Macintosh TV

Basics
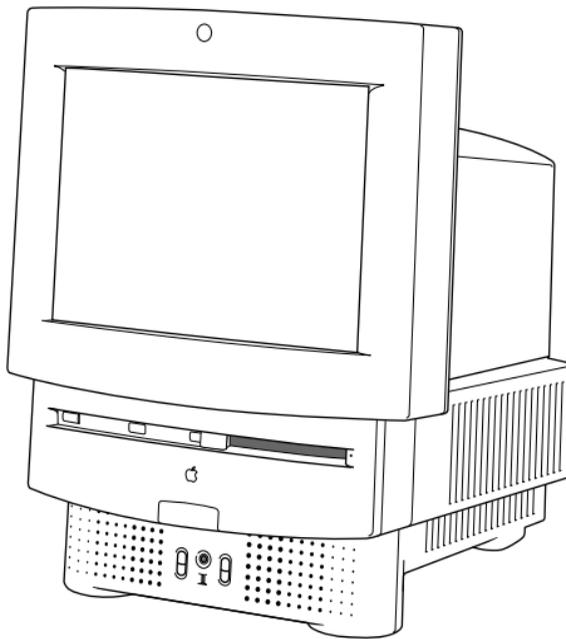
Macintosh TV

Overview

This manual contains complete repair procedures for the Macintosh TV shown at left.

Figure: Macintosh TV

Specifications

Macintosh TV

Processor

CPU   Motorola 68030 microprocessor
                       32 MHz
                       Built-in memory management unit (MMU)
                       Coprocessor
                       Socket for optional math coprocessor

Memory

RAM   4 MB of dynamic RAM on board
                    Expandable to 8 MB (100 ns or faster SIMMs)
                    72-pin DRAM SIMM connector

ROM   1 MB of ROM, expandable to 2 MB

PRAM   256 bytes of clock/calendar/parameter memory
                    Long-life lithium battery

VRAM   512K of VRAM on board (displays up to 256 colors or 8-bit
                    color)

Disk Storage

Floppy Drive   Internal 1.4 MB Apple SuperDrive

Hard Drive   3.5-inch, internal 160 MB SCSI hard drive

CD-ROM Drive   Internal AppleCD 300i, double-speed CD-ROM drive

I/O Interfaces

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

SCSI   One SCSI parallel port; DB-25 connector
                         Connects up to six external SCSI devices

Apple Desktop Bus   Two Apple Desktop Bus (ADB) ports; mini DIN-4 connectors
                         Maximum of three ADB devices recommended
                         Maximum current draw: 500 mA
                         (Mouse draws 10 mA, keyboard draws 25 mA)

Infrared Receiver   For remote control

Sound   Sound-output port capable of delivering stereo sound
Sound-input port for monaural sound input
Front headphone jack capable of delivering stereo sound

I/O Devices

Keyboard   Supports all Apple Desktop Bus keyboards

Mouse   Apple Desktop Bus Mouse II
                      New, ergonomic design

Speaker   Adjustable sound control on front of bezel

Sound and Video

Sound Generator   Records at 11 kHz or 22 kHz sample rate
Plays back at 11 kHz or 22 kHz sample rate
Two speakers with enhanced stereo sound
Allows playback and recording of ordinary audio compact discs

Video Display   14-in. diagonal, 13-in. viewable screen
Trinitron CRT with high-contrast glass
.26-mm aperture grille pitch
640 pixels by 480 lines; 70 dpi

Electrical

Line Voltage   100–240 VAC; Universal power supply

Frequency   47–63 Hz, single phase

Maximum Power   120 W

Physical

Dimensions   Height: 17.9 in. (45.5 cm)
                         Width: 13.5 in. (34.4 cm)
                         Depth: 16.5 in. (42.0 cm)

Weight   41.5 lb. (18.9 kg)

Environmental

Operating Temperature   50–104°F (10–40°C)

Storage Temperature   –30 to 116°F (–30 to 47°C)

Relative Humidity   20–95% noncondensing

Altitude   10,000 ft. (3048 m) maximum (operating)
15,000 ft. (4572 m) maximum (non-operating)

Troubleshooting

Macintosh TV

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 black, too
dark, or too bright;
audio and drive
operate

1 Adjust contrast button on front bezel.
2 Adjust brightness. Use Brightness Control Panel.
3 Reset PRAM.
4 Check yoke cable connection.
5 Perform video adjustments. Refer to "Video" in Adjustments
   chapter.
6 Replace analog board.
7 Replace CRT.

Video (Continued)

Single vertical or
horizontal line is
displayed

1 Replace analog board.
2 Replace CRT.

Predominant color
tint or color cannot be
adjusted

1 Perform video adjustments. Refer to "Video" in Adjustments
   chapter.
2 Replace analog board.
3 Replace CRT if red, green, or blue cannot be turned off using
   appropriate controls.

Screen is bright and
audio is present, but
no video information
is visible

1 Perform video adjustments. Refer to "Video" in Adjustments
   chapter.
2 Replace analog board.
3 Replace chassis harness cable.
4 Replace CRT.

Video (Continued)

Picture breaks into diagonal lines, or picture rolls vertically or horizontally	1 Perform video adjustments. Refer to "Video" in Adjustments chapter. 2 Replace analog board.
Out of convergence (color bleeds from text or lines)	1 Perform convergence adjustment. Refer to "Convergence" in Adjustments chapter. 2 Replace analog board. 3 Replace CRT.
Black screen spots (burnt phosphors)	Replace CRT.

Video (Continued)

Screen jitters or flashes

1 Verify that adjacent computer equipment is properly grounded. Move electrical devices away from monitor. Temporarily shut off all fluorescent lights in area.
2 Check that all ground cables are secure.
3 Disconnect floppy drive, CD-ROM drive and hard drive.
4 Replace analog board.

Out of focus

1 Perform focus adjustment. Refer to "Focus" in Adjustments chapter.
2 Replace analog board.
3 Replace CRT only if one part of display remains out of focus despite adjustment of focus controls to their limits.

Video (Continued)

Flashing or wavy screen, or monitor emits high-pitched noise

Replace analog board.

Raster size too short/ tall or narrow/wide

1 Adjust horizontal or vertical size control. Refer to Adjustments chapter.
2 Replace analog board.

Linearity bad (size of text/graphics differs at top, bottom, or sides of screen)

1 Perform video adjustments. Refer to "Video" in the Adjustments chapter.
2 Replace analog board.

Video (Continued)

Raster tilted or
shifted

1   Verify that adjacent computer equipment is properly
    grounded. Move electrical devices away from monitor.
    Temporarily shut off all fluorescent lights in area.
2   Perform appropriate geometric adjustments (see
    Adjustments chapter).
3   Perform yoke adjustment. Refer to "Yoke" in Adjustments
    chapter.
4   Replace analog board.

Raster distorted
(barrel-shaped,
corners not square,
stretched or
compressed at top of
display, or sides not
perpendicular)

1   Verify that adjacent computer equipment is properly
    grounded. Move electrical devices away from monitor.
    Temporarily shut off all fluorescent lights in area.
2   Perform appropriate geometric adjustments (see
    Adjustments chapter).
3   Replace analog board.
4   Replace CRT (only in rare instances).

Video (Continued)

Raster not centered

1 Verify that adjacent computer equipment is properly grounded. Move electrical devices away from monitor. Temporarily shut off all fluorescent lights in area.

2 Adjust horizontal or vertical center control. Refer to Adjustments chapter.

3 Replace analog board.

Floppy Drive

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

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

Disk ejects; display
shows icon with
blinking "X"

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

Unable to insert disk
all the way

1 To eject previously inserted disk, insert opened paper clip
  into hole beside floppy drive.
2 Switch off system and hold mouse button down while
  switching system on (to complete eject cycle).
3 Remove front drive bezel.
4 Replace floppy drive.

Floppy Drive (Continued)

Does not eject disk
1. Insert opened paper clip into hole beside floppy drive.
2. Switch off system and hold mouse button down while switching system on (to complete eject cycle).
3. Remove front drive bezel.
4. Replace floppy drive.

Internal floppy drive runs continuously
1. Replace bad disk with known-good disk.
2. Replace floppy drive.
3. Replace logic board. Retain customer's SIMMs.

Hard Drive

Internal or external
hard drive does not
operate

1 Verify that SCSI loopback card is not attached.
2 Verify that external drive is properly terminated.
3 Replace hard drive.
4 Replace logic board. Retain customer's SIMMs.

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

1 Verify that SCSI device ID switch setting on external device
   is higher than 0. Also verify that ID switch setting on
   external SCSI device does not duplicate ID switch settings on
   any other attached external SCSI devices.
2 Replace terminator on external SCSI device.
3 Replace SCSI select cable.

CD-ROM Drive

CD-ROM drive does
not accept disc

1 Replace disc (if dirty or damaged).
2 Remove front drive bezel.
3 Replace CD-ROM drive mechanism.
4 Replace chassis harness cable.

Volume control does
not operate correctly

1 Reset PRAM.
2 Replace chassis harness assembly.

Macintosh cannot
mount CD-ROM drive

1 Verify proper software installed.
2 Start up from known-good Disk Tools or external SCSI device.
3 Replace CD-ROM drive mechanism.

Peripheral

Cursor does not move
1. Check mouse connection.
2. If mouse was connected to keyboard, connect it to rear ADB port instead. If mouse works, replace keyboard.
3. If mouse does not work in any ADB port, replace mouse.
4. Reset PRAM.
5. Replace logic board. Retain customer's SIMMs.

Cursor moves, but clicking the mouse button has no effect
1. Replace mouse.
2. Replace logic board. Retain customer's SIMMs.

Peripheral (Continued)

Cannot double-click
to open application,
disk, or server

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

No response to any
key on keyboard

1 Check keyboard connection to ADB port.
2 Replace keyboard cable.
3 Replace keyboard.
4 Replace logic board. Retain customer's SIMMs.

Peripheral (Continued)

Known-good
ImageWriter or
ImageWriter II does
not print

1 Make sure that Chooser and Control Panel are set correctly.
2 Replace printer driver and system software with known-good.
3 Reset PRAM.
4 Replace printer interface cable.
5 Replace logic board. Retain customer's SIMMs.

Known-good
LaserWriter does not
print

1 Make sure that Chooser and Control Panel are set correctly.
2 Replace printer driver and system software with known-good.
3 Reset PRAM.
4 Refer to Network and Communications manual.

Miscellaneous

Clicking, chirping,   1   Replace analog board.
or thumping sound   2   Replace logic board. Retain customer's SIMMs.

Smoke/odor   1   Inspect analog and logic boards for obvious signs of burnt
                                  components.
                             2   Replace analog board.

No video, no audio, and   1   Connect power cord.
no drive operation   2   Switch power on.
                             3   Replace power cord.
                             4   Replace keyboard.
                             5   Replace analog board.
                             6   Replace logic board. Retain customer's SIMMs.

Miscellaneous (Continued)

Screen shows "Sad Macintosh" icon and black vertical lines; screeching sound

1 Replace RAM SIMMs on logic board.
2 Replace logic board. Retain customer's SIMMs.

Headphone jack does not operate correctly

1 Verify that headphone jack is seated properly.
2 Replace chassis harness assembly.

"Sad Macintosh" icon

1 Replace bad disk with known-good disk.
2 Remove all internal and external IDE and SCSI devices. If flashing "?" appears, reconnect devices one at a time and perform software troubleshooting on device that reproduces the issue.
3 Replace RAM SIMMs on logic board.
4 Replace logic board. Retain customer's SIMMs.

Take Apart

Macintosh TV
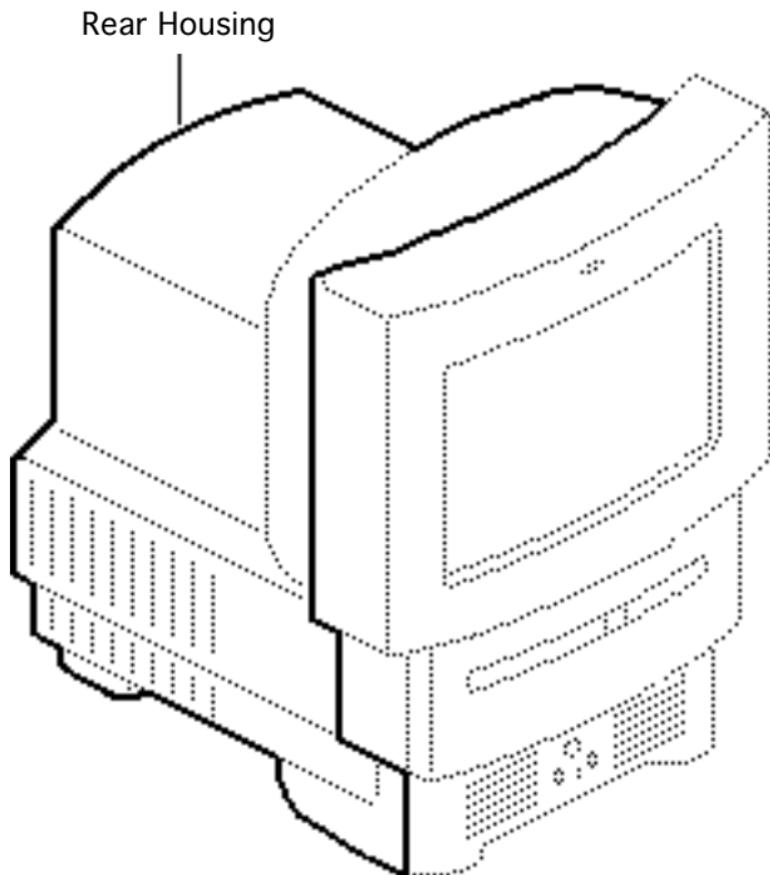
Rear Housing

Rear Housing

No preliminary steps are required before you begin this procedure.

⚠️**Warning:** This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Caution: Never use a grounding wriststrap until after discharging the CRT.

Rear Housing
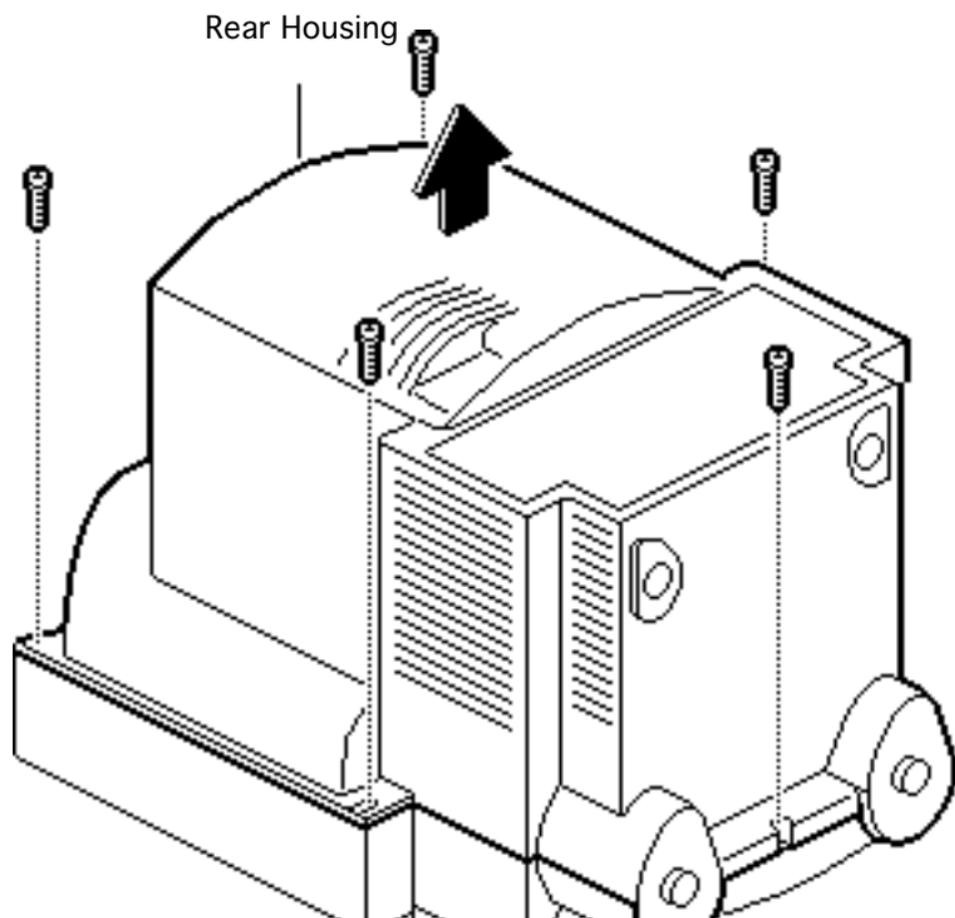
1 Using a torx
  screwdriver, remove
  the five screws.

2 Lift off the rear cover.

Fan
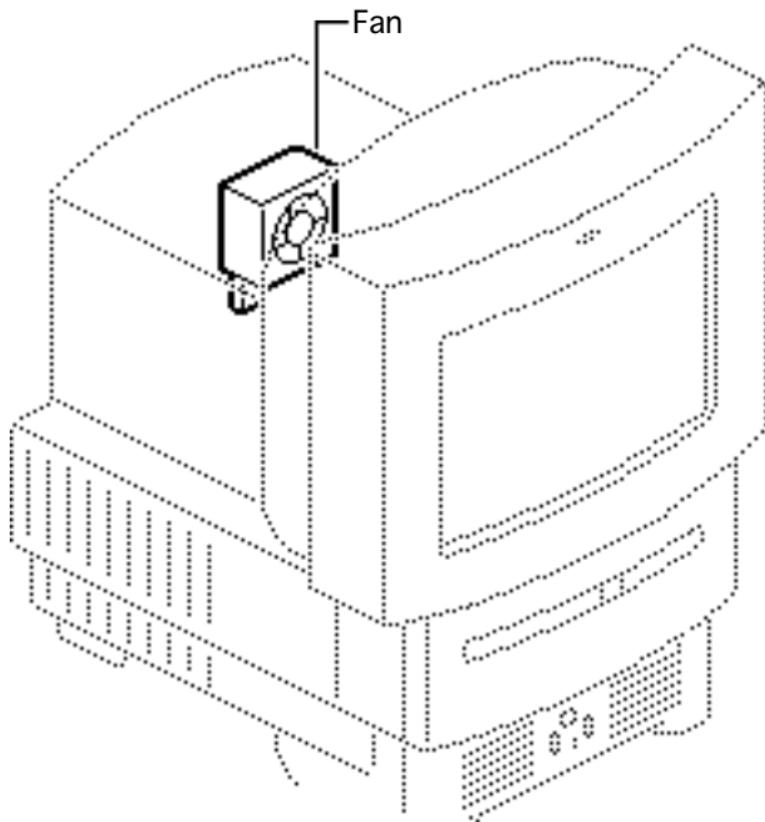
Fan

Before you begin, remove the rear cover.

⚠️Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Caution: Never use a grounding wriststrap until after discharging the CRT.
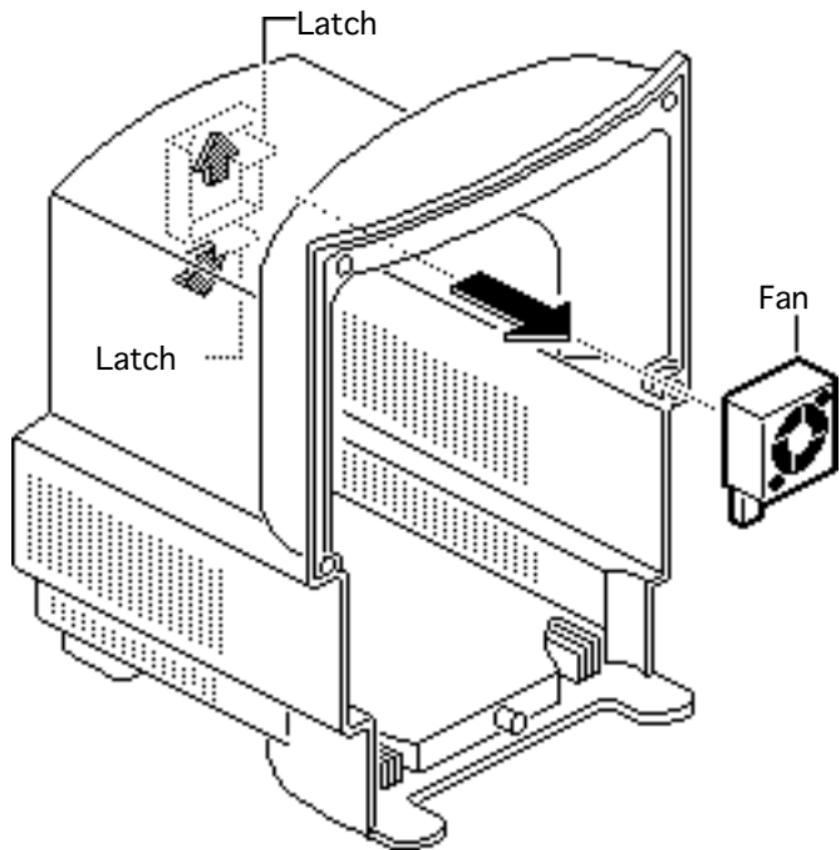
Push out the two latches and
remove the fan assembly.

Latch

Latch

Fan

Analog Board

Analog Board
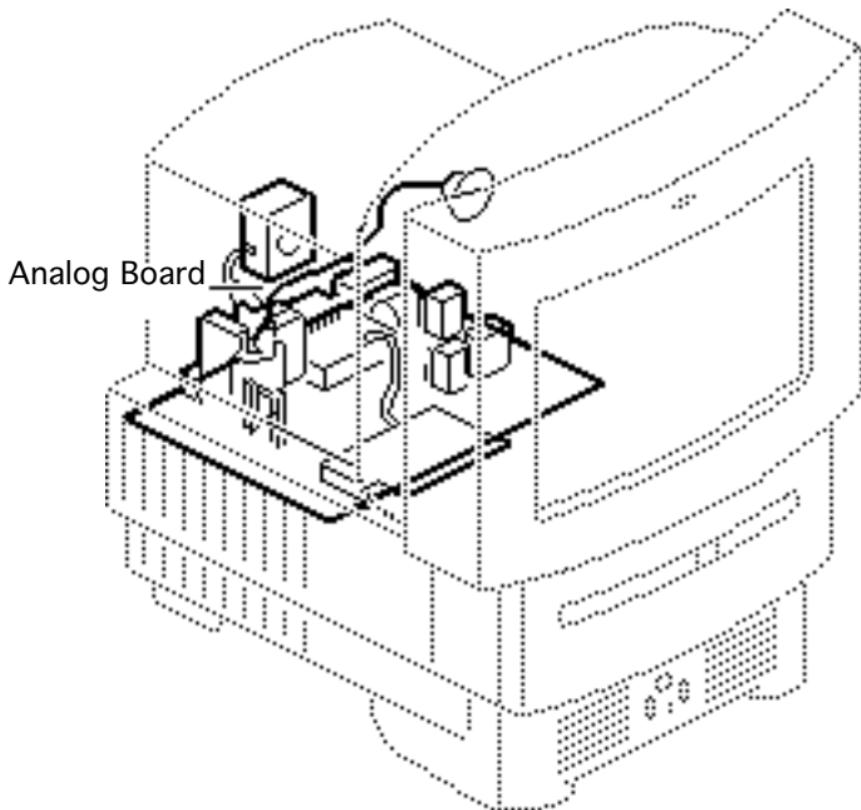
Before you begin, do the following:

- Remove the rear cover
- Discharge CRT
- Remove anode cap

⚠️**Warning:** This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Caution: Never use a grounding wriststrap until after discharging the CRT.
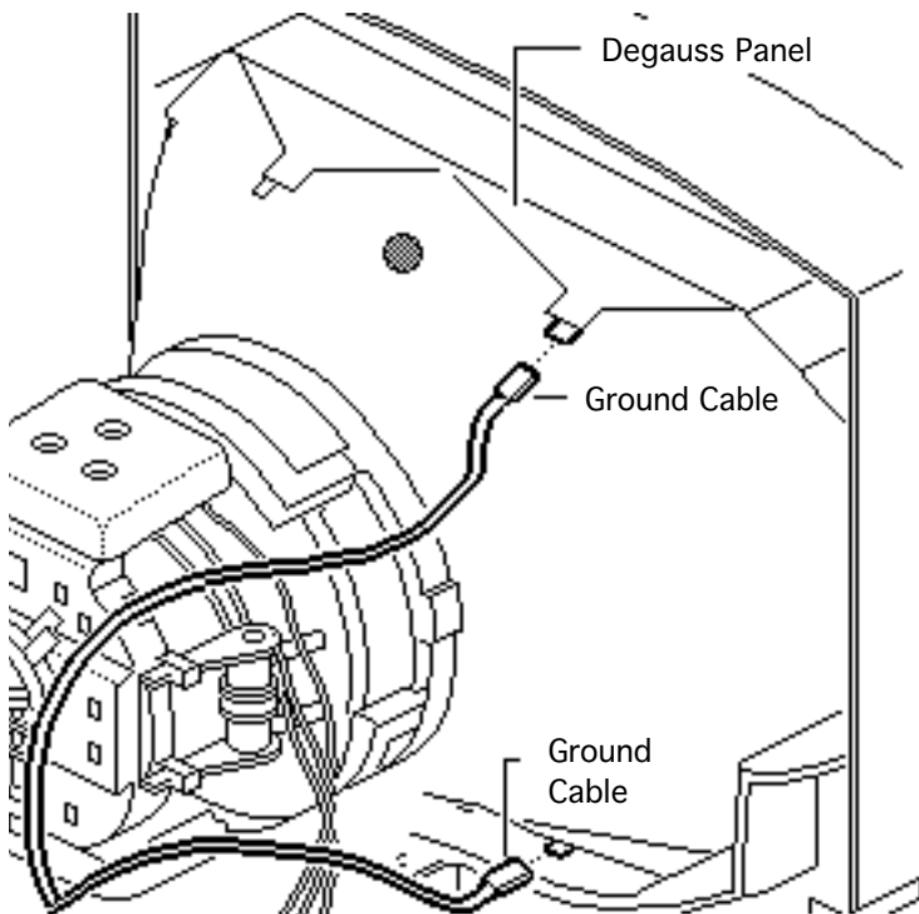
1   Disconnect the two
    ground cables from the
    degauss panels.

Degauss Panel

Ground Cable

Ground
Cable

2 Disconnect the infrared receiver connector.

Infrared Receiver Connector

WARNING:
High Voltage Areas

Cable
Retainer

BD1

BP2
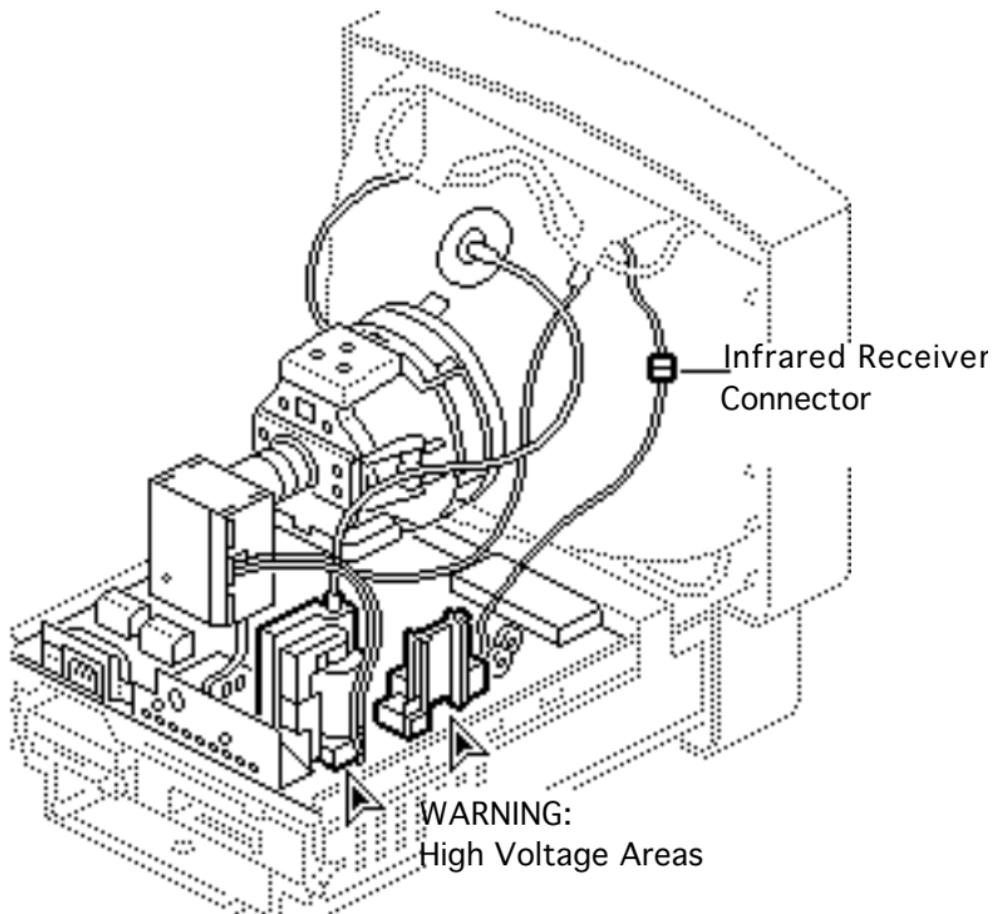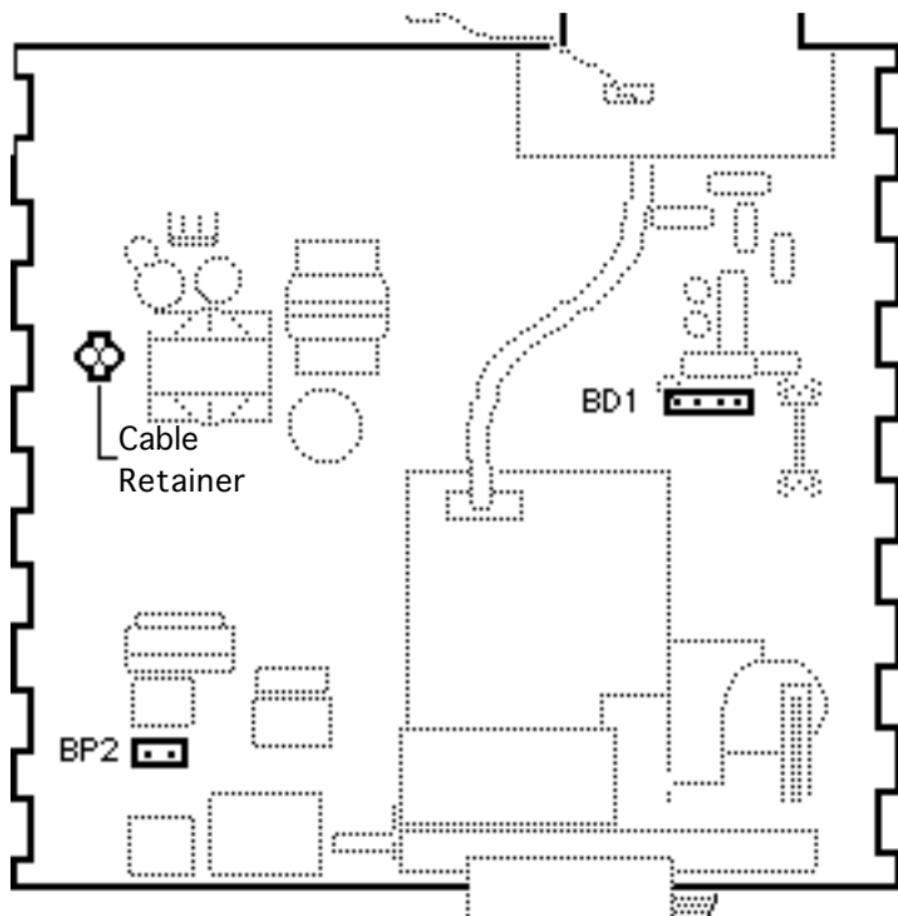
3 Disconnect the following
   cables from the analog
   board:
   • Degauss cable from
     BP2 (use a small
     screwdriver to
     release the latch)
   • CRT cable from BD1

4 Remove the wires from
   the cable retainer.

Replacement Note: If you
are replacing the analog
board, remove the cable
retainer and reinstall it on
the new board.
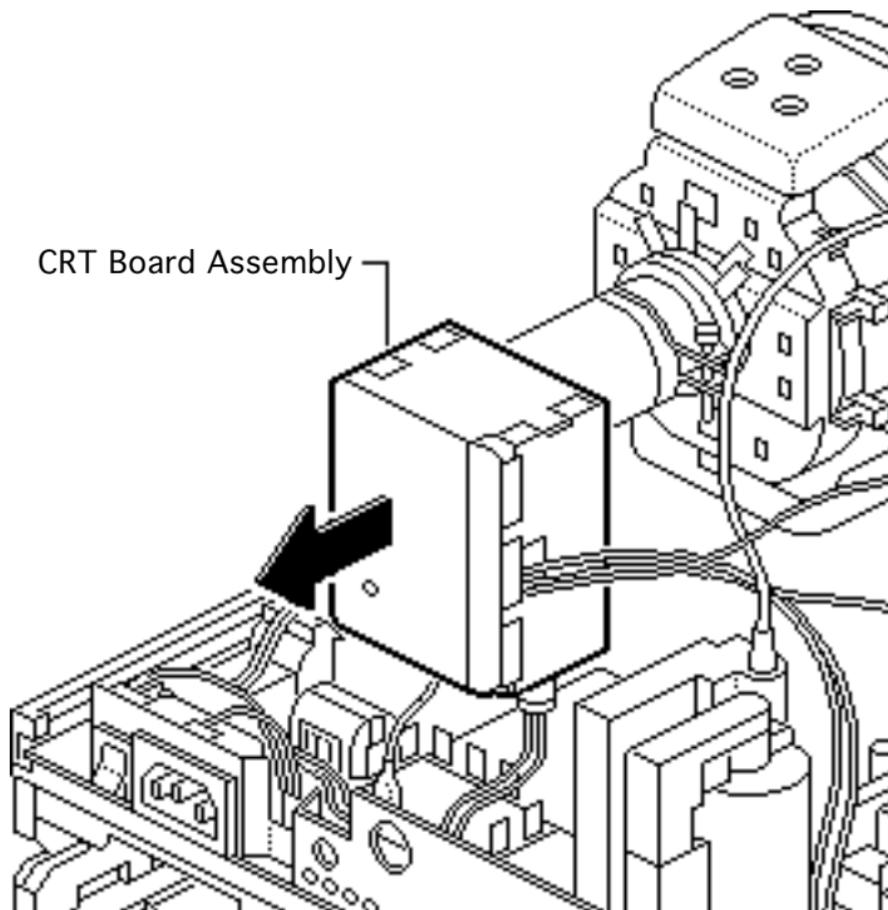
CRT Board Assembly

5 **Caution:** Twisting,
   bending, or applying
   force to the video board
   assembly could damage
   the neck of the CRT. Be
   sure to pull the CRT
   board assembly straight
   off the CRT.

   Remove the CRT board
   assembly from the neck
   of the CRT.
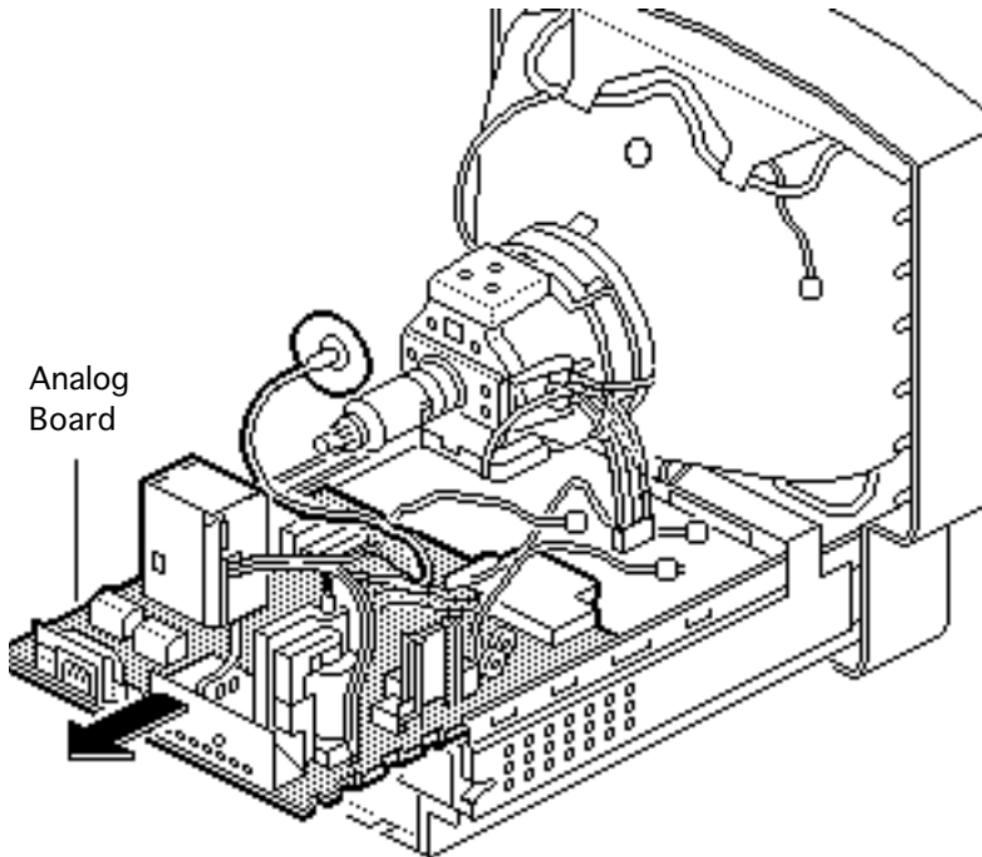
Analog
Board

6   Remove the analog board.

Replacement Note: Perform
the cutoff adjustment
whenever you replace the
analog board. See "Video" in
the Adjustments chapter.

I/O Door

I/O Door

No preliminary steps are required before you begin this procedure.
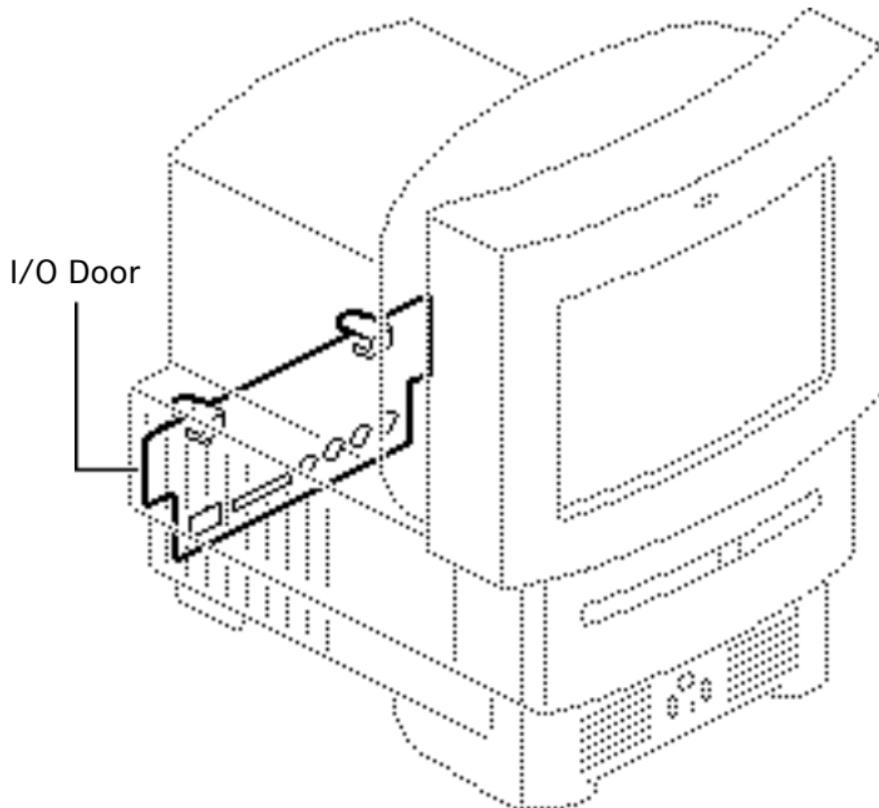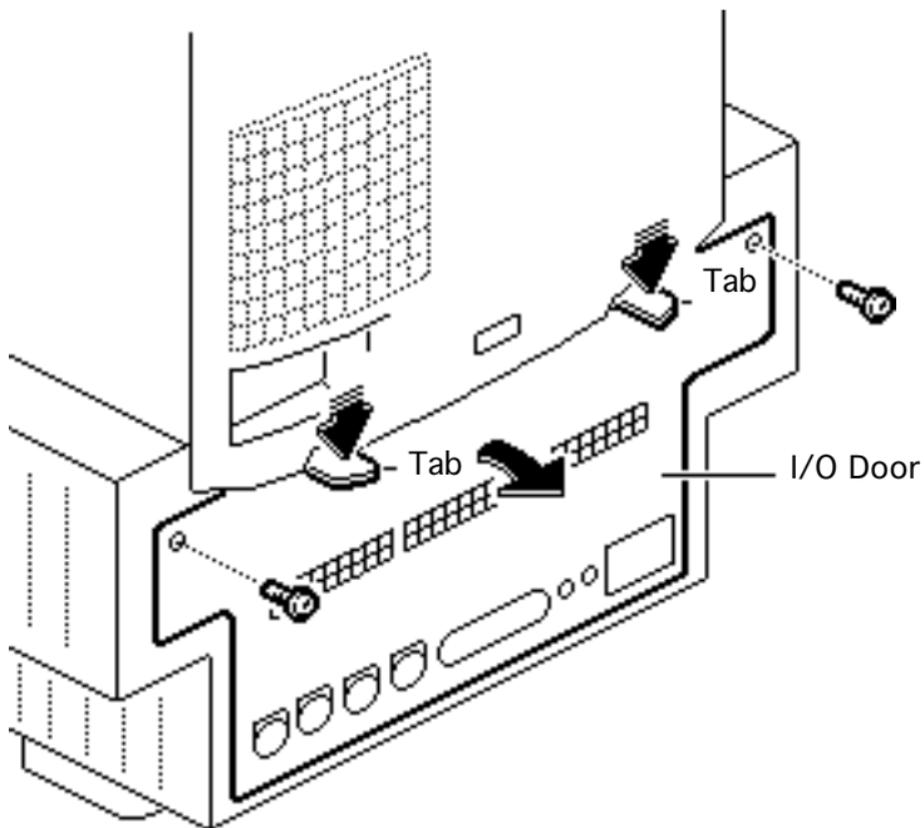
1 Remove the two screws (if present).

2 Push down on the two tabs and remove the I/O door.

Logic Board

Logic Board

Before you begin, remove the I/O door.

Caution: You can access and remove the Macintosh TV logic board merely by removing the I/O door at the rear of the machine. Although upgrading the logic board is now extremely easy, do not neglect to follow proper ESD precautions: use a grounded workbench pad, and always wear a grounding wriststrap.
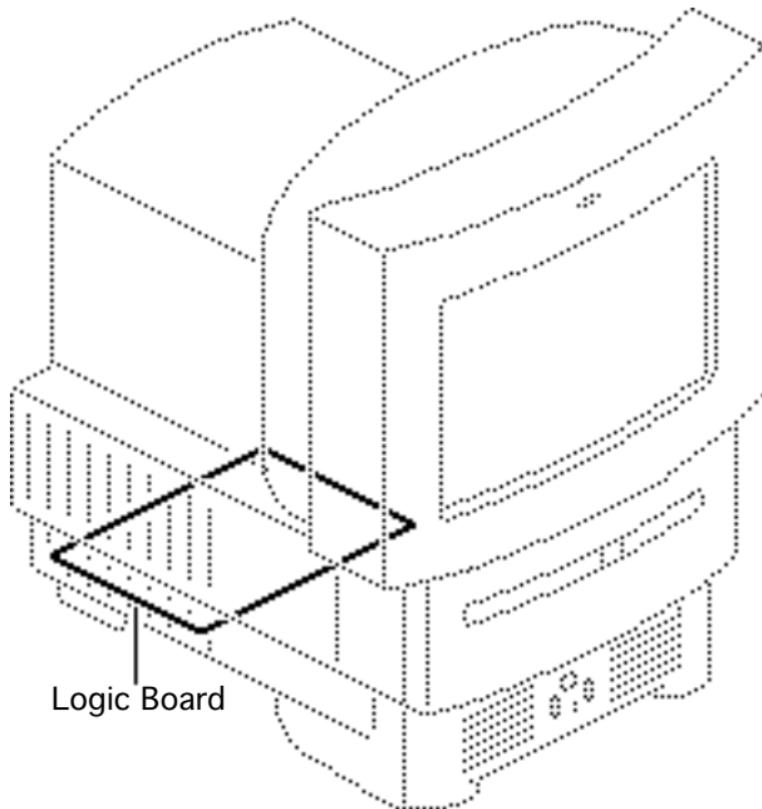
Pull out the logic board.

Logic
Board
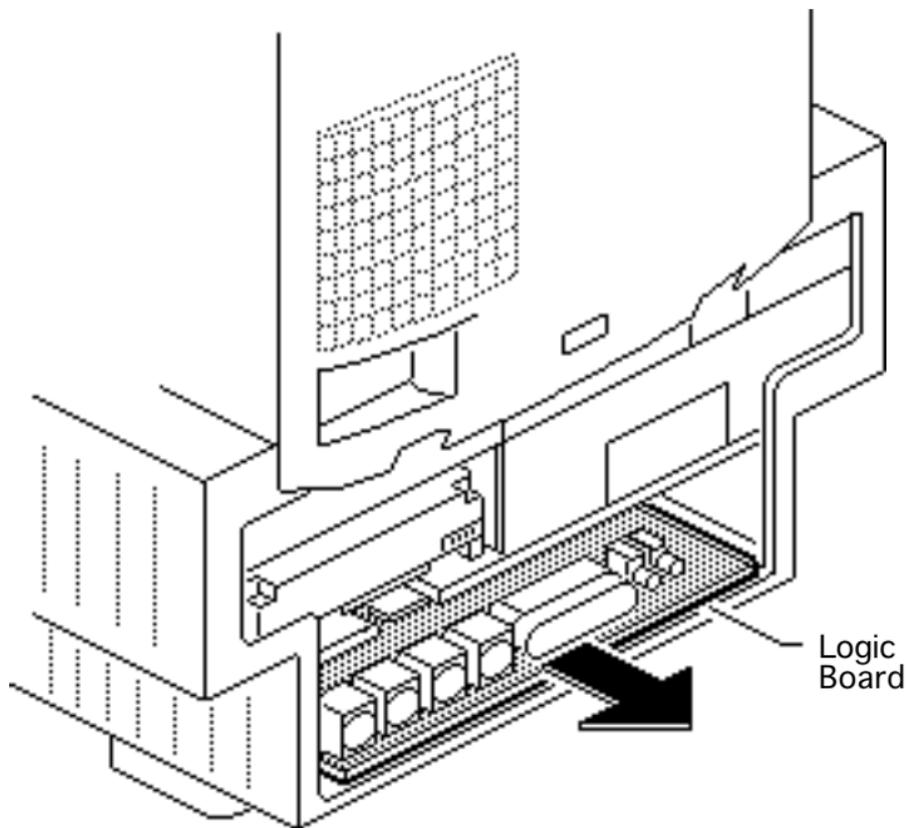
Tuner
Assembly

Tuner Assembly

Before you begin, remove
the following:

- I/O door
- Logic board
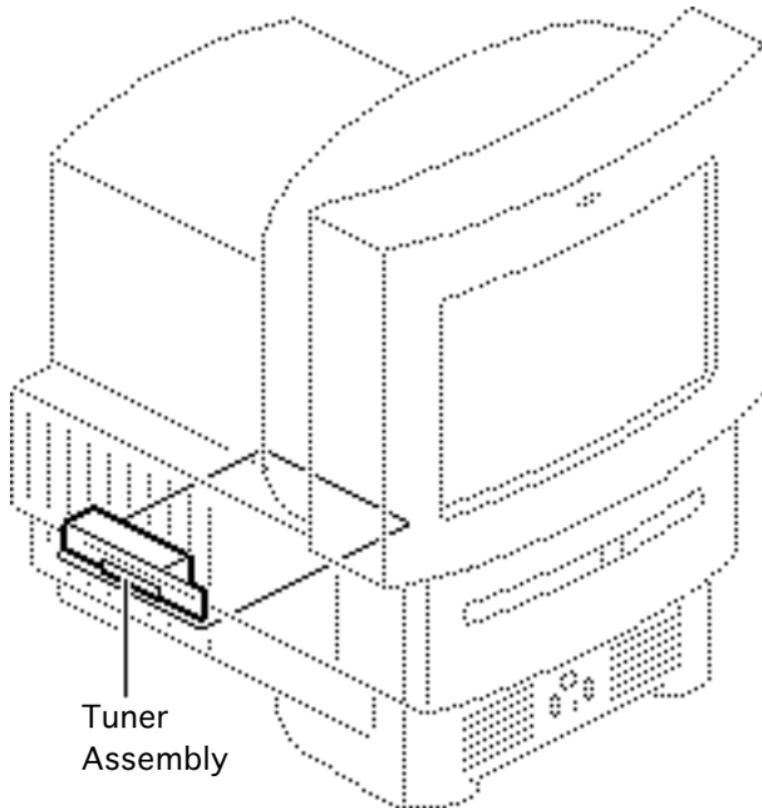
Mounting Tab

1 Turn over the logic
   board.

2 Using needlenose pliers,
   carefully twist the
   mounting tab of the
   tuner.

Tuner Assembly
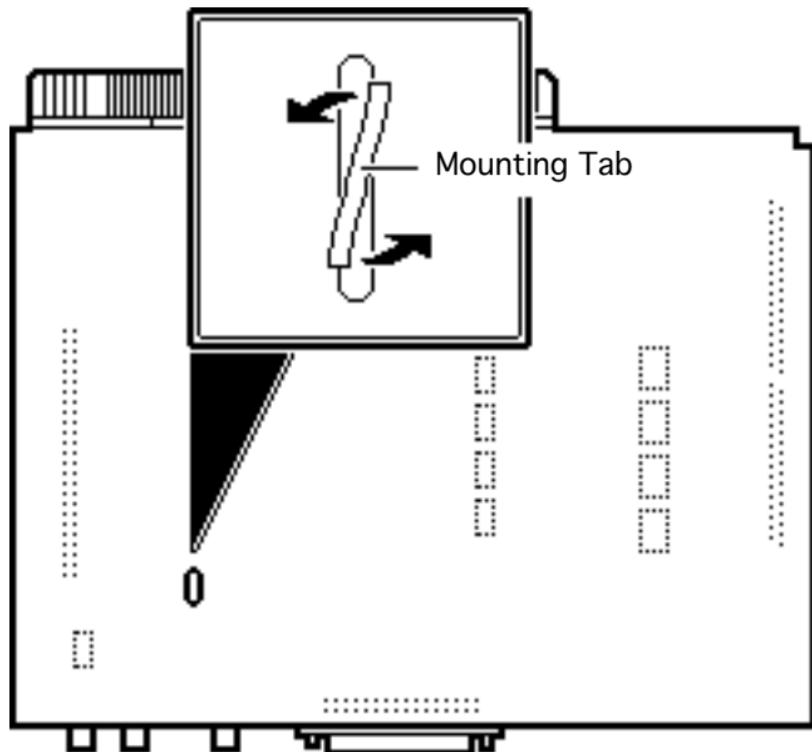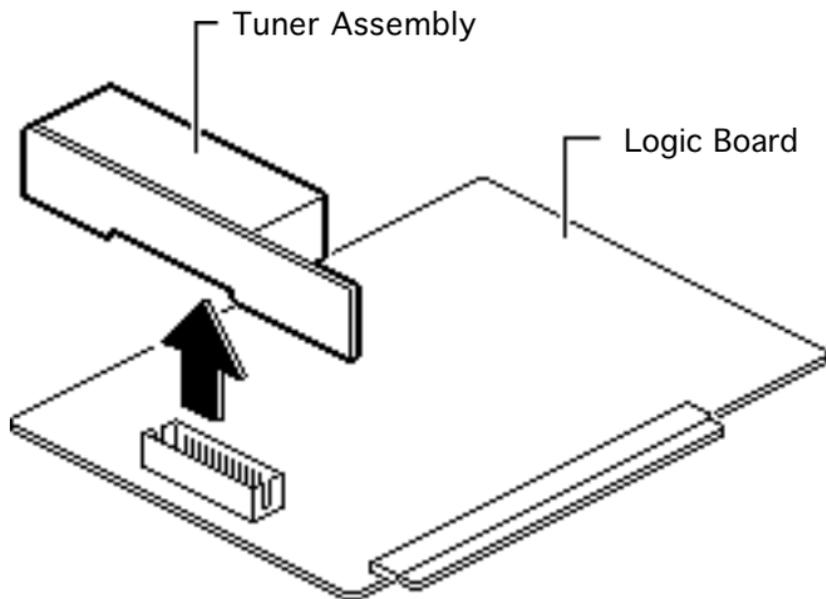
Logic Board

3 Turn over the logic
   board.

4 Pull straight up on the
   tuner assembly and
   remove it from the logic
   board.

Drive Bezel

No preliminary steps are required before you begin this procedure.
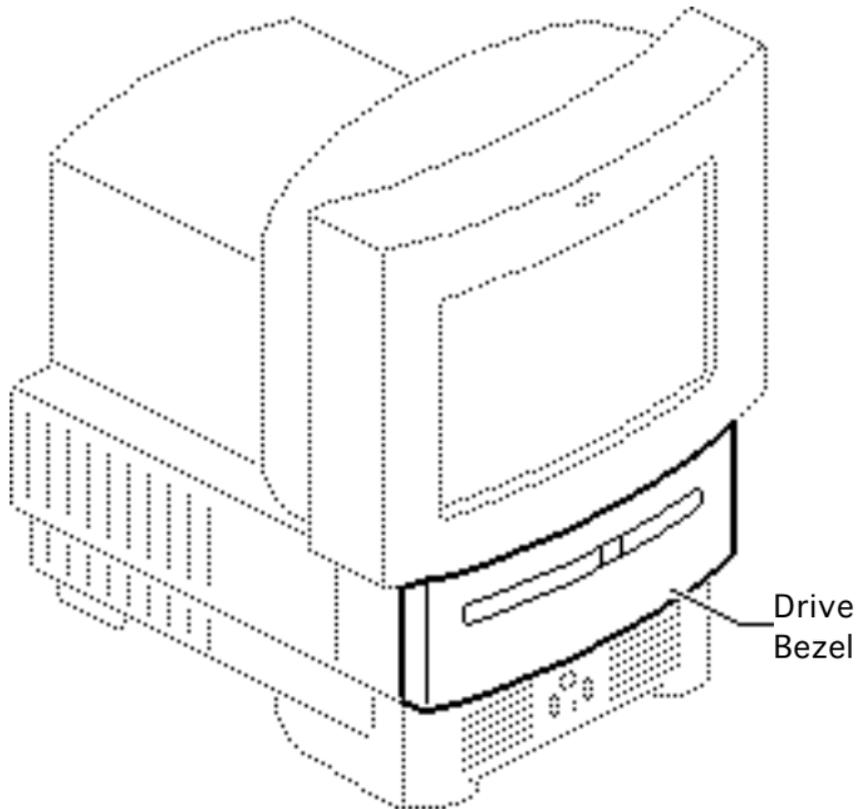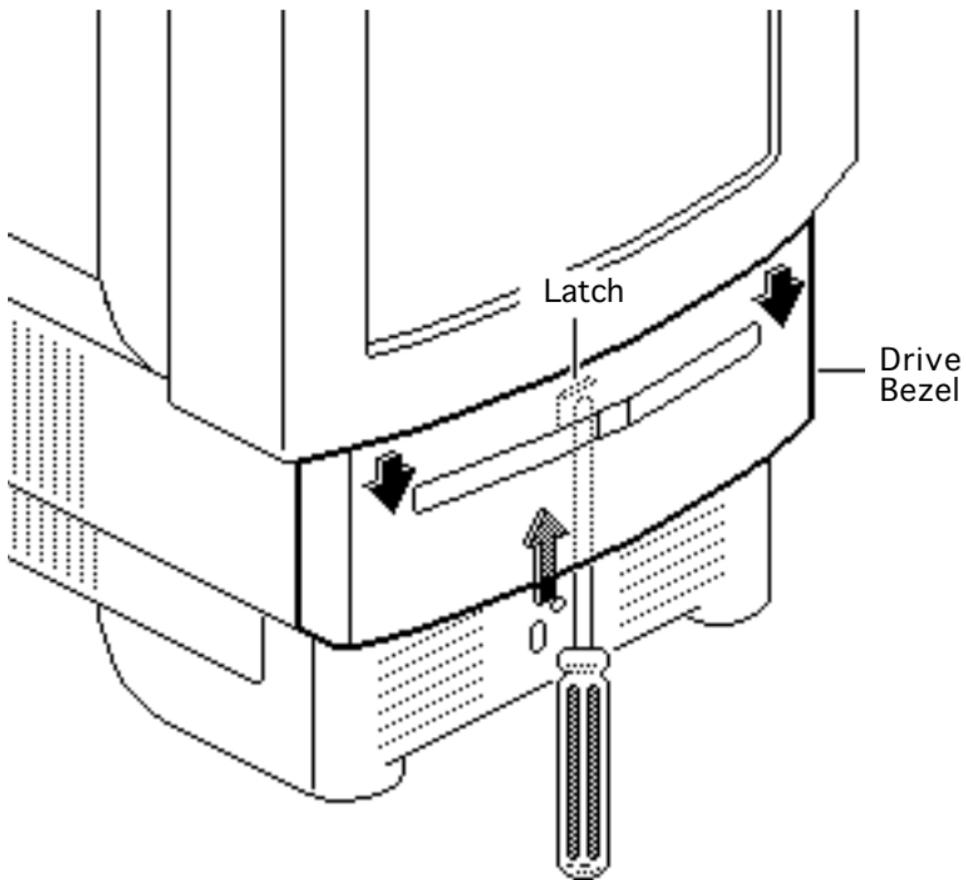
Drive Bezel

Using a flat-blade screwdriver, push up the latch. Pull down and remove the drive bezel.

Latch

Drive Bezel

Floppy
Drive

Floppy Drive

Before you begin, remove the drive bezel.

Caution: You can access and remove the Macintosh TV floppy drive merely by removing the drive bezel at the front of the machine. Although upgrading the floppy drive is now extremely easy, do not neglect to follow proper ESD precautions: use a grounded workbench pad, and always wear a grounding wriststrap.
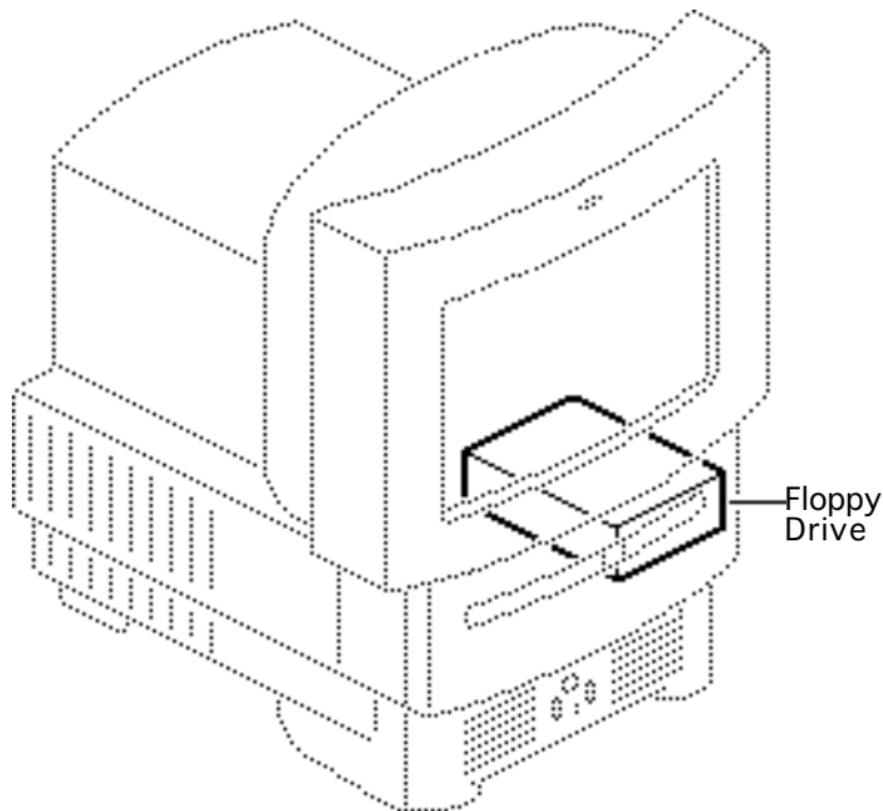
Floppy Drive

1 Push down the latch and pull out the floppy drive.

Floppy Drive
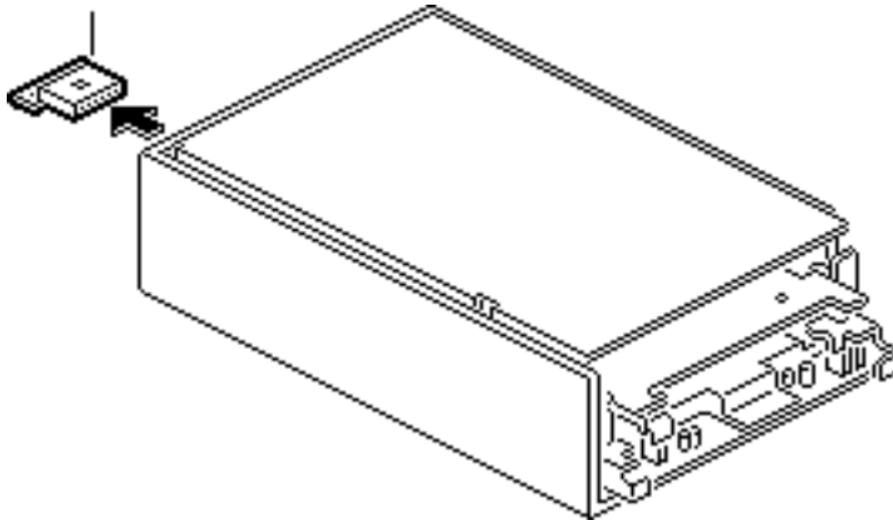
2 Pull out the floppy
   drive connector adapter.

3 **Replacement Note:** Be
   sure to reinstall the
   floppy drive connector
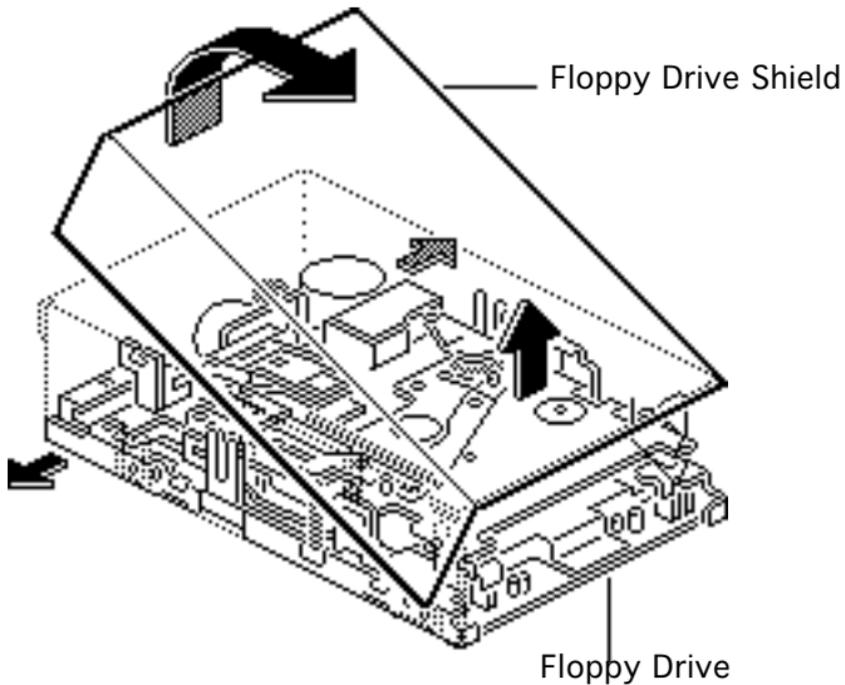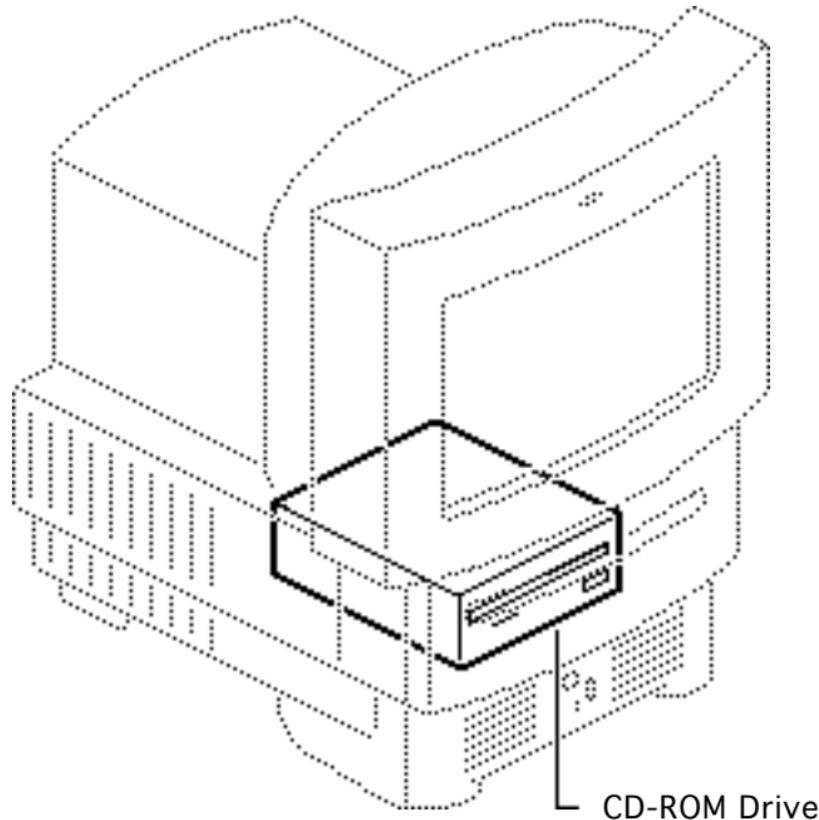   adapter on the
   replacement floppy
   drive.

Connector Adapter
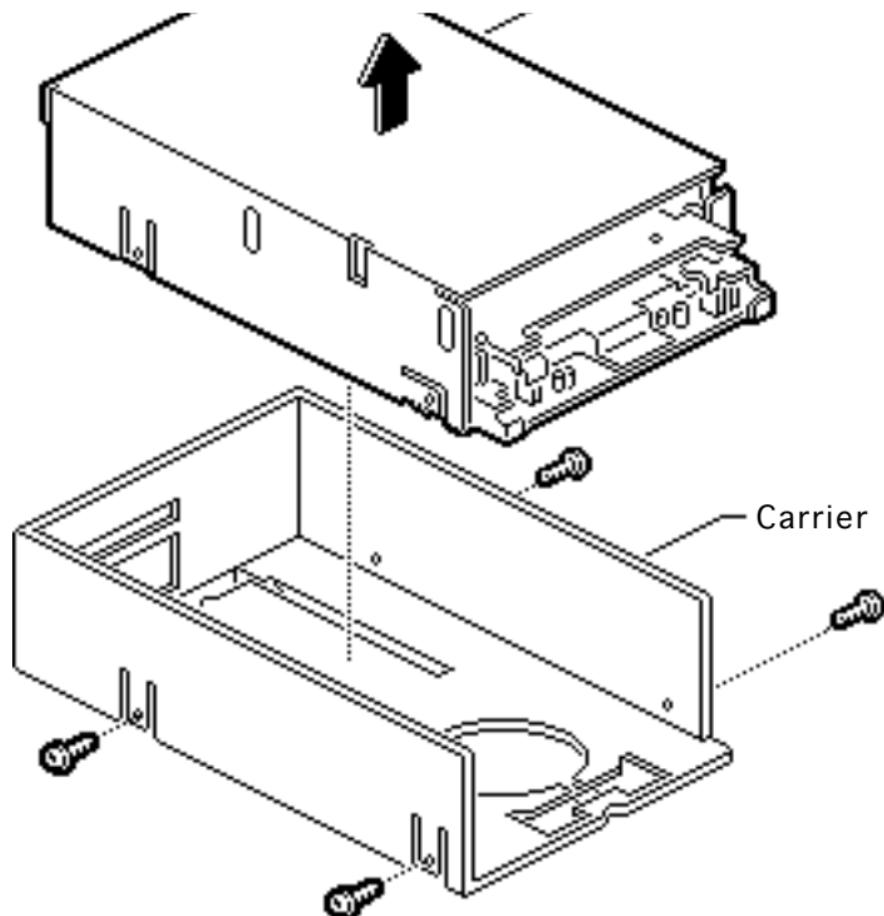
4 Remove the four
   mounting screws and
   remove the floppy drive
   from the carrier.

Carrier

5 Pull out the sides of the floppy drive shield, lift the back of the shield, and remove it from the floppy drive.
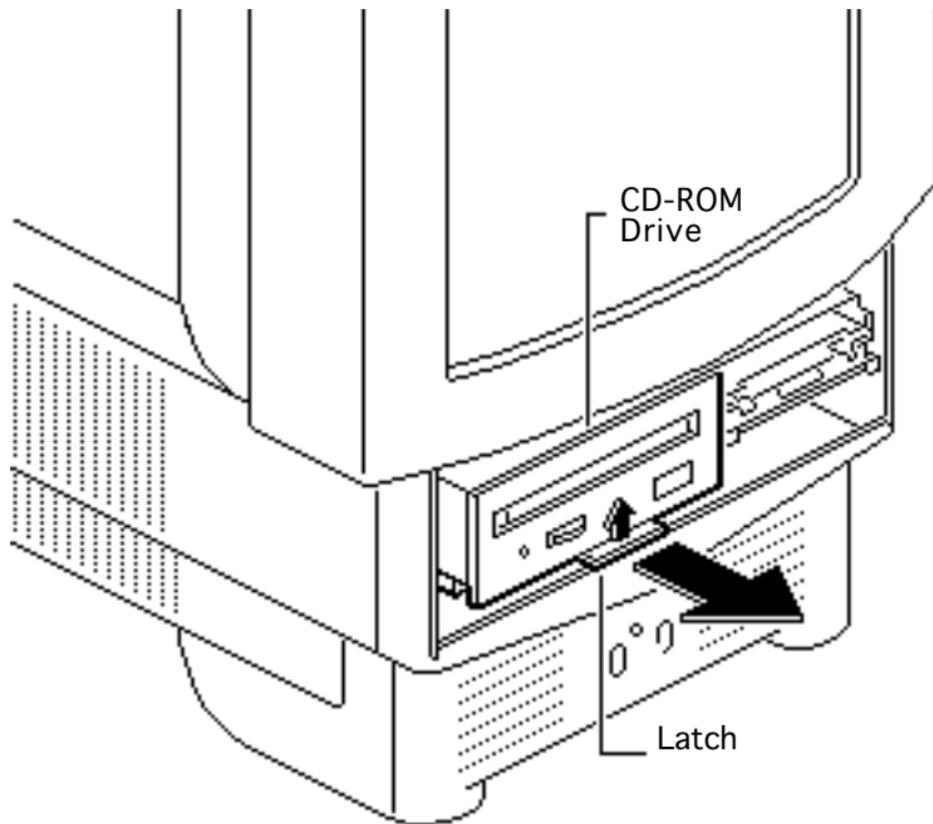
Floppy Drive Shield

Floppy Drive

CD-ROM Drive

CD-ROM Drive

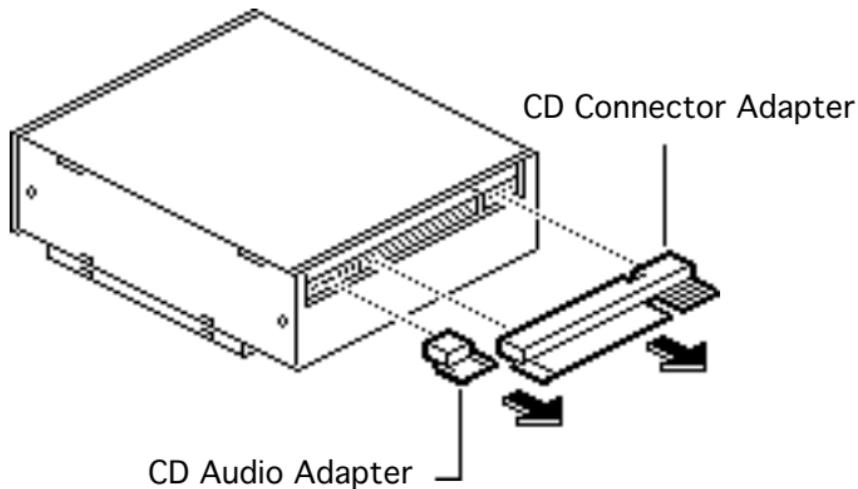Before you begin, remove the drive bezel.

Caution: You can access and remove the Macintosh TV CD-ROM drive merely by removing the drive bezel at the front of the machine. Although upgrading the CD-ROM drive is now extremely easy, do not neglect to follow proper ESD precautions: use a grounded workbench pad, and always wear a grounding wriststrap.

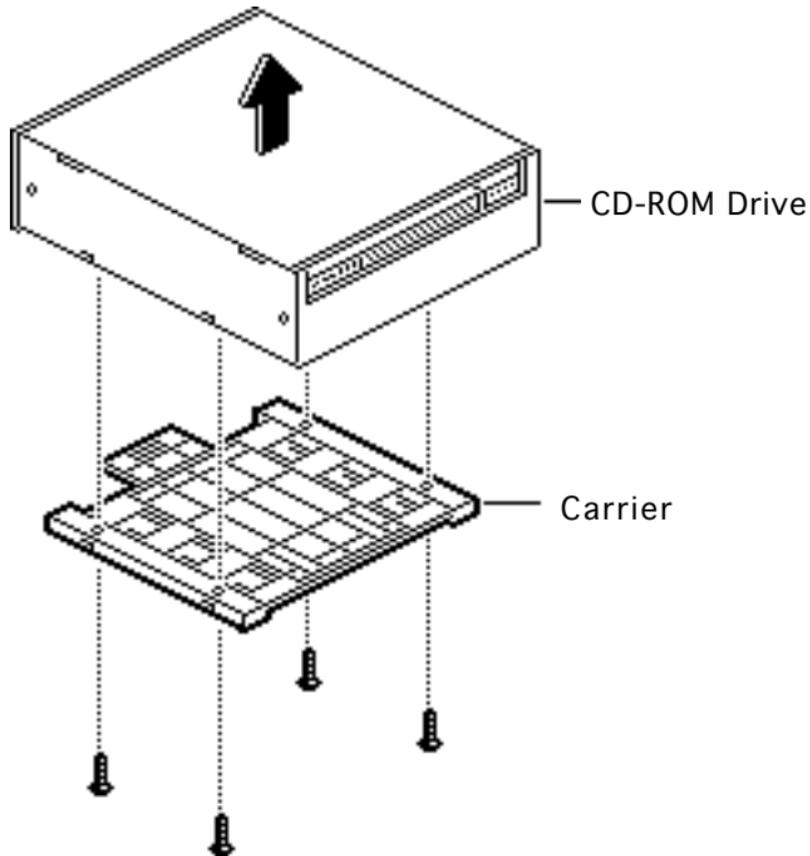1 Pull up the latch and pull out the CD-ROM drive.

CD-ROM Drive

Latch

2 Pull out the CD connector adapter and the CD audio adapter.

Replacement Note: Be sure to reinstall the CD connector adapter on the replacement CD-ROM drive.

CD Connector Adapter

CD Audio Adapter

CD-ROM Drive

Carrier

3 Remove the four mounting screws and remove the CD-ROM drive from the carrier.

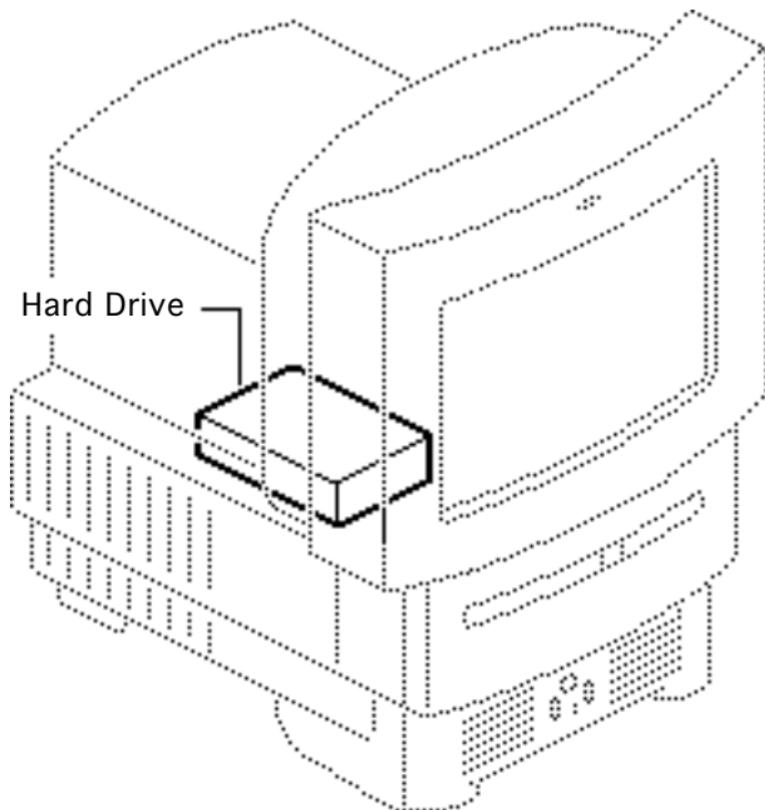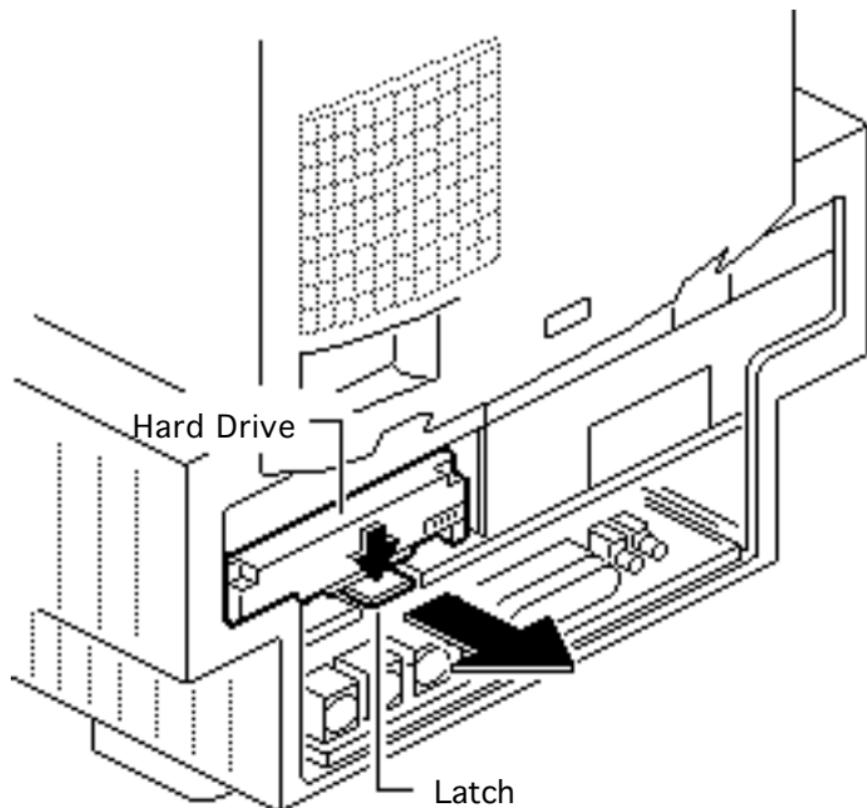**Replacement Note:** Replace the carrier on the new CD-ROM drive.

Hard Drive

Hard Drive

Before you begin, remove the I/O door.

Caution: You can access and remove the Macintosh TV hard drive merely by removing the I/O door at the rear of the machine. Although upgrading the hard drive is now extremely easy, do not neglect to follow proper ESD precautions: use a grounded workbench pad, and always wear a grounding wriststrap.
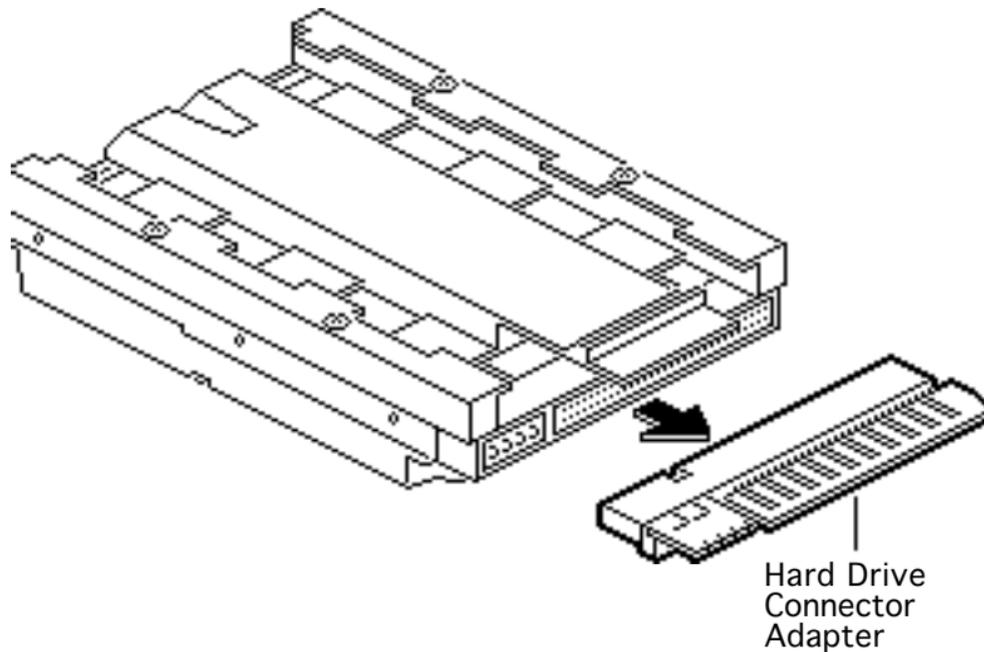
1 Push down the latch and
remove the hard drive.

Hard Drive
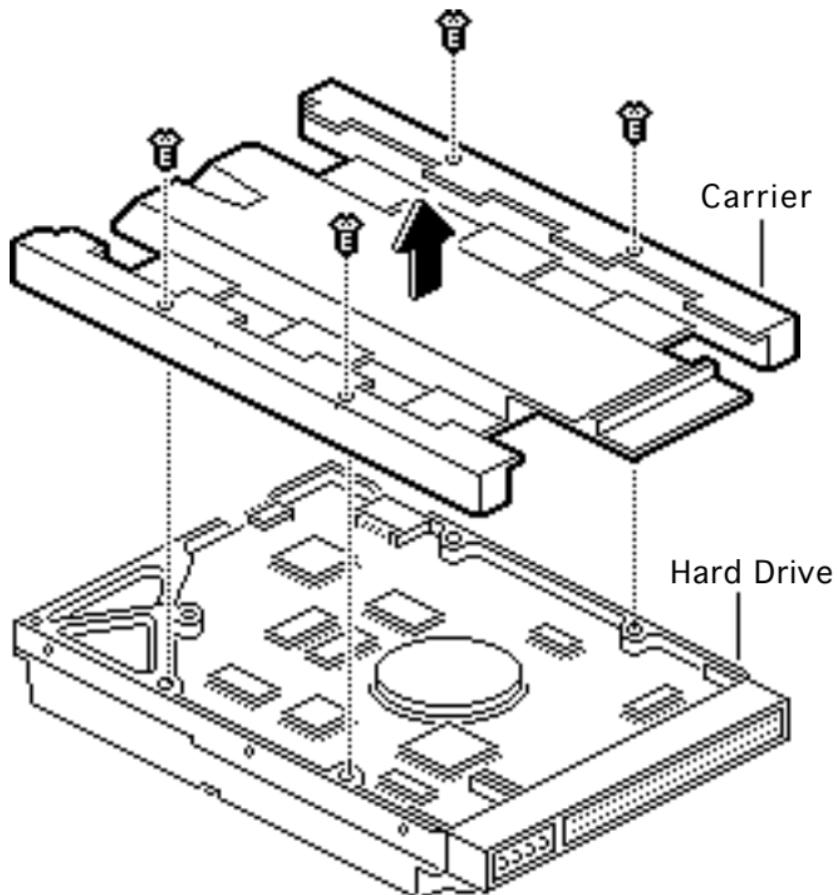
Latch

Hard Drive
Connector
Adapter

2 Pull out the hard drive
   connector adapter.

   Replacement Note: Be
   sure to reinstall the
   hard drive connector
   adapter on the
   replacement hard drive.

3 Remove the four screws.

4 Remove the hard drive from the carrier.

Replacement Note: Replace the carrier on the new hard drive.
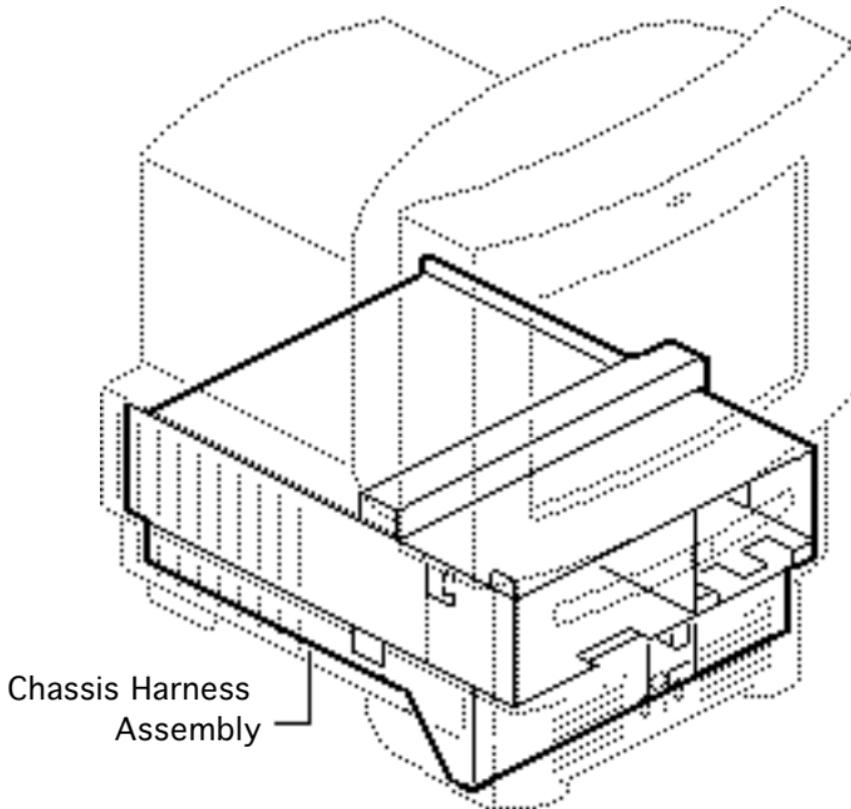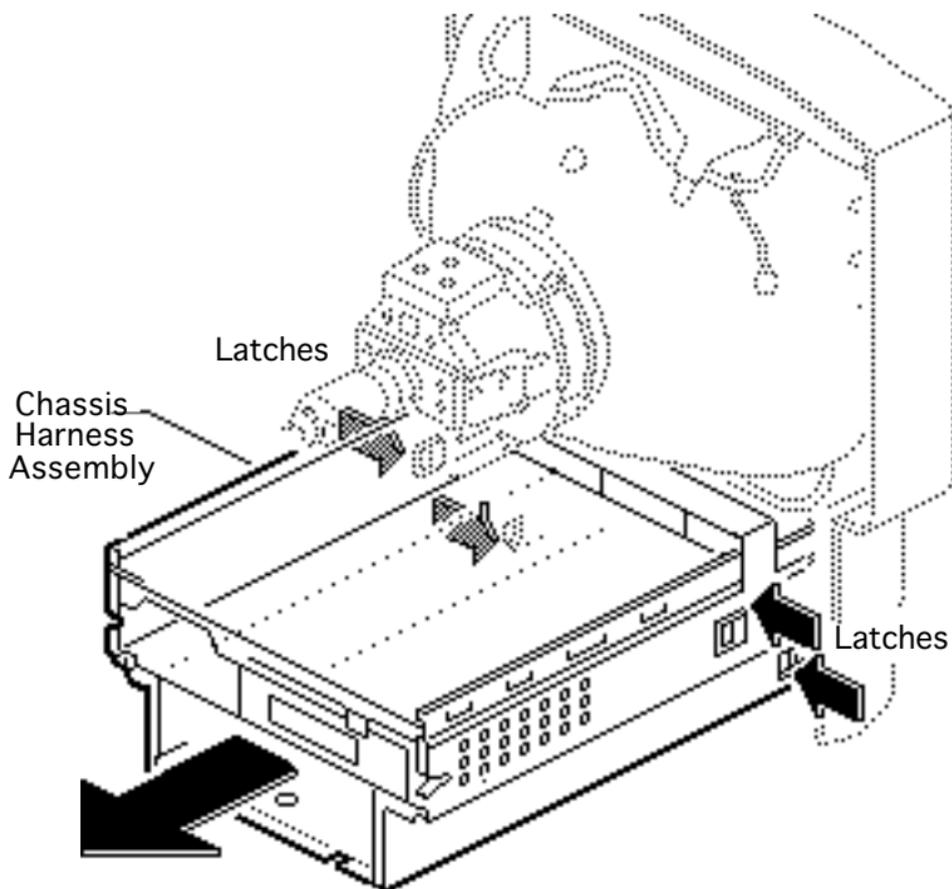
Carrier

Hard Drive

Chassis Harness
Assembly

Chassis Harness Assembly

Before you begin, remove the following:

- Drive bezel
- I/O door
- CD-ROM drive
- Floppy drive
- Hard drive
- Logic board
- Rear housing
- Analog board

Latches

Chassis
Harness
Assembly

Latches

Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious personal injury or equipment damage, review CRT safety in Bulletins/Safety.

Warning: Never use a grounding wriststrap until after discharging the CRT.

1   Discharge the CRT.

2   Press in the four latches and lift off the chassis harness assembly.

Chassis Harness Take Apart Strategy

Background

After product introduction, Apple Service adjusted the
service strategy for the chassis harness assembly in Mac
TV, LC 500 Series, and Performa 500 Series computers.
Originally, the chassis harness assembly was a single
service assembly. As of November 1994, the chassis
harness assembly is divided into several service piece parts.

Identifying the Chassis Harness Assembly

There are three slightly different chassis harness
assemblies and Apple service strategy varies with the type
of chassis.   The three chassis harness assemblies differ
according to the combination of floppy and CD-ROM drives
they support.

- Chassis 922-1824 supports the auto-insert Apple SuperDrive and CD-ROM drives earlier than the 300i+. This chassis requires a floppy drive adapter, and the CD-ROM connector bridge is about 1-1/2 inches above the CD-ROM drive bay.
- Chassis 922-0557 supports the manual-insert Apple SuperDrive and CD-ROM drives earlier than the 300i+. This chassis uses a ribbon cable to connect the floppy drive, and the CD-ROM connector bridge is about 1-1/2 inches above the CD-ROM drive bay.
- Chassis 922-0767 supports the manual-insert Apple SuperDrive and the 300i+ CD-ROM drive. This chassis uses a ribbon cable to connect the floppy drive, but the CD-ROM connector bridge is only 1/2 inch above the CD-ROM drive bay.

For more information, refer to *Apple Service Guide*, Macintosh Computers, Vol. 3 (1994), page 110.

Service Parts Now Available for Chassis 922-1824 and 922-0557

076-0488 Shield Kit (EMI shielding)

922-1825 PCBA Front Panel (front panel control board)

922-1826 Speaker Assembly (speaker and wire)

922-0117 Screw

076-0489 Chassis Kit (bare chassis)

922-0503 FoxConn Cable Assembly (logic board connector and cable assembly)

Service Parts Now Available for Chassis 922-0767

076-0488 Shield Kit (EMI shielding)

922-1825 PCBA Front Panel (front panel control board)

922-1826 Speaker Assembly (speaker and wire)

922-0117 Screw

Chassis Harness Take Apart Procedures

First remove the chassis harness assembly.

EMI Shields

1   Remove the EMI shields in this order: lower shield, front drive and speaker shield, top panel shield.

2   Remove the front panel control board shield if it is present.

Cable Bridge | Left Speaker Connection | Right Speaker Connection

Right Speaker | Control Panel Board | Control Panel Connector | Left Speaker

Speaker Assembly

First remove the EMI shields.

Caution: The speaker wire connections on the chassis cable bridge are very fragile. Avoid removing or replacing the speaker wires unless you need to replace the chassis or have isolated the problem to the speaker wires. (That is, replace and test the speakers, front panel control board, and analog board first.)
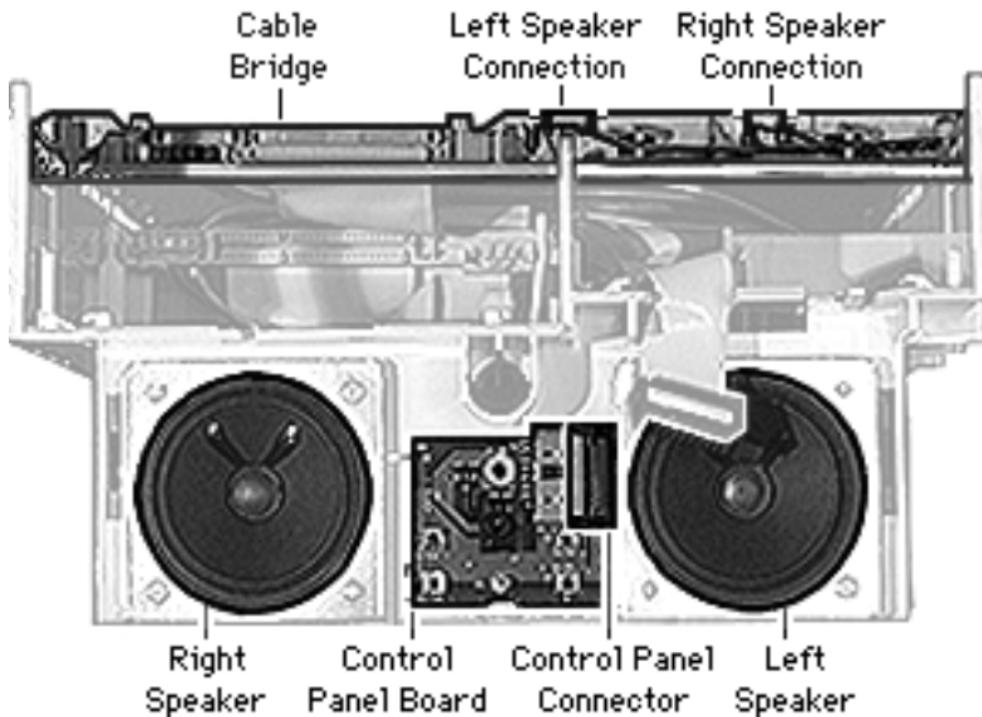
1   Disconnect the speaker wire spade connector from the
    back of the speaker.

2   Remove the Phillips screws from the front of the
    speaker.

Replacement Note: Detach the replacement speaker from its
wires and connect the replacement speaker to the original
speaker wires.

Speaker Wires

Note: The speaker wire connectors are very fragile.

1   Look down on the chassis cable bridge and locate the
    notches in the cable bridge on top of the wire connectors.

2   Using a jeweler's screwdriver, very gently press down
    on the tab in the middle of the wire connector. You will
    feel or hear a snap.

3   Slide out the wire connector.

Replacement Note: The analog board slides into the
computer and completes the connection to the speaker wires;
thus, the speaker wire connectors must sit securely in the
cable bridge.

4   Slide the speaker wire connector into its position in the
    cable bridge and press up until the connector is secure.
    You may need to use a jeweler's screw driver to adjust
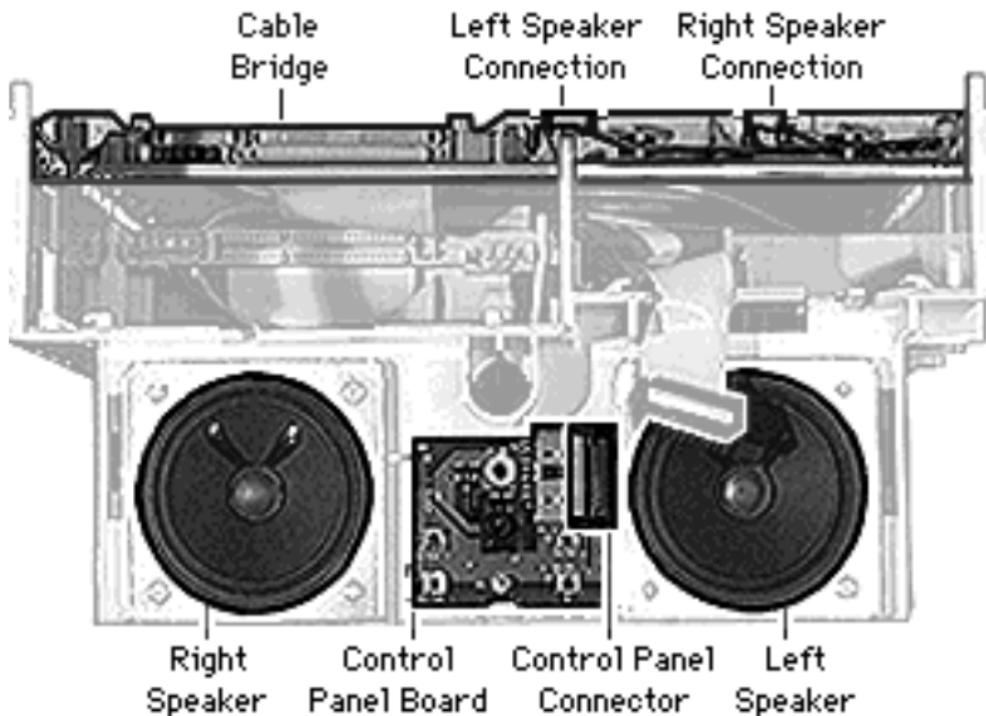   the small metal tab in the center of the speaker wire
    connector.

Cable Bridge   Left Speaker Connection   Right Speaker Connection

Right Speaker   Control Panel Board   Control Panel Connector   Left Speaker

Front Panel Control Board

First remove the EMI shields.

1. Disconnect the front panel control cable.
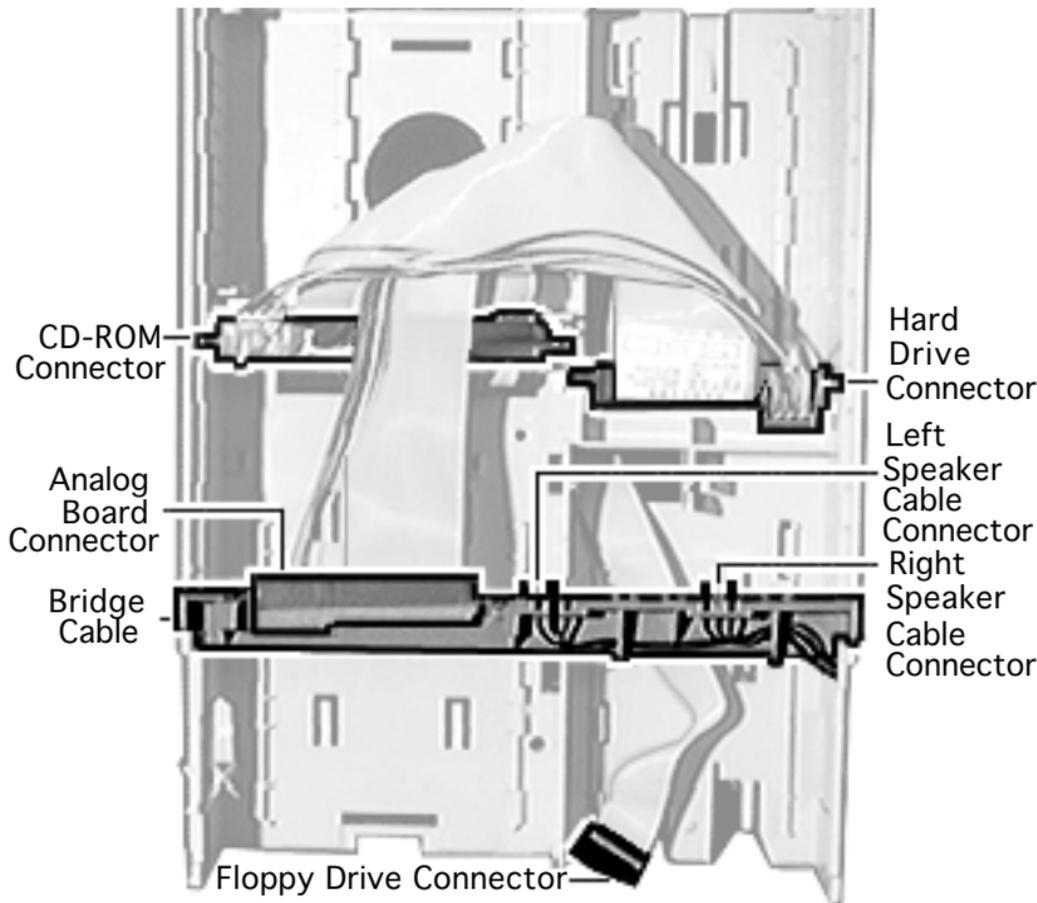
2. Remove the Phillips screw and remove the board.

Logic Board Connector and Cable Assembly

First remove the EMI shields, speaker assembly, and front panel control board.

Overview of removal procedures (Detailed steps follow the overview.)

First disconnect all the connections from the top of the chassis. Then route the cables through to the underside of the chassis and disconnect the logic board connector.

CD-ROM Connector

Hard Drive Connector

Analog Board Connector

Left Speaker Cable Connector

Right Speaker Cable Connector

Bridge Cable

Floppy Drive Connector

1   Stand at the front of the chassis, looking down at the top of the chassis, and disconnect the following in the order listed: analog board connector, CD-ROM drive connector, and hard drive connector. (The connector tabs operate much like large-scale SIMM slot connectors on logic boards.)

2   Route the analog board and the CD-ROM/hard drive
    cables through the large square hole behind the CD-ROM
    drive bay.

3   Push the floppy drive cable (if present) and front panel
    control cable to the underside of the chassis.

4   Turn the chassis over and stand at the rear of the chassis.

5   Release the three tabs from the sides and center of the
    logic board connector and remove the logic board
    connector and cable assembly.

Overview of replacement procedures (Detailed steps follow the overview.)

Connect the logic board connector to the underside of the chassis, route the cables through the appropriate openings, and connect the connectors on the top and front of the chassis. After replacing the logic board connector and cable assembly, replace the speakers, front panel control board, and EMI shields.

1   Place the chassis with the underside facing up and the speakers facing away from you.

Control Panel Cable

Analog Board Connector

Floppy Drive Cable

Logic Board Connector

CD-ROM Drive Cable/ Hard Drive Cable
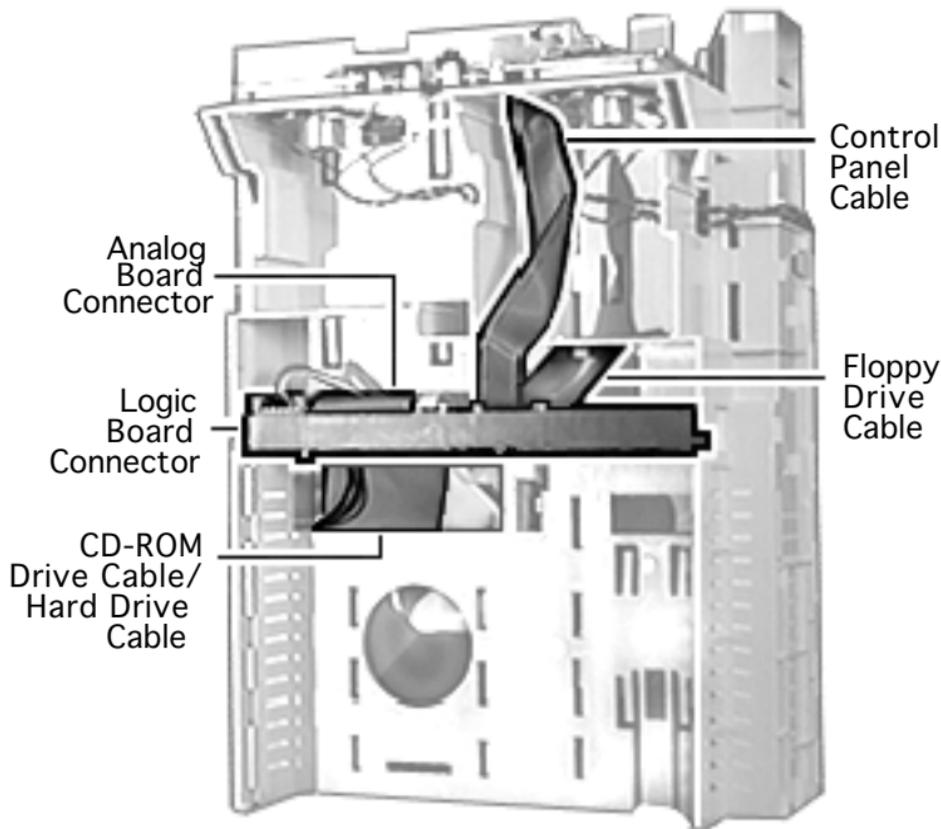
2   Arrange the logic board connector and cable assembly as shown.

3   Face the connector slot of the logic board connector toward the rear and from the back of the connector route the CD-ROM/hard drive, analog, and floppy drive cables under the connector. Extend the control panel connector cable from the back of the logic board connector toward the front of the chassis.

- Control Panel Connector
- Logic Board Connector
- CD-ROM Drive Connector
- Floppy Drive Connector
- Analog Board Connector
- Hard Drive Connector
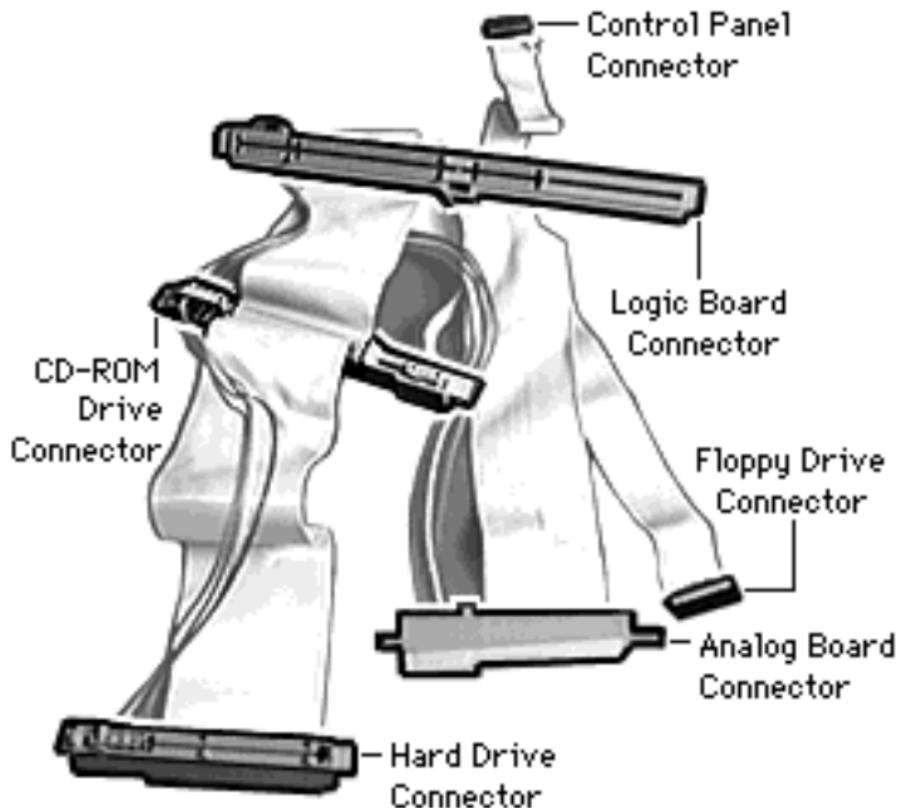
Logic Board Connector and Cable Assembly

1 Slide the side extension of the logic board connector down the front side of the small keyed tabs. The logic board connector will snap into place.

   Note: Be sure the center tab snaps into place at the same time.

2 Route the front panel control cable through the hole in the front of the chassis

3   Route the floppy drive cable through its opening at the back of the floppy drive bay.

4   Carefully route the analog and CD-ROM/hard drive cables through the large opening behind the CD-ROM drive bay

5   Turn over the chassis so that the top is up and the speakers are at the front, facing you.

Important: Be sure to reconnect the CD-ROM, hard drive, and analog connectors in the proper order. When you position the CD-ROM, hard drive, and analog connectors, be sure that the power cables are placed toward the outside of the chassis and the data ribbon cables are placed toward the inside of the chassis.

6   Locate the CD-ROM, hard drive, and analog connectors.

7   Position the CD-ROM connector with the connector slot

facing the front of the chassis and the power cables facing toward the outside edge of the chassis. Slip the connector extension through the slot in the side of the chassis and slide the connector into place.

8   Position the hard drive connector with the connector slot facing the rear of the chassis and the power cables facing toward the outside edge of the chassis. Slip the connector extension through the slot in the side of the chassis and slide the connector into place.

9   Position the analog board connector with the connector slot facing the rear and the power cables facing toward the outside edge of the chassis. You will have to route the cable under the connector (between the connector and the cable bridge). Slightly push forward one of the keyed tabs and slide the connector into place.

10 To replace the speakers, front control panel board, and
   EMI shields, reverse the take-apart procedures above.
   Pay attention to the caution regarding the fragility of the
   speaker wire connectors and their replacement
   procedures.
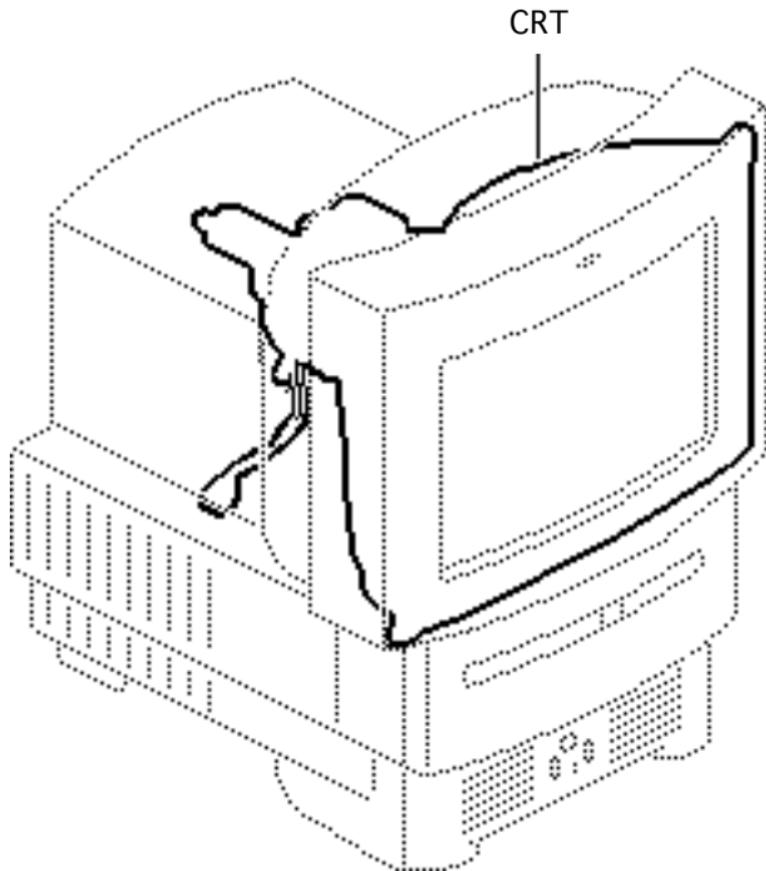
CRT

CRT

Before you begin, remove the following:

- Drive bezel
- I/O door
- CD-ROM drive
- Floppy drive
- Hard drive
- Logic board
- Rear cover
- Analog board
- Chassis harness assembly

Mounting Screws

Degauss Panel

Degauss Panel
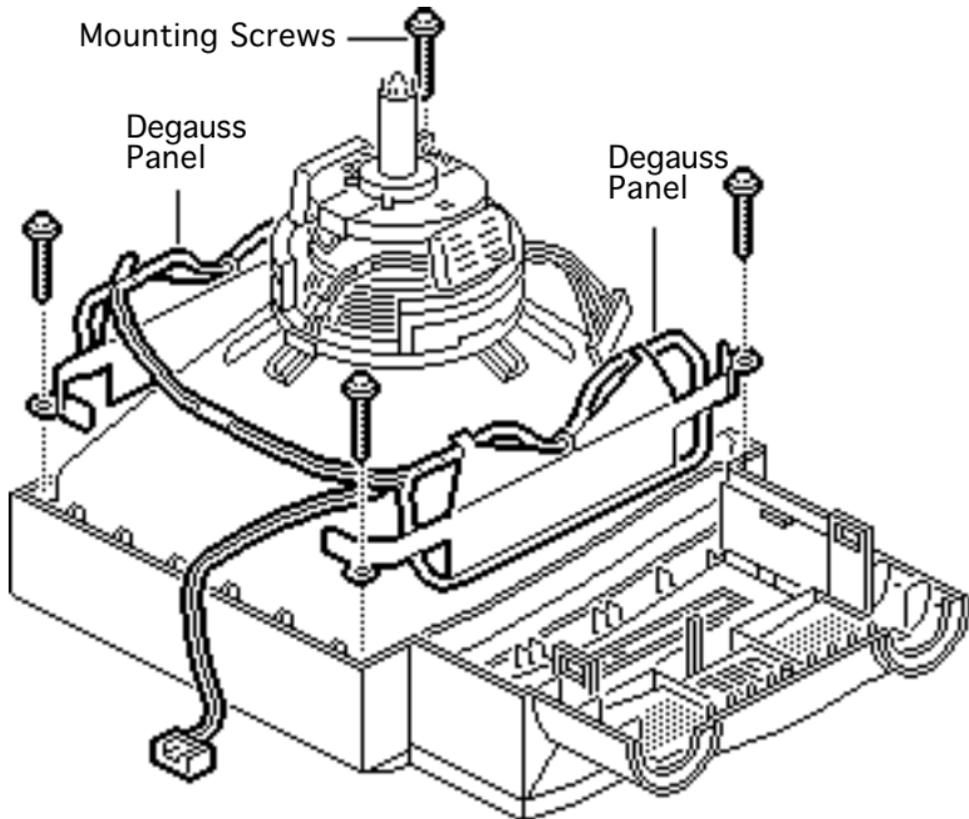
Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.
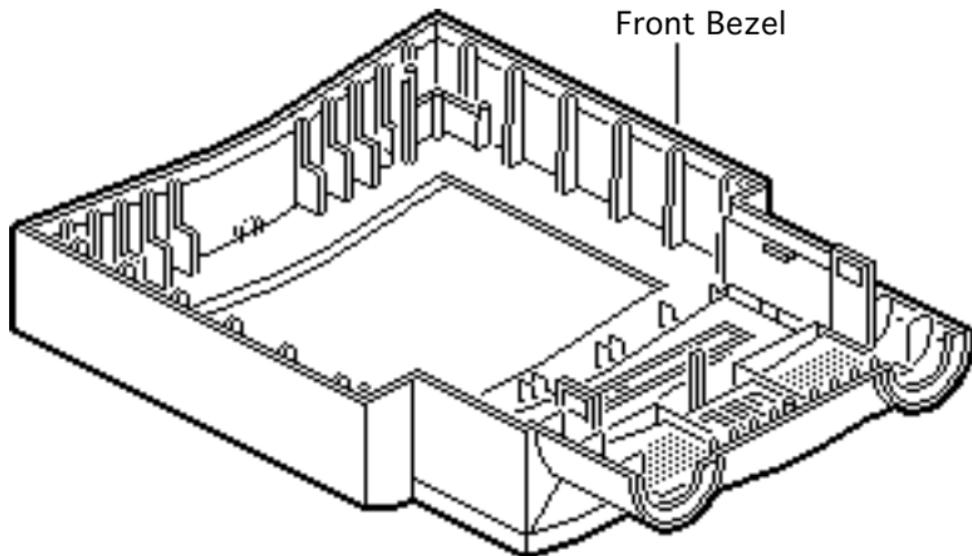
Warning: Never use a grounding wriststrap until after discharging the CRT.

1 Remove the four mounting screws and lift off the two degauss panels.

CRT

Infrared
Receiver
Cable
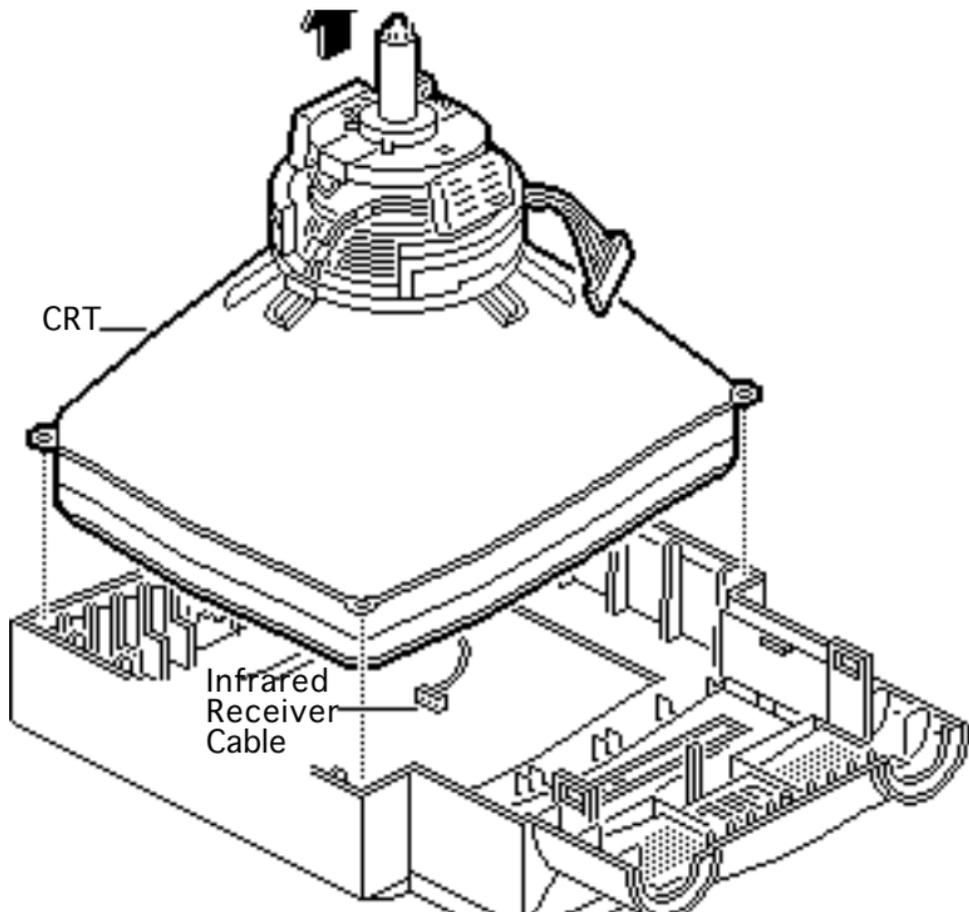
2 Lift off the CRT.

Replacement Note: Be sure
the infrared receiver cable
is not caught under the CRT.

Infrared Receiver
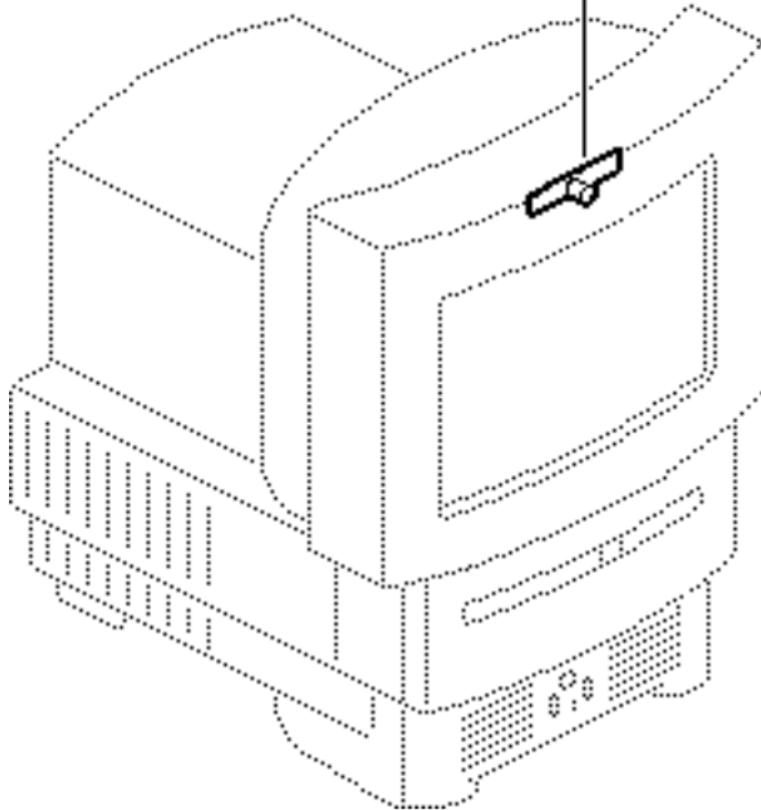
Infrared Receiver

Before you begin, remove the following:

- Drive bezel
- I/O door
- CD-ROM drive
- Floppy drive
- Hard drive
- Logic board
- Rear cover
- Analog board
- Chassis harness assembly
- CRT

Infrared Receiver
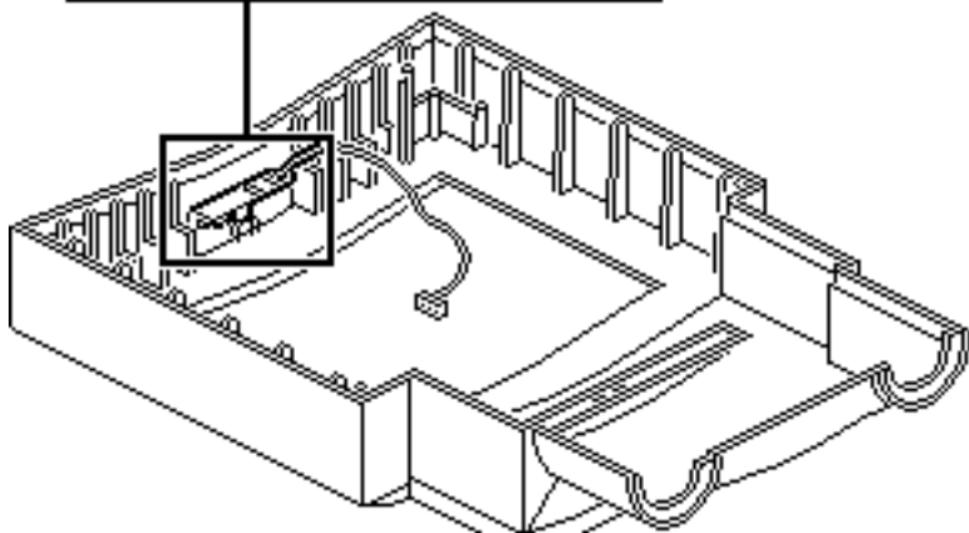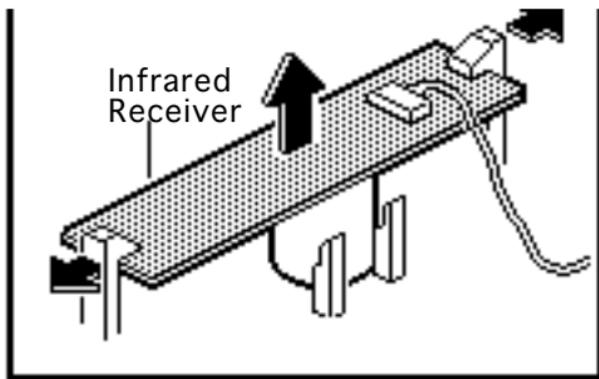
Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Warning: Never use a grounding wriststrap until after discharging the CRT.

Push out the two latches and remove the infrared receiver.
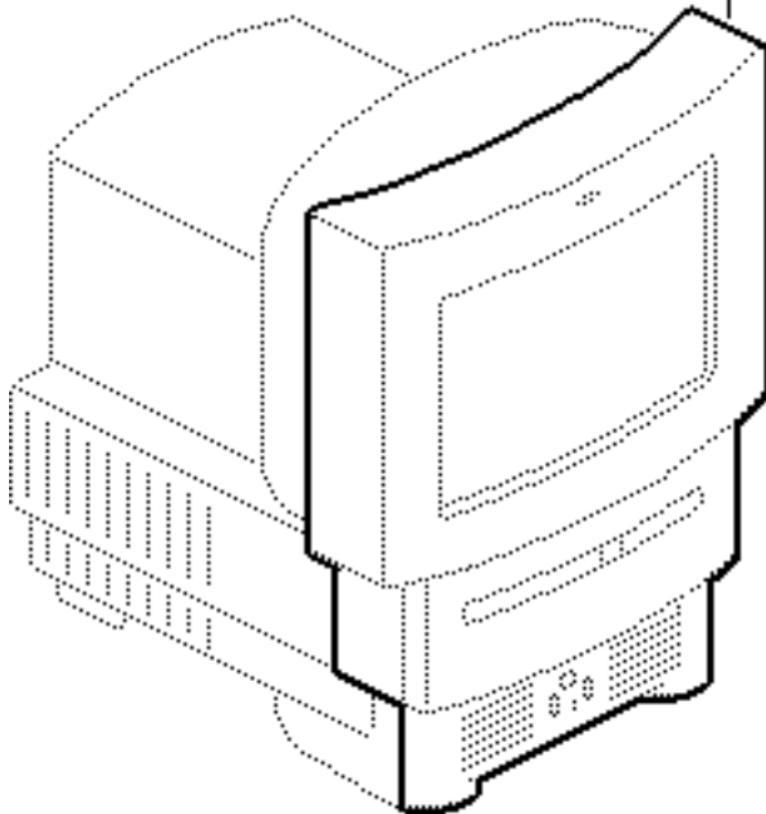
Front Bezel

Front Bezel

To remove the front bezel,
remove the following:

- Drive bezel
- I/O door
- CD-ROM drive
- Floppy drive
- Hard drive
- Logic board
- Rear cover
- Analog board
- Chassis harness assembly
- CRT
- Infrared receiver

Front Bezel

Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Caution: Never use a grounding wriststrap until after discharging the CRT.
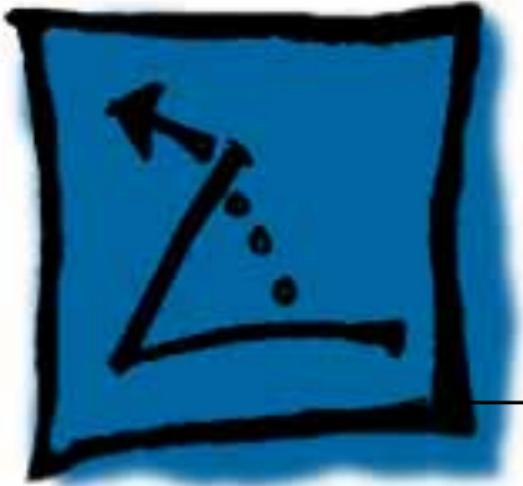
Additional Procedures

Macintosh TV

Battery

Battery Verification

Before you begin, remove the following:
• I/O door
• Logic board

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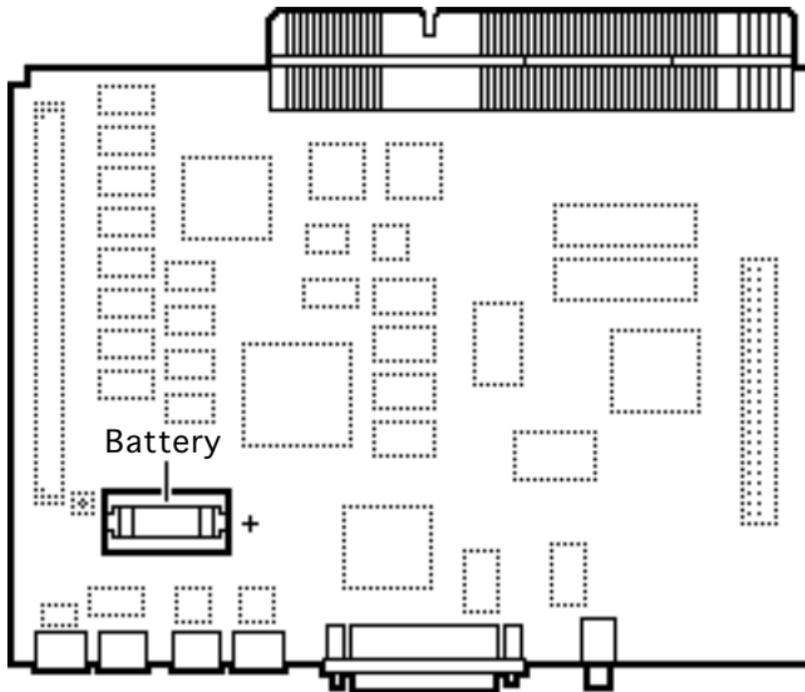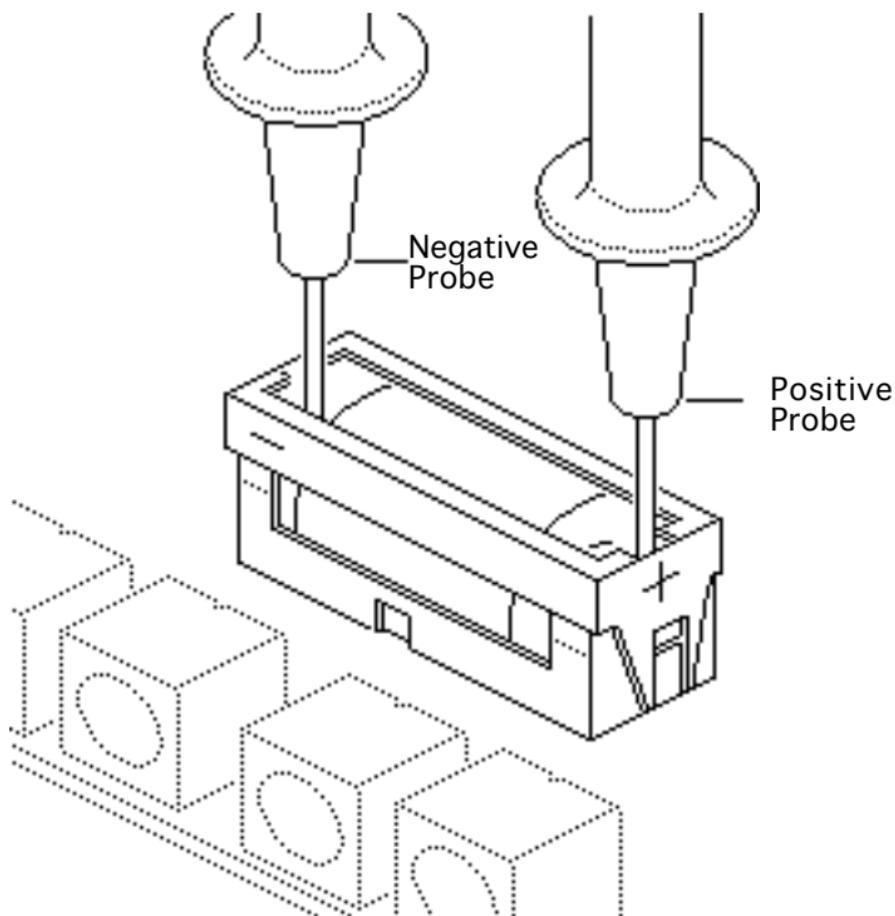
Caution: Review the ESD precautions in Bulletins/Safety.

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 and the negative probe to the negative end of the battery.

3 If the battery voltage is below 3.0 volts, replace the battery. Refer to "Battery Replacement" in this chapter.

Battery

Battery Replacement

Before you begin, remove the following:

- I/O door
- Logic board

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

Cover
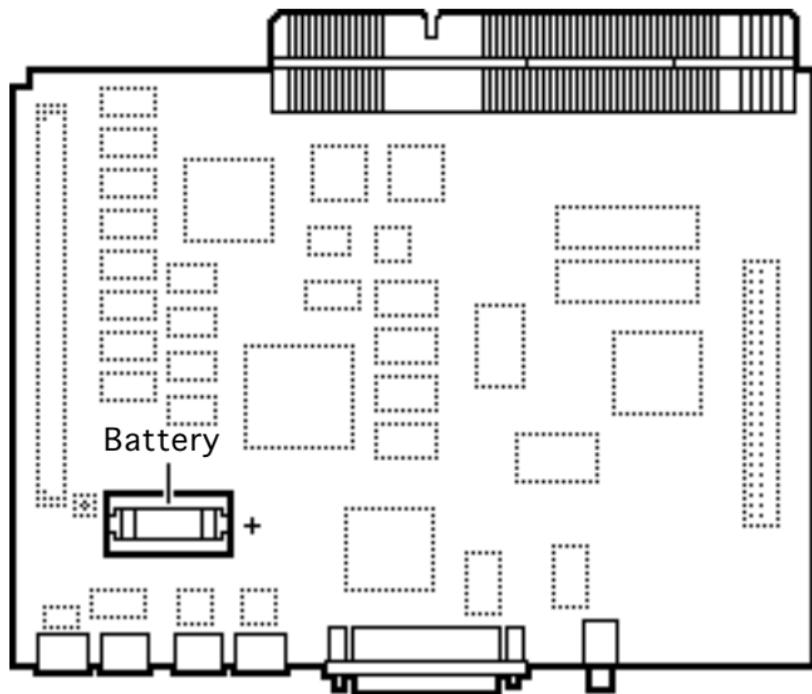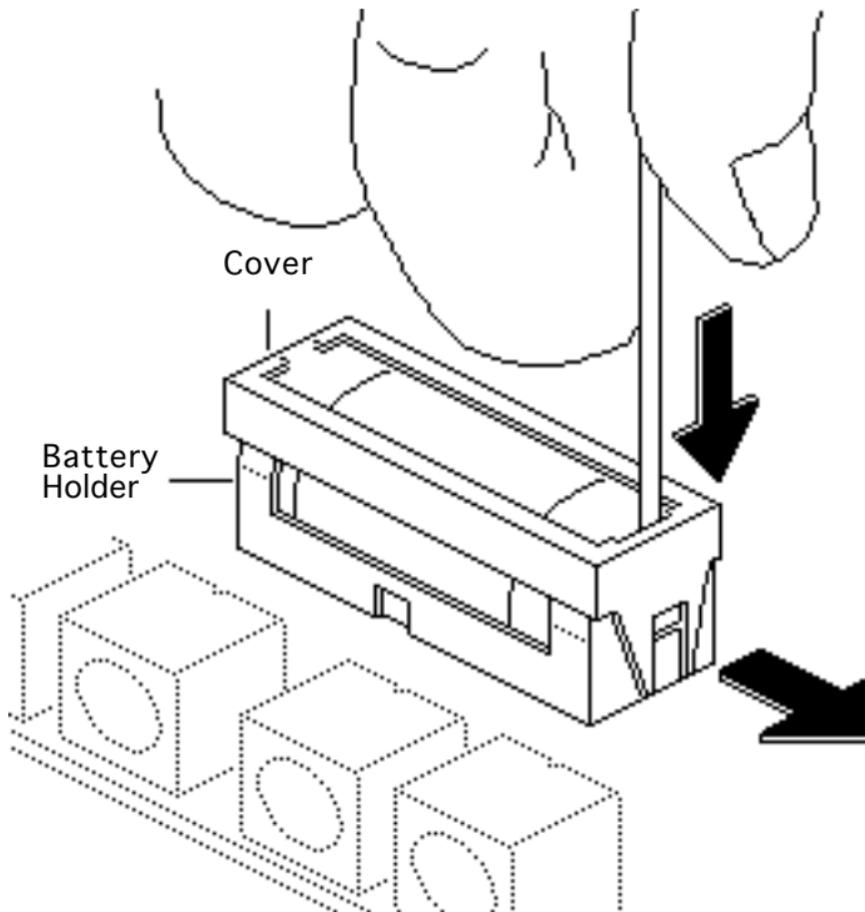
Battery Holder

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

1 Insert a small flat-blade screwdriver into the top of the battery holder cover and gently push down and out with the screwdriver to release the tab.

2 Repeat on the other end and remove the cover from the battery holder.
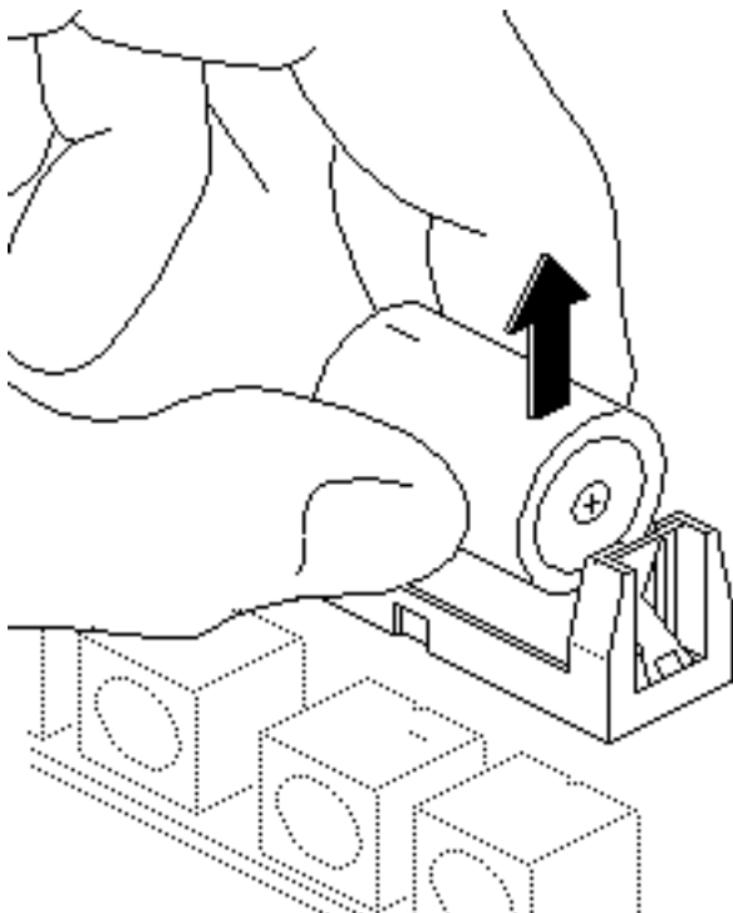
3 Grasp the battery and remove it from the holder.

4 Return the battery to Apple for proper disposal. For battery packaging and labeling information, refer to the instructions in Bulletins/Safety.

Adjustments

Macintosh TV

Adjustment
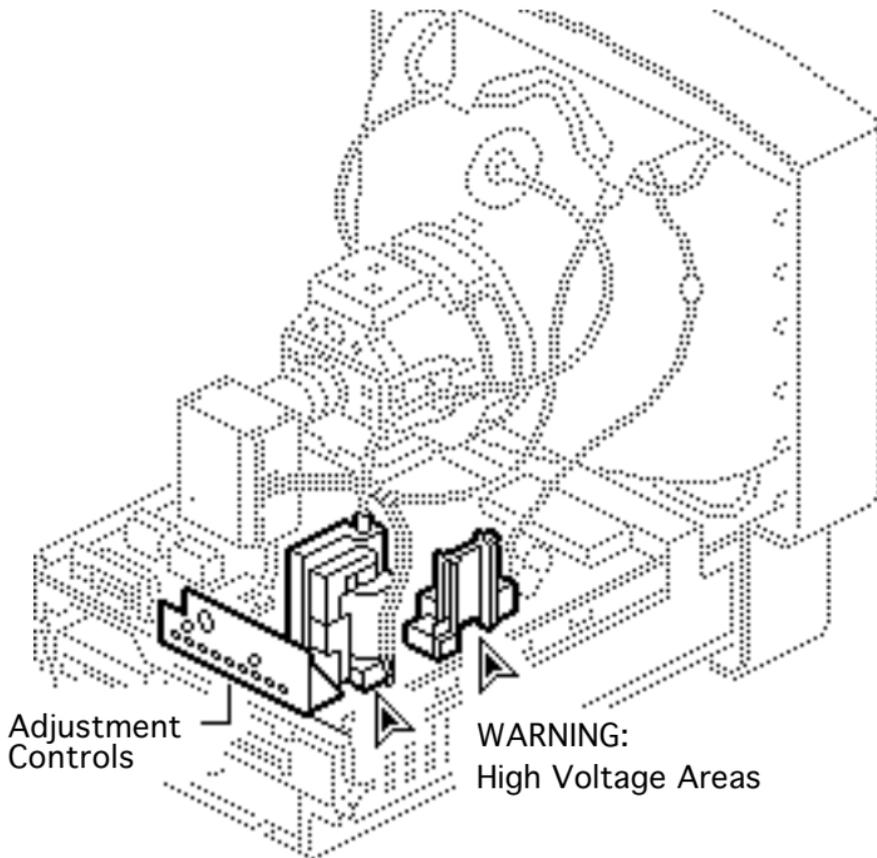Controls

WARNING:
High Voltage Areas

Geometry

Before you begin, remove the rear cover.

⚠️**Warning:** This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Note: The controls on this monitor require a small hex-head plastic tool to make adjustments. If the tool is long, it will be too flexible, which will make fine adjustments difficult. Use a short hex-head plastic tool to minimize flexing. Do not use metal alignment tools—they are a shock hazard.
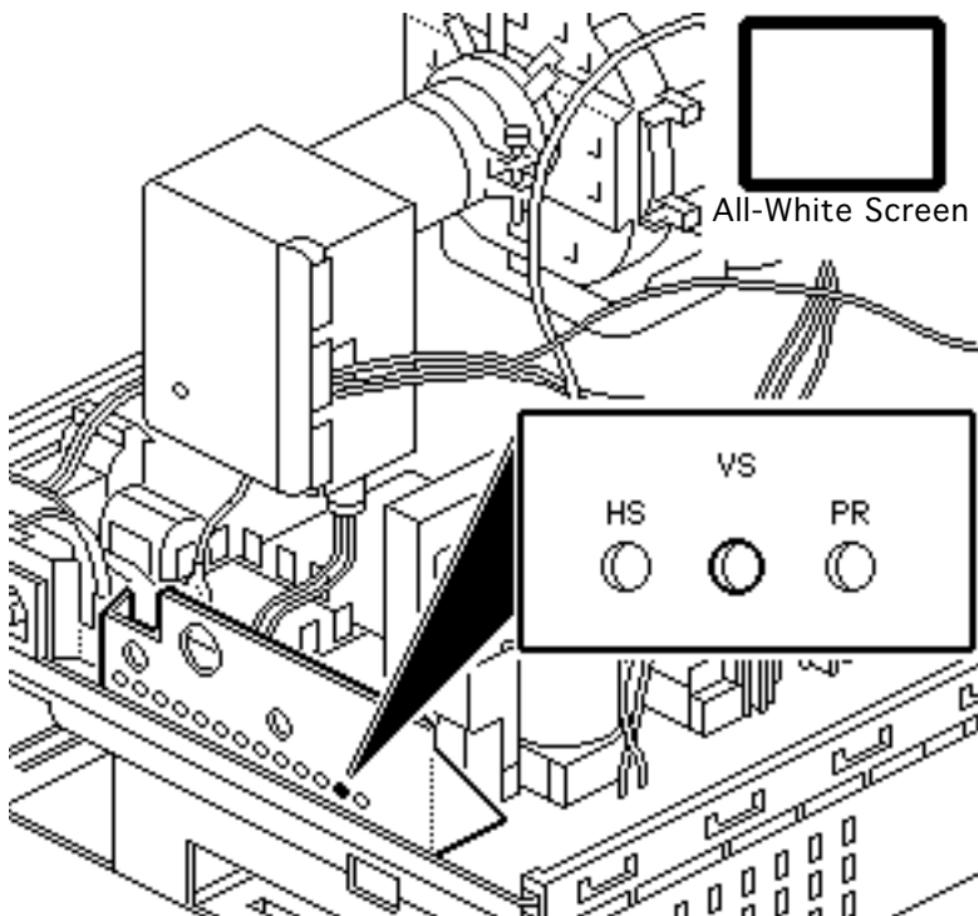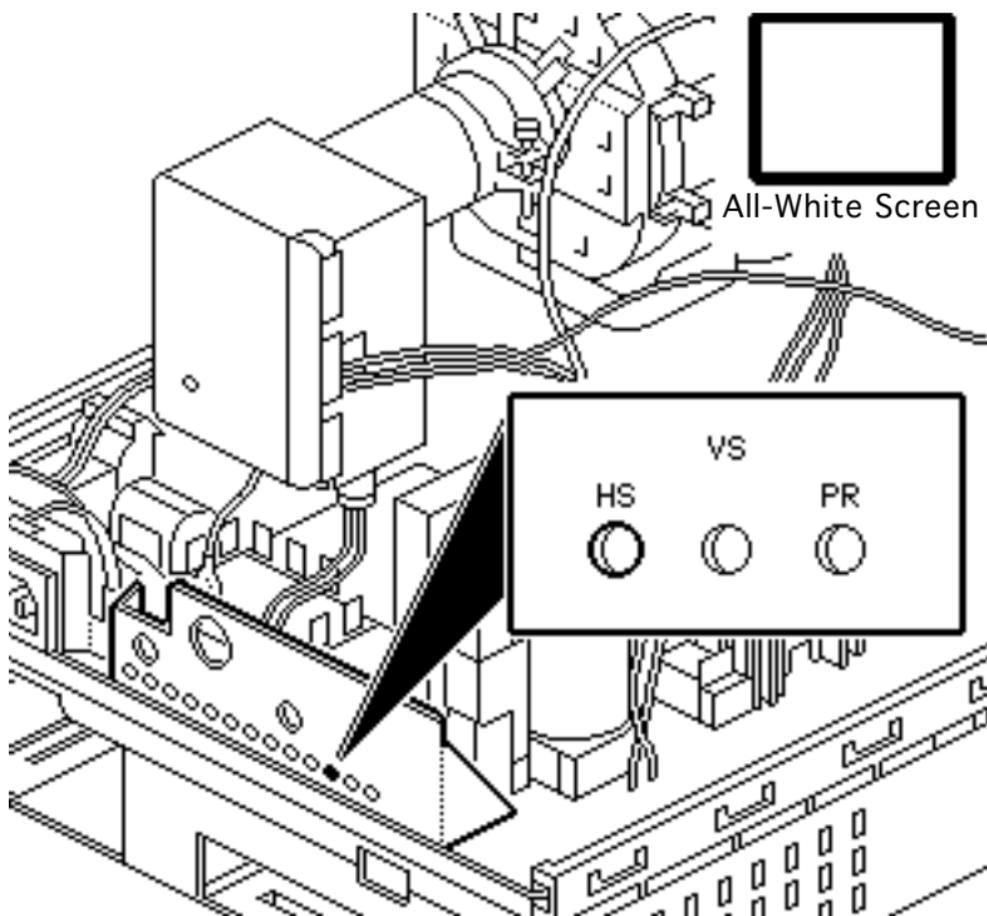
All-White Screen

Vertical Center

1 Use Display Service Utility to display the All-White Screen test pattern.

2 Using a hex-head plastic adjustment tool, adjust the vertical center (VS) control until the raster is centered (top to bottom) in the display area.
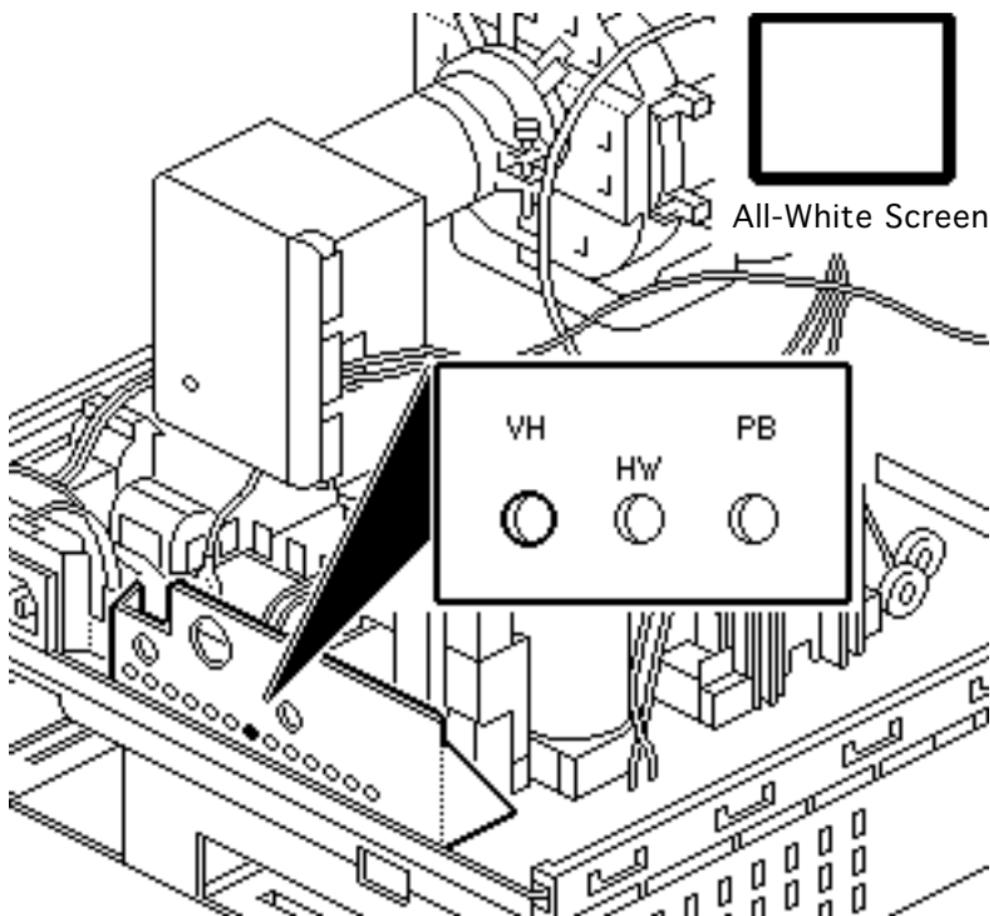
All-White Screen

Horizontal Center

Using a hex-head plastic adjustment tool, adjust the horizontal center (HS) control until the raster is centered (side to side) in the display area.
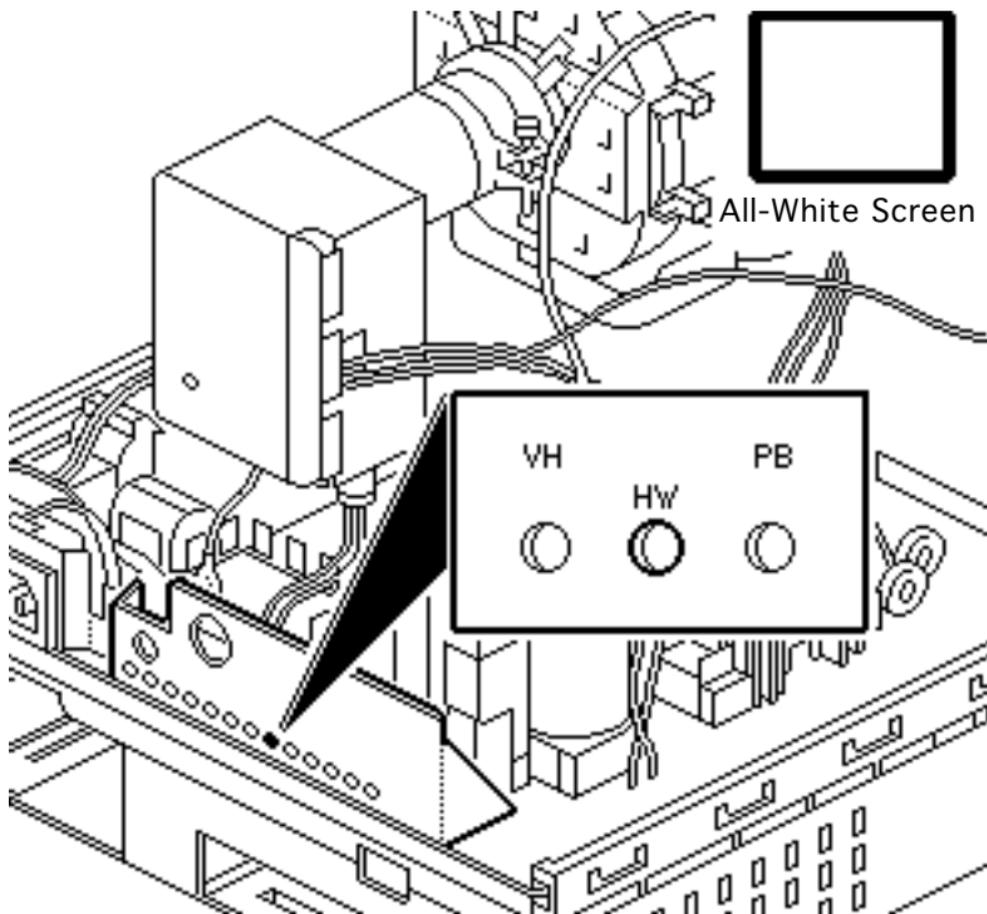
All-White Screen

Vertical Size

1   Using a hex-head plastic adjustment tool, adjust the vertical height (VH) control until the raster height is 7 inches (± 1/ 8 inch) or 176 mm (± 2 mm).

2   Verify this height. If it is off, repeat the vertical size adjustment and, if necessary, the vertical center adjustment.

All-White Screen

Horizontal Size

Note: Due to video features and timing differences across the Apple line of Macintosh computers, the width of the raster/image area on the Macintosh TV screen may vary up to 3/16 inch at each side of the screen. Perform the horizontal size adjustment to set the display to its proper width.

Using a hex-head plastic adjustment tool, adjust the horizontal width (HW) control until the raster is 9 1/4 inches (± 1/8 inch) or 235 mm (± 2 mm).
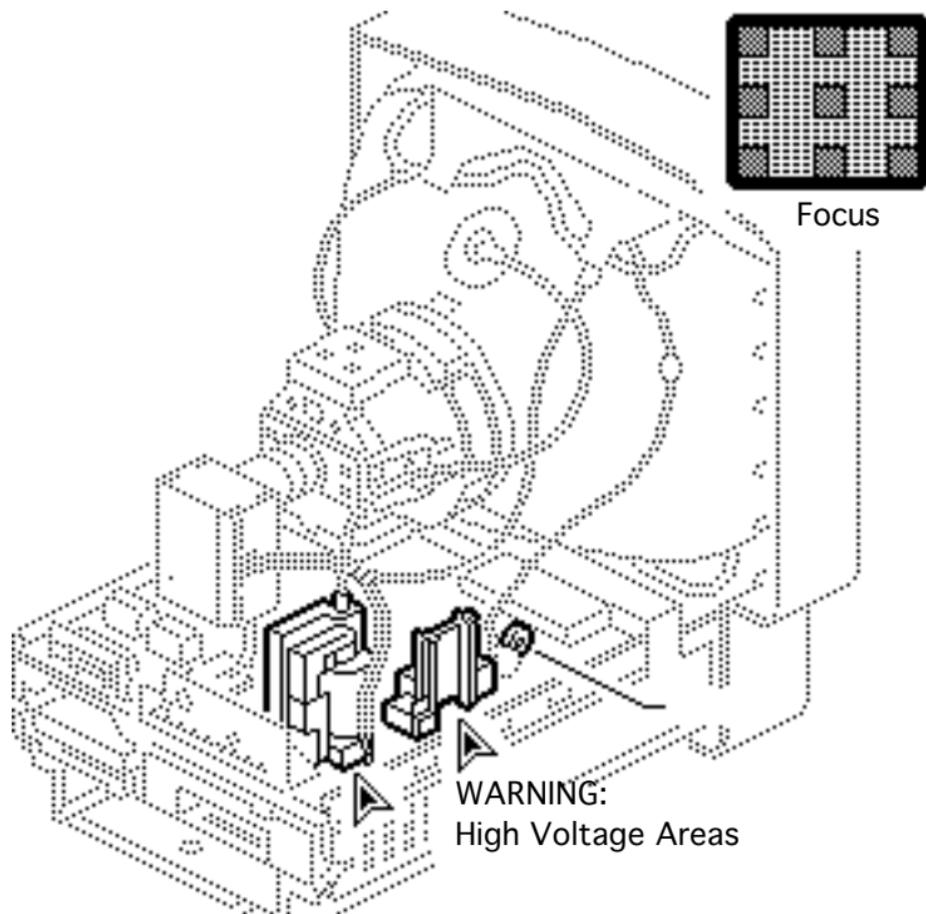
Focus

Focus

1 Use Display Service Utility to display the Focus test pattern.

2 Using a hex-head plastic adjustment tool, adjust the focus control until the Focus test pattern is as clear as possible.
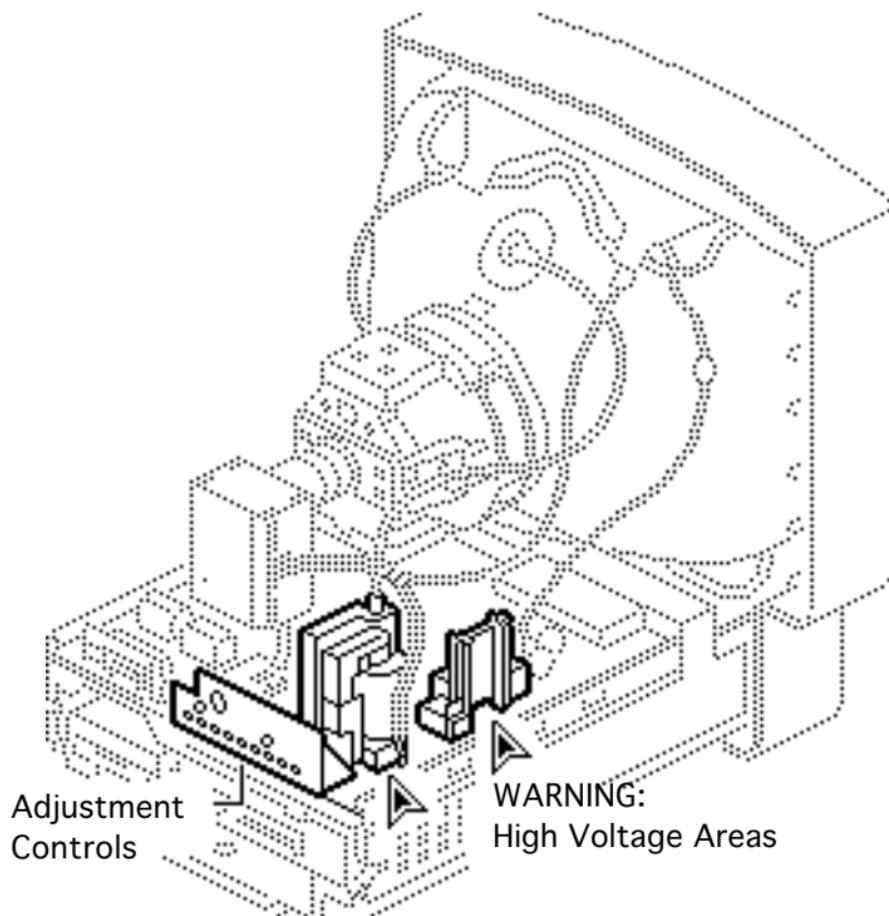
WARNING: High Voltage Areas

Adjustment
Controls

WARNING:
High Voltage Areas

Video

Before you begin, remove
the rear cover.

⚠️**Warning:** This product
contains high voltage and a
high-vacuum picture tube.
To prevent serious injury,
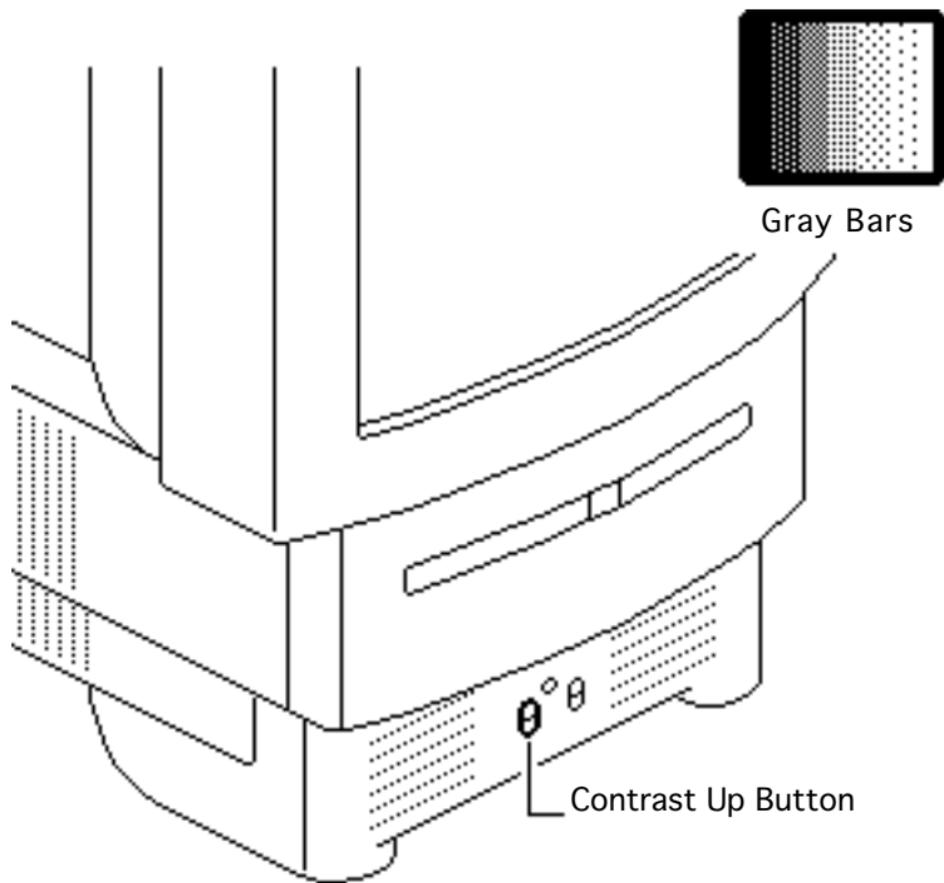review CRT safety in
Bulletins/Safety.

Note: Perform the cutoff
adjustment prior to
adjusting the white balance.

Replacement Note: Perform the cutoff adjustment whenever you replace the CRT or the analog board.
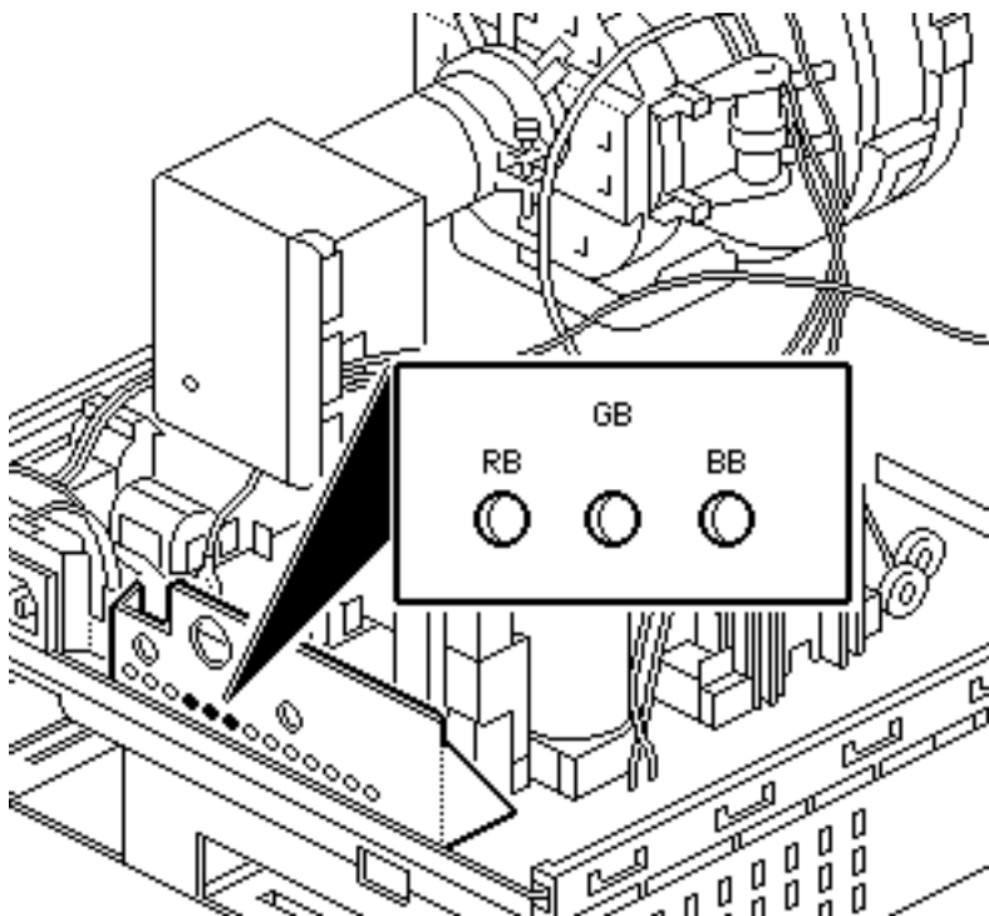
Gray Bars

Contrast Up Button

Cutoff

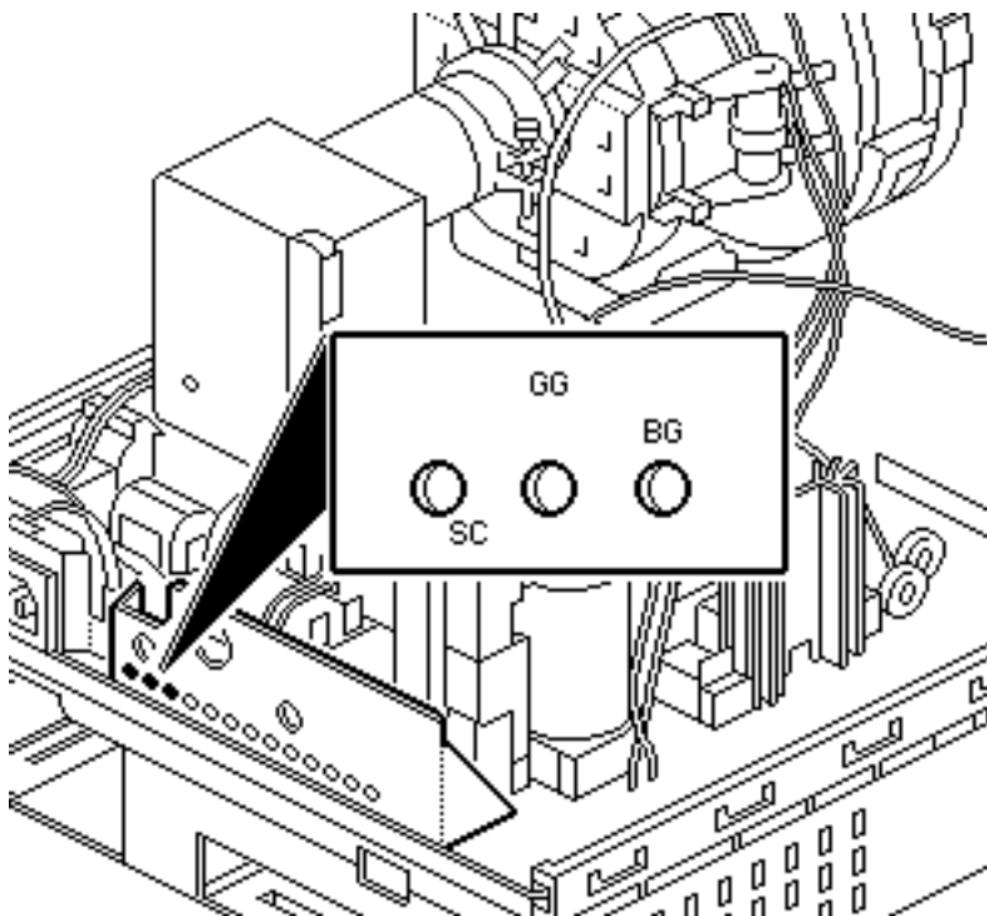**Note:** Perform the cutoff and white balance adjustments after the monitor has been on for at least 10 minutes.

1 Use Display Service Utility to display the Gray Bars test pattern.

2 Press the Contrast Up button and set screen contrast to maximum.

3   Select the Brightness Control Panel from the Apple menu. Drag the brightness control to midrange.

4   Using a hex-head plastic adjustment tool, set the red (RB), green (GB), and blue (BB) background controls to the full counterclockwise positions.
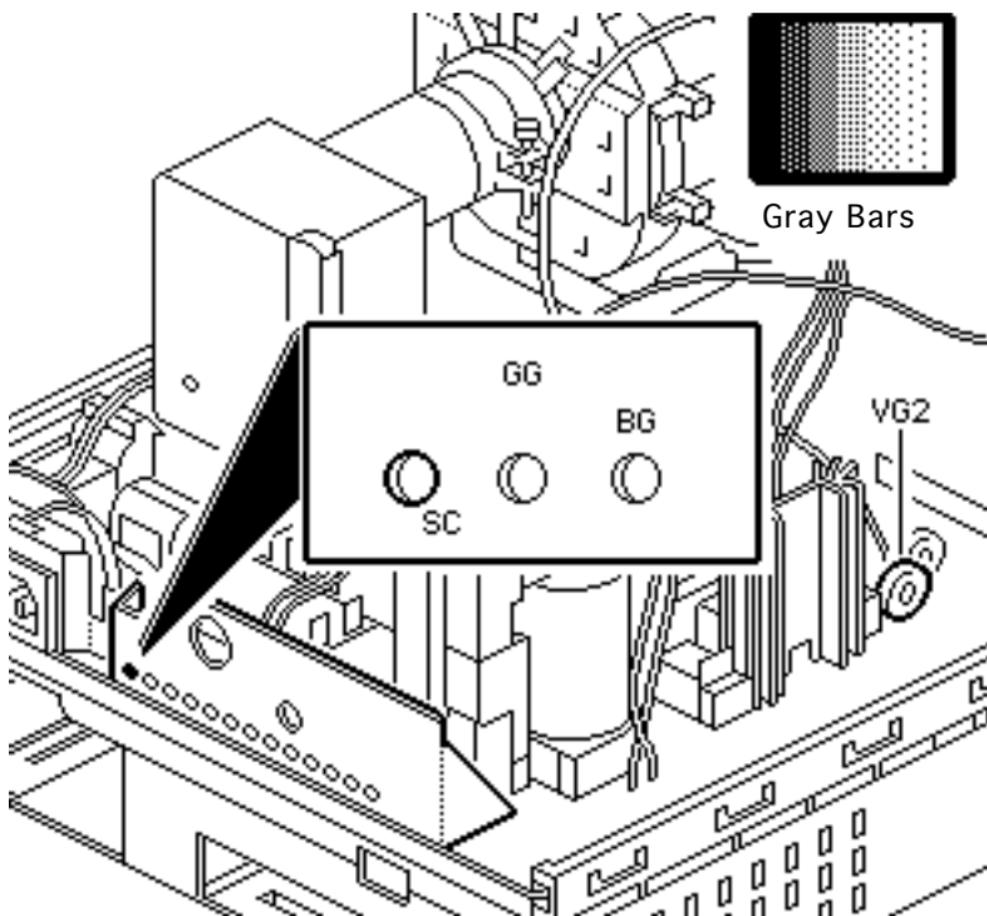
Note: To set the green and blue drive controls to their 3/4 position, turn the controls to their full clockwise position and then turn back 1/4 turn counterclockwise.
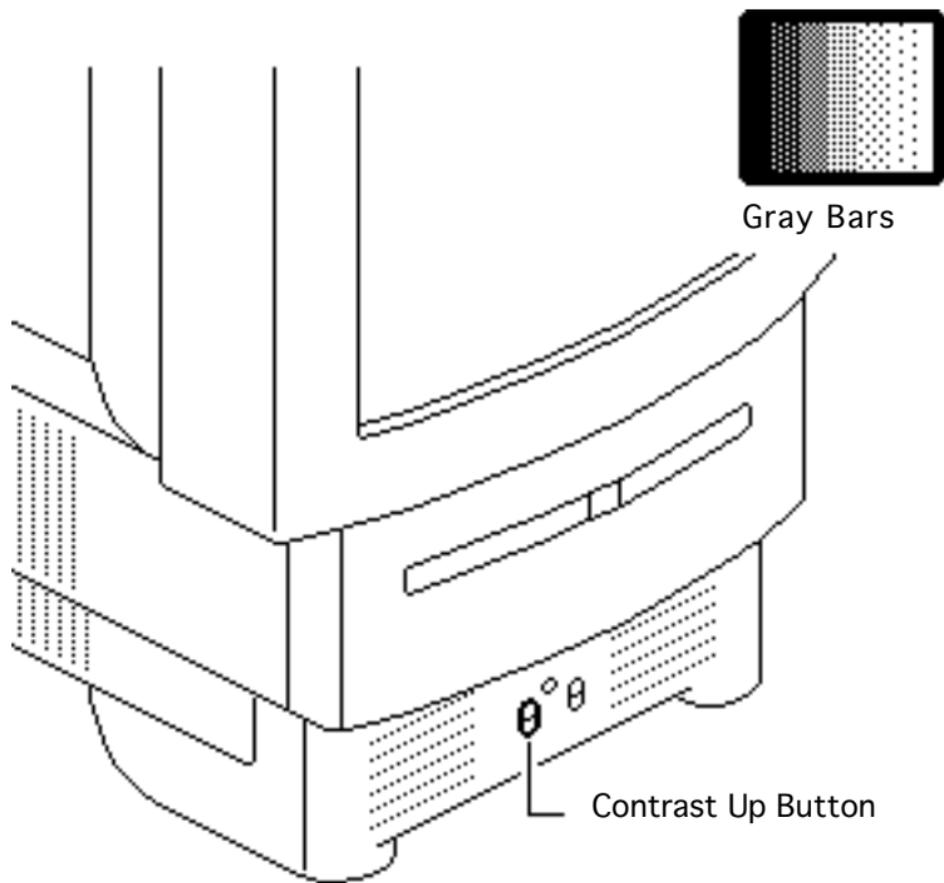
5   Set the green (GG) and blue (BG) drive controls clockwise to their 3/4 position.

6   Set the sub-contrast control (SC) to its full clockwise position.

Gray Bars

7   Using a hex-head plastic adjustment tool, adjust VG2 until the first bar in the test pattern is completely black and the second bar is barely visible.

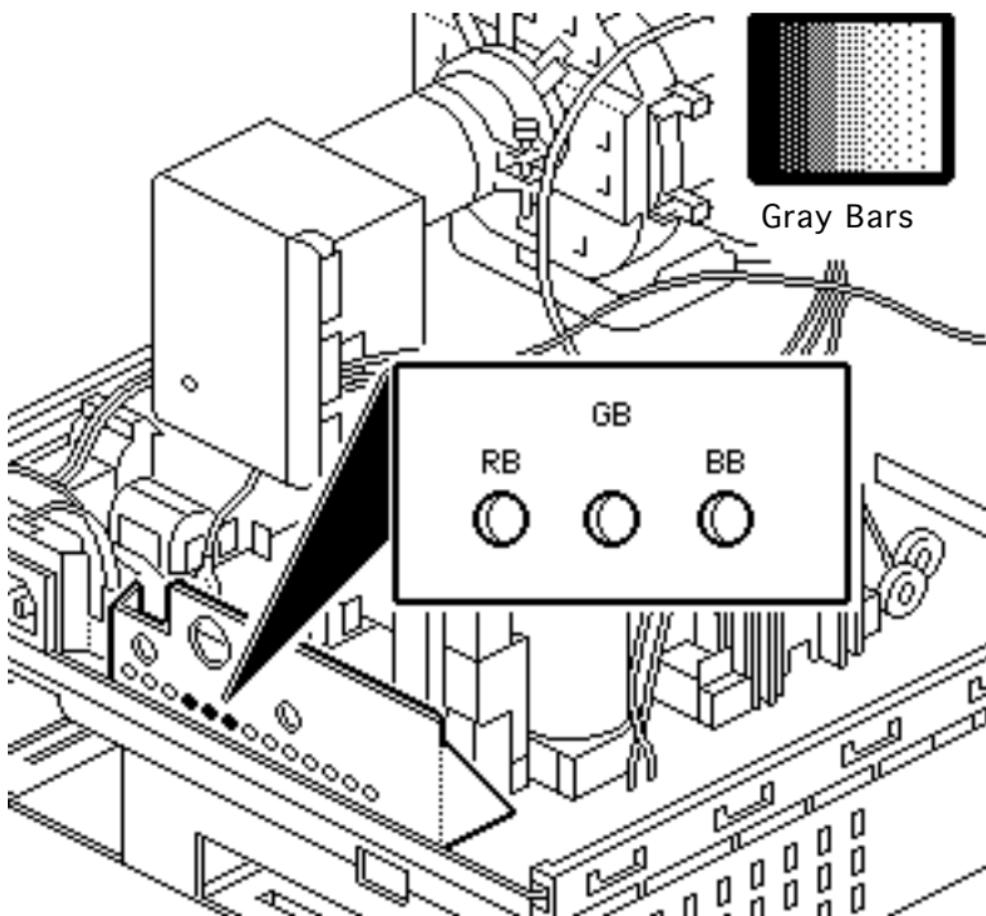8   Set the sub-contrast control (SC) to the center position.

Gray Bars

Contrast Up Button

White Balance

Note: Perform the cutoff and white balance adjustments after the monitor has been on for at least 10 minutes.

1. Use Display Service Utility to display the Gray Bars test pattern.

2. Press the Contrast Up button and set screen contrast to maximum.

Gray Bars

3 Select the Brightness Control Panel from the Apple menu. Drag the brightness control to midrange.

4 Note the predominant color.

5 Using a hex-head plastic adjustment tool, alternately adjust the red (RB), green (GB), and blue (BB) background controls until there is no predominant color in the four darkest bars.

Gray Bars
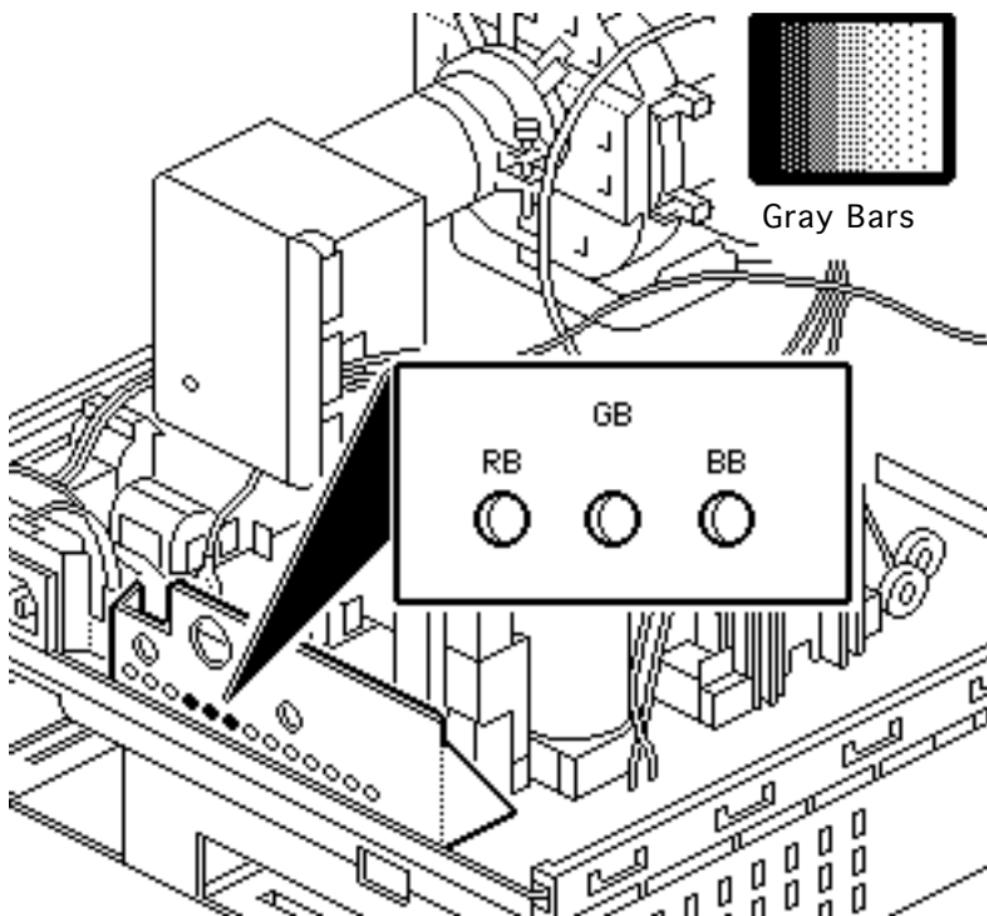
Note: The darkest bar must remain completely black throughout the rest of the procedure. If you notice a predominant color in the darkest bar, readjust the appropriate background control.

6 If necessary, adjust the blue (BG) and green (GG) drive controls until there is no predominant color in the four brightest bars.

7 Check the four darkest bars, and if necessary, adjust the red (RB),
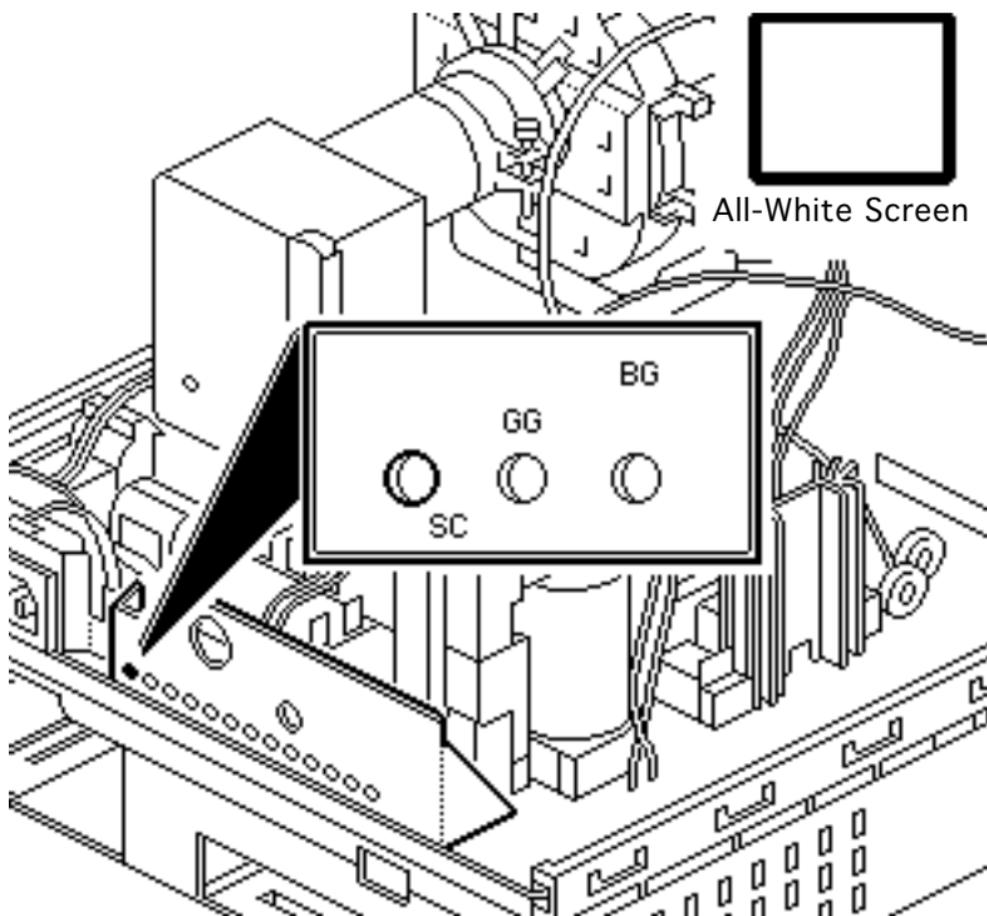
All-White Screen

green (GB), and blue (BB) background controls until there is no predominant color.

8 Use Display Service Utility to display the All-White Screen.

9 Using the light meter, adjust the sub-contrast control (SC) until the luminance measures 33 feet Lamberts (± 3 foot lamberts), which on the light meter is

  • Model L-248: middle of the10 scale
  • Model 246: 25 on the red scale

Important: Over time, light meter tolerance can vary. If you doubt your meter's accuracy, verify the readings with a known-good light meter or photometer.

Yoke Convergence
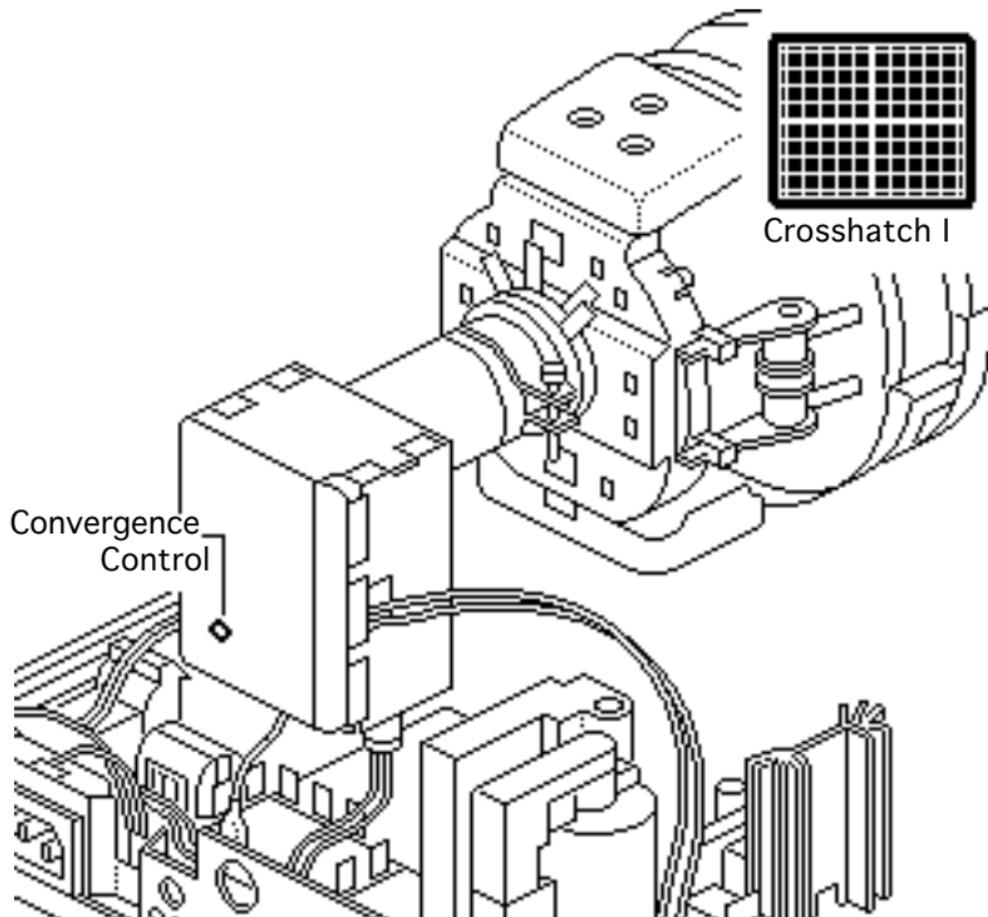Controls

CRT Video
Board

WARNING:
High Voltage Areas
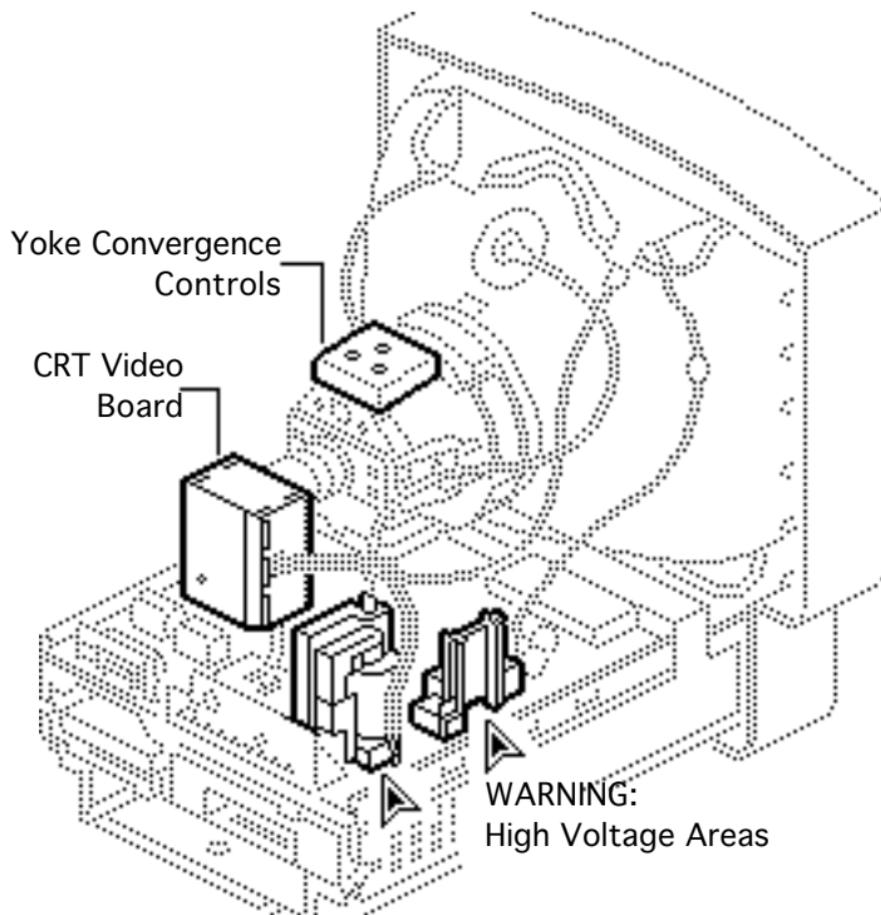
Convergence

Before you begin, remove the rear cover.

▲**Warning:** This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Crosshatch I

Convergence
Control

1 Use Display Service
   Utility to display the
   Crosshatch I test
   pattern.

2 Using a hex-head plastic
   adjustment tool, adjust
   the convergence control
   on the CRT video board
   for best overall
   convergence.

Crosshatch I

3 Using a hex-head plastic adjustment tool, adjust the N/S amp control for best convergence of horizontal lines at the top and bottom of the screen.

4 Adjust the lower correction control for best convergence of vertical lines at the bottom of the screen.

5 Adjust the upper correction control for best convergence of vertical lines at the top of the screen.

Adjustment Controls

WARNING:
High Voltage Areas

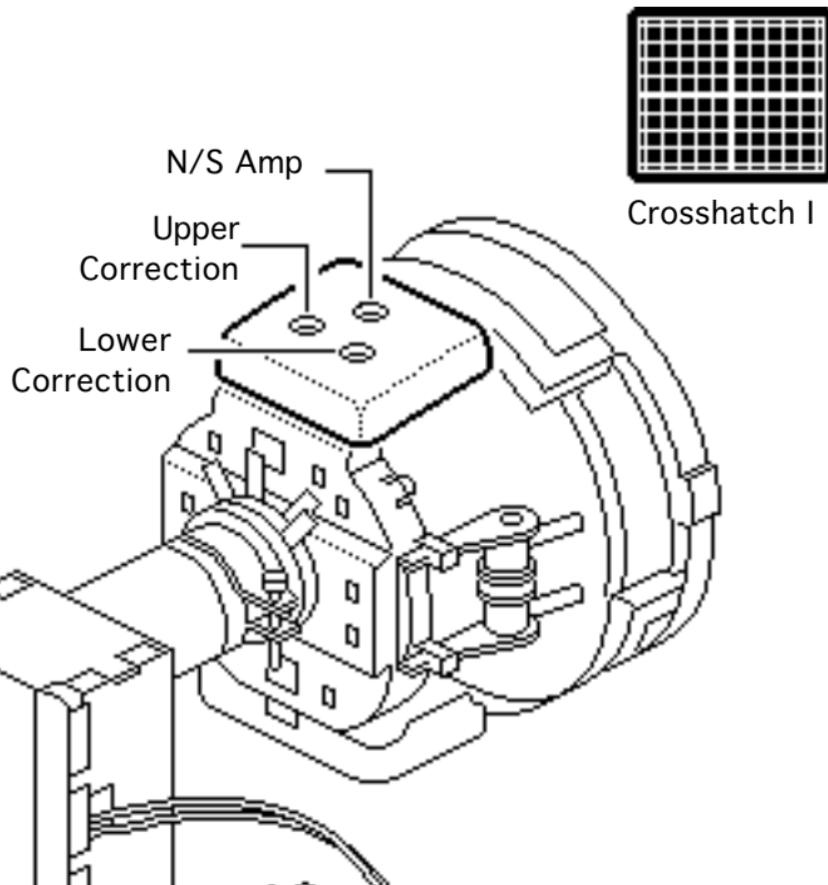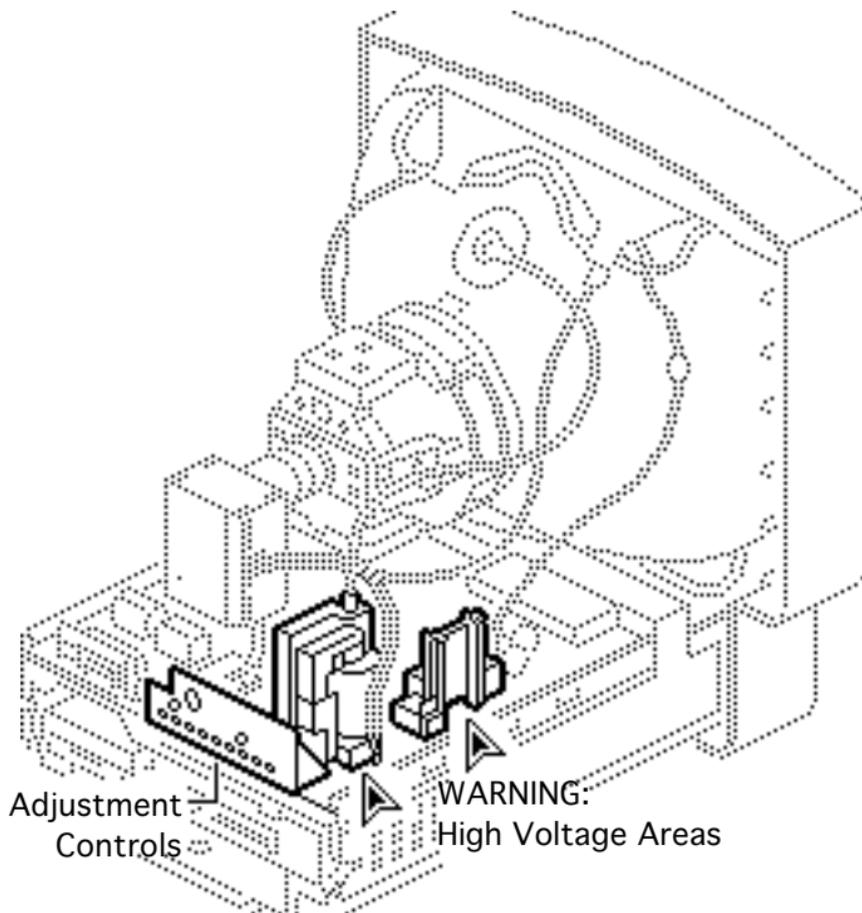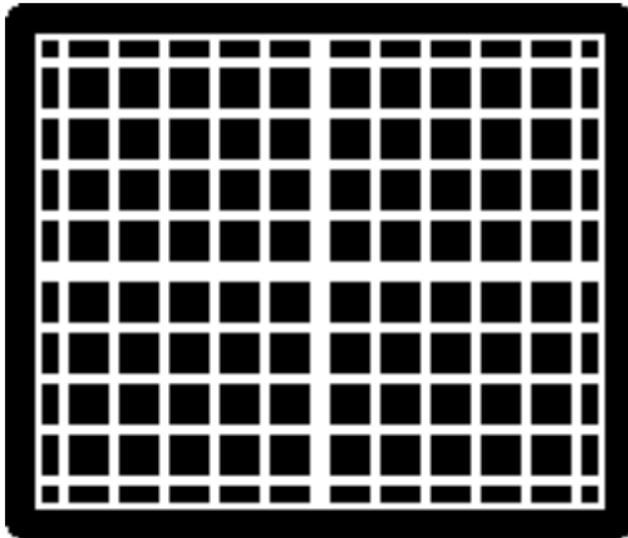## Geometric Distortion

Before you begin, remove the rear cover.

⚠️**Warning:** This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

1   Use Display Service
    Utility to display the
    Crosshatch I test
    pattern.

2   Verify that the boxes on
    the top row are the same
    size as the boxes on the
    bottom row, and the
    boxes on the left side are
    the same size as the
    boxes on the right side.

Crosshatch I

**Warning:** The entire yoke assembly has very high voltage. To prevent electrical shock, do not touch the yoke assembly, the anode wire, or the yoke wires.

Horizontal Bow   or

Pin Phase   or

Vertical Angle   or

3   To determine which control to adjust, compare the display with the distortions shown.

4   Using a hex-head plastic adjustment tool, adjust the control (see next page for control locations).

Analog
Board

KS   VS

PB   HS   PR
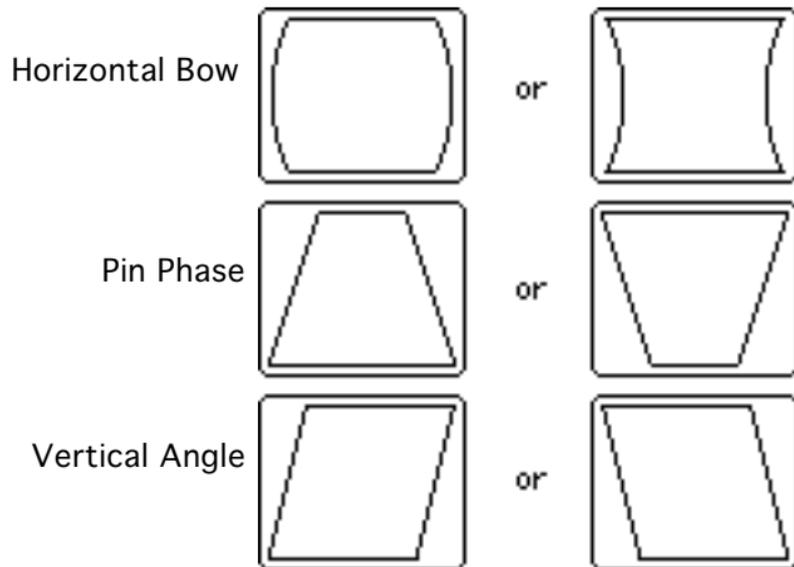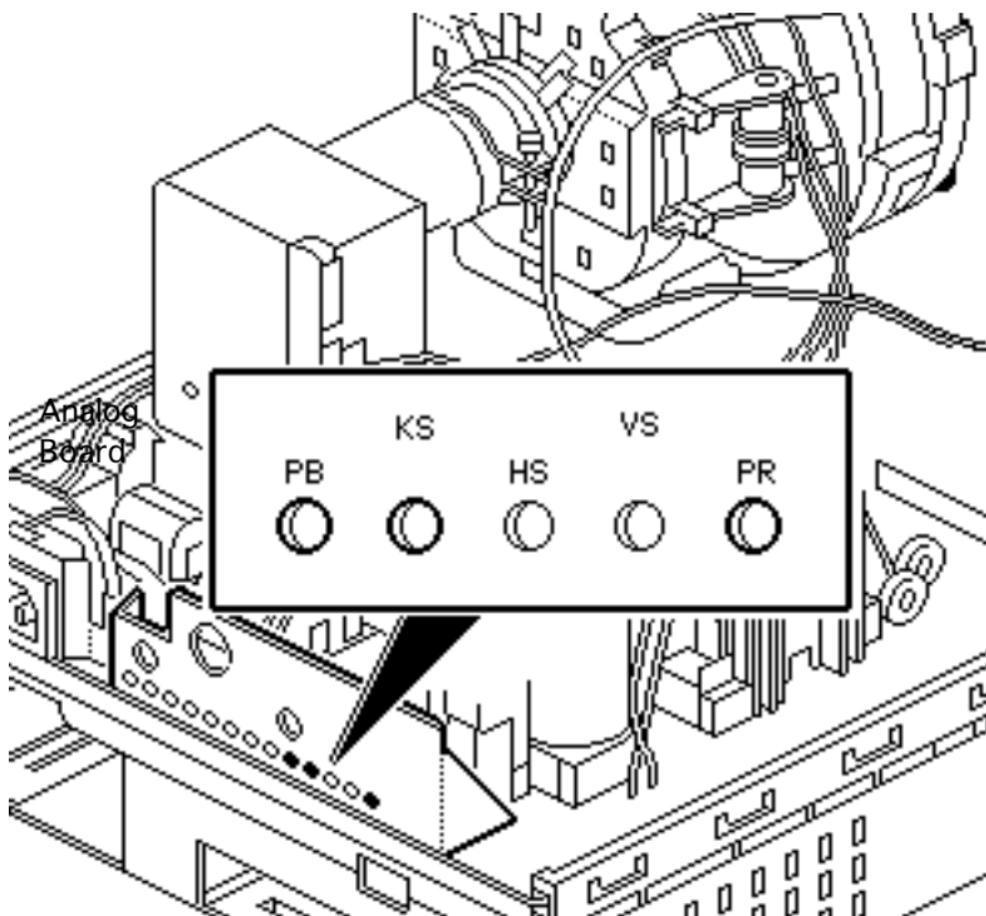
5 Using a hex-head plastic adjustment tool, adjust the control that is appropriate for the distortion.

6 If the display is so distorted that you can't tell which adjustments to make, perform the adjustments in the following sequence:
   • Pin Phase (KS)
   • Vertical Angle (PR)
   • Horizontal Bow (PB)

7 If the display is still distorted, repeat the vertical angle and pin

phase adjustments. If you can't correct the distortion, replace the analog board. See "Analog Board" in the Take Apart chapter.

Plastic Yoke Collar

Yoke Clamp Screw

WARNING:
High Voltage Areas
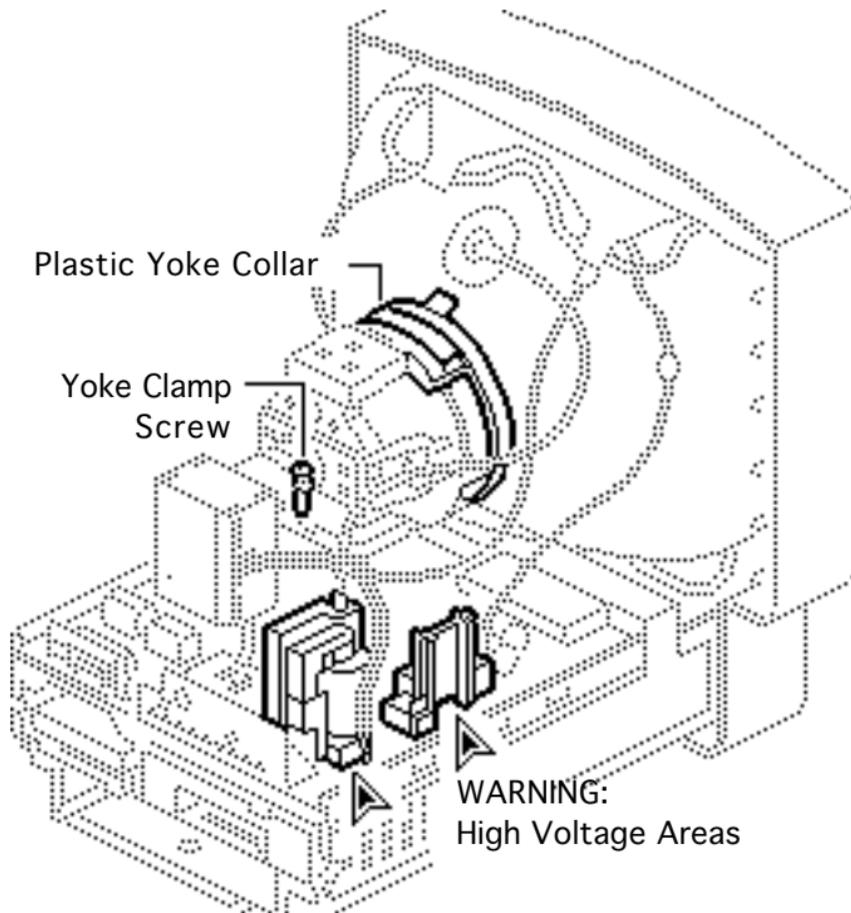
Yoke

Before you begin, remove the rear cover.

⚠Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.
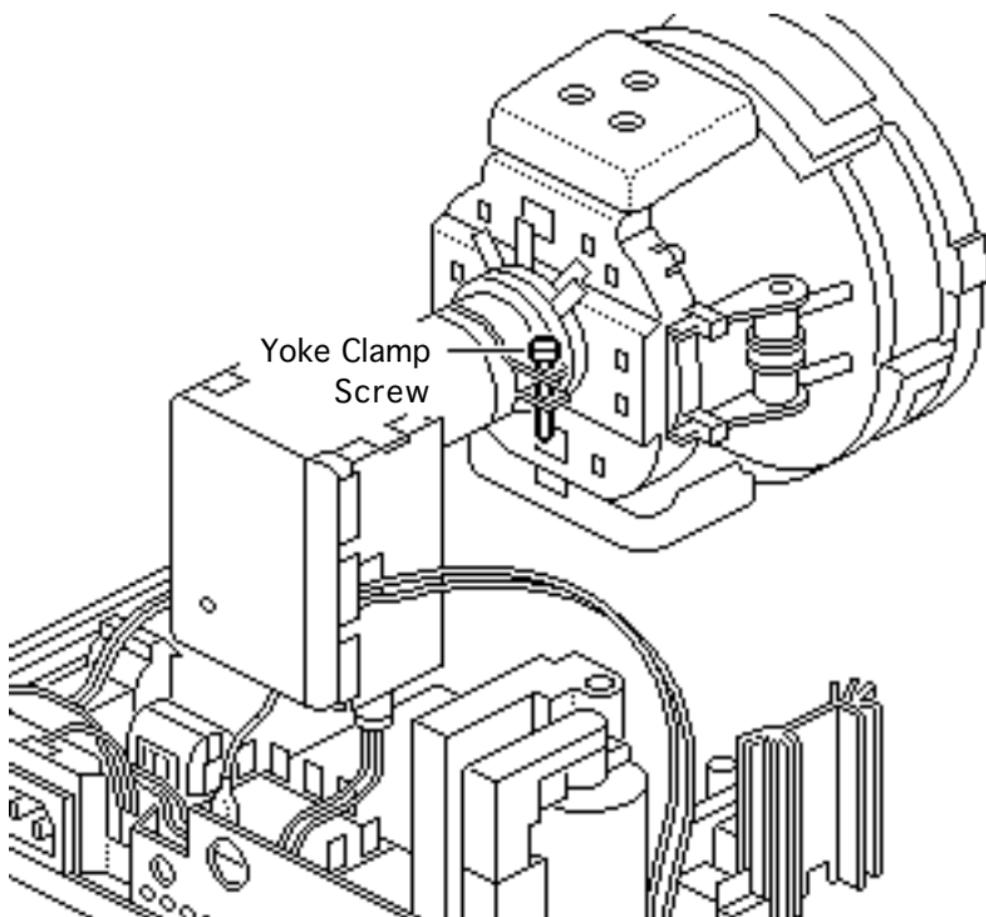
⚠ Warning: Because you must make yoke adjustments from the rear of the computer, use a mirror to view the computer screen. Do not reach around the computer to adjust collars and rings.

Note: If you replace the CRT, you will probably need to adjust the yoke.

Yoke Clamp Screw

1 Using an insulated Phillips screwdriver, loosen the yoke clamp screw two or three turns.

2 Switch on the computer.

3 With one hand, grasp the plastic yoke collar and rotate it until the top and bottom edges of the picture are parallel with the top and bottom of the bezel.

Plastic Yoke Collar
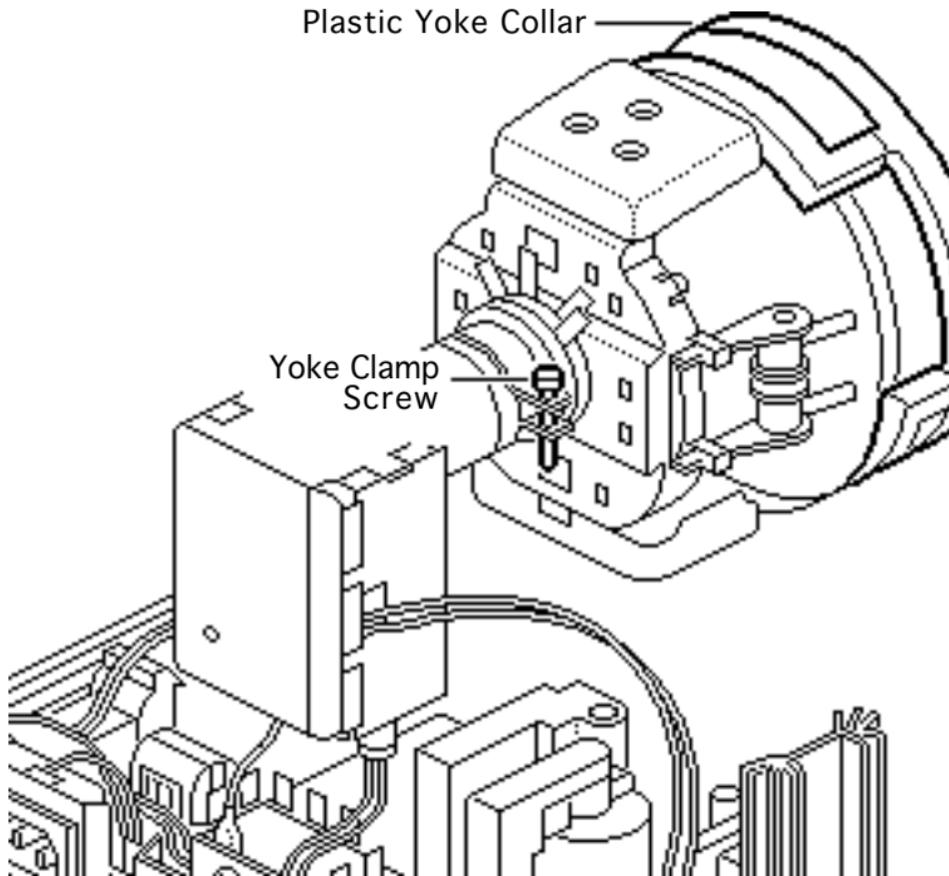
Yoke Clamp
Screw

4 Switch off and unplug the computer.

5 Discharge the CRT.

6 Hold the plastic yoke collar in position and carefully tighten the yoke clamp screw so that the collar cannot slip. Do not overtighten the screw.

7 Replace the rear cover and switch on the computer.

8 Verify that the top and
bottom edges of the
picture are parallel with
the top and bottom of the
bezel.

Side Switch
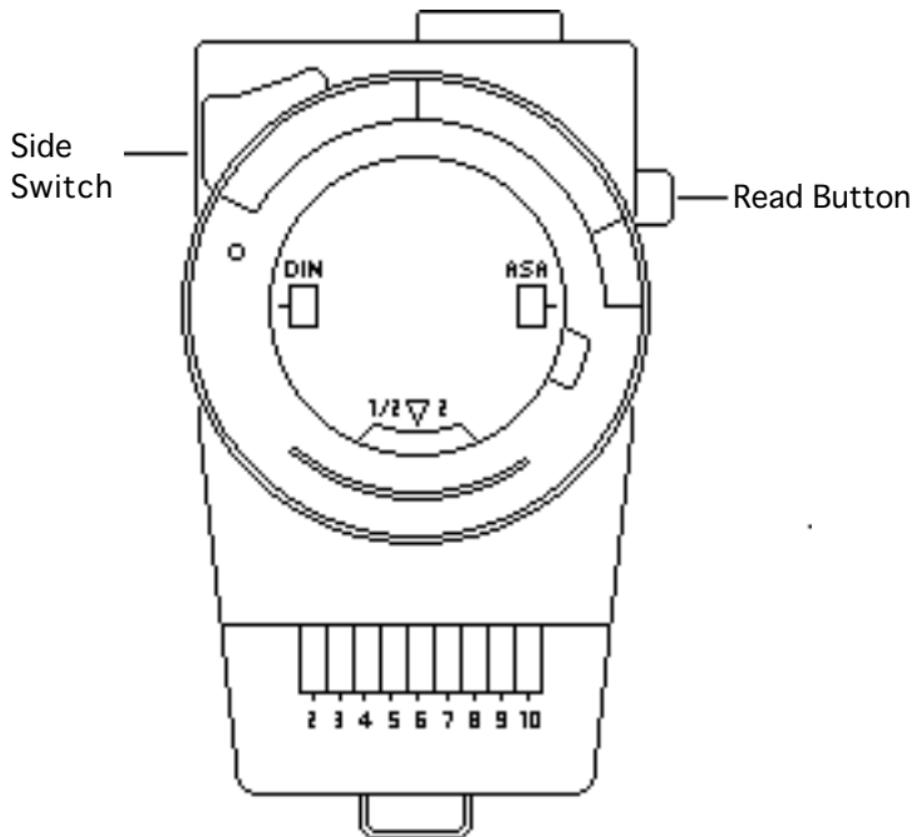
Read Button

Light Meter Setup

Note: This topic covers setup for two light meters: Models L-248 and 246.

Model L-248

1   Press the red button on the back of the light meter. If the reading is out of the red bar, replace the battery.

2   Luminance tests will instruct you to move the side switch either to the low position (2-10) or

the high position (10-18) to get a reading.

3   Uncover the lens of the meter.

4   Place the lens against the middle of the screen and press the Read button.

Lens

Red Scale

Model 246

Note: Remove the metal slide, if installed, from the top of the light meter. Install the white lens with the red dot.

1   Rotate the lens for the meter so the lens faces the monitor and the scale faces you.

2   Use your hand to shield the lens from ambient light.

3   Place the lens against the middle of an all-white screen.
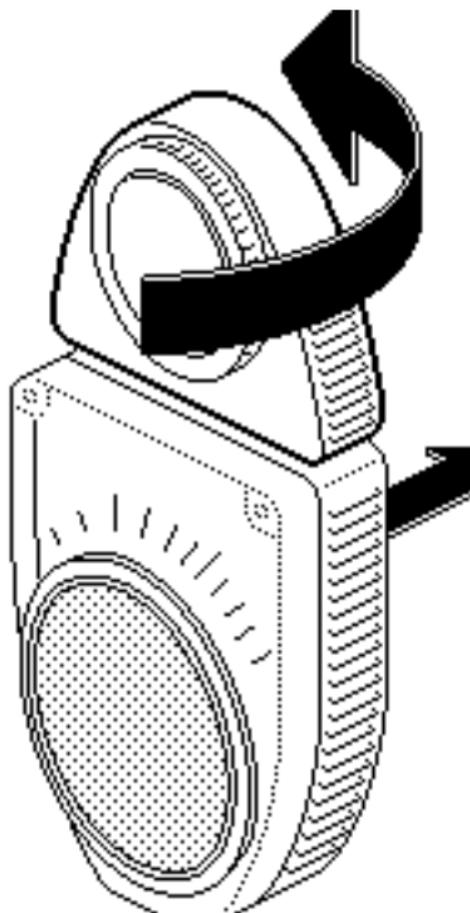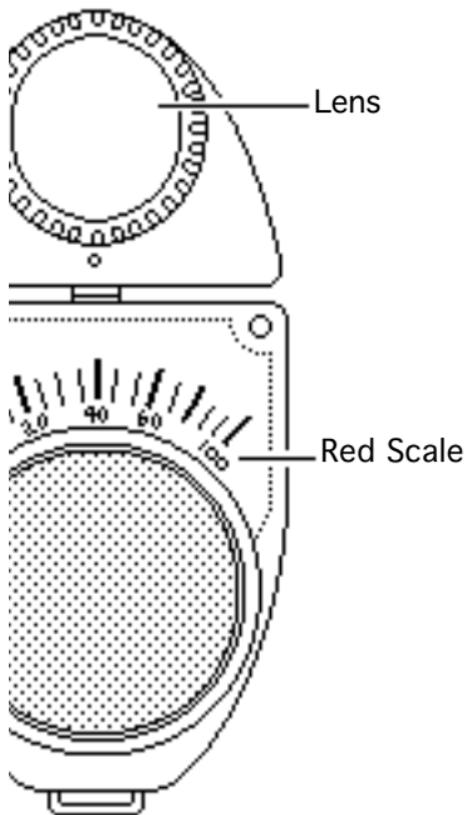
4   Read the red scale while
    you perform the
    Brightness and Contrast
    adjustments in the Video
    topic.

Exploded View

Macintosh TV

Exploded View

Screw (5)

Rear Housing
922-0883

I/O Door
922-0884

Screw

Rear Case
Access Cover

Rear Case
Access
Cover Shield

Fan
922-1803

Rubber Feet

Internal
Microphone
Assembly

CRT
661-1666

Front Bezel
922-0881

Analog Board
661-0872

Hard Drive
Connector
Adapter
922-1820

Drive Bezel
922-0882

Hard Drive
661-1750

Hard Drive
Carrier
922-1806

Screw (4)

Logic Board
6ii61-1724

Floppy Drive
Shield
922-1808

Floppy
Drive
661-0474

Screw (4)

Floppy
Drive
Carrier
922-1807

Chassis
Harness
Assembly
922-0767
922-1824

Floppy Drive
Connector Adapter
922-1823

CD
Audio
Adapter
922-1822

CD
Connector
Adapter
922-1821

CD-ROM Drive
661-0023

CD-ROM
Drive Carrier
922-0850

Screw (4)