Service Source

Power Mac G5

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Basics

Power Mac G5

Overview

Power Mac G5 is a 64-bit desktop computer powered by the PowerPC G5 processor. It offers memory expansion up to 8GB,1 GHz front-side bus, and advanced 64-bit computation, while running existing 32-bit applications natively. The computer also includes serial ATA hard drives, high-end graphics capabilities, and computer-controlled cooling based on four independent zones. Standard configurations are listed below.

1.6 GHz Uni	1.8 GHz Uni	2 GHz Dual
800 MHz frontside bus	900 MHz frontside bus	1 GHz frontside bus
256 MB DDR333 SDRAM, expandable to 4 GB	512 MB DDR400 SDRAM, expandable to 8 GB	512 MB DDR400 SDRAM, expandable to 8 GB
80 GB Serial ATA drive	160 GB Serial ATA drive	160 GB Serial ATA drive
SuperDrive	SuperDrive	SuperDrive
Three PCI slots	Three PCI-X slots	Three PCI-X slots
NVIDIA GeForce FX 5200 Ultra video card	NVIDIA GeForce FX 5200 Ultra video card	ATI Radeon 9600 Pro video card
56K internal modem	56K internal modem	56K internal modem

Serial Number Location

To identify a particular model of Power Mac G5, check the computer's serial number, which lists the model's configuration. The serial number is located directly below the air deflector inside the side access panel.

 # What's New

Overview

PowerPC G5— The Power Mac G5 computer incudes the new 64-bit PowerPC G5 processor running at either 1.6, 1.8, or 2.0 GHz, well beyond the speeds of G4 processors.

Serial ATA hard drives — Unlike older parallel drives, the new serial ATA drives in the Power Mac G5 offer up to 150 MB/s data throughput. The 7200 rpm drives come in 80, 160, or 250 GB capacity.

PCI-X slots—Higher-bandwidth PCI slots allow for greater amounts of data when using expansion cards that demand high performance. Both 100 and 133 MHz PCI-X slots are included in higher-end Power Mac G5 computers. For more information, see the "AGP/PCI Card" topic in the Take Apart chapter.

8x AGP bus— This bus provides a higher amount of data transfer to and from the graphics card. Both NVIDIA and ATI graphics cards are offered for the Power Mac G5.

USB 2.0 —All USB ports on the Power Mac G5 support the USB 2.0 standard, which accommodates more high speed peripherals.

Digital audio in and out —The Power Mac G5 introduces two new optical audio (S/PDIF) ports, allowing for optical audio input and output. These ports are in addition to the existing analog sound input and output ports.

Cooling zones — Nine case fans and blowers are logically grouped into four separate cooling zones in the Power Mac G5. Each zone is software-controlled by the system to only cool when necessary, making for a more efficient (and quieter) cooling solution.

 Controller chips— The Power Mac G5 includes Northbridge and Southbridge controller chips that use "hyper-transport" technology. This new technology allows chips to talk to each other much faster than older Macs. The overall bandwidth of the system is also greatly improved.

ATA/100 bus for optical drives— This technology allows optical storage to read/write data much faster.

Interleaved DDR RAM—The Power Mac G5 requires pairs of DIMMs, which increases performance. Different models require either DDR 333 or DDR 400 RAM. DIMMs must be installed in pairs of equal size and kind. For more information, see the "Memory (DIMMs)" topic in the Take Apart chapter.

DDR Memory

Depending on the model, Power Mac G5 computers have either four or eight Dual Inline Memory Module (DIMM) slots for Double-Data-Rate (DDR) Synchronous Dynamic Random-Access Memory (SDRAM) devices. The computers ship with a minimum of 256 MB of RAM, installed as a pair of 128 MB DIMMs in two of the DIMM slots. You can install additional DIMMs, provided they are installed in pairs of equal size. A diagram marked on the logic board near the slots illustrates how the pairs must be installed.
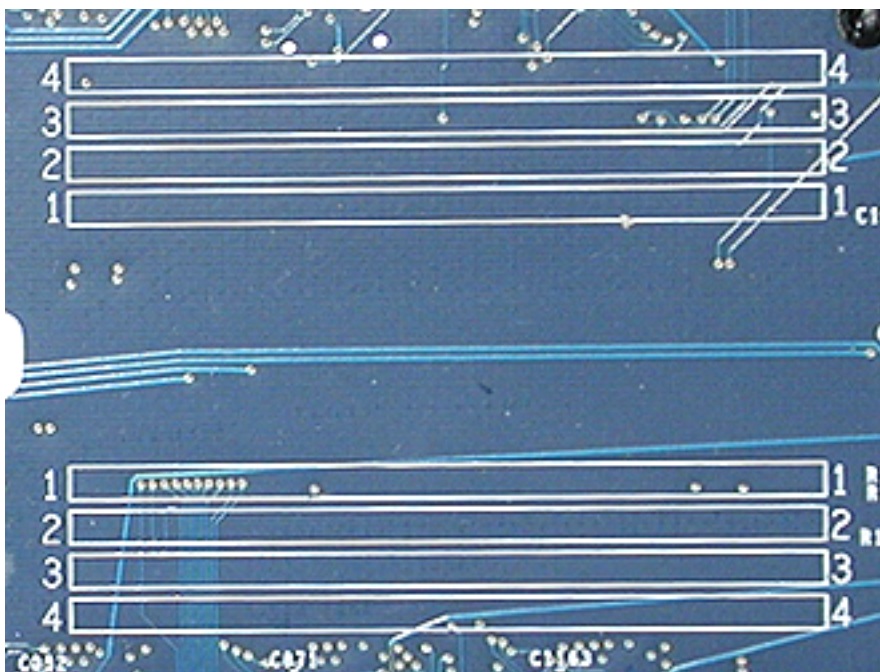
To determine the types of DIMMs to install, refer to the table below:

DIMM Slots	DIMM speed	Maximum amount
4 (two banks of 2 slots)	333 MHz, PC 2700	up to 4 GB
8 (two banks of 4 slots)	400 MHz, PC 3200	up to 8 GB

In addition, DIMMs must fit these specifications:
- 2.5 volt
- 84-pin module
- Maximum number of memory devices on DDR SDRAM:16
- Nonparity
- No error correcting codes (ECC)
- Unbuffered (registered or buffered DDR SDRAM cannot be used)

Video

The Power Mac G5 computer comes with a graphics card installed in the AGP 3.0-compliant 8x Pro slot.

All graphics cards support dual displays in either extended desktop or video mirroring mode, and support digital resolutions up to 1920x1200 pixels and analog resolutions up to 1600x1200 pixels.

The display memory on the AGP card is separate from the main memory. The display memory consists of 64 or 128 MB of DDR devices configured to make a 128-bit data bus. The display memory cannot be expanded by the user.

The supported graphics cards are shown below:

Graphics	Video SDRAM	Connectors
NVIDIA GeForce FX 5200 Ultra	64 MB DDR	ADC and DVI-I
ATI Radeon 9600 Pro	64 MB DDR	ADC and DVI-I
ATI Radeon 9800 Pro (CTO)	128 MB DDR	ADC and DVI-I

Fan Controller

The Power Mac G5 system employs advanced thermal management to keep acoustic noise to a minimum. The system is divided into discrete zones, each with independently controlled fans bringing in cool air from the front of the enclosure, directing it through ducts and exhausting it out the rear. Temperature and power consumption are monitored by the operating system, which communicates with the Fan Control Unit, which in turn controls and monitors fan operation. Note that if Mac OS X is not booted, thermal management will not work correctly.

Important: To ensure proper fan and temperature control, you must run Apple Service Diagnostic whenever you replace a processor or logic board with a new processor or logic board. You must also run the diagnostic if you re-install the same processor but in a different connector from the one in which it was originally installed. For more information, see "Thermal Calibration" in the Troubleshooting chapter.

Optical Audio

Digital data is transmitted to and from the optical audio I/O using special optical cables. The 7.5 mm digital optical connectors on the cables, commonly referred to as TOSLink, are for both input and output and conform to the IEC60874-17 connector standard.

The TOSLink friction-lock type F-05 connectors are available from pro-audio, musician's supply, hi-fi, and other retailers.

Analog audio signals are converted to digital data internally. All audio is handled digitally inside the computer, including audio data from the CD or DVD drive and from devices connected to the USB and FireWire ports. Audio data is converted to analog form for output to the internal speaker, the headphones, or the analog output port.

Wireless

The Power Mac G5 supports an optional internal Apple Bluetooth module that enables short-range wireless connections between desktop and laptop computers and a host of other peripheral devices. Bluetooth support is built into Mac OS X and compliant with Bluetooth specification v1.1. It operates on a globally available 2.4 GHz frequency band (ISM band) for worldwide compatibility and has a maximum throughput of 1Mbps.

The Bluetooth technology supports the following profiles:
- synchronization —enables synchronization of devices over Bluetooth
- serial —provides a wireless serial connection to other Bluetooth devices
- dial-up networking (DUN) — enables a mobile phone to act as a modem
- object push —enables the transfer of files between Bluetooth devices

Important: For proper range and operation, the external Bluetooth antenna must be attached to the Bluetooth port and the external AirPort antenna must be attached to the AirPort port on the back panel of the Power Mac G5.

Ports

The following ports are included on the front and back panels of the Power Mac G5. For illustrations of the port locations, see the "External Views" topic in the Views chapter.

Front
- Power button
- Headphone port
- USB 2.0 port
- FireWire 400 port

Rear
- AirPort antenna port
- Bluetooth antenna port
- Optical audio-out port
- Optical audio-in port
- Audio line-out port
- Audio line-in port
- USB 2.0 ports (two ports)
- FireWire 400 port
- FireWire 800 port
- 10/100/1000Base-T Ethernet port
- Modem port

Service Source

Take Apart

Power Mac G5

 General Information

Orientation

For most take-apart procedures, it is recommended that you lay the computer on its side before removing or installing the part. For proper operation, however, Apple recommends that the unit be run in the upright position. The computer should never be operated on its side with the access panel facing down.

Tools

The following tools are required to service the computer:
- Long-handled magnetic Phillips screwdriver (10-inch shaft)
- Short-handled magnetic Phillips screwdriver
- Flatblade screwdriver
- Jeweler's flatblade screwdriver
- Needlenose pliers
- Long-handled hex wrench
- Tape (for temporarily holding cables out of the way)
- Small mirror (for seeing small boards inside the enclosure)
- Soft cloth (for protect removed parts from scratches)

 Opening the Computer

Tools

No tools are required for this procedure.

Preliminary Steps

1. Shut down the computer.

    Warning: Always shut down the computer before opening it to avoid damaging its internal components or the components you are installing. Do not open the computer or attempt to install items inside it while it is on.

2. Wait 5 to 10 minutes to allow the computer's internal components to cool.

    Warning: After you shut down the system, the internal components can be very hot. You must let the computer cool down before continuing.

3. Unplug all external cables from the computer except the power cord.

4. Touch the metal PCI access covers on the back of the computer to discharge any static electricity from your body.

    Important: Always discharge static before you touch any parts or install any components inside the computer. To avoid generating static electricity, do not walk around the room until you have finished working and closed the computer.

5. Unplug the power cord.

6. Put on an ESD wrist strap.

Procedure

1. Hold the side access panel and lift the latch on the back of the computer.

Warning: The edges of the access panel and the enclosure can be sharp. Be very careful when handling them.

2. Remove the access panel and place it on a flat surface covered by a soft, clean cloth.
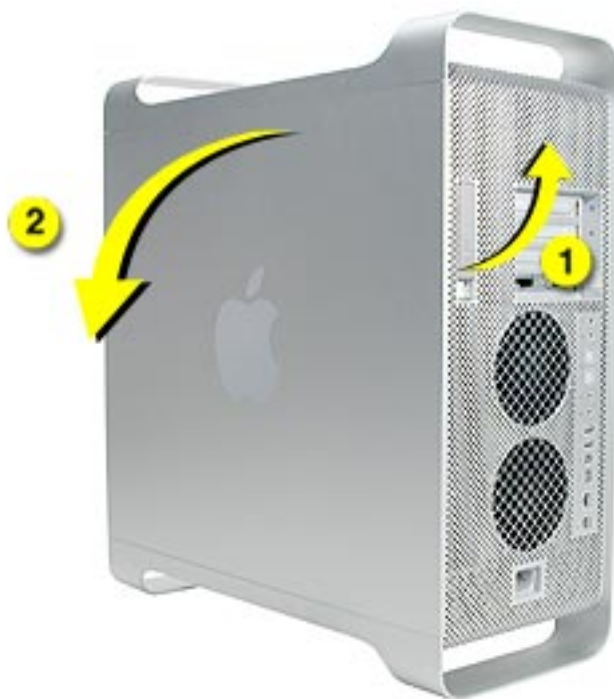
Replacement Note: Make sure the latch is in the up position before replacing the access panel. If the latch is down, the access panel will not seat correctly in the enclosure.

3. Remove the air deflector and place it on a soft, clean cloth.

Replacement Note: To replace the air deflector, insert the three tabs on the bottom edge of the deflector into the three slots in the bottom frame of the enclosure. Then swing the deflector up flush against the top frame of the enclosure.

Important: Make sure you re-install the air deflector before replacing the access panel. If the air deflector is not installed, the computer will not function properly.

Serial ATA Hard Drive

The Power Mac G5 computer can accommodate two serial ATA hard drives in its internal hard drive bay. In most configurations, a single hard drive occupies the top portion of the bay. You can install one additional serial ATA hard drive to the empty slot in the bay.

Important: Use the original Apple cables that came with the Power Mac G5 when installing ATA hard drives.

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer.

Part Location

Procedure

1. Release the drive locking latch by rotating it up.

2. Disconnect the drive data cable and power cable from the hard drive.
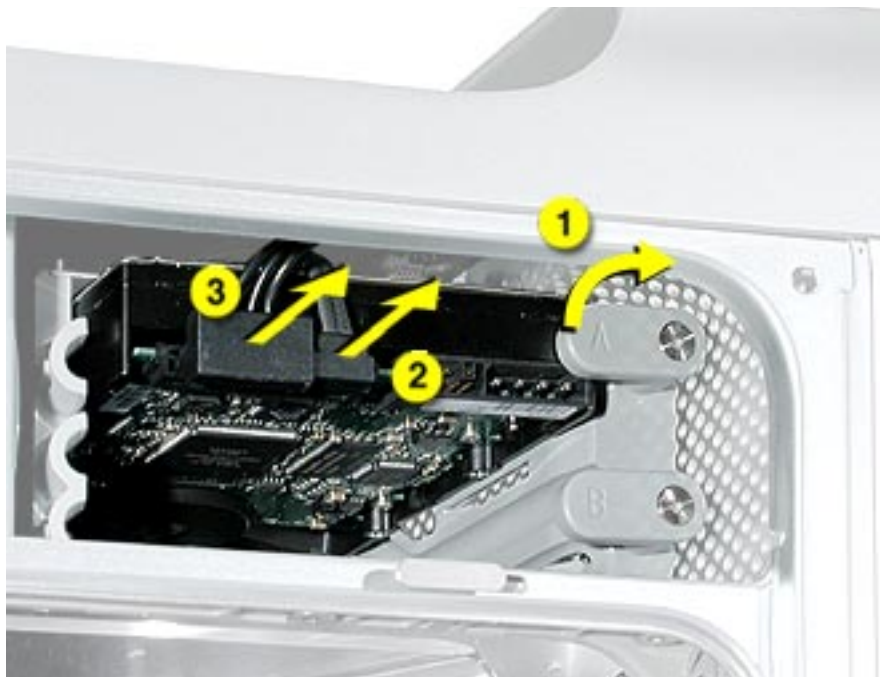
3. Pull the drive out of the drive bay, being careful not to touch the bottom of the drive.
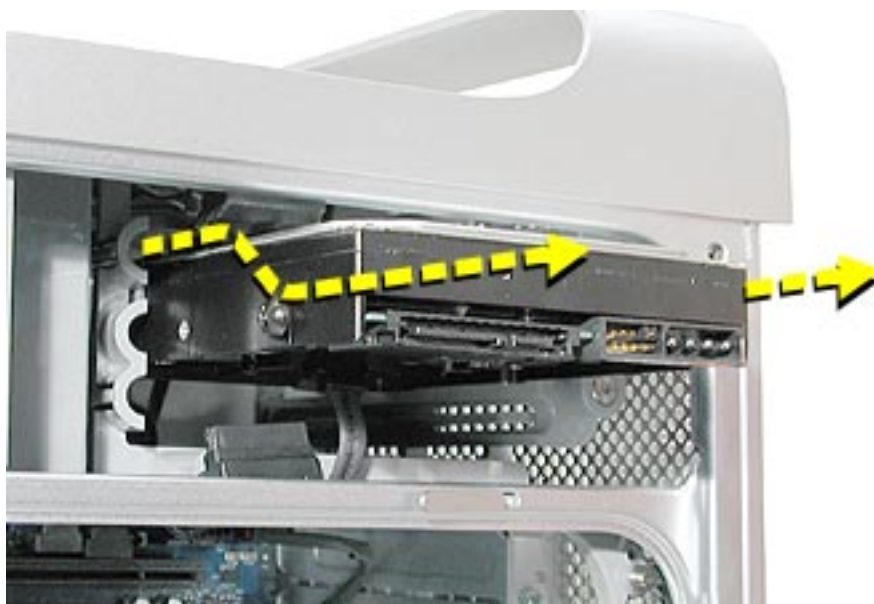
Important: If the printed circuit board (PCB) is exposed on the bottom of the hard drive, hold the drive by its sides. To avoid damaging the replacement drive, take care not to touch the PCB during installation.

4. If you are replacing the drive with a new drive, transfer the four hard drive guide screws from the sides of the original drive to the replacement drive.

5. If you are installing an additional drive, remove the four guide screws from the left side of the hard drive bay and screw them into the sides of the new drive.

Replacement Note: When replacing the top drive, make sure the guide screws align with the middle slot of the drive bay, and then gently push the drive into the bay until it snaps into place in the top position.

When installing a bottom drive, align the guide screws with the bottom slot of the drive bay and slide the drive in until it snaps into place.

Optical Drive

Important: When installing a replacement optical drive, use the original Apple cables that came with the Power Mac G5.

Tools

No tools are required for this procedure.

Preliminary Steps

Before you begin, open the computer.

Part Location

Procedure

1. Disconnect the optical drive ribbon cable from the logic board. (The cable connector is located under the media shelf that holds the optical drive.)
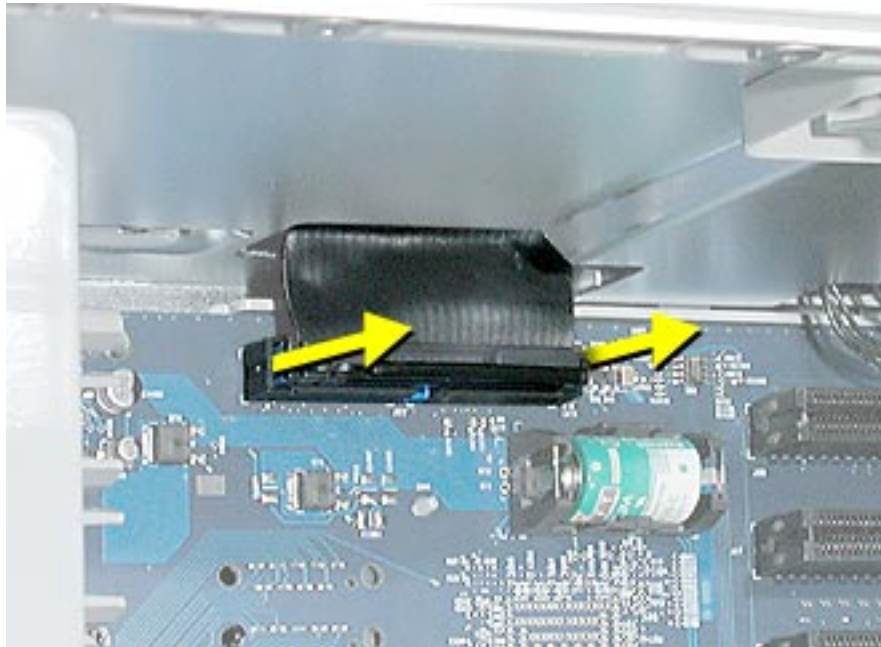
2. Push the optical drive levers out to release the drive.

3. Place the fingers on one hand inside the opening for the optical drive cable and push the edge of the drive forward. The drive will move part way out of the media shelf.
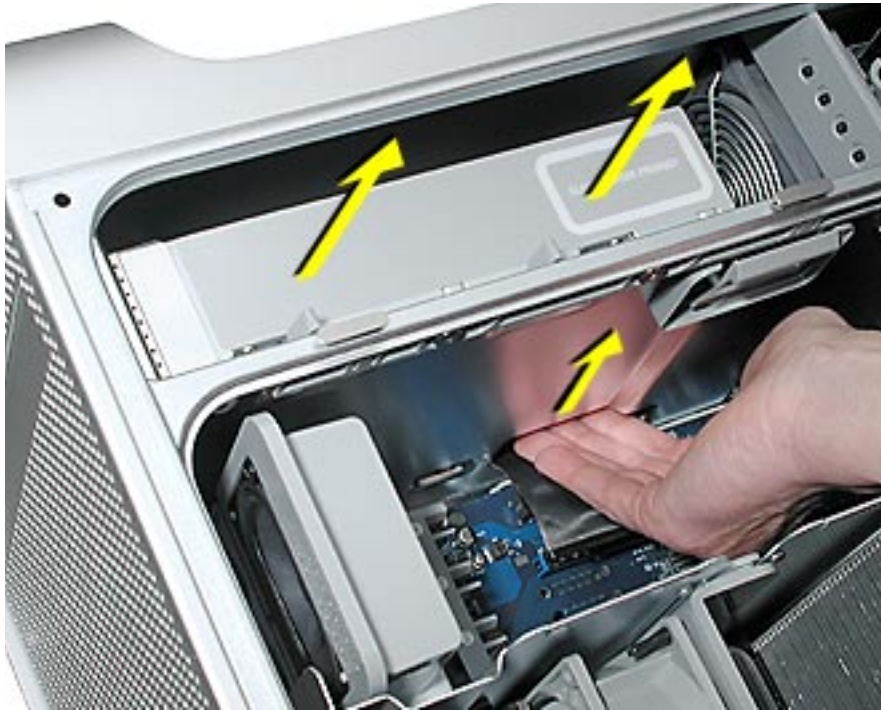
4. Disconnect the power cable from the drive.

5. Route the drive ribbon cable out through the opening in the media shelf and remove the drive and ribbon cable from the computer.

6. If you are replacing the drive with a new drive, install the standoffs on the bottom of the new drive.

    Note for SuperDrives: Two bags of standoffs are included with each drive. Use the standoffs from the bag marked with the same manufacturer's name as printed on the drive.

    Note for Combo Drives: Transfer the standoffs from the original drive to the replacement drive.

7. Disconnect the ribbon cable from the back of the drive, and then carefully pry the cable from the top of the drive. Transfer the cable to the top of the replacement drive, and connect the cable to the drive.

   Note: Reusable adhesive tape on the underside of the cable attaches the cable to the drive. When removing the cable from the original drive, be careful to keep the tape with the cable.

8. Carefully remove the EMI shield from the front of the original drive and transfer it to the front of the replacement drive.

Replacement Note: Insert the optical drive part way into the optical drive bay, and connect the power cable to the drive. Then bend down the free end of the ribbon cable, route it through the opening at the back of the media shelf, and connect the cable to the logic board.

Front Inlet Fan(s)

The front inlet fan assembly consists of one or two fans in a plastic bracket. If the computer is a uniprocessor, the assembly contains a single fan; if the computer is a dual processor, the assembly contains two fans connected by a single cable.

You must remove the front inlet fan assembly to access many other parts within the computer. For this access, remove the bracket with the fans attached. You will have to remove the fans from the bracket only if you are replacing the fans themselves.

Tools

The only tool required for this procedure is needlenose pliers.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

1. Hold the front inlet fan assembly by the front handle and firmly pull it out of the computer.
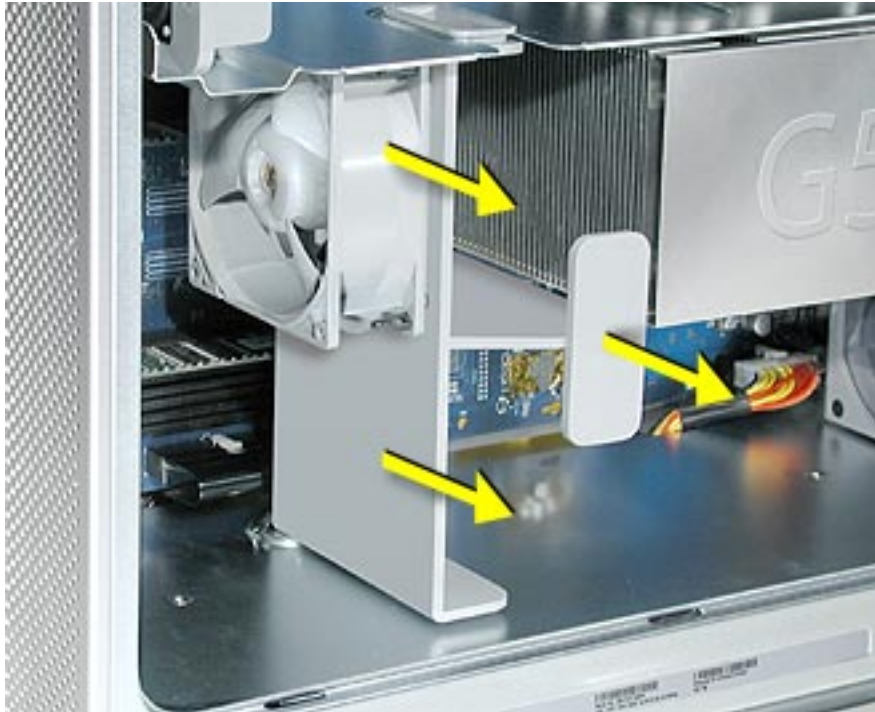
2. If you are replacing the fan(s) in the bracket, do the following:
   - Remove the fan cable from the cable guide.
   - Using needlenose pliers, pull the fan(s) off the grommet fasteners, and remove the fan(s) and cable from the bracket.

   Important: If you are replacing two fans, be careful that you do not separate the fans from each other. They are connected by a common cable.
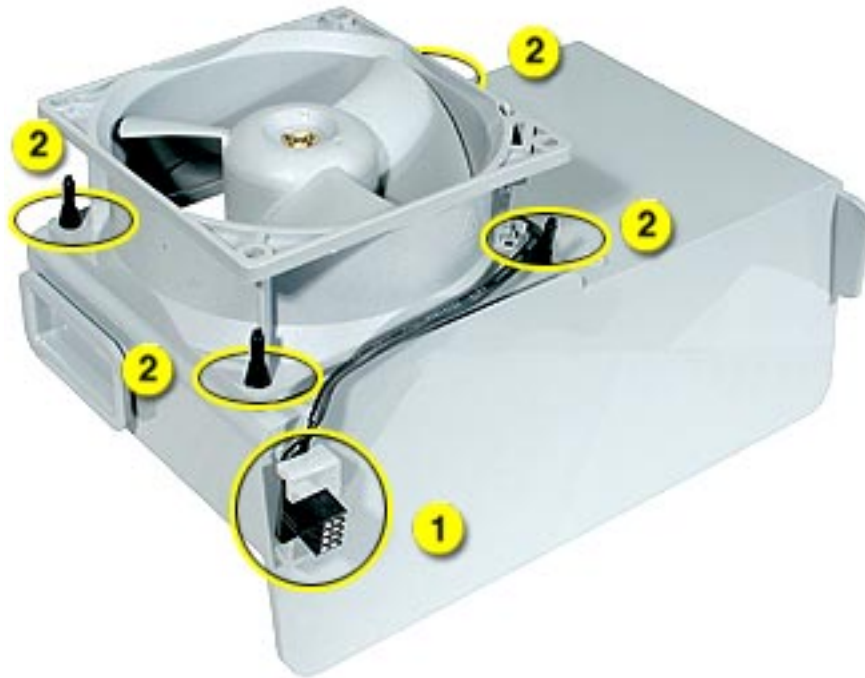
Replacement Note: To replace the front inlet fan bracket in the enclosure, align the large rail on the bracket with the cutout in the PCI divider and press firmly.

Important: Make sure the connector on the fan fully engages the fan connector on the logic board, or the computer will not operate properly. Gently pull the fan assembly to test whether it is connected.
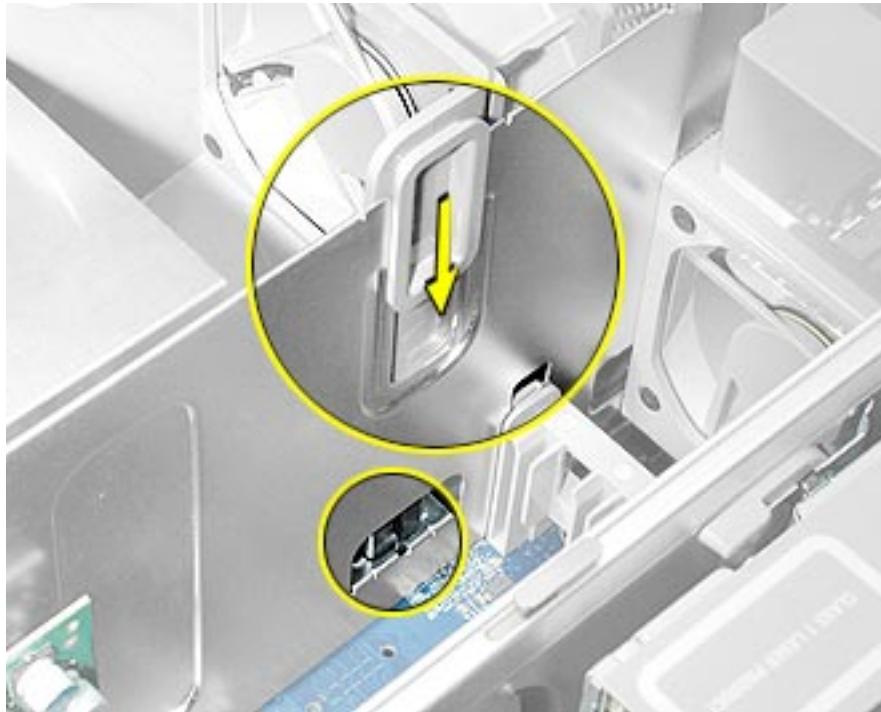
Memory (DIMMs)

Depending on the model, Power Mac G5 computers have either four or eight Dual Inline Memory Module (DIMM) slots arranged in two banks. The slots accept Double-Data-Rate (DDR) Synchronous Dynamic Random-Access Memory (SDRAM) devices.

The computers ship with a minimum of 256 MB of RAM, provided by a pair of 128 MB DIMMs installed in slot 1 of each DIMM bank. You can add DIMMs, provided they are installed in pairs of equal size, one per bank, from the center outward. A diagram marked on the logic board near the DIMM slots illustrates how the pairs must be installed.
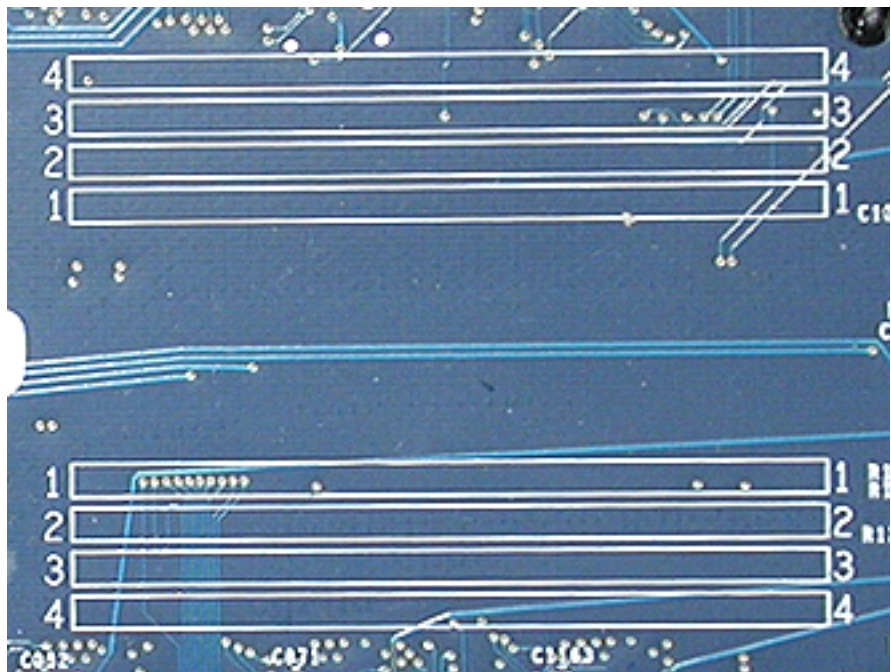
To determine the types of DIMMs to install, refer to the table below:

DIMM Slots	DIMM speed	Maximum amount
4	333 MHz, PC 2700	up to 4 GB
8	400 MHz, PC 3200	up to 8 GB

In addition, DIMMs must fit these specifications:

- 2.5 volt
- 84-pin module
- Maximum number of memory devices on DDR SDRAM:16.
- Nonparity
- No error correcting codes (ECC)
- Unbuffered (registered or buffered DDR SDRAM cannot be used)

Important: Always install DIMMs in pairs of equal size. Memory from older Macintosh computers is not compatible with the Power Mac G5. Do not use older memory, even if it fits into the DIMM slots.

Tools

No tools are required for this procedure.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the front inlet fan assembly.

Part Location

Procedure

1. Locate the DIMM slots on the logic board.

2. Open the ejectors on the DIMM slot by pushing them out to the sides.

3. Holding the DIMM by both top corners, lift it straight up out of the computer.
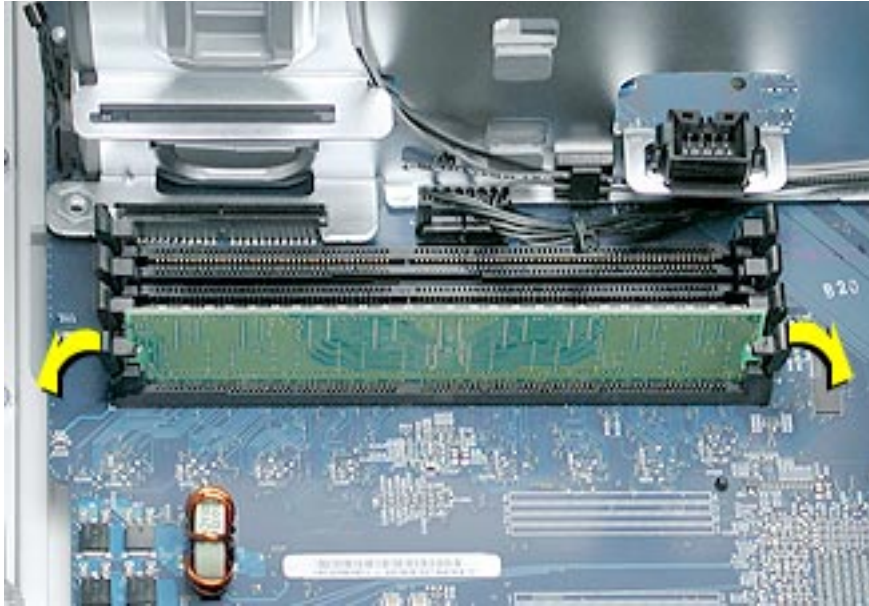
Replacement Note: Align the DIMM in the slot and push both ends of the DIMM down until the tabs are vertical and the ejectors snap into place.
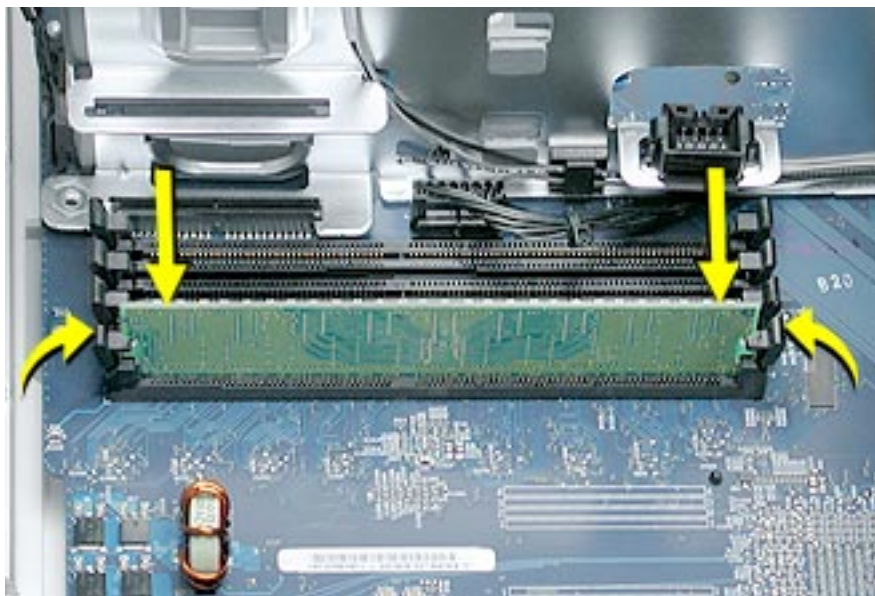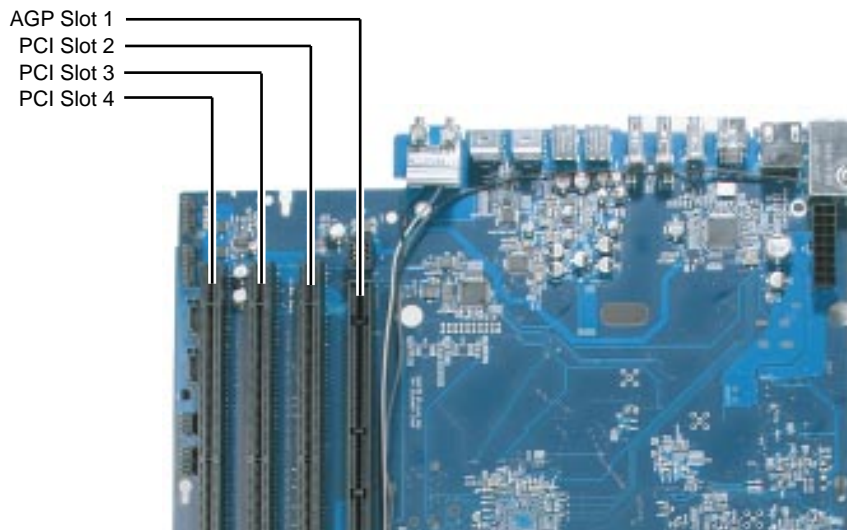

Important: Do not touch the DIMM connectors. Handle the DIMM only by the edges.

AGP/PCI Card

The Power Mac G5 computer has four expansion card slots, three of which accommodate Peripheral Component Interconnect (PCI) cards and one that accepts an advanced graphics port (AGP) video card. AGP cards and PCI cards have different connectors, so you cannot insert a PCI card into the AGP slot.

Note: Maximum power consumption for all four expansion slots (the three PCI expansion cards and the AGP card) should not exceed 90 watts (W).

AGP Slot 1
PCI Slot 2
PCI Slot 3
PCI Slot 4

AGP Cards

The AGP video card, installed in slot 1, contains the graphics processor unit (GPU) and provides the computer's display ports. Slot 1 is designed specifically to accept AGP cards. This 533-megahertz (MHz) slot accommodates 1.5-volt (V) AGP cards.

PCI Cards

The remaining three expansion slots, labeled 2, 3, and 4, accommodate PCI cards up to 12 inches long. Depending on the Power Mac G5 model, you can install either PCI or PCI-X cards.

Note: To determine if a Power Mac G5 computer can accommodate PCI-X cards, check the number of DIMM slots on the logic board. Computers with four DIMM slots have

33 MHz PCI slots and cannot use PCI-X cards; computers with eight DIMM slots can accommodate 100 and 133 MHz PCI-X cards. See the chart below.

Card type	PCI slot	Card speed
PCI*	slots 2, 3, and 4	64-bit, 33 MHz
PCI-X	slots 2 and 3	64-bit, 100 MHz
	slot 4	64-bit, 133 MHz

*The PCI slots can accommodate mixed-voltage (5.0 V, 12 V, or 3.3 V) cards but only at 3.3 V signaling, with 32-bit or 64-bit data widths and a 33 MHz frequency. You can add a 66 MHz card to a 33 MHz PCI slot if the card can operate at the lower 33 MHz rate.

Warning: Do not use PCI cards that function only at 66 MHz in the PCI slots. Damage to the equipment could result. If you are installing an additional 66 MHz PCI card, rather than replacing an existing PCI card like-for-like, check with the card's manufacturer to see if the new 66 MHz card also works at 33 MHz.

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

Install an AGP video card in slot 1 only. Install either PCI or PCI-X cards in the slots labeled 2, 3, and 4.

Warning: When removing or installing a PCI or AGP card, handle it only by the edges. Do not touch its connectors or any of the components on the card. Lift the card straight out from the connector to remove it, and insert it straight into the connector to install it. Do not rock the card from side to side and don't force the card into the slot. Once the replacement card is installed, pull on it gently to check that it is properly connected.

1. Remove the screw that mounts the card to the enclosure.

2. If you are removing an AGP card, pull back the small locking clip at the front of the AGP connector.

3. Holding the card by the top corners, gently pull up the card and remove it from its expansion slot.
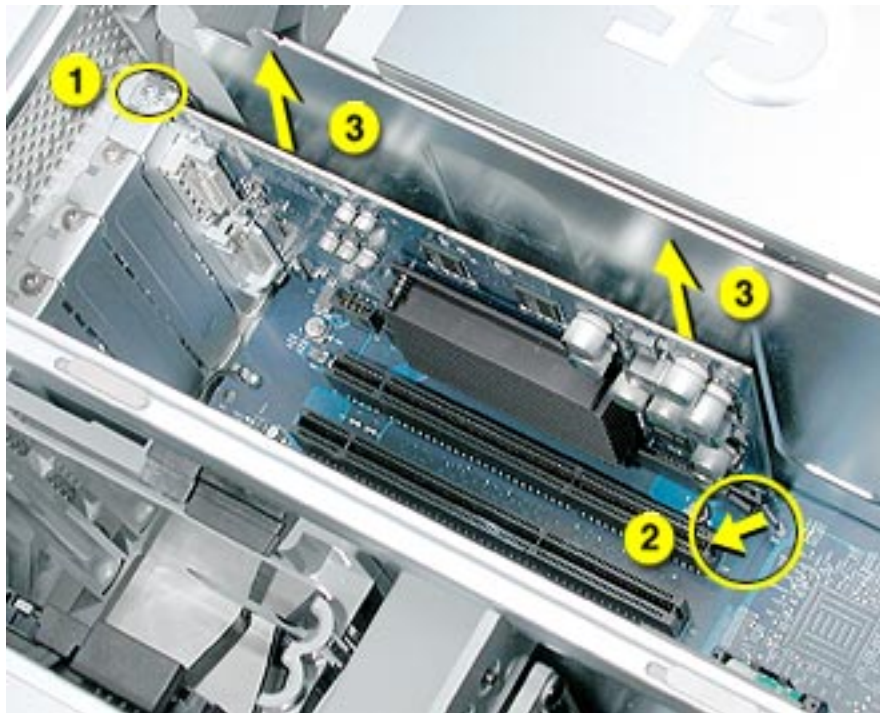
Replacement Note: Align the card's connector with the expansion slot and press until the connector is inserted all the way into the slot. If you're installing a 12-inch card, make sure the card engages the appropriate slot in the PCI card guide.

- Don't rock the card from side to side; instead, press the card straight into the slot.
- Don't force the card. If you meet a lot of resistance, pull the card out. Check the connector and the slot for damage or obstructions, then try inserting the card again.
- Pull the card gently to see if it is properly connected. If it resists and stays in place, and if its gold connectors are barely visible, the card is connected.

AirPort Extreme Card

Only the AirPort Extreme Card may be installed in the Power Mac G5. Older AirPort Cards do not work in this computer.

Tools

No tools are required for this procedure.
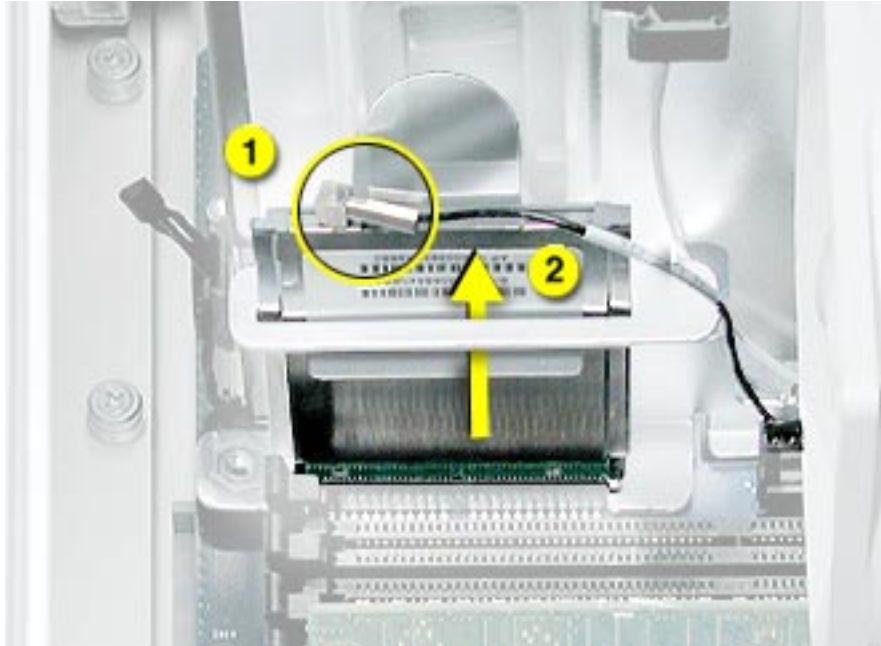
Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

1. Carefully disconnect the antenna cable from the end of the AirPort Extreme Card.

2. Pull the card straight back out of the enclosure.

Replacement Note: Position the AirPort Extreme Card with the ID numbers and barcode facing up and insert the card into the AirPort Extreme Card connector.

Important: Be sure to reconnect the antenna cable to the card.
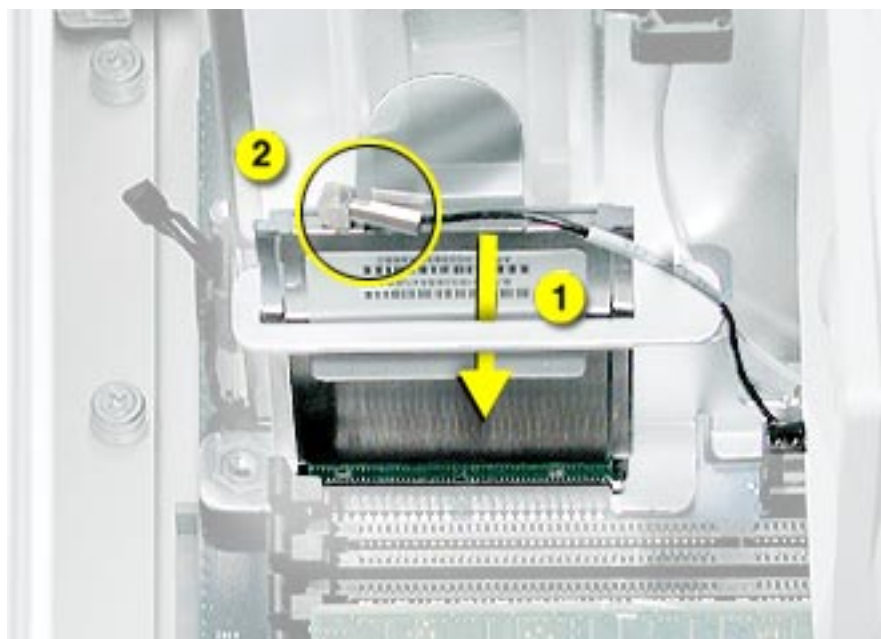
Battery

Tools

No tools are required for this procedure. You may, however, find a flat-blade screwdriver useful in removing the battery from its holder.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up. If a PCI card is installed in the slot next to the battery, remove the card.

Part Location

Procedure

1. If necessary, carefully spread the tabs holding the battery.

2. Remove the battery from its holder, noting the orientation of the battery's positive end. (A plus sign is marked on or near the battery holder.)

Replacement Note: Insert the new battery in the holder, making sure the battery's positive symbol aligns with the positive symbol on or near the holder.

Warning: Installing the battery incorrectly may cause an explosion. Be sure the battery's positive and negative poles are correctly oriented in the holder. Use only the same type of battery or an equivalent recommended by the manufacturer of the original.

Important: Batteries contain chemicals, some of which may be harmful to the environment. Please dispose of used batteries according to your local environmental laws and guidelines.

Rear Exhaust Fan(s)

Tools

The following tools required for this procedure:
• Phillips screwdriver
• Needlenose pliers
• Flatblade screwdriver

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove all AGP and PCI cards.
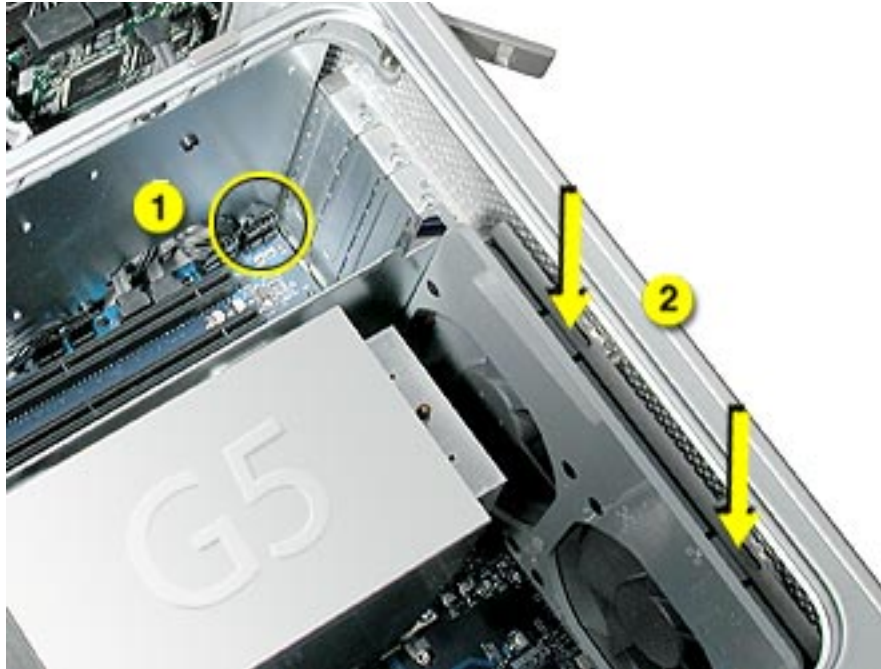
Part Location

Procedure

1. Disconnect the fan cable from the logic board.

   Note: Press the cable connector up toward the media shelf when disconnecting the cable.

2. Press down on the two tabs on the top of the fan bracket to release the two latches.

3. Lift the fan bracket and fans out of the enclosure.

4. If you are replacing the fans, use needlenose pliers to pull each fan off the four grommets that mount it to the bracket, and remove the fans and cable from the bracket.


Replacement Note: When reinstalling the fan bracket in the enclosure, make sure the two tabs on the bottom of the bracket engage with the slots in the enclosure's fan guide.
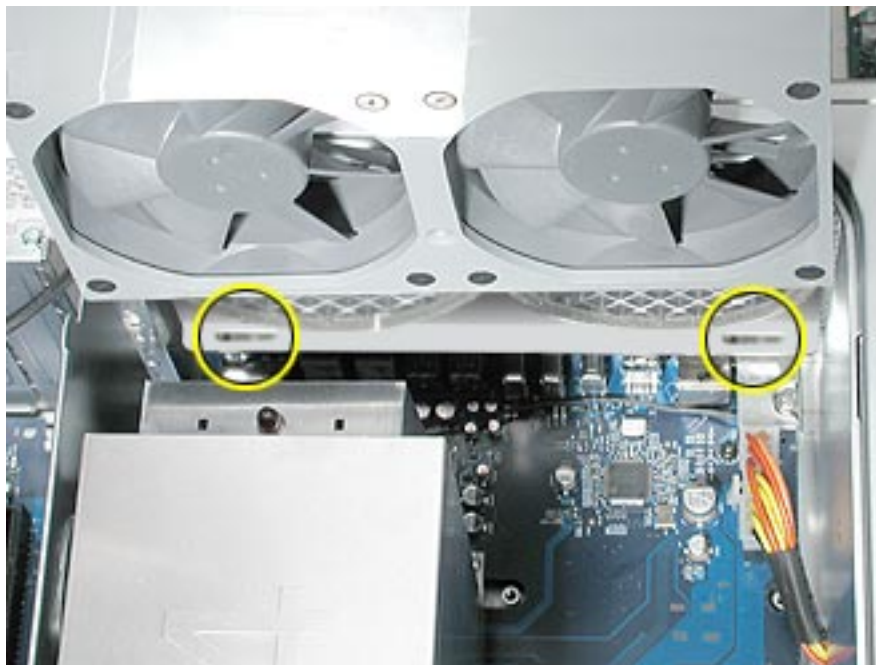
Then rotate the fan back flush with the rear panel, making sure the two latches on the top of the bracket engage with the two slots on the top of the fan guide.
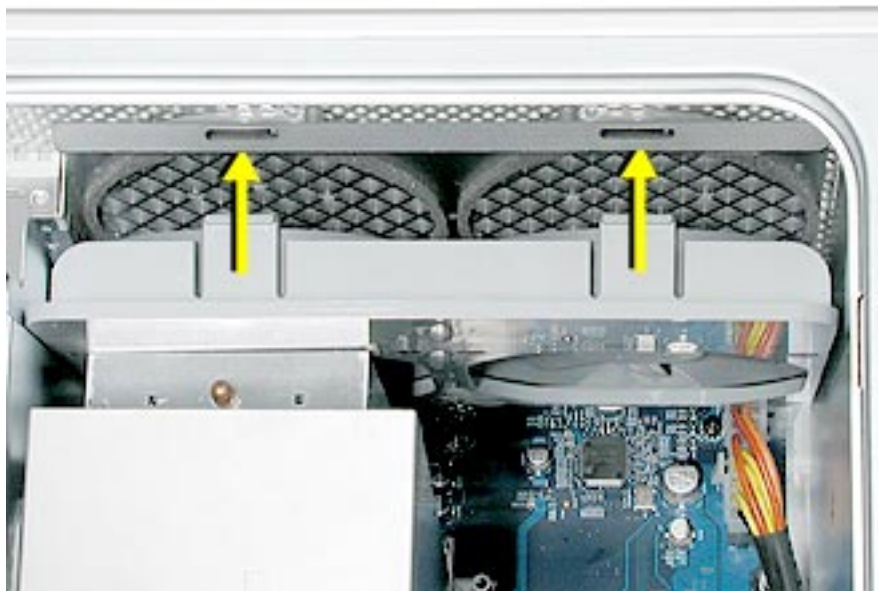
Replacement Note: Using a flatblade screwdriver, tuck the fan cable under the edge of the logic board.
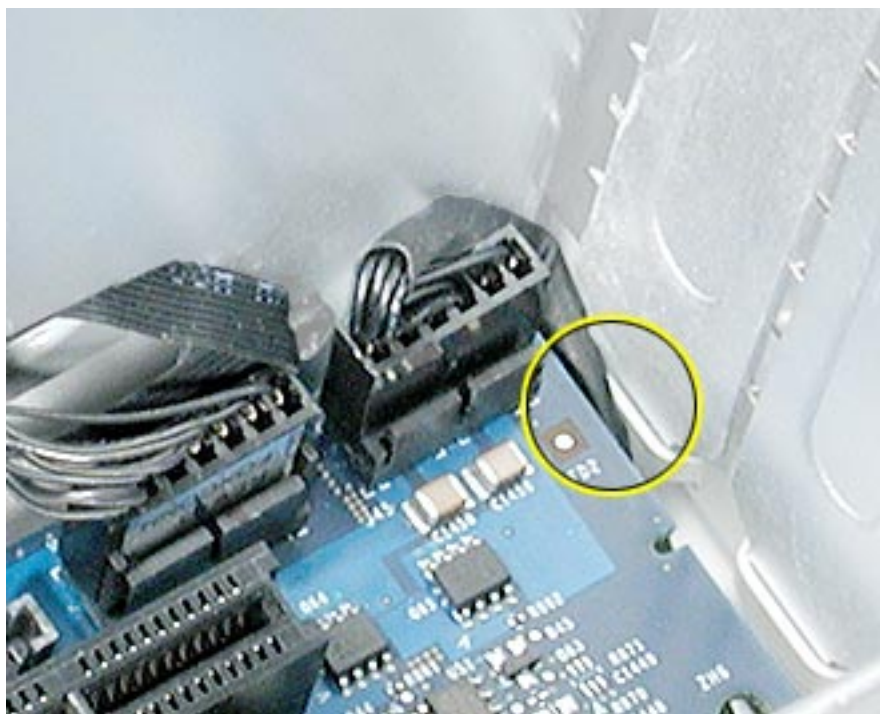
Speaker/Fan Assembly

Tools

The only tools required for this procedure are a Phillips screwdriver and needlenose pliers.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

1. Disconnect the speaker and fan cables from the logic board.

2. Lift the speaker/fan assembly straight up and remove it from the enclosure.

    Important: Be careful that the fan and speaker cables do not catch on the PCI divider as you lift the assembly.
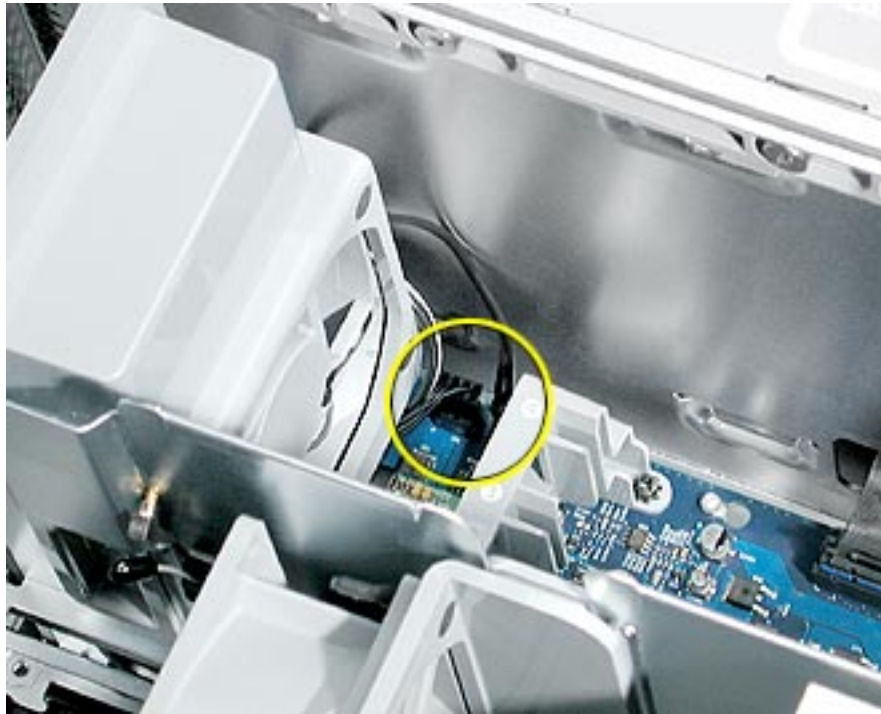
3. If you are replacing the speaker, remove the two screws and remove the speaker from the speaker/fan bracket.

4. If you are replacing the fan, use needlenose pliers to pull the fan off the four grommet fasteners. Then remove the fan from the bracket.

Replacement Note: When reinstalling the speaker/fan bracket in the enclosure, make sure the large tab on the side of bracket engages with the channel in the PCI divider.
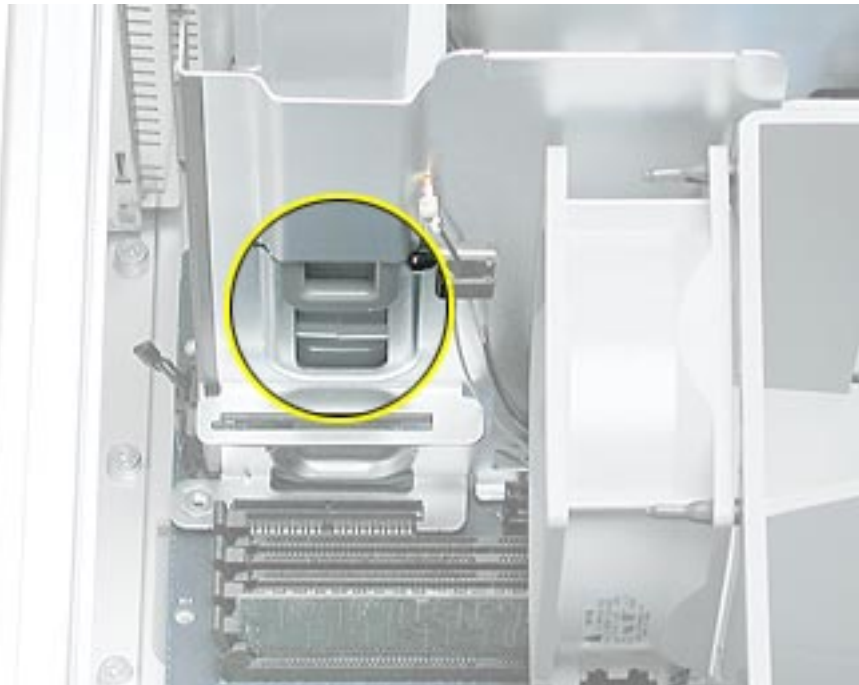
Modem Board

Tools

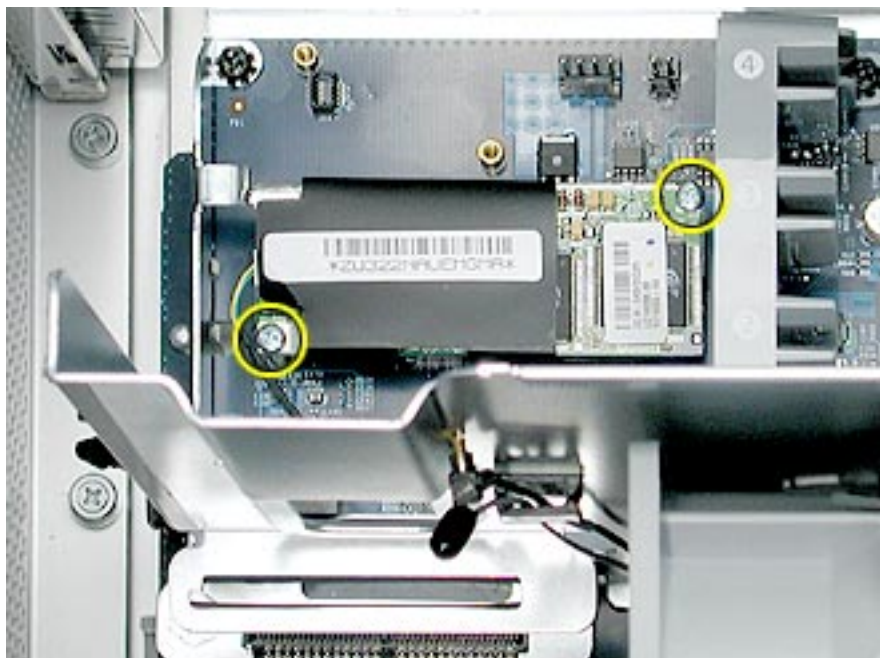The only tool required for this procedure is a Phillips screwdriver.
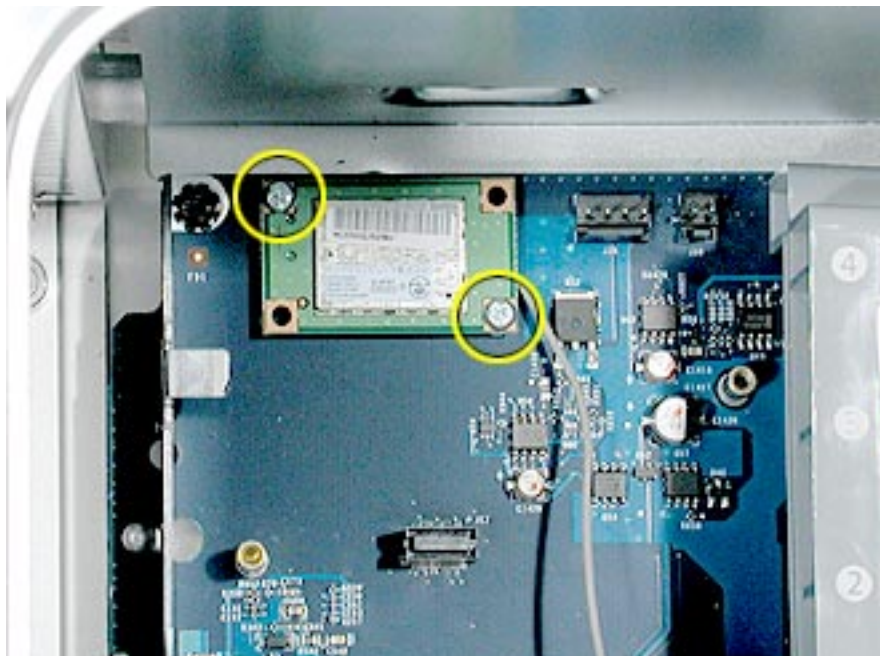
Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the speaker/fan assembly.

Part Location

Procedure

1. Remove the two screws that secure the modem board.

2. Lift the board slightly and disconnect the modem filter cable from the modem board.

3. Remove the modem from the enclosure.

Important: Be sure to reconnect the modem filter cable before reinstalling the modem.

Bluetooth Card

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the speaker/fan assembly.
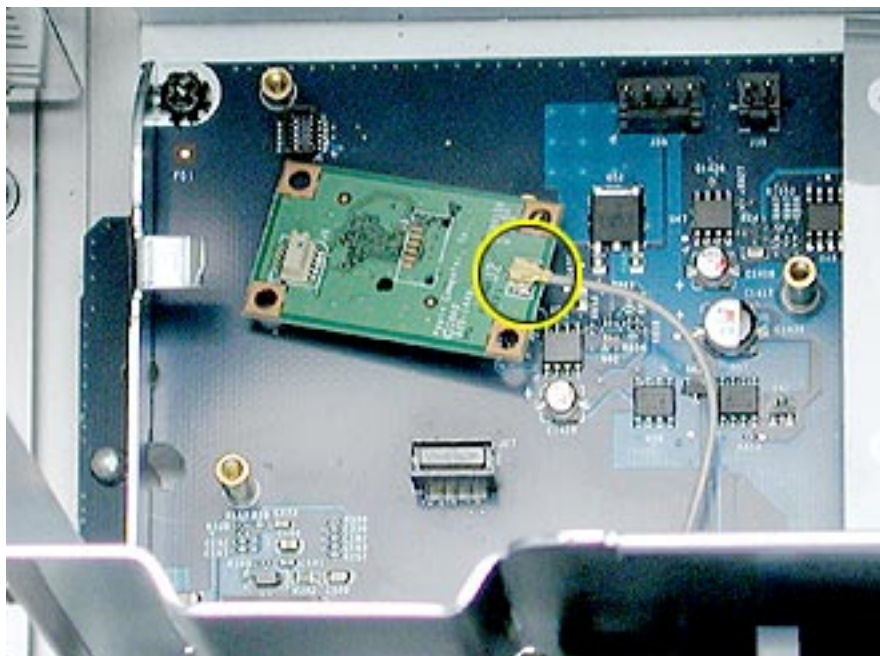
Part Location

Procedure

1. Remove the two Bluetooth mouning screws.

2. Lift the Bluetooth card straight up a short distance to disconnect it from the logic board. Then turn the card over, and disconnect the Bluetooth antenna cable from the underside of the card.

Replacement Note: Be very careful connecting the antenna cable to the Bluetooth card. The connector is fragile and can easily be bent.

Processor

Tools

The only tool required for this procedure is a long-handled Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the front inlet fan assembly.

## Part Location

Procedure

1. Remove the metal G5 cap from the top of the heatsink.

    Note: The cap is held in place by two sets of small plastic latches on the underside of the cap. To release the latches, place both index fingers under the edge of the cap near the "G" and press in on the first set of latches. Then release the second set of latches under the opposite edge of the cap and lift the cap off the heatsink.
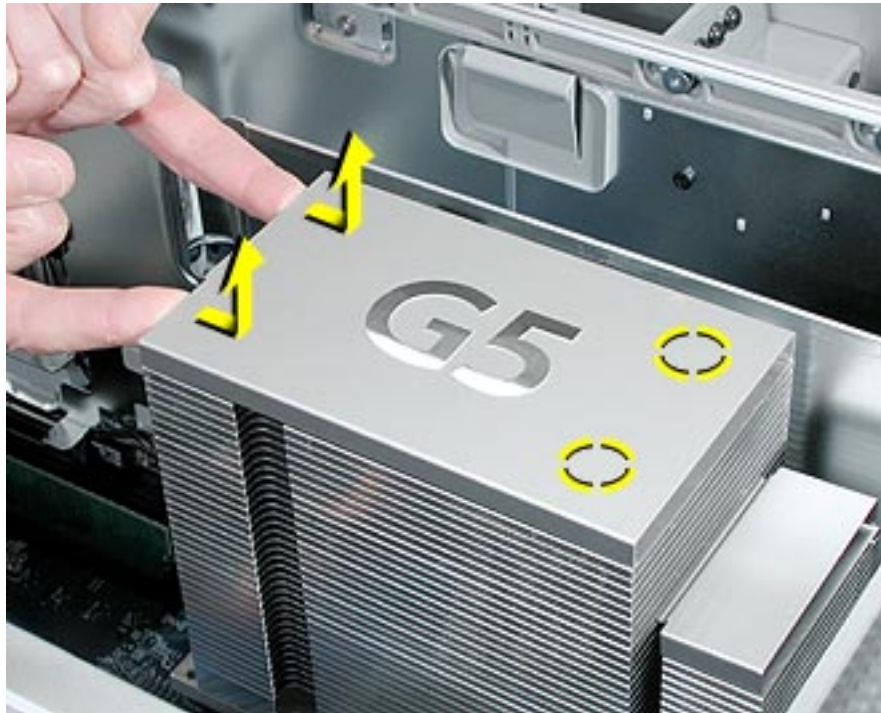
2. Using a long-handled Phillips screwdriver, remove the four processor mounting screws.
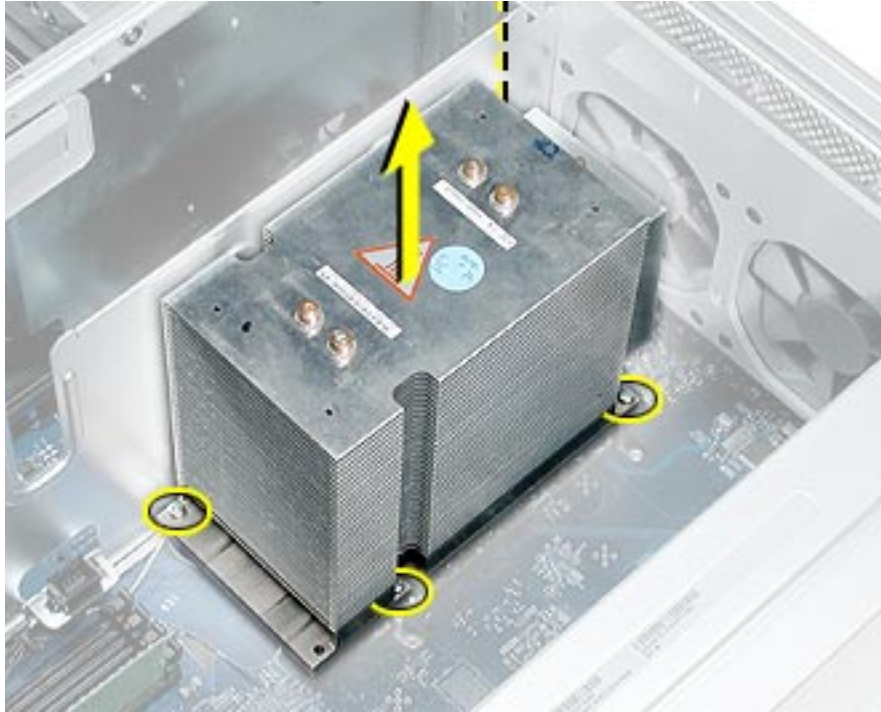
3. Lift the heatsink and processor straight up out of the computer.

    Warning: The heatsink and processor are a unit. Never separate the heatsink from the processor, or you will damage the processor and void the warranty.

4. Repeat steps 1–3 for the second processor, if necessary.

Replacement Note: If you are replacing the processor with a new processor, do the following:

- When removing the new processor from its packaging, be careful to lift the processor straight up out of the box. Tilting the processor could damage the heatsink seal.
- Before installing the processor, remove the cap over the processor connector.

Warning: Do not remove the clear plastic strip on the bottom of the processor. Removing the plastic could cause a short in the logic board.
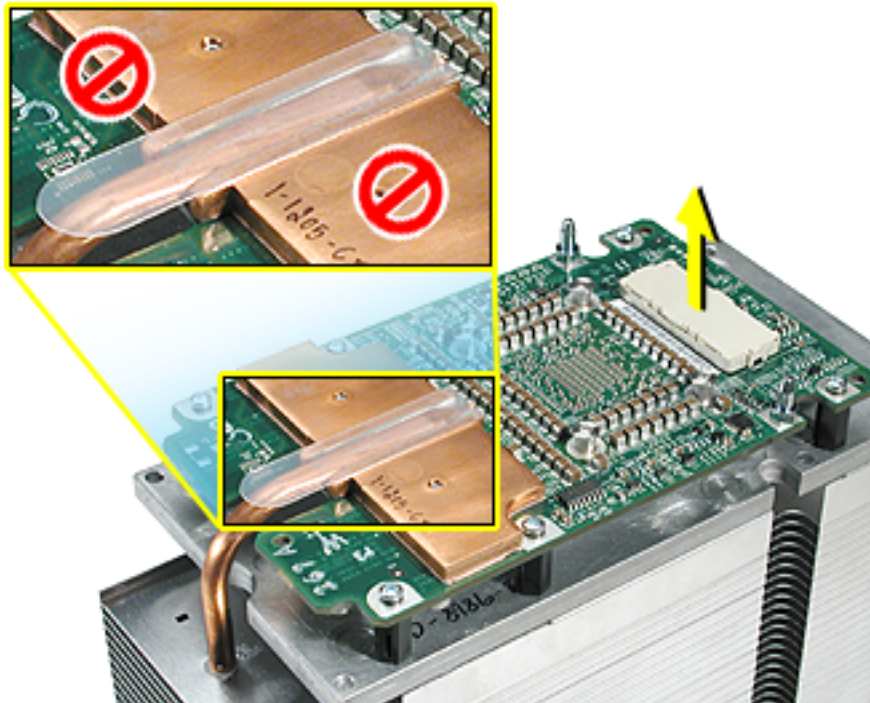
Note: When installing the processor, place the first two screws diagonally from each other and tighten part way. Replace the other two screws and tighten part way. Then tighten all screws again until they are fully secured.

Important: Whenever you replace a processor with a new processor, you must run Apple Service Diagnostic (once the computer is reassembled). You must also run the diagnostic if you re-install the same processor but in a different connector from the one in which it was originally installed. Apple Service Diagnostic for Power Mac G5 is available as a download from the Disc Images section of the Apple Service Source website. For more information, see "Thermal Calibration" in the Troubleshooting chapter.
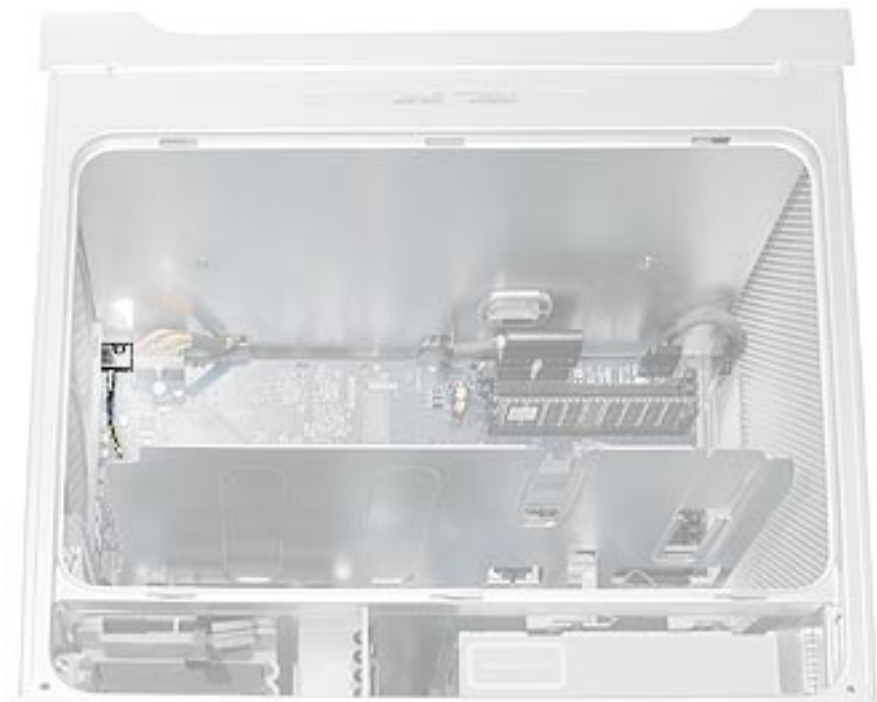
Modem Filter Board and Cables

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:
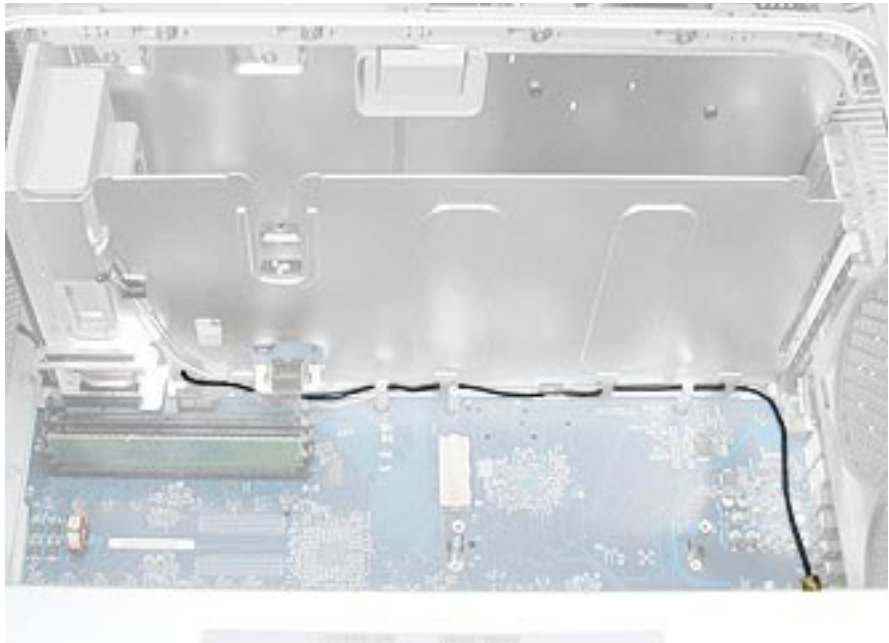• Front inlet fan assembly
• Processor(s)
• All AGP and PCI cards
• Rear exhaust fan assembly
• Speaker/fan assembly
• Modem

Part Location

Procedure

1. Route the modem filter board cable out through the opening in the PCI divider.

2. Disengage the cable from the cable guides on the PCI divider.

3. Disconnect the power cable next to the modem filter board.

4. Remove the mounting screw on the modem filter board cap.

5. Slide the modem filter board back to disengage it from its mounting bracket, and remove the board and cable from the logic board.
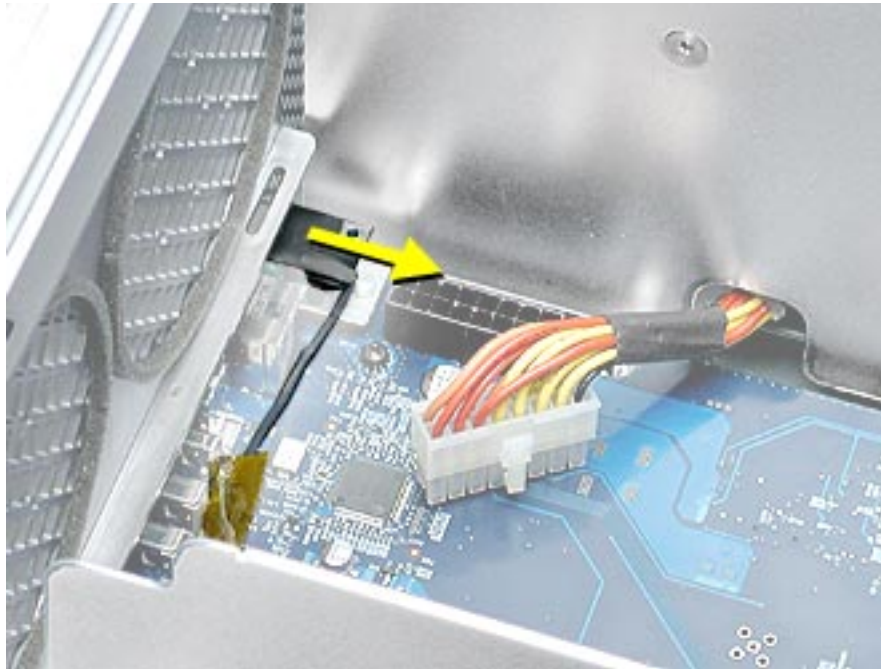

Replacement Note: When re-installing the modem filter board in its mounting bracket, be careful to engage the slots in the board with the edges of the bracket.

Replacement Note: Make sure the modem filter cable routes out through the opening in the side of the modem filter cap before securing the cap to the modem filter board.

Replacement Note: Be careful when rerouting the modem filter cable that it routes under the black connector for the front inlet fan and out through the correct opening in the PCI divider. Make sure the cable is in place behind all cable guides.
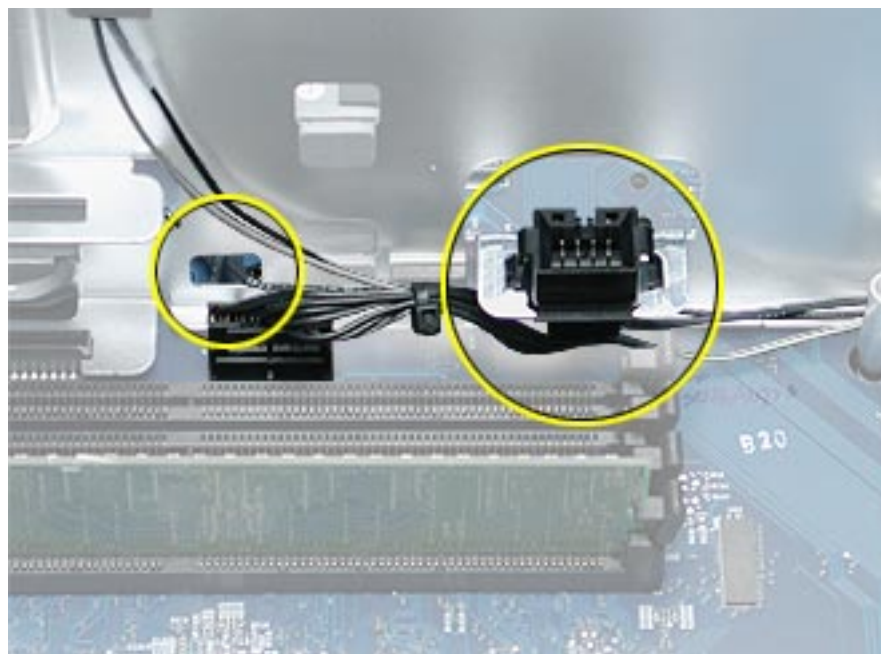
Antenna Board and Cables

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:
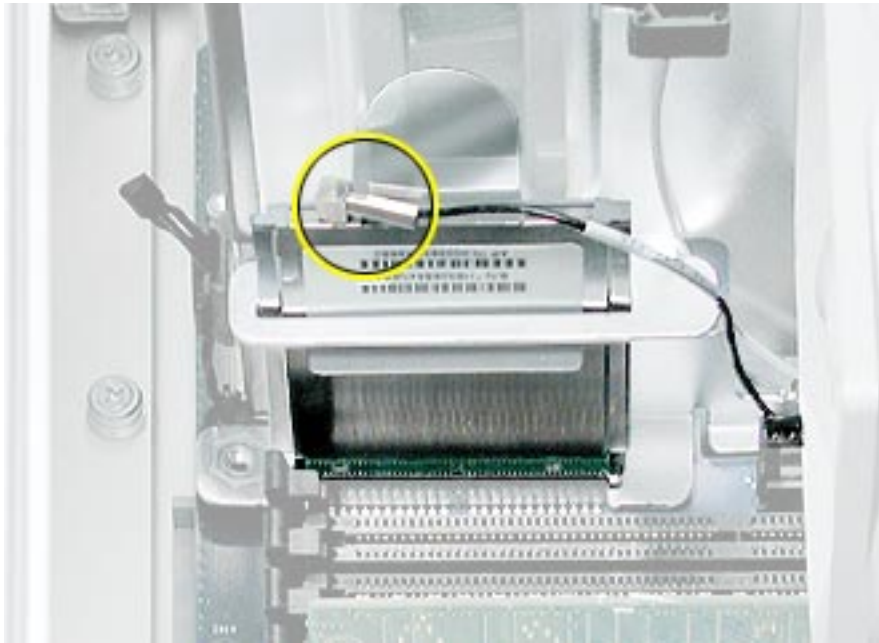- Front inlet fan assembly
- Upper processor
- All AGP and PCI cards
- Rear exhaust fan assembly
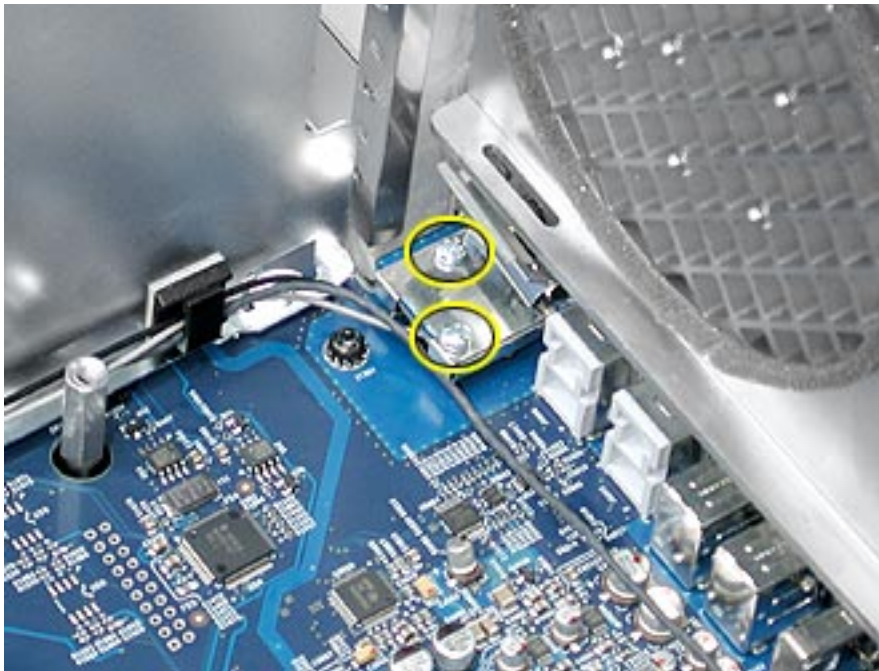
Part Location

Procedure

1. Disconnect the black antenna cable from the AirPort Extreme Card (if installed).

2. Disconnect the gray antenna cable from the Bluetooth card (if installed).

3. Bend the antenna board shield back far enough so that you can access the two antenna board mounting screws, and remove the screws.

4. Remove the Bluetooth cable (gray) and AirPort cable (black) from the cable guides and remove the antenna board and cables from the logic board.
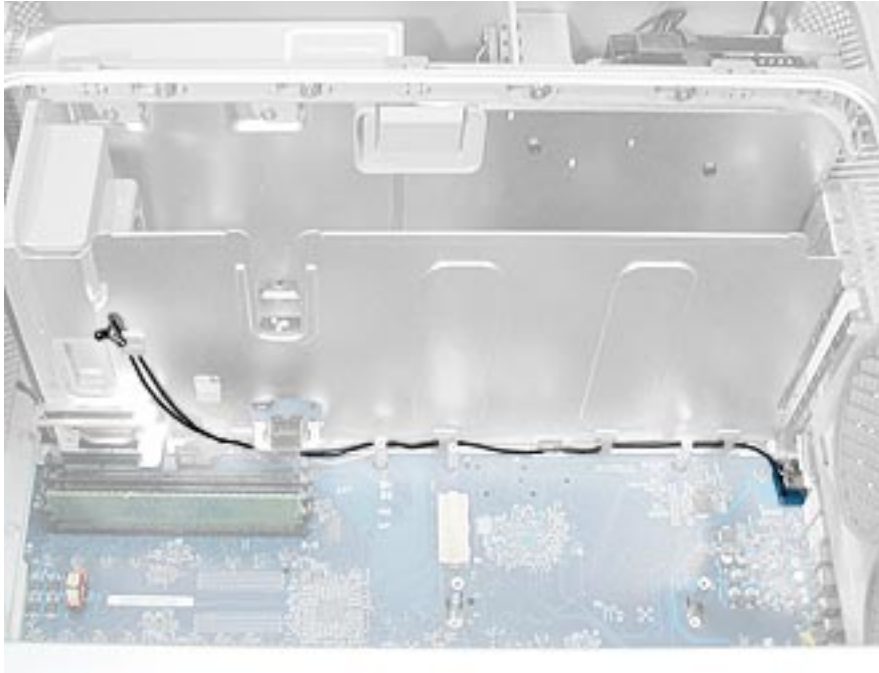
Replacement Note: Be careful when rerouting the two antenna cables that they route under the black connector for the front inlet fan. Make sure that the cables are in place behind all cable guides.
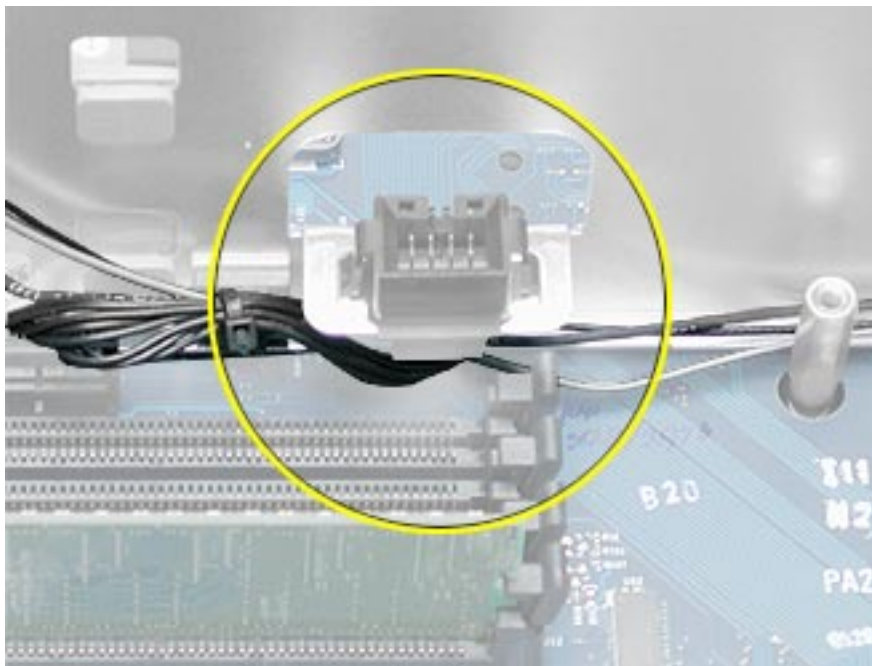
Front Panel Board Cable

Tools

No tools are required for this procedure.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

1. Remove the two black plastic caps that cover the front panel board cable connectors.

    Note: The caps fit tightly over the connectors. To remove them, rock the caps gently forward and backward as you lift up.
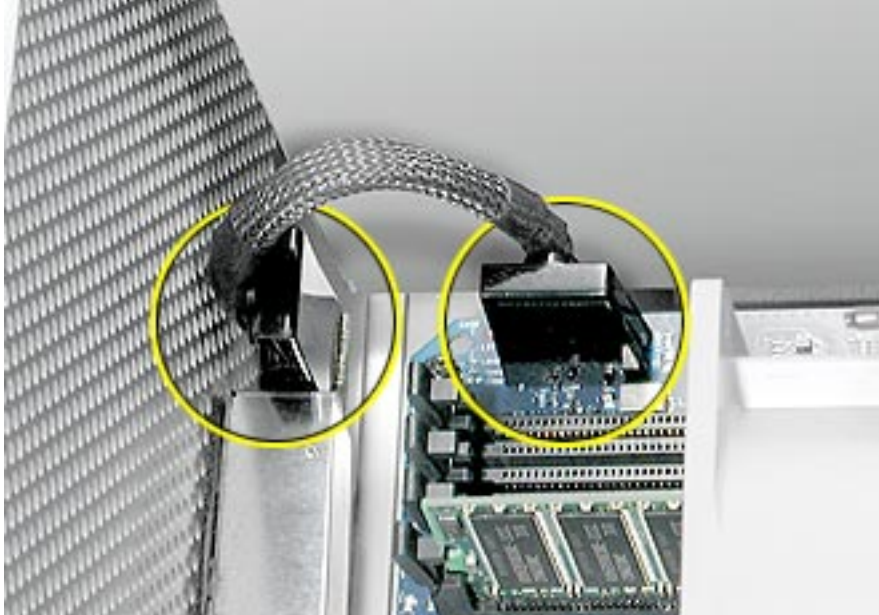
2. Disconnect the cable from the logic board.

3. Disconnect the other end of the cable from the front panel board and remove the cable from the enclosure.
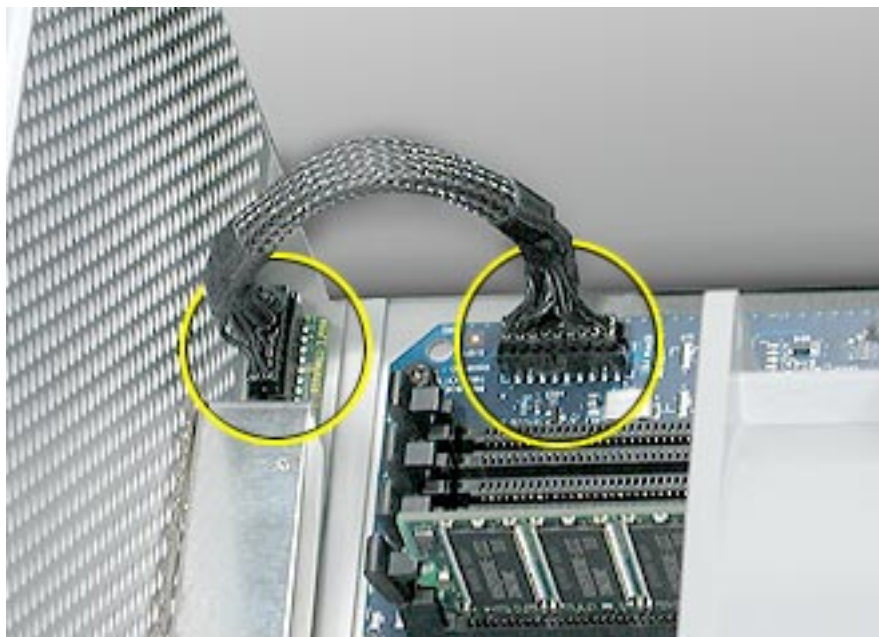
PCI Card Guide

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

1. Remove the two screws that mount the PCI card guide to the logic board.

2. Slide the card guide up to release the two latches from the PCI divider, and remove the card guide from the enclosure.
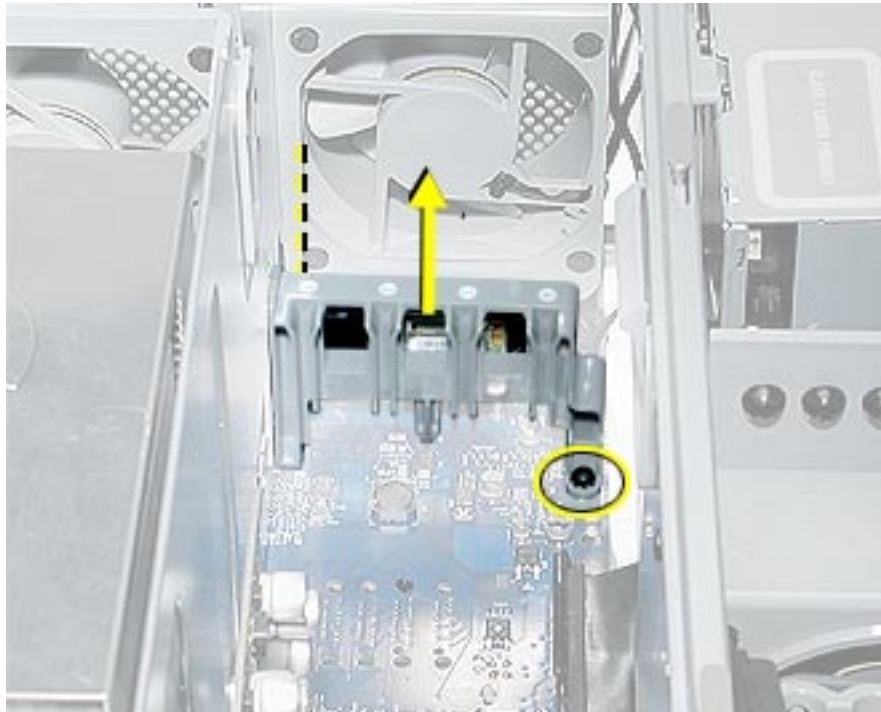
Power Supply

Tools

The only tool required for this procedure is a short-handled Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

- Front inlet fan assembly
- Processor(s)
- All AGP and PCI cards
- Rear exhaust fan assembly
- Front panel board cable
- Memory DIMM if it is in slot next to the power supply cable

Part Location

Procedure

1. Remove the black plastic caps covering the two power supply cable connectors.

   Note: The caps fit tightly over the connectors. To remove them, rock the caps gently forward and backward as you lift up.

2. Press in on the release latch on the first power supply cable connector and disconnect the cable from the logic board. Repeat for the other power supply cable.

3. Remove the two screws that secure the power supply top cover, and remove the cover from the enclosure.

   Warning: Whenever the power supply cover is removed, be very careful not to drop any screws into the power supply. Doing so could short out the unit.
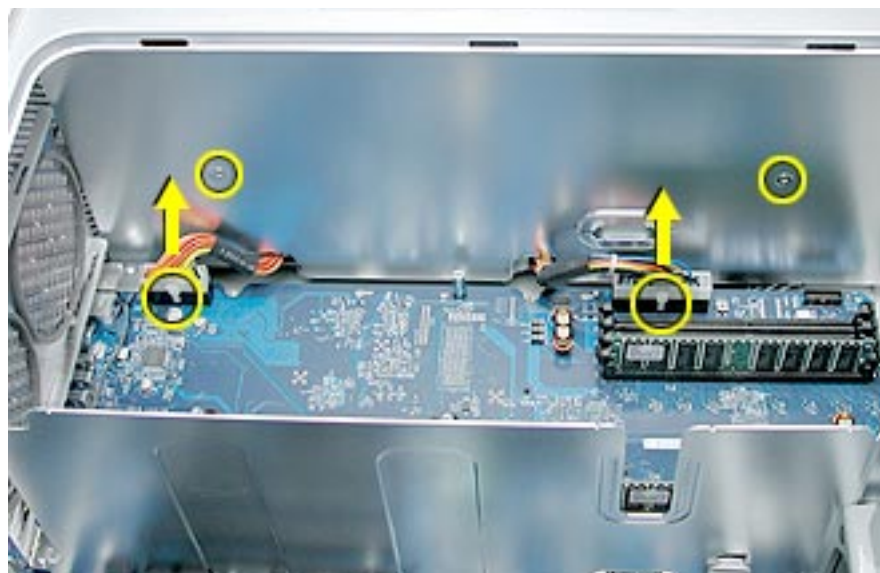
4. Remove the four power supply mounting screws on the bottom of the enclosure.

5. Push in on the power receptacle, and slide the power supply toward the front of the computer.

6. Tilt the power supply a short distance out of the bottom of the enclosure.
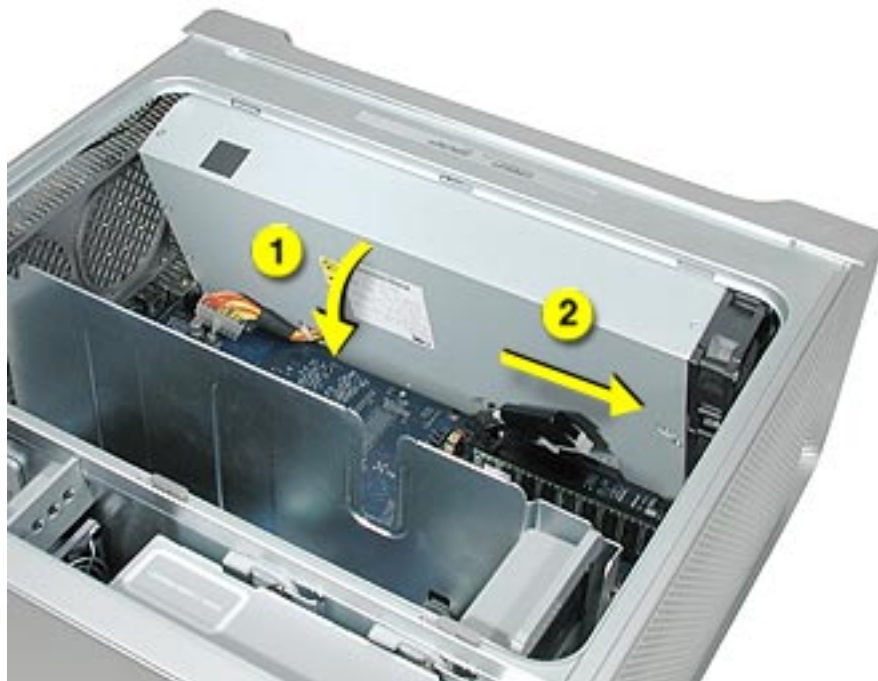
7.	Disconnect the power harness cable from the power supply.
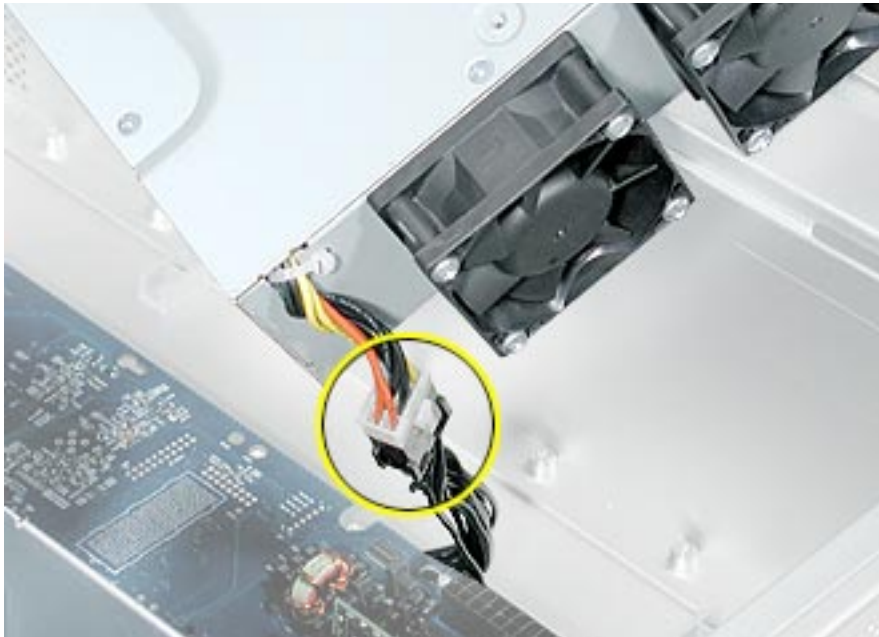
8.	Remove the power supply from the enclosure.

Replacement Note: After reconnecting the power supply to the power harness cable, slightly lift the cable so that it does not become wedged under the power supply, and lower the power supply into the enclosure. Rotate the power supply back flush with the enclosure bottom until it snaps into place. Then slide the power supply toward the back of the computer, making sure the power receptacle aligns with the opening in the back panel.
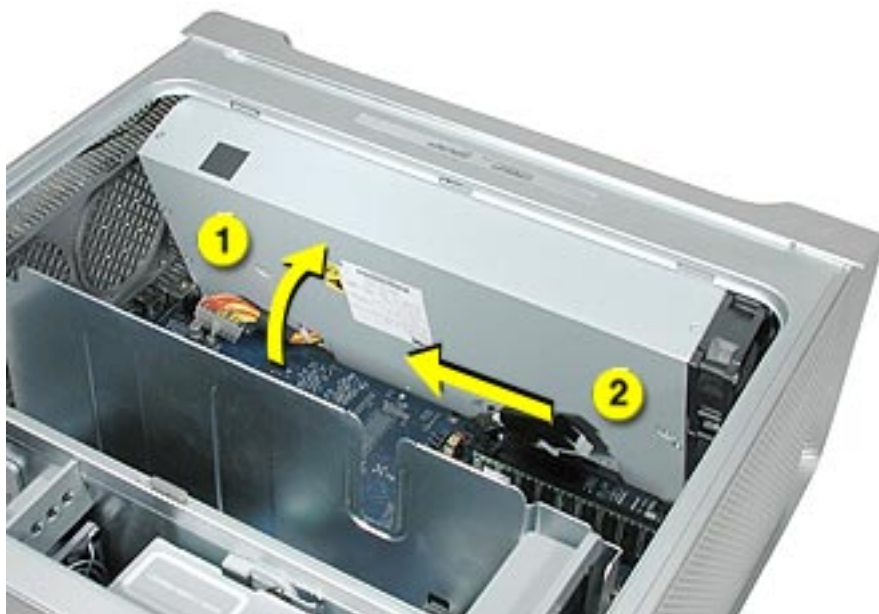
![Logic Board icon] Logic Board

Tools

The only tools required for this procedure are a Phillips screwdriver and a hex wrench.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:
- Front inlet fan assembly
- Processor(s)
- All AGP and PCI cards
- Rear exhaust fan assembly
- Speaker/fan assembly
- Front panel board cable
- Power supply

Part Location

Procedure

1. Remove the two screws that secure the PCI card guide.
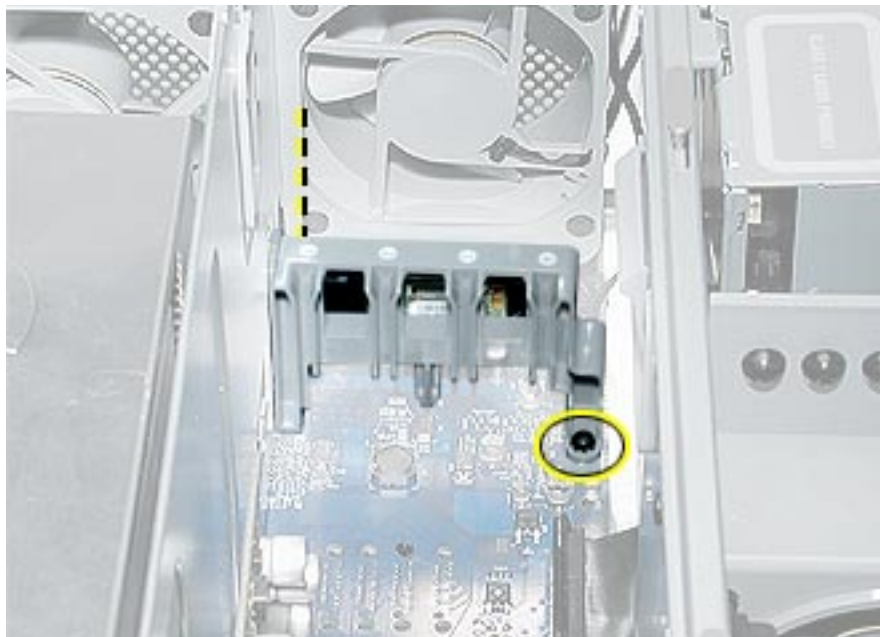
2. Disconnect the six cables from the top of the logic board.

3. Using a hex wrench, remove the four standoffs for the upper processor. Using a Phillips screwdriver, remove the remaining processor standoff (marked by a square in the illustration below). Repeat the procedure for a second processor, if installed.

4. Remove the five screws that secure the logic board.
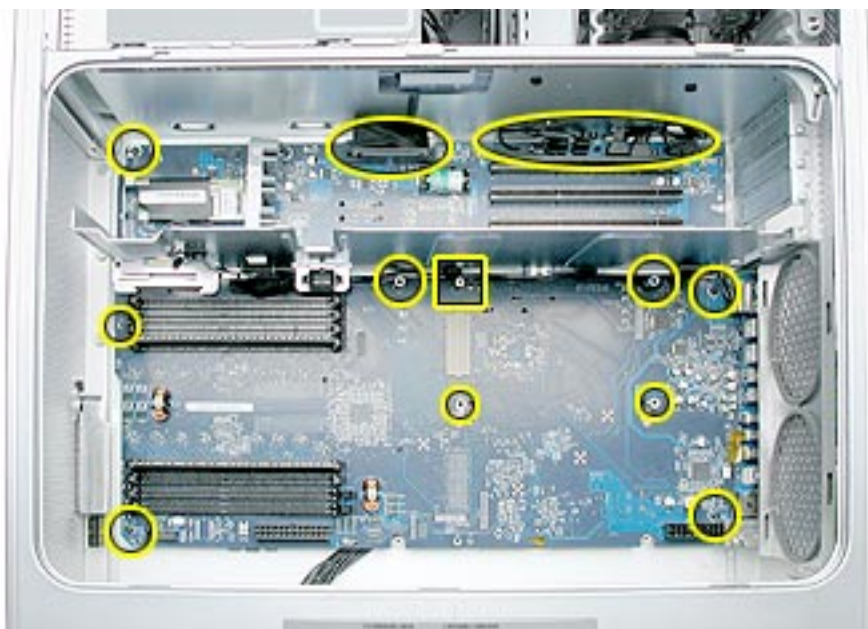
5. Carefully tilt the logic board up and maneuver it out of the enclosure, making sure the ports clear the enclosure openings.

Note: Perform the following procedures only if you are replacing the logic board with a new logic board.

6. Remove the following from the original logic board (see individual procedures in this chapter for detailed steps):
   • Memory DIMMs
   • AirPort Extreme Card (if installed)
   • Bluetooth card (if installed)
   • Modem (if installed)
   • Modem filter board and cables
   • Antenna board and cables

7. Disconnect the thermistor from the logic board.
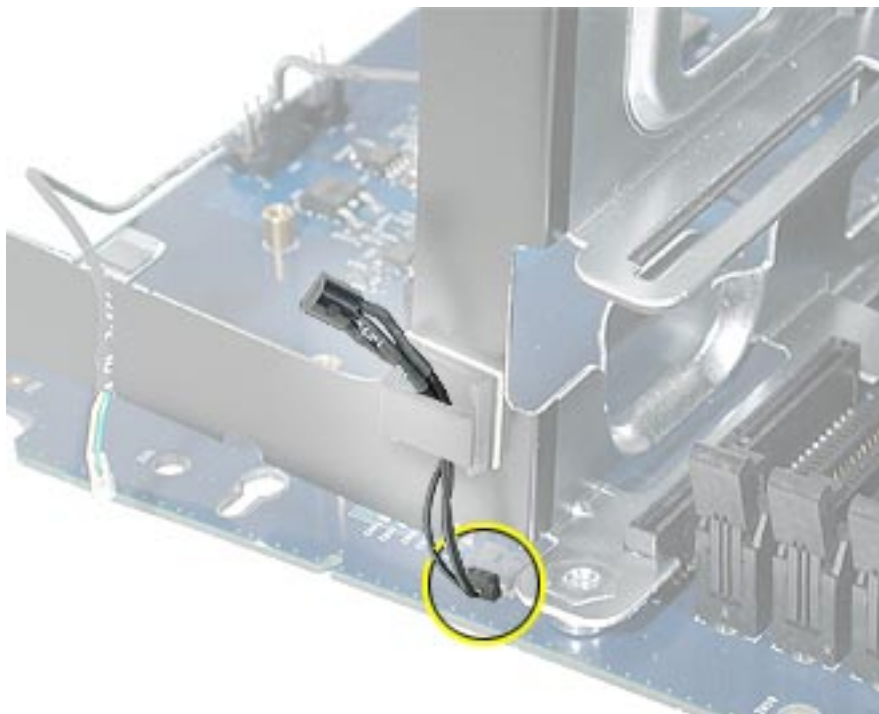
8. Disconnect the front inlet fan cable from the logic board.
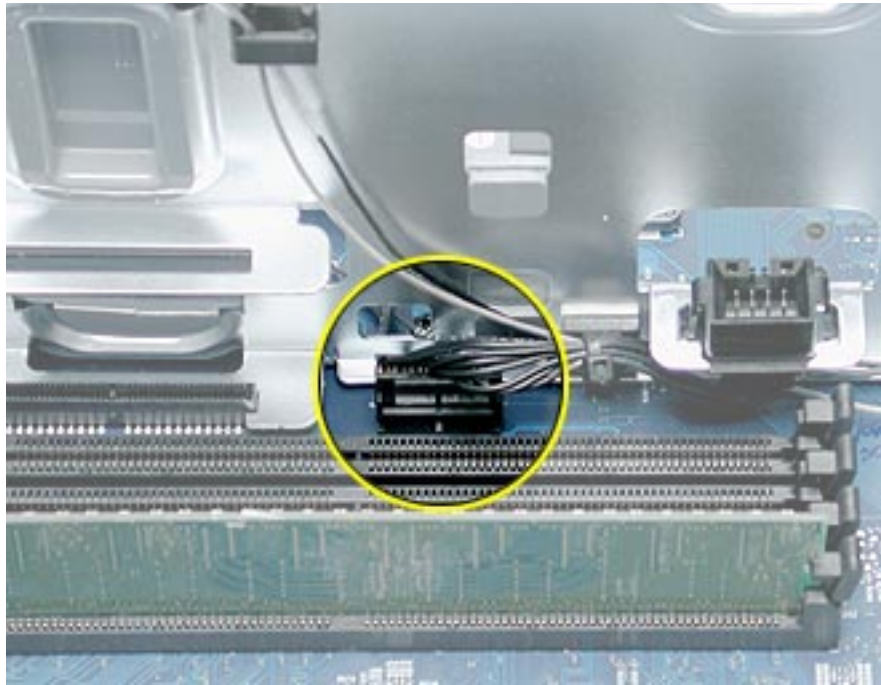
9. Remove the three PCI divider mounting screws and remove the divider (with PCI card guide and thermistor attached) from the logic board.
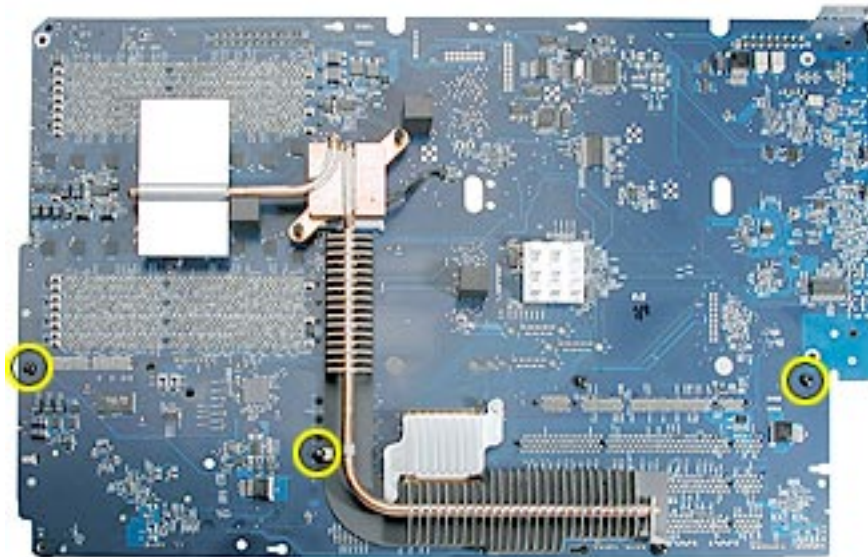
10. Position the PCI divider on the replacement logic board and install the three mounting screws.

11. Connect the thermistor and front inlet fan cable to the logic board.

12. Install the modem filter board and cable on the logic board.

13. Install the antenna board and cables on the logic board.

    Note: Be careful when rerouting the two antenna cables and the modem filter cable that they route under the black connector for the front inlet fan. Make sure that the cables are in place behind all cable guides and that the modem filter cable routes out through the correct opening in the PCI divider.
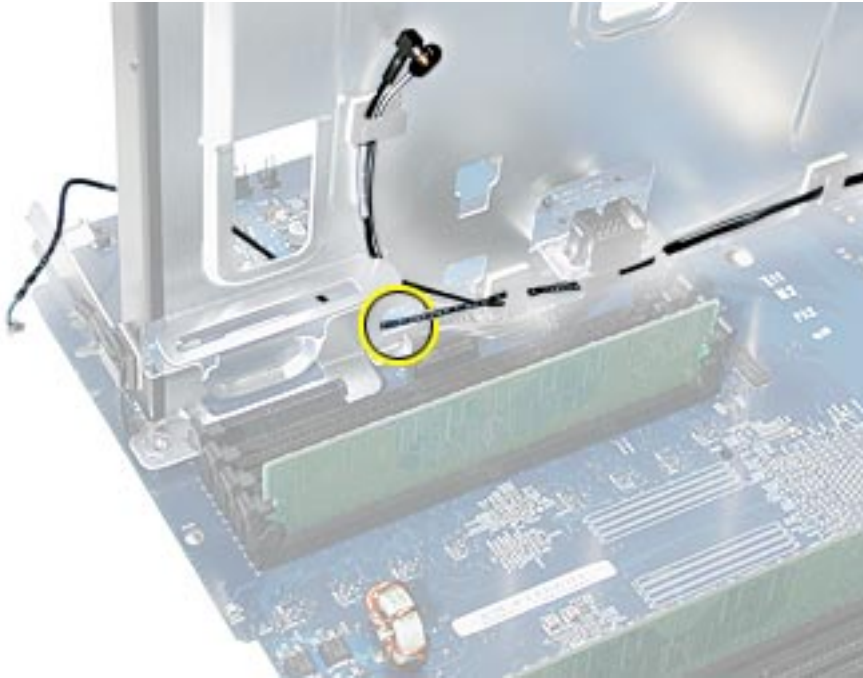
14. Connect the modem filter cable to the modem and install the modem on the logic board.

15. Install the AirPort Extreme Card and Bluetooth card on the logic board and connect their cables to the cards.

16. Install the memory DIMMs on the logic board.

17. Transfer the port EMI shield from the original logic board to the replacement logic board, making sure the shield is fully seated on the ports.
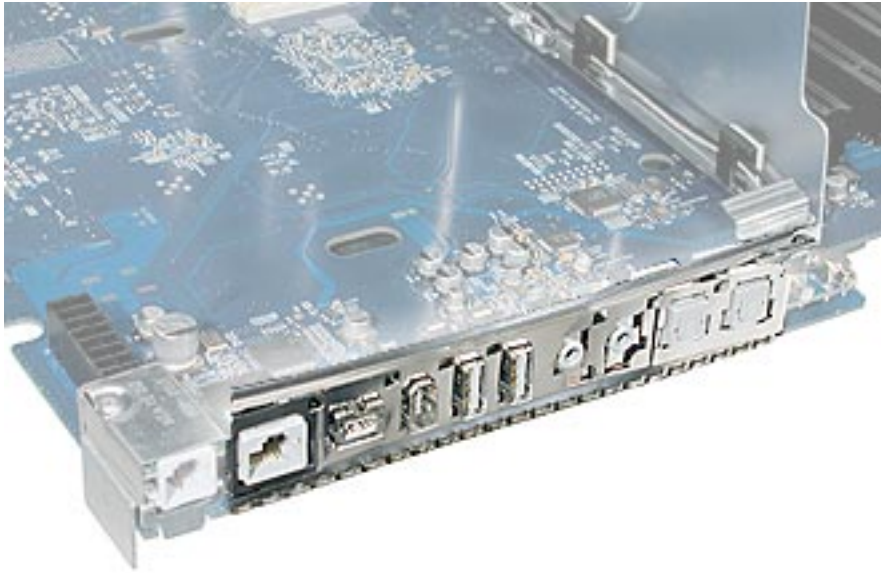
Replacement Procedure

1. Temporarily tape the top six cables to the media shelf so that they are out of the way.

2. Angle the logic board into the enclosure so that the port edge goes in first.

3. Position the logic board on the three guide pins, aligning the ports with the openings in the enclosure.

4. Slide the board toward the rear of the computer so that the logic board locks onto the guide pins and the ports are fully seated in the back panel openings.
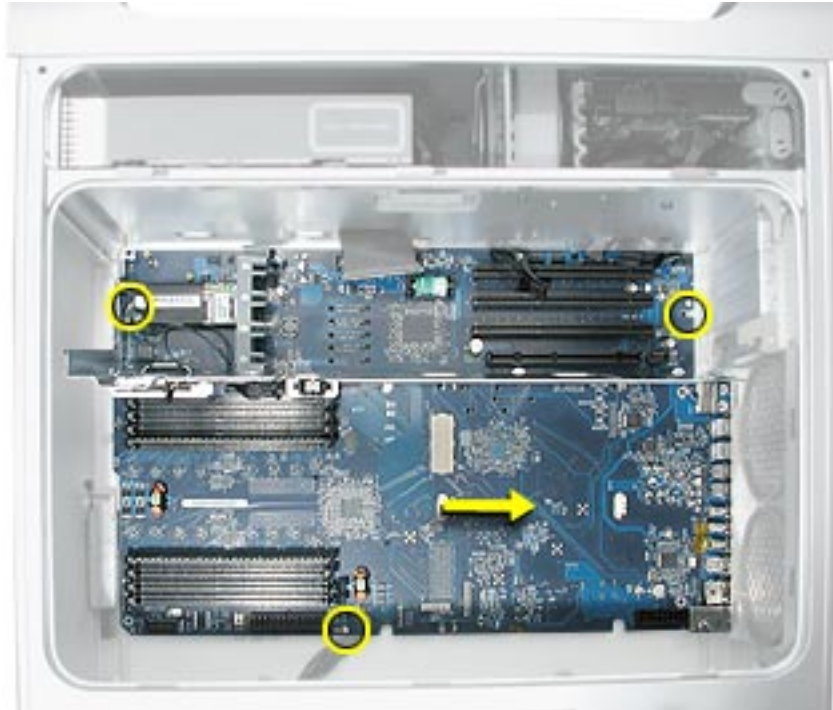
5.   Replace the logic board screws and standoffs.

6.   Replace the two PCI card guide screws.

7.   Connect the six cables at the top of the logic board to the board.

8.   Replace the power supply and reconnect all power supply cables to the logic board.

9.   Replace the front panel board cable.

10. Replace the speaker/fan assembly and reconnect its cables to the logic board.

11. Replace the rear exhaust fan assembly and reconnect its cable to the logic board.

12. Replace all AGP and PCI cards.

13. Replace the processor(s).

14. Replace the front inlet fan assembly.

Important: Whenever you replace a logic board with a new logic board, you must run Apple Service Diagnostic (once the computer is reassembled). Apple Service Diagnostic for Power Mac G5 is available as a download from the Disc Images section of the Apple Service Source website. For more information, see "Thermal Calibration" in the Troubleshooting chapter.

PCI Divider

Tools

The only tools required for this procedure are a Phillips screwdriver and hex wrench.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

- Front inlet fan assembly
- Processor(s)
- All AGP and PCI cards
- Rear exhaust fan assembly
- Speaker/fan assembly
- Front panel board cable
- Power supply
- Logic board

Part Location

Procedure

1. Disconnect the front inlet fan cable from the logic board.
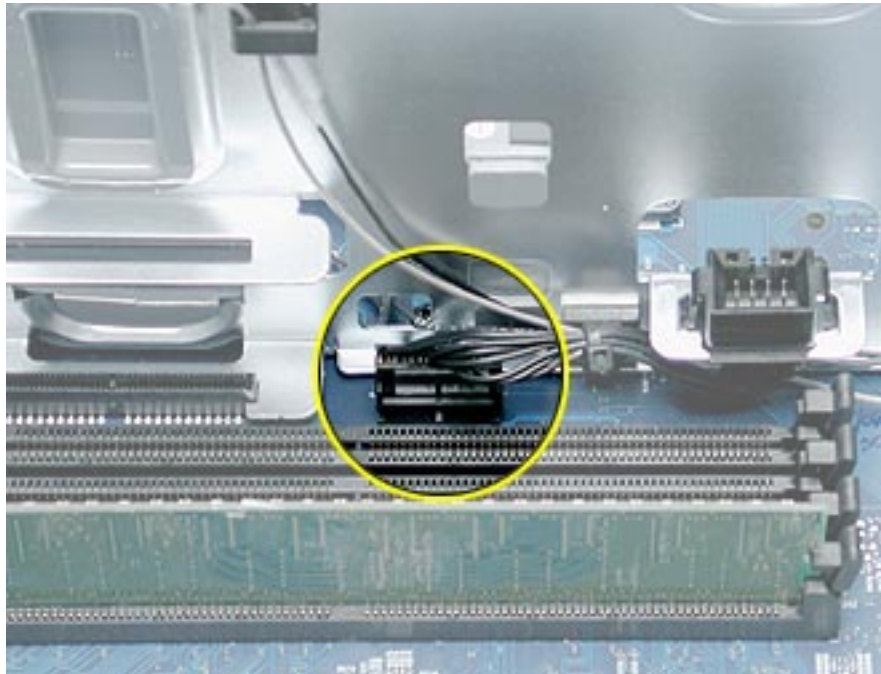
2. Remove the thermistor from the cable guide on the end of the PCI divider.
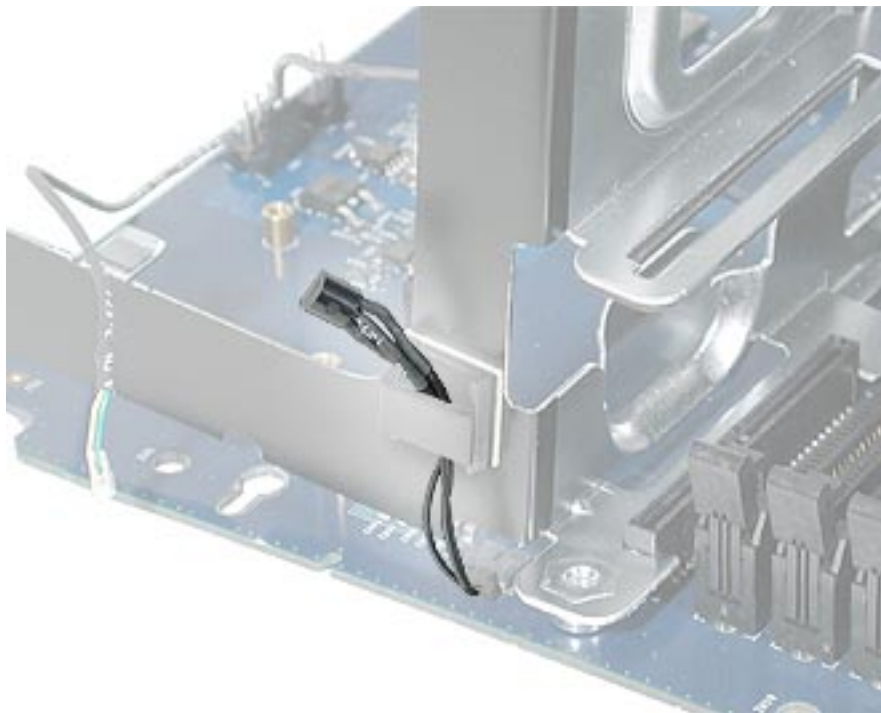
3. Remove the modem filter board cable, Bluetooth cable, and AirPort cable from the cable guides on the PCI divider.

Replacement Note: Be careful when rerouting the two antenna cables that they route under the black connector for the front inlet fan. Make sure that the cables are in place behind all cable guides.

4. Turn the logic board over so that bottom of the board faces up. Remove the three screws that secure the PCI divider, and remove the divider from the logic board.
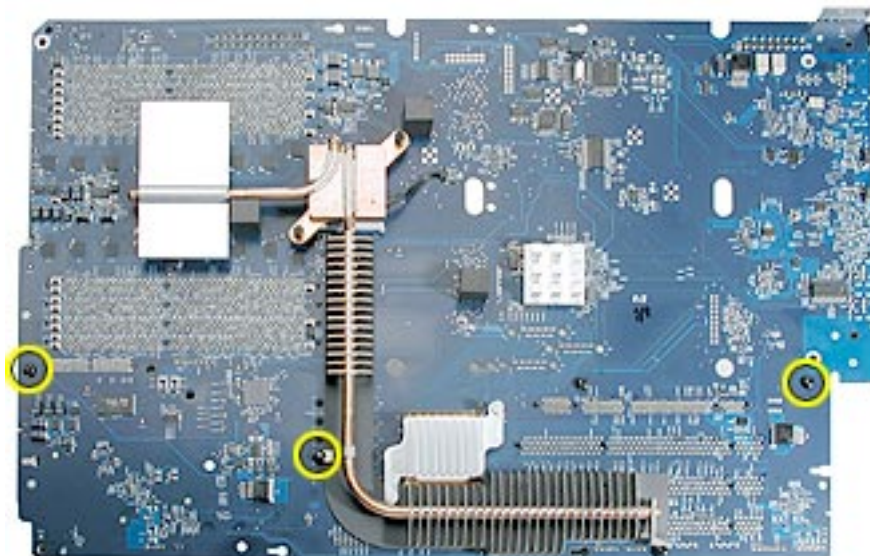
5. Compress the two latches on the sides of the front inlet fan cable connector, press the connector down through the opening in the PCI divider, and remove the cable from the divider.
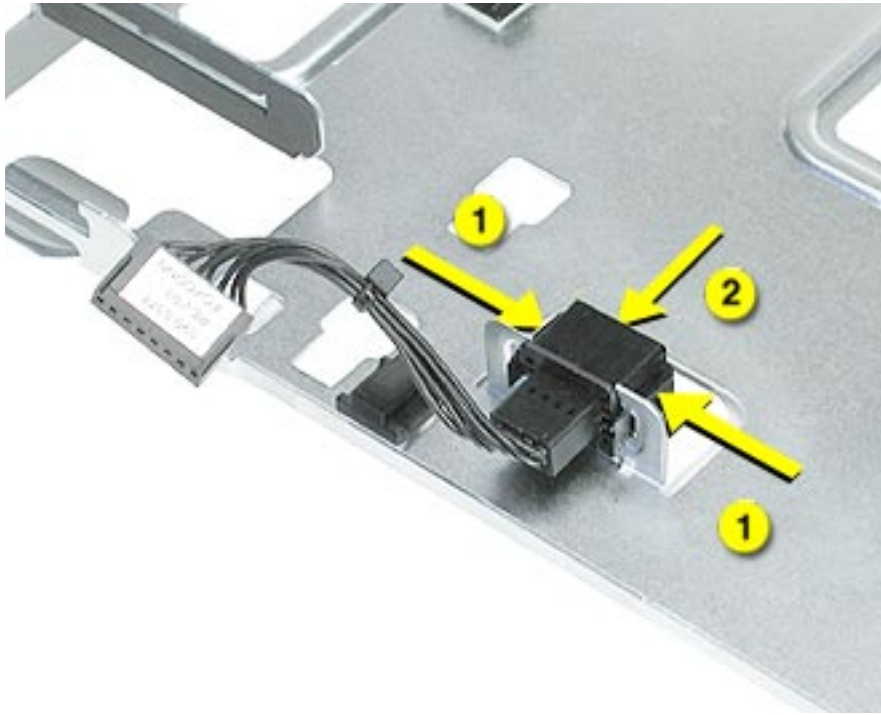
Thermistor Cable

Tools

The only tools required for this procedure are a Phillips screwdriver and hex wrench.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:
- Front inlet fan assembly
- Processor(s)
- All AGP and PCI cards
- Rear exhaust fan assembly
- Speaker/fan assembly
- Front panel board cable
- Power supply
- Logic board

Part Location
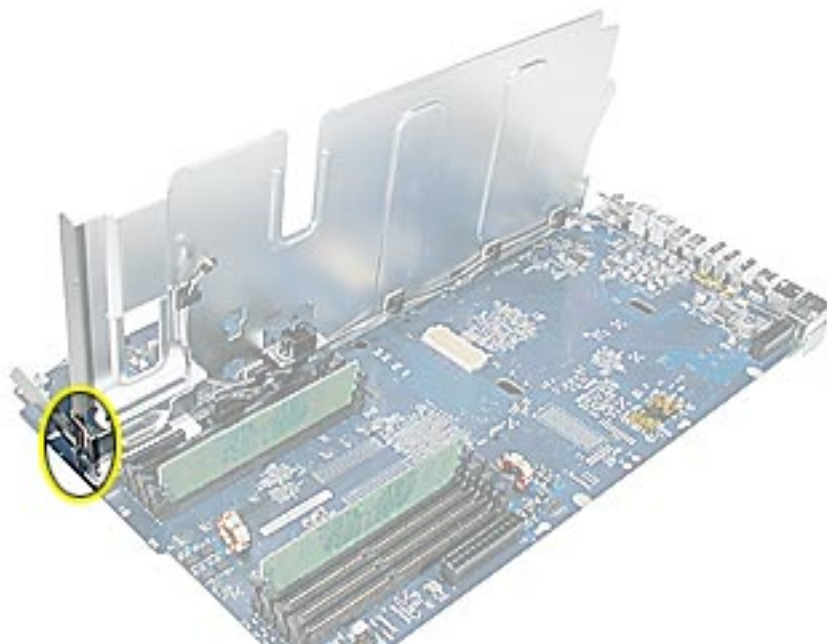
Procedure

1. Disconnect the thermistor cable from the logic board.

2. Remove the thermistor cable from the guide on the PCI divider.
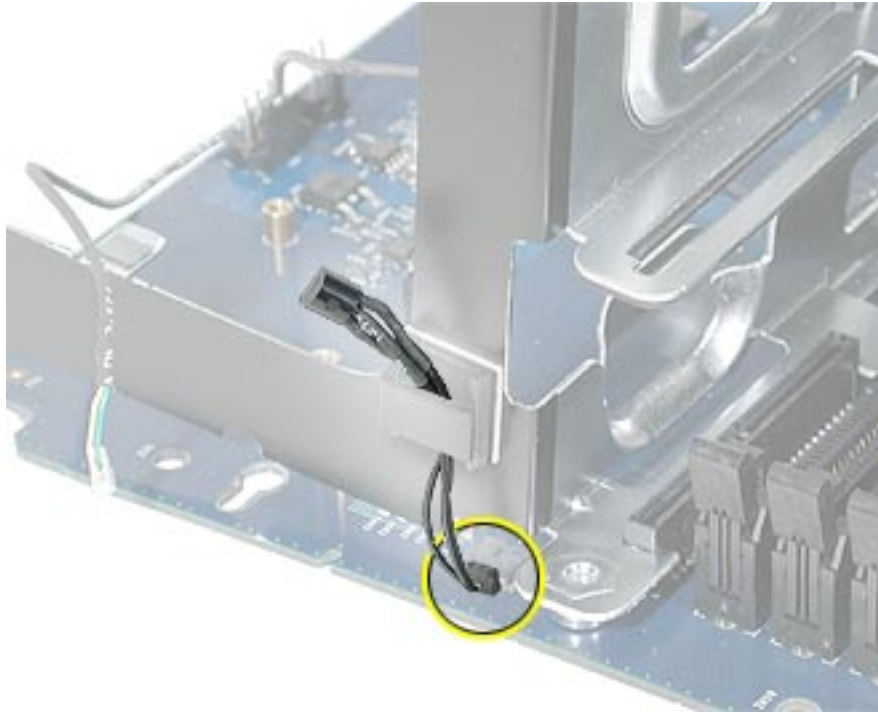
Front Inlet Fan Cable

Tools

The only tools required for this procedure are a Phillips screwdriver and hex wrench.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:
• Front inlet fan assembly
• Processor(s)
• All AGP and PCI cards
• Rear exhaust fan assembly
• Speaker/fan assembly
• Front panel board cable
• Power supply
• Logic board
• PCI divider

Part Location

Procedure

1. Compress the two latches on the sides of the fan cable connector, and press the connector down through the opening in the PCI divider.

2. Remove the cable from the PCI divider.
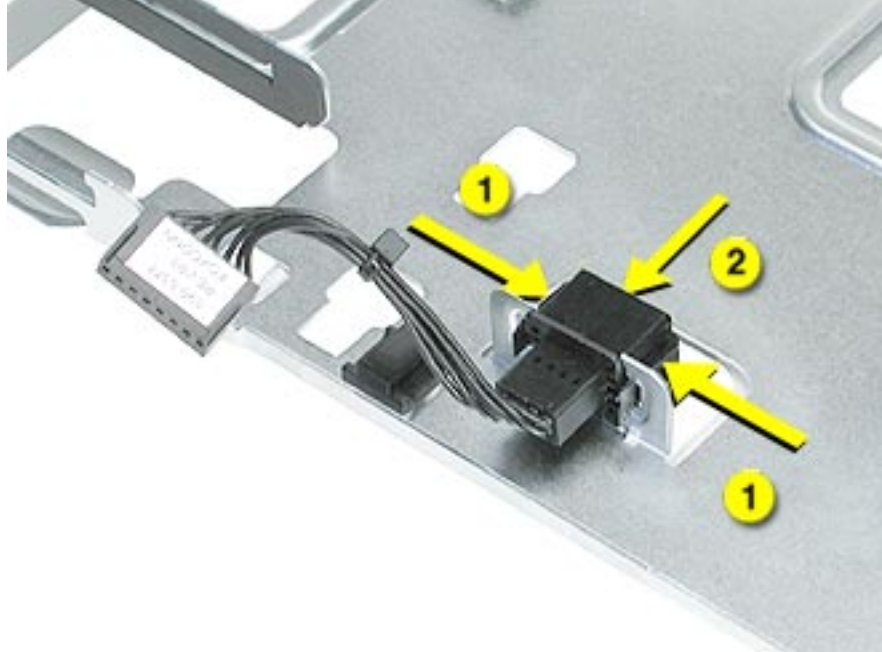
 Front Panel Board

Tools

The only tools required for this procedure are a jeweler's flatblade screwdriver, Phillips screwdriver, and hex wrench.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:
- Front inlet fan assembly
- Processor(s)
- All AGP and PCI cards
- Rear exhaust fan assembly
- Speaker/fan assembly
- Front panel board cable
- Power supply
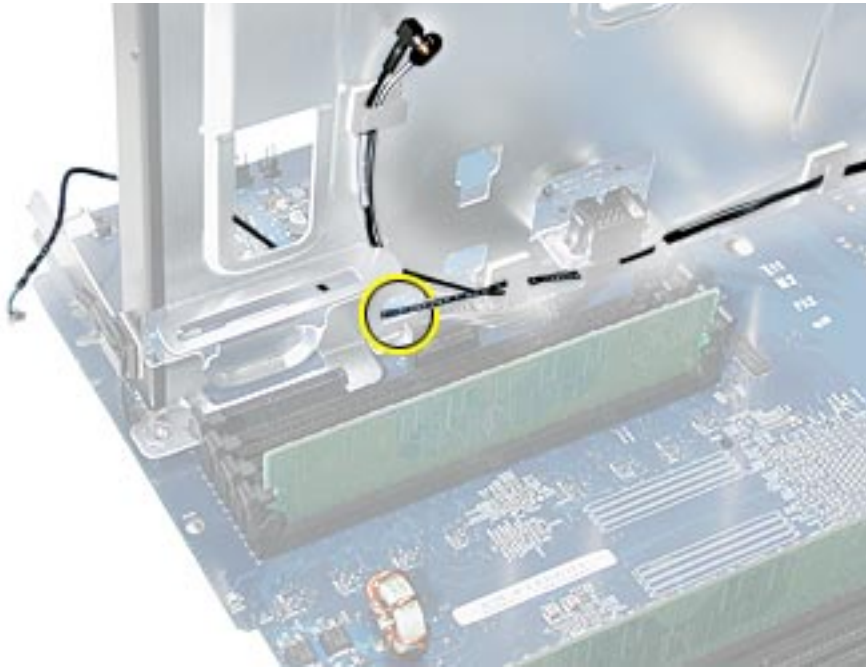- Logic board

Part Location

Procedure

1. Using a jeweler's flatblade screwdriver, pry up the metal cap covering the front panel board EMI shield.
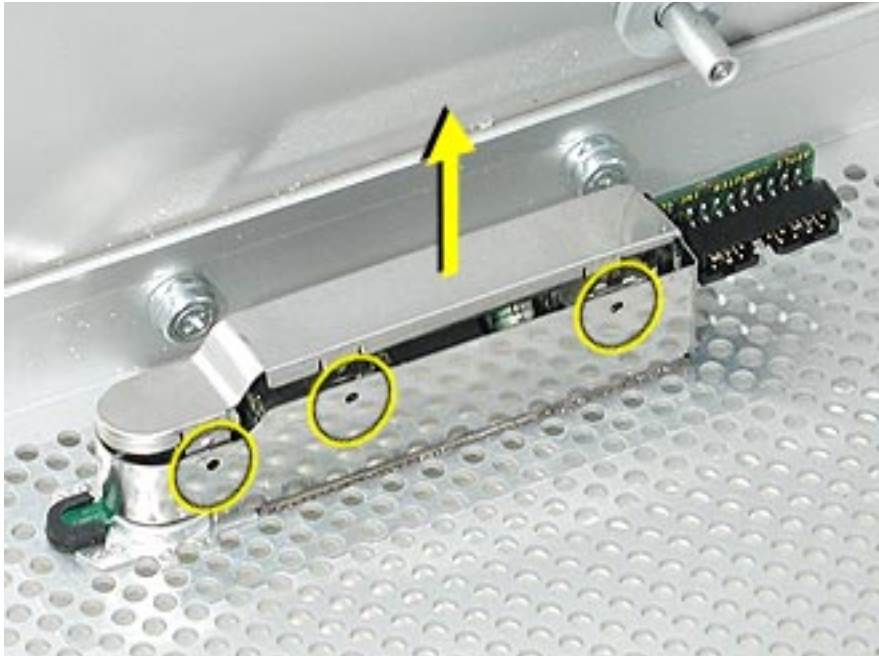
2. Using a Phillips screwdriver, remove the two front panel board mounting screws.
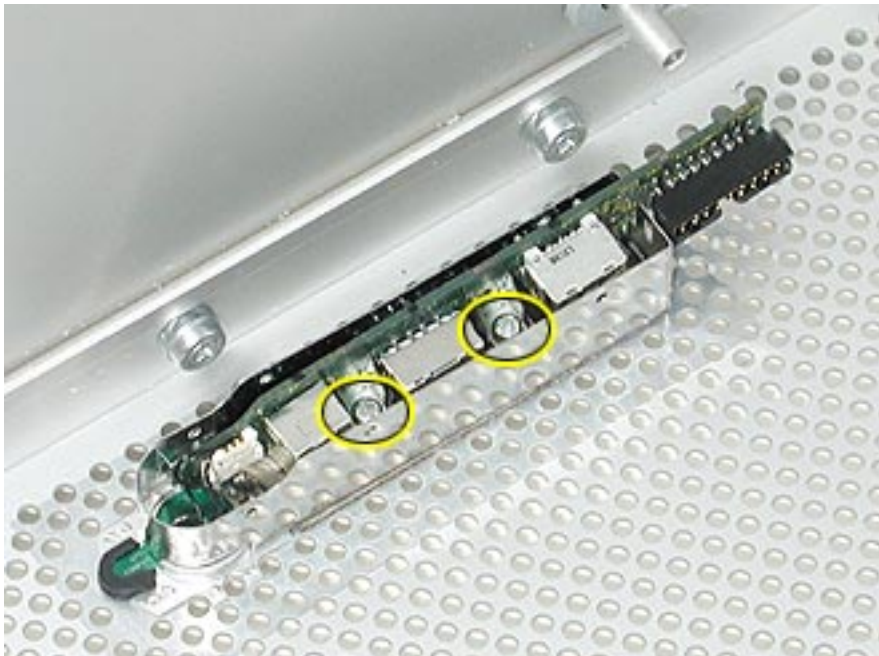
3. Carefully pull the board a short distance out of its EMI shield, and disconnect the power button cable from the board.

4. Remove the board and shield from the enclosure.
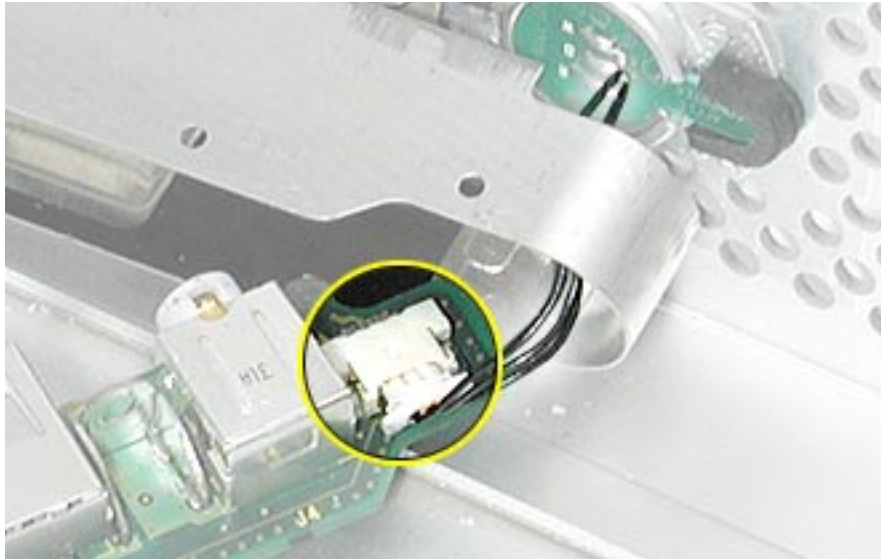
Replacement Procedure

1. If you are replacing the front panel board with a new front panel board, do the following:
   • Peel the backing off the mylar insulation for the EMI shield, and apply the mylar to the side of the shield, as shown.

• Peel the backing off the EMI shield gasket and apply the gasket to the bottom of the shield, making sure the openings in the gasket align with the shield openings.

2. Thread the power button cable through the opening in the EMI shield and connect the cable to the front panel board.

3. Insert the front panel board into the EMI shield, making sure the ports are fully seated in the openings in the shield.
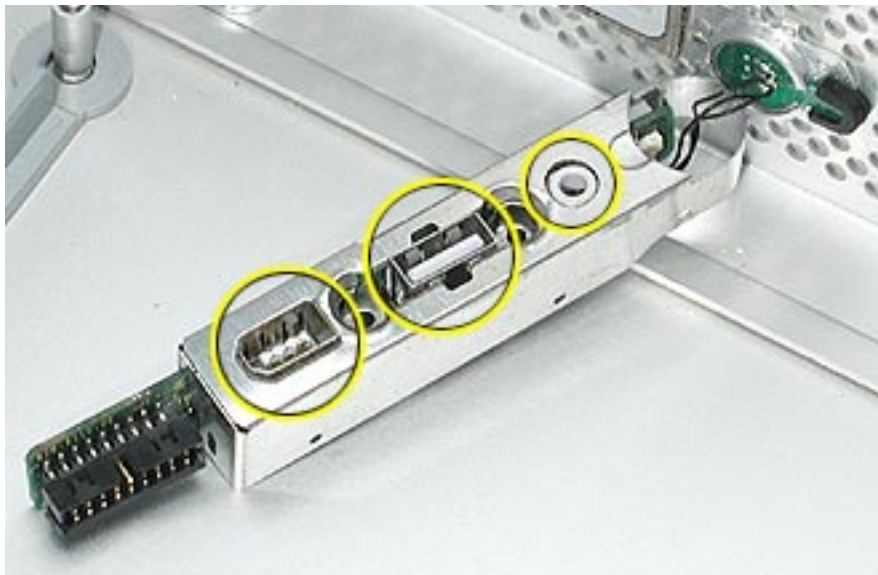
4. Install the front panel board and EMI shield on the inside front of the enclosure and replace the two mounting screws.

5. Install the metal cap on the EMI shield.

 Service Source

Troubleshooting

Power Mac G5

General Information

DDR Memory

In the Power Mac G5, DIMMs must always be installed in pairs of equal size and speed. Use PC2700 DDR-SDRAM for 4-DIMM-slot computers and PC3200 DDR-SDRAM for 8-DIMM-slot computers. Memory from older Macintosh computers is not compatible. Do not try to install non-DDR memory as it will not physically fit in the DIMM slots and could damage the logic board.

Results of Mixing PC2100, PC2700, and PC3200 RAM

The table below describes what happens if you install PC2100, PC2700, or PC3200 memory in either a 4-DIMM-slot or 8-DIMM-slot Power Mac G5 computer.

Four-DIMM-Slot Systems	
When only PC2100 DIMMs are installed	The computer makes three single tones instead of the startup sound. The LED on the front of the computer flashes three times, and the computer does not startup.
When a mix of PC2100, PC2700, or PC 3200 DIMMs is installed	The computer starts up normally, but neither the computer nor Apple System Profiler recognizes the PC2100 memory.
When only PC3200 DIMMs are installed in the slots	The computer starts up normally and behaves as though PC2700 DIMMs are installed.
When no memory is installed	The computer does not make a normal startup sound. Instead, there is a single tone, and the computer's front LED flashes continuously.
Eight-DIMM-Slot Systems	
When only PC2100 DIMMs are installed	The computer makes three single tones instead of the startup sound. The LED on the front of the computer flashes three times, and the computer does not startup.
When a mix of PC2100, PC2700, or PC 3200 DIMMs is installed	The computer starts up normally, but neither the computer nor Apple System Profiler recognizes the PC2100 memory.
When no memory is installed	The computer does not make a normal startup sound. Instead, there is a single tone, and the computer's front LED flashes continuously.

PCI and AGP Cards

The Power Mac G5 computer has four expansion card slots, three of which accommodate Peripheral Component Interconnect (PCI) cards and one that accepts an advanced graphics port (AGP) video card. AGP cards and PCI cards have different connectors, so you cannot insert a PCI card into the AGP slot.

AGP Slot 1
PCI Slot 2
PCI Slot 3
PCI Slot 4
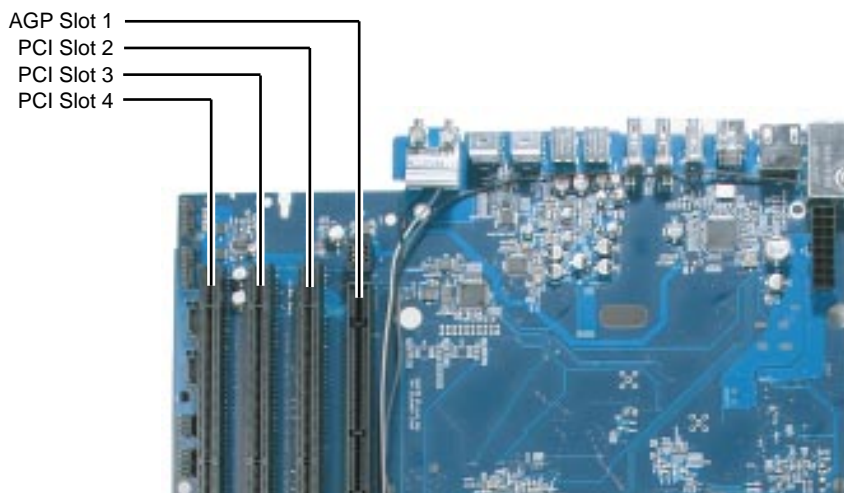
Note: Maximum power consumption for all four expansion slots (the three PCI expansion cards and the AGP card) should not exceed 90 watts (W).

AGP Cards

The AGP video card, installed in slot 1, contains the graphics processor unit (GPU) and provides the computer's display ports. Slot 1 is designed specifically to accept AGP cards. This 533-megahertz (MHz) slot accommodates 1.5-volt (V) AGP cards.

PCI Cards

The remaining three expansion slots, labeled 2, 3, and 4, accommodate PCI cards up to 12 inches long. Depending on the Power Mac G5 model, you can install either PCI or PCI-X cards.

Note: To determine if a Power Mac G5 computer can accommodate PCI-X cards, check the number of DIMM slots on the logic board. Computers with four DIMM slots have 33 MHz PCI slots and cannot use PCI-X cards; computers with eight DIMM slots can accommodate 100 and 133 MHz PCI-X cards. See the chart below.

Card type	PCI slot	Card speed
PCI*	slots 2, 3, and 4	64-bit, 33 MHz
PCI-X	slots 2 and 3	64-bit, 100 MHz
	slot 4	64-bit, 133 MHz

*The PCI slots can accommodate mixed-voltage (5.0 V, 12 V, or 3.3 V) cards but only at 3.3 V signaling, with 32-bit or 64-bit data widths and a 33 MHz frequency. You can add a 66 MHz card to a 33 MHz PCI slot if the card can operate at the lower 33 MHz rate.

Warning: Installing PCI cards that function only at 66 MHz could damage the computer. However, cards that run at both 66 MHz and 33 MHz may be installed. Check with the card's manufacturer to see if a 66 MHz card also works at 33 MHz.

Thermal Calibration

To ensure proper fan and temperature control in the Power Mac G5, you must run Apple Service Diagnostic whenever you replace a processor or logic board with a new processor or logic board. You must also run the diagnostic if you re-install the same processor but in a different connector from the one in which it was originally installed. Apple Service Diagnostic for Power Mac G5 is available as a download from the Disc Images section of the Apple Service Source website.

Note: The calibration process of Apple Service Diagnostic requires a controlled environment to ensure accurate ambient temperature readings. Computers under test must have the transparent air deflector installed and the door sensor switch must be operable. Units under test should also be located away from heating and air conditioning ventilation systems and the fan exhaust of other machines. Ambient temperature should not go above 77 degrees Fahrenheit or 25 degrees Centigrade.

Block Diagram

The architecture of the Power Mac G5 computer is based on the PowerPC G5 microprocessor and two custom ICs: the U3 memory controller/bus bridge and the K2 I/O controller.
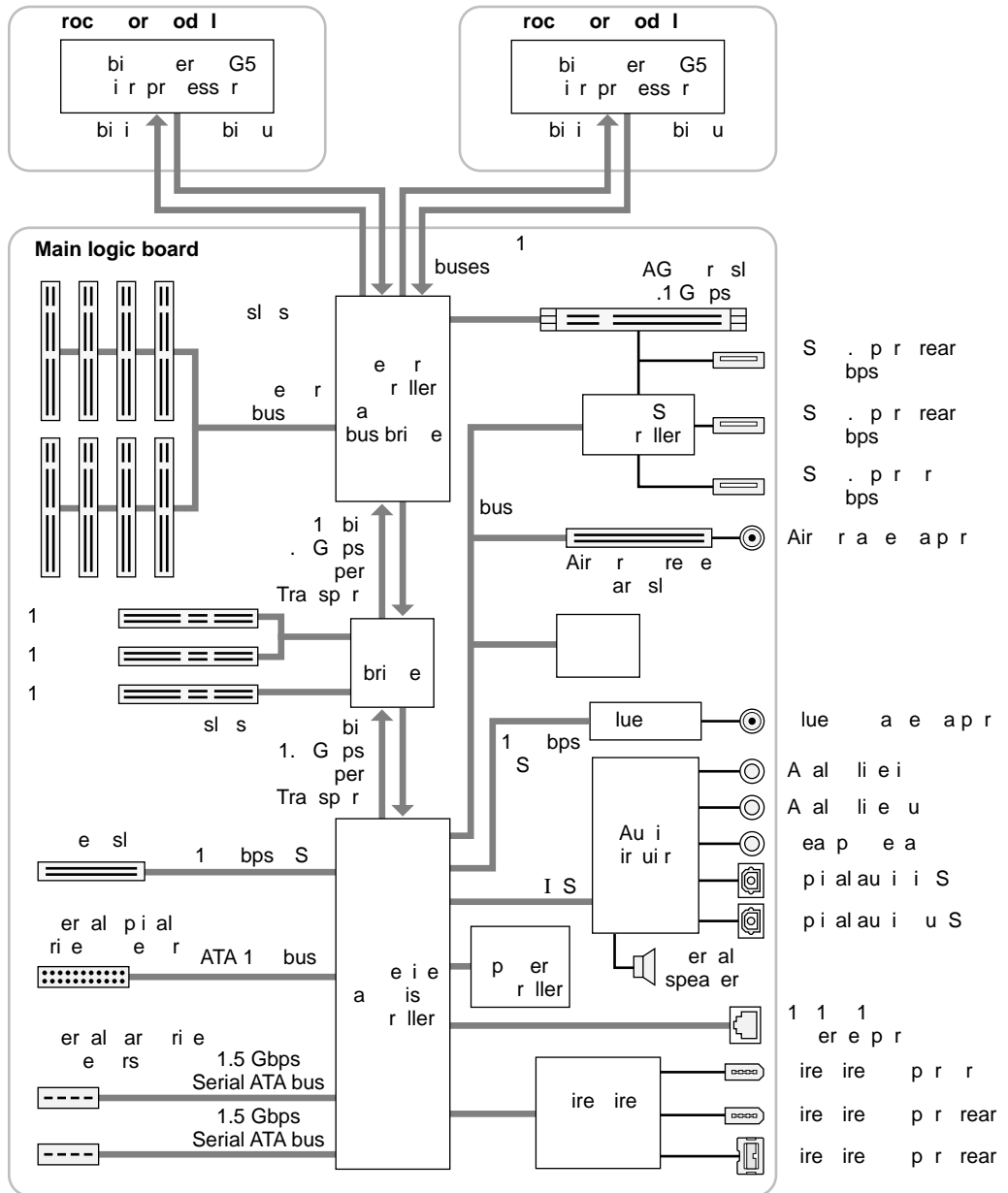
Resetting the PMU on the Logic Board

The PMU (Power Management Unit) is a microcontroller chip that controls all power functions for this computer. The PMU is a computer within a computer. 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 logic board. The PMU is very sensitive and touching the circuitry on the logic board can cause the PMU to crash. If the PMU crashes and is not reset, the battery life goes from about five years to about two days.

Note: For the location of the PMU reset button, see "Logic Board Diagram" in the Views chapter.

Many system problems can be resolved by resetting the PMU chip. When you have a computer 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. The battery should read 3.3 to 3.7 volts. If the battery is bad, replace it, wait ten seconds, and then proceed to step 2. If the battery is good, go directly to step 2.

2. Press the PMU reset button once and then proceed to step 3. Do not press the PMU reset button a second time because it could crash the PMU chip.

3. Wait ten seconds before connecting the power cord and powering on the computer. If the computer does not power on, there is something else wrong with it; refer to the "System" section of "Symptom Charts" in this chapter.

Note: The above procedure resets the computer's PRAM. After resetting the PMU, be sure to reset the time, date, and other system parameter settings.

RAM and Processor Verification: Power-On Self Test

A power-on self test in the computer's ROM automatically runs whenever the computer is started up after being fully shut down (the test does not run if the computer is only restarted). If the test detects a problem, the status LED located above the power button on the front of the computer will flash in the following ways:
• **2 Flashes:** No RAM is installed or detected.
• **3 Flashes:** Incompatible RAM types are installed.
• **4 Flashes:** No RAM banks passed memory testing.
• **5 Flashes:** No good boot images are detected in the boot ROM (and/or there is a bad sys config block).
• **6 Flashes:** The processor is not usable.

Pinouts

Power Supply P1 Connector
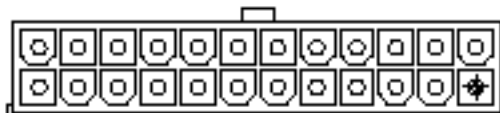
Pin #	Signal	Color	Pin#	Signal	Color
1	+5Vstb	Purple	13	GND	Black
2	GND	Black	14	Power ON	Green
3	FANtach	White/Yellow	15	GND	Black
4	GND	Black	16	Reserved	
5	Reserved		17	GND	Black
6	GND	Black	18	RTNaud(GND)	Black
7	+12Vaud (12V2)	Yellow	19	GND	Black
8	GND	Black	20	+5V sense	Red
9	+3.3V sense	Orange	21	GND	Black
10	GND	Black	22	-12V	Blue
11	GND	Black	23	GND	Black
12	Reserved		24	Reserved	

Power Supply P2 Connector
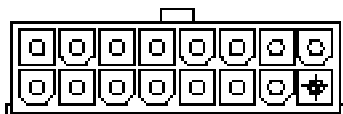
Pin#	Signal	Color	Pin#	Signal	Color
1	+3.3V	Orange	9	+5V	Red
2	+3.3V	Orange	10	+5V	Red
3	+3.3V	Orange	11	+5V	Red
4	+3.3V	Orange	12	+12V3	Yellow
5	Reserve		13	+12V3	Yellow
6	+12Vfan	Yellow	14	+12V1	Yellow
7	+12Vfan(12V2)	Yellow	15	+12V1	Yellow
8	+25V	White	16	RTNfan(GND)	Black

Power Supply P3 Connector

Pin#	Signal	Color	Pin#	Signal	Color
1	+5V	Red	5	+5V	Red
2	GND	Black	6	GND	Black
3	GND	Black	7	GND	Black
4	12V2	Yellow	8	+12V2	Yellow

Front Inlet Fan Connector
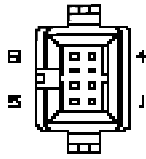
Pin#	Signal
1	FAN CPU Cpu AF MOTOR
2	FAN CPU AF TACH
3	FAN GND
4	FAN 12V
5	FAN CPU BF MOTOR
6	FAN CPU BF TACK
7	TEMP SENSE D-
8	TEMP SENSE D+

Front Panel Board Connector
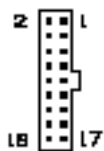
Pin#	Signal	Type
1	25V	
2	V-GND	
3	FW TPA	Twisted Pair Shield 110 Ohm
4	FW TPA +	Twisted Pair Shield 110 Ohm
5	CHASSIS GND FW	
6	CHASSIS GND USB	
7	FW TPB	Twisted Pair Shield 100 Ohm
8	FW TPB+	Twisted Pair Shield 100 Ohm
9	USB PWR	
10	USB GND	
11	USB	Twisted Pair Shield 60 Ohm
12	USB+	Twisted Pair Shield 60 Ohm
13	LED	
14	PWR BTN	
15	AUDIO SENSE	
16	AUDIO COM	Twisted TRI
17	AUDIO RIGHT	Twisted TRI
18	AUDIO LEFT	Twisted TRI

Optical and Serial ATA Hard Drive Cable Connectors

Power		Optical		SP1 (HD1)		SP2 (HD2)	
Pin#	Color	Pin#	Color	Pin#	Color	Pin#	Color
1	BLK	4	BLK				
2	BLK	3	BLK				
3	BLK	1	BLK				
4	BLK			2	BLK	2	BLK
5	BLK			3	BLK	3	BLK
6	BLK			1	BLK	1	BLK
7	BLK			4	BLK	4	BLK

Media Bay Temperature Sensor Cable

7 Pin Connector	Signal	5 Pin Connector	4 Pin Connector
1	3.3V	1	1
2	[ ]G B CLK	2	
3	] [G B DAT	2	
4	GND	4	2
5	OVER TEMP	5	
6	DOOR AJAR 1		3
7	3.3V SLEEP		4

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 a cure instructs you to replace a module, reinstall the original module before you proceed to the next cure.

Important: The only way to shut off power completely to the computer and display is to disconnect their power plugs from the power source. Make sure the power cords to the computer and display are within easy reach.

Failures

No power (no LED, no fans, no boot tone, no video)

1. Verify power outlet is good
2. Replace power cord
3. Check power supply cables
4. Check power rails for correct voltage
5. Replace power supply
6. Check front panel board cable
7. Replace front panel board cable
8. Replace front panel board
9. Replace power button
10. Replace logic board

No LED (fans on, boot tone, video)

1. Replace front panel board
2. Replace power button

No power (LED on/off, no fans, no boot tone, no video)

1. Check power supply cables

2. Check logic board power rails

3. Check processor connector

4. Check logic board tape for dual config

5. Replace power supply

6. Replace processor

7. Replace logic board

No boot (LED on/off, fans spin, no boot tone, no video)

1. Replace memory

2. Replace logic board

Memory (blinking LED, fans spin, no boot tone, no video)

1. Check memory config and replace DIMMs

2. Replace logic board

No boot tone (LED on, fans spin, no boot tone, video) or
No video (LED on, fans spin, boot tone, no video)

1. Reseat video card

2. Replace video card

3. Replace front panel board cable

4. Replace speaker

5. Replace front panel board

6. Replace logic board

Duct door sensor

1. Reseat interlock sensor board cable

2. Replace interlock sensor board

3. Replace logic board

4. Replace enclosure

Optical drive

1. Replace optical drive cable

2. Replace optical drive

3. Replace logic board

FireWire port (front panel A)

1. Replace front panel board cable

2. Replace front panel board

3. Replace logic board

Firewire port (rear A<->B)

Replace logic board

Firewire port (rear B<->B)

Replace logic board

Internal speakers (left or right fails, boot tone)

Replace logic board

Internal speakers (high-pitch tone)

1. Replace power supply

2. Replace logic board

USB 2.0 (front port)

1. Replace front panel board cable

2. Replace front panel board

3. Replace logic board

USB 2.0 (rear-top port)

Replace logic board

USB 2.0 (rear-bottom port)

Replace logic board

Modem

1. Replace modem

2. Replace modem filter board

3. Replace logic board

AirPort

1. Replace AirPort Card

2. Replace antenna card

3. Replace logic board

Bluetooth

1. Replace Bluetooth card

2. Replace antenna card

3. Replace logic board

Audio IO (front line in <-> headphones)

1. Replace front panel board cable

2. Replace front panel board

3. Reposition logic board

4. Replace logic board

Audio IO (rear line in <-> line out)

Replace logic board

Audio IO (rear line out <-> line out)

Replace logic board

Fans

1. Replace fan

2. Replace logic board

Service Source
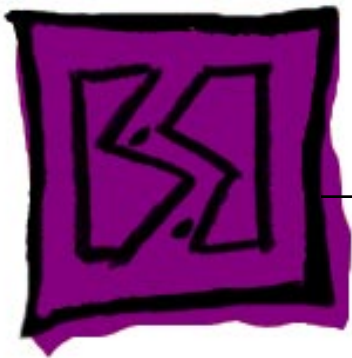
Views

Power Mac G5

Exploded Views

Exploded View 1

Super Drive
661-2908
Combo Drive
661-2909

Optical Drive EMI Shield
922-6036

Speaker / Fan Bracket
922-6029

Speaker
922-5959

Fan
076-1049

Inlet / Processor Fan, Dual
076-1046
Inlet Fan Bracket, Dual
922-6031
Inlet / Processor Fan, Uni
076-1048
Inlet Fan Bracket, Uni
922-6058

Power Supply
450W 661-2903
600W 661-2904

Video Card
661-2912, 661-2921, 661-2922
Fibre Channel Card
661-1763

Serial ATA Hard Drive
80GB 661-2905
160GB 661-2906
250GB 661-2907

Rear Exhaust Fan Bracket
922-6033

Rear Exhaust Fans
076-1047

Enclosure
922-5952

Exploded View #2

DC Heatsink Cover
922-6025

G5 Heatsink Cap
922-6026

PCI Divider
922-6207

Processor, 1.6 GHz, Uni
661-2899
Processor, 1.8 GHz, Uni
661-2900
Processor, 2.0 GHz, Dual
661-2901

Logic Board, 167 MHz, Uni
661-2894
Logic Board, 233 MHz, Uni
661-2895
Logic Board, 233 MHz, Dual
661-2950

DIMMS, DDR 333
128MB 661-2897
256MB 661-2726
512MB 661-2727
1GB 661-2935

DIMMS, DDR 400
256MB 661-2898
512MB 661-2934

Internal Views

Overview

Optical Drive

Top Hard Drive Bay

Battery

Bottom Hard Drive Bay

G5

G5

AirPort Extreme
Card Connector

Slots 2—4: PCI or PCI-X Slots
(Depending on model)

DDR SDRAM Slots
(Either 4 or 8 Slots,
depending on model)

Slot 1: AGP 8X Pro Slot
(Graphics card installed)

Logic Board

Optical Digital Audio In
Optical Digital Audio Out

BlueTooth Antenna
AirPort Antenna

AGP Slot 1
PCI Slot 2
PCI Slot 3
PCI Slot 4

Rear Exhaust Fan Connector

Media Thermal Sensor Connector

Upper Hard Drive Connector

Lower Hard Drive Connector

Media Fan Connector

Media Blower Connector

Battery

Optical Drive Connector

Speaker Connector

PCI Fan Connector

Modem Card Connector

Bluetooth Connector

Front Inlet Fan Connector

AirPort Connector

Audio Line Out
Audio Line In

USB 2.0 Port
USB 2.0 Port
FireWire 400 Port
FireWire 800 Port
Ethernet Port
Modem Port

Power Supply Connector

Processor Connectors

Power Supply Connector

PMU Reset Button

Front Panel Board Connector

DIMM Slots

External Views

Front View

Optical Drive

Status Light

f Headphone Jack

¤ Power Button

⚡ FireWire 400 Port

USB 2.0 Port

Rear View

Latch

DVI Display Port

AirPort Antenna Port

Bluetooth Antenna Port

USB 2.0 Ports (2)

FireWire 400 Port

FireWire 800 Port

Power Socket

Access Covers for PCI Expansion Slots

ADC Display Port

Optical Digital Audio Out Port

Optical Digital Audio In Port

Audio Line-Out Port

Audio Line-In Port

Ethernet Port

Internal Modem Port (On some models)