



Macintosh Quadra 610/ Centris 610/WS 60

Macintosh Quadra 610 DOS Compatible

Macintosh Quadra 610

Macintosh Centris 610

Workgroup Server 60



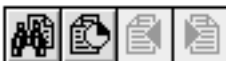
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Service Source Main Menu



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- Product Name
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Basics

Macintosh Quadra 610/Centris
610/WS 60





Overview

This manual includes complete repair procedures for the Quadra 610, Centris 610, and WorkGroup Server 60 shown at left.

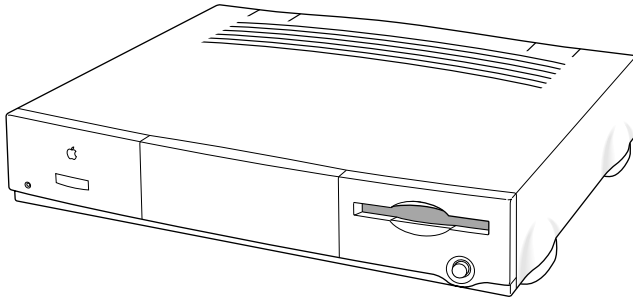


Figure: Macintosh Centris 610, Quadra 610, and WS 60





Specifications

Macintosh Quadra 610/Centris
610/WS 60





Processors

Centris 610/AWS 60

Motorola 68LC040

20 MHz

Built-in memory management unit (MMU)

Note: Apple does not provide a floating point unit (FPU) upgrade for this product.

Quadra 610/AWS 60

Quadra 610: Optional Motorola 68LC040 or 68040

AWS 60: Motorola 68040

25 MHz

Built-in memory management unit (MMU)

Note: A floating point unit (FPU) coprocessor is included with the 68040 processor.



**Quadra 610, DOS
Compatible**

Motorola 68LC040
25 MHz
Built-in memory management unit
DOS compatible card

**DOS Compatible
Card**

486SX microprocessor
25 MHz
32-bit addressing
32-bit data paths
One 72-pin SIMM slot supports up to 64 MB expansion, 80 ns or faster SIMM.
512K, 80 ns video DRAM soldered on board supports standard VGA, many SVGA, and Macintosh monitors.
32-bit DMA channel supports peripheral access to local memory and shared memory through the Macintosh Operating System.





Memory

Centris 610/ Quadra 610

RAM	4 or 8 MB RAM standard, expandable to 68 MB (80 ns or faster 72-pin SIMM)
ROM	1 MB

AWS 60

RAM	8 MB RAM standard, expandable to 68 MB (80 ns or faster 72-pin SIMM)
ROM	1 MB





PRAM	1 MB
VRAM	256 bytes of nonvolatile parameter memory
Clock/Calendar	512K, expandable to 1 MB (80 ns or faster 68-pin SIMM) CMOS custom chip with long-life lithium battery





Disk Storage

Floppy Drive

1.4 MB Apple SuperDrive

Hard Drive

Centris 610/Quadra 610: 80 MB to 500 MB hard drive

CD-ROM

AWS 60: 230 MB or 500 MB hard drive
Optional internal 5.25-in. CD-ROM drive





I/O Interfaces

SCSI

One SCSI port; DB-25 connector

Supports a maximum of six external devices (internal SCSI devices include the computer, which is always device 7)

Apple Desktop Bus

Two Apple Desktop Bus (ADB) ports; mini DIN-4 connectors

Low-speed synchronous serial interface

Two RS-232/RS-422 serial ports; mini DIN-8 connectors

230.4 Kbps maximum

0.92 Mbps maximum, clocked externally

Serial

Internal expansion slot supports either a processor-direct slot card or 7-inch NuBus card (with appropriate adapter)





Sound	One stereo-capable output port One monaural input port
Video	One video port; DB-15 connector Supports Apple monitors (8-bit) VGA and SVGA monitors require a special adapter cable
Ethernet	Centris 610: Optional on-board Ethernet port AWS 60/Quadra 610: On-board Ethernet





I/O Devices

Keyboard

Standard, extended, or adjustable keyboard connected through either of two ADB ports

Maximum power draw for all ADB devices: 500 mA

Keyboard draws 25–80 mA

Mouse

ADB Mouse II; mechanical tracking optical shaft or contact encoding (low power)

Draws up to 80 mA

Microphone

Optional electret, omnidirectional microphone

Microphone output voltage is 4 mV peak to peak at normal value

Mini phone plug connector





Sound and Video

Video Display

Supports Apple monitors, including

- Macintosh 12-in. Monochrome Display
- Macintosh 12-in. RGB Display
- AppleColor High-Res RGB 14-in. Monitor
- Macintosh Color Display
- Macintosh 15-in. Portrait Display
- Macintosh 16-in. Color Display
- Apple Two-Page 21-in. Monochrome Monitor
- Macintosh 21-in. Color Display

Supports NTSC and PAL

Supports VGA monitors (640 pixels by 480 pixels only) and SVGA monitors (800 pixels by 600 pixels only) with appropriate adapter cable





Sound

Custom sound chip supports stereo playback from compact discs and computer-generated stereo sounds through stereo output port

Monaural sound input port





Electrical

Line Voltage

100-240 VAC

Line Frequency

50-60 Hz

Power

112 W (not including monitor)





Physical

Dimensions

Height: 3.4 in. (85 mm)

Width: 16.3 in. (415 mm)

Depth: 4.2 in. (107 mm)

Weight

14.0 lb. (6.4 kg)





Environmental

**Operating
Temperature**

10-40°C (50-104°F)

**Storage
Temperature**

-40 to 47°C (-40 to 116.6°F)

Relative Humidity

10-90% (noncondensing)

Altitude

0-10,000 ft. (0-3,048 m)





Troubleshooting

Macintosh Quadra 610/Centris
610/WS 60





General

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to your product. Because cures are listed on the charts in the order of most likely solution, try the first cure first. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure. (Note: If you have replaced a module, reinstall the original module before you proceed to the next cure.)

If you are not sure what the problem is, or if the Symptom Charts do not resolve the problem, refer to the Flowchart for the product family.

For additional assistance, contact Apple Technical Support.





Symptom Charts

Video

Screen is dark, audio and at least one drive operate, fan is running, and LED is lit

- 1 Adjust brightness on monitor.
- 2 Replace monitor. Refer to appropriate monitor manual to troubleshoot defective monitor.
- 3 Replace video cable.
- 4 Replace VRAM SIMMs.
- 5 Replace logic board. Retain customer's SIMMs.

Screen is dark, audio and drive do not operate, fan is running, and LED is lit

- 1 Remove peripherals.
- 2 Replace VRAM SIMMs.
- 3 Replace DRAM SIMMs.
- 4 Replace power supply.
- 5 Replace logic board.





Video (Continued)

Partial or whole screen is bright and audio is present, but no video information is visible

- 1 Replace monitor. Refer to appropriate monitor manual to troubleshoot defective monitor.
- 2 Replace video cable.
- 3 Replace VRAM SIMMs.
- 4 Replace logic board. Retain customer's SIMMs.

Screen is completely dark, fan is not running, and LED is not lit

- 1 Verify that external power cables are properly connected.
- 2 Remove peripherals.
- 3 Replace power supply.
- 4 Replace logic board. Retain customer's SIMMs.





Floppy Drive

Audio and video are present, but internal floppy drive does not operate

- 1 Replace internal floppy drive cable.
- 2 Replace internal floppy drive.
- 3 Replace logic board. Retain customer's SIMMs.

Floppy disk ejects, and display shows Mac icon with blinking "X"

- 1 Replace floppy disk.
- 2 Replace floppy drive cable.
- 3 Replace internal floppy drive.
- 4 Replace logic board. Retain customer's SIMMs.

Floppy disk does not eject

- 1 Switch off system and hold mouse button down while switching on the system
- 2 Eject disk manually.
- 3 Replace floppy drive cable.
- 4 Replace floppy drive.





Floppy Drive (Continued)

Floppy drive
attempts to eject disk
but doesn't

- 1 Push floppy disk completely in.
- 2 Eject floppy disk manually.
- 3 Replace floppy drive.





Hard Drive

Internal hard drive runs continuously

- 1 Replace SCSI data cable.
- 2 Replace internal hard drive.
- 3 Replace logic board. Retain customer's SIMMs.

Internal hard drive does not operate

- 1 Replace SCSI data cable.
- 2 Replace SCSI power cable.
- 3 Replace hard drive.
- 4 Replace logic board. Retain customer's SIMMs.





CD-ROM Drive

CD-ROM drive does not accept a compact disc

- 1 Exchange disc (if disc is dirty or damaged).
- 2 Replace CD-ROM drive mechanism.
- 3 Replace 50-pin ribbon cable.

Macintosh does not display CD-ROM drive icon

- 1 Verify that CD-ROM extension is in System Folder.
- 2 Replace CD-ROM drive mechanism.
- 3 Replace power supply.
- 4 Replace SCSI data cable.

Compact disc won't eject from the drive

- 1 Manually eject the compact disc.
- 2 Press the eject button behind the front bezel (if it is accessible).
- 3 Replace CD-ROM drive mechanism.





Peripheral

Works with internal or external SCSI device, but does not work with both

- 1 Verify that SCSI select switch on any external device is set differently from any internal SCSI device setting.
- 2 Verify that hard drive is terminated but optional CD-ROM is not terminated.
- 3 Replace terminator on external hard drive.
- 4 Replace SCSI select cable on external SCSI device.

Cursor does not move

- 1 Reboot computer.
- 2 Verify that mouse is connected properly.
- 3 If mouse was connected to keyboard, connect mouse to computer ADB port instead. If mouse works, replace keyboard.
- 4 If mouse does not work in any ADB port on computer, replace mouse.
- 5 Replace logic board. Retain customer's SIMMs.





Peripheral (Continued)

Cursor moves, but clicking the mouse button has no effect

- 1 Replace mouse.
- 2 Replace logic board. Retain customer's SIMMs.

Double-click does not open application, disk, or server

- 1 Remove duplicate system files from hard drive.
- 2 Clear parameter RAM. Hold down <Shift> <Option> <P> <R> during startup but before "Welcome to Macintosh" appears.
- 3 If mouse was connected to keyboard, connect mouse to computer ADB port instead. If mouse works, replace keyboard.
- 4 If mouse does not work in any ADB port on computer, replace mouse.
- 5 Replace logic board. Retain customer's SIMMs.





Peripheral (Continued)

No response to any key on the keyboard

- 1 Verify that keyboard is connected to ADB port.
- 2 Replace keyboard cable.
- 3 Replace keyboard.
- 4 Replace logic board. Retain customer's SIMMs.





Take Apart

Macintosh Quadra 610/Centris
610/WS 60

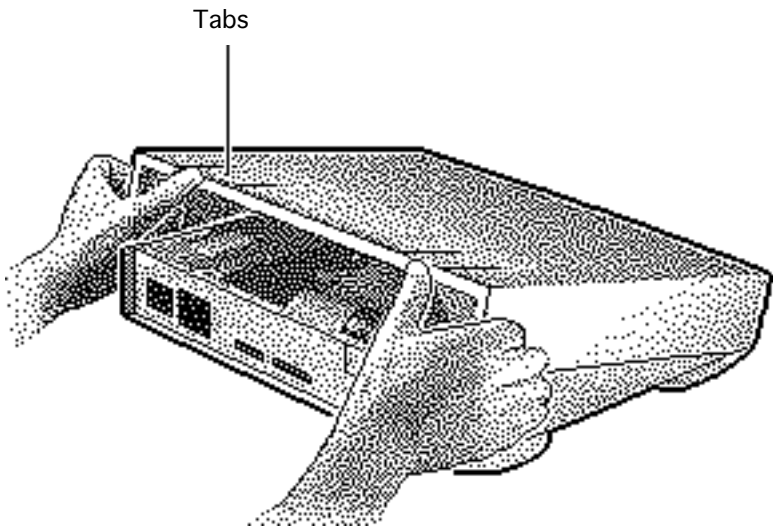




Top Cover

No preliminary steps are required before you begin this procedure.

- 1 Press up on the tabs at the back of the top cover.
- 2 Tilt the back of the top cover and remove the top cover.

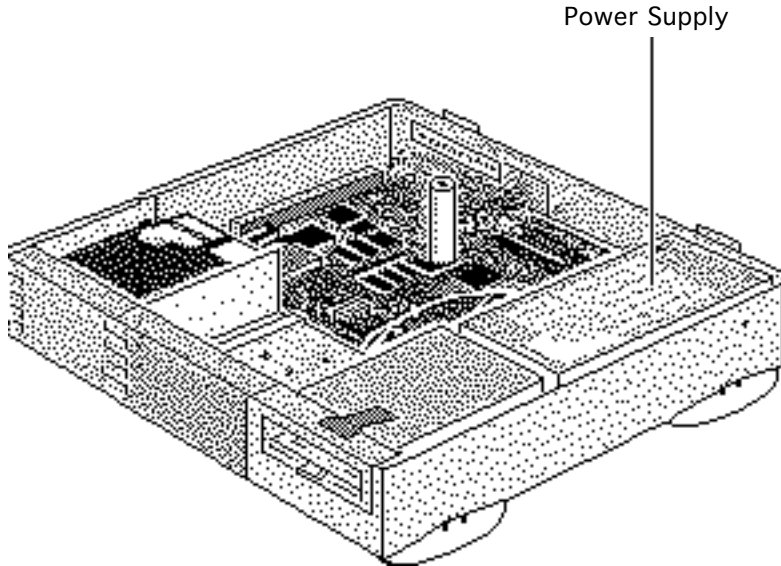




Power Supply

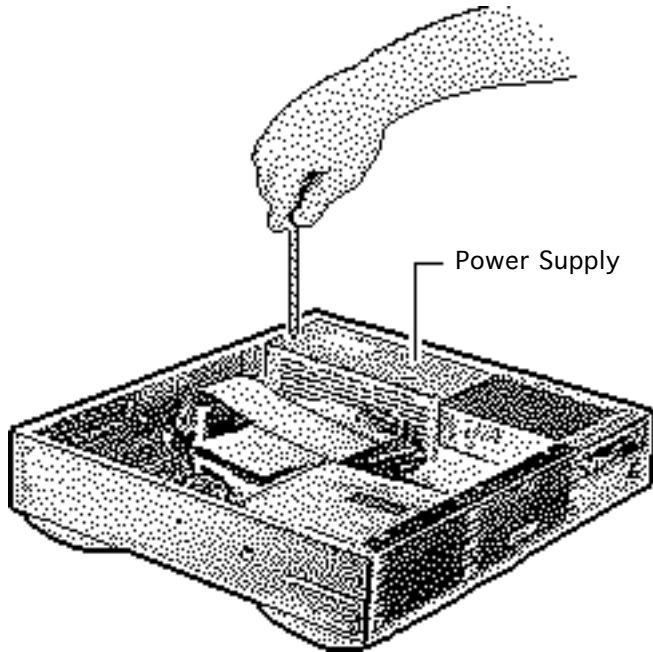
Before you begin, remove the top cover.

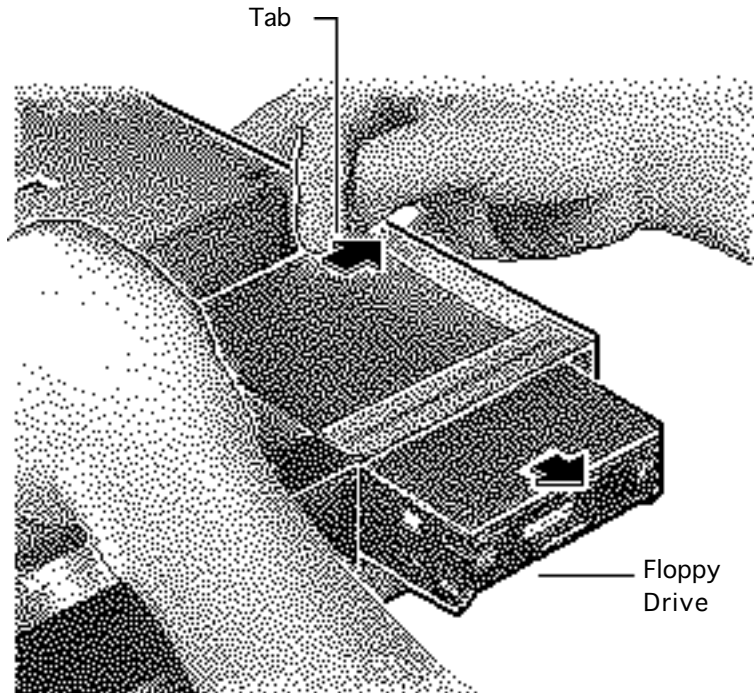
Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Remove the screw that secures the power supply.

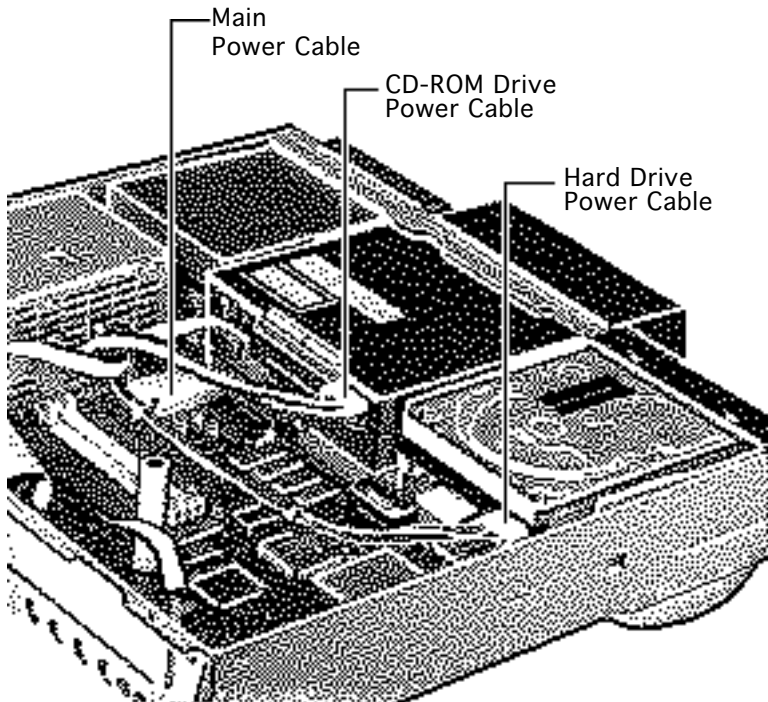




- 2 For easier access to the power supply, release the tabs of the floppy drive and slide the floppy drive forward a few inches.

Note: If a CD-ROM drive is present, remove the SCSI data cable and move the CD-ROM drive forward. Refer to the “CD-ROM Drive” topic.



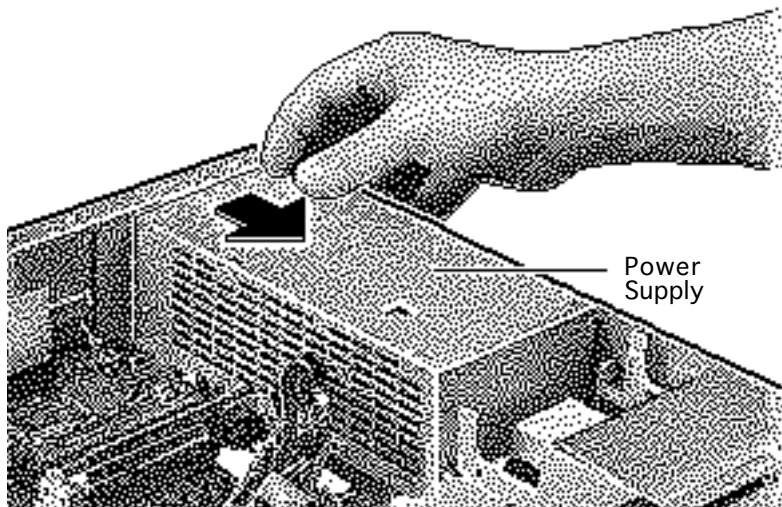


- 3 Disconnect these power supply cables:
- Main power cable
 - Hard drive power cable
 - CD-ROM drive power cable (if installed)





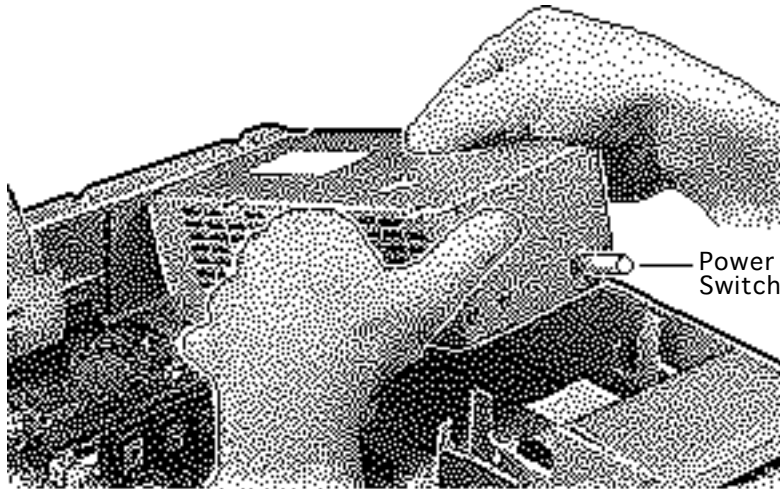
- 4 Slide the power supply forward slightly.





- 5 Tilt the front of the power supply and lift it out of the computer.

Replacement Note: Move the floppy drive forward. Press the actuator toward the back of the computer to properly seat the power switch in the actuator.



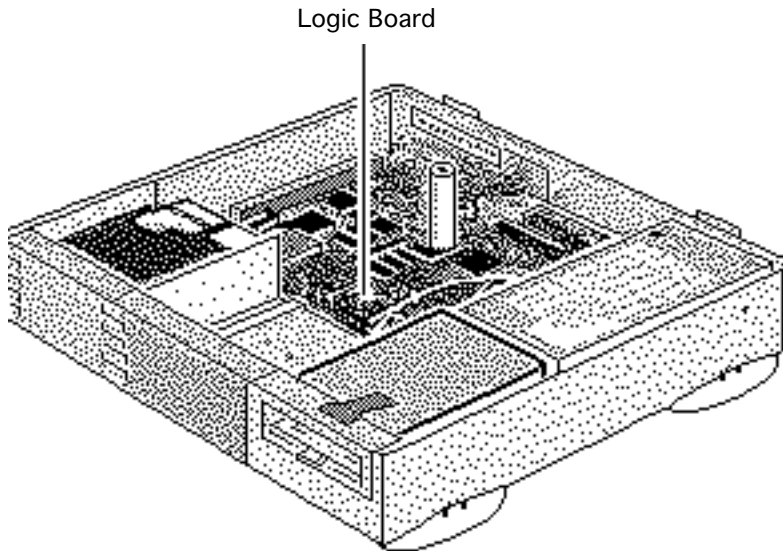


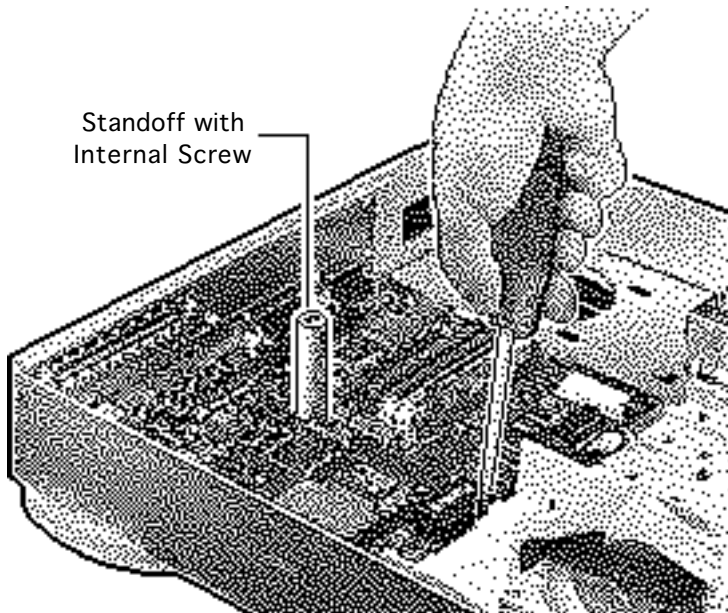
Logic Board

Before you begin, remove the following:

- Top cover
- Power supply

Caution: Review the ESD precautions in Bulletins/Safety.

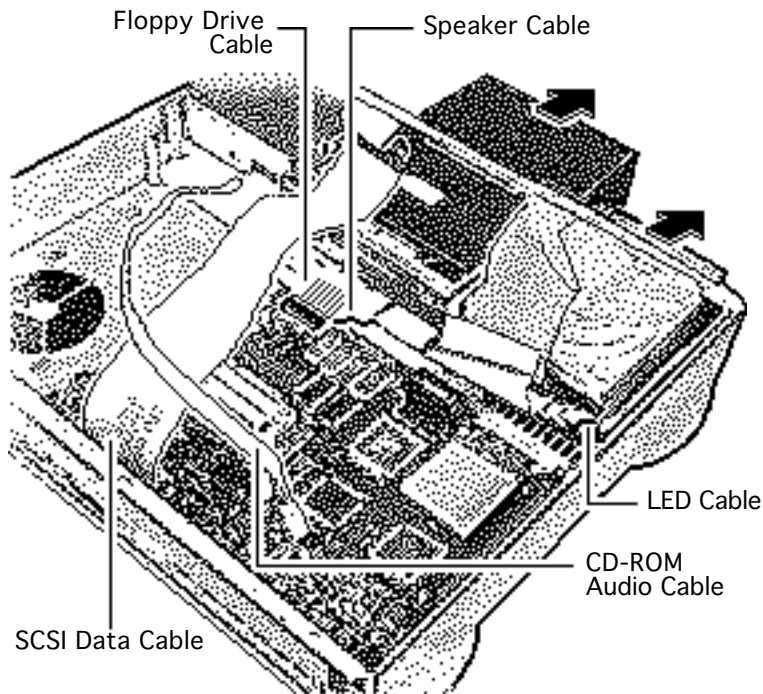




Note: The logic board is secured with two screws.

- 1 Using a long Phillips screwdriver, remove the screw from the center of the standoff.
- 2 Remove the standoff.
- 3 Remove the Phillips screw from the front edge of the logic board.



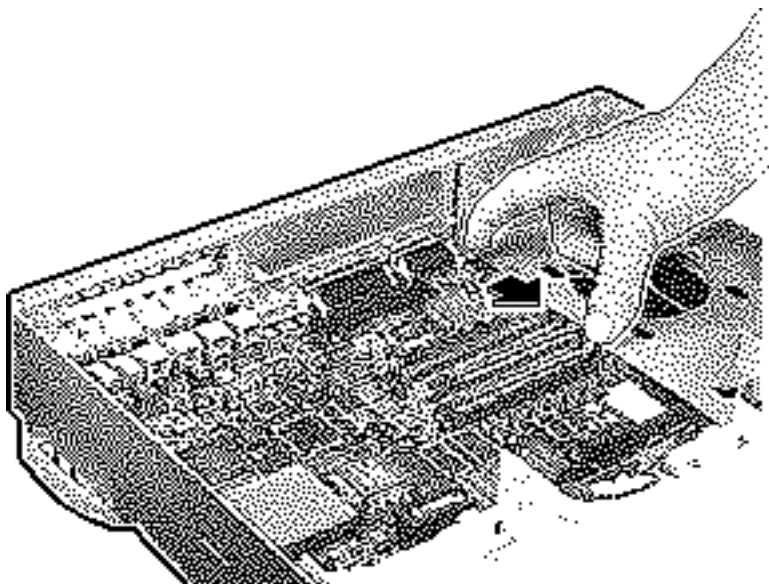


- 4 Disconnect these cables from the logic board:
 - SCSI data cable
 - Speaker cable
 - LED cable
 - CD-ROM audio cable (if present)
 - Floppy drive cable
- 5 **Note:** Lift the front edge of the logic board to make removing the floppy drive easier.
- 6 Slide forward the hard drive and CD-ROM drive (if installed).





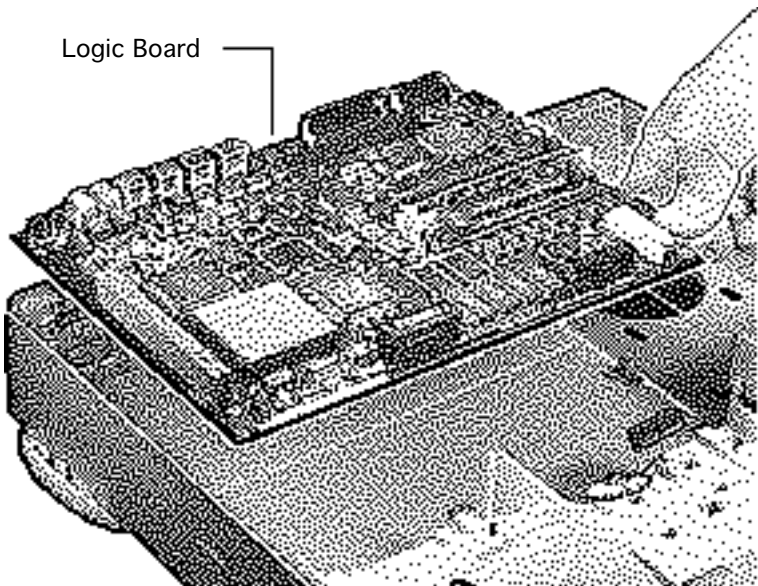
- 7 Slide the logic board toward the front of the computer.





- 8 Remove the logic board.

Logic Board



Replacement Note:

Slide the hard drive and optional CD-ROM drive forward. Connect the floppy drive cable before replacing the logic board.

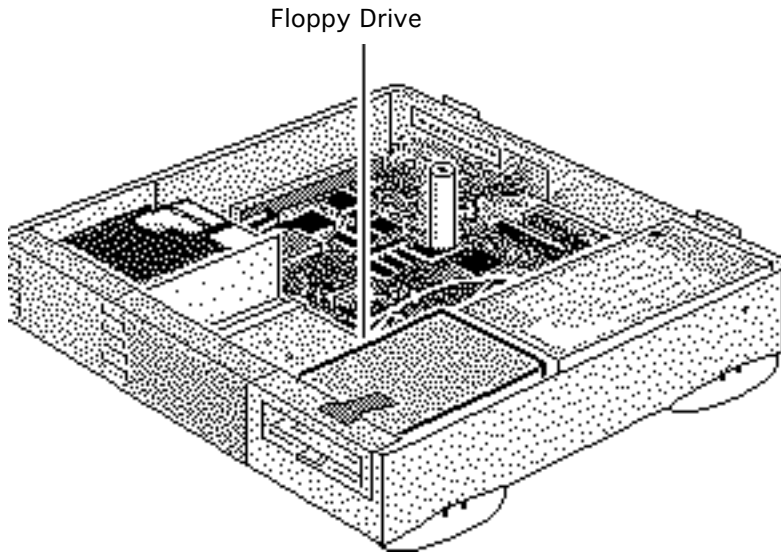


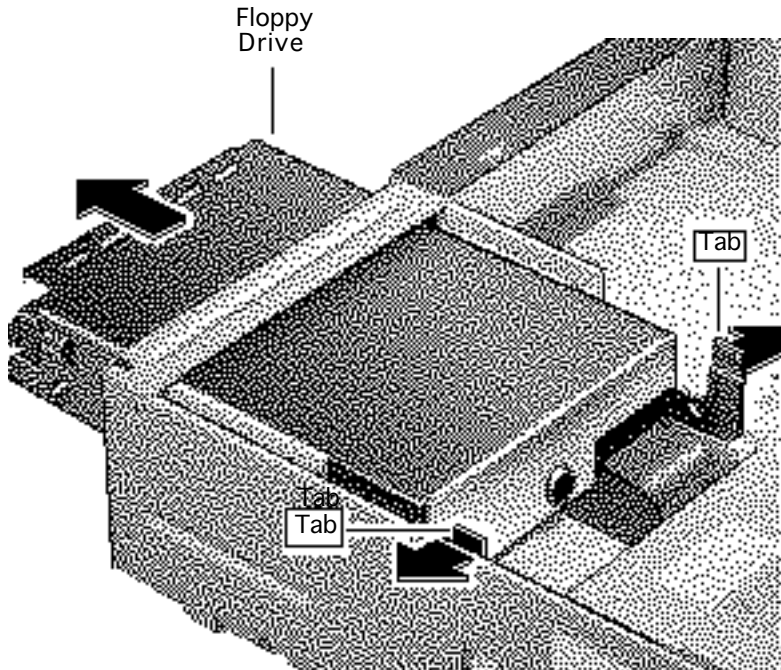


Floppy Drive

Before you begin, remove the top cover.

Caution: Review the ESD precautions in Bulletins/Safety.





1 Press the tabs outward and slide the floppy drive forward a few inches.

2 Disconnect the floppy drive cable.

Note: You can easily reach the floppy drive cable connector when the floppy drive is forward.

3 Slide out the floppy drive.



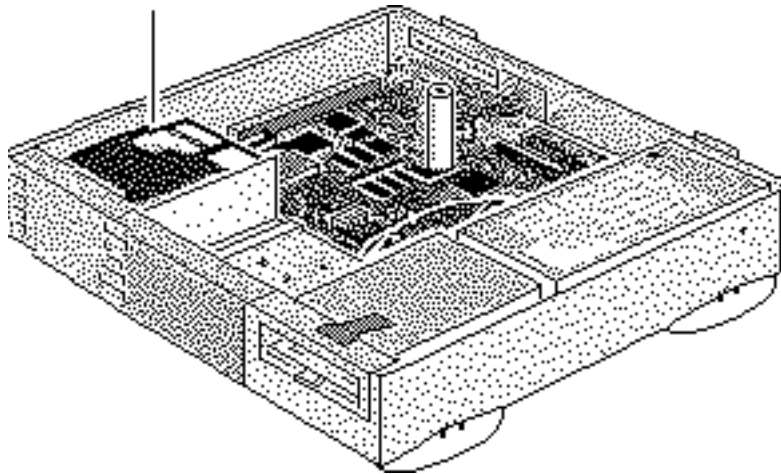


Hard Drive

Before you begin remove the top cover.

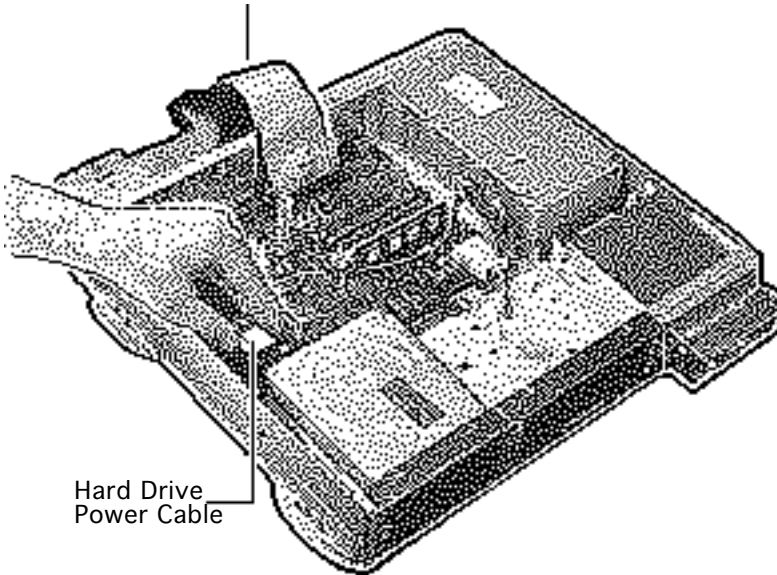
Caution: Review the ESD precautions in Bulletins/ Safety.

Hard Drive





SCSI Data Cable



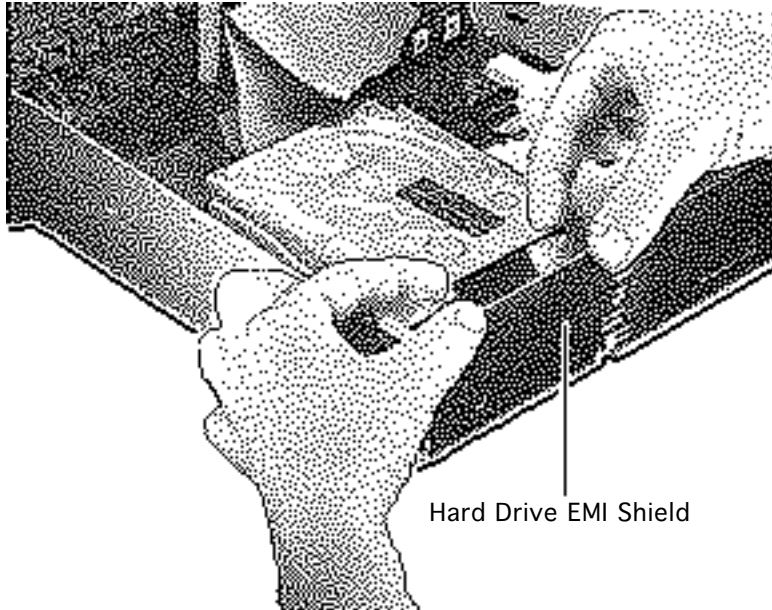
Hard Drive
Power Cable

- 1 Disconnect the SCSI data and hard drive power cables from the hard drive.



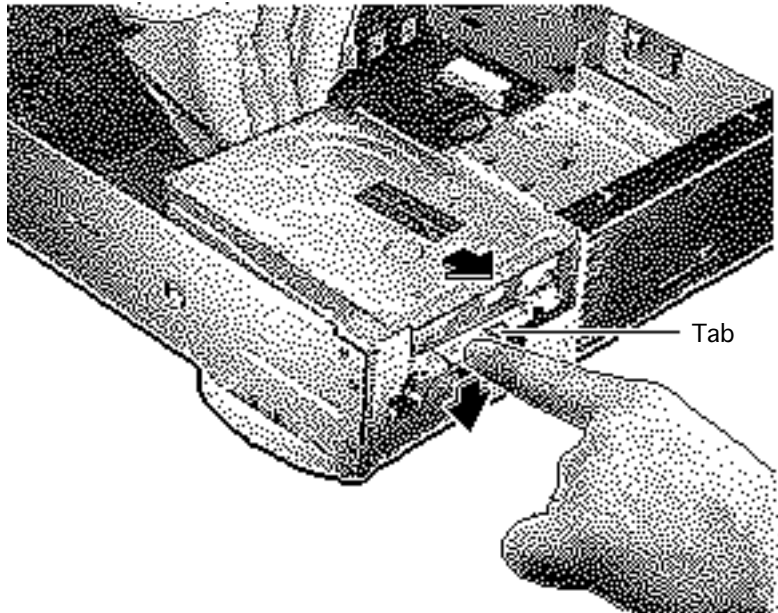


- 2 Remove the hard drive EMI shield.





- 3 Press down on the tab and slide out the hard drive.

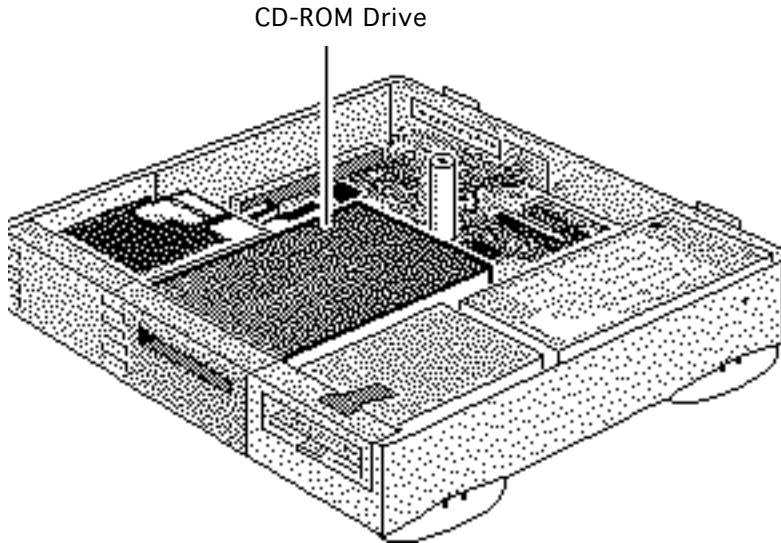


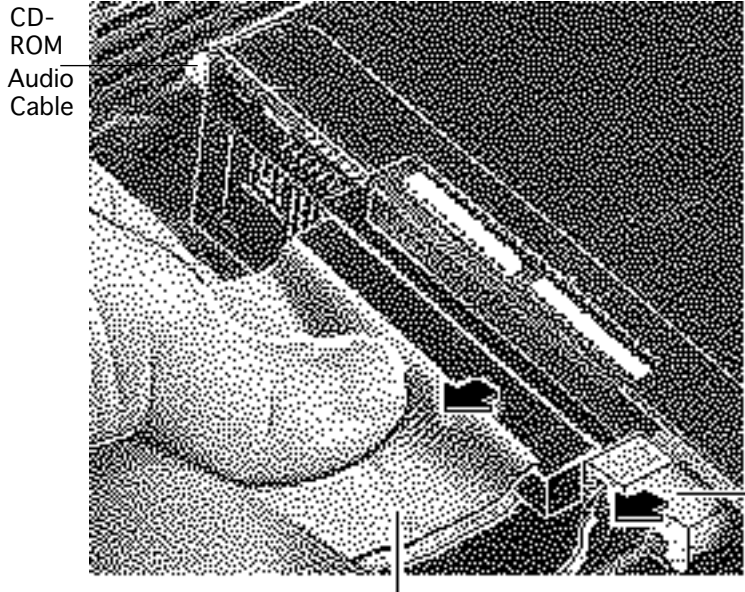


CD-ROM Drive

Before you begin, remove the top cover.

Caution: Review the ESD precautions in Bulletins/Safety.





CD-ROM
Audio
Cable

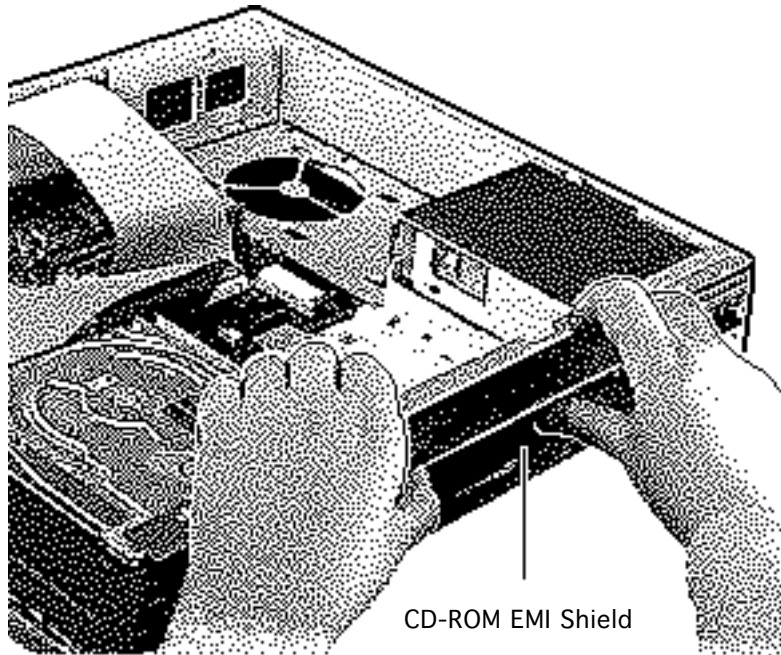
SCSI Data Cable

- 1 Disconnect the SCSI data cable and CD-ROM drive power cable from the CD-ROM drive.
- 2 Disconnect the CD-ROM audio cable.





- 3 Remove the CD-ROM drive EMI shield.



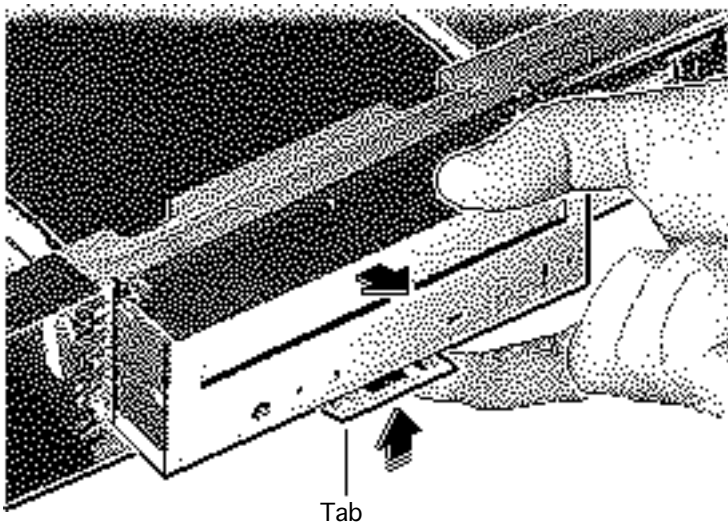
CD-ROM EMI Shield





- 4 Press up on the tab and slide out the CD-ROM drive.

Replacement Note: Be sure to remove the CD-ROM drive from the carrier prior to returning the drive to Apple.



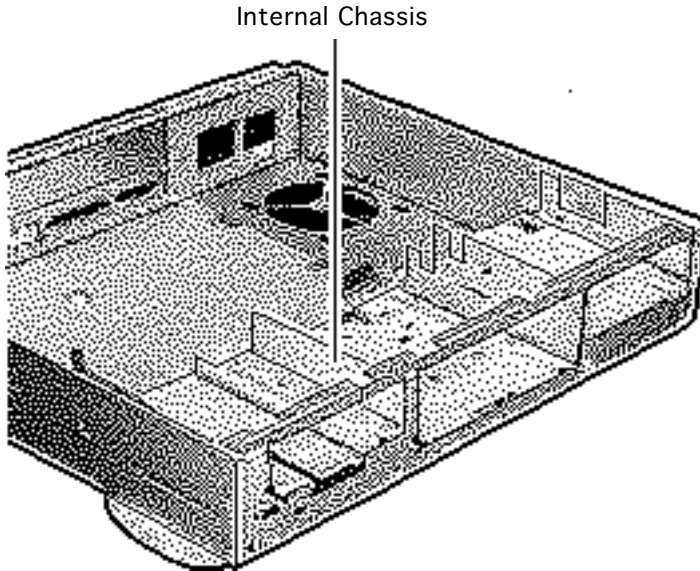


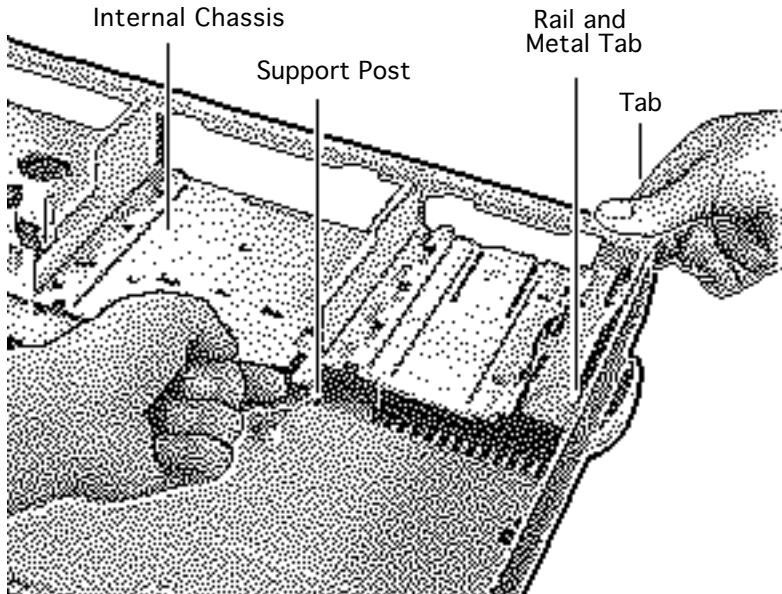
Internal Chassis

Before you begin, remove the following:

- Top cover
- Power supply
- Floppy drive
- Hard drive
- CD-ROM drive (if installed)
- Logic board

Caution: Review the ESD precautions in Bulletins/ Safety.





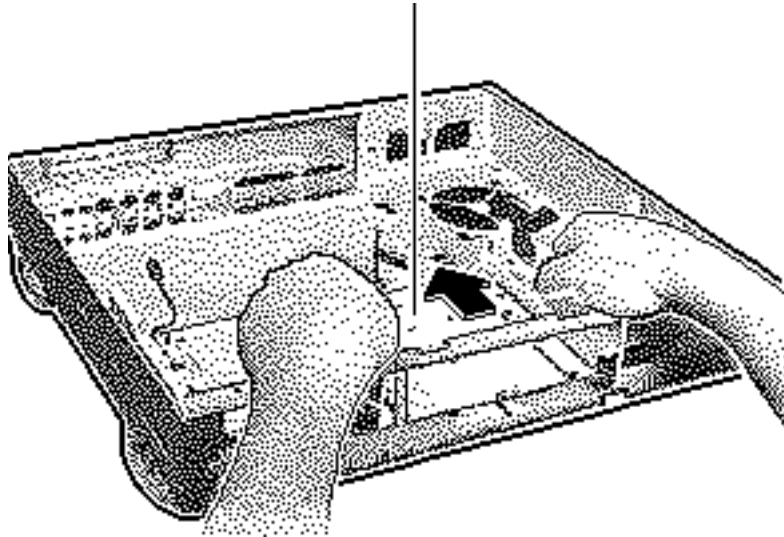
Note: The chassis is secured to the bottom cover by two tabs at the front of the unit, two rail and tab sets at the sides of the unit, support posts at the back of the chassis, and hidden brackets that slide into the bottom cover.

- 1 Press up on one of the front tabs while lifting the support post.
- 2 Repeat this step on the other side until the internal chassis slides easily toward the back of the computer.





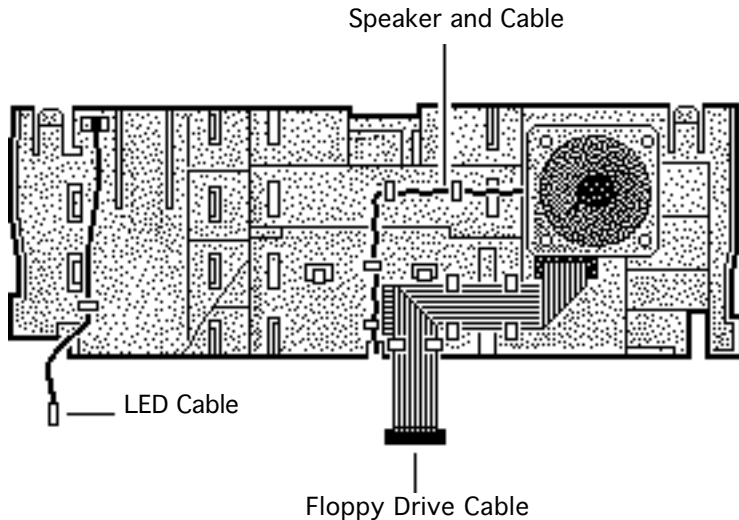
Internal Chassis



- 3 Press down and slide the chassis toward the back of the computer.
- 4 Remove the chassis.

Note: The LED cable, floppy drive cable and speaker are not part of the internal chassis assembly.



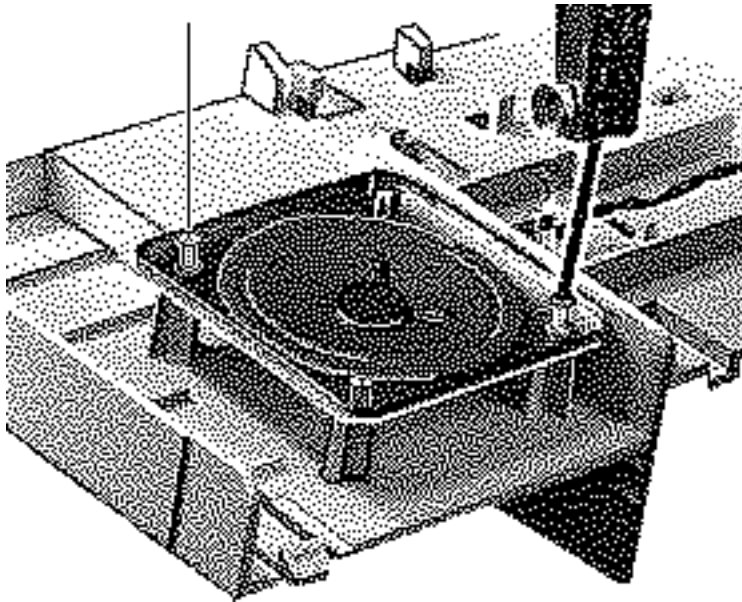


- 5 Turn the chassis over.
- 6 Remove the floppy drive cable and the LED cable.
- 7 Remove the speaker cable from its routing guides.



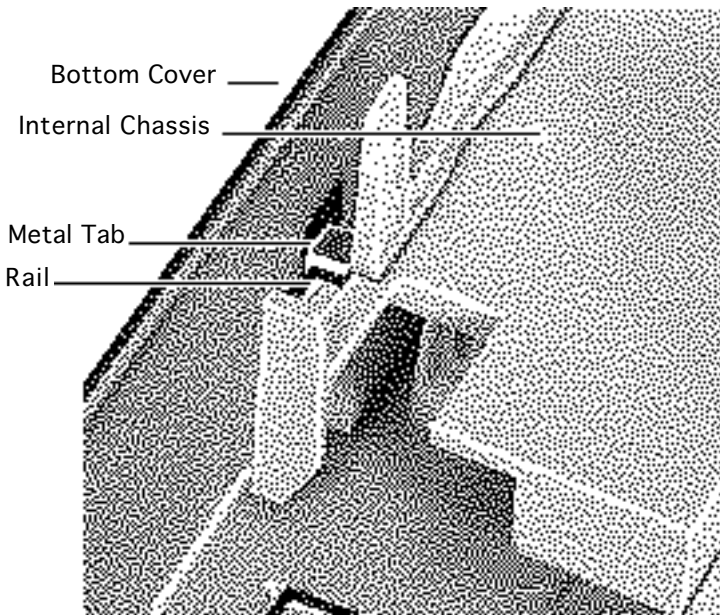


Torx Screws



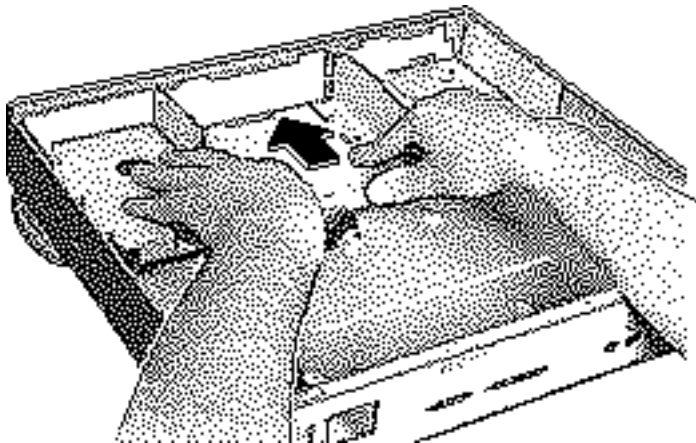
- 8 Remove the two torx screws from the speaker.
- 9 Lift out the speaker.





Replacement Note: To replace the chassis, carefully slide the rails at the side of the chassis under the metal tabs.





Replacement Note: After carefully aligning the side rails, push down firmly on the chassis and slide it toward the front of the unit. The tabs will snap in place.



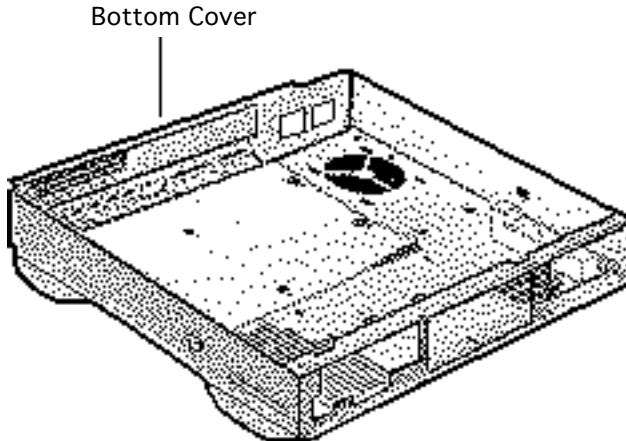


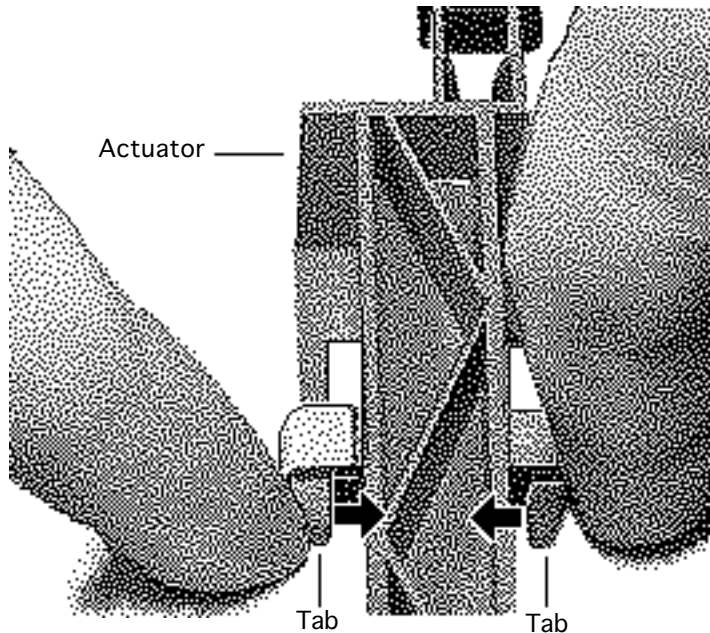
Bottom Cover

Before you begin, remove the following:

- Top cover
- Power supply
- Floppy drive
- Hard drive
- CD-ROM drive (if installed)
- Logic board
- Internal chassis

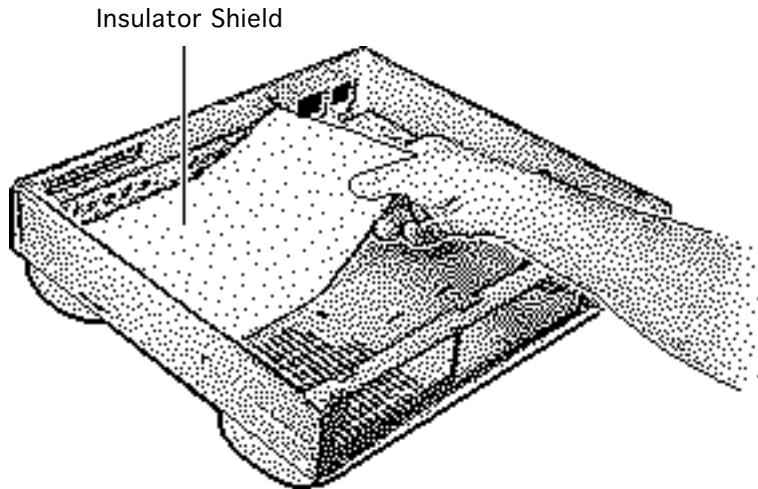
Caution: Review the ESD precautions in Bulletins/ Safety





- 1 Shift the actuator toward the back of the unit.
- 2 Squeeze together the tabs on the shaft of the actuator.
- 3 Remove the actuator.



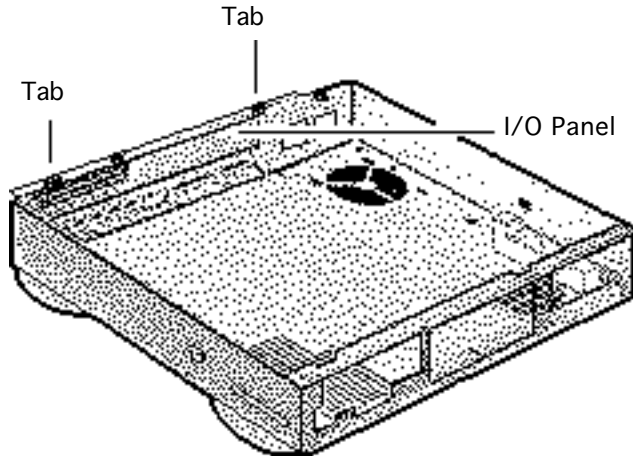


- 4 Lift out the insulator shield.

Replacement Note:

There is only one correct position for the insulator shield. Match the notches on the sides of the insulator sheet with the corresponding metal stops.





- 5 Using a screwdriver, release the tabs on the upper-rear edge of the bottom cover.
- 6 Push out the I/O panel.





Upgrades

Macintosh Quadra 610/Centris
610/WS 60



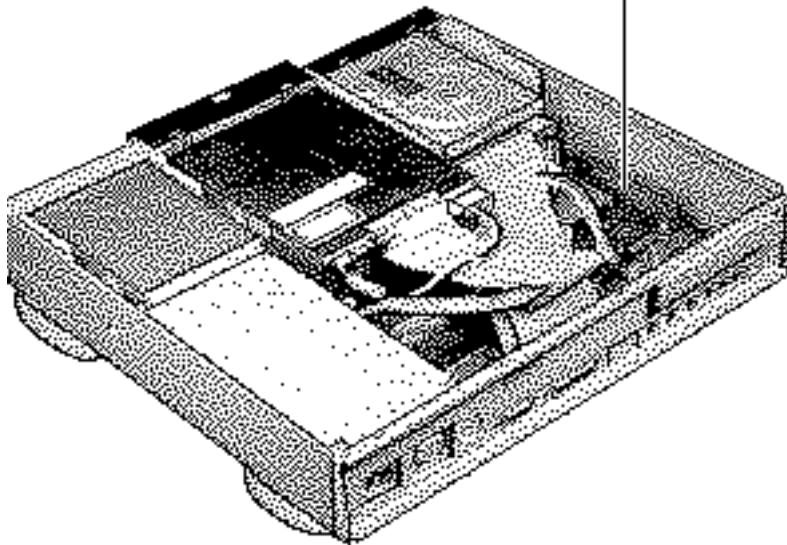


Expansion Cards

Before you begin, remove the cover.

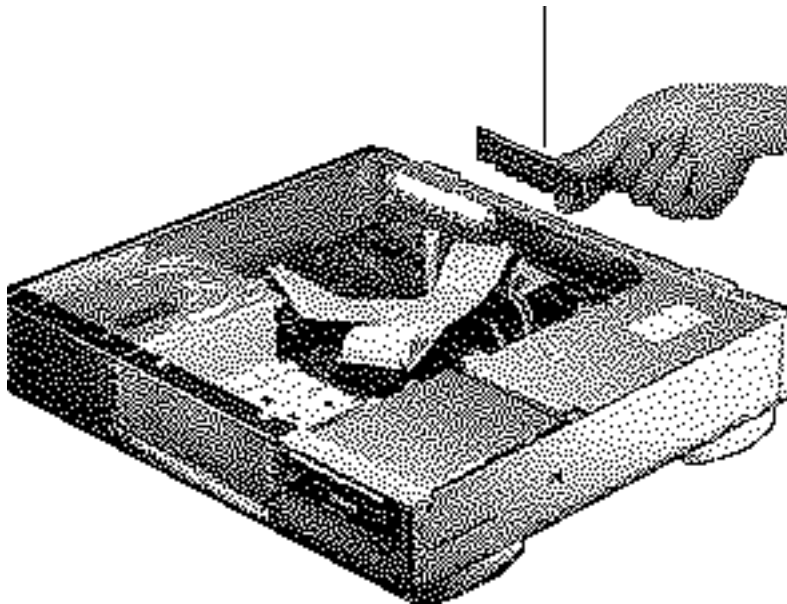
Caution: Review the ESD precautions in Bulletins/Safety.

Expansion Card Slot





Expansion Port Cover

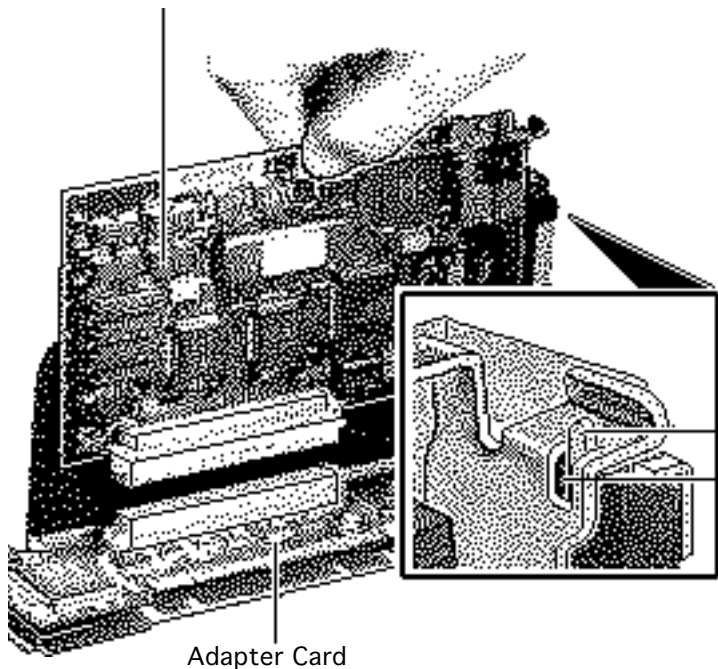


- 1 Remove the expansion port cover from the back panel.





Expansion Card



- 2 Loosely connect the expansion card connector to the adapter card connector.

Note: Be sure to fit the adapter card pin into the expansion card hole.

- 3 Gently press the connectors together.

Adapter Card Pin

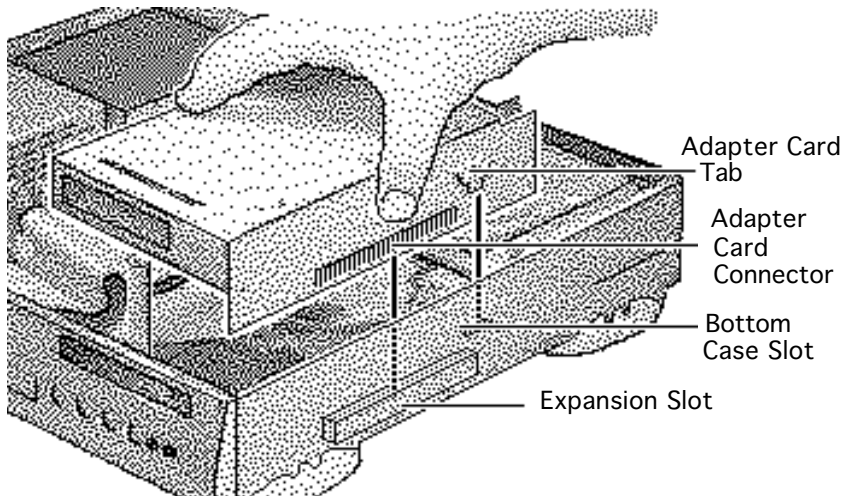
Expansion Card Hole





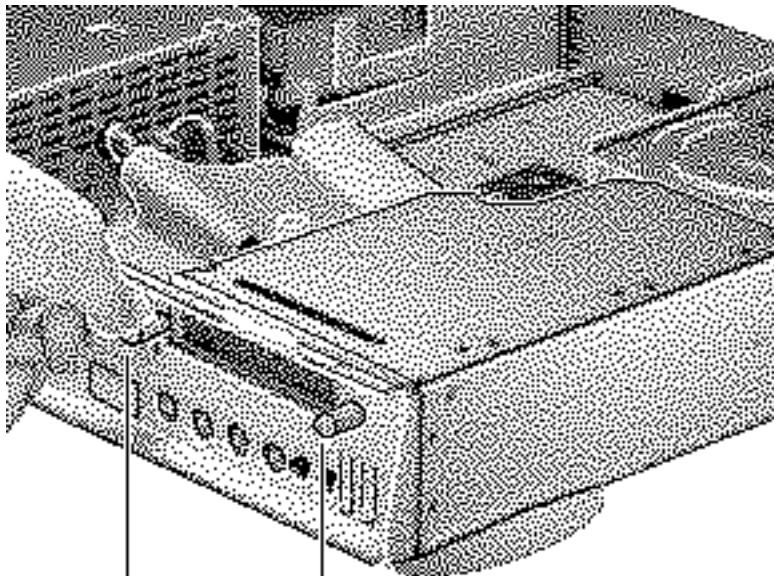
- 4 Insert the connector on the bottom of the adapter card into the expansion slot.

Note: Make sure that the tab on the side of the adapter card slides into the slot on the side of the bottom case.





- 5 Attach the thumbscrews.



Thumbscrews



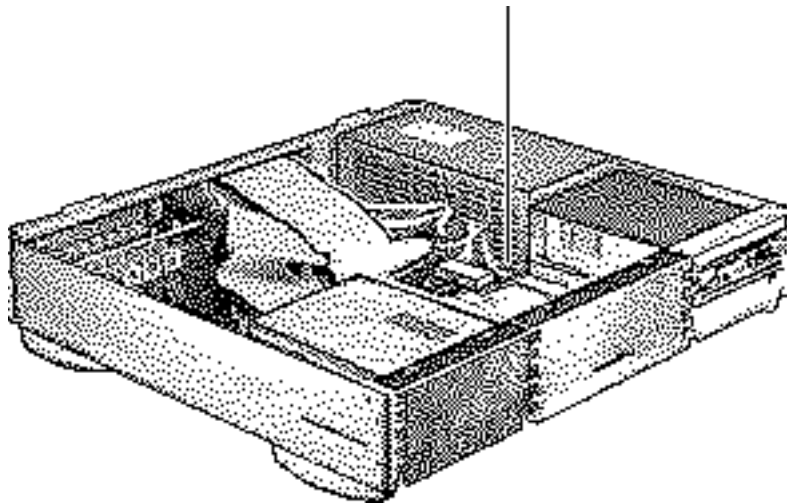


CD-ROM Drive Upgrade

Before you begin, remove the top cover.

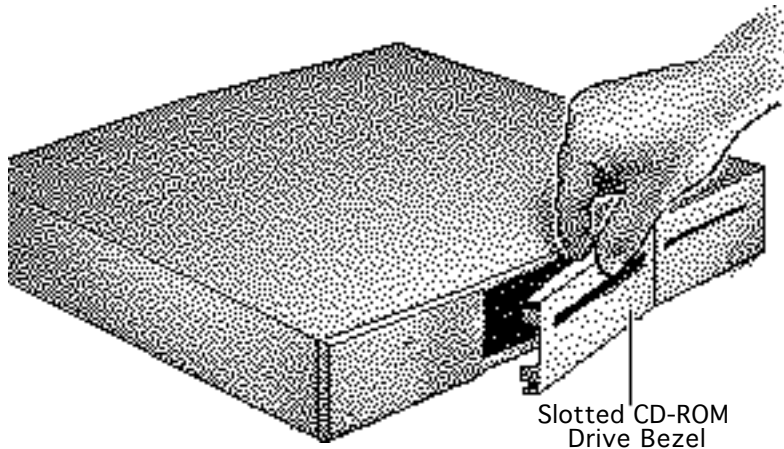
Caution: Review the ESD precautions in Bulletins/Safety.

CD-ROM Drive Bay



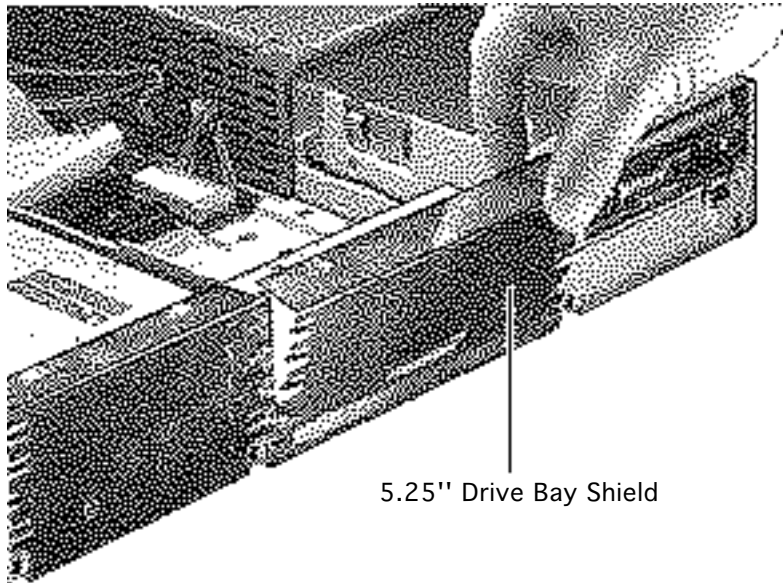


- 1 Remove the blank CD-ROM drive bezel from the top cover.
- 2 Install the slotted CD-ROM drive bezel in the top cover.





- 3 Pry off the metal 5.25" drive bay shield.

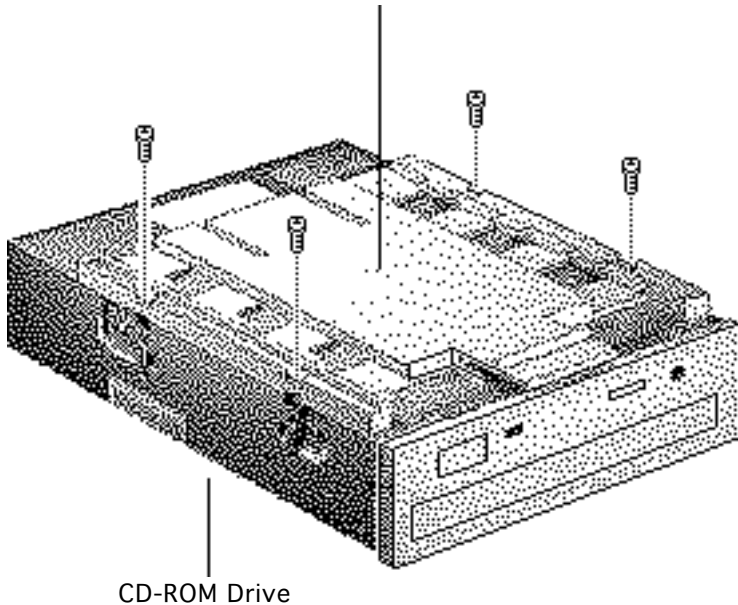


5.25" Drive Bay Shield



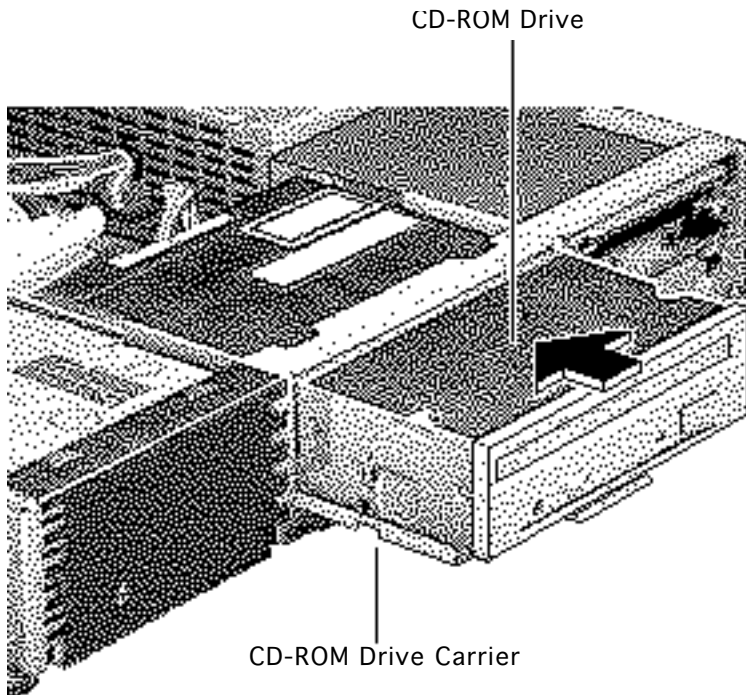


CD-ROM Drive Carrier



- 4 Attach the CD-ROM drive carrier to the CD-ROM drive with four Phillips screws.



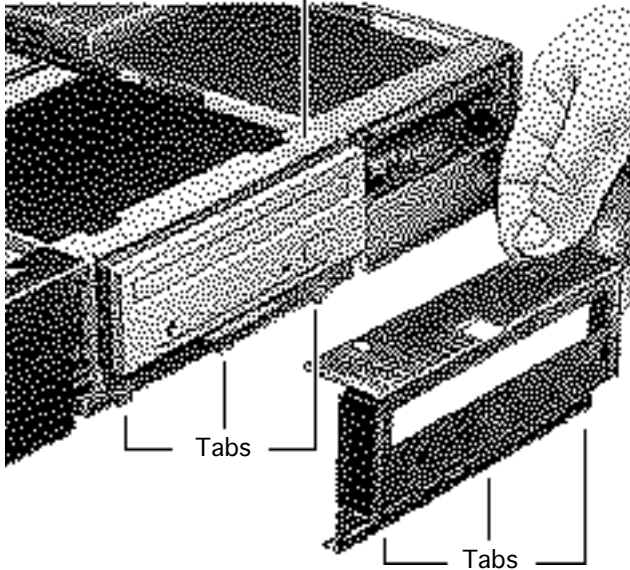


- 5 Push in the CD-ROM drive and carrier.





Bottom Cover



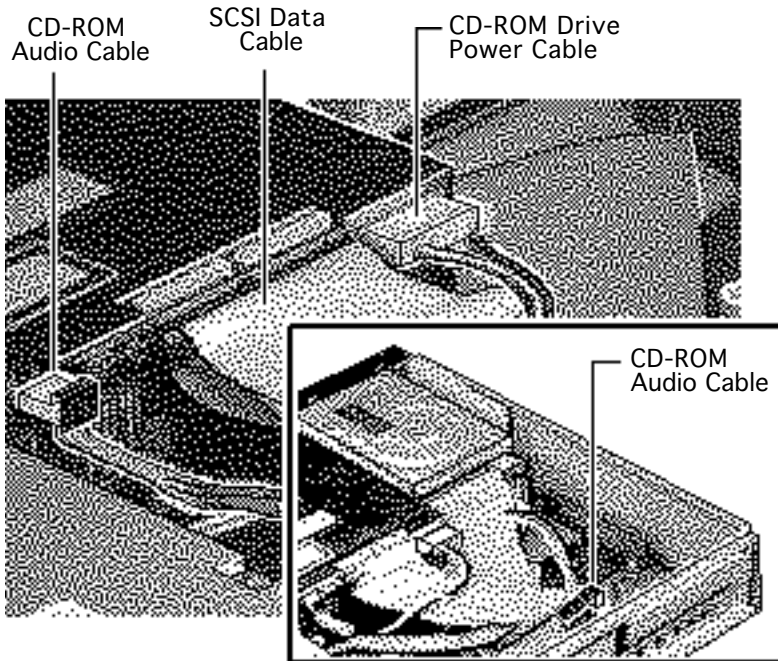
- 6 Align the slots at the lower edge of the CD-ROM shield with the tabs on the bottom cover.
- 7 Swing up the CD-ROM shield until it snaps securely onto the bottom cover.

CD-ROM Shield

Tabs

Tabs





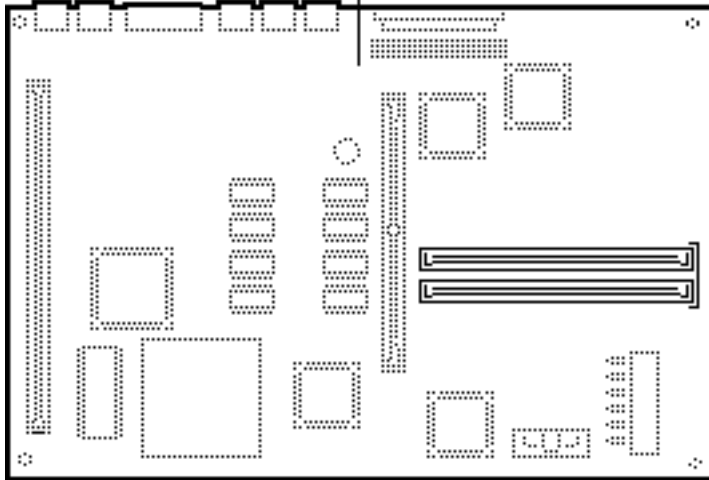
- 8 Connect these cables from the power supply to the CD-ROM drive:
 - SCSI data cable
 - CD-ROM drive power cable

- 9 Connect one end of the audio cable to the CD-ROM drive and the other end of the audio cable to the logic board.





Centris 660AV Logic Board



660AV Upgrade

Before you begin, remove the following:

- Top cover
- Power supply
- Logic board

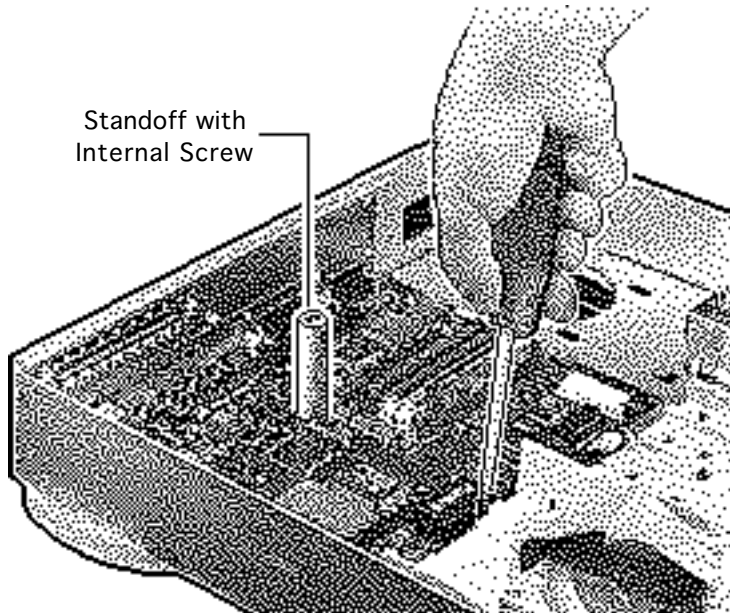
Caution: To prevent ESD damage to components, wear a grounding wriststrap. Review the ESD precautions in Bulletins/Safety.





Note: The Centris 610AV Upgrade Kit for the Centris 610 includes a Centris 610AV Logic Board, product labels, and I/O panel.

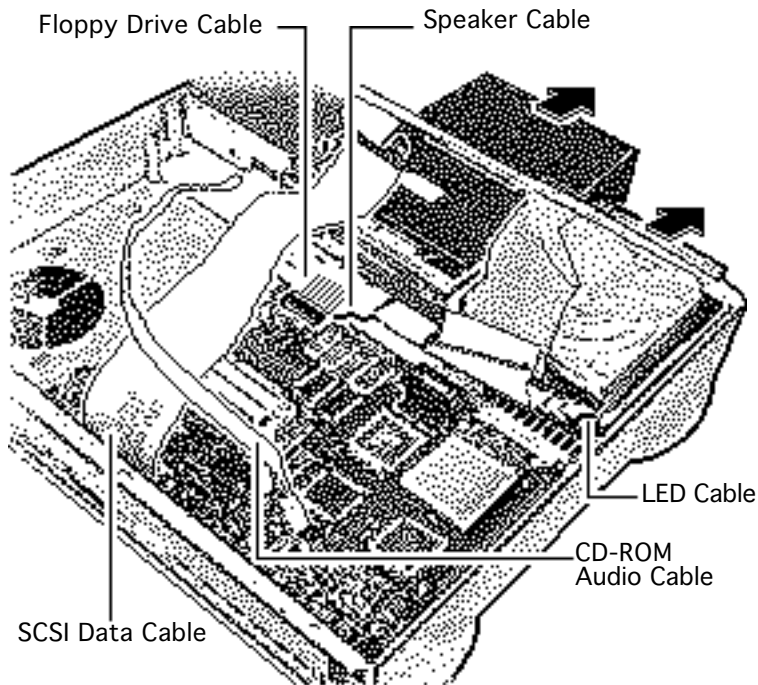




Note: The Centris 610 logic board is secured with two screws.

- 1 Using a long Phillips screwdriver, remove the screw from the center of the standoff.
- 2 Remove the standoff.
- 3 Remove the Phillips screw from the front edge of the Centris 610 logic board.





- 4 Disconnect these cables from the Centris 610 logic board:
 - SCSI data cable
 - Speaker cable
 - LED cable
 - CD-ROM audio cable (if present)
 - Floppy drive cable

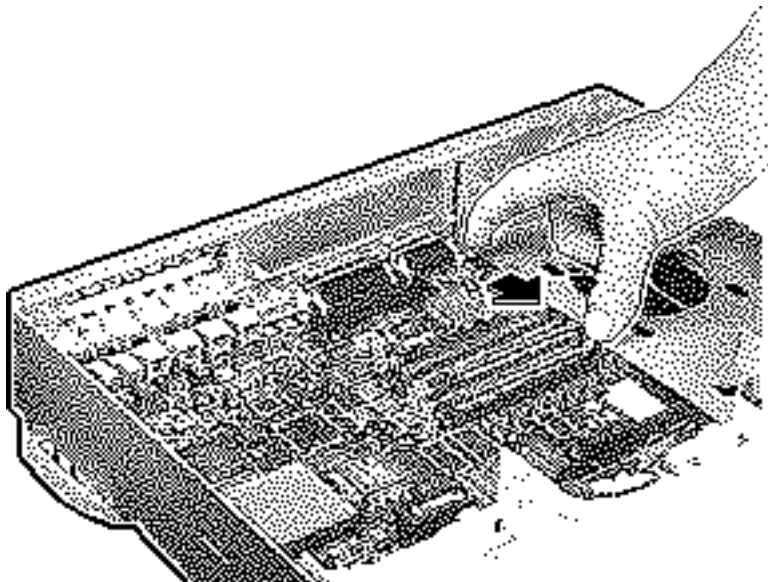
Note: Lift the front edge of the logic board to make removing the floppy drive easier.

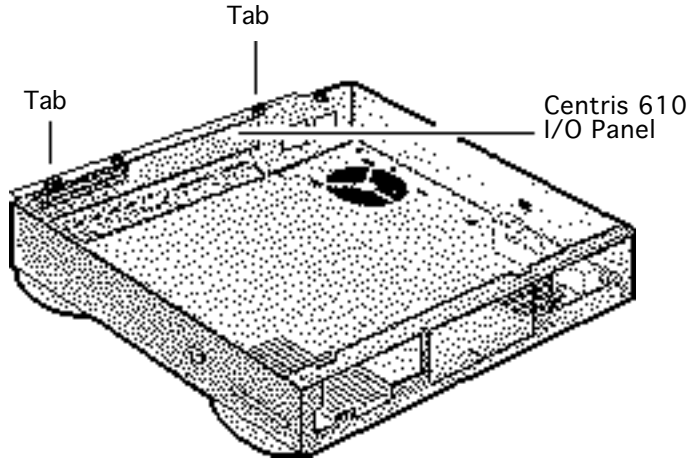
- 5 Slide forward the hard drive and CD-ROM drive (if installed).





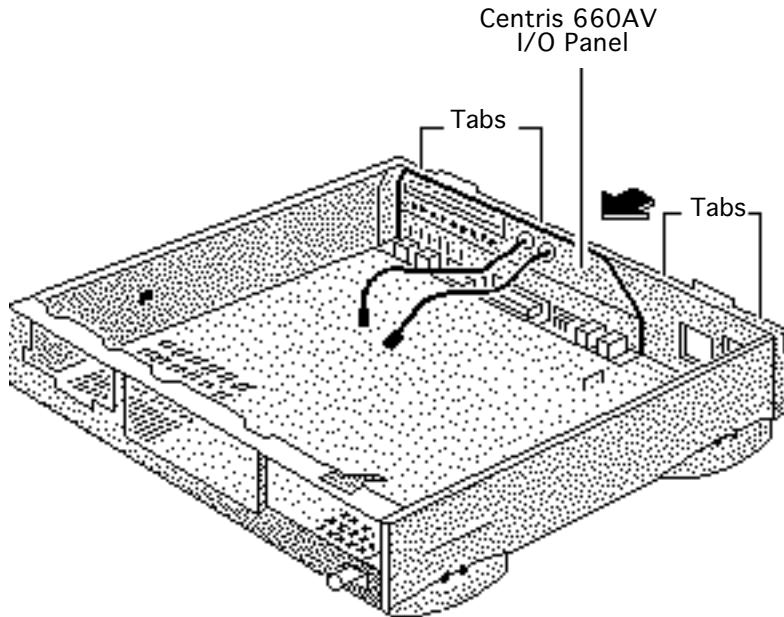
- 6 Slide the Centris 610 logic board toward the front of the computer.
- 7 Remove the Centris 610 logic board.





- 8 Using a screwdriver, release the tabs on the upper-rear edge of the bottom cover.
- 9 Push out the Centris 610 I/O panel.



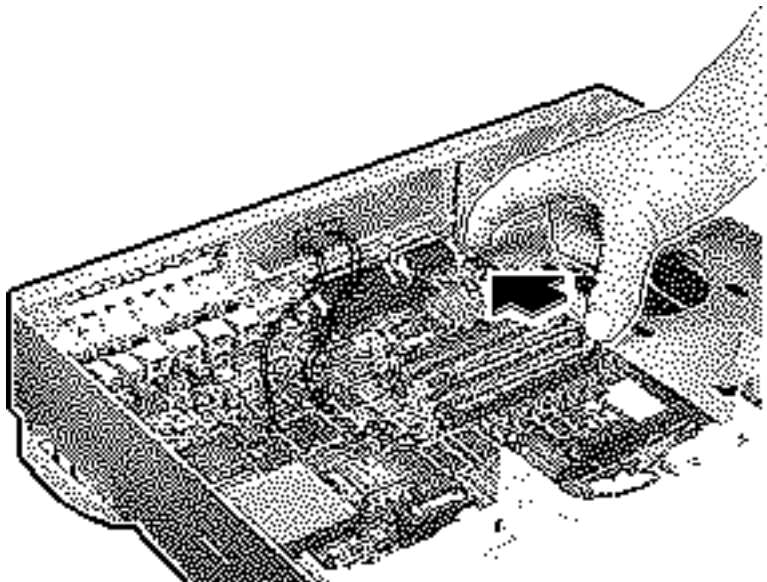


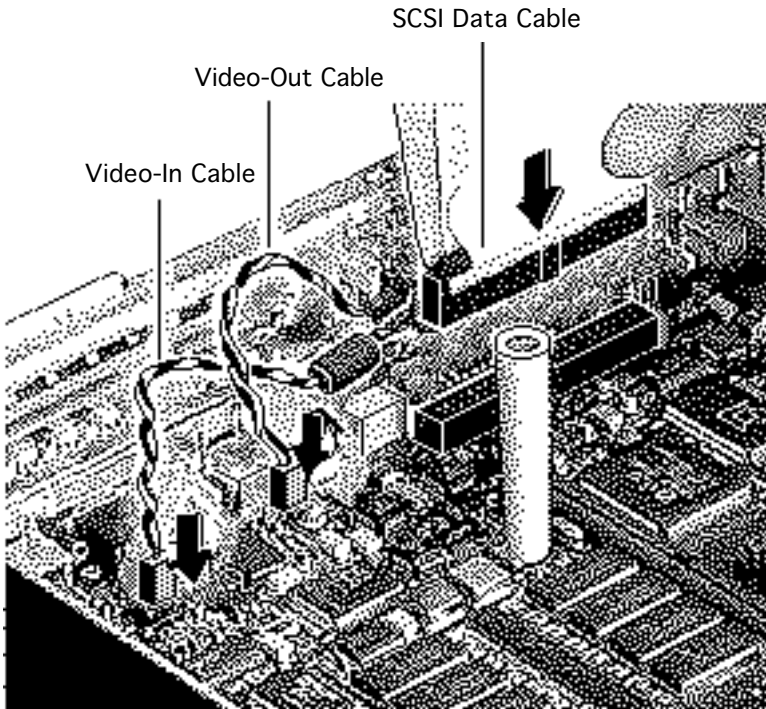
- 10 Position the Centris 660AV I/O panel in the bottom cover.
- 11 Press the I/O panel to snap the tabs in place.





- 12 Place the Centris 660AV logic board in the bottom cover just forward of the I/O panel and slide the logic board into place.

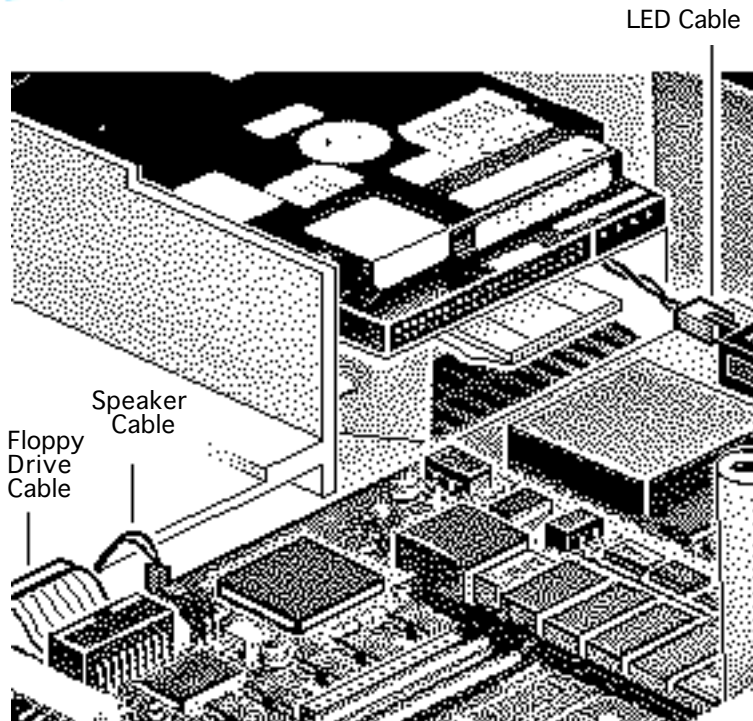




13 Connect these cables to the back edge of the logic board:

- Video-out cable
- Video-in cable
- SCSI data cable





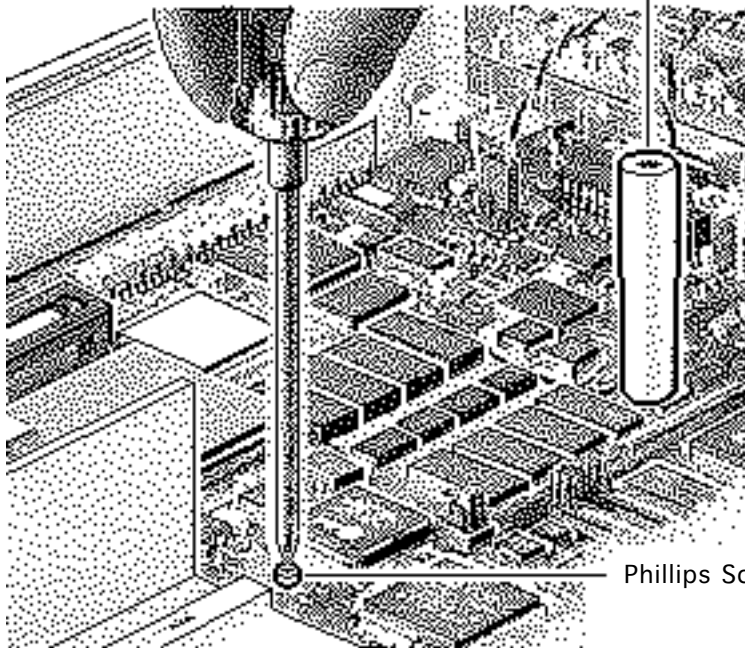
14 Connect these cables to the front edge of the Centris 660AV logic board:

- Floppy drive cable
- Speaker cable
- LED cable
- CD-ROM audio cable (if present)





Standoff with Internal Screw



Phillips Screw

Replacement Note: Replace the standoff with the internal Phillips screw. Replace the Phillips screw on the front edge of the logic board.



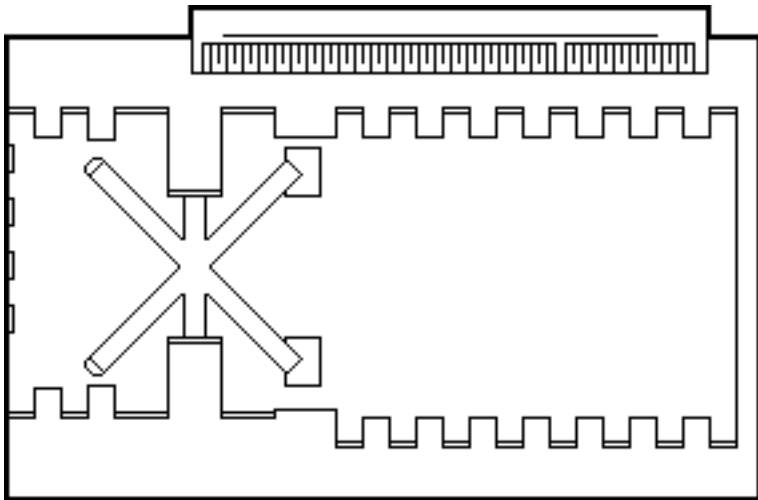


Power Macintosh Card

Before you begin, remove the cover.

Caution: Review the ESD precautions in Bulletins/ Safety.

Installing this card in the computer's Processor-Direct Slot (PDS) upgrades this 68040-based computer to a PowerPC-based computer.





Refer to “Expansion Cards” in this chapter for installation procedures.

Refer to Power Macintosh Card manual for more information.

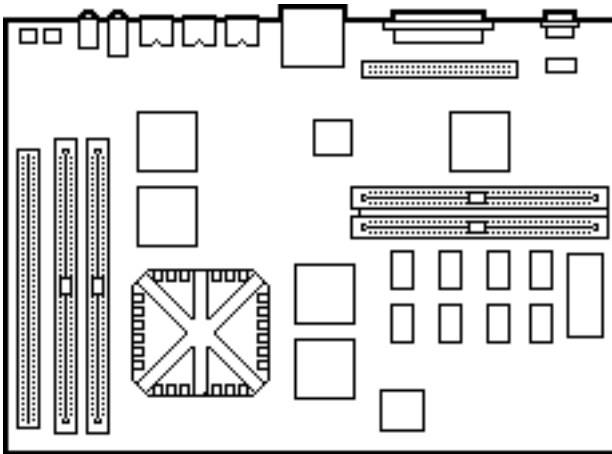




Power Mac Upgrade

No preliminary steps are required before you begin this procedure.

The Centris 610 and Quadra 610 can be upgraded to a Power Macintosh 6100/60 or Power Macintosh 6100/60AV. The AWS 60 can be upgraded to a Workgroup Server 6150.





For upgrade instructions, refer to the Upgrades chapter in the Power Macintosh 6100/WS 6150 manual.





Additional Procedures

Macintosh Quadra 610/Centris
610/WS 60



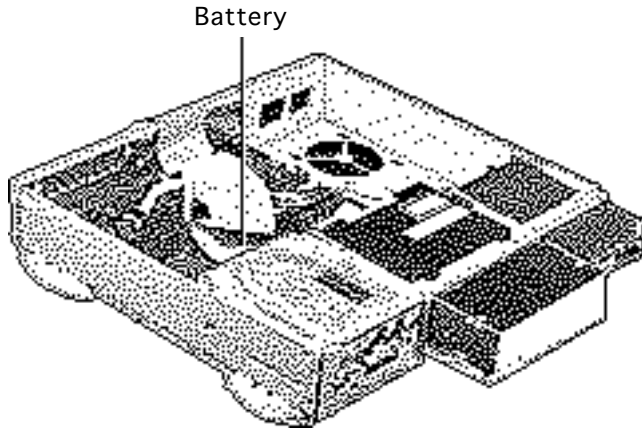


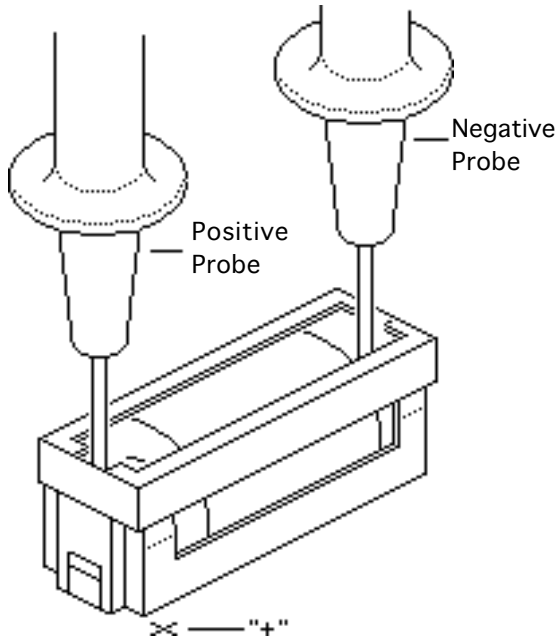
Battery Verification

Before you begin, remove the cover.

⚠ Warning: If handled or discarded improperly, the lithium battery in the computer could explode. Review battery-handling and disposal instructions in Bulletins/Safety.

Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Set the voltmeter to the 10 volts DC scale.
- 2 Hold the positive probe of the voltmeter to the positive end of the battery (marked “+” on the logic board) and the negative probe to the negative end of the battery.
- 3 If the battery voltage is below 3.2 volts, replace the battery. Refer to “Battery Replacement” in this chapter.



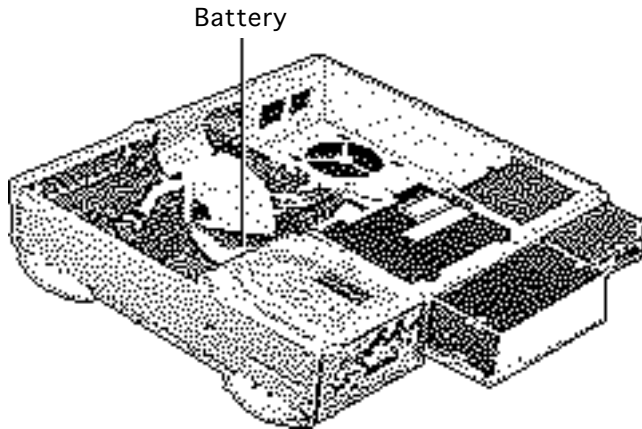


Battery Replacement

Before you begin, remove the cover.

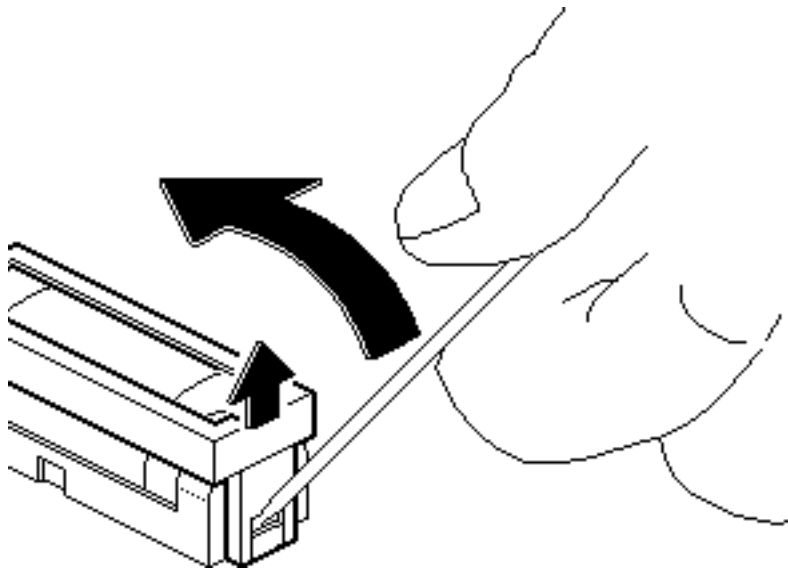
⚠ Warning: If handled or discarded improperly, the lithium battery in the computer could explode. Review battery-handling and disposal instructions in Bulletins/Safety.

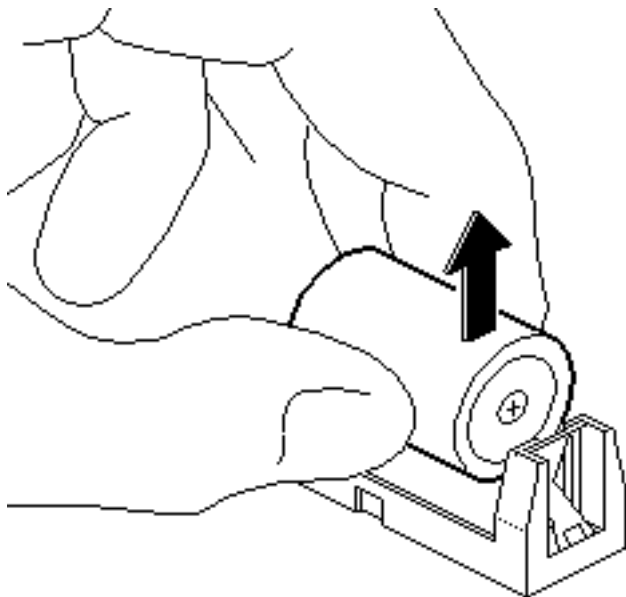
Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Using a small flat-blade screwdriver, pry open the latch at the end of the battery holder and lift off the cover.





- 2 Grasp the battery and remove it from the holder.
- 3 Return the battery to Apple for proper disposal. For battery packaging and labeling instructions, refer to the safety information in Bulletins/Safety.



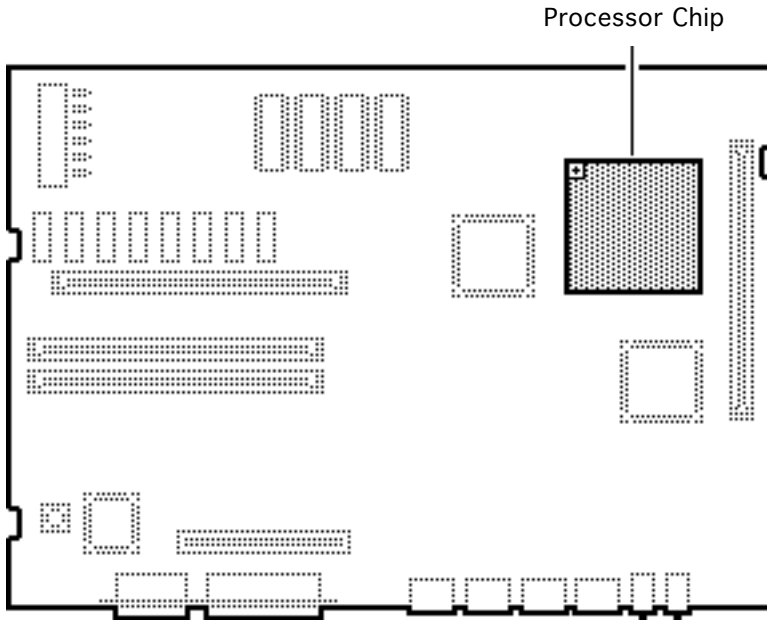


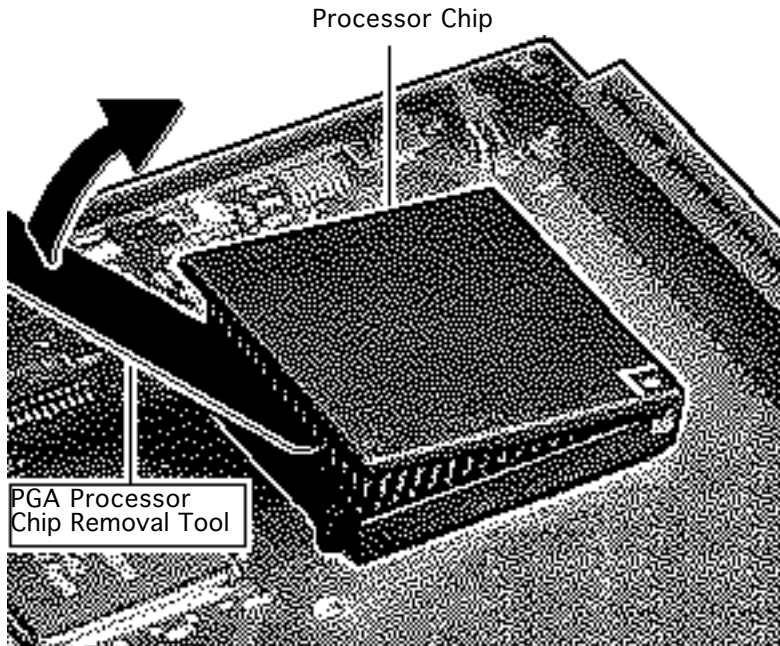
CPU Replacement

Before you begin, remove the following:

- Top cover
- Power supply
- Expansion card
- Logic board

Caution: Review the ESD precautions in Bulletins/Safety.



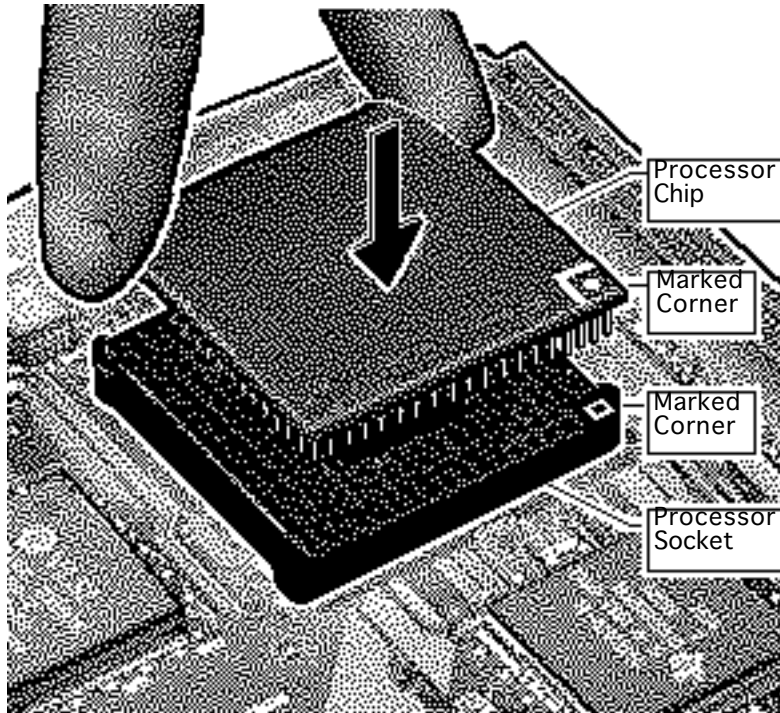


- 1 Position the teeth of the PGA processor chip removal tool in the groove between the chip and the socket.

Caution: Be sure to lift up on the handle of the chip removal tool. Pressing down could damage components on the board.

- 2 Gently lift up the handle to loosen each side of the processor chip from the socket.
- 3 Remove the processor chip.





- 4 Position the marked corner of the processor chip over the marked corner of the processor socket.

Replacement Caution:

Forcing the processor into the socket could damage processor pins. If the processor resists installation, check pin alignment.

- 5 Carefully align the pins of the processor chip with the corresponding holes in the socket.





- 6 Press down firmly on each edge of the processor chip.





Parts

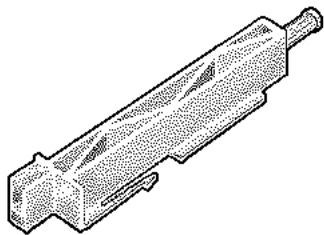
Centris/Quadra 610/AWS 60





Actuator, On/Off

922-0357





Actuator, Reset/Interrupt

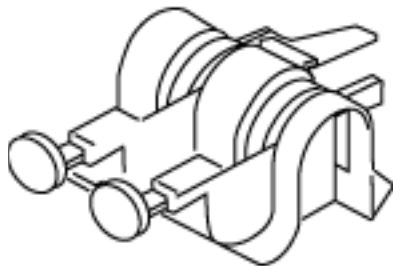
815-6270





Actuator, Reset/Interrupt

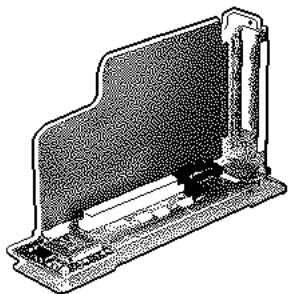
922-1260





Adaptor, NuBus, Centris 610/AWS 60

661-1718





Battery, Lithium, without Leads

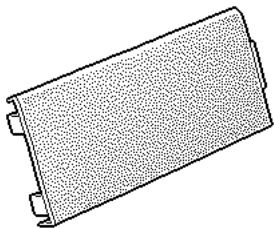
742-0011





Bezel, Blank

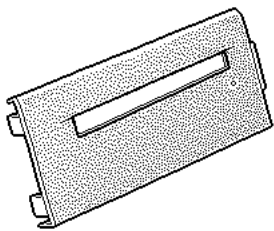
922-0358





Bezel, CD, ROM Drive

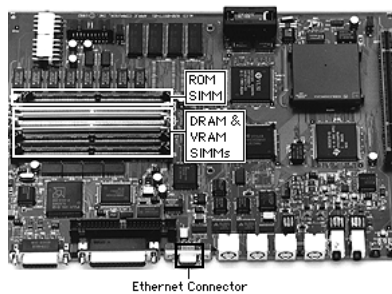
922-0355





Board, Logic, w/FPU, Ethernet

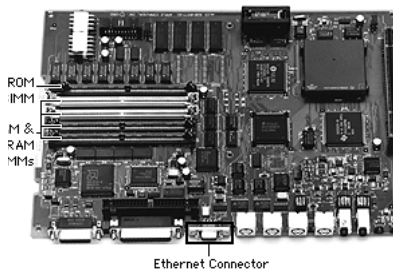
661-0043

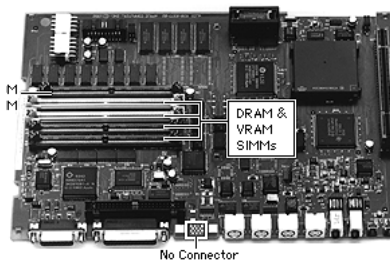




Board, Logic, w/o FPU, Macintosh Quadra 610

661-0042



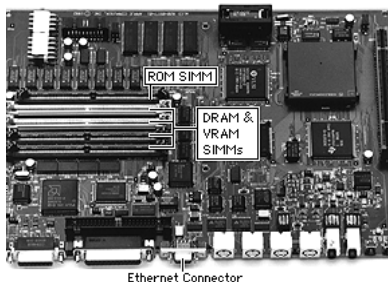
**Board, Logic, 20 MHz, 4 MB, Centris 610****661-1681**

Return the Macintosh Centris 610 logic board without DRAM or VRAM SIMMs.

This logic board does not support Ethernet and can be identified by the vacant connector on the lower part of the board.

There may or may not be a ROM SIMM connector on the board.



**Board, Logic, 20 MHz, w/E-Net, 4 MB~Centris 610/AWS 60****661-1682**

Return the Macintosh Centris 610 logic board without DRAM or VRAM SIMMs.

This logic board supports Ethernet and can be identified by the Ethernet connector on the lower part of the board.

There may or may not be a ROM SIMM connector on the board.





Bracket, Adapter Card

922-0708





Cable, AC Power Cord, International

590-0094





Cable, CD-ROM, Audio

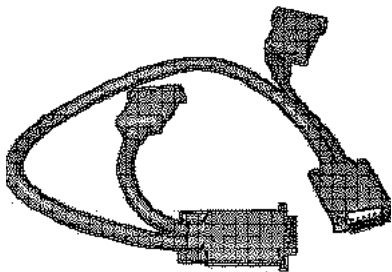
922-0842





Cable, DOS Compatibility, External

922-0706





Cable, Floppy Drive

922-0351





Cable Kit, SCSI Select

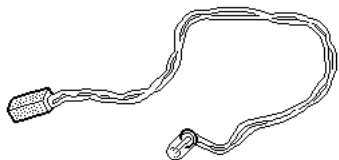
076-0130





Cable, LED, Power

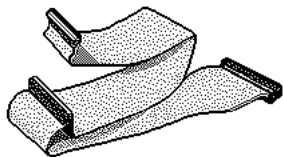
922-0354





Cable, SCSI Drive (Replaced by 922-0804)

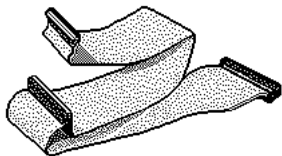
922-0352





Cable, SCSI Drive, Pkg. of 5

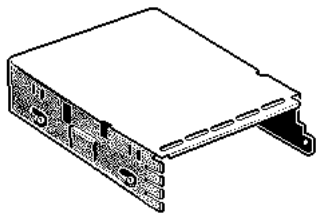
922-0804





Carrier, 1.4 MB Apple SuperDrive

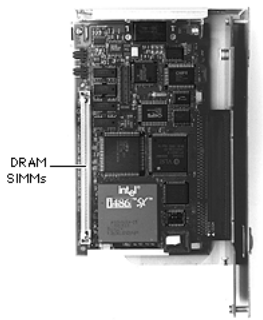
805-0961





Card, 486 PC, DOS Compatible, Quadra 610

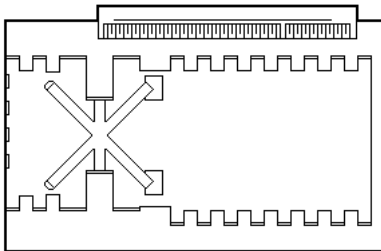
661-1017





Card, 040 PDS, Power Macintosh Upgrade

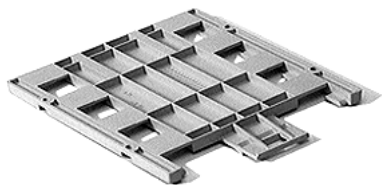
661-0035





Carrier, CD-ROM Drive

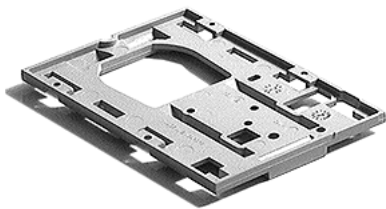
922-0850





Carrier, Floppy Drive, Manual Insert

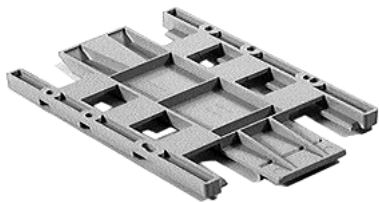
922-0445





Carrier, Hard Drive/Tape Drive, 3.5"

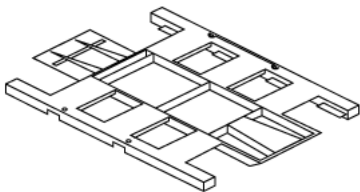
922-0621





Carrier, Hard Drive

922-1806





CD Caddy

678-5059





CD-ROM Drive, Apple CD 300+, Trayloading

661-0222





CD-ROM Drive, Apple CD 300, Caddy Loading

661-0023



**CD-ROM Drive, AppleCD 300****661-1646**

Special Packaging is Required.

Pkg: 602-0188

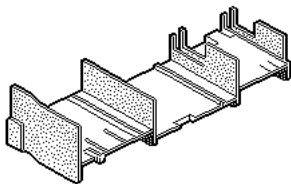
Failure to comply with these requirements may result in a packaging noncompliance charge. Refer to Service Prices for ordering and pricing information.





Chassis, Drive Assy (TBD)

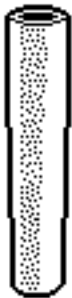
922-0359





Column (Top Cover Support)

922-0356





Cord, Power, 110 V, Smoke

590-0380





Cover, Battery Holder

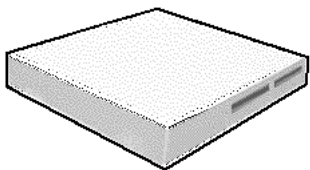
520-0344





Cover, Top, Manual Insert Floppy

922-0545





Feet, Enclosure, Pkg. of 4

922-0862



**Floppy Drive, Apple SuperDrive 1.4 MB****661-0474**

You can identify the 1.4 MB drive mechanism by the 2 MB designation on the blue model number label, on the right side of the module.

When returning the defective drive to Apple, assemble the shipping fixture and remove the drive cable. Special Packaging Is Required:

Pkg: #602-0210

Surcharge: \$50.00

Failure to comply with these requirements may result in a packaging noncompliance surcharge. Please refer to Service Prices for ordering and pricing information.

Note: Service is removing dust shields from standard packaging. Drives will be shipped with either carriers 805-5050 or 805-0961.

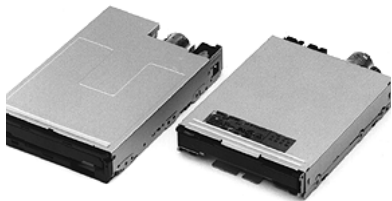
Use this drive in the Macintosh LC and LCII.





Floppy Drive, Apple SuperDrive, 1.4 MB, Manual Insert

661-0121



**Hard Drive, 1 GB, SCSI, 3.5"****661-0228**

This drive is one of the recommended replacement choices for an out-of-warranty hard drive that's been discontinued. This drive may not be exchanged for the failed, out-of-warranty drive, but must be ordered as stock.

All replacement drives will be shipped without carriers. Return the defective drive without cables, carrier, hard drive frame, LED cable, or SCSI select cable. Special Packaging Requirements: Pkg: #602-0282 Surcharge: \$150.00.

Failure to comply with these requirements may result in a packaging noncompliance surcharge. The drive warranty will be void and Apple will return the module to the service provider without repair if the drive bar code label, manufacturer identification label, Apple capacity or EPROM label, or labels that say "Warranty Void if Seal Broken" have been tampered with or removed.



**Hard Drive, 160 MB, SCSI, 3.5" (Discontinued)****661-0214**

This part has been discontinued. For replacement of parts covered under warranty or AppleCare®, order 661-1750. For replacement of out-of-warranty parts, refer to the parts list in the Service Source manual for the product you are repairing.



**Hard Drive, 230 MB, SCSI, 3.5" (Discontinued)****661-1637**

This part has been discontinued. For replacement of parts covered under warranty or AppleCare®, order 661-1750. For replacement of out-of-warranty parts, refer to the parts list in the Service Source manual for the product you are repairing.





Hard Drive, 250 MB, SCSI, 3.5"

661-0890

Top



Bottom

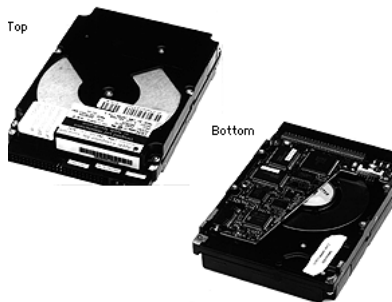


This drive is one of the recommended replacement choices for an out-of-warranty hard drive that's been discontinued. This drive may not be exchanged for the failed, out-of-warranty drive, but must be ordered as stock.





Hard Drive, 350 MB, SCSI, 3.5"

661-0182

This drive is one of the recommended replacement choices for an out-of-warranty hard drive that's been discontinued. This drive may not be exchanged for the failed, out-of-warranty drive, but must be ordered as stock.



**Hard Drive, 500 MB, SCSI, 3.5"****661-0219**

This drive is one of the recommended replacement choices for an out-of-warranty hard drive that's been discontinued. This drive may not be exchanged for the failed, out-of-warranty drive, but must be ordered as stock. All replacement drives will be shipped without carriers.

Cable Return Requirements: Return the defective drive without cables.

Carrier Return Requirements: Return the drive without a carrier.

Special Packaging Requirements: Pkg: #602-0282
Surcharge: \$150.00

Failure to comply with these requirements may result in a packaging noncompliance surcharge. Please refer to Service Price Pages for ordering and pricing information.



**Hard Drive, 500 MB, SCSI, 3.5"****661-0974**

This drive is one of the recommended replacement choices for an out-of-warranty hard drive that's been discontinued. This drive may not be exchanged for the failed, out-of-warranty drive, but must be ordered as stock.



**Hard Drive, 80 MB, SCSI, 3.5" (Discontinued)****661-0212**

This part has been discontinued. For replacement of parts covered under warranty or AppleCare®, order 661-1750. For replacement of out-of-warranty parts, refer to the parts list in the Service Source manual for the product you are repairing.



**Hard Drive, 800 MB, SCSI, 3.5"****661-1102**

This drive is one of the recommended replacement choices for an out-of-warranty hard drive that's been discontinued. This drive may not be exchanged for the failed, out-of-warranty drive, but must be ordered as stock.



**Hard Drive, 500 MB, SCSI, 3.5", In-Warranty Exchange ONLY****661-1750**

Only order this part number when exchanging a failed hard drive that meets both of the following conditions: 1) the failed hard drive is covered under warranty or AppleCare®, and 2) the like-for-like replacement hard drive has been discontinued.

Apple has made every effort to maintain LED support in its exchange program; however, some drives no longer support an LED. We regret any inconvenience this may cause.



**Hard Drive, 160 MB, SCSI, 3.5", HD Adapter Support (Discontinued)****661-1649**

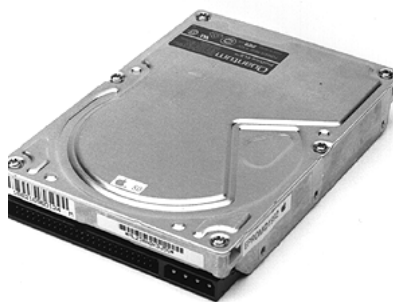
This part has been discontinued. For replacement of parts covered under warranty or AppleCare®, order 661-1750. For replacement of out-of-warranty parts, refer to the parts list in the Service Source manual for the product you are repairing.

Top



Bottom



**Hard Drive, 80 MB, SCSI, 3.5" (Discontinued)****661-0111**

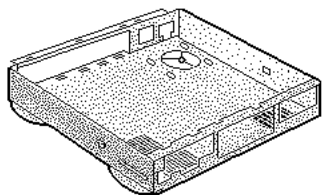
This part has been discontinued. For replacement of parts covered under warranty or AppleCare®, order 661-1750. For replacement of out-of-warranty parts, refer to the parts list in the Service Source manual for the product you are repairing.





Housing, Bottom (replaced by 922-0806)

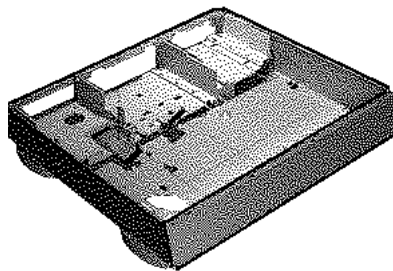
922-0360





Housing, Bottom

922-0806





Housing, Rear, I/O Bezel

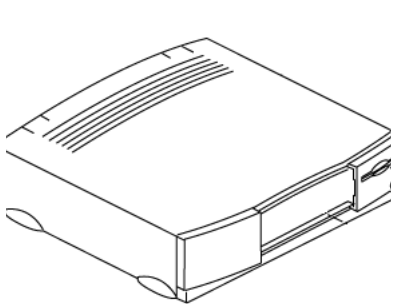
922-0365





Housing, Top cover Assy

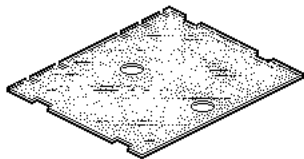
922-0368





Insulator Sheet, Centris 610/AWS 60

922-0361



**Keyboard, AppleDesign (Discontinued and Replaced by 922-2832)****661-0310**

The US version of this keyboard must now be ordered as 922-2832. Orders are no longer accepted for 661-0310. Do not return this keyboard to Apple. The international versions of this keyboard (661-0310 B/D/F/E/S/T) are still valid part numbers and should be returned to Apple for replacement.





Keyboard, AppleDesign

922-2832





Keyboard, AppleDesign, British

B661-0310





Keyboard, AppleDesign, French Canadian

C661-0310





Keyboard, AppleDesign, French

F661-0310





Keyboard, AppleDesign, German

D661-0310





Keyboard, AppleDesign, Italian

T661-0310





Keyboard, AppleDesign, Spanish

E661-0310





Keyboard II, Apple Extended

661-0543





Keyboard II, Apple

661-0603





Label, Name Plate, AWS 60

922-0623





Label, Product ID, (Bag of 10) AWS 60

922-0624





Label, Product ID, Centris 610

922-0364





Label, Product ID, Quadra 610 (Bag of 10)

922-0588





Microphone Assembly

699-5103





Mouse II, Apple Desktop Bus, Version A

661-0763



This module is replaced by part number 661-0104.



**Mouse II, Apple Desktop Bus, Version B****661-0104**

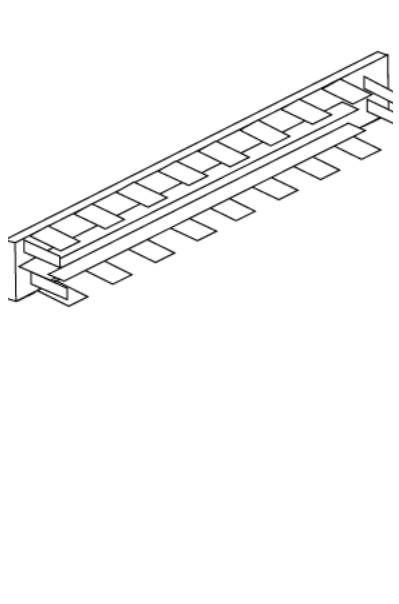
P/N 661-0104 and P/N 661-0763 are similar. To differentiate the two, check the connector at the end of the cable. P/N 661-0763 has a number printed on the connector; P/N 661-0104 has no number. The retainer for P/N 661-0104 is available with or without a small locking hole. There are two versions of the retainers with holes: version M, P/N 922-1242, and version L, P/N 922-1109. If the product label on the bottom of the mouse begins with “M,” and the retainer has a hole, order P/N 922-1242; if the product label begins with “L,” and the retainer has a hole, order P/N 922-1109. Note: The retainers are not interchangeable; be sure to order like for like.





Plug, Expansion, Pkg. of 5

922-0902





Power Supply, 86 W

661-1688



The Macintosh 86 watt power supply has the assembly part number 614-0022 on the module label.



**Retainer, ADB Mouse II, Black (for 21.9mm mouse ball)****922-0350**

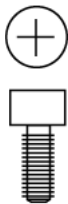
Use this retainer with a black mouse ball in ADB mouse II version A, P/N 661-0763, when the product label on the bottom of the mouse begins with "L."





Screw, FDHD SuperDrive

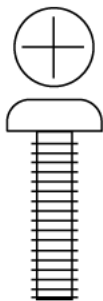
844-0018





Screw, M3x.5x10mm, PN, CRS

416-1310





Screw, M3X.5x8mm

410-1308





Screw, M3x5mm, Thumb, Slotted, Pkg. of 25

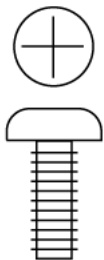
922-0995





Screw, M3x6mm, Mach

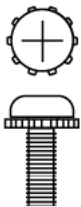
416-1306





Screw, M3x8mm, Pan Head, Philips, Pkg. of 10

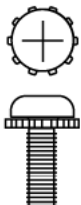
922-0401





Screw, Sems 6-32x.313 PN CRS (Replaced by 922-1381)

440-6105





Screw, Sems 6-32x.313 PN CRS

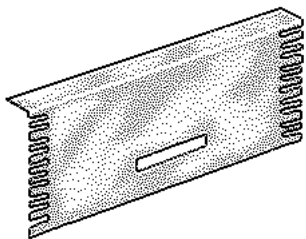
922-1381





Shield, 5.25 Drive Bay

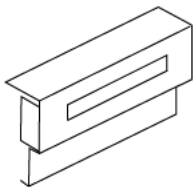
922-0366





Shield, CD-ROM (replaced by 922-0826)

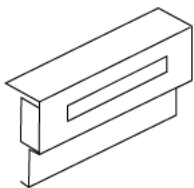
922-0400





Shield, CD-ROM Drive, Trayloading, Pkg. of 10

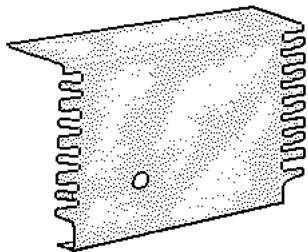
922-0826





Shield, Hard Drive

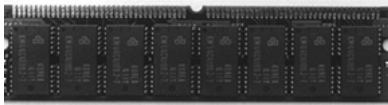
922-0367

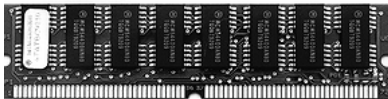




SIMM, DRAM, 16 MB, 80ns, 72-Pin

661-0087



**SIMM, DRAM, 4 MB, 80ns, 72-Pin****661-0808**

The board has ICs on one side.

The RAM speed is usually indicated by a number after a dash or after a letter at the end of the manufacturer's part number. For example, -80, -8, or S8 indicates 80 ns, where as -60, -6 or S6 indicates 60 ns. These numbers are located on the surface of the chip or on the back side of the SIMM board. Apple accepts only 80 ns or faster RAM SIMMs of this 4 MB variety for return.

Compatibility:

These SIMMs can be used in the following computers and printers:

- Power Macintosh 6100/60, 6100/60AV, and WGS 6150
- Power Macintosh 7100/66 and 7100/66AV
- Power Macintosh 8100/80, 8100/80AV, and WGS 8150





- Workgroup Server 9150
- Macintosh LC 520
- Mac TV
- Macintosh Quadra 605
- Macintosh Quadra/Centris 610
- Macintosh Quadra/Centris 650
- Macintosh LC III/Performa 450, 460, 466, and 467
- Macintosh LC 475/Quadra 605/Performa 475 and 476
- LaserWriter Pro 600 and 630
- LaserWriter Select 310



**SIMM, DRAM, 8 MB, 80ns, 72-Pin****661-0809**

This board has ICs on both sides.

The RAM speed is usually indicated by a number after a dash or after a letter at the end of the manufacturer's part number. For example, -80, -8, or S8 indicates 80 ns, where as -60, -6 or S6 indicates 60 ns. These numbers are located on the surface of the chip or on the back side of the SIMM board. Apple accepts only 80 ns or faster RAM SIMMs of this 8 MB variety for return.

Compatibility:

These SIMMs can be used in the following computers and printers:

- Power Macintosh 6100/60, 6100/60AV, and WGS 6150
- Power Macintosh 7100/66 and 7100/66AV
- Power Macintosh 8100/80, 8100/80AV, and WGS 8150





- Workgroup Server 9150
- Macintosh LC 520
- Mac TV
- Macintosh Quadra 605
- Macintosh Quadra/Centris 610
- Macintosh Quadra/Centris 650
- Macintosh LC III/Performa 450, 460, 466, and 467
- Macintosh LC 475/Quadra 605/Performa 475 and 476
- LaserWriter Pro 600 and 630
- LaserWriter Select 310



**SIMM, VRAM, 256K, 80ns, 68-Pin****661-0722**

The RAM speed is usually indicated by the -XX after the manufacturer's part number (e.g., -8 indicates 80 ns, -10 indicates 100 ns, etc.). This number is on the surface of the chip or on the back of the SIMM board. For return, Apple accepts only 80 ns or faster VRAM SIMMs of this 256K variety.

These SIMMs can be used with the following computers and video cards:

- Power Macintosh 2 MB Video Card
- Macintosh Color Classic
- Macintosh Color Classic II/Performa 275
- Macintosh IIvi, IIvx, and Performa 600
- Macintosh LC 520/575
- Mac TV
- Macintosh IIvi/IIvx/Performa 600
- Macintosh Quadra 700





- Macintosh Quadra 800 and Apple Workgroup Server 80
- Macintosh Quadra 840AV
- Macintosh Quadra 900, 950, and Apple Workgroup Server 95
- Macintosh Quadra/Centris 610
- Macintosh Quadra/Centris 650
- Macintosh LC
- Macintosh LC II/Performa 400
- Macintosh LC III/Performa 450, 460, 466, and 467
- Macintosh LC 475/Quadra 605/Performa 475 and 476
- Display Card 4•8





Speaker

922-0353





Exploded View

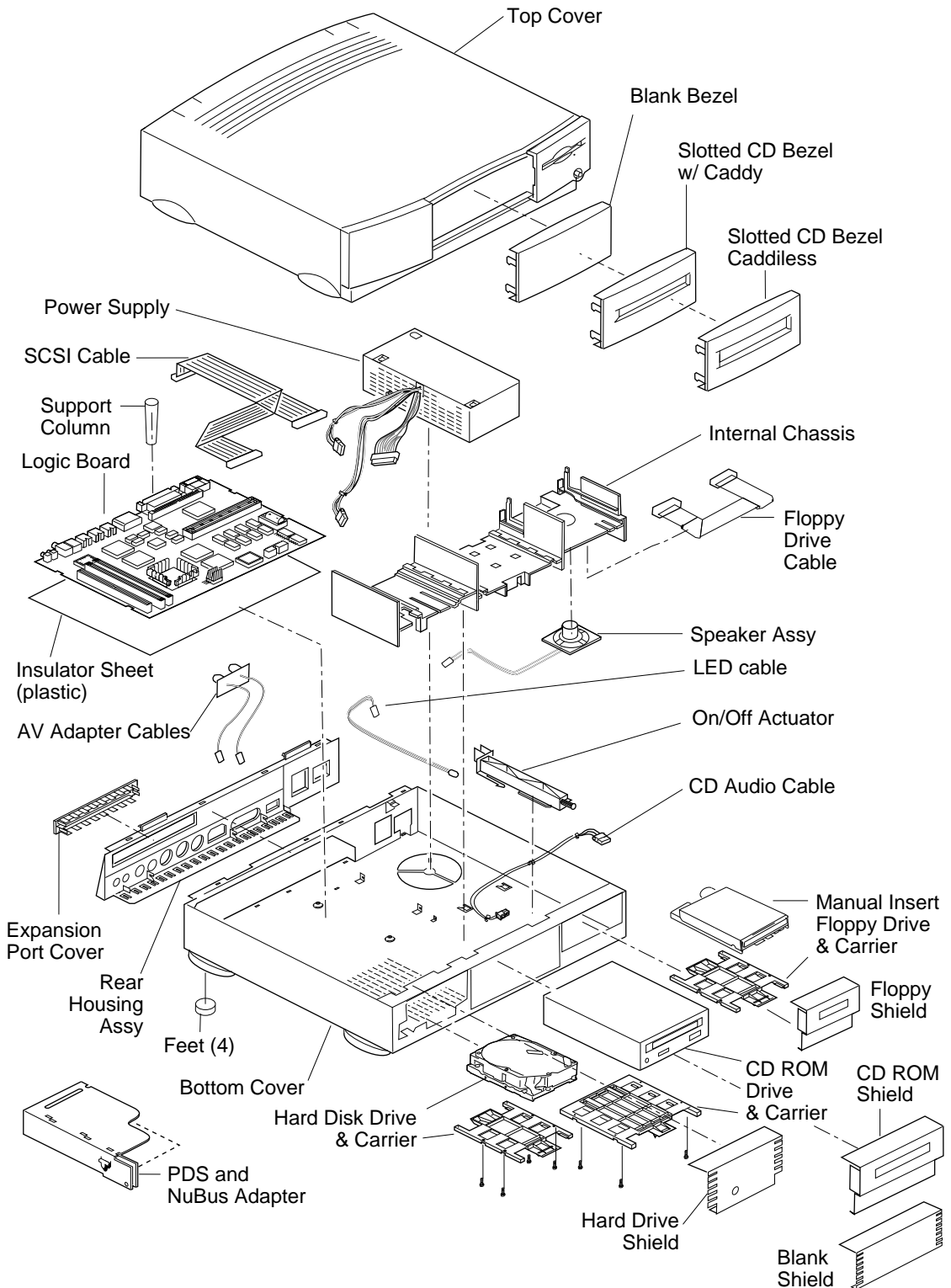
Macintosh Quadra 610/Centris
610/WS 60





Exploded View

Quadra 610, Centris 610, and WS 60



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

