

Apple Cinema Display 22" (DVI)





Take Apart

Apple Cinema Display 22" (DVI)





Tools

The following tools are recommended for the take apart procedures.

- 2 mm hex key
- #2 Phillips screwdriver
- jeweler's #1 Phillips screwdriver
- ESD wriststrap and mat
- white cotton gloves (922-1592)
- nylon probe tool (922-5065)

Important: The display plastics, inside and out, retain fingerprints and can scratch easily. Be very careful with tools, lay the display and plastic parts only on a clean soft surface, and wear clean white cotton gloves when handling and servicing the display.



Foot Assembly

Tools

This procedure requires the following tools:

- 2mm hex key
- White gloves for handling plastics

Part Location



Preliminary Steps

Before you begin, do the following:

- Place the display face down on an ESD mat or soft cloth.

Note: Plastics are easily damaged. The white gloves prevent fingerprints.

Procedure

1. Remove three screws and lift the foot off the hinge.



2. The clear hinge cap may fall off the foot. If it doesn't, remove the hinge cap from the foot.



3. Pull the ADC (Apple Display Connector) cable through the opening in the foot to separate the foot and the cable.



Rear Cover

Tools

This procedure requires the following tools:

- 2mm hex key
- White gloves for handling plastics

Part Location



Preliminary Steps

Before you begin, do the following:

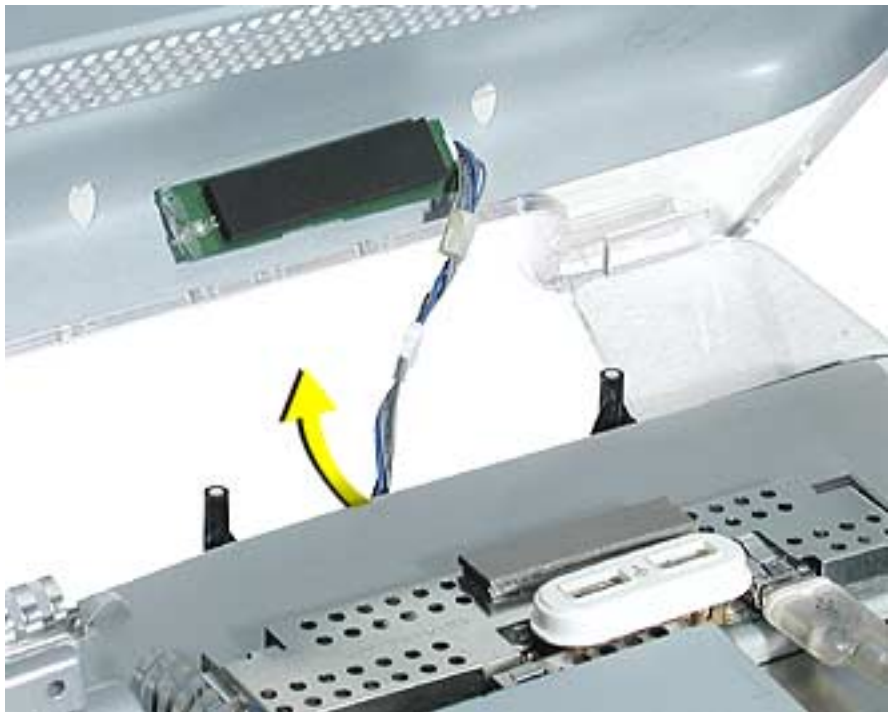
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover

Procedure

1. Remove eighteen hex screws on the rear cover.



2. Carefully lift the rear cover only enough to expose the power/brightness switch cable and connector. Disconnect the cable, shown below. **Note:** The power switch on the rear cover is heat-staked to the cover. It can't be removed.



- Carefully pull the ADC cable through the hole in the rear cover.



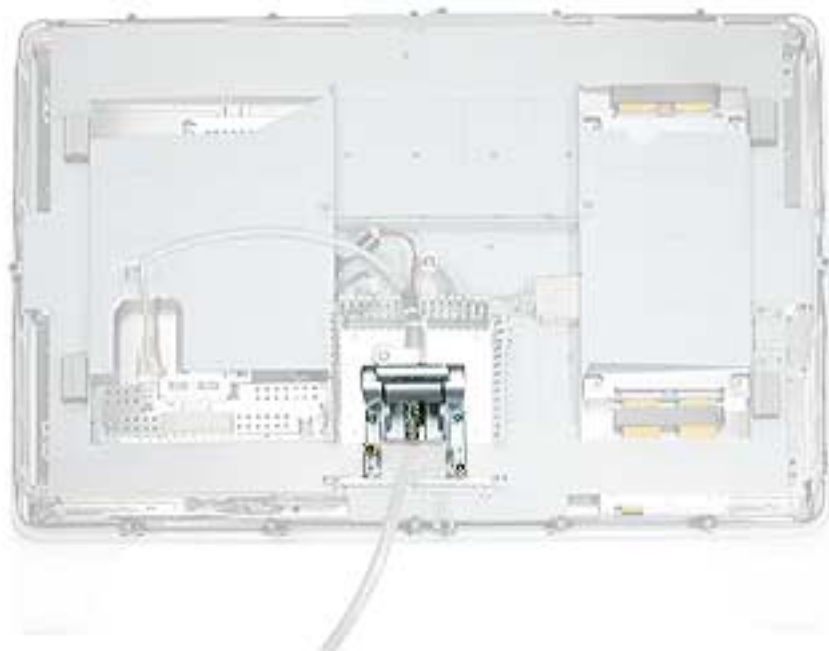


Hinge

Tools

- #2 Phillips screwdriver

Part Location



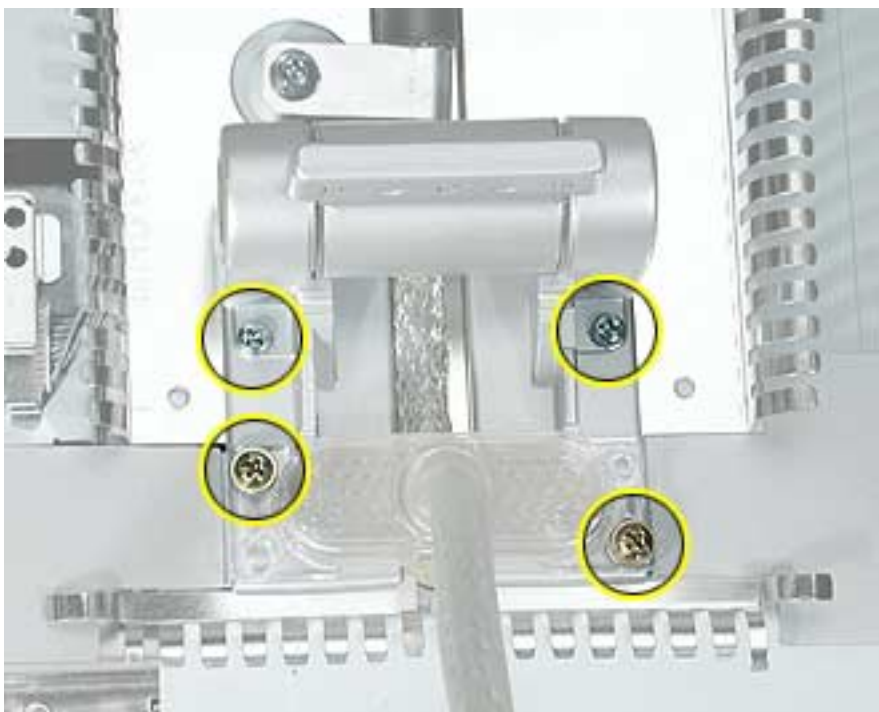
Preliminary Steps

Before you begin, do the following:

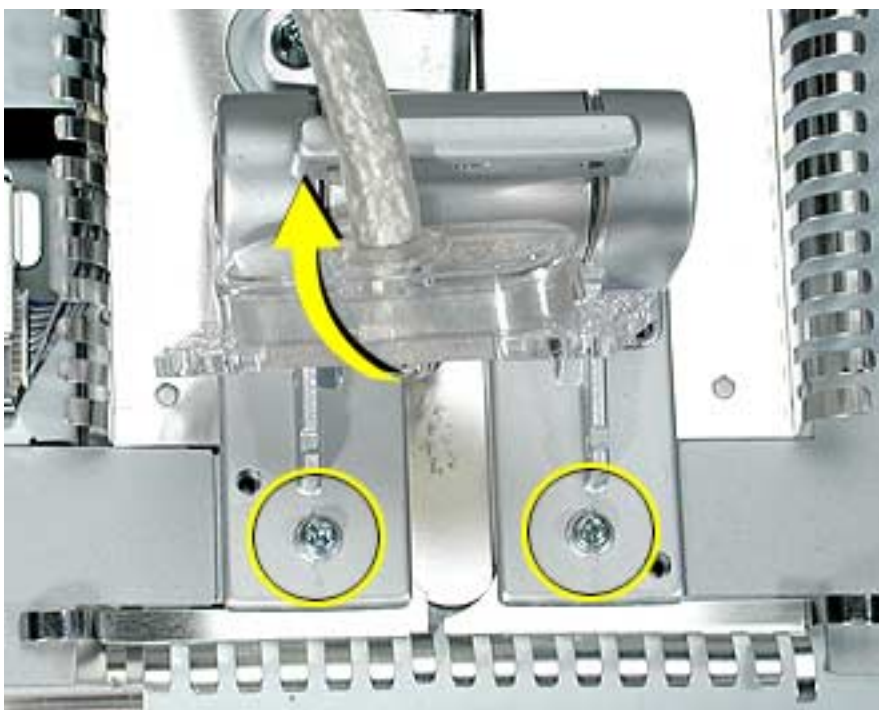
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the rear cover

Procedure

1. Remove four screws. **Note:** The two bottom screws are anodized (brass colored).



2. Pull the ADC cable out of the way and remove two more hinge screws.



3. Lift the hinge up and off the chassis. **Replacement Note:** The hinge has locators on it, so it seats correctly in the chassis.



ADC Cable

Tools

- #2 Phillips screwdriver

Part Location



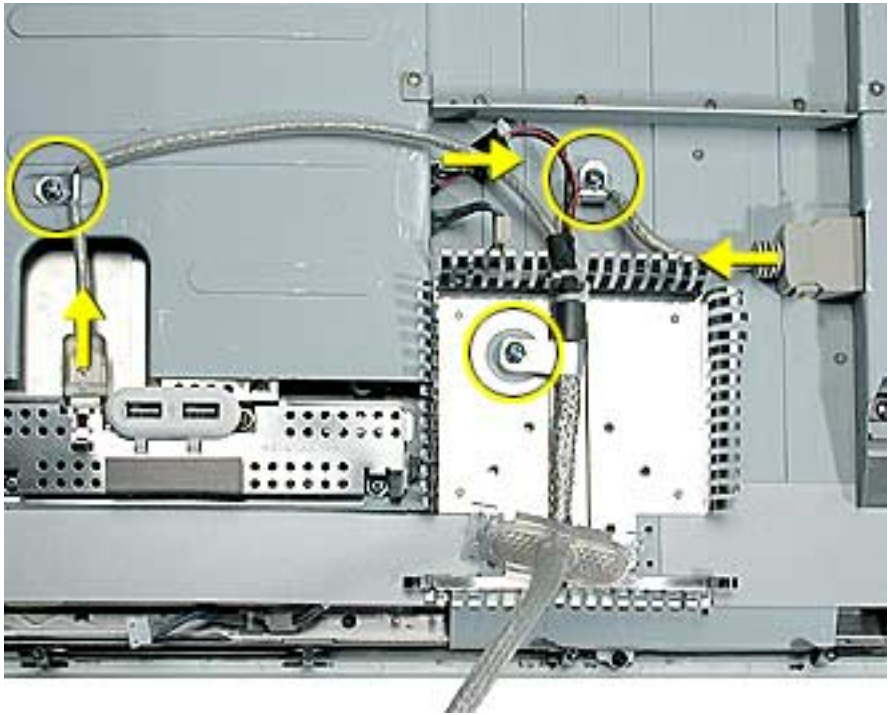
Preliminary Steps

Before you begin, do the following:

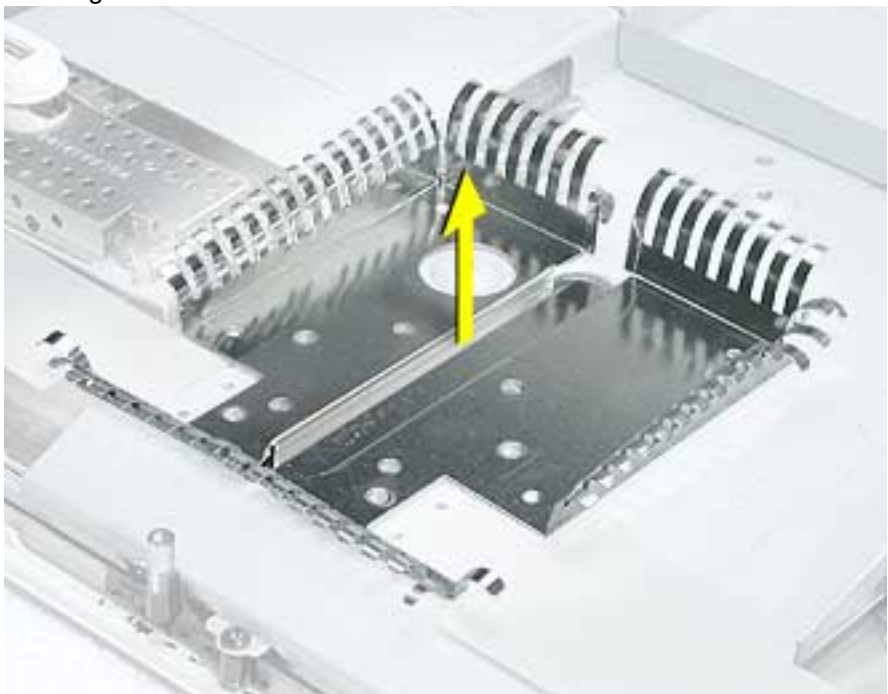
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the rear cover
- Remove the hinge

Procedure

1. Remove three screws holding the ADC cable clips (circled below) to the chassis. Disconnect the three cable connectors (shown with arrows).



2. Lift the ADC cable from the chassis.
3. Lift the hinge shield from the chassis.



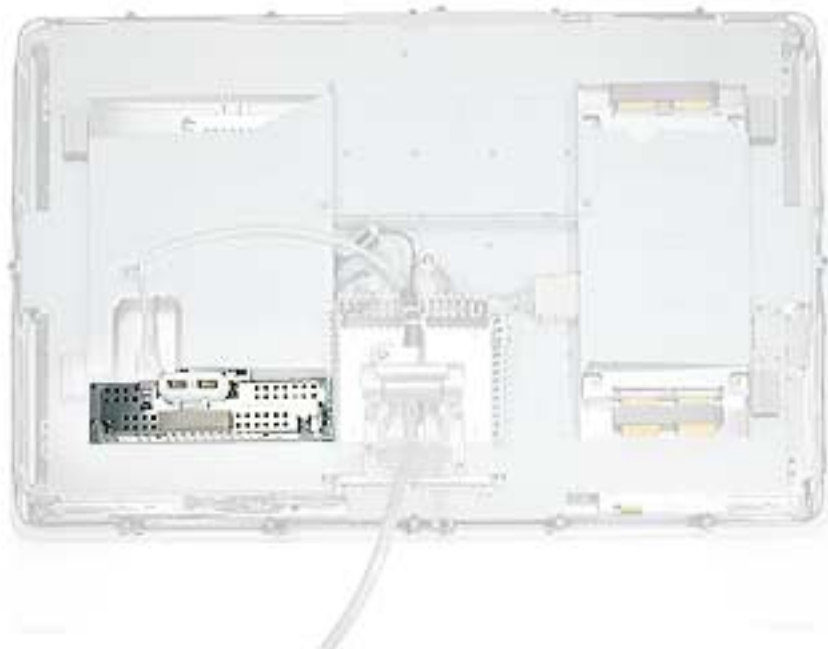


USB Board

Tools

- #2 Phillips
- Nylon probe tool (922-5065)

Part Location



Preliminary Steps

Before you begin, do the following:

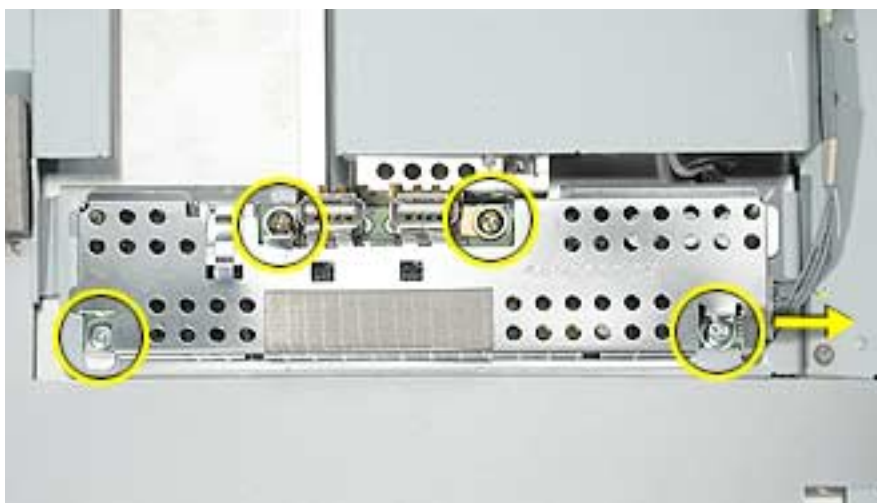
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the rear cover
- Disconnect the USB cable next to the USB ports

Procedure

1. Pull the USB trim cap off the USB ports.

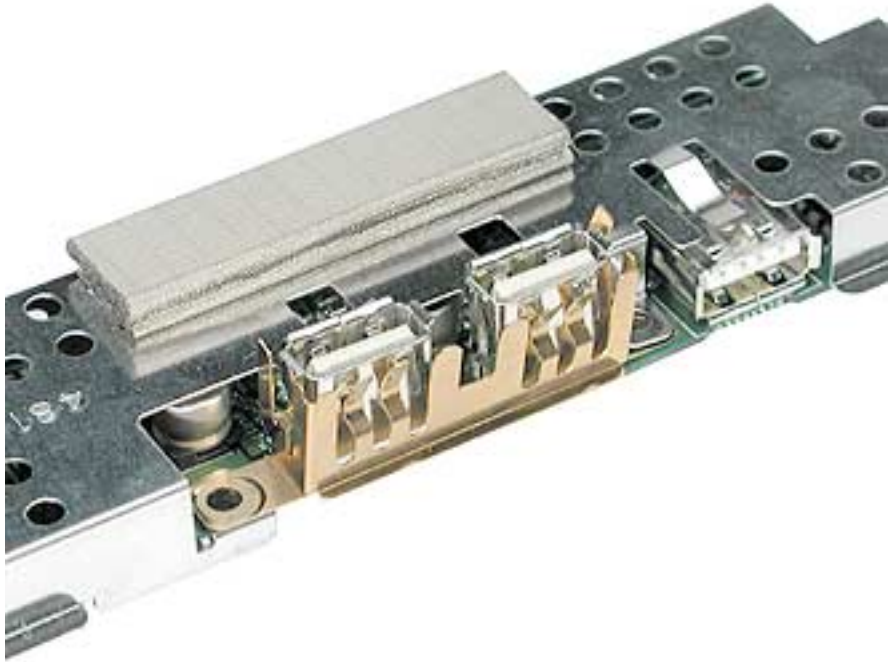


2. Remove four USB board screws; two silver screws on the bottom and two anodized screws near the USB ports. Carefully disconnect the USB -to- main-board cable (shown with arrow) using the nylon probe tool or similar tool.



3. Lift the USB board (located inside the shielding) from the chassis. Remove the USB shield and copper ground shield. **Note:** The shielding needs to be removed before returning the USB board to Apple.

-
4. **Replacement Note:** Reassemble the USB board and shields as shown below.





Front Bezel

Tools

This procedure requires the following tools:

- #2 Phillips screwdriver

Part Location



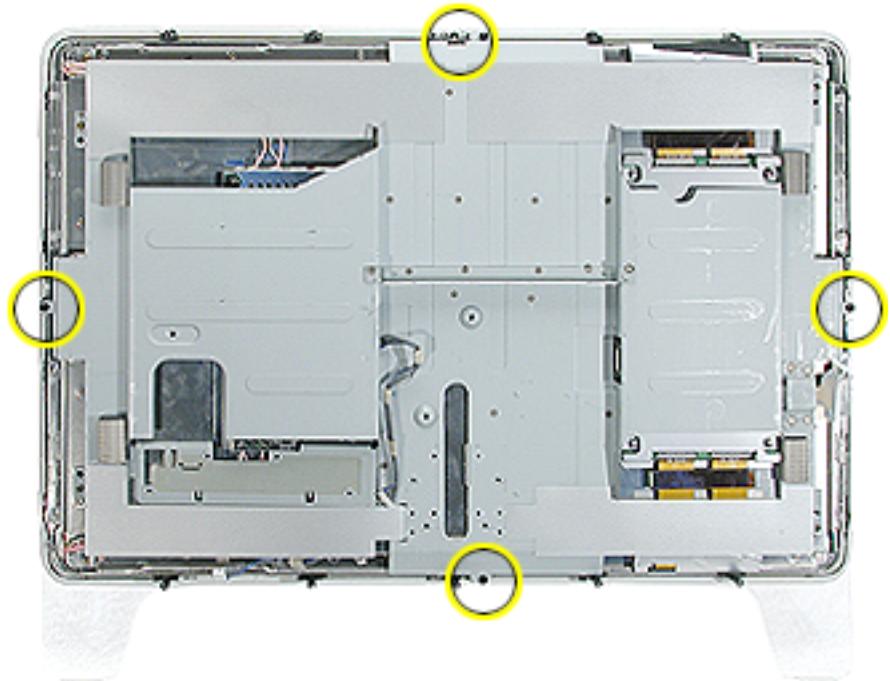
Preliminary Steps

Before you begin, do the following:

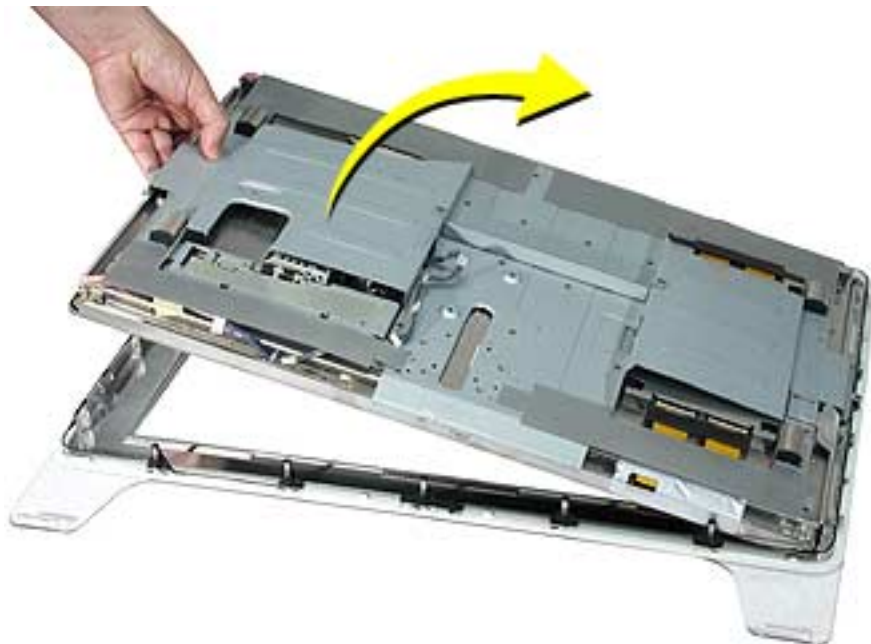
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the rear cover
- Remove the hinge
- Remove the ADC cable and hinge shield

Procedure

1. Remove the four black bezel screws.



2. Carefully lift the display panel off the front bezel **Note:** The display panel is very heavy. Use caution when lifting the panel out of the bezel.





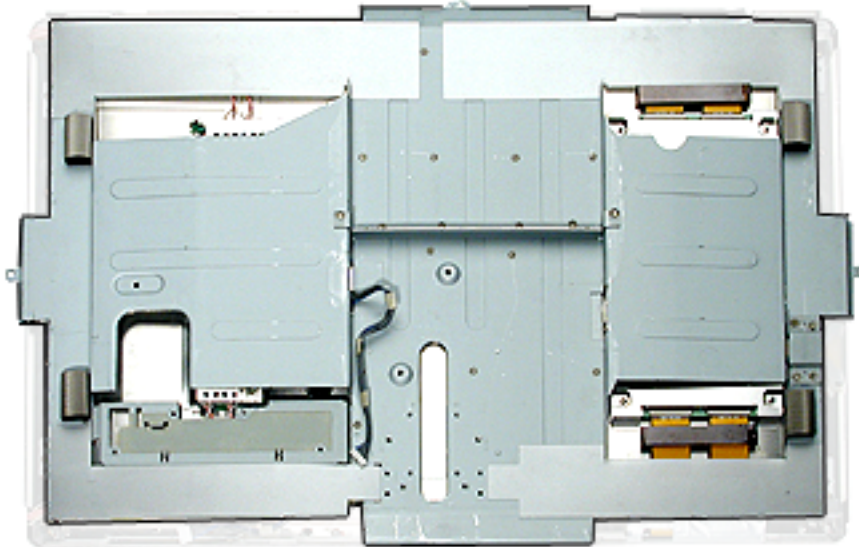
Chassis

Tools

This procedure requires the following tools:

- #2 Phillips screwdriver

Part Location



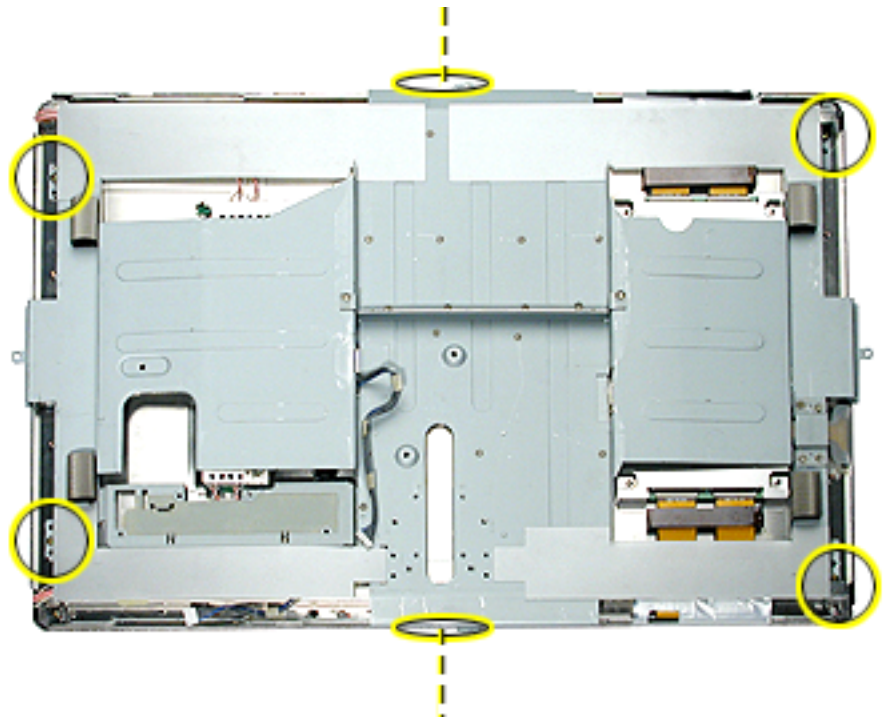
Preliminary Steps

Before you begin, do the following:

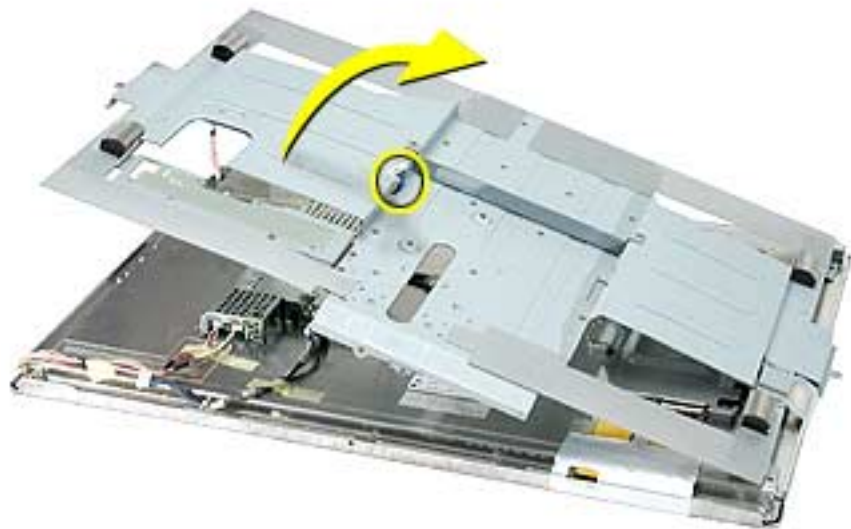
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the rear cover
- Remove the hinge
- Remove the ADC cable
- Remove the hinge shield
- Remove the USB board
- Remove the front bezel.

Procedure

1. Remove the four screws (one in each corner) and the two silver screws on the top and bottom of the chassis (shown with dotted lines).



2. Pull the cable (circled below) through the hole in the chassis, then lift the metal chassis off the LCD panel.





Top Backlight Bulb

Tools

This procedure requires the following tools:

- #1 Phillips screwdriver

Part Location



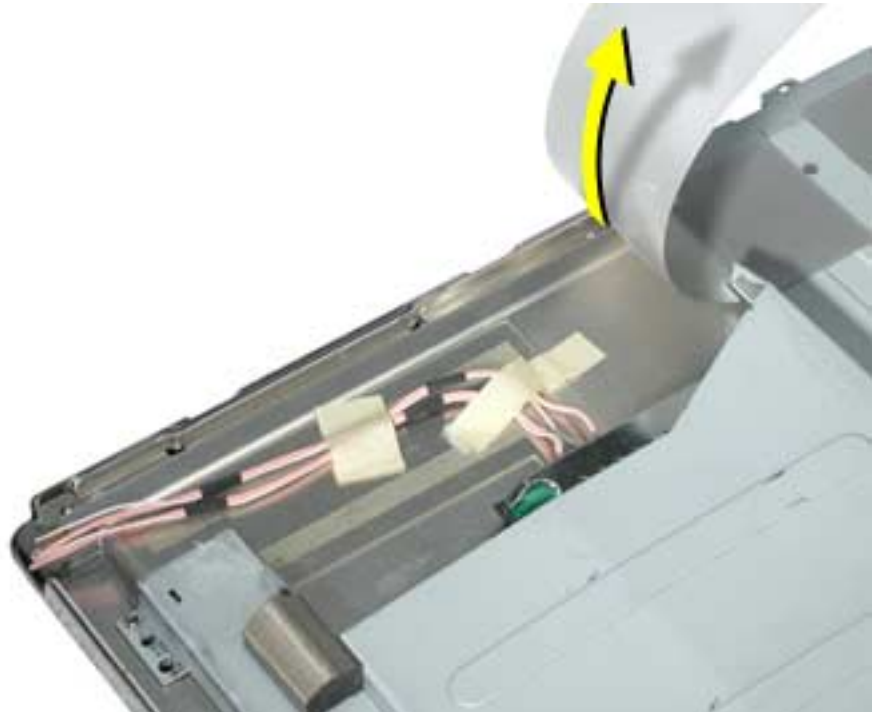
Preliminary Steps

Before you begin, do the following:

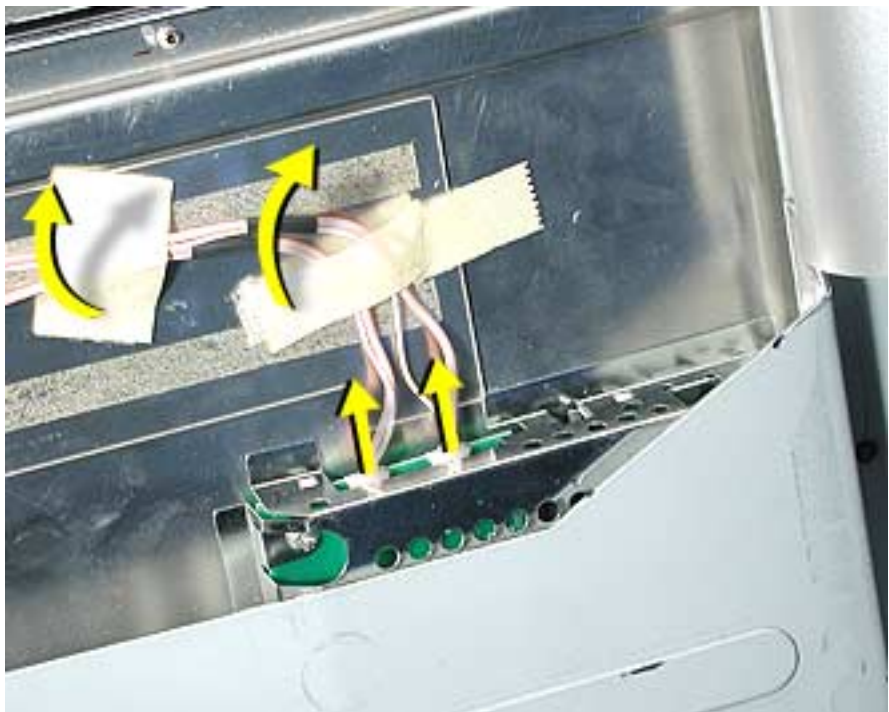
- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the back cover
- Remove the hinge
- Remove the ADC cable
- Remove the hinge shield
- Remove the USB board
- Remove the front bezel.

Procedure

1. Peel the gray flexible material (see arrow) back to expose the top bulb cables.



2. Release the masking tape and disconnect the two bulb cables from the inverter board.



3. Remove the bulb screw.



4. Carefully slide the top bulb tray out of the panel. **Note:** The top and bottom bulbs are interchangeable.





Bottom Backlight Bulb

Tools

This procedure requires the following tools:

- #1 Phillips screwdriver

Part Location



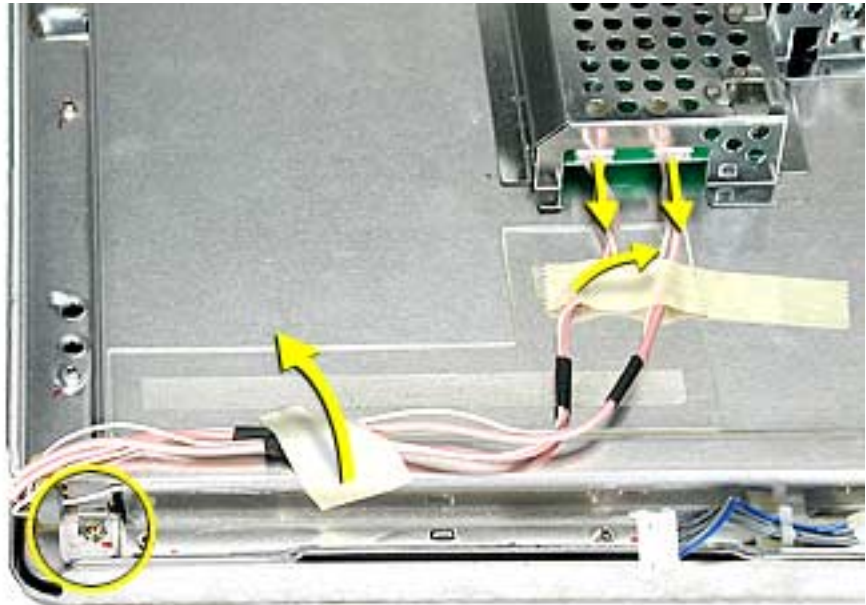
Preliminary Steps

Before you begin, do the following:

- Place the display face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the rear cover
- Remove the hinge
- Remove the ADC cable
- Remove the hinge shield
- Remove the USB board
- Remove the front bezel.
- Remove the chassis

Procedure

1. Release the masking tape, disconnect the two bulb cables from the inverter board, and remove the bulb screw (circled).



2. Carefully slide the bottom bulb tray out of the panel. **Note:** The backlight bulbs are interchangeable



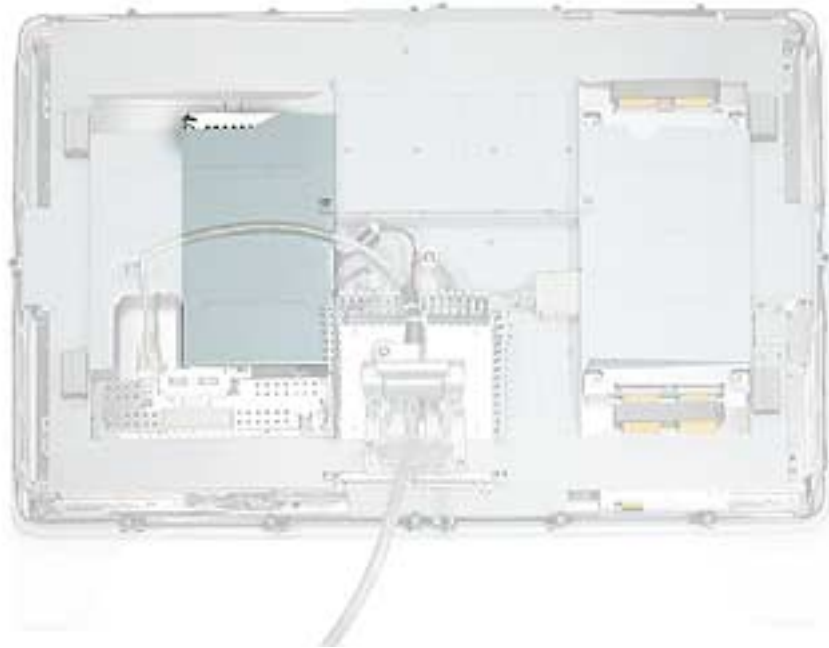
Inverter and Main Board

Tools

This procedure requires the following tools:

- #2 Phillips screwdriver

Part Location



Preliminary Steps

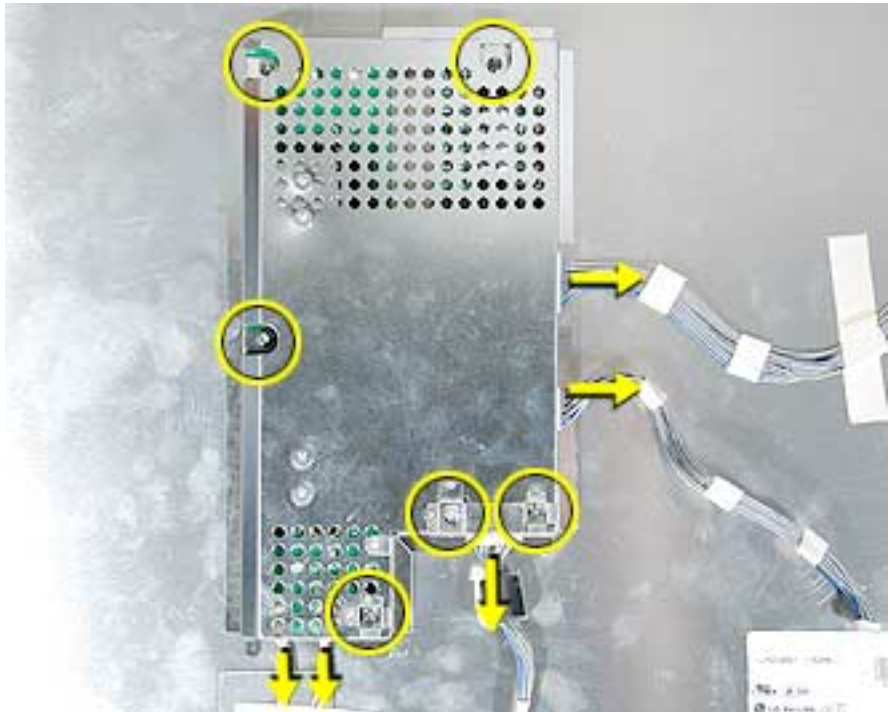
Before you begin, do the following:

- Place the computer face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the back cover
- Remove the hinge
- Remove the ADC cable
- Remove the shield
- Remove the USB board

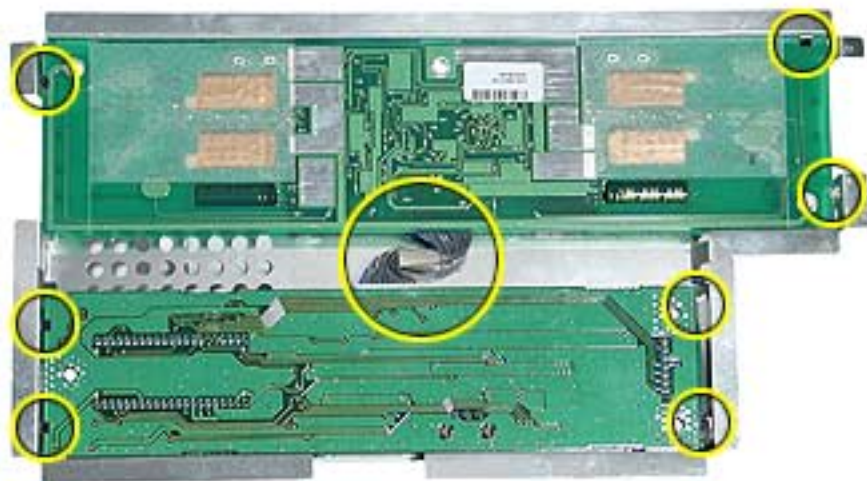
-
- Remove the front bezel
 - Remove the chassis
 - Disconnect the bulbs cables (top and bottom) from the inverter

Procedure

1. Remove the six screws on the metal shield and disconnect any attached cables.



2. Lift the shield off the display panel.
3. Turn the shield over to access the inverter board (the longer board of the two) and the main board. Flex the shield a bit to unlatch the boards from the metal tabs (smaller circles). The boards slide under the metal tabs. Disconnect the cable connecting the inverter to the main board (shown by the big circle).





Display Panel

Tools

This procedure requires the following tools:

- #2 Phillips screwdriver

Part Location



Preliminary Steps

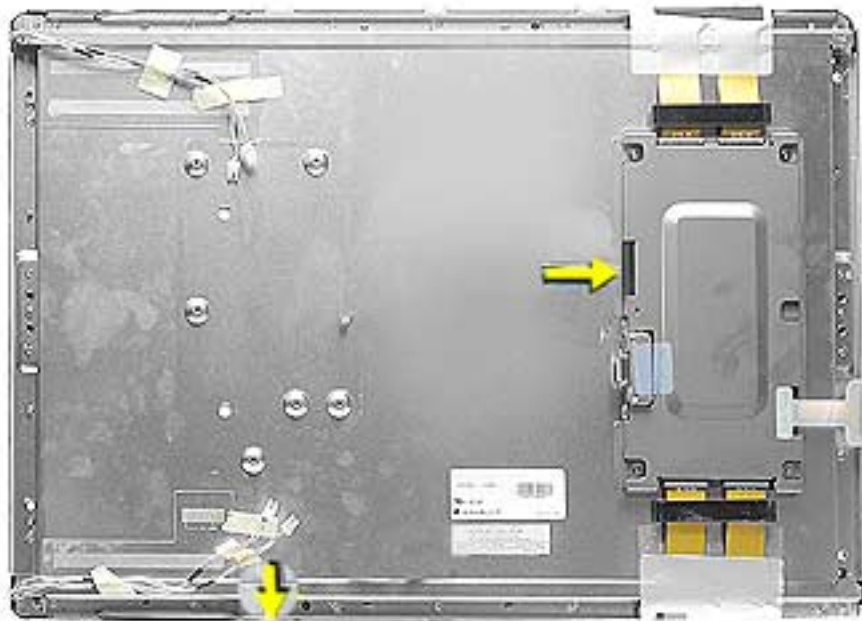
Before you begin, do the following:

- Place the computer face down on an ESD mat
- Remove the foot assembly and hinge cover
- Remove the back cover
- Remove the hinge
- Remove the ADC cable
- Remove the hinge shield
- Remove the USB board
- Remove the front bezel

- Remove the chassis
- Disconnect the bulbs cables (top and bottom) from the inverter
- Remove the inverter and main board
- Remove the power switch cable (near bottom backlight bulb)

Procedure

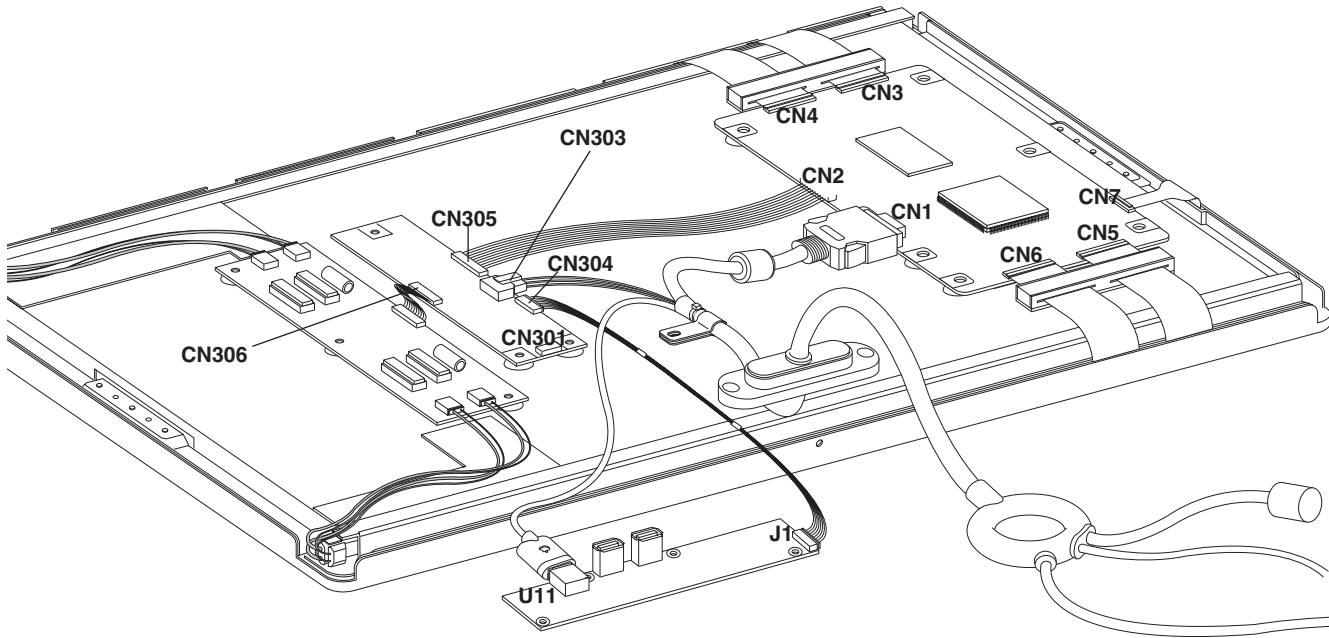
1. If attached, remove the two cables at the locations indicated by the yellow arrows. Return the panel as it appears below. **Important: The backlight bulbs must be returned with the panel.**



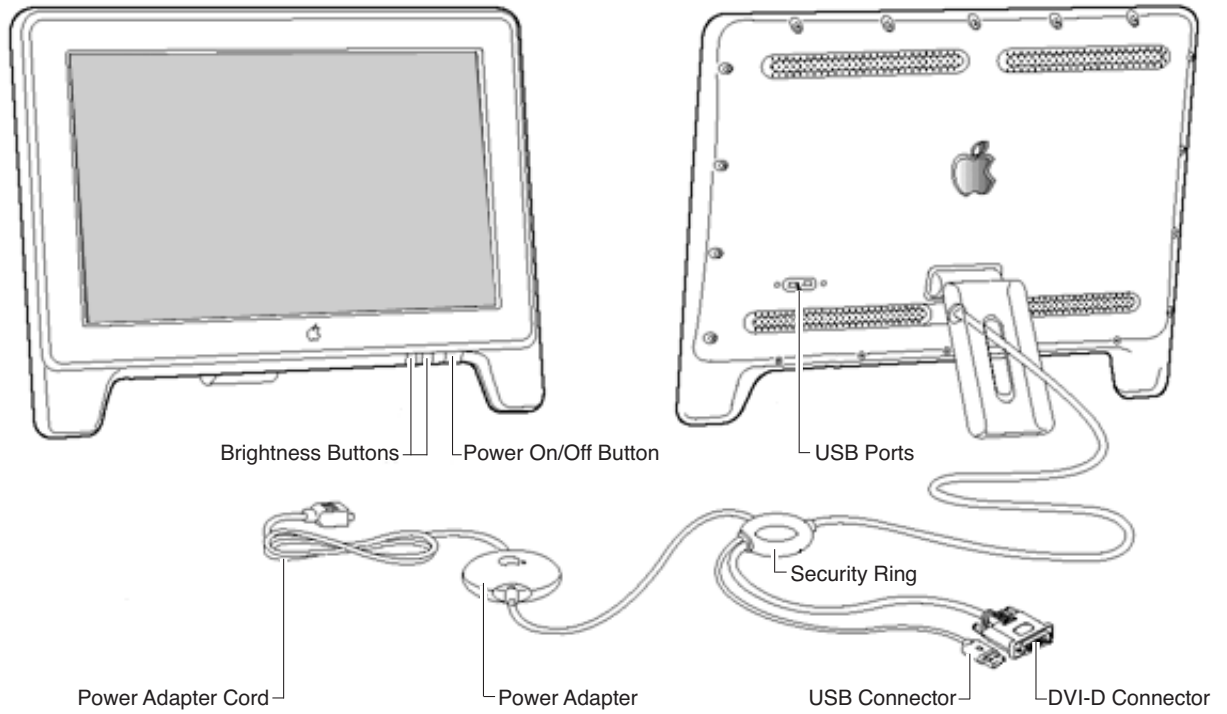


Troubleshooting
Apple Cinema Display 22" (DVI)

Wiring Diagram



Front and Back Views



Symptom Charts

How to Use the Symptom Charts

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to the product. Because cures are listed on the charts in the order of most likely solution, try the cures in the order presented. 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.

Note: Referring to the Wiring Diagram in this chapter may be helpful.

No Power

1. Check the main DVI cable. Replace the cable if damaged.
2. Check for bent pins in the DVI connector. If pins are slightly bent, carefully straighten. If pins are severely bent, replace cable. Also, inspect or have the customer inspect the display port on the computer for broken pin dividers. If the display port is damaged it must be repaired before inserting the DVI connector.
3. Disconnect the display from the computer and disconnect the power cord from the display's power adapter. Open the display and check for secure connections on the inverter and main board. **Warning: The inverter board generates high voltage when the display is plugged in. Do not touch the inverter board components, pins or connectors, when the display is connected to the computer.**
4. Disconnect CN303 (refer to wiring diagram in this chapter) from the main board, then connect the power adapter. Check for approximately 16V between the red and black pins on the connector. Voltage between 14V and 17V is okay. Replace the power adapter if the voltage is out of spec.
5. Check the connection on the power switch- to- main -board cable. **Note:** The power switch is located in the front bezel. Reseat the power switch cable. If you still have no power, go on to the next step.
6. Replace the main board.

Blank screen

This symptom may indicate a problem with the LCD panel, backlight bulbs, inverter, main board, or related cables or connectors.

1. Check DVI cable. Replace cable if damaged.
2. Check for bent pins in the DVI connector. If pins are slightly bent, carefully straighten. If pins are severely bent, replace cable. Also, inspect or have the customer inspect the display port on the computer for broken pin dividers. If the display port is damaged it must be repaired before inserting the DVI connector.
3. Plug the display into a known-good computer with a known-good video card and DVI display port. Boot the computer and allow enough time to finish booting.
4. If the power button on the display is flashing, two short flashes then a long flash, in a delayed repeating pattern, this indicates trouble with either the inverter, backlight bulbs or related cables or connectors. With this in mind, continue with the troubleshooting steps to determine the problem.
5. To check whether the LCD is working, make sure that the display's power light is on (glows green). Shine a bright light such as sunlight or a high intensity lamp (see Important note, below) into the screen and at the same time notice whether you can see faint images of desktop items on the screen.
 - If desktop items can be seen, the LCD panel is working. The problem may be with the inverter or backlight bulbs or related cables or connectors. Continue with the troubleshooting steps.
 - If no desktop items can be seen, the problem may be with the LCD panel or the main board or related cables or connectors.

Important: Lights get very hot and can quickly damage the display; be extremely careful not to allow too much heat next to the screen or other parts of the display and do not allow the light fixture to touch the screen, or damage can result.

6. **Warning: The inverter board generates high voltage when the display is plugged in. Do not touch the inverter board components, pins or connectors, when the display is connected to the computer.**

Disconnect the display from the computer and remove the power from the power adapter. Open the display and check for secure connections on the inverter and main board at CN301, CN303, CN304, CN305, CN306, CN1, CN2, and the DVI cable connection to the panel. **Note:** Refer to the Wiring Diagram in this chapter for connector locations.

7. Plug the display into a known-good computer and reconnect the power adapter. Then boot the computer.
8. Replace the main board.
9. Replace the inverter board.
10. Replace the LCD display panel.

Partially dim screen

This symptom indicates a problem with the inverter or backlight bulbs (on the side of the display that is dim), or related cables or connectors. This may be caused by the backlight bulbs or the inverter not working properly.

1. Plug the display into a known-good computer with a known-good video card and DVI display port. Boot the computer.
2. Notice whether the power button on the display is flashing, two short flashes then a long flash, in a delayed repeating pattern. This indicates trouble with either the inverter, backlight bulbs or related cables or connectors (this indicator may not always be exhibited). With this in mind, continue with the troubleshooting steps to determine the problem.
3. **Warning:** The inverter board generates high voltage when the display is plugged in. Do not touch the inverter board components, pins or connectors, when the display is connected to the computer.

Disconnect the display from the computer and remove power from the power adapter. Then open the display and check for secure connections where the backlight bulbs plug into the inverter.

Note: Refer to the Wiring Diagram in this chapter for connector locations.

4. **Important:** The backlight bulbs are extremely delicate. Handle with care.

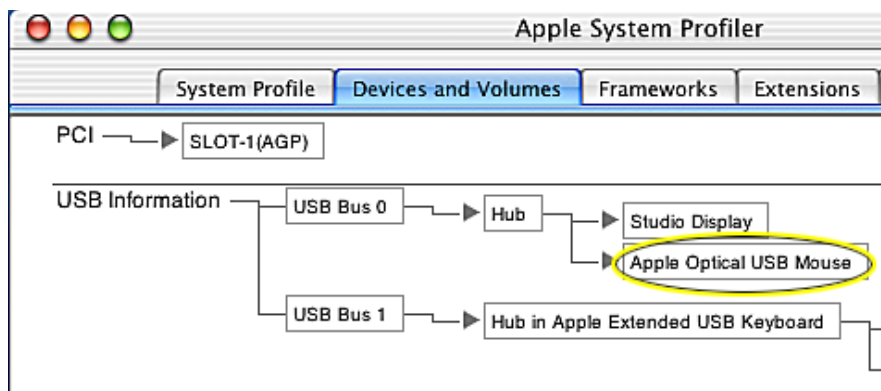
To determine whether the problem is with the backlight bulbs or the inverter board, disconnect the two CN connectors to the backlight bulbs on the side that is dim. Connect the CN connectors to a known good backlight bulb tray (the bulb tray from the other side of the display can be removed and plugged in to test, if known good). Connect the display's DVI connector to a known-good computer, then boot the computer. If one or more of the bulbs does not light, replace the inverter. If the bulbs light correctly, the original backlight bulb tray is bad, replace the bulb tray.

Note: The top and bottom backlight bulb trays are interchangeable. The bulb trays are not specific to the top or bottom.

USB device not working

1. Check for bent pins in the display's cable USB connector. If pins are slightly bent, carefully straighten. If pins are severely bent, replace cable. Also, inspect or have the customer inspect the USB port on the computer for broken pin dividers. If the USB port is damaged it must be repaired before inserting the USB connector.
2. Plug the display into a computer with a known-good DVI display port, then boot the computer. On the back of the display, connect a known-good USB device into one of the USB ports, then check Apple System Profiler to see if it is recognized. Check both USB ports. If the device is recognized, the customer's USB device may be the issue. If the device is not recognized, check the J1 and U11 USB board connections (see wiring diagram in this chapter). If the problem still exists, replace the USB board.

Note: ⌘+R, refreshes the Apple System Profiler list when USB devices are changed.



3. If the USB device is not working after replacing the USB board, replace the main board.

Power/brightness switch not working

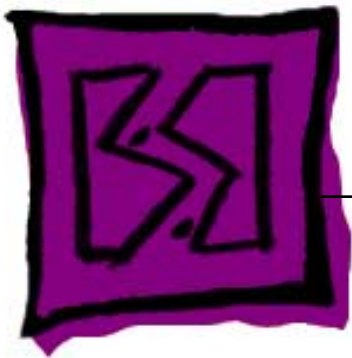
1. Verify that the cable is connected to the power/brightness switch cable connector.
2. Replace the rear cover (the power/brightness board is permanently affixed).
3. Replace main board.

Pixel anomalies

Refer to the KnowledgeBase article 22194 (www.info.apple.com/kbnum/n22194) for information about pixel anomalies.

The document explains why such anomalies occur, and describes what to do if the customer believes that their active matrix LCD panel has more than an acceptable number of pixel anomalies.

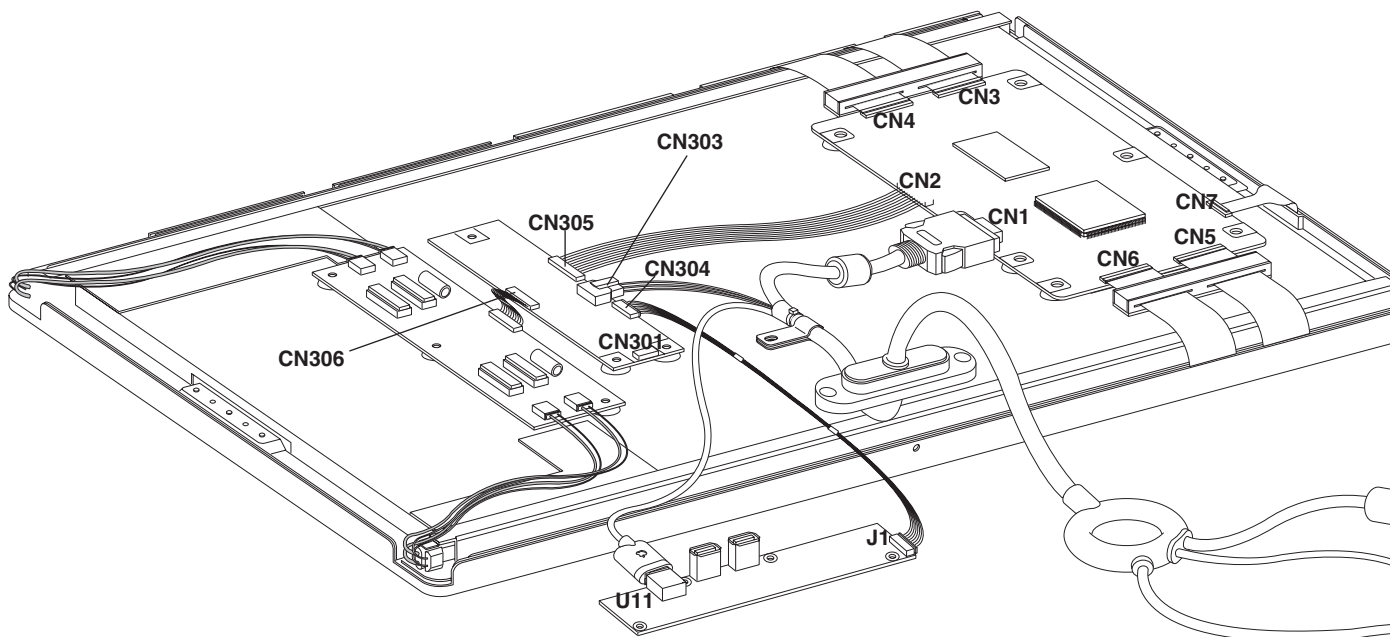
Important: The information and specifications in the section labeled “EXTENDED Information section - Apple Internal Use - Service Providers and Support Professional” is CONFIDENTIAL and is not for release to customers.



Views

Apple Cinema Display 22" (DVI)

Wiring Diagram



Exploded View

