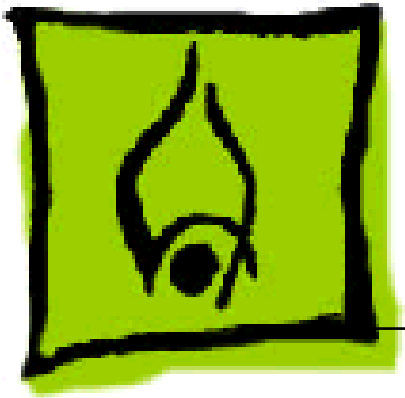




## 1710AV/1710 Display

AppleVision 1710AV Display  
AppleVision 1710 Display





## Hot Issues

AppleVision 1710AV/1710  
Display





## Overview

This chapter is designed to highlight unique or high-priority product issues that you should be aware of before servicing this display.

This chapter alerts you to important issues and provides links to other areas in the manual where more complete information can be found. This chapter is not intended to replace other parts of this manual; it merely provides a pointer to pertinent information in those chapters.

The date the Hot Issue was published is indicated in parentheses after the title.





## AppleVision 1710 Enhanced Customer Support Program (ECSP) Has Expired (2/99)

The Enhanced Customer Support Program (ECSP) that addressed a number of isolated quality issues with AppleVision 1710 and 1710AV Displays expired on December 31, 1998.

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# AppleVision 1710/1710AV Repair Program Extended (8/98)

## Overview

Apple is extending the AppleVision 1710 and 1710AV Display Repair Program. Under this program, which now runs from August 1, 1998 through December 31, 1998, customers with AppleVision 1710 and 1710AV Displays that exhibit no video and/or no power symptoms may be eligible to receive repairs at no charge.

Any other failures should be handled as out-of-warranty repairs unless an AppleCare Extended Service Agreement or the Apple Limited Product Warranty covers the display.





## **Product Identification**

All AppleVision 1710 and 1710AV Displays that exhibit the no video and/or no power symptom and have serial numbers from SG522xxxxxx up to and including SG628xxxxxx are eligible for this program.

## **Repair Strategy**

Refer to the latest update of the AppleVision 1710/1710AV Repair Program program notice on Service Source Online for complete details.





## Revised Troubleshooting Chapter Features CRT/Video Board Procedures (3/98)

The Troubleshooting chapter has been revised to include procedures for downloading setup parameters, adjusting the display after replacing the CRT/video board or the main deflection board, and diagnosing suspected hardware problems.

The latest version of the Diagnostics utility called Display Service Utility (v4.2.1) enables service providers to more accurately determine the source of hardware problems and readily repair the display.

The CRT/video board (Apple part number 661-0914) is now offered worldwide as a replacement module. Refer to the





expanded Troubleshooting chapter for the latest troubleshooting procedures; refer to the Diagnostics site of Service Source Online or the Service Source Companion CD (Diagnostic Utilities folder) for the Display Service Utility v4.2.1.





## Focus Adjustment Might Be Necessary After Replacing the Main Deflection Board (10/97)

**Issue:** After replacing the main deflection board on an AppleVision 1710 or 1710AV display, the screen focus might require adjustment.

**Solution:** If the screen focus is poor after replacing a main deflection board, adjust the horizontal and vertical focus controls on the flyback transformer. For complete instructions, refer to the Focus symptom in the Troubleshooting chapter of this manual.





## Black Screen, Distortion, or Misconvergence Caused by CRT Arcing (6/97)

**Issue:** On a limited number of AppleVision 1710 monitors, an internal arcing within the cathode ray tube (CRT) may reset some control values in the monitor's internal microcontroller chip. This can cause the screen to go blank, cause some geometry distortion, or cause the convergence to become intolerable.

The monitor is most likely to experience this problem within the first few hours or days after installation. However, it is possible to have this problem anytime during the life of the product. CRT arcing is normal and expected on all CRT-type monitors.





**Solution:** In some cases simply using the power switch on the front panel of the monitor will eliminate the screen distortion.

Otherwise, shut down the monitor and unplug the power cord and ADB cables from the back of the monitor. Count to ten. Then plug in the power cord and ADB cables. This action should remove all symptoms. If the blank screen symptom persists, contact Apple Technical Support.

CRT arcing is normal and expected on a certain percentage of displays from all manufacturers. An arc happens when residual particles inside the CRT are dislodged. This usually occurs when the display has experienced physical vibration like transportation. The arc time is short and there is no safety hazard because the arc is contained inside the sealed glass of the CRT. This arcing will not cause permanent damage to the display.





## Basics

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AppleVision 1710AV/1710 Display



## Product Overview

The AppleVision 1710AV Display is a full-page, Trinitron color monitor that supports a variety of resolutions. The display includes sound and video support for multimedia application programs and advanced controls for accurate color rendering.

The AppleVision 1710AV Display has a diagonal viewable image size of 16.1 inches.





The AppleVision 1710AV Display works with both Macintosh and IBM PC-compatible computers. For information on using the display with an IBM PC-compatible computer, refer to Part II (“Using the Display With Your IBM PC-Compatible Computer”) in the User’s Guide.

## Features

The AppleVision 1710AV Display features

- A range of screen resolutions (from 640x480 to 1280x1024)
- A tilt/swivel base that allows the monitor to be positioned for optimal viewing comfort
- Integrated speaker enclosure and voice recognition-capable microphone
- Energy Star Power Conservation compliance (featuring Display Manager software)





Except for the speaker enclosure and microphone, the AppleVision 1710 Display shares the same features as the AppleVision 1710AV Display.



## Repair Issue: Display Service Utility

The Display Service Utility (located in the Diagnostic Utilities folder on the Service Source Companion CD) has been updated for the April 1998 CD and Service Source Online (March 1998). The Display Service Utility is an application that you can use to display video test patterns, restore display parameter settings, and adjust the display after replacing a board. This latest update allows

Within the Display Service Utility, select Pattern Selections: AppleVision 1710/1710AV. Refer to the Troubleshooting chapter for instructions on how to use the Display Service Utility.

For more information on the updated features, refer to the Read Me document in the Display Service Utility folder.







## Repair Issue: Focus Adjustment after Replacing Main Deflection Board

After replacing the main deflection board on an AppleVision 1710 or 1710AV display, the screen focus might require adjustment. If the screen focus is poor, adjust the horizontal and vertical focus controls on the flyback transformer. For complete instructions, refer to the section “Adjusting the Display after Replacing the Main Deflection Board” in the Troubleshooting chapter.





## Specifications

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AppleVision 1710AV/1710  
Display





## Introduction

Specifications information for this product can be found in this chapter and also in the Spec Database, which you can access in one of three ways:

- Launch it directly by double-clicking the Apple Spec Database runtime alias at the top level of the Main Service Source CD.
- Select “Apple Spec Database” from the Service Source drop-down main menu.
- Click the Acrobat toolbar icon for the database, which is near the right end of the toolbar with the letters “SP.”



## Characteristics

### **Picture Tube**

17-in. Trinitron CRT (16.1-in. viewable image)

Multiple scan

Antistatic, antiglare surface treatment

0.26-mm dot pitch

### **Screen Resolution**

640x480 at 60 Hz in VGA mode

640x480 at 66.67 Hz in Macintosh mode

800x600 at 60.31 Hz in VESA mode

800x600 at 75 Hz in VESA mode

832x624 at 74.55 Hz in Macintosh mode

1024x768 at 74.93 Hz in Macintosh mode

1024x768 at 60 Hz in VESA mode

1280x1024 at 60 Hz in VESA mode

1280x1024 at 75.03 Hz in VESA mode



**Scan Rates**

Vertical refresh rate: 50–120 Hz  
Horizontal scan rate: 30–80 kHz

**Cable Connector**

15-pin miniature D-type

**Input Signals**

Red, green, and blue signals; separate sync

**System Requirements**

System software version 7.1 or later

AppleVision software is supported by the computers shown in the next table:



**AppleVision/CPU Compatibility List**

| PowerBook                                         | Quadra, Centris,<br>Performa                                                            | Power Macintosh                                                                                                                                                                       |
|---------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 280 & 280c <sup>a</sup><br>520, 520c<br>540, 540c | 6200<br>5200<br>900, 950<br>800, 840AV<br>700<br>605, 610, 630,<br>650, 660AV<br>LC 475 | 9500, 8500<br>8100/110, 8100/110AV<br>8100/80, 8100/80AV<br>7500, 7200<br>7100/80, 7100/80AV<br>7100/66, 7100/66AV<br>6200<br>6100/60, 6100/60AV<br>5200 LC<br>Power Mac Upgrade Card |

a. With MiniDock and DuoDock II.





## Monitor Timings

640x480  
Resolution @ 60 Hz

Horizontal Timing  
1/H: 31.5 kHz  
Back Porch: 48 dots  
H SYNC: 96 dots  
Front Porch: 16 dots  
1 H: 31.75  $\mu$ s  
1/dot: 25.175 MHz

Vertical Timing  
1 V: 16.7 ms  
Back Porch: 33 H  
V SYNC: 2 H  
Front Porch: 10 H

640x480  
Resolution @ 66.67 Hz

Horizontal Timing  
1/H: 34.97 kHz  
Back Porch: 96 dots  
H SYNC: 64 dots  
Front Porch: 64 dots  
1 H: 28.0  $\mu$ s  
1/dot: 30.24 MHz

Vertical Timing  
1 V: 15.0 ms  
Back Porch: 39 H  
V SYNC: 3 H  
Front Porch: 3 H





## Monitor Timings

800x600  
Resolution @ 60.31 Hz

Horizontal Timing  
1/H: 37.9 kHz  
Back Porch: 88 dots  
H SYNC: 128 dots  
Front Porch: 40 dots  
1 H: 27.85  $\mu$ s  
1/dot: 40.000 MHz

Vertical Timing  
1 V: 16.58 ms  
Back Porch: 22 H  
V SYNC: 4 H  
Front Porch: 2 H

800x600  
Resolution @ 75 Hz

Horizontal Timing  
1/H: 46.9 kHz  
Back Porch: 160 dots  
H SYNC: 80 dots  
Front Porch: 16 dots  
1 H: 21.33  $\mu$ s  
1/dot: 49.5 MHz

Vertical Timing  
1 V: 13.33 ms  
Back Porch: 21 H  
V SYNC: 3 H  
Front Porch: 1 H







## Monitor Timings

832x624  
Resolution @ 74.55 Hz

Horizontal Timing  
1/H: 49.7 kHz  
Back Porch: 224 dots  
H SYNC: 64 dots  
Front Porch: 32 dots  
1 H: 20.1  $\mu$ s  
1/dot: 57.28 MHz

Vertical Timing  
1 V: 13.41 ms  
Back Porch: 38 H  
V SYNC: 3 H  
Front Porch: 2 H

1024x768  
Resolution @ 74.93 Hz

Horizontal Timing  
1/H: 60.24 kHz  
Back Porch: 176 dots  
H SYNC: 96 dots  
Front Porch: 32 dots  
1 H: 16.6  $\mu$ s  
1/dot: 80 MHz

Vertical Timing  
1 V: 13.35 ms  
Back Porch: 30 H  
V SYNC: 3 H  
Front Porch: 3 H





## Monitor Timings

1024x768  
Resolution @ 60 Hz

Horizontal Timing  
1/H: 48.4 kHz  
Back Porch: 160 dots  
H SYNC: 136 dots  
Front Porch: 24 dots  
1 H: 20.68  $\mu$ s  
1/dot: 65.0 MHz

Vertical Timing  
1 V: 16.66 ms  
Back Porch: 29 H  
V SYNC: 6 H  
Front Porch: 3 H

1280x1024  
Resolution @ 60 Hz

Horizontal Timing  
1/H: 63.8 kHz  
Back Porch: 272 dots  
H SYNC: 112 dots  
Front Porch: 16 dots  
1 H: 15.23  $\mu$ s  
1/dot: 110.25 MHz

Vertical Timing  
1 V: 16.66 ms  
Back Porch: 39 H  
V SYNC: 3 H  
Front Porch: 1 H





## Monitor Timings

1280x1024

Resolution @ 75.03 Hz

Horizontal Timing

1/H: 79.976 kHz

Back Porch: 248 dots

H SYNC: 144 dots

Front Porch: 16 dots

1 H: 12.5  $\mu$ s

1/dot: 135 MHz

Vertical Timing

1 V: 13.33 ms

Back Porch: 38 H

V SYNC: 3 H

Front Porch: 1 H



**Speakers (1710AV only)**

Stereo, with ported (bass reflex) chamber design

Maximum loudness: 92 dB SPL at 1 kHz at 0.5 meters

Frequency response: 70 Hz to 20 kHz  $\pm$  6 db

Audio input signal: Accepts audio signal of up to 4 Vpp (line level-low sensitivity) or as low as 20 mVpp (microphone level-high sensitivity)

Internal speaker muted when headphones are inserted into the headphone port



## Controls and Ports

### User Controls

Front panel (1710AV): power, brightness, contrast, bass, treble, microphone on, volume, mute, and three on-screen control buttons

Front panel (1710): power, brightness, contrast, and three on-screen control buttons

Additional picture and sound controls available using the AppleVision Setup control panel (Macintosh users) or on-screen controls (IBM PC-compatible users)

Automatic degauss at power-on; manual degauss by turning power switch off, then on (capable of full degauss after monitor is turned off for 20 minutes or more)



**I/O Ports**

Apple Desktop Bus (ADB): one input port and two pass-through output ports

Headphone/Speaker (1710AV): One output port and two speaker ports

Microphone (1710AV): One input port and one microphone port



## Physical and Electrical

### **Power Supply**

Voltage: 100–240 VAC

Frequency: 50–60 Hz

Power: 130 W maximum

### **Size and Weight**

Height: 19.7 in. (507 mm)

Width: 15.8 in. (405 mm)

Depth: 17.6 in. (452 mm)

Weight (1710AV): 60 lb. (27 kg)

Weight (1710): 50 lb. (22.5 kg)

### **Monitor Stand**

Built-in, tilt-and-swivel stand





## Environmental

### **Temperature**

Operating: 50°F to 104°F (10°C to 40°C)

Shipping: -4°F to +140°F (-40°C to +60°C)

Storage: 32°F to 140°F (0°C to 60°C)

### **Humidity**

Operating: 20% to 80%, noncondensing

Shipping: 5% to 95%, noncondensing

Storage: 5% to 90%, noncondensing

### **Altitude**

Operating: 0 to 10,000 ft. (0 to 3,048 m)

Transit: 0 to 35,000 ft. (0 to 10,670 m)

### **Power Saving Feature**

Conforms to the Energy Star Program of the United States  
Environmental Protection Agency







## Troubleshooting

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AppleVision 1710AV/1710  
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, contact Apple Technical Support.





## First Checklist

**Important:** Many AppleVision 1710AV and 1710 display modules returned for repair are found to be fully operational. Read this checklist before you return a module, and prevent needless module replacement and unnecessary time delays.



### **The AppleVision 1710AV/1710 Display is not compatible with all computers.**

This display works with both Macintosh and IBM PC-compatible computers. A video card may need to be installed to use this display with some computers. For more information, see the computer manual.

The display is preadjusted to work with any computer that has the following timing ranges:

- Horizontal scan rate of 30-80 kHz
- Vertical refresh rate of 50-120 Hz

For best display performance, operate the display in one of the standard Macintosh screen resolutions listed in the Specifications chapter in this manual.



### **The CRT raster will not always resemble a perfect rectangle.**

CRT tolerances allow for some distortion. Additional distortion can be caused by magnetized metal objects (desks, file cabinets, etc.). Move the unit to a different location if you notice raster bowing or bent raster edges.



### **Jitter, faint lines, or screen movement can be caused by external interference such as electronic devices and fluorescent lights**

Fluorescent lights, other monitors, or electronic appliances such as coffee makers and copy machines can cause raster distortion. Move the unit to another room or building to help determine if external interference is the source of the problem.

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

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 move the distortion-causing object.





 **A maladjusted screen can mimic the symptoms of main deflection board or CRT failures.**

By performing the adjustment procedures, you might determine if one or more of the adjustments is the cause of the problem.

 **Variances in screen color and brightness are usually caused by the setup controls or the environment.**

Screen color purity over the entire screen is never perfect. CRT tolerances allow for some distortion.

Try adjusting the rotation, brightness, or contrast to reduce or eliminate the symptom.

Color imperfections can be caused by magnetized metal objects (desks, file cabinets, etc.). Move the unit to a different location if you notice color blotches or a change in brightness on an area of the screen. 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 move the distortion-causing object.

 **If you suspect a failure, check the monitor serial number before replacing modules**

- If the monitor serial number is between SG522xxxxxx and SG536xxxxxx, contact Apple Technical Support (1-800-919-2775, option 6) to expedite replacement of the head unit or whole unit.
- If the number is SG537xxxxxx or greater, refer to the Symptom Charts to troubleshoot the monitor.





## Symptom Charts

**Important:** For procedures that require the monitor to be turned on, allow the monitor to warm up for approximately 20 minutes, unless instructed otherwise.

**Important:** Ensure the latest version of Apple Display software (1.5.3 or later) is installed. (Apple Display software supersedes and replaces AppleVision software as of version 1.5.3.)

**Caution:** For procedures that require a second known-good monitor, do not use an AppleVision or ColorSync display. Connecting a second AppleVision or ColorSync monitor could cause the AppleVision software to operate erratically.

### No Raster

No raster (screen is black); power indicator light on

- 1 Verify computer video signal by connecting a known-good monitor. Then disconnect the known-good monitor and reconnect the AppleVision display. Ensure the monitor's video cable and ADB cable are connected to the computer.
- 2 Adjust front panel brightness and contrast controls (they may be set too low).
- 3 Check for presence of high voltage (see "Checking High Voltage" in this chapter). High voltage is present if you hear a rustling sound when the display is turned on or off. If high voltage is present, refer to "AppleVision Recovery Utility for Malfunction During Startup or Recalibration" in this chapter.
- 4 Replace main deflection board. Then adjust the display (see "Adjusting the Display after Replacing the Main Deflection Board" in this chapter).
- 5 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 6 US only: Call Apple Technical Support at 1-800-919-2775.





No raster (screen is black); power indicator light off

- 1 Verify that monitor is connected to live power source, that power button is on, and that computer connected to display is turned on.  
**Important:** Be sure the ADB and video cables from the monitor are connected to the ports on the computer.
- 2 Check that all internal cables are connected and that CRT/video board is properly seated on CRT socket.
- 3 Replace main deflection board. Then adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter).
- 4 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 5 US only: Call Apple Technical Support at 1-800-919-2775.

No raster (screen is black) after Restart

- 1 Turn off the monitor's power button, and then turn it on again. (This is a quick fix; this symptom causes no permanent damage to the display.)
- 2 Replace the main deflection board. Then adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter).
- 3 US only: Call Apple Technical Support at 1-800-919-2775.

## Geometry

Shape of raster is distorted

- 1 Use Monitors & Sound control panel to adjust the display for optimum screen performance. If necessary, click Factory Settings button in Monitors & Sound control panel (refer to the Adjustments chapter).
- 2 Replace main deflection board. Then adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter).
- 3 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 4 US only: Call Apple Technical Support at 1-800-919-2775.

Raster is distorted only in some resolutions

- 1 Check for supported resolutions in the Specifications chapter.
- 2 Reboot computer and click Factory Settings button in Monitors & Sound control panel (see Adjustments chapter).
- 3 Replace main deflection board. Then adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter).
- 4 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 5 US only: Call Apple Technical Support at 1-800-919-2775.





## Screen Color

Screen is one predominant color

- 1 Verify that CRT/video board is properly seated on CRT socket.
- 2 Using Monitors & Sound control panel, click Recalibrate button (see the Adjustments chapter).
- 3 If you have AppleVision software 1.5.2 or earlier, run the AppleVision Recovery Utility (see “AppleVision Recovery Utility for Malfunction During Startup or Recalibration” in this chapter). If you have Apple Display software 1.5.3 or later, refer to the first Important note in the section “AppleVision Recovery Utility for Malfunction During Startup or Recalibration” in this chapter.
- 4 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 5 US only: Call Apple Technical Support at 1-800-919-2775.

Screen has color rainbow effect (bands of color across the screen)

- 1 Use a manual degaussing coil to degauss the screen. (You can purchase a degaussing coil for about \$25 at most larger electronic parts stores.)
- 2 Replace main deflection board. Then adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter).
- 3 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 4 US only: Call Apple Technical Support at 1-800-919-2775.

## Screen Brightness

Screen is very bright (monitor might shut down)

- 1 If possible, from the Monitors & Sound control panel, click Recalibrate button.
- 2 If you have AppleVision software 1.5.2 or earlier, run the AppleVision Recovery Utility (see “AppleVision Recovery Utility for Malfunction During Startup or Recalibration” in this chapter). If you have Apple Display software 1.5.3 or later, refer to the first Important note in the section “AppleVision Recovery Utility for Malfunction During Startup or Recalibration” in this chapter.
- 3 Replace main deflection board. Then adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter).
- 4 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 5 US only: Call Apple Technical Support at 1-800-919-2775.

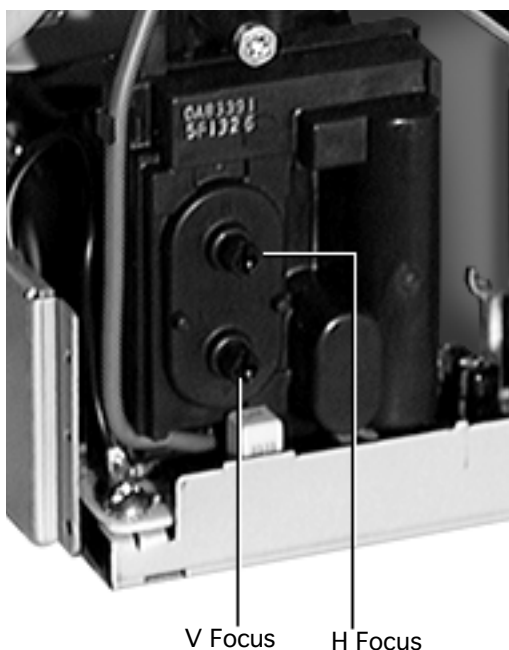




## Focus

### Focus poor

- 1 Using the Monitors & Sound control panel, verify that convergence is set correctly. Maladjusted convergence gives the appearance of bad focus.  
**Note:** Convergence over entire screen is never perfect.
- 2 Using the Display Service Utility (inside the Diagnostics Utilities folder on the Service Source Companion CD), select focus pattern. For best screen focus, use a plastic adjustment tool to adjust H focus and V focus controls that are mounted on the flyback transformer.
- 3 If focus is still poor, one of the CRT socket wires may be improperly secured. Refer to the Take Apart chapter to secure the red and white wires correctly in the CRT socket.
- 4 Readjust the focus controls. If adjusting focus controls has no effect, replace main deflection board. If necessary, repeat step 2 and step 3.
- 5 Replace CRT/video board only if the service strategy in your region supports CRT/video board replacement.
- 6 US only: Call Apple Technical Support at 1-800-919-2775.







Center of screen remains blurry after adjusting focus and convergence

- 1 Use a standard hex tool to adjust H-Stat (lower left side of CRT/video board).
- 2 If center-of-screen appearance is good, but top/bottom convergence is blurry, use a plastic adjustment tool to adjust the top and bottom convergence (back of CRT/video board).
- 3 If screen is still blurry after adjusting convergence, one of the CRT socket wires may be improperly secured. Refer to the Take Apart chapter to secure the red and white wires correctly in the CRT socket.





## Audio (1710AV only)

The symptoms associated with a defective sound enclosure are relatively easy to diagnose. Following are typical symptoms of a defective audio system. However, some of these symptoms can also be caused by defective speakers, the built-in microphone, and connectors or cables that plug into the sound enclosure.

- No sound left/right channel
- No recording capability (internal/external microphone)
- No volume/bass/treble control
- Sound distortion
- No gain control (line in and external microphone)
- Loud popping sounds
- Headphones have no sound

## Miscellaneous

Microphone doesn't work

- 1 Without removing rear housing, disconnect microphone from bezel of AppleVision 1710AV Display.
- 2 Connect microphone to known-good AppleVision 1710AV display to verify whether it works.
  - If microphone doesn't work, replace it. Because microphone cable might also be damaged, go to step 3.
  - If microphone works, check microphone cable (as described in the next step).
- 3 With microphone disconnected, use a DC voltmeter to check contacts on microphone connector that is secured inside monitor bezel. The voltmeter should measure 8 volts DC.
- 4 If voltmeter reads 0 VDC, remove sound enclosure, connect extension cables to head unit, and measure voltage at the microphone connector (BA10) on sound board.
  - If voltmeter measures 8 VDC, replace microphone cable
  - If voltmeter measures 0 VDC on sound board at BA10, replace sound board

**Important:** Due to connector changes on the latest revision of the sound board, when you are replacing a sound board, you must also replace the intermediate board. The original sound board is no longer available.





While in sleep mode, power indicator light randomly flashes and monitor powers up and shuts down every few seconds; speakers may emit clicking sound

- 1 Check computer or video card. Some AppleVision 1710AV displays may not function as intended while in Energy Saver mode when connected to a Power Macintosh 7200, 7500, 8500, or 9500 computer or some third-party video cards.
- 2 Check monitor serial number
  - If the number is between SG522xxxxxx and SG536xxxxxx, turn energy saver off and use Sleep or Shut Down option under Special menu instead. Contact Apple Technical Support (1-800-919-2775, option 6) to expedite replacement of the unit.
  - If the number is SG537xxxxxx or greater, the display should function normally in Energy Saver mode.

Moving and clicking a Logitech mouse has no effect on screen, but keyboard input is accepted

Some models of Logitech mice are incompatible with this display. Refer customers to Logitech for information on mouse compatibility and upgrades. The display is not at fault; do not replace it.

Suspected hardware problem because checking cable connections, power, AppleVision software, and other front-of-screen cures did not solve problem

Refer to “Diagnosing a Suspected Hardware Problem” in this chapter.

Thin horizontal lines on screen

Displays larger than 15 inches with tron-style CRTs typically have two wires, each about one-quarter to one-third of the way from the top and bottom of the display image. These supporting wires, which are thinner than a human hair, stabilize the aperture grill against shocks. The lines are common to all tron-style displays and are not screen defects. The lines cannot be adjusted out or eliminated by repairing or replacing modules in the display.



## Downloading Setup Parameters and Replacing the CRT/Video Board\*

\* **Important:** Some countries do not support replacement of the CRT/video board. Check the service strategy in your region before continuing this procedure.

**Caution:** Before removing a defective CRT/video board, check the monitor serial number. If the number is between SG522xxxxxx and SG536xxxxxx, contact Apple Technical Support (1-800-919-2775, option 6) to expedite replacement of the unit. If the serial number is outside of that range, you must download the display parameter settings before removing the CRT/video board.

The following steps show the procedure for

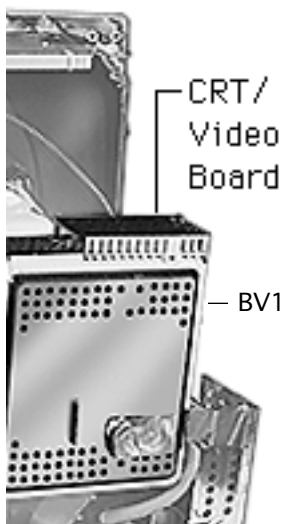
- Creating (downloading) a parameter settings file
- Duplicating the parameter settings file
- Replacing the CRT/video board
- Writing (uploading) the display parameters

**Important:** When you connect the monitor to a computer, be sure to connect the ADB cable from the monitor's video cable to the ADB port on the computer.

### Download Parameter Settings

- 1 With the power off, install the jumper (from kit part number 076-0529) in connector BV1 (next to the BV2 ribbon cable) on the right side of the CRT/video board.
- 2 Turn on the computer and the monitor.
- 3 Copy the application called Display Service Utility (inside the Diagnostics Utilities folder on the Service Source Companion CD) to the desktop.
- 4 Open the copy of the DSU and select AppleVision 1710/1710AV pattern selections.
- 5 To download parameters from the CRT/video board, click Create File. A message appears explaining that the process will take about 3 minutes.
- 6 When the message disappears, a new file called Parameter Settings 1710 is created on the same level as the Display Service Utility application.

**Caution:** To avoid loss of data, do not move or rename the Parameter Settings file.





## Duplicate the Parameter Settings File

- 1 Locate the Parameter Settings 1710 file, but do not move or rename it.
- 2 Beside the Parameter Settings 1710 file create a new folder.
- 3 Name the new folder Parameter File Backup.
- 4 Hold down the option key and drag the Parameter Settings 1710 file onto the Parameter File Backup folder.
- 5 Shut down the monitor. Unplug the power cord.

## Replace the CRT/Video Board

- 1 Remove the defective CRT/video board and replace it with a new CRT/video board. Refer to “CRT/Video Board” in the Take Apart chapter.
- 2 Remove the jumper from the defective CRT/video board, and install it on the new CRT/video board.
- 3 Reattach the power cord. Restart the computer.
- 4 Open the Display Service Utility and select AppleVision 1710/1710AV pattern selections.

## Upload Parameter Settings

- 1 To upload parameter settings, use the Display Service Utility and click Write File. A message appears explaining that the process will take about 3 minutes. In this time the screen will blink 2 to 3 times before the Parameter Settings 1710 file is uploaded.  
**Note:** If the Write File button is grayed out, this means the application can't find the Parameter Settings 1710 file. Make sure you did not move or rename the original file.
- 2 When the message disappears, quit the Display Service Utility.
- 3 Turn off the monitor and remove the jumper.
- 4 After about 5 seconds, turn on the monitor.
- 5 Drag the AppleVision Preferences folder into the trash. Restart the computer.
- 6 Open the Monitors & Sound control panel, and click the Geometry button.
- 7 Hold down the option key and click Factory Settings.
- 8 Go to the next procedure: “Adjusting the Display after Replacing the CRT/Video Board.”





## Adjusting the Display after Replacing the CRT/Video Board\*

**\* Important:** Some countries do not support replacement of the CRT/video board. Check the service strategy in your region before continuing this procedure.

**Caution:** Perform this procedure only after you've replaced the CRT/video board and uploaded the parameter settings.

After replacing the CRT/video board, some adjustment is necessary. The following steps show the procedure for

- Adjusting screen geometry
- Adjusting screen convergence
- Recalibrating white points

### Adjust Geometry

If the screen is displaying keystoneing, open the Display Service Utility, select AppleVision 1710/1710AV pattern, and click the Adjust Geometry button. Using the keystone slider control, you can adjust the width of the top and bottom of the screen. If necessary, use the Display Service Utility to make other geometry adjustments. Click the Save button to store the adjustments in user and factory mode. Trash the AppleVision Preferences folder, and Restart the system.

### Adjust Convergence

- 1 Use Monitors & Sound to select Convergence and set the convergence for the best center-of-screen appearance. Refer to Convergence in the Adjustments chapter.
- 2 If center-of-screen appearance is still blurry, use a standard hex tool to adjust H-Stat (lower left side of CRT/video board).
- 3 If center-of-screen appearance is good, but the top/bottom convergence is blurry, use the plastic adjustment tool to adjust the top and bottom convergence (back of CRT/video board).
- 4 If the screen is still blurry after adjusting convergence, one of the CRT socket wires may be improperly secured. Refer to the Take Apart chapter to secure the red and white wires correctly in the socket.
- 5 If the screen is still blurry, check the high voltage. Refer to "Checking High Voltage" in this chapter.





## Recalibrate White Points

**Caution:** If the video cable is connected to a third-party video card that uses proprietary color calibration drivers, you might need to disable the drivers to use the AppleVision color calibration functions.

- 1 After you've rewritten the file, as instructed in "Upload Parameter Settings," restart the system.
- 2 Open Monitors & Sound and select Color.
- 3 Select the default 9300 white point and click Recalibrate.
  - If you later choose another white point such as 6500 or D50, you must click Recalibrate for the changes to take effect.
  - If the display looks blurry after recalibrating, adjust convergence as described in the previous section.
  - If you hold down the option key and click Factory Settings, it might be necessary to perform a minor convergence adjustment using Monitors & Sound.
- 4 If the Recalibration fails, a warning message will appear. Click OK and click Recalibrate again.
- 5 If the recalibration fails again, use the duplicated file to upload the parameter settings. (Hold down the option key and drag the Parameter Settings 1710 file out of the Parameter File Backup folder; then follow the procedure under "Upload Parameter Settings.") Adjust the display. If the recalibration fails again, click Recalibrate.

**Note:** These multiple recalibration attempts might seem excessive, however lab tests have confirmed a high success rate at saving the display and preventing needless replacements.
- 6 If the recalibration fails again (after the fourth attempt), call Apple Technical Support. (In the US, call 1-800-919-2775, option 3.)





## Adjusting the Display after Replacing the Main Deflection Board

After replacing the main deflection board, perform the following adjustments for all three Macintosh modes (screen resolutions):

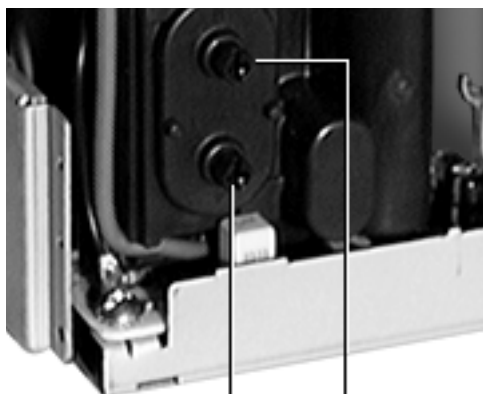
- 640x480 at 67 Hz
- 832x624 at 75 Hz
- 1024x768 at 75 Hz

- 1 Using the control strip (or the Monitors control panel), select 1024x768, the highest of the three Macintosh screen resolutions.



Screen  
Resolutions

- 2 Open the Display Service Utility (DSU) and select Pattern Selections: AppleVision 1710/1710AV.
- 3 Refer to the procedure called “Checking High Voltage” in this chapter to verify that the high voltage is 26 kV. If the high voltage is not 26 kV, adjust the high voltage using the DSU, the multimeter, and the high-voltage probe. Use the high voltage slider control on the DSU to make final adjustments.
- 4 Using the DSU, select the focus pattern (percent signs). Adjust horizontal and vertical focus controls for best center-of-screen performance. If necessary, readjust each focus control to optimize overall focus.



V Focus    H Focus





- 5 If necessary, repeat step 4 for the best overall focus.
- 6 Check the screen to see if any minor geometry adjustments are necessary. If so, shut down the monitor and unplug the power cord. Install the jumper on the CRT/video board. Reattach the power cord. Restart the computer. Open the Display Service Utility and select AppleVision 1710/1710AV pattern selections. Use the DSU geometry slider controls to adjust the display. Turn off the monitor before removing the jumper.
- 7 For the two remaining Macintosh modes, check the screen, and if necessary, repeat this procedure but leave out steps 3, 4, and 5.



## Checking High Voltage

This high-voltage check is a required procedure for some of the symptoms in this chapter. After checking high voltage, return to the symptom chart, if necessary.

**Caution:** Do not attempt this procedure without the Apple high-voltage probe (Apple part number 076-0392). Use only the Apple high-voltage probe; other high-voltage probes will not give accurate readings for this procedure.

**⚠ Warning:** Read all of the warnings, notes, and steps of this procedure before beginning.

**⚠ Warning:** Voltage at the anode, with the power on, can cause serious injury. Double-check all multimeter connections before taking the reading. Probe the anode carefully. Serious damage and injury may occur if the anode is knocked off while the CRT is charged.

- 1 Turn off the monitor and computer. Disconnect the power cords and video/ADB cables. Wait at least two minutes for the CRT to discharge.
- 2 Refer to the Take Apart chapter to remove the following:
  - Microphone assembly/blank plate
  - Sound enclosure
  - Rear housing
- 3 Attach the Apple high-voltage probe to a multimeter and attach the ground wire to the chassis.

**⚠ Warning:** Verify that the ground wire connection to the chassis is secure.
- 4 From the rear of the CRT—away from the CRT frame—carefully insert the probe under the anode cap.
- 5 With the power switches off, connect the power cords and video/ADB cables.
- 6 Turn on the computer and monitor.
- 7 The reading should be 26 VDC on the meter. This is actually 26 kV. Most of the voltage is across the high-voltage probe.

**⚠ Warning:** Do not remove the probe from under the anode cap until power is turned off. Injury or damage to equipment may occur.
- 8 If reading is 0 VDC, replace the main deflection board.
- 9 Turn off the monitor.
- 10 Unplug the monitor.
- 11 Remove the probe from under the anode cap.
- 12 Go back to the symptom chart for the next cure, if necessary.





# AppleVision Recovery Utility for Malfunction During Startup or Recalibration

**Important:** Disregard the rest of this section if you are using Apple Display software 1.5.3 or later. With version 1.5.3 or later, the AppleVision Recovery Utility is built in. To operate the built-in recovery function, ensure the monitor's video and ADB cables are connected to the computer. Start up the computer and hold down the keys command-option-a-v until you hear a system alert or the screen image is restored. Apple Display software will detect a "no video" condition at startup and will correct the condition when the extension loads. If the screen is blank after startup or recalibration, use the AppleVision Recovery Utility as follows.

## Symptom Sets

A small percentage of AppleVision 1710 and AppleVision 1710AV monitors malfunction either during startup or immediately after color recalibration.

When this malfunction occurs, the monitor can display two different sets of symptoms:

### Symptom Set 1

- No raster (black screen).
- Power indicator light is on.
- Rustling or crackling sound emitted when the monitor is turned on or off. **Note:** This sound indicates high voltage is present. If high voltage is not present, the Recovery Utility will not solve the problem. In that case, refer to the symptom "No raster (screen is black); power indicator light on" in this chapter.

### Symptom Set 2

- Screen is one predominant color (magenta, green, red, blue, etc.).
- Instead of being black, the left and right edges of the screen might exhibit some luminance.

If your monitor displays either set of symptoms, use the AppleVision Recovery Utility to correct the problem.





## Using the AppleVision Recovery Utility

To perform the recovery procedure, you need

- Macintosh computer that can support two monitors (unless you have Symptom Set 2)
- Malfunctioning AppleVision 1710 or 1710AV monitor
- Known-good monitor (any model)
- AppleVision Recovery Utility application located on the Service Source Companion CD: Diagnostics Utilities folder
- AppleVision Setup control panel application installed on the Macintosh computer

**Important:** Be sure to use the correct Recovery image for your Macintosh computer model. Copy the image to a blank disk using Disk Copy 4.2. The correct image is determined by the type of computer used with the AppleVision Display:

- For PowerMac 7100/80 and AV, 8100/100/110 and AV computers, use the file AppleVision Recovery.image 1.
- For Quadra, Centris, PowerBooks (except 190, 2300, 5300), and first-generation Macintosh computers, use the file AppleVision Recovery.image 2.
- For PowerBook 190, 2300, 5300, PowerMac 7200, 7500, 7600, 8500, and 9500, use the file AppleVision Recovery.image 3.
- For PowerBooks with external video support or other computers with a second display connected, use the file AppleVision Recovery App.

Follow these steps to recover the monitor:

- 1 Connect a known-good monitor to the Macintosh's built-in video port (unless you have Symptom Set 2).
- 2 Connect the malfunctioning AppleVision 1710 or 1710AV monitor to the Macintosh's second video port. Connect the monitor's ADB cable connector to the Macintosh's ADB port.
- 3 Turn on the Macintosh system, and confirm that the known-good monitor displays the menu bar and Finder desktop.
- 4 Run the AppleVision Recovery Utility. After recalibrating, the 1710(AV) monitor should display an active raster.
- 5 Press a button on the left side of the 1710(AV) front panel to open the AppleVision Setup control panel. Click the Color button.





- 6 Recalibrate the 1710(AV) monitor by clicking the recalibrate button. The screen should recalibrate successfully and return to an active raster.
  - If the recalibration is successful and the screen returns to an active raster, the monitor is recovered and no further service is required.
  - If the recalibration is successful (active raster returns) using the Recovery Utility, but the screen returns to black (or color) after the recalibration check, call Apple Technical Support at 1-800-919-2775 for assistance.
- 7 Restart the Macintosh. Confirm that the 1710(AV) monitor has an active raster through the entire restart cycle and that the Finder desktop is active after the cycle is completed. If the monitor was recovered using the Recovery Utility and the screen returns to black or color during start-up, call Apple Technical Support at 1-800-919-2775 for assistance.



## Diagnosing A Suspected Hardware Problem

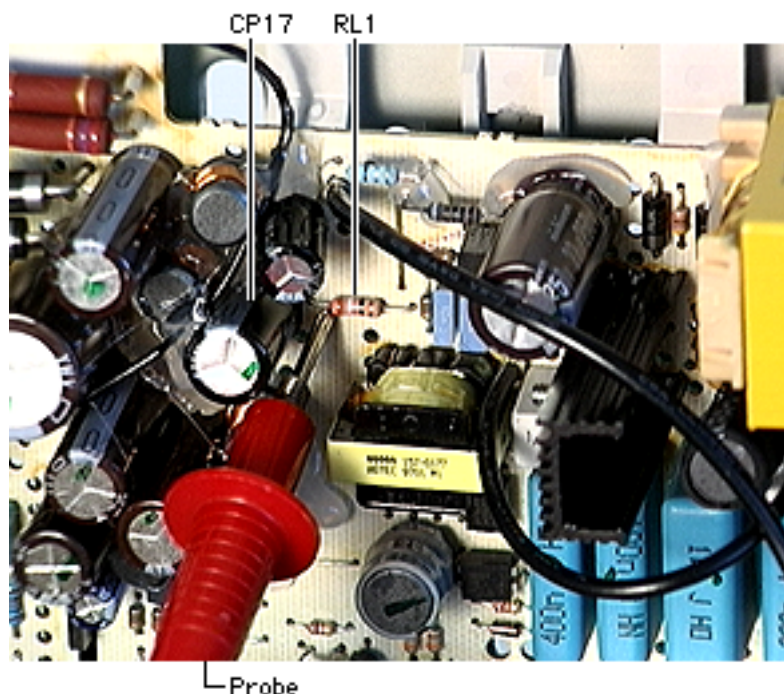
After ruling out other possible cures (that is, you have already checked cable connections, power, AppleVision software, and other possible front-of-screen cures), use the following procedure to help determine and resolve hardware problems. (See the flowchart at the end of this chapter for a simplified depiction of this process.)

- 1 If the problem is a completely black screen, connect another known-good display (not an AppleVision or ColorSync display) as follows. Use a computer that has a video card so you can connect both displays to the computer. Connect the known-good display to the built-in monitor port; connect the 1710(AV) display to the video card connector.
- 2 If the problem involves a partially visible screen (you can see the screen desktop and read the screen icons), there is no need to connect a second display.
- 3 Turn on the computer and the monitor(s). If using a second display, confirm that the known-good display is set up as the main startup screen (Monitors & Sound control panel).
- 4 Open the application called Display Service Utility (from the Diagnostics Utilities folder on the Service Source Companion CD).
- 5 Select AppleVision 1710/1710AV pattern selections.
- 6 Click Create File. A message appears explaining that the process will take about 3 minutes.





- 7 If a dialog box appears that says the Display Service Utility (DSU) is unable to communicate with the display, then remove the monitor housing, and use a multimeter to measure the voltage between chassis ground and resistor RL1 on the end closest to capacitor CP17 on the main deflection board:



- If the voltage measures 11.5 V to 12.5 V, replace the CRT/video board
  - If the problem is gone, adjust the display as described in “Adjusting the Display after Replacing the CRT/Video Board” in this chapter.
  - If the problem persists, reassemble the monitor, and return the display for whole unit or head unit replacement (following the service strategy in your region).
- If the voltage measures less than 11.5 V or greater than 12.5 V, replace the main deflection board (refer to the Take Apart chapter). Reconnect the display to the computer and turn on the computer and monitor.
  - If the problem is gone, adjust the display as described in “Adjusting the Display after Replacing the Main Deflection Board” in this chapter.
  - If the problem persists, reassemble the monitor, and return the display for whole unit or head unit replacement (following the service strategy in your region).

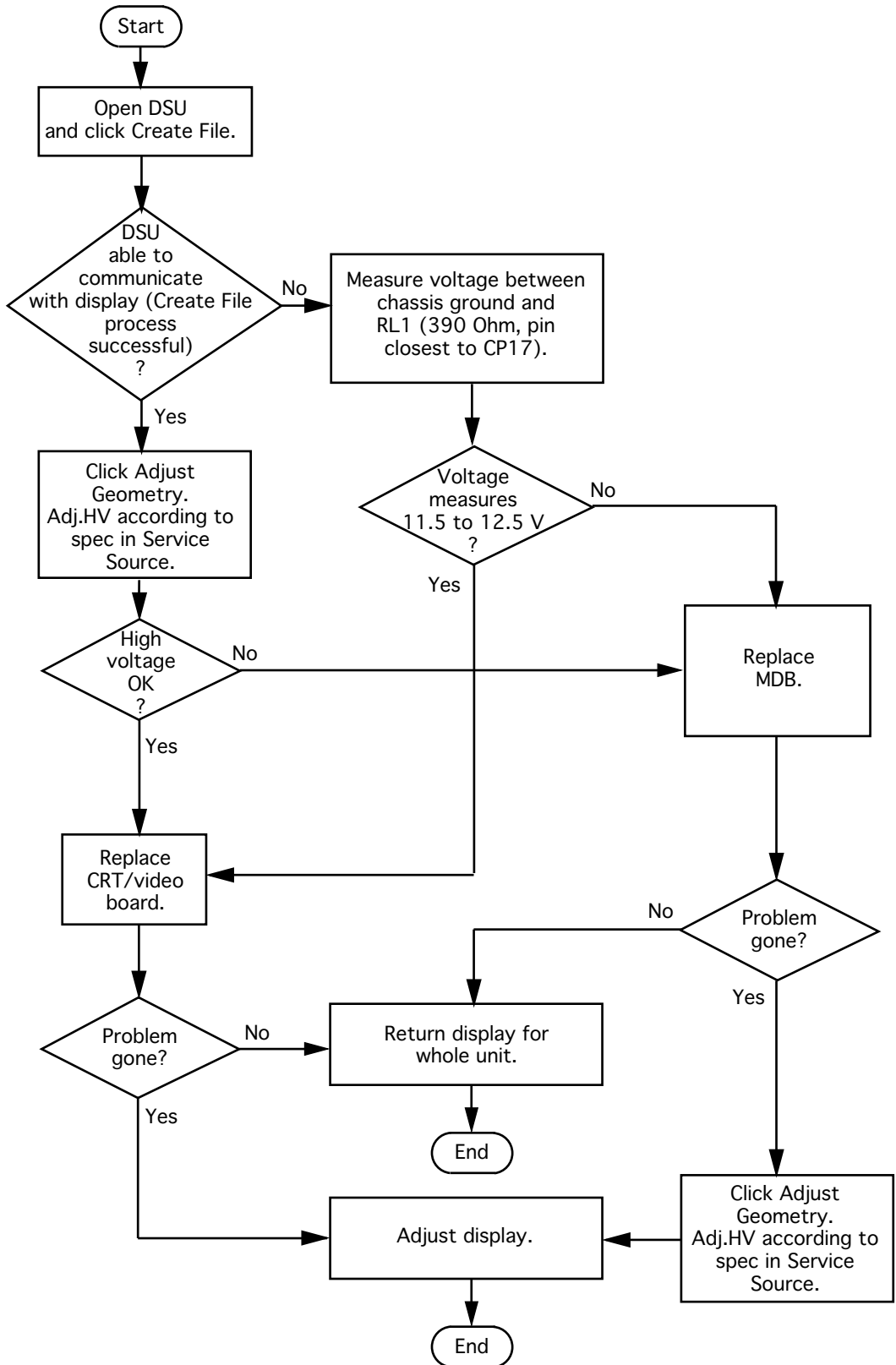




- 8 If the Create File process finishes successfully, click Adjust Geometry. Clicking this button causes the DSU to automatically verify EHT (high voltage). Use a probe to measure the high voltage. (Refer to “Checking High Voltage” in this chapter.)
  - If the high voltage is okay, replace the CRT/video board and adjust the display (see “Adjusting the Display after Replacing the CRT/Video Board” in this chapter). If the hardware problem still exists after completing the adjustments, return the display for whole unit or head unit replacement (following the service strategy in your region).
  - If there is no high voltage, replace the main deflection board and adjust the display (see “Adjusting the Display after Replacing the Main Deflection Board” in this chapter). If the hardware problem still exists after completing the adjustments, return the display for whole unit or head unit replacement (following the service strategy in your region).









Take Apart

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AppleVision 1710AV/1710  
Display



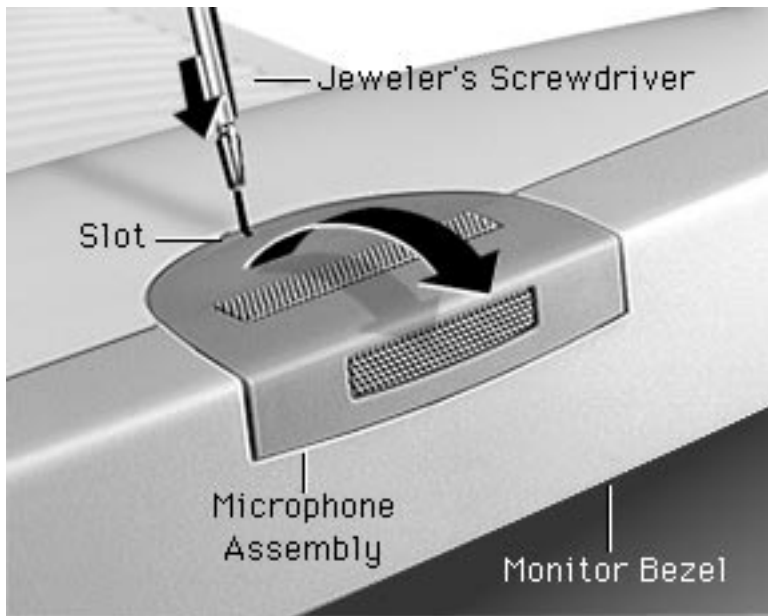


## Microphone Assembly/Blank Plate

No preliminary steps are required before you begin this procedure.

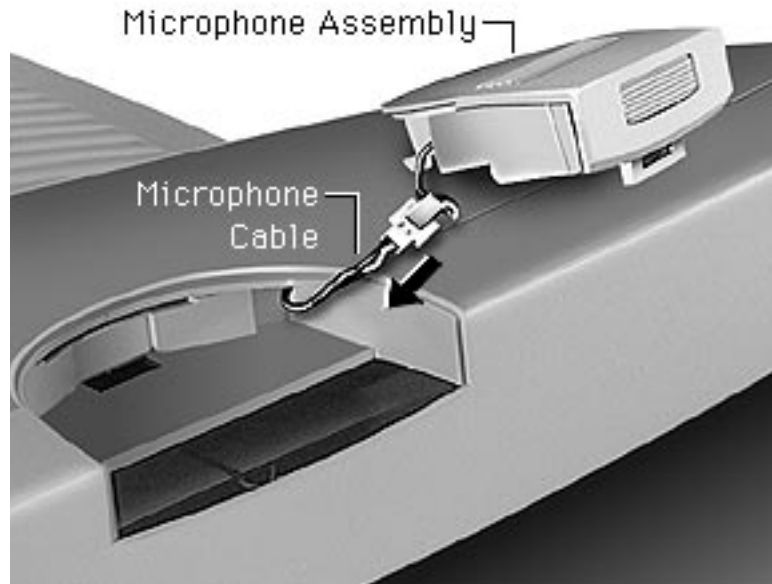
**Note:** The microphone assembly is on the 1710AV display; the blank plate is on the 1710 display. To protect the microphone assembly or blank plate, remove it before removing the sound enclosure or rear housing.





- 1 Place a jeweler's screwdriver in the microphone assembly slot. Press the screwdriver down and toward the bezel to release a tab that holds the microphone to the bezel and rear housing.
- 2 Grasp the microphone assembly with your other hand, and tilt it up and away from the monitor bezel.





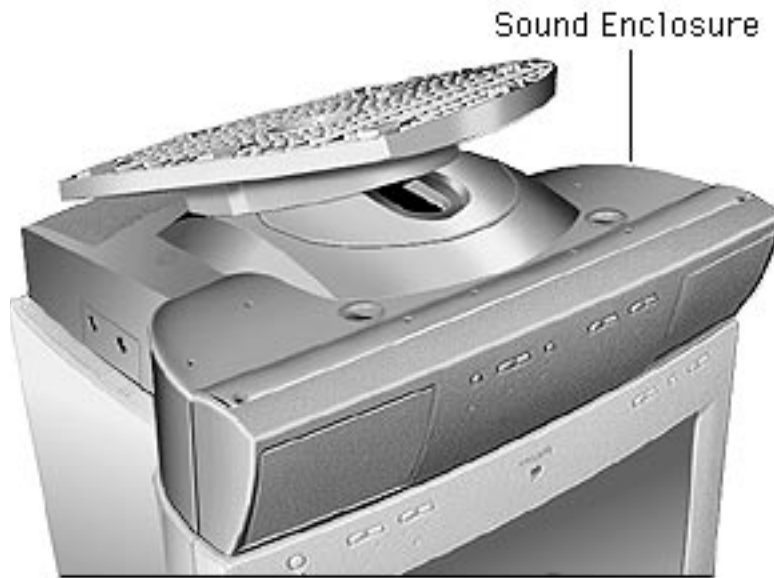
- 3 Disconnect the microphone cable and remove the microphone assembly.



## Sound Enclosure (1710AV only)

Before you begin, remove  
the microphone assembly.





- 1 Place the monitor upside down on a protective pad.

Monitor Front





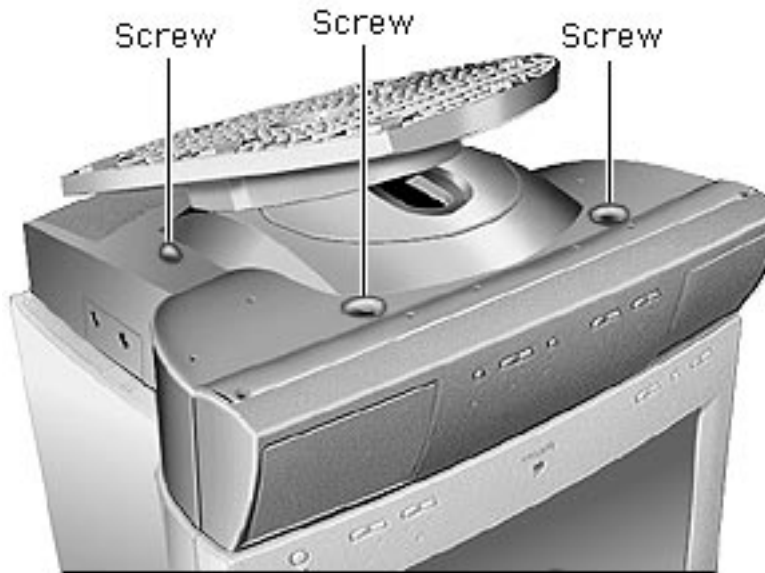
- 2 Peel off the two adhesive disk screw covers. Stick them beside the screw holes.

**Replacement Note:**

After reinstalling the sound enclosure, replace the adhesive disk screw covers. They help maintain the sound integrity of the speaker chamber.







- 3 Use a long T-15 torx driver to loosen (but not remove) the four corner screws.

**Important:** Do not remove the captive screws; they are held in place by rubber grommets inside the sound enclosure.

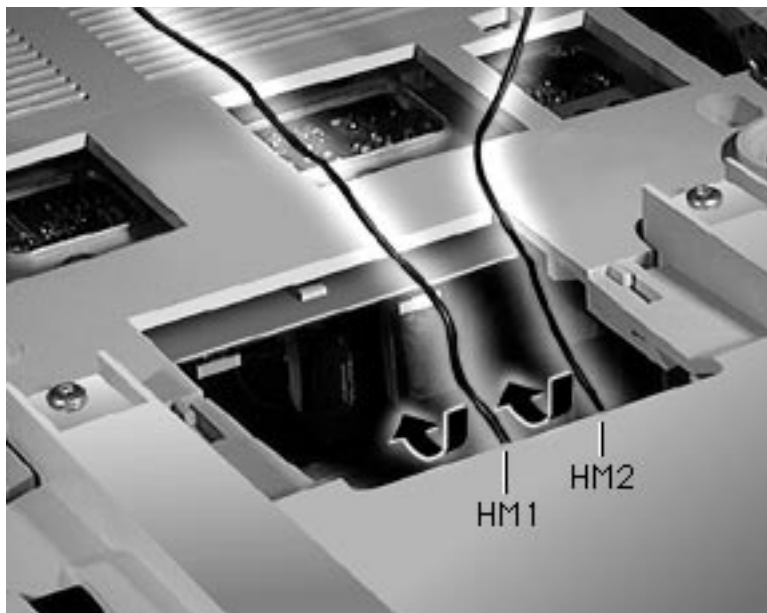




Rear Housing Bottom

- 4 Tilt up the sound enclosure, away from the front of the monitor.
- 5 While holding the sound enclosure up, disconnect
  - Connector at BA9 on the sound board (white wires)
  - 2-pin connector at BA10 on the sound board (gray wire)
- 6 **Important:** Read the following Caution before removing other connections.

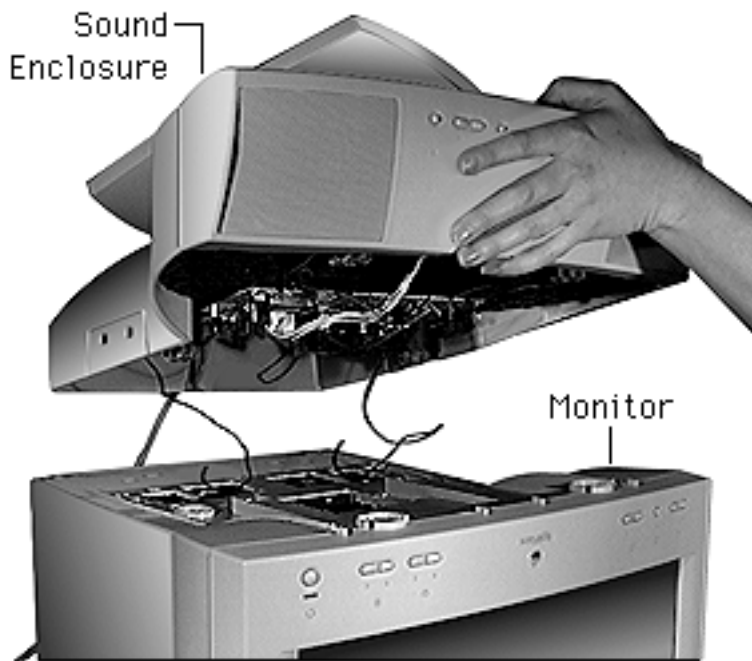




**Caution:** Pins HM1 and HM2 on the intermediate board are difficult to see. With the monitor upside down, the pins point straight down. To avoid bending the pins, use needlenose pliers to pull the connectors straight down and off the pins.

- 7 With needlenose pliers, disconnect
  - Black wire at HM1
  - Black wire at HM2





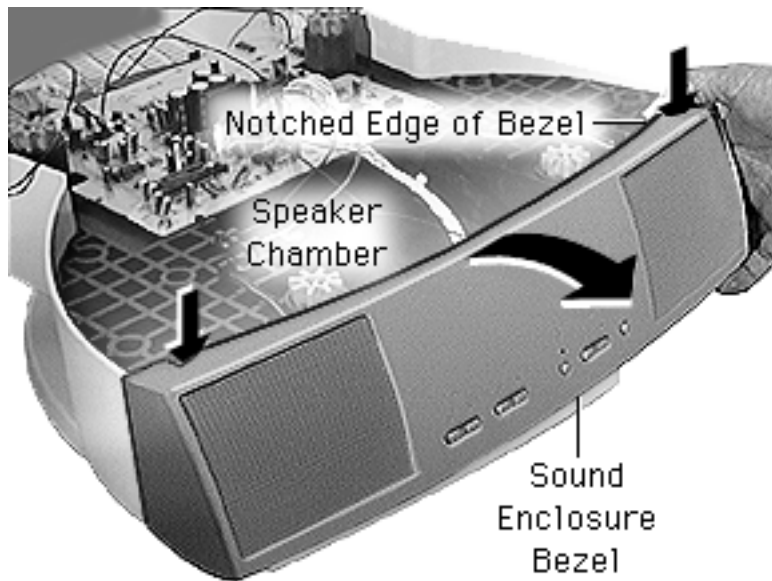
- 8 Lift the sound enclosure straight up and away from the monitor.



## Sound Enclosure Bezel (1710AV only)

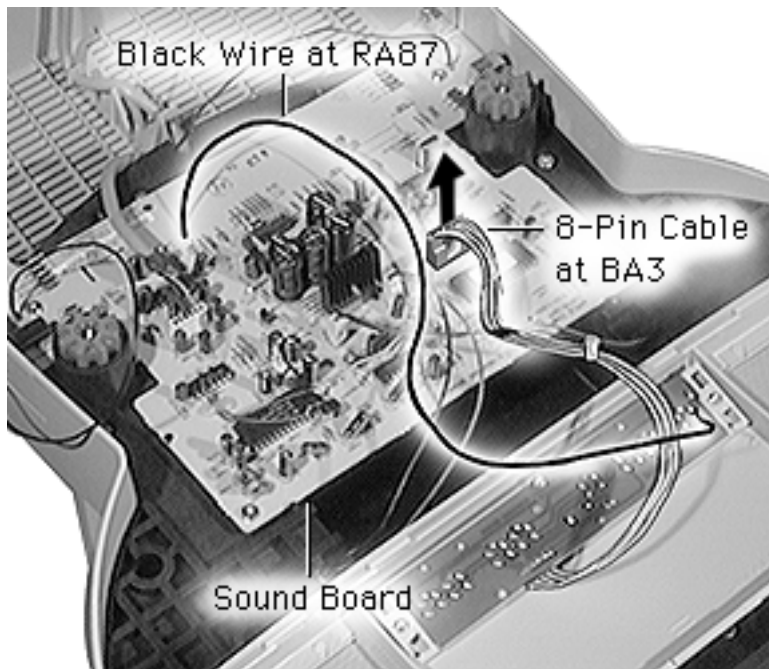
Before you begin, remove the following:

- Microphone assembly
- Sound enclosure



- 1 If you see glue where the bezel and the speaker chamber meet, cut through the glue with a sharp knife.
- 2 With the bezel facing you, place your thumbs on the notched top edges and pull the bezel up and toward you to release the tabs.





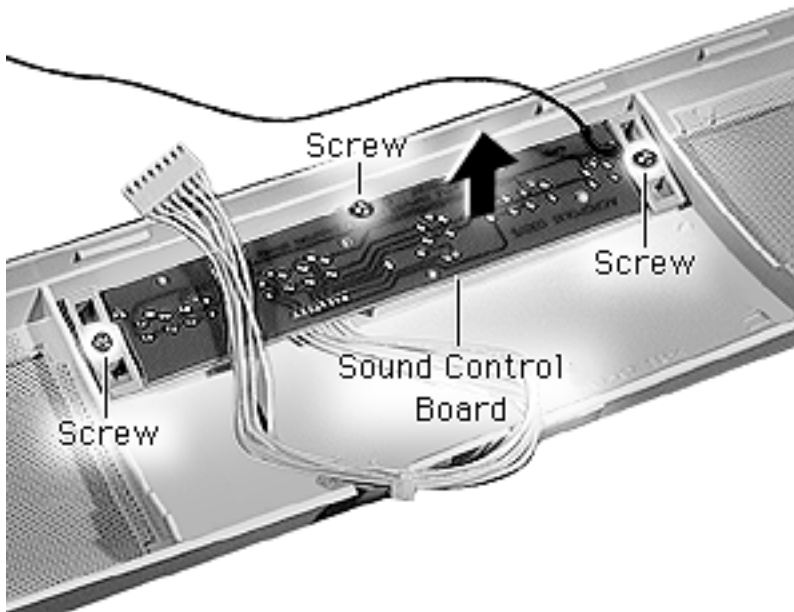
- 3 Disconnect the cable at BA3 from the sound board.
- 4 Unsolder the black wire that is soldered to the rearmost end of component RA87 on the sound board.

**Note:** On some units the black wire may not be soldered to RA87. If not, look for a single black wire coming from the bezel and connecting to the sound board. Disconnect the wire from the sound board.





- 5 Remove the three T-8 torx screws from the sound control board.



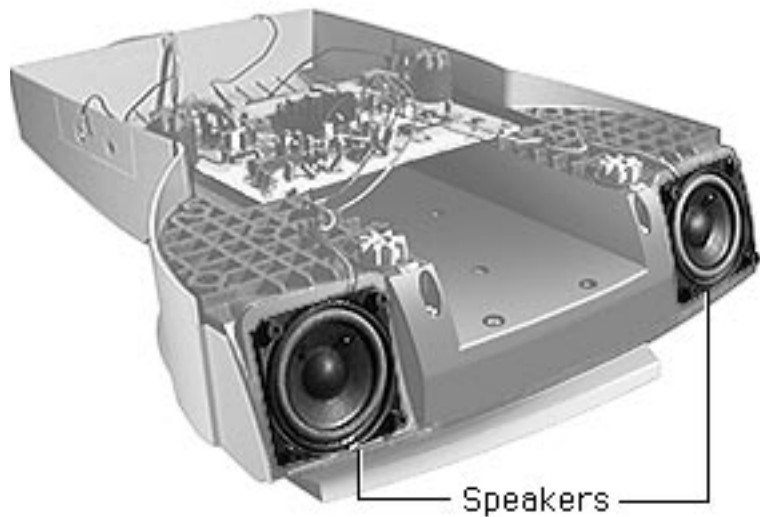


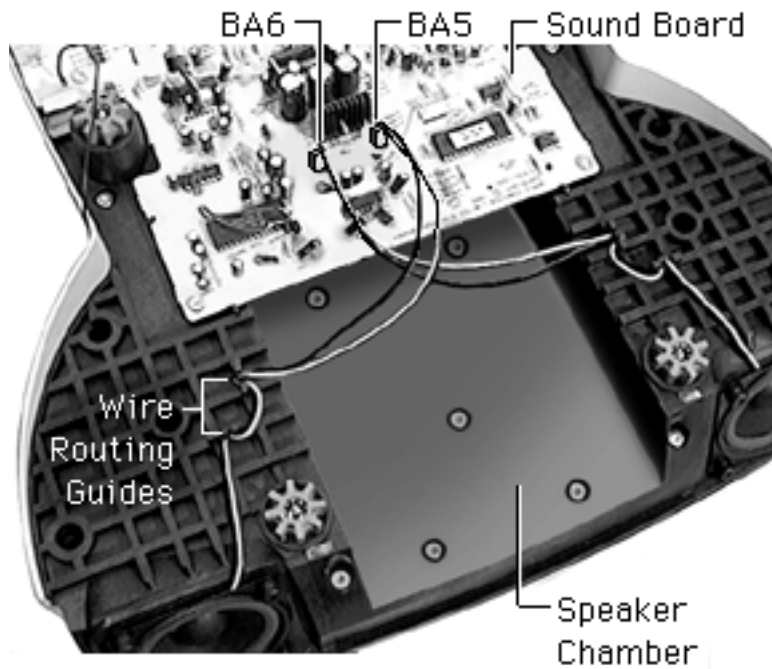


## Speakers (1710AV only)

Before you begin, remove the following:

- Microphone assembly
- Sound enclosure
- Sound enclosure bezel

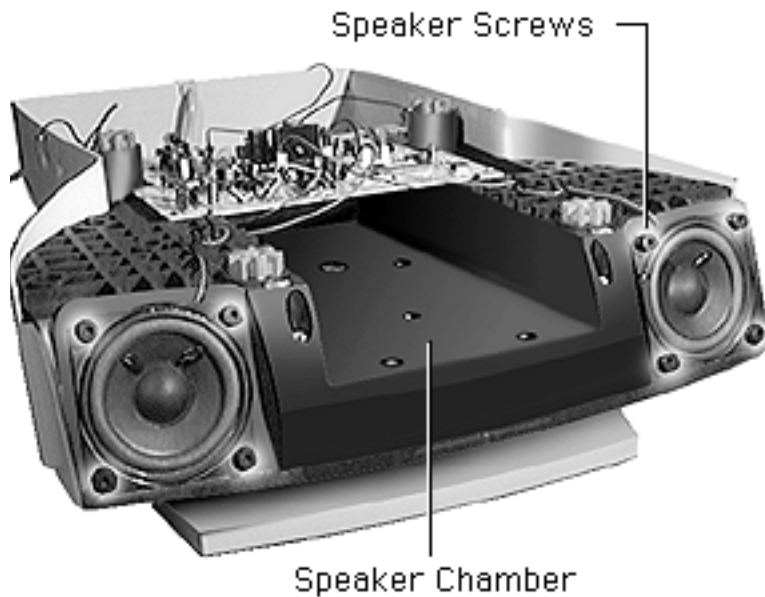




- 1 Disconnect speaker wires BA5 and BA6 from the sound board.

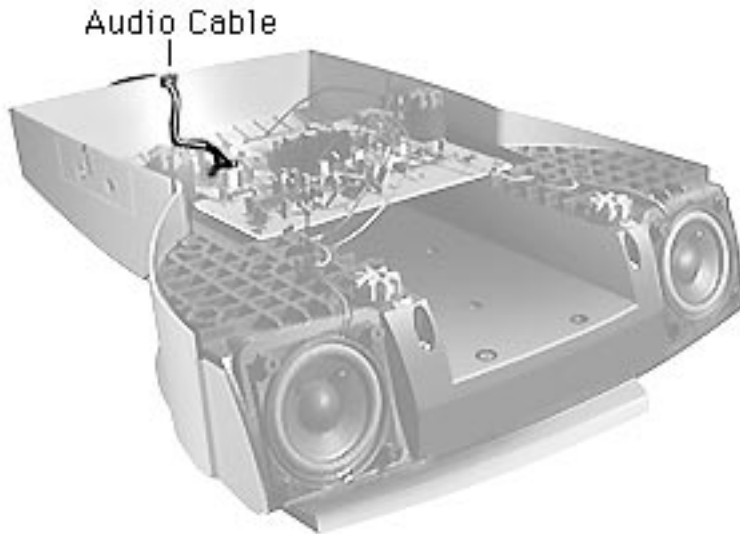
**Replacement Note:** The speaker wires must cross each other. So when the front of the sound enclosure is facing you, the left speaker wire connects to the right connector at BA5, and the right speaker wire connects to the left connector at BA6. When replacing a speaker, route the wires through the guides on the speaker chamber.





- 2 Remove the four T-15 torx speaker screws.

**Caution:** When replacing a speaker, do not overtighten the screws.

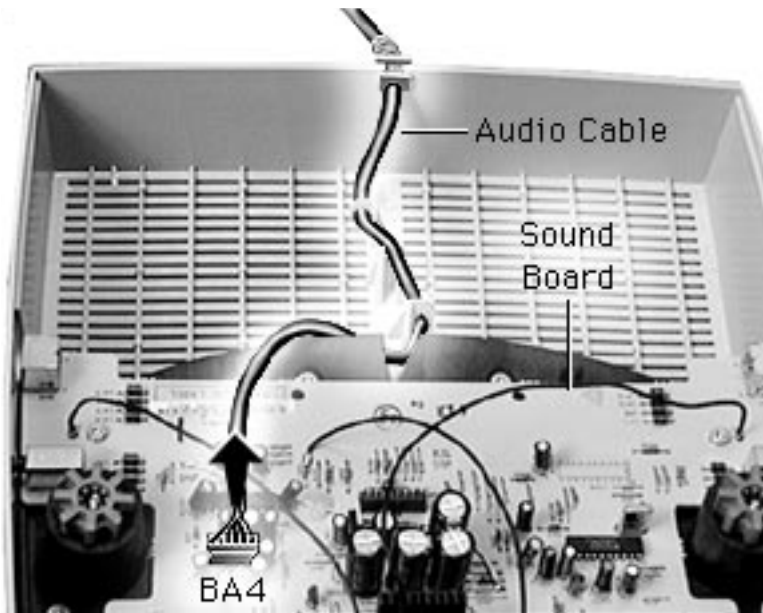


## Audio Cable (1710AV only)

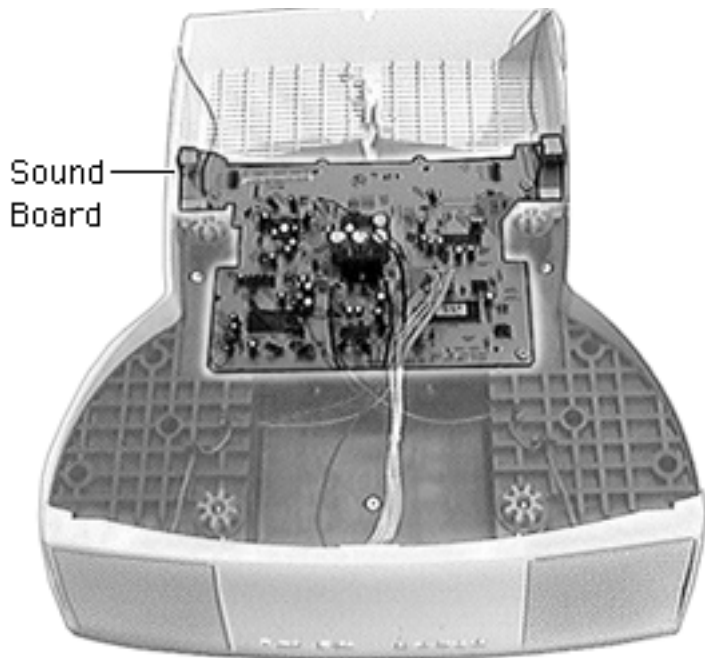
Before you begin, remove the following:

- Microphone assembly
- Sound enclosure





- 1 Disconnect the audio cable from connector BA4 on the sound board.
- 2 Lift the cable from the plastic guides and from the slot in the sound enclosure.

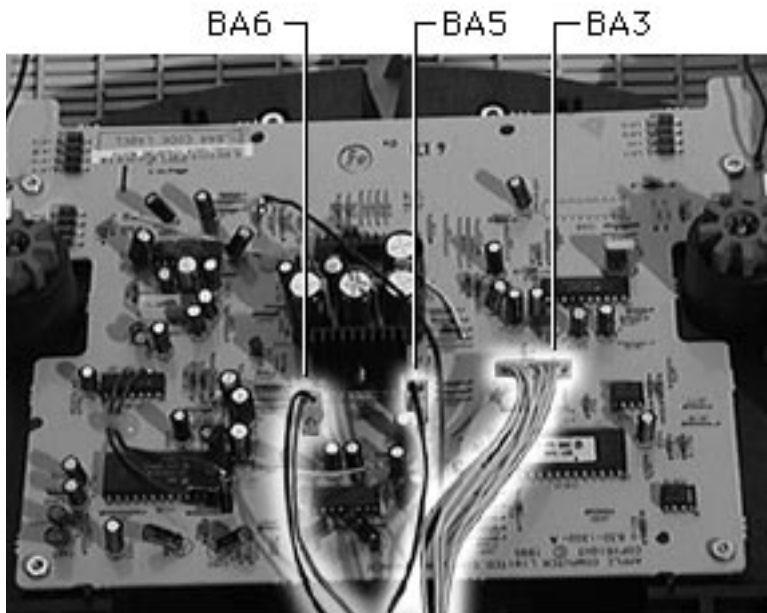


## Sound Board (1710AV only)

Before you begin, remove the following:

- Microphone assembly
- Sound enclosure
- Audio cable

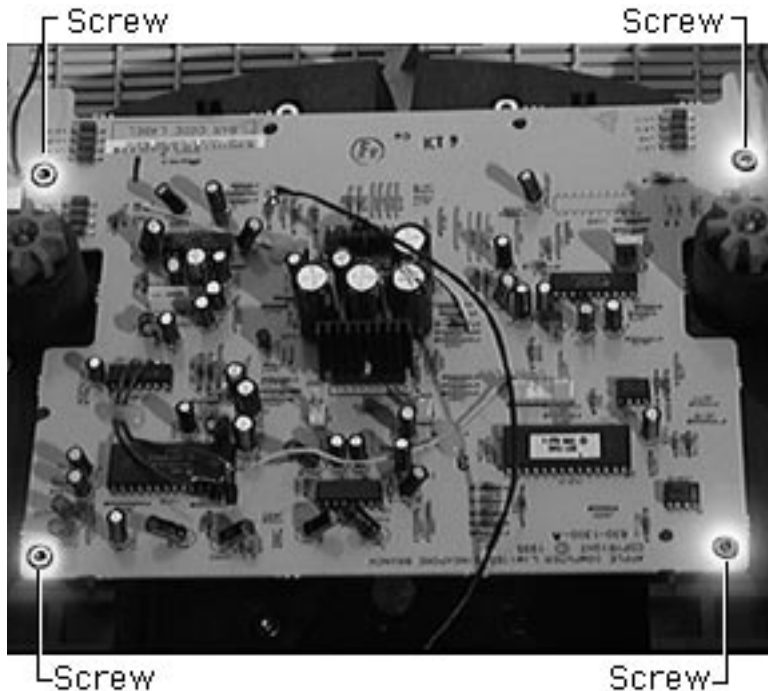




- 1 Disconnect from the sound board
  - Connector at BA3
  - 2-pin connector at BA5
  - 2-pin connector at BA6

**Replacement Note:** The speaker wires must cross each other. So when the front of the sound enclosure is facing you, the left speaker wire connects to BA5, and the right speaker wire connects to BA6.





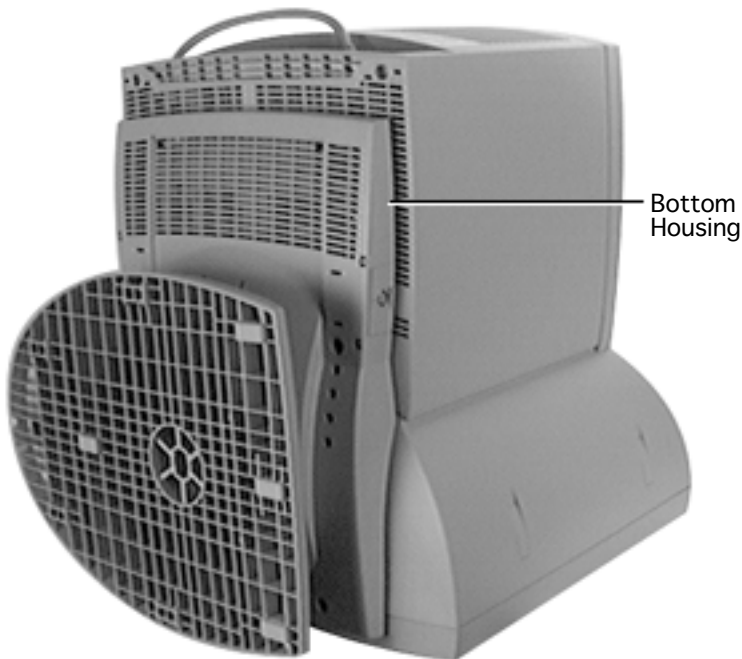
2 Remove the four T-15 torx screws from the sound board.

3 Lift the board off of the sound enclosure.

**Replacement Note:** Due to connector changes on the latest revision of the sound and intermediate boards, when you are replacing a sound board, you must also replace the intermediate board. The original sound board is no longer available.







## Bottom Housing (1710 only)

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.

- 1 Place the monitor face down on a protective pad.



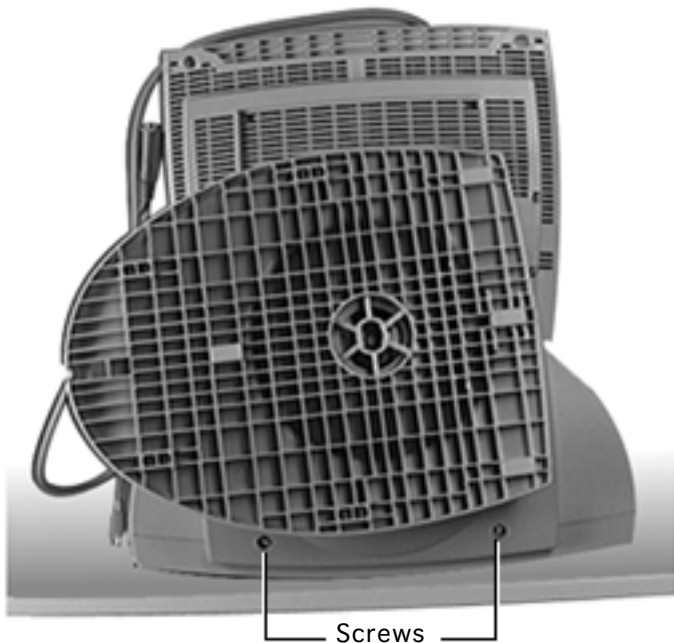


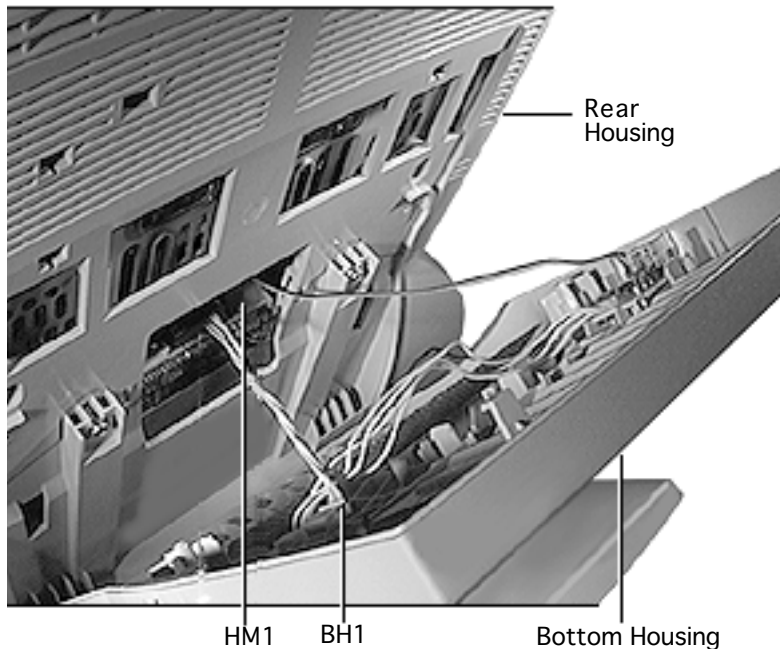
- 2 Position the tilt-swivel base sideways and so it is resting over a table edge.
- 3 Slide the tilt-swivel base down and remove the two T-15 torx screws above the tilt-swivel base.





- 4 Slide the tilt-swivel base up and remove the two T-15 torx screws below the base.





- 5 Tilt the bottom housing away from the rear housing.
- 6 Disconnect the 4-pin connector at BH1 on the ADB board.
- 7 Disconnect the single-pin connector at HM1 on the intermediate board.
- 8 Remove the bottom housing.



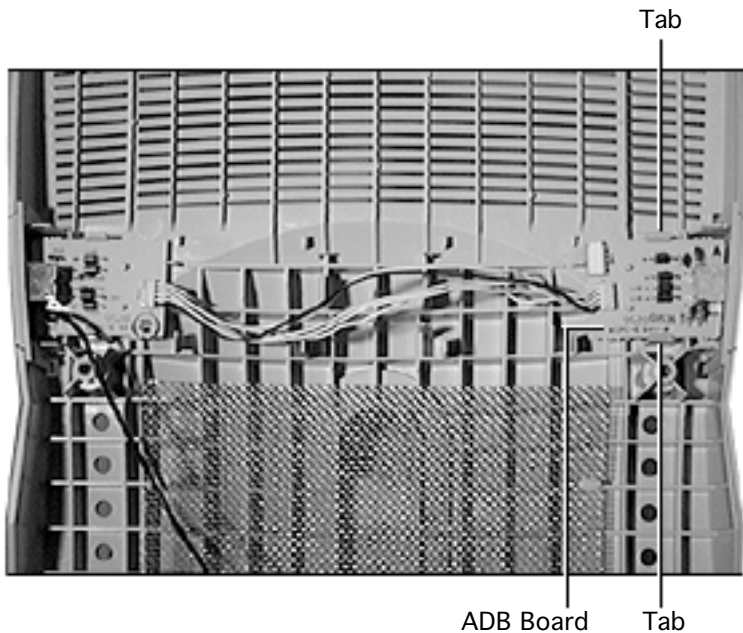


## ADB Board (1710 only)

Before you begin, remove the bottom housing.

**Note:** The ADB board consists of two boards joined together with a cable and soldered connections.

- 1 Press and hold the two tabs away from the ADB board.
- 2 Tilt the board up from the bottom housing to release it.





**Replacement Note:** Before securing the board tabs, position the ADB board so the plastic pins on the bottom housing line up with the holes in the board.



Rear Housing

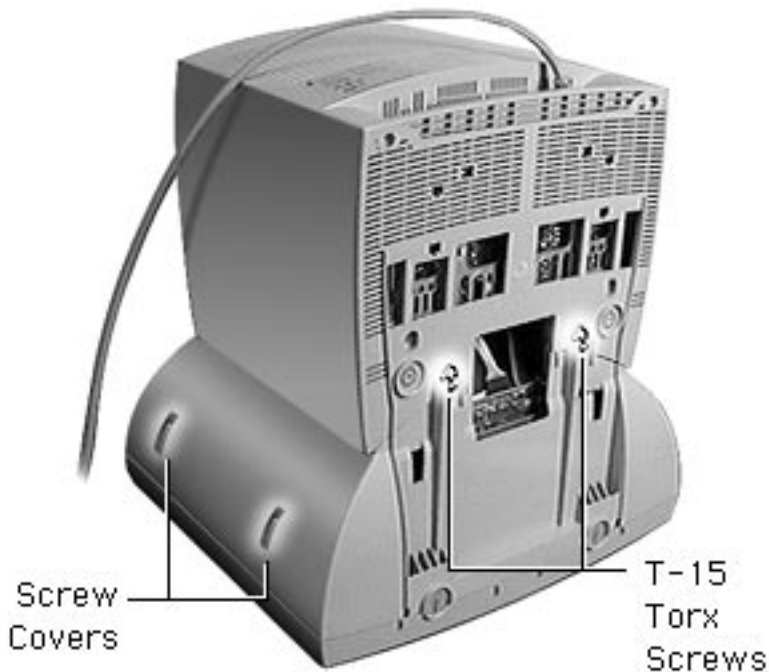
## Rear Housing

Before you begin, remove the following:

- Microphone assembly or blank plate
- Sound enclosure (1710AV display)

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



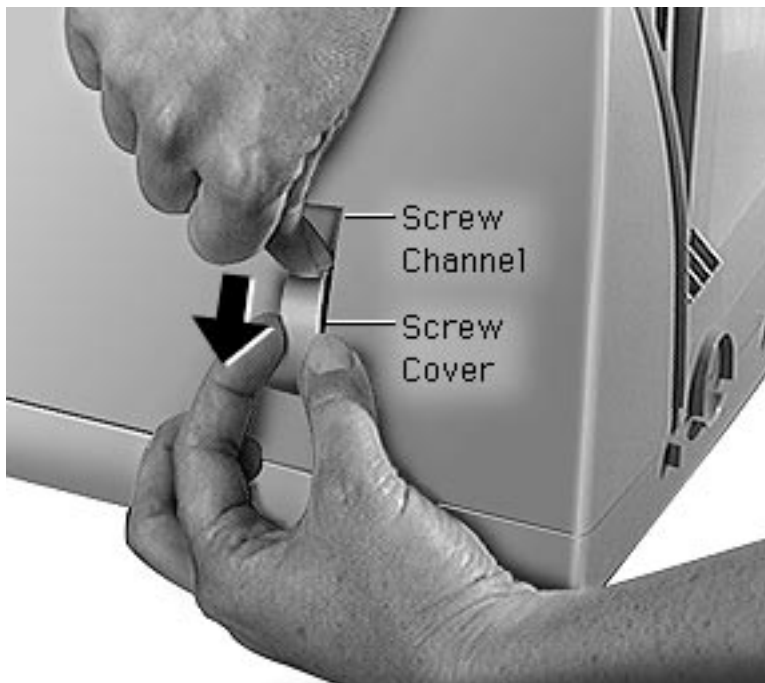


**Important:** You must remove the microphone assembly or blank plate and the sound enclosure before removing the rear housing.

- 1 With the monitor face down on a protective pad, remove the two T-15 torx screws.
- 2 Locate the four screw covers.





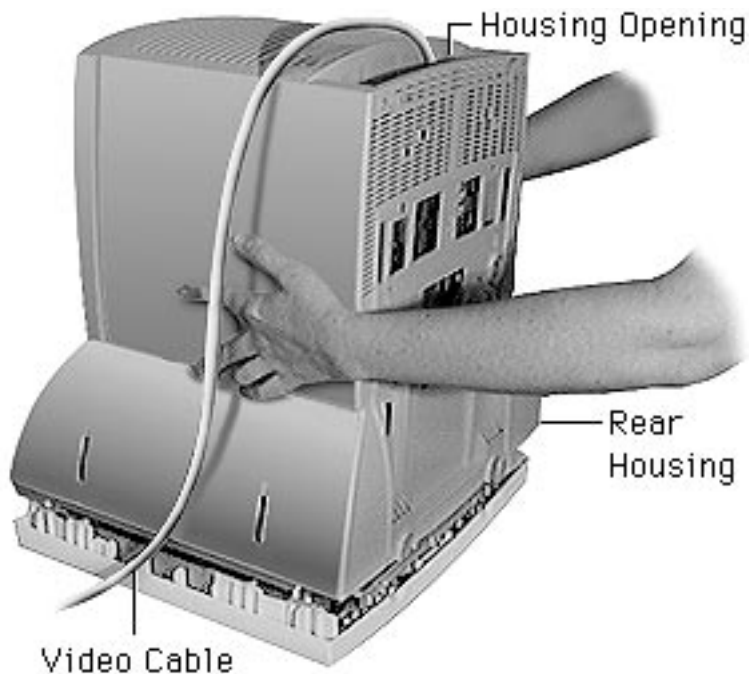


- 3 **Caution:** To avoid damaging the plastic housing or screw cover, don't use a screwdriver or other metal tool.

With one hand, press down on the tip of the screw cover, causing the screw cover to bow outward from the screw channel.

- 4 Pull out the screw cover with your other hand.
- 5 Repeat steps 3 and 4 for the remaining three screw covers.

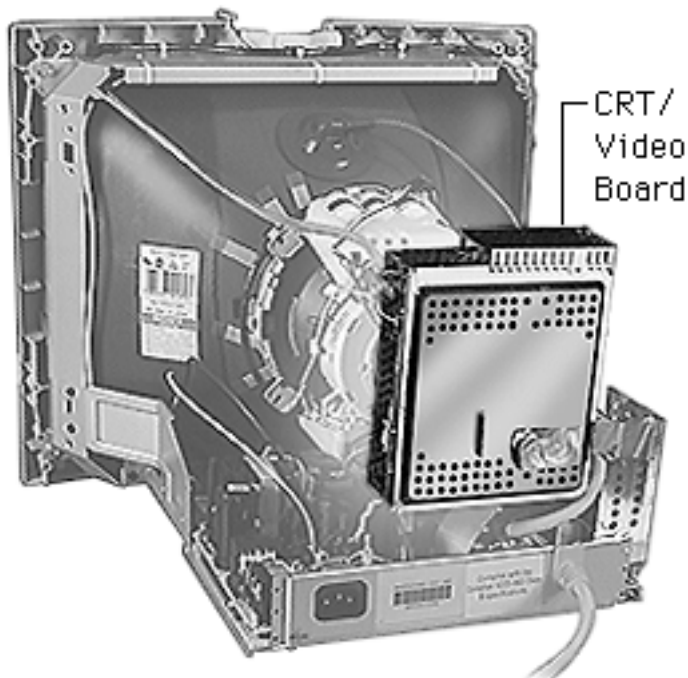




- 6 Remove the four T-15 torx screws.
- 7 Where the top part of the rear housing meets the bezel, pull up and out on the arched opening (at the microphone assembly/blank plate area) to release the rear housing tabs from the bezel.
- 8 With both hands on the rear housing, lift it off the bezel.

Route the video cable through the housing opening.





## CRT/Video Board

Before you begin,

- Remove the microphone assembly/blank plate
- Remove the sound enclosure (1710AV only)
- Remove the rear housing
- Discharge the CRT
- Download the setup parameters if replacing the CRT/video board with a new board (refer to the Troubleshooting chapter)

**Caution:** To avoid loss of data, you must download the display parameter settings





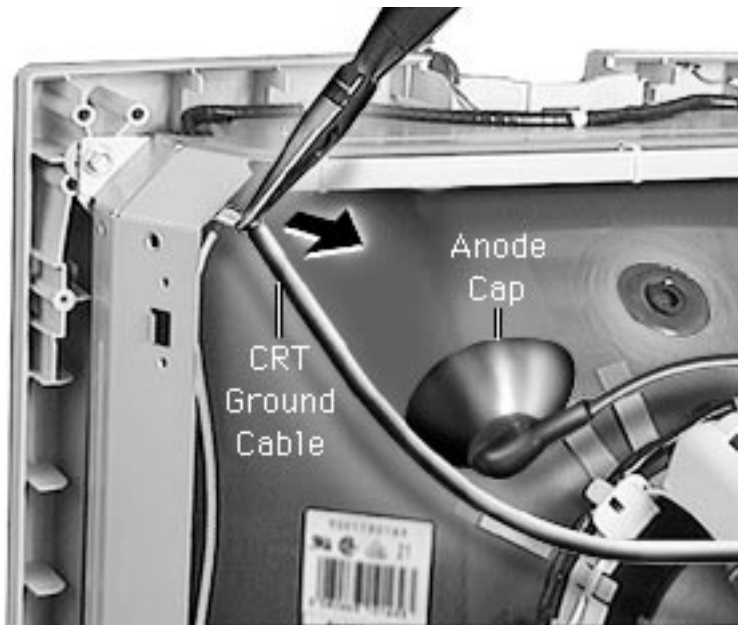
before replacing the CRT/video board with a new board. However, you do not have to download the setup parameters if you are removing the board for another procedure and will install the same board.

**⚠ 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.

**Caution:** When disconnecting cables from the CRT/video board, be careful not to apply excessive pressure to the neck of the CRT.

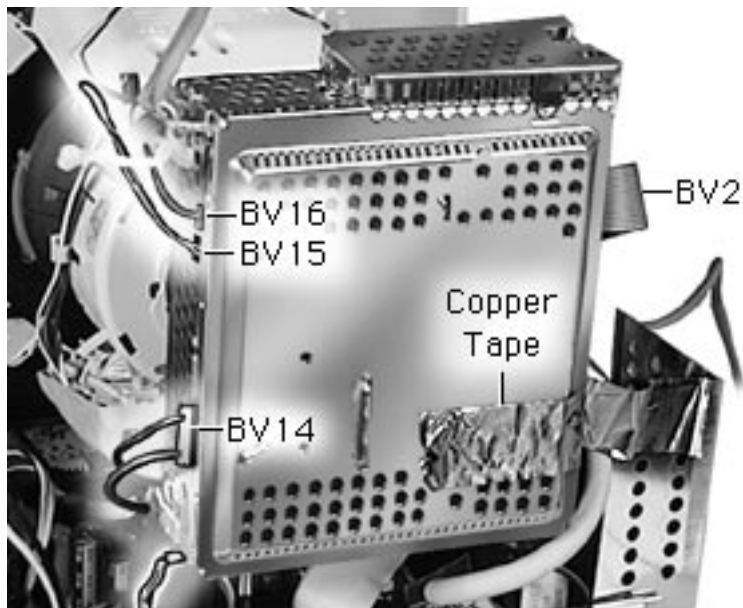




After discharging the CRT,

- 1 Remove the anode cap.
- 2 With needle-nose pliers, disconnect the long braided CRT ground cable.

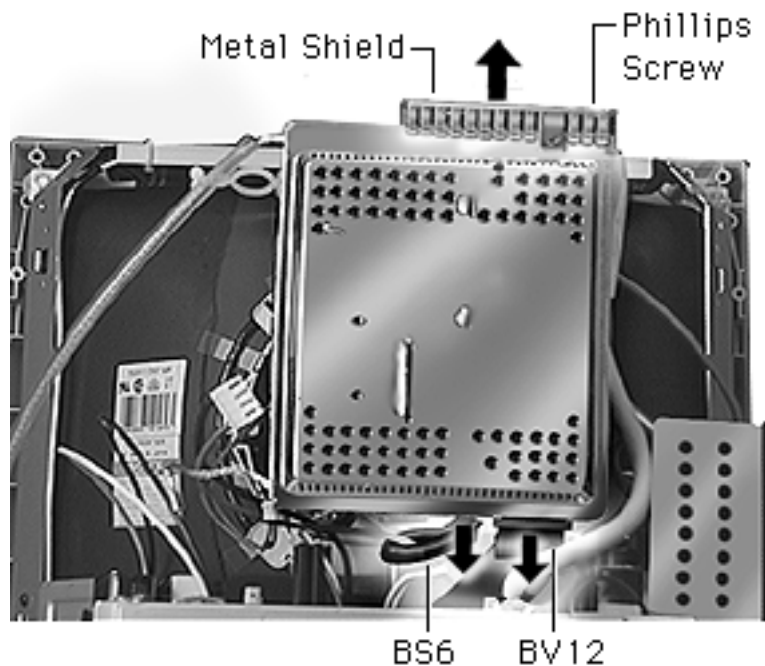




— Braided Ground Cable

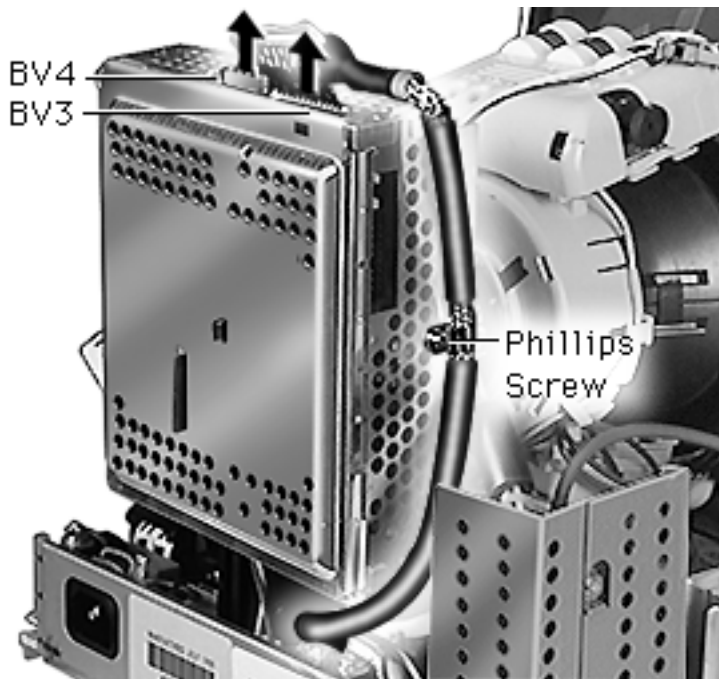
- 3 Disconnect
- Short braided ground cable
  - BV14 (black and blue wires)
  - BV15 (red and brown wires)
  - BV16 (with ferrite bead)
  - BV2 (ribbon cable)
  - Copper tape (or other connection between flyback transformer shield and CRT/video board)





- 4 Disconnect these cables:
  - BV12 (ribbon cable)
  - BS6 (5-pin connector next to BV12)
- 5 Remove the single Phillips screw from the metal shield on top of the CRT/video board.
- 6 Remove the metal shield.

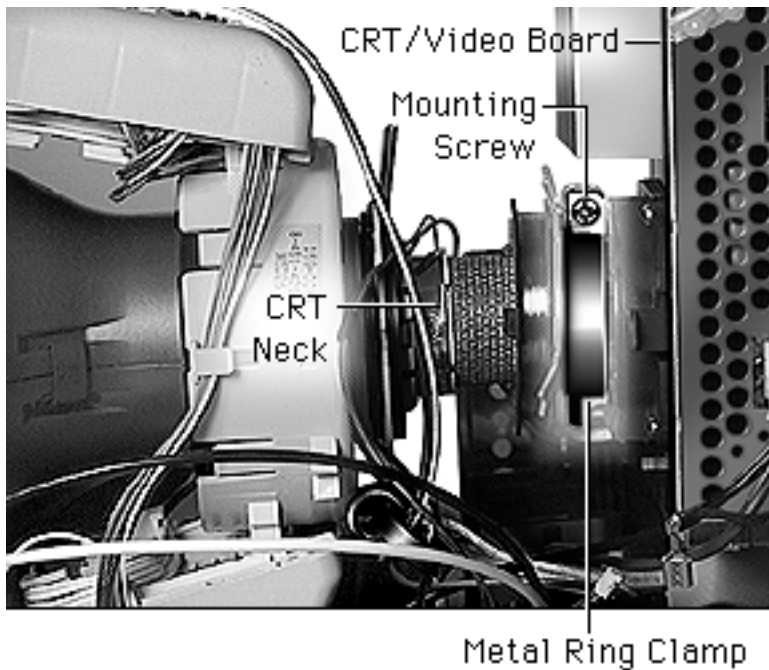




- 7 Disconnect the video cable at
  - BV4
  - BV3
- 8 Remove the Phillips screw that attaches the video cable clip to the CRT/video board.







- 9 Loosen the mounting screw on the metal ring clamp that holds the CRT/video board to the CRT neck.





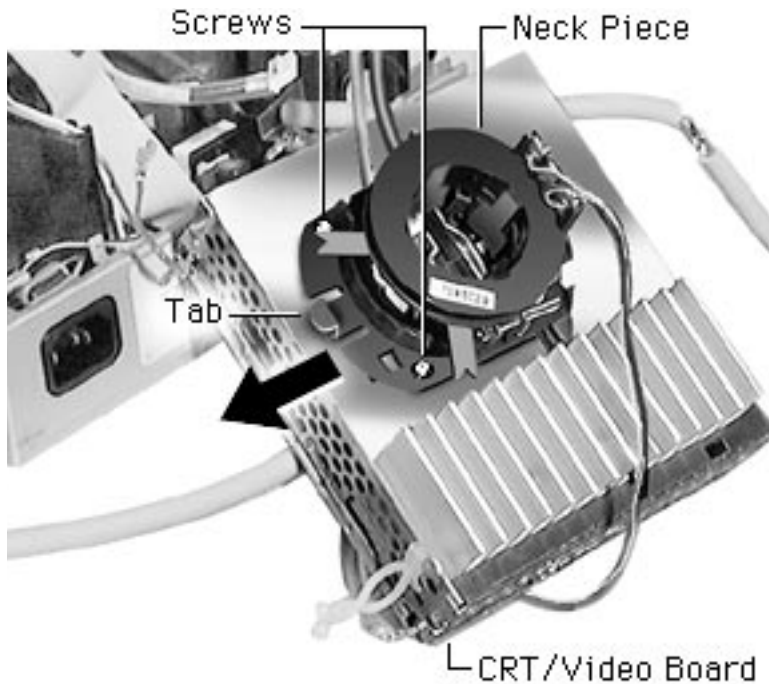
CRT/Video Board



10 **Caution:** Twisting, bending, or applying force to the CRT/video board could damage the neck of the CRT.

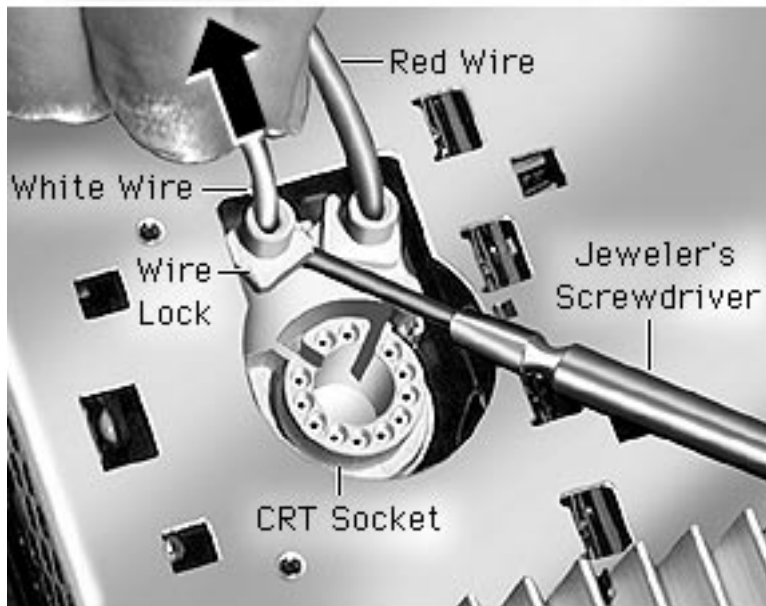
With a gentle side-to-side motion, ease the CRT/video board off the neck of the CRT until it clears the neck pins.





- 11 With the red and white flyback transformer wires still attached, set the CRT/video board on the table.
- 12 Remove the three Phillips screws from the dark gray neck piece.
- 13 Press the tab and slide the plastic piece to the left and off of the CRT/video board.





14 While holding, but not pulling, the red and white wires, use a jeweler's flat-blade screwdriver to tilt up the wire locks. Do not remove the wire locks from the CRT socket.

**Replacement Note:** Place the wires in the correct location as shown: red wire in the right wire lock and the white wire in the left wire lock. Feel them touch the bottom of the CRT socket before securing them with the wire locks.



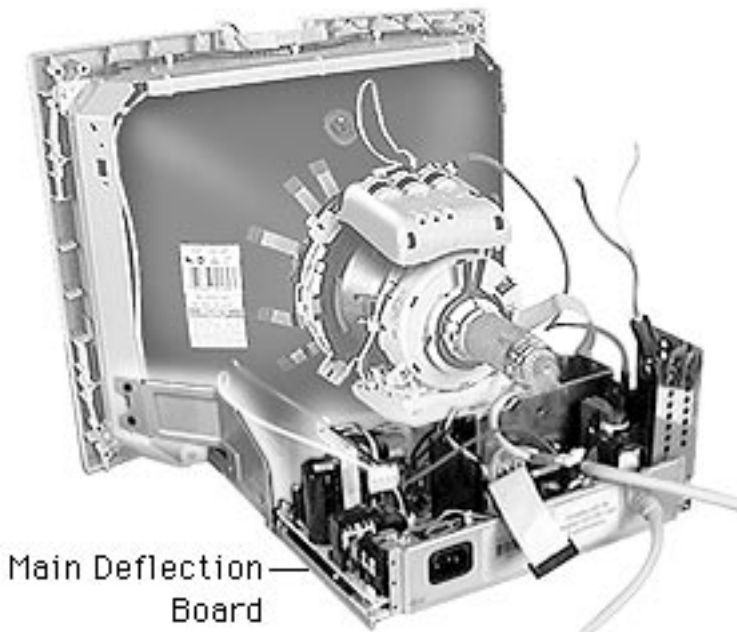


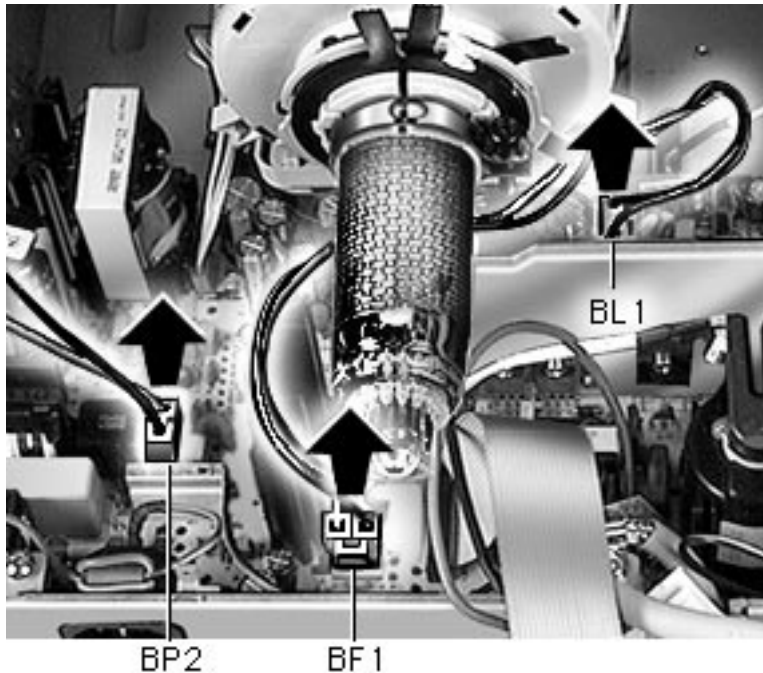
## Main Deflection Board

Before you begin,

- Remove the microphone assembly/blank plate
- Remove the sound enclosure (1710AV only)
- Remove the rear housing
- Discharge the CRT
- Remove the CRT/video board

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



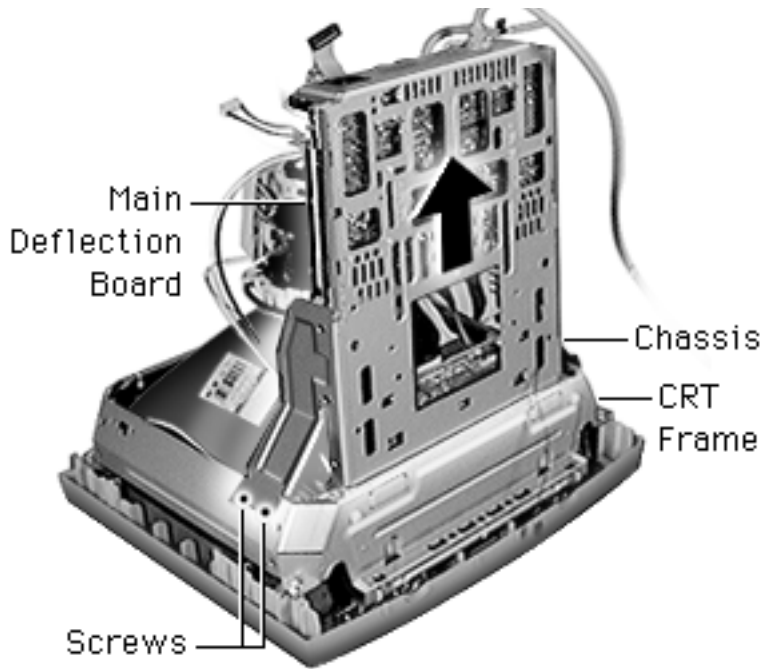


### Bulletins/Safety.

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

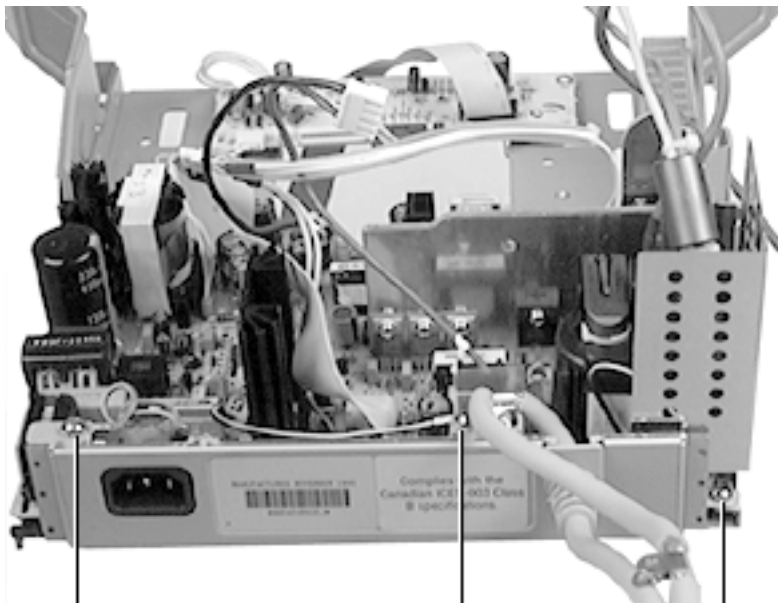
- 1 Disconnect two-wire cable BP2 (black and white wires) from the main deflection board.
- 2 Disconnect the two yoke wires
  - Red and blue wire at BL1
  - Yellow and brown wire at BF1





- 3 Place the monitor face down on a padded surface.
- 4 Remove the six Phillips screws that secure the chassis to the CRT frame.
- 5 Lift the main deflection board chassis straight off the CRT frame.





Screw

Screw

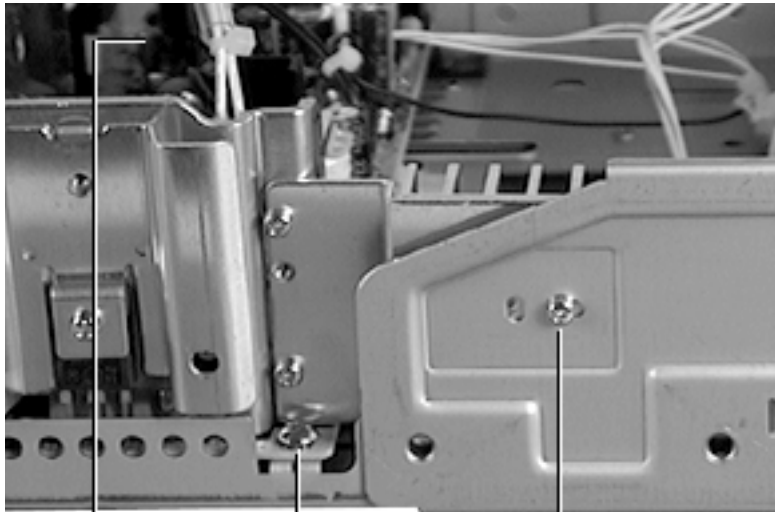
Screw  
at HL7

6 Remove the following ground lug Phillips screws:

- Green wire on top chassis flange
- Black wire on top chassis flange
- Black wire at HL7







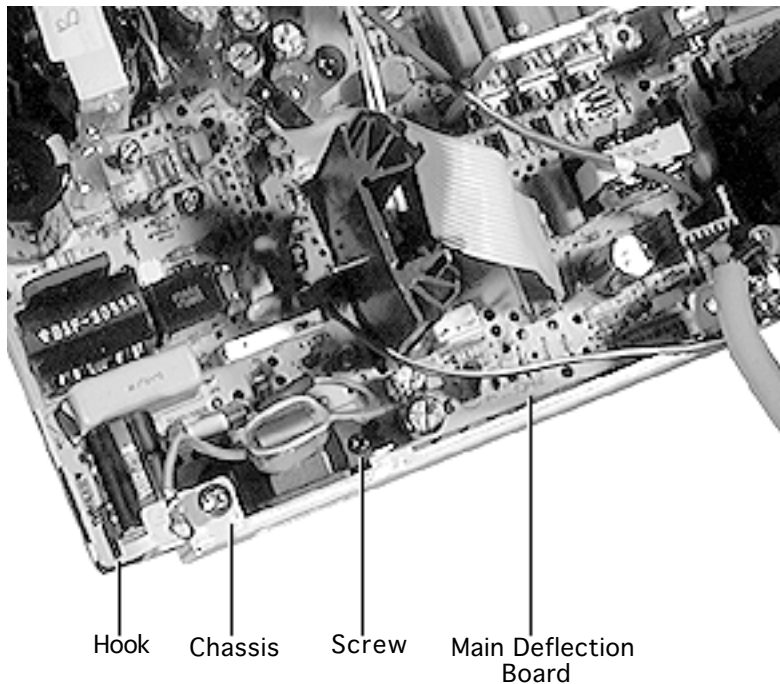
Main Deflection  
Board

Screw

Screw

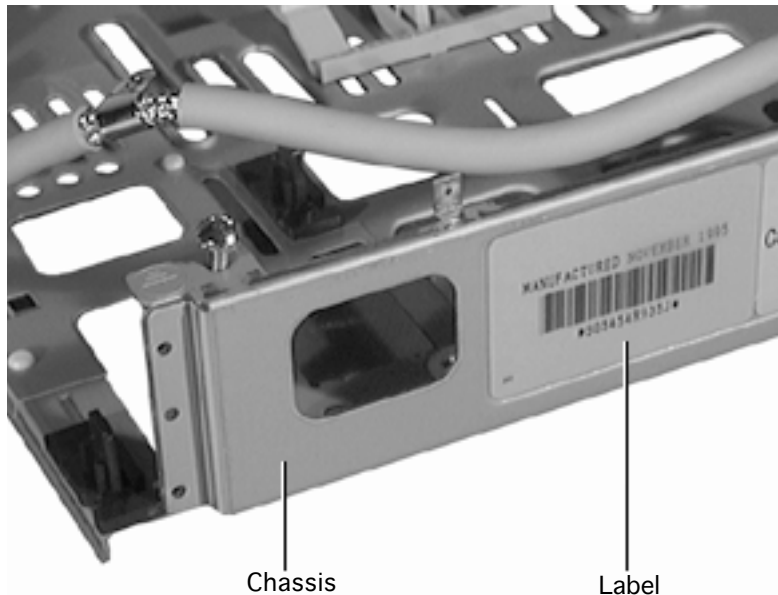
- 7 Remove the Phillips screw on the corner of the board next to the heatsink for DL6.
- 8 Remove the Phillips screw that attaches the heatsink to the right side of the chassis.





- 9 Remove the Phillips screw that secures the power receptacle to the board and chassis.
- 10 Being careful not to damage the plastic standoffs between the board and the chassis, slide the board forward to release it from the chassis standoffs and hooks.
- 11 Lift the board up and out of the chassis.
- 12 Remove the video cable (see "Video Cable and Strain Relief").

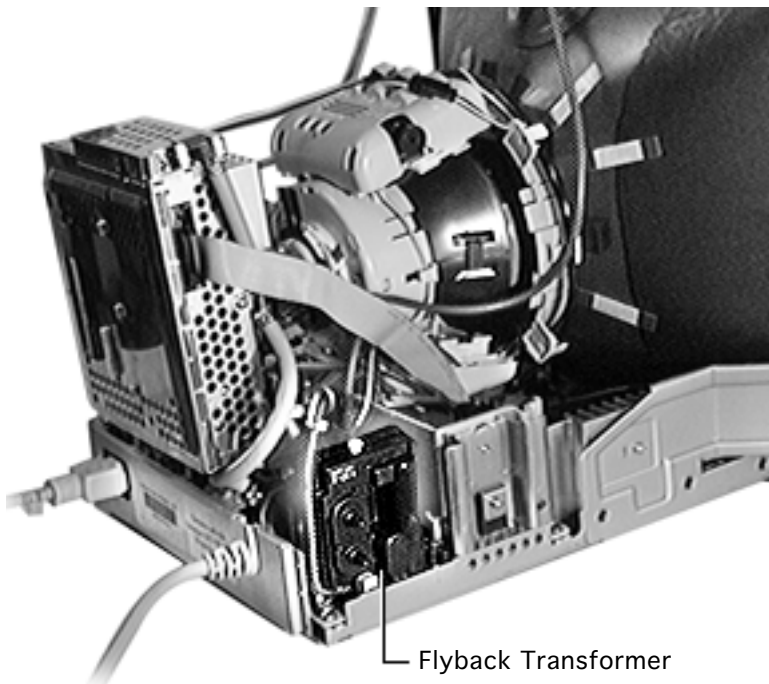




**Replacement Note:** The main deflection board chassis includes a label with the serial number for the entire monitor. So before returning a main deflection board, remove and retain the video cable and chassis. You will need to install the original video cable and chassis on the new board.

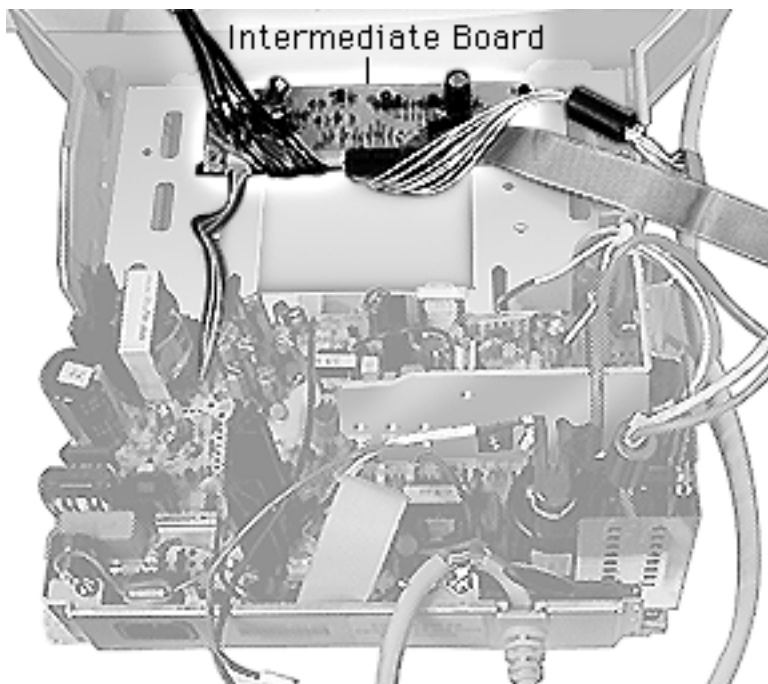
**Caution:** Do not replace the main deflection board chassis as a complete assembly or you will lose the monitor's original serial number.





**Replacement Note:** After replacing the main deflection board on an AppleVision 1710 or 1710AV display, the screen focus might require adjustment. If the screen focus is poor, adjust the horizontal and vertical focus controls on the flyback transformer. For complete instructions, refer to the Focus symptom in the Troubleshooting chapter.





## Intermediate Board

**Important:** Service data indicates this board rarely fails.

Before you begin,

- Remove the microphone assembly/blank plate
- Remove the sound enclosure (1710AV only)
- Remove the rear housing
- Discharge the CRT
- Remove the CRT/video board
- Remove the main deflection board (chassis)

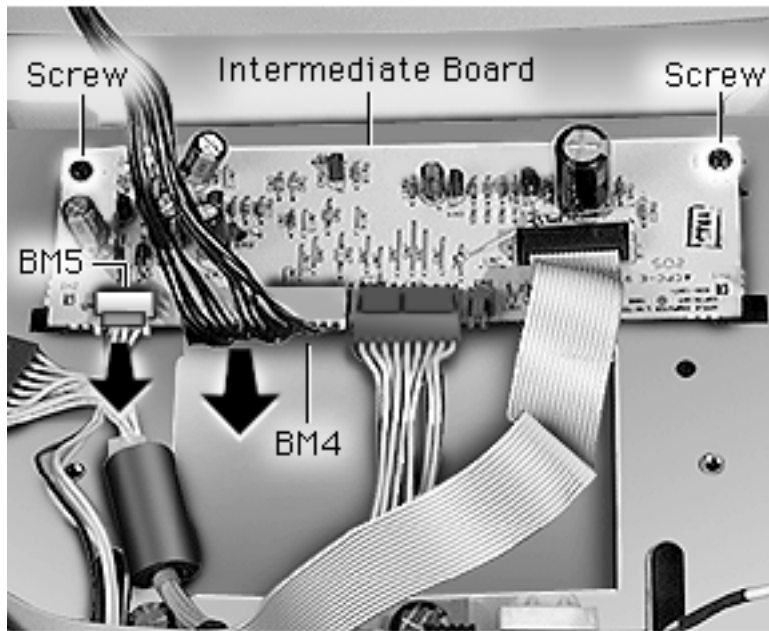




**⚠ Warning:** This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

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

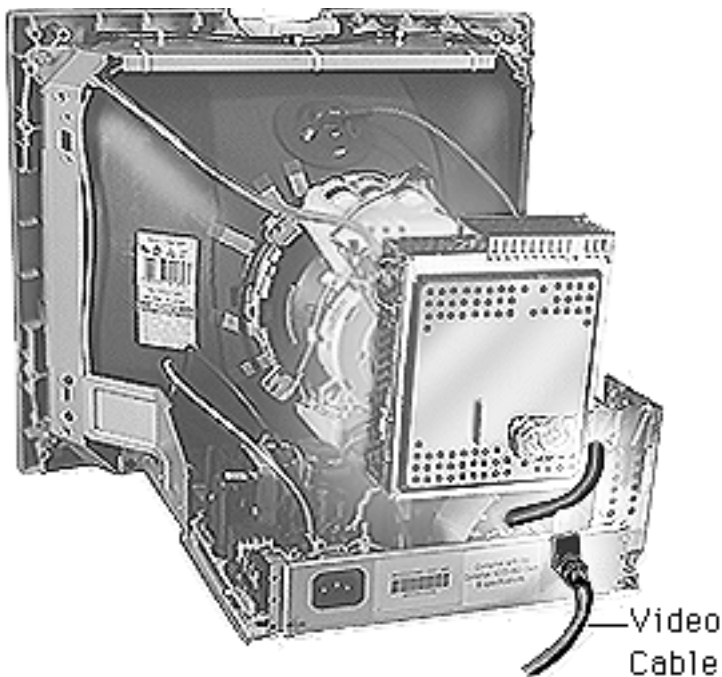




- 1 Remove the two Phillips screws.
- 2 Disconnect
  - 10-pin connector at BM4
  - 4-pin connector at BM5
- 3 Lift the intermediate board off of the chassis.

**Replacement Note:** Due to recently revised connectors on the intermediate and sound boards, when you are replacing a sound board, you must also replace the intermediate board.





## Video Cable and Strain Relief

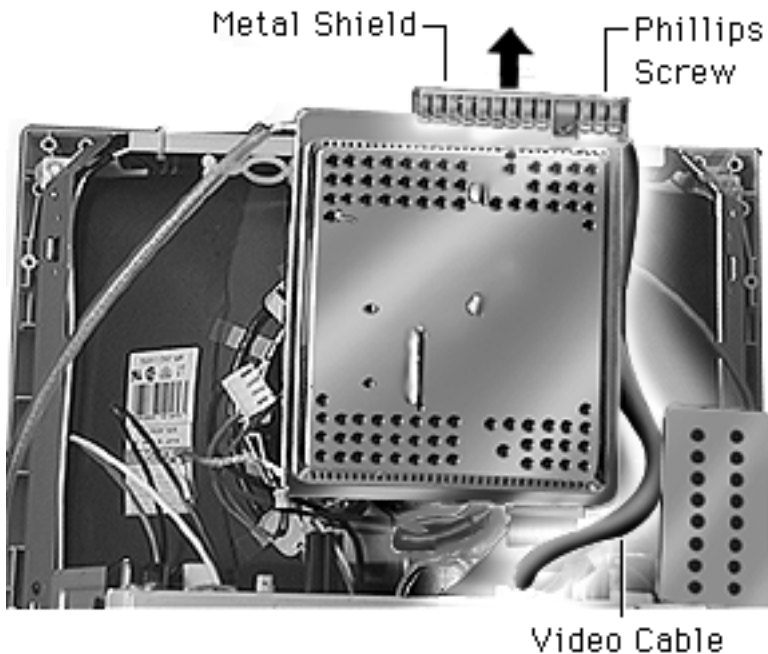
Before you begin,

- Remove the microphone assembly/blank plate
- Remove the sound enclosure (1710AV only)
- Remove the rear housing
- Discharge the CRT

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



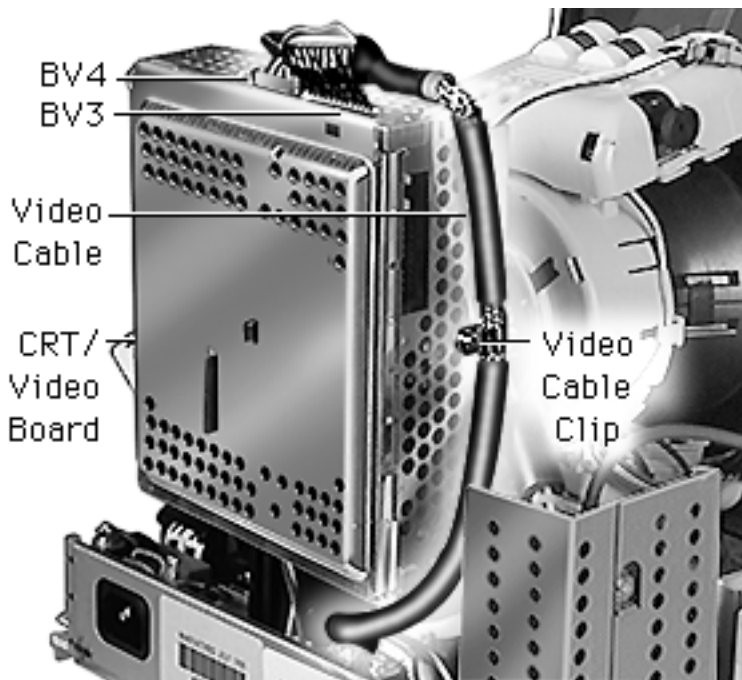




**Caution:** Never use a grounding wriststrap until after discharging the CRT.

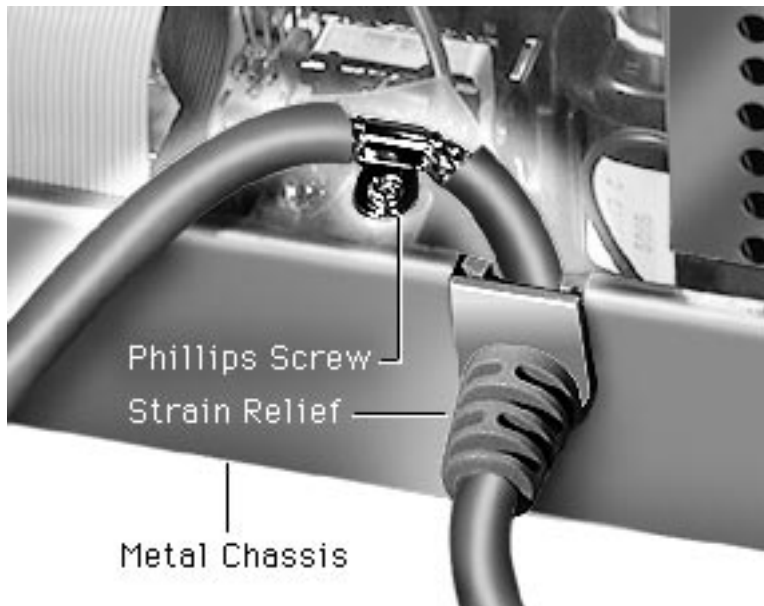
- 1 Remove the single Phillips screw from the metal shield on top of the CRT/video board.
- 2 Remove the metal shield.



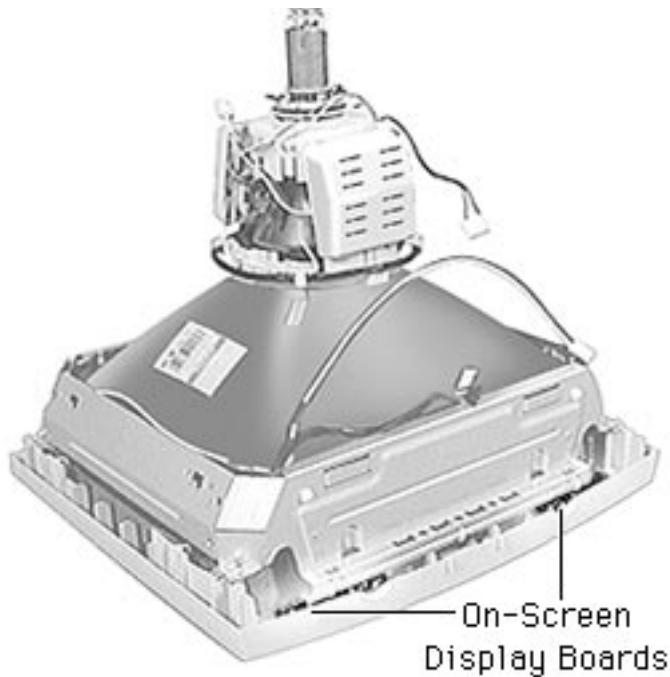


- 3 Disconnect the video cable at
  - BV4
  - BV3
- 4 Remove the Phillips screw that attaches the video cable clip to the CRT/video board.
- 5 Refer to “CRT/Video Board” in this chapter to remove the CRT/video board.





- 6 Remove the Phillips screw from the metal chassis.
- 7 Lift the strain relief straight out of the chassis slot.

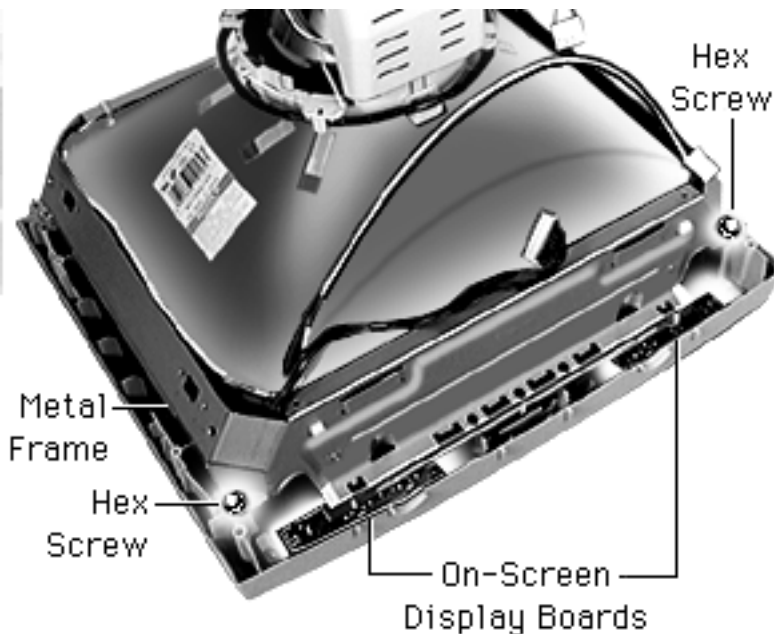


## On-Screen Display Board

Before you begin,

- Remove the microphone assembly/blank plate
- Remove the sound enclosure (1710AV only)
- Remove the rear housing
- Discharge the CRT
- Remove the CRT/video board
- Remove the main deflection board





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

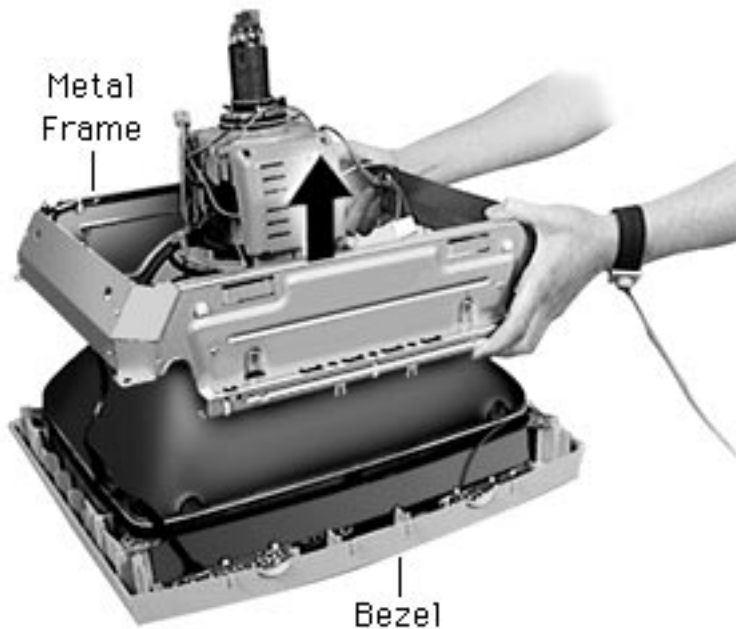
**Caution:** Never use a grounding wriststrap until after discharging the CRT.

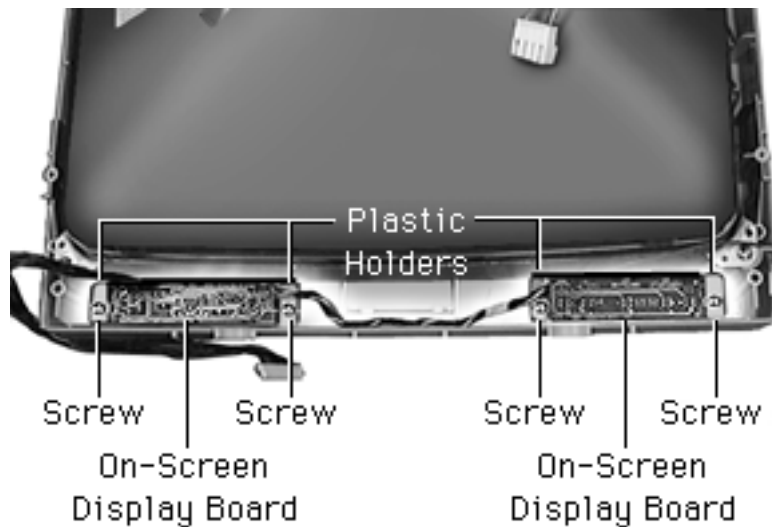
- 1 With the CRT face-down on a padded surface, remove the four 5/16-inch hex screws.





- 2 Lift the metal frame straight off of the bezel.





- 3 Use a 9/64-inch hex key to remove the four screws holding the on-screen control boards to the front bezel.
- 4 Lift the boards, including their plastic holders, straight up from the bezel.

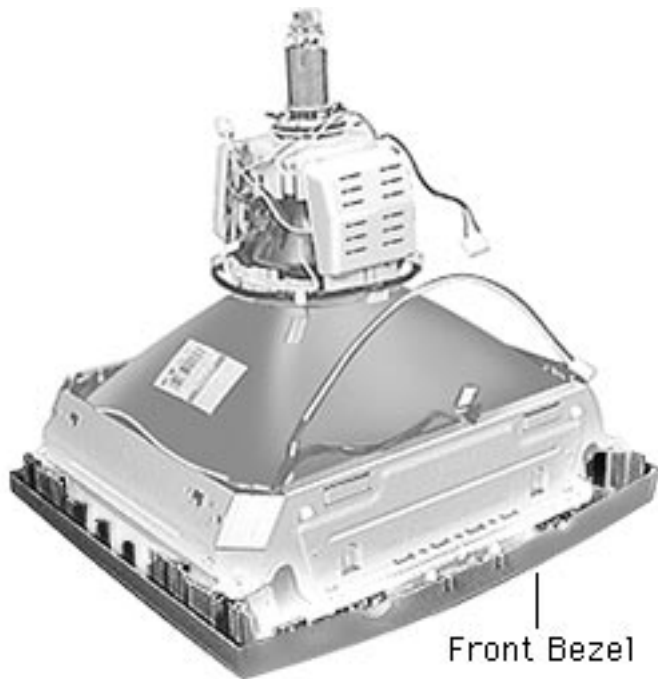




## Front Bezel

Before you begin,

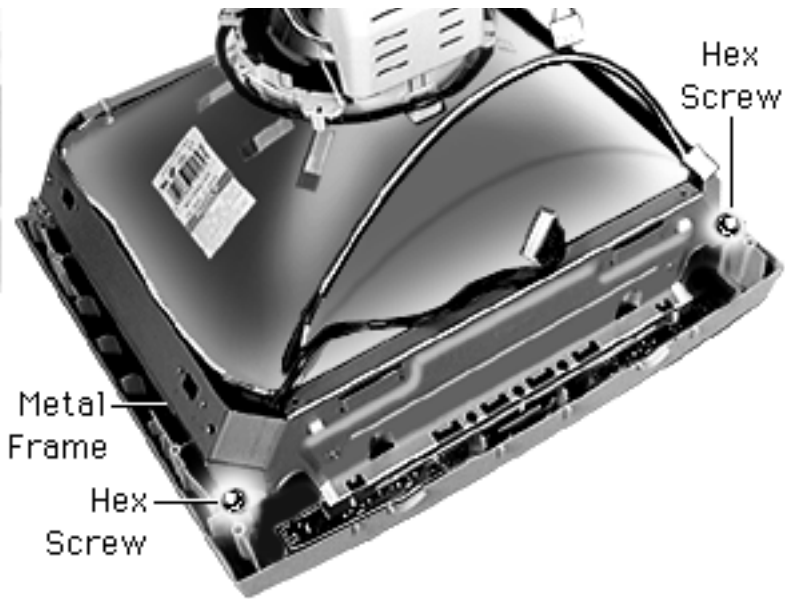
- Remove the microphone assembly/blank plate
- Remove the sound enclosure (1710AV only)
- Remove the rear housing
- Discharge the CRT
- Remove the CRT/video board
- Remove the main deflection board



Front Bezel







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

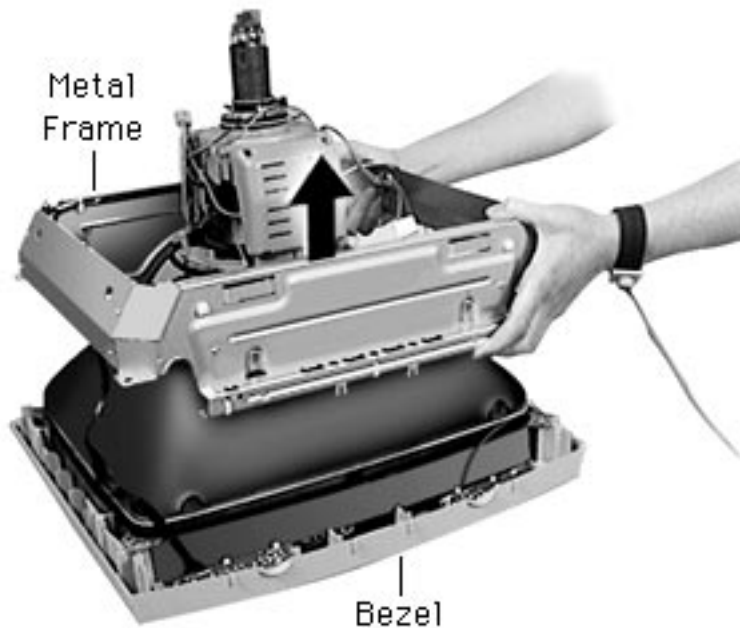
**Caution:** Never use a grounding wriststrap until after discharging the CRT.

- 1 With the CRT face-down on a padded surface, remove the four 5/16-inch hex screws.



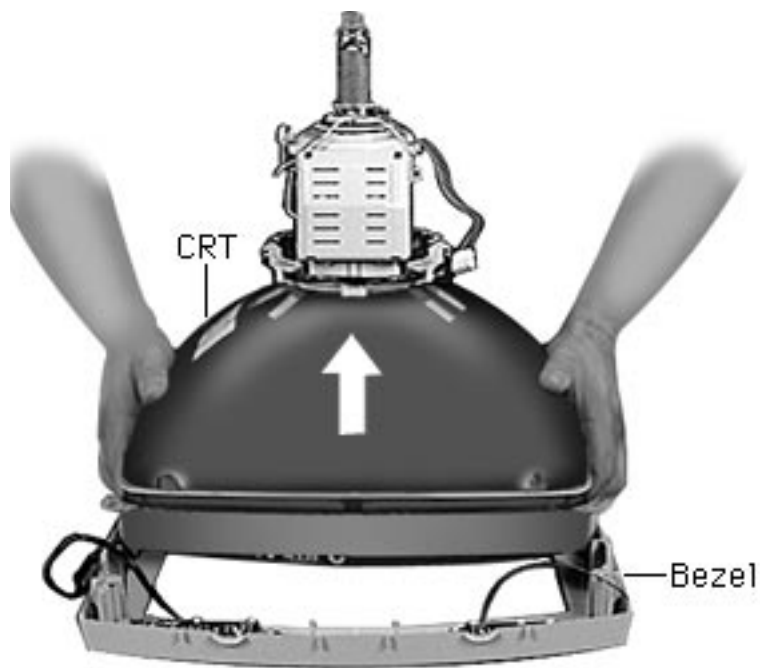


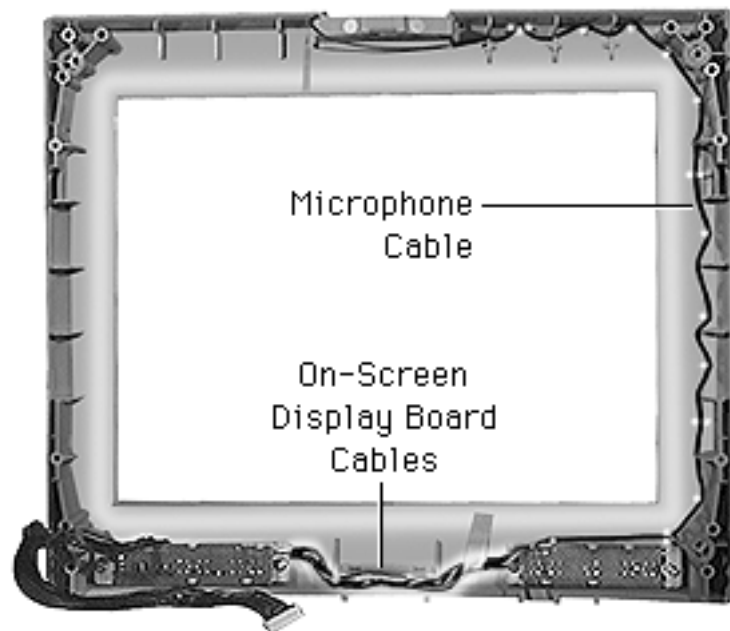
- 2 Lift the metal frame straight off the bezel.





- 3 Using both hands, lift the CRT off of the bezel.





**Replacement Note:** Route the cables as shown when replacing the bezel.





Adjustments

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AppleVision 1710AV/1710  
Display





## Introduction to AppleVision Setup Control Panel

You can adjust the screen image using the buttons on the front of the display or you can use the AppleVision Setup Control panel. Most of the procedures in this chapter require use of the AppleVision Setup control panel.

Before you begin, make sure you have installed the Macintosh software and have connected the monitor cable's ADB connector to your computer's ADB port.

If you need more information or you are using the monitor with an IBM PC-compatible computer, refer to the User's Guide (a linked document).



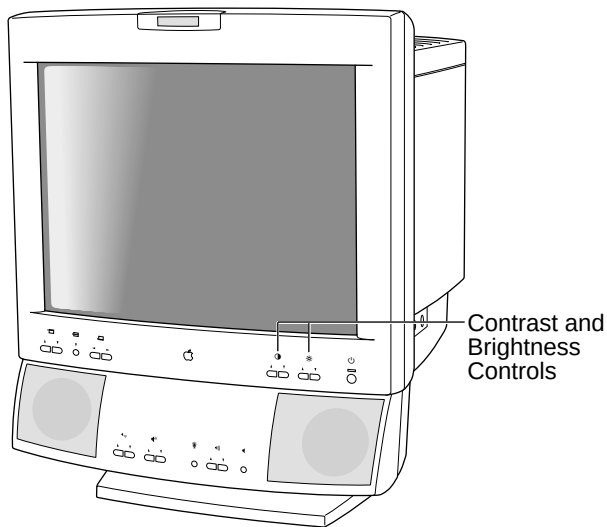


From the AppleVision 1710AV Setup control panel, you can select four main buttons: Display, Geometry, Color, and Sound. From the buttons, you can make the following adjustments:

| Display                | Geometry                                                                                               | Color                                                                                      | Sound                                                                                       |
|------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Contrast<br>Brightness | Height/Width<br>Position<br>Pincushion<br>Rotate<br>Convergence<br>Overscan<br>Recall Factory Settings | White Point<br>Gamma Curve<br>Ambient Light<br>Import/Export<br>Preferences<br>Recalibrate | Sound Input<br>Gain<br>Sound Output<br>Volume<br>Treble<br>Bass<br>Headphone Vol.<br>Muting |

From the AppleVision 1710 Setup control panel, you can select three main buttons: Display, Geometry, and Color. Sound selections are not available.





## Brightness and Contrast

Before you begin, install the AppleVision Setup software.

**Note:** There are two ways to adjust the brightness and contrast. You can use the controls on the right side of the front panel, or you can use AppleVision Setup controls.





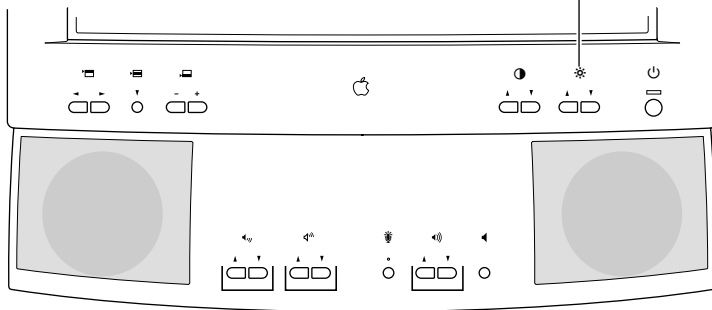


## Brightness

To use the front panel brightness controls,

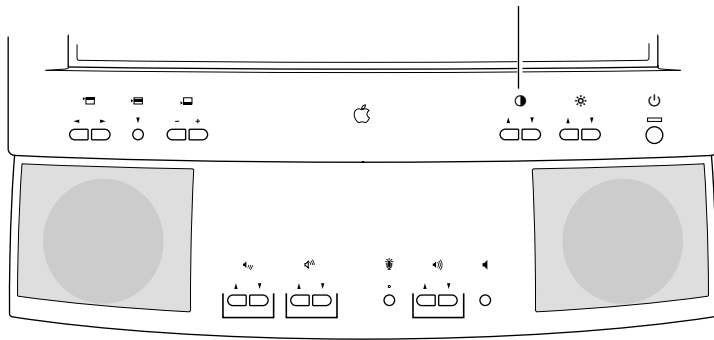
- Press the down button to decrease the brightness.
- Press the up button to increase the brightness.

Brightness Controls





### Contrast Controls



## Contrast

To use the front panel contrast controls,

- Press the down button to decrease the contrast.
- Press the up button to increase the contrast.

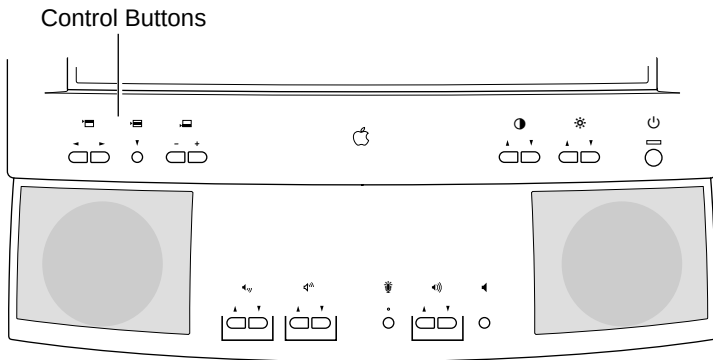




## Using AppleVision Setup

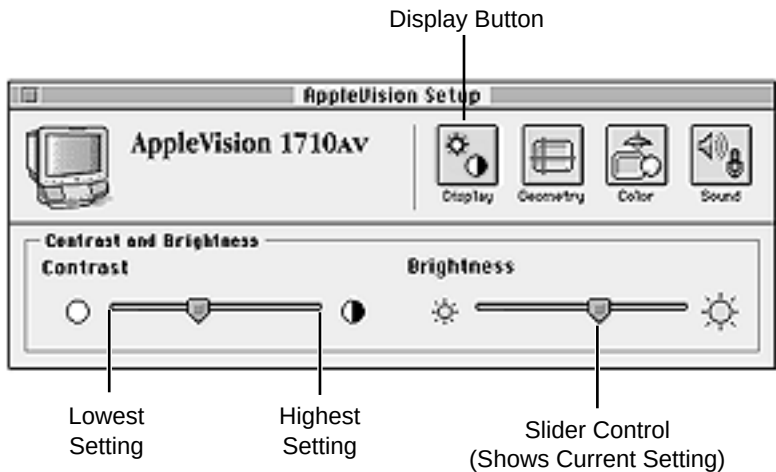
To use AppleVision Setup to adjust brightness and contrast,

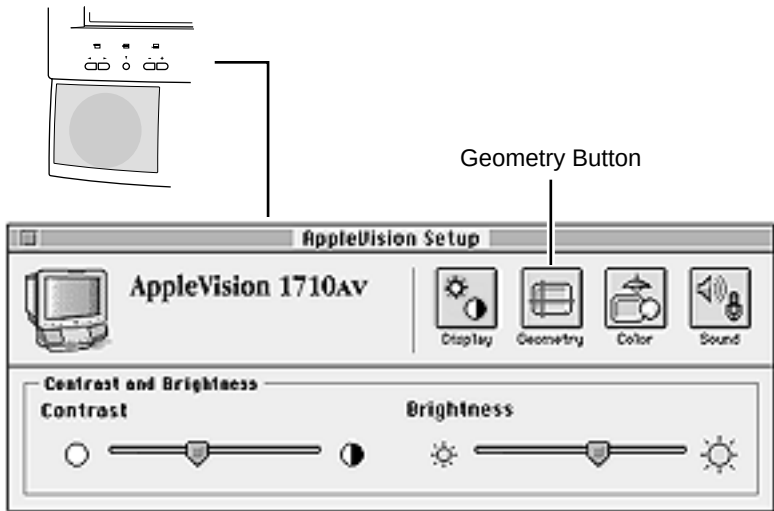
- 1 Press any control button to open the AppleVision Setup control panel.





- 2 Click the Display button.
- 3 Drag the slider controls left or right to decrease or increase the brightness and contrast.





## Geometry

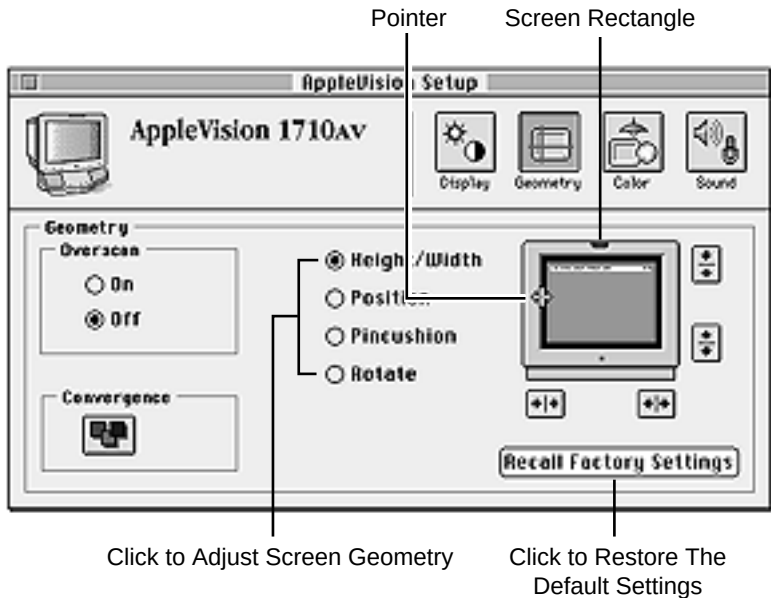
- 1 Press any control button to open the AppleVision Setup control panel.
- 2 Click the Geometry button.

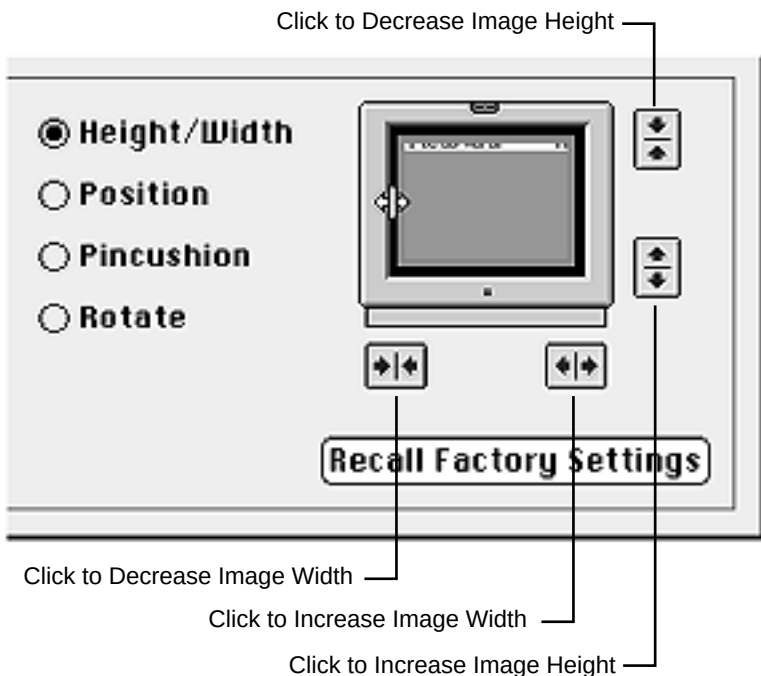




## Height/Width

- 1 Click Height/Width.
- 2 Move the pointer over the screen rectangle in the picture of the display.
- 3 Drag the left or right side of the screen rectangle to change the width.
- 4 Drag the top or bottom edge of the screen rectangle to change the height.





**Note:** Instead of dragging the screen rectangle, you can adjust height and width by clicking the arrow buttons for incremental movement.

Normal height and width leaves a black border of approximately 1/2-inch around the screen image.

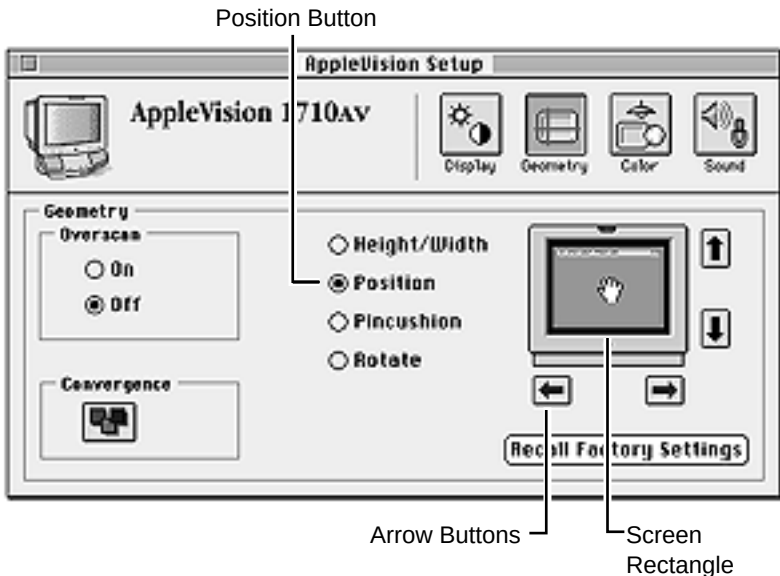




## Position (Centering)

- 1 Click Position.
- 2 Move the pointer over the picture of the display.
- 3 Drag the screen rectangle to center the image.

**Note:** Instead of dragging the screen rectangle, you can also adjust height and width by clicking the arrow buttons for incremental movement.



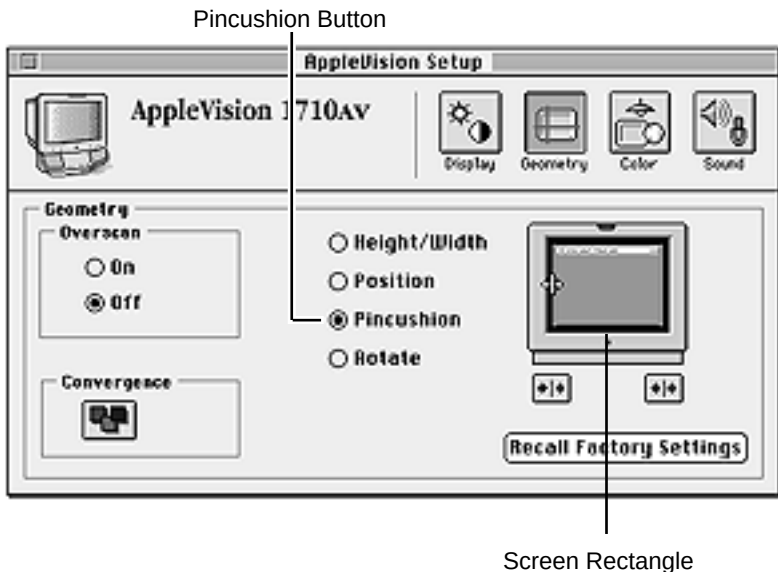




## Pincushion

- 1 Click Pincushion.
- 2 Move the pointer over the picture of the display.
- 3 Drag the left or right side of the screen rectangle to adjust the image.

**Note:** Instead of dragging the screen rectangle, you can adjust the shape of the image by clicking the arrow buttons for incremental movement.

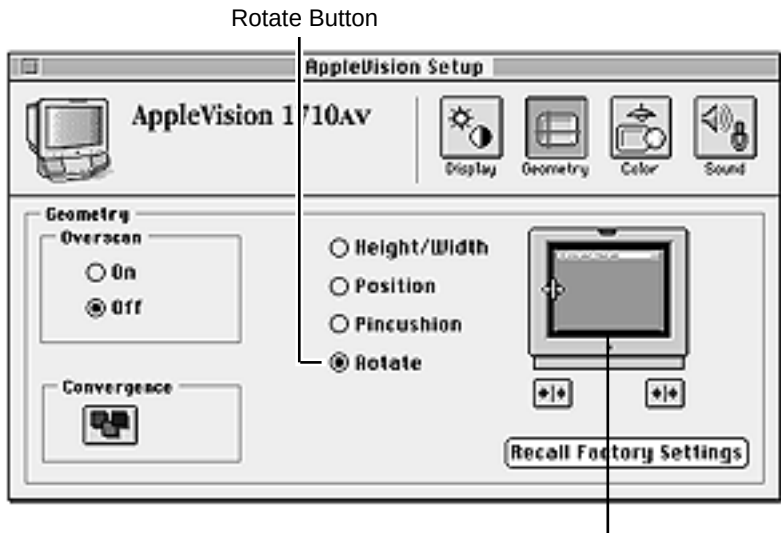




## Rotating

- 1 Click Rotate.
- 2 Move the pointer over the picture of the display.
- 3 Drag the screen rectangle clockwise or counterclockwise to rotate the image.

**Note:** Instead of dragging the screen rectangle, you can rotate the image by clicking the arrow buttons for incremental movement.



Screen Rectangle

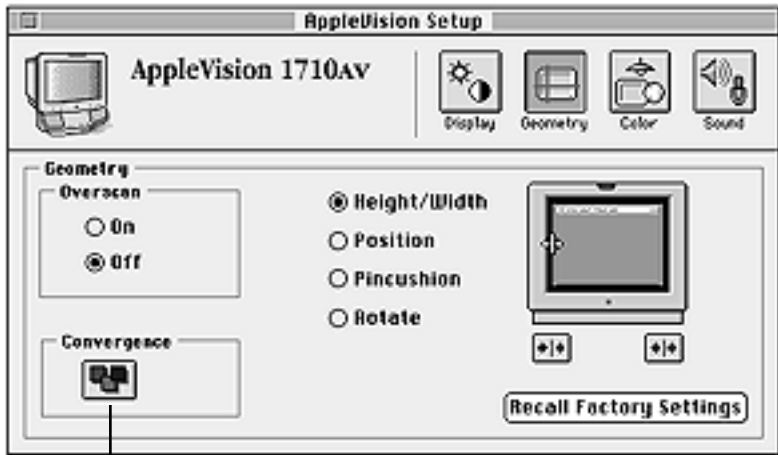




## Convergence

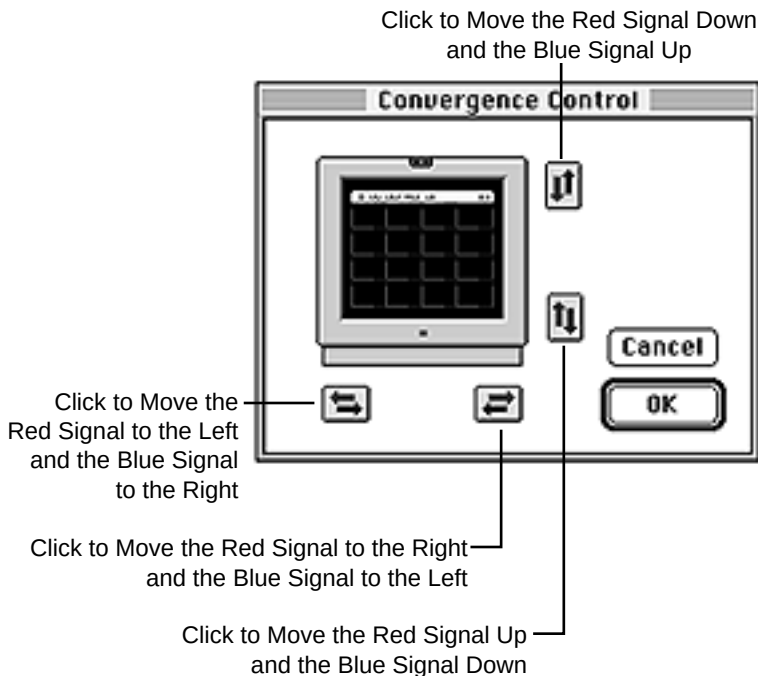
- 1 If you want to adjust the RGB color convergence, click the Convergence button. A Convergence Control window appears.

**Note:** When you adjust convergence, refer to the center of the screen on the grid outside the Convergence Control window. If necessary, move the window away from the center of the screen.



Click to Adjust  
Convergence





- 2 Click the arrow buttons to adjust convergence. Adjust convergence for the overall best screen color clarity.

**Note:** The active range for the horizontal convergence controls varies from unit to unit. In most cases there is a portion of the range that has no affect. This means that the usable range could be 75% of the total range. At times these controls may seem stuck in position.



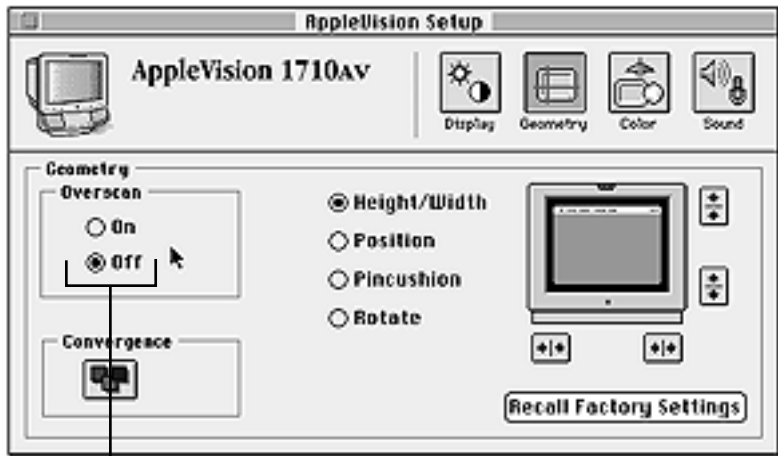


If the horizontal controls seem stuck, move the controls in one direction a large extent and if no affect is seen, move them in the other direction a large extent until a change is detected. Moving back and forth in small increments will have no affect until the controls are moved into the active range.

- 3 Click OK to save your convergence changes and close the Convergence Control window.

**Note:** If focus is poor after adjusting convergence, refer to the Focus symptom in the Troubleshooting chapter.





Click to Turn  
Overscan  
On or Off

## Overscan

**Note:** Overscan is typically used when viewing a movie or when you want the screen image to span the entire screen area (exceeding the limit of the raster).

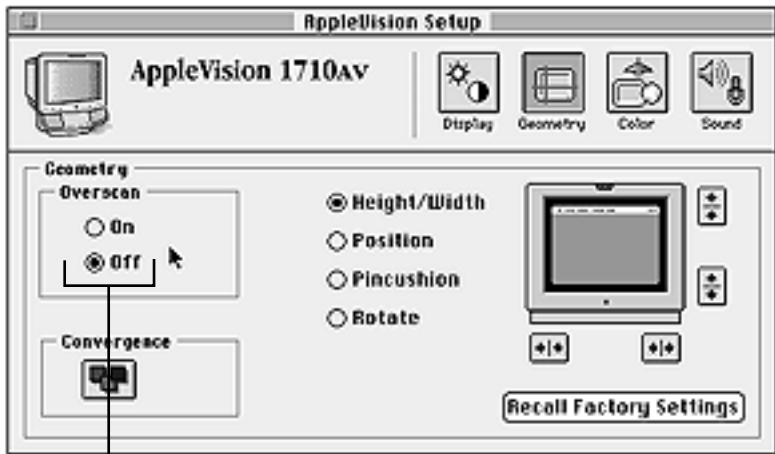
- 1 To turn overscan on, click On.

**Important:** When overscan is on, you cannot adjust screen geometry or convergence, and you might not be able to choose commands from the menu bar at the top of the screen.





- 2 To turn overscan off, click Off, and the screen image returns to its previous size.



Click to Turn  
Overscan  
On or Off



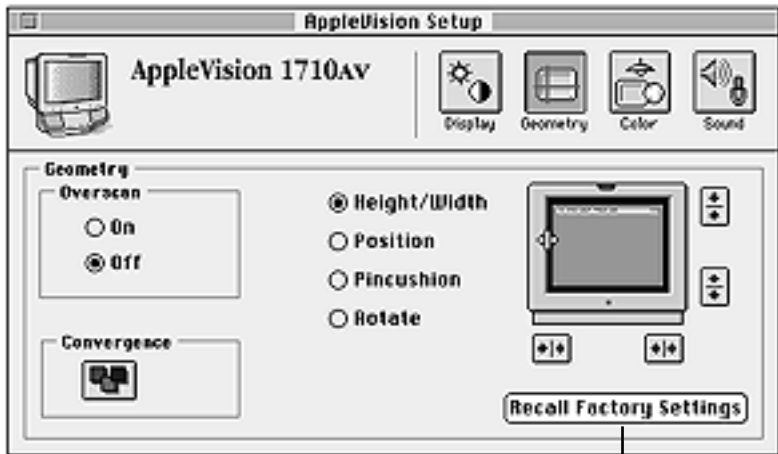


## Factory Settings

**Important:** Recalling the factory settings resets only the four geometry controls and convergence. The screen image returns to the factory preset levels of geometry (height/width, position, pincushion, rotation) and convergence for the current screen resolution.

Adjustments you make in the Display, Color, or Sound windows are not reset.

Click Recall Factory Settings.



Click to Recall  
Factory Settings

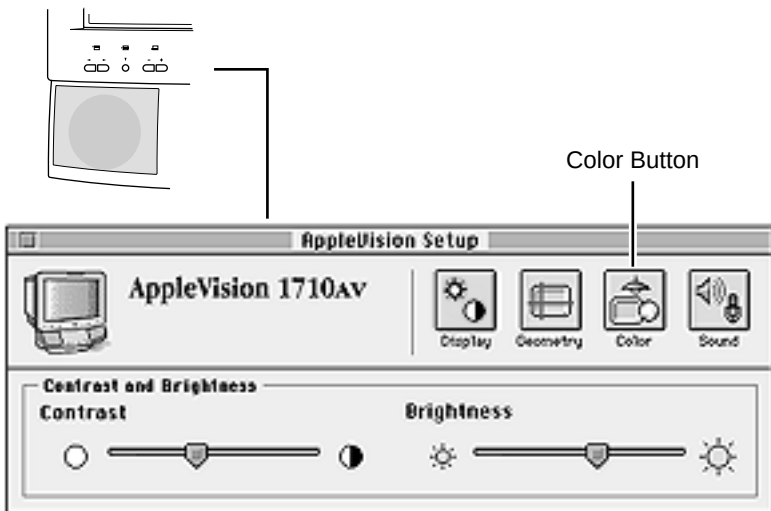






## Color

- 1 Press any control button to open the AppleVision Setup control panel.
- 2 Click the Color button.



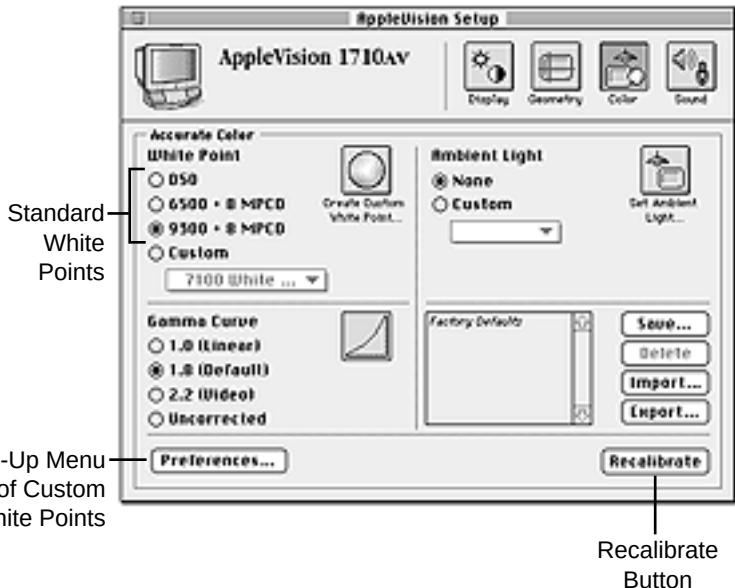


## Setting a White Point

- 1 Click one of the standard white points:
  - D50=graphic arts standard
  - 6500=midday sun
  - 9300=Macintosh displays and high-definition TV

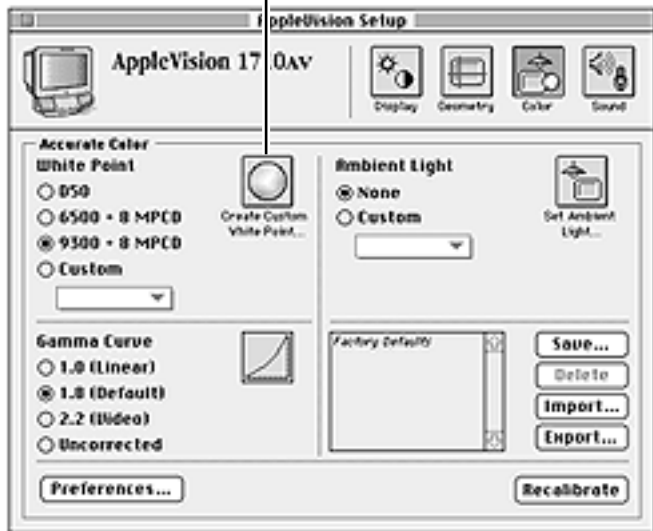
**Note:** Changes won't take effect until you click Recalibrate.

- 2 Click Recalibrate.





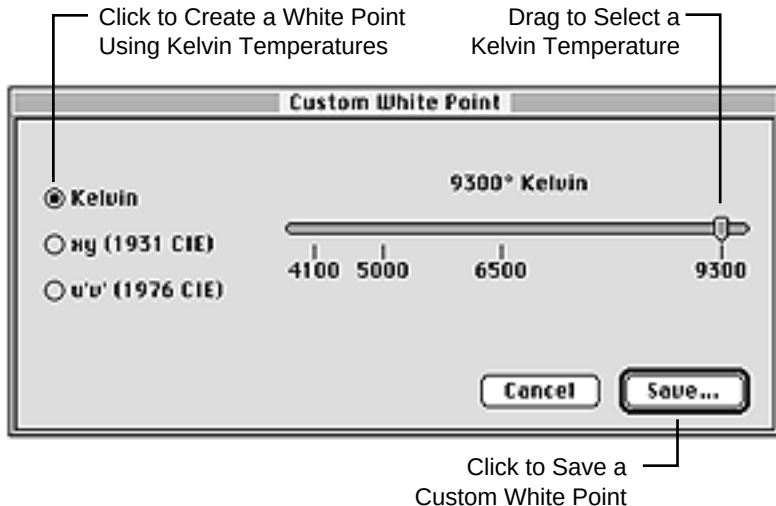
Create Custom White Point Button



## Creating a Custom Kelvin White Point

- 1 Click Create Custom White Point button.



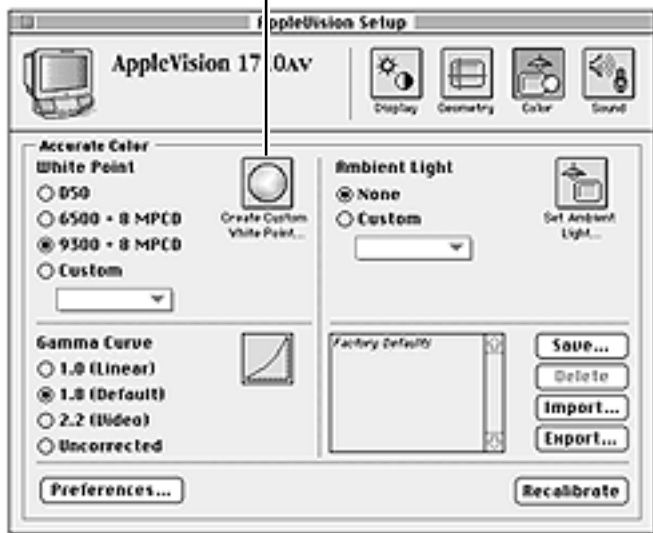


- 2 Click Kelvin if you want to use Kelvin temperatures.
- 3 Drag the slider control to select the temperature (4100 to 9300).
- 4 Click Save, and name the custom white point. The name appears in the White Point Custom menu.
- 5 Click Recalibrate.





Create Custom White Point Button



## Creating a Custom CIE Color Space White Point

- 1 Click Create Custom White Point button.



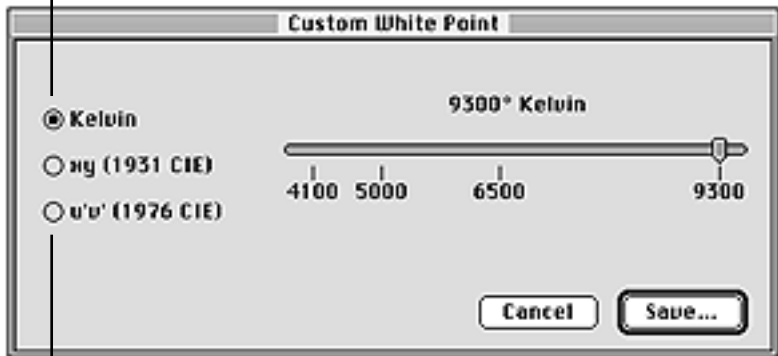


## 2 Click

- xy (1931 CIE) if you want to use 1931 CIE standards
- u'v' (1976 CIE) if you want to use 1976 CIE standards

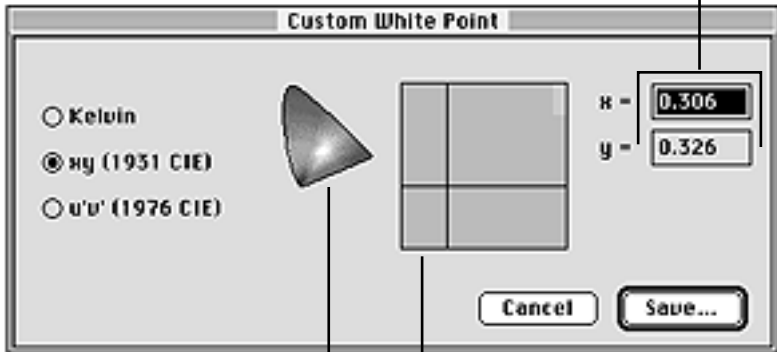
Click to Create a White Point Using 1931 CIE Standards

Click to Create a White Point Using 1976 CIE Standards





Enter Values to Create a Custom White Point



1931 CIE Color Space

Drag Crosshairs to Create  
a Custom White Point

- 3 Drag crosshairs to create custom white point.

**Note:** Instead of dragging the crosshairs, you can enter values in the fields to the right of the crosshairs.

- 4 Click Save, and name the custom white point.
- 5 Click Recalibrate.

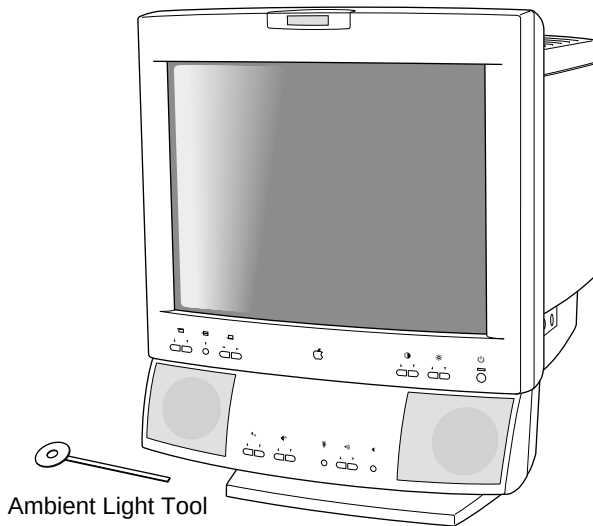




### Adjusting for Ambient Light

- 1 Locate the ambient light tool that came with the display.

**Important:** Store the ambient light tool in its protective sleeve when you're not using it. If the gray color fades, you'll get incorrect ambient light readings.

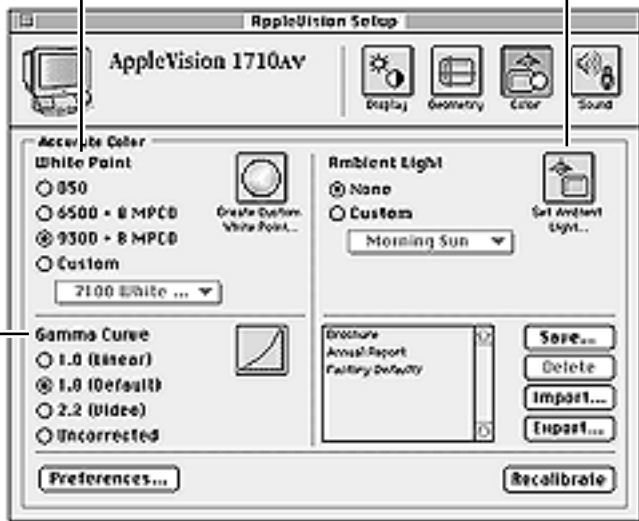






White Point

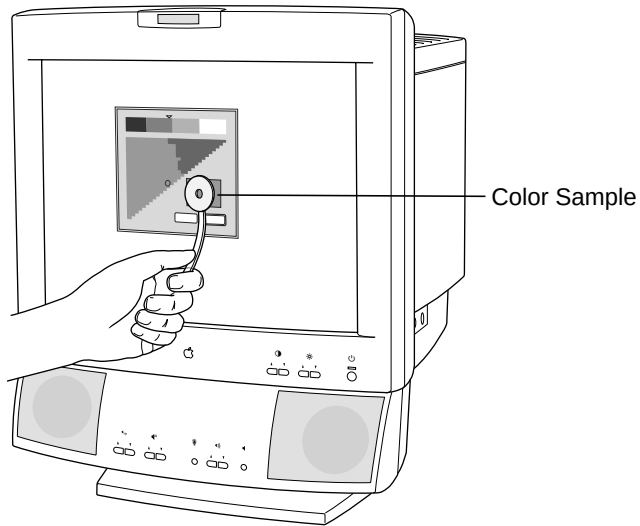
Set Ambient Light Button

Gamma  
Curve

- 2 Click Set Ambient Light button.

**Important:** The screen's color depth must be set to "Millions of Colors." Refer to the section called "The Control Strip" in this chapter.

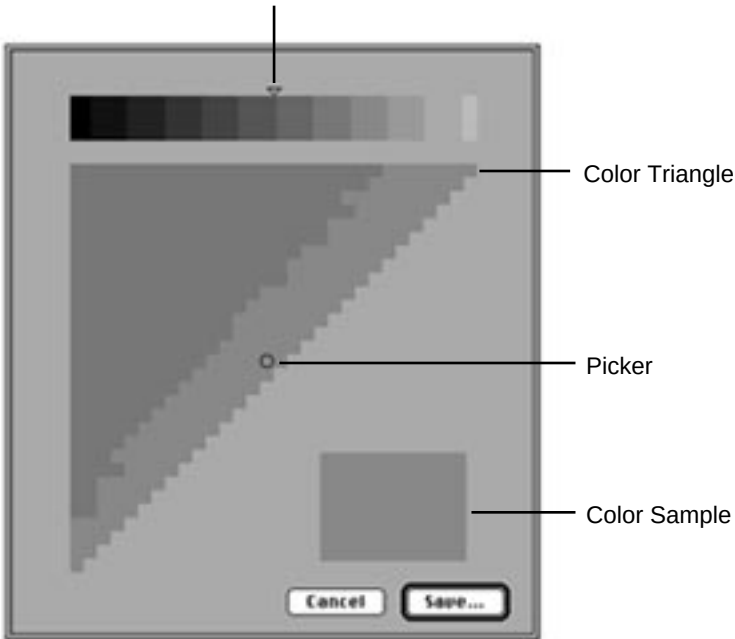




- 3 Hold the ambient light tool against the display face, over the square color sample.



Brightness Slider



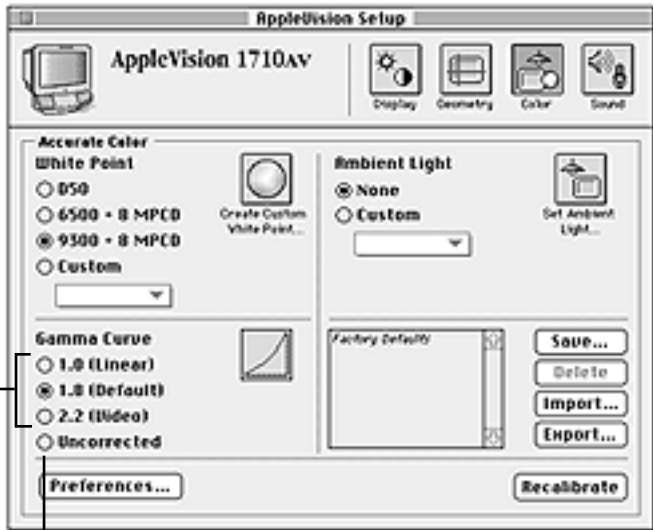
- 4 Drag the picker in the color triangle until the color sample is similar to the gray color on the ambient light tool.
- 5 Drag the brightness slider until the color sample matches the ambient light tool exactly.
- 6 Click Save, and name the new setting. The name appears in the Ambient Light Custom menu.
- 7 Click Recalibrate.





## Adjusting Gamma Curve

**Important:** The gamma value you select depends on the image you're displaying. Color images with important details in highlights or shadows need a different gamma value than standard images.



Click to  
Select a  
Standard  
Gamma  
Value

Click to Leave Gamma Value Uncorrected

- 1 Select a standard gamma value. Notice how the picture of the curve changes when you select a gamma value.
- 2 Click Recalibrate.





## Recalibrating Automatically

- 1 Click Preferences.
- 2 Select your recalibration preferences.

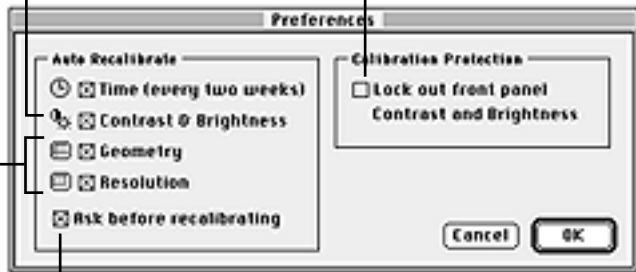
**Important:** If you select Time (recalibration every two weeks), your work can be interrupted without asking.

- 3 Click OK.

Disables the Contrast and Brightness Buttons on the Front of Your Display

Recalibrates If You Change Contrast or Brightness

Recalibrates When You Change Screen Geometry or Screen Resolution



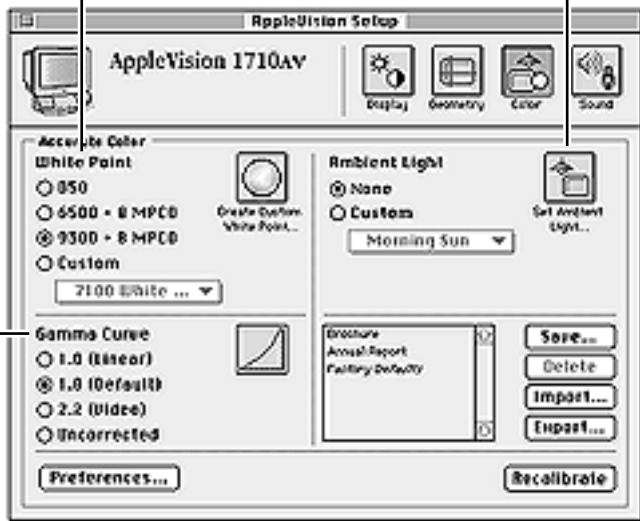
Displays a Message Before Recalibrating Automatically





White Point

Set Ambient Light Button

Gamma  
Curve

## Saving Color Settings

You can save different combinations of white point, gamma curve value, and ambient light in named color settings.

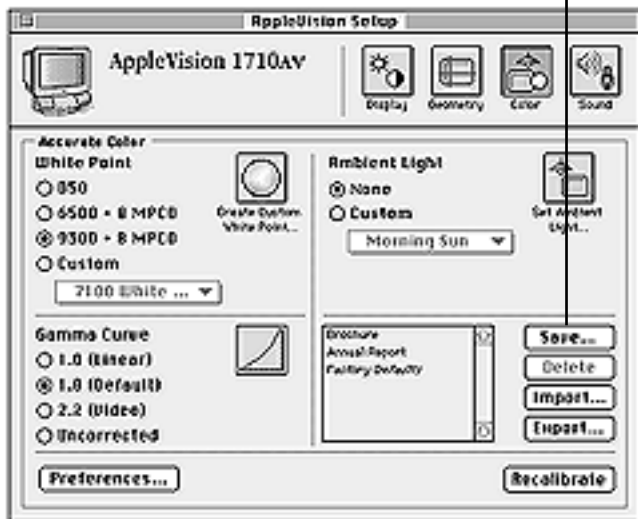
To save a color setting,

- 1 Make sure white point, gamma curve, and ambient light are set as desired.



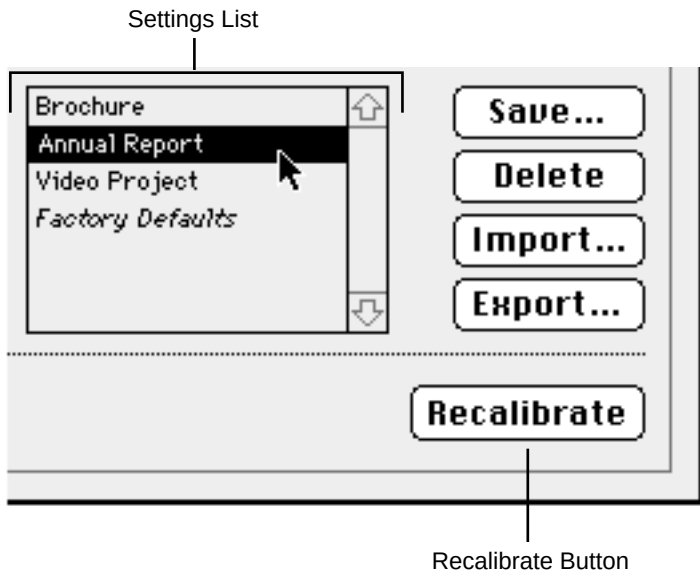


Click to Save All Settings in the Color Window



- 2 **Optional:** Click Recalibrate to see how the settings change the screen image.
- 3 Click Save, and name the new color setting.
- 4 Click Save, and the new name appears in the settings list.



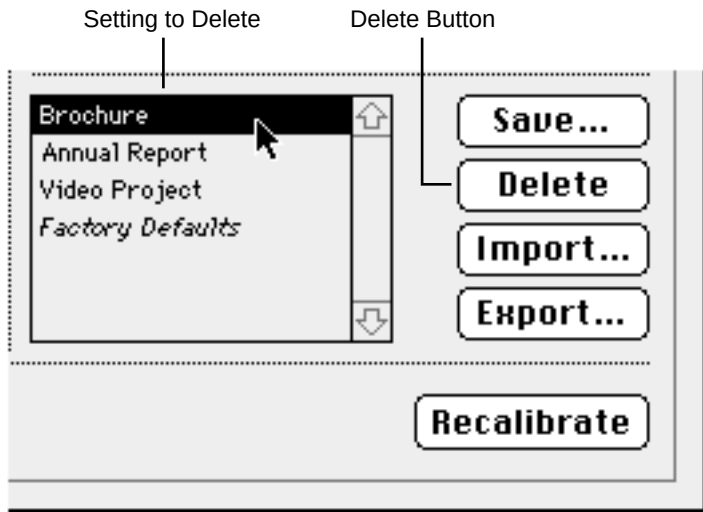


## Using Existing Color Settings

To use previously saved color settings,

- 1 Click a name in the settings list.
- 2 Click Recalibrate.





## Deleting a Color Setting

To delete a color setting,

- 1 Select the name of the setting you want to delete from the settings list.
- 2 Click Delete.





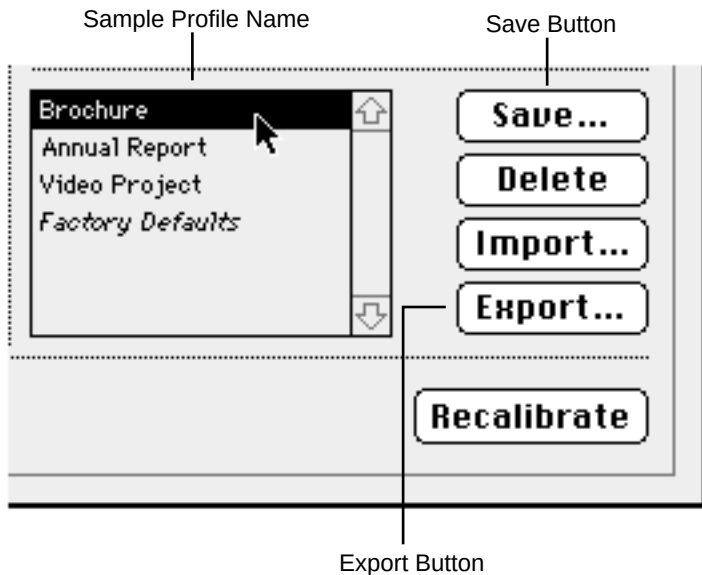
## Overview of ColorSync Profiles

The AppleVision display lets you create a ColorSync profile that describes the white point and gamma value for your display.

**Note:** The ambient light setting is not saved as part of the ColorSync profile because ambient light changes as the physical location of the display changes. So the ambient light setting for one display will not be correct for another display.

Custom color settings can be shared with any other display that supports Apple's ColorSync color matching system. ColorSync ensures that the colors shown on the display closely match the colors that are printed or scanned.



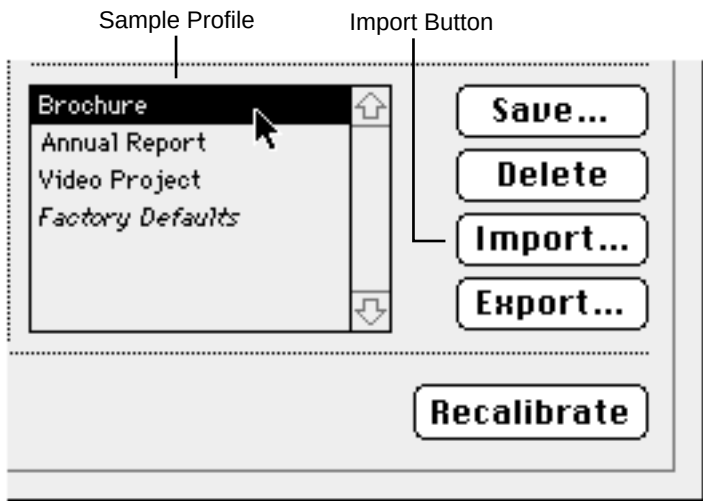


## Exporting a ColorSync Profile

To send a custom color setting to another display,

- 1 Make sure white point and gamma curve are set as desired.
- 2 Click Recalibrate.
- 3 Click Export.
- 4 Enter a name for the profile, and click Save.





## Importing a ColorSync Profile

To select a custom color setting from another display,

- 1 Click Import.
- 2 Select the profile you want and click Open.
- 3 Click Recalibrate.

**Important:** To get truer color rendering, adjust for ambient light after importing a ColorSync profile.





## Introduction to the Sound Window (1710AV only)

Before you make changes to the Sound window of AppleVision Setup, choose Control Panels from the Apple menu. Open the Sound control panel to select a sound input source, select a sound output device, and adjust volume.

Refer to Chapter 5, “Using Sound and Video,” from the User’s Guide (a linked document) for more information.





## Sound (1710AV only)

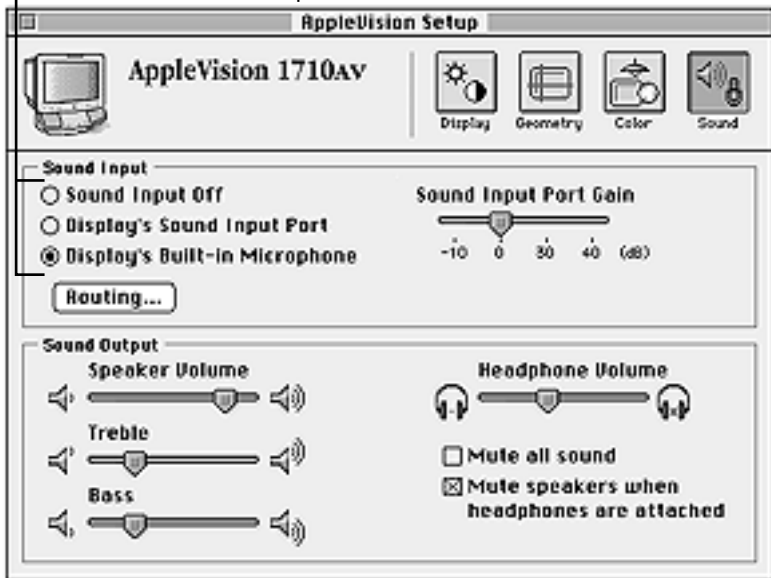
- 1 Press any control button to open the AppleVision Setup control panel.
- 2 Click the Sound button.

Sound Button





Click to Select Sound Input Source



## Selecting a Sound Input Source

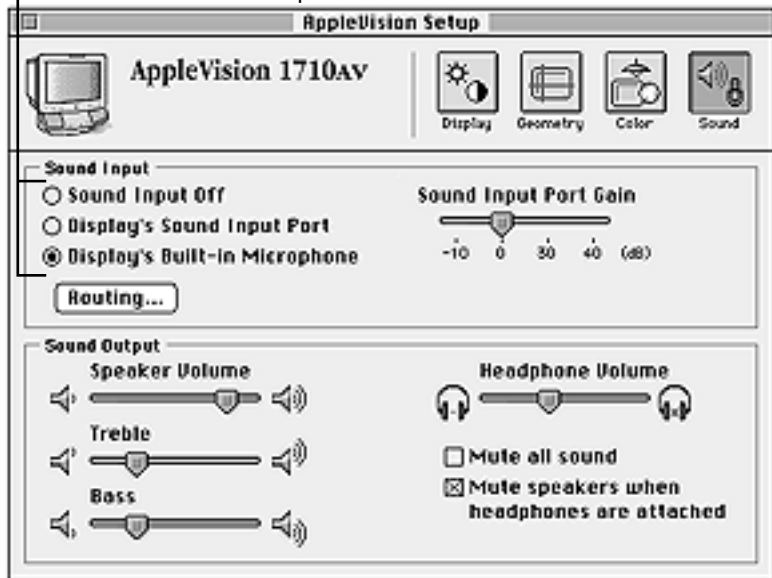
**Note:** Make sure you have selected a sound input port on the computer before selecting the sound input source for your display.

- 1 Click
  - “Sound Input Off” if you want to disable sound input on the display
  - “Display’s Built-In Microphone” if you want to use the display’s built-in microphone





Click to Select Sound Input Source



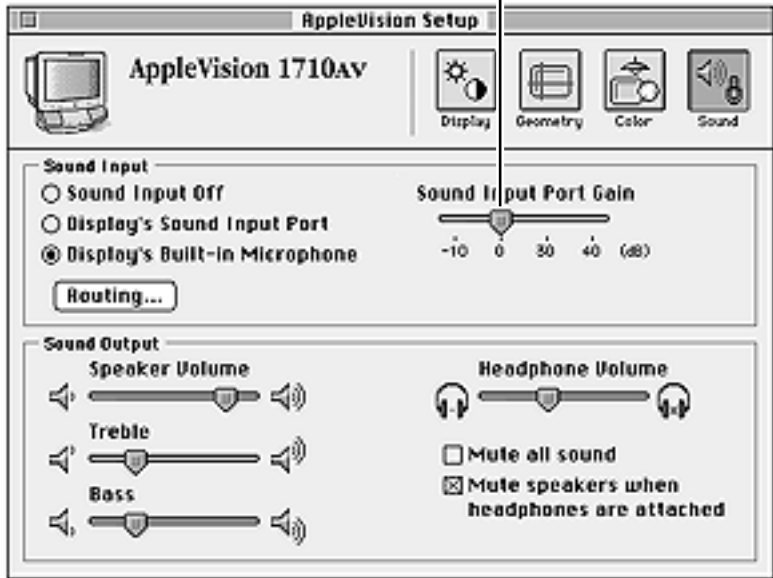
- “Display’s Sound Input Port” if you want to use an audio device attached to the display’s input port







Gain Slider



- 2 If you select "Display's Sound Input Port," drag the Sound Input Port Gain slider to set the desired gain.

**Note:** Settings in the Sound window control sound only on the AppleVision 1710AV Display. To get desired results, you might also need to adjust sound on the computer connected to the display. Refer to the computer manual for more information.





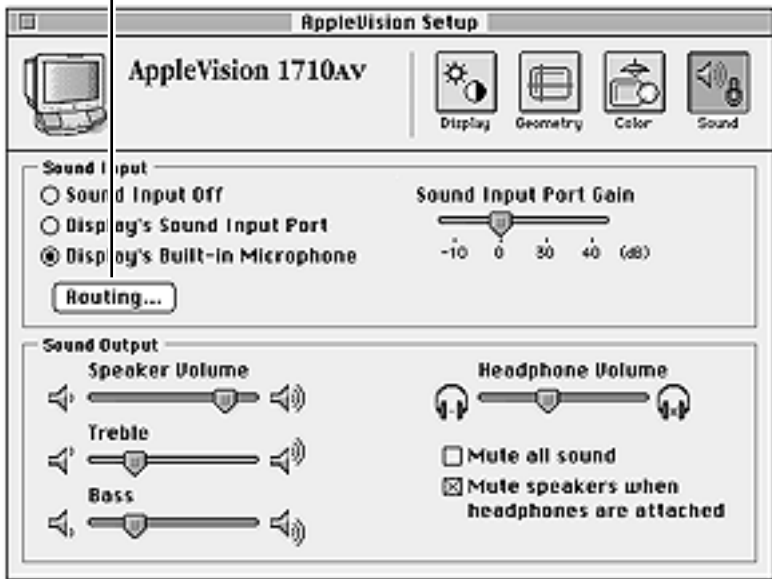
## Selecting a Sound Output Device

Refer to Chapter 5, “Using Sound and Video,” in the AppleVision 1710AV Display User’s Guide.





Routing Button

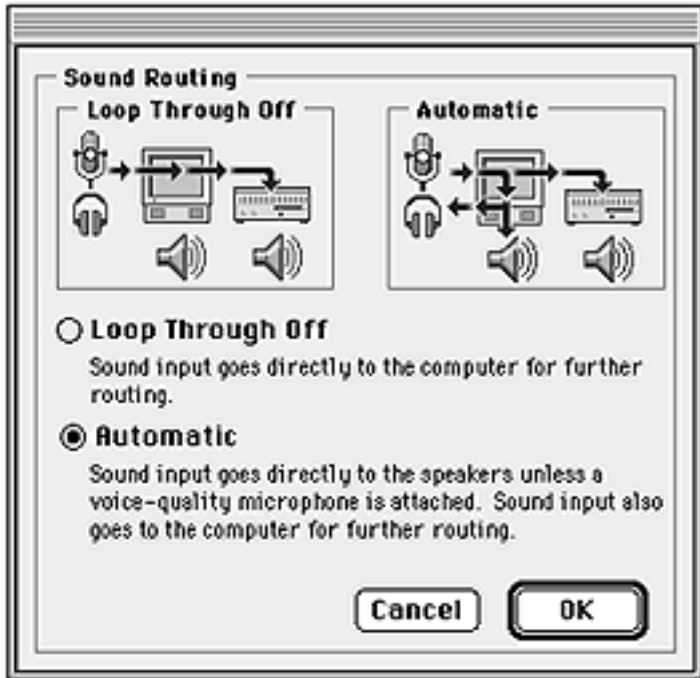


## Routing Display Sound

To select how the sound is routed,

- 1 Click Routing.



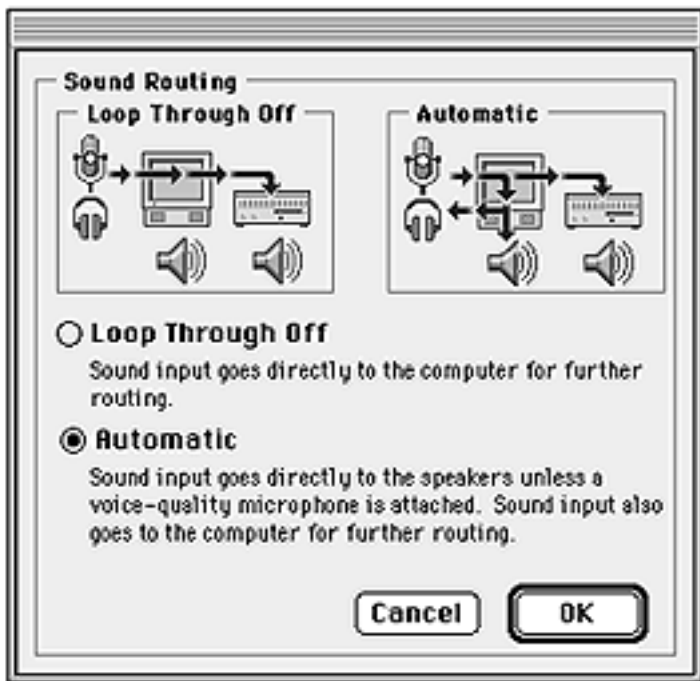


## 2 Select a routing path.

Click

- “Loop Through Off” if you’re recording from a device and you don’t want to hear the sound on your display.
- “Automatic” if you want sound routed to the speakers, headphones, and computer unless a voice-quality microphone is attached.

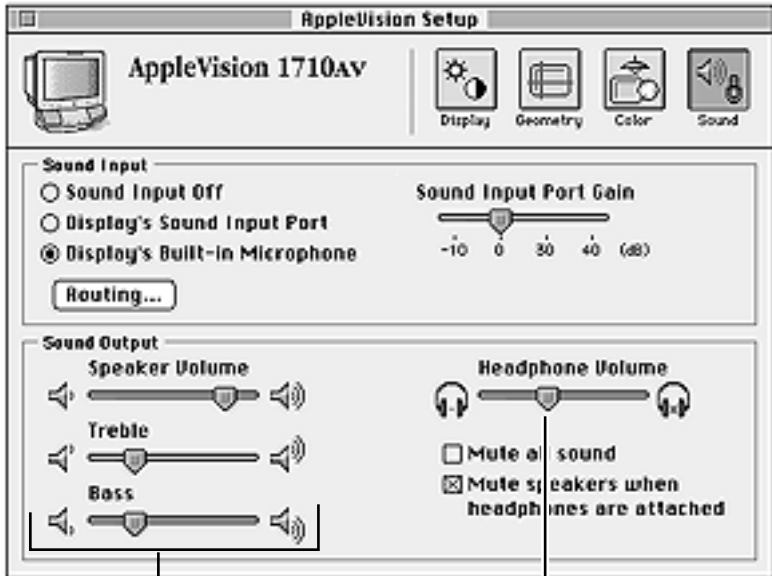




**Note:** A voice-quality microphone is any microphone that has an extended stereo miniplug connector.

- 3 Click OK.





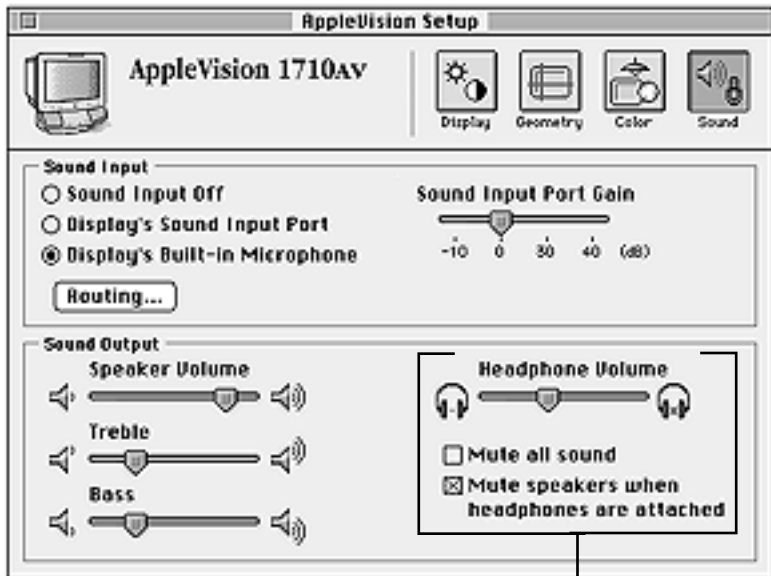
Speaker, Treble, and Base  
Slider Controls

Headphone  
Slider Control

## Adjusting Volume, Treble, and Bass

- 1 Drag the Speaker Volume slider to adjust speaker volume.
- 2 If desired, adjust treble and base by dragging their slider controls.
- 3 If desired, adjust headphone volume by dragging the slider control to the right to increase volume or to the left to decrease volume.





Selections for Mute

**Note:** When you make volume adjustments, “Mute all sound” is turned off automatically. When you make speaker volume adjustments and headphones are attached to the display, “Mute speakers when headphones are attached” is turned off automatically.





## The Control Strip

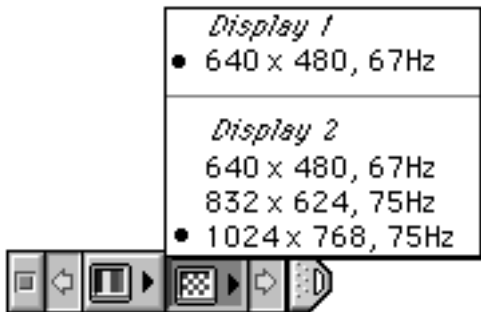


The control strip is a line of small icons that appears when you turn on the AppleVision display.

The control strip allows you to make quick and easy changes to common settings such as screen resolution or color depth.







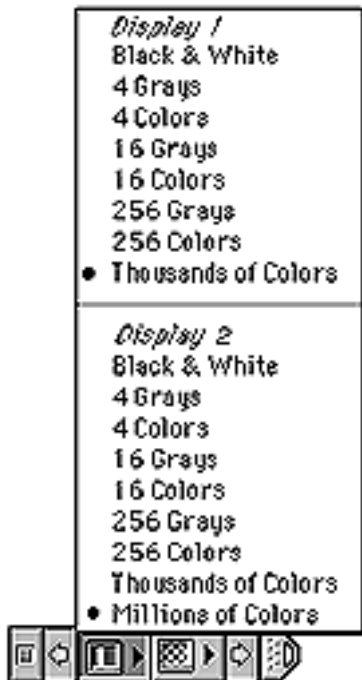
## Changing Screen Resolution

To view or change the display's screen resolution,

- 1 Move the pointer over the checkerboard screen icon, and hold down the mouse button.
- 2 Select a screen resolution from the pop-up menu.

**Note:** The example shows what you might see if two displays were connected to your computer.





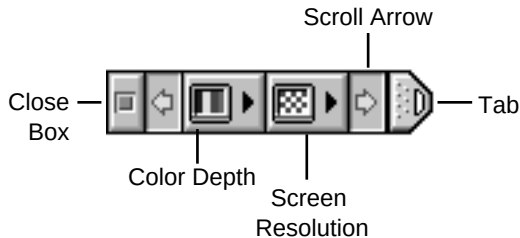
## Changing Color Depth

To view or change the display's color depth,

- 1 Move the pointer over the striped screen icon, and hold down the mouse button.
- 2 Select a color setting from the pop-up menu.

**Note:** The example shows what you might see if two displays were connected to your computer.





| To...     | Do this...                                      |
|-----------|-------------------------------------------------|
| Close     | Click close box or click tab                    |
| Open      | Click tab                                       |
| Resize    | Click and drag tab                              |
| Move      | Hold down Option key and drag tab               |
| Hide      | Press Shift-Control-C                           |
| Customize | Apple menu:<br>Control Panels:<br>Control Strip |





## Exploded View

AppleVision 1710AV/1710  
Display



