



LED Cinema Display (27-inch)

Updated: 2010-11-18

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About This Guide

LED Cinema Display (27-inch)

Updates

Updated 18 November 2010

Take Apart

- LCD Panel and Logic Board: Added instructions to download and run the EDID Reset Tool after replacing either the LCD panel or logic board.

Introduced 24 September 2010

Feedback

We want your feedback to help improve this and future Technician Guides!

Please email any comments to: smfeedback6@apple.com

Basics

LED Cinema Display (27-inch)



Overview



Identifying Features

The LED Cinema Display (27-inch) is an active-matrix liquid crystal display with LED backlight that includes a built-in iSight camera with microphone and a 2.1 speaker system (49 watts maximum). It supports resolutions up to 2560 by 1440 pixels. The all-in-one cable creates a docking station for portable computers, providing a universal MagSafe (up to 85W), Mini DisplayPort with audio support, and three self-powered USB 2.0 ports.

The unit has no buttons. Power is controlled by the state of the connected computer. It is OFF if it detects the DisplayPort source is powered off. It is in Sleep if it detects the DisplayPort source is powered but does not send a video signal (i.e., Display Sleep). It is ON when the DisplayPort source sends a valid video signal. Brightness and speaker volume are controlled via System Preferences in Mac OS X.

System Requirements

The LED Cinema Display (27-inch) works with Mac computers running Mac OS X 10.6.4 or later that have a Mini DisplayPort connector.

Product Configurations

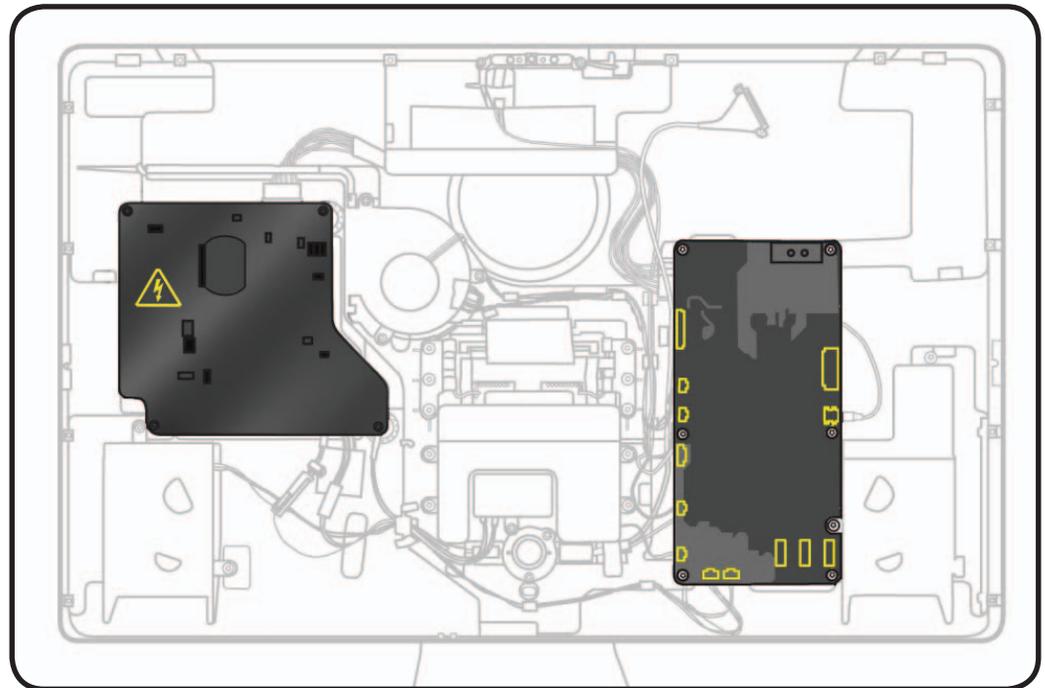
For product configurations, refer to AppleCare Tech Specs: <http://support.apple.com/specs/>



Safety Precautions



Warning: HIGH VOLTAGE: The AC/DC power supply board and logic board remain powered up whenever the system is plugged in, whether or not system has been turned on. Use extreme caution when troubleshooting system with the glass panel removed.





Serial Number Location

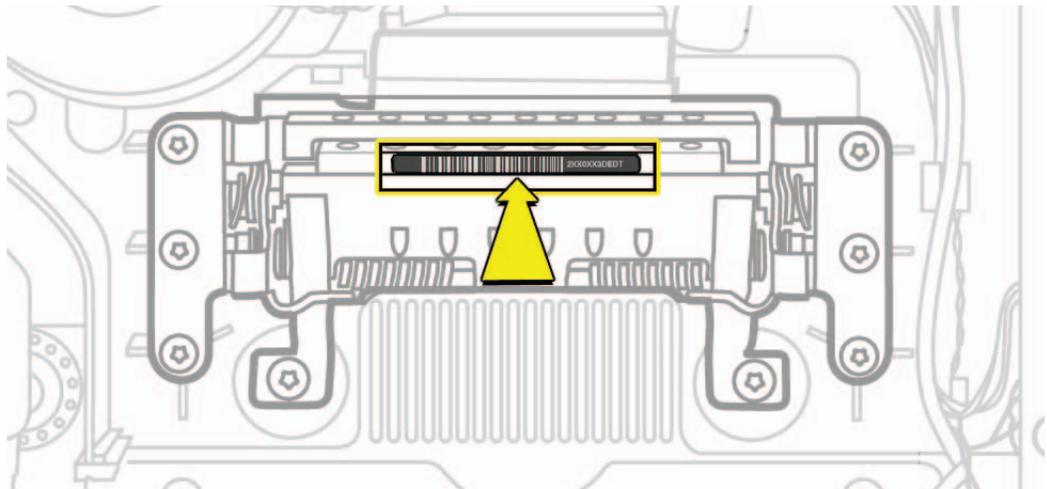
Serial Number on Stand

The LED Cinema Display (27-inch)'s serial number is located on the base of the stand. When replacing a stand, transfer the serial number to the new stand.



Serial Number on Mechanism

The LED Cinema Display (27-inch)'s serial number is also located on the hinge mechanism inside, for users who remove the stand to use a VESA mount. When replacing a mechanism, transfer the serial number label to the new mechanism.



Troubleshooting

LED Cinema Display (27-inch)



General Troubleshooting

Troubleshooting Theory

For general information on troubleshooting theory, go to GSX and find the Service Training course menu link. From there you can access the Troubleshooting Theory self-paced course.

Also, refer to the following Apple Knowledge Base articles:

[kBase #TS1388: Isolating issues in Mac OS X](#)

[kBase #HT1199: Mac OS X: How to troubleshoot a software issue](#)



Update System Software & Firmware

Important: Before beginning troubleshooting, connect the display to a known-good computer and ensure that the latest software and firmware updates have been installed. Some controls or options for the LED Cinema Display (27-inch) may not appear in System Preferences: Displays if incorrect system software is installed, or if the latest software and firmware updates (released at or after the display's introduction) are not applied AFTER the display has been connected to an eligible computer.

If using a LED Cinema Display (27-inch) with Windows, run Windows Apple Software Update after connecting the display in order to download software that will enable functionality and support for Windows. If a computer is dual-booting, the display software will need to be installed separately for both Mac OS and Windows.

Display Adapters

Apple does not support the use of “daisy chaining” or using multiple display adapters (of any kind, active or passive) with any Apple displays. The list of possible symptoms observed by doing this are broad, however, some more common ones include not being able to use connected USB keyboards after waking from sleep, issues with distortion, and issues which do not occur when only a single adapter is used.

Check Audio Features of Connected Computer

The LED Cinema Display (27-inch) has two ways to reproduce audio coming from a computer:

- Audio via the Mini DisplayPort, when computer does support this feature, and
- Audio via the USB port, for all computer models.

Before troubleshooting an audio-related issue, first identify which computer model is used with the display, and which cable(s) are connected. Computers released before 2009 will NOT support audio output through the Mini DisplayPort.



Functional Overview

A guide to connector locations, and the possible symptoms when the cable is disconnected, mis-connected or shorted.

Power Supply
No Power, no video, no MagSafe power, no USB output power, no camera input, no audio output, no audio input, no fan

LCD Panel Control
No video, distorted video, no Audio Output through speakers (via DisplayPort audio), display brightness change (no LCD temp feedback)

Fan
Display getting hot, Display shutting down when hot, fan running at full speed, fan not running

Exhaust Temp sensor
Display getting hot, fan not running, fan running at full speed

Camera + Camera LED + ALS light Sensor
No Camera, no LED when camera is used, brightness does not adjust to a room light level change

Microphone
No audio input when display microphone is selected in System Preferences Sound Input

SubWoofers
Missing low frequencies reproduction when display speakers are selected in System Preferences Sound Output

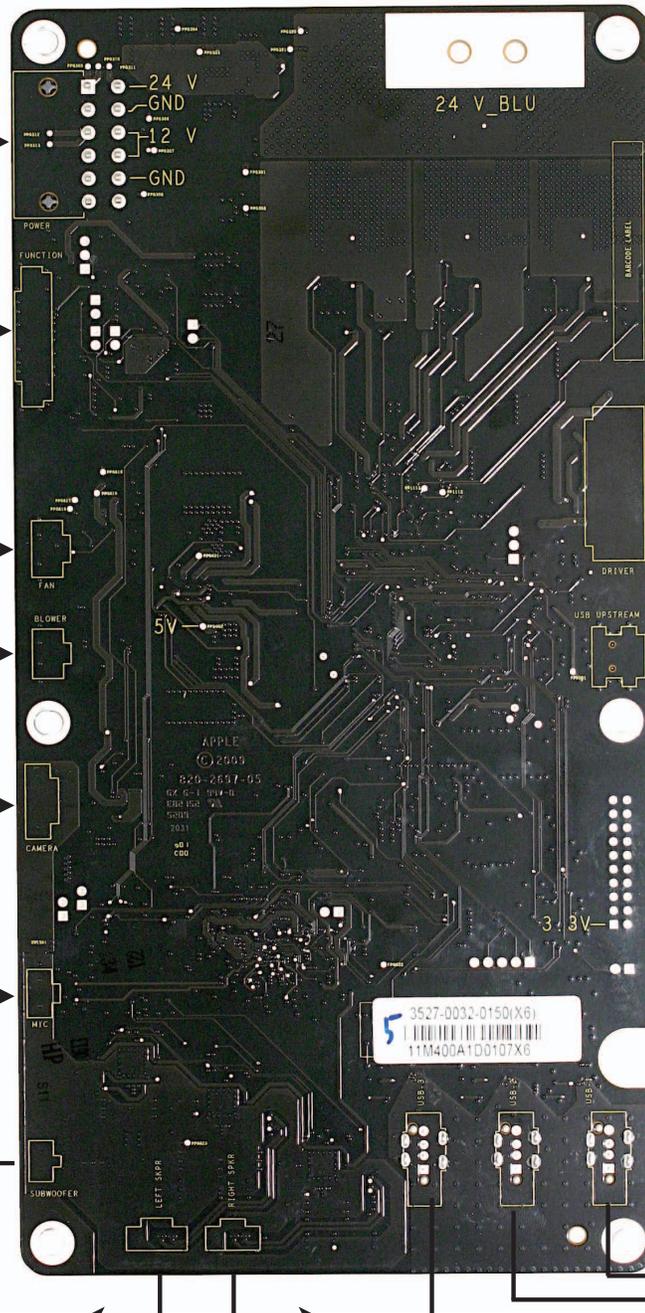
Left Speakers
Missing mid & high frequency reproduction on left side when display speakers are selected in System Preferences Sound Output

Right Speakers
Missing mid & high frequency reproduction on right side when display speakers are selected in System Preferences Sound Output

LCD LED backlight
No backlight, uneven backlight, flickering backlight

USB (from computer)
No camera functionality, USB devices connected not seen, no audio input from microphone, no audio output through speakers (via USB audio)

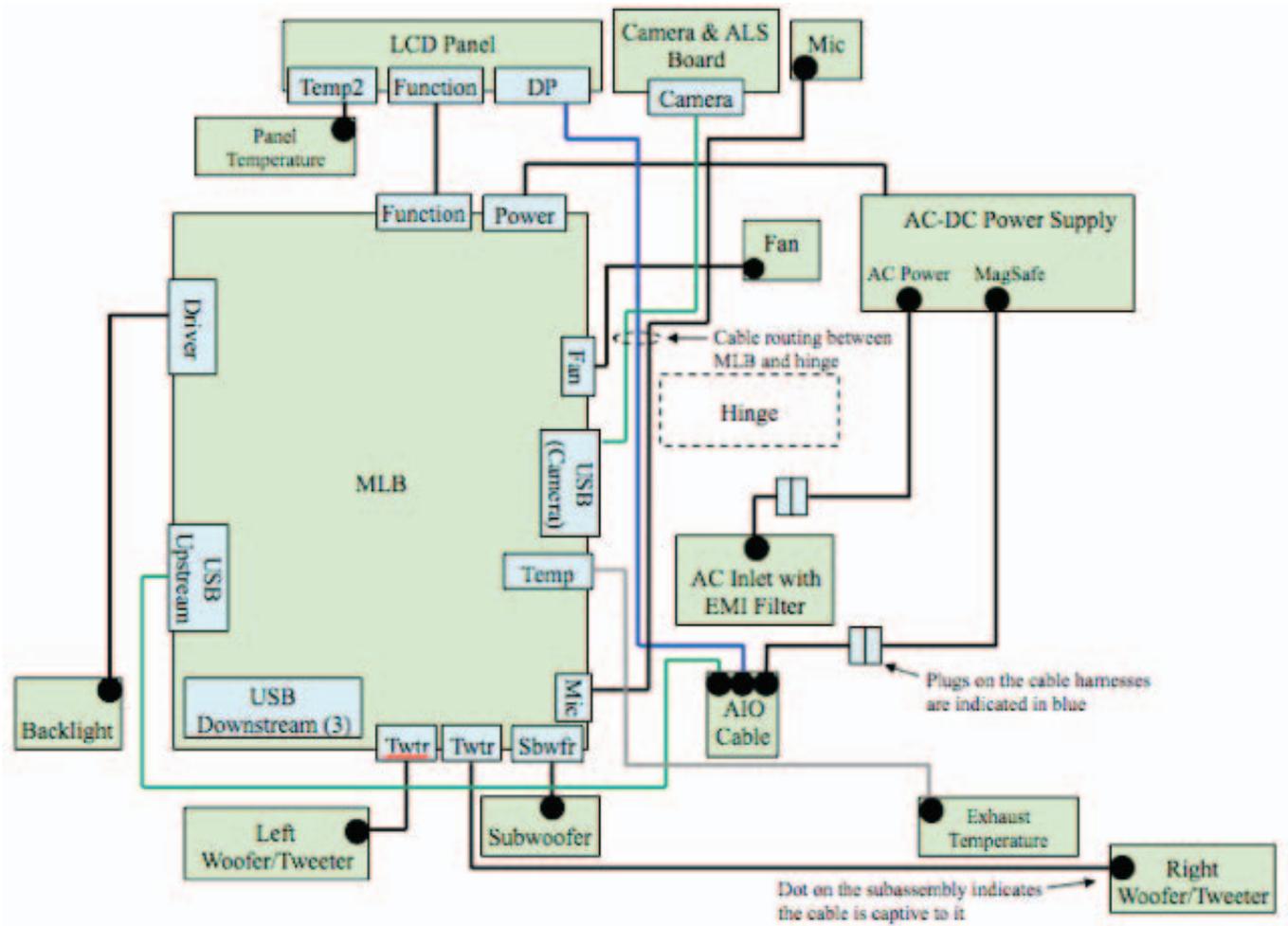
USB ports (to connected devices)
USB devices not seen, No iPod/iPhone/iPad charge





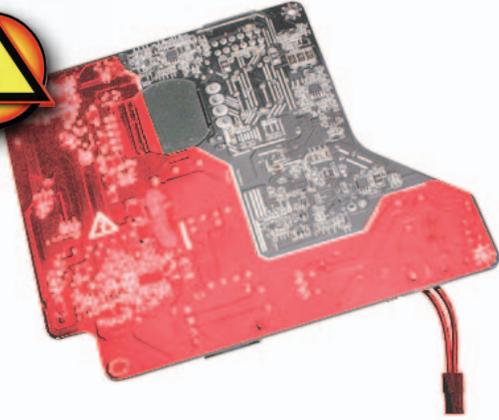
Block Diagram

Refer to this diagram to see how modules are interrelated:





Test Points Diagram

Warning ! HIGH VOLTAGE :
Use extreme caution when working around the power supply.

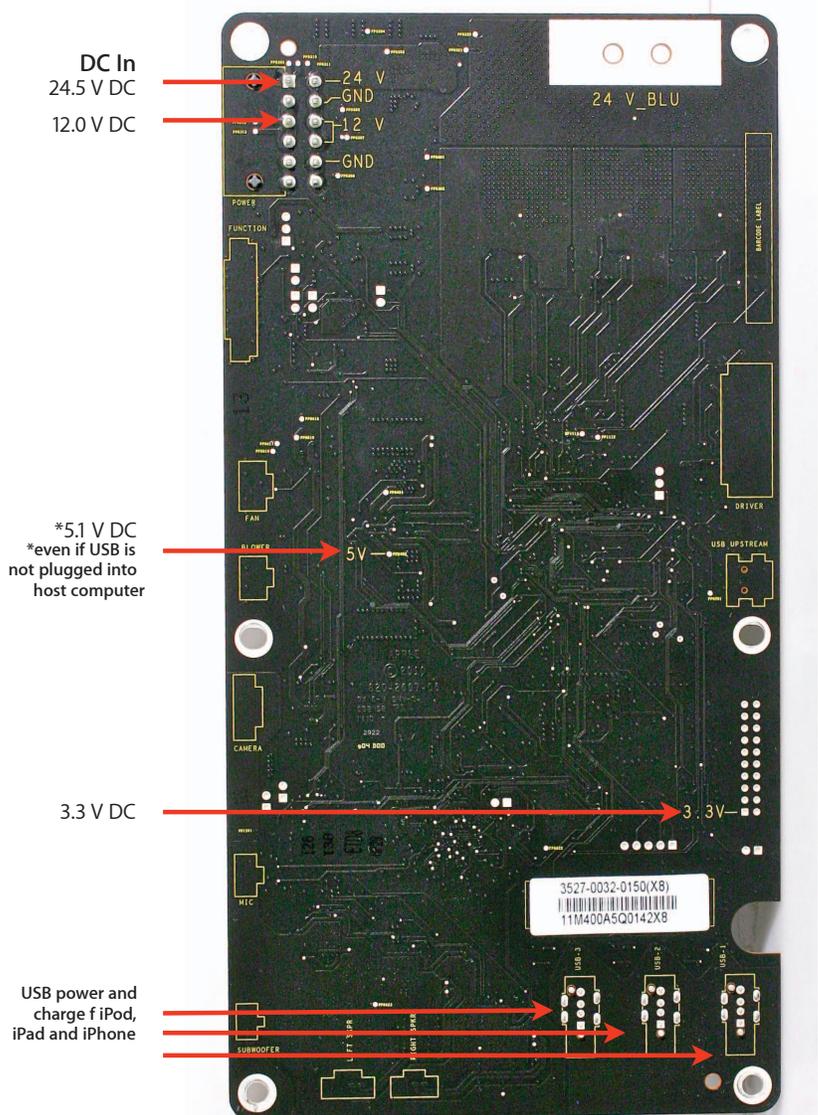
- Never touch the leads on bottom and left side of the power supply around the warning sign.
- Do NOT lean over or accidentally touch power supply area during living testing.
- Keep your fingers behind the finger guards of the test probes when making measurements !

Test Points for DC Power Presence

Following are test points you can use to verify proper power flow in the LED Cinema Display. All voltages assume that the display is only plugged into a power outlet, and NOT into the host computer.

How to proceed:

- Turn the dial of your voltmeter/ multimeter to measure DC (direct current). If your voltmeter requires that you set a voltage range, choose a DC range that includes the voltage that you are measuring.
- Connect the black probe to ground by gently inserting into any of the logic board corner screws posts.
- Touch the red probe to the appropriate test point.
- Verify voltage on multimeter.
- For the USB power presence, plug a known-good iPod, iPad or iPhone device and check for a spark icon visible on the device LCD display.





Symptom Charts

Follow steps in the order indicated below. If an action resolves the issue, retest system to verify.

Startup and Power Issues

Dead Unit / No Power

Unlikely cause: fan, camera, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
Dead Unit / No Power <ul style="list-style-type: none"> No power No image No fan spin No active MagSafe LED when MagSafe is connected to a MacBook /MacBook Pro No iPod/iPhone/iPad is charged/powerd when connected to USB ports on display 	<ol style="list-style-type: none"> Verify power cord and AC wall outlet. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. Check brightness setting. Verify display is used with a supported system with up-to-date system software. Test display with a known-good system. If used as second display, open Display Preferences (or press Option-F2) and check for presence of the middle Arrangement tab to confirm that display is recognized.

Deep Dive

Check	Result	Action	Code
1. Connect display to a known-good supported computer and check in System Profiler's USB device tree that display's USB hub and built-in camera are listed.	Yes	Power is present on the display logic board. Go to Blank / No Video, No Backlight .	
	No	Go to step 2.	
2. Unplug and replug Mini DisplayPort connector into a known-good supported portable computer and monitor the portable's display. Verify that portable's display briefly turns off then back on.	Yes	LCD panel is powered and video signal is asserted. Go to Blank / No Video, No Backlight .	
	No	Go to step 3.	



3. Remove glass and LCD panel, reconnect MagSafe, DisplayPort and USB cables to a powered on computer. Set digital multimeter to DC and correct range, and verify that: - a 23.3–25.7 V DC voltage is present between logic board test point (24 V) and chassis ground (GND); this circuit powers LCD backlight; and - an 11.4–12.6 V DC voltage is present between logic board test point (12 V) and chassis ground (GND); this circuit powers everything else.	Yes	24.5 V DC and 12.0 V DC from power supply are both present. Go to step 4.	
	No	Either 24.5 V DC or 12.0 V DC or both have no power or incorrect power at logic board, indicating a power supply issue. Unplug AC power cord from display, wait a moment, then reconnect AC power cord and retest. If issue persists, go to step 6.	
4. Verify that a 3.1–3.5 V DC voltage is present between logic board test point (3.3 V DC) and chassis ground (GND).	Yes	3.3 V DC present on logic board. Go to step 5.	
	No	No 3.3 V DC power at logic board. Go to step 9.	
5. Verify that a 4.8–5.5 V DC voltage is present between logic board test point (5 V DC) and chassis ground (GND).	Yes	All DC voltages present on logic board; power OK. Go to Blank / No Video, No Backlight, Step 3	
	No	No 5.1 V DC present at logic board. Go to step 9.	
6. Verify all connections between AC inlet, power supply, all-in-one cable, and logic board are secure. See Functional Overview .	Yes	If connections are secure and display still does not function correctly, go to step 7.	
	No	Reseat connectors and retest.	
7. Set digital multimeter to AC setting and range to 500 V AC, then locate the two AC pins on lower right of power supply, and verify that a 100–240 V AC voltage (depending on your local AC voltage) is present between the two pins. WARNING! Make sure that your fingers do not touch metal part of probes, any pins of power supply, or any other part of the live power supply with fingers!	Yes	Go to step 8.	
	No	No AC power available to power supply input. Replace AC inlet by replacing rear housing.	X03



8. Disconnect all connectors from the logic board EXCEPT the DC power cable. Set digital multimeter to DC and correct range, and verify that a 3.1-3.5 V DC voltage is present between logic board test point (3.3 V DC) and chassis ground (GND), then verify that a 4.8-5.5 V DC voltage is present between logic board test point (5 V DC) and chassis ground (GND).	Yes	Power sources appear OK when all devices disconnected. Suspect possible damaged connector, short, faulty internal USB, audio or fan control device. Reconnect connectors one at a time and retest for 3.3 V DC and 5 V DC presence each time. When any of the 3.3 V DC or 5 V DC voltages cannot be read anymore, replace part that causes their power failure. Go to step 10.	X03
	No	The master 12 V DC power presence needs to be checked. Go to step 9.	
9. Disconnect all connectors from the logic board EXCEPT the power supply to logic board cable. Set digital multimeter to DC and correct range, and verify that an 11.4-12.6 V DC voltage is present between logic board test point (12 V DC) and chassis ground (GND).	Yes	12 V DC master power present, but 5 V DC and 3.3 V DC are missing: replace logic board and retest the 12V DC presence. Go to step 10.	M01
	No	Faulty 12 V DC source or logic board shorting it: replace logic board and retest 12V DC presence. If issue persists after logic board replaced, replace power supply and retest. Go to step 10.	M01 P01
10. Before reinstalling LCD panel into rear housing, verify that LED backlight driver cable on LCD panel is not damaged (wires not pinched nor shorted).	Yes	Test reassembled display to make sure it is fully functional.	
	No	LED backlight driver cable with pinched or shorted wires is likely the cause of board damage. Replace LCD Panel and take care not to pinch any cable during reassembly. Test reassembled display to make sure it is fully functional.	L01



MagSafe Adapter – No Power

Unlikely cause: LCD panel, logic board, fan, camera, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
MagSafe Adapter – No Power <ul style="list-style-type: none"> No power available to MagSafe connector MagSafe connector status LED does not illuminate 	<ol style="list-style-type: none"> Verify power cord and AC wall outlet. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. Verify display is operating. Ensure MagSafe connector and receptacle on MacBook or MacBook Pro are clean. Verify LED glowing green or orange/amber when MagSafe connector attached to a known-good MacBook or MacBook Pro.

Deep Dive

Check	Result	Action	Code
1. Attach MagSafe cable to known-good supported portable computer. Verify connector status LED illuminates green or orange/amber.	Yes	MagSafe LED illuminates green or orange/amber depending on charging state. Go to step 4.	
	No	Go to step 2.	
2. Visually inspect MagSafe cable and user's portable MagSafe receptacle for physical damage, stuck pins, debris, or metal fragments.	Yes	See kBase #TS1713: Apple Portables: Troubleshooting MagSafe adapters. Go to step 4.	
	No	Go to step 3.	
3. Unplug and replug the display's AC power cord, and verify that MagSafe connector LED color illuminates green or orange/amber depending on charging state.	Yes	Go to step 4.	
	No	Replace all-in-one cable.	P15
4. Verify a known-good supported portable computer simultaneously operates and charges a discharged battery to 100% from the display's MagSafe cable.	Yes	Repair complete.	
	No	Replace power supply. If needed afterwards, refer to Dead Unit/No Power.	P01



Sleep/Wake Issue

Unlikely cause: LCD panel, fan, camera, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
Sleep/Wake Issue <ul style="list-style-type: none"> • Won't go to sleep or won't wake from sleep 	<ol style="list-style-type: none"> 1. Verify display is being used with supported system with up-to-date system software. 2. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. 3. Check brightness setting. 4. Use with known-good system. If used as second display, open Display Preferences (or press Option-F2) and check for presence of the middle Arrangement tab to confirm that display is recognized.

Deep Dive

Check	Result	Action	Code
1. Verify display's USB hub and built-in camera are listed in the System Profiler's USB device tree.	Yes	Internal USB buses active. Power supply appears OK. Go to step 3.	
	No	Go to step 2.	
2. Unplug and replug the Mini DisplayPort connector into a known-good, supported, powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	DisplayPort connection from computer to LCD panel appears OK. Go to step 3.	
	No	Go to step 4.	
3. Remove glass and LCD panel, reconnect MagSafe, DisplayPort and USB cables to a powered on computer. Set digital multimeter to DC and correct range and verify that a 23.3–25.7 V DC voltage is present between logic board test point (24 V DC) and chassis ground (GND).	Yes	24 V DC is available to logic board. Power supply appears OK. Go to step 5.	
	No	No power at logic board. Go to step 4.	



4. Verify if all connections between power supply, all-in-one cable, and logic board are secure. See Functional Overview .	Yes	If connections were secure, go to step 5.	
	No	Reseat connectors and retest.	
5. Set digital multimeter to DC and correct range, and verify that a 11.4 -12.6 V DC voltage is present between logic board test point (12 V DC) and chassis ground (GND).	Yes	12 V DC available to logic board. Replace logic board.	M01
	No	No 12 V DC power from power supply. Replace power supply.	P01
6. Visually inspect cables and connectors for any debris, damage, or bent pins. Reinstall LCD panel and verify if all connections between logic board and LCD panel are secure.	Yes	If connections are secure and display still does not function correctly, go to Blank / No Video, No Backlight .	
	No	Reseat connectors and retest. For damaged all-in-one cable, replace all-in-one cable. For other cable damage, replace affected cable.	

Uncategorized Symptoms

Deep Dive

Check	Result	Action	Code
1. Verify whether existing symptom code applies to the issue reported by the user.	Yes	Jump to appropriate symptom code flow.	
	No	Document reported failure and send feedback to smfeedback6@apple.com stating that a suitable symptom code wasn't found.	N99



Display Issues

Blank / No Video, No Backlight

Unlikely cause: fan, camera, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
Blank / No Video, No Backlight <ul style="list-style-type: none"> No video No backlight Dim backlight 	<ol style="list-style-type: none"> Verify display is used with a supported system and up-to-date system software. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. Test display with a known-good system. Connect display to a portable system, open System Preferences: Display (or press Alt-F2) and check for presence of the middle Arrangement tab to confirm that external display is recognized. Open System Preferences: Displays and select Gather Display option to check for external display brightness setting.

Deep Dive

Check	Result	Action	Code
1. Connect display to AC power source. Connect Mini DisplayPort, MagSafe and USB connectors into a known-good, supported, powered-up portable. Verify display's USB hub and built-in camera are listed in the System Profiler's USB device tree.	Yes	Power is available to the display logic board, and USB communication working. Go to step 2.	
	No	Go to Dead Unit/No Power .	
2. Unplug and replug Mini DisplayPort connector into a known-good, supported, powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	LCD is powered and detected by system. Go to step 7.	
	No	Suspected no power to LCD panel or no DisplayPort connection with system. Go to step 3.	



3. Remove glass and LCD panel screws, slightly pivot LCD panel and verify that the internal DisplayPort cable (part of all-in-one cable) and function cable are fully connected to LCD panel and logic board.	Yes	Go to step 4.	
	No	Reseat DisplayPort connection to LCD panel and/or function cable connections between logic board and LCD panel and retest. If issue persists go to step 4. For any damaged cable, replace affected cable before testing again: - all-in-one cable. - function cable.	X03 X03
4. Unplug and replug Mini DisplayPort connector into a known-good, supported, powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	LCD is powered and detected by system. Go to step 7.	
	No	Suspect no power to LCD. Replace function cable and retest. If issue persists go to step 5.	
5. Replace all-in-one cable and reinstall LCD. Unplug and replug the Mini DisplayPort connector into a known-good, supported, powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	LCD panel powered and detected by system. Go to step 7.	
	No	LCD panel still not detected by system. Suspect no LCD power from logic board. Go to step 6.	
6. Replace logic board and reinstall LCD. Unplug and replug the Mini DisplayPort connector into a known-good, supported, powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	LCD panel powered and detected by system. Go to step 7.	
	No	LCD panel still not detected by system with replaced function cable, all-in-one cable and logic board. Suspect LCD panel video input damage. Replace LCD panel.	L03
7. If the Blank/No Video/No Backlight issue persists, darken room and connect to a known-good supported system. Verify backlight is present by looking for faint glow from display.	Yes	LCD panel powered, detected by system and backlight is ON but there is no video on LCD. Replace LCD panel.	L03
	No	LCD panel is detected by system but no backlight. Check whether video is present on LCD. Go to step 8.	



8. Shine bright (low heat) flashlight into the front of the LCD. and verify if any image is being displayed.	Yes	Video is present, so issue is only with missing backlight. Go to step 9.	
	No	No image displayed on LCD Replace LCD panel.	L03
9. Remove glass and LCD panel screws, lift LCD panel to verify that the function cable, and LED backlight driver cable connections are secure. See Functional Overview .	Yes	If connections are OK and secure and there is still no backlight, go to step 10.	
	No	If any cable is damaged, replace affected cable and retest: - function cable - LED backlight driver cable (part of LCD panel)	X03 L09
10. Remove LCD panel. Set digital multimeter to DC and correct range, and verify that a 23.3–25.7 V DC voltage is present between logic board test point (24 V DC) and chassis ground (GND).	Yes	24 V DC power for backlight is present on logic board, but no backlight. Suspect no V-sync signal coming to logic board. Go to step 11.	
	No	No 24 V DC present for LED backlight power. Replace power supply.	P01
11. Replace function cable and retest. Verify that the no backlight issue is fixed.	Yes	Defective function cable prevented backlight from being enabled by logic board.	X03
	No	Go to step 12.	
12. Verify if the LED backlight driver cable (part of the LCD panel) has any signs of pinched or shorted wires. Also remove the logic board and verify if one or more of the three square inductors or adjacent components on top of board show signs of overheating.	Yes	LED backlight driver cable on LCD panel found damaged. Replace LCD panel, (make sure that you don't pinch the LED driver cable from LCD panel) and retest. If the no backlight issue persists after LCD panel replacement, replace logic board (LED backlight output from logic board had been damaged by shorted cable.)	L14 M25
	No	Suspect no LED backlight output from logic board: go to step 12.	
13. Replace logic board and verify that the no backlight issue is fixed.	Yes	Defective logic board LED backlight driver output.	M25
	No	Replace LCD panel.	L09



Noise / Unstable Flicker

Unlikely cause: fan, camera, speakers, subwoofer, microphone

Quick Check

Symptom	Quick Check
Noise / Unstable Flicker <ul style="list-style-type: none"> Image flickers Audible noise 	<ol style="list-style-type: none"> Verify display being used with supported system with all software updates installed. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. Use with known-good system. If used as second display, open System Preferences: Displays (or press Option-F2) and check for presence of the middle Arrangement tab to confirm that display is recognized. Verify whether the issue also happens when System Preferences: Displays: Automatic Brightness checkbox is unchecked (If issue does not happen anymore when unchecked, jump to Unstable Brightness / Brightness Progressively Getting Low). Adjust display brightness to all levels, and check for a correlation with noise/ backlight flicker issue. (Noise) Check for correlation with fan operation on center of the back surface of display (Noise) Play a sound from known-good source sound file and verify it does not cause any speaker distortion.

Deep Dive

Check	Result	Action	Code
1. Verify if noise/flickering is linked to a change of the video display or backlight level.	Yes	Suspected backlight or video related flickering issue. Go to step 2.	
	No	Noise does not appear to come from video or backlight circuitry but likely from audio or mechanical source. Go to Noise/Hum/Vibration .	



2. Verify in the System Profiler's USB device tree that display's USB hub and built-in camera are listed continuously and do not disappear intermittently (refresh System Profiler to observe).	Yes	Power supply appears OK. Go to step 3.	
	No	Go to Dead Unit/No Power.	
3. Unplug and replug Mini DisplayPort and USB connectors into a supported powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	If connections are secure and display still shows unstable noise/flickering, go to step 4.	
	No	Reseat connectors and retest.	
4. Adjust Brightness level to low and high levels (with keyboard or System Preferences: Displays) and verify that noise/flicker issue varies accordingly.	Yes	Issue is likely to be backlight-related. Go to step 8.	
	No	Go to step 5.	
5. Remove glass and LCD panel screws, lift LCD panel and verify if all connections between power supply, all-in-one cable, LCD, and logic board are secure. See Functional Overview.	Yes	If connections are secure and the display video is still unstable. Go to step 6.	
	No	Reseat connectors and retest.	
6. Disconnect all-in-one cable and LCD function cable from logic board and system. Verify connectors and cable under magnification for pinched cables and damaged/bent pins.	Yes	If any cable is damaged, replace affected cable and retest: - all-in-one cable, - function cable.	X03 X03
	No	Go to step 7.	
7. If not already replaced, replace all-in-one cable, reconnect LCD panel and verify that video noise/flicker issue is fixed.	Yes	Issue was due to the all-in-one cable failure.	
	No	Replace LCD function cable. and retest. If flickering issue persists, go to step 8.	
8. Check LED backlight driver cable and connectors and verify under magnification for pinched cable and damaged or bent pins.	Yes	Damaged LED backlight driver cable. Replace LCD panel.	L14
	No	Go to step 9.	



9. Reconnect LCD panel and verify that video noise/flicker issue is appears at all backlight levels.	Yes	LED backlight output from logic board appears defective. Replace logic board.	M25
	No	Go to step 10.	
10. Reconnect LCD panel and verify that video noise/flicker issue only appears with low backlight levels.	Yes	Backlight power from power supply appears defective. Replace Power supply board.	P04
	No	Review symptom occurrence to match with one of the last steps.	

Unstable Brightness / Brightness Progressively Getting Low

Unlikely cause: fan, camera, speakers, subwoofer, microphone

Quick Check

Symptom	Quick Check
<p>Unstable Brightness / Brightness Progressively Getting Low.</p> <ul style="list-style-type: none"> Brightness quickly or slowly varies Brightness slowly decreases to a low level over time. 	<ol style="list-style-type: none"> Verify display is used with a supported system and up-to-date system software. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. Use with known-good system. If used as second display, open Display Preferences (or press Option-F2) and adjust Brightness. Verify whether issue disappears when the System Preferences: Displays: Automatic Brightness checkbox is unchecked (If issue still happens when unchecked, jump to Noise / Unstable Flicker). Verify that issue does not depend on specific room lighting.



Deep Dive

Check	Result	Action	Code
1. Connect display to a known-good supported powered-up system with up-to-date system software. Check the Automatic Brightness Setting checkbox in System Preferences: Displays, Then cover camera with your hand and verify if brightness varies accordingly.	Yes	Ambient Light Sensor appears OK. Go to step 3.	
	No	No or Incorrect brightness variation to light change, ALS/ Camera connection need to be checked. Go to step 2.	
2. Verify in System Profiler's USB device tree that display's USB hub and built-in camera are listed.	Yes	Ambient Light Sensor (located in camera assembly) appears OK. Go to step 3.	
	No	Check and reseat camera cable connections at logic board and camera. If connections are secure Replace camera cable and retest. If issue persists, replace camera and run EEPROM Reset Tool to calibrate new camera module (see camera take-apart section).	X03 X03
3. Remove glass and LCD panel screws, lift LCD panel and verify connection of the LCD temp sensor (on back of LCD panel) is secure to LCD panel connector, and that sensor is covered with the insulating foam.	Yes	LCD temp sensor appears OK. Go to step 4.	
	No	Reseat LCD temp sensor cable, and readjust the insulating foam around sensor to protect it from internal ambient temperature. If LCD temp sensor cable is damaged, replace LCD temp sensor cable.	X03
4. Check that fan connection to logic board is secure, remove all fan screws and pivot fan so you can see blades, then reconnect display to AC power and verify that fan is operating.	Yes	Fan is connected and operating. Go to step 5	
	No	Reseat fan and retest. If fan still not running, go to Fan Failures/ Thermal Issue .	



5. Reinstall fan and LCD panel and retest. Verify that brightness level remains equal while display is warming up.	Yes	Display brightness does not seem to suffer from the brightness adjustment circuitry. Go to Noise/Unstable Flicker .	
	No	Fan connected and operating, but brightness still cannot be compensated over temperature increase. Replace LCD temp sensor cable. If issue (brightness still getting low after warmup) persists, replace LCD panel.	X03 L07

LCD Image Issues

Quick Check

Symptom	Quick Check
LCD Issues <ul style="list-style-type: none"> • Pixel anomalies • Non-uniform brightness • Incorrect/missing colors • Distorted/blurred image • Vertical/horizontal lines • Display appears washed or with dominant color tint 	<ol style="list-style-type: none"> 1. Verify display being used with supported system with LED Cinema Display software installed. 2. If used as second display, check display preferences to see if the display's native resolution is correctly recognized by system. 3. Verify USB/Mini DisplayPort/MagSafe connectors are fully seated. 4. Check System Preferences: Displays: Color for the selection of an incorrect custom display profile. 5. Check brightness setting. 6. In System Preferences: Displays, uncheck setting "Automatically adjust brightness as ambient light changes" 7. Clean glass panel while checking for dust/debris.

Deep Dive: General

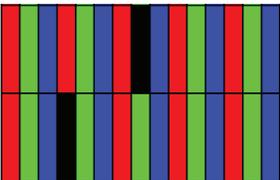
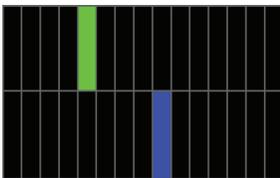
Check	Result	Action	Code
1. Verify if issue is blank/no video.	Yes	Go to blank/no video, no backlight .	
	No	Go to step 2.	



2. Verify if issue is bright or dark dot pixel anomalies.	Yes	Go to pixel anomalies.	
	No	Go to step 3.	
3. Verify if issue is non-uniform brightness.	Yes	Go to non-uniform brightness.	
	No	Go to step 4.	
4. Verify if issue is incorrect/missing colors.	Yes	Go to incorrect/missing colors.	
	No	Go to step 5.	
5. Verify if issue is distorted/blurred image.	Yes	Go to distorted/blurred image.	
	No	Go to step 6.	
6. Verify if issue is vertical or horizontal lines.	Yes	Go to vertical/horizontal lines.	
	No	Go to step 7.	
7. Verify if issue is overall display appearing washed or tinted.	Yes	Go to washed or predominant color tint.	
	No	LCD functioning OK.	

Deep Dive: Pixel Anomalies

Unlikely cause: logic board, power supply, fan, camera, speakers, subwoofer, microphone



Check	Result	Action	Code
1. Determine if “defects” are dust/debris on surface of glass panel or LCD panel.	Yes	Clean glass/LCD panel. Note: If debris is inside LCD, it can't be cleaned, therefore replace LCD panel.	L08
	No	Go to step 2.	
2. Determine if bright pixel defects exceed acceptable number. See kBase #HT1721: About LCD display pixel anomalies	Yes	Replace LCD panel.	L08
	No	LCD meets bright pixel defect specifications. Go to step 3.	
3. Determine if dark pixel defects exceed acceptable number. See kBase #HT1721: About LCD display pixel anomalies	Yes	Replace LCD panel.	L08
	No	LCD meets dark pixel defect specifications. Go to step 3.	
4. Determine if combination of bright/dark pixel defects exceed acceptable number. See kBase #HT1721: About LCD display pixel anomalies	Yes	Replace LCD panel.	L08
	No	Explain to user that LCD is within specifications for pixel defects. Do not replace LCD.	



Deep Dive: Non-Uniform Brightness

Unlikely cause: logic board, power supply, fan, camera, speakers, subwoofer, microphone



Check	Result	Action	Code
1. Determine if brightness uniformity issue is visible after display has warmed up for a few minutes.	Yes	Go to step 2.	
	No	Display backlight can take a few minutes to stabilize.	
2. Display user-provided examples showing brightness uniformity issue. Determine if issue appears excessive when compared to a similar unit.	Yes	Go to step 3.	
	No	Explain to user that LCD appears to meet specifications.	
3. Remove front bezel and loosen screws securing LCD. Determine if brightness uniformity improves.	Yes	Inspect for mechanical interference with screws/chassis/wires making contact with back of LCD. Retest	
	No	Replace LCD panel.	L07

Deep Dive: Incorrect/Missing Colors

Unlikely cause: power supply, fan, camera, speakers, subwoofer, microphone

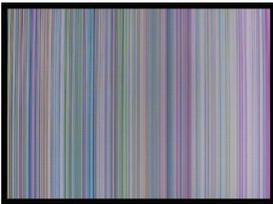
Check	Result	Action	Code
1. Verify display's USB hub and built-in camera are listed in the System Profiler's USB device tree.	Yes	Power supply and USB communication OK. Go to step 2.	
	No	Go to USB Issues .	
2. Verify System Preferences: Displays: Color is using a valid display profile for this display.	Yes	If display profile is valid and the colors are still incorrect or missing, go to step 3.	
	No	Calibrate display by creating a manual profile using calibrate feature in System Preferences: Displays: Color and retest.	
3. Verify that the glass panel and LCD are free of contaminants. Also verify that LCD glass is flush with rear housing.	Yes	Go to step 4.	
	No	Clean glass/LCD panel and retest. Make sure that glass is correctly reinstalled onto enclosure to prevent any air / dust passage.	



4. Remove glass and LCD panel screws, lift LCD panel and verify that all connections between, all-in-one cable, LCD, and logic board are secure. See Functional Overview .	Yes	Go to step 5.	
	No	Reseat connections, replace damaged cable(s) as needed. Retest.	
5. Set desktop pattern in System Preferences to "solid gray light." Verify if incorrect/missing color issue affects entire display.	Yes	Suspect poor video connection. Replace all-in-one cable.	L14
	No	Go to step 6.	
6. Set up user's display side-by-side with a known-good display showing the same image. Verify if issue is noticeably worse on the display being tested.	Yes	Replace LCD panel.	L02
	No	Small variations in color uniformity are normal and do not warrant replacement or repair of the display.	

Deep Dive: Distorted/Blurred Image

Unlikely cause: power supply, fan, camera, speakers, subwoofer, microphone



Check	Result	Action	Code
1. Verify display's Mini DisplayPort connector is plugged into known-good system.	Yes	Go to step 2.	
	No	Connect Mini DisplayPort cable to known-good system.	
2. Reseat Mini DisplayPort cable at attached computer and reseat internal all-in-one cable's DisplayPort connector to LCD panel. Determine if image corruption issue was resolved.	Yes	Loose cable. Issue resolved.	
	No	Go to step 3.	
3. Disconnect Mini DisplayPort cable from system and display logic board. Inspect connectors and cable under magnification for pinched cables and damaged/bent pins.	Yes	Replace all-in-one cable.	X03
	No	Replace LCD panel.	L04



Deep Dive: Vertical/Horizontal Lines

Unlikely cause: logic board, power supply, fan, camera, speakers, subwoofer, microphone



Check	Result	Action	Code
1. Verify display's USB hub and built-in camera are listed in the System Profiler's USB device tree.	Yes	Power supply and USB communication appear OK. Go to step 3.	
	No	Go to step 2.	
2. Unplug and replug the Mini DisplayPort connector into a supported powered-up portable system and monitor the portable's display. Verify that the portable's display briefly turns off then back on.	Yes	LCD panel DisplayPort connection detected by system. Go to step 3.	
	No	Replace all-in-one cable. If issue persists, go to step 3.	X03
3. Verify all-in-one cable, and all connections between logic board and LCD are secure. Visually inspect cables and connectors for any debris, damage, or bent pins.	Yes	If connections are secure and the display still does not function correctly, replace LCD panel.	L05
	No	Connector/cable damage. Go to Mechanical Physical Damages .	

Deep Dive: Washed or Predominant Color Tint

Unlikely cause: logic board, power supply, fan, camera, speakers, subwoofer, microphone



Check	Result	Action	Code
1. In System Preferences: Displays set brightness slider setting to maximum, and verify that issue is fixed.	Yes	Issue caused by low brightness adjustment for current room light.	
	No	Go to step 2.	
2. In System Preferences: Displays uncheck the "Automatically adjust brightness as ambient light changes" checkbox, and verify that issue is fixed.	Yes	Go to Unstable Brightness / Brightness Progressively Getting Low	
	No	Go to step 3.	
3. In System Preferences: Displays: Color select the LED Cinema Display profile and verify that issue is fixed.	Yes	Issue was caused by use of incorrect display profile. Delete incorrect profile and recreate a new one if needed.	
	No	Replace LCD panel.	L05



Physical Damage

Quick Check

Symptom	Quick Check
Physical Damage <ul style="list-style-type: none"> Cracked LCD Scratched LCD polarizer Scorched or melted LCD Impact damage to LCD, glass or rear housing 	<ol style="list-style-type: none"> Determine damage caused by user/technician environment, accidental damage, or abuse. Inform user/technician the failures are not covered by Apple warranties. Refer to http://www.apple.com/legal/warranty

Uncategorized Symptoms

Deep Dive

Check	Result	Action	Code
1. Verify whether existing symptom code applies to the issue reported by the user.	Yes	Jump to appropriate symptom code flow.	
	No	Document reported failure and send feedback to smfeedback6@apple.com stating that a suitable symptom code wasn't found.	L99



Input/Output Issues

USB Issues

Unlikely cause: LCD panel, fan, camera, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
USB Issues <ul style="list-style-type: none"> External USB device(s) not recognized Wired USB keyboard/mouse not recognized No audio output through display speakers (when using USB audio) 	<ol style="list-style-type: none"> 1. Check USB device on a known-good system. 1. Verify display's USB and Mini DisplayPort connectors are plugged into known-good powered-up supported system with up-to-date system software. 2. Run Software Update to check for any available software or firmware update for the connected display. Connect known-good USB input device. 3. Launch System Profiler and confirm that display's USB hub, Apple LED Cinema Display, Display's Audio and iSight are visible in USB devices list. 4. Launch System Preferences: Sound: Output and check that the display's speakers output can be selected and that sound can be played through them.

Deep Dive

Check	Result	Action	Code
1. Connect AC power cord to display then connect MagSafe to a known-good portable system and verify that the MagSafe connector LED is either green or orange/amber.	Yes	Go to step 2.	
	No	Display does not seem to be powered. Go to Dead Unit/ No Power .	
2. Connect display's USB connectors into known-good powered-up portable system, launch System Profiler and verify that display's USB hub, Apple LED Cinema Display, Display's Audio and iSight are visible in the USB devices list.	Yes	Go to step 5.	
	No	Need to check internal USB uplink cable connection. Go to step 3.	



3. Remove glass and LCD panel and verify USB uplink cable connection to logic board is secure. See Functional Overview .	Yes	If connections are secure and USB ports still do not function correctly, go to step 4.	
	No	Reseat connector and retest.	
4. Disconnect USB cable from logic board and from attached computer. Inspect connectors and cable under magnification for pinched cables and damaged/bent pins.	Yes	Replace all-in-one cable.	X03
	No	Go to step 5	
5. Inspect all three USB ports on display under magnification for damaged/bent pins.	Yes	USB ports damaged. Go to step 7.	
	No	Need to check that USB peripheral works on known-good display. Go to step 6.	
6. Verify that USB device works with another known-good display	Yes	Device OK with other display. Go to step 7.	
	No	Refer to device manufacturer for compatibility support.	
7. Verify that USB device only fails on this display USB ports.	Yes	Replace logic board.	M15
	No	Refer to device manufacturer for compatibility support.	



Camera Issues

Unlikely cause: LCD panel, power supply, fan, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
Camera Issues <ul style="list-style-type: none"> • Camera not detected • No green LED for camera • Excessive blooming • Poor white balance • Poor focus • Image distortion 	<ol style="list-style-type: none"> 1. Verify display's USB and Mini DisplayPort connectors are plugged into known-good powered-up supported system with up-to-date system software. 2. Run Software Update to check for any available software or firmware update for the display. 3. Launch System Profiler and confirm that display's USB hub, Apple LED Cinema Display, Display's Audio and iSight are visible in USB devices list. 4. Verify camera lens and glass panel are clear of contaminants.

Deep Dive

Check	Result	Action	Code
1. Connect display's USB connectors into known-good powered-up portable system, launch System Profiler and verify that the display's USB hub is visible in the USB tree.	Yes	USB hub recognized. Go to step 2.	
	No	Go to USB Issues .	
2. Verify in System Profiler that iSight camera is recognized in display's USB tree.	Yes	Go to step 3.	
	No	Remove glass and LCD panel, reseal camera cable and retest. If problem persists, replace camera cable.	X03
3. Launch Photo Booth. Verify that green LED near camera lens turns on.	Yes	Go to step 4.	
	No	Replace camera, run EEPROM Reset Tool (see camera take-apart section for details) and retest.	M13
4. Launch Photo Booth. Verify that camera image appears normal.	Yes	Repair completed.	
	No	Clean camera lens. If needed, replace camera, run EEPROM Reset Tool , and retest.	M13



Audio Issues

Unlikely cause: power supply, fan, camera

Quick Check

Symptoms	Quick Check
<p>Audio Issues</p> <ul style="list-style-type: none"> Internal speakers not recognized (through USB audio or Mini DisplayPort connections) No sound Garbled sound No bass No treble Sound seems to come from only one side Microphone not working 	<ol style="list-style-type: none"> Connect display to a known-good supported powered-up system with up-to-date system software. For audio through Mini DisplayPort, check that system model supplies an audio signal through Mini DisplayPort (see kBase #TS3065: Mac computers: HDMI audio doesn't work with some adapters for list of system models) Run Software Update to check for any available software or firmware update for the display. Launch System Profiler and confirm that display's USB hub, Apple LED Cinema Display, Display's Audio and iSight are visible in USB devices list. Launch System Preferences: Sound: Output and verify that Display's audio output is selected. Verify that Output volume 'mute' option is not checked, and Output volume is set above minimum (suggest setting at midpoint). Verify that System Preferences: Sound: Input is set to Display's Audio, and adjust Input Volume slider according to room noise.

Deep Dive: Audio Issues, General

Check	Result	Action	Code
1. Connect display AC power cord and connect MagSafe, USB and Mini DisplayPort cables into known-good supported powered-up system with up-to-date system software. Launch System Profiler and confirm that display's USB hub is visible.	Yes	USB hub circuit OK. Go to step 2.	
	No	Go to USB Issues .	
2. Determine if user-reported issue is with display's internal microphone.	Yes	Go to Audio Issues: Microphone .	
	No	Issue only with speakers. Go to step 3.	



3. Verify that issue only happens when playing audio through the DisplayPort audio.	Yes	Verify that system model supplies an audio signal through Mini DisplayPort (see kBase #TS3065: Mac computers: HDMI audio doesn't work with some adapters for list of models which support it): -If the system supports audio through DisplayPort, go to step 8 for specific troubleshooting. -If computer does not support audio through DisplayPort, make sure that USB is connected to system. If you need to troubleshoot a USB Audio issue, go to step 4.	
	No	Issue happens with USB audio. Go to step 4.	
4. (USB Audio) Make sure that USB is connected to supported powered-up portable system. Launch System Preferences: Sound: Output. Verify Output option is set to Display's Audio speakers.	Yes	Go to step 5.	
	No	Set Output to Display Audio speakers and retest.	
5. Launch System Preferences and select Sound options. Play a known-good sound while adjusting Balance control and verify that sounds play normally from both left and right speakers.	Yes	Speakers and amplifier circuit appear OK. Go to step 6.	
	No	Reseat left, right, and subwoofer speaker cable connections on logic board while inspecting cables for damage. If any cable is damaged, replace affected left, right or subwoofer speaker and retest. If audio issue is not resolved, go to step 5.	X03
6. Play a known-good sound and verify sound quality is good on each side when Balance control is set to 'left only' and 'right only' speakers.	Yes	Speakers and amplifier circuit appear OK. Go to step 7.	
	No	Based on results of test, replace left or right speaker or replace subwoofer. Retest. If not resolved, go to step 7.	X03



7. Play a known-good sound and verify sound quality is good.	Yes	Speakers and amplifier circuit are OK.	
	No	Replace logic board.	M09
8. (DisplayPort Audio) Disconnect USB, and connect Mini DisplayPort cable to a powered-up portable system supporting Audio via DisplayPort, and verify that video is available on display.	Yes	Go to step 9.	
	No	No Mini DisplayPort connection. Go to Blank / No Video, No Backlight.	
9. (DisplayPort Audio) Launch System Preferences: Sound: Output and verify that Display's Audio Output is available and selected.	Yes	Go to step 10.	
	No	Remove glass, LCD panel screws, and lift LCD panel to verify that function cable is correctly seated between LCD panel and logic board. Reseat it and retest. Replace function cable if damaged and retest. If issue persists, go to step 10.	X03
10. (DisplayPort Audio) Play a known-good sound while adjusting Balance control and verify that sounds play normally from left and right speakers.	Yes	Audio through DisplayPort appears to be functional. Go to step 4 for further USB Audio and speakers testing.	
	No	No or bad audio through DisplayPort, replace logic board and retest. If audio issue only persists through the Mini DisplayPort connection (but is OK when using the USB connection), replace LCD panel.	M09 L11

Deep Dive: Audio Issues, Microphone

Check	Result	Action	Code
1. Verify display's USB connector is plugged into known-good powered-up supported system.	Yes	Go to step 2.	
	No	Connect display's USB connector to system. Go to step 2.	
2. Launch System Profiler and verify that display's USB hub, Apple LED Cinema Display, Display's Audio and iSight are visible in USB devices list.	Yes	USB hub circuit OK. Go to step 3.	
	No	Go to USB Issues.	



3. Determine if user-reported issue is with display's internal speakers.	Yes	Go to Audio Issues: General.	
	No	Go to step 4.	
4. Launch System Preferences: Sound: Input and verify that Display's Audio input (internal Microphone) is selected.	Yes	Go to step 5.	
	No	Select display's internal Microphone and retest.	
5. Launch System Preferences : Sound: Input and verify that Input Volume is set above minimum.	Yes	Go to step 6.	
	No	Adjust Input Volume slider to the middle position. Retest.	
6. Launch System Preferences : Sound: Input and verify that Input Level indicator moves when speaking into the microphone.	Yes	Microphone working. Go to step 7.	
	No	No input from display's microphone. Go to step 8.	
7. Record sound sample using GarageBand or QuickTime Player (New Audio record in File menu). Verify sound quality is normal during playback on any working audio outputs.	Yes	Microphone OK.	
	No	Replace microphone cable by replacing rear housing.	X03
8. Remove glass and LCD panel, and verify if microphone cable is correctly seated on logic board.	Yes	Replace microphone cable by replacing rear housing and retest. If issue persists, replace logic board.	X03 M09
	No	Reseat microphone connector on logic board and retest.	

Uncategorized Symptoms

Deep Dive

Check	Result	Action	Code
1. Verify whether existing symptom code applies to the issue reported by the user.	Yes	Jump to appropriate symptom code flow.	
	No	Document reported failure and send feedback to smfeedback6@apple.com stating that a suitable symptom code wasn't found.	N99



Mechanical Issues

Noise / Hum / Vibration

Unlikely cause: LCD panel, logic board, all-in-one cable, camera

Quick Check

Symptoms	Quick Check
Noise / Hum / Vibration <ul style="list-style-type: none"> Buzzing noise Rattling noise Ticking noise Squeaking noise 	<ol style="list-style-type: none"> Verify display's USB and Mini DisplayPort connectors are plugged into known-good supported system with up-to-date system software. Tilt display to hinge limits to determine if mechanical noise is generated by the hinge mechanism. Repair/replace mechanism if needed. Play sound sample at loud and soft volume levels to determine if noise is caused by the left/right/subwoofer speakers or the amplifier circuit. See Audio Issues. Verify that air intake/outflow vents are not obstructed, inducing a high fan speed.

Deep Dive

Check	Result	Action	Code
<ol style="list-style-type: none"> Disconnect AC power cord, remove glass and LCD panel, disconnect left, right, and subwoofer speaker cables from logic board. Then reconnect MagSafe, DisplayPort and USB cables to a powered-on computer. Verify if noise has disappeared. 	Yes	Audio issue with speakers or amplifier. Go to Audio Issues .	
	No	Go to step 2.	
<ol style="list-style-type: none"> Verify that ambient air temp sensor is correctly positioned on fan and securely connected to logic board, and that LCD temp sensor is securely connected to its connector on back of LCD panel, and properly protected by insulating foam. 	Yes	Go to step 4	
	No	Reseat sensors connectors / readjust sensor position/ foam protection and retest.	



3. Determine if noise issue sounds like fan is running unusually fast.	Yes	Replace ambient temp sensor cable.	X03
	No	Go to step 4.	
4. Remove fan and inspect blades for damage or obstructions.	Yes	Replace fan.	X23
	No	Go to step 5.	
5. Remove fan and rotate blades. Verify that fan blades spin smoothly without interference from fan housing.	Yes	Go to step 6.	
	No	Replace fan. Retest.	X23
6. Reinstall fan while carefully ensuring that there are no cables routed under or near fan assembly that might cause interference with the fan blades. After reassembling verify that noise is resolved.	Yes	Noise issue resolved.	
	No	Replace fan. Reconnect all cables, reinstall LCD panel and retest.	X23

Burnt Smell / Odor

Unlikely cause: LCD panel, fan, camera, speakers, subwoofer, microphone

Quick Check

Symptoms	Quick Check
Burnt Smell/Odor <ul style="list-style-type: none"> No power No image No fan spin 	<ol style="list-style-type: none"> Verify if source of smell/odor is emanating from the LED Cinema Display (27-inch). Verify display is functional. Remove any air vent obstructions.

Deep Dive

Check	Result	Action	Code
1. Verify by visual inspection of each module for the source of burnt smell/odor.	Yes	Located affected module. Go to step 2.	
	No	Not able to locate affected module. Go to Dead Unit / No Power.	
2. Verify no other modules or internal cables damages (pinched, shorting wires) as the root cause.	Yes	Replace all affected module(s) and/or cable(s).	P08
	No	Return unit to user.	



Fan Failures / Thermal Issues

Quick Check

Symptoms	Quick Check
Fan Failures / Thermal Issues <ul style="list-style-type: none"> Washed out image No, slow, fast fan spin Excessive heat exhaust Eventual shutdown of display 	<ol style="list-style-type: none"> Remove air vent obstructions. Verify display is functional. Ensure the display on a stable work surface that allows for adequate air circulation under and around the unit.

Deep Dive

Check	Result	Action	Code
1. Verify ambient temp sensor is correctly positioned on fan and connected to logic board, that LCD temp sensor is securely connected to its connector on back of LCD panel, and properly protected by insulating foam.	Yes	Go to step 2.	
	No	Reseat sensors connectors and/or readjust sensor position and retest.	
2. Verify pressure wall section attached to fan is securely seated to the rear housing.	Yes	Go to step 3.	
	No	Secure pressure wall and check for presence of air separation foam on back of LCD panel. Retest.	
3. Determine if fan is running abnormally fast, slow, or stopped.	Yes	Go to step 4.	
	No	Go to step 5.	
4. Remove fan and rotate blades. Verify that fan blades spin smoothly without interference with housing.	Yes	Go to step 5.	
	No	Replace fan.	X22
5. Verify fan cable is securely connected to logic board.	Yes	Go to step 6.	
	No	Reseat fan cable connector and retest.	
6. Disconnect any portable computer connected via MagSafe, unplug AC power cord for a few minutes and then replug to verify if fan starts at full speed as soon as AC is plugged.	Yes	Replace fan and retest. If issue persists, replace logic board.	X22 M18
	No	Fan speed managed as expected. Return unit to user.	



Mechanical Physical Damages

Quick Check

Symptoms	Quick Check
Mechanical Physical Damages <ul style="list-style-type: none"> • Broken glass • Bent stand • Broken hinge • Stripped screw/head/boss • Dent or scratch to exterior • Damaged cable/connector 	<ol style="list-style-type: none"> 1. Determine damage caused by user/technician environment, accidental damage, or abuse. 2. Inform user/technician the damage is not covered by Apple warranties. Refer to http://www.apple.com/legal/warranty

Deep Dive

Check	Result	Action	Code
1. Determine whether fault has already been isolated to a single damaged part.	Yes	Go to step 2	
	No	Jump to appropriate symptom code flow most closely related to the user's reported symptom(s).	
2. Determine whether damage was caused by abuse.	Yes	Replace affected part. Abuse is not covered by warranty.	M24
	No	Replace affected part.	M24

Uncategorized Symptoms

Deep Dive

Check	Result	Action	Code
1. Verify whether existing symptom code applies to the issue reported by the user.	Yes	Jump to appropriate symptom code flow.	
	No	Document reported failure and send feedback to smfeedback6@apple.com stating that a suitable symptom code wasn't found.	X99

Take Apart

LED Cinema Display (27-inch)



General Information

Opening the Unit

- The LED Cinema Display (27-inch) has a glass panel that attaches to the front, which must be removed prior to replacing any module on the unit.
- **Important:** The glass panel should only be removed by Apple-authorized technicians. Follow all cleaning and handling instructions to prevent damaging glass panel or LCD panel.
- Follow ESD precautions when glass panel is removed.

For more information about ESD, refer to:

[kBase #HT3451: Electrostatic Discharge Precautions and Myths](#)
[AppleCare Service Training: ESD Precautions](#)

Required Tools

The following tools are required to service an LED Cinema Display (27-inch):

- ESD-safe workstation, including an ESD mat and wrist or heel strap
- ESD bags (for storing ESD-sensitive parts while removed from unit)
- Magnetized Torx T10 screwdriver
- Magnetized Phillips #0 screwdriver
- Black stick (nylon probe, Apple part #922-5065) or other non-conductive nylon or plastic flat-blade tool
- Access card (Apple part #922-7172)
- Clutch mechanism retrieval tool (Apple part #922-7849)
- Thermal paste syringe (Apple part #922-9625) for camera
- Kapton tape
- Digital volt meter (for troubleshooting)
- Soft, clean towel or cloth (to protect display and removed parts from scratches)

For more information about tools, refer to:

[kBase #HT3452: Hand Tools for Desktop and Portable Repairs](#)

Required Special Tools for Glass Panel

Special tools are required to remove, handle and clean glass panel.

- 922-8252 – Suction cups, Pkg of 2
- 922-8253 – Gloves, lint-free, anti-static, Pkg of 2
- 922-8261 – Sticky silicone roller (6-inch) to clean glass panel
- 922-8262 – Sticky sheet pads to clean silicone roller
- 922-8263 – Polishing cloths, anti-static, optical-grade micro-terry, Pkg of 5
- 922-9275 – Microfoam bag (large) to store glass panel, Pkg of 5



Cleaning Tools Starter Kit

The following tools are offered in the cleaning starter kit (076-1277):

- Suction cups, 1 pair
- Gloves, lint-free, anti-static, 2 pairs
- Sticky silicone roller (6-inch) to clean glass panel
- Sticky sheets to clean the silicone roller, 2 pads
- Polishing cloths, clean, anti-static, optical-grade micro-fiber “terry” style, 5 cloths
- Microfoam bag to store glass panel, 5 bags
- ESD bag for LCD panel storage, 5 bags

Cleaning & Handling Glass Panel

Follow cleaning procedures in this manual to ensure glass panel is free of dust and other particles before returning the computer to customer.

- The glass panel is not tempered and will break into sharp pieces if mishandled. A scratched or broken glass panel is not covered under warranty.
- Removing glass panel requires special tools such as lint-free gloves, rubber suction cups, microfoam storage bags, and iKlear cleaning solution.
- To prevent contamination, wear lint-free gloves and handle glass only by edges.

Do's and Don'ts

DO

- Handle glass panel using lint-free gloves.
- Use only a sticky silicone roller to clean the inside surface of glass and LCD panel.
- Use iKlear ONLY on the outside surface of glass panel.
- Place glass panel into a clean protective microfoam bag when removed from unit.
- Store glass panel in a safe area where it will not be broken or damaged.
- Store LCD panel in an anti-static bag to prevent buildup of static charges which may attract dust particles to display's surface.
- Store silicone roller and sticky paper within a temperature range of 39-104 F (5-40 C).
- If silicone roller is no longer tacky, wash it in warm soapy water or wipe with isopropyl alcohol. If tackiness does not return, replace silicone roller.

DON'T

- Touch inside of glass with bare hands or dirty gloves. Fingerprints are difficult to remove.
- Place glass panel onto a work surface where it may collect dust and other contaminants unless it has first been placed into a protective microfoam bag.

Handling a Broken Glass Panel

The glass panel is not tempered and will break into sharp pieces if mishandled. If the glass is broken it must be carefully removed from the unit to prevent irreparable damage to the front surface of the LCD. If the front surface of the LCD is scratched by broken glass, the LCD may need to be replaced.



How to Remove a Broken Glass Panel

A shattered panel can be removed using safety glasses, packing tape, and leather gloves.

1. Put on the safety glasses and leather gloves.
2. Lay the computer on a smooth, clean work surface.



3. Peel protective covering off the front of the glass. Remove and discard any large pieces of broken glass.





4. Apply a strip of packing tape horizontally across the top and bottom of the glass panel. Next, apply the tape diagonally, across the broken glass panel, forming an "X."



5. Continue applying tape horizontally, thoroughly covering the broken glass. Most of the glass will still be attached to the steel ring that runs around the perimeter of the glass panel.

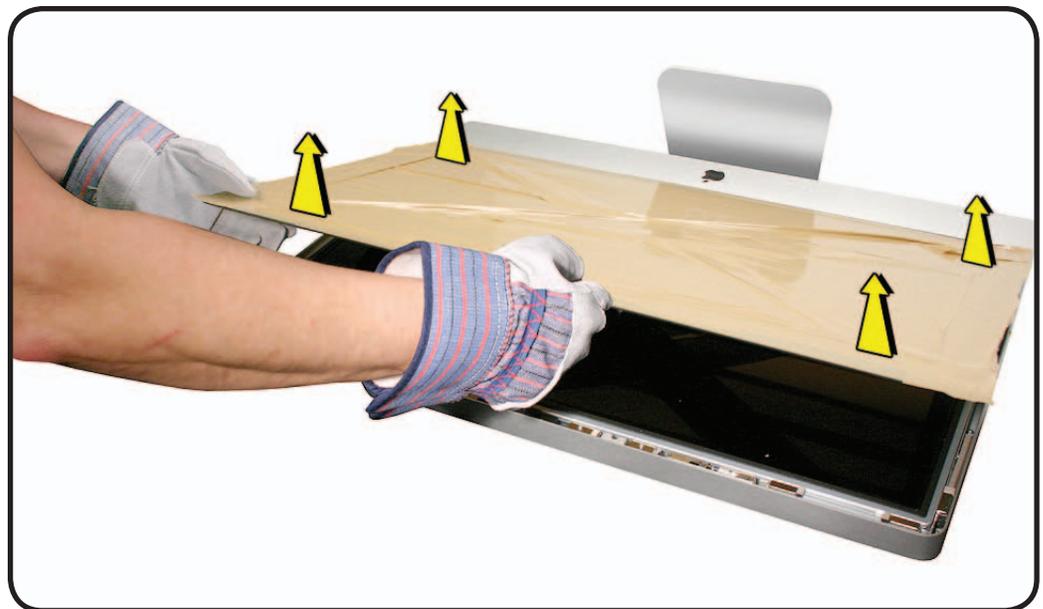




6. Use a black stick to pry the glass panel off the magnets on the rear housing.



7. Lift the entire glass panel off the rear housing.





8. Place the broken glass inside a large box, label the box, and dispose of it properly.



9. Using a whisk broom, clean the work surface of tiny glass particles.
10. Stand the iMac up and use a lint free cloth to carefully brush any of the particles off the iMac onto the table. Clean the work surface again.
11. When the repair is finished the cloth should be disposed of immediately.
12. Use a broom and dustpan to sweep up as much of the broken glass as possible. Glass fragments may have traveled several feet from the location of the glass panel, so be sure to thoroughly clean the entire area. Use a vacuum to remove the smaller fragments not picked up by the broom.

Note: A broken glass panel may leave one or more scratches on the LCD display depending on the severity of the glass breakage. As long as the LCD itself has not been fractured the LCD does not require replacement, but be sure to let the customer know that the scratches are there and were caused by the broken glass panel.



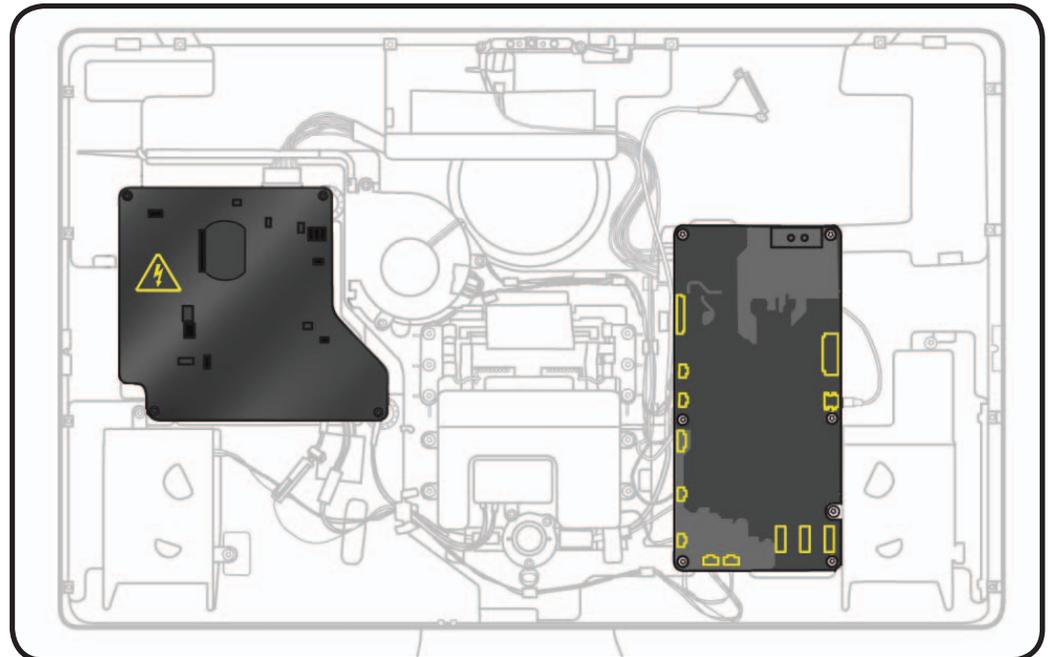
Safety



Warning: HIGH VOLTAGE: The AC/DC power supply board and logic board remain powered up whenever the system is plugged in. Use extreme caution when troubleshooting system with glass panel and LCD panel removed.

- Don't work alone. In the event of electrical shock it is important to have another individual present who can provide assistance.
- Keep one hand in your pocket when working on any unit that is plugged in. This will help ensure that your body does not provide a path to ground in the event that you accidentally make contact with line voltage.
- Don't wear jewelry, watches, necklaces, or other metallic articles that could present a risk if they accidentally make contact with power supply circuitry.

Use extreme caution when working around the power supply. The power supply contains a high voltage capacitor that may remain charged for several minutes even when unit is unplugged. Never touch leads on top side of power supply, especially near warning sign.



Reassembly Steps

When no replacement steps are listed, replace parts in exact reverse order of Removal procedure.

Note About Images in This Guide

Because a pre-production model was used for most images in this guide, you may notice small differences in appearance between the image pictured and the unit you are servicing. However, although appearance may differ, steps and sequence are the same unless noted.

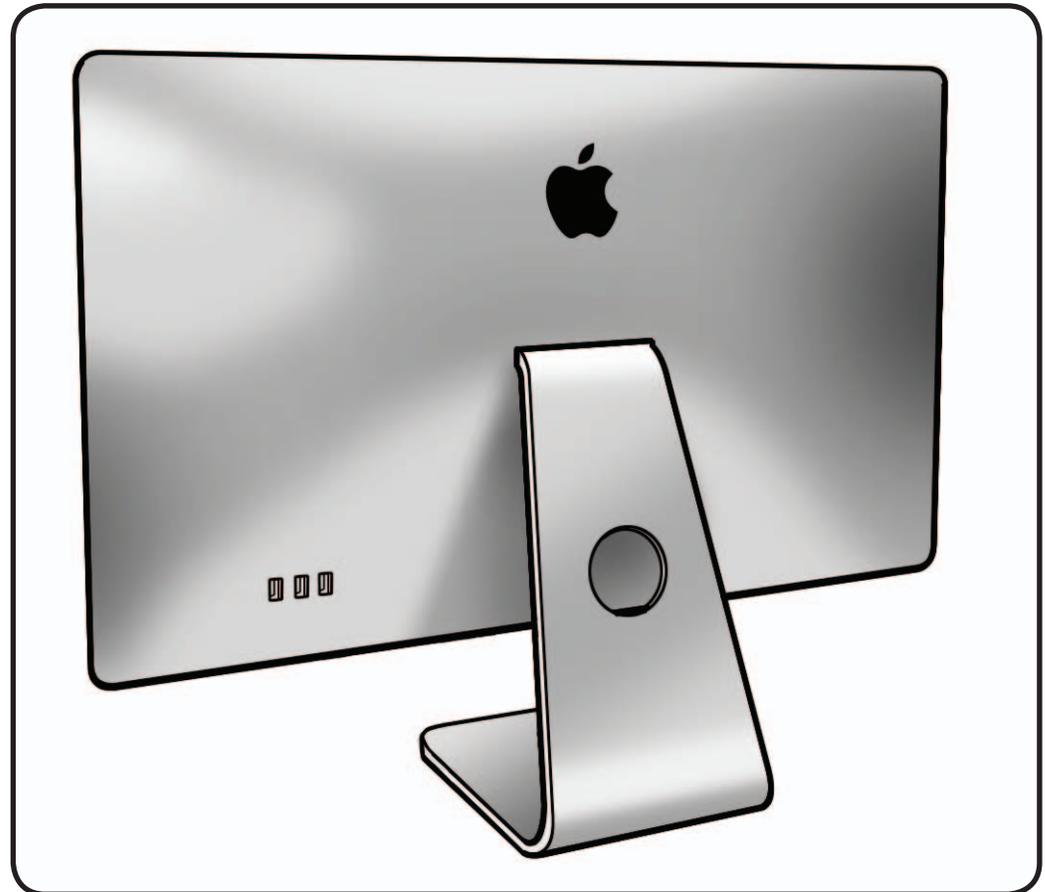


Stand

First Steps

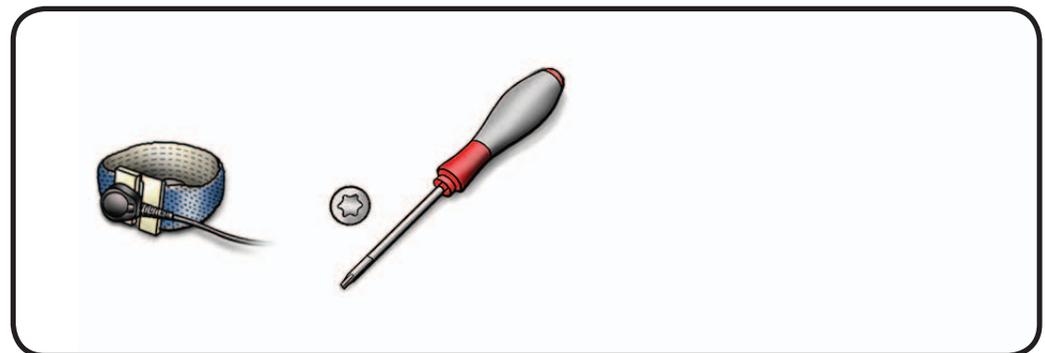
No preliminary steps are required to remove the stand.

Note: The stand screws cannot be removed from inside the rear housing.



Tools

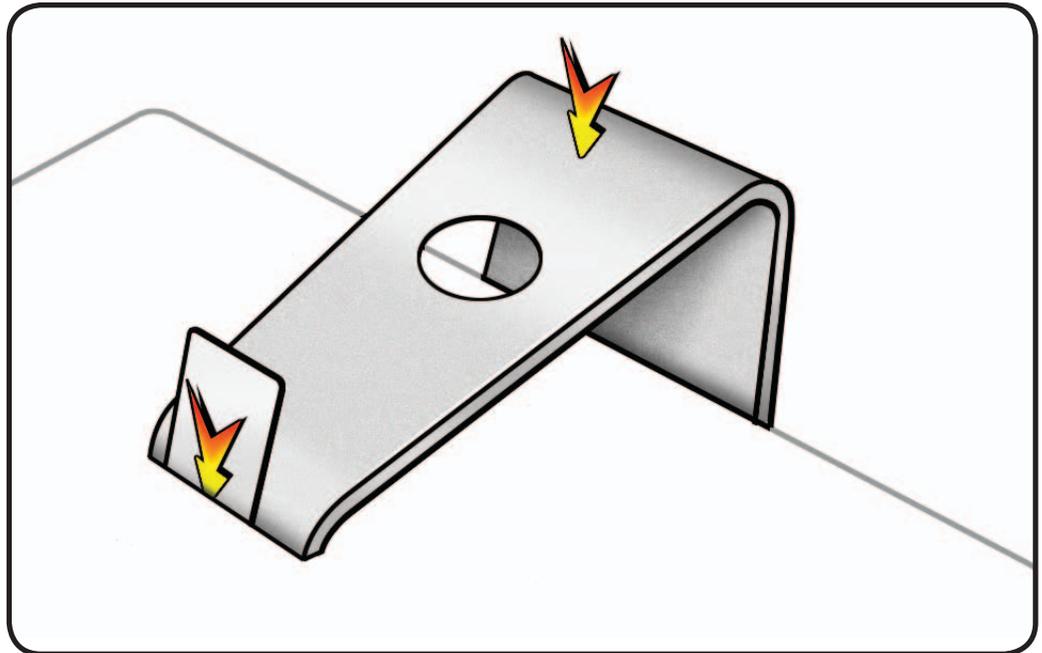
- ESD wrist strap
- Torx T10 screwdriver
- Access card
(Apple part #922-7172)



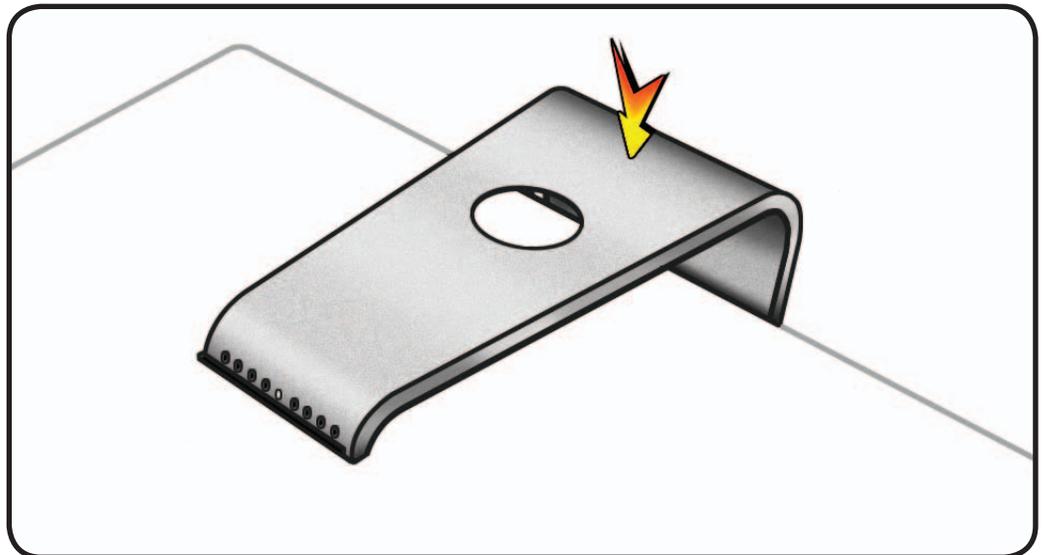


Removal

- 1** Place unit face down on a table so that base of stand extends over table edge.
- 2** Press stand down and insert access card into slot between top of stand and rear housing.



- 3** Insert card as far as it will go, and press stand down until you hear a click—the audible cue that tells you that stand is locked into place.
- 4** Remove access card.

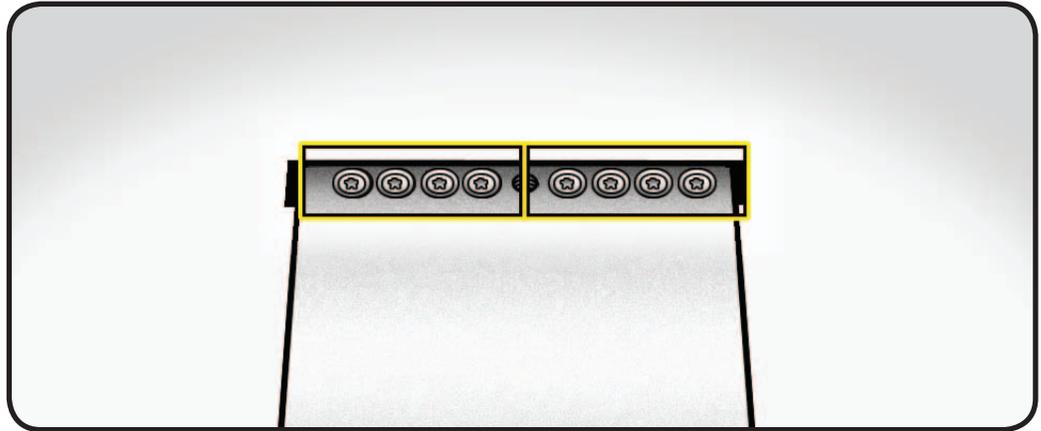




- 5** Remove T10 screws:
(8) 922-8749



- 6** Separate stand from
clutch mechanism.



Reassembly

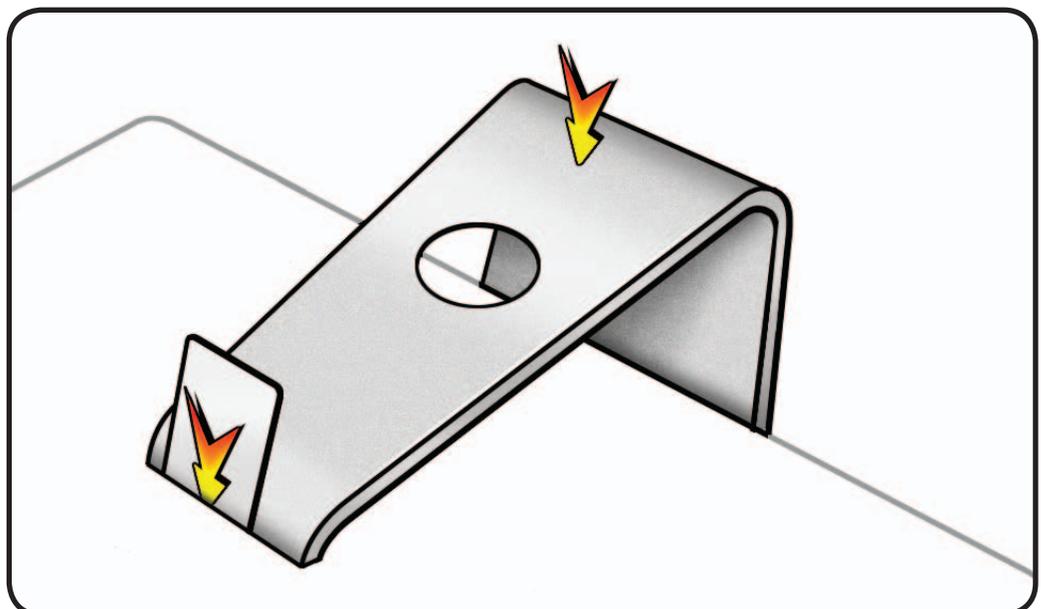
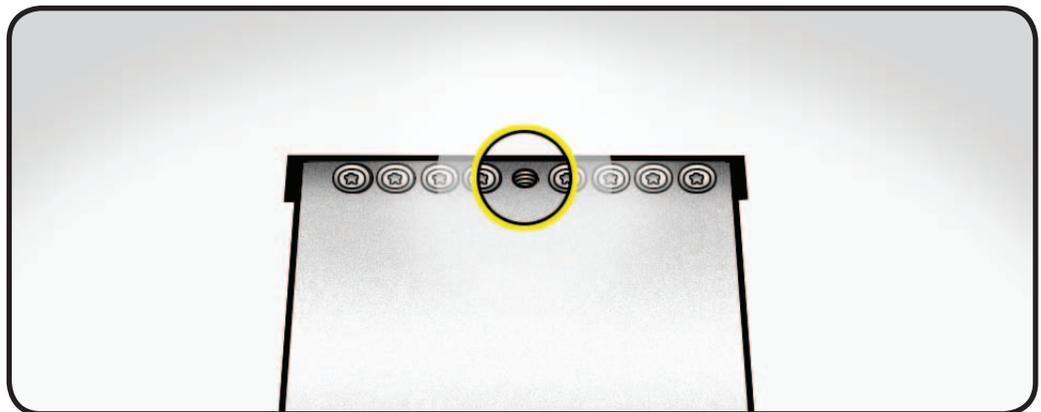
- 1** Place unit face down
on a table. Align pin
on mechanism to
central hole in stand.

- 2** Replace 8 T10 screws.

- 3** Place unit so that
base of stand extends
over table edge. Press
stand down and
insert access card into
slot between top
of stand and rear
housing.

- 4** Insert access card
as far as it will go.
Gently lift stand
approximately two
inches to unlock
mechanism, and then
remove access card.
Mechanism should
now be unlocked.

- 5** Stand unit upright.





Glass Panel

First Steps

- Unplug all cables and the power cord.
- Put on ESD strap.

Caution: The glass panel is not tempered and will break into sharp pieces if mishandled. A scratched or broken glass panel is not covered by warranty.

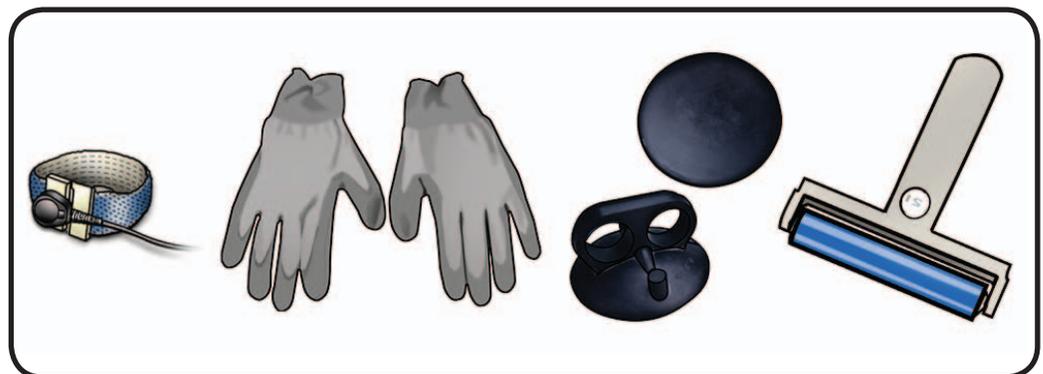
Important:

This procedure requires special tools, which are offered individually or as part of a cleaning kit. See General Take Apart section for more information.



Tools

- ESD wrist strap
- lint-free gloves
- suction cups
- sticky silicone roller
- sticky sheets to clean the silicone roller
- microfoam bag to store glass panel



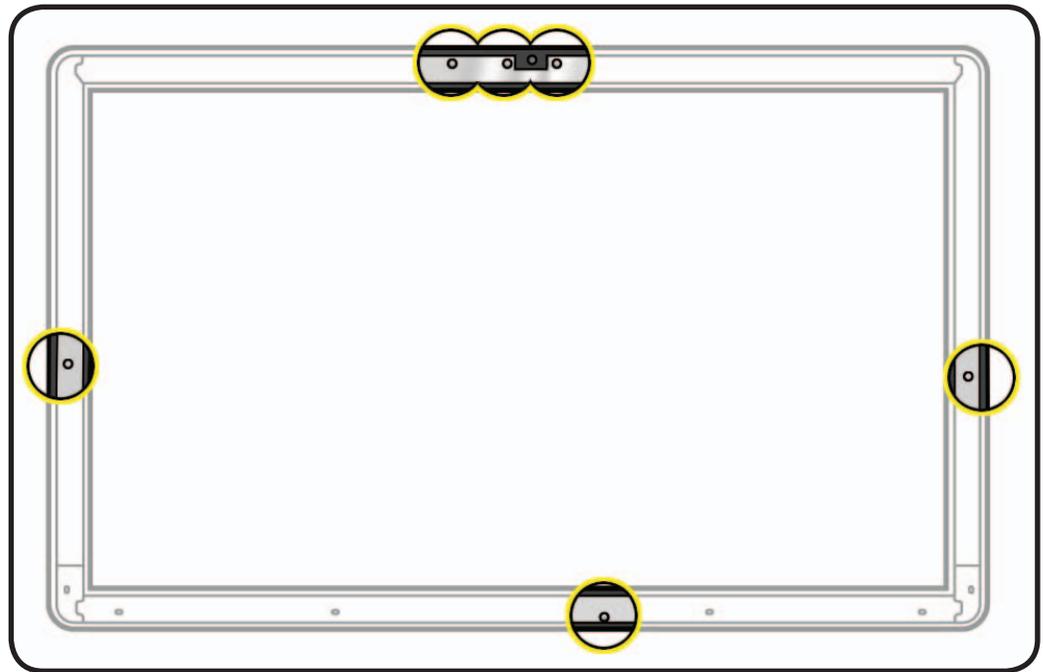


Removal

Note: Glass panel is held in place by magnets.

Note: There are guide pins on back of glass panel. Be careful not to bend or break guide pins during removal or installation. If any pins are missing, check for loose metal pieces inside unit and replace glass panel.

Apple strongly recommends wearing clean, lint-free gloves whenever handling the glass panel, to reduce cleaning required on reassembly.



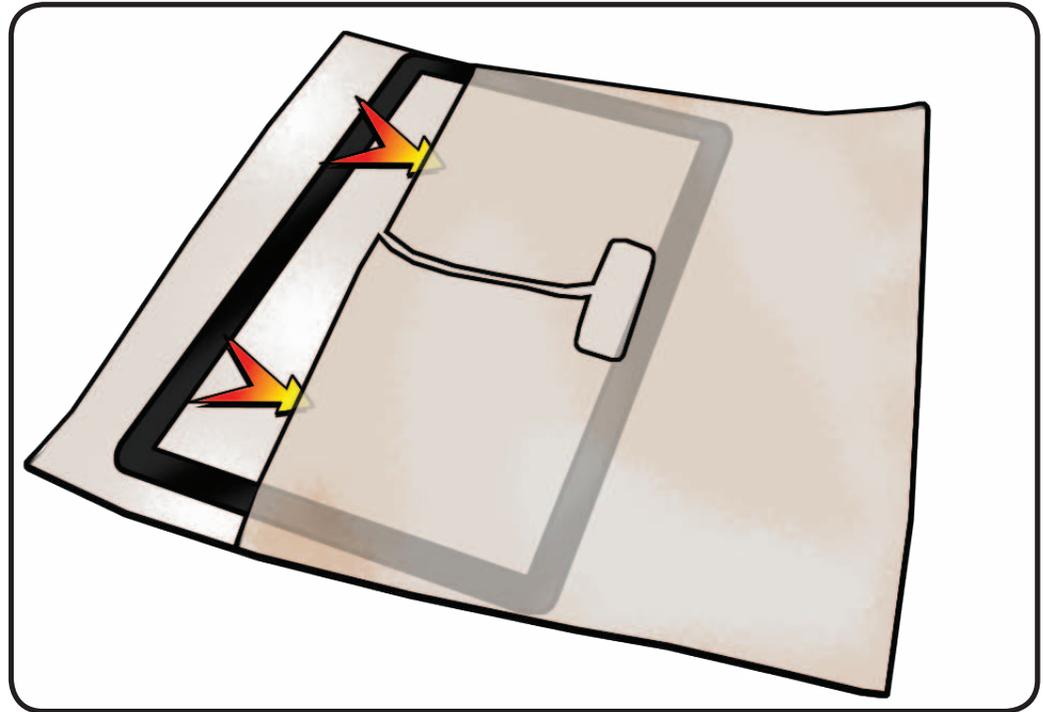
- 1 Glass panel can be removed in various ways:
 - Lay unit on its back and press clean suction cups in opposite corners on glass panel, or...
 - Lay unit on its back and press clean suction cups in top right and left corners on glass panel, or...
 - Stand unit upright and use fingernails to pull glass forward along top edge.



- 2 Lift panel up and off.



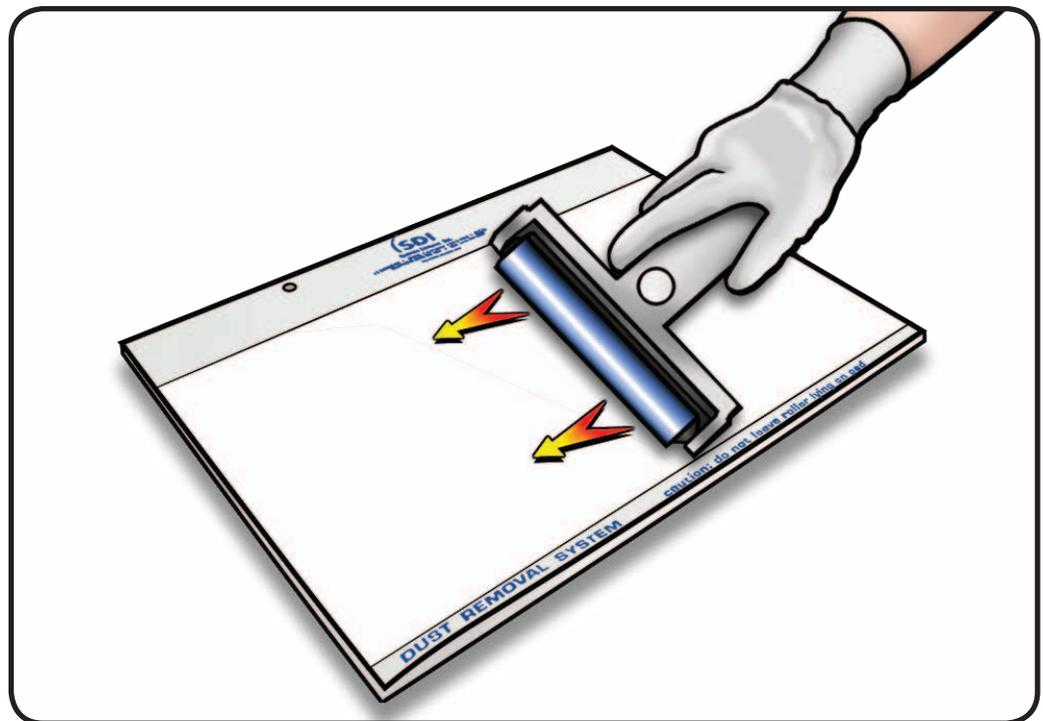
- 3 Remove suction cups and slide glass into protective microfoam bag.



Reassembly

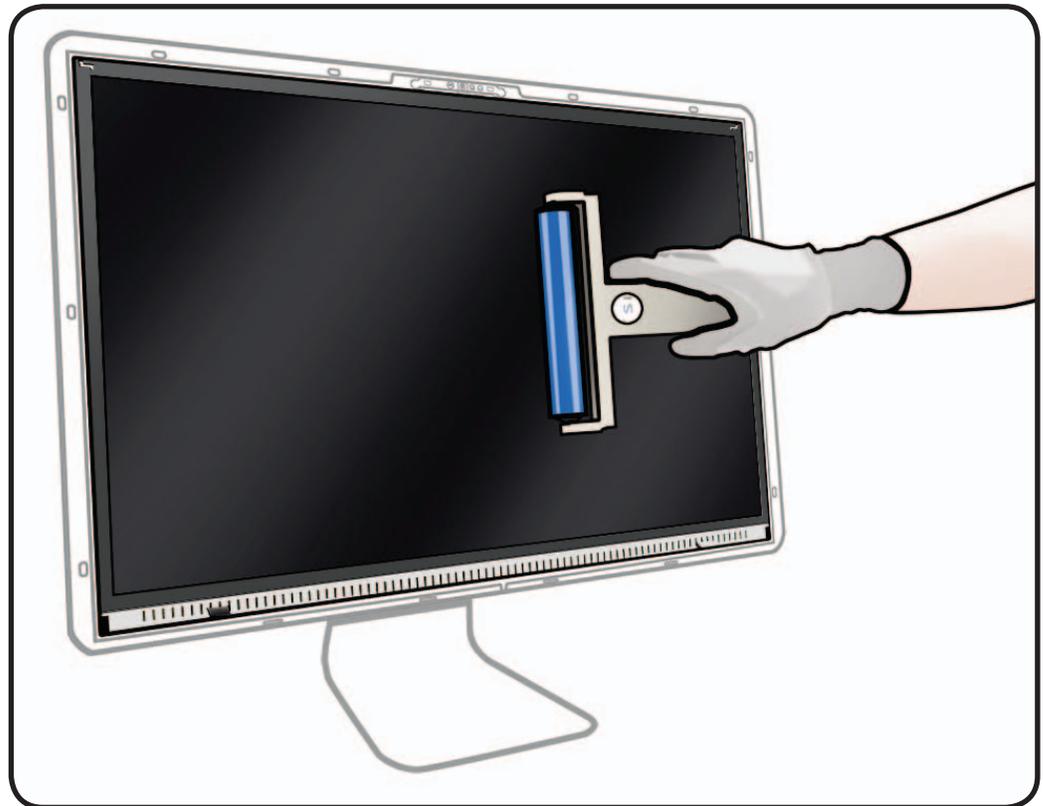
- 1 Remove protective covering from silicone roller and sticky sheet.
- 2 Clean silicone roller by rolling it back and forth a few times on sticky sheet.

If sticky sheet looks dirty, use a new one.
If roller is no longer tacky, wash it in warm soapy water.
If tackiness does not return, replace silicone roller.



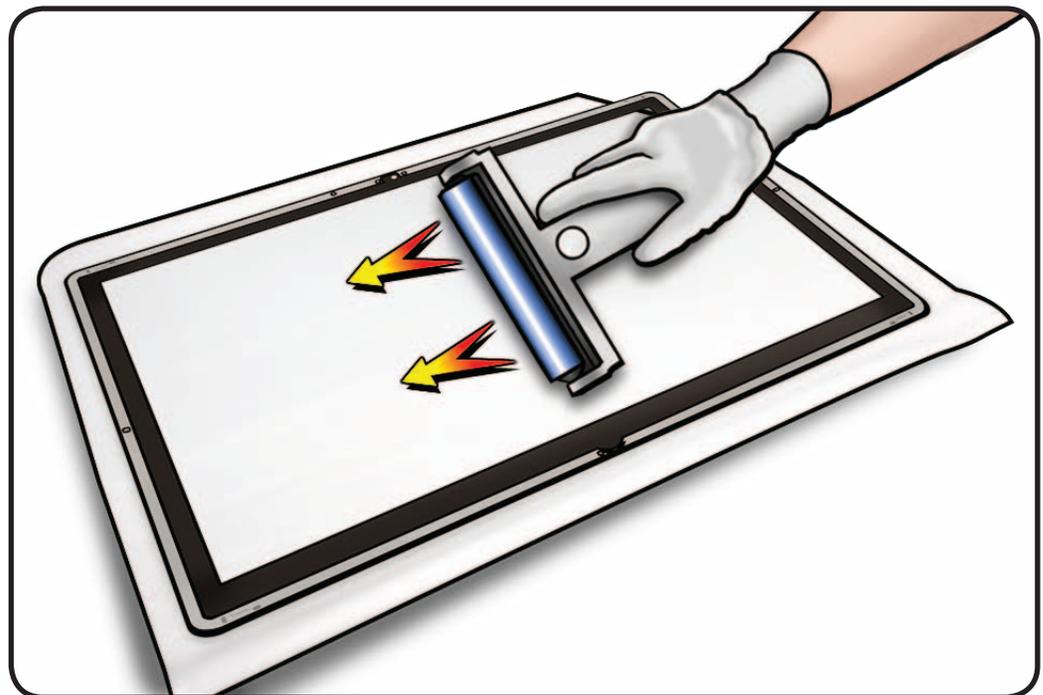


- 3 Set unit in upright position to minimize settling of dust.
- 4 Roll silicone roller over LCD panel to remove any particles.



- 5 Remove glass panel from microfoam bag.
- 6 Clean INSIDE of glass panel with the silicone roller to remove dust.

Note: If fingerprints or oils are on inside of glass, clean first with a microfiber cloth made damp with water.





- 7** Wearing clean gloves, place glass directly onto unit. Magnets will catch glass panel and hold it in place.

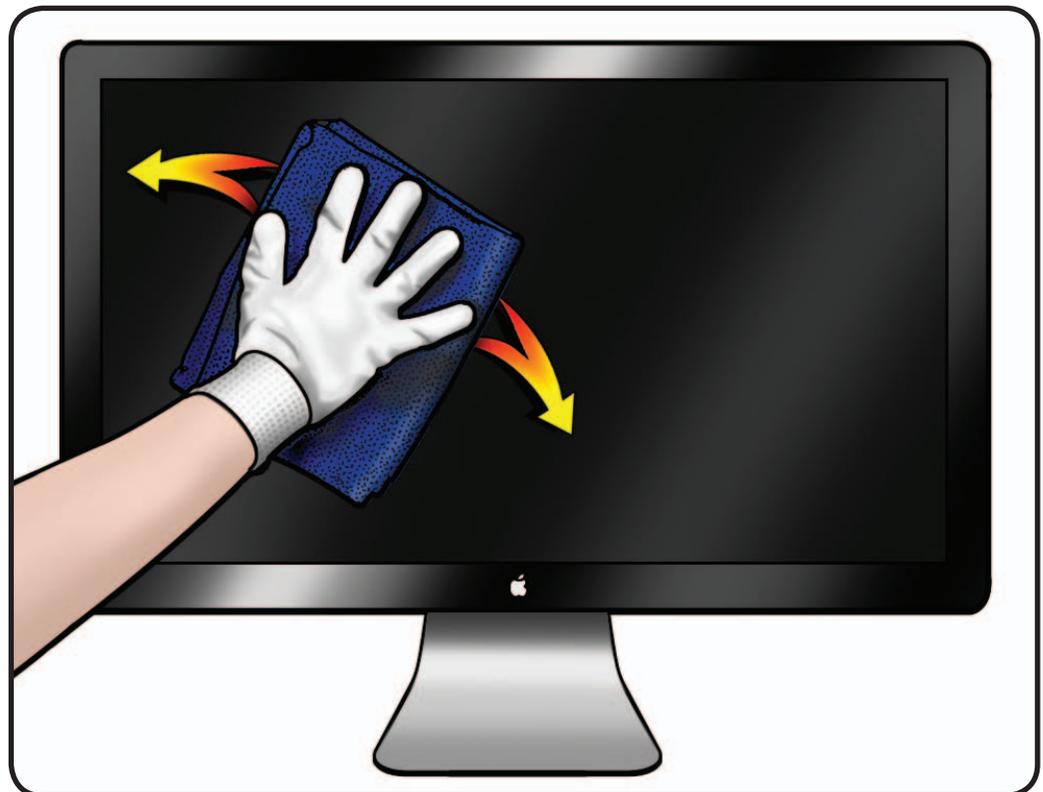
Make sure pull tabs at bottom of LCD panel are tucked behind glass panel.

Glass should be flush with rear housing after it is reinstalled.



- 8** Clean outside of glass panel with a clean microfiber cloth. Wipe glass until there is no longer any residue or haze.

- 9** Inspect glass for any remaining dust, fingerprints, or a hazy residue. If there are contaminants trapped between LCD panel and glass panel, repeat cleaning procedure.





LCD Panel

First Steps

Remove:

- Glass Panel



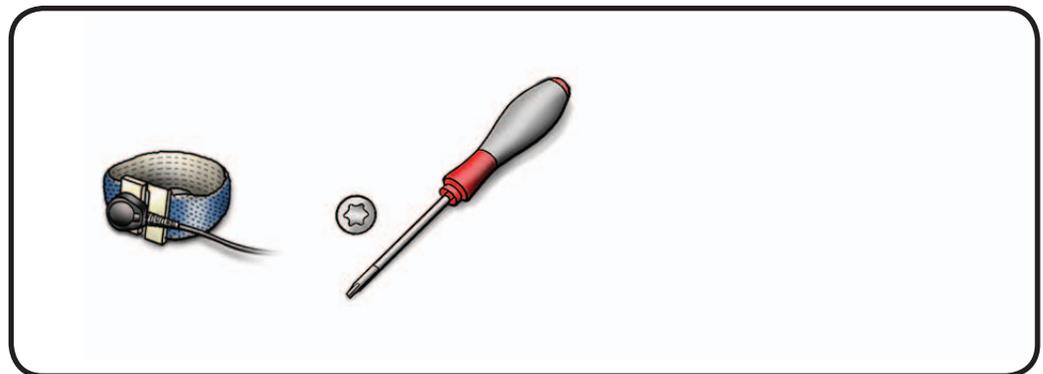
Caution: Do not press on front surface of LCD panel when handling.

Important: When replacing the LCD Panel, use the [EDID Reset Tool](#).



Tools

- ESD wrist strap
- Torx T10 screwdriver
- ESD bag to store LCD panel





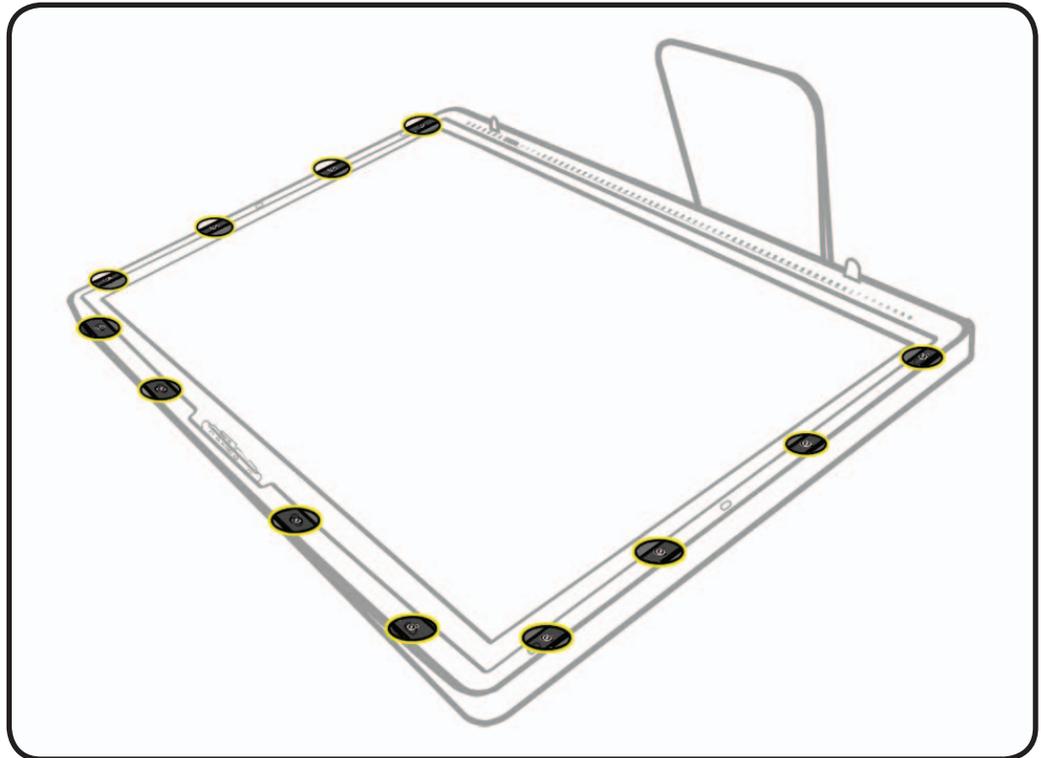
Removal

- 1 Remove T10 screws:
(12) 922-9348



Reassembly Note:

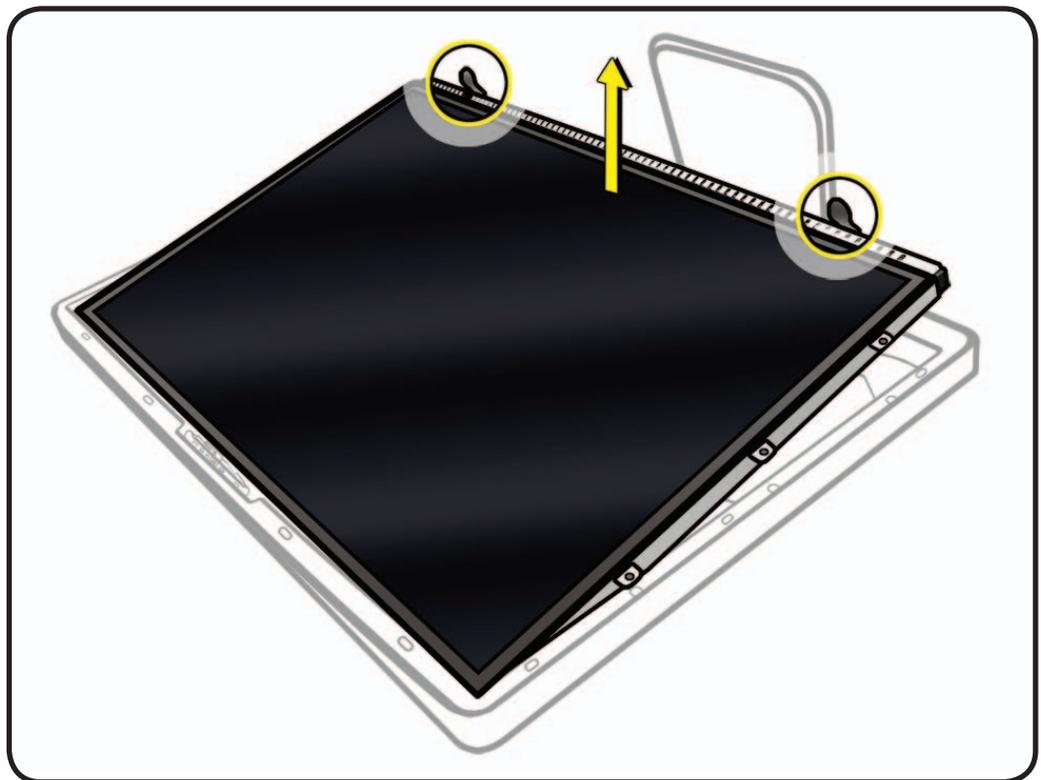
Do not overtighten LCD screws, which could cause light leakage after unit is reassembled.



- 2 Using black tabs, raise bottom edge of LCD a few inches to access cables inside.



CAUTION: Tilt display up **no more than 4 inches (10 cm)**. Pulling display too far could damage cables or connectors.



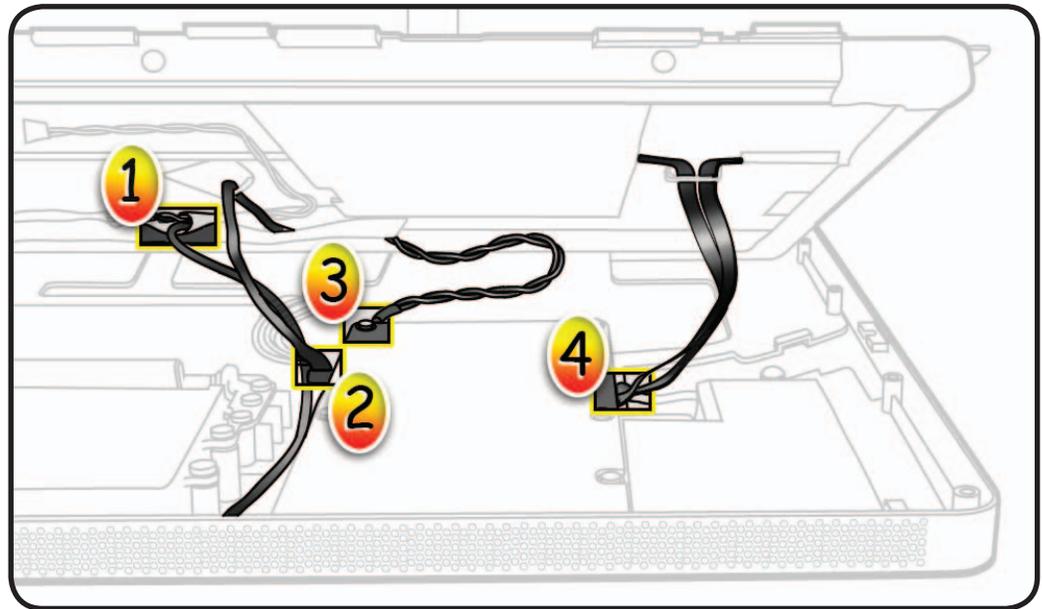


3 Looking into gap under LCD, disconnect 4 cables:

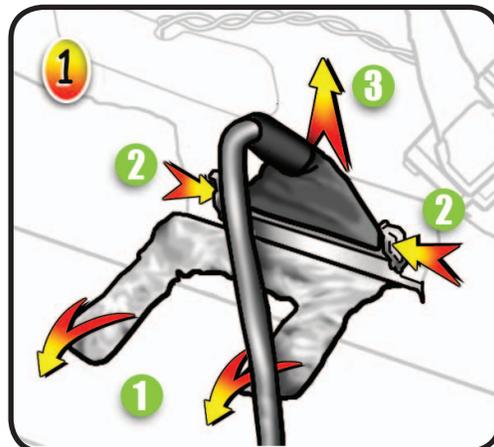
- #1: DisplayPort
- #2: function
- #3: ground
- #4: LED backlight driver

Reassembly Note:

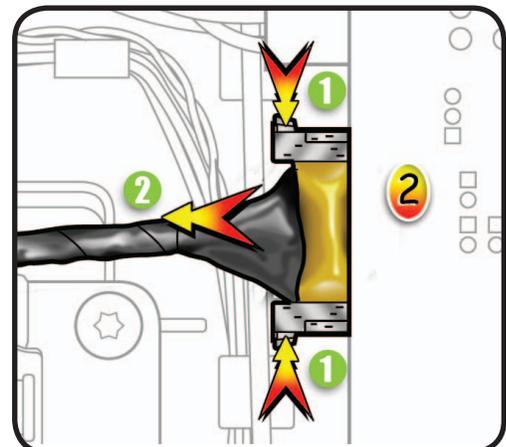
Verify that all cables are firmly seated into connectors. An unsecure cable connection can cause image flicker.



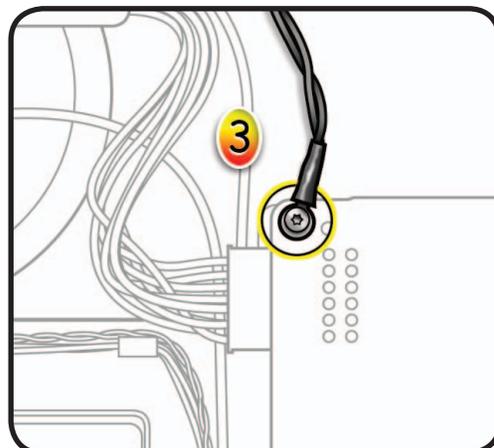
LEFT: Close-up of #1 DisplayPort cable on back of LCD panel. Peel back mylar and foil tape, squeeze sides of connector and pull out.



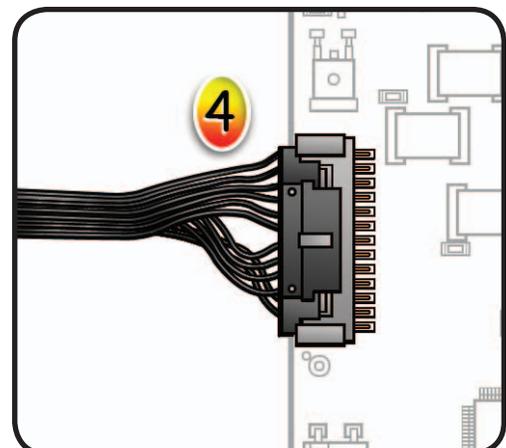
RIGHT: Close-up of #2 function cable at top left of logic board. Squeeze sides of connector and pull straight out.



LEFT: Close-up of #3 ground cable at top left of logic board. Remove T10 screw from top left corner of logic board.



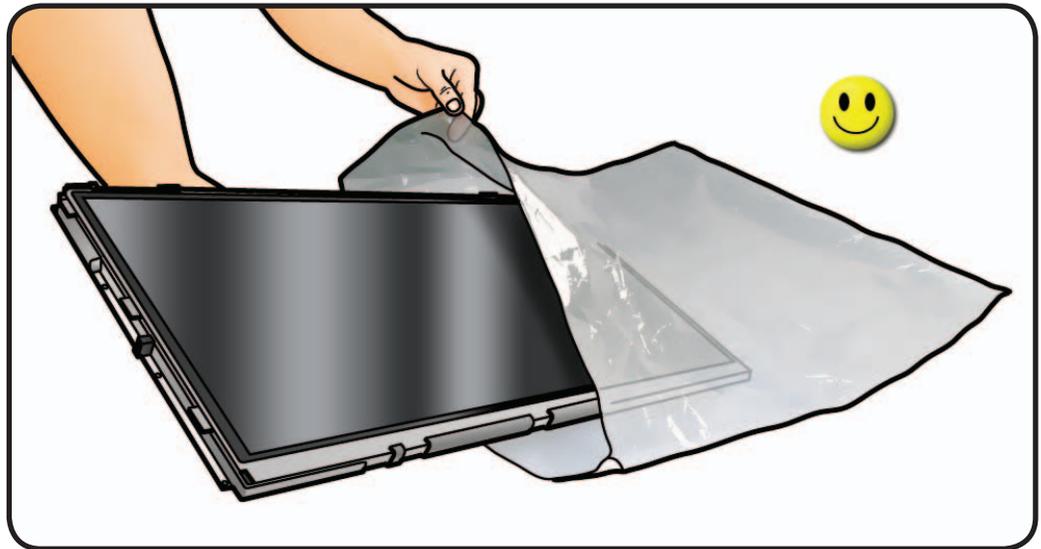
RIGHT: Close-up of #4 LED backlight driver at center right of logic board (view from underneath board). Pinch underneath and pull straight out.





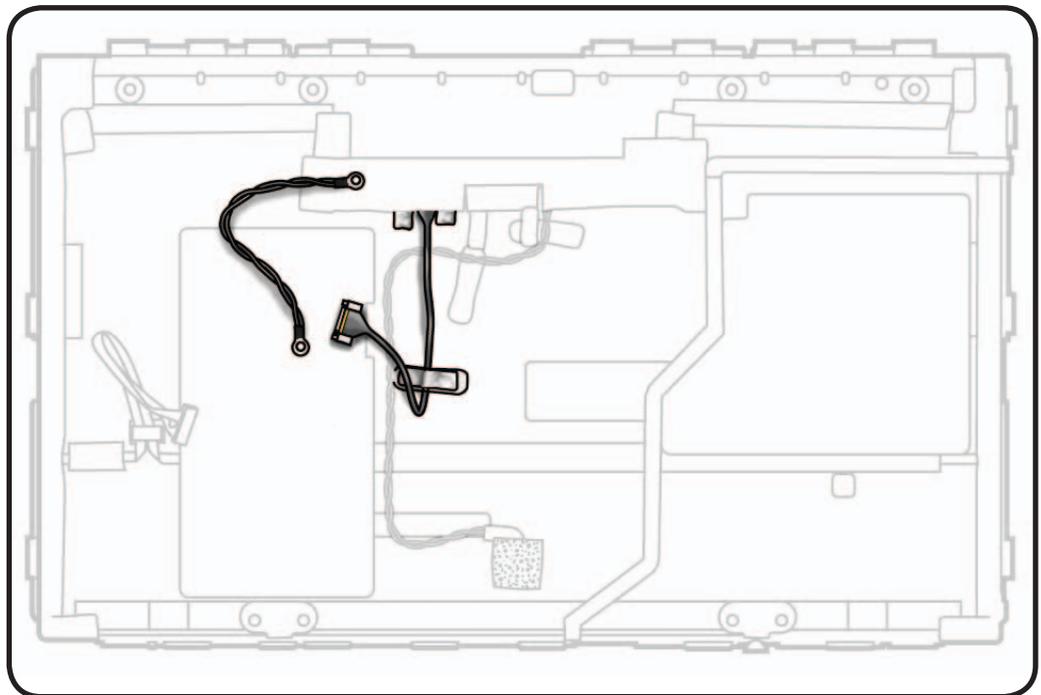
4 Lift LCD panel off rear housing.

5 To prevent buildup of static charges which may attract dust particles to the surface of the display, store LCD panel in an anti-static bag whenever it has been removed from computer.



Replacement Notes:

- A new LCD panel includes a new temp sensor cable and the built-in LED backlight driver cable.
- The function cable and ground cable (shown at right) must be transferred from old LCD panel to new LCD panel.
- A new LCD panel will already have foil and mylar tape installed, which will need to be peeled back when transferring function cable. The LCD panel will come with extra foil and mylar tape, if needed to replace any damaged tape.

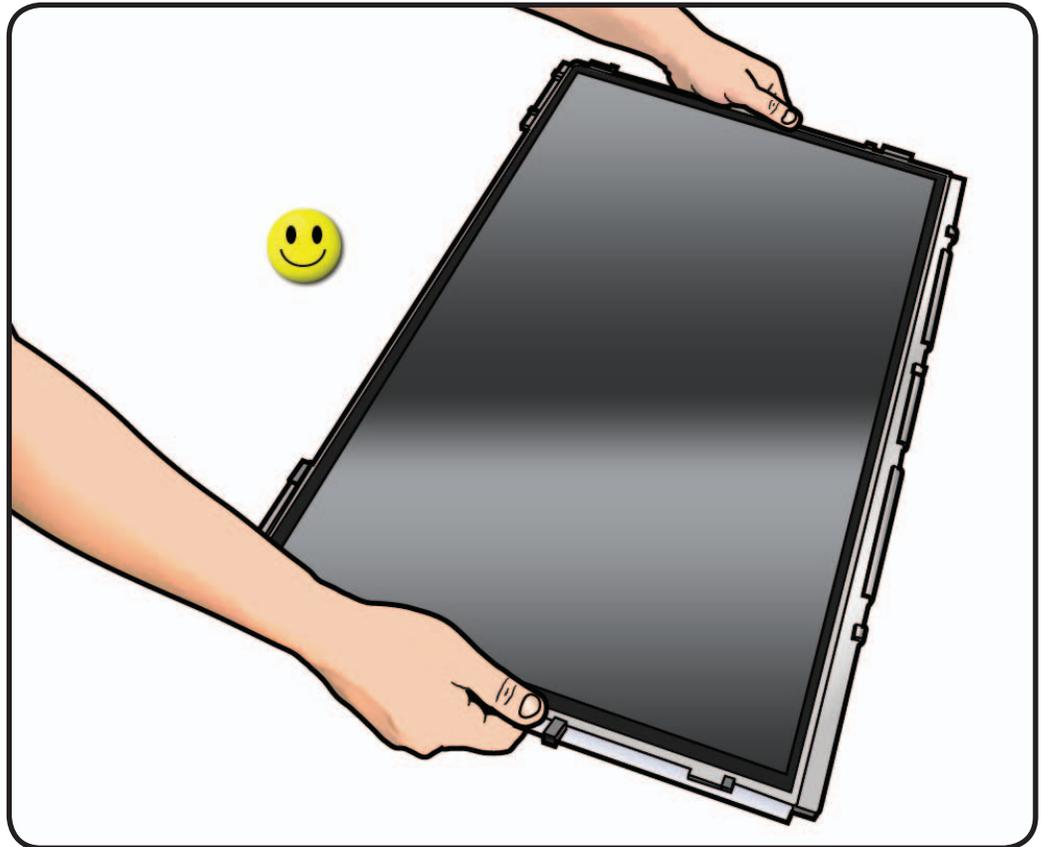




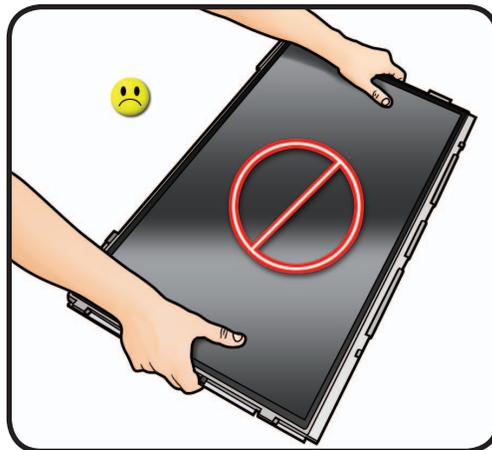
Handling LCD Panel

- 1 Important:** Handle LCD panel by edges only.

Use two hands to carry the panel.



- 2** Never touch LCD surface or hold LCD panel with one hand. It could damage the LCD panel.

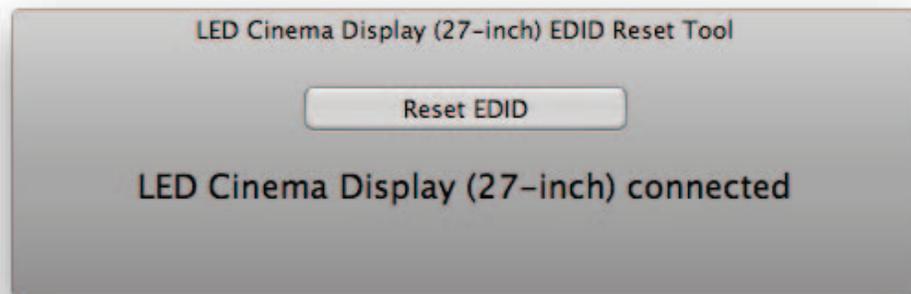




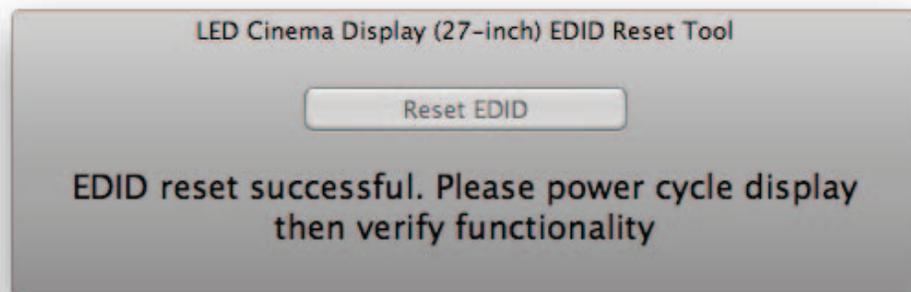
EDID Reset Tool

After replacing the LCD panel or the logic board in an LED Cinema Display (27-inch), run the EDID Reset Tool to reset the Extended Display Identification Data (EDID). If this tool is not used when the LCD panel and/or logic board are replaced, software features such as the brightness control may not be available.

1. Download the EDID Reset Tool from Service Source, by navigating the Product Browser to “Displays” and then to “LED Cinema Display (27-inch).”
2. Launch the EDID Reset Tool on a host computer that is connected to the LED Cinema Display (27-inch) under test. The following window will appear:



3. Select the “Reset EDID” button. The Extended Display Identification Data in the logic board will be reset and the following message will appear:



4. Unplug the display’s power cord from AC outlet, wait at least 10 seconds, and then reconnect to AC power in order to cycle the unit. The window above should re-appear on the screen.
5. Verify that System Preferences: Displays has a Brightness slider control present.
6. The reset process is now complete.



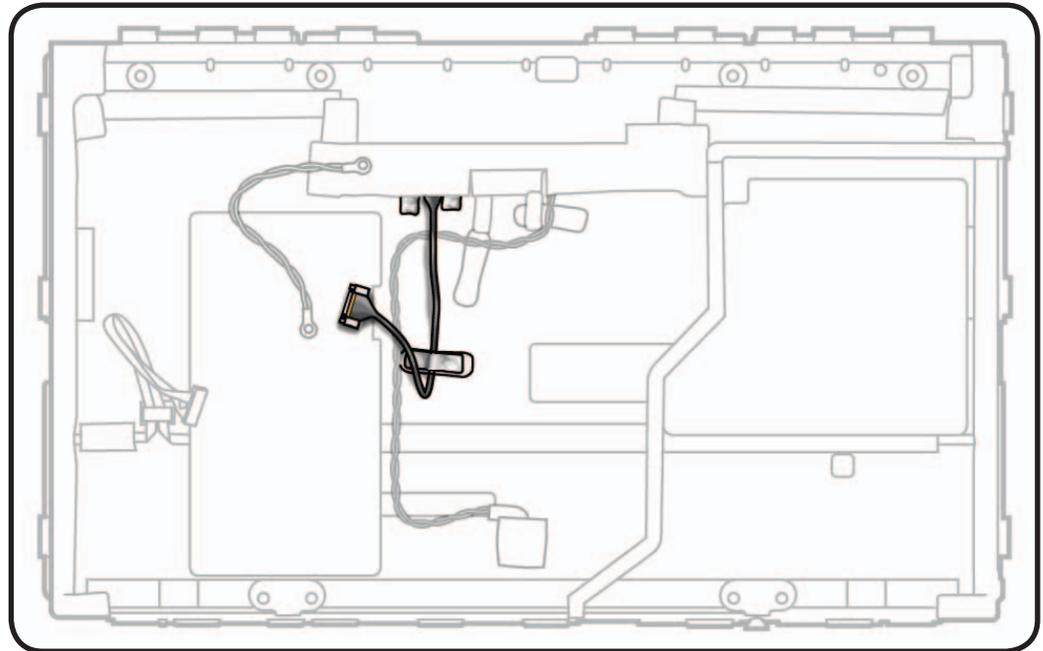
LCD Function Cable

First Steps

Remove:

- Glass Panel
- LCD Panel

Note: A new LCD panel does not include a new function cable; it must be transferred from old LCD panel.



Tools

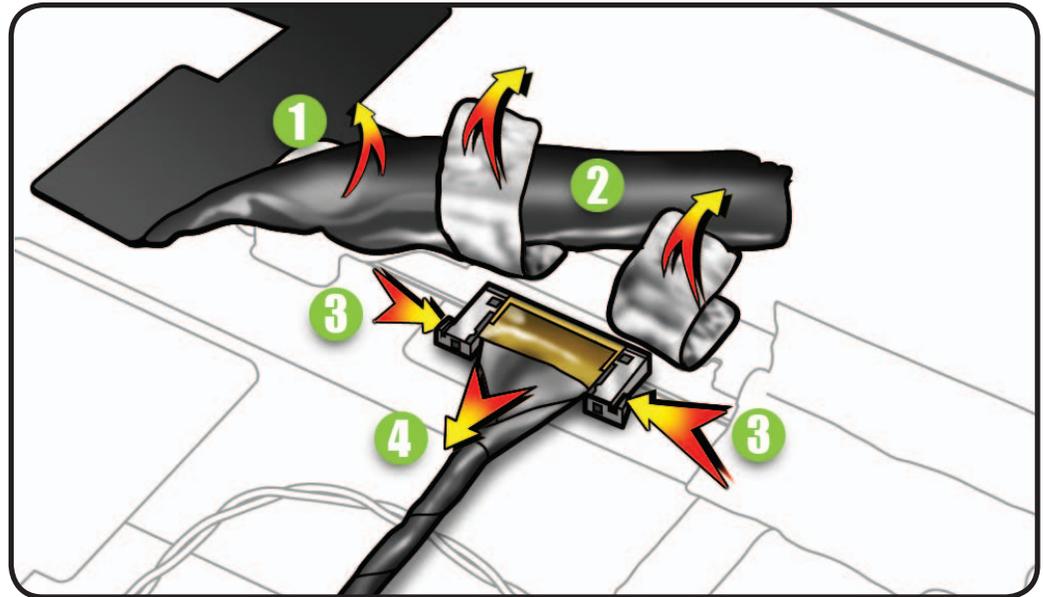
- ESD wrist strap





Removal

- 1 Note cable routing and placement of tape securing cable to LCD panel.
- 2 Peel back black mylar and foil strips covering connector.
- 3 Squeeze sides of connector and pull cable straight out to remove from LCD panel.



Reassembly Note:

Insert cable securely into connector and replace all mylar and foil tape.



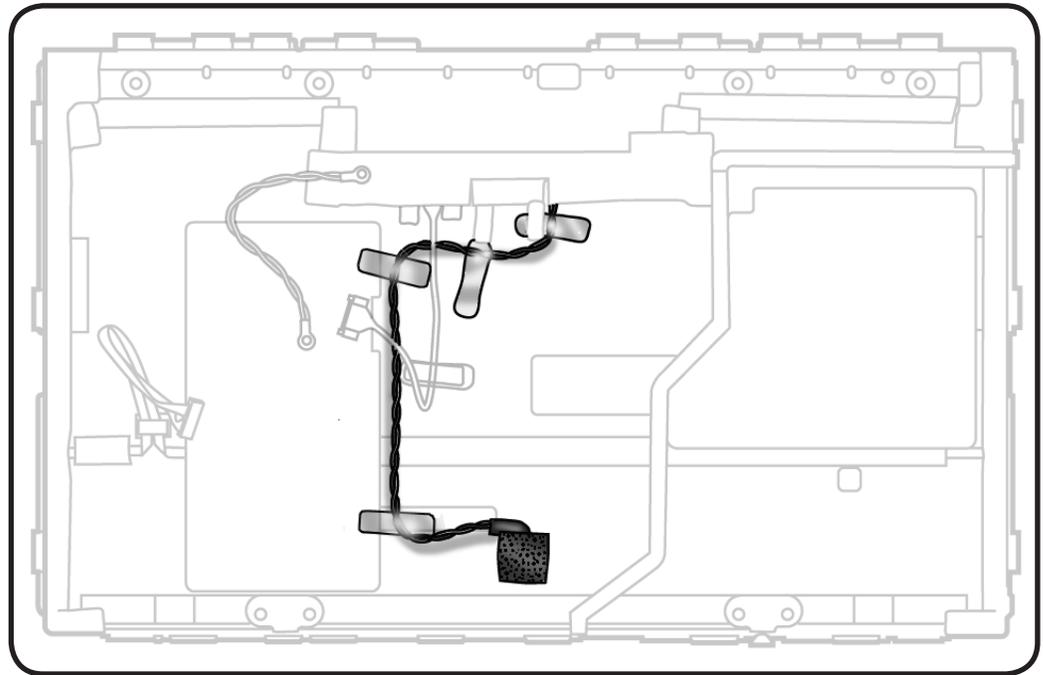
LCD Temp Sensor Cable

First Steps

Remove:

- Glass Panel
- LCD Panel

Note: A new LCD panel includes a new temp sensor cable.



Tools

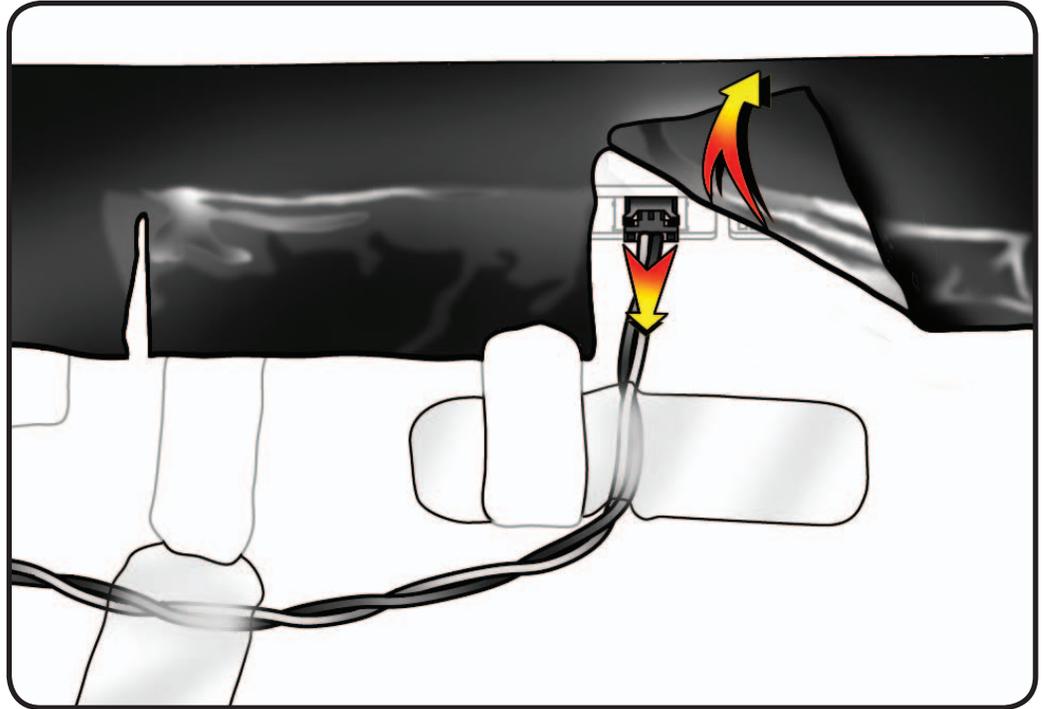
- ESD wrist strap





Removal

- 1 Note cable routing and placement of tape securing cable to LCD panel.
- 2 Peel back mylar at top rear of LCD panel.
- 3 Pull cable straight out of connector.



- 4 Peel back foam gasket covering sensor at bottom rear of LCD panel.

Replacement Note:

Fully cover sensor with gasket to isolate from internal air temperature.

- 5 Remove cable from LCD panel.





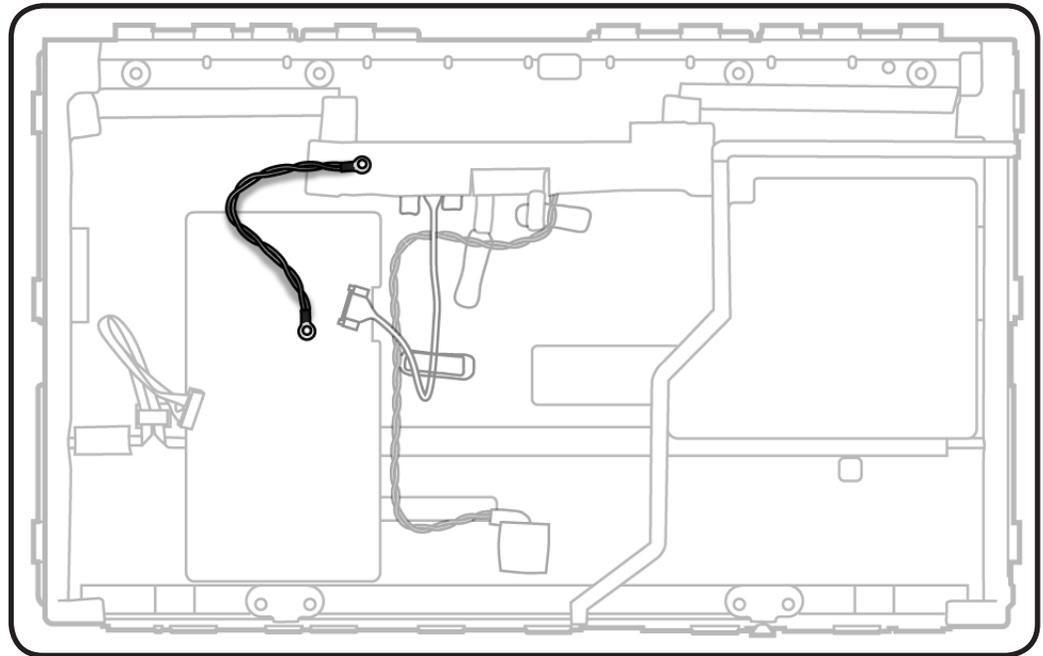
LCD Ground Cable

First Steps

Remove:

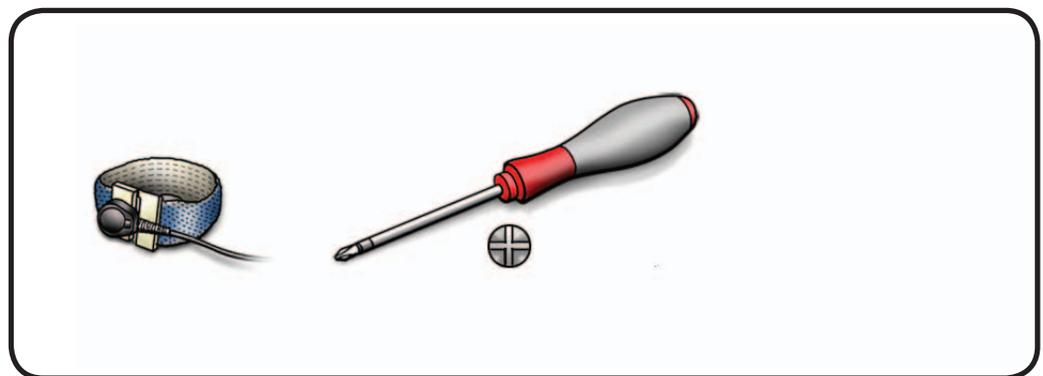
- Glass Panel
- LCD Panel

Note: A new LCD panel does not include a new ground cable; it must be transferred from old LCD panel.



Tools

- ESD wrist strap
- Phillips #0 screwdriver



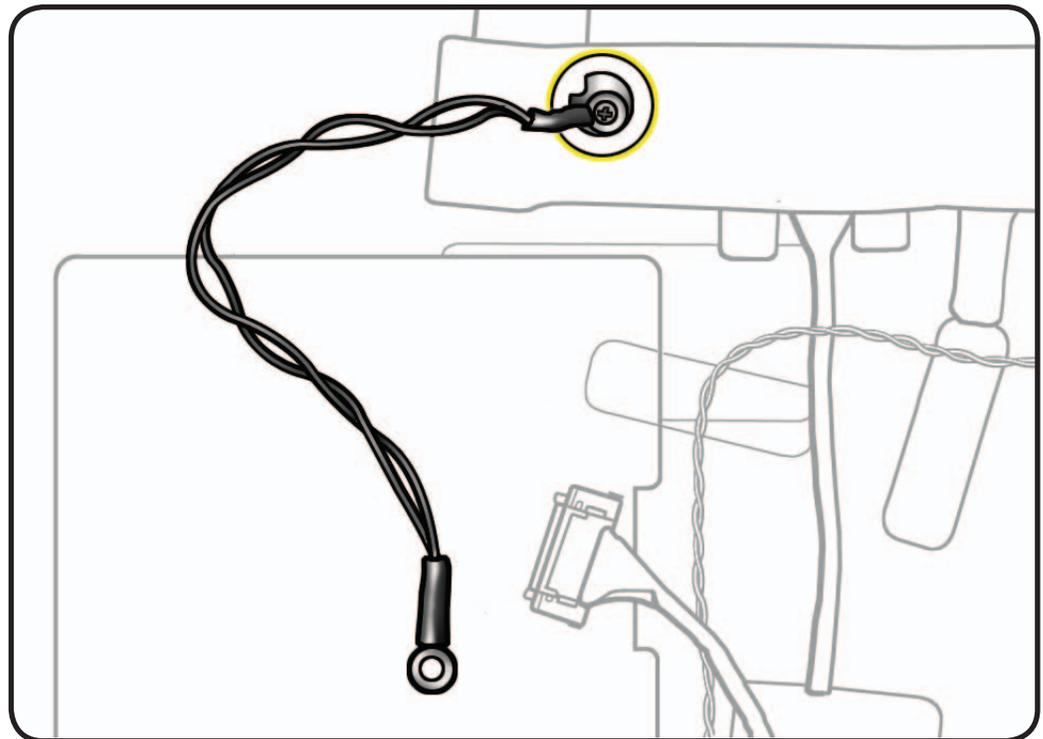


Removal

- 1 Remove Phillips #0 screw:
(1) 922-9724



- 2 Remove cable from LCD panel.





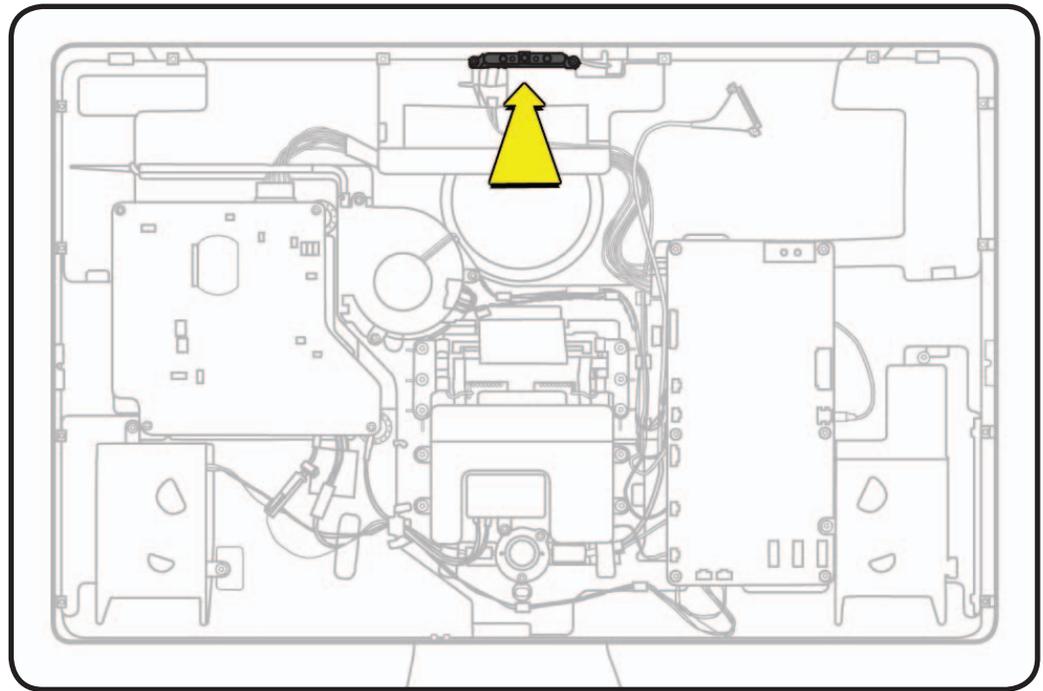
Camera

First Steps

Remove:

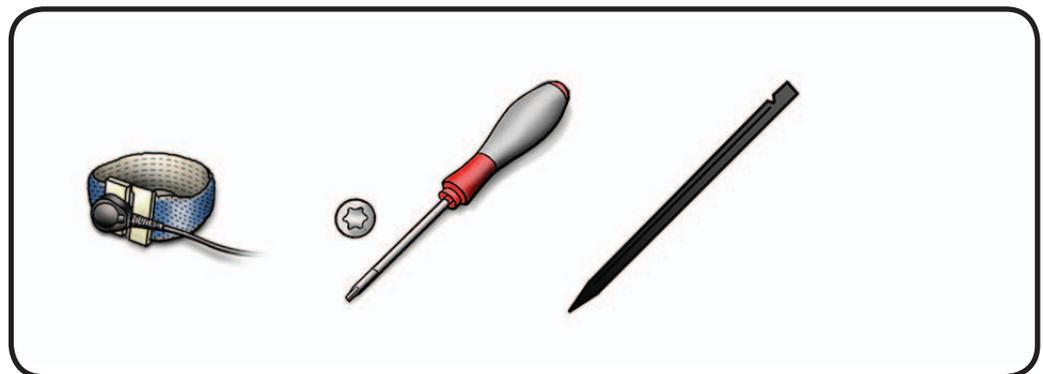
- Glass Panel
- LCD Panel

Important: The camera assembly contains an ambient light sensor. When replacing camera, use the [EEPROM Reset Tool](#) to reset the ambient light sensor's calibration factor.



Tools

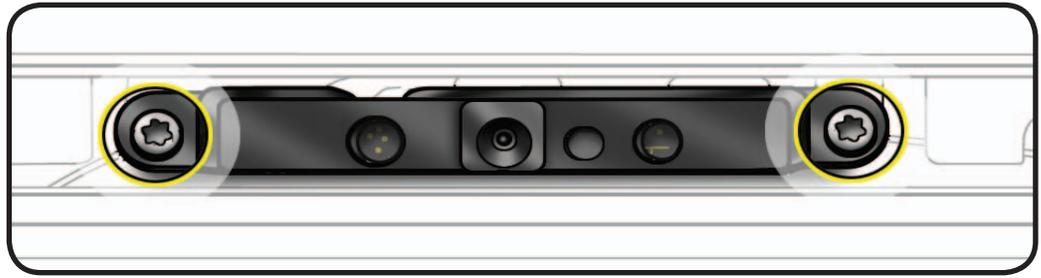
- ESD wrist strap
- Torx T10 screwdriver
- Black stick



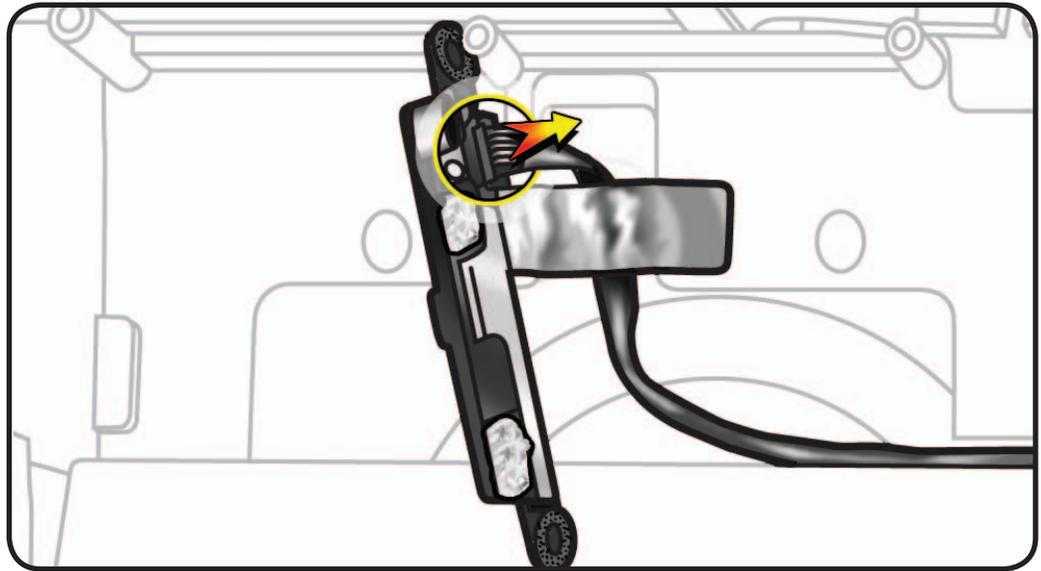


Removal

- 1 Remove T10 screws:
(2) 922-9723



- 2 Lift camera out of rear housing.
- 3 Disconnect cable from camera.

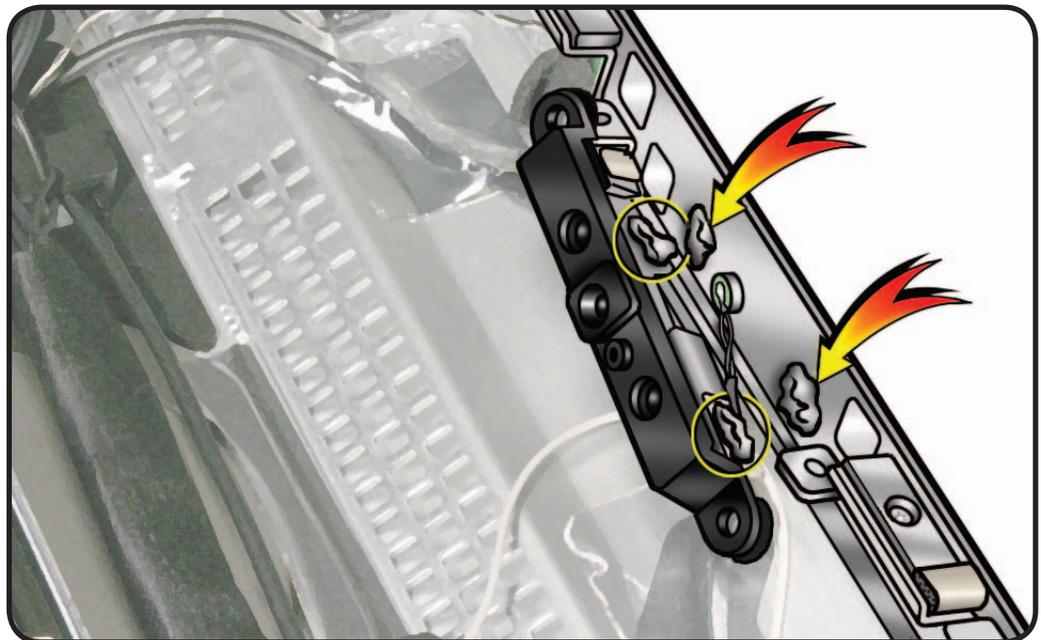


Reassembly Note:

Thermal paste is required between camera and rear housing.

Use a black stick to remove thermal paste from old camera and reapply to new camera (areas circled).

Note: A syringe of thermal paste is available as needed, Apple part# 922- 9625, good for 5 applications.

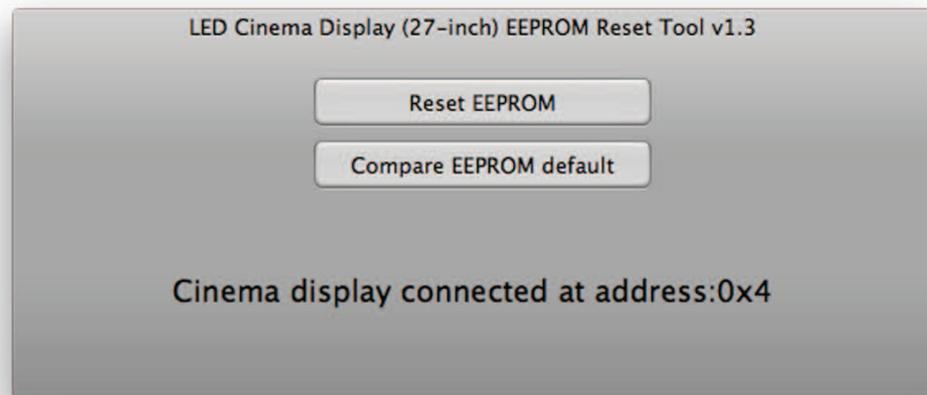




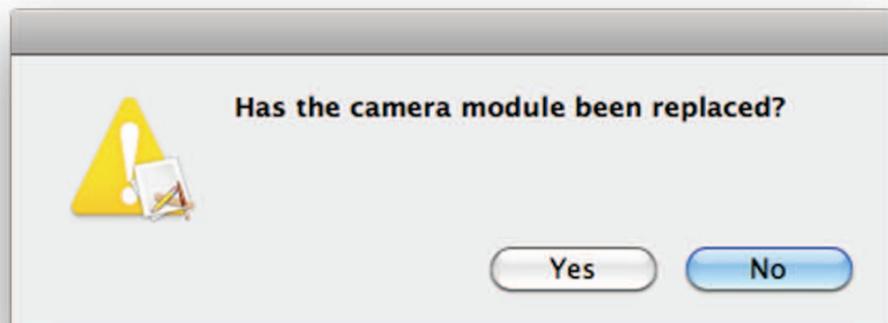
EEPROM Reset Tool

After replacing the camera in an LED Cinema Display (27-inch), run the EEPROM Reset Tool to reset the Ambient Light Sensor (ALS) calibration factor. This tool should only be run when the camera has been replaced.

1. [Download the EEPROM Reset Tool](#) from Service Source, by navigating the Product Browser to “Displays” and then to “LED Cinema Display (27-inch).”
2. Launch the EEPROM Reset Tool on a host computer that is connected to the LED Cinema Display (27-inch) under test. The following window will appear:

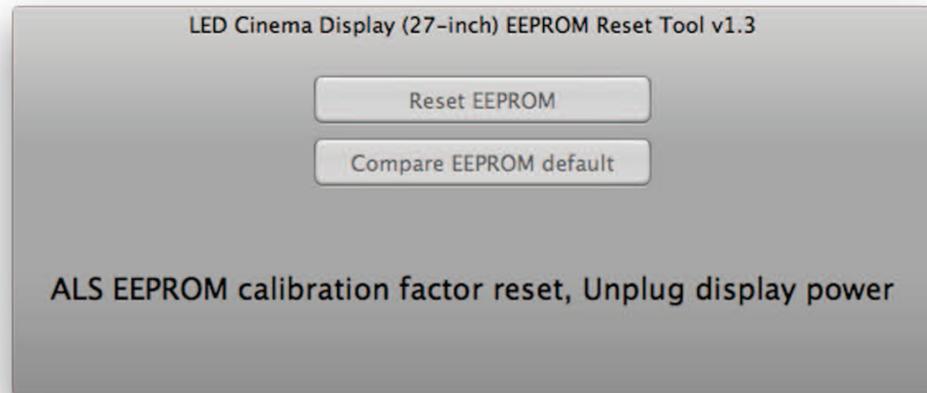


3. Select the “Reset EEPROM” button. A dialogue box will ask if the camera has been replaced.
Note: The EEPROM should only be reset after the camera has been replaced. If the camera has not been replaced, choose “No” and do not reset the EEPROM.

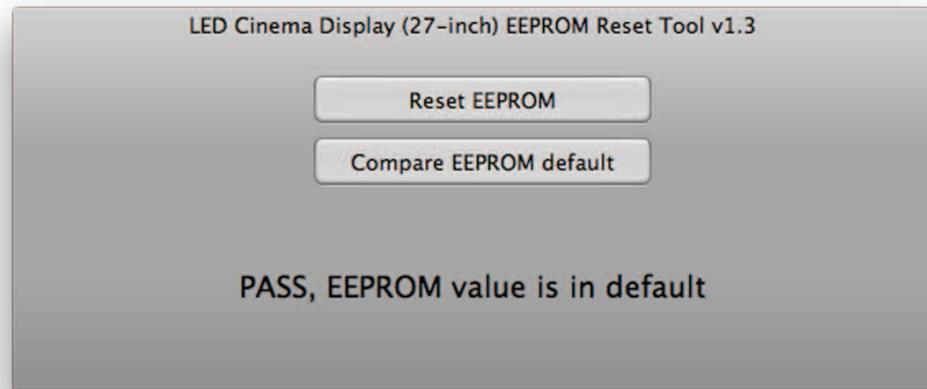




- If the camera has been replaced, choose “Yes”. The Ambient Light Sensor (ALS) EEPROM calibration factor will be reset and the following message will appear:



- Unplug the display’s power cord from AC outlet, wait at least 10 seconds, and then reconnect to AC power in order to cycle the unit. The window above should re-appear on the screen.
- Select the “Compare EEPROM default” button. The response should be:



- The reset process is now complete.



Camera Cable

First Steps

Remove:

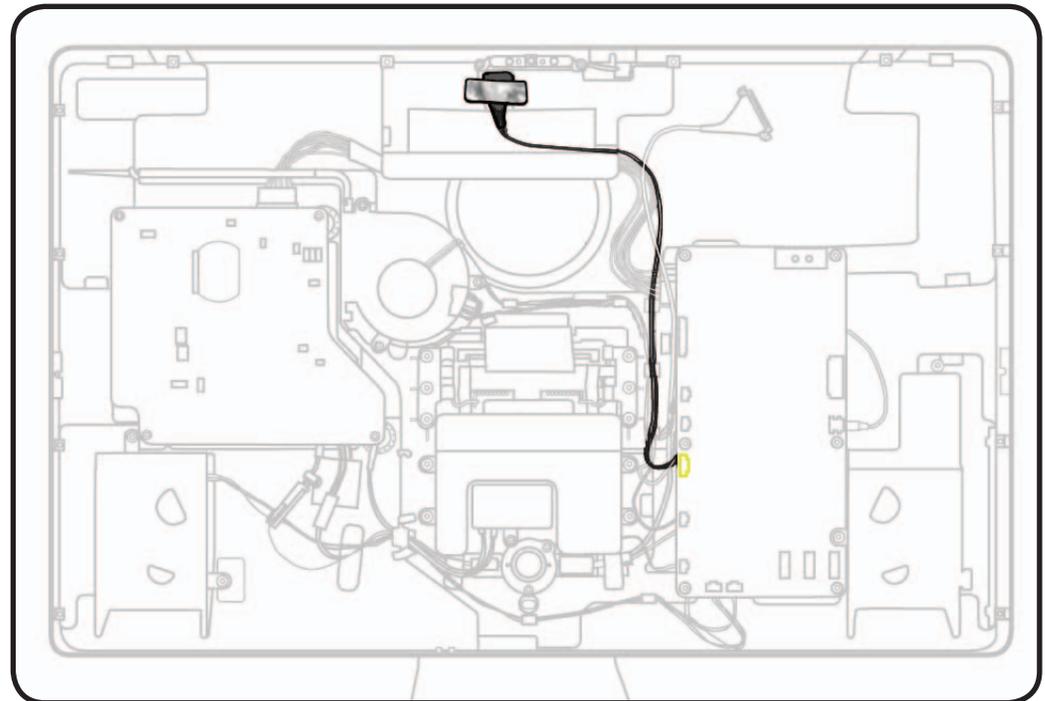
- Glass Panel
- LCD Panel
- Camera

Removal

- 1** Note cable routing through black plastic guides in rear housing, and tape securing camera cable to rear housing.
- 2** Disconnect cable from camera and from logic board.

Reassembly Note:

For easier access to reconnect cables, unscrew and flip over logic board.





Power Supply

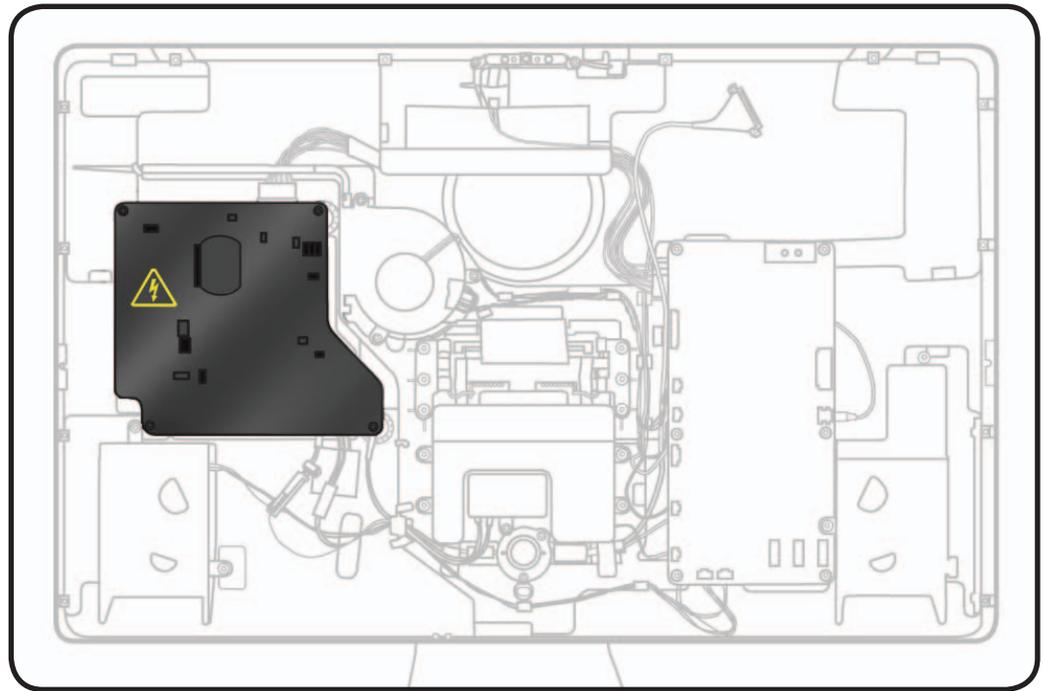
First Steps

Remove:

- Glass Panel
- LCD Panel

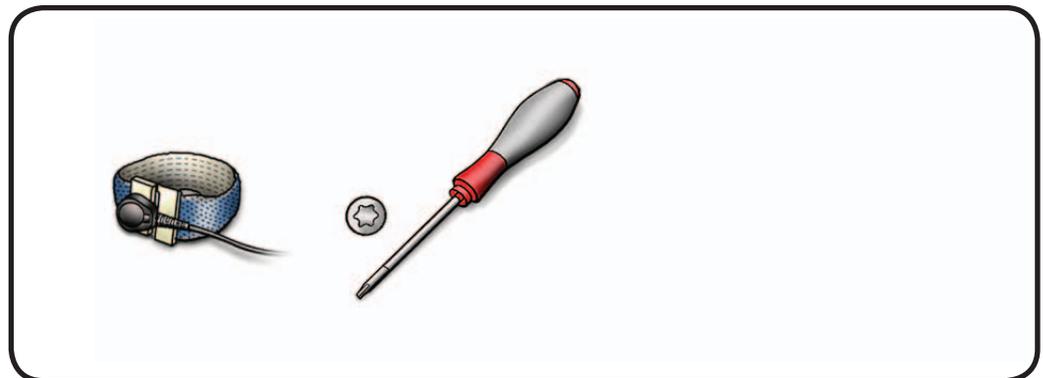


Warning: HIGH VOLTAGE:
Use extreme caution when working around the power supply, which contains a high-voltage capacitor that may remain charged for several minutes even when unit is unplugged. Never touch leads on top side of power supply, especially those near warning sign.



Tools

- ESD wrist strap
- Torx T10 screwdriver





Removal

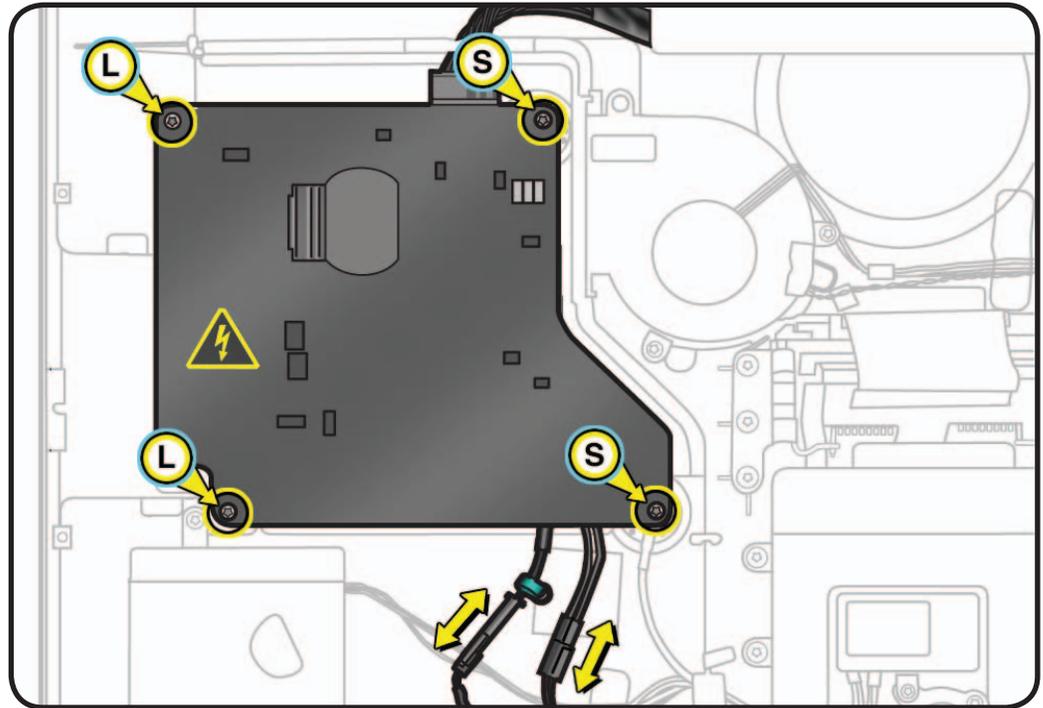
- 1 Remove T10 screws:
(2) 922-9348, long,
at left



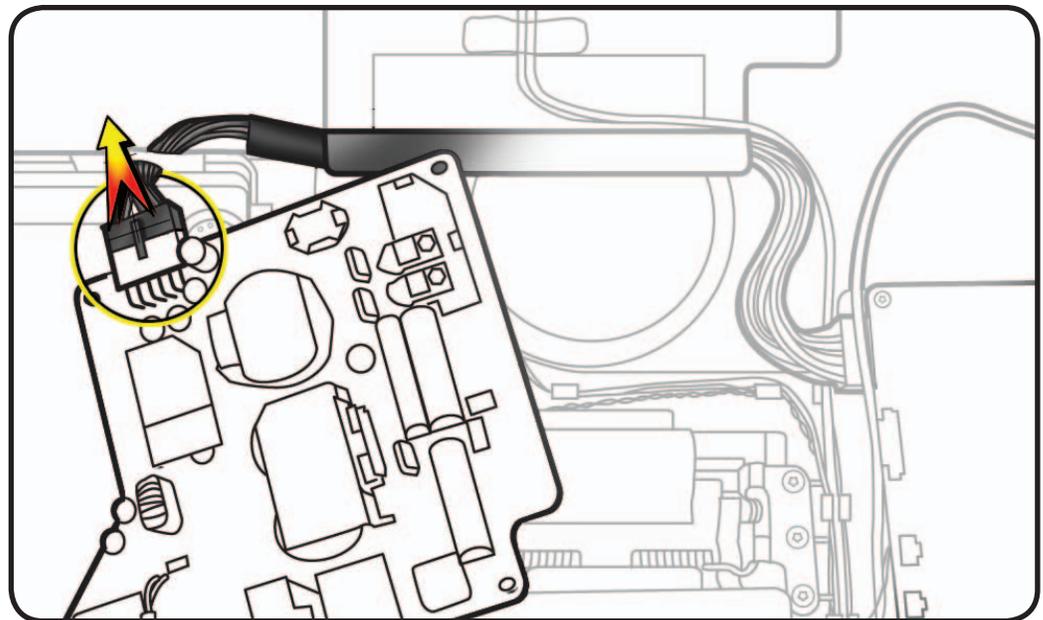
- (2) 922-8685, short,
machine, at right



- 2 Disconnect 2 cables
below power supply.



- 3 Lift up power
supply, flip over and
disconnect DC power
cable.



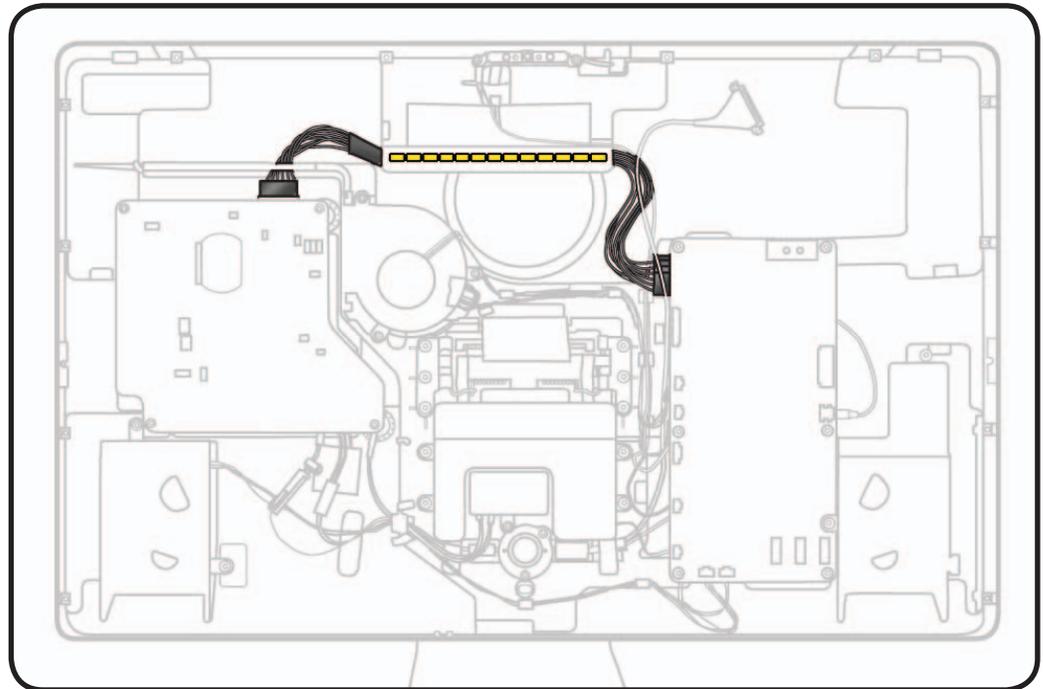


DC Power Cable

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Logic Board



Tools

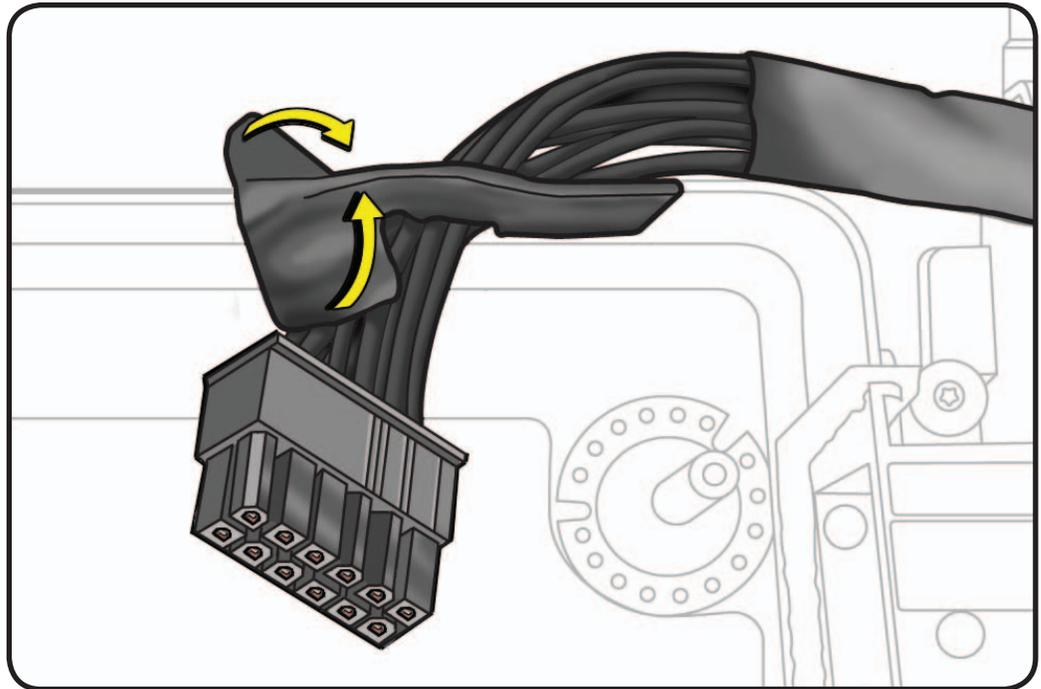
- ESD wrist strap



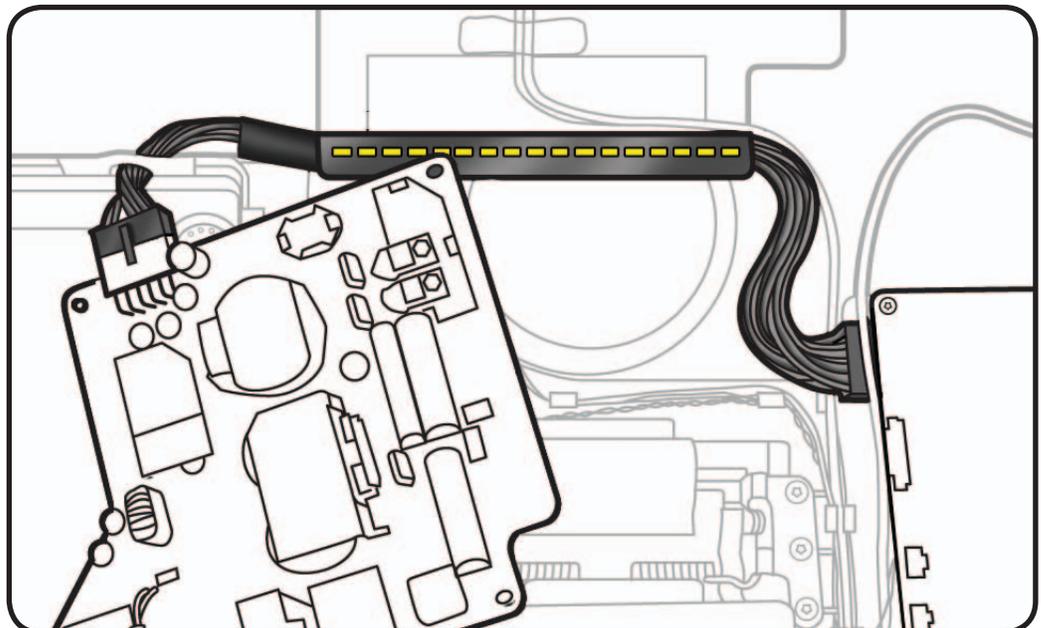


Removal

- 1 Remove “H” tape securing cable to pressure wall above power supply.
- 2 Lift cable out of rear housing.



Reassembly Note:
Cable routes through long flat black plastic guide in rear housing.



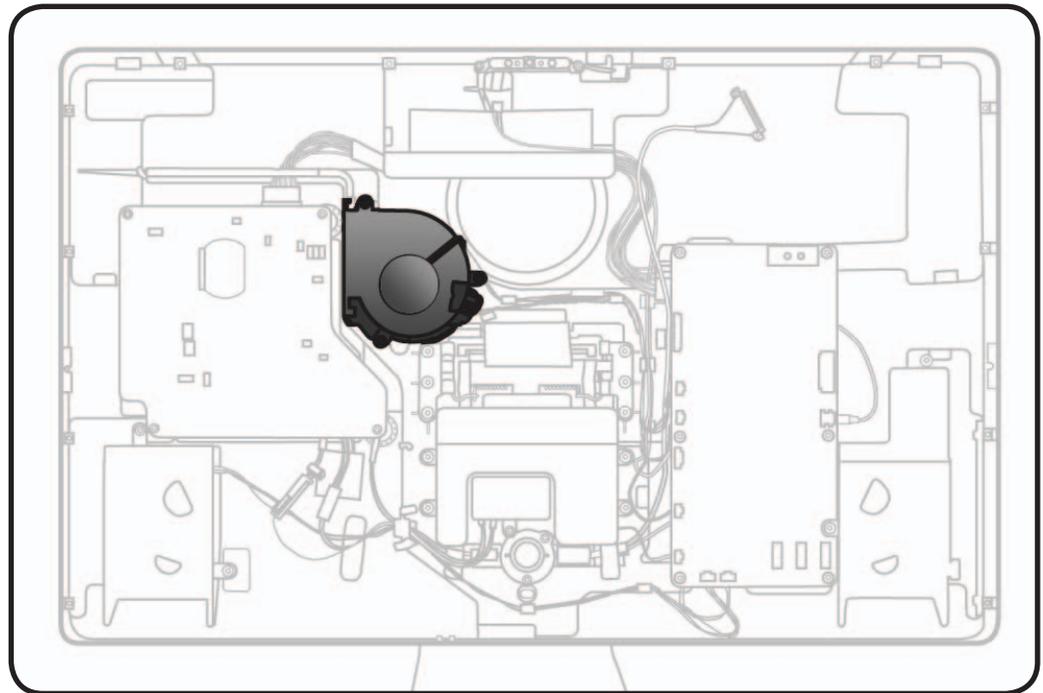


Fan

First Steps

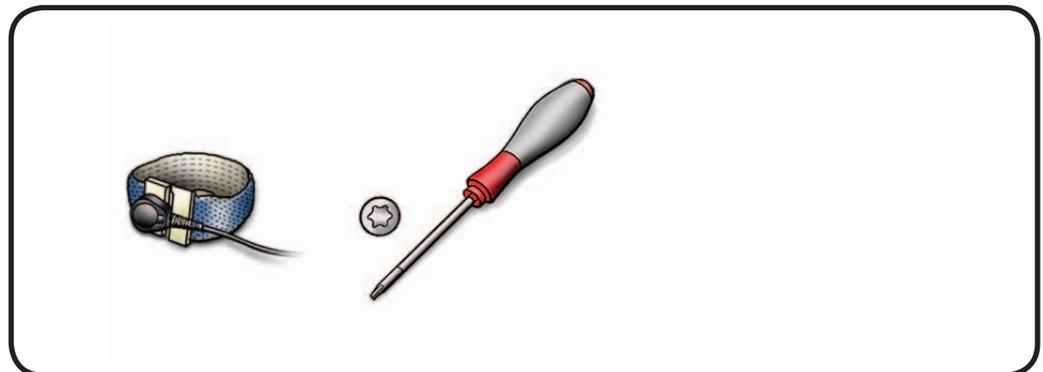
Remove:

- Glass Panel
- LCD Panel



Tools

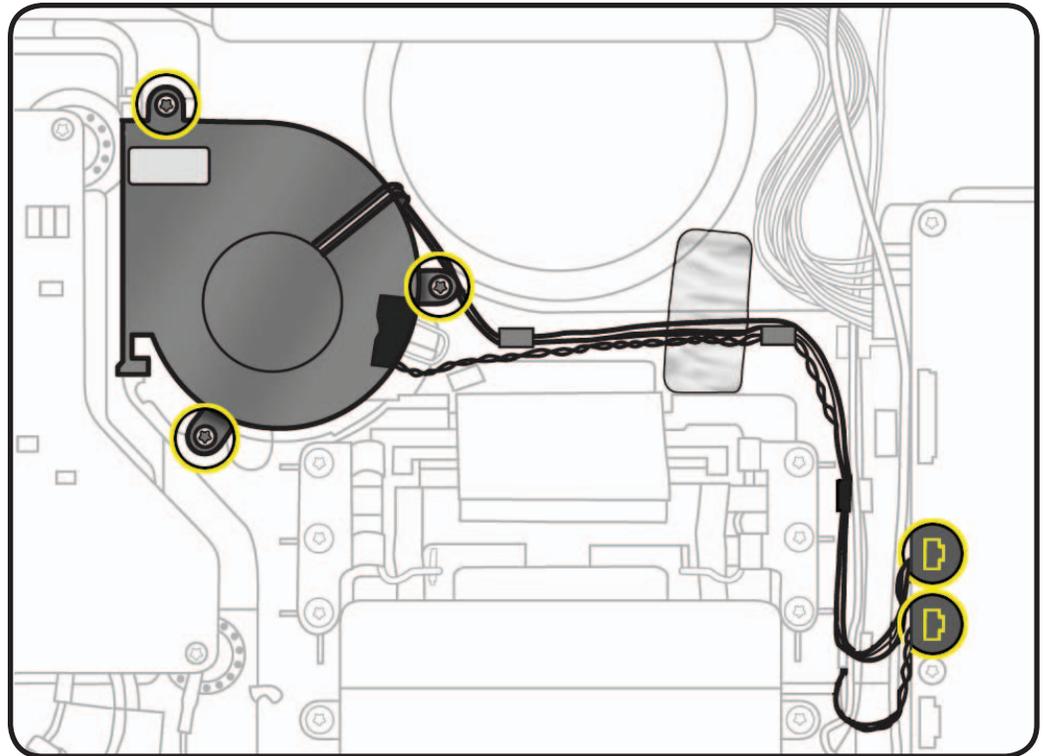
- ESD wrist strap
- Torx T10 screwdriver





Removal

- 1 Remove T10 screws:
(3) 922-9722

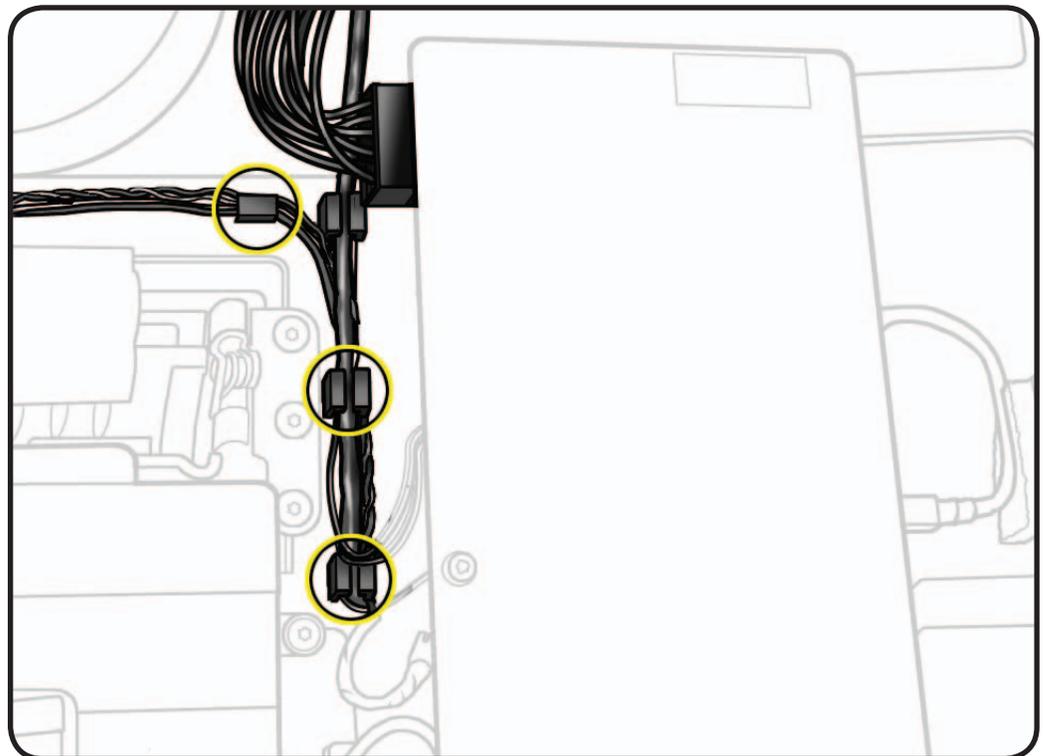


- 2 Observe cable routing through black plastic guides in rear housing.

- 3 Disconnect 2 cables from logic board:
 - fan cable (4-pin)
 - sensor cable (3-pin)

Reassembly Note:

For easier access to reconnect cables, unscrew and flip over logic board.





- 4 Remove ambient temp sensor cable from fan, preserving black tape for reuse.

Reassembly Note:

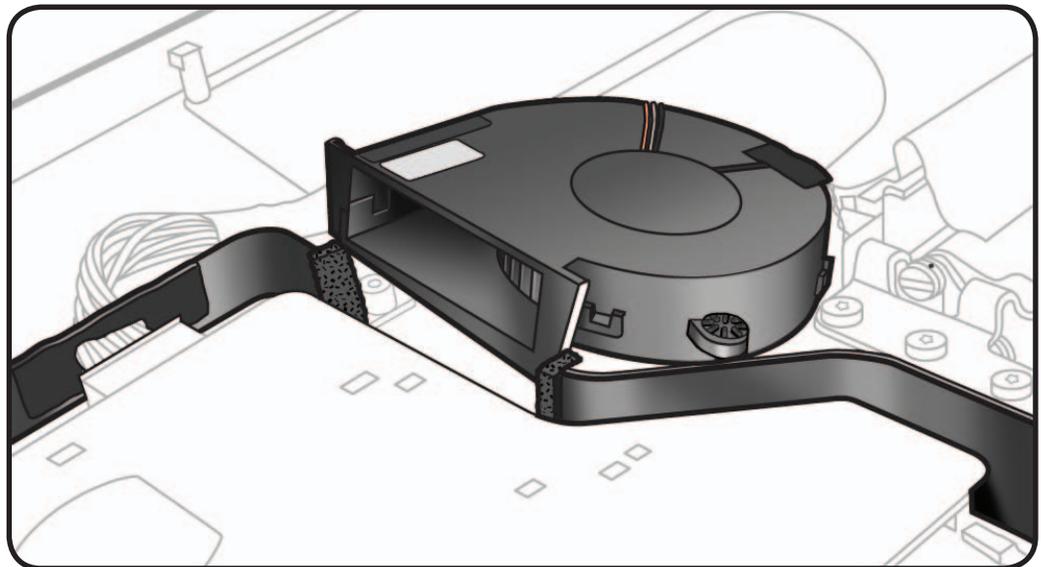
Ambient temp sensor must extend exactly 1cm from plastic retaining ring on fan so that it will sit the proper distance from rear housing when installed.

Incorrect sensor placement can lead to false temperature readings and unusual fan behavior.



Reassembly Note:

Ensure fan fits securely into foam on rear housing for a snug fit. Air leaks in pressure wall can lead to temperature and/or noise issues.



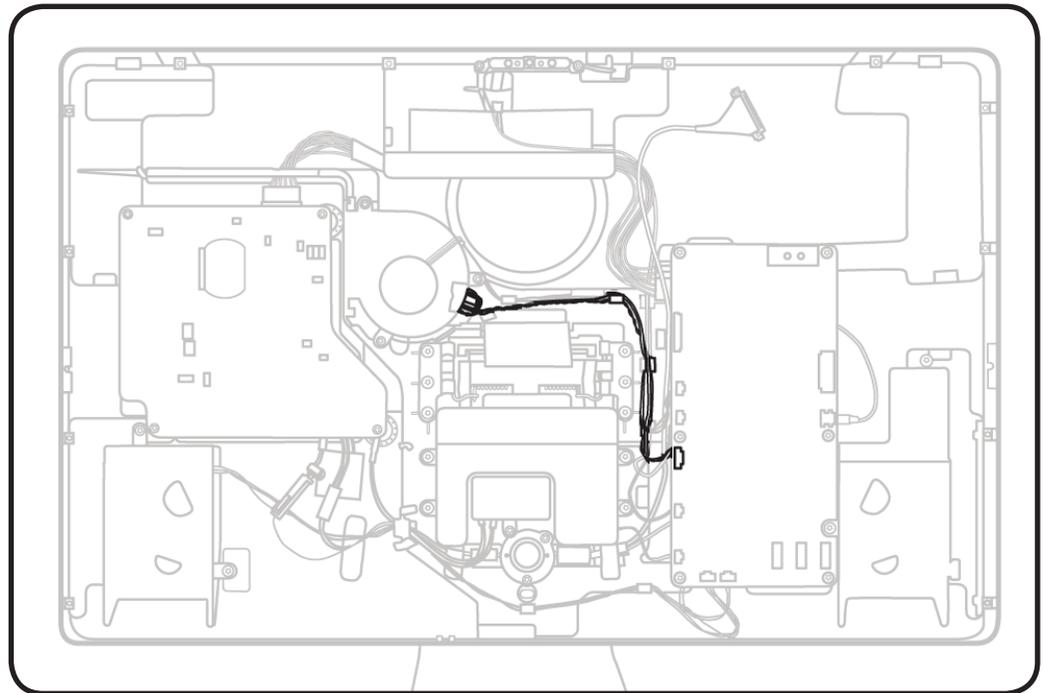


Ambient Temp Sensor Cable

First Steps

Remove:

- Glass Panel
- LCD Panel
- Fan



Removal

- 1 Remove ambient temp sensor cable from fan, preserving black tape for reuse.

Reassembly Note:

Ambient temp sensor must extend exactly 1cm from plastic retaining ring on fan so that it will sit the proper distance from rear housing when installed.

Incorrect sensor placement can lead to false temperature readings and unusual fan behavior.





Logic Board

First Steps

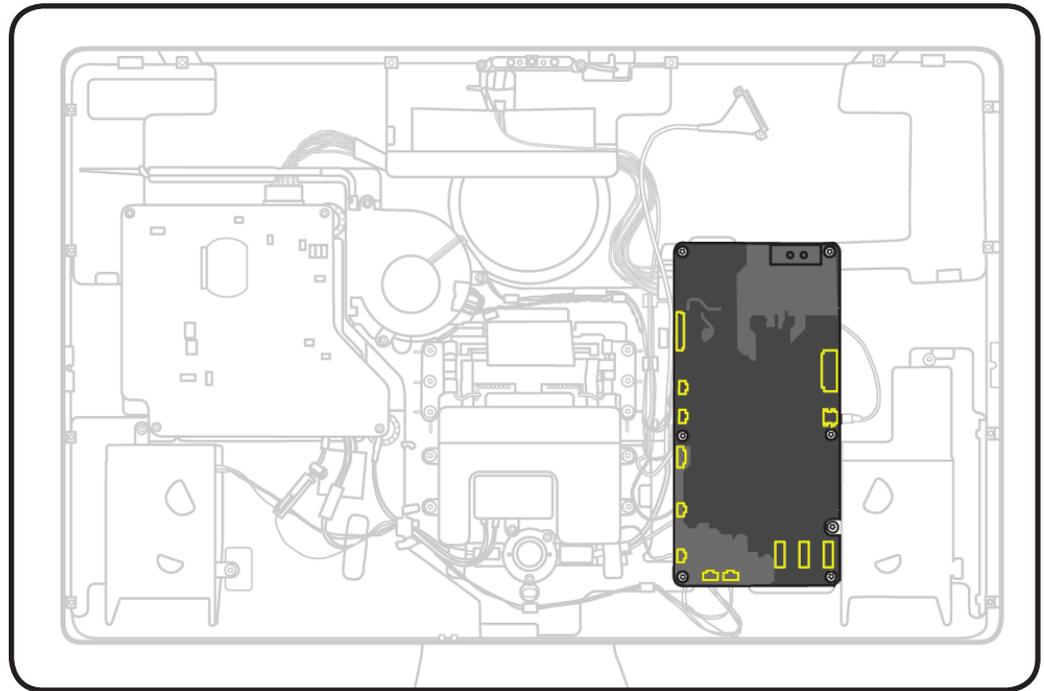
Remove:

- Glass Panel
- LCD Panel



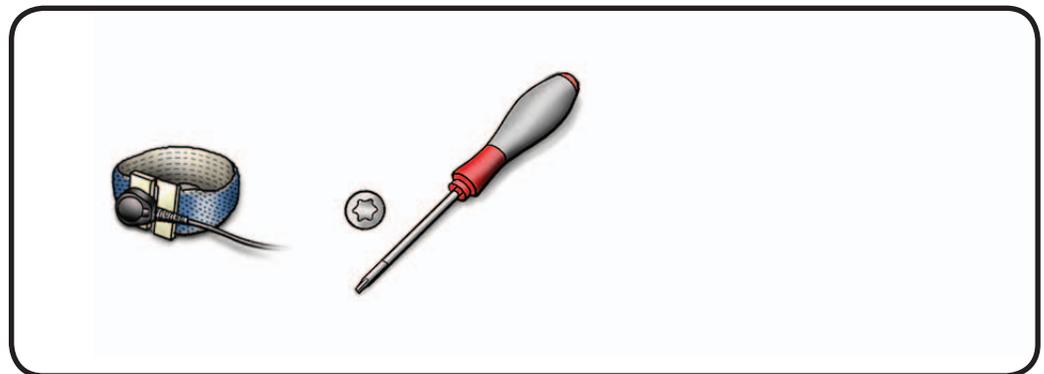
Warning: HIGH VOLTAGE:
Use extreme caution
when working around
the logic board if unit is
plugged in.

Important: When
replacing the LCD Panel,
use the [EDID Reset Tool](#).



Tools

- ESD wrist strap
- Torx T10 screwdriver



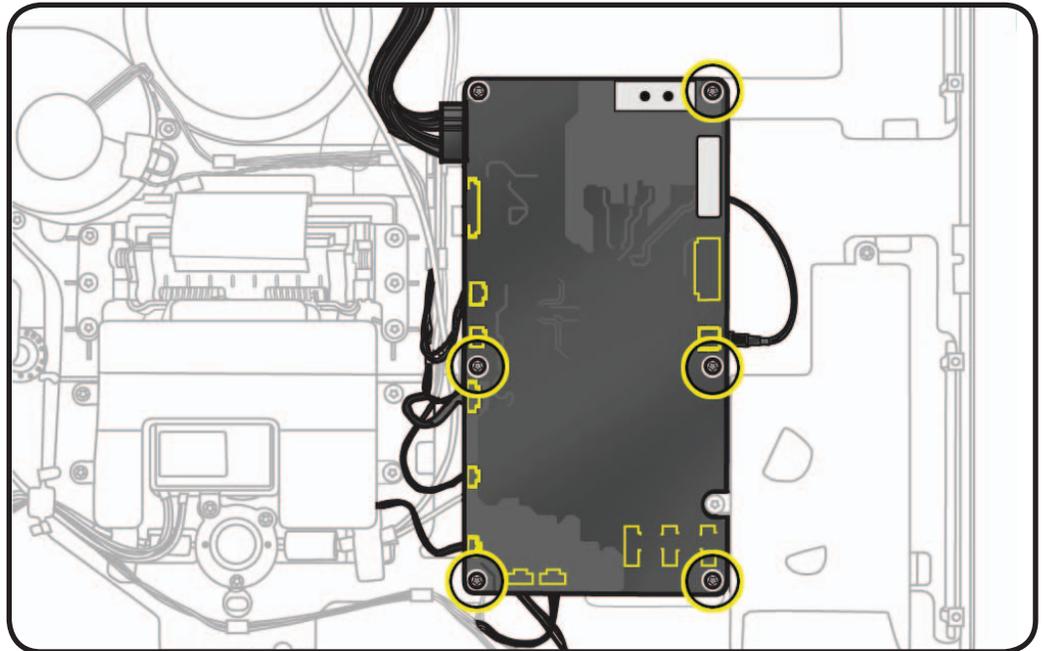


Removal

- 1 Remove T10 screws:
(5) 922-9348



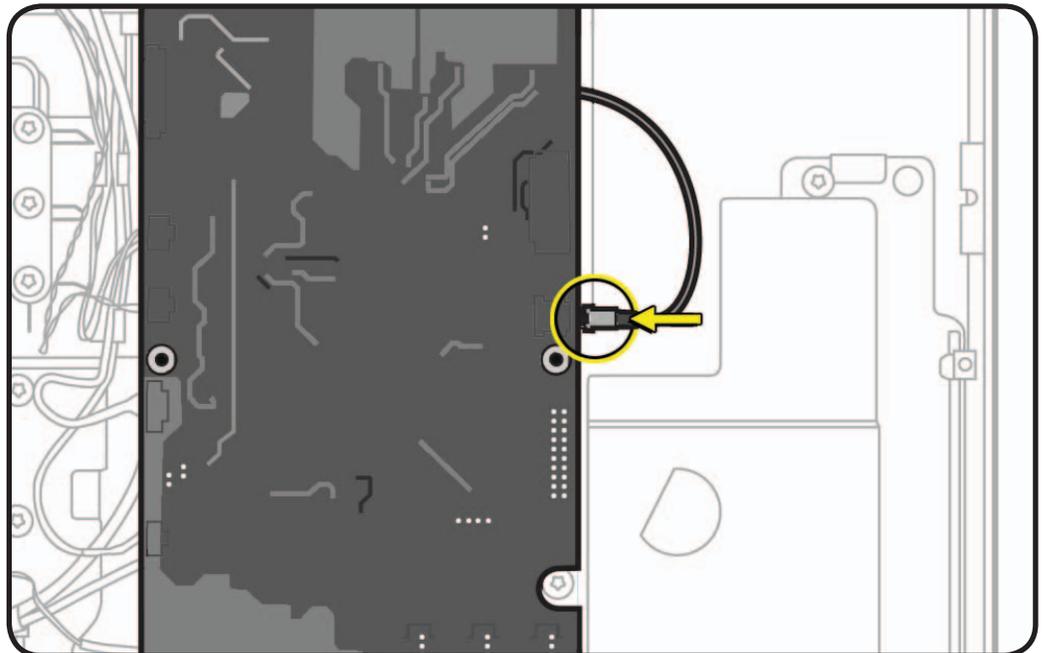
(top left screw was removed with LCD ground cable)



- 2 Disconnect USB uplink cable (part of all-in-one cable) from right side of logic board

Reassembly Note:

Make sure USB uplink cable rests against foam gasket on top left side of right speaker, to avoid vibration noise.



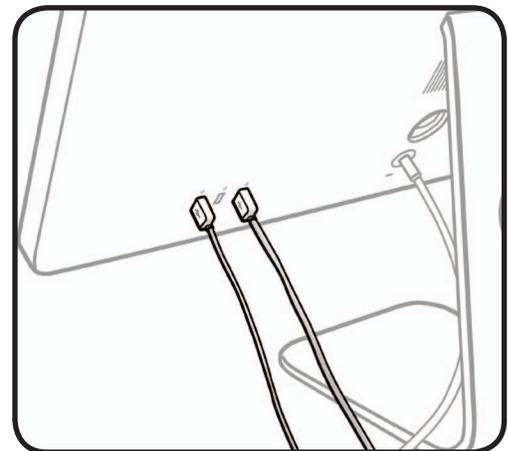
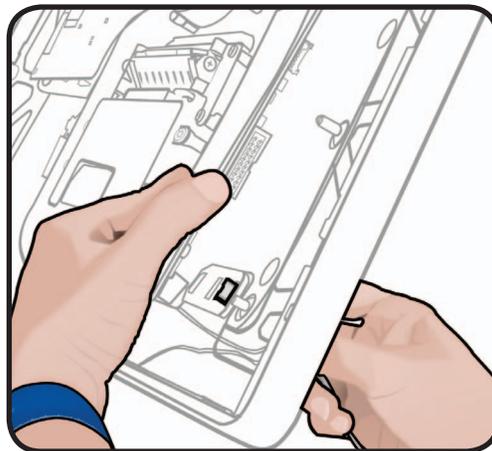
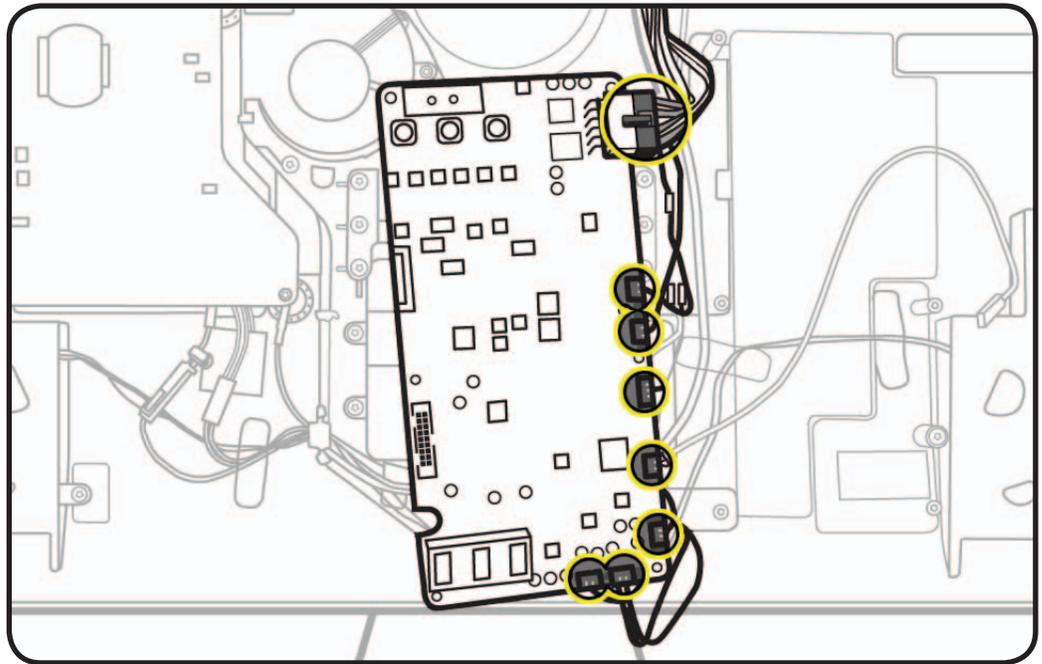


- 3** Flip logic board over and disconnect remaining cables.

Note: See next page for a map of logic board connectors.

Reassembly Notes:

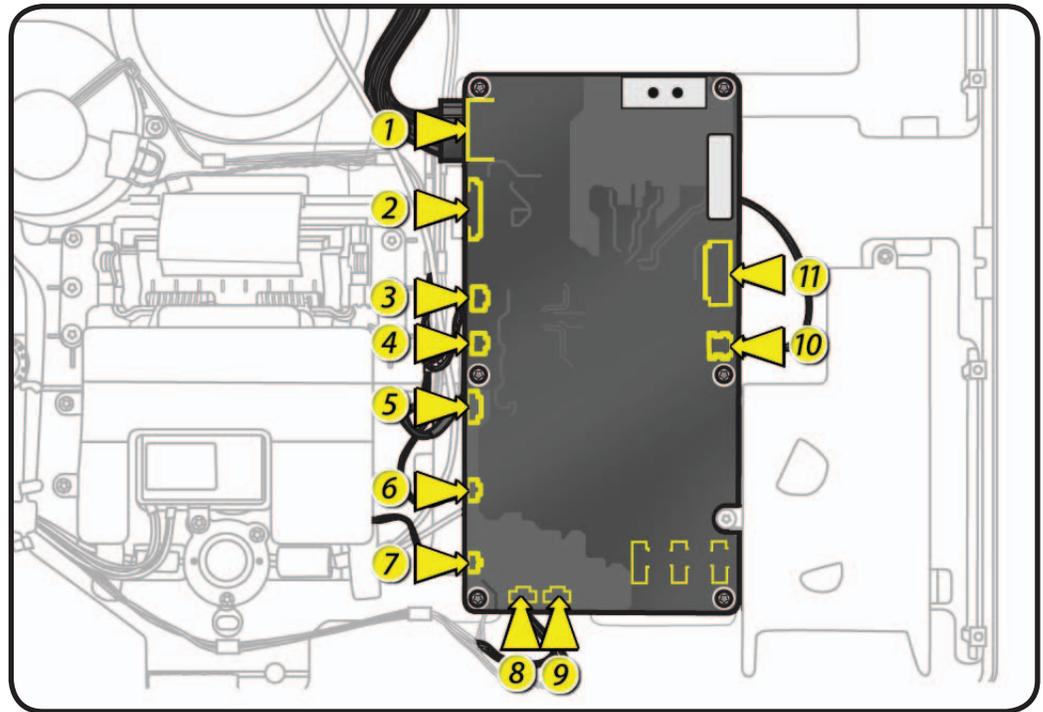
- Connect 8 cables with reverse side of MLB facing you, then flip board into regular position and connect USB uplink cable.
- Avoid trapping DisplayPort cable underneath other cables to left of logic board. DisplayPort cable needs slack in order to be reconnected to LCD.
- For proper USB port alignment, connect two USB cables through port openings as you replace logic board and until board is securely fastened.





Logic Board Connectors

1. DC power
2. LCD function
3. fan (4-pin)
4. ambient temp sensor (3-pin)
5. camera (7-pin)
6. microphone (3-pin; translucent white)
7. subwoofer (2-pin)
8. left speaker (5-pin)
9. right speaker (4-pin)
10. USB uplink (metal; part of all-in-one cable)
11. LED backlight driver (part of LCD panel)

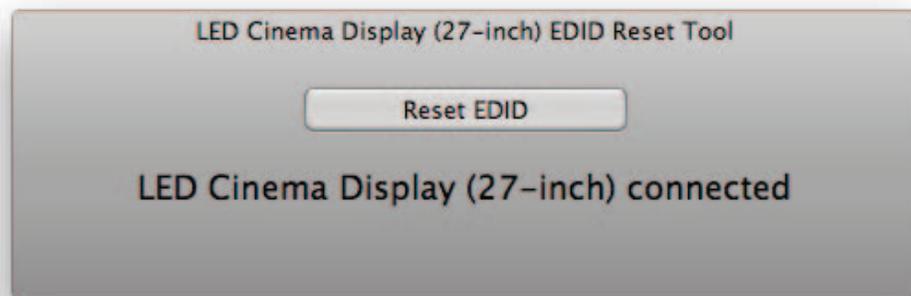




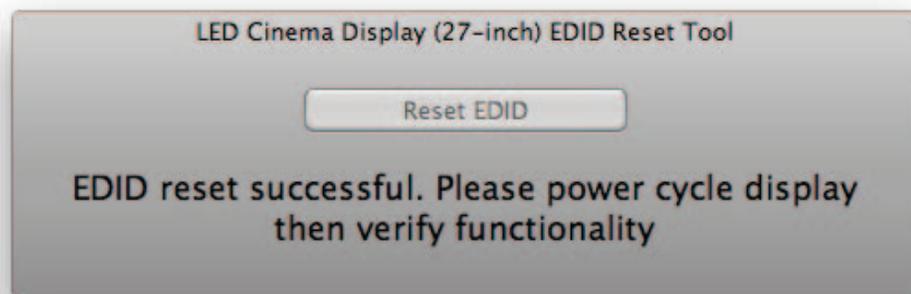
EDID Reset Tool

After replacing the LCD panel or the logic board in an LED Cinema Display (27-inch), run the EDID Reset Tool to reset the Extended Display Identification Data (EDID). If this tool is not used when the LCD panel and/or logic board are replaced, software features such as the brightness control may not be available.

1. Download the EDID Reset Tool from Service Source, by navigating the Product Browser to “Displays” and then to “LED Cinema Display (27-inch).”
2. Launch the EDID Reset Tool on a host computer that is connected to the LED Cinema Display (27-inch) under test. The following window will appear:



3. Select the “Reset EDID” button. The Extended Display Identification Data in the logic board will be reset and the following message will appear:



4. Unplug the display’s power cord from AC outlet, wait at least 10 seconds, and then reconnect to AC power in order to cycle the unit. The window above should re-appear on the screen.
5. Verify that System Preferences: Displays has a Brightness slider control present.
6. The reset process is now complete.

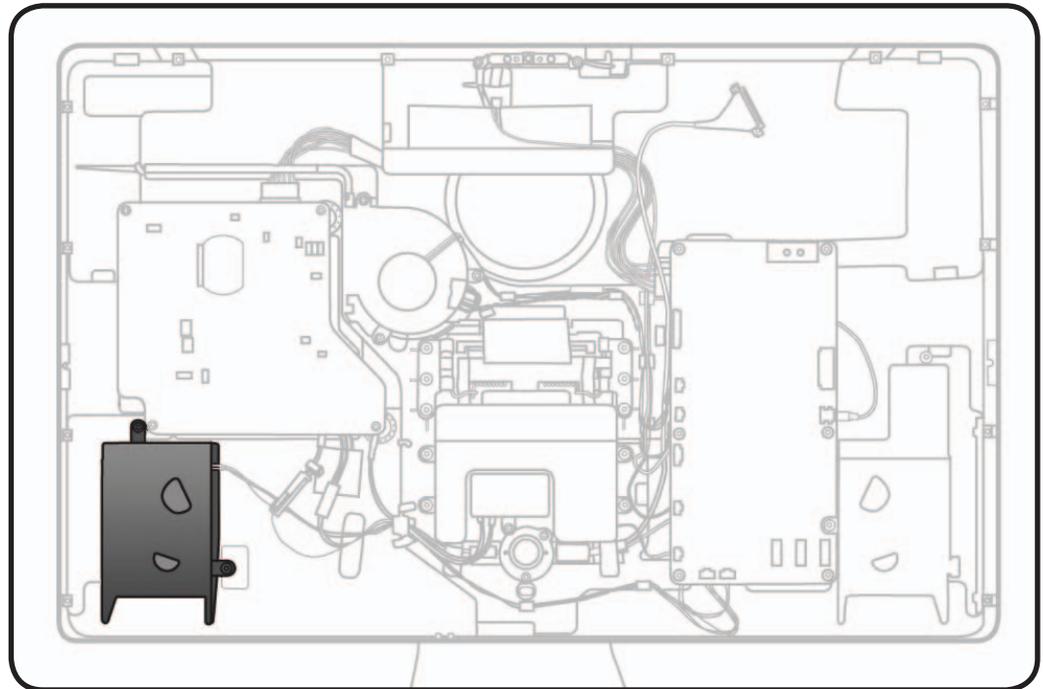


Left Speaker

First Steps

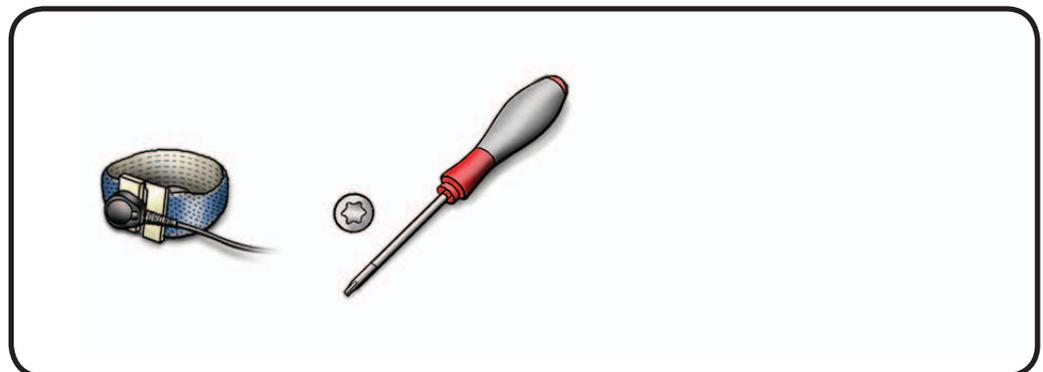
Remove:

- Glass Panel
- LCD Panel



Tools

- ESD wrist strap
- Torx T10 screwdriver





Removal

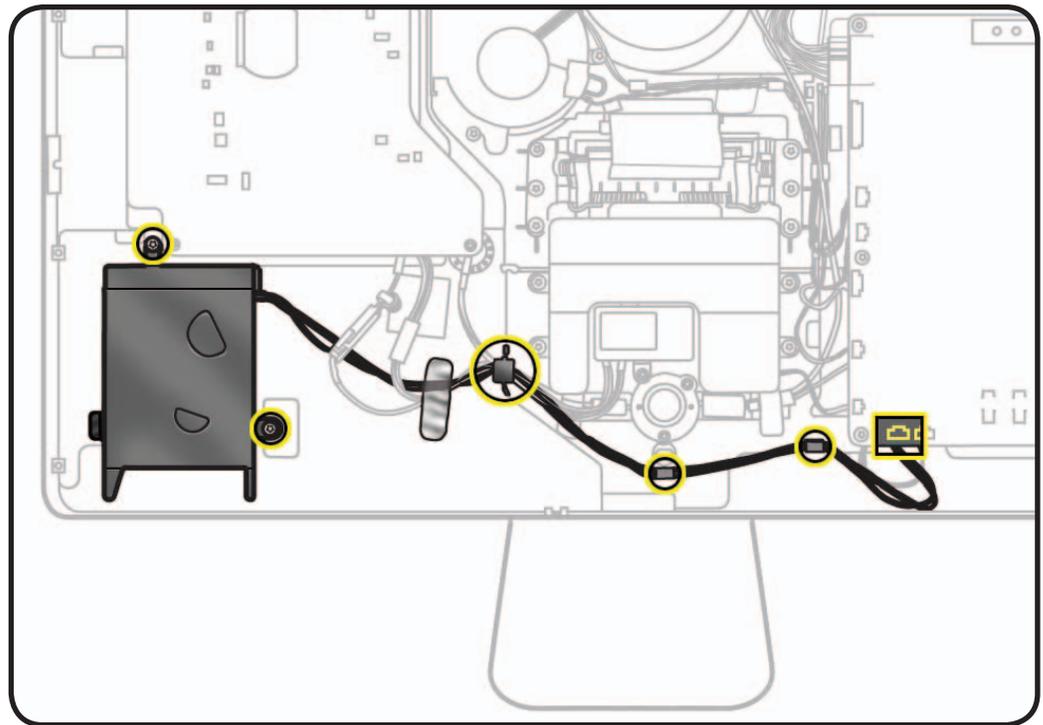
- 1 Remove T10 screws:
(2) 922-9236



- 2 Note cable routing and tape placement along rear housing.

- 3 Disconnect 5-pin speaker cable from logic board.

- 4 Remove speaker from rear housing.

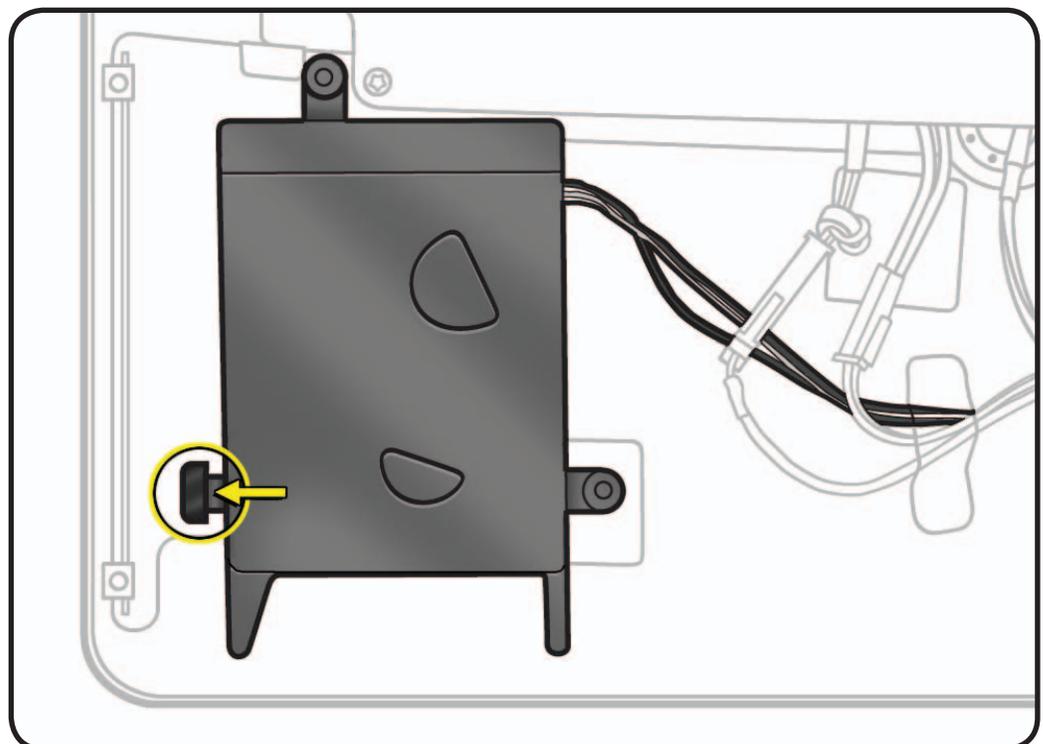


Reassembly Note:

Insert tab into guide in rear housing.

Reassembly Note:

For easier access to reconnect cables, unscrew and flip over logic board.



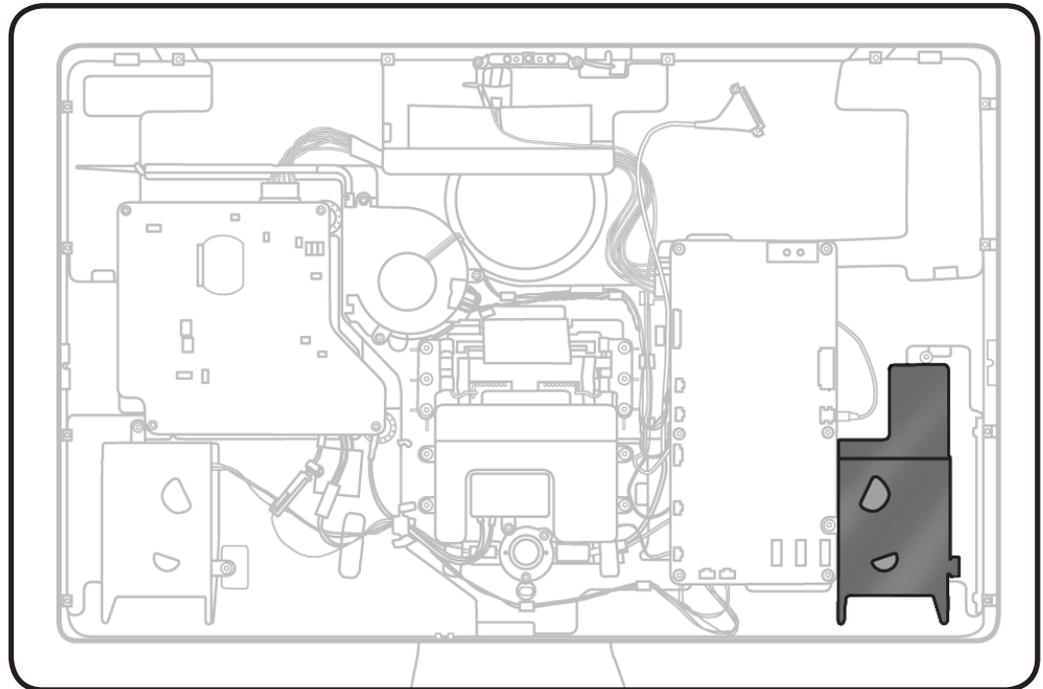


Right Speaker

First Steps

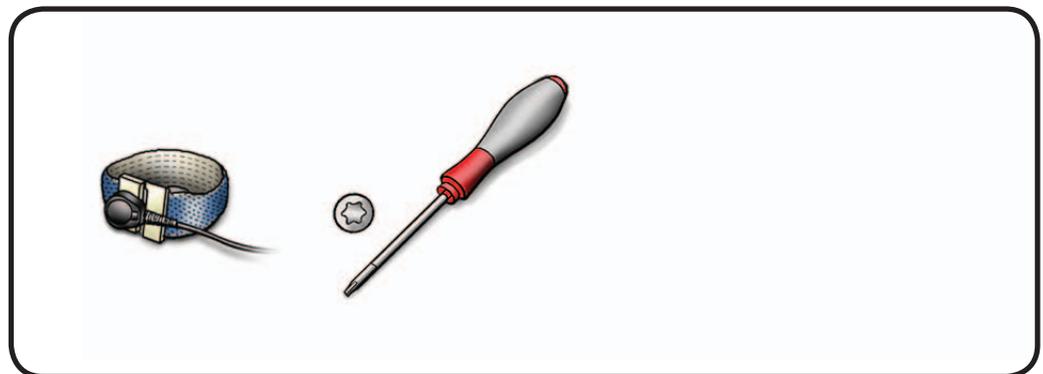
Remove:

- Glass Panel
- LCD Panel
- Logic Board



Tools

- ESD wrist strap
- Torx T10 screwdriver



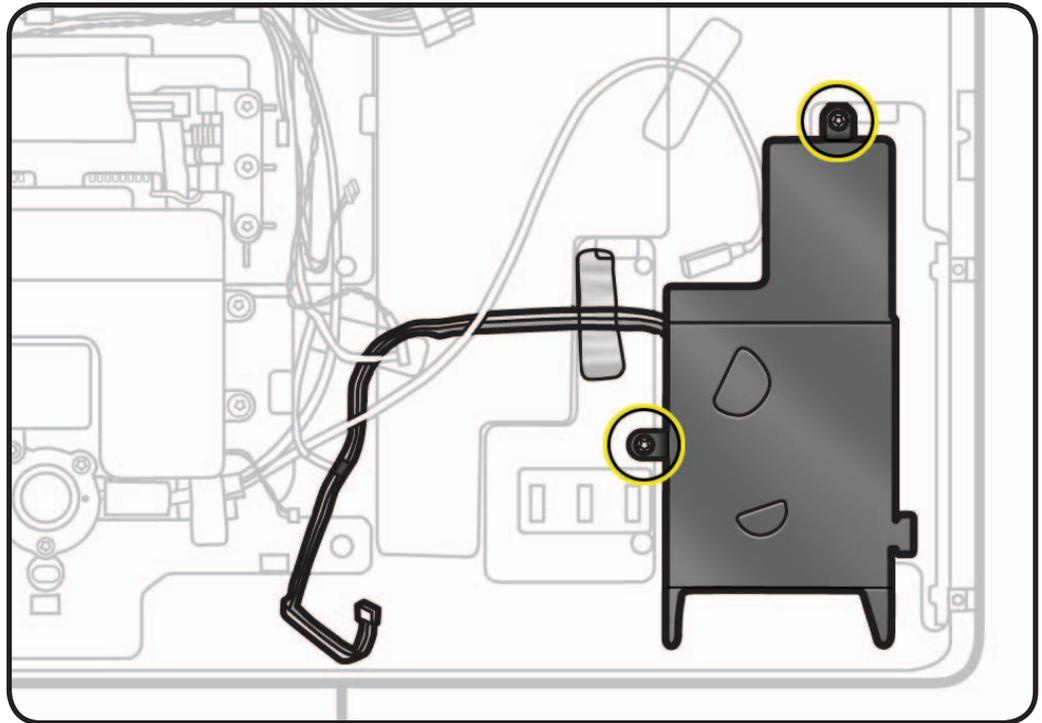


Removal

- 1 Remove T10 screws:
(2) 922-9236

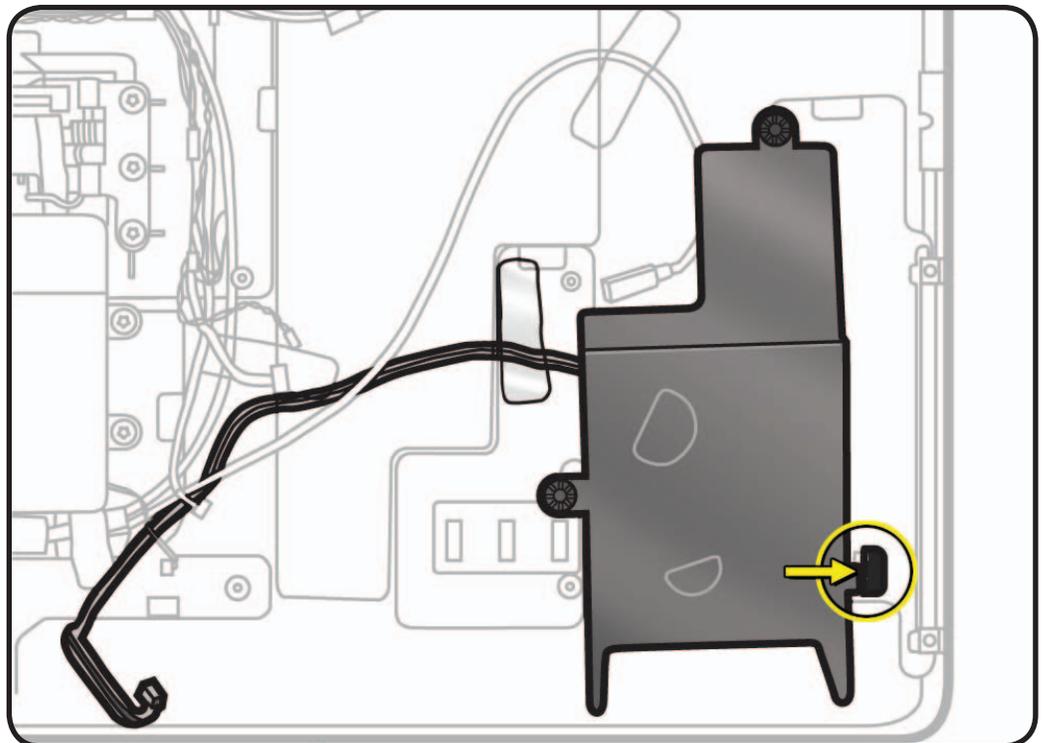


- 2 Note cable routing and tape on rear housing.
- 3 Remove speaker from rear housing.



Reassembly Notes:

- Insert tab into guide in rear housing.
- Make sure USB uplink cable rests against foam gasket on top left of speaker, to avoid vibration noise.



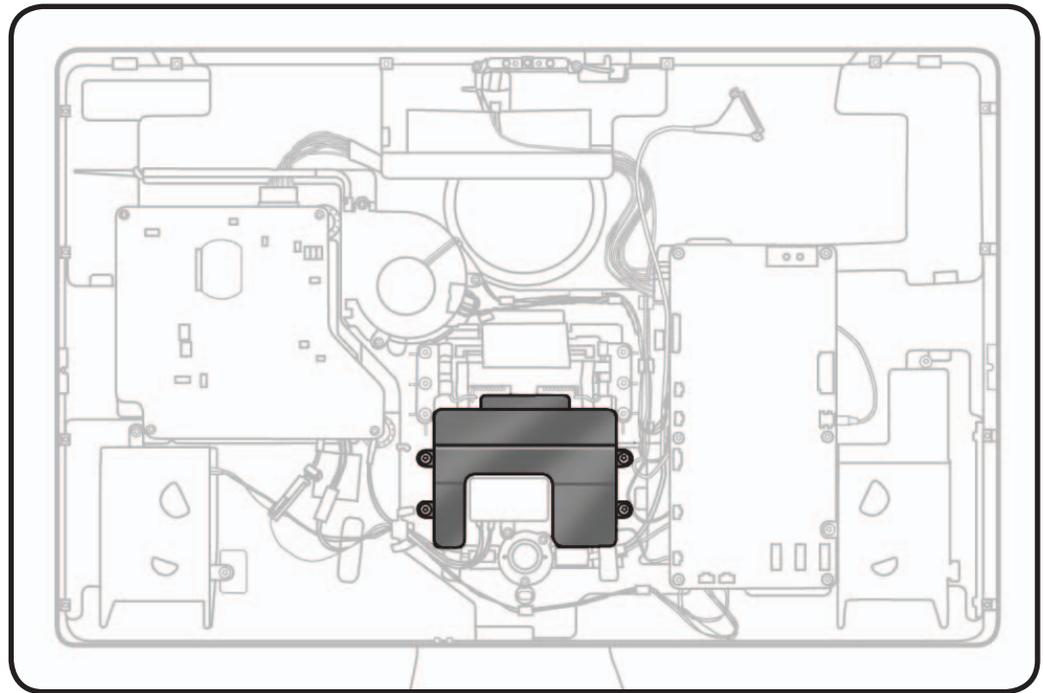


Subwoofer

First Steps

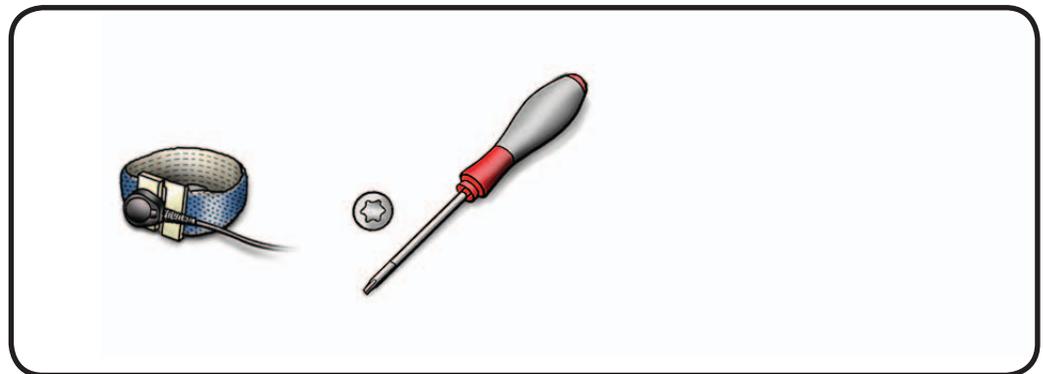
Remove:

- Glass Panel
- LCD Panel



Tools

- ESD wrist strap
- Torx T10 screwdriver





Removal

- 1 Remove T10 screws:
(4) 922-9722

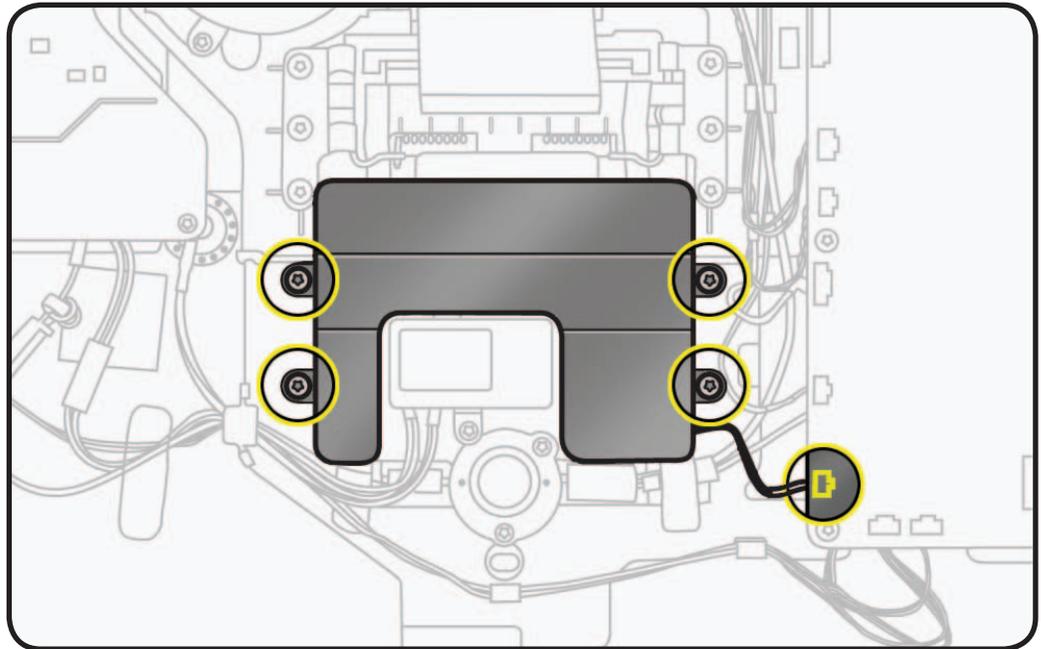


- 2 Disconnect 2-pin subwoofer cable from logic board

Reassembly Note:

For easier access to reconnect cables, unscrew and flip over logic board.

- 3 Remove subwoofer from rear housing.



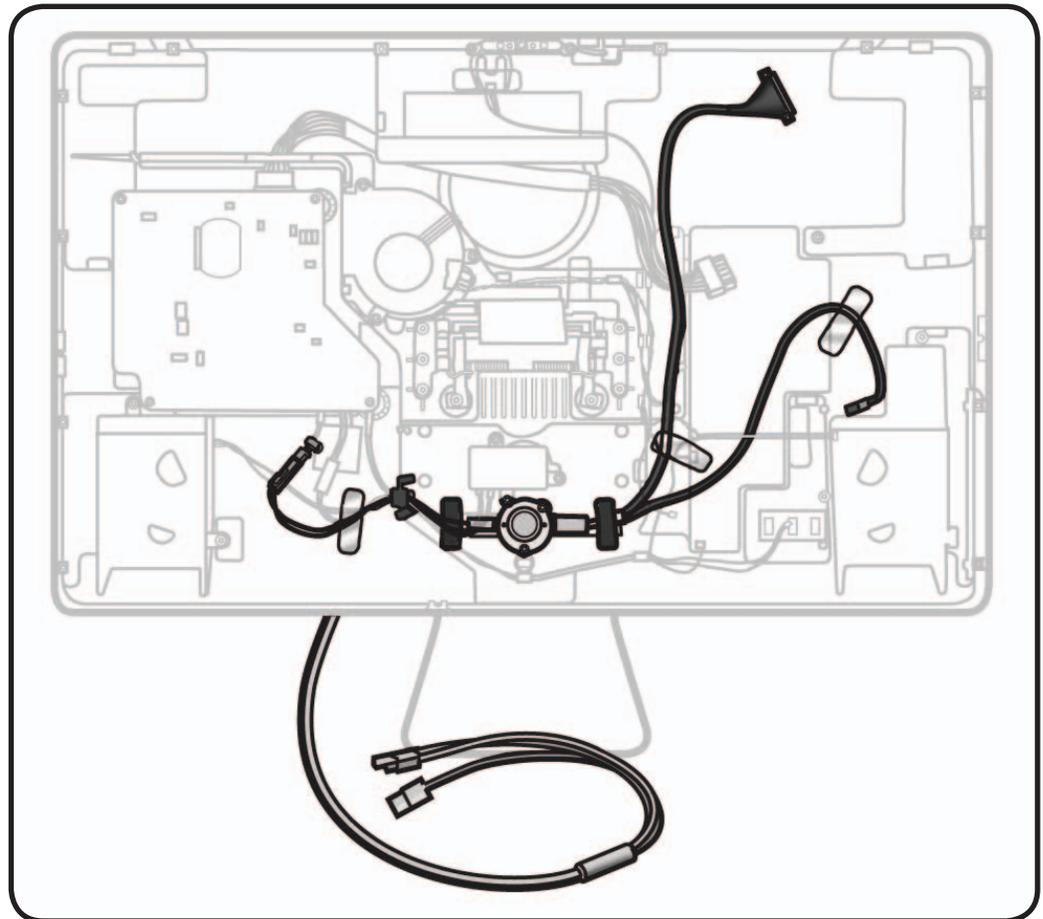


All-in-One Cable

First Steps

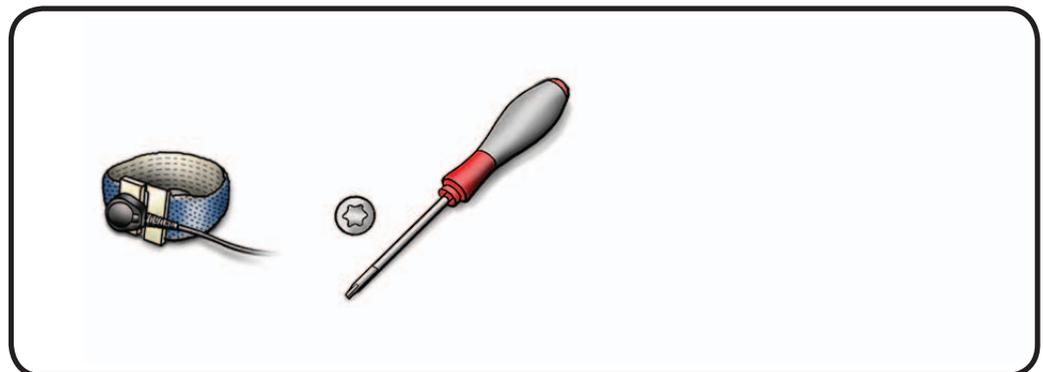
Remove:

- Glass Panel
- LCD Panel
- Logic Board
- Subwoofer



Tools

- ESD wrist strap
- Torx T10 screwdriver





Removal

- 1 Remove T10 screws:
(1) 922-8685, machine,
top left (also secures
gasket and AC inlet)



- (2) 922-9351



Loosen 2 other T10
screws on AC inlet.

- 2 Remove round metal
bracket.

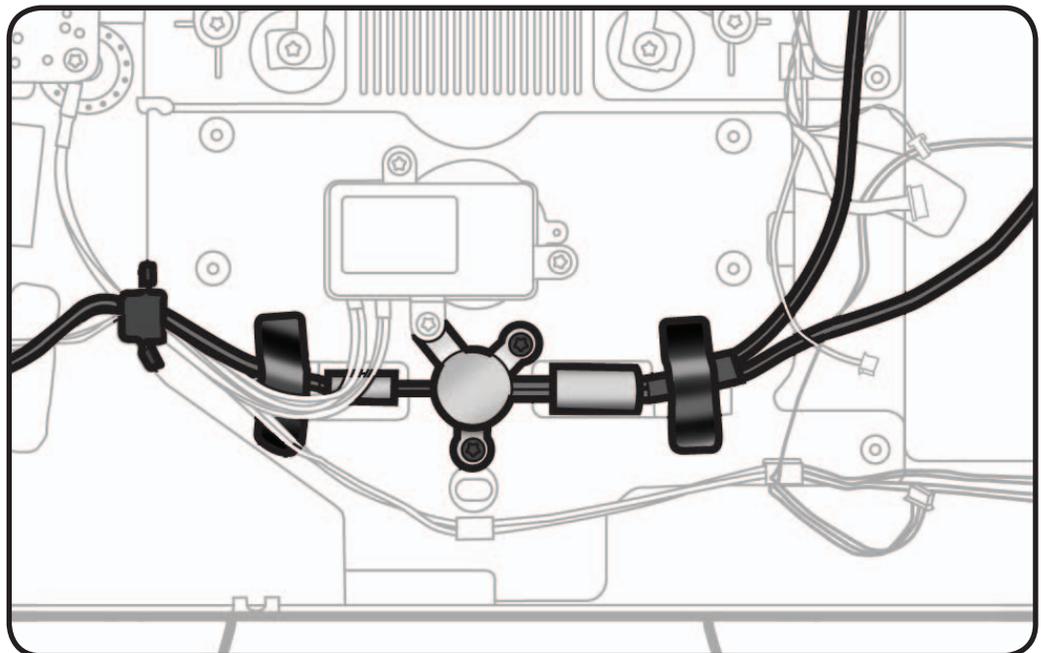
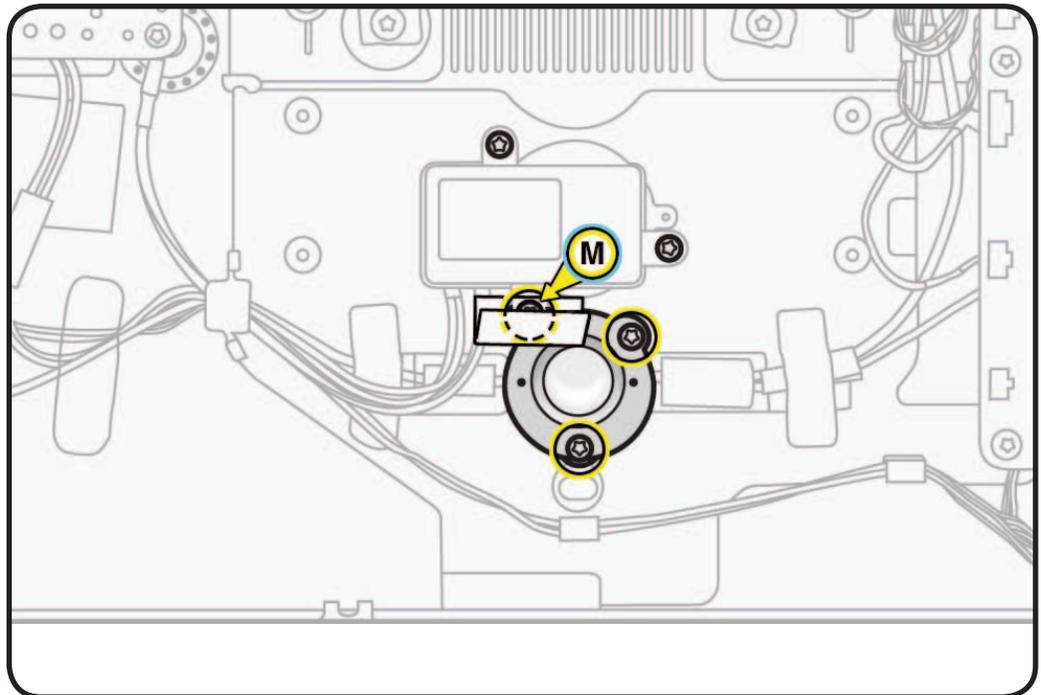
Reassembly Note:

Bracket tucks underneath
metal tab of AC inlet.

- 3 Note cable routing and
tape securing the USB
uplink, DisplayPort,
and power cables
inside rear housing.

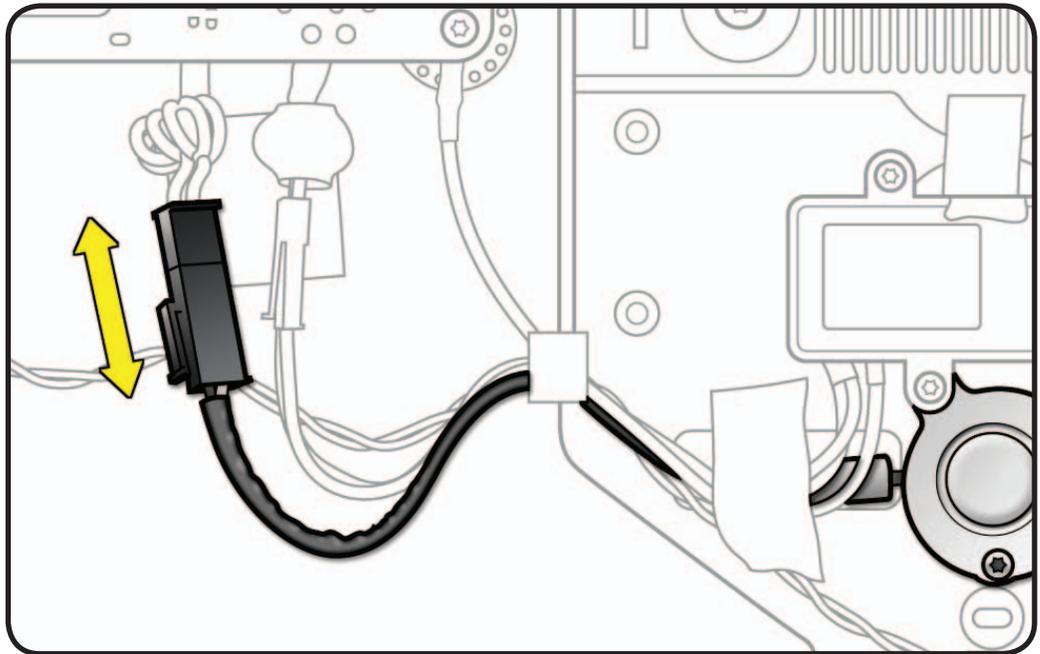
- 4 Peel back tape
securing cables to rear
housing, and "H" tape
securing power cable
to pressure wall.

- 5 Loosen ferrite beads
from rear housing.

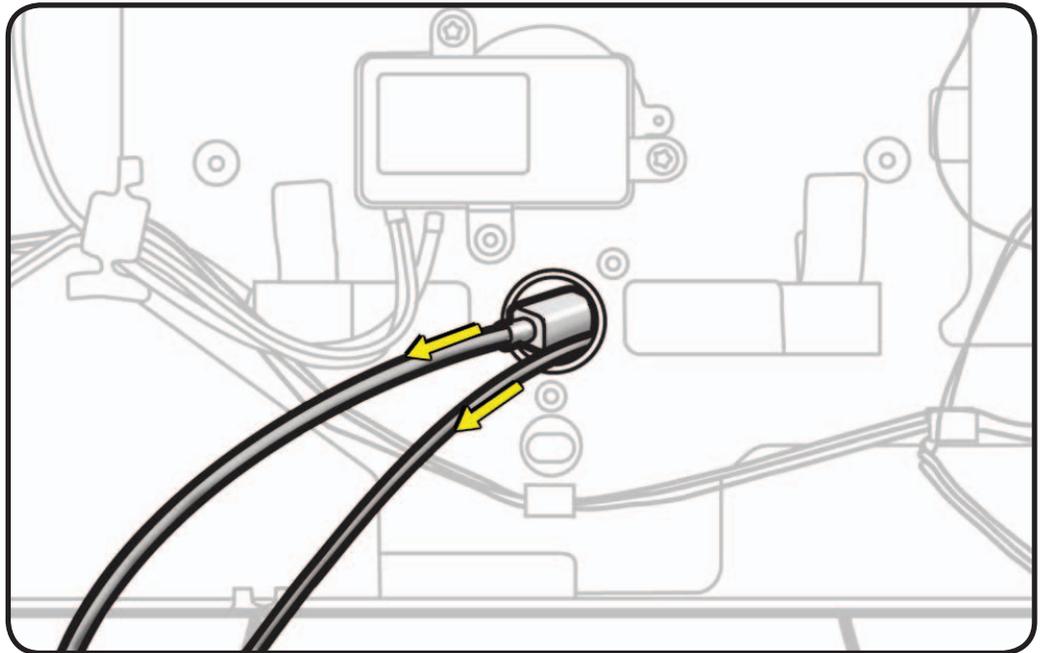




- 6** Disconnect cable from power supply.



- 7** Pull all-in-one cable through opening in rear housing, feeding three cable ends through opening one at a time.



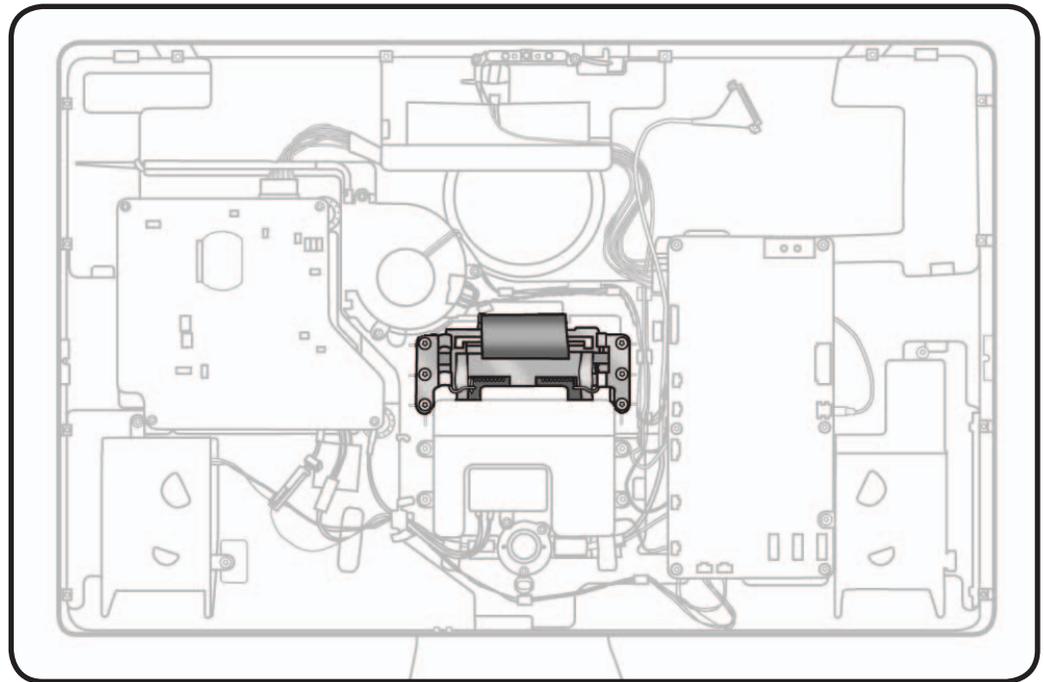


Mechanism

First Steps

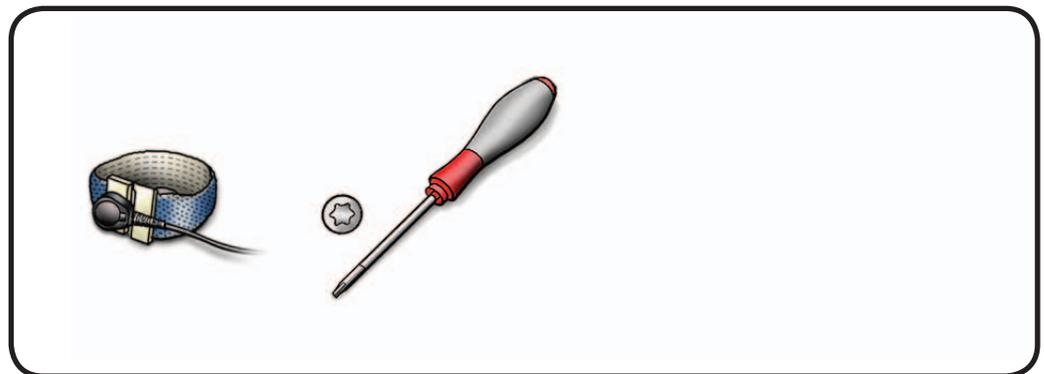
Remove:

- Glass Panel
- LCD Panel
- Subwoofer
- Stand



Tools

- ESD wrist strap
- Torx T10 screwdriver



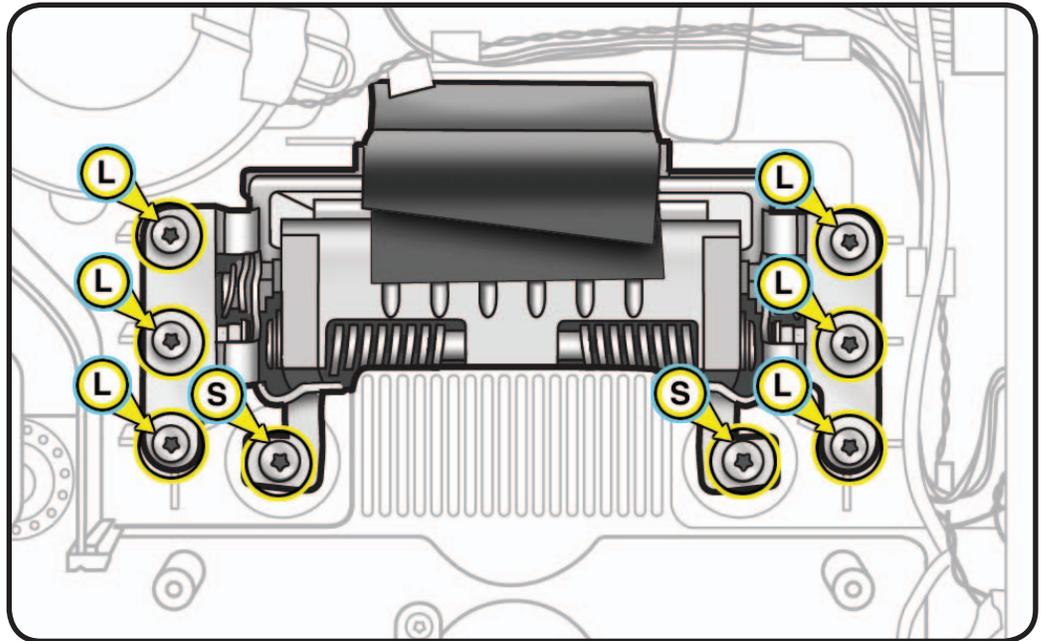


Removal

- 1 Remove T10 screws:
(6) 922-9349, long

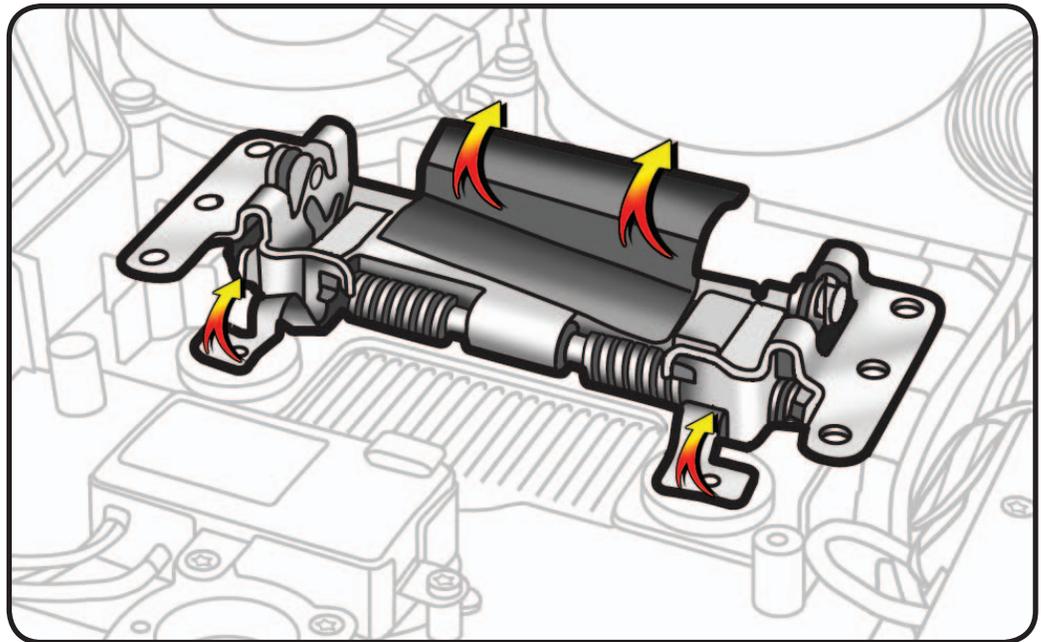


- (2) 922-9353, short,
with black circle
gaskets on the head



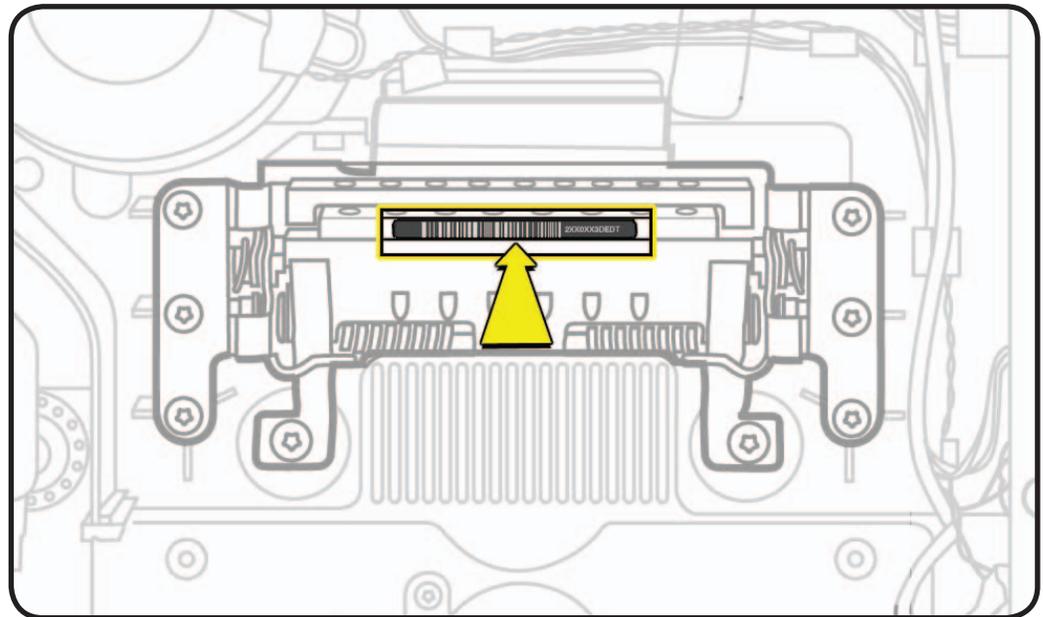
- 2 Peel back EMI mesh
tape strips (was under
screws) and wide black
EMI tape.

- 3 Remove mechanism
from rear housing.
Note: Strong adhesive,
may require some
force.





Replacement Note:
If installing a new mechanism, transfer serial number sticker to new part.



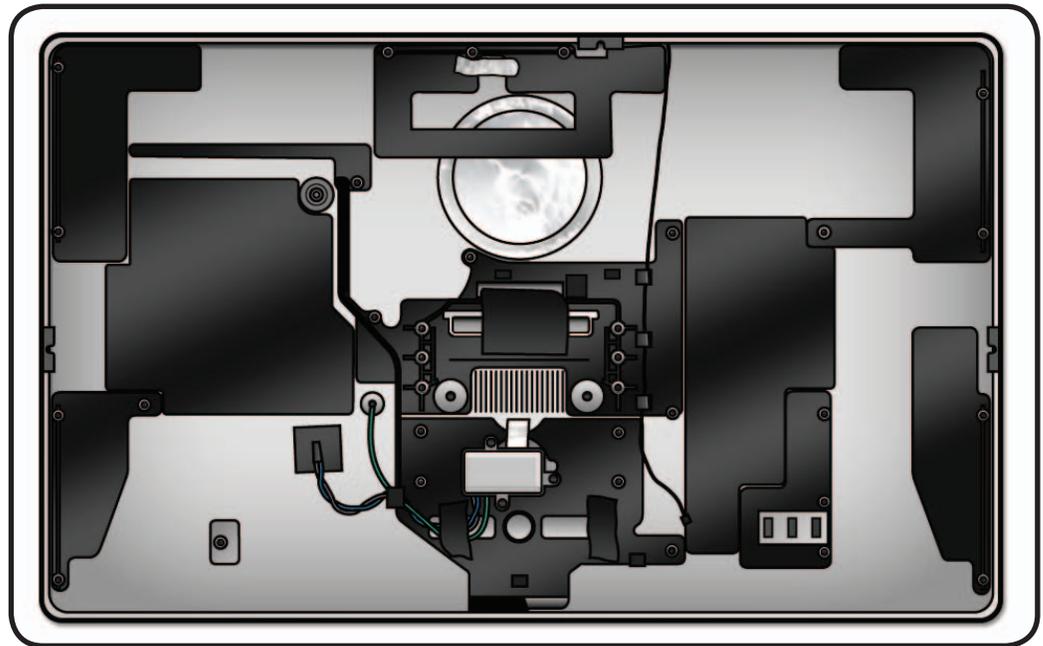


Rear Housing

First Steps

Remove:

- Glass Panel
- LCD Panel
- Camera
- Camera Cable
- Power Supply
- Logic Board
- DC Power Cable
- Fan
- Left Speaker
- Right Speaker
- Subwoofer
- All-In-One Cable
- Stand
- Mechanism



With all other modules removed, rear housing is the remaining assembly.

A new rear housing includes the following parts, which are not available separately:

- microphone cable
- AC inlet

A new rear housing also includes:

- new "H" tape for DC power cable
- new "H" tape for pressure wall below power supply and subwoofer
- new wide black EMI tape for mechanism
- new aluminum foil tape for camera cable

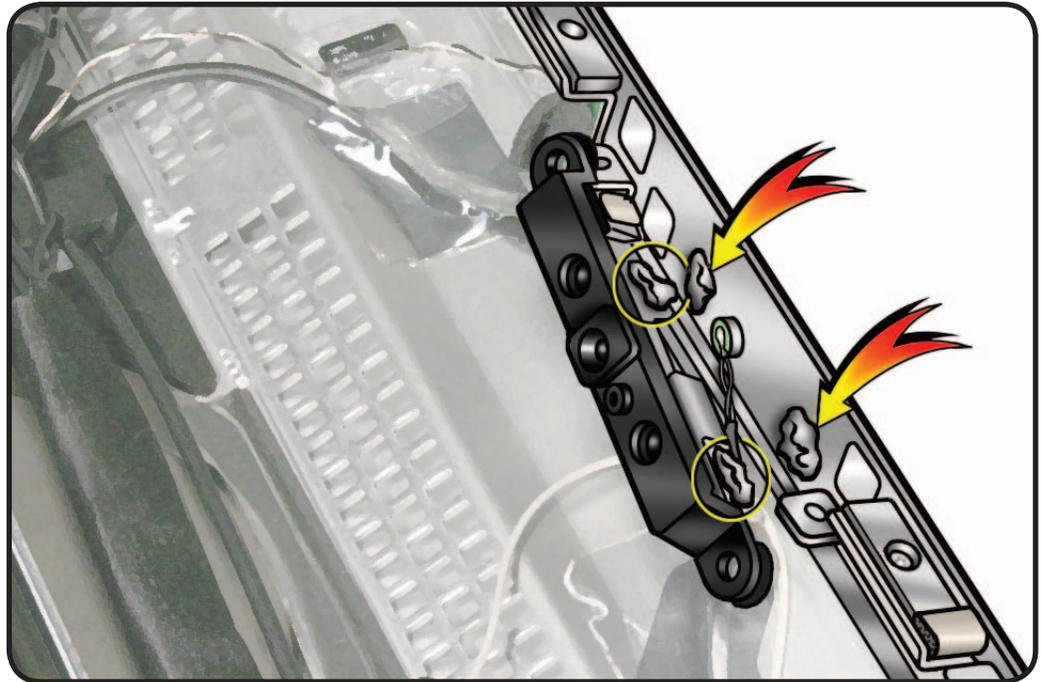


Camera Thermal Paste

Transfer camera from old rear housing to new rear housing and reuse thermal paste from old rear housing.

Use a black stick to remove and reapply thermal paste to camera (areas circled).

Note: A syringe of thermal paste is available as needed, Apple part# 922- 9625, good for 5 applications.



Additional Procedures

LED Cinema Display (27-inch)



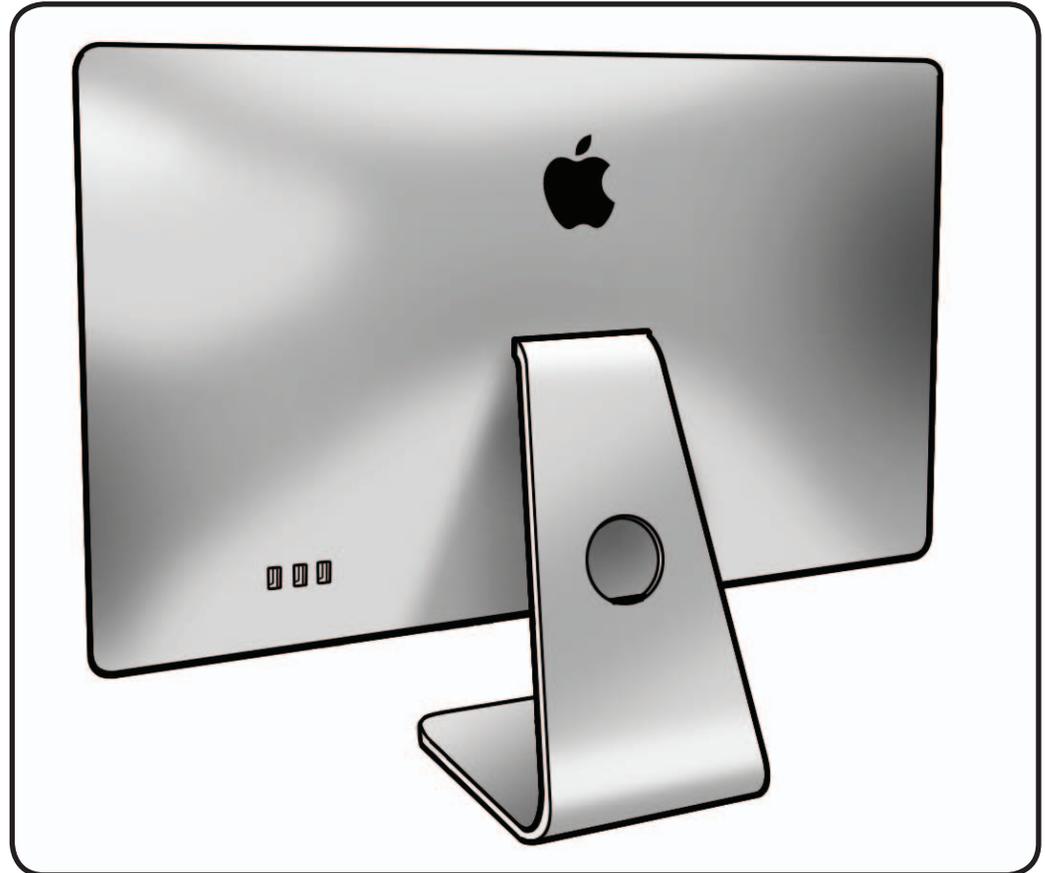
Retrieving Mechanism

Overview

Without a stand or VESA mount installed, the mechanism can retract inside the unit if an access card trips the latch that locks the mechanism.

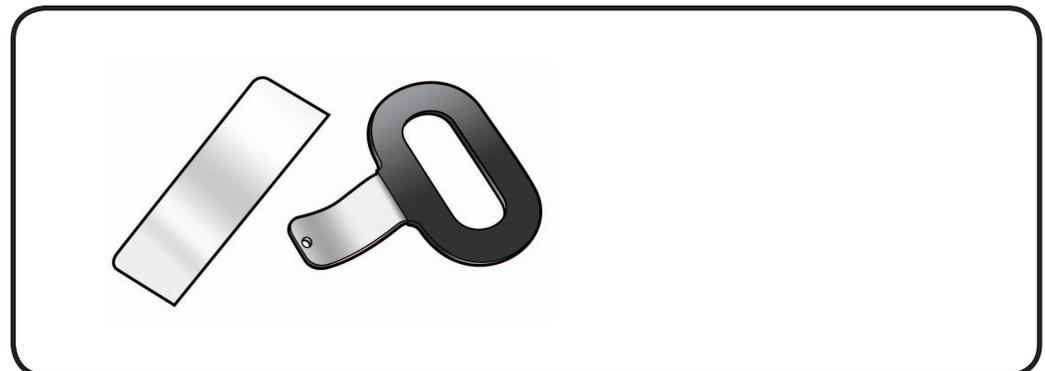
In the rare event that retrieving the mechanism is necessary, follow this procedure.

Note: You may notice small differences in appearance between the images in this procedure and the computer you are servicing. Although the appearance may differ, the steps and sequence are the same unless noted.



Tools

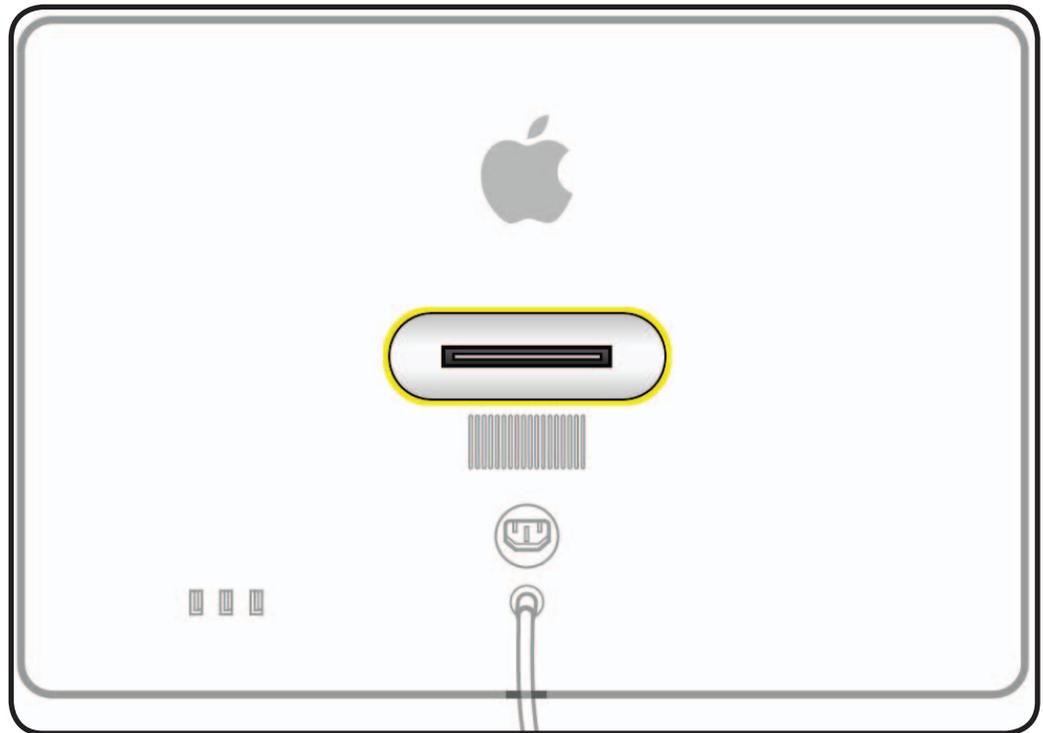
- Access card (Apple part #922-7172)
- Retrieval tool (Apple part #922-7849)
- Scissors to cut access card in half



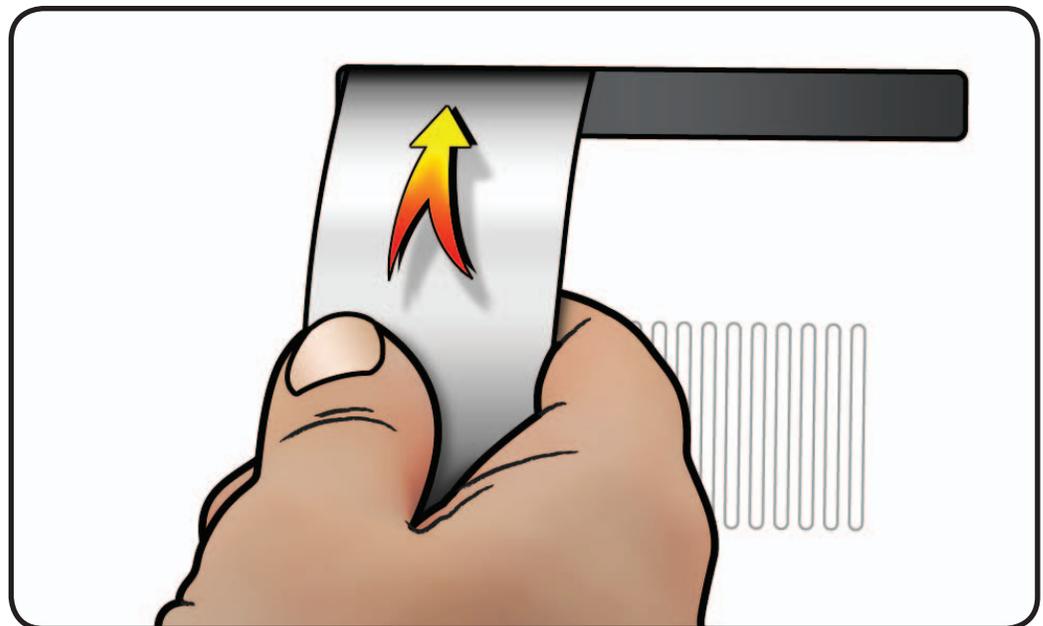


Removal

- 1 Place unit face down on a clean, soft surface.
- 2 Peer into stand slot to see recessed latch. Latch is a shiny metal spring clip located above mechanism that is almost as wide as stand slot.

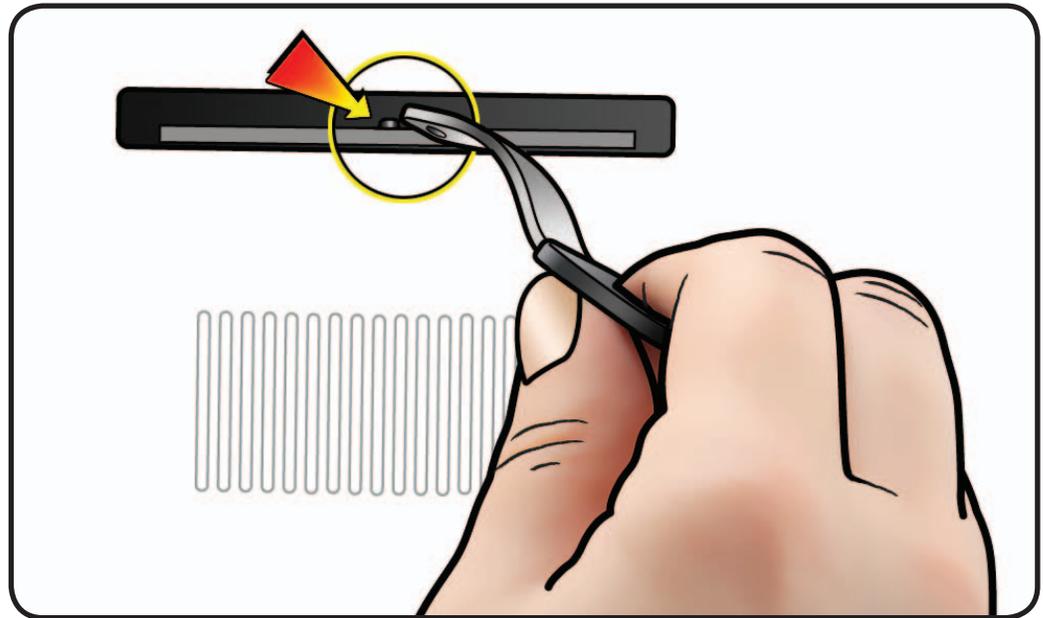


- 3 Cut access card in half vertically, into two equal halves.
- 4 Insert half of access card into one end of stand slot and push latch away to get a sense of how latch moves.





5 Notice shape of retrieval tool. When inserting retrieval tool, make sure curved end of tool is down, as shown.



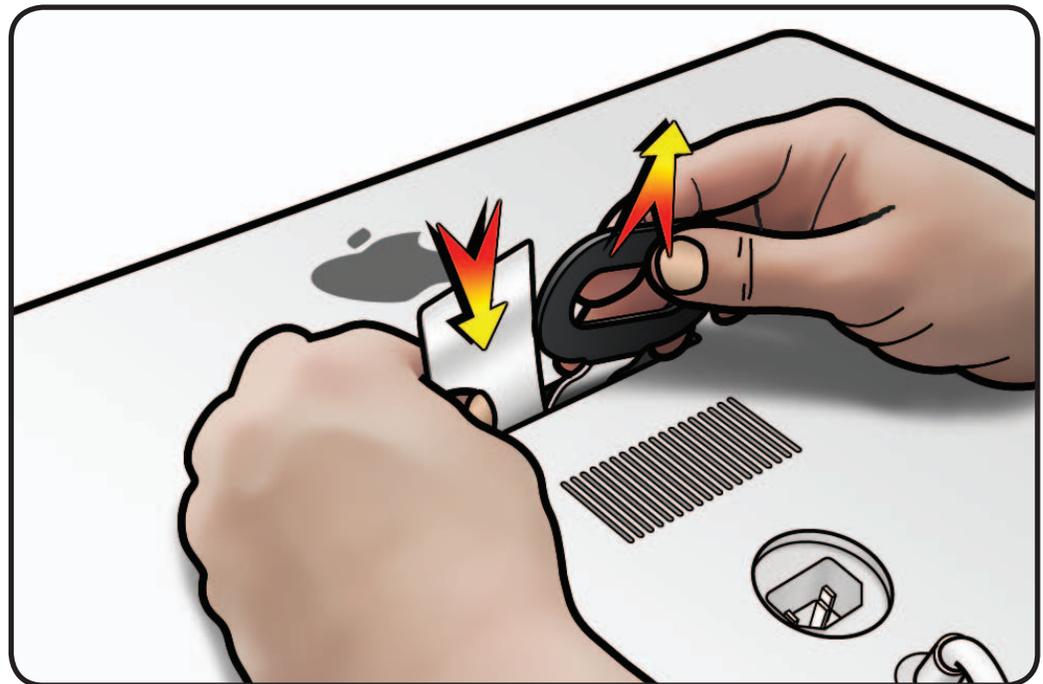
6 The small hole on end of retrieval tool will hook onto pin on recessed mechanism.

7 Hold access card so latch is pushed as far as possible.

8 Align retrieval tool over pin on mechanism.

9 Have an assistant hold unit down firmly as you simultaneously push latch away and pull mechanism towards you.

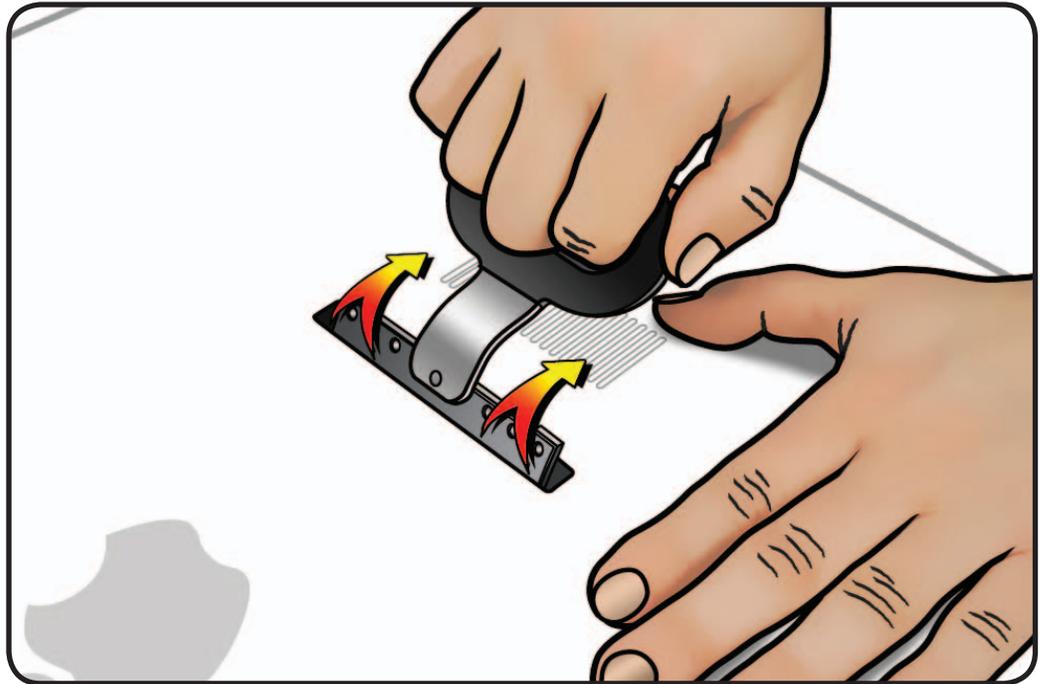
Note: There is a lot of tension on mechanism and it will take a lot of force to pull it up.



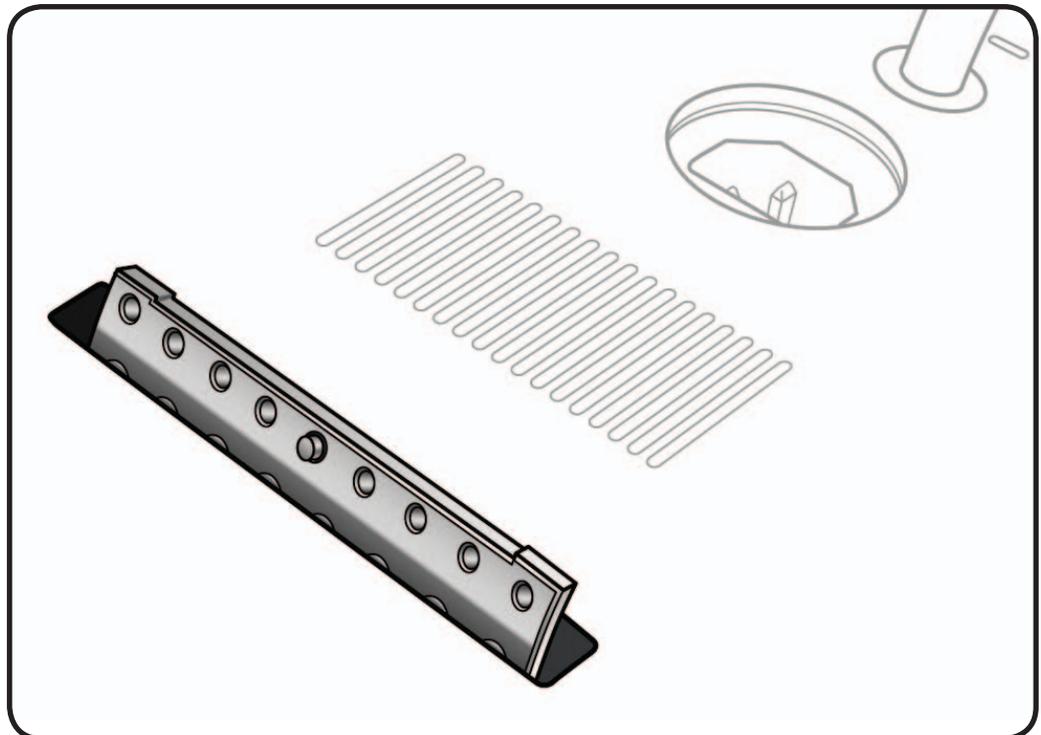


10 When you can pull up mechanism and see it emerge through slot, maintain pull force on retrieval tool, but remove access card.

11 Pull up mechanism until it clicks or locks into place.



12 Mechanism is now ready to accept installation of stand or VESA mount.

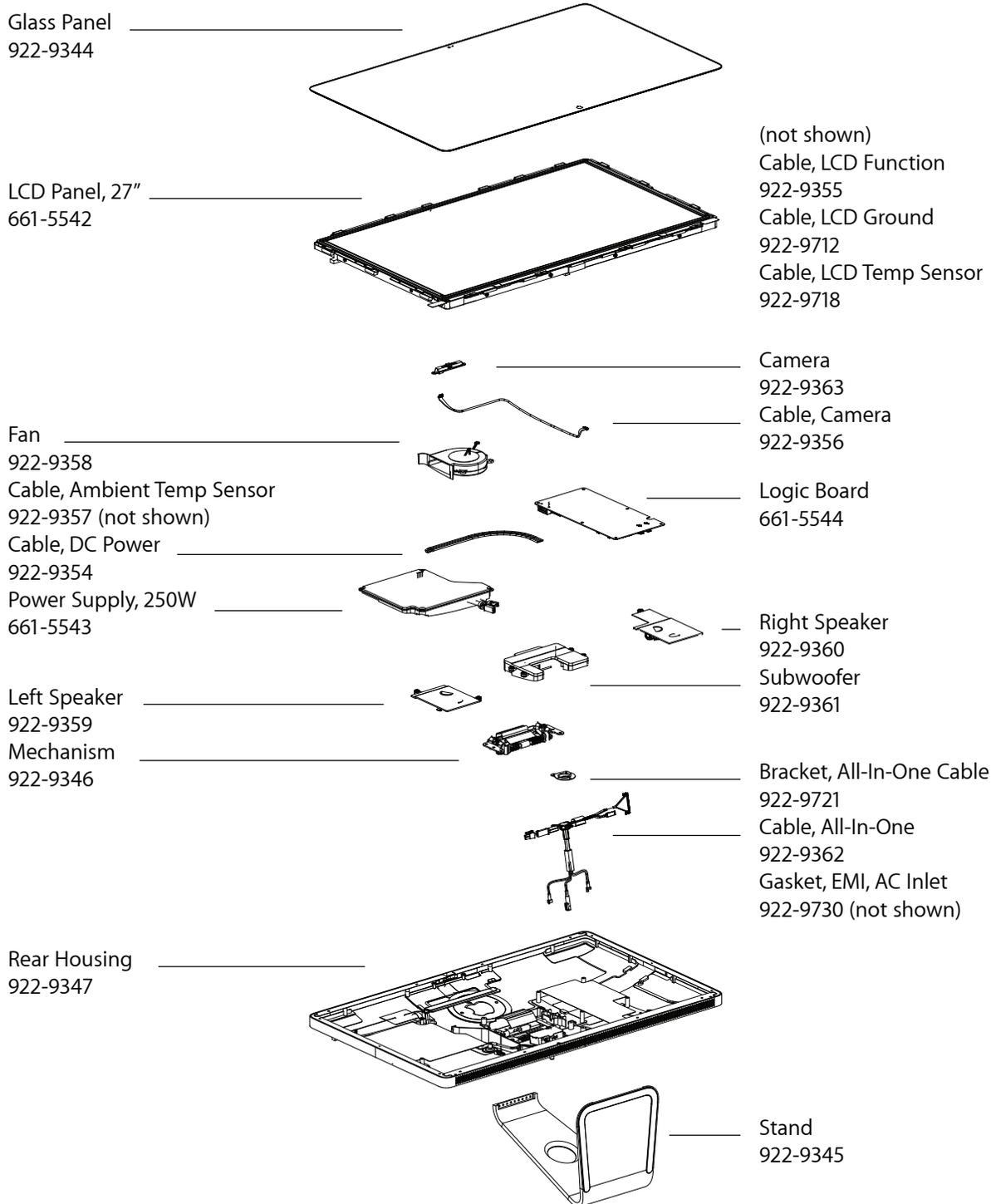


Views

LED Cinema Display (27-inch)



Exploded View





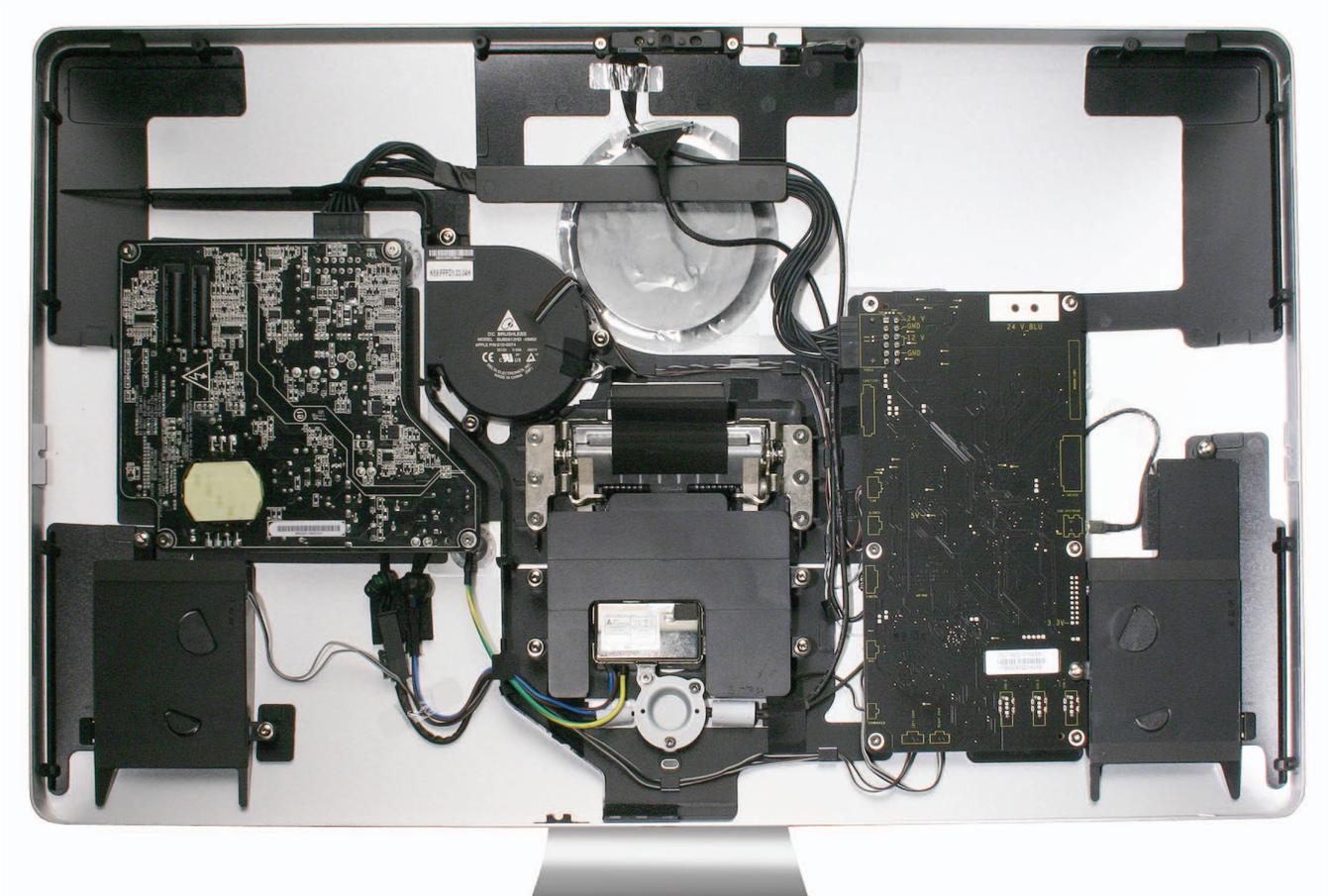
Screw Chart

<p>922-8685 T10, machine</p>  <p>Power Supply (2); All-in-One Cable Bracket (1)</p>	<p>922-8749 T10, machine</p>  <p>Stand (8)</p>	<p>922-9236 T10, shoulder</p>  <p>Left Speaker (2); Right Speaker (2)</p>
<p>922-9348 T10</p>  <p>LCD (12); Power Supply (2); Logic Board (6); AC Inlet (2)</p>	<p>922-9349 T10</p>  <p>Mechanism (6)</p>	<p>922-9351 T10</p>  <p>All-in-One Cable Bracket (2)</p>
<p>922-9353 T10, with foam gasket</p>  <p>Mechanism (2)</p>	<p>922-9722 T10, shoulder</p>  <p>Fan (3); Subwoofer (4)</p>	<p>922-9723 T10, shoulder</p>  <p>Camera (2)</p>
<p>922-9724 Phillips #0</p>  <p>LCD Ground Cable (1)</p>		



Internal Views

Photo of Components below LCD





External Views

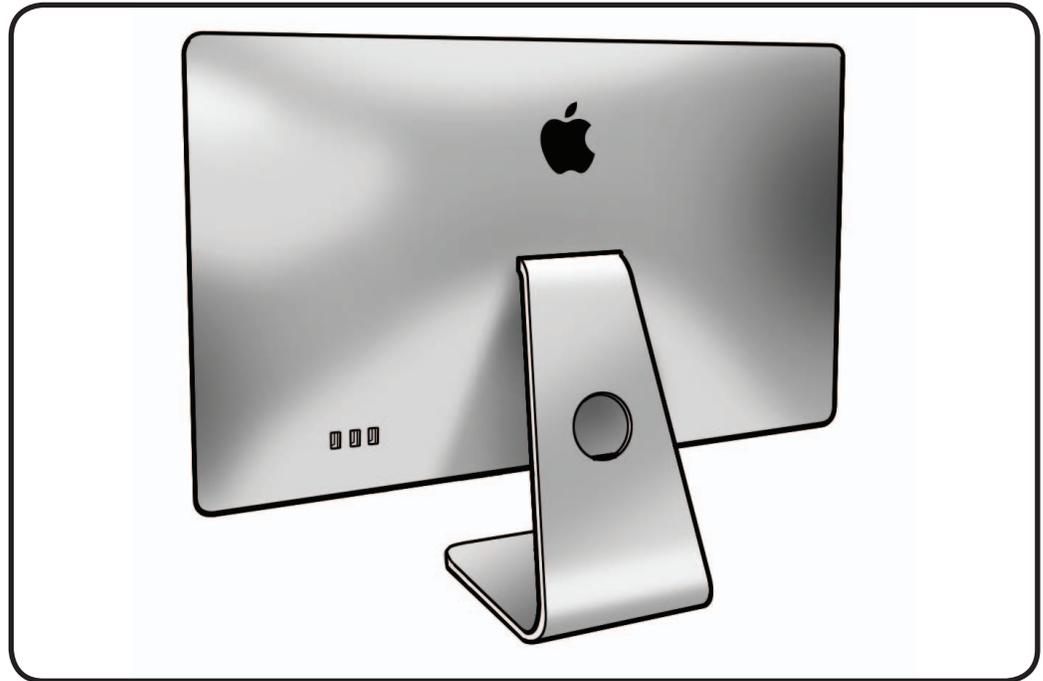
Front View





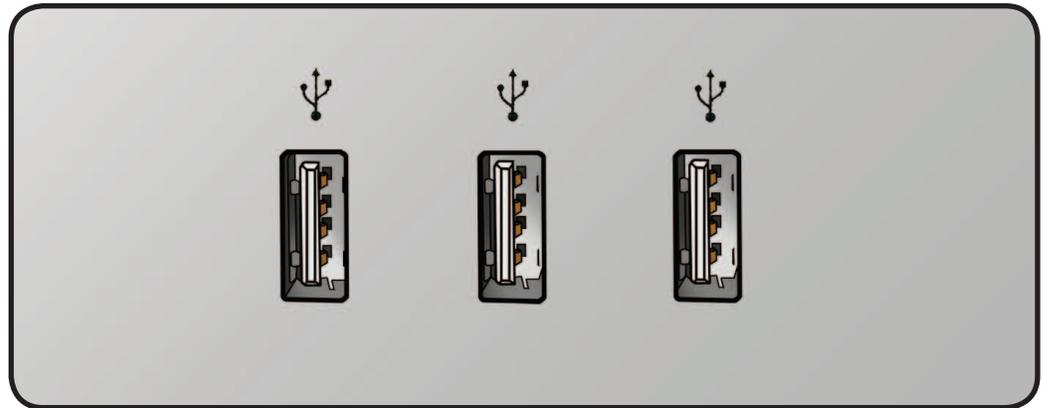
Rear View

The stand is removable in order to allow the use of a VESA mount.



I/O Ports

The 3-port USB 2.0 hub can power three ports at 1.1A each, or up to two ports at 1.5A each.



All-In-One Cable

Includes (left to right):
USB, Mini DisplayPort, and
MagSafe power.

