



LC 630/Quadra 630/ Performa 640

Macintosh LC 630, Macintosh LC 630 DOS Compatible,
Macintosh Performa 640 DOS Compatible, Macintosh
Quadra 630



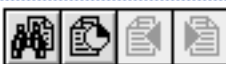
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Service Source Main Menu



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Basics

LC 630/Quadra 630/Performa 640





General Information

Macintosh LC 630 and Macintosh Quadra 630 Computers

The Macintosh LC 630 and Macintosh Quadra 630 computers are high-performance, low-cost modular computers with multimedia features. The LC 630 uses the Motorola 68LC040 processor. The Quadra 630 uses the Motorola 68040, which includes a floating point unit. The computers ship with the manual insert floppy drive, an IDE hard drive, and an optional trayloading CD-ROM drive.





Macintosh LC 630, DOS-Compatible

The LC 630 DOS-Compatible computer adds to the basic 630 design the ability to simultaneously run the Macintosh operating system and PC application programs. The DOS-Compatible computer ships with three boards and a DRAM SIMM installed on the main logic board. The three boards are the DOS-compatible board, a daughterboard for sound, and a DOS-Compatible adapter board in the Processor Direct Slot (PDS).





Performa 640 DOS-Compatible

The Performa 640 DOS-Compatible is based on the Macintosh LC 630-DOS Compatible computer.

The Performa 640 DOS-Compatible is bundled with a 500 IDE hard drive and the trayloading double-speed CD-ROM drive.

As you go through this manual, consider the Macintosh LC 630 DOS-Compatible information as applicable to the Performa 640 LC DOS-Compatible unless specified otherwise.





User Controls

User controls include:

- Soft power-on control from keyboard
- Front panel sound-control push buttons
- Optional infrared remote control





Internal Expansion Connections

Four types of expansion slots on the logic board include:

- DRAM SIMM expansion slot (1 or 2 slots)
- LC PDS slot (already populated in the LC 630 DOS-Compatible).
- Communications slot for modems and Ethernet
- Video-in slot for real-time video display, capture, and overlay

In addition to expansion slots on the logic board, there is an expansion ribbon connector for an optional TV tuner card. The TV-tuner connector provides NTSC and PAL input from an external TV antenna or cable.





IDE (Intelligent Device Electronics)

The internal hard drive uses IDE (Intelligent Device Electronics) technology, commonly used in DOS-compatible systems.

The internal IDE hard drive functions the same as a typical SCSI hard drive. You must replace IDE drives like for like.

The IDE drive does not affect SCSI ID selections or SCSI termination schemes.

Seven external SCSI devices may be daisy chained through the external SCSI port.





Plastic Panel Design

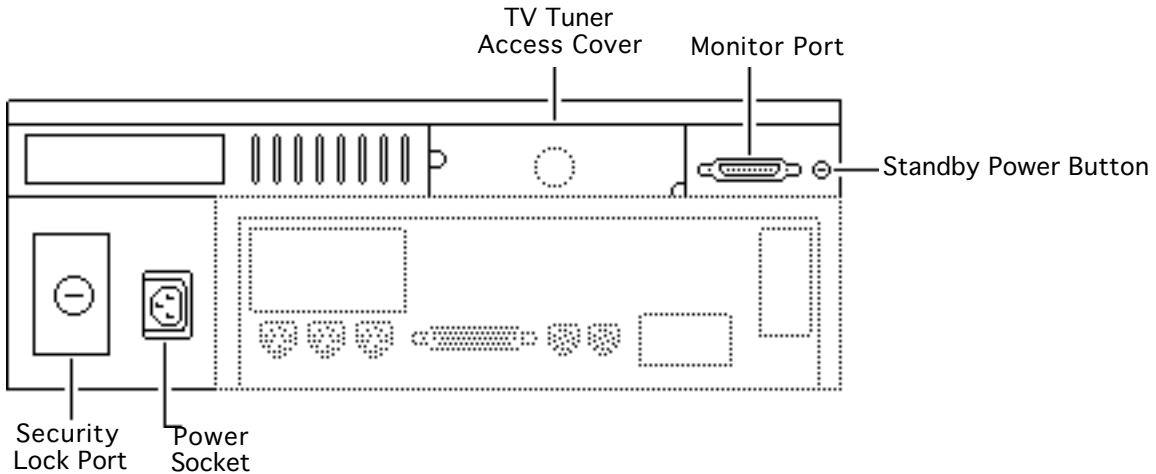
The computer is designed for easy service. Plastic panels cover the metal bottom case, the metal top cover shield, and the left, right, and rear sides of the metal case.

To service the logic board, simply remove the rear plastic panel and slide out the logic board. To access the drives, simply remove the front plastic panel.



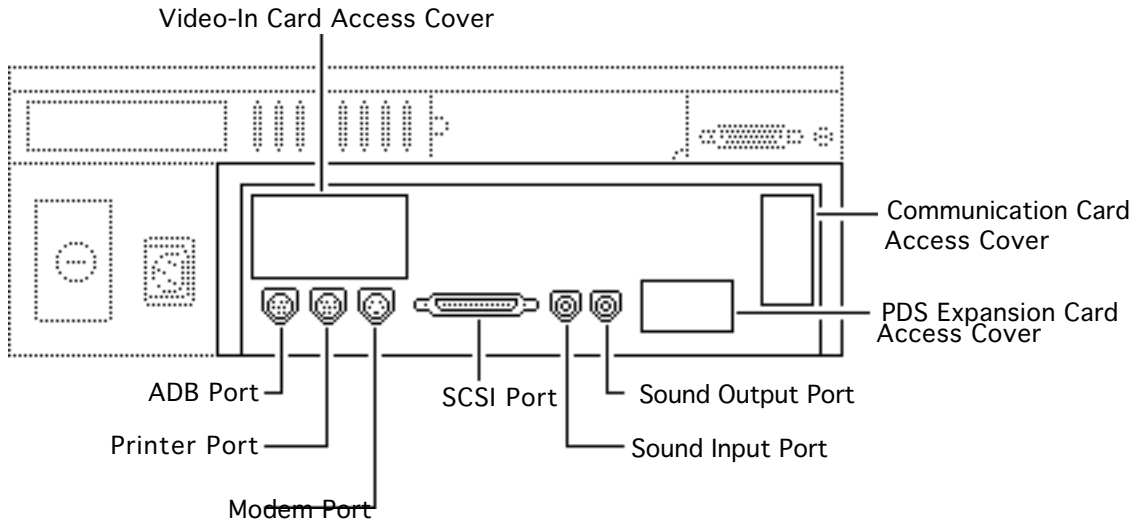


Rear View Diagram





I/O Door Diagrams

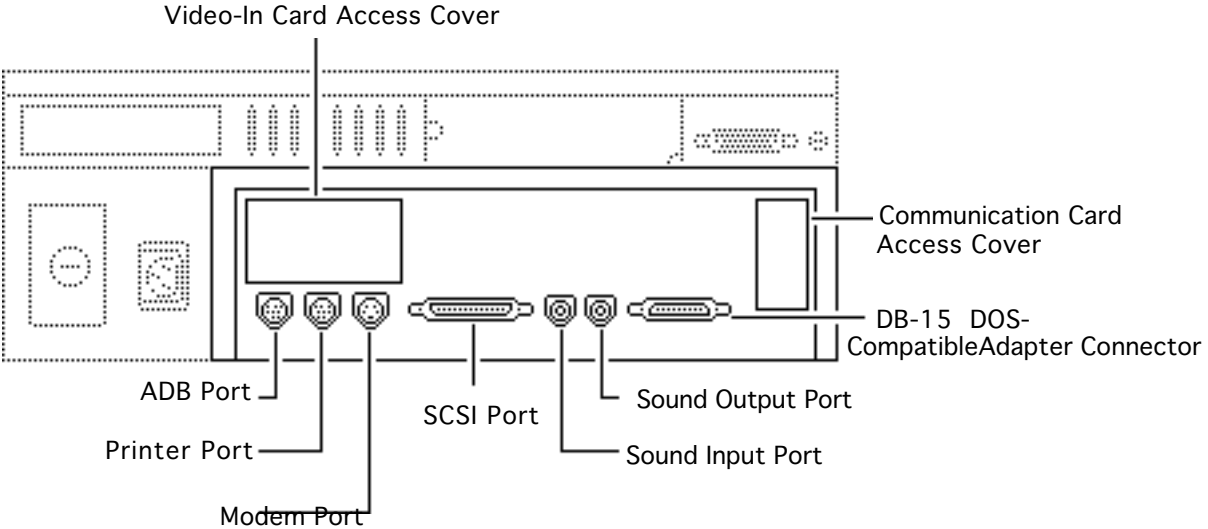


630 Series Computers



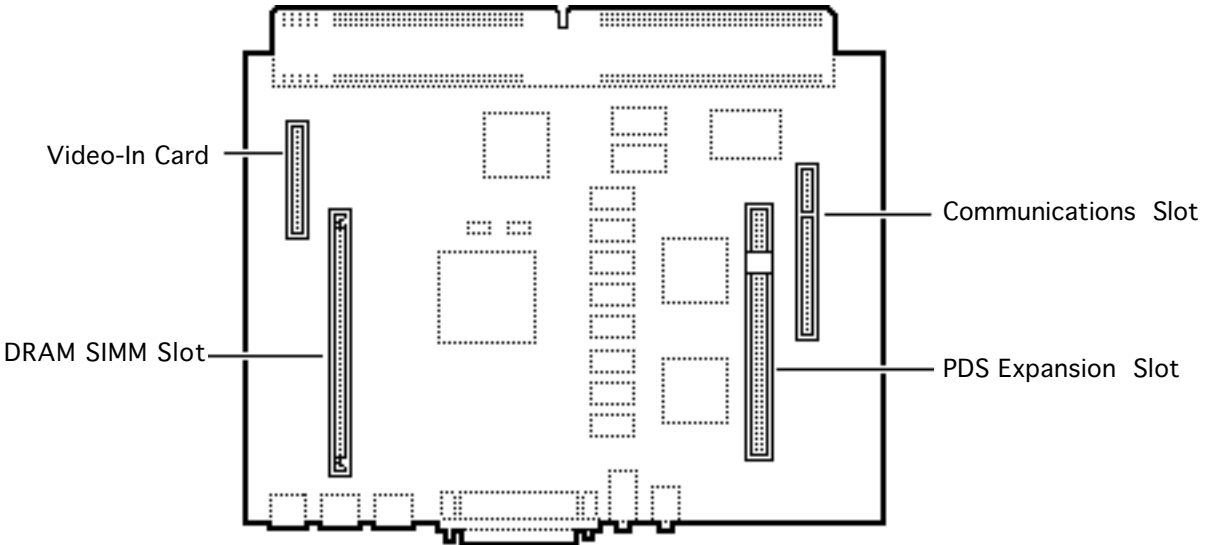


Logic Board Diagrams





Shield/Wiring Harness

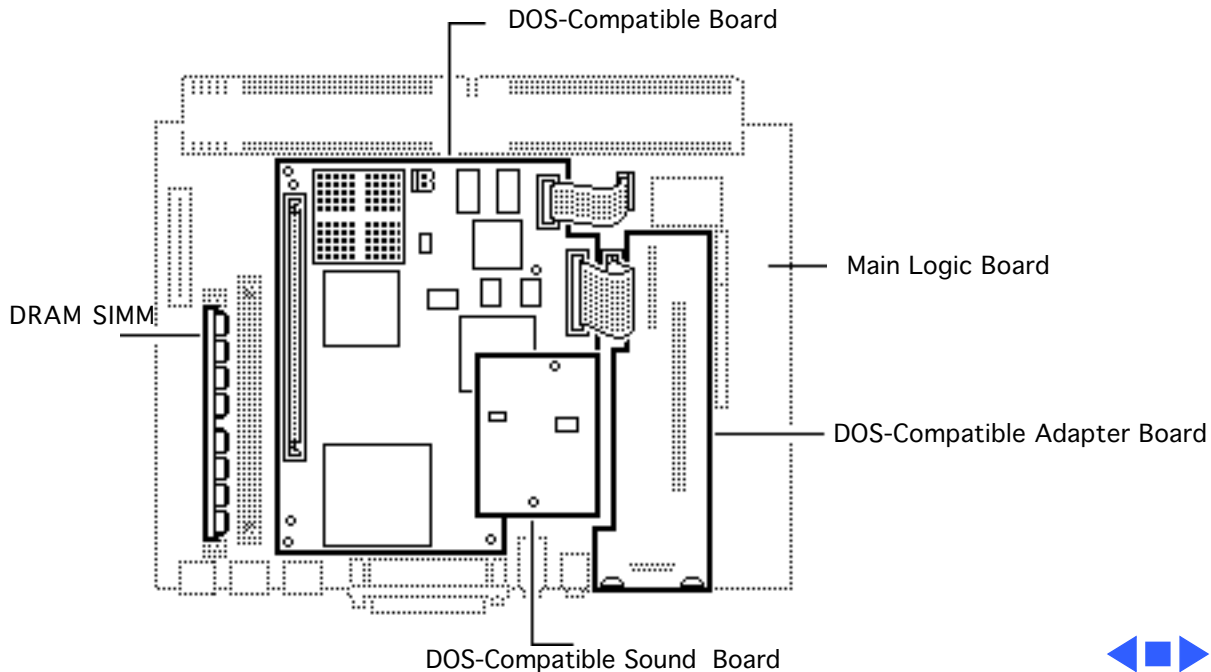


630 Series Computers

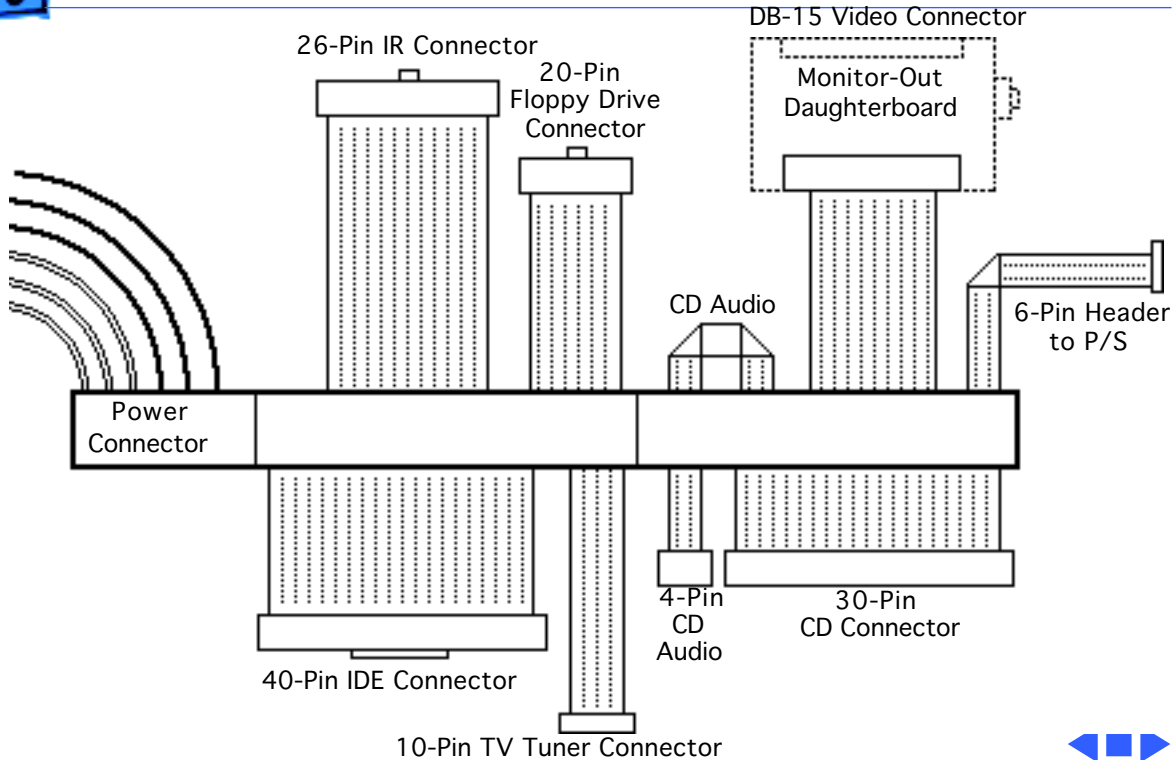




LC 630 DOS-Compatible Logic Board









Specifications

LC 630/Quadra 630/Performa 640





Processor

LC 630 Motorola 68LC040 microprocessor
33 MHz

Quadra 630 Motorola 68040 microprocessor
(with floating point unit)
33 MHz

**LC 630 DOS-
Compatible** Motorola 68040, 33 MHz
80486DX2, 66 MHz

Addressing 32-bit internal registers
32-bit address bus
32-bit data bus





Memory

DRAM

630 Series: 4 MB built in, minimum configuration, 8 MB optional; expandable to 36 MB (72-pin, 80 ns or faster SIMMs)

LC 630 DOS-Compatible ships with 8 MB on main logic board (4 MB built in and 4 MB DRAM SIMM in one slot). Maximum addressable memory is 52 MB on the main logic board (4 MB built in, 32 MB SIMM in one slot and 16 MB SIMM the second slot).

DOS Compatible board ships with 4 MB SIMM . Maximum addressable memory is 32 MB on the DOS-Compatible board. Main logic board and DOS Compatible board require 72-pin, 80 ns or faster SIMMs.



**DRAM Frame
Buffer**

1 MB

ROM

1 MB

VRAM

Video data are stored in the 1 MB DRAM frame buffer. The LC 630, Quadra 630, and LC 630 Dos-Compatible computers do not support video memory expansion.





Disk Storage

Floppy Drive

1.4 MB Apple SuperDrive Manual Insert

CD-ROM Drive

Optional Apple 300i Plus CD-ROM drive

Hard Drive

630 Series: 250 MB or 350 MB IDE hard drive

LC 630 DOS-Compatible: 500 MB IDE hard drive

Note: The internal IDE hard drive interface is new to Apple products. Macintosh 630 computers do not support internal SCSI hard drives.





I/O Interfaces

Serial	Two RS-232/422 serial ports; mini DIN-8 connectors
SCSI	One external SCSI port; DB-25 connector Supports up to six external SCSI devices
Apple Desktop Bus	One Apple Desktop Bus (ADB) port; mini DIN-4 connector
Video	One DB-15 monitor port on built-in video daughterboard





Sound	<p>Mono sound input port supports external microphone or line-level inputs</p> <p>Bias current for electret microphone</p> <p>Stereo sound output jacks at front and rear</p>
Processor-Direct Slot	<p>630 Series: One 114-pin internal expansion slot for LC compatible processor-direct card</p> <p>LC 630 DOS-Compatible: An adapter board occupies the LC processor-direct slot, providing a DB-15 connector for a PC/AT game controller</p>
Communications Slot	<p>One 112-pin internal expansion slot for modem and Ethernet</p>
Video-In Slot	<p>One 60-pin internal video-in slot for real-time video display, capture, and overlay</p>





TV Tuner

One 10-pin slot for TV tuner card

Controls

Softpower-on control from keyboard

Front panel push button control for sound volume

Front panel stereo headphone jack

Optional infrared remote control





I/O Devices

Keyboard

Apple Extended Keyboard II (other ADB keyboards supported)

Mouse

ADB Mouse II

Microphone

Electret, omnidirectional
Operates on 8 VDC supplied by sound input on CPU





Sound and Video

Sound

8-bit monophonic sound input

8-bit stereo sound output (16-bit in CD mode), level nominally
0.5 V RMS into 39 ohms

Internal speaker muted when a plug is inserted into an output jack

Video

Supports all Apple 12-inch, 13-inch, and 14-inch monitors,
Apple 15-inch multiple synchronous monitor, and VGA (640 x
480) monitors at maximum 16-bit per pixel

Supports Apple 16-inch and SVGA (800 x 600) monitors at
maximum 8-bit per pixel





Electrical

Line Voltage

100-240 VAC

Frequency

50-60 Hz

Maximum Power

45 W, not including monitor





Physical

Dimensions

Height: 4.3 in. (10.95 cm)

Width: 16.5 in. (41.95 cm)

Depth: 12.6 in. (32 cm)

Weight

Without CD-ROM: 17 lb. (7.7 kg)

With CD-ROM: 19 lb. (8.6 kg)

Weight varies with options





Troubleshooting

LC 630/Quadra 630/Performa 640





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

Error Chords

Eight-tone error chord sounds during startup

- 1 Reseat SIMMs
- 2 Replace SIMMs.
- 3 Replace logic board. Retain customer's SIMMs.
- 4 Perform SIMM verification on replacement logic board.

Four-tone error chord sounds during startup

- 1 Disconnect hard drive power cable and reboot system. If startup sequence is normal, run "Macintosh Hard Disk Test" and replace hard drive if necessary.
- 2 Disconnect floppy drive cable and reboot system. If startup sequence is normal, replace floppy drive.
- 3 Replace logic board. Retain customer's SIMMs.





System

Flashing “?” appears at startup in system with vacant PDS and communication slots

- 1 Diagnose hard drive with Disk First Aid included on Power Macintosh CD-ROM.
- 2 Perform repairs and then go to step 4.
- 3 If repairs are impossible, back up drive, reformat with Drive Setup 1.0.3, and then go to step 4.
- 4 Update driver using Drive Setup 1.0.3.
- 5 Perform clean install

Menu bar constantly flashes or system constantly beeps

- 1 Verify that front panel control buttons are not jammed.
- 2 Reseat drive bezel and front panel control board.





Audio

Crackling noise is present when you play sounds other than system beeps and you are not in “play through” mode

- 1 If static noise varies when you adjust volume by Sound control panel, use Audio Volume Extension 1.1 or later. Note: Audio Volume Extension is available from standard Apple software update sites.
- 2 Replace logic board.

Static through speaker with optional sound adapter board installed and Internal CD and Playthrough option selected.

Replace the sound card, PN 661-0253.





Audio

Sound distortion with
MPEG board installed

Replace MPEG board with modified MPEG board. A modified board should have a jumper present from U5 Pin 2 to D1 Pin 1.





Video

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

- 1 Confirm that video connections are secure.
- 2 Confirm that monitor-out daughterboard connection on the fan bracket is secure.
- 3 Reseat logic board.
- 4 Perform monitor adjustments
- 5 Replace monitor.
- 6 Replace logic board. Retain customer's SIMMs.
- 7 Replace power supply.

Video will not play or system hangs when you attempt to run video in units with MPEG card

- 1 If chip at location U12 on MPEG card displays number 341S0205, check all connections.
- 2 If chip at location U12 on MPEG card does not display number 341S0205, replace MPEG card





Video

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

- 1 Reseat logic board.
- 2 Remove expansion card, if present.
- 3 Remove peripherals.
- 4 Replace SIMMs. Refer to Memory manual.
- 5 Replace logic board. Retain customer's SIMMs.
- 6 Replace power supply.

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

- 1 Reseat logic board.
- 2 Replace fan/video card bracket.
- 3 Replace monitor.
- 4 Replace logic board. Retain customer's SIMMs.





Video

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

- 1 Check all external power connections.
- 2 Computer powers on exclusively through softpower on keyboard. Verify that power-on connections of keyboard are functioning by testing with known-good keyboard.
- 3 Reseat logic board.
- 4 Unplug 5.4 battery, wait 20 seconds, plug in battery, and restart computer.
- 5 Verify that monitor has power.
- 6 Remove expansion card, if present.
- 7 Remove peripherals.
- 8 Replace power supply.
- 9 Replace logic board. Retain customer's SIMMs.





Video

Vertical lines, horizontal lines, or snow appears on screen, or screen is completely dark; startup tone is normal

- 1 Perform monitor adjustments.
- 2 Replace monitor.
- 3 Replace logic board. Retain customer's SIMMs.
- 4 Replace power supply.

Unable to tune in some UHF channels.

Replace Rev. A video-in card, part number 661-0159, with Rev. B video-in card, part number 661-1073.





Floppy Drive

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

- 1 Reseat logic board
- 2 Replace floppy drive.
- 3 Replace shield/wiring harness
- 4 Replace logic board. Retain customer's SIMMs.

Disk ejects; display shows Mac icon with blinking "X"

- 1 Replace disk with known-good system disk.
- 2 Replace floppy drive cable.
- 3 Replace floppy drive.
- 4 Replace logic board. Retain customer's SIMMs.

Disk does not eject

- 1 Switch off system and hold mouse button down while switching system back on.
- 2 Eject disk manually by pushing opened paper clip into hole beside drive slot.
- 3 Replace floppy drive cable.
- 4 Replace floppy drive.





Floppy Drive

Drive attempts to eject disk, but doesn't

- 1 Switch off system and hold mouse button down while switching system back on.
- 2 Eject disk manually by pushing opened paper clip into hole beside drive slot.
- 3 Replace floppy drive cable.
- 4 Replace floppy drive.





Hard Drive

Internal hard drive runs continuously

- 1 Make sure System is version 7.1.2 (or later).
- 2 Replace hard drive cable.
- 3 Replace internal hard drive.
- 4 Replace logic board. Retain customer's SIMMs.

Internal hard drive does not operate

- 1 Confirm that all hard drive connections are secure.
- 2 Reseat logic board.
- 3 Replace internal IDE hard drive.
- 4 Replace shield/wiring harness chassis.
- 5 Replace logic board. Retain customer's SIMMs.

Hard drive not found when booted from CD-ROM drive

Use Drive Setup 1.03.





CD-ROM drive

CD-ROM drive does not accept disc

- 1 Replace disc (if dirty or damaged).
- 2 Reseat CD-ROM drive.
- 3 Replace CD-ROM drive.

Volume control does not operate correctly

- 1 Check Control Panel Sound setting.
- 2 Check front panel controls.
- 3 Reseat front panel control board.
- 4 Replace shield/wiring harness chassis.

Macintosh cannot mount CD-ROM drive

- 1 Reseat CD-ROM drive.
- 2 Check SCSI ID setting; internal CD-ROM drive was originally set at 3 at the factory.
- 3 Replace CD-ROM drive.





Peripheral

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

- 1 Verify that SCSI select switch on external device is set to different priority from internal CD-ROM drive.
- 2 Verify that both ends of external SCSI device are terminated.
- 3 Replace terminator on external device.
- 4 Verify that terminator is installed on internal SCSI drive.
- 5 Replace SCSI select cable (on external SCSI device).

Cursor does not move

- 1 Reboot system.
- 2 Check mouse connection.
- 3 If mouse was connected to keyboard, connect mouse to rear ADB port and disconnect keyboard. If mouse works, replace keyboard.
- 4 If mouse does not work in ADB port, replace mouse.
- 5 Reseat logic board.
- 6 Replace logic board. Retain customer's SIMMs.





Peripheral

Cursor moves, but clicking mouse button has no effect

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

Double-click doesn't open application, disk, or server

- 1 Remove extra system files on hard drive.
- 2 Check mouse speed on Control Panel
- 3 Unplug 5.4 battery, wait 20 seconds, plug in battery, and restart computer.
- 4 If mouse was connected to keyboard, connect mouse to rear ADB port and disconnect keyboard. If mouse works, replace keyboard.
- 5 If mouse does not work in ADB port, replace mouse.
- 6 Replace logic board. Retain customer's SIMMs.





Peripheral

No response to any key on keyboard

- 1 Make sure System is version 7.1.2 (or later).
- 2 Check keyboard connection to ADB port.
- 3 Replace keyboard.
- 4 Reseat logic board.
- 5 Replace logic board. Retain customer's SIMMs.

Known-good ImageWriter or ImageWriter II does not print

- 1 Make sure that Chooser and Control Panel settings are correct.
- 2 Make sure System is version 7.1.2 (or later).
- 3 Check printer DIP switches.
- 4 Replace printer interface cable.
- 5 Replace logic board. Retain customer's SIMMs.





Peripheral

Known-good
LaserWriter does not
print

- 1 Make sure that Chooser and Control Panel settings are correct.
- 2 Make sure System is version 7.1.2 (or later).
- 3 Refer to Networks manual.





Miscellaneous

Rattling sound at startup in system with Apple External Video Connector

Press or fold Apple External Video cable to prevent it from contacting fan blades.





Take Apart

LC 630/Quadra 630/Performa 640



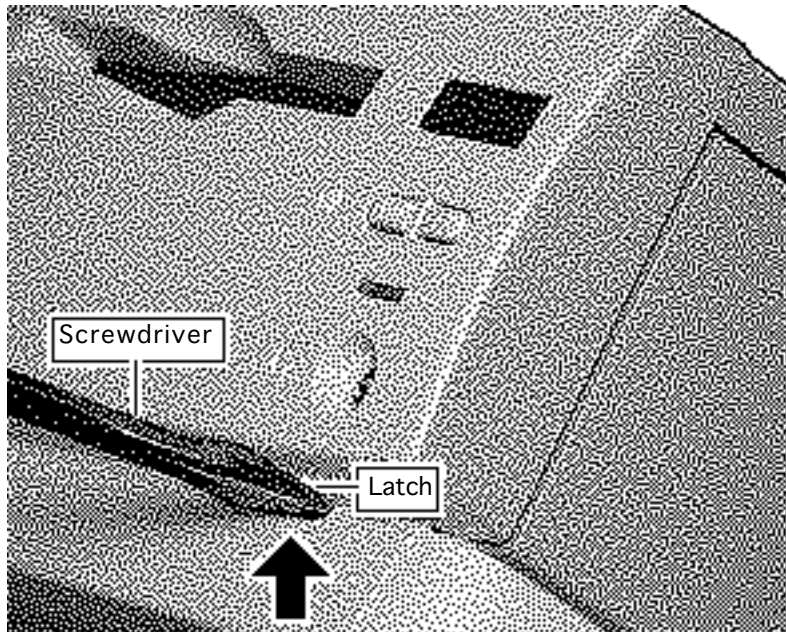


Drive Bezel

No preliminary steps are required before you begin this procedure.

- 1 Locate the two latches below the ridge on the drive bezel.





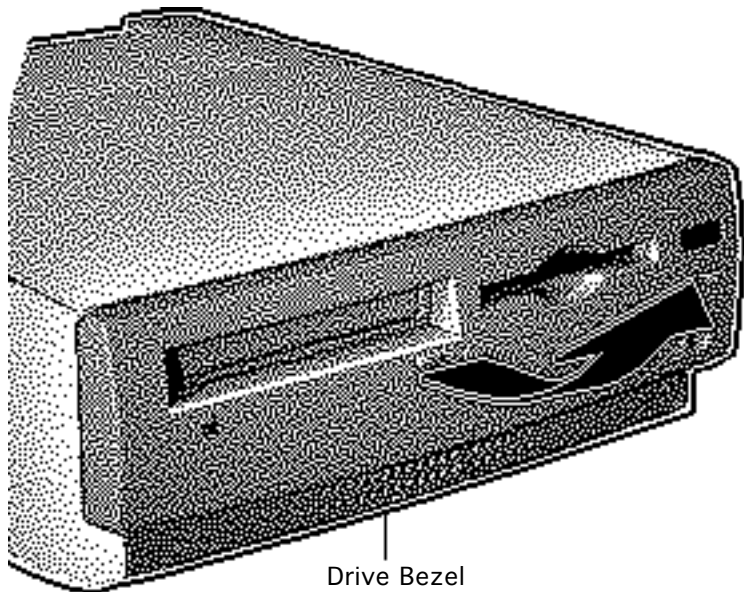
Caution: When using a screwdriver to release a latch, press up carefully. Do not scratch or gouge the plastic.

- 2 Insert a flat-blade screwdriver at each latch.
- 3 Pry up to release each latch.





- 4 Swing up the drive bezel and pull it away from the metal chassis.

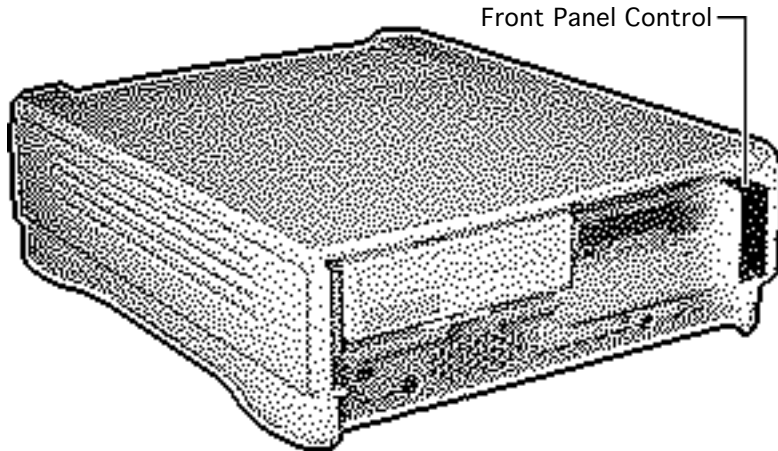




Front Panel Control

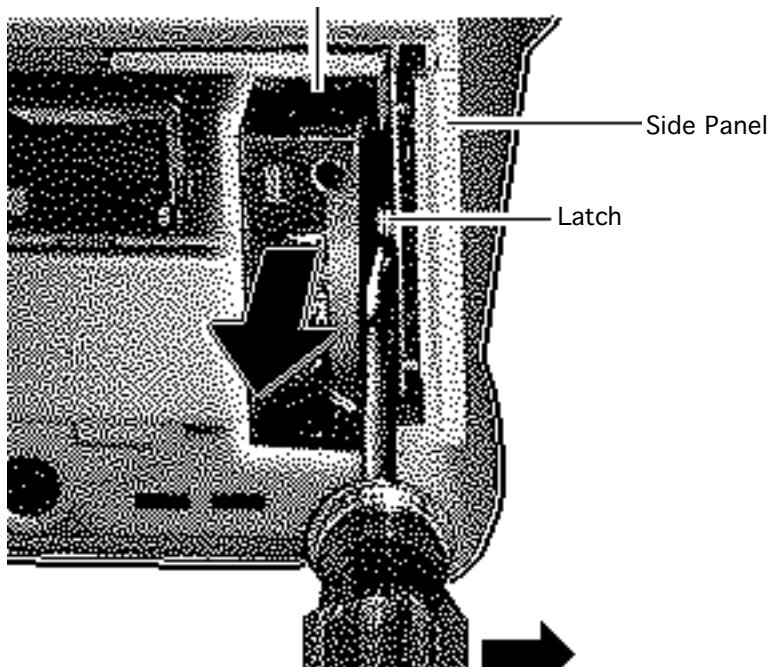
Before you begin, remove drive bezel.

Review the ESD precautions in Bulletins/Safety.





Front Panel Control

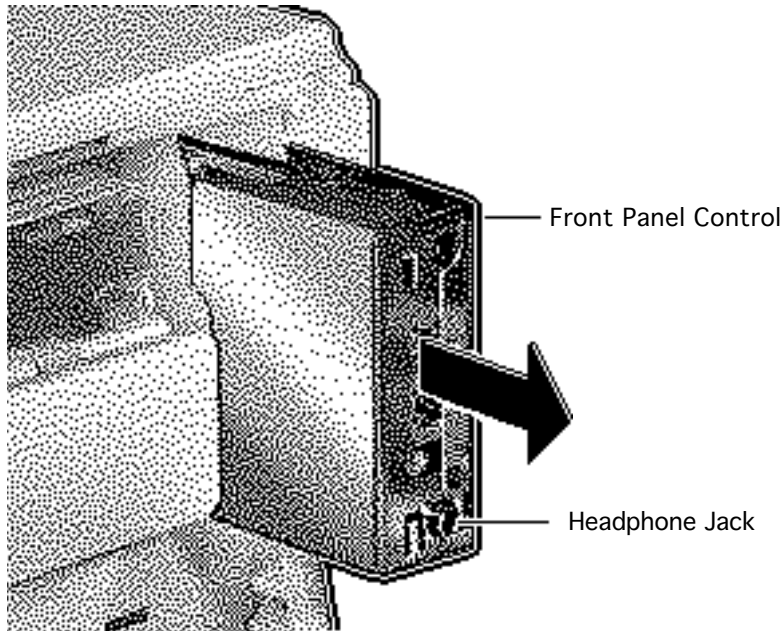


Side Panel

Latch

- 1 Insert a flat-blade screwdriver about an inch between the side panel and the front panel control.
- 2 Pry open the latch to release the front panel control.





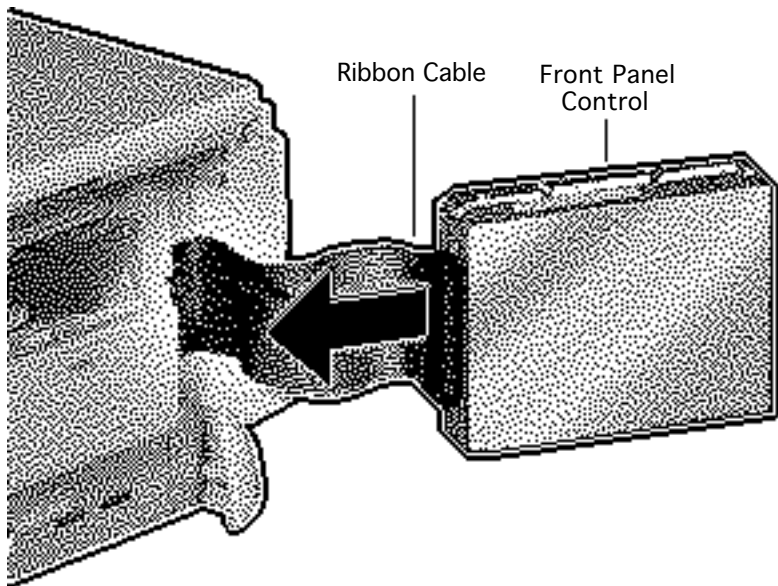
- 3 Pull the front panel control out just far enough to reach the ribbon cable connector.

Replacement Caution:
When you replace the front panel control assembly, make sure that the headphone jack is at the bottom of the assembly.





- 4 Disconnect the front panel control from the ribbon cable.

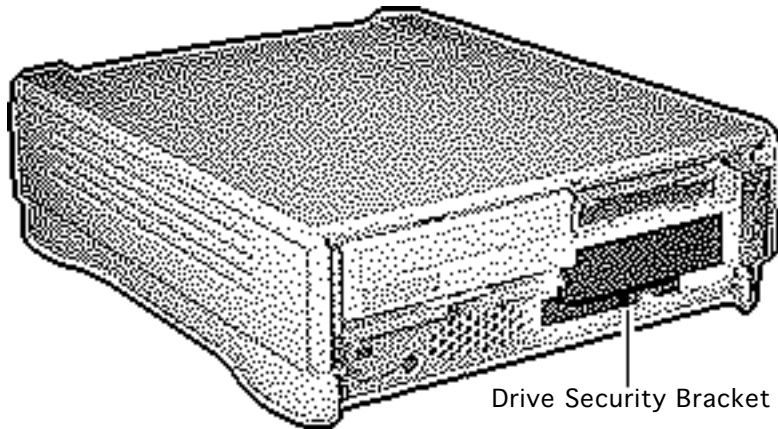




Drive Security Bracket

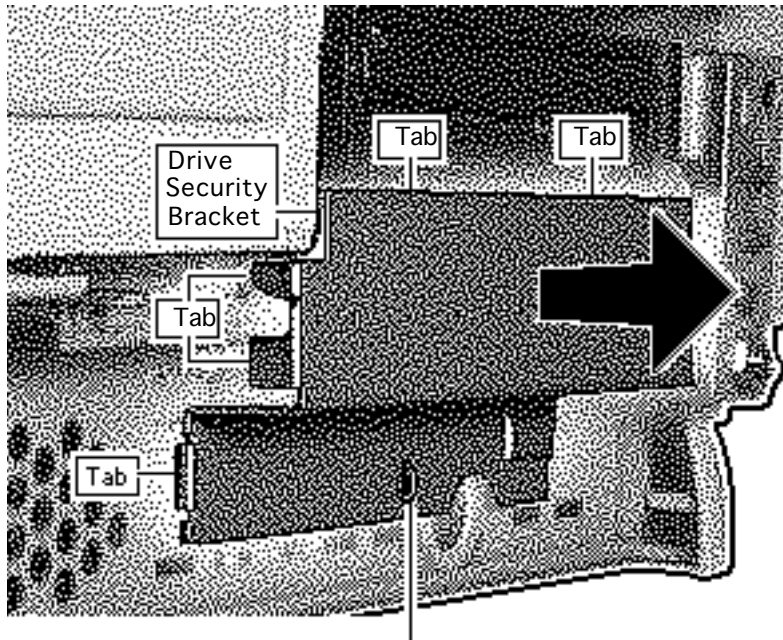
Before you begin, remove drive bezel.

Review the ESD precautions in Bulletins/Safety.



Drive Security Bracket





Remove the mounting screw and pull off the drive security bracket.

Replacement Note: Be sure to correctly position the four tabs of the drive security bracket.



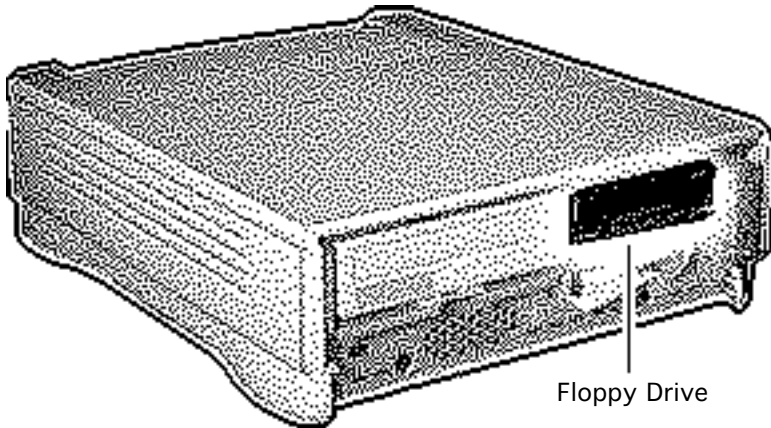


Floppy Drive

Before you begin, remove the following:

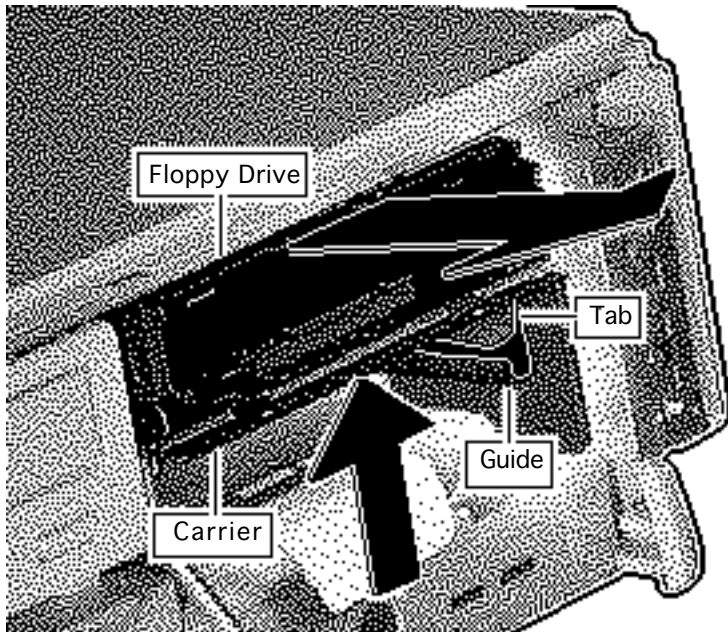
- Drive bezel
- Drive security bracket

Review the ESD precautions in Bulletins/Safety.



Floppy Drive





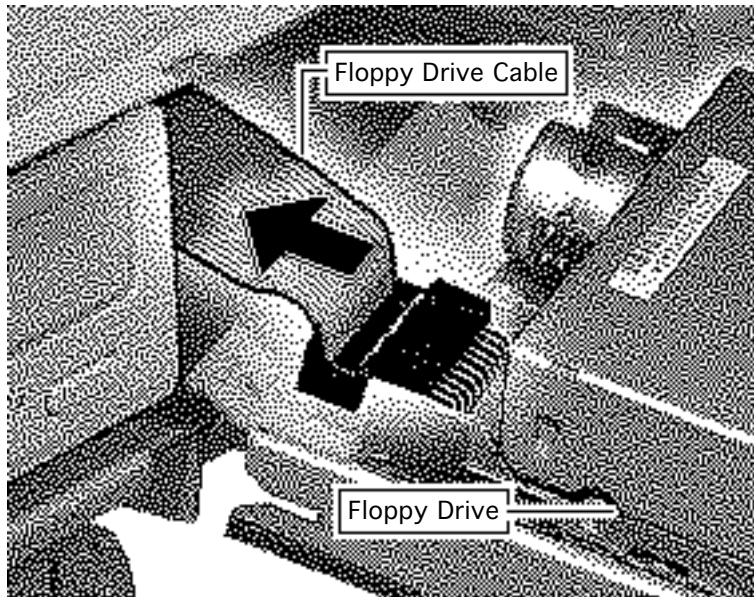
- 1 Lift the front of the floppy drive and carrier.
- 2 Pull the floppy drive out just far enough to reach the ribbon cable connector.

Replacement Note:
When you replace the floppy drive, make sure that the tab of the floppy carrier is seated properly in the floppy drive guide.





- 3 Disconnect the floppy drive from the floppy drive cable.



Replacement Note: If you are replacing a defective floppy drive, invert the drive and carrier and remove the four carrier mounting screws. Separate the drive from the carrier.



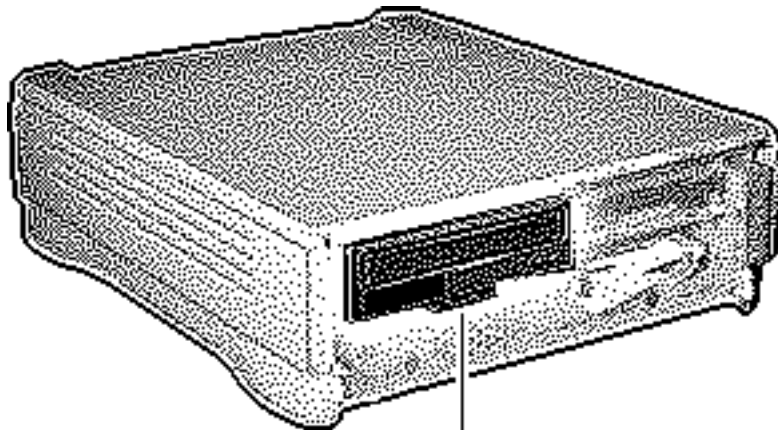


CD-ROM Drive

Before you begin, remove the following:

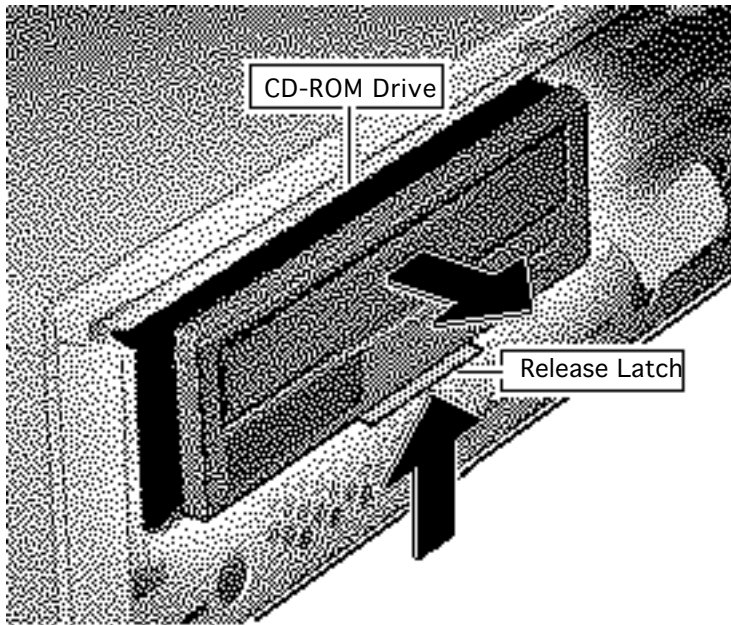
- Drive bezel
- Drive security bracket

Review the ESD precautions in Bulletins/Safety.



CD-ROM Drive



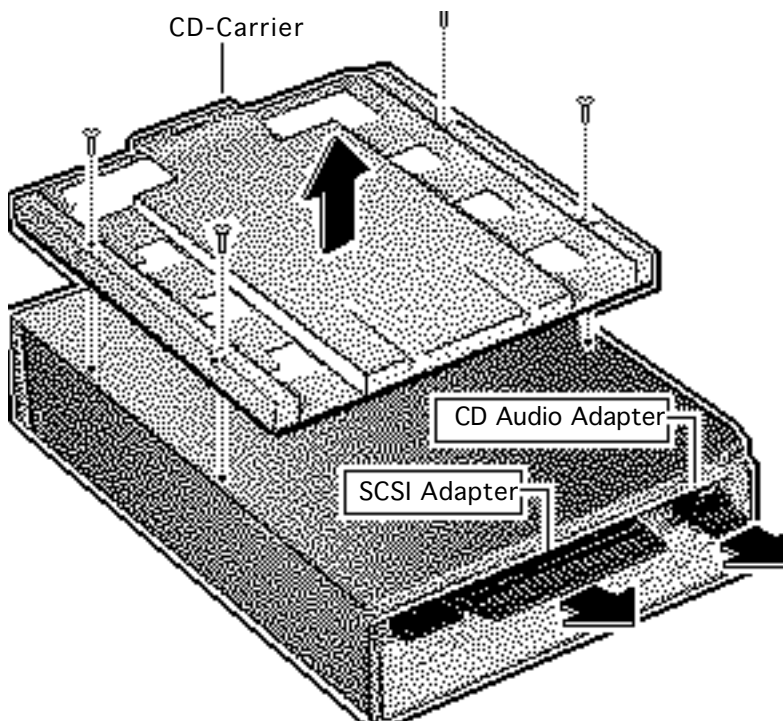


Note: To perform the next procedure, you may want to insert a screwdriver in the slot of the release latch to help you pull the CD-ROM drive.

- 1 Push up the release latch and pull the CD-ROM drive from the chassis.

Note: You may need to use some initial force to disconnect the CD-ROM from the internal wiring harness.





Note: Perform the following steps only if you are replacing a defective CD-ROM drive.

- 2 Disconnect the CD-ROM audio adapter from the drive.
- 3 Disconnect the SCSI adapter.
- 4 Remove the four mounting screws and carrier from the CD-ROM drive.





Replacement Caution:

Before replacing the SCSI adapter, make sure that the SCSI drive connector pins are not bent.





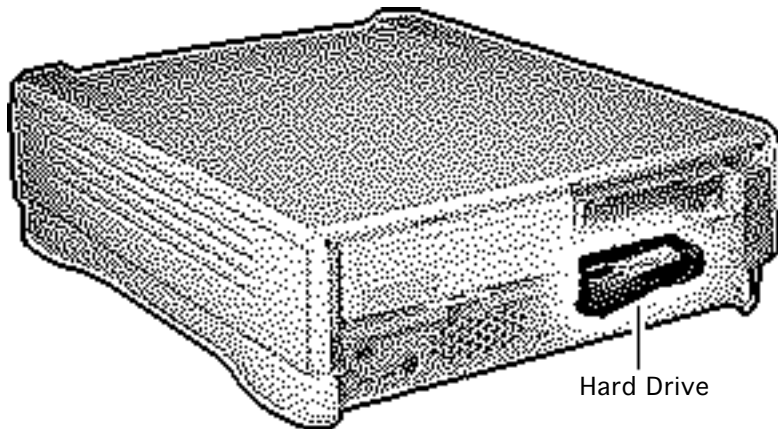
Hard Drive

Before you begin, remove the following:

- Drive bezel
- Drive security bracket

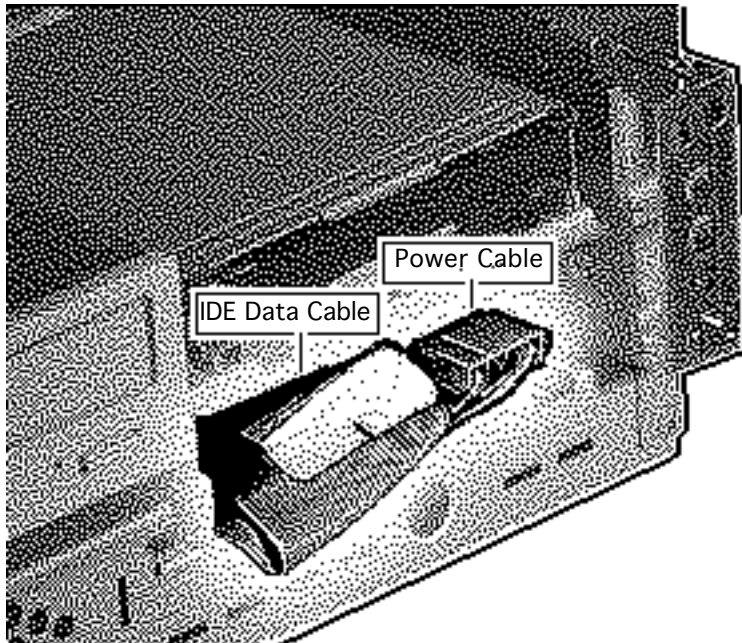
Review the ESD precautions in Bulletins/Safety.

Note: The IDE hard drive interface is new to Apple products. LC 630 and Quadra 630 computers do not support internal SCSI hard drives. Refer to Basics for more information.



Hard Drive



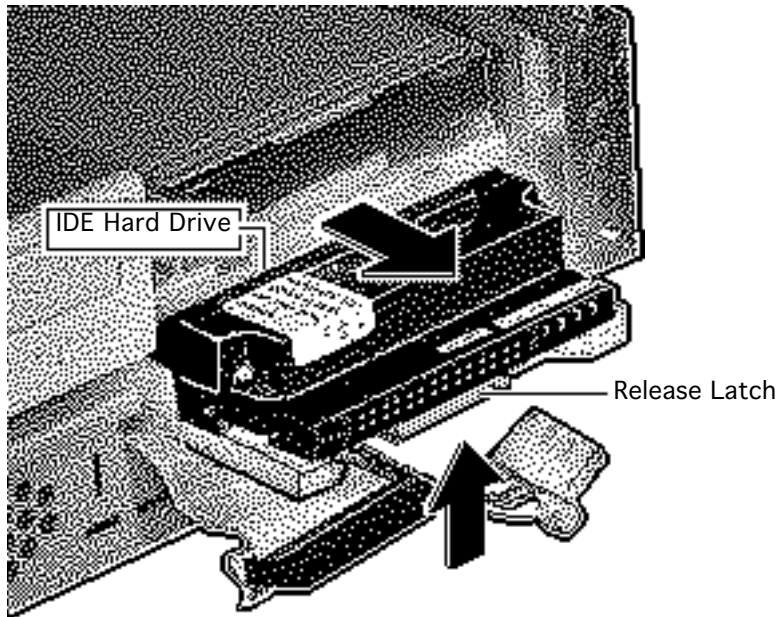


- 1 Using the pull tabs, disconnect the IDE data cable from the hard drive connector.
- 2 Disconnect the power cable.





- 3 Using a flat-blade screwdriver, push up the release latch and pull the IDE hard drive from the chassis.

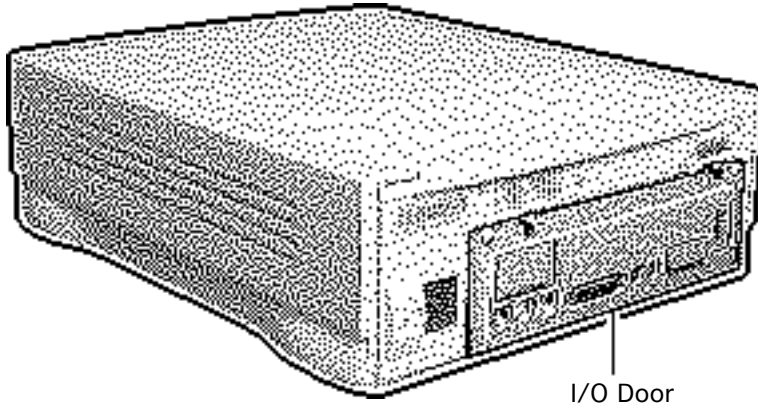




I/O Door

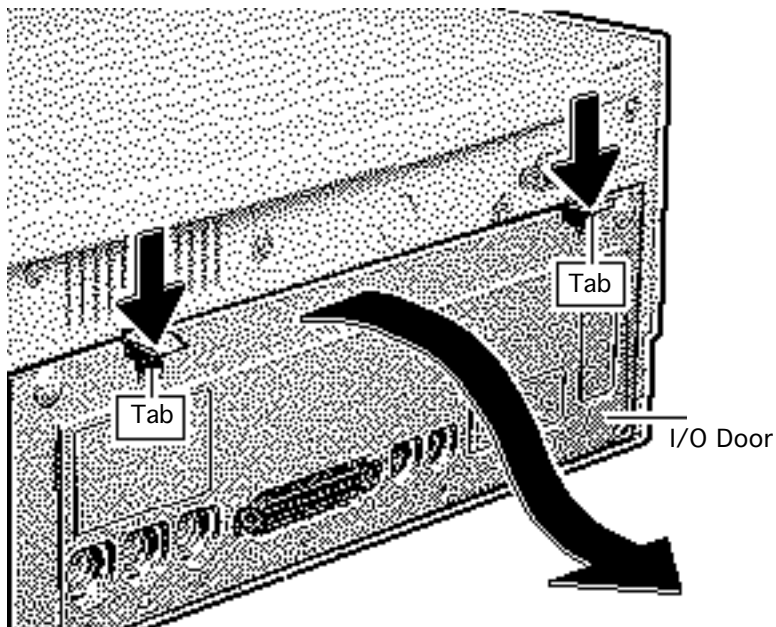
No preliminary steps are required before you begin this procedure.

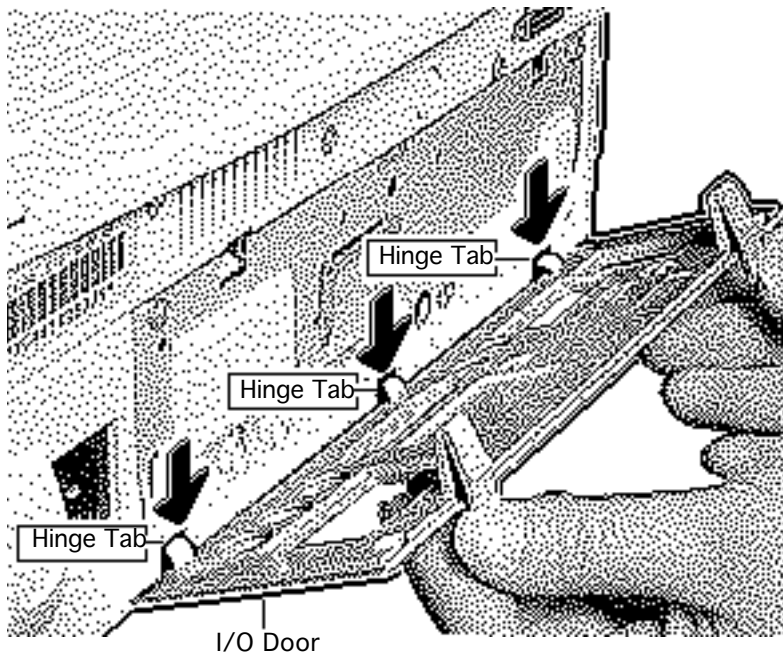
Review the ESD precautions in Bulletins/Safety.





- 1 Push down the two locking tabs and swing down the door.





Replacement Note:

Carefully align the three hinge tabs before swinging up the I/O door.



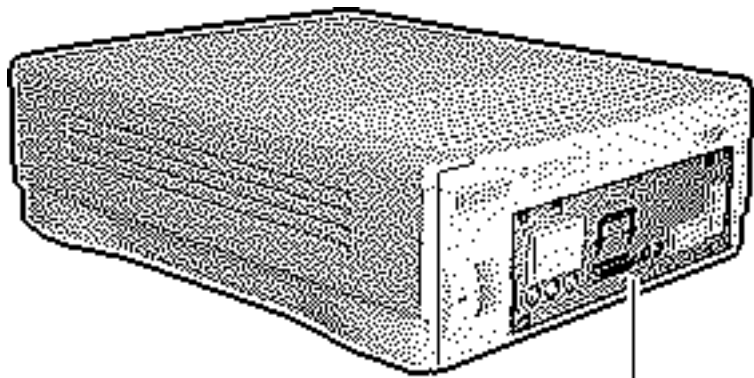


Logic Board

Before you begin, remove I/O door.

Review the ESD precautions in Bulletins/Safety.

Note: If you are replacing a logic board that has one SIMM slot, replace it with P/N 661-0158. If you are replacing a logic board that has two SIMM slots, replace it with P/N 661-1114.



Logic Board with Fence



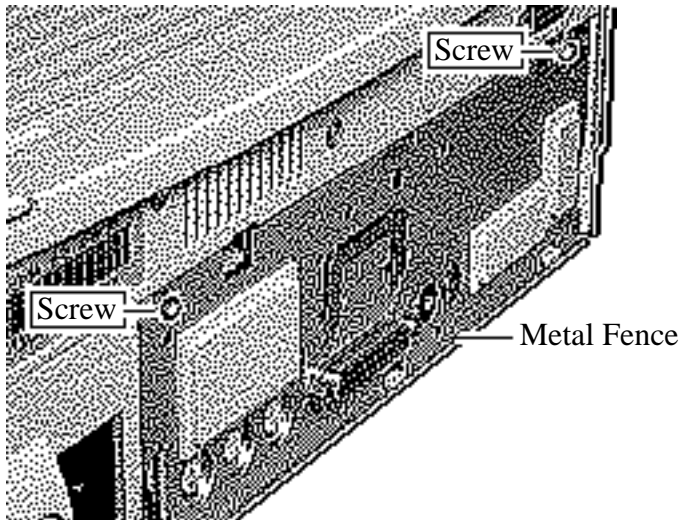


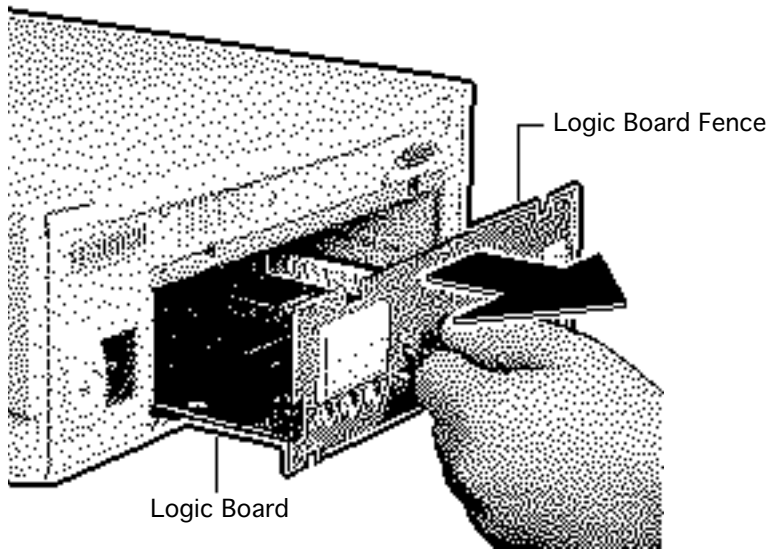
Note: The 630 series includes a variety of logic board configurations. This topic describes the logic board removal procedures common to all models in this series. See “DOS-Compat. Logic Board” topic, for procedures specific to that logic board. See Upgrades chapter, “Processor Upgrade” topic, for procedures about the RISC processor logic board upgrade.





- 1 Remove the two screws from the metal fence.

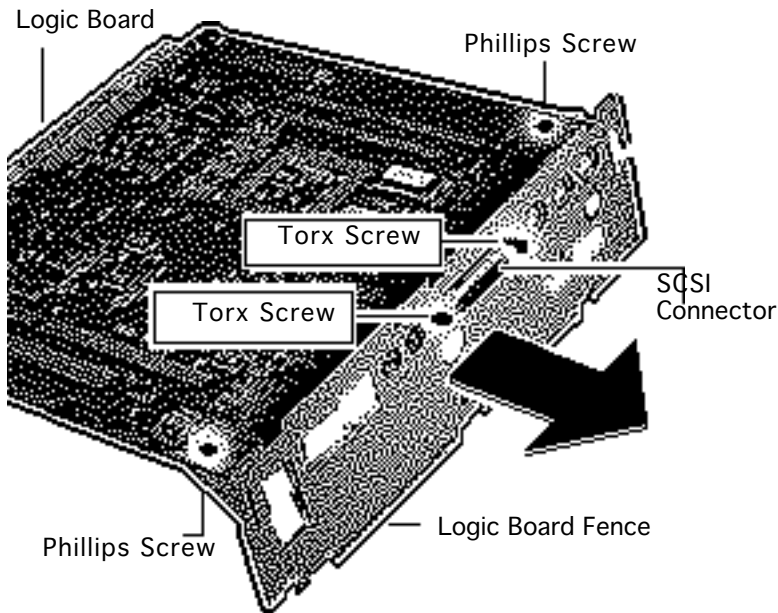




Note: The logic-board-and-fence assembly may need a firm initial tug to loosen it from the shield/wiring harness.

- 2 Slide out the logic-board-and -fence-assembly.





Note: Perform the following steps only if you are replacing a defective logic 630 board. Do not attempt to

- 3 Remove the two Phillips screws that secure the fence to the solder side of the logic board.
- 4 Using a T9 torx driver, remove the two torx screws that secure the logic board fence to the SCSI connector.
- 5 Separate the logic board fence from the logic board.





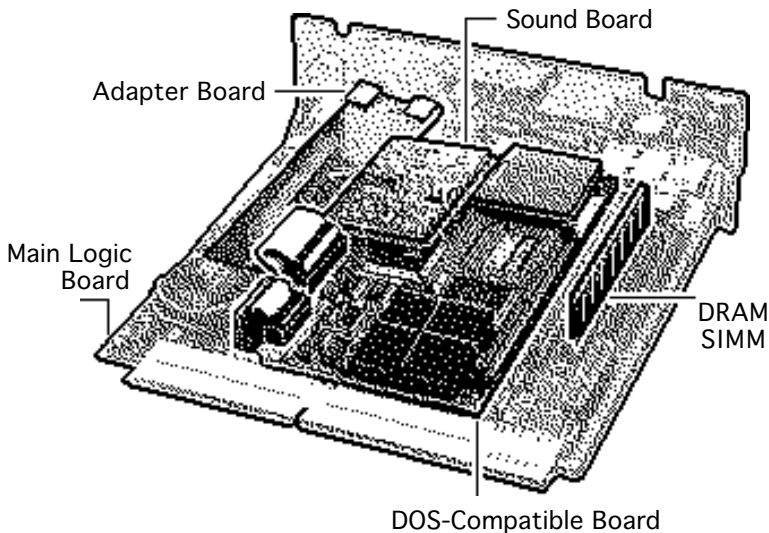
DOS Compat. Logic Board

Before you begin, remove the following:

- I/O door
- Logic board

Review the ESD precautions in Bulletins/Safety.

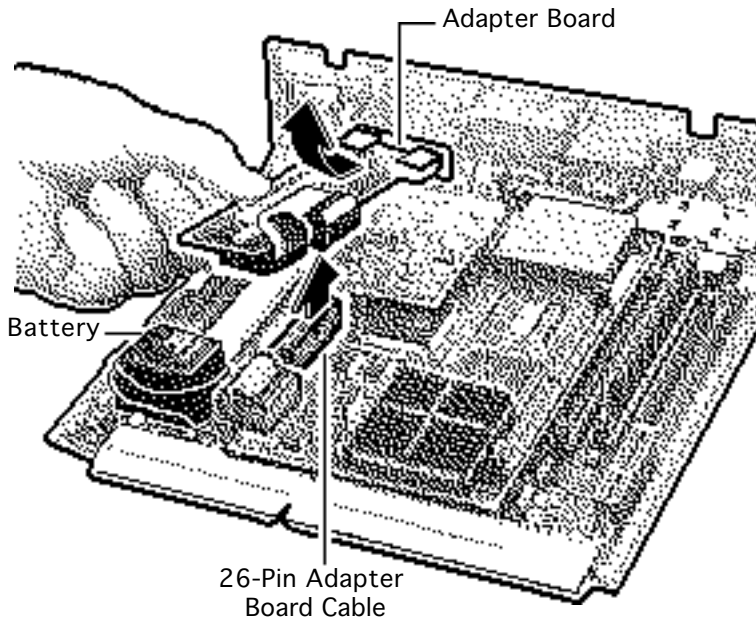
Note: If you are replacing a logic board that has one SIMM slot, replace it with P/N 661-0158. If you are replacing a logic board that has two SIMM slots, replace it with P/N 661-1114.





Note: The LC 630 DOS-Compatible logic board includes the main logic board with DRAM SIMM, the DOS-Compatible board with DRAM SIMM, DOS-Compatible sound board, DOS-Compatible adapter board, and appropriate cables.

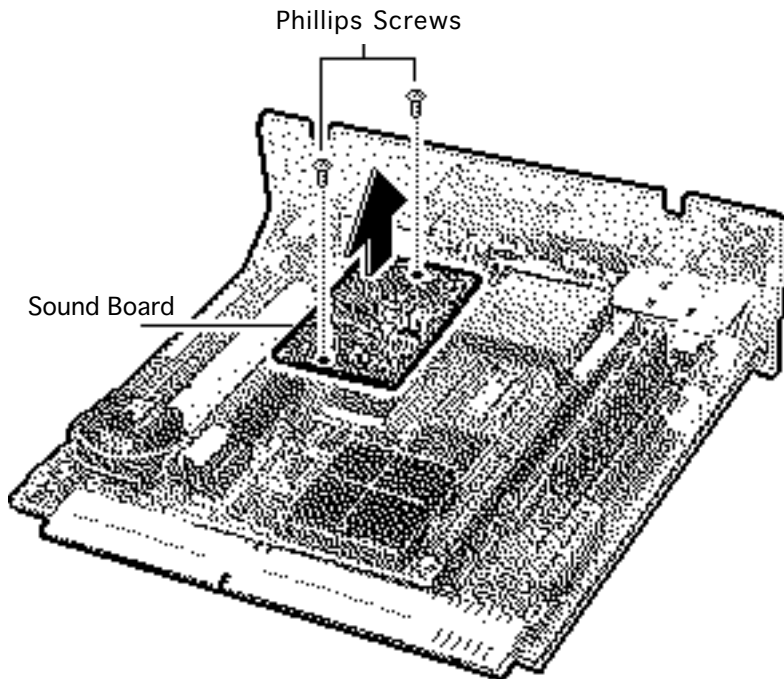




Removing the Adapter Board

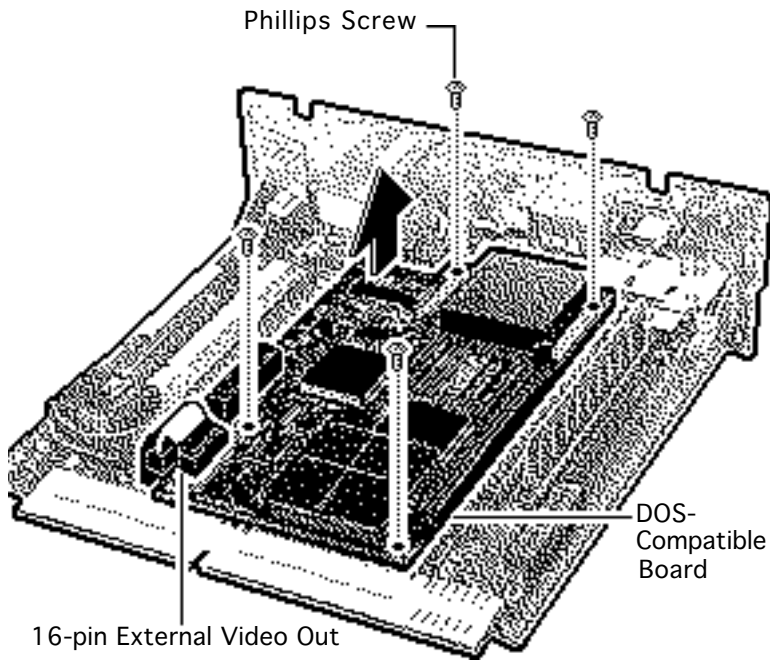
- 1 Disconnect the 26-pin adapter board cable.
- 2 Gently lift up the battery end of the adapter board and disconnect the board from the PDS slot.
- 3 Pull the adapter board back and out.





- 4 Removing the Sound Board
- 5 Remove the two Phillips screws.
- 6 Lift the sound board to disconnect and remove it.





Removing the DOS-Compatible Board

- 1 Disconnect the 16-pin external video out cable from the logic board.
- 2 Remove the four Phillips screws from the DOS-compatible board.





Caution: the DOS-compatible board is installed directly into the '040 processor socket. Use extreme caution not to bend the processor pins when you remove the DOS-compatible board from the main logic board.

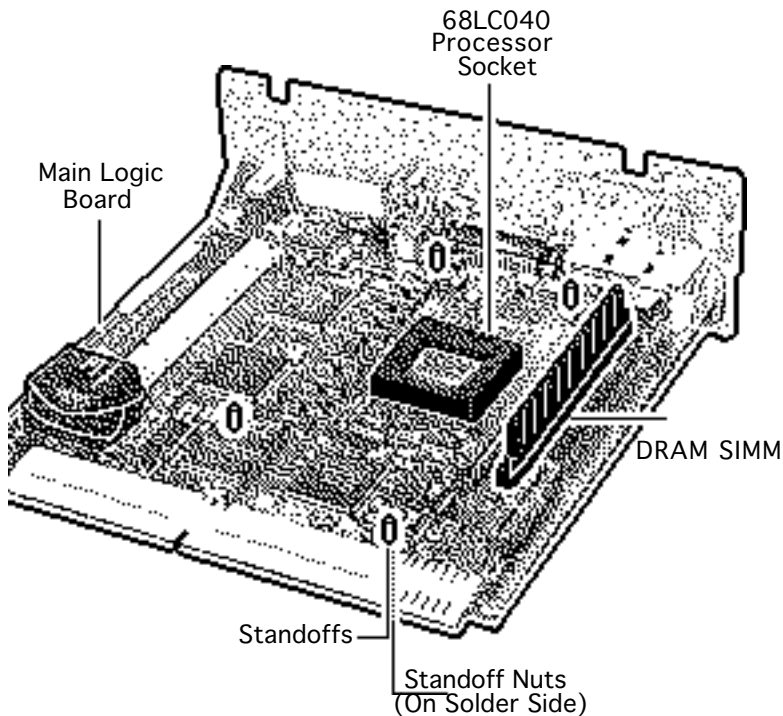
- 3 Gently loosen each side of the DOS-compatible board from the processor socket.
- 4 Lift off the board.





Replacement Note: Return a defective DOS-Compatible board to Apple service with the 68LC040 processor installed.





Note: To return the main logic board to Apple, remove the DRAM SIMM, the standoffs, sound, adapter and DOS-compatible boards. In addition, transfer the 68LC040 processor from the DOS-compatible board to the main logic board processor socket. Procedures for removing and installing the 68LC040 processor follow.

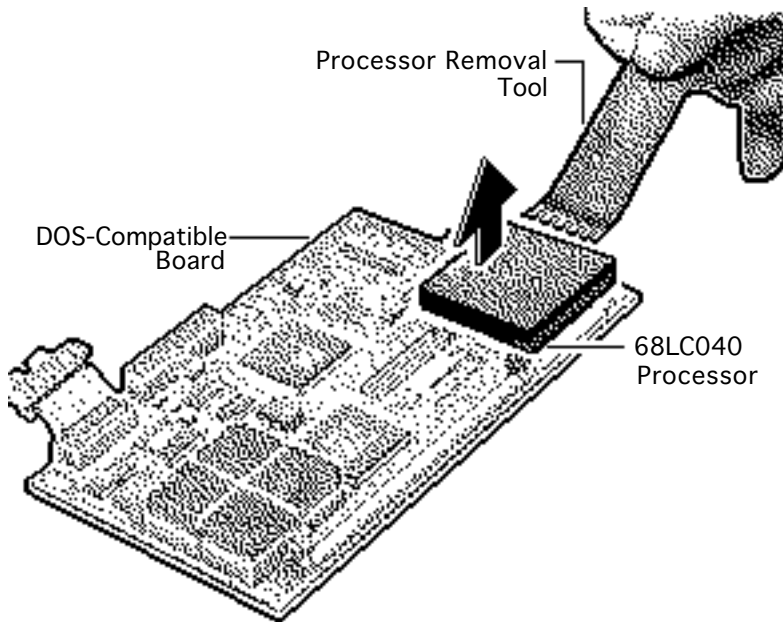




Removing the Standoffs from the Main Logic Board

Remove the four standoff nuts from the solder side of the main logic board and lift off the standoffs.





Removing the 68LC040 from the DOS-Compatible Board

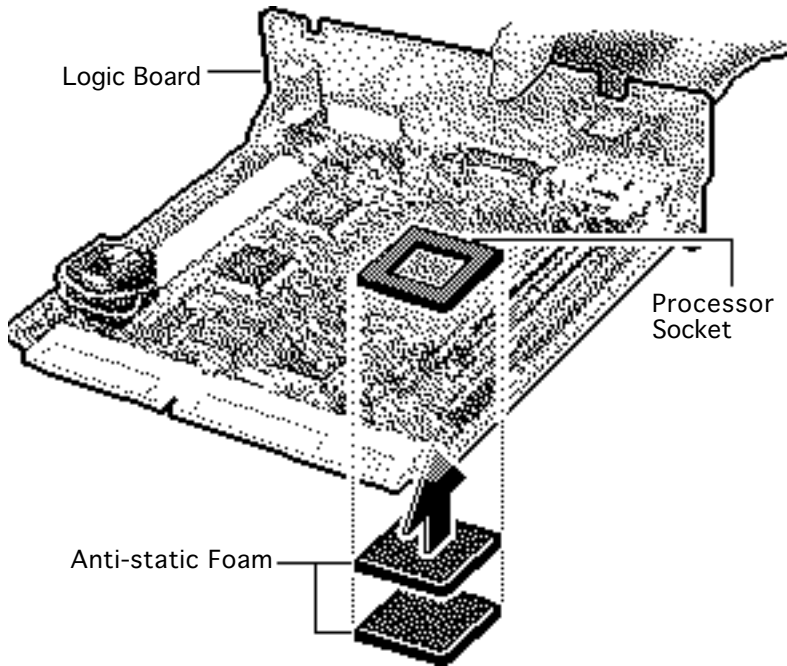
Caution: The 68LC040 processor pins are fragile. To avoid bending the pins, gently loosen the pins from each side of the processor and lift the processor straight up. To avoid scratching the tracings on the logic board, avoid contacting the logic board with the processor removal tool





- 1 Using the processor removal tool, gently pry up all four sides of the 680LC40 processor from the DOS-compatible board.
- 2 Lift the processor straight up and remove it.





Installing the 68LC040 processor in the main logic board socket.

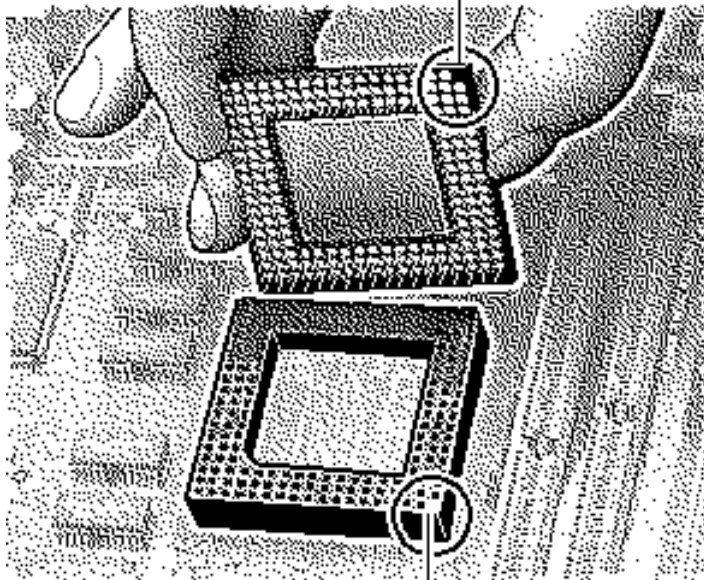
Caution: The following procedure protects the EMI clips and avoids warping the logic board and thus harming the tracings.

- 1 Support the processor socket area of the main logic board with several thicknesses of anti-static foam.





Processor Alignment Corner

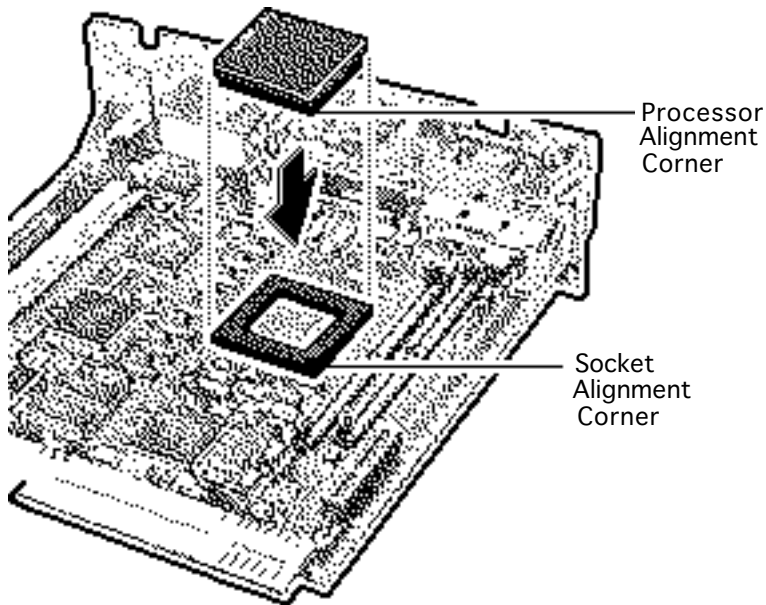


Socket Alignment Corner

Note: A missing pin and pin socket hole mark the alignment corners of the 68LC040 processor and socket.

- 2 Locate the alignment corners of the 68LC040 processor and the processor socket.





Caution: Avoid bending the processor pins when you install the 68LC040 processor. If you meet resistance, realign the pins and standoffs.

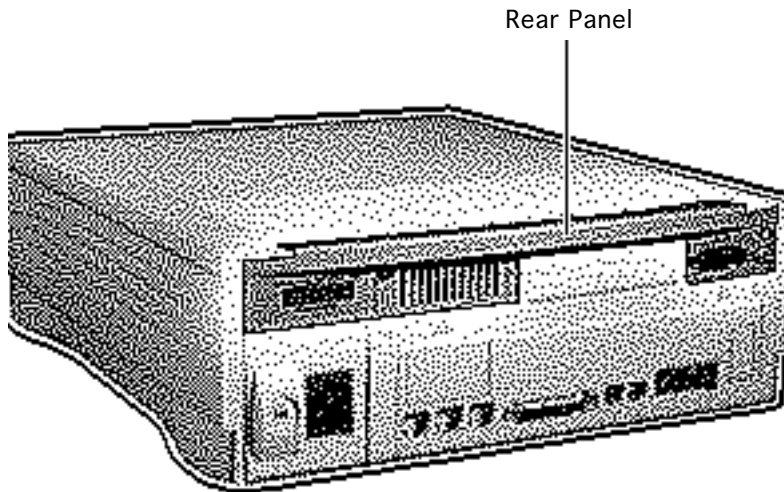
- 3 Carefully position the processor alignment corner over the socket alignment corner.
- 4 Press the pins firmly into the socket.





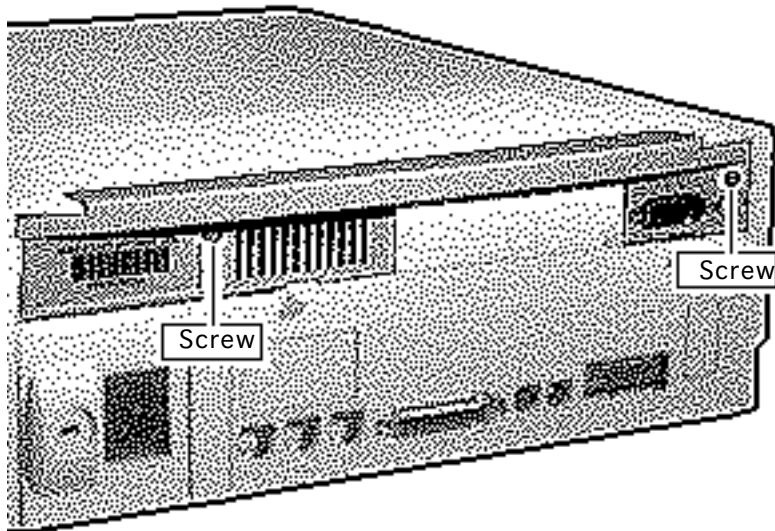
Rear Panel

No preliminary steps are required before you begin this procedure.





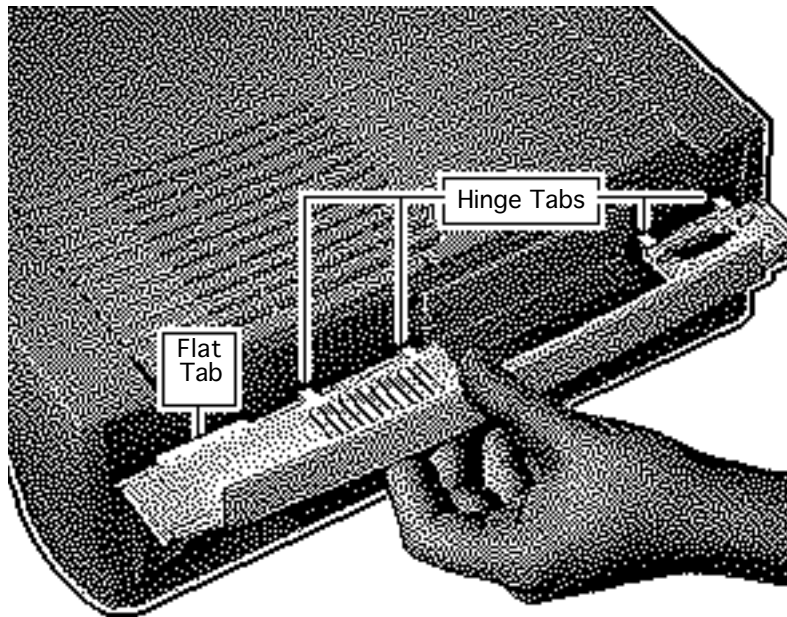
- 1 Remove the two Phillips screws.
- 2 Lift off the rear panel.





Replacement Note:

Carefully align the flat tab and the four hinge tabs.





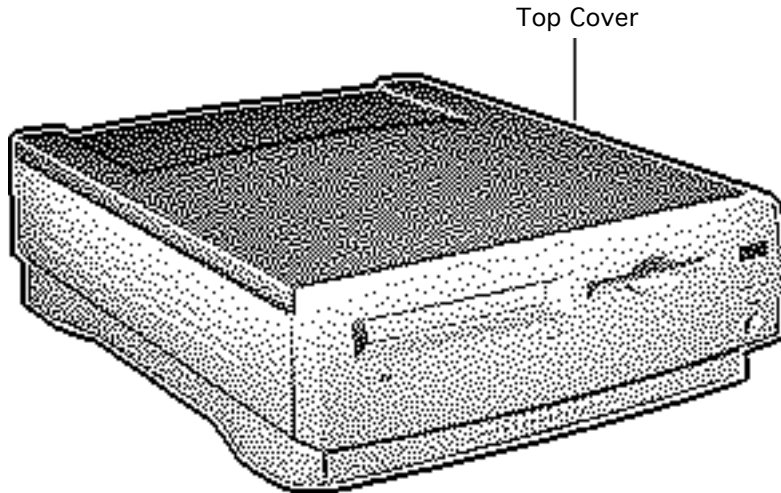
Top Cover

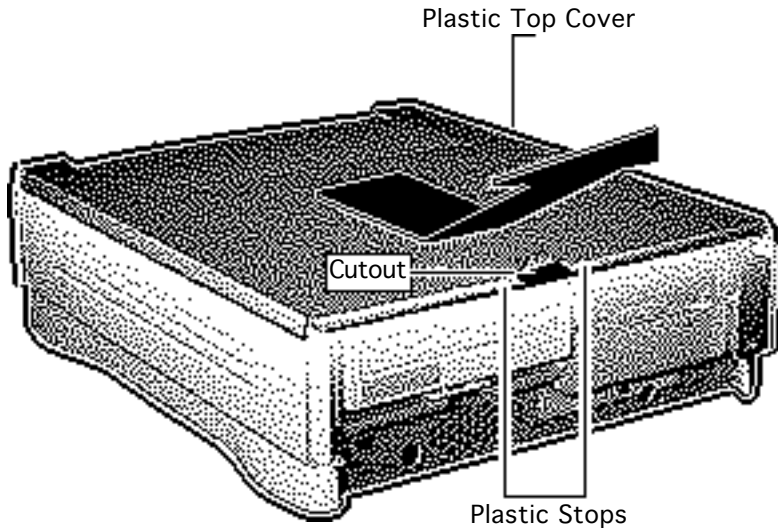
Before you begin, remove the following:

- Drive bezel
- Rear panel

Review the ESD precautions in Bulletins/Safety.

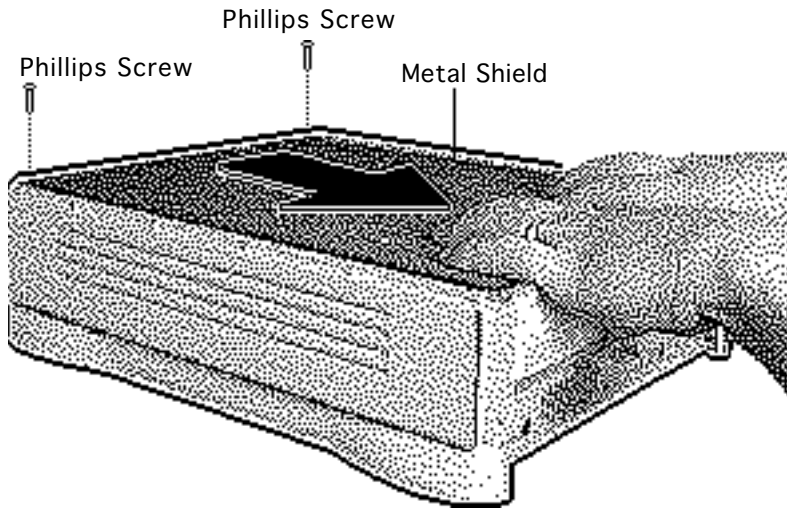
Note: The top cover consists of two parts that must be removed separately, a plastic cover on top of a metal shield.





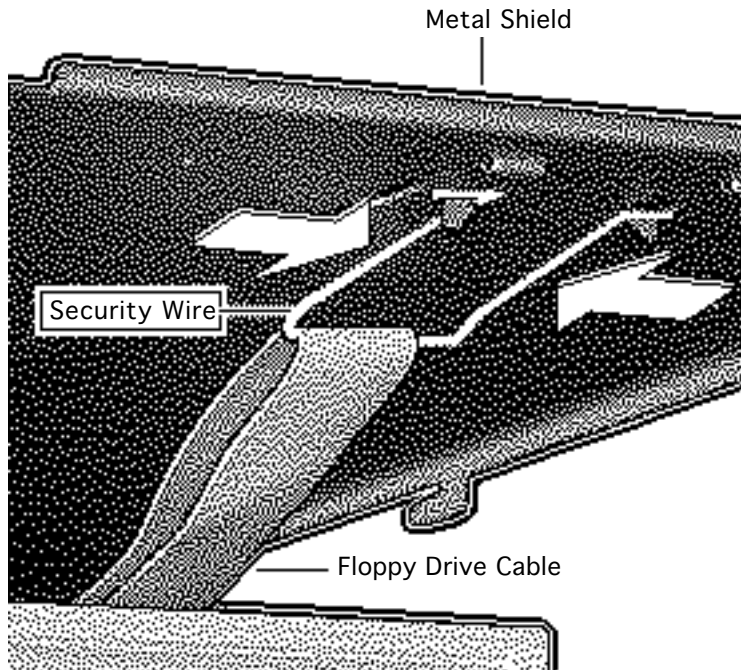
- 1 Insert a small flat-blade screwdriver into the cutout and lift the front edge to clear the plastic stops.
- 2 With your other hand, slide the plastic cover forward about one-half inch.
- 3 Lift the plastic cover off the metal shield.





- 4 Remove the two Phillips screws.
- 5 Slide the metal shield toward the front of the unit about one-half inch.





- 6 Lift the front edge of the metal shield about an inch.
- 7 Under the metal shield, squeeze together the ends of the floppy drive cable security wire and unhook it from the metal shield.
- 8 Remove the security wire from the floppy drive cable.
- 9 Lift off the metal shield.

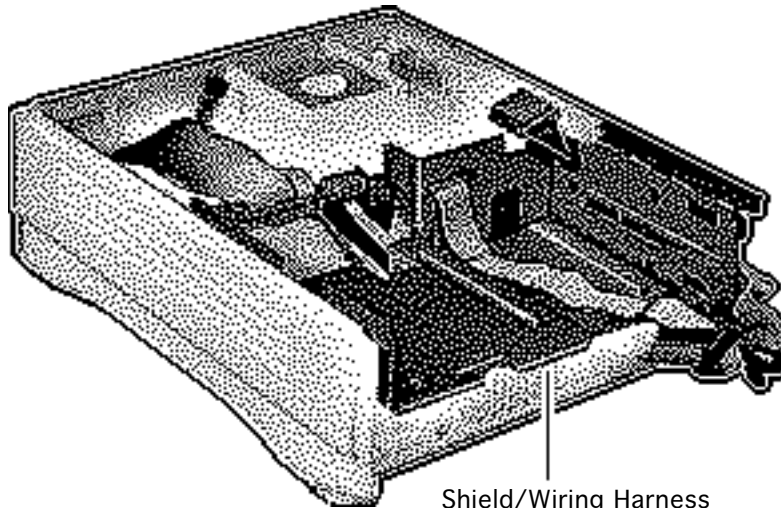




Shield/Wiring Harness

Before you begin, remove the following:

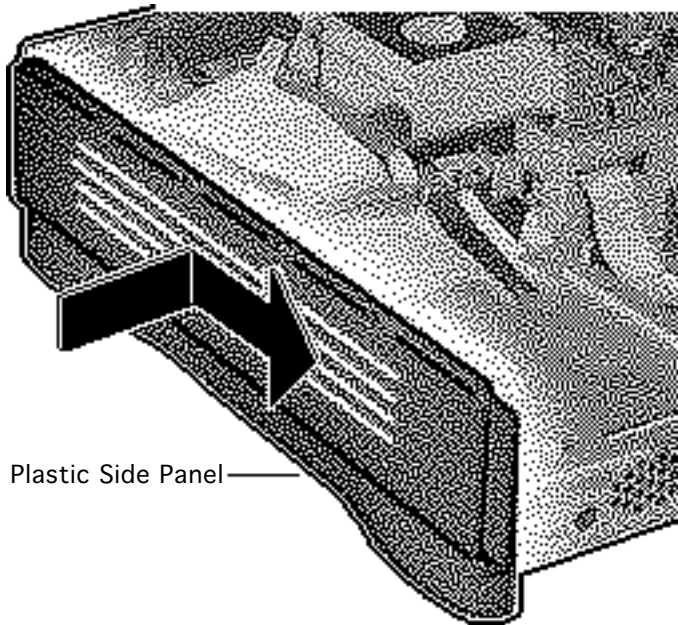
- Drive bezel
- Drive security bracket
- Front panel control
- Floppy drive
- CD-ROM drive
- Hard drive
- I/O door
- Logic board
- Rear panel
- Top cover and shield



Shield/Wiring Harness

Review the ESD precautions in Bulletins/Safety.

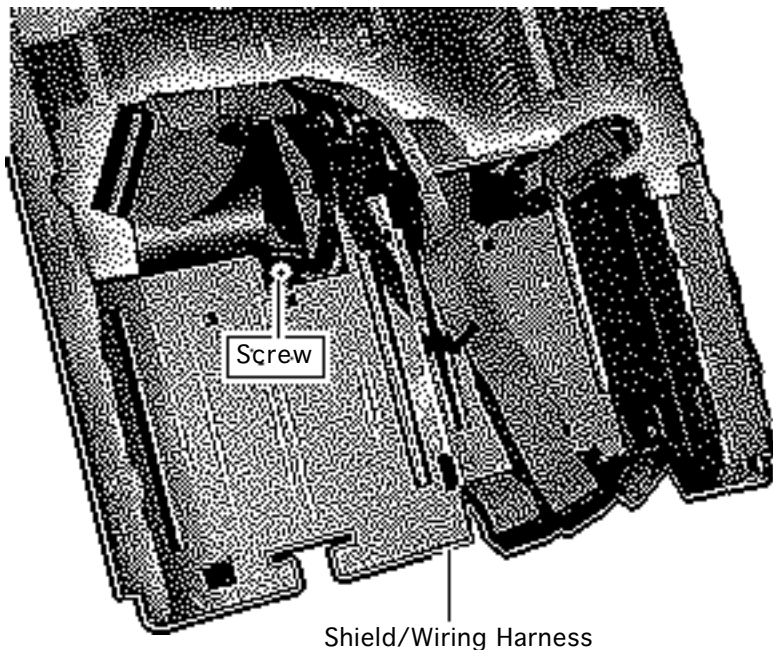




Plastic Side Panel

- 1 Push in and slide the plastic side panels toward the front of the computer about one-half inch.
- 2 Remove the plastic side panels.





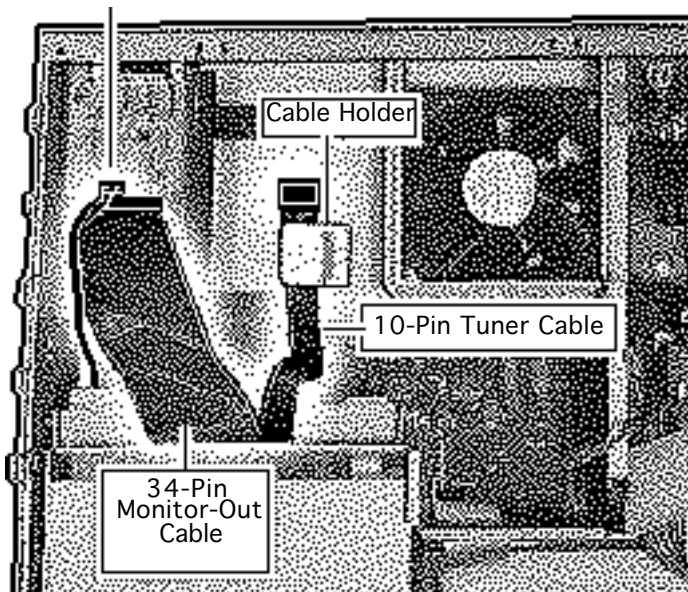
Note: This graphic shows the bottom case tipped to provide a better view of the screw. Perform this procedure with the bottom case seated on a firm, flat surface.

- 3 Remove the screw that secures the shield/wiring harness to the bottom case.



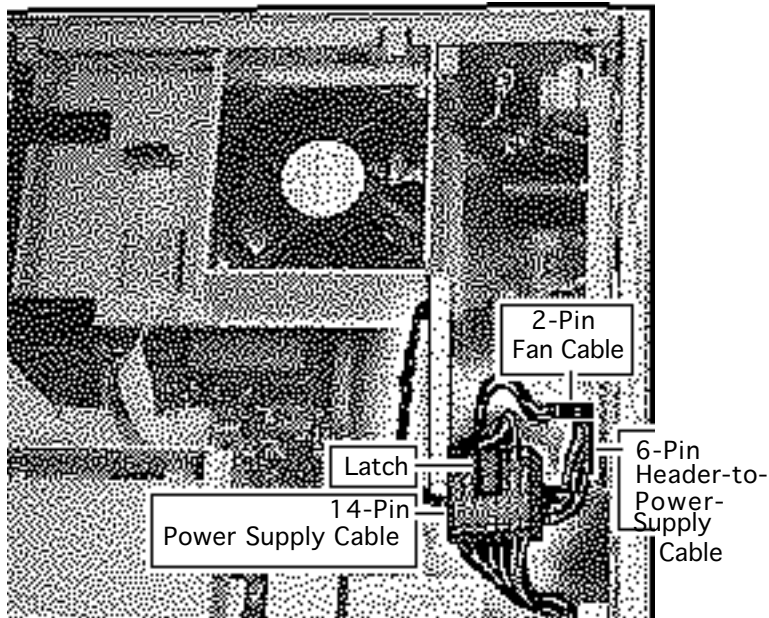


2-Pin Speaker Cable



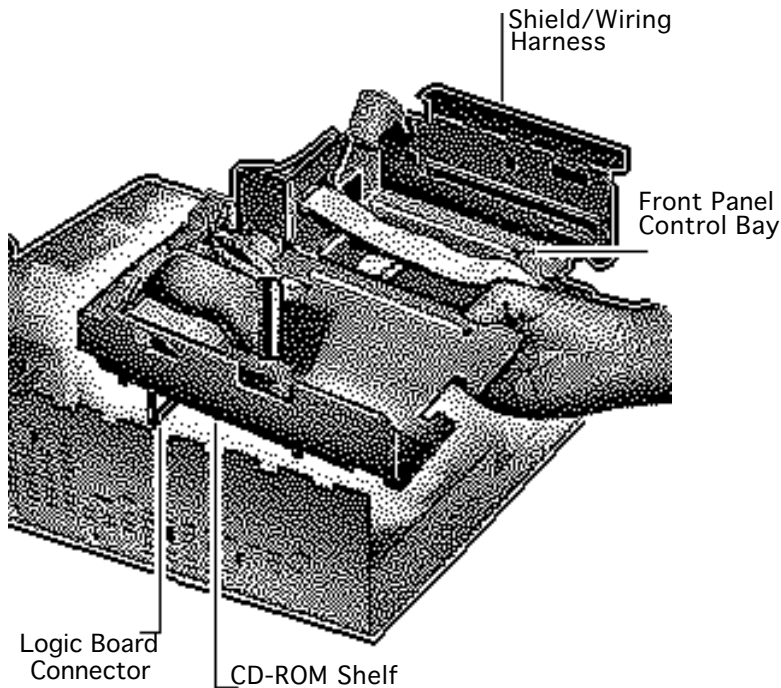
- 4 Disconnect:
 - 2-pin speaker cable
 - 34-pin monitor-out cable
 - 10-pin tuner cable, if connected
- 5 Slide the tuner cable from the cable holder.





- 6 Release the latch on the 14-pin power supply cable and disconnect the cable.
- 7 Disconnect the 2-pin fan cable.
- 8 Disconnect the 6-pin header-to-power-supply cable and remove the cable from the routing notch in the power supply case.





- 9 Lift up one side of the shield/wiring harness a few inches, then lift up the other side about an inch.

Note: Guide the speaker cable through the shield/wiring harness as you remove the harness.

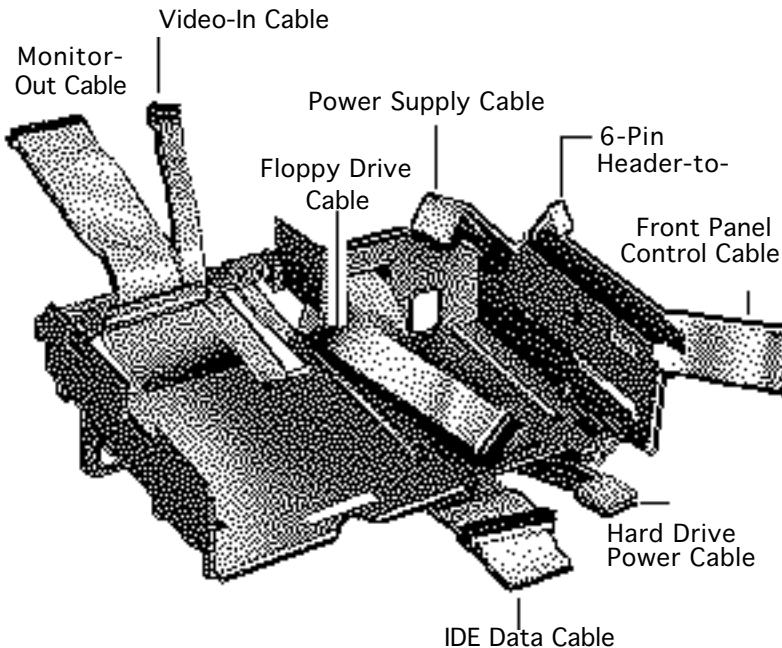
- 10 Remove the shield/wiring harness.





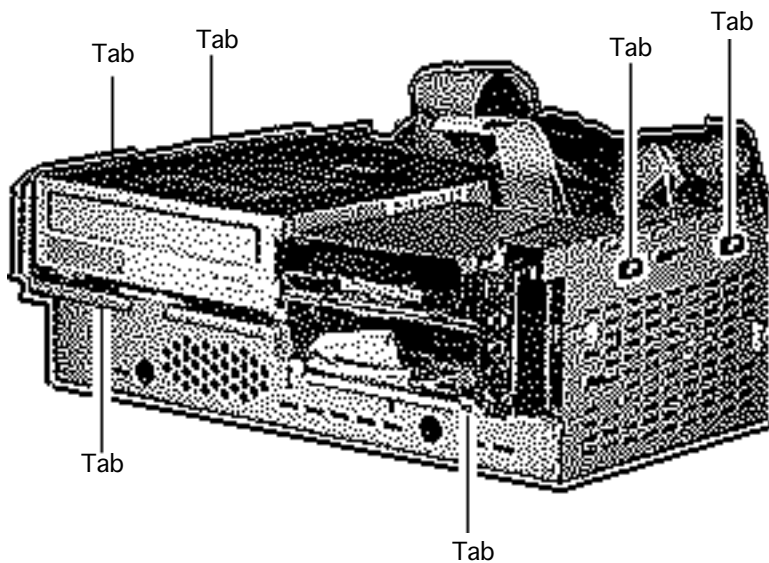
Replacement Note: In re-routing the cables, do not crimp cables between the harness and the floor or sides of the bottom case. Route the speaker cable between the logic board connector and the CD-ROM shelf. Route the fan, power supply, and header cables to the side of the front panel control bay.





Replacement Note: Arrange the cables as shown before replacing the shield/wiring harness. When dressing the cables, do not crimp them between the harness and the floor of the bottom case, or between the harness and the sides of the bottom case. Route the speaker cable between the logic board connector and the CD-ROM shelf. Route front panel control, power supply, and header cables to the side of the front panel control bay.





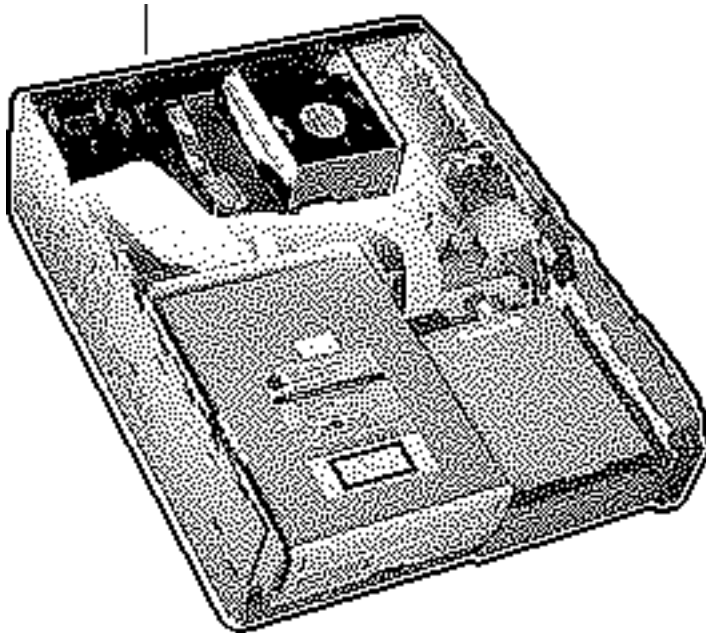
Replacement Note:

Carefully position all six tabs of the shield/wiring harness.





Fan/Video Card Bracket



Fan/Video Card Bracket

Before you begin, remove the following:

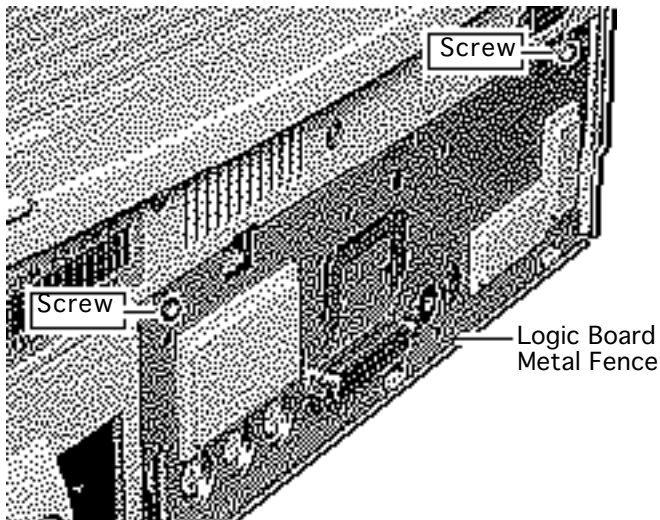
- I/O door
- Drive bezel
- Top cover and shield

Review the ESD precautions in Bulletins/Safety.



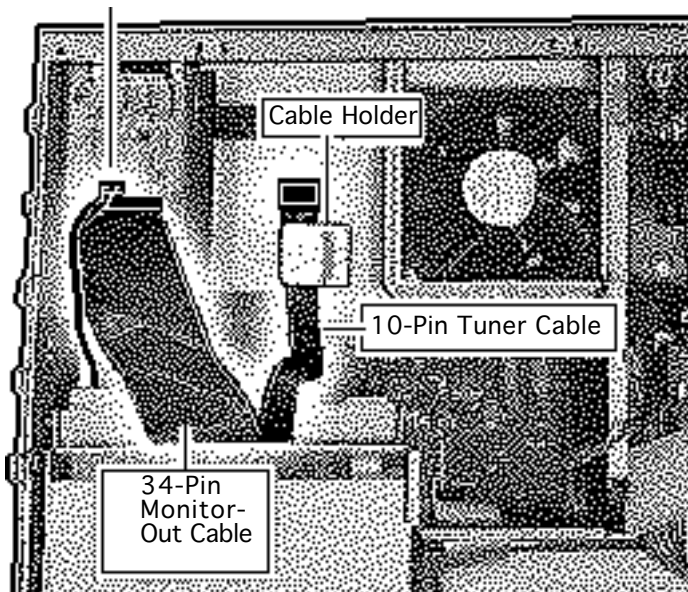


- 1 Remove the two screws from the logic board metal fence.





2-Pin Speaker Cable

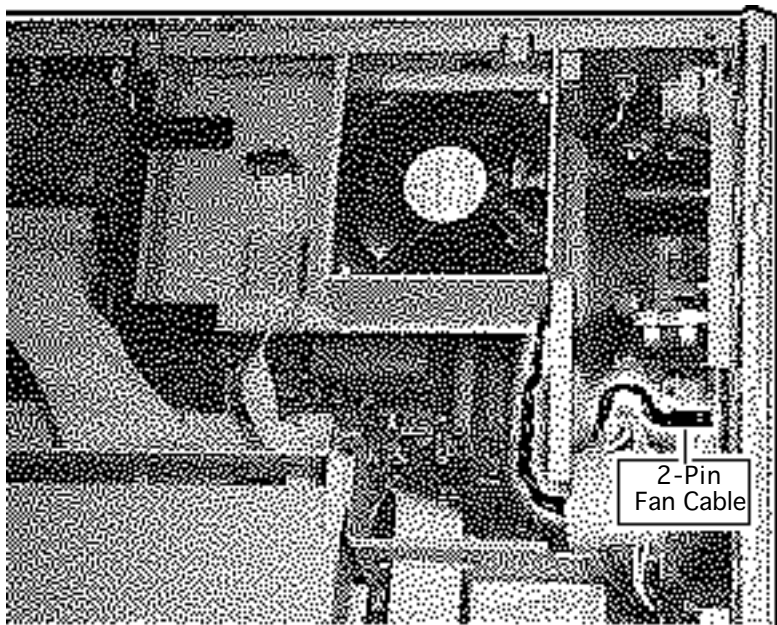


- 2 Disconnect:
 - 2-pin speaker cable
 - 34-pin monitor-out cable
 - 10-pin tuner cable, if connected
- 3 Slide the tuner cable from the cable holder.



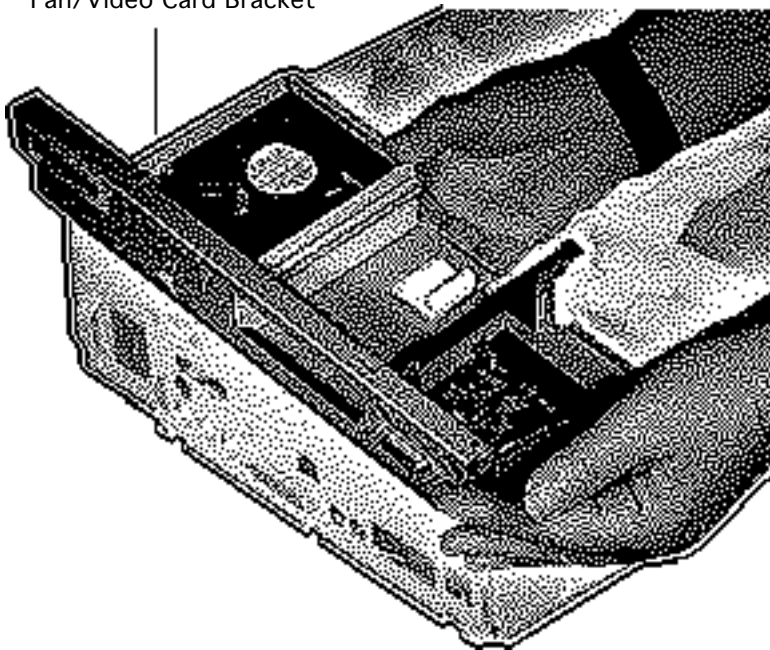


- 4 Disconnect the 2-pin fan cable. 2-Pin Fan Cable





Fan/Video Card Bracket



- 5 Lift up one side of the fan/video card bracket, then the other.
- 6 Remove the fan/video card bracket.

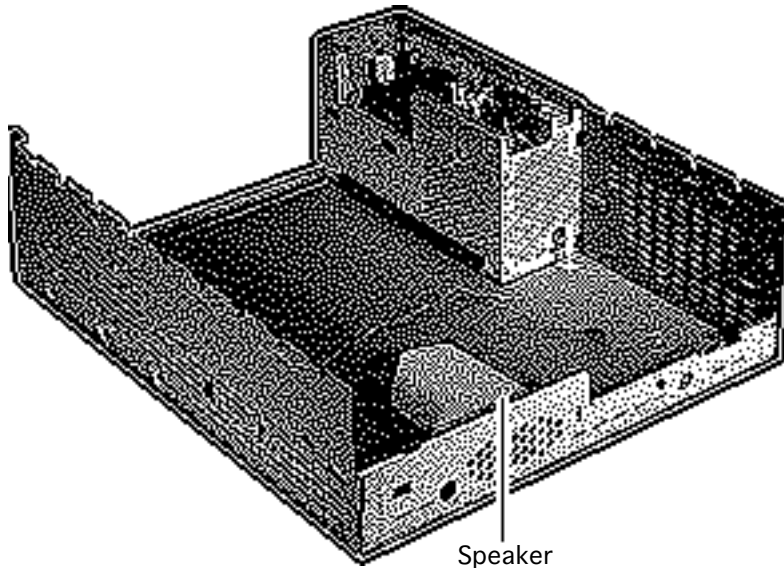


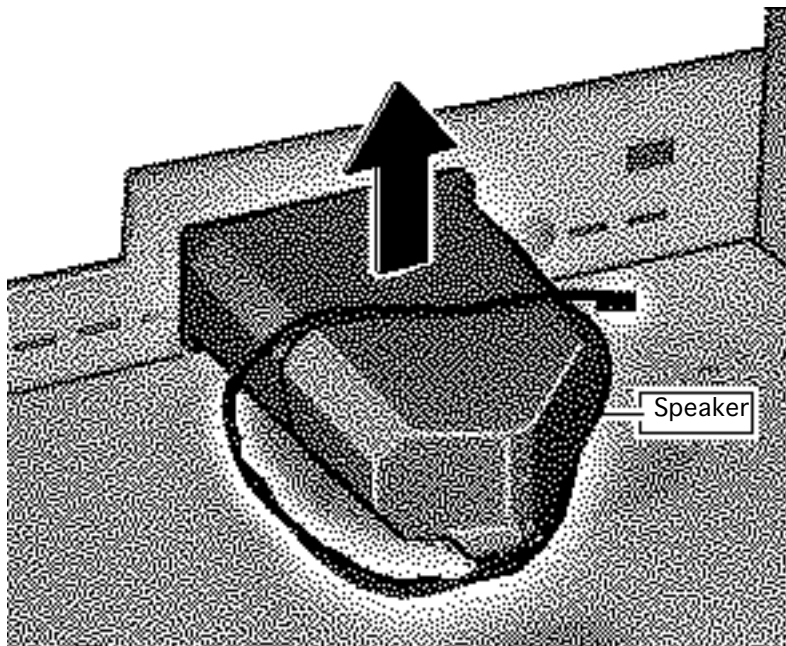


Speaker

Before you begin, remove the following:

- Drive bezel
- Drive security bracket
- Front panel control
- Floppy drive
- CD-ROM drive
- Hard drive
- I/O door
- Logic board
- Top cover and shield
- Shield/Wiring harness
- Fan/Video card bracket





Pull up on the speaker to disengage it from its hook-and-loop connection.

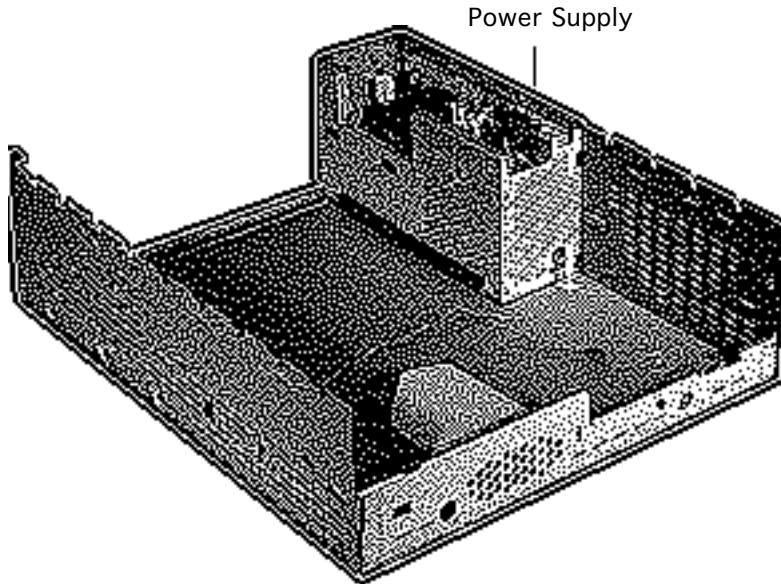


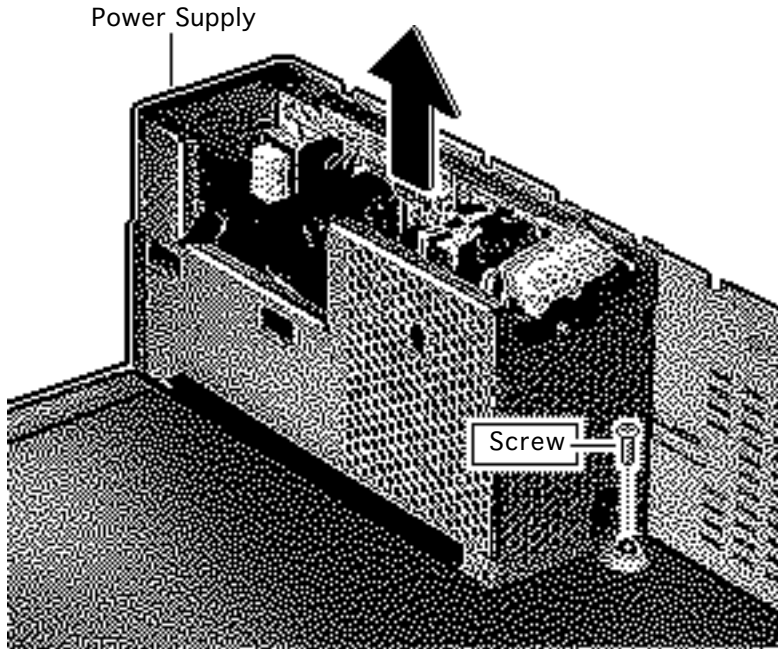


Power Supply

Before you begin, remove the following:

- Drive bezel
- Drive security bracket
- Front panel control
- Floppy drive
- CD-ROM drive
- Hard drive
- I/O door
- Logic board
- Top cover and shield
- Shield/Wiring harness
- Fan/Video card bracket





Remove the screw from the power supply and lift the power supply from the bottom case.

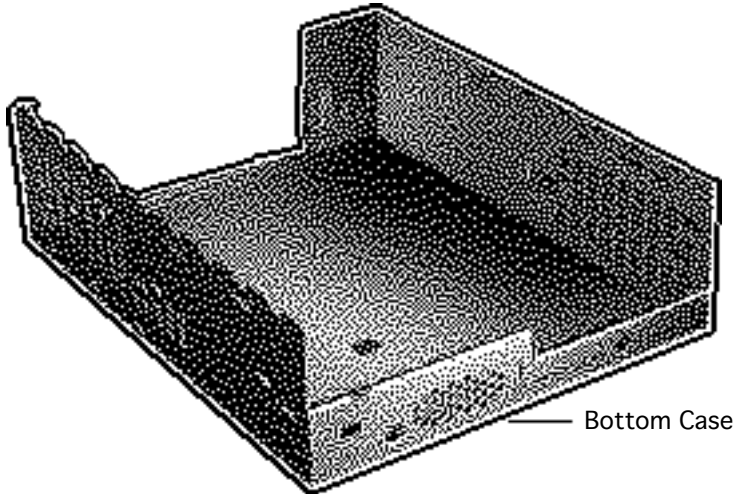




Bottom Case

Before you begin, remove the following:

- Drive bezel
- Drive security bracket
- Front panel control
- Floppy drive
- CD-ROM drive
- Hard drive
- I/O door
- Logic board
- Top cover and shield
- Shield/Wiring harness
- Fan/Video card bracket
- Speaker
- Power supply





Upgrades

LC 630/Quadra 630/Performa 640



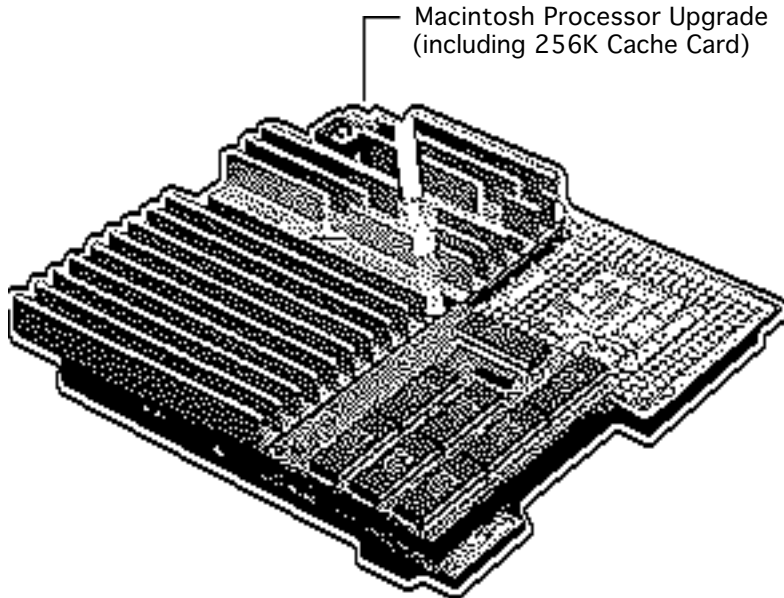


Processor Upgrade

Before you begin, remove the following:

- I/O door
- Logic board
- Card in PDS slot (if any)

Review the ESD precautions in Bulletins/Safety.

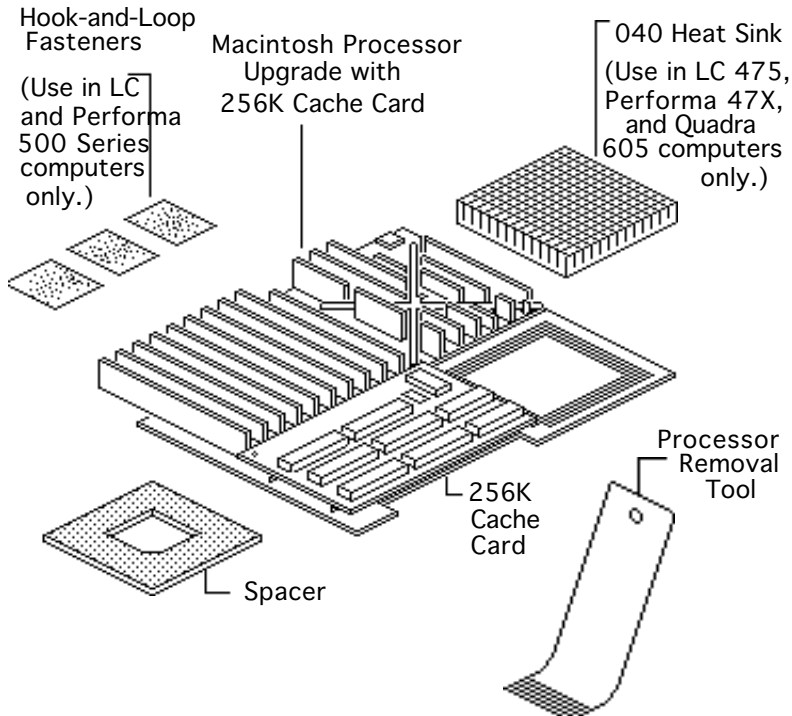




Note: The Macintosh Processor Upgrade kit allows 68LC040 computers to switch between a PowerPC 601 processor and a 68LC040 processor. The upgrade board includes the PowerPC 601 processor on board and a socket to accept the customer's 68LC040 processor.

Note: Refer to the Macintosh Processor Upgrade manual under the Power Macintosh menu for information about specifications and troubleshooting.





Note: The Macintosh Processor Upgrade comes packaged with the Macintosh Processor Upgrade board, 256K cache card, 040 heat sink, and hook-and-loop fasteners. If you need to order service replacement parts, order the parts separately.

Note: To install the upgrade, you will need a processor removal tool. Order the removal tool as a separate service part.





Note: The cache card comes installed on the upgrade board.





Installation Procedure Overview

There are four basic steps to installing the Macintosh Processor Upgrade.

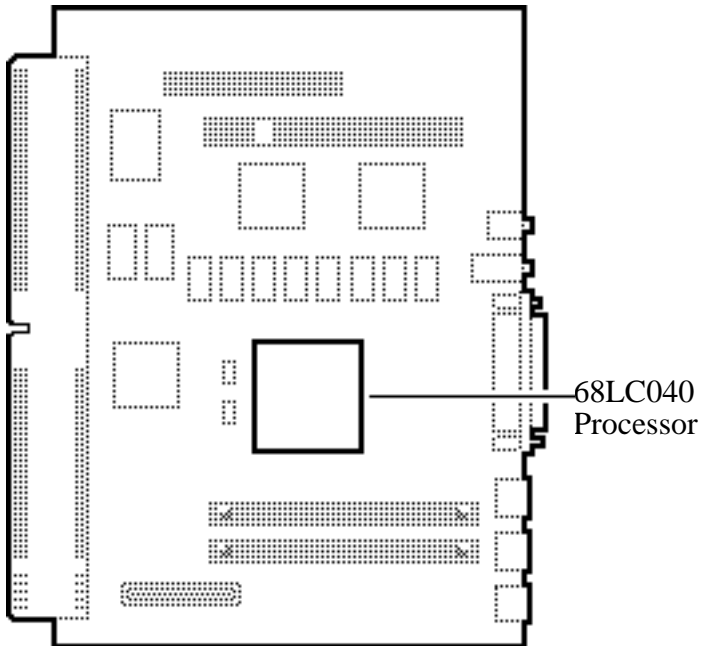
- Remove the 68LC040 processor from the customer's logic board
- Install the 68LC040 processor on the upgrade board
- Prepare the upgrade and logic boards for installation
- Install the upgrade board on the logic board





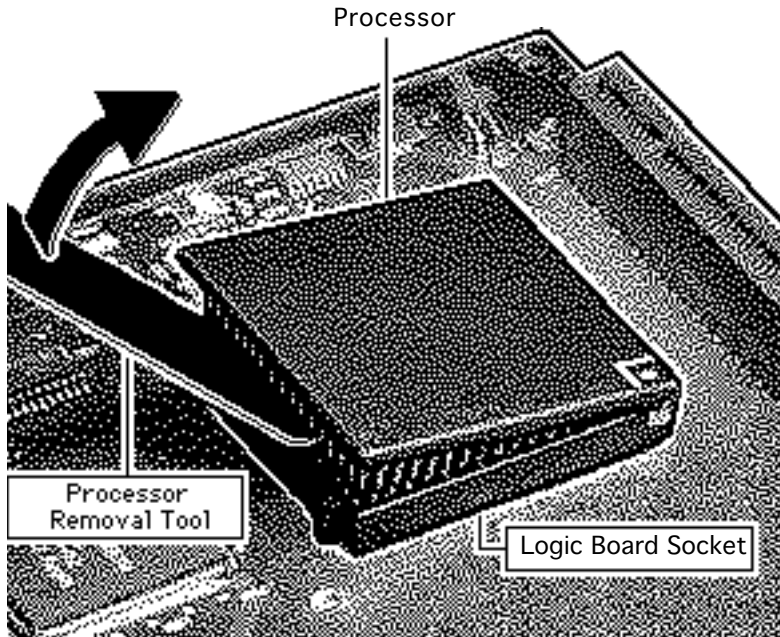
Detailed procedures for this computer follow.





- 1 Remove the 68LC040 Processor from the Logic Board
- 2 Locate the 68LC040 processor on the logic board.





- 3 Position the teeth of the processor removal tool in the groove between the processor and the logic board socket.

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

Note: This graphic shows the proper way to remove any 68LC040 chip from its logic board. Your logic board may differ somewhat from this graphic

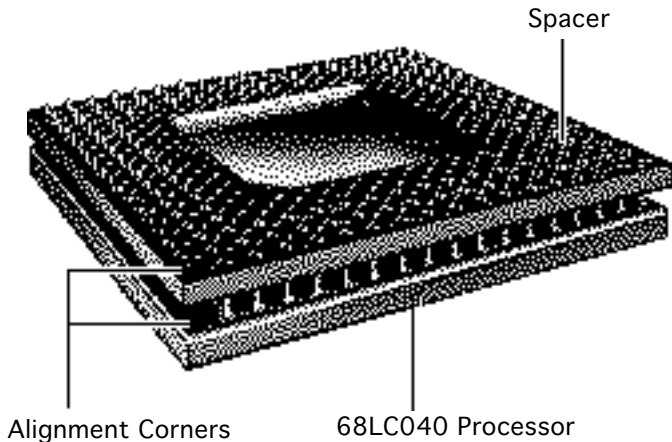




Caution: Pry up each side of the processor only slightly to avoid bending the pins.

- 4 Gently lift up the processor removal tool handle and pry up each side of the processor from the socket.
- 5 Remove the processor.



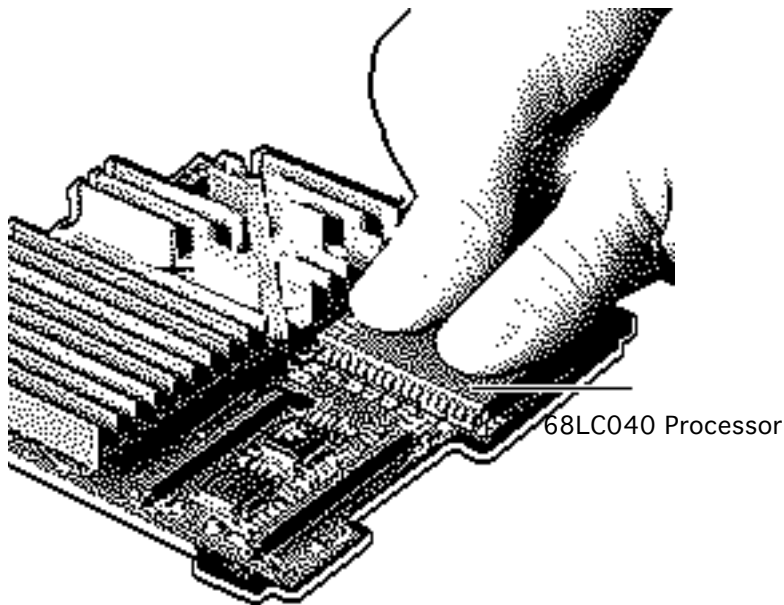


- 6 Install the 68LC040 Processor on the Upgrade Board

Note: The alignment corner of the 68LC040 processor is missing one pin. The alignment corner of the spacer is missing a pin hole.

- 7 Position the spacer alignment corner over the 68LC040 processor alignment corner
- 8 Place the spacer on the processor.





Caution: Forcing the 68LC040 processor connector pins into the socket could damage the pins. If the processor resists installation, check the pin alignment.

Caution: Place the upgrade board on a firm even surface to avoid bending the upgrade board when pressing the processor into the socket.

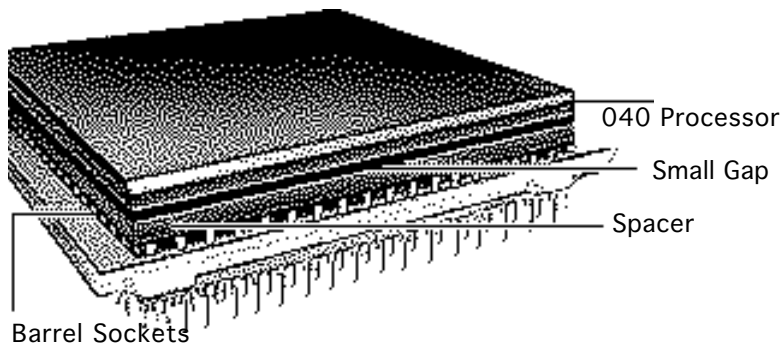
Caution: Use two thumbs to evenly distribute the pressure as you press the processor into the socket.





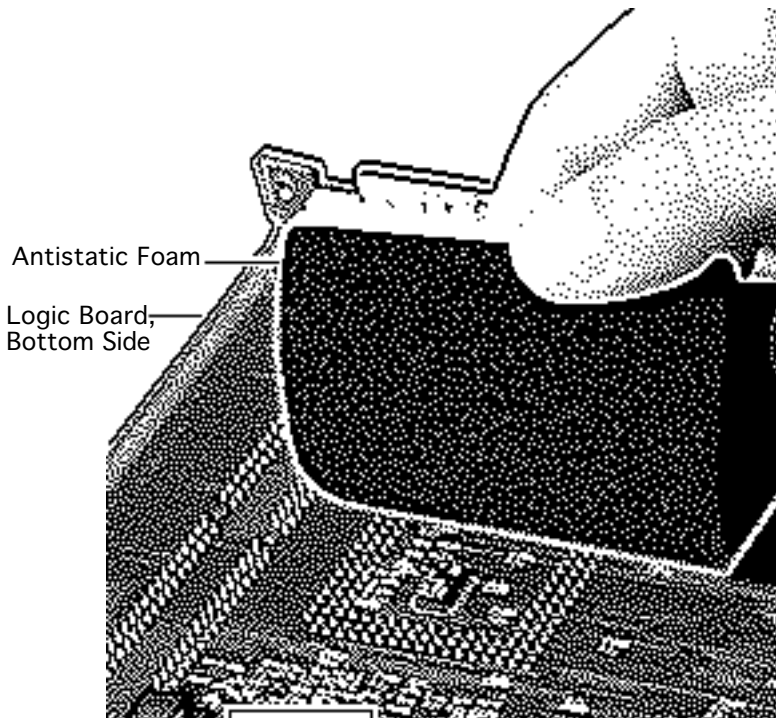
- 9 Hold the processor and spacer together and position the spacer alignment corner over the upgrade socket alignment corner.
- 10 Press the processor connector pins into the socket until you hear a “snap.”





Note: On a correctly installed 040 processor, a very small gap separates the 040 chip from the metal spacer. A larger gap caused by the barrel sockets of the upgrade board separates the upgrade board and the spacer.





11 Prepare the Upgrade and Logic Boards for Installation

Note: The following steps explain how to prepare the logic board to accept the upgrade board.

Caution: The EMI clips on the bottom of logic board are fragile. Do not apply heavy pressure directly to these clips or you may bend the logic board.

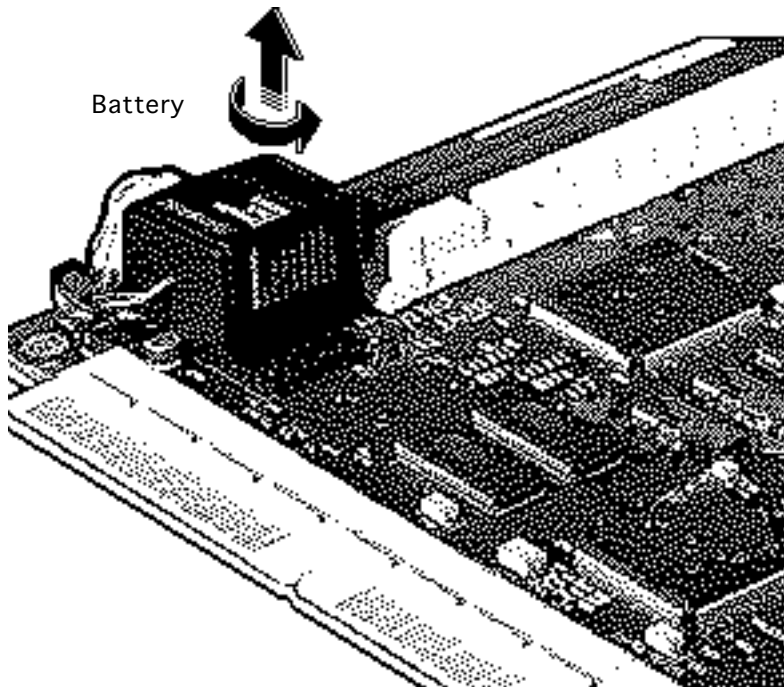




- 12 Place a piece of antistatic foam directly under the processor socket on the bottom side of the logic board.

Note: This step helps prevent the logic board from bending when you apply pressure in the next few steps.





- 13 Lift and rotate the battery one quarter turn from its original position on the logic board. (This step makes room for the upgrade board.)
- 14 Press the battery firmly into its new position.



**LATE DESIGN CHANGE**

Do not add the 040 heat sink when you upgrade an LC, Quadra, or Performa 630 computer.

Upgrade Connector Alignment Corner



Logic Board Socket Alignment Corner

- 15 Install the Upgrade Board

Caution: Forcing the upgrade board connector pins into the logic board socket could damage the pins. If the connector resists installation, check the pin alignment.

- 16 Position the upgrade connector alignment corner over the logic board socket alignment corner.
- 17 Carefully align the pins along all sides of the processor and socket.





18 Firmly press the connector pins into the logic board socket.

Note: To install the software, refer to the upgrade Owner's Guide.



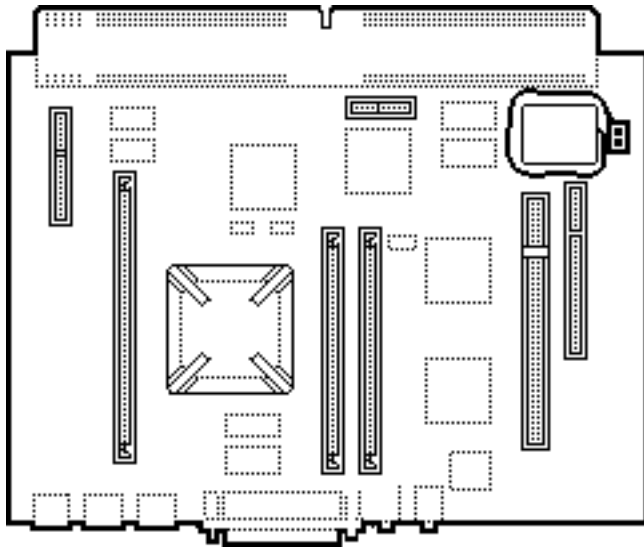


Logic Board and Upgrade Board Returns

Return the upgrade and logic boards to their original conditions before sending them to Apple. Be sure to remove the upgrade board from the logic board and reinstall the 68LC040 processor on the logic board.

Replacement Caution: To avoid bending any pins when removing the 68LC040 processor, pry up each side only slightly.





PowerMacintosh 5300/6300 Logic Board Upgrade

Before you begin, remove the following:

- I/O door
- Logic board
- Card in PDS slot (if any)

Caution: Use a grounded workbench and always wear a grounding wriststrap.

Note: This upgrade is not supported by DOS-Compatible systems.





The Power Macintosh 5300/6300 Logic Board Upgrade is a finished goods product. The upgrade kit includes the 603e, 100 MHz logic board and logic board fence. See Take Apart chapter, Logic Board topic for installation procedures.

Service Provider's Checklist

- Install the upgrade board
- Run Safe Install
- Install System 7.5
- Turn on the upgrade board
- Turn on Modern Memory Manager
- Restart the computer to verify the board works properly

Replacement Note: You may need to remove the 603e processor on the 6300 series logic board to install or service SIMMs. See “6300 SIMM Upgrade.”





Parts

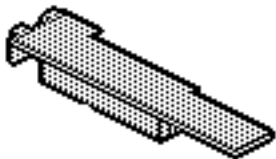
LC 630/Quadra 630/Perf 640

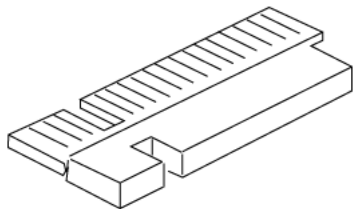




Adapter Card, DOS Compatible

922-1366



**Adapter, CD/HD Connector****922-1820**

Part number 922-1820 connects hard drives to the LC 500 series chassis/harness assembly.

Part number 922-1820 also connects the caddyless CD ROM drive to the chassis/harness assembly of the LC 575.

Part number 922-1820 is not interchangeable with part number 922-1821 used to connect the 300i CD ROM drive to the LC 520 harness/chassis assembly.





Battery, Alkaline., 4.5V, Velcro Mount

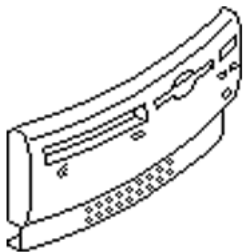
922-0750





Bezel, Front, DOS Compatible

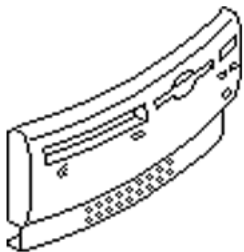
922-1508





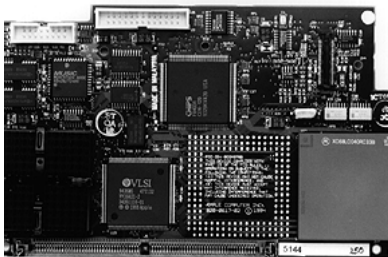
Bezel, Front

922-1157



**Board, DOS Compatible, 68LC040****661-0915**

Return this board with the 68LC040 installed.





Board, DOS Compatible, with FPU, International

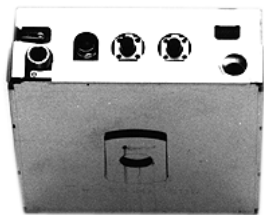
661-0767





Board, Front Panel Control

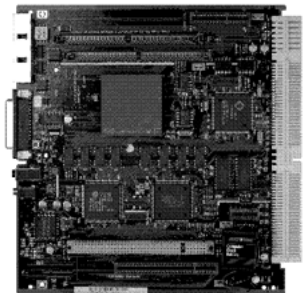
661-0139





Board, Logic, 4 MB, Two 72-Pin SIMM Slots, without FPU, DOS Compatible

661-1114





Board, Logic, 4 MB, Two SIMM Slots, with FPU, DOS Compatible, International

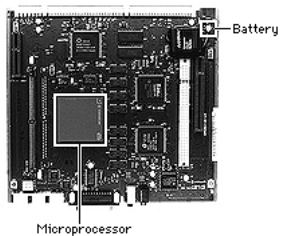
661-1115





Board, Logic, Quadra 630, 4 MB

661-0189



**Board, Logic, One 72-Pin SIMM Slot****661-0158**

Microprocessor

Battery



On some logic boards the microprocessor may be soldered to a small printed circuit board.

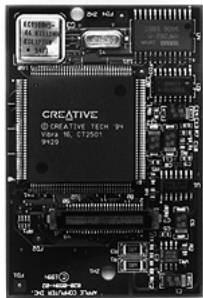
This logic board is for the non-DOS Compatible systems.





Board, Sound, DOS Compatibility

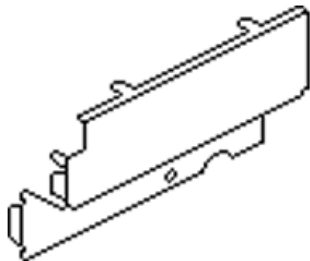
661-0253





Bracket, Drive Security

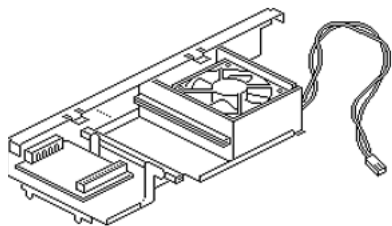
922-1156





Bracket, Fan/Video

922-1160





Cable, DOS Compatible, 16-pin, Pkg. of 5

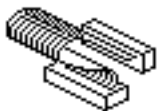
922-1289





Cable, DOS Compatible, 26-pin, Pkg. of 5

922-1288





Cable, MPEG Board, Pkg. of 5

922-1568





Cable, Power, 110 V, Smoke

590-0380





Card, Ethernet, 10 Base-T, Comm Slot

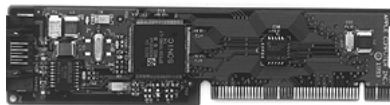
661-0888





Card, Ethernet, AAUI Port, Comm Slot

661-0889





Card, Ethernet, Thin Net, Comm Slot

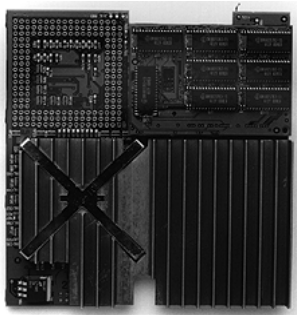
661-0036





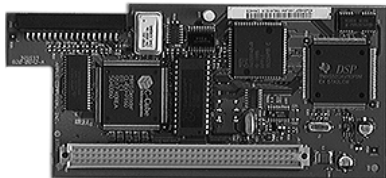
Card, Macintosh Processor Upgrade w/256K Cache

661-0255



**Card, MPEG Media System****661-0995**

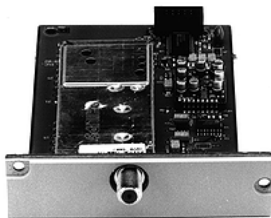
Make sure there is a jumper present from U5 Pin 2 to D1 Pin 1.





Card, TV Tuner

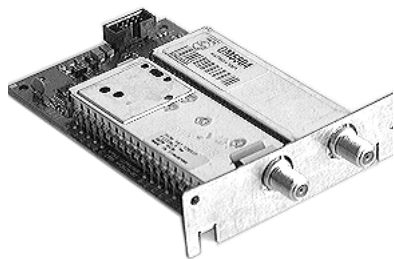
661-0160





Card, TV/FM Tuner

661-1147





Card, Video-In, Rev. A (replaced by 661-1073)

661-0159





Card, Video-In, Rev. B

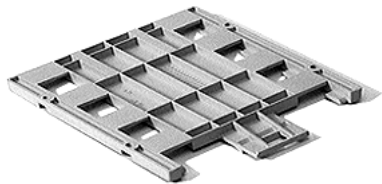
661-1073





Carrier, CD-ROM Drive

922-0850





Carrier, Floppy Drive

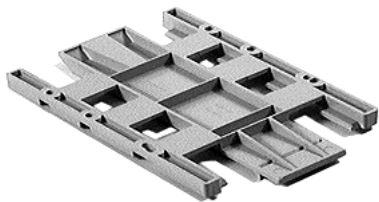
922-1133





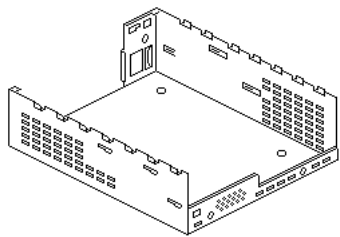
Carrier, Hard Drive

922-1124



**Case and Shield, Bottom**

922-1176





CD-ROM Drive, Apple CD 300+, Trayloading

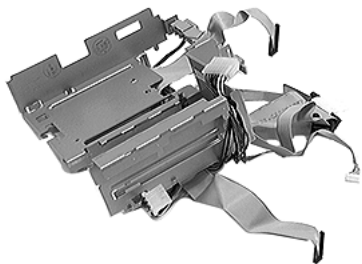
661-0222





Chassis, Shield/Wiring Harness

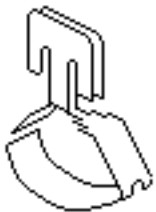
922-1154





Clip, Ground, Logic Board, Pkg. of 25 (replaced by 922-2320)

922-1279





Clips, Ground, Logic Board, Pkg. of 25 (replaced by 922-2454)

922-2320





Clips, EMI, Logic Board, Pkg. of 25

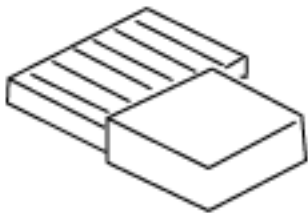
922-2454





Connector, CD Audio (Use with 661-0222)

922-0766





Cover Plate, Rear, Plastic

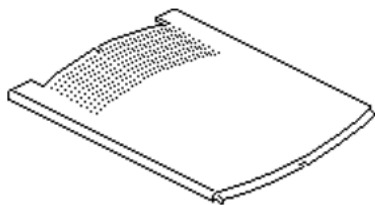
922-1178





Cover, Top, Plastic

922-1161





Display, Apple Multiple Scan

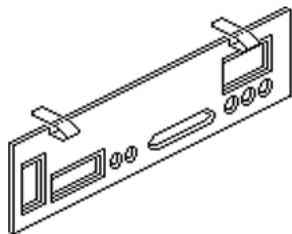
N/A





Door, I/O, Plastic (replaced by 922-2439)

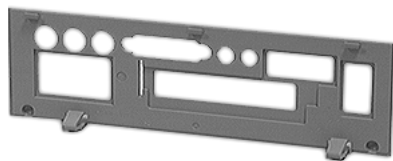
922-1163





Door, I/O, with PCI Hole

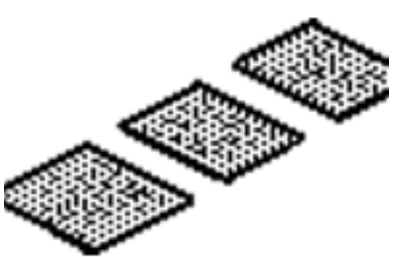
922-2439





Fastener, Hook and Loop~Macintosh Processor Upgrade (Pkg. of 5)

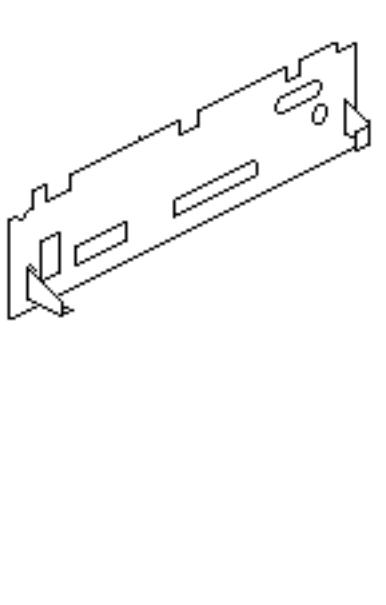
922-1264





Fence, Logic Board (replaced by 922-2314)

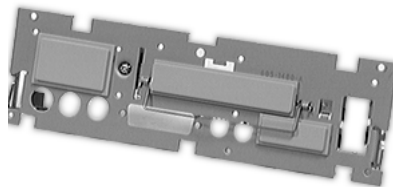
922-1164





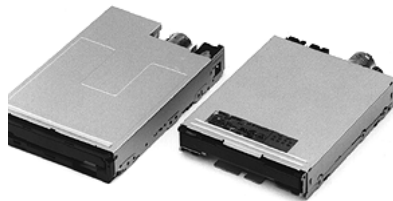
Fence, Logic Board

922-2314





Floppy Drive, Apple SuperDrive, 1.4 MB, Manual Insert

661-0121

Warranty: 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. **APPLE REQUIRES SPECIAL PACKAGING**; failure to comply with these requirements may result in a packaging noncompliance charge.

Use this drive in the Macintosh LCIII. For the Macintosh LC and LCII, use part number 661-0474.





Foot, Platinum

865-0051





Guide, Logic Board, Left, Pkg. of 10

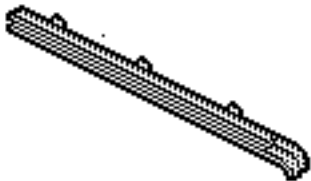
922-1186





Guides, Logic Board, Right, Pkg. of 10

922-1177





Hard Drive, 250 MB, IDE, 3.5"

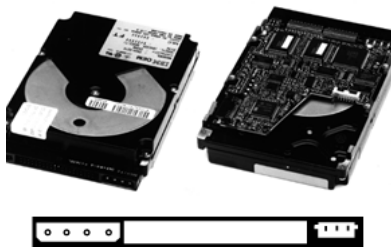
661-0070





Hard Drive, 350 MB, 3.5 IDE

661-0068





Hard Drive, 500 MB, 3.5", IDE (Replaced by 661-0146)

661-0086





Hard Drive, 500 MB, 3.5", IDE

661-0146





Keyboard, Apple Adjustable

661-0731



**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, Apple Desktop Bus (replaced by 661-0603)****661-0337**

Internationally localized versions of this module may be ordered by utilizing P/Ns 661-0337B/D/F/T.
Keyboard is to be returned to Apple without the cable.





Keyboard, Apple Extended (Replaced by 661-0543)

661-0384





Keyboard II, Apple Extended

661-0543





Keyboard II, Apple

661-0603





Keypad, Apple Adjustable, Int'l, w/Decimal Point (,)

661-0816





Keypad, Apple Adjustable, Int'l, w/Decimal Point (.)

661-0817





Keypad, Apple Adjustable

661-0762





Label, Product ID, Performa 640 with DOS, Pkg. of 25

922-1484





Label, Product ID, Quadra 630 (Bag of 10)

922-1152





Label, Product ID~LC 630 & LC 630 DOS Compatible, Pkg. of 10

922-1132





Microphone, Apple PlainTalk

922-0867

Use this microphone with Macintosh LC 475.





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.





Mouse, Apple DeskTop Bus (Replaced by 661-0763)

661-0338



Note: This module is replaced by Apple P/N 661-0104.



**Mouse, Apple Desktop Bus (replaced by 661-0763)****661-0479**

Note: This module is replaced by Apple P/N 661-0104.





Nut, Jac-D Sub Conn, Pkg. of 15

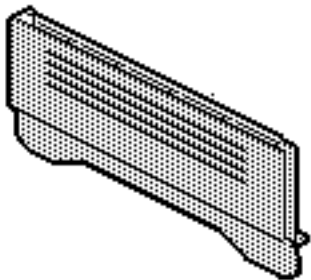
922-1287





Panel, Left Side, Plastic

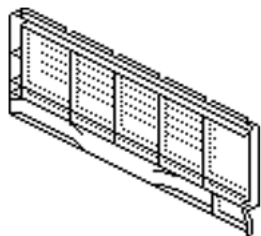
922-1158





Panel, Right Side, Plastic

922-1159





Panel, Rear, Plastic

922-1162





Plug, Bezel, CD Slot, Pkg. of 10

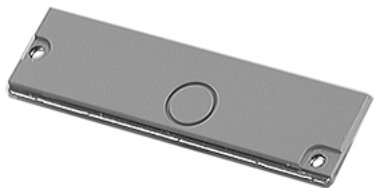
922-1184





Plug, Tuner, without Hole, Pkg. of 10

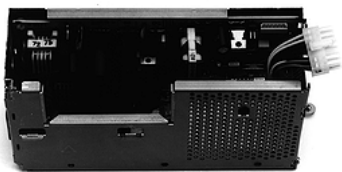
922-1213





Power Supply

661-0170





Remote Control

922-1201





Remote Control, I/R (replaced by 922-1201)

922-0549





Screw, CR REC PAN M3x.5x6

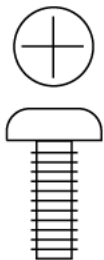
922-0979





Screw, M3x6mm, Mach

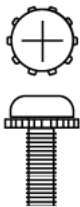
416-1306





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

922-0401





Screw, Net, Sems, M3x.5, Pan Head, Pkg. of 25

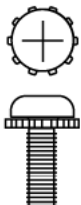
922-0895





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

440-6105





Screw, Sems 6-32x.313 PN CRS

922-1381





Screw, SEMS, M3.5x.6x6

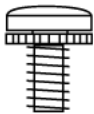
462-4101





Screw, SEMS, M3.5x.6x6.0, Pkg. of 25

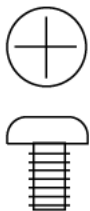
922-1203





Screw, Torx, External 800K Drive

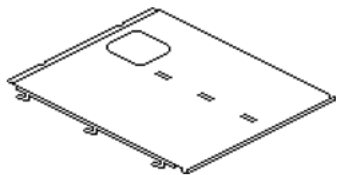
416-1305





Shield, Top Cover

922-1155



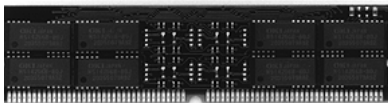


SIMM, 1 MB, 80ns

661-0734

Compatibility

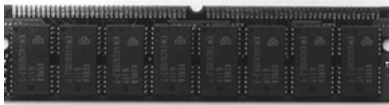
These SIMMs can be used in the Personal LaserWriter NTR.

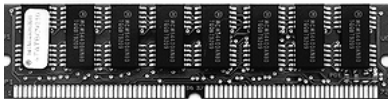




SIMM, DRAM, 16MB, 80ns, 72-pin

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





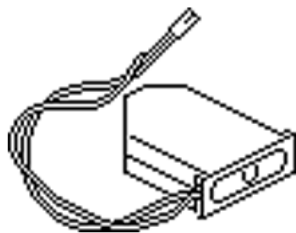
- Workgroup Server 9150
- Macintosh LC 520
- Mac TV
- Macintosh Quadra 605
- Macintosh Quadra/Centris 610
- Macintosh Quadra/Centris 650
- Macintosh LC III/Performa 450, 460, 466, and 467
- Macintosh LC 475/Quadra 605/Performa 475 and 476
- LaserWriter Pro 600 and 630
- LaserWriter Select 310





Speaker

922-1175





Standoff, Sound Card, 10mm, Pkg. of 25

922-1286





Standoff, DOS Card, 11mm, Pkg. of 25

922-1240





Standoffs, Ethernet LC Card, 10 sets

076-0543





Exploded View

LC 630/Quadra 630/Performa 640



