Macintosh Portrait Display

Basics

Macintosh Portrait Display

International "Series B"

Apple produced domestic and international versions of the Portrait Display. The troubleshooting and repair procedures differ for each version of the monitor. This manual covers the domestic version only. For documentation on the Portrait Display "Series B," refer to the international manual.

# Monitor Distortion

Overview

Ideal Raster

All large-screen monitors are susceptible to distortions caused by environmental conditions. These distortions are usually not visible on monitors with smaller screens.

Important: Even monitors set to factory specifications may appear distorted when set up in a new environment.

Right Edge
Not Straight

Common environmentally-caused distortions are shown on this and the following pages. Always check first for environmental causes before attempting to repair or adjust a monitor with a distorted raster.

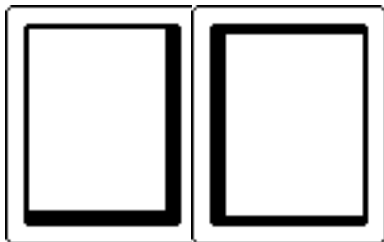Raster Shifted
Up and Left
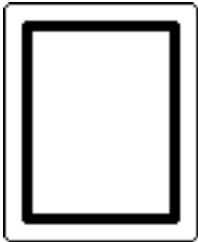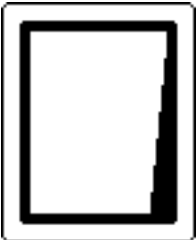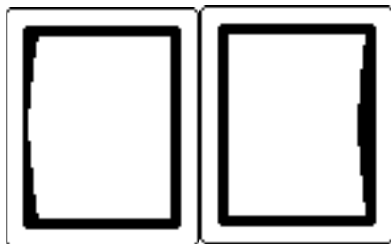
Raster Shifted
Right

Environmental Influences

The following environmental conditions may distort the raster of a Portrait Display:

• Proximity to metal objects, such as metal desks, file cabinets, and bookshelves. Metal objects affect the earth's magnetic field. Earth magnetism usually distorts only the edges of the screen.

• Fluorescent lights, other monitors, or electronic appliances such as coffee makers and copy machines. These objects cause dynamic raster distortion, that is, movement or jitter of the image.
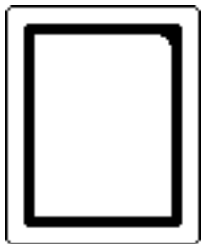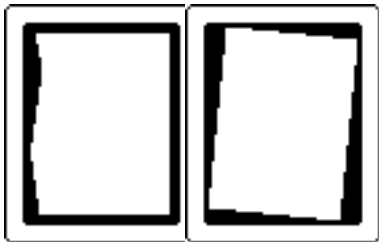
Left Side
Bowed Out

Right Side
Bowed In

Upper-Right Corner
Rounded

S-Shaped
Left Edge

Raster Tilted
Right

Troubleshooting

Important: Module swapping cannot fix a monitor with environmental distortion problems, and adjusting a monitor with such problems alters the factory settings.

Note: If the monitor has shifted up/down or right/left only, go ahead and adjust it using the centering controls. However, keep in mind that if you then move the monitor you may need to readjust the centering controls.

Before adjusting a monitor with a distorted raster, try the following:
• Swivel or move the monitor, or
• Remove the monitor from the building and recheck it in another location.

If the display changes (for better or worse) when you move it to another location, the environment is the source of the problem. Relocate the monitor or remove the distortion-causing object.

If the display does not change when you move it to another location, continue troubleshooting the problem (refer to Troubleshooting/Symptom Charts).

Specifications

Macintosh Portrait Display

Characteristics

Picture Tube   15-in. diagonal screen
                        Phosphor EIA Type P4 (white)
                        Flat, square, high-contrast, antiglare surface

Screen Resolution   640x870; 80 dpi
                        Analog 1-, 2-, 4-, or 8-bit pixel depth; permits 256 grays at
                            8 bits/pixel

Scan Rates   Vertical refresh rate: 75 Hz
                        Horizontal scan rate: 68.85 kHz
                        Dot clock: 52 MHz

Active Video Display Area   8 in. by 10.87 in. (203 mm by 276 mm)

Input Signal   Video: analog; RS-343 standard

Controls and Ports

User Controls   Rear panel: power switch
                           Right side: brightness and contrast controls

I/O Ports   Three Apple Desktop Bus (ADB) connectors

Physical and Electrical

Power Supply   Universal power supply
                          Voltage: 90–270 VAC, self-configuring
                          Frequency: 47–63 Hz
                          Power: 75 W maximum

Size and Weight   Height: 13.1 in. (332 mm)
                          Width: 11.5 in. (292 mm)
                          Depth: 14.9 in. (379 mm)
                          Weight: 35 lb. (16 kg)

Operating Environment

Temperature   50°F–95°F (10°C–35°C)

Humidity   90% maximum, noncondensing

Altitude   10,000 ft. (3,048 m) maximum

Troubleshooting

Macintosh Portrait Display

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

No Raster

No raster, LED off

1. Ensure monitor's video cable is connected to the computer or the video card in the computer.
2. Check power cord connections.
3. Check internal power connections.
4. Replace blown fuse.
5. Replace power/sweep board.
6. Replace video board.

No Raster **(Continued)**

No raster, LED on

1 Ensure monitor's video cable is connected to the computer or the video card in the computer.
2 Adjust brightness and contrast knobs.
3 Verify that video card in computer is working properly.
4 Perform video adjustments.
5 Check internal power connections.
6 Replace power/sweep board.
7 Replace CRT board.
8 Replace video board.
9 Replace CRT.

Geometry

Raster not centered

1. Verify that distortion is not due to environmental conditions. Move monitor to another location.
2. Perform horizontal or vertical center adjustments.
3. Replace power/sweep board.
4. Replace CRT.

Raster bulges along top of screen

1. Verify that distortion is not due to environmental conditions. Move monitor to another location.
2. Replace CRT.

Raster stretched or compressed at top

1. Verify that distortion is not due to environmental conditions. Move monitor to another location.
2. Perform vertical-linearity adjustment.
3. Replace power/sweep board.
4. Replace CRT.

Geometry **(Continued)**

Raster short (less   1   Perform vertical-height adjustment.
than 10 7/8 in. high)   2   Replace power/sweep board.
                           3   Replace CRT.

Raster narrow (less   1   Perform horizontal-size adjustment.
than 8 in. wide)   2   Replace power/sweep board.
                           3   Replace CRT.

Raster bowed or   1   Verify that distortion is not due to environmental conditions.
barrel-shaped   Move monitor to another location.
                           2   Perform video adjustment.
                           3   Replace power/sweep board.
                           4   Replace CRT.

Geometry **(Continued)**

Raster pyramid   Replace CRT.
shaped (or inverted
pyramid)

Video Display

Picture is too dark or too bright

1. Adjust contrast and brightness knobs.
2. Verify that video card in computer is working properly.
3. Perform video adjustments.
4. Replace CRT board.
5. Replace video board.
6. Replace contrast/brightness board.
7. Replace CRT.

Out of focus

1. Perform focus adjustments.
2. Replace power/sweep board.
3. Replace CRT.

Synchronization

Picture rolls
vertically

1 Verify that video card in computer is working properly.
2 Replace power/sweep board.

One thin, bright,
horizontal line
appears on screen

1 Replace power/sweep board.
2 Replace CRT.

Picture breaks into
diagonal lines

1 Connect another monitor to computer and verify video signal.
2 Replace power/sweep board.

Miscellaneous

Black spots on screen (burnt phosphors)

Replace CRT.

Picture jitters or flashes

1 Check all ground cable connections.
2 Verify that adjacent computer equipment is properly grounded. Move electrical devices away from monitor and shut off fluorescent lights in area.
3 Replace power/sweep board.

Intermittently shuts down

1 Ensure monitor's video cable is connected to the computer or the video card in the computer.
2 Replace power/sweep board.

Take Apart

Macintosh Portrait Display
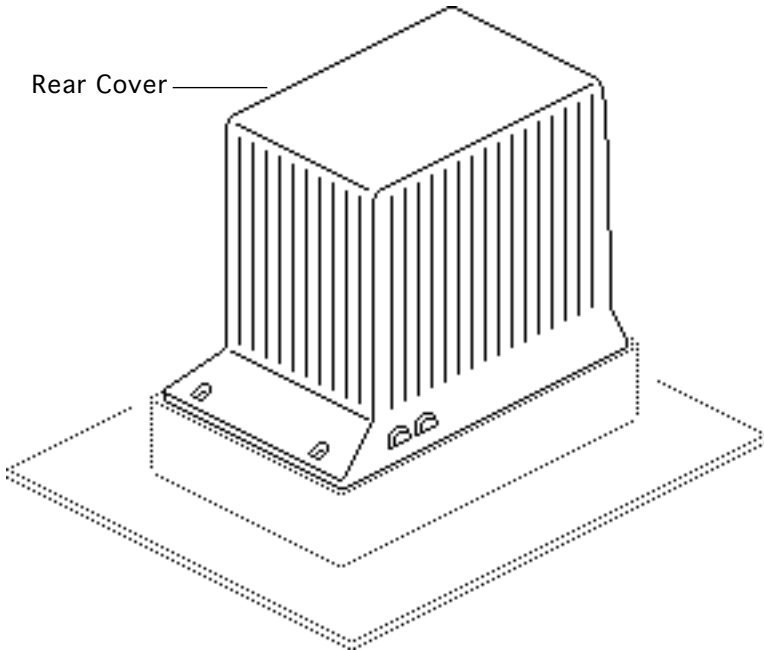
Rear Cover

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.
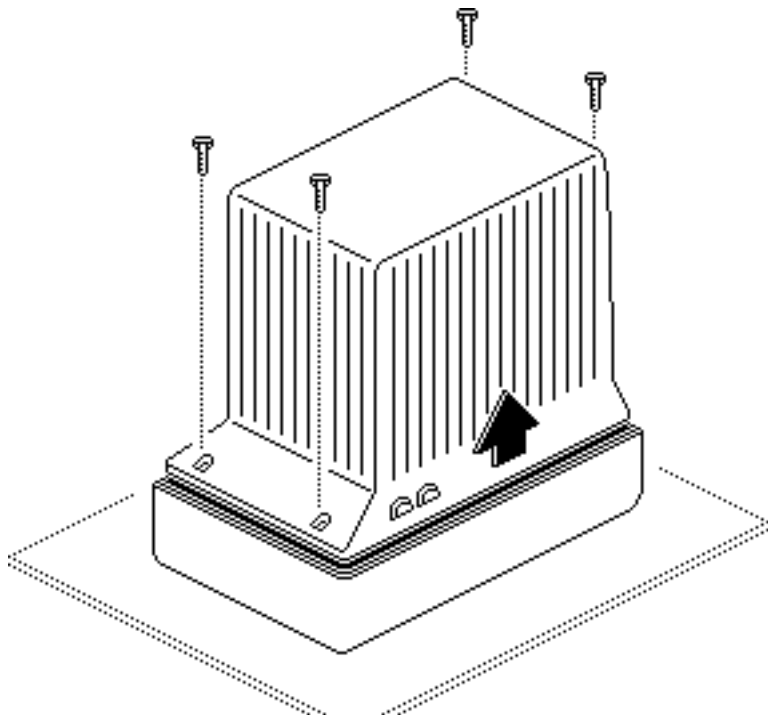
Rear Cover ———

Remove the four case screws
and lift the rear cover off
the bezel.

EMI Shield

EMI Shield

EMI Shield

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 EMI shield includes two metal panels at the top and rear of the monitor chassis. To repair the monitor, remove both panels.
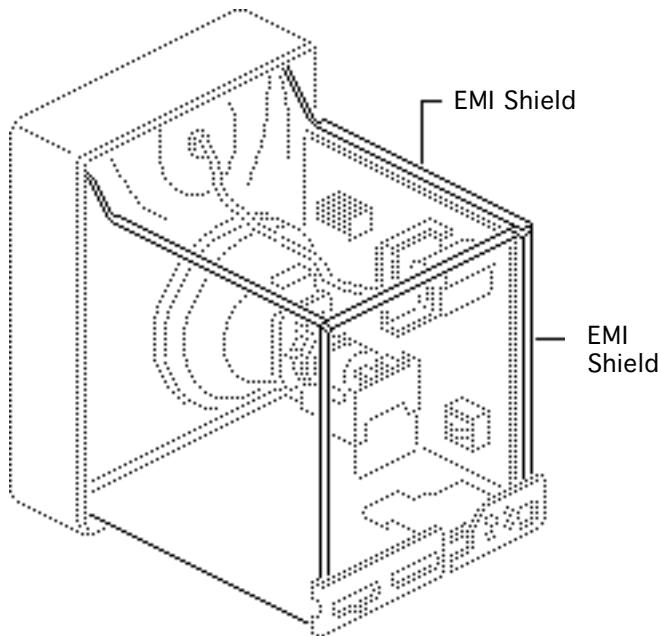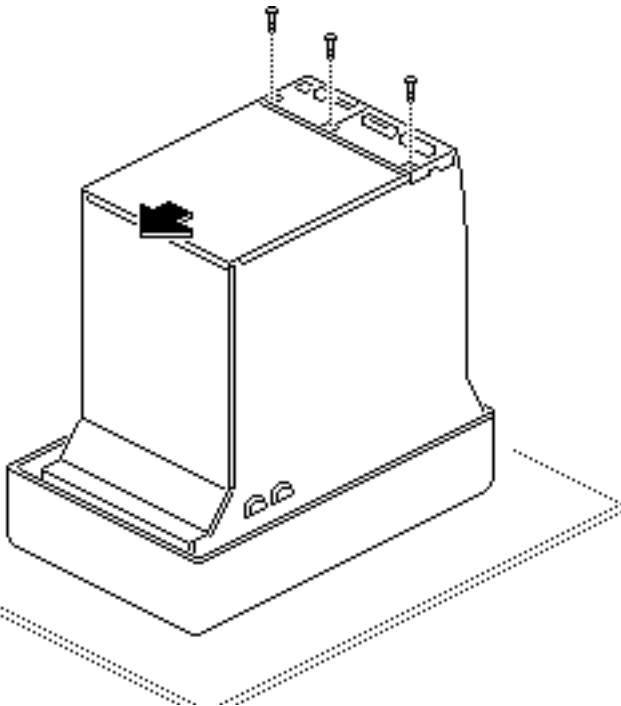
1 Remove the three screws from the rear panel of the EMI shield.

2 Slide the rear panel forward; then lift the rear panel off the chassis.

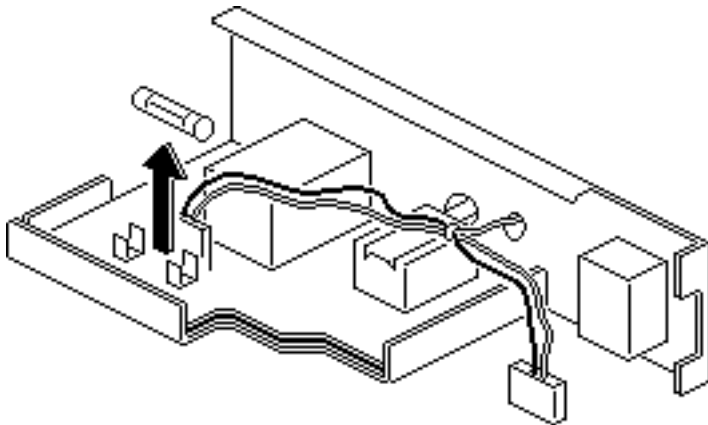3 Pull up and remove the top panel from the chassis.
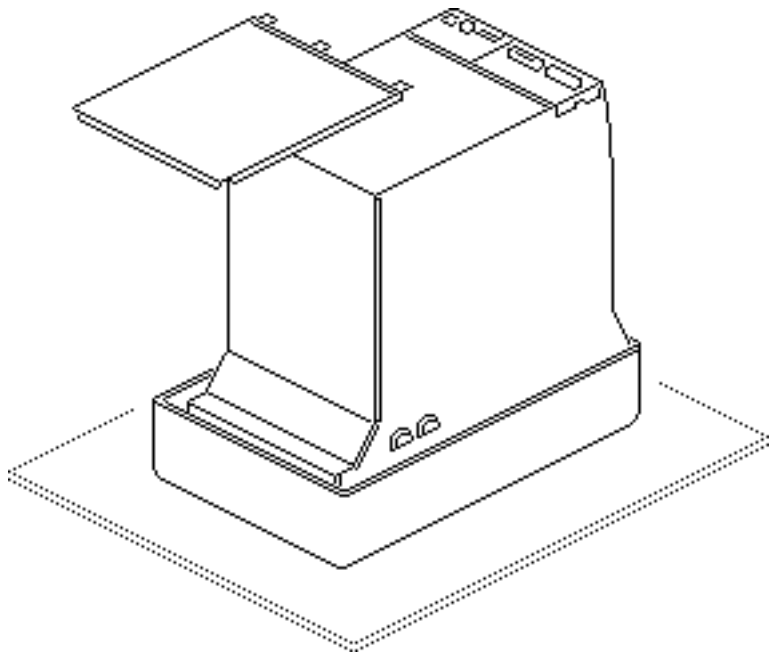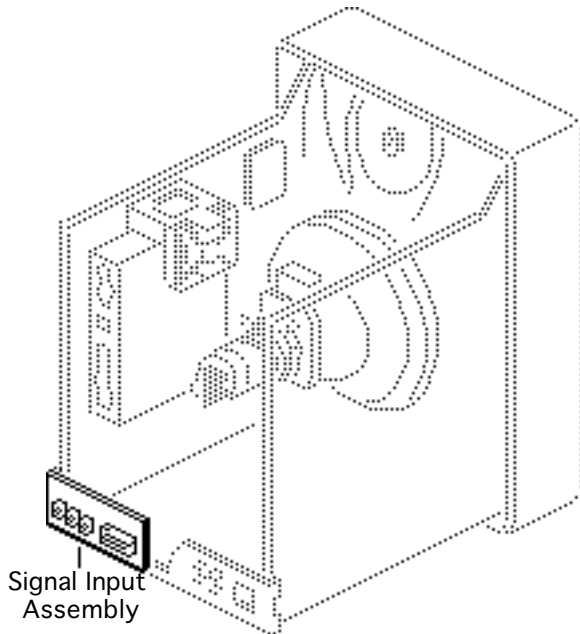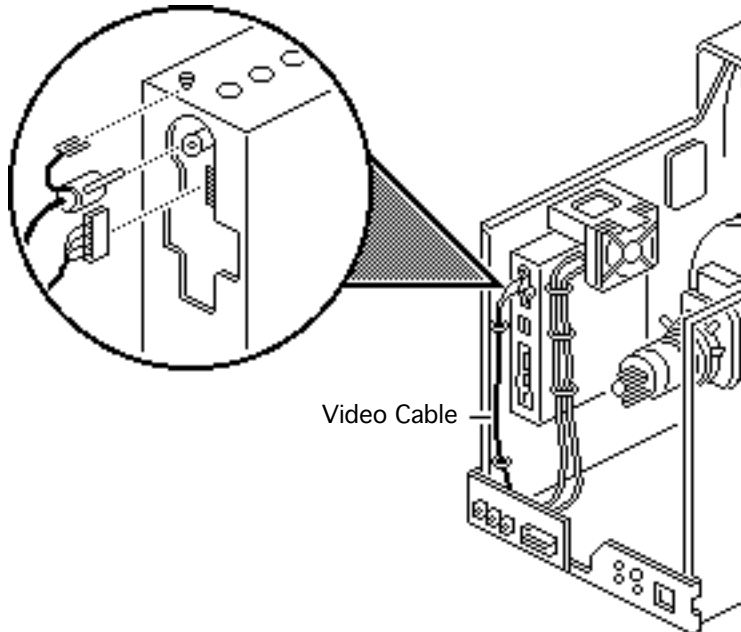
AC Input Assembly

Before you begin,
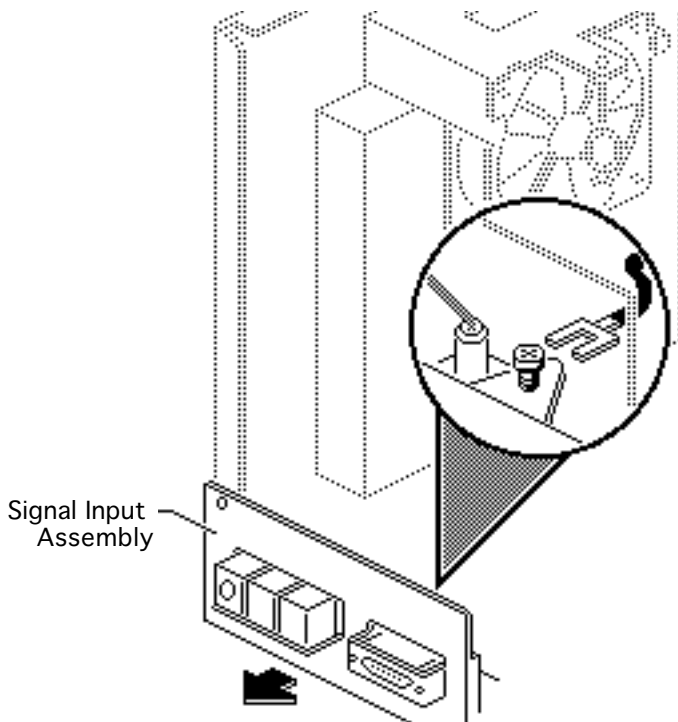
- Remove rear cover
- Remove EMI shield
- Discharge CRT

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

AC Input Assembly

P Connector

Ground Wire
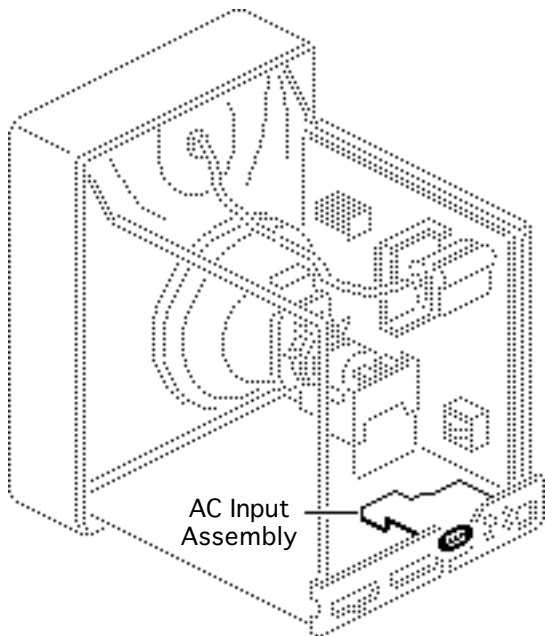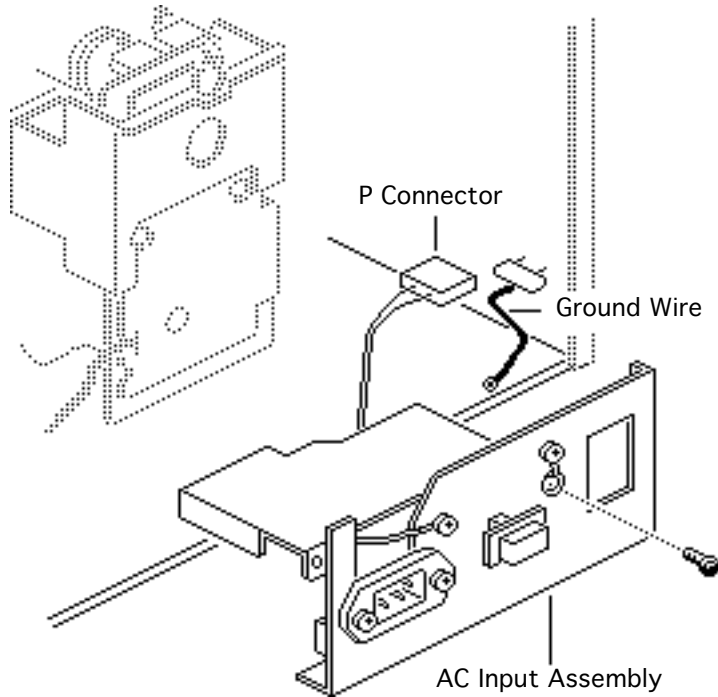
AC Input Assembly

1　Remove the screw that secures the black ground wire to the AC input assembly mounting bracket. Push the ground wire through the hole in the mounting bracket.

2　Lift the AC input assembly from the chassis and disconnect the P connector from the power/sweep board.

Note: Stop here if you are removing the AC input assembly to access another component.
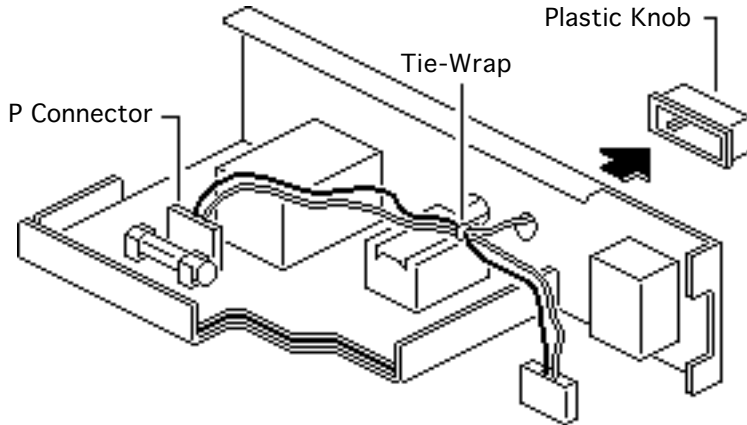
3 Cut the tie-wrap and remove the P connector from the AC input assembly. Keep the P connector.

4 Pull the plastic knob off the On/Off switch. Keep the knob.

Replacement Note: When returning a defective AC input assembly, remove and keep the plastic On/Off knob, the P connector, and the fuse. Install these items on the replacement assembly.

Fuse

Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT
- Remove AC input assembly

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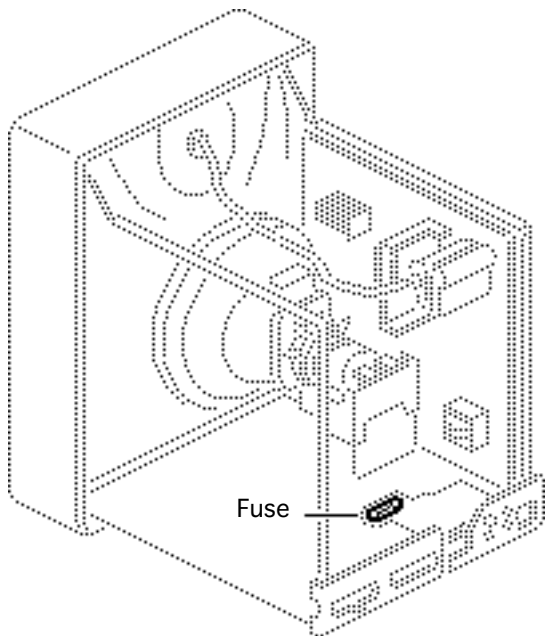
Fuse

Using your fingers or a flat-blade screwdriver, gently pry up one end of the fuse and lift out the fuse.

Signal Input
Assembly

Signal Input Assembly

Before you begin,
- Remove rear cover
- Remove EMI shield
- Discharge CRT

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

Video Cable

1 Loosen the screw at the upper corner of the video board assembly and remove the black ground cable.

2 Disconnect the black video cable (with the attached ground cable) and the 4-wire cable from the video board.

3 Remove the video cable and the 4-wire cable from the two cable clamps.

Signal Input Assembly

4 Loosen the screw on the signal input assembly mounting bracket and remove the black ground cable.

5 Remove the signal input assembly from the chassis.
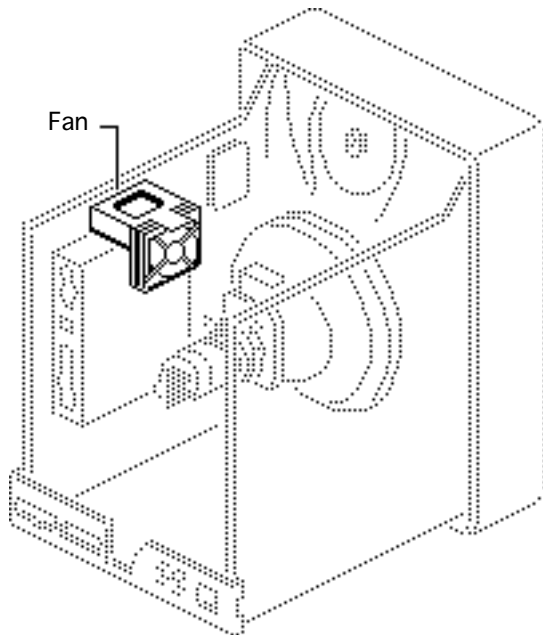
Fan

Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT

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Fan
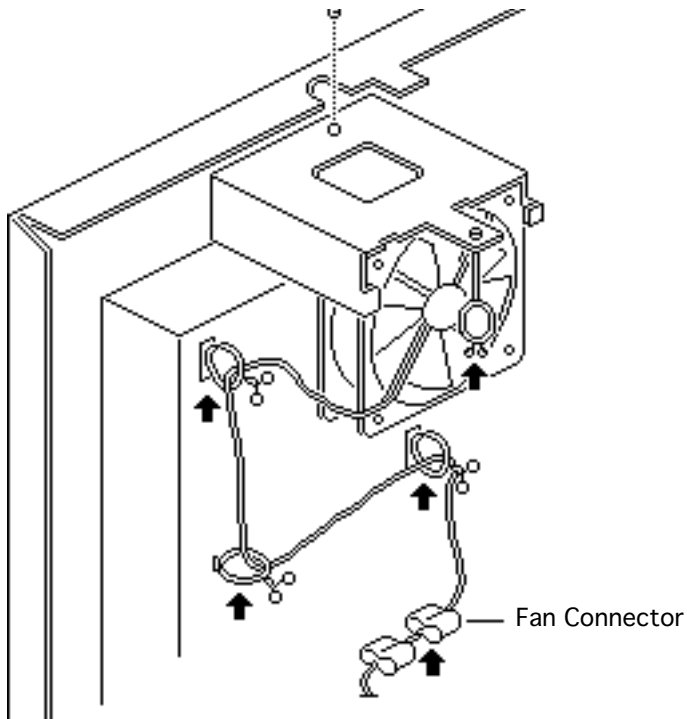
Fan Connector

1. Open the four cable clamps.

2. Remove the screw that secures the fan mounting bracket to the chassis. Remove the mounting bracket, fan, and wire.

3. Disconnect the fan wires at the fan connector and remove the fan from the mounting bracket.

Note: Stop here if you are removing the fan assembly to access another component.
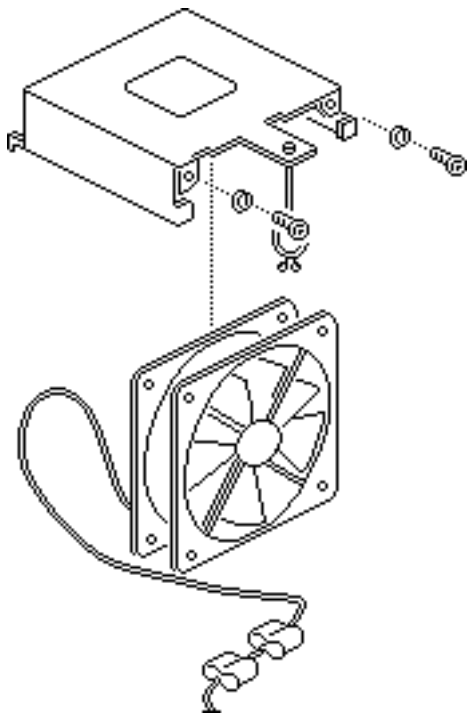
4 Remove the two screws and lockwashers that secure the fan to the mounting bracket.

5 Remove the fan from the mounting bracket.

Video Board

Video Board
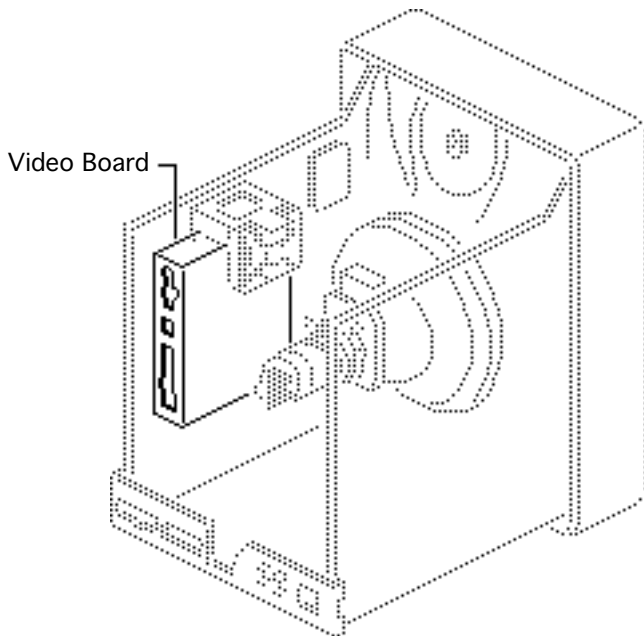
Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT
- Remove signal input assembly
- Remove fan

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Ground Cable
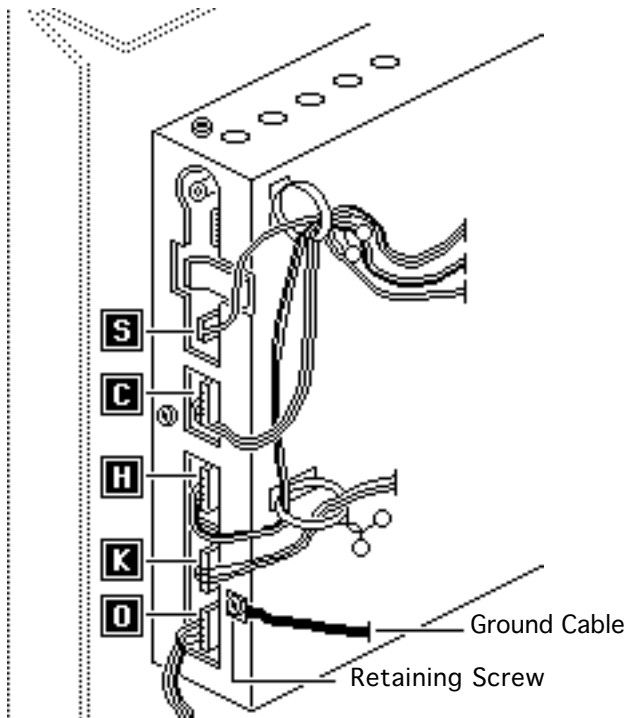
Retaining Screw

1 Remove these connectors from the video board:
   - 3-wire connector S
   - 5-wire connector H
   - 4-wire connector O
   - 6-wire connector C
   - 3-wire connector K

2 Remove all connector wires from cable clamps.

3 Loosen the retaining screw on the video board case and remove the black ground cable.

LED Connector
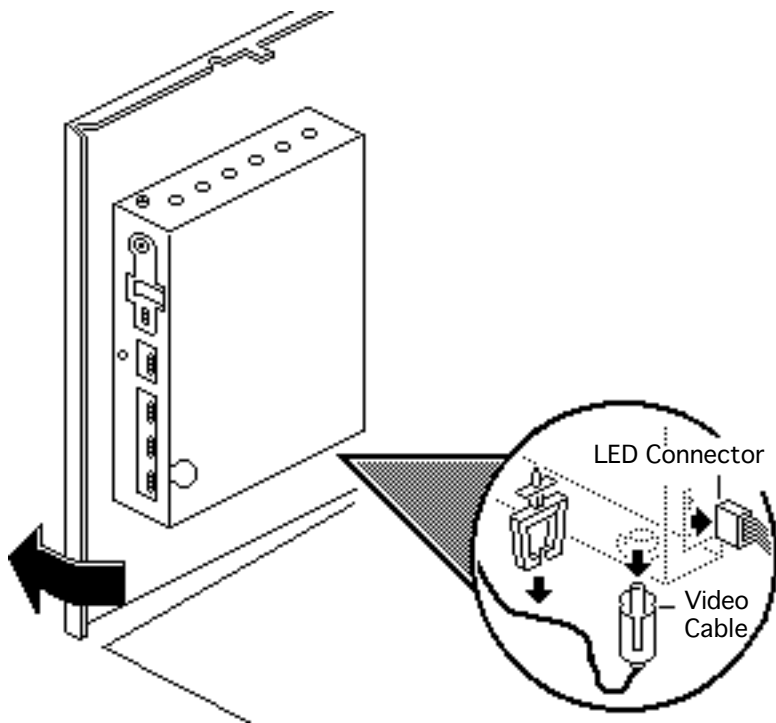
Video Cable

4　Pull open the left chassis panel to access the two cables at the bottom of the video board.

5　Remove the video cable from the cable clamp beneath the video board case and disconnect the cable from the video board.

6　Disconnect the small LED connector from the video board.
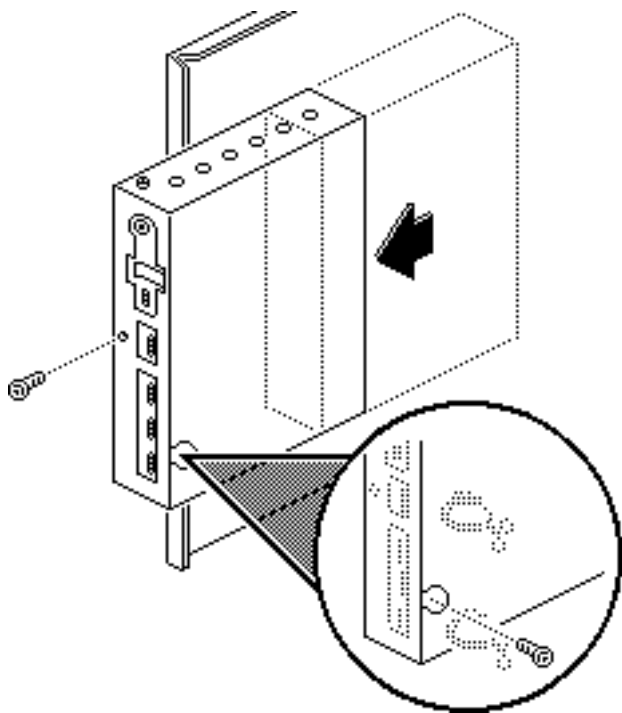
7 Remove the mounting screw and the video board case from the chassis.

8 Remove the video board mounting screw through the back of the video board case.
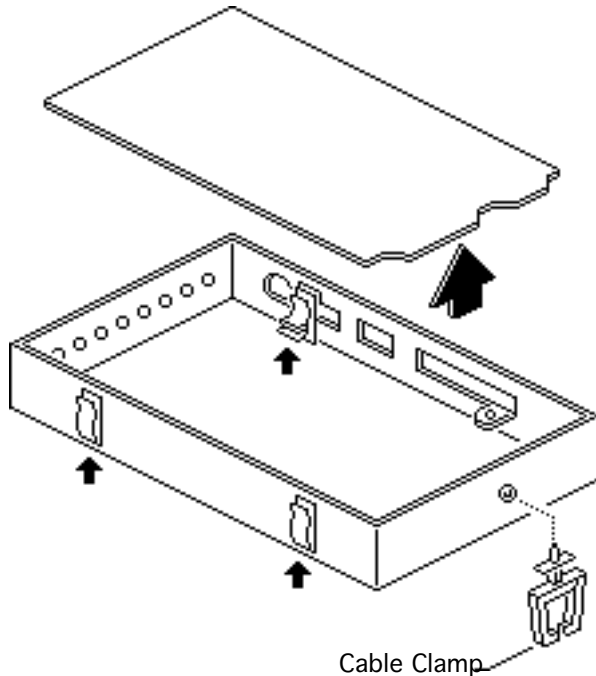
9 Remove the plastic cable clamp from the bottom of the video board case.

10 Depress the three plastic clips and lift the video board out of the case.

Cable Clamp

Contrast Brightness Board

Contrast Brightness Board
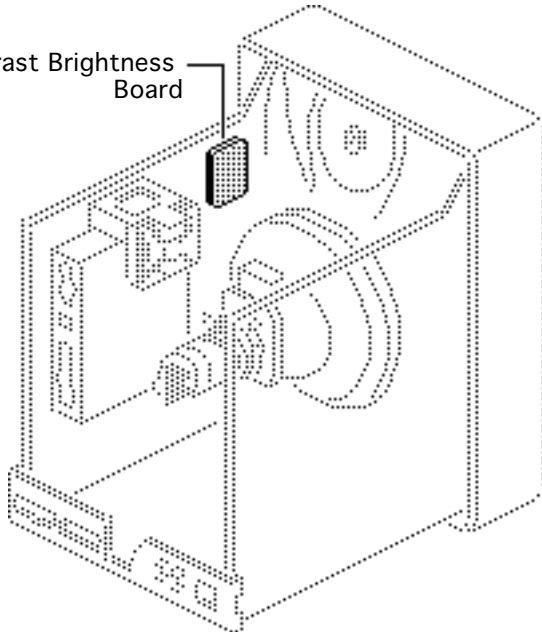
Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT

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Control Knobs

C
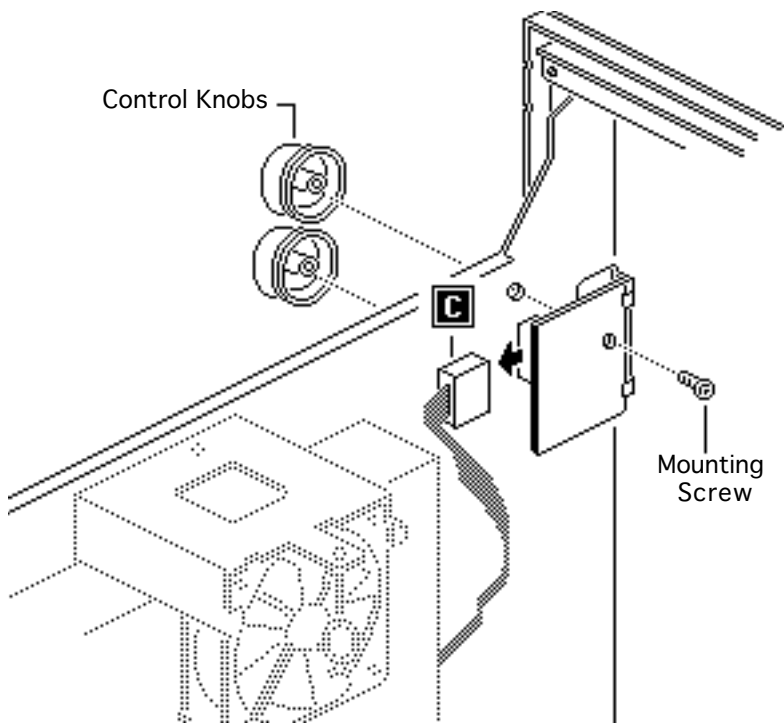
Mounting
Screw

1 Disconnect the C
   connector from the
   contrast brightness
   board.

2 Remove the mounting
   screw from the contrast
   brightness board.

3 Pull off the two control
   knobs and remove the
   contrast brightness
   board. Keep the knobs to
   install on the
   replacement board.

CRT Board

CRT Board

Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT
- Remove AC input assembly
- Remove signal input assembly

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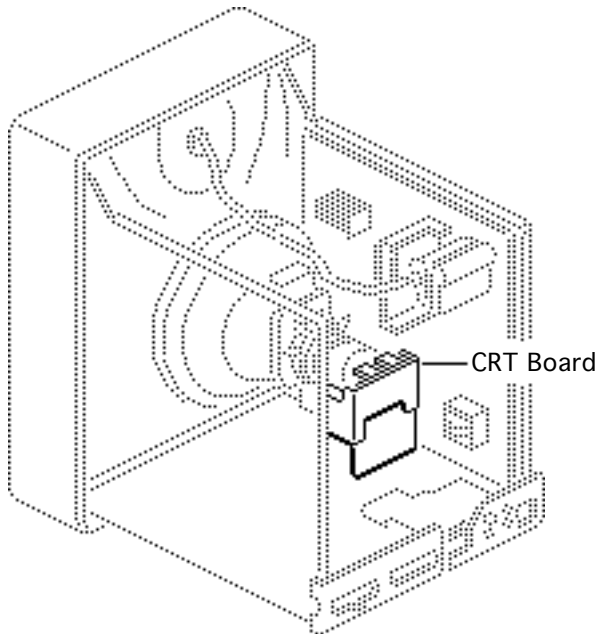
Video Board Case

Ground Cable
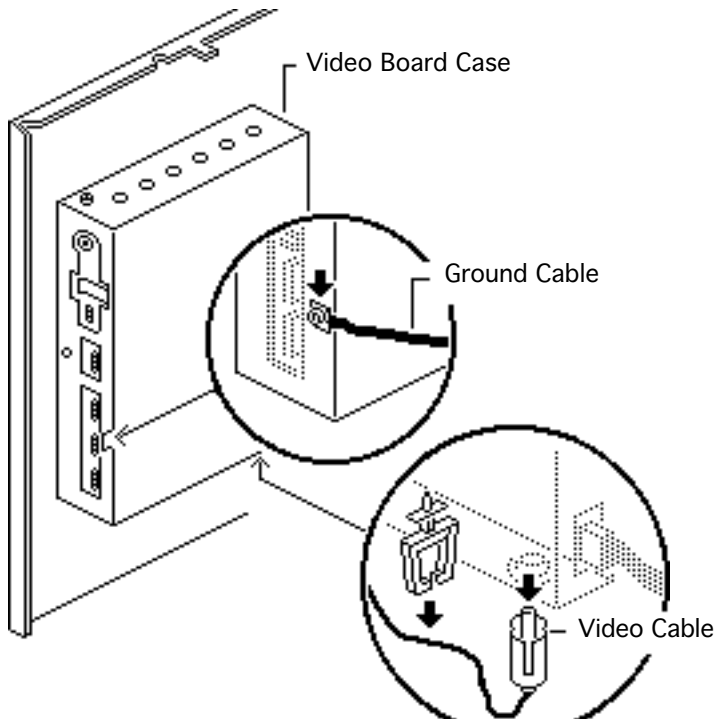
Video Cable

1 Loosen the screw on the video board case and remove the black ground cable.

2 Remove the video cable from the cable clamp beneath the video board case and disconnect the cable from the video board.
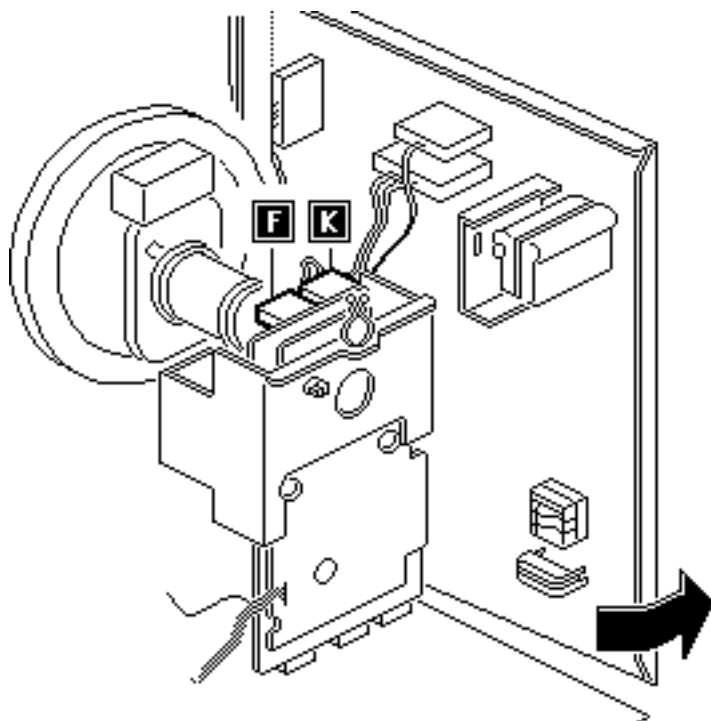
3 Pull open the right chassis panel enough to gain access to the upper connectors on the CRT board.

4 **Caution:** The neck of the CRT is easily damaged. Do not apply force to the neck of the CRT when removing connectors from the CRT board.

Support the CRT board with one hand and disconnect the 2-wire 4-pin connector F, and the 3-wire connector K.
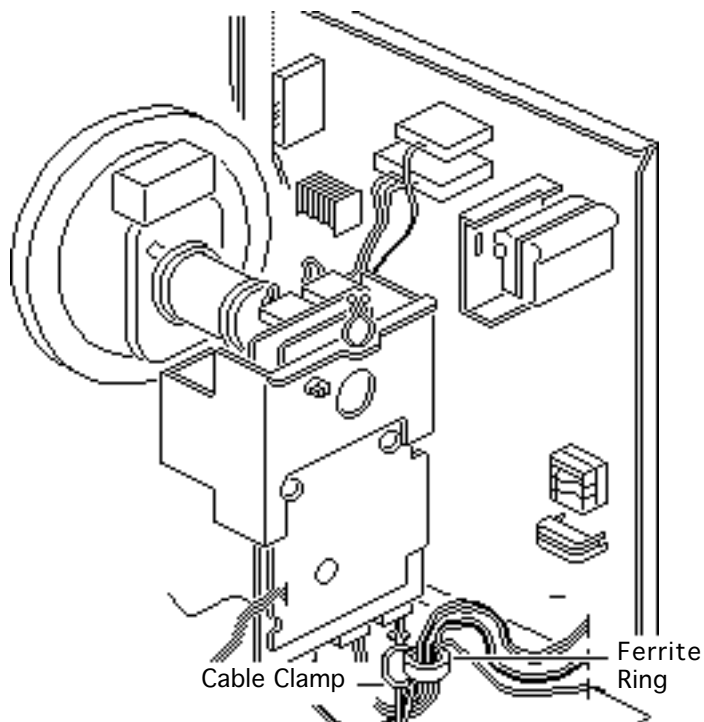
5 Remove the cables and the ferrite ring from the cable clamp beneath the CRT board.

Cable Clamp

Ferrite Ring

Metal Cover
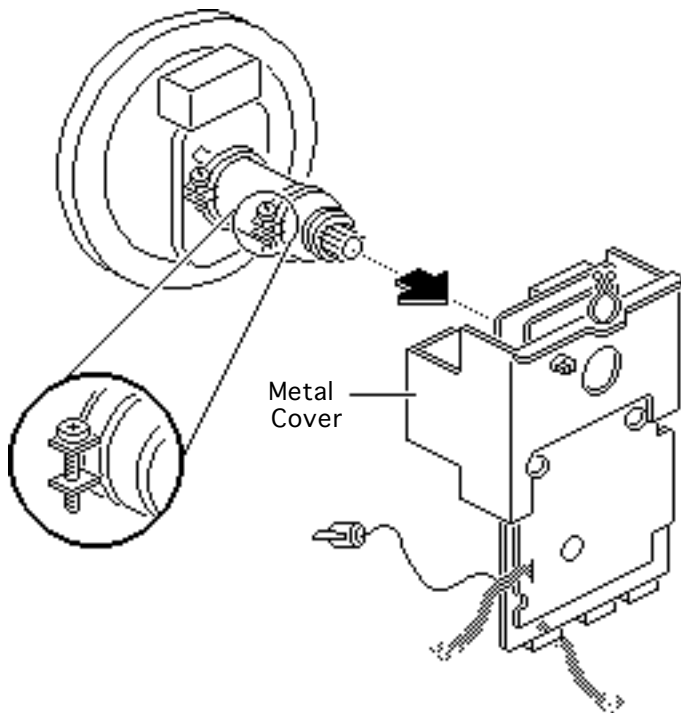
6 Loosen the screw on the ring clamp that secures the CRT board to the neck of the CRT.

7 **Caution:** Twisting, bending, or applying force to the CRT board could damage the neck of the CRT. Pull the CRT board straight off the neck of the CRT.
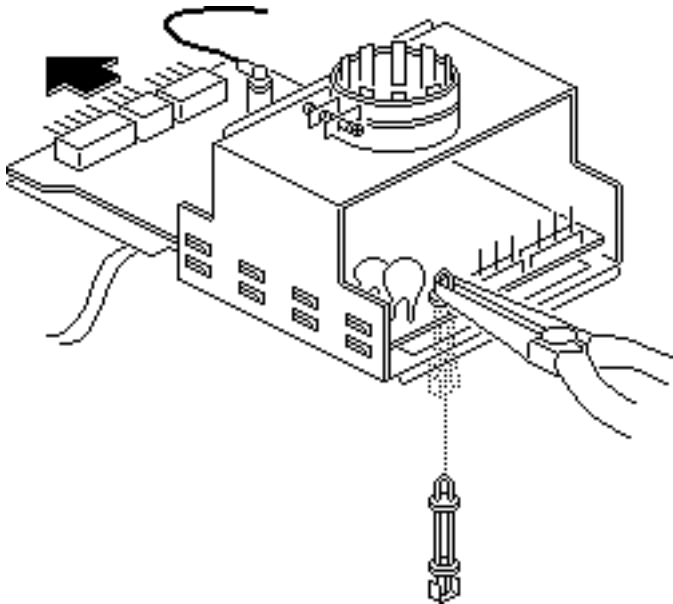
Grasp the metal cover that protects the CRT board and carefully pull the board straight off the CRT.
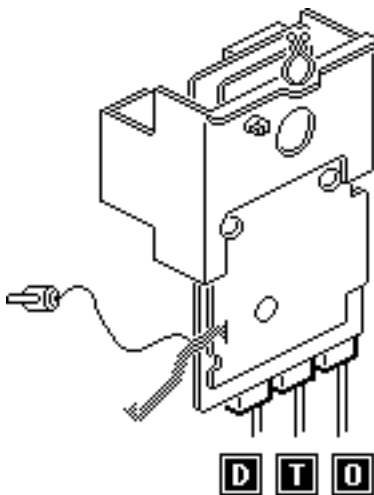
8   Disconnect the following
    cable connectors from
    the bottom of the CRT
    board:
    • 4-wire connector O
    • 4-wire connector T
    • 5-wire connector D

9 Using needlenose pliers, remove the plastic standoff from the bottom of the metal cover. Keep the standoff and use it to install the replacement CRT board.

10 Slide the CRT board out of the metal cover. Keep the cover for installation on the replacement CRT board.
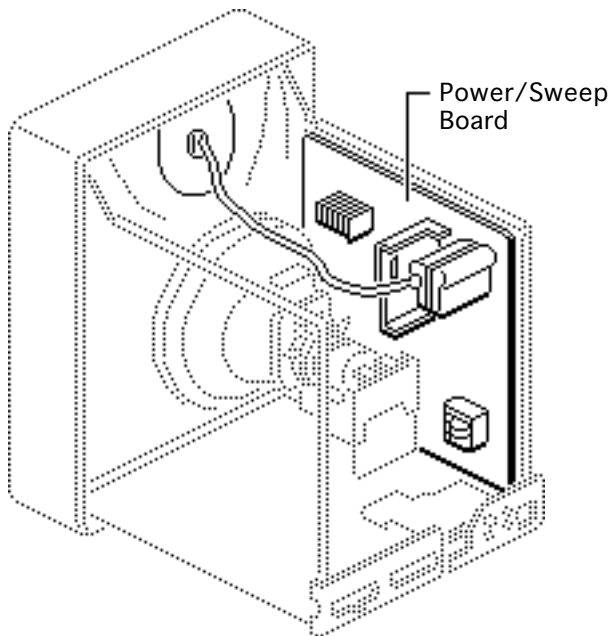
Power/Sweep Board

Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT
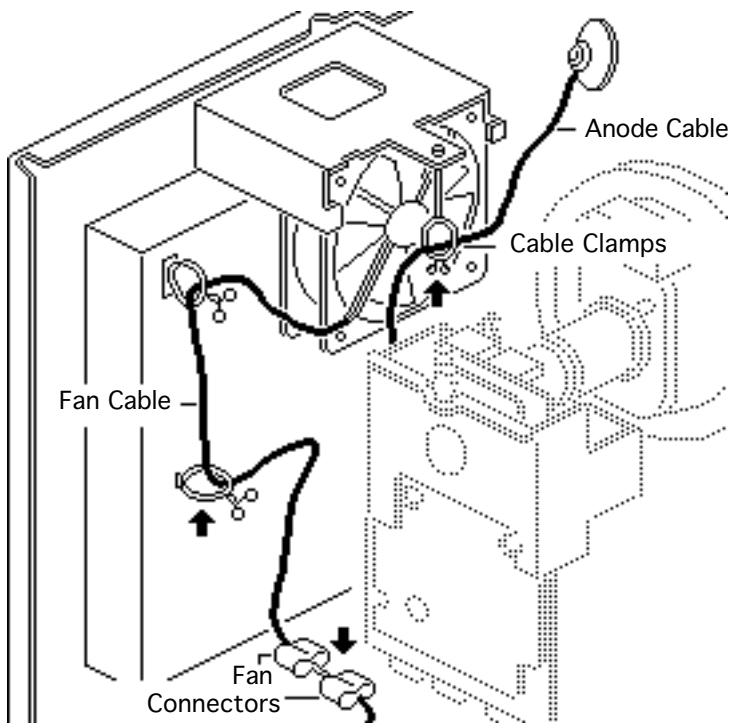- Disconnect anode cap
- Remove AC input assembly

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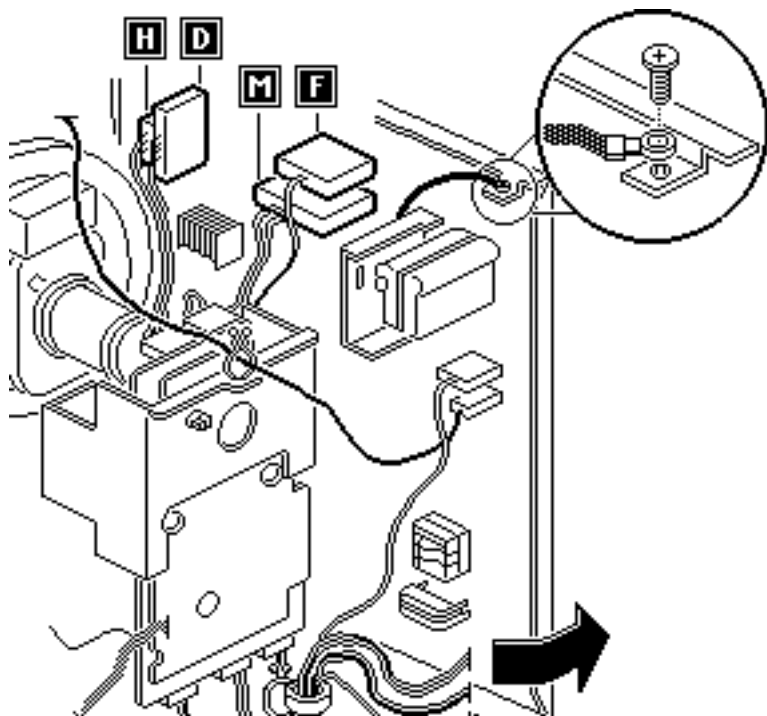
Power/Sweep Board
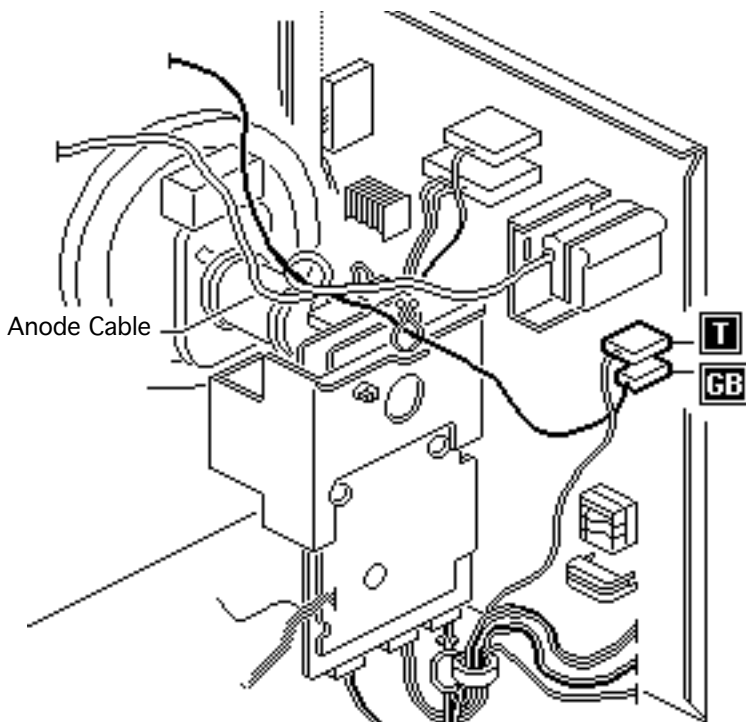
Anode Cable

1 Disconnect the following connectors from the power/sweep board:
   • 2-wire connector T
   • Single connector GB

2 Unravel the GB connector cable from the large red anode cable.

3 Disconnect the fan cable at the fan connectors.

4 Remove the fan cable and the large red anode cable from the three cable clamps.

Anode Cable

Cable Clamps

Fan Cable

Fan Connectors

5 Pull open the right chassis panel.

6 Disconnect the following connectors from the power/sweep board:
- 8-wire connector H
- 5-wire connector D
- 2-wire connector F
- 4-wire connector M

7 Remove the screw that secures the black ground cable to the top of the chassis.
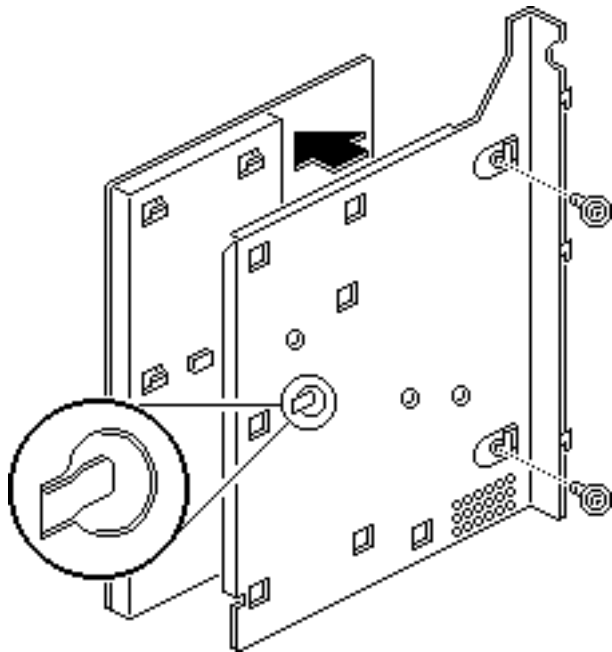
8 Remove the two screws with captive lockwashers from the outside of the right chassis panel.

9 **Note:** Do not attempt to remove the power/ sweep board from its plastic cover. When returning a defective power/sweep board to Apple, return the board and cover as a unit.

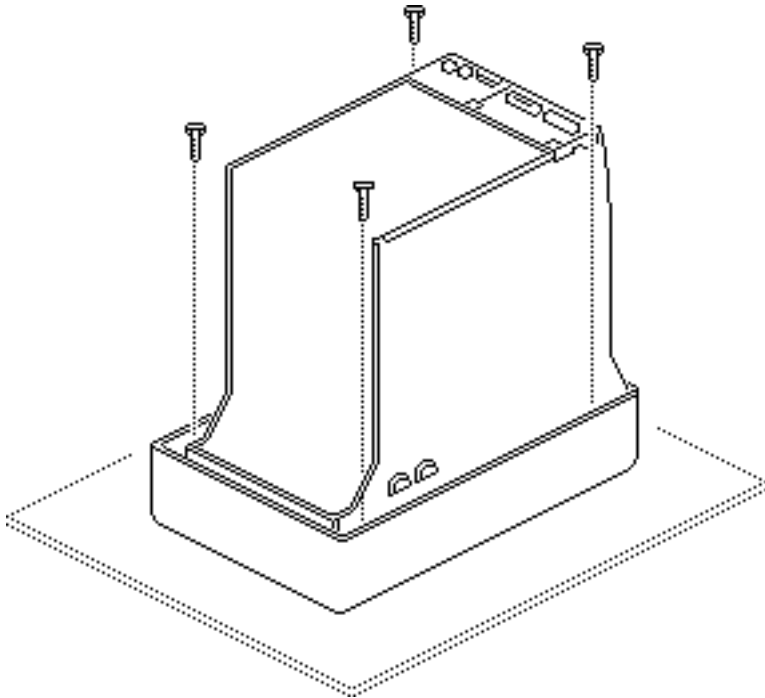Depress the release latch and pull the power/ sweep board off the chassis.
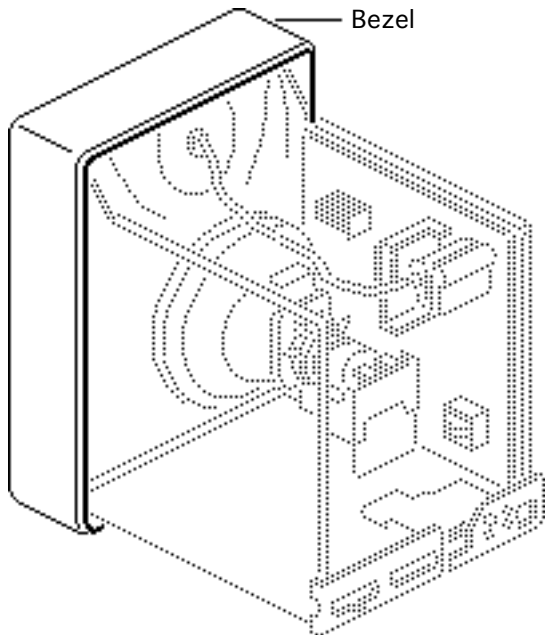
Bezel

Bezel

Before you begin,

- Remove rear cover
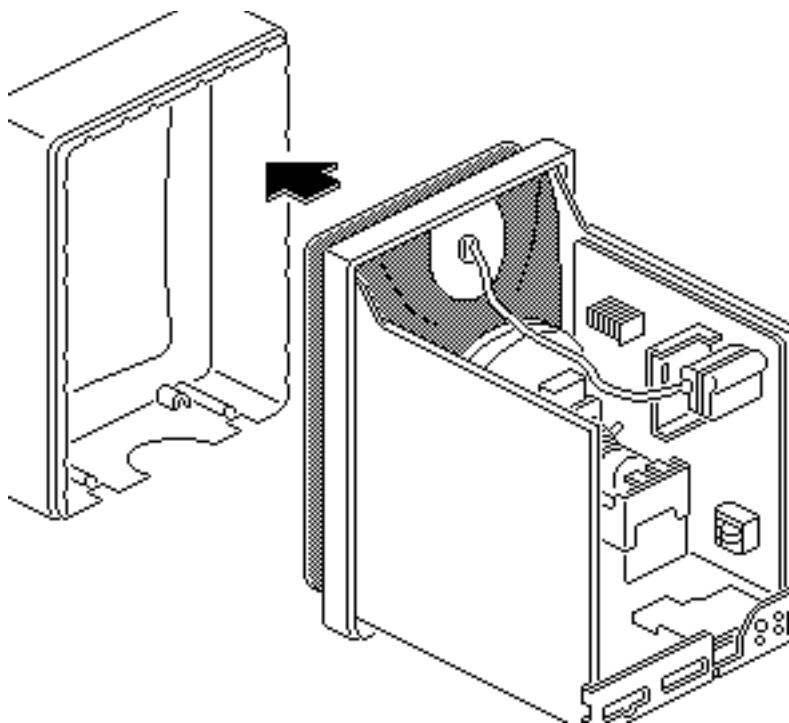- Remove EMI shield
- Discharge CRT

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

1 With the monitor face-down on a protective pad, remove the four screws that secure the bezel to the chassis.

2 Set the monitor upright on a protective pad.

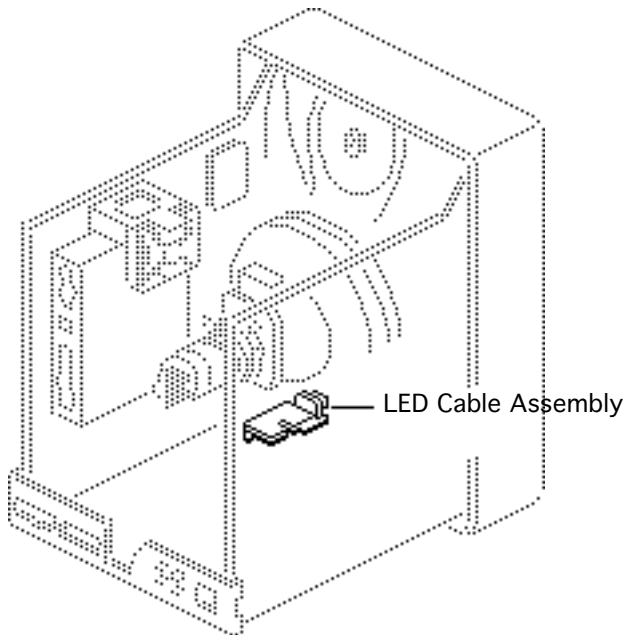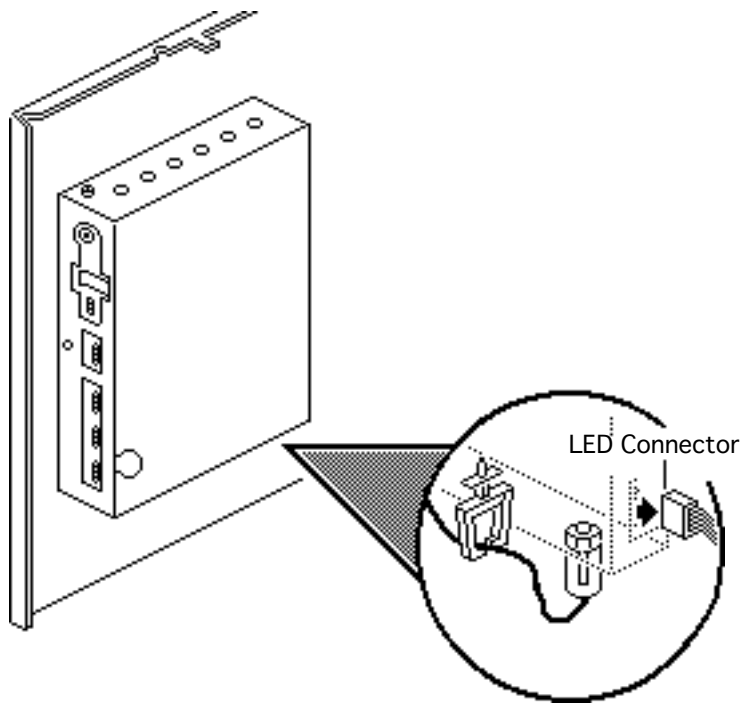3 Slightly lift the chassis and pull off the top and then the bottom of the bezel.

LED Cable Assembly

Before you begin,

- Remove rear cover
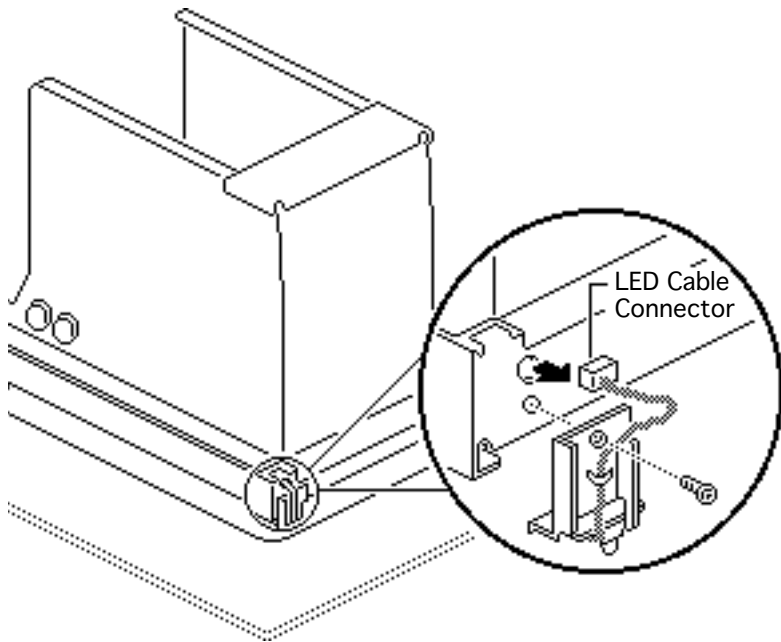- Remove EMI shield
- Discharge CRT
- Remove bezel

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

LED Cable Assembly

LED Connector

1 Disconnect the small LED connector from the bottom of the video board. Remove the LED cable from the cable clamp.
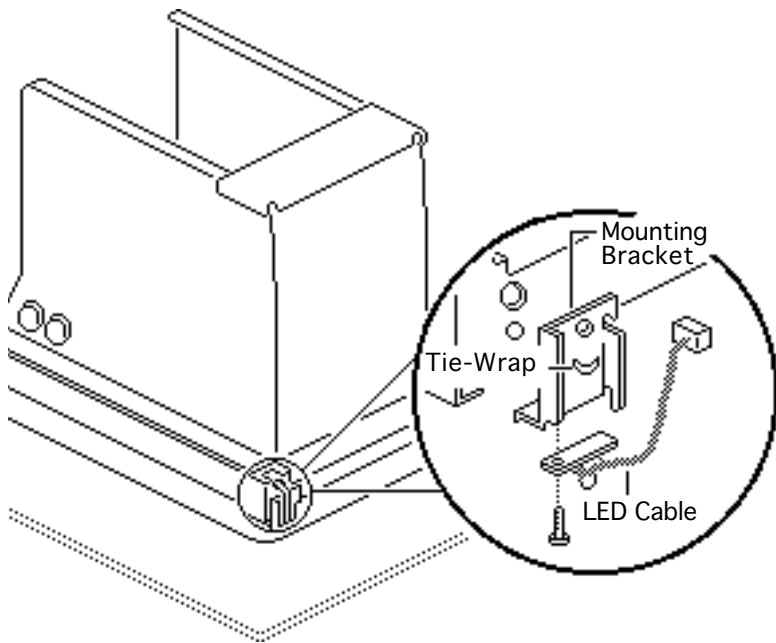
LED Cable
Connector

2   With the monitor face-
    down on a protective pad,
    pull the small LED cable
    connector from the
    chassis access hole.

3   Remove the screw that
    secures the LED
    mounting bracket to the
    chassis.

4 Remove the screw from the LED board.

5 Cut the tie-wrap and remove the LED cable assembly from the mounting bracket.
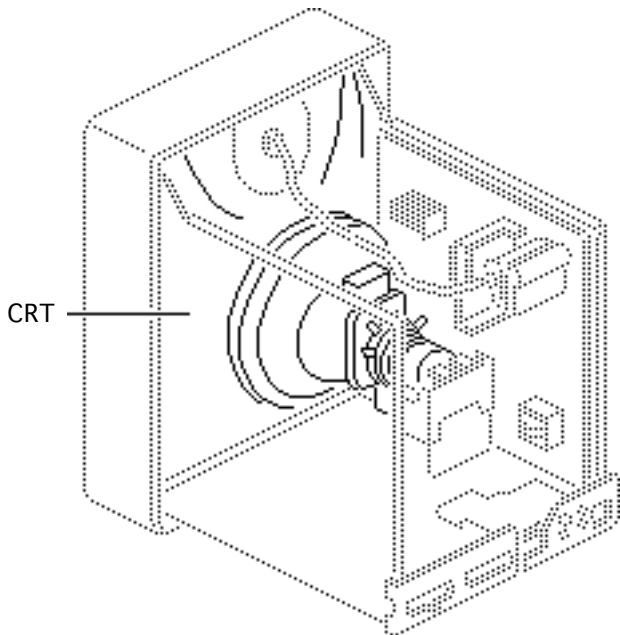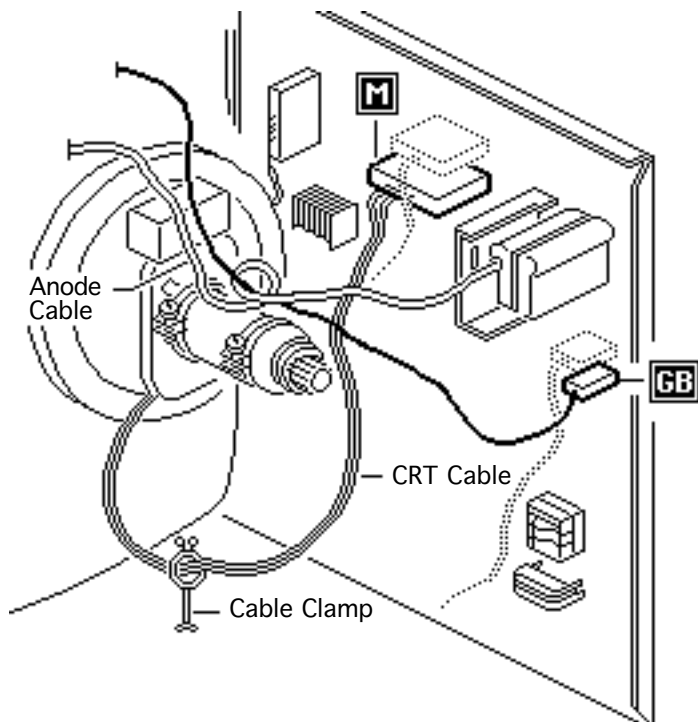
Mounting Bracket

Tie-Wrap

LED Cable

CRT

Before you begin,

- Remove rear cover
- Remove EMI shield
- Discharge CRT
- Remove anode cap
- Remove AC input assembly
- Remove signal input assembly
- Remove CRT board
- Remove bezel
- Remove LED assembly

CRT

Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.
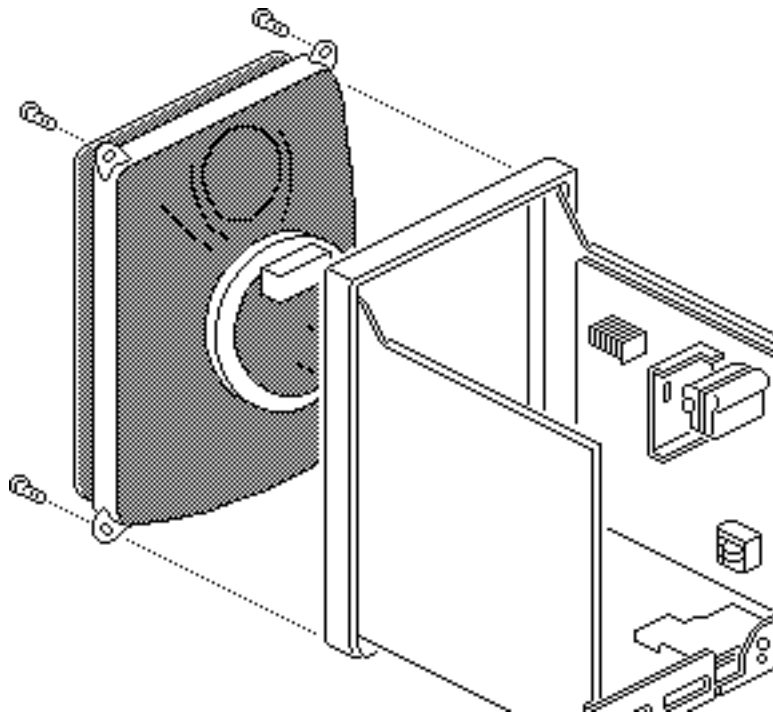
1 Disconnect the 4-wire CRT connector M, and the single-wire connector GB from the power/sweep board.

2 Remove the CRT cable from the cable clamp at the bottom of the chassis and unwrap the GB cable.
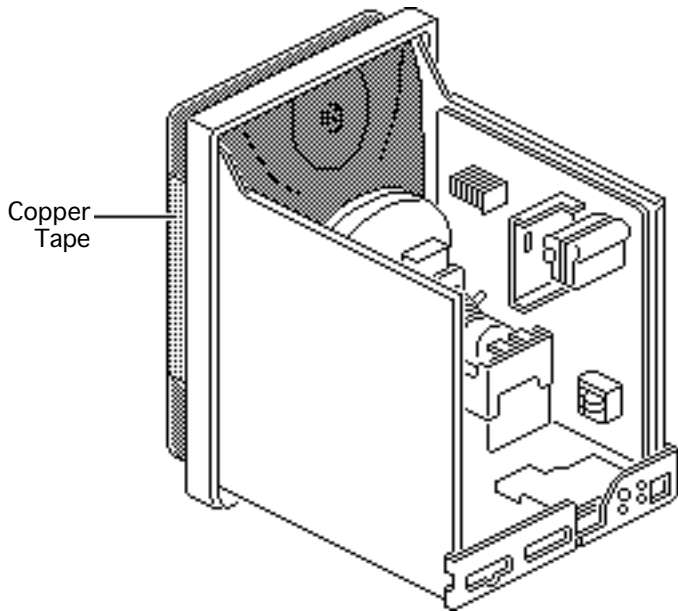
3 Remove and discard the copper tape from both sides of the CRT and chassis. (Two new strips of copper tape ship with the replacement CRT.)

Copper Tape

4 Remove the four mounting screws from the CRT.

5 **Caution:** The neck of the CRT is easily damaged. Do not grab the neck of the CRT to remove it from the bezel.

Carefully grasp and pull the sides of the CRT from the chassis.

Adjustments

Macintosh Portrait Display

Monitor Safety

When adjusting this monitor, be sure to follow all CRT safety instructions outlined in Bulletins/Safety. Make sure you are familiar with these warnings and cautions:

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

Warning: Adjustments are made from the rear of the monitor. Position a mirror to view the screen. Do not reach around the monitor to adjust the controls.

Caution: When measuring voltage, avoid a possible short. Switch off the monitor before connecting and disconnecting the alligator clips to/from the test points.
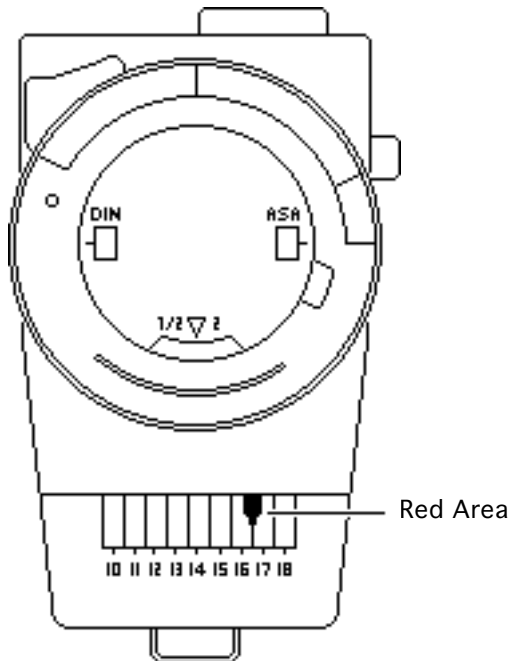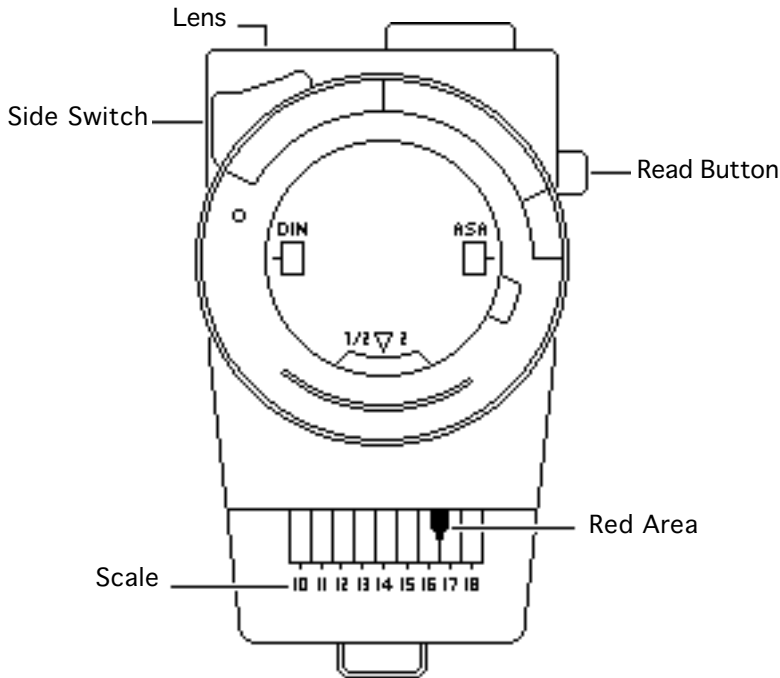
Red Area

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 area, replace the battery.

Lens

Side Switch

Read Button

DIN   ASA

1/2 ▽ 2

Red Area

Scale

10 11 12 13 14 15 16 17 18

2 Move the side switch to its higher position so that the scale reads 10 through 18.

3 Uncover the lens of the meter.

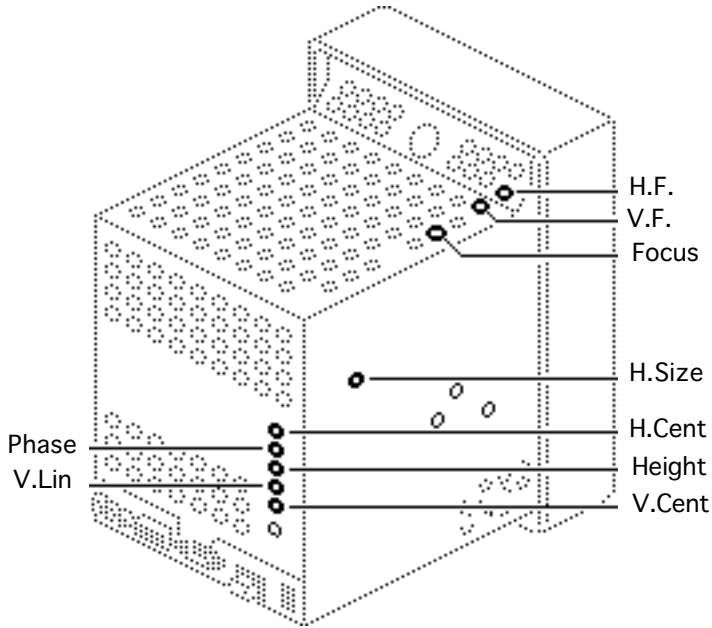4 Place the lens against the middle of the screen and press the read button.
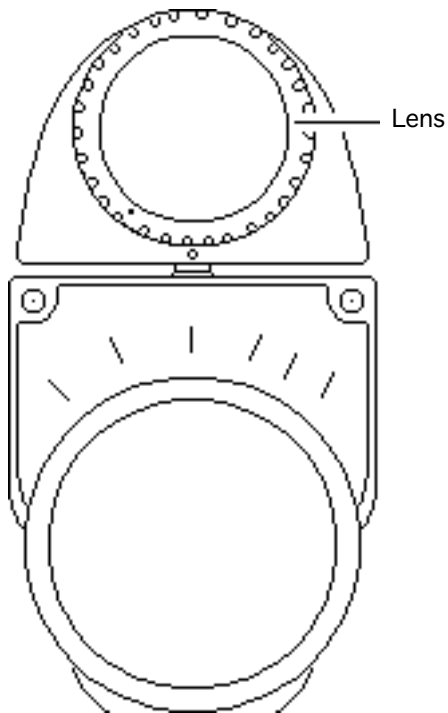
Lens

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 of the meter to face the monitor.

2   Place the lens against the middle of the screen and read the scale.

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: Geometry adjustments may be necessary whenever you replace the power/sweep board.

H.F.
V.F.
Focus

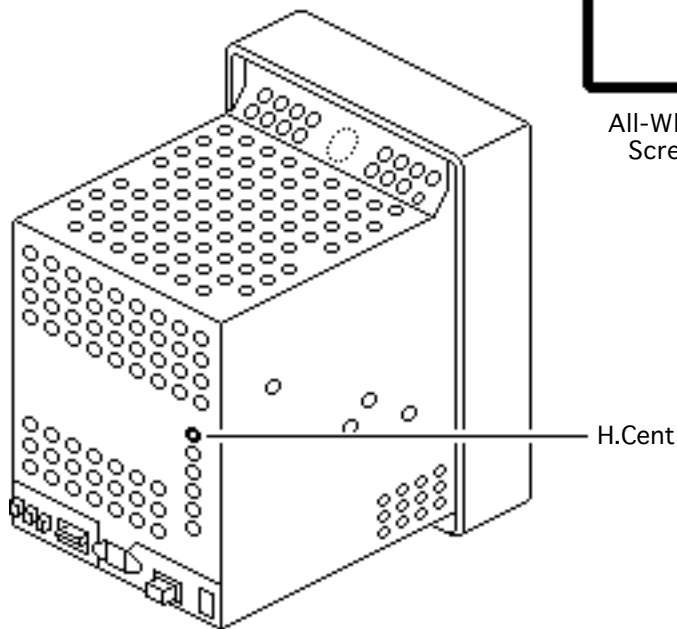H.Size

H.Cent
Height
V.Cent

Phase
V.Lin
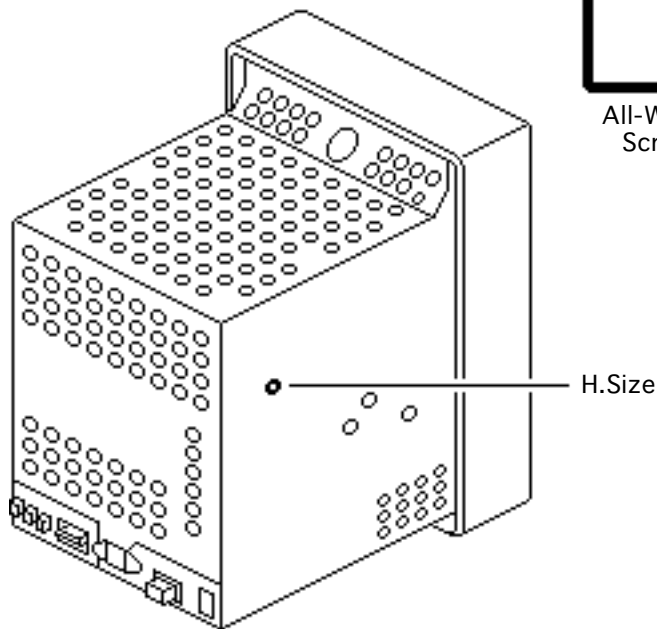
All-White
Screen

Horizontal Size

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

2 Using the plastic screwdriver, adjust the horizontal size (H.Size) control until the raster width is 8 inches (± 1/8 inch) or 203 mm (± 2 mm).
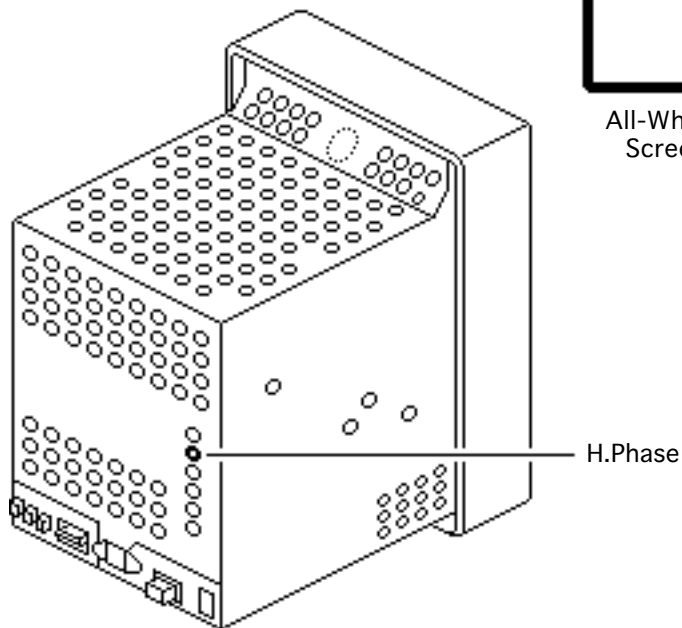
H.Size

All-White
Screen

H.Cent

Horizontal Center

1 Using the plastic
   screwdriver, adjust the
   horizontal center
   (H.Cent) control until
   the raster is centered
   (left to right) in the
   display area.

2 Verify that the raster
   width is 8 inches (± 1/8
   inch) or 203 mm (± 2
   mm) wide. If it is not,
   repeat the horizontal
   size and horizontal
   center adjustments.
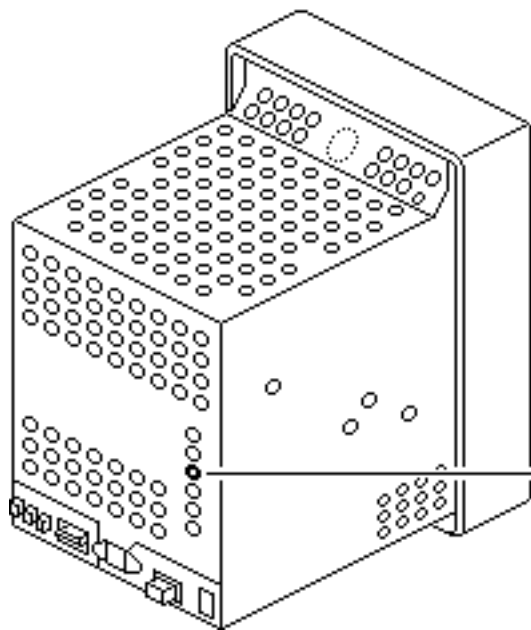
All-White
Screen

H.Phase

Horizontal Phase

1 Measure the black margin on the right side of the display. The black margin should measure 1/4 inch or 7 to 8 mm from the right edge of the white raster to the edge of the plastic bezel.

2 If necessary, use the plastic screwdriver to adjust the horizontal phase (H.Phase) control until the black margin is 1/4 inch or 7 to 8 mm wide.
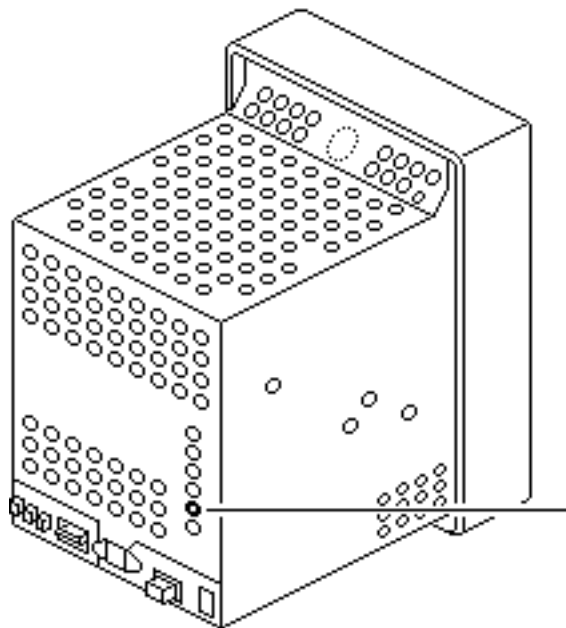
All-White
Screen

Height

Using a plastic screwdriver, adjust the height control until the raster height is 10 7/8 inches (± 1/8 inch) or 276 mm (± 2 mm).
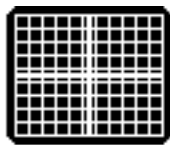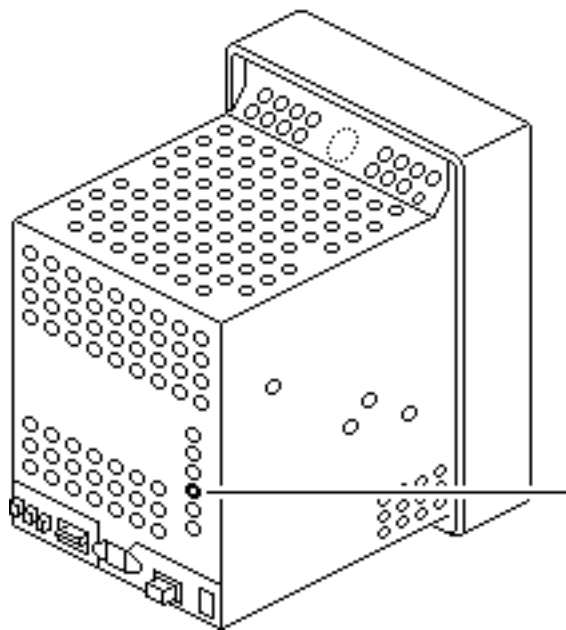
Height

All-White
Screen

Vertical Center

1 Using the plastic screwdriver, adjust the vertical center (V.Cent) control until the raster is centered (top to bottom) in the display area.

2 Verify that the raster height is 10 7/8 inches (± 1/8 inch) or 276 mm (± 2 mm). If it is not, repeat the height and vertical center adjustments.
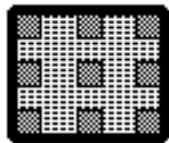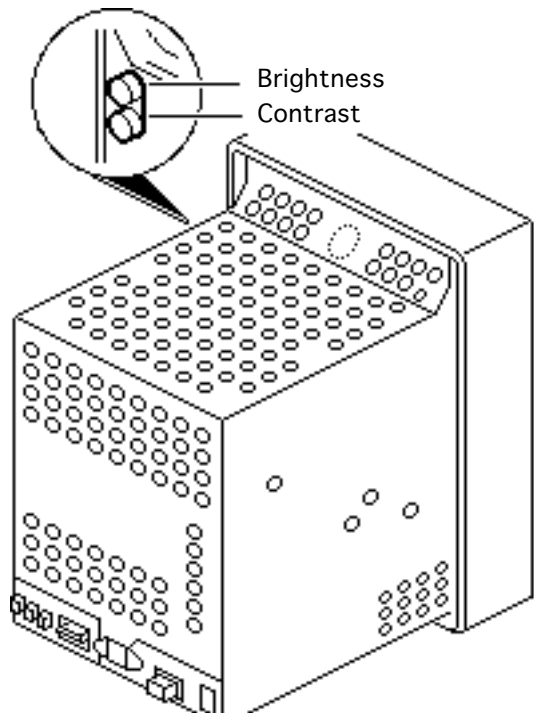
V.Cent

Crosshatch

Vertical Linearity

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

2 Using a plastic screwdriver, adjust the vertical linearity (V.Lin) control until the boxes at the top of the display are the same size as those at the bottom.
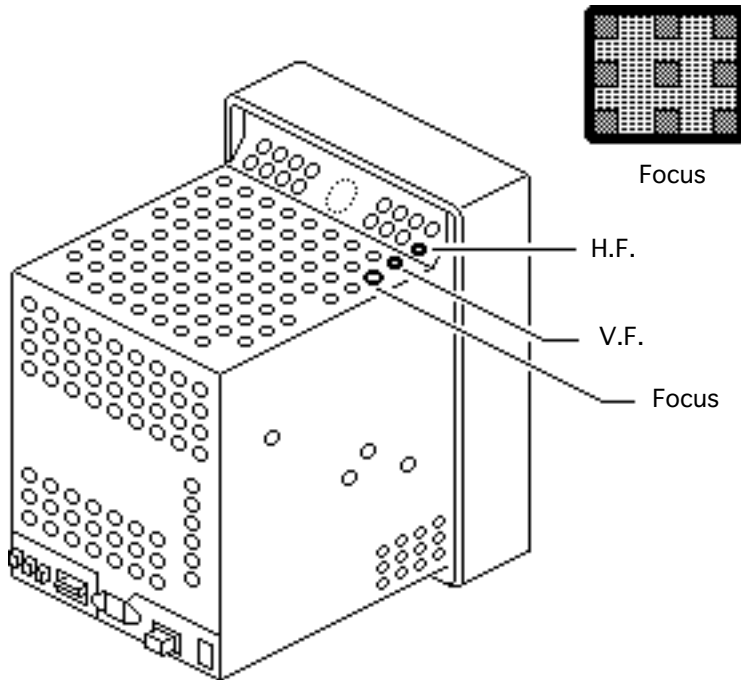
V.Lin

Brightness
Contrast

Focus

Focus

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

2 Set the external contrast control to maximum (turn fully clockwise) and the external brightness control to the center (detent) position.

Focus

H.F.

V.F.

Focus

3 Using a plastic screwdriver, adjust the focus controls as follows:

- Adjust the focus control for the best overall focus
- Adjust the H.F. control for the best focus along the left and right edges of the display
- Adjust the V.F. control for the best focus at the top and bottom
- Repeat the adjustments until you have attained the best focus possible

Brightness
Contrast
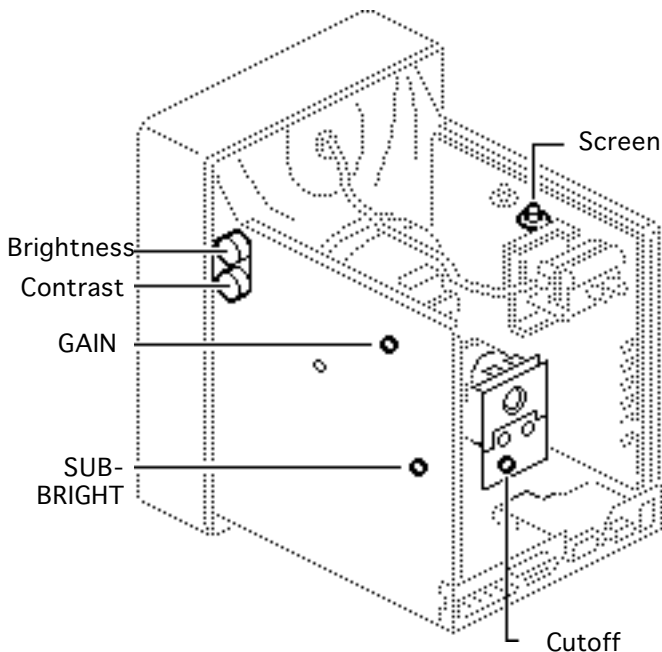GAIN
SUB-
BRIGHT

Screen

Cutoff
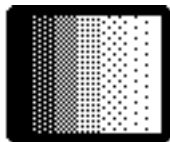
Video With Screen Control

Before you begin, remove the following:
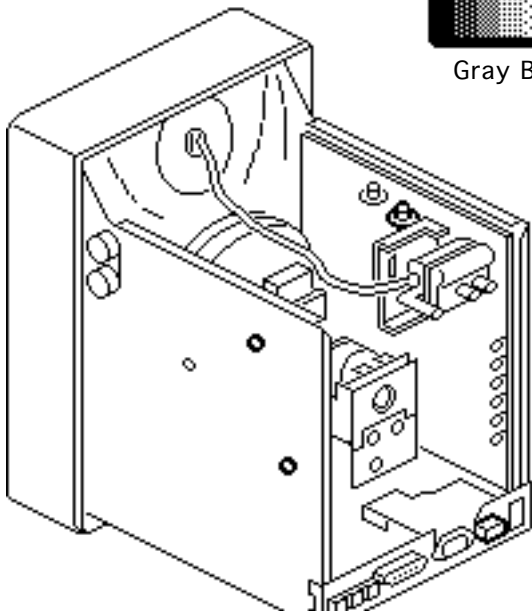
- Rear cover
- EMI shield

If the monitor doesn't have a screen control, go to "Video Without Screen Control."

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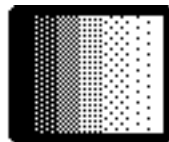
Gray Bars

Caution: To prevent damaging the monitor, reinstall the signal input board with the two mounting screws.
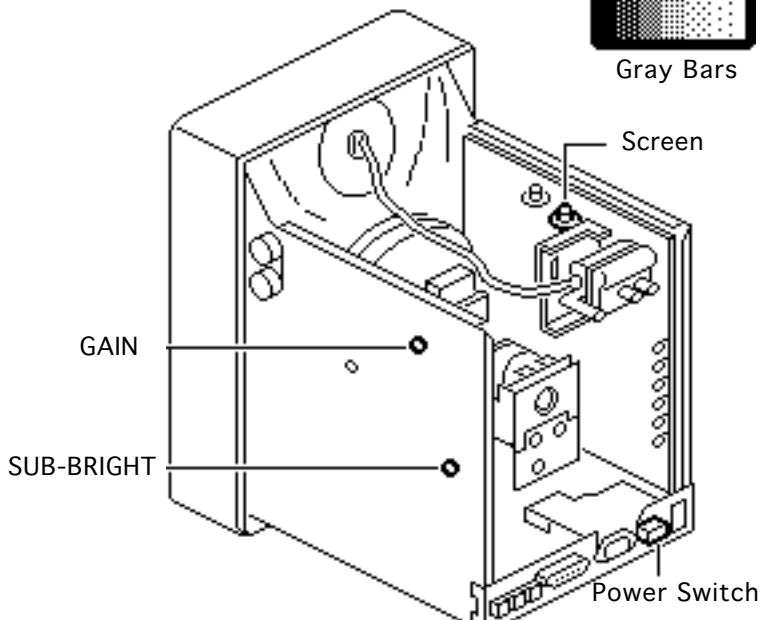
Note: Perform the video adjustments whenever the CRT or video board has been replaced or the display appears to be maladjusted.

1 Switch on the monitor and let it warm up for at least 10 minutes.

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

Gray Bars

Screen

GAIN

SUB-BRIGHT

Power Switch

3 Using a plastic
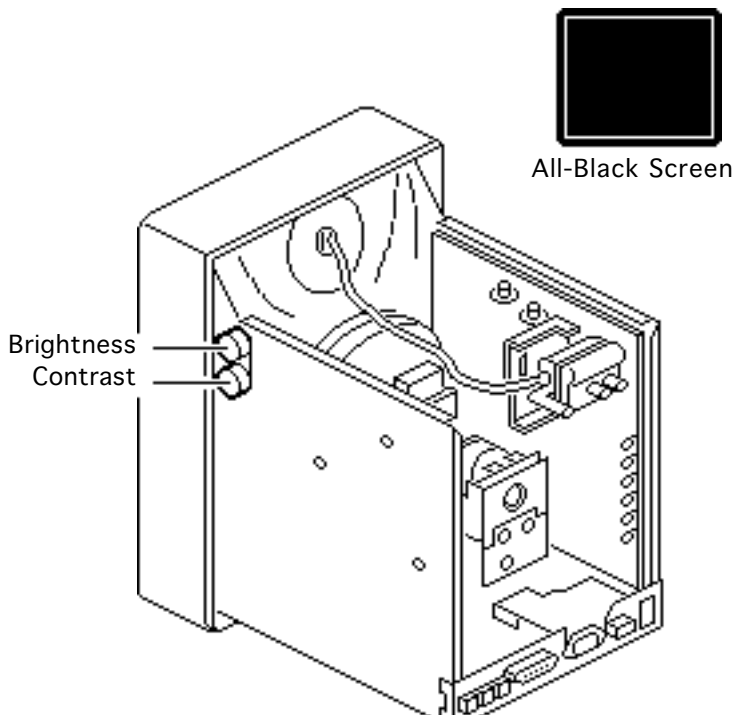screwdriver, preset the
following controls:
• Screen control to
maximum (turn fully
clockwise)
• GAIN control to its
midpoint
• SUB-BRIGHT control
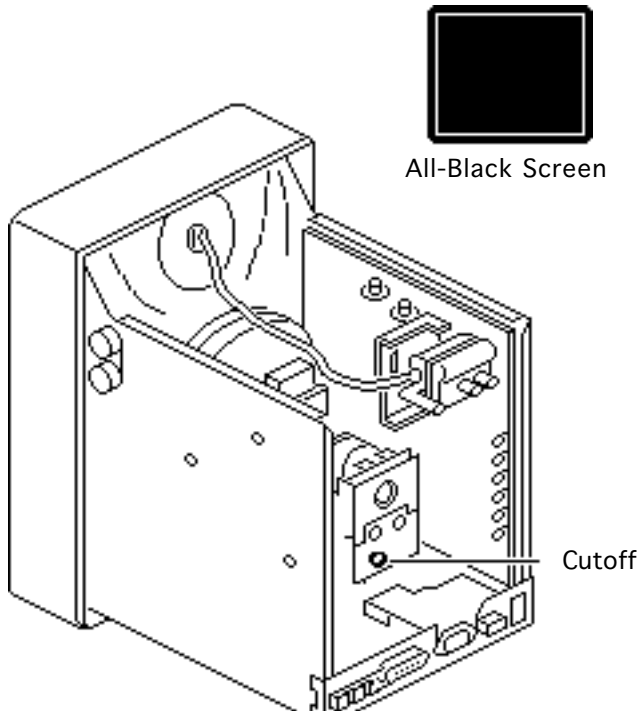to maximum (turn
fully clockwise)

All-Black Screen

Cutoff

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

2 Set the contrast control and the brightness control to maximum (turn fully clockwise).

Brightness
Contrast

All-Black Screen

**Note:** If you turn the cutoff control up (clockwise) too far, the monitor may shut down. If this happens, switch off the monitor, turn the cutoff control all the way down, and wait 30 seconds. Then resume the adjustment.

3　Using the plastic screwdriver, adjust the cutoff control clockwise until retrace lines are just visible.

4　Then turn the cutoff control counterclockwise until the retrace lines just disappear.
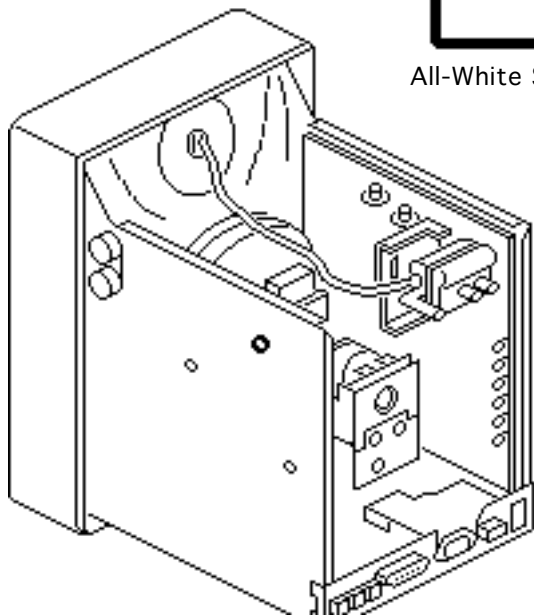
Cutoff
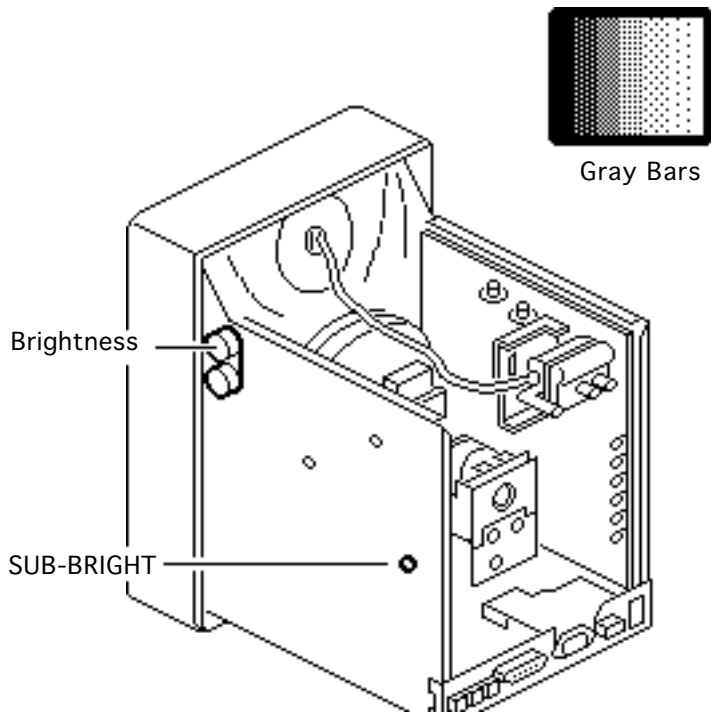
Gray Bars

Sub-Brightness

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

2 Set the brightness control to the center (detent) position.

3 Set the SUB-BRIGHT control so that the leftmost bar is completely black.
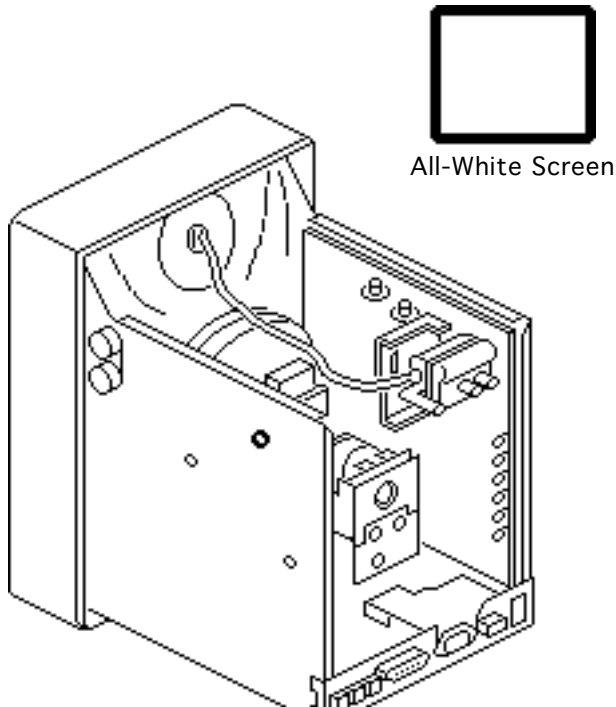
Brightness

SUB-BRIGHT

All-White Screen

Screen Luminance

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

Important: Readings from light meter model L-248 and 246 differ. Please note which meter you are using before making adjustments. (See "Light Meter Setup" in this chapter.)

All-White Screen

2   Measure screen
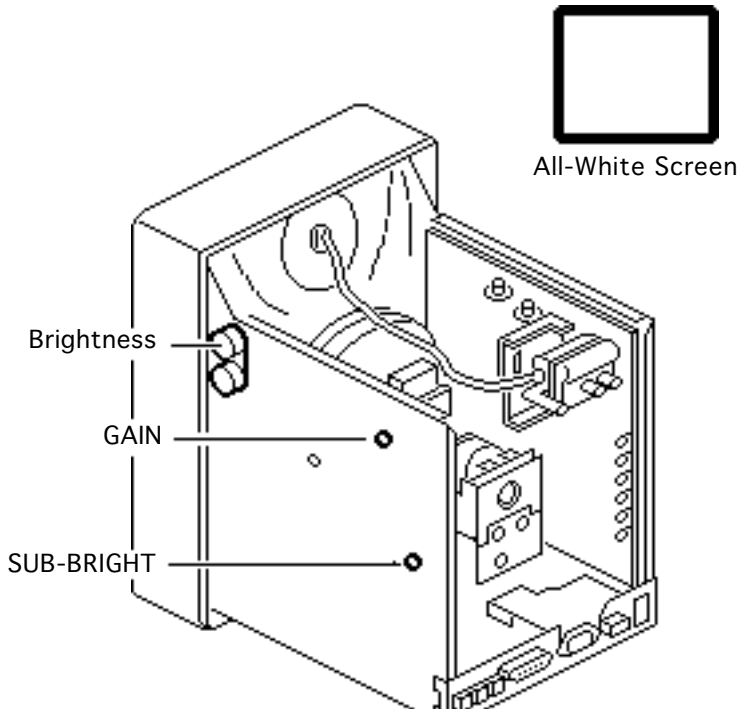   luminance with the light
    meter. You should get
    40 foot lamberts (± 3
    foot lamberts), which on
    the light meter is
    • Model L-248: 10 to
      11 on the 10–18 scale
    • Model 246: 29 on the
      red scale

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

All-White Screen

Brightness

GAIN

SUB-BRIGHT

3   Set the brightness
    control to the center
    (detent) position, and
    recheck the screen
    luminance. The
    luminance reading
    should not go beyond 60
    foot lamberts, which on
    the light meter is
    • Model L-248: 11 to
      12 on the 10–18 scale
    • Model 246: 40 on the
      red scale

4   If necessary, repeat the
    SUB-BRIGHT and GAIN
    adjustments until you
    obtain a correct reading.

Brightness
Contrast
GAIN
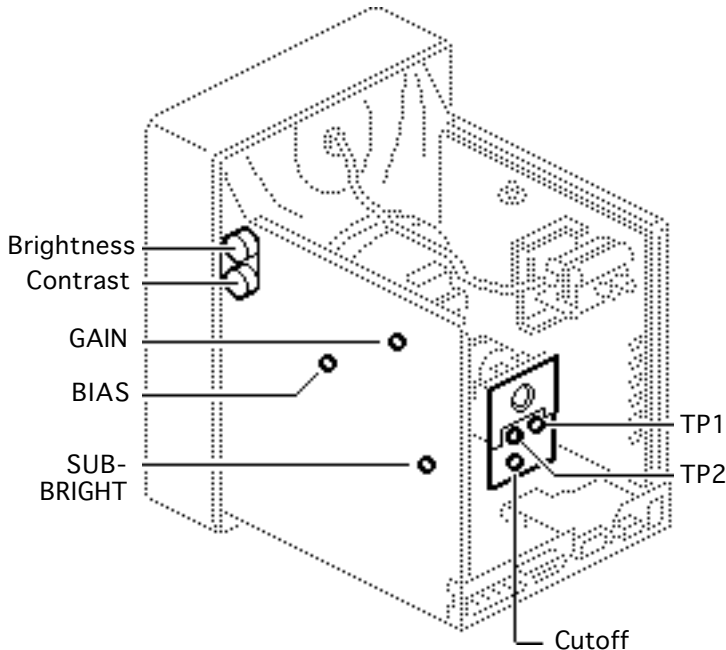BIAS
SUB-BRIGHT
TP1
TP2
Cutoff

Video Without Screen Control

Before you begin, remove the following:

- Rear cover
- EMI shield

Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.
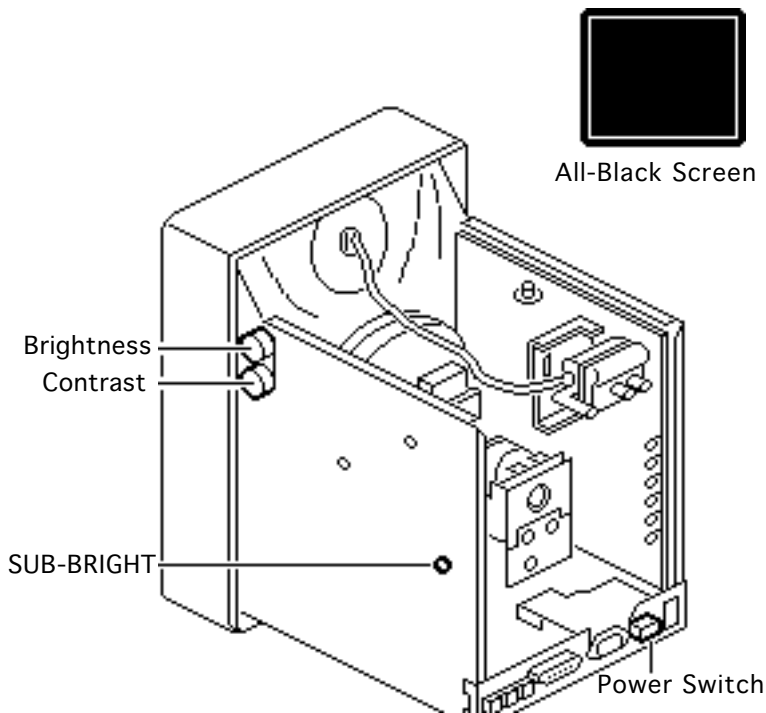
Caution: To prevent damaging the monitor, reinstall the signal input board with the two mounting screws.

Note: Perform the video adjustments whenever the CRT or video board has been replaced or the display appears to be maladjusted.

All-Black Screen
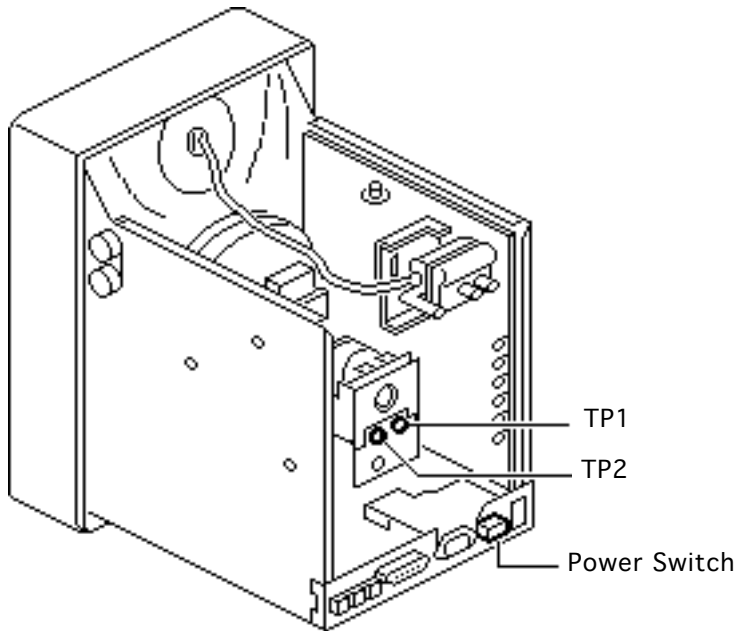
Brightness
Contrast

SUB-BRIGHT

Power Switch

Bias

1   Switch on the monitor and let it warm up for at least 10 minutes.

2   Preset the SUB-BRIGHT control to minimum (fully counterclock-wise).

3   Use Display Service Utility to display the All-Black Screen.

4   Set the brightness control and contrast control to minimum (turn fully counter-clockwise).

TP1

TP2

Power Switch

Note: For accurate voltage measurements, use two shielded alligator clip leads and a high quality DC voltmeter.

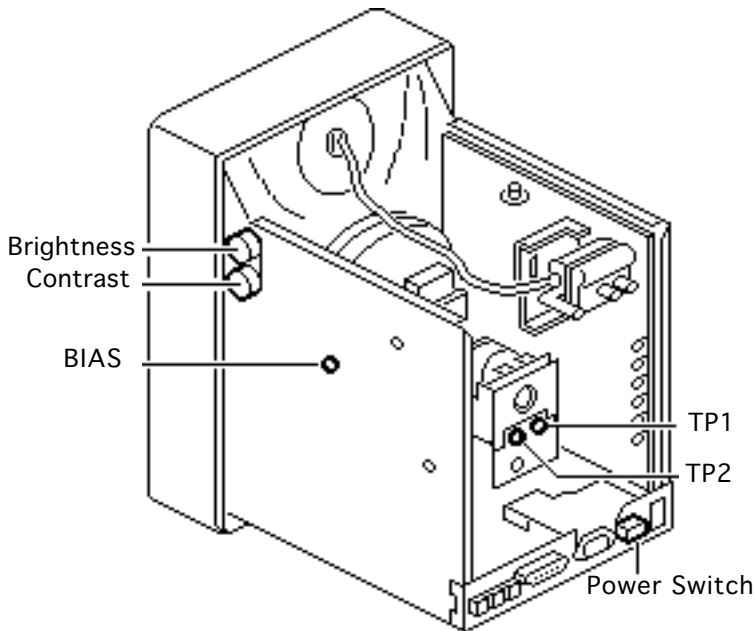**Caution**: To avoid a short, switch off the monitor before connecting the alligator clips.

5 Switch off the monitor.

6 Connect one end of a shielded alligator clip lead to TP1 on the CRT board. Connect the other end to the positive probe of a DC voltmeter.
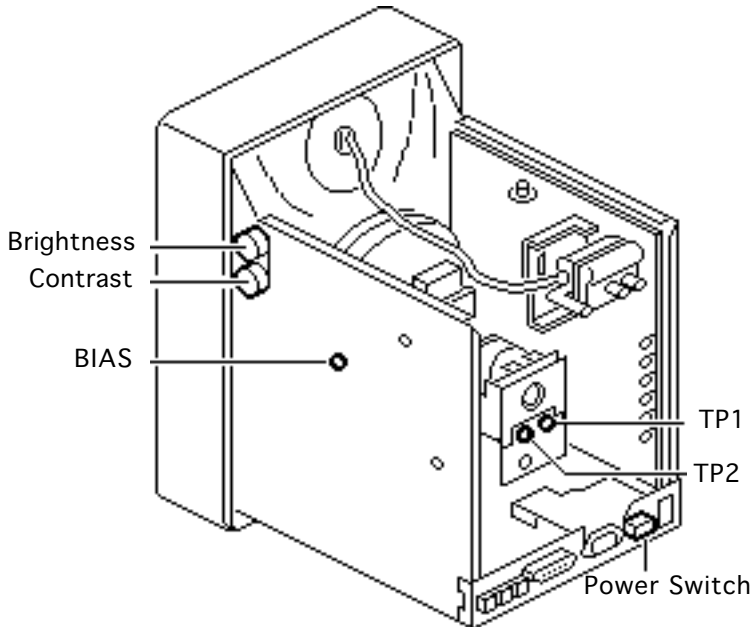
7 Connect one end of a second shielded alligator clip lead to TP2 on the CRT board. Connect the other end to the negative probe of the DC voltmeter.

8 Switch on the monitor.

9 Adjust the BIAS control with a plastic screwdriver until the voltmeter measures 55 volts DC ± 1.0 volt.
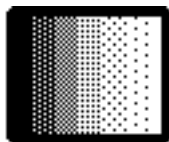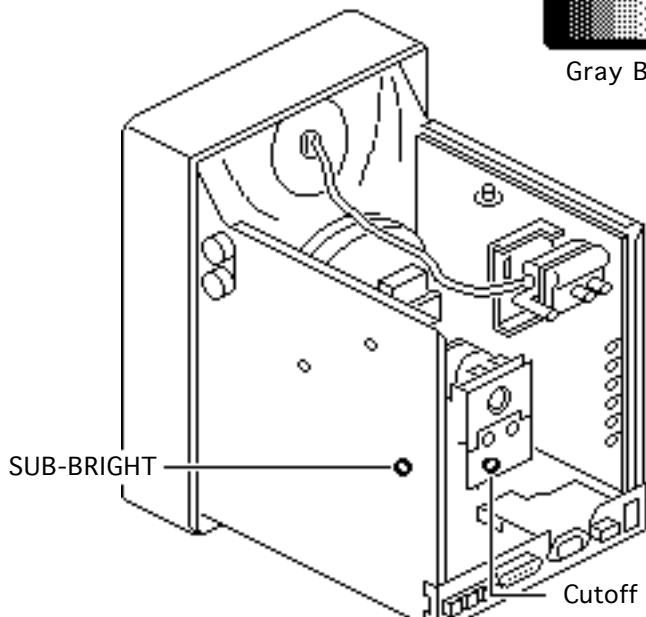
Brightness
Contrast

BIAS

TP1
TP2

Power Switch

Caution: To avoid a short, switch off the monitor before disconnecting the alligator clips.

10 Switch off the monitor.

11 Disconnect the alligator clips from TP1 and TP2.

12 Switch on the monitor.

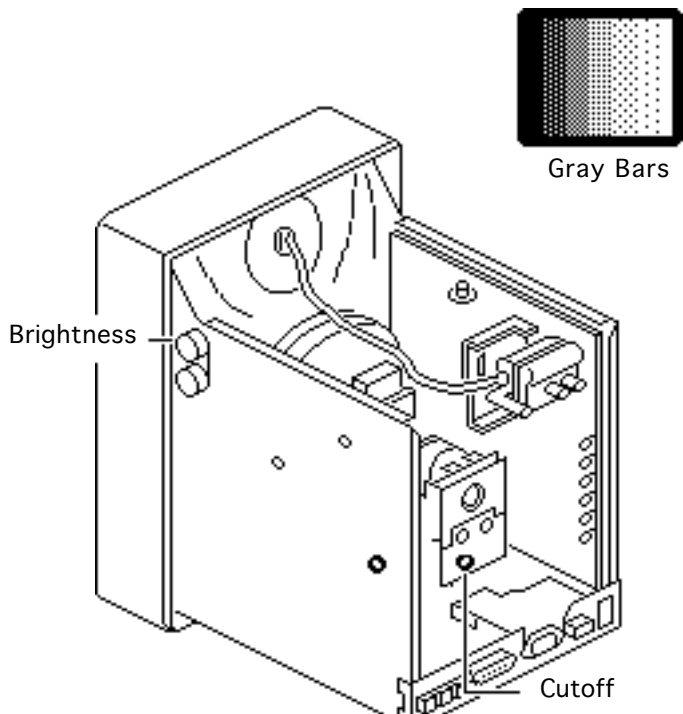13 Set the brightness control and contrast control to maximum (turn fully clockwise).

Gray Bars

Cutoff

1 Set the SUB-BRIGHT control to the midpoint.

2 Use Display Service Utility to display the Gray Bars test pattern (16 shades of gray).

SUB-BRIGHT

Cutoff

Gray Bars

**Note:** If you turn the cutoff control up (clockwise) too far, the monitor may shut down. If this happens, switch off the monitor, turn the cutoff control all the way down, and wait 30 seconds. Then resume the adjustment.

Brightness

3 Using the plastic screwdriver, adjust the cutoff control until the leftmost gray bar turns completely black.

4 Set the brightness control to the center (detent) position.
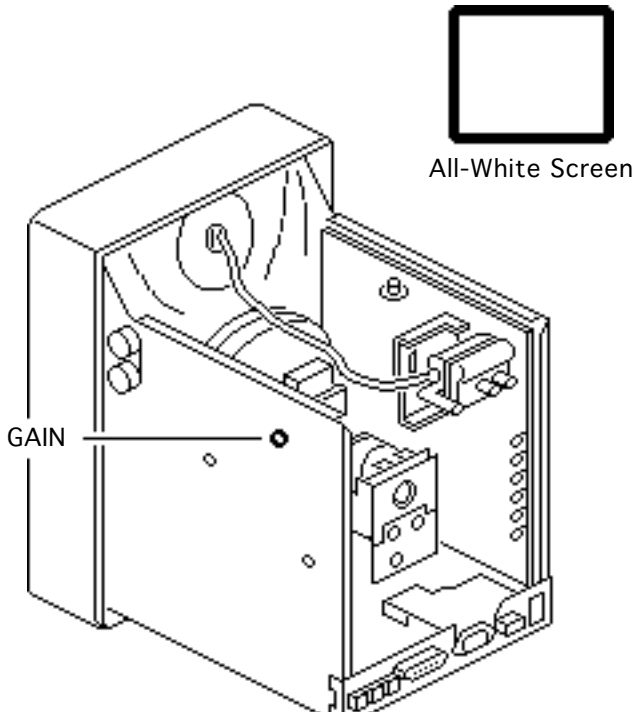
Cutoff
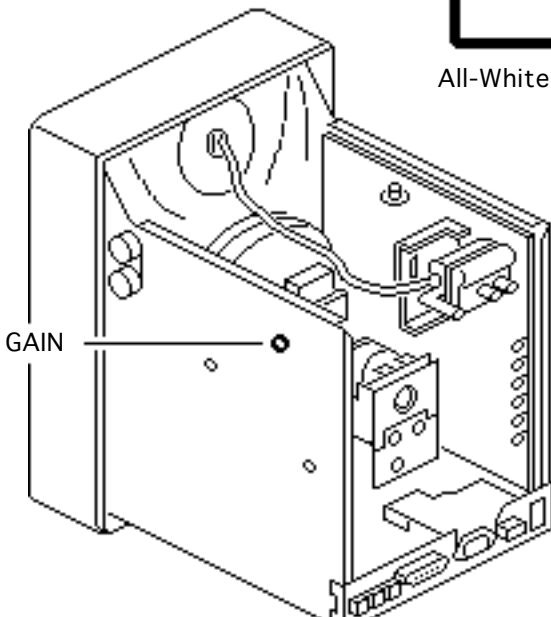
All-White Screen

Screen Luminance

1 Using Display Service Utility, display the All-White Screen test pattern.

Important: Readings from light meter model L-248 and 246 differ. Please note which meter you are using before making adjustments. (See "Light Meter Setup.")

GAIN

All-White Screen

GAIN

2 Using the light meter and a plastic screwdriver, adjust the GAIN control until you get 40 foot lamberts (± 3 foot lamberts), which on the light meter is
   • Model L-248: 10 to 11 on the 10–18 scale
   • Model 246: 29 on the red scale

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

Exploded View

Macintosh Portrait Display

661-0117
Power Sweep
Board

983-0014
Fan

937-0019
AC Input
Assembly

076-0350
CRT
Assembly

941-0017
Fuse

937-0022
Signal
Input
Assembly

661-0119
CRT
Video Board

661-0118
Video Board

590-0071
LED and
Cable
Assembly

982-0004
Contrast/
Brightness
Board

956-0015
Screw/Knob
Set

949-0089
Rear Cover

949-0079
Bezel

590-4501
ADB Cable

590-0615
590-0574
Video Cable

590-0371
Power Cable