



# Replacing/Upgrading Mac Pro Processors (Early 2008)

The steps in this procedure illustrate how to remove the lower processor (CPU B). The instructions are the same for removing the upper processor (CPU A). If you have a Mac Pro with only one processor it can be upgraded to two. All motherboards in the 2008

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# INTRODUCTION

Welcome, you will learn that replacing or installing a new processor/s is by far the more difficult procedure to complete. Once complete you will have a faster computer and a stronger understanding of your Mac Pro.



## TOOLS:

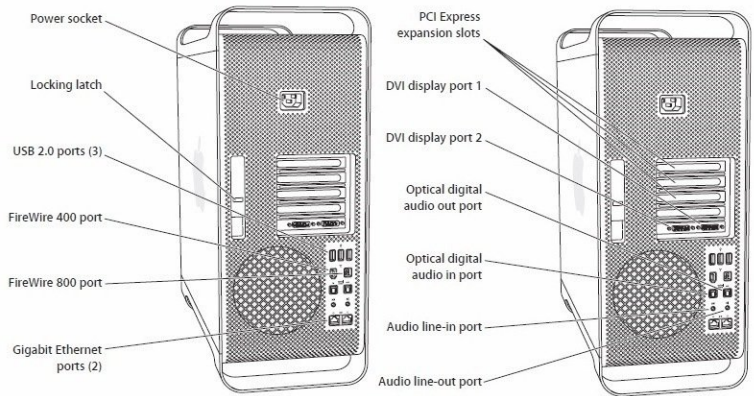
- Phillips #1 Screwdriver (1)
- Phillips #1 Screwdriver "long-handled" (1)
- Magnetized jeweler's #1 Phillips screwdriver (1)
- Right-angle, magnetized #1 Phillips screwdriver (1)
- Long-handled, magnetized 3 mm flathead hex screwdriver (1)
- Anti-Static Wrist Strap (1)
- Arctic Silver Thermal Paste (1)
- High Content Rubbing Alcohol (1)
- Lint-Free Cloth (1)



## PARTS:

- 2.8GHz, 3.0GHz, or 3.2GHz Quad-Core Intel Xeon 5400 series (2)
- Processors

## Step 1 — Opening the Computer (Early 2008)



- Shut down the computer.

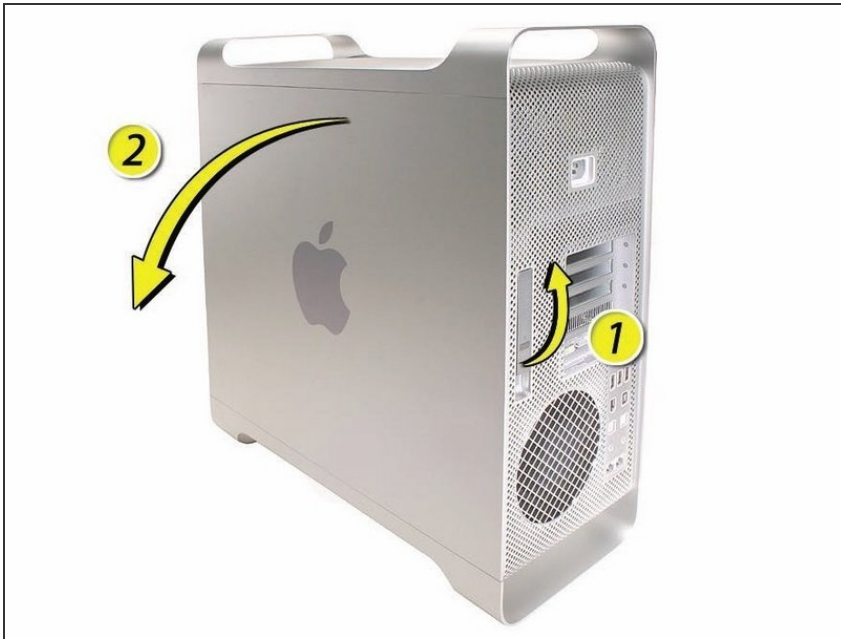
**Warning:** Always shut down the computer before opening it to avoid damaging its internal components or the components you are installing. Do not open the computer or attempt to install items inside it while it is on.

- 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.

- Unplug all external cables from the computer except the power cord.
- Touch the metal PCI access covers on the back of the computer to discharge any static electricity from your body.
- Unplug the power cord.
- Put on an ESD wrist strap.

## Step 2



- 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.

**i** 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.

## Step 3 — Hard drives and hard drive carriers (Early 2008)

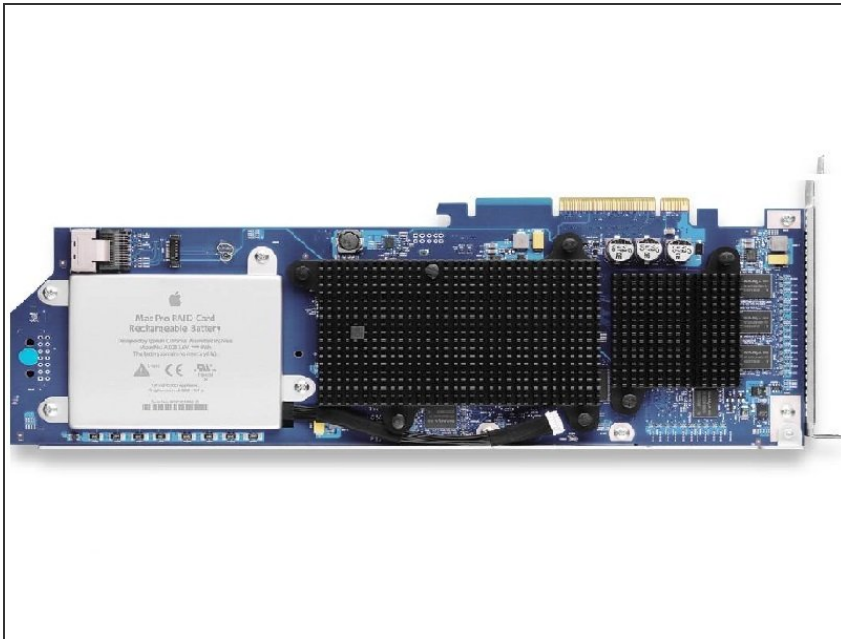


**i** The hard drives must meet the following specifications:

- Type: Serial Attached SCSI (SAS) or Serial ATA (SATA) 3 Gb/s
- Width: 3.9 inches (102 mm)
- Depth: 5.7 inches (147 mm)
- Height: 1.0 inch

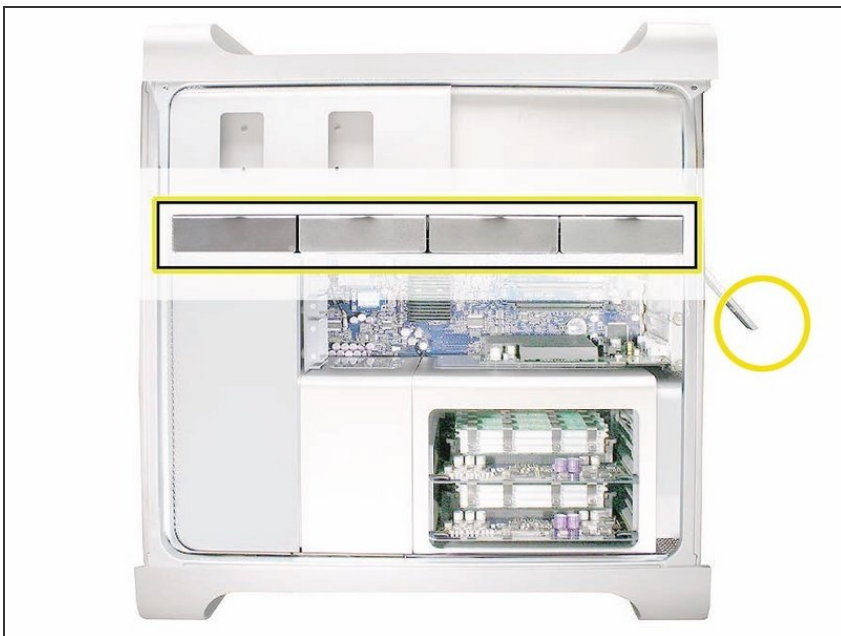


## Step 4



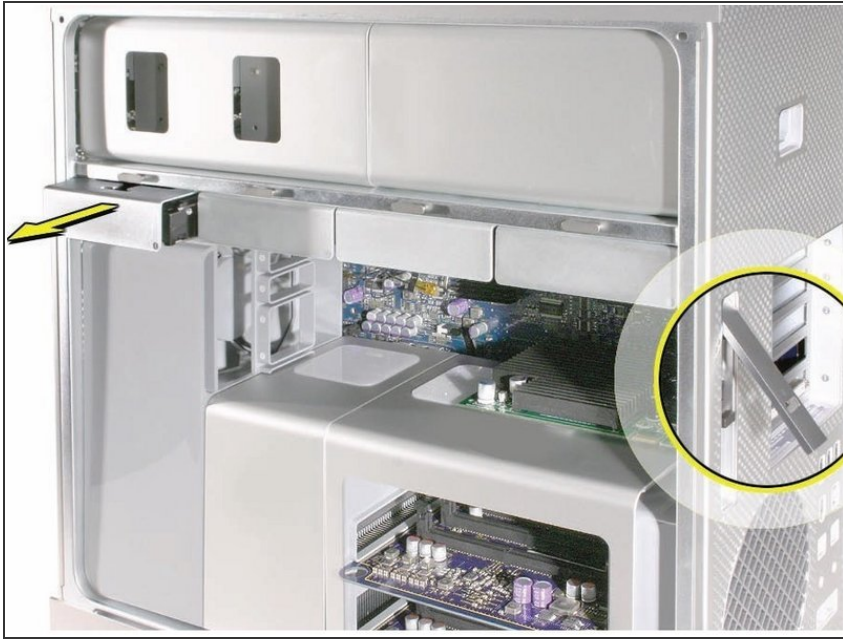
**⚠ Important:** To install SAS drives in a Mac Pro (Early 2008) computer, you must also install the optional Mac Pro RAID Card.

## Step 5



- Before you begin, open the computer, and lay it on its side with the access side facing up.
- ⓘ **Important:** Make sure the latch on the back panel is in the up position. When the latch is down, the hard drives and carriers are locked in place and you will not be able to remove them.

## Step 6



- Make sure the latch on the back panel is up, so that the drives and carriers are unlocked.
- Pull the hard drive out of the drive bay.

## Step 7

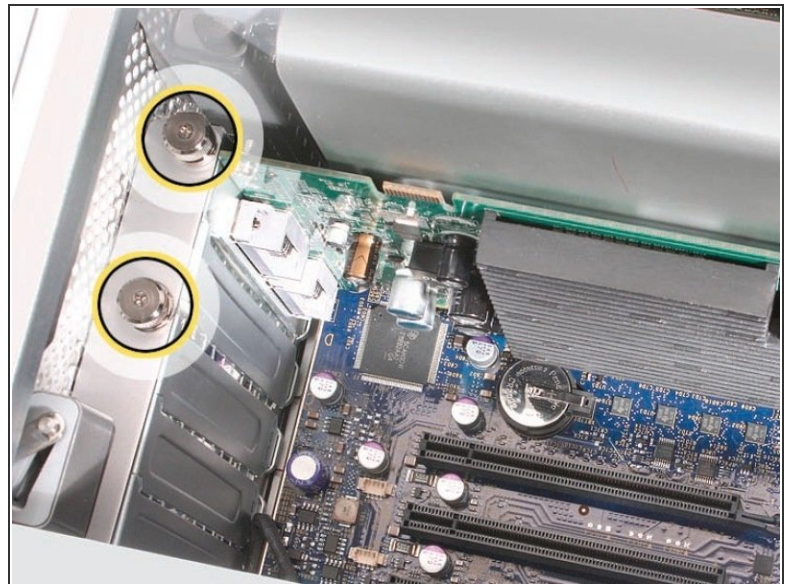
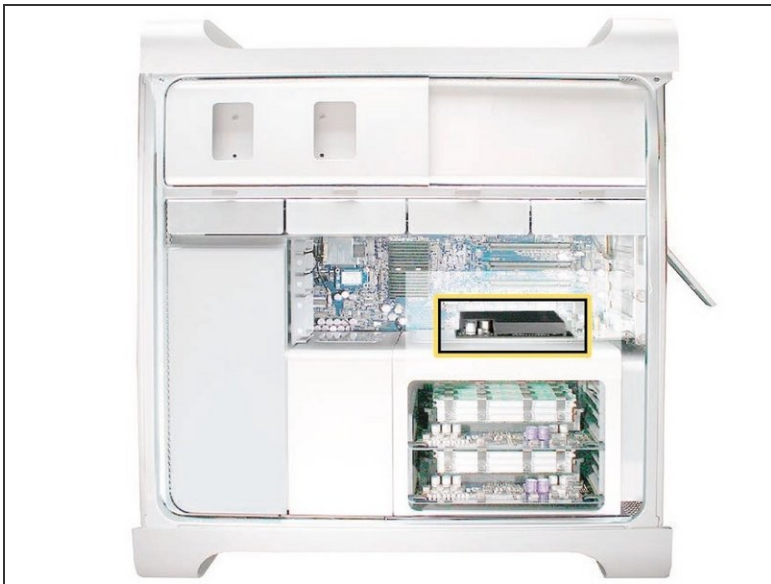


- If you are replacing the hard drive with a new drive, remove the four screws that mount the drive to the

carrier and mount the new drive in the carrier.

- ⓘ Important: Hold the drive by its sides. Be careful not to touch the printed circuit board on the bottom of the drive.
- ⓘ Replacement Note: Slide the carrier and drive over the guides and into the drive bay, until you feel the drive snap into place.

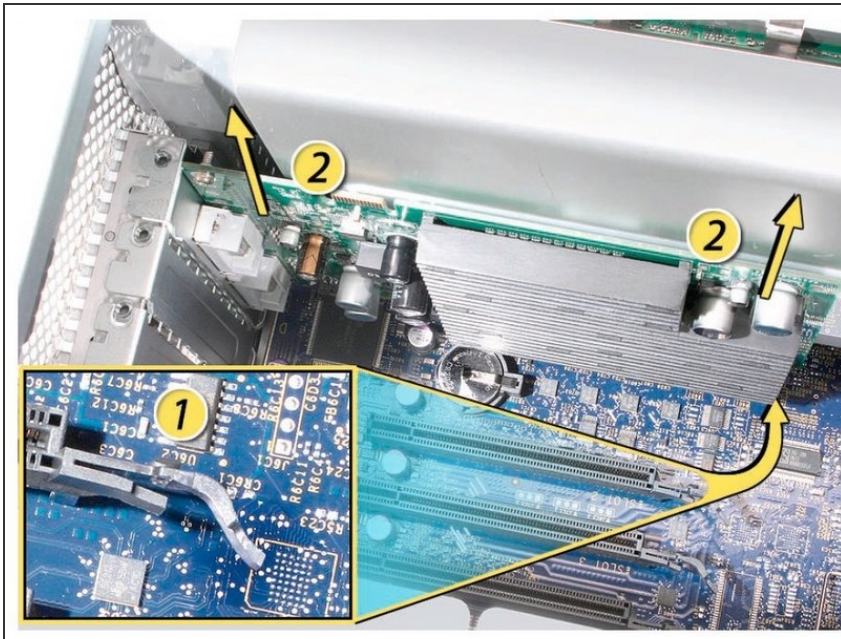
## Step 8 — Graphic Card for Mac Pro (Early 2008)



- This procedure explains how to remove a standard card and a card that includes a booster cable. Before you can remove either type of card, however, you must first loosen the two captive screws that secure the PCI bracket to the enclosure and remove the bracket.



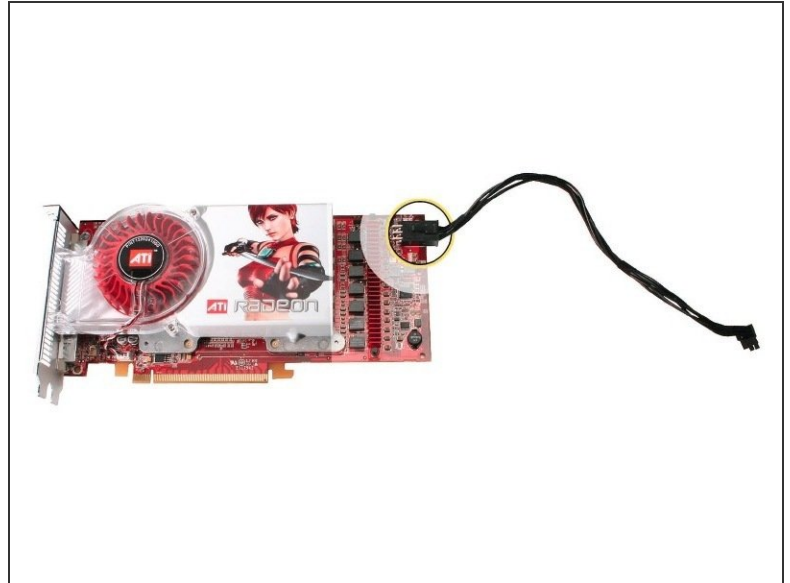
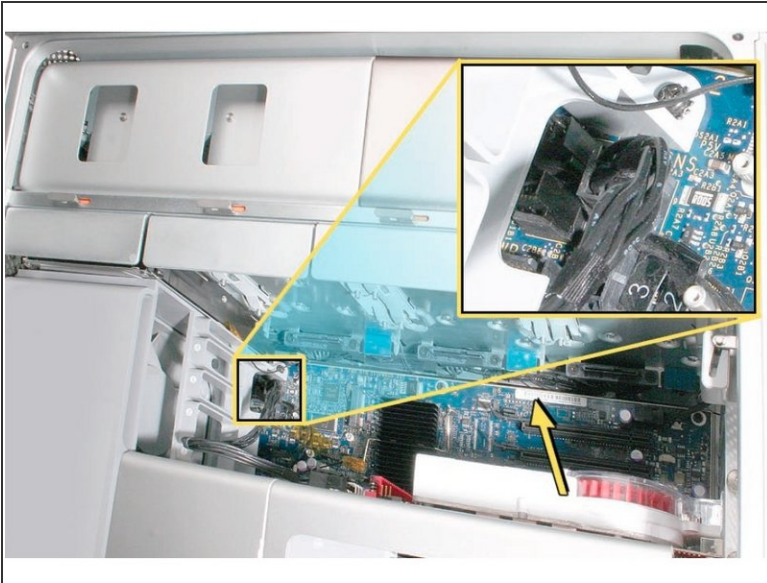
## Step 9



**⚠** Handle the card only by the edges. Do not touch its connectors or any of the components. 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.

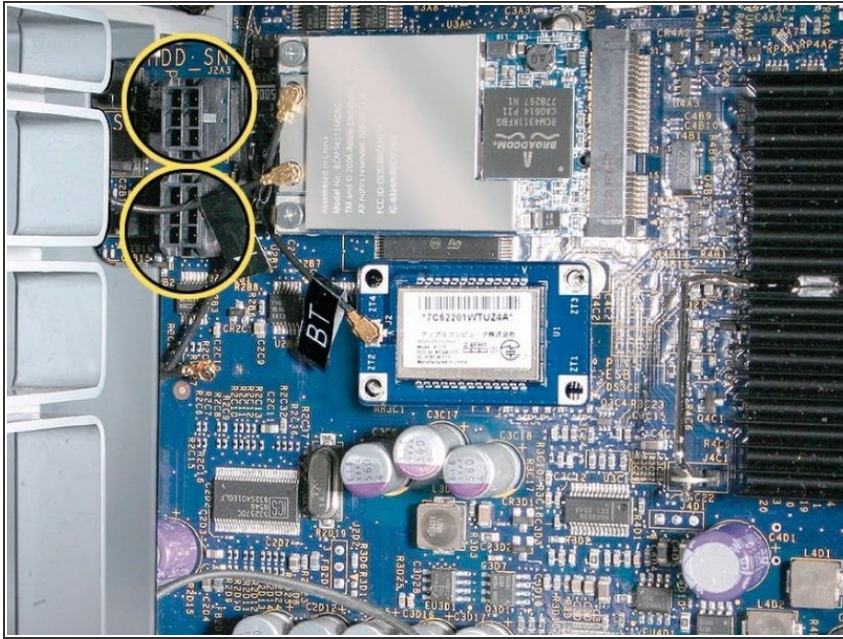
- 1) Release the small locking clip at the front of the card's logic board connector by pushing the clip up toward the media shelf.
- 2) Holding the card by the top corners, pull up the card and remove it from its expansion slot.

## Step 10 — Card with Booster Cable



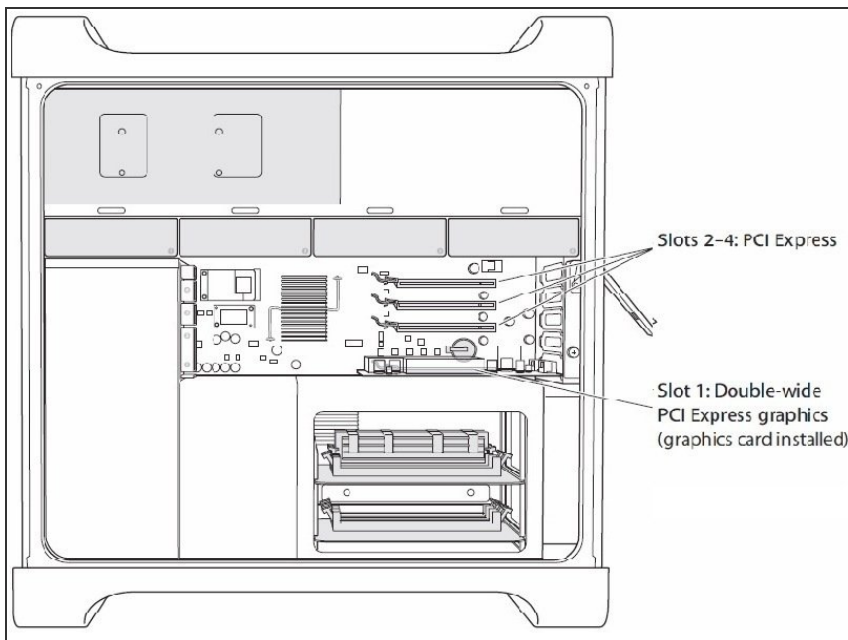
- ❗ Some graphics cards require either one or two booster cables connecting the card to the auxiliary power connectors on the logic board.
- ❗ The graphics card NVIDIA GeForce 8800 GT requires one booster cable; the graphics card NVIDIA Quadro FX 5600 requires two booster cables.
- Disconnect the booster cable(s) from the logic board.
- Release the small locking clip at the front of the card's logic board connector by pushing the clip up toward the media shelf.
- Holding the card by the top corners, gently pull up the card and remove it from its expansion slot.
- ❗ If you are replacing a booster cable with a new one, disconnect the cable from the card.

## Step 11



- ❗ Replacement Note for Card Using One Booster Cable: Be sure to connect the card's booster cable to the correct auxiliary power connector on the logic board. Connect the booster cable for a card in PCI slot 1 to the lower connector. Connect the booster cable for a card in PCI slot 2 to the upper connector.
- ❗ Replacement Note for Card Using Two Booster Cables: Connect both cables to the two auxiliary power connectors.

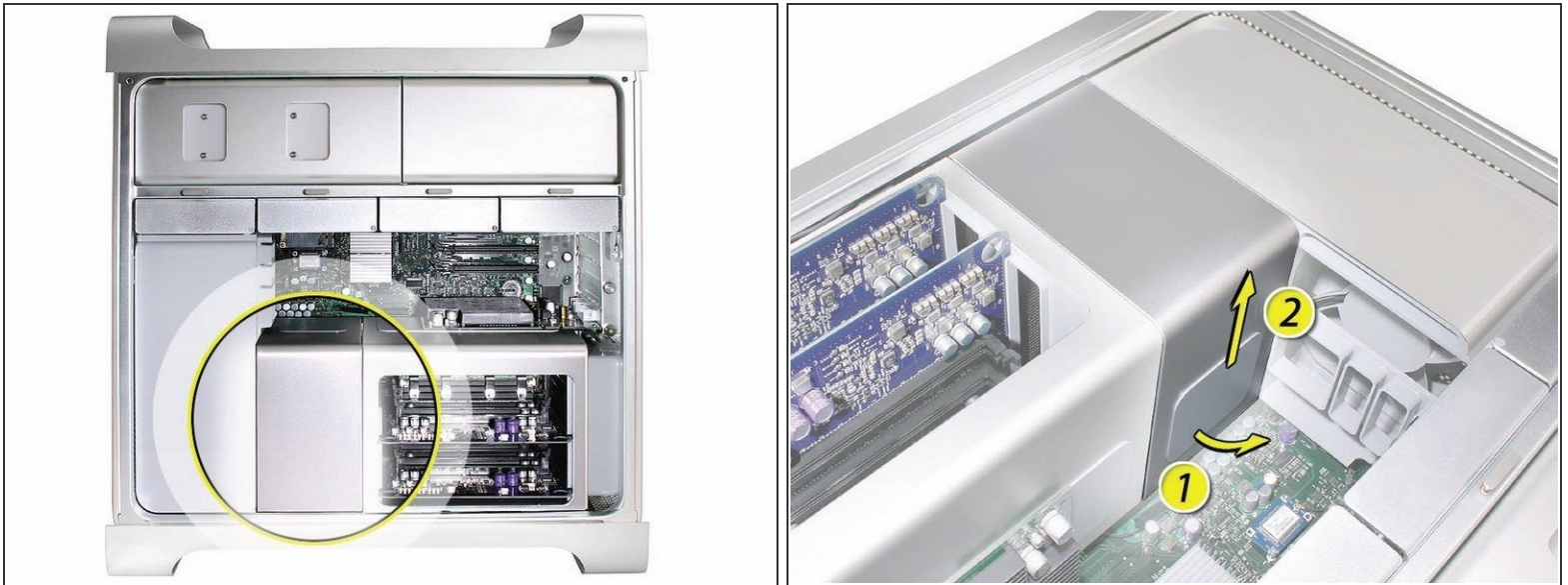
## Step 12 — PCI Express Cards (Early 2008)



- ❗ The procedure to remove the graphic cards is the same for PCI Express Cards for exception of minor card differences.
- ⚠ Important: Combined maximum power consumption for all four PCI Express slots must not exceed 300 W.



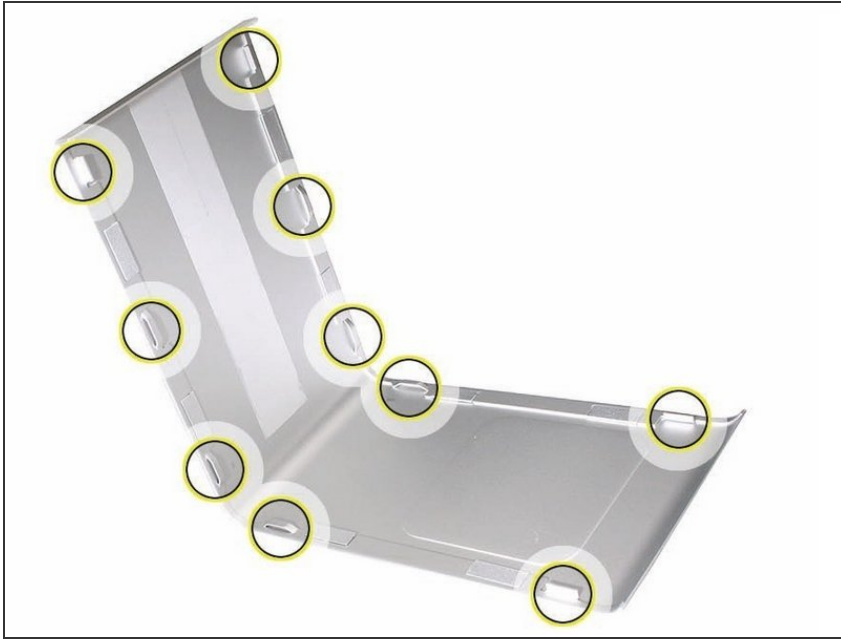
## Step 13 — Processor Heatsink Cover (Early 2008)



- ✦ Remember to check that all the PCI Express cards have been removed and properly stowed.
- ⓘ Note: The heatsink cover is held in place by a number of tabs and magnets on the underside of the cover. You must release the tabs before you can remove the cover from the enclosure.
  - Place the fingers of one hand under the lip of the heatsink cover nearest the logic board. Lift the lip slightly toward the media shelf to release the tabs and magnets under the top face of the cover.
  - With your fingers still under the cover's bottom lip, lift the cover straight up to release the remaining tabs and magnets under the front face of the cover
  - Remove the cover from the enclosure.



## Step 14



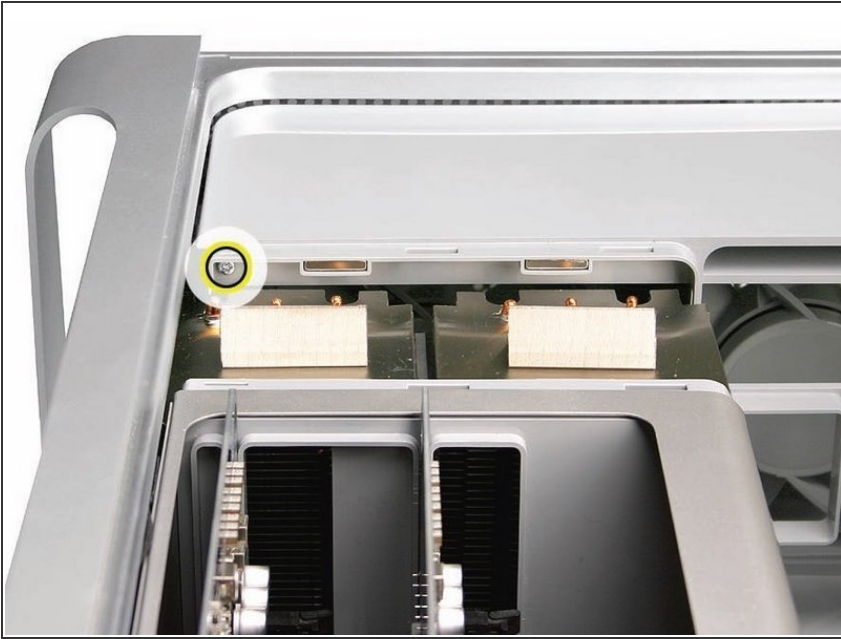
**i** Replacement Note: When reinstalling the processor heatsink cover, make sure the tabs on the underside of the cover align with the slots directly below them. (The slots are on the front fan and memory cage on either side of the heatsink cover.)

## Step 15 — Front Fan Assembly (Early 2008)



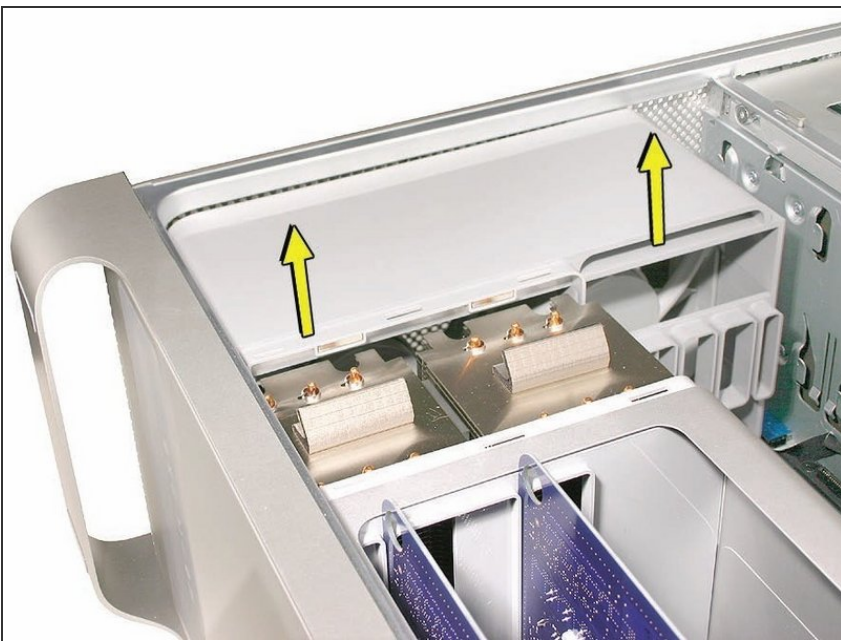
- Remember:** Before removing the Front Fan Assembly ensure that the first two bays of the hard drives are removed, All PCI express cards removed, and placed in a safe location.
- Using a long-handled, magnetized #1 Phillips screwdriver, remove the screw at the top rear of the front fan assembly that mounts the assembly to the logic board.

## Step 16



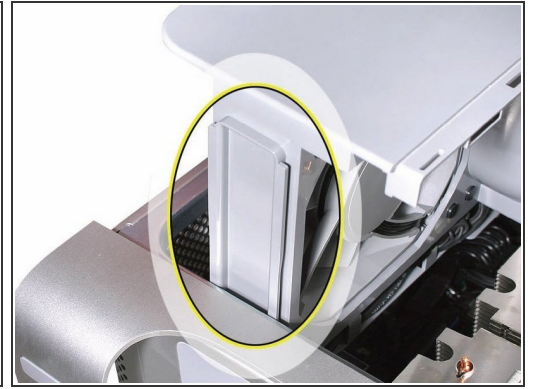
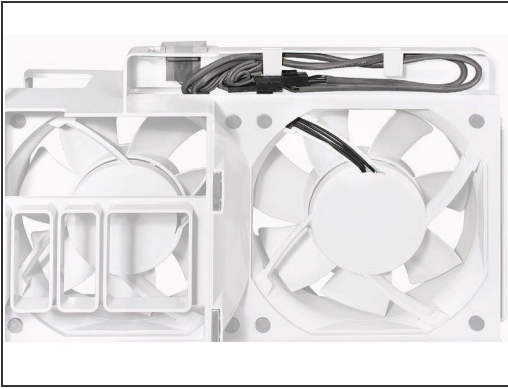
- Remove the second Phillips screw at the bottom front of the assembly.

## Step 17



- Place one hand on each end of the fan, lift straight up, and remove the fan from the enclosure.

## Step 18



- ⓘ Replacement Note: Before re-installing the front fan assembly in the enclosure, make sure that the fan cables are routed correctly in the fan channel.
- ⓘ Replacement Note: Make sure all AirPort and Bluetooth antenna wires are out of the way before lowering the fan assembly onto the logic board.
- ⓘ Replacement Note: When lowering the front fan into the enclosure, slide the guide on the base of the fan assembly into the channel on the speaker assembly.

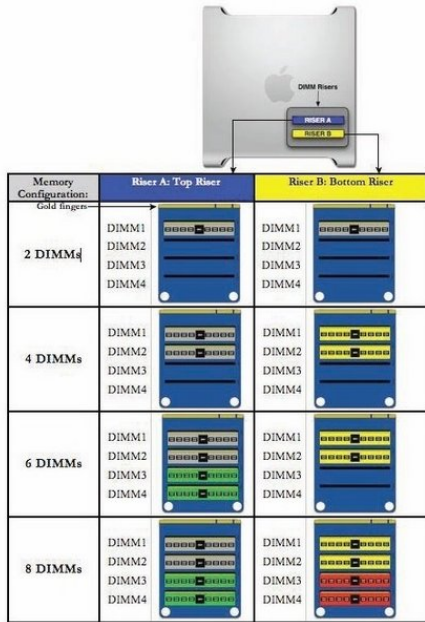
## Step 19



- Replacement Note: Also make sure the latch on the inside top left edge of the fan assembly engages with the slot on the inside lip of the enclosure



## Step 20 — Memory (FB-DIMMs) and Memory Riser Cards (Early 2008)



- i** Additional pairs of 1 GB, 2 GB, or 4 GB FB-DIMMs can be installed in the open DIMM slots. Maximum memory is 32 GB.
- i** DIMMs must be installed as pairs of identical size and type, from the same vendor. Use the provided illustration, like-colored DIMMs must match.
- !** DIMMs for Mac Pro (Early 2008) must fit these specifications:

  - 800 MHz, DDR2, FB-DIMMS
  - 72-bit wide, 240-pin modules
  - 36 memory ICs maximum per DIMM
  - Error-correcting code (ECC)
- i** Important: For proper operation of Mac Pro (Early 2008) computers, Apple recommends using only Apple-approved Mac Pro (Early 2008) FB-DIMMs

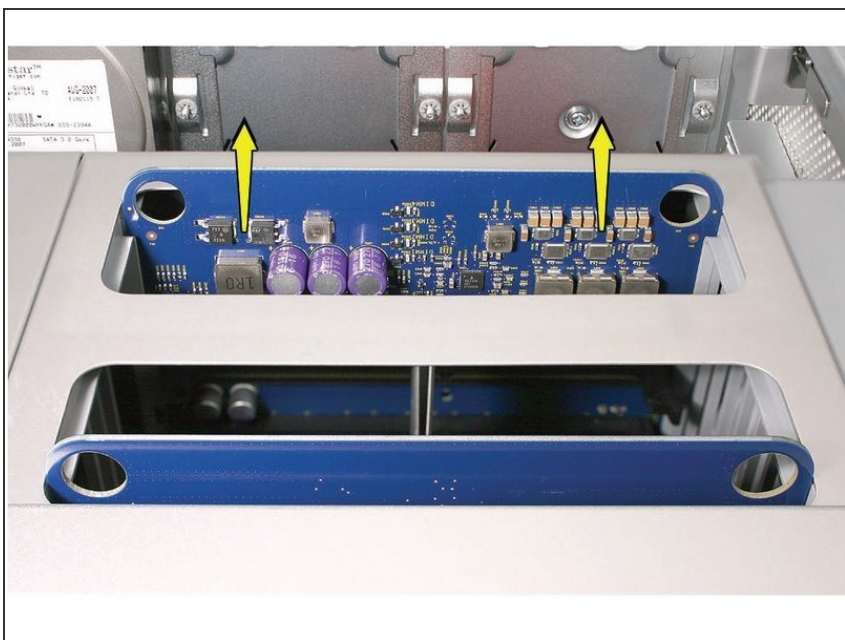


## Step 21



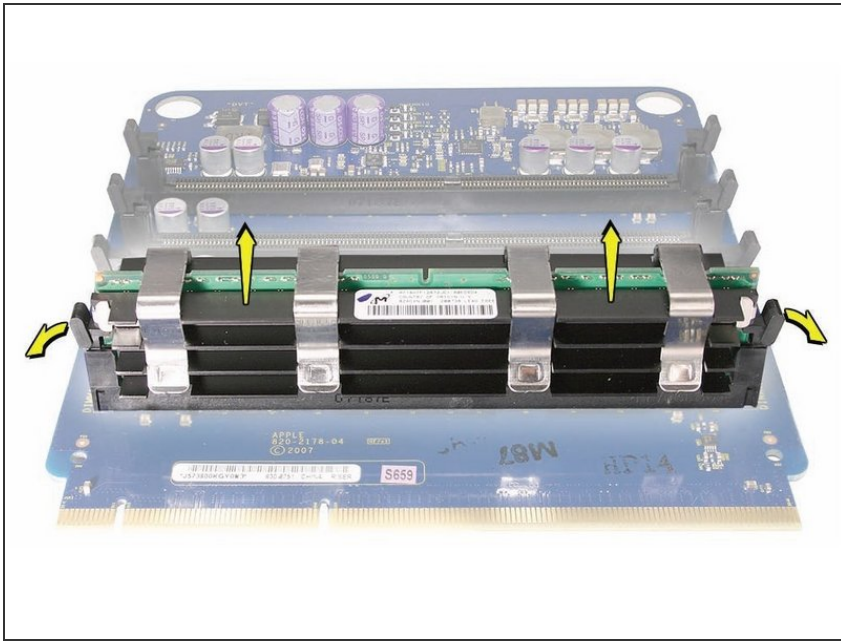
**Warning:** Always wait 5–10 minutes for the computer to cool down before you remove or install memory. The DIMMs may be very hot.

## Step 22



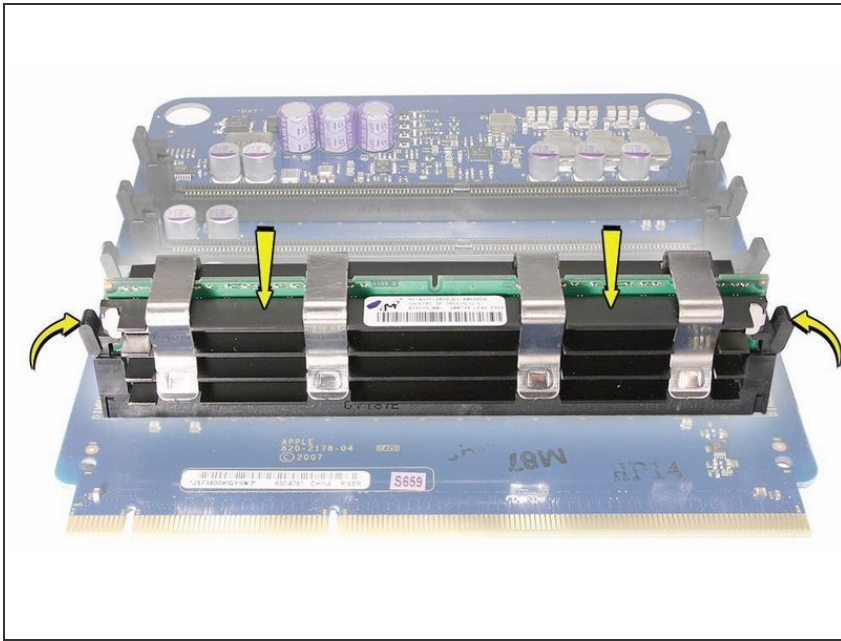
- Holding the memory riser card by the two finger holes, pull it out of the memory cage and place the card DIMM side up on a soft, clean cloth.

## Step 23



- Open the ejectors on the DIMM slot by pushing them out to the sides, and remove the DIMM from the riser card.

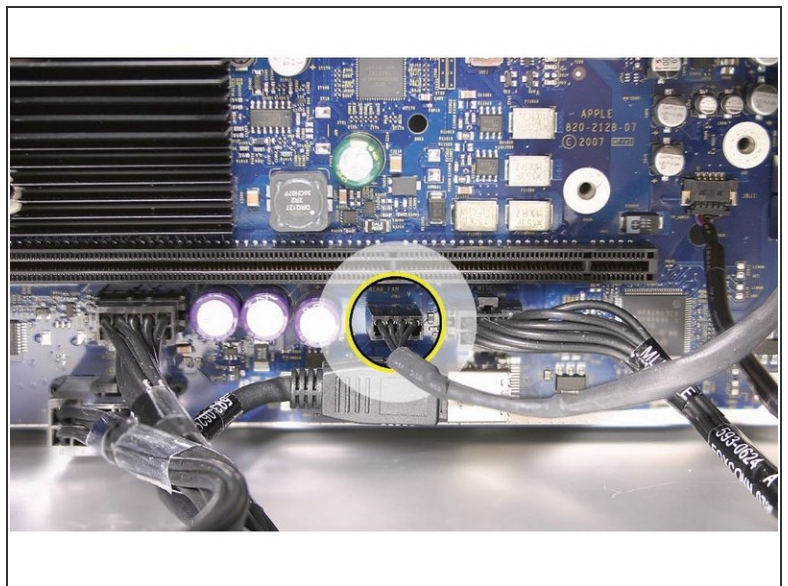
## Step 24



**i** Replacement Note: Align the DIMM in the slot on the riser card and push both ends of the DIMM down until the ejectors snap back up into place.

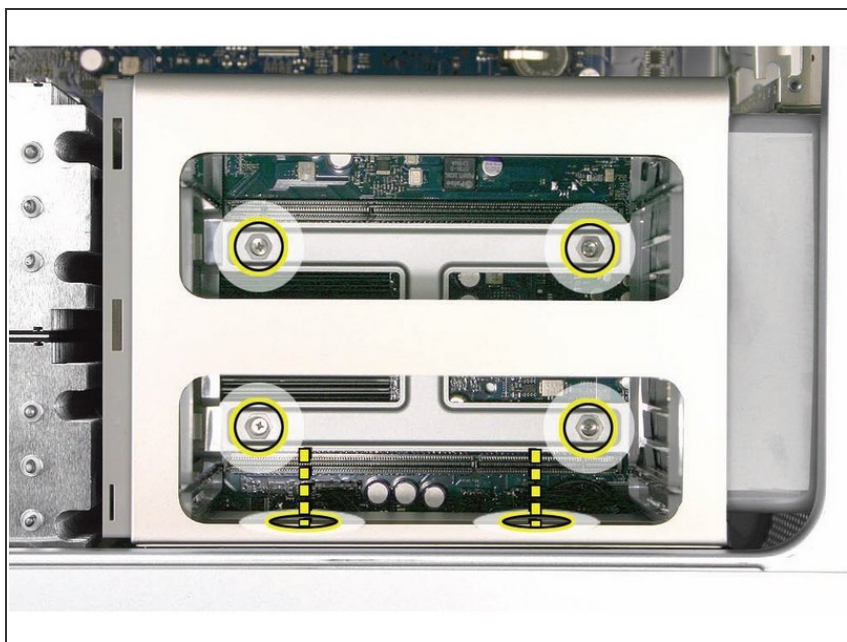
**!** Warning: FB-DIMMs carry heatsinks on either side of the DIMM. Never attempt to remove the heatsinks from the DIMMs. Doing so could damage the DIMM.

## Step 25 — Memory Cage with Rear Fan (Early 2008)



- Disconnect the rear fan cable from the logic board.

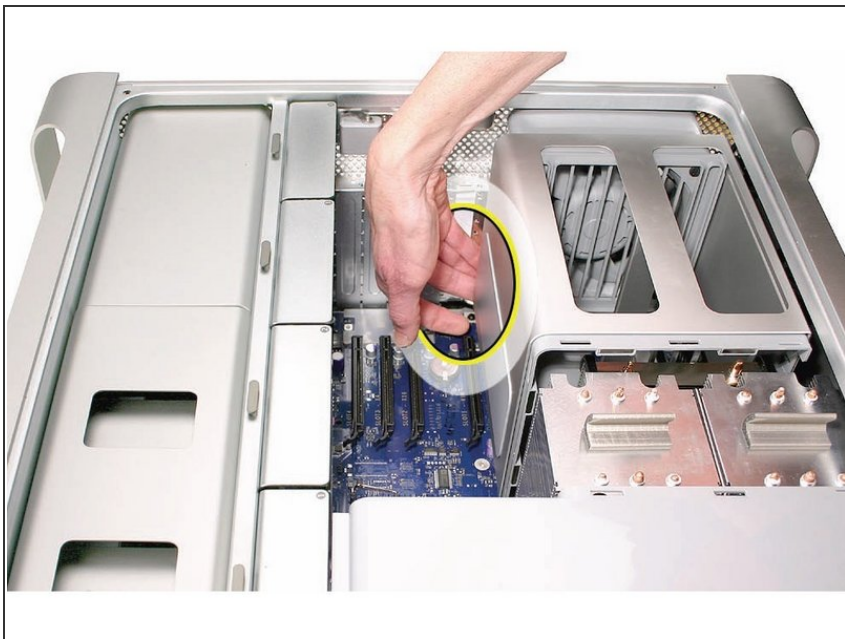
## Step 26



- Using a long-handled, magnetized #1 Phillips screwdriver, loosen the four captive screws that mount the memory cage to the logic board.
- Rotate the computer so that it is standing vertically. Using a magnetized short-handled or right-angled jeweler's #1 Phillips screwdriver, carefully remove the two short screws that mount the memory cage to the bottom panel of the enclosure.

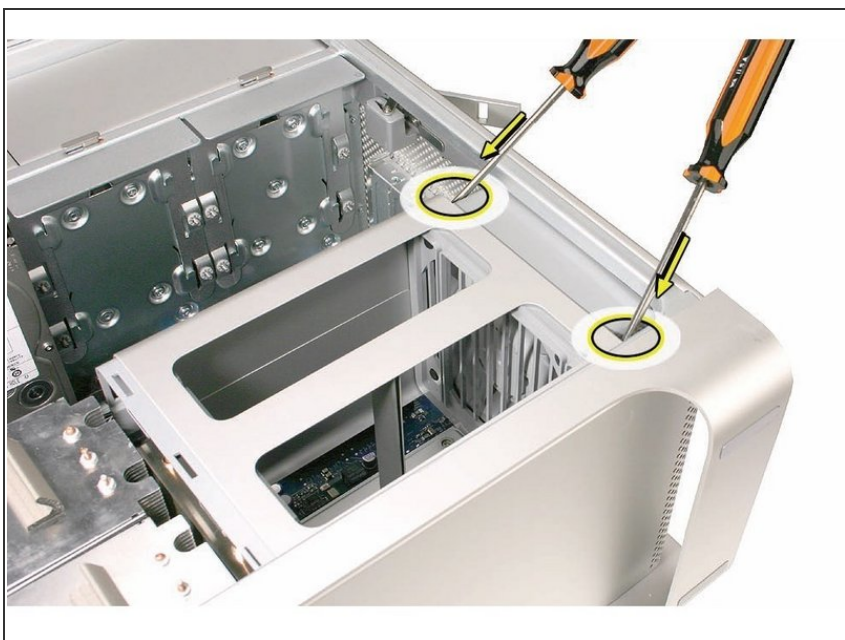


## Step 27



- i** Note: To remove the memory cage and fan, you must first slide the fan partway into the cage. The fan is held in place by three latches, which you must release before sliding the fan.
- Using your forefinger, reach below the fan and release the latch nearest the logic board.

## Step 28



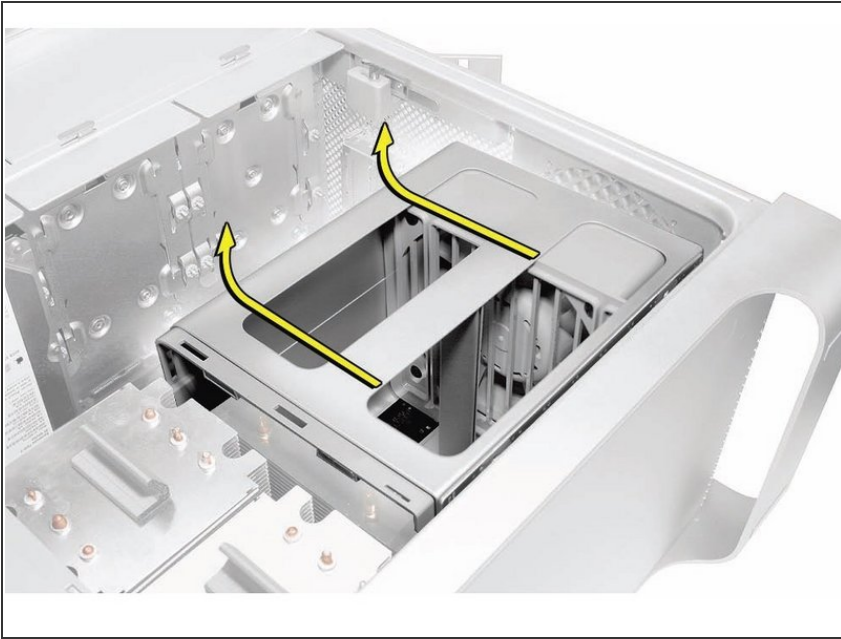
- Using a flat-blade screwdriver, release the two latches nearest the front of the computer.

## Step 29



- Slide the rear fan into the memory cage.

## Step 30



- Slide the memory cage and fan toward the power supply far enough that the cage clears the bottom edge of the enclosure. Then lift the memory cage and fan out of the enclosure.

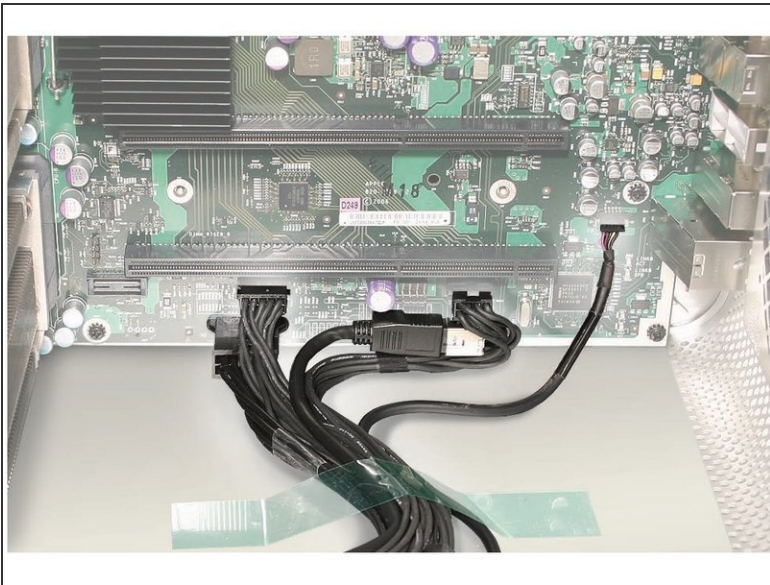
## Step 31






**i** Replacement Note: If you are installing a new fan in the memory cage assembly, rotate the fan into the cage as illustrated. Also note carefully the orientation of the fan in relation to the cage.

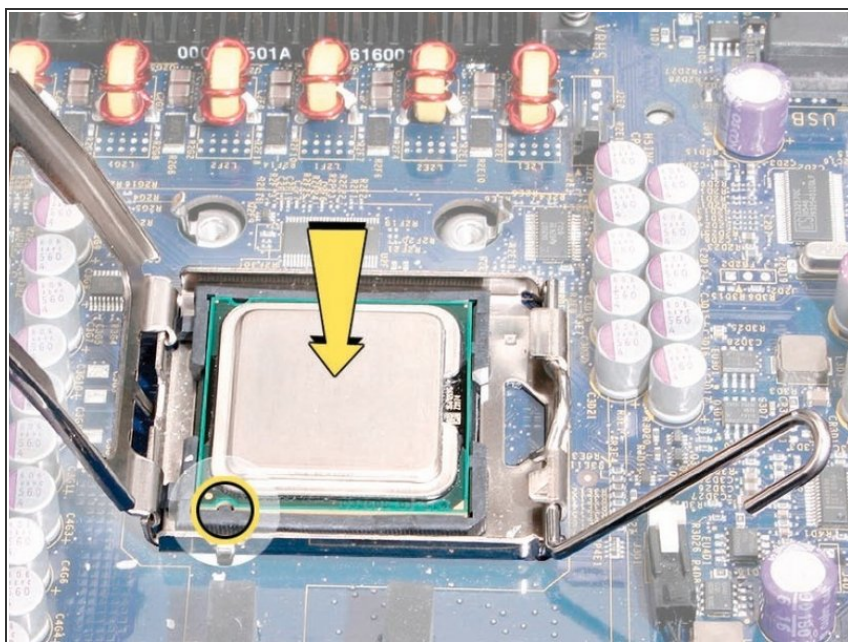


## Step 32



-  **Important:** Before you install the cage in the enclosure, the fan should always be inserted partway into the cage.
-  **Replacement Note:** Before installing the memory cage and fan, make sure all logic board cables below the cage are out of the way so that the cage sits properly and the cables are not pinched or damaged when you tighten the screws.
-  **Replacement Note:** To install the memory cage and fan, maneuver the cage into position in the enclosure. Tighten at least two of the captive mounting screws. Then slide the fan toward the back panel, until you hear it snap into place.

## Step 33 — 2.8 / 3.0 / 3.2 GHz Processors



- ⓘ This procedure applies to 2.8 GHz and 3.0 GHz configurations of the Mac Pro (Early 2008). For the 3.2 GHz configuration, see the notes that mention “Processors, 3.2 GHz.”

## Step 34

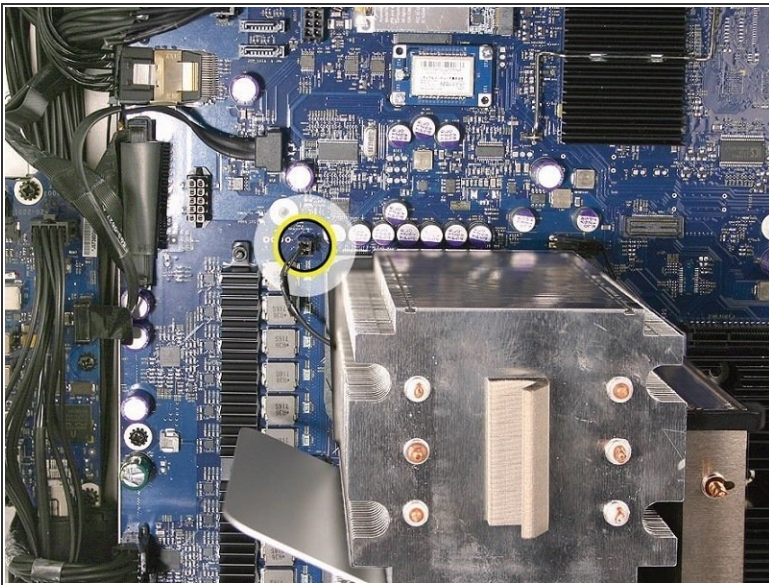


- ⓘ The steps in this procedure illustrate how to remove the lower processor (CPU B). The instructions are the

same for removing the upper processor (CPU A).

- ✦ Every time you remove a processor, you must replace the thermal grease on the processor heatsink. New grease and alcohol wipes for removing the previous grease are included with replacement processors. Instructions for applying the grease are included with the processor heatsinks procedure.

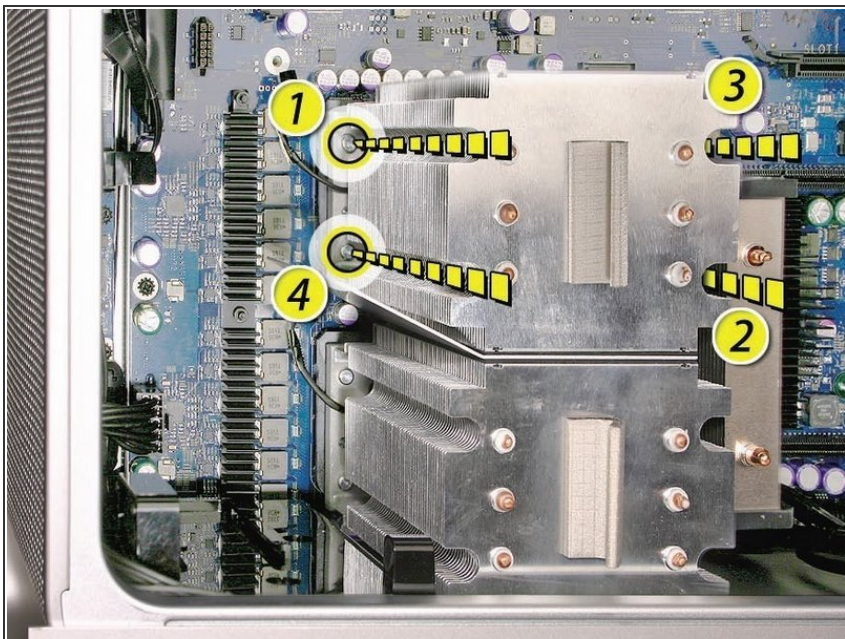
## Step 35



- Disconnect the 2-pin cable for the upper processor (CPU A) heatsink from the logic board.

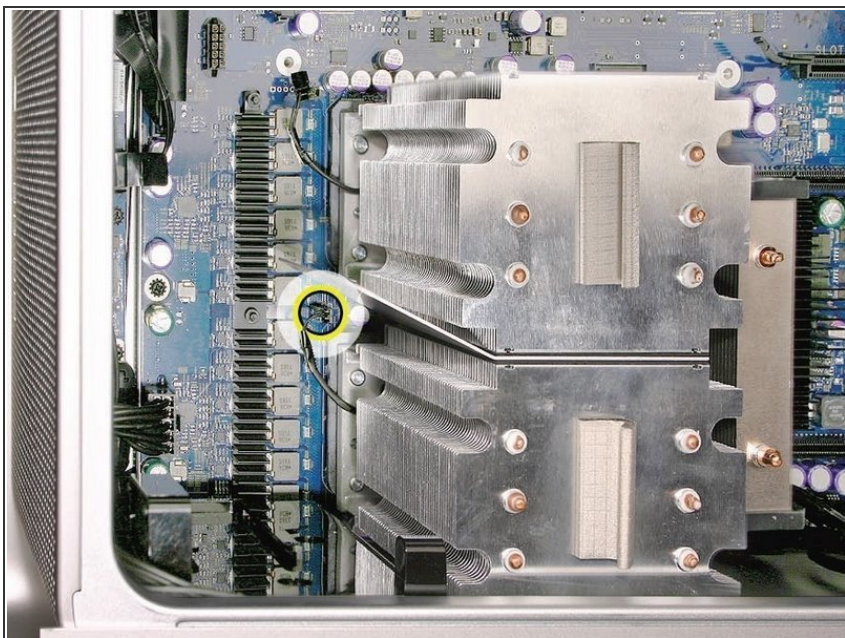


## Step 36



- Using a long-handled, magnetized 3 mm flathead hex screwdriver, loosen the four captive mounting screws for the upper processor heatsink in the order indicated below.
- Lift the heatsink straight up and out of the enclosure.

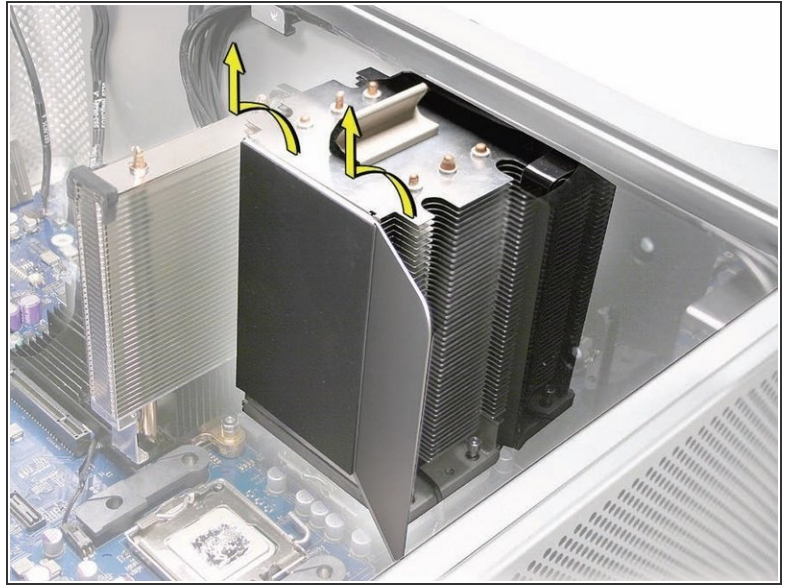
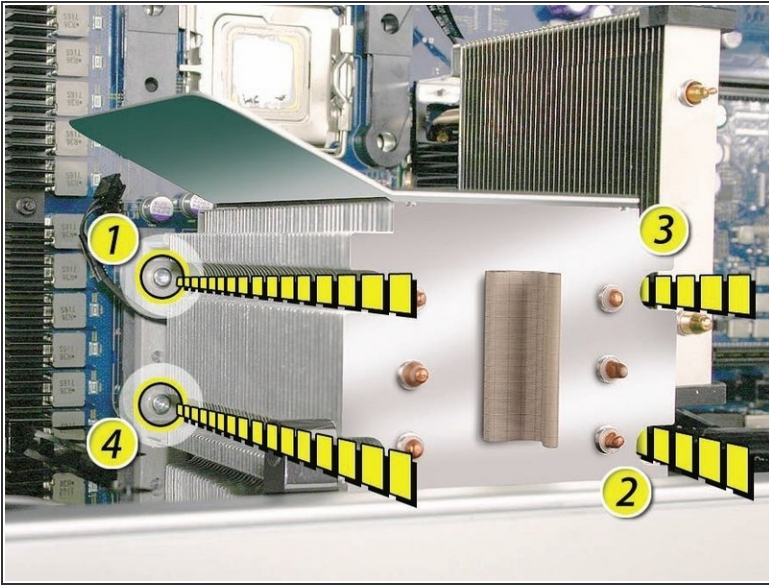
## Step 37



- Disconnect the cable connector for the lower processor (CPU B) heatsink.

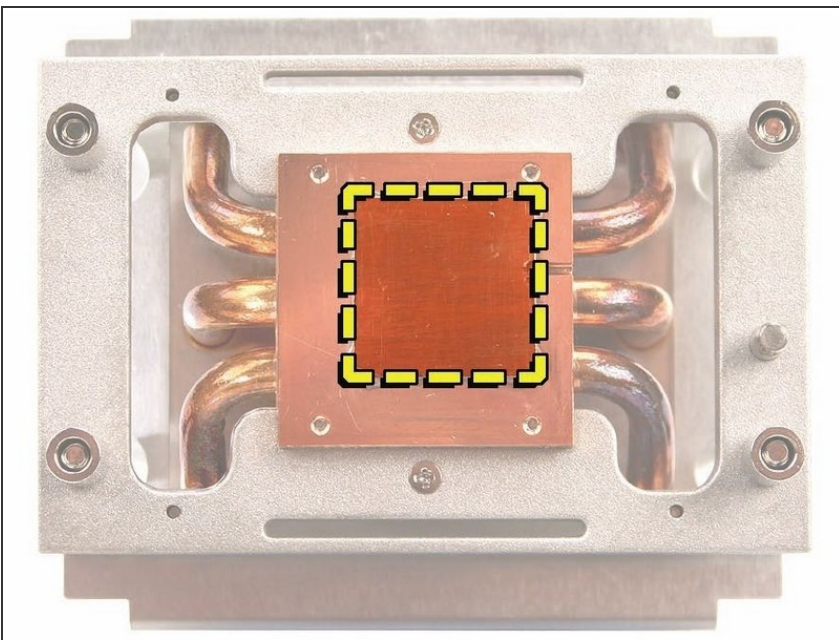


## Step 38



- Using a long-handled, magnetized 3 mm flathead hex screwdriver, loosen the four captive mounting screws for the lower processor heatsink in the order indicated below.
- Carefully tilt the heatsink so that it clears the bottom lip of the enclosure and then lift the heatsink out of the computer.

## Step 39 — Replacement Note: Existing Heatsink




- ⓘ Perform the following steps once you have installed the new processors and ready to re-install the heatsinks.
- Preparing an EXISTING Heatsink for Re-installation. If you have a new heatsink, follow the NEW Heatsink procedure.

- Using the alcohol pad included with the logic board or processor replacement part, clean off any

used thermal grease from the processor and the bottom of the heatsink.

- Using the thermal grease included with the logic board or processor replacement part, apply one dot of fresh grease to the raised square area on the bottom of the heatsink.
- Spread the grease evenly across the square to a thickness of approximately 1 mm.

 **Warning:** Do not apply more grease than recommended. The grease must not overflow the heatsink and come in contact with the processor connector.

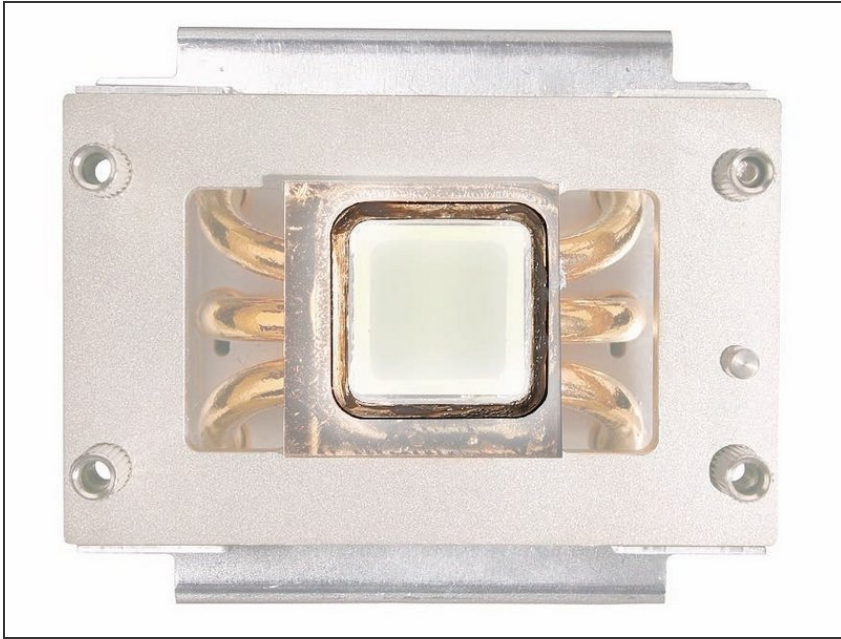
## Step 40 — Replacement Note: New Heatsink



- ① Perform the following steps once you have installed the new processors and ready to re-install the heatsinks.
  - Preparing a New Heatsink for Re-installation. If you have an existing heatsink, follow the EXISTING Heatsink procedure.
    - Apply the top gasket included in the parts box to the top of the heatsink.
    - If you are replacing the lower processor heatsink with a new heatsink, install the bumper included in the parts box on the side of the heatsink.
- ① Do not apply thermal grease to a new heatsink. It comes with thermal grease already in place, covered by a cap over the bottom of the heatsink. Before installation, remove the cap.

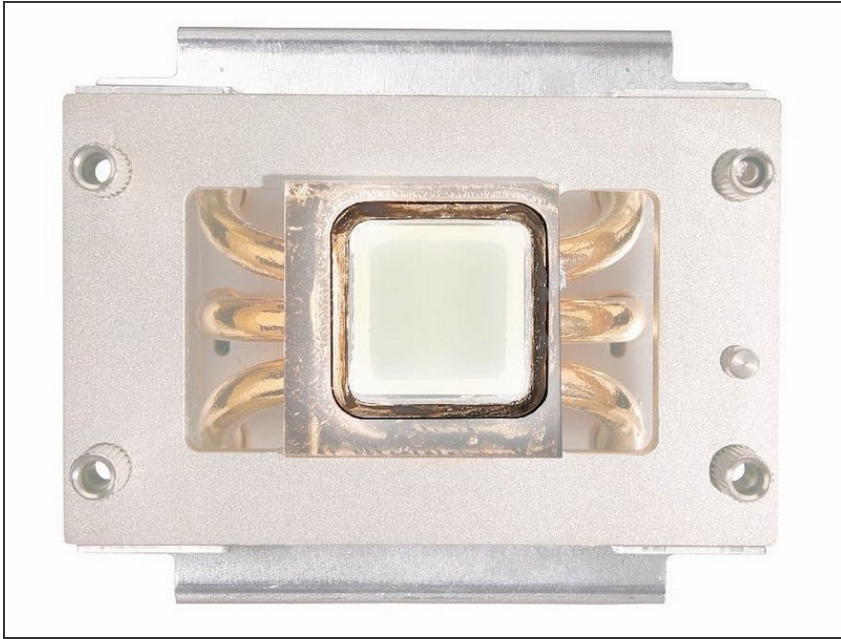


## Step 41 — Replacement Note: 3.2 GHz Processors Heatsink



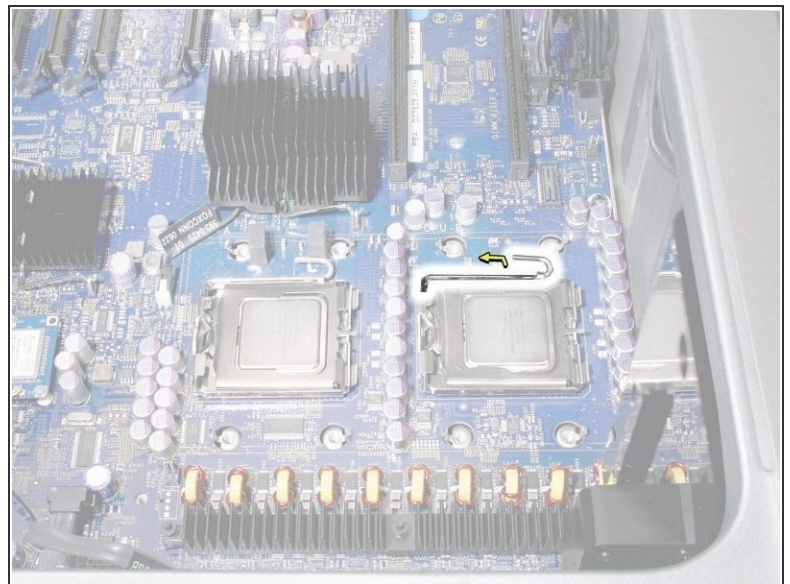
- ❗ The Mac Pro (Early 2008 Dual 3.2 GHz) computer uses a special coating on the processor heatsink and processor to manage the temperature in the computer. The silver-colored coating comes applied to the underside of the heatsink and the top of the processor.
- Use the following guidelines when handling the processor heatsink and/or processor:
  - Wear disposable nitrile or latex gloves
  - Avoid touching the silver-colored coating on the underside of the heatsink and the top of the processor.
  - Always make a visual inspection of new or existing heatsinks and processors before installing them in the computer.
  - When removing or replacing the heatsink and/or processor, do not allow the heatsink to be separated from the processor for more than 30 minutes. The special coating on the heatsink and processor degrades with exposure to air; more than 30 minutes exposure could result in damage to the computer and a repeat, multi-part repair.

## Step 42 — Replacement Note: 3.2 GHz Processors Heatsink 2



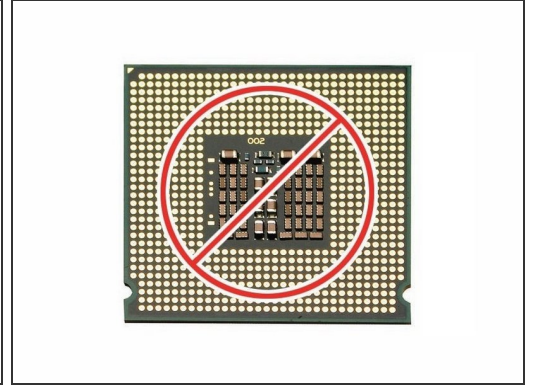
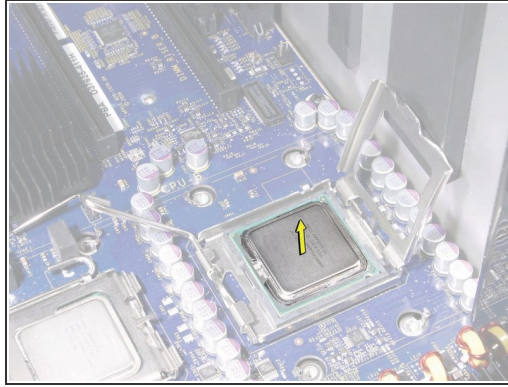
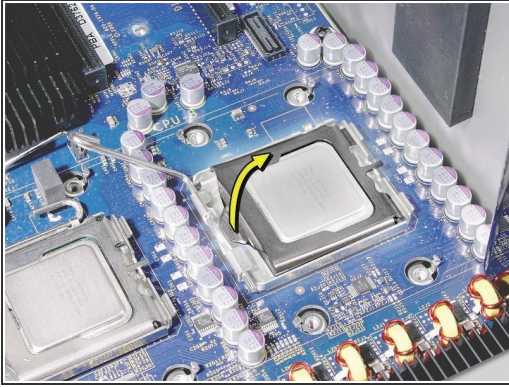
- i** Before installing a new or existing heatsink, check that the gasket that surrounds the silver colored coating on the underside of the heatsink is in good condition, as shown in the graphic. Replace the gasket if it shows obvious damage, such as cracks, folds, and broken-off surfaces, or if it is dislocated from the heatsink.
- i** The gasket is available through GSX as part of the Mac Pro Grease Kit, part number 076-1258.

## Step 43





- Release the latch on the metal processor holder.
- i** You may want to use a flat-blade screwdriver to help release the latches.

## Step 44



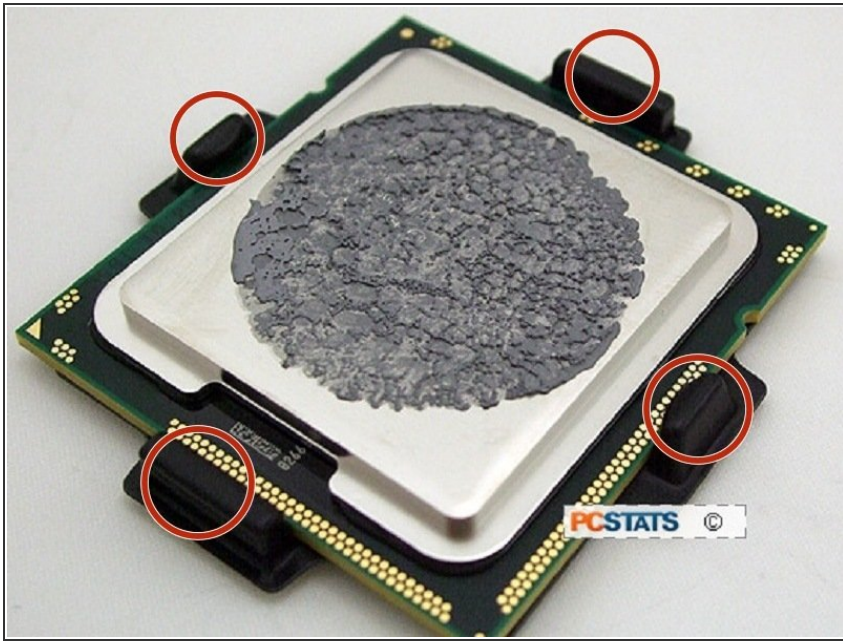
- Rotate the top of the holder to the open position.
- Lift the processor out of the holder.

 **Important:** When removing or installing a processor, always hold the processor by the edges. Be extremely careful not to touch the gold pins on the bottom of the processor, as this type of connector is very sensitive to contamination. Also be careful not to touch the gold pins in the processor socket on the logic board.

 You can identify the processor by the speed etched on the processor. You must clean off the thermal grease from installed processors to see the speed.



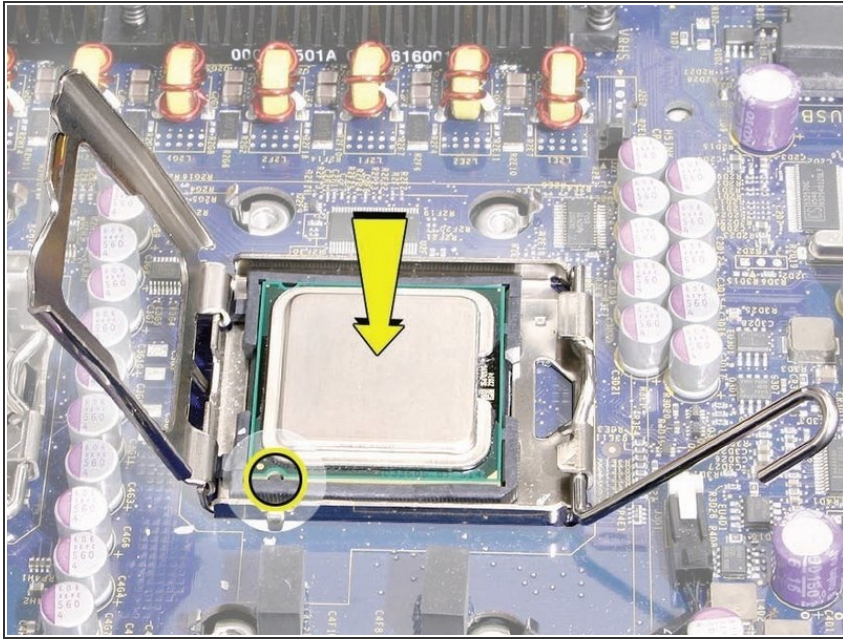
## Step 45



- i** Replacement Note: Before installing a replacement processor, remove the protective cap covering the new processor's connector.



## Step 46



- ⓘ Replacement Note: When installing the processor on the logic board, align the processor notch with the tab on the processor holder, as illustrated. Then lower the processor straight down onto the socket.
- ⓘ Note: Unlike in earlier Power Mac G5 computers, replacing a processor in Mac Pro (Early 2008) does not require running Apple Service Diagnostic for thermal calibration.

To reassemble your device, follow these instructions in reverse order.