pull the speaker housing back to release it.

4. Remove the speaker housing from the computer.

5. Remove the speaker from the speaker housing. **Note:** The speaker and speaker housing are separate parts.

Front Panel Board, Power Mac G4 (QuickSilver)
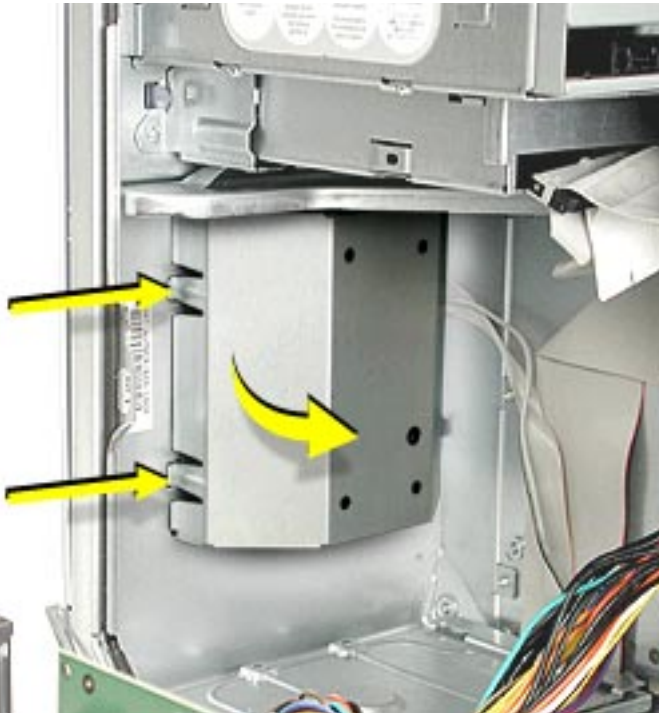
Before you begin, open the side access panel.

1. Using your thumbs, press the tabs in on the speaker shield.

2. Rotate the shield and remove it from the chassis.
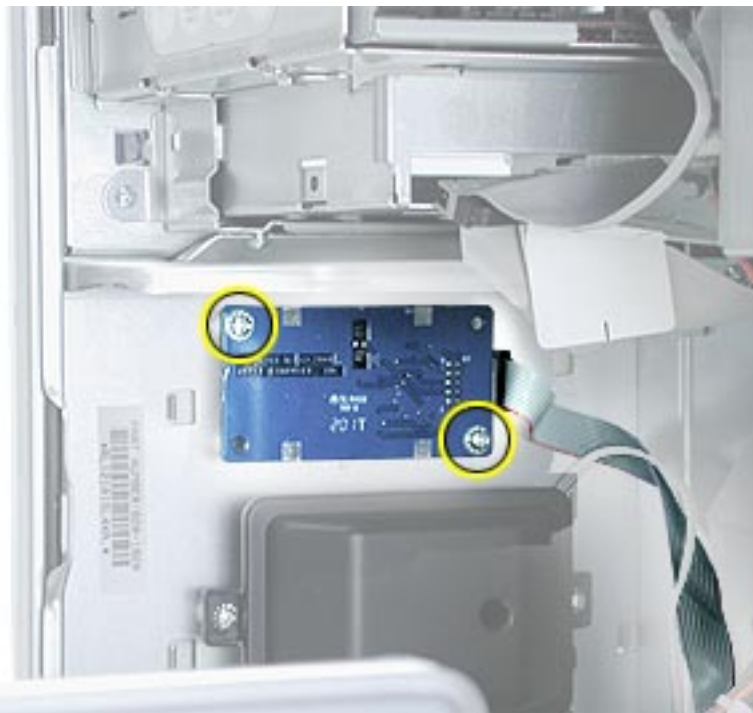
3. Disconnect the front panel cable from the front panel board.

4. Remove the two screws and remove the front panel board from the computer.

Front Panel Board, PCI/AGP Graphics/ Gigabit Ethernet/ Digital Audio

Before you begin, open the side access panel.
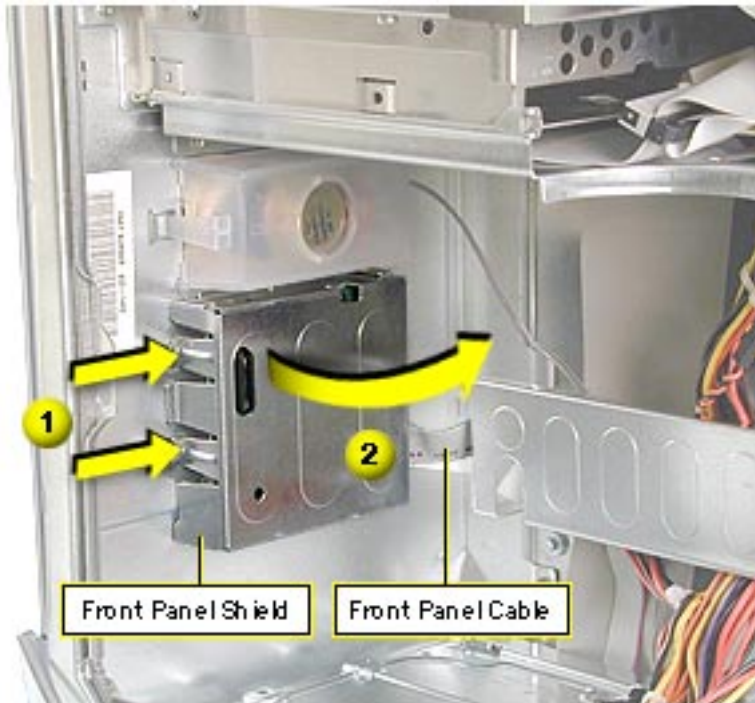
Front Panel Board

1. Using your thumbs, press the tabs in on the front panel shield.

2. Gently pull the front panel shield away from the chassis.

3. Disconnect the front panel cable from the front panel board.

4. Power Mac G4 (PCI Graphics): Disconnect power cable P4 and the FireWire cable from the front panel board.

5. Push in and pry up on the three tiny metal tabs to release the front panel board from the front panel shield.

Tabs

Front Panel Shield

Front Panel Board
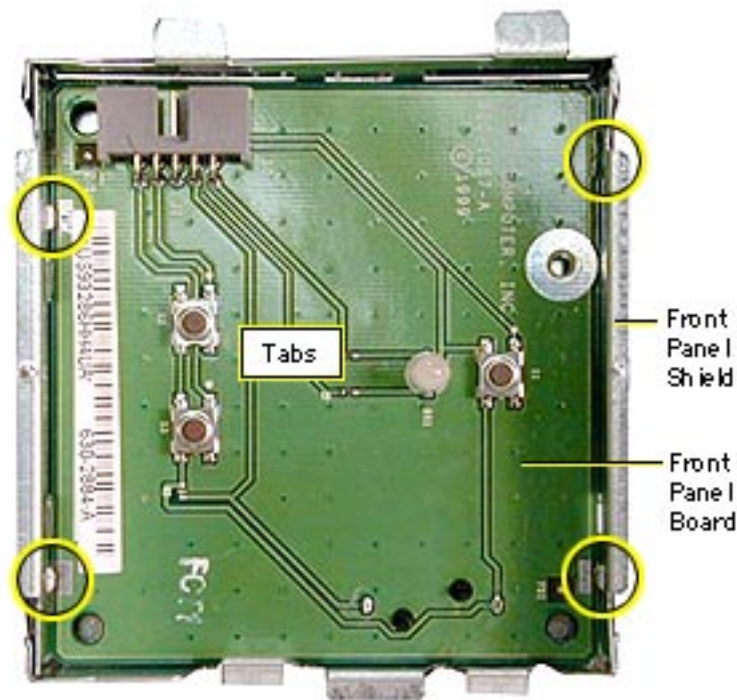
Antenna

Note: The antenna is routed through the chassis in two ways: under the logic board and through drive bay 1. Do not remove or replace the antenna if it is routed under the logic board. To replace this type of antenna, you must replace the entire chassis.

Before you begin, remove the following:

- top front handle
- top panel
- carrier support plate (if
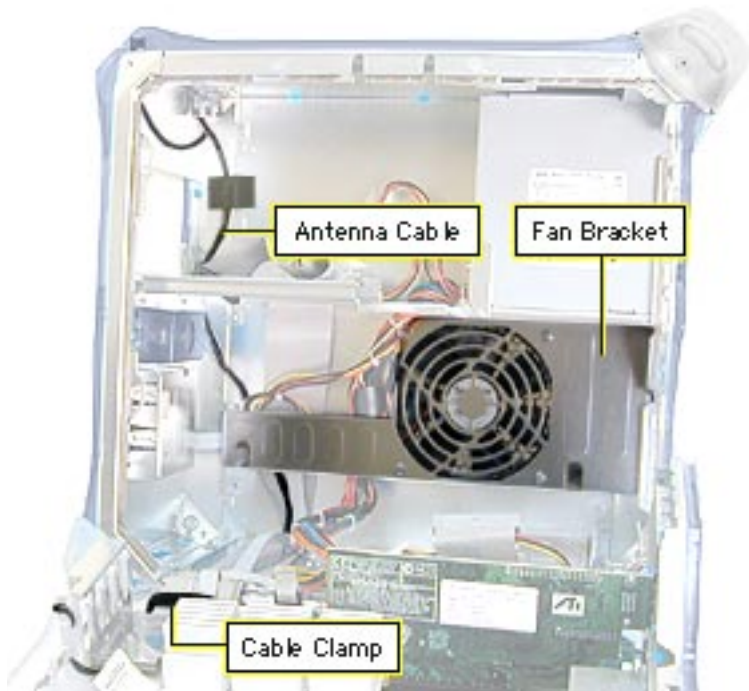
the antenna cable is
routed underneath it)

- CD-ROM drive carrier

1. Disconnect the antenna
   cable from the AirPort
   card (if installed).

2. Free the antenna cable
   from the cable clamp and
   the fan bracket.

3. Using a jeweler's screw driver, remove the antenna mounting screws and lift the antenna and antenna cable out of the computer.

Front Top Handle   Rear Top Handle

Top Handles, Front and Rear

No preliminary steps are required before you begin this procedure.

Allen Screws

1. Using a 2.5 mm Allen wrench, remove the two allen screws securing each handle.

2. Lift the handle from the computer.
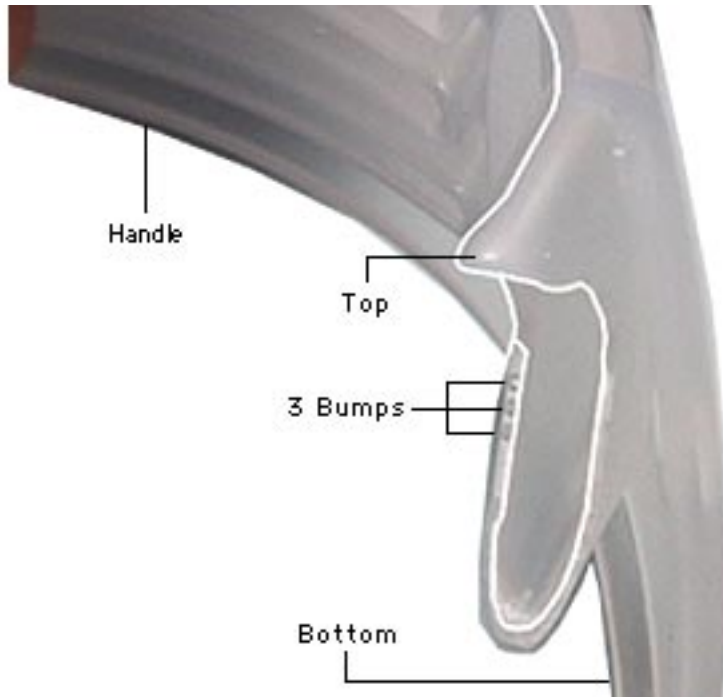
Replacement Note: When installing the top handles (front and rear) orient them so that the three tiny bumps on the handle are in the orientation shown in the photo. The handle won't fit properly if it's turned upside down. The top front and top rear handles are interchangeable.

Top Panel

Before you begin, remove the following:

- top front handle
- top rear handle

Tabs

1. Slide the top panel back, towards the power supply, to unhook the tabs.

2. Lift the top panel from the chassis.

Supports, Front and Rear

Before you begin, place the computer on an ESD mat and turn the unit upside down.

Warning: When the computer is upside down or the lower supports are removed, the computer can be unstable.

Front Support　　　Rear Support

1. Using a 2.5 mm Allen wrench, remove the two screws securing each support to the computer.

2. Remove the support from the computer.

Lower Panel

Lower Panels, Front and Rear

Before you begin, remove the front and/or rear support.

Warning: When the computer is upside down or the lower supports are removed, the computer can be unstable.

Note: The computer is shown upside down.

1. Lift the lower front panel or the lower rear panel from the chassis. There are no screws holding these panels to the chassis; the front and rear supports hold them in place.

   Important: These panels are keyed. The notch goes on the access panel side.

Lower Panel

Keyed Notch
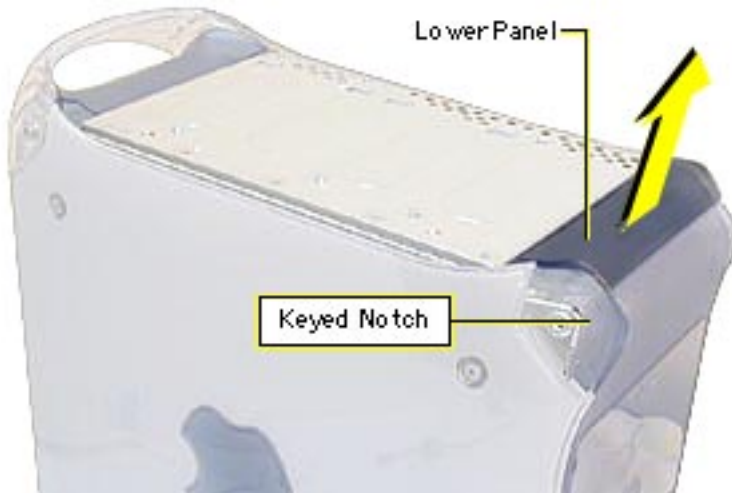
Front Panel

Front Panel

Before you begin, remove:

- top front handle
- lower front support and lower front panel
- Power Mac G4 (PCI/AGP Graphics/GIgabit Ethernet/Digital Audio): CD/DVD drive bezel and CD/DVD drive carrier
- Power Mac G4 (QuickSilver): Zip drive bezel or blank bezel

Warning: When the lower support is removed, the computer can be unstable.
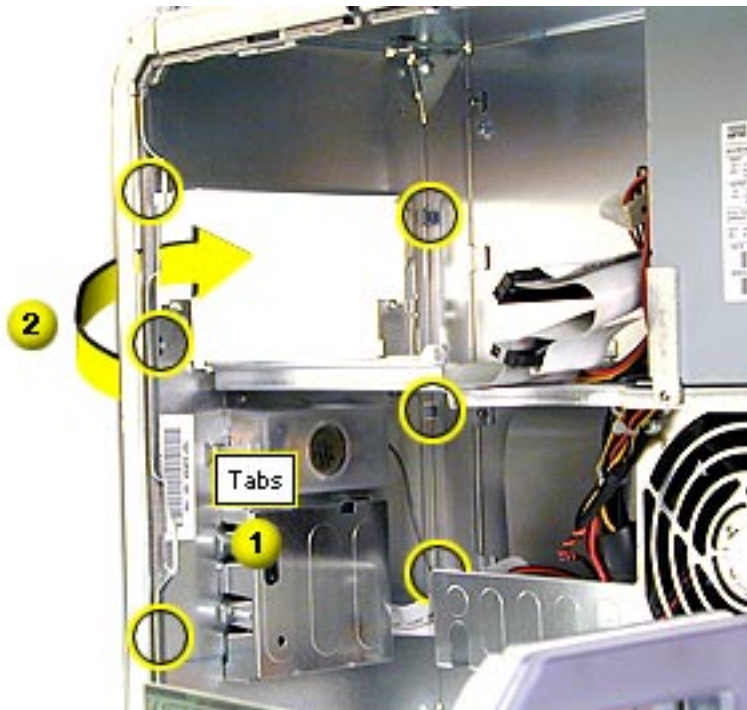
1. Open the side access panel. Locate the front panel tabs.

2. Using a screwdriver, carefully push the front panel tabs inward to release them from the chassis.

3. Pull the front panel off the chassis.

Rear Vented Panel

Before you begin, remove the following:

- top rear handle
- lower rear support

Warning: When the lower support is removed, the computer can be unstable.

Rear Vented Panel

Rear
Vented
Panel
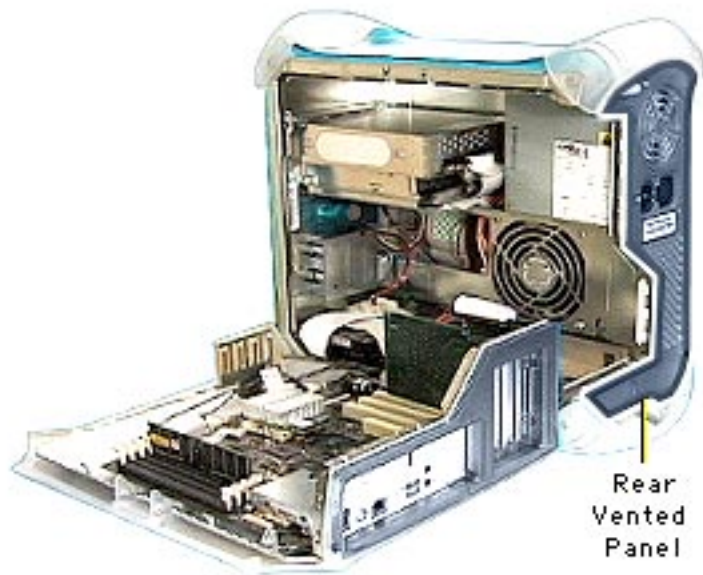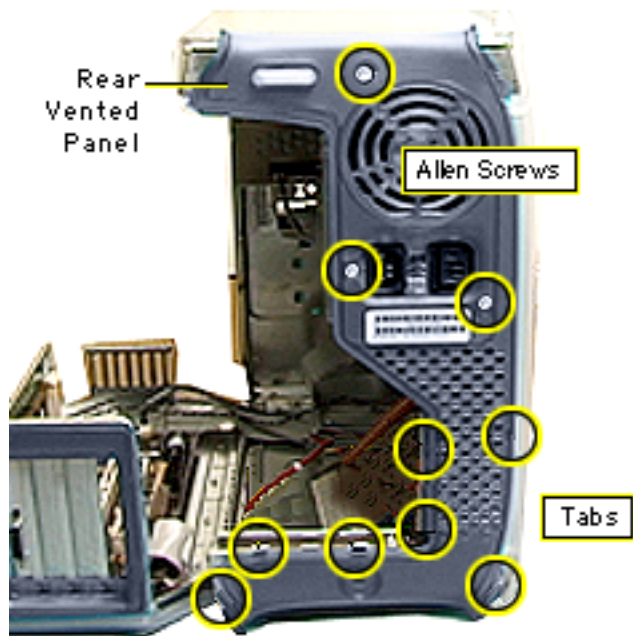
Allen Screws

Tabs

1. Open the side access panel.

2. Remove the three 2.5 mm Allen screws.

3. Push in on the six tabs to release the panel from the chassis.

4. Once the tabs are
   released, carefully pull
   the rear panel forward
   to remove.

Rear
Vented
Panel
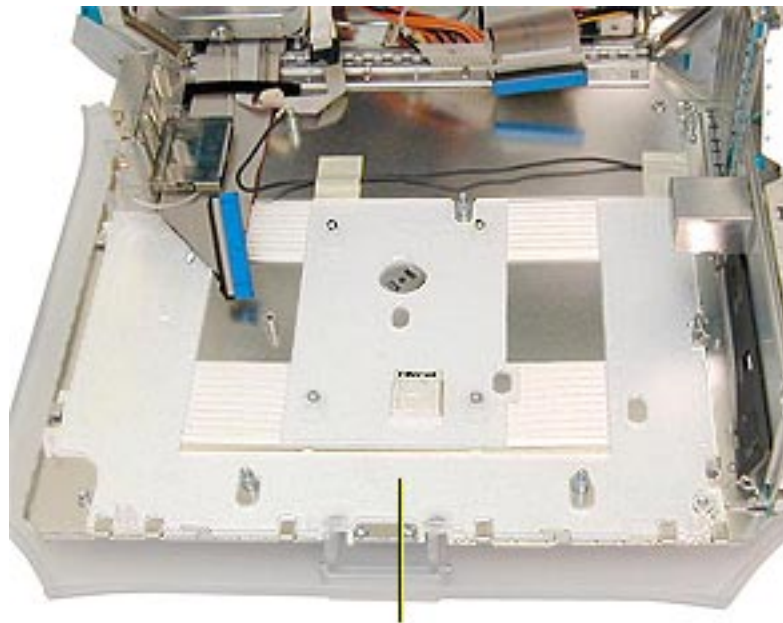
Latch Panel

Latch Panel

Before you begin, remove the following:

- video card
- PCI cards (if present)
- Power Mac G4 (PCI Graphics): FireWire board (if present)
- Power Mac G4 (PCI Graphics): modem (if present)
- AirPort card (if present)
- logic board
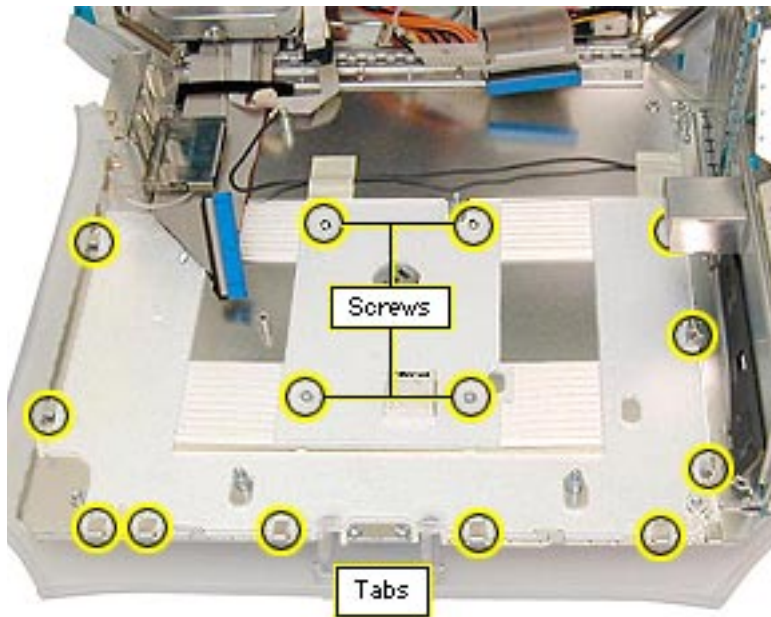
1. Remove the four Phillips screws holding the panel to the chassis.

2. Slide the panel toward the hard drives, freeing the latch panel from the tabs on the chassis.

   Note: Circles indicate tab locations.

3. Remove the latch panel.

Right Side Access Panel

Before you begin, remove the following:

- PCI cards (if present)
- video card
- FireWire board (if present)
- modem (if present)
- AirPort card (if present)
- logic board

Right Side Panel

1. Remove the four 2.5 mm Allen screws on the side panel.

Allen Screws

Panel Latch

Right Side Panel

2. Open the side access panel.

3. Remove the two Phillips screws attaching the right side panel to the metal chassis.
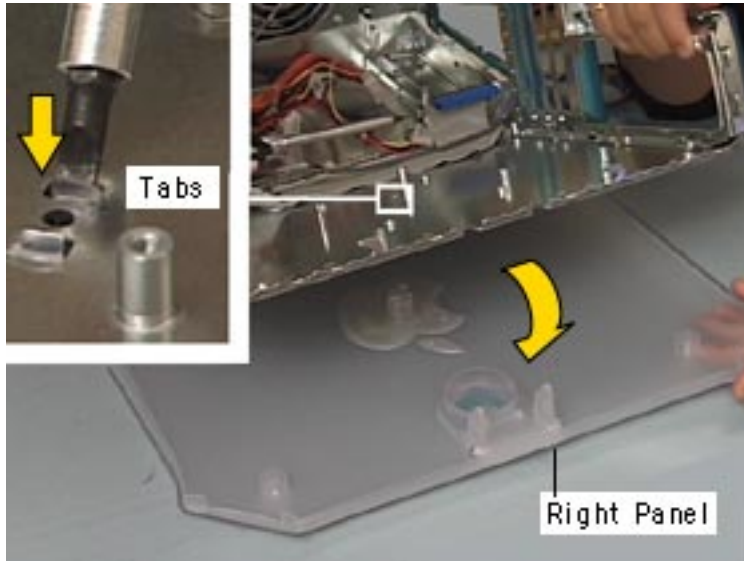
4. Using a flatblade screwdriver or needlenose pliers, push or squeeze the plastic tabs (protruding through the side chassis panel), to release the right panel from the metal chassis.

5. Remove the right side panel from the chassis.

Left Side Panel

No preliminary steps are required before you begin this procedure.

Left Side Panel

1. Remove the four 2.5 mm Allen screws on the side panel.

Allen Screws
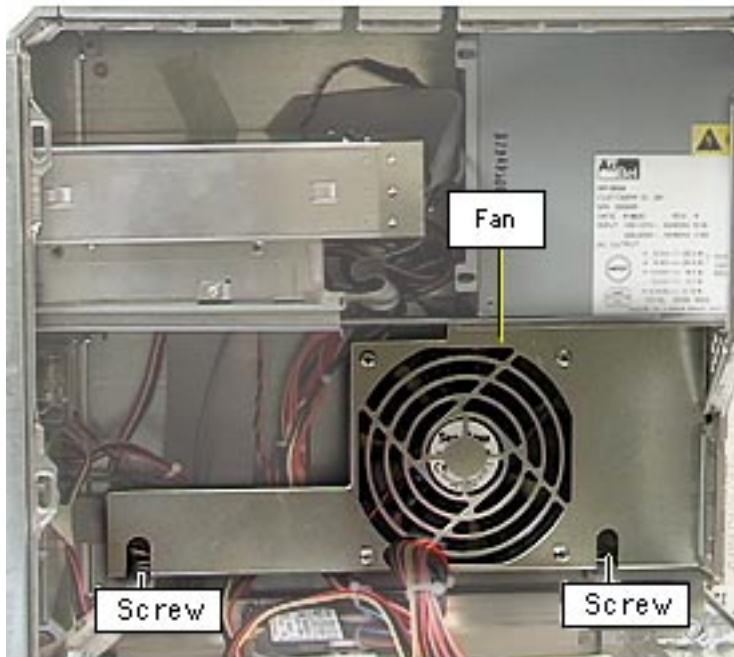
2. Open the side access panel.

3. Remove the fan screws and drop the fan bracket down to access the plastic panel tabs (protruding through the side chassis) on the left side panel.
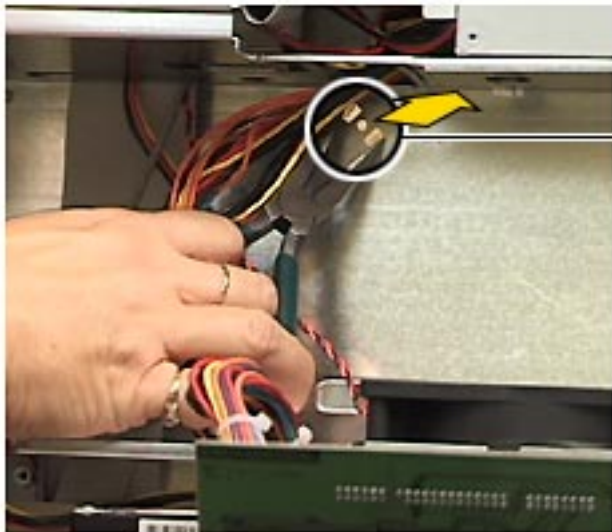
Tabs

4. Using a needlenose pliers, squeeze the tabs (located behind the fan bracket) to release the left side panel from the metal chassis.

5. Lift the left side panel from the chassis.
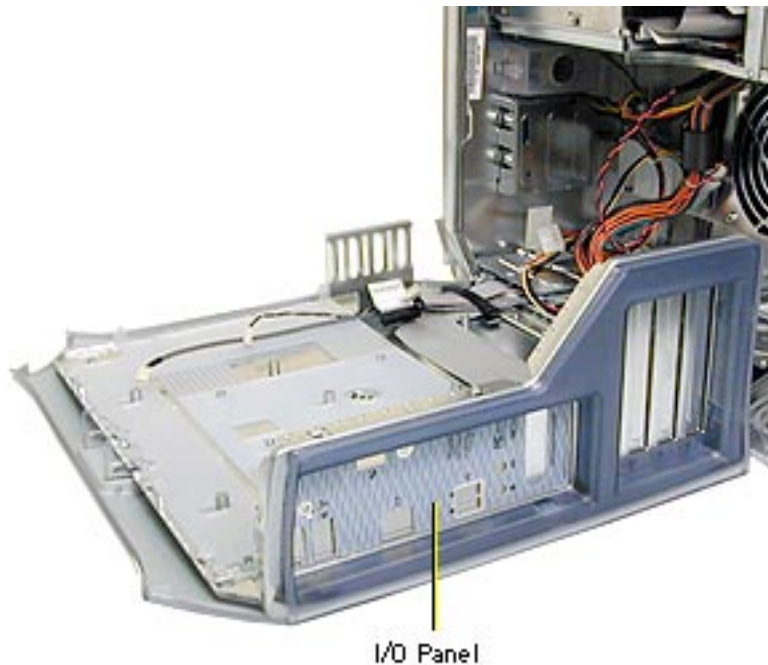
I/O Panel

I/O Panel, PCI Graphics

Note: The I/O panel can be removed only in Power Mac G4 (PCI Graphics) computers. The I/O panel in Power Mac G4 (AGP Graphics/Gigabit Ethernet/ Digital Audio/QuickSilver) computers is part of the chassis.

Before you begin, do the following:

- Open the side access panel.
- Remove the logic board.

Screws

1. Remove the two mounting screws on the I/O panel.

2. Tilt the I/O panel forward and remove.

I/O Panel
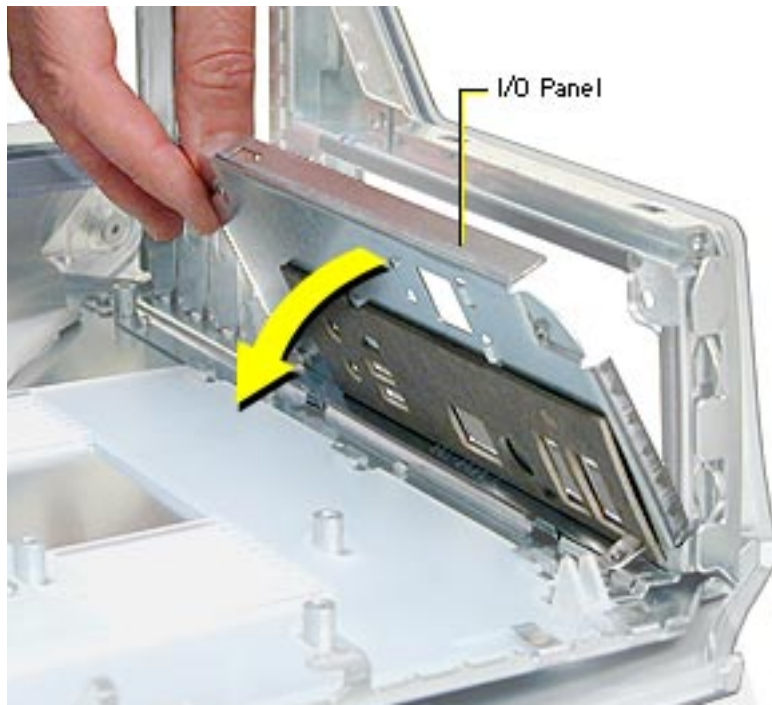
I/O Panel Cover

I/O Panel Cover

Before you begin, do the following:

- Open the side access panel.
- Remove the logic board.
- Power Mac G4 (PCI Graphics): Remove the I/O panel.

Tab Locations

Left

Right
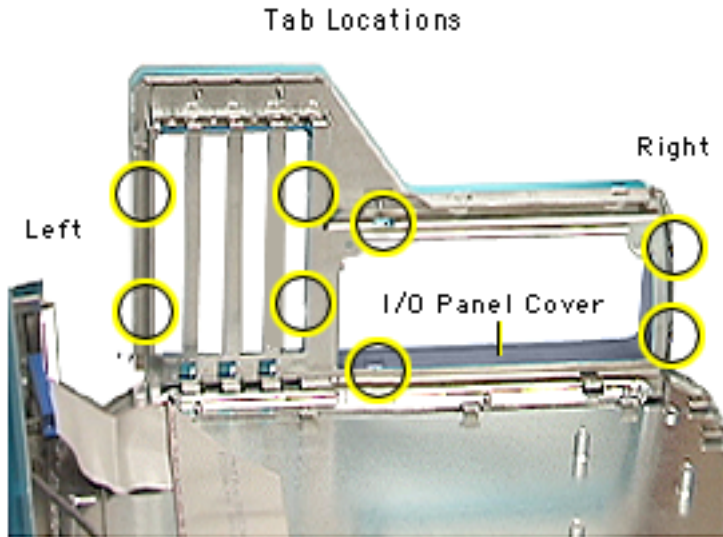
I/O Panel Cover

Note: Because the I/O panel cover can be difficult to remove, take your time prying up the plastic tabs.

1. Using a jeweler's screwdriver and working from right to left, carefully pry the plastic tabs away from the metal frame. As each tab is released, pull the I/O cover away from the frame.

2. Remove the I/O panel cover from the chassis.

Troubleshooting

Power Mac G4/
Macintosh Server G4

General

Block Diagrams

Power Mac G4 (AGP Graphics) Block Diagram

Processor Module

Backside L2 cache — PowerPC G4 microprocessor

100 MHz Max bus

Main Logic Board

100 MHz memory bus

UniNorth memory controller and PCI bus bridge

AGP 2x bus

SDRAM DIMM slots

AGP 2x slot

32-bit 66 MHz PCI bus

PCI slots

PCI-PCI bus bridge — Boot ROM

Firewire controller — Firewire PHY — Firewire port / Firewire port

64-bit 33 MHz PCI bus

Internal DVD-ROM connector

Ethernet controller — Ethernet PHY — Ethernet port

Internal Zip drive connector

ATA bus

USB port A
USB port B

Internal hard drive connectors

Ultra ATA bus

KeyLargo I/O device and disk controller

Modem slot

Screamer sound IC — Microphone jack / Headphone jack

PMU99 power controller

Wireless LAN slot

Internal speaker connector

Power Mac G4 (Gigabit Ethernet) Block Diagram

Processor Module

Backside L2 cache — PowerPC G4 microprocessor

Main Logic Board

100 MHz Max bus

100 MHz memory bus — UniNorth memory controller and PCI bus bridge — Ethernet PHY — Ethernet port

SDRAM DIMM slots

AGP 2x bus

32-bit 66 MHz PCI bus

AGP 2x slot

PCI slots

PCI-PCI bus bridge — Boot ROM

Internal DVD-ROM connector

64-bit 33 MHz PCI bus — Firewire controller — Firewire PHY — Firewire port / Firewire port

Internal Zip drive connector

ATA bus

USB port A

USB port B

Internal hard drive connectors

Ultra ATA bus

KeyLargo I/O device and disk controller — Modem slot

Screamer sound IC — Microphone jack / Headphone jack

PMU99 power controller

Wireless LAN slot

Internal speaker connector

Power Mac G4 (QuickSilver/Digital Audio) Block Diagram

Processor Module

| Backside L3 cache | PowerPC G4 microprocessor L2 cache : 256K 1:1 |

Main Logic Board

133 MHz Max bus

SDRAM DIMM slots

133 MHz memory bus

UniNorth memory controller and PCI bus bridge

Ethernet PHY — Ethernet port

Firewire PHY — Firewire port / Firewire port

66 MHz AGP bus

PCI slots

Boot ROM

AGP 4x slot

Internal CD or DVD connector

64-bit 33 MHz PCI bus

Internal Zip drive connector

EIDE bus

USB port A

USB port B

Internal hard drive connectors

Ultra ATA bus

KeyLargo I/O device and disk controller

Modem slot

Tumbler audio — Headphone jack / Apple speaker mini-jack

Wireless LAN slot

PMU99 power controller

Internal speaker connector

Power Macintosh G4 (PCI Graphics) Block Diagram

Power-On Self Test

There is a power-on self test that resides in the ROM of the Power Mac G4. This test automatically runs whenever the computer is powered on after being fully shut down (the power-on self test does not run if the machine is only restarted). If a problem is detected during the test, you will not hear a normal startup chime. Instead, the system will beep as explained below.

Power Mac G4 (all models except PCI Graphics):

- **1 Beep:** No RAM is installed or detected.
- **2 Beeps:** Incompatible RAM types are installed (for example, both SDRAM and EDO installed).
- **3 Beeps:** No RAM banks passed memory testing.
- **4 Beeps:** No good boot images are detected in the boot ROM (and/or there is a bad sys config block).
- **5 Beeps:** The processor is not usable.

Power Macintosh G4 (PCI Graphics):

- **1 Beep:** No RAM is installed or detected.
- **2 Beeps:** Incompatible RAM types are installed (for example, both SDRAM and EDO installed).
- **3 Beeps:** No RAM banks passed memory testing.
- **4 or 5 Beeps:** Bad checksum for the remainder of the boot ROM block. The ROM is bad and probably cannot be fixed.

Logic Board Diagrams

Power Mac G4 (AGP Graphics/Gigabit Ethernet) Logic Board Diagram
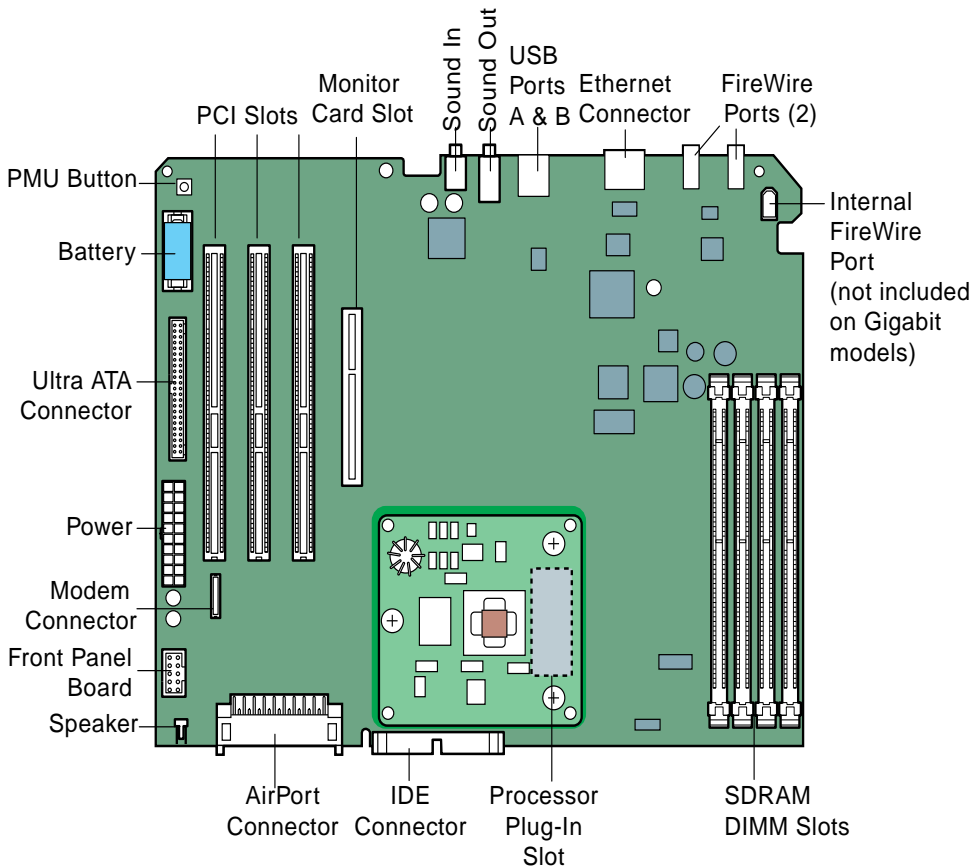
Power Mac G4 (QuickSilver/Digital Audio)
Logic Board Diagram
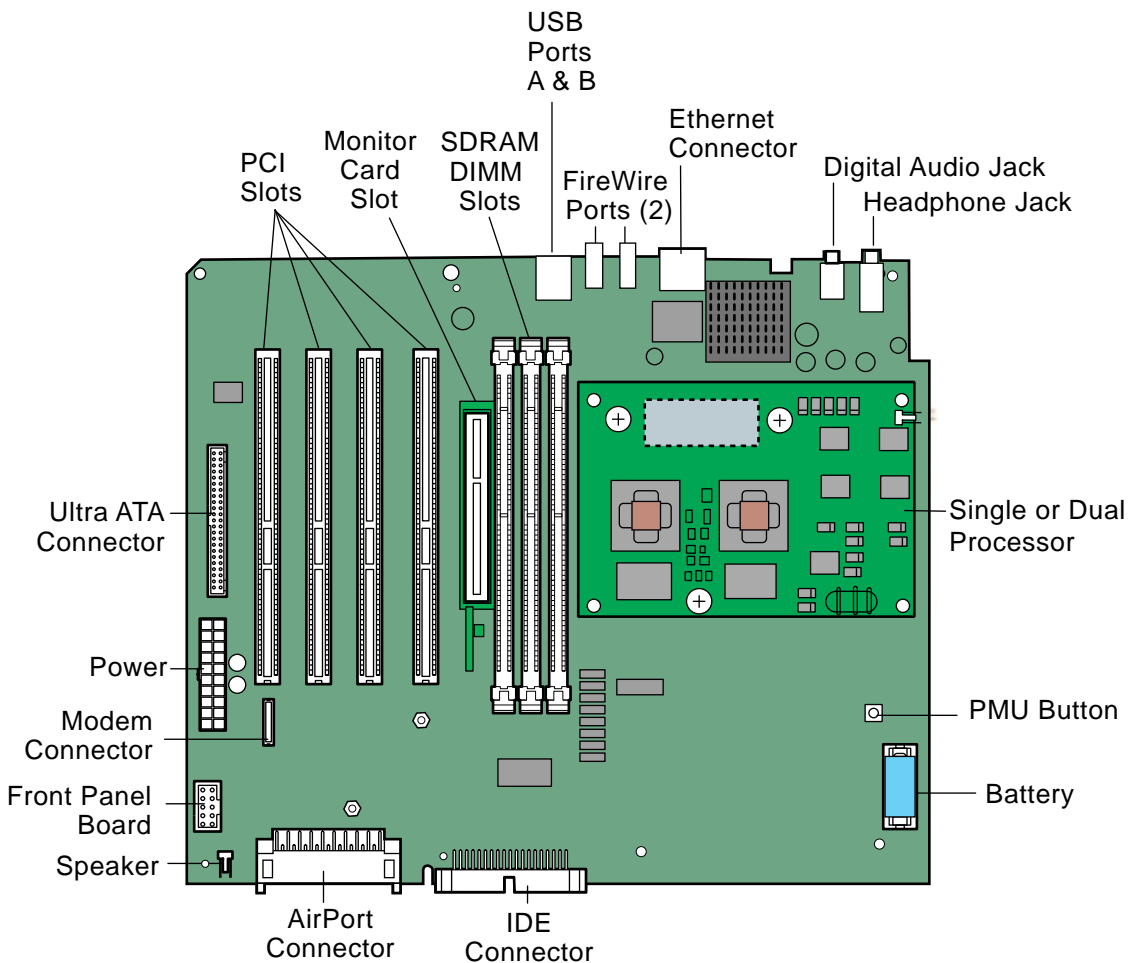
Power Macintosh G4 (PCI Graphics) Logic Board Diagram
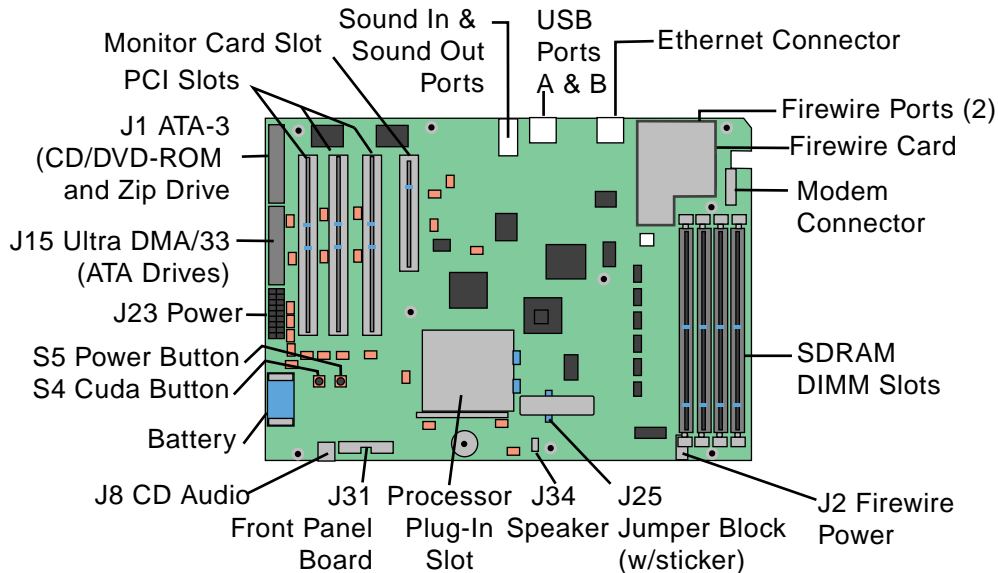
Logic Board Troubleshooting

Power Mac G4 (all models except PCI Graphics)

Processor Module

The logic board comes with a removable processor module. The processor should rarely fail and should be replaced only as a last resort. Processor modules can be ordered from Service.

Refer to "Processor Module" in the Take Apart chapter for more information.

Resetting the PMU on the Logic Board

The PMU (Power Management Unit) is a microcontroller chip that controls all power functions for the computer. The PMU is a computer within a computer. It has memory, software, firmware,

I/O, two crystals, and a CPU. Its function is to:

- Tell the computer to turn on, turn off, sleep, wake, idle, etc.
- Manage system resets from various commands.
- Maintain parameter RAM (PRAM).
- Manage the real-time clock.

Important: Be **very** careful when handling the main logic board. Remove the battery when handling the logic board so the PMU is not affected. The PMU is **very** sensitive and touching the circuitry on the logic board can cause the PMU to crash. If the PMU crashes, the battery life goes from about five years to about two days if the PMU is not reset. The PMU chip is located on the underside of the logic board at U20; refer to the Power Mac G4 (AGP Graphics/ Gigabit Ethernet/Digital Audio) Logic Board Diagrams for the location of the PMU button.

Many system problems can be resolved by resetting the PMU chip. Whenever you have a unit that fails to power up, follow this

procedure before replacing any modules:

1. Disconnect the power cord and check the battery in the battery holder (BT1). The battery should read 3.3 to 3.7 volts. If the battery is bad, replace the battery, wait ten seconds, and then reset the PMU (refer to the next step). If the battery is good, go to the next step.

2. Press the PMU reset switch (S1) once on the logic board and then proceed to step 3. Do **NOT** press the PMU reset switch a second time because it could crash the PMU chip.

3. WAIT ten seconds before connecting the power cord and powering the computer on. If the computer powers on, go to the next step. If the computer does not power on, there is something else wrong with the computer; refer to the symptom/cure chart, "System" in this chapter.

4. Run MacTest Pro and return the computer to the customer.

Note: This entire procedure resets the computer's PRAM. Be sure to reset the computer's time, date, and other system parameter settings before returning the computer to the customer.

Logic Board LEDs: Power Mac G4 (all models except PCI Graphics)

There is one red LED on the Power Mac G4 (AGP Graphics/Gigabit Ethernet/Digital Audio) logic boards. It indicates that there is power to the board and does not imply a fault condition. Hardware such as DIMMs and PCI cards should not be installed or removed when the LED is on.

Power Macintosh G4 (PCI Graphics)

Processor Module

The logic board comes with a removable processor module. The processor should rarely fail and should be replaced only as a last resort. Processor modules can be ordered from Service.

Note that when you replace the logic board on a Power Macintosh G4 (PCI Graphics), you must also change the processor jumper block and warranty sticker to be compatible with the processor module. Failure to install the jumper block properly will result in a unit that does not boot up. No jumper block is required for Power Mac G4 (AGP Graphics/Gigabit Ethernet/Digital Audio) processors.

Refer to "Processor Module" in the Take Apart chapter for more information.

Resetting the Cuda Chip: Power Macintosh G4 (PCI Graphics)

The Cuda is a microcontroller chip on the Power Macintosh G4 (PCI Graphics) logic board. Its function is to

• Turn system power on and off.
• Manage system resets from various commands.
• Maintain parameter RAM (PRAM).
• Manage the real-time clock.

Many system problems can be resolved by resetting the Cuda chip (see the Symptom Charts for examples). Press the Cuda reset button on the logic board to reset the Cuda chip. The Cuda reset button is located on the logic board to the right of the battery. Refer to the Logic Board Diagram earlier in this chapter for location information. If you continue to experience system problems, refer to "Resetting the Logic Board" in this chapter.

Resetting the PCI Logic Board

Resetting the logic board can resolve many system problems (see the Symptom/Cure tables for examples). Whenever you have a Power Macintosh G4 (PCI Graphics) computer that fails to power up, you should follow this procedure before replacing any modules.

1. Unplug the computer.

2. Press the Power On button on the front of the unit.

3. Open the side access panel.

4. Remove the battery from the logic board.

5. Wait at least 10 minutes before replacing the battery.

6. Make sure the battery is installed in the correct +/- direction.

7. Reassemble the computer and test the unit.

Note: This procedure resets the computer's PRAM. Be sure to check the computer's time/date and other system parameter settings afterwards.

Logic Board LEDs: Power Macintosh G4 (PCI Graphics)

There are seven diagnostic LEDs on the Power Mac G4 (PCI Graphics) logic board. A graphic follows showing their location.

DS1 = ATA drive activity

If a CD and/or Zip are attached to the ATA bus, this LED will illuminate at power/on restart time for a few seconds. After that, it is unlikely it will illuminate again in a trouble-free system. If this light stays on for a prolonged period, this is a sign of trouble on the ATA bus. If devices are connected to the ATA bus and this LED is dark at boot time, that is also likely a sign of trouble. If a hard disk drive is attached to this bus, the LED flickers regularly indicating drive activity (reads/writes).

DS4 and DS5 = USB power for downstream devices

DS5 = USB port 1- lower

DS4 = USB port 2- upper

(There is no DS2 or DS3 on the board.)

When illuminated, these LEDs indicate that the computer is providing power (+5 V) to downstream USB ports. USB devices do not need to be connected in order for these LEDs to illuminate. However, if one or both of the LEDs is not illuminated and a USB device is/was attached (and the system has completed its boot process), then the logic board has removed downstream power because of a trouble condition.

Since the downstream power is controlled individually for each port, it is possible to have these LEDs in a different state: one off and one on. This way if one port has troubled USB devices, the

other port can still be functional. These LEDs are not immediately illuminated at the beginning of a restart or cold power-on. During a successful/normal boot, the sequence will look like:

1. Unit is powered on and other LEDs will illuminate while DS4 and DS5 are off.

2. Then DS4 and DS5 on for a second or two

3. Then off very briefly (1 second)

4. Then back on (confirms secondary PCI bus is initialized and power now available)

These two LEDs are often useful when troubleshooting an unpredictable system. If they stay on (step 4) then the secondary PCI bus has been initialized which happens relatively late in the boot/hardware initializing process.

DS6 = Ultra ATA bus activity

DS6 indicates Ultra ATA bus activity.

DS7 & DS8 = Power Indication

In a working unit, these LEDs should be in sync with each other: both on or both off. If one LED is on and the other is off, there is a problem.

DS9 = CPU Bus Request

When illuminated, this LED indicates that the CPU is requesting the bus. This LED will rarely glow as brightly as the others (like the Ultra ATA LED) given that the CPU is not always requesting the bus, and when it does, the period of time is short. As a result, you may need to watch this LED much more carefully than the others to tell if there is activity. If this LED is ever on continuously and bright, then the system is troubled and likely hung.

Power Macintosh G4 (PCI Graphics) LEDs Locator
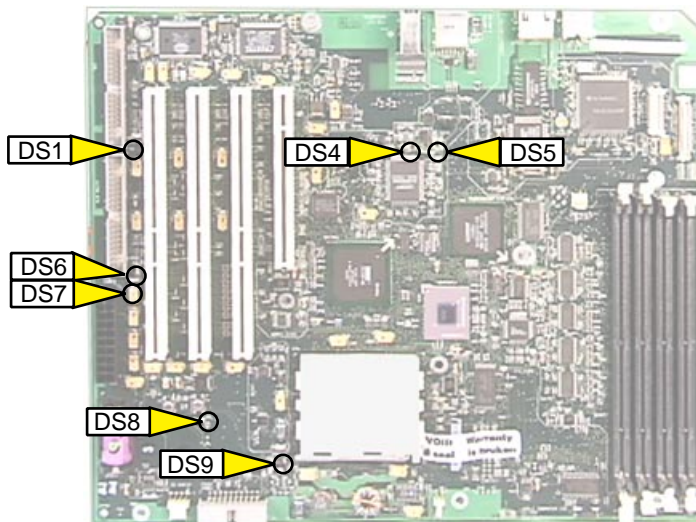
Power Supply Verification

To start up, the Power Mac G4 logic board requires a "trickle" power of +5V for AGP and PCI models, +28V for Gigabit Ethernet/ Digital Audio models, or +25V for QuickSilver models. If the system fails to start up, follow the procedure outlined below to determine whether the problem is related to the power supply.

Note: To verify the power supply, you need a volt meter.

Verification Procedure

Follow the procedures in the Take Apart chapter to access the power supply.

Important: For this verification procedure when connecting the volt meter leads to specific pins, ensure the power supply cable remains securely plugged into the power supply connector on the logic board.

1. Plug in a known-good power cord into the back of the computer. Do not turn on the computer.

2. Power Mac G4 (AGP or PCI) (see Figure 1):

   Connect the black lead of the volt meter to pin 16 of the 20-pin power supply connector. Connect the red lead of the volt meter to pin 9 of the power supply connector. The volt meter should measure approximately +5V.

   If you do not get a reading of +5V, re-check the volt meter connections and measure the voltage again. If voltage is still not present, replace the power supply; otherwise, go to the step 4.

   If you do measure +5V on pin 9, the power supply is likely OK. Go to the next step for further verification.

```
+12V Pin 10   □ □   Pin 20 +5V
+5V TRKL Pin 9   □ □   Pin 19 +5V
POK Pin 8   □ □   Pin 18 GND
GND Pin 7   ■ ■   Pin 17 GND
+5V Pin 6   □ ■   Pin 16 GND
GND Pin 5   ■ ■   Pin 15 GND
+5V Pin 4   □ □   Pin 14 [Power On]
GND Pin 3   ■ ■   Pin 13 GND
+3.3V Pin 2   □ □   Pin 12 -12V
+3.3V Pin 1   □ □   Pin 11 +3.3V
```
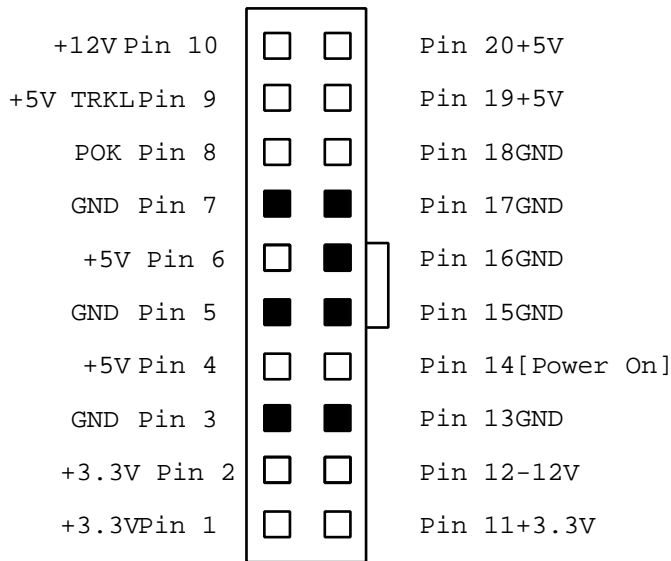
Figure 1. Power Supply 20-Pin Connector

3. Power Mac G4 (Gigabit Ethernet/Digital Audio) (see Figure 2):

   Connect the black lead of the volt meter to pin 11 of the 22-pin power supply connector. Connect the red lead of the volt meter to pin 22 of the power supply connector. The volt meter should measure approximately +28V.

   If you do not get a reading of +28V, re-check the volt meter connections and measure the voltage again. If voltage is still not present, replace the power supply; otherwise, go to the next step.

   If you do measure +28V on pin 22, the power supply is likely OK. Go to the next step for further verification.

```
GND  Pin 11    ☐  ☐    Pin 22+28V TRKL

+12V Pin 10    ☐  ☐    Pin 21+5V

 NC  Pin 9     ☐  ☐    Pin 20+5V

+3.3V Pin 8    ☐  ☐    Pin 19GND

GND  Pin 7     ☐  ☐    Pin 18GND

+5V  Pin 6     ☐  ☐    Pin 17GND

GND  Pin 5     ☐  ☐    Pin 16GND

+5V  Pin 4     ☐  ☐    Pin 15[Power On]

GND  Pin 3     ☐  ☐    Pin 14GND

+3.3V Pin 2    ☐  ☐    Pin 13-12V

+3.3V Pin 1    ☐  ☐    Pin 12+3.3V
```
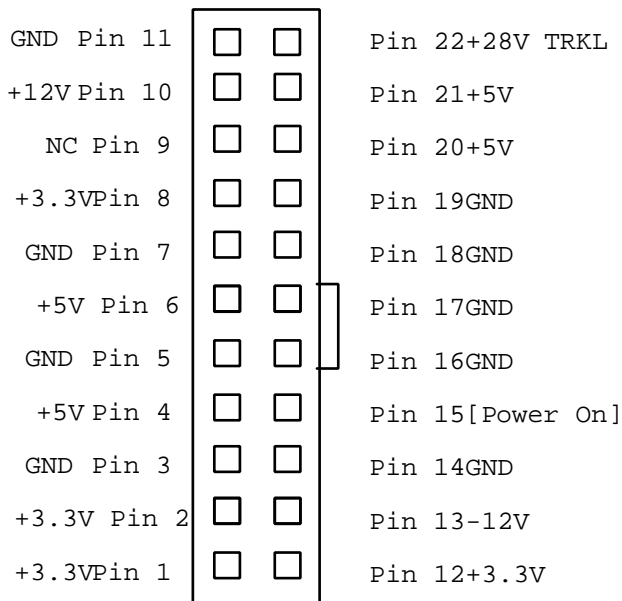
Figure 2. Power Supply 22-Pin Connector

4. Power Mac G4 (QuickSilver) (see Figure 3):

Connect the black lead of the volt meter to pin 11 of the 22-pin power supply connector. Connect the red lead of the volt meter to pin 22 of the power supply connector. The volt meter should measure approximately +25V.

If you do not get a reading of +25V, re-check the volt meter connections and measure the voltage again. If voltage is still not present, replace the power supply; otherwise, go to the next step.

If you do measure +25V on pin 22, the power supply is likely OK. Go to the next step for further verification.

```
GND  Pin 11    □   □    Pin 22 +25V TRKL

+12V Pin 10    □   □    Pin 21 +5V

+25V Pin 9     □   □    Pin 20 +5V

+3.3V Pin 8    □   □    Pin 19 GND

GND  Pin 7     □   □    Pin 18 GND

+5V  Pin 6     □   □    Pin 17 GND

GND  Pin 5     □   □    Pin 16 GND

+5V  Pin 4     □   □    Pin 15 [Power On]

GND  Pin 3     □   □    Pin 14 GND

+3.3V Pin 2    □   □    Pin 13 -12V

+3.3V Pin 1    □   □    Pin 12 +3.3V


+12V Pin 2     □   □    COM Pin 4

+12V Pin 1     □   □    COM Pin 3
```
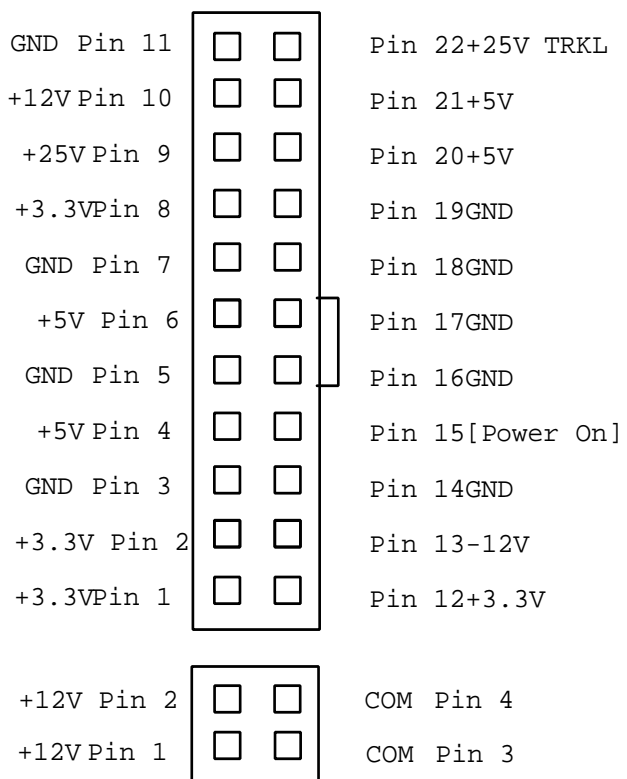
Figure 3. Power Supply 22-Pin Connector and 4-Pin Connector

Note: The four-pin connector (P4) supplies power to the multiprocessor.

5. Start up the computer by pressing the power button on the front of the computer. **Note:** Verify that the power cable is plugged into connector J30.

   If the computer starts up normally, the power supply is OK. If the computer does not start up, go to the next step.

6. Check to see if the power supply fan is spinning. If it is not, go to the next step.

7. Connect the black lead of the volt meter to pin 16 of the power supply connector for AGP and PCI models or pin 11 for Gigabit Ethernet/Digital Audio/QuickSilver models. Connect the red lead of the volt meter to pin 1 of the power supply connector. The volt meter should measure approximately +3.3V.

   If you do not get a reading of +3.3V, re-check the volt meter connections and measure the voltage again. If voltage is still not present, replace the power supply; otherwise, go to the

next step.

8. Connect the black lead of the volt meter to pin 16 of the power supply connector for AGP and PCI models or pin 11 for Gigabit Ethernet/DIgital Audio/QuickSilver models. Connect the red lead of the volt meter to pin 4 of the power supply connector. The volt meter should measure approximately +5V.

   If you do not get a reading of +5V, re-check the volt meter connections and measure the voltage again. If voltage is still not present, replace the power supply; otherwise, go to the next step.

9. Measure the voltage of pin 10 on the power supply connector. The voltage should measure approximately +12V.

   If you do not get a reading of +12V, re-check the volt meter connections and measure the voltage again. If voltage is still not present, replace the power supply; otherwise, go to the

next step.

10. The testing is complete. You have just verified that the power
    supply is not the cause of the "No apparent power" symptom.

SDRAM DIMMs

The Power Mac G4 uses the following types of SDRAM DIMMs:

PCI/AGP/Gigabit Ethernet   **QuickSilver/Digital Audio**
PC-100 SDRAM   PC-133 SDRAM
3.3 volt unbuffered   3.3 volt unbuffered
168-pin   168-pin
64-bit wide   64-bit wide

PC-100 DIMMs from recent Power Macintosh G3 computers are compatible with Power Mac G4 (PCI Graphics/AGP Graphics/ Gigabit Ethernet) computers; DIMMs in older Macintosh computers are not. Do not use older DIMMs even if they fit into the Power Mac G4 DIMM slots. Power Mac G4 (Digital Audio) computers must use PC-133 DIMMs, not PC-100 DIMMs.

The SDRAM DIMMs can be installed one or more at a time. There are no performance gains when two DIMMs of the same size are

installed. Any supported size DIMM can be installed in any DIMM slot.

Power Mac G4 (all models except PCI Graphics)

Four slots on the Power Mac G4 (AGP Graphics/Gigabit Ethernet) logic boards accept 64, 128, 256, or 512 MB DIMMs. Three slots on the Power Mac G4 (QuickSilver/Digital Audio) board accept 64, 128, 256, or 512 MB DIMMs. Any 256 MB DIMMs must be 128 or 256 Mbit technology; 512 MB DIMMs must be 256 Mbit technology.

Power Macintosh G4 (PCI Graphics)

Four slots on the Power Macintosh G4 (PCI Graphics) logic board accept 8, 16, 32, 64, 128, and 256 MB DIMMs. Any 128 MB DIMMs must be 64 or 128 Mbit technology; 256 MB DIMMs must be 128 Mbit technology.

PCI Cards

Video Card Installation

Power Mac G4 computers require an I/O video card that moves video from the main logic board. The card is installed in slot #1 on the logic board, as illustrated below. Slot #1 on the Power Macintosh G4 (PCI Graphics) is a PCI slot; slot #1 on the other models of Power Mac G4 is an AGP slot. Refer to the Symptom Charts for details on troubleshooting video cards.

Note: The computer will boot up without the video card installed, but it will not operate properly.

Power Mac G4 (PCI Graphics/AGP Graphics/Gigabit Ethernet)

Slots #4 #3 #2   Slot #1
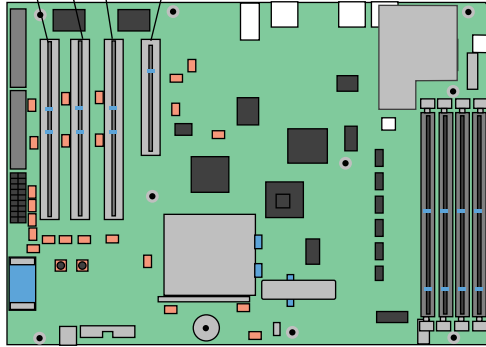
Power Mac G4 (QuickSilver/Digital Audio)

Slots #2-5   Slot #1
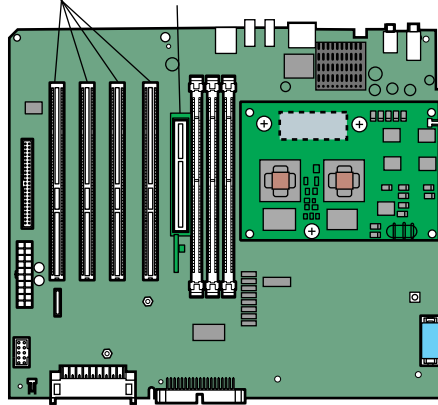
Cleaning Procedure for Card Connectors

It is possible for residue to build up on the gold edge connector pins on some cards, which could cause a variety of symptoms.

If you are having problems with a card, inspect the connector pins with a magnifying glass. If you find residue, use a pencil eraser or the chemical cleaner "stabilant" (see TIL article 10468) to gently clean the pins. Remember, never handle the cards by the gold connectors.

VGA-to-Macintosh Adapters

To avoid "No video" or "Black screen" situations, do not use two VGA-to-Macintosh adapters (one on each end) on the video cable that connects a Power Mac G4 computer to a monitor with a captive VGA connector.

If you need to connect a VGA monitor, connect it in one of the following ways:

- VGA monitor --> to a VGA cable with VGA connectors on both ends --> to the video card on the Power Mac G4
- VGA monitor --> to a mixed cable, a cable that has a VGA connector on one end and a Macintosh connector on the other end --> to the video card on the Power Mac G4

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. Because cures are listed on the charts in the order of most likely solution, try the cures in the order presented. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure. **Note:** If you have replaced a module, reinstall the original module before you proceed to the next cure.

Troubleshooting information for Power Mac G4 (Gigabit Ethernet/Digital Audio) is also available in the Tech Info Library, which you can access on line at http://til.info.apple.com.

In addition, refer to the Diagnostics page of Service Source, on Service Source CD or at Service Source Online

(http://service.info.apple.com), for information on diagnostic tools that can help you isolate hardware problems.

For other assistance, contact Apple Technical Support.

System

System is completely dead (no fan movement)

1 Power Macintosh G4 (PCI Graphics): Check LEDS DS7 and DS8 on the logic board. In a working unit, these LEDs should be in sync with each other: both on or both off. If one LED is on and the other is off, there is a problem.

2 Verify power outlet is good. Try a known-good power cord.

3 Make sure the voltage switch on the back of the power supply is set to the correct voltage.

4 Check for trickle voltage on the power supply connector. Refer to "Power Supply Verification" in this chapter.

5 Disconnect the keyboard and power-on the system via the power button on the front of the computer. If the unit powers on, replace the USB keyboard. If not, go to next step.

6 Power Macintosh G4 (PCI Graphics): Reset the Cuda chip and try again. See "Resetting the Cuda Chip" in this chapter.

7 Reset the logic board:
   • Power Mac G4 (AGP Graphics): Refer to "Resetting the

PMU on the Logic Board" in this chapter to reset the PMU.

- Power Macintosh G4 (PCI Graphics): Refer to "Resetting the PCI Logic Board" in this chapter.

8   Replace the logic board.

Fan is running, LED is on, drive is accessed at startup, no startup chime, and screen is black

1   Reseat SDRAM DIMMs.

2   Check cable connections to the monitor and to the speaker/ microphone ports on the rear of the unit. Are the cables connected to the correct ports?

3   Power Mackintosh G4 (PCI Graphics): Check jumper block at J25. Make sure jumper is correct color for processor type, includes all required inner metal clips, and is installed in correct direction. See "Processor Module" in Take Apart for more information.

4   Reseat video card and PCI cards.

Memory error dialog box message appears on the screen

1. Reseat SDRAM DIMMs. (**Note**: The computer does not ship with any on-board memory. You must have an SDRAM DIMM installed for the computer to boot properly.)

2. Verify that only SDRAM DIMMs are installed and not EDO memory. Use PC-100 DIMMs on Power Mac G4 (PCI/AGP/Gigabit Ethernet) and PC-133 DIMMs on Power Mac G4 (Digital Audio/QuickSilver).

3. Run MacTest Pro to locate the bad SDRAM. Replace the SDRAM with a known-good DIMM.

Computer begins to power up, the fan and hard drive are spinning, the power LED is lit, but there is no video.

1 Check all cable connections.
2 Power Macintosh G4 (PCI Graphics): Check jumper block at J25. Make sure jumper is correct color for processor type, includes all required inner metal clips, and is installed in correct direction. See "Processor Module" in Take Apart for more information.
3 Reseat SDRAM DIMMs. Refer to the "Power-On Self Test" section mentioned earlier in this chapter.
4 Test for a bad SDRAM DIMM by removing the DIMMs one at a time (replacing each one afterwards). Replace any faulty SDRAM DIMMs.
5 Reseat the processor card.
6 Verify internal SCSI cabling is secure.
7 Verify all cards are seated properly.
8 Remove all cards (except video card) and disconnect hard drives from the logic board. Do you have video?
9 Replace the video card.
10 Replace the logic board.

11 Replace the processor.

Clicking, chirping, thumping, or rubbing

1 Remove all PCI cards and test unit. If problem does not occur with cards removed, begin replacing cards one at a time to determine which card is causing problem. Replace problem card with known-good card.

2 Remove media from drives and verify noise is gone. Replace media.

3 Verify no cables are caught in fan.

4 Disconnect fan and verify noise is gone. Replace fan.

5 Reseat the CD-ROM/Zip drive carrier.

6 Disconnect power cable to all drives. Reconnect drives one at a time. Replace problem drive.

7 Replace power supply.

8 Replace video card.

9 Replace logic board.

10 Replace processor module.

System shuts down intermittently	1	Check that the fan cable is connected and the fan is operational.
	2	Make sure air vents are clear. Do not operate the computer with the access panel open, the heatsink could overheat.
	3	Make sure power cord is plugged in firmly.
	4	Check that power source is turned on and correct voltage is present.
	5	Replace power cord.
	6	Check battery.
	7	Power Macintosh G4 (PCI Graphics): Reset Cuda chip. See "Resetting the Cuda Chip" in this chapter.
	8	Reset the logic board: • Power Mac G4 (AGP Graphics): Refer to "Resetting the PMU on the Logic Board" in this chapter to reset the PMU. • Power Macintosh G4 (PCI Graphics): Refer to "Resetting the PCI Logic Board" in this chapter.
	9	Replace power supply.
	10	Replace logic board.

11 Replace processor module.

System shuts down almost immediately	1 Verify the power outlet is good. Try a known-good power cord.
	2 Ensure the voltage switch on the back of the power supply is set to the correct voltage.
	3 Power Macintosh G4 (PCI Graphics): Reset Cuda chip and try again. See "Resetting the Cuda Chip" in this chapter.
	4 Reset the logic board:
	• Power Mac G4 (AGP Graphics): Refer to "Resetting the PMU on the Logic Board" in this chapter to reset the PMU.
	• Power Macintosh G4 (PCI Graphics): Refer to "Resetting the PCI Logic Board" in this chapter.
	5 Replace power supply.
System intermittently crashes or hangs	1 Verify system software is Mac OS 8.6 or higher.
	2 If crash or hang is occurring in a specific application, replace the application.

3   Perform a clean install of system software with the system restore CD that came with the computer.

4   Verify software is compatible with this model of Power Macintosh (contact developer).

5   Start up with extensions off to determine if there are system extension or control panel problems.

6   Run Disk First Aid.

7   Test for bad memory. Run MacTest Pro in loop mode overnight to test the memory. If MacTest Pro finds a bad memory module, or other hardware, replace the hardware in question with a known-good module.

8   Clear parameter RAM. Hold down Command-Option-P-R during startup but before "Welcome to Macintosh" appears.

9   Remove all SDRAM DIMMs and try replacing them one at a time to test. Replace any bad DIMMs.

10 Reset the logic board. Refer to "Resetting the Logic Board."

11 Replace logic board.

12 Replace processor module.

During startup, following message is displayed, "This startup disk will not work on this Macintosh model...."	1	Start up with the system restore CD that came with the computer and run Disk First Aid.
	2	Verify system software is Mac OS 8.6 or higher.
	3	Perform a clean install of system software with the system restore CD that came with the computer.

System freezes during normal operation	1	Boot with extensions off by holding down the Shift key during startup. To isolate the problem, use the Extension Manager to add the system extensions and control panels back one at a time, starting up the system after each addition.
	2	Perform a clean install of system software with the system restore CD that came with the computer.
	3	Reset the logic board:
		• Power Mac G4 (AGP Graphics): Refer to "Resetting the PMU on the Logic Board" in this chapter to reset the PMU.
		• Power Macintosh G4 (PCI Graphics): Refer to "Resetting the PCI Logic Board" in this chapter.

4   Remove all third-party hardware from the computer,
    including RAM, PCI cards, hard drives, external USB devices,
    and FireWire devices. Also remove any third-party drivers.
    Reinstall one at a time, starting up after each addition.

5   Run MacTest Pro in loop mode to verify the remaining Apple
    hardware.

6   Replace the logic board.

7   Replace the processor module.

Error Beeps

Computer beeps once at startup

1 One beep means that no RAM is installed or detected.

2 Reseat the SDRAM and try again.

3 If no SDRAM is present, install a known-good SDRAM DIMM in the top slot and try again.

4 If DRAM is present, replace it (one DIMM at a time, starting with the top DIMM slot) with a known-good SDRAM DIMMs.

5 Reseat processor module and try again.

6 Replace processor module and try again.

7 Replace logic board.

Computer beeps twice at startup

1 Two beeps means that incompatible RAM types may be installed. Verify that only SDRAM DIMMs are installed and not EDO memory. Use PC-100 DIMMs on Power Mac G4 (PCI/AGP/Gigabit Ethernet) and PC-133 DIMMs on Power Mac G4 (Digital Audio/QuickSilver).

2 Replace the existing SDRAM one DIMM at a time with known-

		good SDRAM DIMMs.
	3	Reseat processor module and try again.
	4	Replace processor module and try again.
	5	Replace logic board.

Computer beeps three times at startup	1	Three beeps means that no RAM banks passed memory testing.
	2	Replace the existing SDRAM one DIMM at a time with known-good SDRAM DIMMs.
	3	Reseat processor module and try again.
	4	Replace processor module and try again.
	5	Replace logic board.

Computer beeps four or five times at startup	1	Four or five beeps means that the ROM is probably bad and cannot be fixed.
	2	Remove all third-party hardware from the computer, including RAM, PCI cards, hard drives, external USB devices, and FireWire devices. Reinstall one at a time, starting up after each addition.
	3	Replace logic board.

Video and Sound

Video

Screen is black, but boot tone is present, drive operates, fan is running, and LED is lit

1 Check video cable/card connections and connector pins.

2 Remove all third-party devices.

3 Reseat video card.

4 Power Mac G4 (PCI Graphics): Check jumper block at J25. Make sure jumper is correct color for processor type, includes all required inner metal clips, and is installed in correct direction. See "Processor Module" in Take Apart for more information.

5 Clear parameter RAM. Hold down Command-Option-P-R during startup but before "Welcome to Macintosh" appears.

6 Reseat SDRAM DIMMS. Verify that only SDRAM DIMMs are installed and not EDO memory. Use PC-100 DIMMs on Power Mac G4 (PCI/AGP/Gigabit Ethernet) and PC-133 DIMMs on Power Mac G4 (Digital Audio/QuickSilver).

7   Remove all SDRAM DIMMs and try replacing them one at a
    time to test. Replace any bad DIMMs.

8   Power Macintosh G4 (PCI Graphics): Reset Cuda chip. See
    "Resetting the Cuda Chip" in this chapter.

9   Reset the logic board:
    • Power Mac G4 (AGP Graphics): Refer to "Resetting the
      PMU on the Logic Board" in this chapter to reset the PMU.
    • Power Macintosh G4 (PCI Graphics): Refer to "Resetting
      the PCI Logic Board" in this chapter.

10 Test with known-good monitor. Replace monitor if necessary.
    Refer to appropriate monitor manual to troubleshoot
    defective monitor.

11 Replace video card.

12 Replace processor module.

13 Replace logic board.

Screen is black, there is no boot tone, and drive does not operate, but fan is running and LED is lit	1 Power Macintosh G4 (PCI Graphics): Check jumper block at J25. Make sure jumper is correct color for processor type, includes all required inner metal clips, and is installed in correct direction. See "Processor Module" in Take Apart for more information.
	2 Check video cable/card connections.
	3 Reset Cuda chip. See "Resetting the Cuda Chip" in this chapter.
	4 Reset the logic board: • Power Mac G4 (AGP Graphics): Refer to "Resetting the PMU on the Logic Board" in this chapter to reset the PMU. • Power Macintosh G4 (PCI Graphics): Refer to "Resetting the PCI Logic Board" in this chapter.
	5 Reseat the video card.
	6 Reseat the SDRAM DIMMs.
	7 Reseat processor module.
	8 Remove all SDRAM DIMMs and try replacing them one at a time to test. Replace any bad DIMMs.

9   Replace the video card.
10   Replace processor module.
11   Replace logic board.
12   Replace power supply.

Boot tone is present and screen lights up, but nothing is displayed on screen

1   Check video cable/card connections.
2   Reset Cuda chip. See "Resetting the Cuda Chip" in this chapter.
3   Reset the logic board:
     • Power Mac G4 (AGP Graphics): Refer to "Resetting the PMU on the Logic Board" in this chapter to reset the PMU.
     • Power Macintosh G4 (PCI Graphics): Refer to "Resetting the PCI Logic Board" in this chapter.
4   Reseat all PCI cards and SDRAM.
5   Reseat processor module.
6   Test with known-good monitor. Replace monitor if necessary. Refer to appropriate monitor manual to troubleshoot defective monitor.

7   Replace processor module.

8   Replace logic board.

Distorted Video

1   Apple monitors: Adjust the focus using the Display Adjustment Utility on the MacTest Pro CD.

2   Third-party monitors: Try a known-good monitor.

3   Check and reseat the video cable.

4   Check the video adapter if using one. Refer to "VGA-to-Macintosh Adapter" earlier in this chapter.

5   Adjust the screen geometry using the Display Adjustment Utility on the MacTest Pro CD.

6   Adjust the cutoff or white balance using the Display Adjustment and Display Service Utilities on the MacTest Pro CD. Refer to the monitor's owner's manual for additional information.

Erroneous text or
characters appear on
the screen

1 Check the keyboard and the keyboard connection.
2 Start up from the system restore CD that came with the
   computer. If problem is resolved, perform a clean install of
   the system software.

Flashing question
mark

1 Boot from the system restore CD to verify the hard drive can
   be seen on the desktop. If booting from a SCSI chain, make
   sure the hard drive's SCSI ID is set to a unique number.
2 Check for OS software on the boot drive.
3 Run Disk First Aid. Update the driver with Drive Setup.
4 If the symptom is on the external SCSI drive, disconnect the
   external SCSI devices. Troubleshoot the SCSI chain if
   necessary.
5 Reinstall system software using the system restore CD that
   came with the computer.
6 Replace the hard drive data cable.
7 Replace the hard drive.

Screen jitter

1. Verify there are no environmental factors causing jitter.
2. Check all cable connections.
3. Test with known-good monitor. Replace monitor if necessary. Refer to appropriate monitor manual to troubleshoot defective monitor.
4. Reseat the video card.
5. Replace the video card.

Sound

No sound from computer's speaker

1. Boot with extensions off and try again. Troubleshoot extensions.
2. Boot from system restore CD that came with the computer and test. Reinstall system software.
3. Disconnect any microphones or external speakers.
4. Verify that volume setting in Control Panel is adequate and mute is not checked.
5. Clear parameter RAM. Hold down Command-Option-P-R

during startup, until the Macintosh restarts.

6   Verify speaker cable is plugged into logic board.

7   Plug headphones or external speakers into the external jack. If the external jack works, replace the internal speaker. If the external jack doesn't work, replace the logic board.

No sound from Apple Pro Speakers when attached to a Power Mac G4 (Digital Audio/QuickSilver) computer

1   Push on the Apple Pro Speaker jack to make sure it is firmly inserted into the Apple Speaker sound output port. (The Apple Pro Speaker jack has two detents. You should feel them as you push the jack into the sound output port. Giving the jack a slight twist while inserting it into the port may make a better connection.)

2   Verify the speaker volume and balance are set appropriately in the Sound control panel.

3   Clear parameter RAM. Hold down Command-Option-P-R during startup, until the computer restarts.

4   Reinstall system software.

5   Replace the Apple Pro Speakers.

Hard Drive

Single internal ATA hard drive does not operate; drive doesn't spin

1   Check if you can see the drive using Drive Setup from MacTest Pro. Reinstall the software drivers for the hard drive.
2   Check all cable connections to the hard drive.
3   Replace hard drive data cable.
4   Verify hard drive power cable is OK. Try another power connector. If power cable defective, replace power supply.
5   Replace hard drive. If problem resolved, reinstall IDE device driver and system software.

No internal SCSI drives operate

1   Verify hard drives are getting power.
2   Verify there are no duplicate SCSI device addresses on a single SCSI bus.
3   Disconnect external SCSI devices and check for proper termination.
4   Reseat SCSI PCI card and verify data cable is seated firmly in

card and drives.

5   Check internal SCSI termination. Internal drives should not
    be terminated; SCSI cable should have termination at end.
6   If more than one SCSI device is on the SCSI chain, remove one
    device at a time and retest. Replace the bad drive.
7   Replace internal SCSI data cable.
8   Replace SCSI PCI card.
9   Replace power supply.

No external SCSI   1   Verify there are no duplicate SCSI device addresses.
drive shows up   2   Verify total cable length does not exceed maximum total cable
                           length for SCSI card. See TIL article 58204.
                       3   Reseat SCSI cable connections going to the SCSI card.
                       4   Replace terminator on external SCSI device.
                       5   Reseat the SCSI card, then try a known-good SCSI card.
                       6   Replace SCSI drive cables one at a time.
                       7   Disconnect external SCSI chain. Using known-good cables,
                           reattach devices one at a time.

CD-ROM and DVD-ROM Drives

CD-ROM Drive

CD-ROM tray won't open

1 Reseat cables on the back of the CD-ROM drive.
2 Verify CD-ROM software is good. Reinstall CD-ROM software.
3 Verify CD-ROM bezel is properly seated.
4 Reseat CD-ROM data cable on logic board.
5 Try using known-good compact disc.
6 Replace CD-ROM drive mechanism.

CD-ROM icon does not appear on the desktop

1 Try using known-good compact disc.
2 Reinstall CD-ROM software.
3 Reseat CD-ROM data cable back of CD-ROM drive and at logic board.
4 Replace CD-ROM data cable.
5 Replace CD-ROM drive mechanism.
6 Replace logic board only if other devices on bus do not work.

DVD-ROM Drive

"Cannot open"
message appears when
Apple DVD Player
launched

1. Make sure DVD-ROM drive is installed. (Apple DVD Player cannot launch without DVD-ROM installed.)
2. Quit all open applications and relaunch Apple DVD Player.
3. Restart computer and relaunch Apple DVD Player.
4. Power Mac G4 (PCI Graphics): Verify DVD decoder card is installed.
5. Turn off Chooser setting for automatically mounting servers at startup. For more information, see TIL article 30970.
6. Refer to TIL article 30887 for further instructions.

Zip Drive

Zip drive does not
show up on desktop

1 Replace Zip disk with known-good disk.
2 Does drive have power? Check that light blinks on front of Zip drive when disk is inserted.
3 Reseat cables on back of Zip drive.
4 Make sure driver is turned on in Extension Manager.
5 Reinstall Zip software.
6 Verify that Zip drive shows up in Apple System Profiler as ID = 1 (slave). If not, check the connector. There should be no jumper on the 6-pin device setting's connector.
7 Replace IDE/ATA drive cable.
8 Replace Zip drive.
9 Replace logic board.

During system startup, Zip disk ejects	1	Replace Zip disk with known-good disk.
	2	Reseat cables on back of Zip drive.
	3	Reinstall Zip software.
	4	Verify that Zip drive shows up in Apple System Profiler as ID = 1 (slave). If not, check the connector. There should be no jumper on the 6-pin device setting's connector.
	5	Replace IDE/ATA cable.
	6	Replace Zip drive.
	7	Replace logic board.
Zip disk does not eject	1	Use manual eject hole on Zip drive to eject stuck disk. Examine disk for damage. Restart the computer, and hold down manual eject button throughout entire boot process. Once system is booted, insert known-good Zip disk and try ejecting it by dragging the disk icon to the trash can.
	2	Reinstall Zip software.
	3	Replace Zip drive.
	4	Replace IDE/ATA drive cable.

5   Replace logic board.

Zip drive attempts to eject disk, but doesn't

1   Reseat Zip drive bezel so bezel slot aligns correctly with drive.
2   Use the manual eject hole on the Zip drive to eject the stuck disk. Examine the disk for damage. Restart the computer, and hold down the manual eject button throughout the entire boot process. Once the system is booted, insert a known-good Zip disk and try ejecting it by dragging the disk icon to the trash can.
3   Replace Zip drive.

Zip drive runs
continuously

1. Replace Zip disk with known-good disk.
2. Reinstall Zip software.
3. Replace Zip drive.
4. Replace IDE/ATA drive cable.
5. Replace logic board.

Input Device Problems

At startup, cursor does not move with the USB mouse

1. Disconnect and reconnect mouse securely to USB keyboard.
2. Inspect inside of mouse for buildup of dirt or other contaminants. Clean mouse if necessary. **Note:** The mouse contains a ball and several rollers that must remain clean. If either the ball or rollers are dirty, the mouse might not track properly. Refer to Tech Info Library article 6491: "How To Clean A Mouse."
3. If mouse is connected to keyboard, connect the mouse to one of the USB ports on the I/O panel instead. If the mouse works, replace keyboard.
4. If the cursor doesn't move, replace the USB mouse.
5. If the mouse is connected to one of the USB ports on the I/O panel, switch to the other USB port.
6. If the cursor moves, replace logic board.

Cursor moves, but clicking USB mouse button has no effect	1	Boot from system restore CD that came with the computer.
	2	Troubleshoot extensions or reinstall system software.
	3	If mouse is connected to keyboard, connect the mouse to one of the USB ports on the I/O panel instead. If mouse works, replace keyboard.
	4	If the mouse is connected to one of the USB ports on the I/O panel, switch to the other USB port. If mouse works, replace logic board.
	5	Clear parameter RAM. Hold down Command-Option-P-R during startup but before "Welcome to Macintosh" appears.
	6	Replace mouse.
No response to any key on keyboard	1	Boot with extensions off. If problem resolved, troubleshoot extensions.
	2	Check keyboard connection to USB port.
	3	Remove all USB devices, except keyboard and mouse.
	4	Boot from system restore CD that came with the computer and test. Reinstall system software.

5   Replace keyboard.
6   Replace logic board.

USB printer does not work

1   Verify you have correct version of system software and printer driver installed.
2   Open the Chooser and verify that you have the correct printer selected.
3   If the printer is connected to a third-party USB hub, switch it to one of the USB ports on the I/O panel. If the printer works now, you have a bad third-party USB hub.
4   Turn off unnecessary extensions and try again.
5   Perform clean install of system software and print driver.
6   Replace printer interface cable.
7   Replace the printer.
8   Replace logic board.

Known-good network
printer does not print

1 Check network connections.
2 Verify you have correct version of system software and
   printer driver installed.
3 Open the Chooser and verify that you have the correct printer
   selected.
4 Does printer show up in Chooser? If so, perform clean install
   of system software and/or network and printer software.

Network Problems

Ethernet connection
drops off line by itself

1 Try another Ethernet cable.
2 Reinstall the Ethernet driver.
3 Possible network problem. Troubleshoot the network.

Unable to switch to
Ethernet network
option in control
panel

1 Use a known-good Ethernet cable and connect properly to an
   known-good network.
2 Reset parameter RAM. Hold down Command-Option-P-R
   during startup but before "Welcome to Macintosh" appears.
3 Boot from the system restore CD that came with the
   computer. Open the TCP/IP control panel and switch to
   Ethernet. Are you able to switch to Ethernet and see Ethernet
   devices on the network now? If so, troubleshoot software
   extensions or reinstall system software.

Unable to see any network devices	1	Open the AppleTalk or TCP/IP control panel and select the Ethernet option. Verify that you can now see devices on the network.
	2	Reset parameter RAM. Hold down Command-Option-P-R during startup but before "Welcome to Macintosh" appears.
	3	Boot from the system restore CD that came with the computer. Open the AppleTalk or TCP/IP control panel and switch to Ethernet. Are you able to switch to Ethernet and see Ethernet devices on the network now? If so, troubleshoot software extensions or reinstall system software.
	4	Try connecting to a known-good Ethernet port at the wall or external hub.
	5	Verify that other users are experiencing the same problem. If so, contact the network administrator. If not, go on to the next step
	6	Replace the logic board.

Modem

The internal modem is not recognized.

1. Make sure the correct CCL and extension files installed.
2. Reseat the modem and modem cable.
3. Reinstall the CCL and modem extension. If the problem persists, reinstall the system software and try again.
4. Reset parameter RAM. Hold down Command-Option-P-R during startup but before "Welcome to Macintosh" appears.
5. Replace the modem.

Modem reports an error when dialing out

1. Use the Modem Country Selector utility to make sure the modem is set to the correct country.
2. Make sure the correct driver is installed and the correct CCL is selected and that they are not corrupted. If necessary, reinstall the driver and/or CCL.
3. Try another cable and phone jack.
4. If problem persists, reinstall system and modem software.

Computer freezes
when modem dials

Extensions are in conflict or the Mac OS is corrupted. Enable only
the Mac OS files in the Extensions Manager and any modem drivers
needed. If the problem persists, reinstall the system software

Modem is having
trouble connecting to
Online site

1   Use the Modem Country Selector utility to make sure the
    modem is set to the correct country.
2   The phone line may have too much noise. If the user has a
    second line, try that one. The user should contact their local
    phone company and request their line be checked.
3   Check to make sure the TCP/IP control panel is correctly
    configured for the user's Internet Service Provider. If the
    TCP/IP control panel is not configured correctly, it may
    connect but won't be able to access any sites.
4   Sometimes online services use different servers for dial-up/
    authentication and for services. If one server is down, users
    may be able to login but not access any services. Contact the
    online service for help.

The system returns an error message when launching an Internet browser

Browser software is not installed correctly. If necessary, reinstall the browser software. **Note**: Internet Explorer 4 and greater needs to be installed and not just drag copied.

The dialup software will not initiate a connection

1 Use the Modem Country Selector utility to make sure the modem is set to the correct country.
2 Make sure dialup software is fully installed and all required extensions are enabled. If necessary, reinstall the dialup software and provide the necessary information for setup.

Modem is dropping its connection

1 Use the Modem Country Selector utility to make sure the modem is set to the correct country.
2 Try another cable and phone jack.
3 The phone line may be too noisy to handle the higher modem speeds. Try connecting at a slower speed or use a generic CCL file. (If you are familiar with the CCL script language, you can edit the modem script to force a connection at a lower

speed.) If the problem continues, contact the phone company to report the bad phone line.

4   Verify that the user has call waiting on that phone line. With call waiting active, an incoming call can interrupt the connection. Disable call waiting using AT commands placed in the init string of the dialup application. Usually the string is *70.

5   There may be a problem with the server to which you are connecting. Servers sometimes develop problems that disconnect users without explanation. Try calling back later or use an alternate number if one is available.

6   Check with the Internet Service Provider.

7   Reseat the modem. If the problem persists, replace the modem.

Modem disconnects after a period of time	Timed disconnect setting is causing the modem to disconnect. Some services or software packages have a feature that will disconnect the user after a set period of time. Either increase this time setting or disable the feature if possible. Contact the ISP or network administrator for more information.
Modem is slow responding	1 Too many people are using the ISP's Internet services. When using an ISP, users need to remember that the ISP only has a limited amount of bandwidth to the Internet. If a large amount of people are dialing in, individual's speeds will be affected
	2 Check the phone line. The quality of the phone line can limit modem performance.

Service Source

Upgrades

Power Mac G4 /
Macintosh Server G4

DIMM Slots

Installation Procedures

SDRAM DIMM

Before you begin, open the side access panel.

DRAM Slot (1 of 4)

Notches

DRAM DIMM

Connectors

Ejector
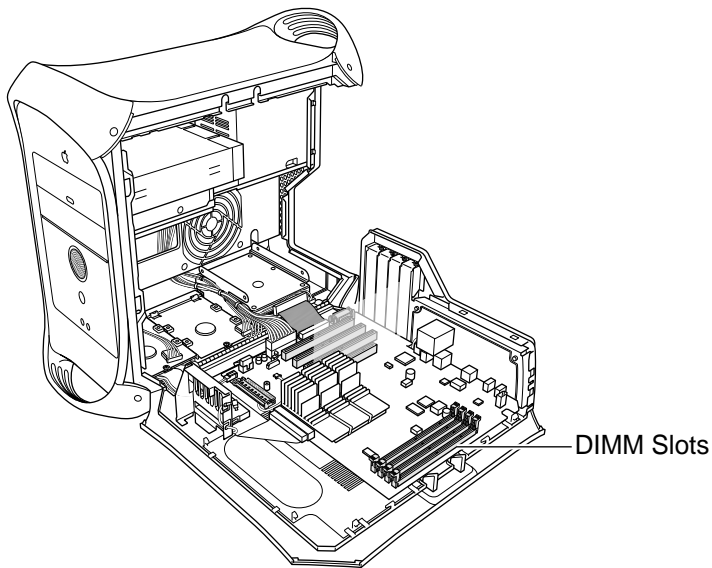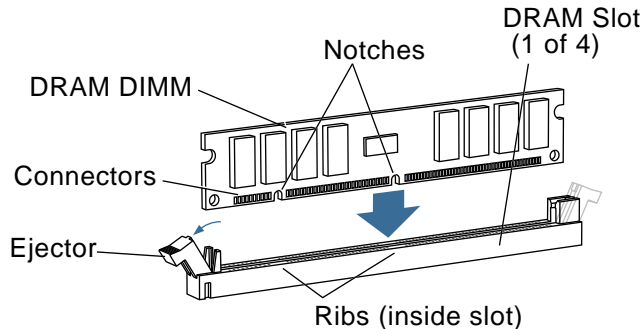
Ribs (inside slot)

1. Align a DRAM DIMM in the DRAM slot so the notches line up with the ribs inside the slot.

2. Push the DIMM down evenly until the ejectors snap into place.

Note: To remove a DIMM, push down on the slot's ejectors until they open and release the DIMM. Some DRAM slots may have only one ejector.

Important: After upgrading memory on a new, out-of-the-box Power Mac G4

running Mac OS 9, you must press Option-S when restarting the computer. This ensures the customer will see the Setup Assistant (a movie and setup instructions). If these keys are not pressed down each time a technician restarts the system after an upgrade, the Setup Assistant file will execute, disable itself, and the customer will never see it.

AirPort Card Connector
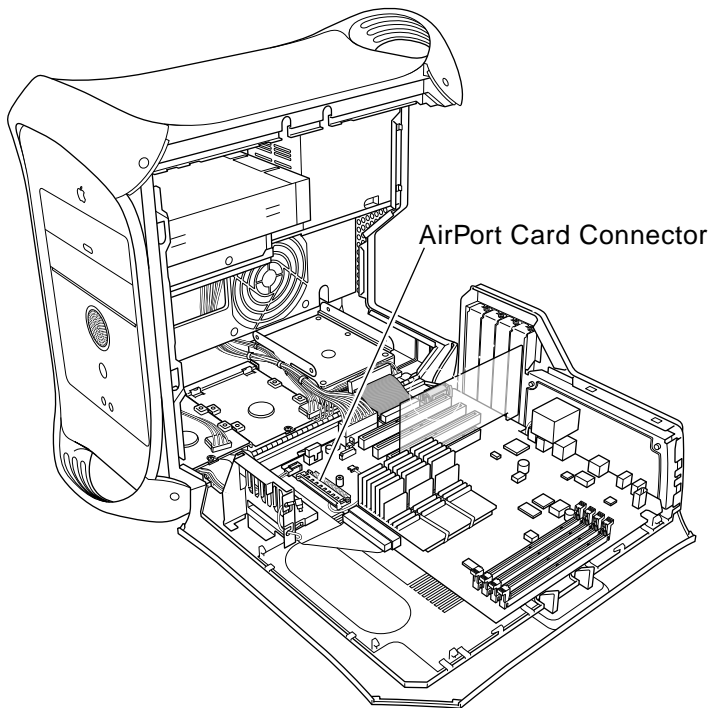
AirPort Card

Before you begin, open the side access panel.

Note: The following procedure applies to the Power Mac G4 (AGP Graphics/Gigabit Ethernet/ Digital Audio) only. You cannot install an AirPort card in the Power Mac G4 (PCI Graphics).

AirPort Card

Adapter Card
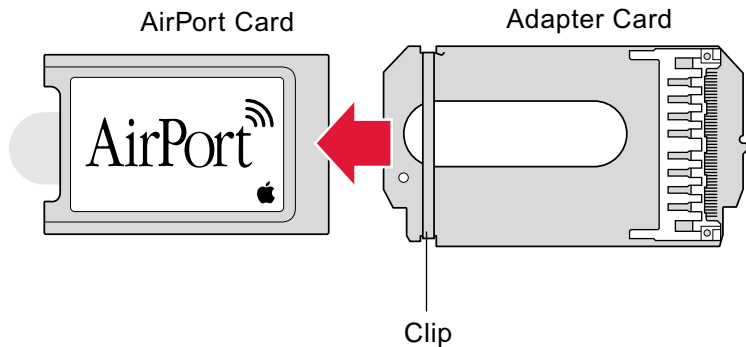
AirPort

Clip

1. If an adapter card is installed on the AirPort card, release the metal clip and remove the AirPort card from the adapter.

Note: The adapter and clip are not used with the Power Mac G4.

AirPort Card

Plug the antenna wire into the hole in the end of the AirPort Card.

The antenna wire is stowed here when not in use.
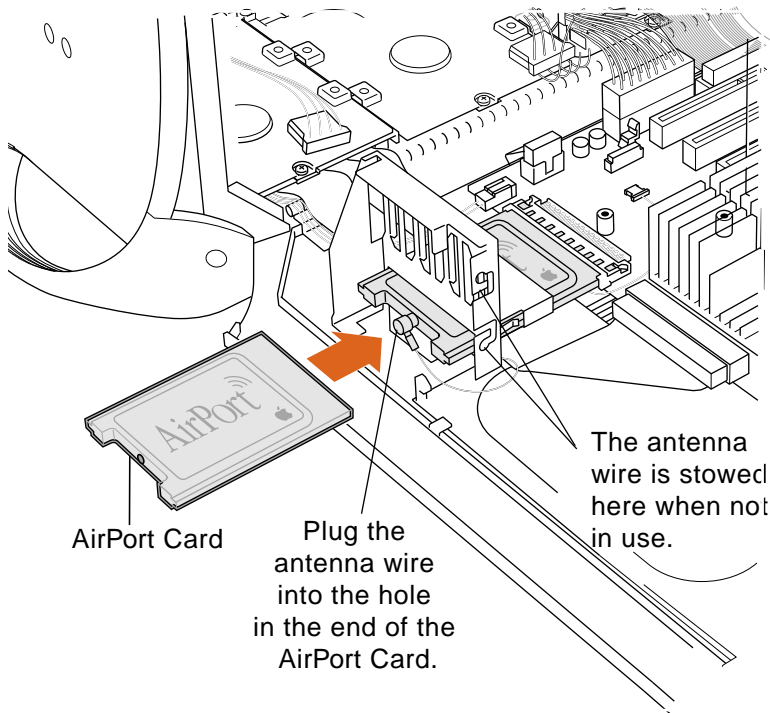
2. Insert the AirPort card through the opening in the PCI card guide and into the connector on the logic board.

3. Connect the antenna cable to the conector on the end of the AirPort card.

Important: After installing an AirPort card on a new, out-of-the-box Power Mac G4 running Mac OS 9, you must press Option-S when restarting the computer. This ensures the customer will see the Setup Assistant

(a movie and setup instructions). If these keys are not pressed down each time a technician restarts the system after an upgrade, the Setup Assistant file will execute, disable itself, and the customer will never see it.

Exploded View

Power Mac G4/
Macintosh Server G4

Power Mac G4 (AGP Graphics)

CPU Heatsink Kit
076-0803

Processor Module
350 MHz 661-2278
400 MHz 661-2259,
400 MHz 661-2308 (Rev. 2)
450 MHz 661-2260,
450 MHz 661-2306 (Rev. 2)
500 MHz 661-2262

Modem Card
661-2186

Video Card, AGP, 16 MB,
Rage 128 661-2273
Rage 128 Pro 661-2292

Ultra2 LVD SCSI
Dual Chan PCI Card
661-2274

Battery
922-4028

Logic Board,
V.1 661-2251
V.2 661-2302

Zip & DVD
Drive Carrier
922-3972

Panel Latch
922-4134

DVD-ROM Drive
661-2226
DVD-RAM Drive
661-2162

Power Supply
661-2256, 661-2303

Power Supply Bracket
922-3766

Fan 922-3295

Fan Bracket
922-3854

Enclosure
w/Chassis
922-4045

PCI Slots Shield
922-3704

Speaker Housing
922-3982

Modem Filter
w/cable
922-4054

Speaker
922-4048

Hard Drive
Ultra ATA
10GB 661-2247
10GB 661-2294
13GB 661-2245
20GB 661-2249
20GB 661-2299
27GB 661-2250
27GB 661-2300

Front Panel
Board
922-4049

Front Panel Shield
922-3689

Thermal Pad
922-3863

Hard Drive SCSI 36 GB
Ultra2 LVD 7200rpm 1.6" High
661-2185

U-Shaped
Carrier, Ver. 2
076-0778

Hard Drive SCSI
18 GB Ultra2 LVD
661-2203

Hard Drive Carrier
Ver. 2 076-0777

Carrier
Support Plate
922-3871

COVERS

Allen Screws
Side Panels (typical)
922-3761

Left Side
Panel
922-3974

Front and Rear
Top Handle
922-3981

Top Panel
922-3976

Allen Screws Handles
and Supports (typical)
922-3759

Vented
Rear
Panel
922-3977

Allen
Screws (3)
922-3760

Security
Bar Cover
922-3693

I/O Panel
Cover
922-3978

Right Side
Access Panel
922-3975

ZIP Bezel
922-3966

Blank Bezel
922-3965

CD/DVD
Door Frame
922-3967

Front Panel
922-3973

Front Support
922-3971

Lower
Front
Panel
922-3980

Lower Rear Panel
922-3979

Rear Support
922-3970

Enclosure with Chassis 922-4045
Rev. 2 922-4186
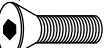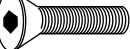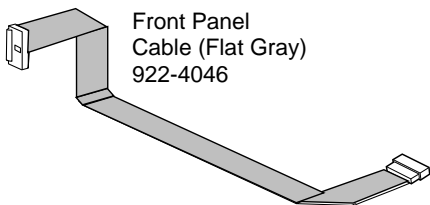
Note:
Logic Board, CD drive, Zip drive, power supply and hard drives are not part of the enclosure.

Power Mac G4 (AGP Graphics)—Screw Matrix

076-0777		Hard drive carrier, Ver. 2, and (5) screws (same as 922-3874) (4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
922-3874		(4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
922-1203 (34 total)		(1) Modem, (1) Modem plug, (2) Carrier support plate, (1) Power supply bracket, (4) Latch panel, (12) Logic board, (2) Firewire board, (2) Fan guard, (3) Chassis, (1) Hard drive carrier retainer, (4) PCI slot covers (same screw can be used when cards installed)
922-2739		(4) CD/DVD drive to carrier, (4) Zip drive to carrier, (1) Bracket to power supply
922-3669		(4) Fan to fan bracket
922-3759		(4) Handles and (4) supports
922-3760		(3) Vented rear panel
922-3761		(8) Right and left side panels
922-3762		(2) Latch to right side panel
922-3873		(2) CD/DVD/ZIP drive carrier to chassis
922-4051		(3) Processor to logic board
922-4050		(2) Modem to logic board
922-4052		(2) Antenna

Cables

Front Panel
Cable (Flat Gray)
922-4046

IDE / ATA Cable
922-4047

Adapter
Mac to VGA
922-3764

Firewire Cable (External)
922-3884
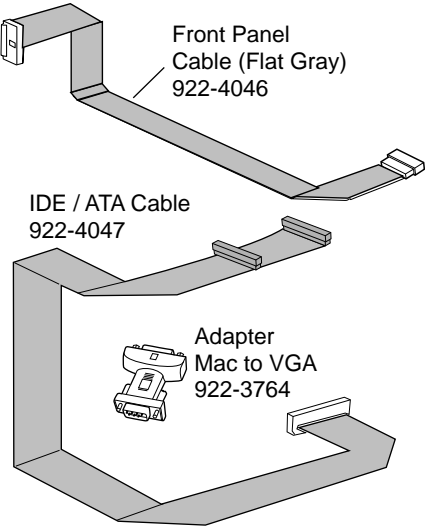
Computer
Power Cord
922-3964

Cable Modem, Phone Ice
922-3963

SCSI Adapter
922-3770

Ultra ATA Cable, Dual Drive
922-3862

Ultra2 LVD SCSI
Cable 922-3861
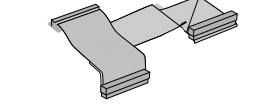
Apple USB Mouse
922-3969
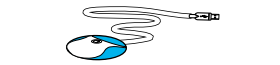
Apple USB Keyboard
922-4161

Power Mac G4 (Gigabit Ethernet)

CPU Heatsink Kit, Dual Procesor 076-0812

CPU Heatsink Kit 076-0803

Processor Module
400 MHz, Ver. 2 661-2354
450 MHz, Dual 661-2305
500 MHz, Dual 661-2325

Modem Card 661-2324

Video Card, AGP, 16 MB, Rage 128 Pro, Ver. 2 661-2330

Ultra 160 SCSI Dual Chan PCI Card 661-2365

Battery 922-4028

Logic Board, w/Gigabit Ethernet 661-2331

Panel Latch 922-4134

Zip & DVD Drive Carrier 922-3972

DVD-ROM Drive 661-2338, 661-2376
DVD-RAM Drive 661-2345

Power Supply 661-2332

Power Supply Bracket 922-3766

Fan 922-3295

Fan Bracket 922-3854

Enclosure w/Chassis,Ver. 2 922-4268

PCI Slots Shield 922-3704

Speaker Housing 922-3982

Modem Filter w/cable, Ver. 2 922-4236

Speaker 922-4048

Hard Drive Ultra ATA
20GB 661-2333
30GB 661-2322
40GB 661-2323

Front Panel Board, Ver. 2 922-4234

Front Panel Shield 922-3689

Hard Drive SCSI 36 GB Ultra2 LVD 10K rpm 661-2321

U-Shaped Carrier,Ver. 2 076-0778

Hard Drive Carrier Ver. 2 076-0777

Carrier Support Plate 922-3871

COVERS

Allen Screws
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Left Side
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Front and Rear
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Top Panel
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and Supports (typical)
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Vented
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I/O Panel
Cover
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ZIP Bezel
922-3966

Blank Bezel
922-3965

CD/DVD
Door Frame
922-3967

Front Panel
922-3973

Lower
Front
Panel
922-3980

Right Side
Access Panel
922-3975

Lower Rear Panel
922-3979

Rear Support
922-3970

Front Support
922-3971

Enclosure with Chassis, Ver. 2   922-4268

Note:
Logic Board, CD drive, Zip drive, power supply and hard drives are not part of the enclosure.

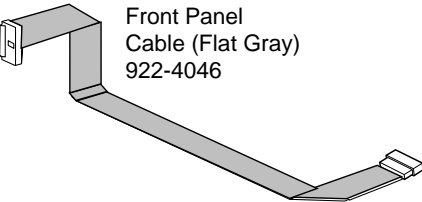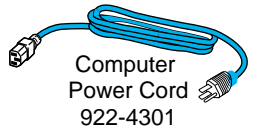| Power Mac G4 (Gigabit Ethernet)—Screw Matrix		
076-0777		Hard drive carrier, Ver. 2, and (5) screws (same as 922-3874) (4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
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922-3762		(2) Latch to right side panel
922-3873		(2) CD/DVD/ZIP drive carrier to chassis
922-4051		(3) Processor to logic board
922-4050		(2) Modem to logic board

Cables

Front Panel
Cable (Flat Gray)
922-4046

Firewire Cable (External)
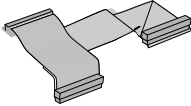922-3884

Ultra ATA Cable, Dual Drive
922-3862

Computer
Power Cord
922-3964

Ultra 160 SCSI
Cable 922-4274

IDE / ATA Cable
922-4047
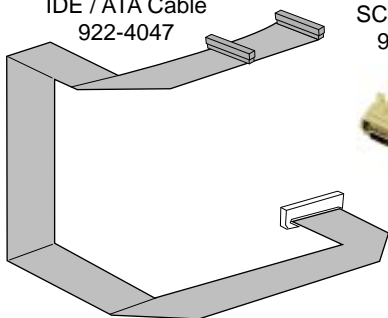
SCSI Adapter
922-3770

Cable Modem, Phone Ice
922-3963

USB Pro Keyboard
922-4229

USB Pro Mouse (optical)
922-4230

Power Mac G4 (Digital Audio)

CPU Heatsink Kit
076-0822
076-0823

Processor Module
466 MHz 661-2402
533 MHz 661-2403
533 MHz, Dual 661-2389

Modem Card
661-2324

Video Card
661-2330, 661-2360, 661-2408

Ultra3 LVD SCSI
Dual Chan PCI Card
661-2392

Logic Board
661-2397

Battery
922-4028

Panel Latch
922-4134

Zip & DVD
Drive Carrier
922-3972

DVD-ROM Drive
661-2376
CD-RW Drive
661-2401

Power Supply
661-2332

Power Supply Bracket
922-3766

Fan 922-3295

Fan Bracket
922-3854

Enclosure
w/Chassis
922-4333

PCI Slots Shield
922-4375

Speaker Housing
922-3982

Modem Filter
922-4338

Speaker
922-4048

Hard Drive
Ultra ATA
30 GB 661-2410
40 GB 661-2394
40 GB 661-2323

Front Panel
Board
922-4234

Front Panel Shield
922-3689

Hard Drive Ultra2 LVD SCSI
36 GB 661-2396
72 GB 661-2355

U-Shaped
Carrier,Ver. 2
076-0778

Hard Drive Carrier
Ver. 2 076-0777

Carrier
Support Plate
922-3871

COVERS

Allen Screws
Side Panels (typical)
922-3761

Left Side
Panel
922-3974

Front and Rear
Top Handle
922-3981

Top Panel
922-3976

Allen Screws Handles
and Supports (typical)
922-3759

Allen
Screws (3)
922-3760

Security
Bar Cover
922-3693

Vented
Rear
Panel
922-4334

I/O Panel
Cover
922-4335

ZIP Bezel
922-3966

Blank Bezel
922-3965

CD/DVD
Door Frame
922-3967

Front Panel
922-3973

Front Support
922-3971

Lower
Front
Panel
922-3980

Right Side
Access Panel
922-3975

Lower Rear Panel
922-3979

Rear Support
922-3970

Enclosure with Chassis 922-4333

Note:
Logic Board, CD drive, Zip drive, power supply and hard drives are not part of the enclosure.

Power Mac G4 (Digital Audio)—Screw Matrix

076-0777		Hard drive carrier, Ver. 2, and (5) screws (same as 922-3874) (4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
922-3874		(4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
		(1) Modem, (1) Modem plug, (2) Carrier support plate, (1) Power supply bracket, (4) Latch panel, (12) Logic board, (2) Firewire board, (2) Fan guard, (3) Chassis, (1) Hard drive carrier retainer, (4) PCI slot covers (same screw can be used when cards installed)
922-2739		(4) CD/DVD drive to carrier, (4) Zip drive to carrier, (1) Bracket to power supply
922-3669		(4) Fan to fan bracket
922-3759		(4) Handles and (4) supports
922-3760		(3) Vented rear panel
922-3761		(8) Right and left side panels
922-3762		(2) Latch to right side panel
922-3873		(2) CD/DVD/ZIP drive carrier to chassis
922-4051		(3) Processor to logic board
922-4050		(2) Modem to logic board

Cables

Front Panel
Cable (Flat Gray)
922-4046

Firewire Cable (External)
922-3884

Ultra ATA Cable, Dual Drive
922-3862

Computer
Power Cord
922-4301

Ultra 160 SCSI
Cable 922-4274

IDE Cable
922-4373

SCSI Adapter
922-3770

Cable Modem, Phone Ice
922-3963

USB Pro Keyboard
922-4320
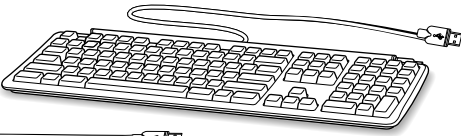
USB Pro Mouse (optical)
922-4230

Power Mac G4 (QuickSilver)

CPU Heatsink Kit
076-0823
076-0884

Processor Module
733 MHz 661-2505
867 MHz 661-2506
800 MHZ Dual 661-2507

Modem Card
661-2324

Video Card
661-2407, 661-2408, 661-2508
661-2515 (PCI Video Card)

Ultra3 LVD SCSI
Dual Chan PCI Card
661-2392

Logic Board
661-2503

Battery
922-4028

Zip & DVD
Drive Carrier
922-4565

Panel Latch
922-4134

CD/DVD Drives
661-2500
661-2501
661-2502

Power Supply
661-2513, 661-2514

Zip Drive
661-2545

Fan 922-3295

Fan Bracket
922-4572

Enclosure
w/Chassis
922-4543

PCI Slots Shield
922-4375

Modem Filter
922-4338

Speaker
922-4560

Front Panel
Board
922-4562

Hard Drive
Ultra ATA
40 GB 661-2497
60 GB 661-2498
80 GB 661-2499

Hard Drive Ultra2 LVD SCSI
36 GB 661-2396
72 GB 661-2355

U-Shaped
Carrier,Ver. 2
076-0778

Hard Drive Carrier
Ver. 2 076-0777

Carrier
Support Plate
922-3871

COVERS

Allen Screws
Side Panels (typical)
922-3761

Left Side
Panel
922-4567

Front and Rear
Top Handle
922-4573

Top Panel
922-4569

Vented
Rear
Panel
922-4570

Security
Bar Cover
922-3693

I/O Panel
Cover
922-4571

ZIP Bezel
922-4582
Blank Bezel
922-4581

Front Panel
922-4566

Lower
Front
Panel
922-4576

Front Support
922-4564

Right Side
Access Panel
922-4568

Lower Rear Panel
922-4575

Rear Support
922-4563
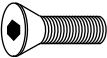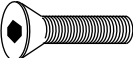
Enclosure with Chassis 922-4543

Note:
Logic Board, CD drive, Zip drive, power supply and hard drives are not part of the enclosure.

076-0777		Hard drive carrier, Ver. 2, and (5) screws (same as 922-3874) (4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
922-3874		(4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
		(1) Modem, (2) Carrier support plate, (1) Power supply bracket, (4) Latch panel, (12) Logic board, (2) Firewire board, (2) Fan guard, (3) Chassis, (1) Hard drive carrier retainer, (4) PCI slot covers (same screw can be used when cards installed)
922-2739		(4) CD/DVD drive to carrier, (4) Zip drive to carrier, (1) Bracket to power supply
922-3669		(4) Fan to fan bracket
922-4610		(4) Handles and (4) supports
922-3760		(3) Vented rear panel
922-4611		(8) Right and left side panels
922-3762		(2) Latch to right side panel
922-3873		(2) CD/DVD/ZIP drive carrier to chassis
922-4051		(3) Processor to logic board
922-4050		(2) Modem to logic board

Cables

Front Panel
Cable (Flat Gray)
922-4561

Firewire Cable (External)
922-3884

Ultra ATA Cable, Dual Drive
922-3862

Computer
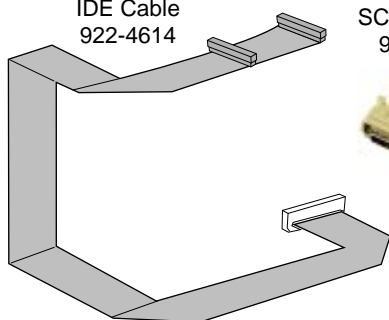Power Cord
922-4301

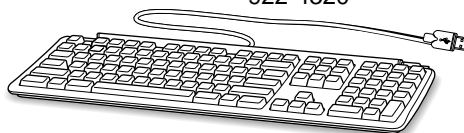Ultra 160 SCSI
Cable 922-4274

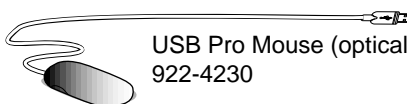IDE Cable
922-4614

SCSI Adapter
922-3770
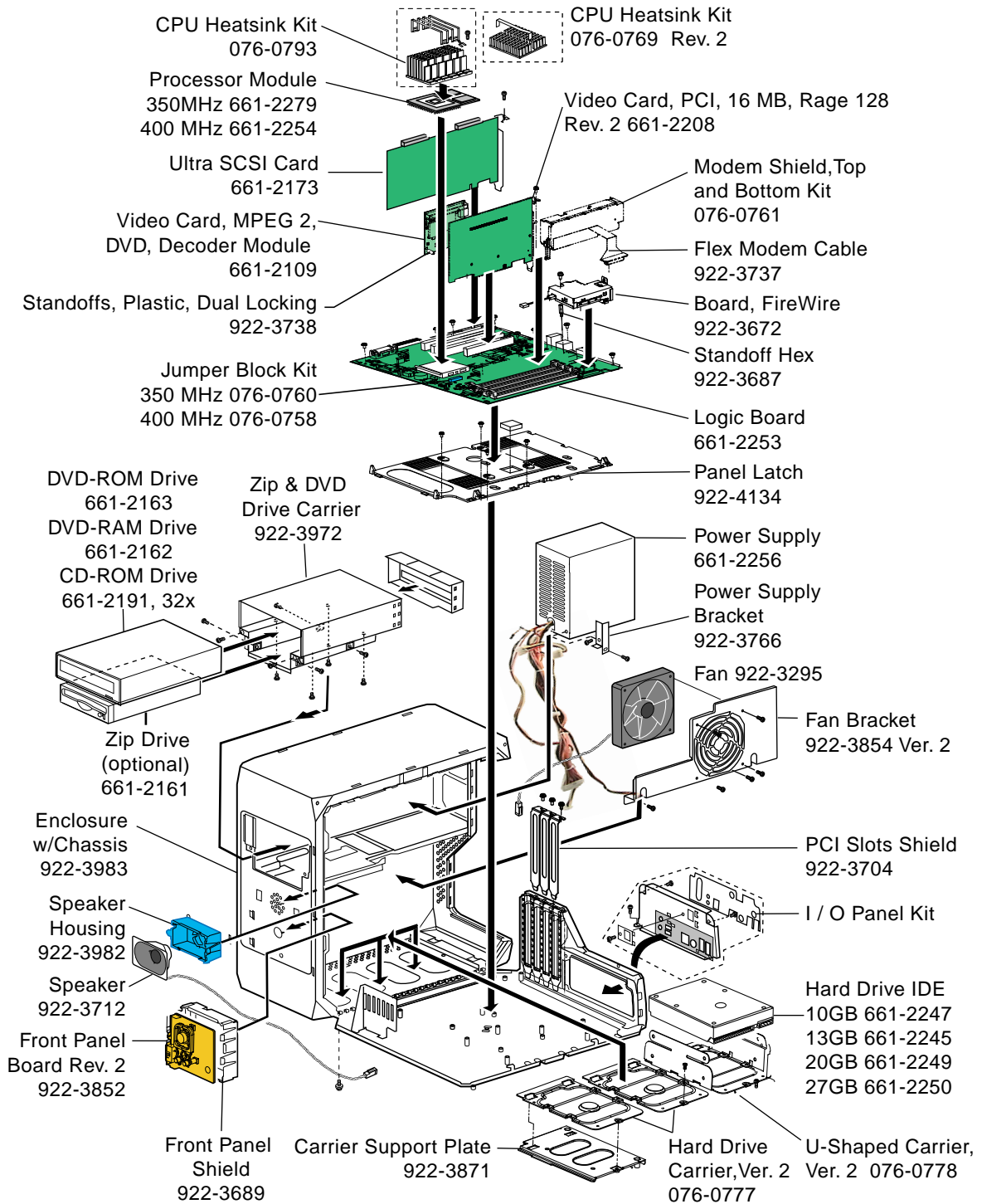
Cable Modem, Phone Ice
922-3963

USB Pro Keyboard
922-4320

USB Pro Mouse (optical)
922-4230

Power Mac G4 (PCI Graphics)
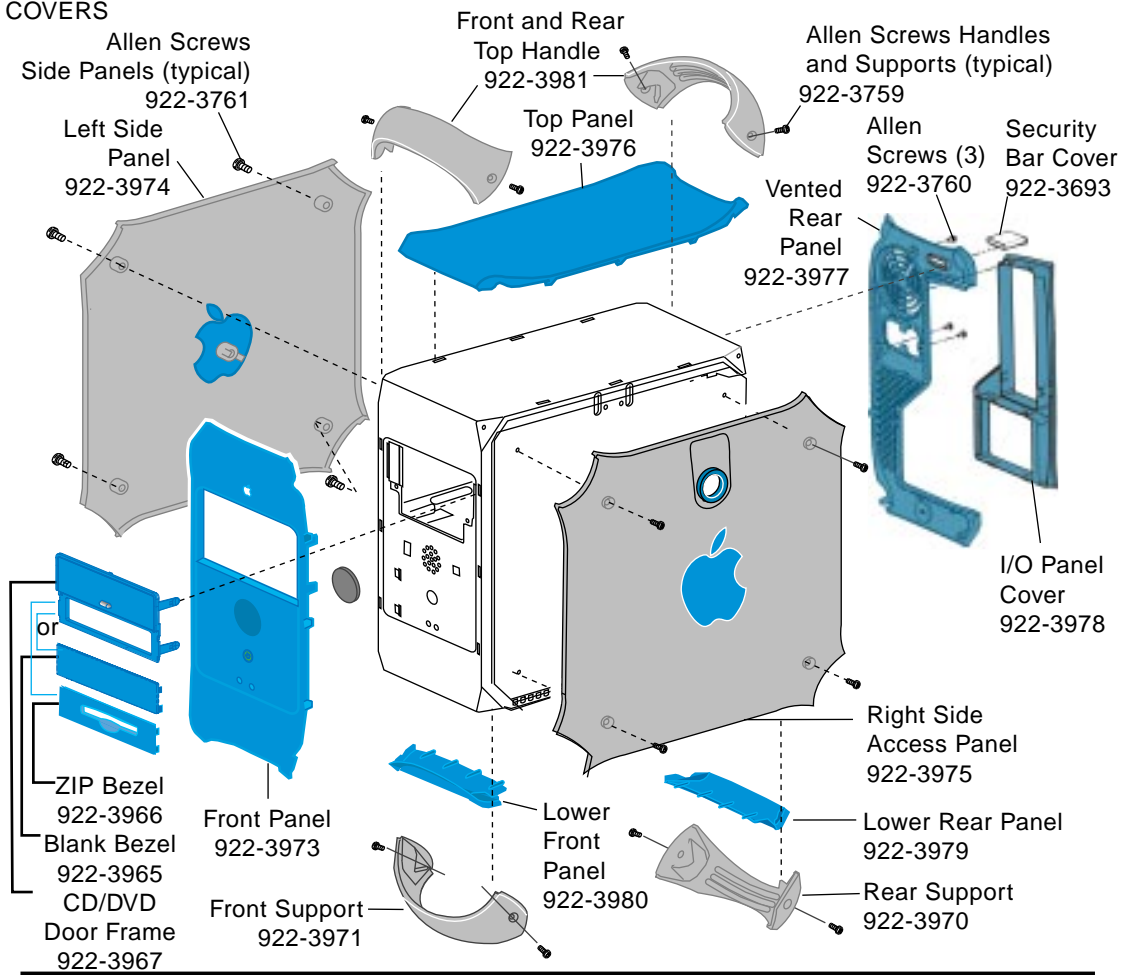
CPU Heatsink Kit
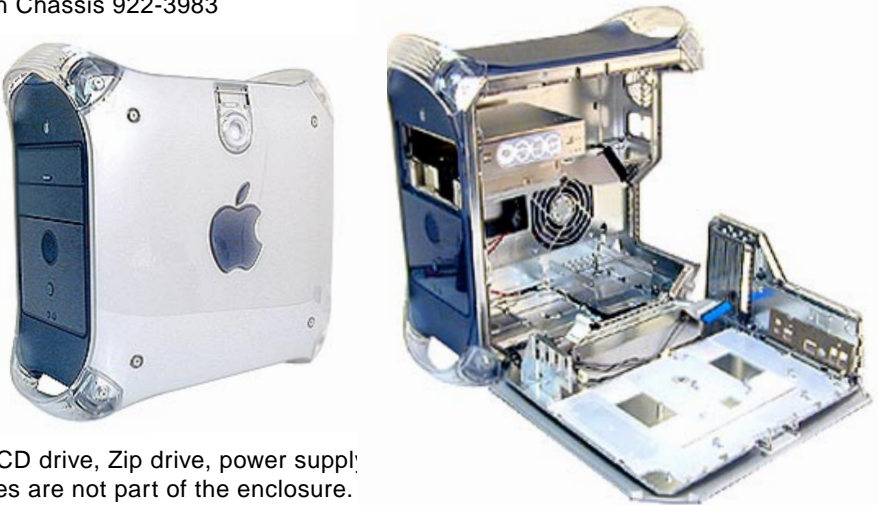076-0793

CPU Heatsink Kit
076-0769 Rev. 2

Processor Module
350MHz 661-2279
400 MHz 661-2254

Video Card, PCI, 16 MB, Rage 128
Rev. 2 661-2208

Ultra SCSI Card
661-2173

Modem Shield,Top
and Bottom Kit
076-0761

Video Card, MPEG 2,
DVD, Decoder Module
661-2109

Flex Modem Cable
922-3737

Standoffs, Plastic, Dual Locking
922-3738

Board, FireWire
922-3672

Jumper Block Kit
350 MHz 076-0760
400 MHz 076-0758

Standoff Hex
922-3687

Logic Board
661-2253

Panel Latch
922-4134

DVD-ROM Drive
661-2163
DVD-RAM Drive
661-2162
CD-ROM Drive
661-2191, 32x

Zip & DVD
Drive Carrier
922-3972

Power Supply
661-2256

Power Supply
Bracket
922-3766

Fan 922-3295

Zip Drive
(optional)
661-2161

Fan Bracket
922-3854 Ver. 2

Enclosure
w/Chassis
922-3983

PCI Slots Shield
922-3704

Speaker
Housing
922-3982

I / O Panel Kit

Speaker
922-3712

Hard Drive IDE
10GB 661-2247
13GB 661-2245
20GB 661-2249
27GB 661-2250

Front Panel
Board Rev. 2
922-3852

Front Panel
Shield
922-3689

Carrier Support Plate
922-3871

Hard Drive
Carrier,Ver. 2
076-0777

U-Shaped Carrier,
Ver. 2 076-0778

*Covers and Enclosure: See page 2. Cables and Screw Matrix: See page 3.

COVERS

Allen Screws
Side Panels (typical)
922-3761

Left Side
Panel
922-3974

Front and Rear
Top Handle
922-3981

Top Panel
922-3976

Allen Screws Handles
and Supports (typical)
922-3759

Allen
Screws (3)
922-3760

Security
Bar Cover
922-3693

Vented
Rear
Panel
922-3977

I/O Panel
Cover
922-3978

Right Side
Access Panel
922-3975

ZIP Bezel
922-3966

Blank Bezel
922-3965

CD/DVD
Door Frame
922-3967

Front Panel
922-3973

Front Support
922-3971

Lower
Front
Panel
922-3980

Lower Rear Panel
922-3979
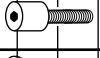
Rear Support
922-3970

Enclosure with Chassis 922-3983

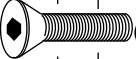Note:
Logic Board, CD drive, Zip drive, power supply
and hard drives are not part of the enclosure.

Power Mac G4 (PCI Graphics) Screw Matrix			
076-0777 Ver. 2 only			Hard drive carrier, Ver. 2, and (5) screws (same as 922-3874) (4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
922-3874			(4) Hard drive carrier to hard drive, (1) Hard drive carrier to chassis
922-1203 (34 total)			(1) Modem, (1) Modem plug, (2) Carrier support plate, (1) Power supply bracket, (4) Latch panel, (12) Logic board, (2) Firewire board, (2) Fan guard, (3) Chassis, (1) Hard drive carrier retainer, (4) PCI slot covers (same screw can be used when cards installed)
922-2739			(4) CD/DVD drive to carrier, (4) Zip drive to carrier, (1) Bracket to power supply
922-3013			(1) FireWire board into hex standoff on logic board
922-3669			(4) Fan to fan bracket
922-3687			(1) Hex standoff (under FireWire board) to logic board
922-3759			(4) Handles and (4) supports
922-3760			(3) Vented rear panel
922-3761			(8) Right and left side panels
922-3762			(2) Latch to right side panel
922-3873			(2) CD/DVD/ZIP drive carrier to chassis

Cables

FireWire Power Cable Shielded
922-3709

AudioCable
922-3708

IDE / ATA Cable
922-3707

Adapter Mac to VGA
922-3764

Ultra ATA Cable, Dual Drive
922-3862

Ultra2 LVD SCSI Cable
922-3861 Ver. 2

SCSI Adapter
922-3770

Front Panel Cable (Flat Gray)
922-3706

FireWireCable Unshielded
922-3751

Apple USB Mouse
922-3969

Apple USB Keyboard
922-3968

Cable Modem, Phone Ice
922-3963

Computer Power Cord
922-3964

Firewire Cable (External)
922-3884