Apple Technician Guide



iMac (21.5-inch, Mid 2010)

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About This Guide

iMac (21.5-inch, Mid 2010)

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Updates

Updated 3 September 2010

Basics:

- Overview: New Accessories: Magic Trackpad and Apple Battery Charger: Added links to the User Guides.

Troubleshooting:

- Display: several symptoms: Modified steps to allow unit to warm up for about a minute (instead of 15 minutes) before evaluating front-of-screen performance.

Take Apart:

- LCD Panel: Added note that overtightening screws could lead to issue of light leakage after unit is reassembled.
- Camera and Rear Housing: Added note that white thermal paste intended for camera should not be used for any other purpose (such as portable computer heatsinks).

Views:

- Screw Chart: Added image for screw 922-7018.

Apple Technician Guide introduced 27 July 2010

Feedback

We want your feedback to help improve this and future Technician Guides!
Please email any comments to: **smfeedback6@apple.com**

Apple Technician Guide

Basics

iMac (21.5-inch, Mid 2010)

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Overview



The iMac (21.5-inch, Mid 2010) has an all-aluminum enclosure with a glass front which extends all the way to the top, left and right edges. Its external appearance is identical to the previous model, iMac (21.5-inch, Late 2009), but includes new options such as faster Intel Core i3 and i5 processors with speeds up to 3.6GHz, better graphics, and an additional input device option, the Apple Magic Trackpad.

The Mid 2010 model can be most easily distinguished from the Late 2009 model by the internal position of the AirPort card, which now connects directly to the logic board in the center of the unit.

Identifying Features

The iMac (21.5-inch, Mid 2010) features include:

- Built-in 21.5-inch (viewable) LED-backlit glossy widescreen TFT active-matrix liquid crystal display with IPS technology; 1920 by 1080 pixel resolution
- Processor and memory:
  - 3.06GHz Intel Core i3 with 4MB level 3 cache
  - 3.2GHz Intel Core i3 with 4MB level 3 cache
  - 3.6GHz Intel Core i5 with 4MB level 3 cache (CTO)
  - 4GB (two 2GB SO-DIMMs) of 1333MHz DDR3 SDRAM; four SO-DIMM slots support up to 16GB maximum
- Graphics and video support:
  - ATI Radeon HD 4670 with 256MB of GDDR3 memory
  - ATI Radeon HD 5670 with 512MB of GDDR3 memory
  - Mini DisplayPort output with support for DVI, VGA, and dual-link DVI (adapters sold separately)
- 500GB, 1TB, or 2TB 7200-rpm Serial ATA hard drive
- SDXC (Secure Digital Extended Capacity) card slot; supports higher card capacity, 32GB-2TB
- Ships with and requires at least Mac OS 10.6.3
- Apple Magic Mouse (2010) and Apple Wireless Keyboard (2009) standard with all configurations
- Apple Magic Trackpad (CTO)
- Apple Battery Charger (CTO)

Product Configurations

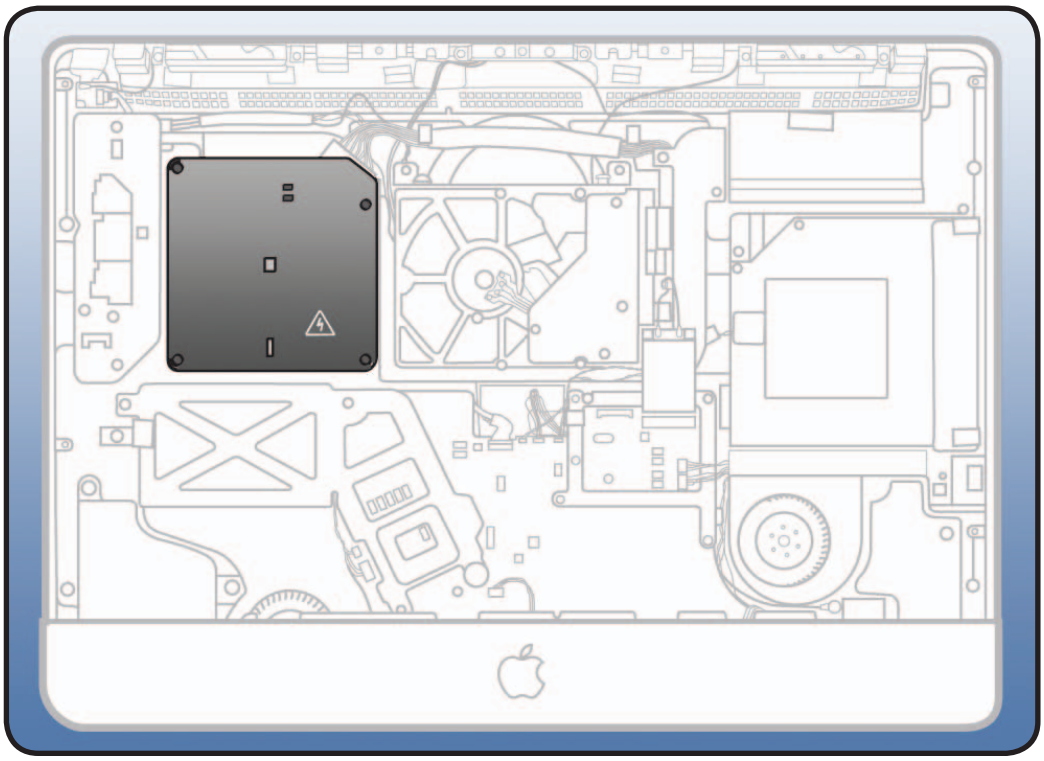
For product configurations, refer to AppleCare Tech Specs: **http://support.apple.com/specs/**

Safety Precautions



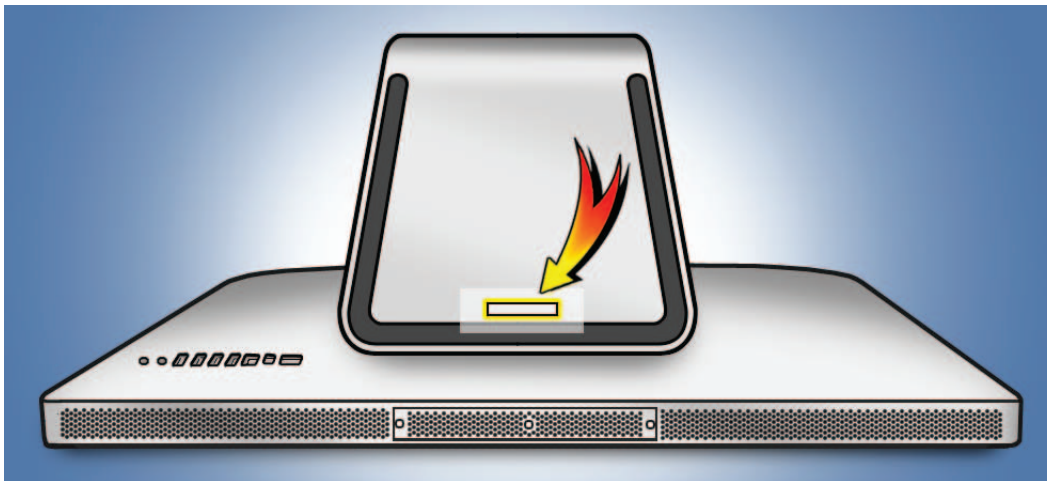
Warning: HIGH VOLTAGE: The AC/DC power supply PCB remains powered up whenever system is plugged in, whether or not system has been turned on. Use extreme caution when troubleshooting system with the glass panel removed.

Important: If computer is shut down by removing power cord, allow power supply a good 2-3 minutes to discharge capacitors before handling it. However, if you select "Shut Down" via the Apple menu, the computer will discharge power supply capacitor almost immediately.



Serial Number Location

The iMac (21.5-inch, Mid 2010)'s serial number is located on the bottom of the stand. When replacing a stand, transfer the serial number to the new stand.



New Accessories

Magic Trackpad

The wireless Magic Trackpad uses Bluetooth technology to connect to the Mac and comes with two AA batteries installed. To use the Magic Trackpad and its full features, update your Mac to Mac OS X version 10.6.4 or later, and then install the latest trackpad software using Software Update, if needed. For more information, refer to the **Magic Trackpad User Guide**.

Note: If the iMac (21.5-inch, Mid 2010) has had system software reinstalled for any reason, pair the Magic Trackpad and then run Software Update. If only basic functionality is present on Magic Trackpad, ensure that it is paired correctly before launching Software Update. For more information, refer to:

- **kBase #HT4254: About Magic Trackpad and Multi-Touch Trackpad Update 1.0**
- **kBase #HT4273: About Magic Trackpad Update 1.0 for Windows**

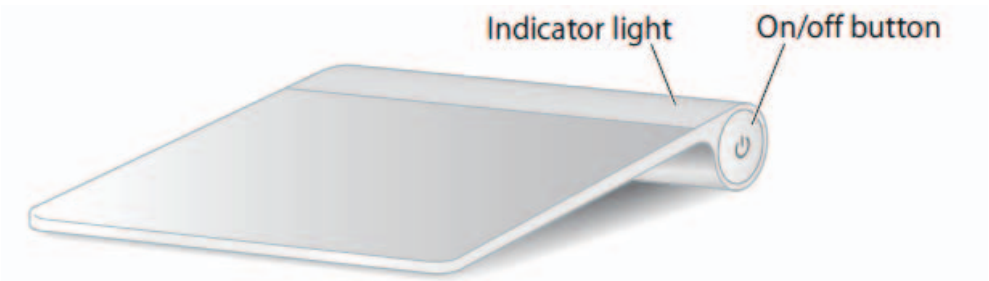
About the Indicator Light

The indicator light displays the status of your Magic Trackpad and the batteries.

- When you first turn your trackpad on, the indicator light glows steadily for 2 to 3 seconds, indicating the batteries are good.
- If your trackpad isn't paired with a Mac, the light blinks, indicating your trackpad is in discovery mode and ready to pair (pairing means connecting your trackpad and Mac to each other wirelessly).
- If you don't pair your trackpad with your Mac within 3 minutes, the light and trackpad turn off to conserve battery life. Press the on/off button on your trackpad to turn it on again, allowing you to pair it with your Mac.
- When your trackpad is on and connected, the indicator light turns off.

Turn on the Trackpad

- To turn the trackpad on, press firmly and release the on/off button.
- To turn the trackpad on and make it stay in discovery mode (prevent auto-pairing to previous known host), press and hold the on/off button.



Pairing the Magic Trackpad

To pair your trackpad:

1. Choose Apple (🍎) menu > System Preferences, and then click Trackpad.
2. Click "Set Up Bluetooth Trackpad …" in the lower-right corner.
3. Press the on/off button on your trackpad to turn it on.
4. Click Continue when your trackpad is detected.

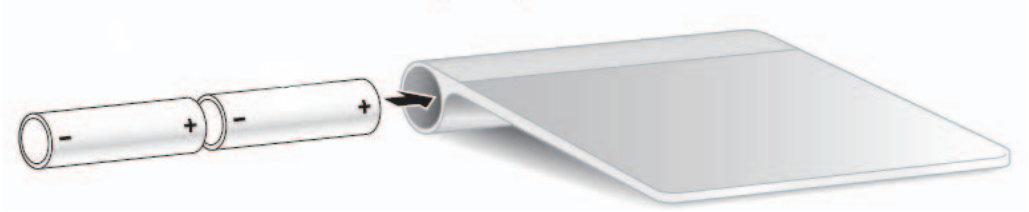
Once your trackpad is paired with your Mac, use Software Update again to make sure you have the latest software installed.

Note: If the iMac (21.5-inch, Mid 2010) has had system software reinstalled for any reason, pair the Magic Trackpad and then run Software Update. If only basic functionality is present on Magic Trackpad, ensure that it is paired correctly before launching Software Update.

Installing Batteries

1. Use a coin to remove the battery compartment cover on the left side.
2. Insert batteries into the battery compartment as shown.

Warning: Replace or recharge batteries at the same time. Don't mix old batteries with new batteries and don't mix battery types (for example, alkaline and lithium batteries). Don't open or puncture the batteries, install them backwards, or expose them to fire, high temperatures, or water. Don't charge nonrechargeable AA batteries. Keep batteries out of the reach of children.



Apple Battery Charger

Use the Apple Battery Charger to charge rechargeable NiMH batteries for your Apple products that use AA batteries. Each Apple Battery Charger comes with six high-performance AA NiMH batteries: two for your keyboard, two for your mouse or trackpad, and two for charging. You can use the Apple Battery Charger to charge either one or two NiMH rechargeable batteries. To charge batteries fully, allow at least five hours of charging time. For more information, refer to the **Battery Charger User Guide** or **kBase #HT4275: About Apple Battery Charger**.

Batteries

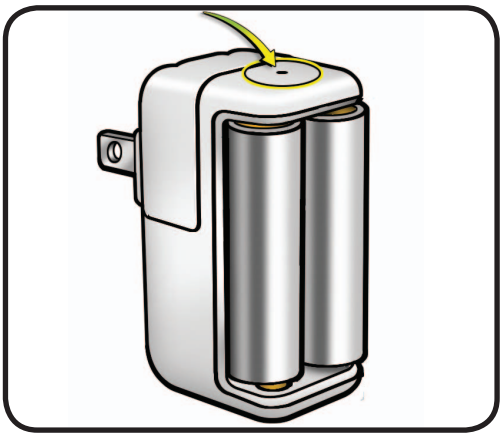
Use only NiMH rechargeable batteries in the Apple Battery Charger. Don't try to charge nonrechargeable AA batteries (lithium or alkaline) in the charger.

Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions. Don't open or puncture the batteries, install them backwards, short circuit, or expose them to fire, high temperatures, or water. Keep batteries out of the reach of children.

Status Lights

The indicator light on top of the Apple Battery Charger displays the charging status of the batteries.

- Amber: The batteries are charging.
- Green: The batteries are charged and ready to use—the green indicator light shuts off after six hours.
- No light: May indicate any of the following conditions:
  - The batteries are charged and ready to use.
  - The inserted batteries are too deeply discharged to register immediately.
- Flashing Amber: May indicate any of the following conditions:
  - The batteries haven't been properly installed in the charger.
  - An unsupported type of battery is in the charger.
  - The batteries may be faulty or damaged and should be replaced.





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Troubleshooting

iMac (21.5-inch, Mid 2010)

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General Troubleshooting

Wireless Troubleshooting

If you're having issues with Bluetooth and wireless connectivity issues, refer to:

- Bluetooth Service Diagnostic (BSD) self-paced training
- Bluetooth Troubleshooting Course
- kBase #TS3048: Troubleshooting wireless mouse and keyboard issues
- kBase #HT3887: Wireless input devices: Bluetooth frequently asked questions
- kBase #HT1365: AirPort and Bluetooth: Potential source of interference
- kBase #HT3903: Apple Wireless Keyboard and Mouse: How to install batteries
- kBase #HT4275: About Apple Battery Charger
- kBase #HT4254: About Magic Trackpad and Multi-Touch Trackpad Update 1.0
- kBase #HT4273: About Magic Trackpad Update 1.0 for Windows

Update System Software & Firmware

Important: Ensure the correct version Mac OS X and latest software and firmware updates have been applied before you begin troubleshooting. Computers sometimes exhibit symptoms that indicate the wrong Mac OS X system software is installed.

Firmware is the name given to software that is written into memory circuits such as flash memory, that will hold the software code indefinitely, even when power is removed from the hardware. Firmware on Intel Mac computers is designed to be updated if necessary by running the Mac OS X Software Update check (available in the Apple menu) while computer is connected to the Internet. For more information about firmware updates, refer to:
kBase # HT1557: About firmware updates for Intel-based Macs

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.

Hardware vs. Software

For information on how to isolate a hardware issue from a software issue, refer to:
kBase #TS1388: Isolating issues in Mac OS X

For information on how to troubleshoot a software issue, refer to:
kBase #HT1199: Mac OS X: How to troubleshoot a software issue
kBase #TS1394: Mac OS X: Troubleshooting installation and software updates
kBase #HT2956: Troubleshooting Mac OS X installation from CD or DVD

Common Reset Procedures

Power On Self Test (POST)

Intel-based Mac computers such as the iMac rely on a combination of tones and blinking LEDs to display Power On Self Test (POST) error codes.

- If the computer detects out-of-specification or no SDRAM, the screen will remain black but the computer will beep. This error condition may be due to physically damaged RAM, installing an incorrect type of RAM, or not having RAM installed.
- Some RAM may appear to pass the Power-On-Self-Test (POST) but still cannot be used by the operating system. In this case, the computer will display a gray screen, sound three tones and repeat tones until computer is turned off.
- The solution to both of these situations is to first re-seat memory and test computer again. If memory fails the POST test again, remove all installed memory and test by installing one by one each memory module that has been verified to work correctly on another system (i.e., "known-good" memory) or order new memory.
- A sequence of tones heard at startup or a no video symptom may also be fixed by temporarily removing/replacing the backup battery.

For more information, refer to:
kBase #HT2538: iMac (Mid 2007) and later models: About new startup tones

Resetting the System Management Controller (SMC)

The System Management Controller (SMC) is a chip on logic board that controls all power functions. If computer is experiencing any power issue, such as not starting up, not displaying video, sleep issues, or fan noise issues, resetting SMC may resolve it. To reset SMC on an iMac:

1. From Apple menu, choose Shut Down (or if the computer is not responding, hold power button for approximately ten seconds until it powers off).
2. Unplug all cables from computer, including power cord.
3. Press and hold the power button for 5 seconds.
4. Release the power button.
5. Attach the computer's power cable, making sure power button is not being pressed.
   Note: If you press the power button while inserting the power cord, the iMac will enter a mode in which the fans run at full speed. For more information, refer to:
   kBase #TS1433: iMac: Fans run at full speed after computer turns on
6. Press the power button to turn on the computer.

For more information, refer to:
kBase #HT1543: Intel-based iMacs: Resetting the System Management Controller (SMC)

Resetting Parameter RAM (PRAM)

PRAM stores certain system and device settings in a location that Mac OS X can access quickly. Exactly which settings are stored in the computer's PRAM varies depending on the type of computer as well as the types of devices and drives connected. To reset PRAM:

1. Shut down the computer.
2. Locate the following keys on keyboard: Command, Option, P, and R. You will need to hold these keys down simultaneously in Step 4.
   Note: If the keyboard does not have an Option key, use the Alt key instead.
3. Press power button.
4. Immediately press and hold Command-Option-P-R keys.
   Important: You must press this key combination before the gray screen appears.
5. Hold down keys until the computer restarts, and you hear the startup chime a second time.
6. Release keys.

For more information, refer to:
kBase #HT1242: Mac OS X: What's stored in PRAM
kBase #HT1379: Resetting your Mac's PRAM and NVRAM

Starting Up in Safe Mode

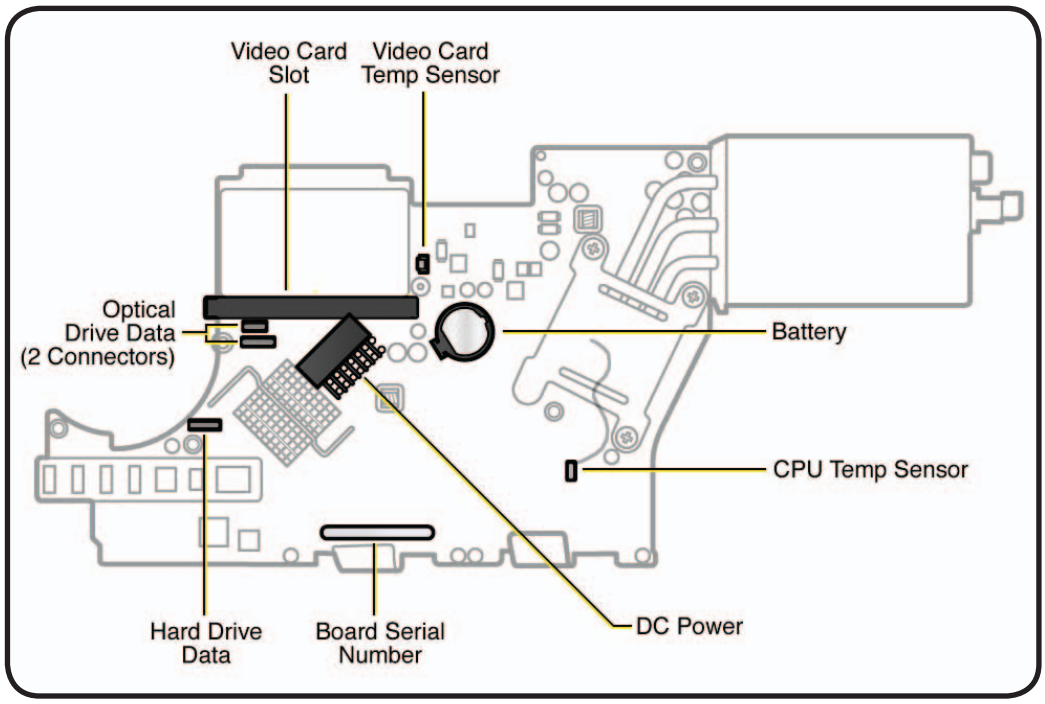
A Safe Boot is a special way to start Mac OS X when troubleshooting. Starting up into Safe Mode does several things that can help resolve software or directory issues that may exist on the startup volume. To start up in Safe Mode:

1. Make sure computer is shut down.
2. Press power button.
3. Immediately after you hear the startup tone, press and hold Shift key.
   Note: The Shift key should be held as soon as possible after startup tone but not before.
4. Release Shift key when you see the screen with the gray Apple and progress indicator (looks like a spinning gear). Note that booting into Safe Mode will take longer than a normal startup. During startup, the words "Safe Boot" appear on the Mac OS X startup screen and a gray progress bar is displayed on bottom of window (since Mac OS X 10.6).
5. To leave Safe Mode, restart computer normally, without holding down any keys during startup.

For more information, refer to:
kBase #HT1564: Mac OS X: What is Safe Boot, Safe Mode?
kBase #TS1884: Safe Boot takes longer than normal startup

Removing the Battery, Measuring DC Voltage

1. Shut down and unplug the computer. Allow several minutes for power supply to discharge.
2. Remove logic board.
3. Remove coin battery for 1-2 minutes. The coin battery is located on the back side of the logic board (see graphic below).



4. Measure DC voltage on battery touching battery with red probe, and grounding with black probe. If voltage is 2.7v or less, replace battery.
5. Reinstall the battery and logic board. This will reset the logic board.
6. Power on computer.
7. If computer boots, check for and install all software and firmware updates.

Diagnostics

Run latest available service utilities to determine if any thermal sensors or blowers are malfunctioning. When a test reports an error, reseat appropriate connections and check that all air flows are free from obstruction. If issue persists, replace the corresponding part (sensor, blower, logic board, video card, or power supply). See chart below for correlation between affected sensor, sensor location, and additional checks to perform.

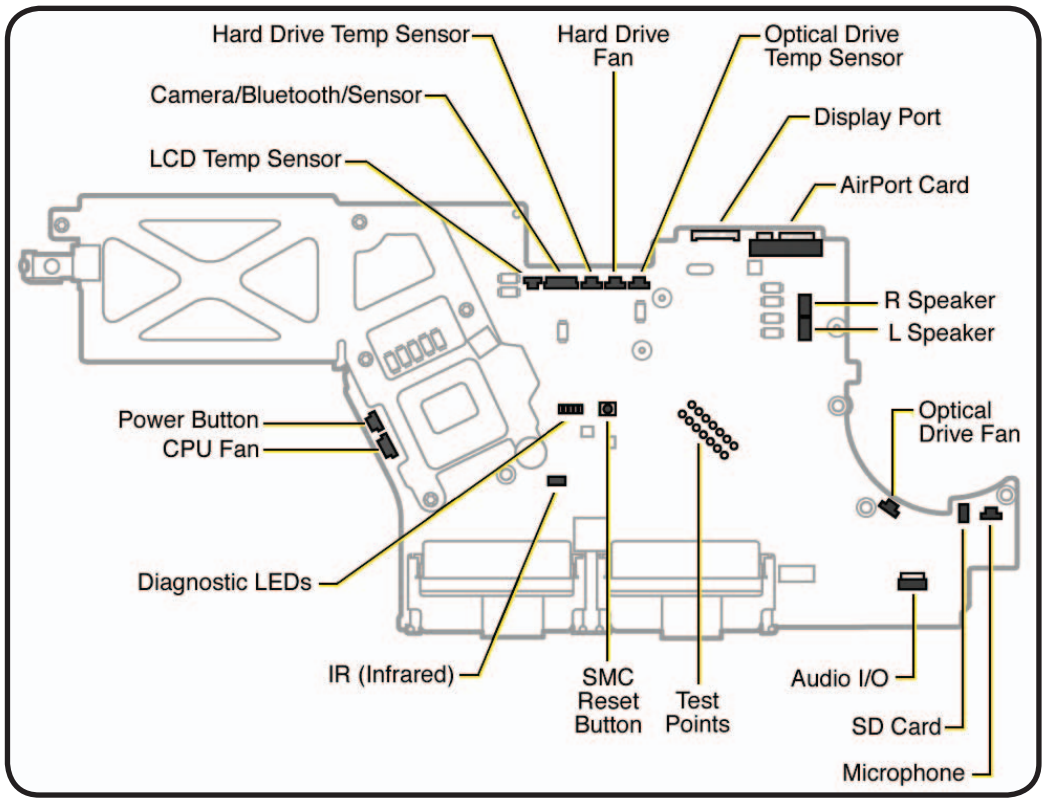
Note: AHT can be run by pressing the D key on startup (if hard drive was not reformatted, or if adequate system specific restore DVD is inserted). If a sensor error is detected, AHT will report an error code containing the affected sensor name (ex: "4SNS/1/40000000 TC0H" error code reports to sensor TC0H).

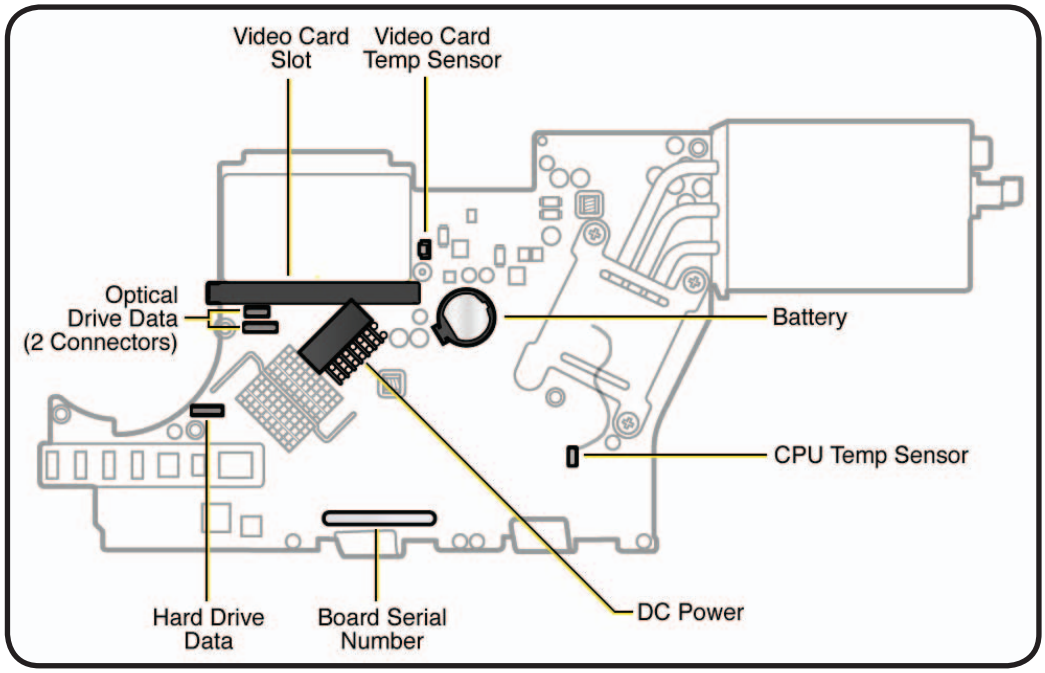
Sensor	Suspected part and Location	Suggested Action	Notes
TA0P	Excessive incoming ambient air temperature, or ambient temp sensor (part of CPU fan assembly) is damaged/ disconnected from logic board.	Verify that incoming/outgoing air vents are free from obstruction , that CPU fan cable is securely connected to the left edge of the logic board. Replace fan/sensor assembly if damaged.	All fans ramp at full speed if fan/sensor is disconnected.
T00p	Excessive optical drive area temperature, or ODD temp sensor damaged/ disconnected from logic board.	Verify sensor cable is securely connected to the logic board and the sensor is properly attached to the ODD mechanism. Replace sensor cable if damaged.	The ODD fan will run at full speed if sensor is disconnected.
TH00	Excessive hard drive area temperature, or HD temp sensor damaged/disconnected from logic board. Use the correct sensor cable, each drive vendor has a unique sensor cable model.	Verify sensor cable is securely connected to top side of logic board, and is correctly connected and oriented to the hard drive end. Check for damaged cable or logic board.	The HD fan may run at full speed if the sensor is disconnected/ misconnected.
Tm0p	Excessive logic board temperature (this sensor is part of logic board)	Test with known-good logic board	
TL0p	Excessive LCD panel area temperature, or LCD temp sensor damaged/disconnected from top of logic board	Verify that the LCD sensor cable is securely connected to the logic board and the sensor is covered by a foam gasket on the LCD.	The CPU fan will run at full speed if the sensor is disconnected.

TS2P	Excessive upper internal enclosure temperature, or Bluetooth/camera/sensor damaged/disconnected from top of logic board.	Verify that the Bluetooth/ camera/sensor cable is securely connected to the top of the logic board. Replace the cable if damaged.	
TC0H	Excessive processor heatsink temperature, or CPU temp sensor damaged/disconnected from logic board (this sensor is part of logic board)	Check CPU sensor cable connection to logic board. It is located on back side and requires removal of the logic board.	If the sensor is disconnected, the CPU fan will run at full speed.
TG0D	Excessive graphics processor die temperature (sensor is part of graphics processor chip)	Test with known-good video card	
TG0H	Excessive graphics processor heatsink temperature, or GPU temp sensor damaged/ disconnected from back side of logic board (this sensor is part of video card assembly)	Check GPU sensor cable connection to logic board. (requires removal of the logic board to access).	If sensor is disconnected the ODD fan will run at full speed.
Tp1P, Tp2H, Tp3H	Excessive power supply temperature (these sensors are part of the power supply)	Test with known-good power cable harness , or known-good power supply board.	
ODD fan	Optical fan located next to right speaker	Verify that the ODD fan cable is securely connected to the right side of the logic board and that there are no obstructions that would prevent the fan from rotating. Replace fan if error continues.	Normal fan operation, except the ODD blower
HDD fan	Hard drive fan, located below logic board, near hard drive	Verify that the HDD fan cable is securely connected to the top of the logic board and that there are no obstructions that would prevent the fan from rotating. Replace fan if the error continues.	Normal fan operation, except the HDD blower
CPU fan	CPU fan, located next to left speaker.	Verify that CPU fan/ambient sensor cable is securely connected to the left side of the logic board and that there are no obstructions that would prevent the fan from rotating. Replace fan assembly if the error persists.	Normal fan operation, except the CPU blower

Sensor and Fan Connector Locations

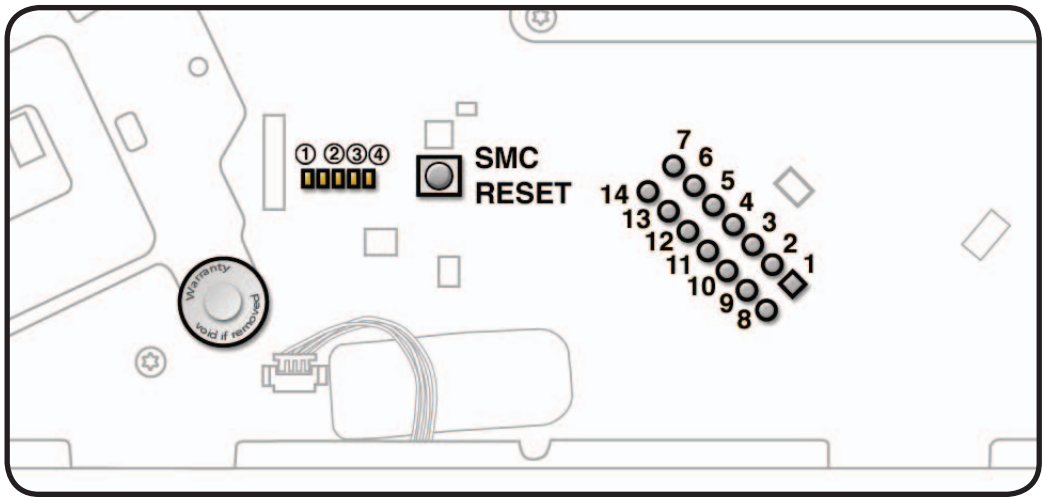
Temp sensors and fan connector locations are shown below. Ensure cables are correctly routed and the sensors and fans are properly connected. If a sensor or fan is faulty or not connected, Apple Hardware Test or Macintosh Resource Inspector diagnostics will generate an error code.





Diagnostic LEDs

There are four built-in diagnostic LEDs on the logic board that can help troubleshoot the computer. LEDs are located on the front center of the logic board, above the IR board, to the left of the SMC reset button.



LED Functions

LED #1

- Indicates that the trickle voltage from power supply has been detected by main logic board. This LED will turn ON when you connect the iMac to a working AC power source. The LED will remain ON as long as the computer is ON or asleep.
- When computer has been correctly shutdown, the LED#1 behavior may differ:
- - If a startup event is scheduled in System Preferences/Energy saver, LED#1 will stay ON after a correct shutdown,
- - If no startup event is scheduled in System Preferences/Energy saver, LED#1 will turn OFF and will stay OFF as long as AC cable is kept connected and AC power source is present. Disconnecting the AC cable and plugging it back will turn back this LED ON , even if computer is still off.
- After disconnecting and reconnecting the AC power source, this LED could remain OFF if the AC power source is missing or disconnected , if the logic board is disconnected from the power supply or from the AC receptacle, or if the power supply board is faulty.

LED #2

- Indicates that computer is turned on. This LED will be ON as long as computer is turned on (but is not asleep) and power supply and voltage regulators are working correctly.

LED #3

- Indicates that computer and video card are communicating. This LED will be ON when computer is communicating properly with video card. If LEDs 1 and 2 are ON and you heard the startup sound, but LED 3 is OFF, then the backup battery (on back of logic board) may need to be reseated, or the video card might be installed incorrectly or needs replacement.

LED #4

- Indicates that computer and LCD panel are communicating. This LED will be ON when computer is turned on and video signal is being generated. If LED#4 is ON and there is no image on display, then the LCD panel, the LED backlight board, or the cables between LCD and logic board or backlight board might be installed incorrectly, or need replacement.

LED Startup Sequence

LED #1 = Power available.

If no LED is visible:

- First disconnect the AC cable from computer, then reconnect it to reset the LED status, in case computer was correctly shutdown and AC was kept connected since
- Verify AC source
- Verify known-good AC cable is connected
- Verify cable connection between AC inlet and power supply
- Verify cable connection between power supply and logic board
- Verify power supply

LED #1 + LED #2 = Power available, and system is powered on.

If second LED is not visible when power button is pressed:

- Verify power button connection to logic board
- Verify power button functionality
- Verify cable connection between power supply and logic board
- Verify power supply
- Verify logic board

LED #1 + LED #2 + LED #3 = Power available, system is powered on, and video card found.

If third LED is not visible after power on:

- Verify that the MXM video card is seated properly
- Verify if boot chime is present and fans are running when powered ON (reset SMC and PRAM, reseat or check backup battery if necessary for proper boot up):

  If POST boot chime is not heard, go to Won't Start Up symptom flow,
  If POST boot chime is heard, go to No Video symptom flow.

LED #1 + LED #2 + LED #3 + LED #4 = Power available, system is powered on, video card found, and internal LCD found.

If fourth LED is not visible after power on:

- Verify internal DisplayPort cable connections between LCD panel and logic board
- Inspect LCD display cables for cable damage
- Verify external video functionality, and according to result check the following items:

  If external display works then verify/replace the LED backlight board
  If external display works then verify/replace the LCD panel
  If external display does not work verify/replace the logic board

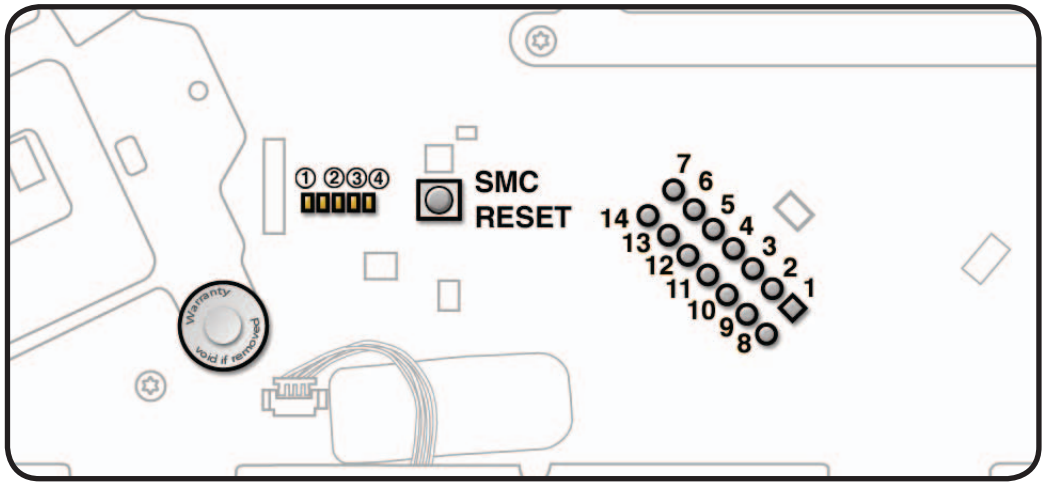
Logic Board Test Points



Test points, which can be used to verify proper power flow, are accessible in center of logic board, to right of SMC Reset button, when LCD panel is removed. All voltages given in Troubleshooting Symptom Charts assume that computer is plugged into a known-good power outlet with a known-good AC cable. Some guidelines for using test points:

- **Warning: HIGH VOLTAGE: Use extreme caution when live testing!**
- Do NOT lean over or touch the power supply area during live testing.
- Keep your fingers behind finger guards on test probes when measuring.
- Turn dial of voltmeter/multimeter to measure DC (direct current, usually indicated by a solid horizontal line over dashes). If your voltmeter requires a set voltage range, choose a DC range that includes the voltage you are measuring.
- Connect black probe to ground. Connect red probe to test point and verify voltage.

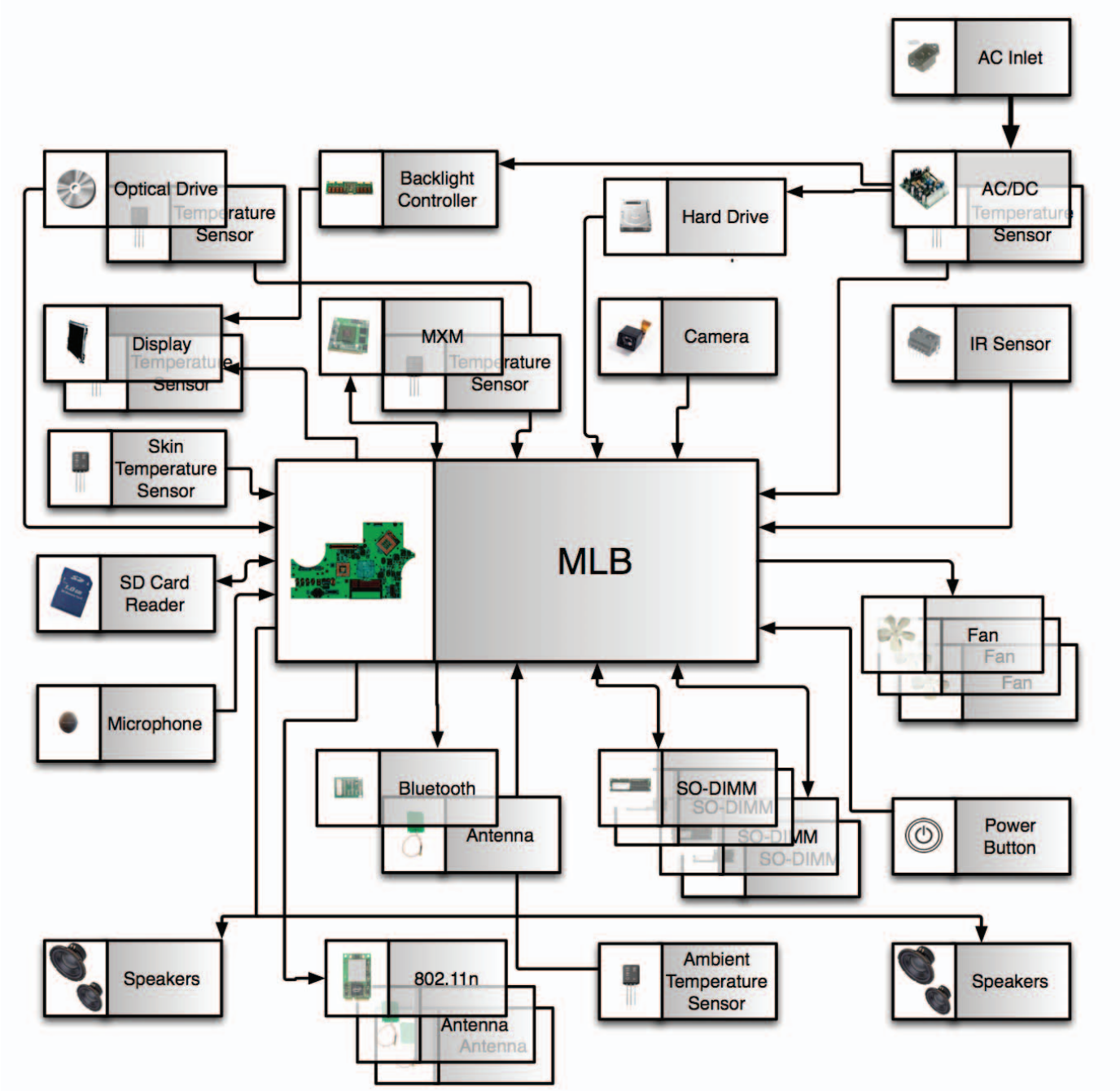
For more info, see **kBase #HT3250: Diagnostics: Using a digital multimeter**



Test Point	Function
Pin 1	Ground
Pin 3	5V power for Hard Drive(s). Note: If present, the 12V power will come directly from the Power Supply to the Hard Drive thru the power harness cable.
Pin 4	Standby 12V power (permanent power coming from power supply, present as long as AC cable is connected, even if computer is off); corresponds to LED #1
Pin 6	Backlight Control pulse width modulated signal (from logic board to LED backlight board, to adjust the backlight level setting according to user setup)
Pin 11	12V Run-Mode power to logic board (coming from power supply, present as long as system is on or asleep); corresponds to LED #2
Pin12	Power On Request signal (from logic board to power supply when power button is pressed)
Pin 13	Backlight Enable (signal from logic board to Backlight Controller board, to enable backlight

Block Diagram

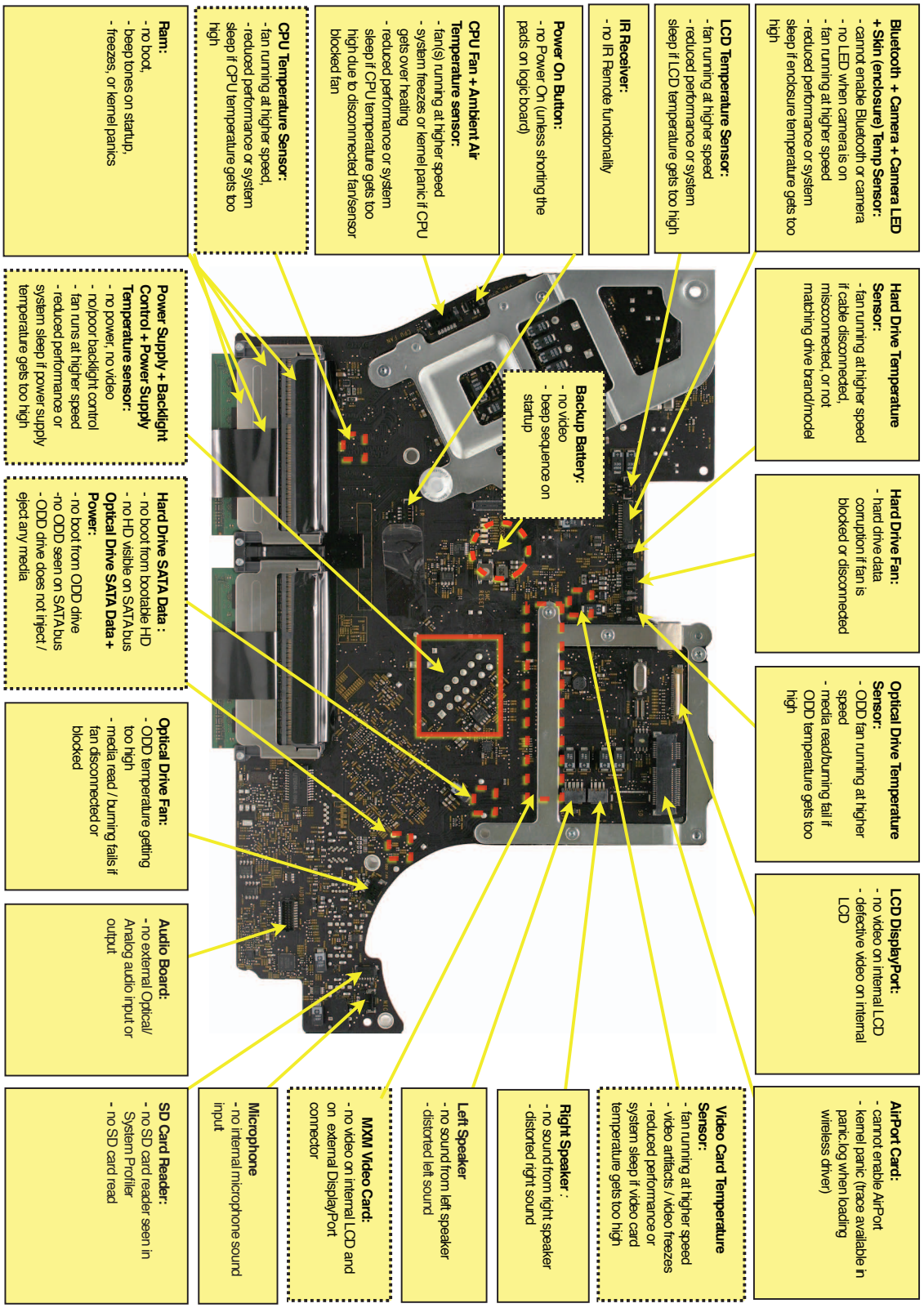
Refer to this diagram to see how modules are interrelated.



Functional Overview

Refer to this diagram for symptoms related to logic board connectors.

To rotate this page in Preview for easier viewing, go to Tools menu and choose "Rotate Left".



Symptom Charts

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

Startup and Power

No Power, Dead Unit

Unlikely cause: speakers

Quick Check

Symptoms	Quick Check
No Power, Dead Unit • No power • No fan spin • No startup chime • No image on external display • No hard drive or optical drive activity • Caps Lock LED on wired keyboard doesn't light when pressed.	**1.** Verify power source. **2.** Verify power cable. **3.** Listen closely for signs of activity from system including: rotating fans, hard drive or optical drive activity, startup chime, etc.

Deep Dive

Check	Result	Action	Code
1. Power ON system. Verify if there is any indication that the system has powered up (fan rotation, hard drive or optical drive noise, backlight turns on).	Yes	The symptom is powering up. Go to Won't Start Up.	
	No	Go to step 2.	
2. Disconnect AC cable Remove glass and LCD panel and locate the diagnostic LEDs in the middle of logic board. Reconnect AC cable to system. Verify if diagnostic LED #1 turns ON. You may alternately check for presence of a 12V DC signal between pin 4 and pin 1 of the logic board.	Yes	Standby power voltage being supplied by power supply. Go to step 3.	
	No	Go to step 4.	

3. Press power button while monitoring diagnostic LEDs. Verify if LED #2 turns ON and remains ON after releasing the power button. You may alternately check for a power request signal between pin 12 and pin 1 of logic board.	Yes	Power supply functioning and logic board detects supply voltages and is powered on. Go to **Won't Start Up**.	
	No	Go to step 5.	
4. Disconnect AC cable. Carefully inspect the connectors between AC inlet and power supply, then DC connectors and cables between power supply and logic board, for damage or poor connections.	Yes	Reseat misconnected cable(s), or replace damaged one(s).	**P16**
	No	Replace DC power cable harness. Go to step 8.	**X03**
5. Inspect power button and verify if it is properly connected to the logic board.	Yes	Go to step 6.	
	No	Reconnect power button.	
6. Disconnect power button from logic board. Inspect cable and connector for damage. Using a multimeter (set as ohmmeter), verify continuity between the two pins of the power button when it is pressed.	Yes	Power button is functioning correctly. Reconnect power button to logic board and go to step 7.	
	No	Power button faulty. Replace rear housing (which includes power button).	**X14**
7. Reconnect AC cable Press power button and Verify if system turns ON. You may alternately check for presence of a 12V DC signal between pin 11 and pin 1 of logic board when power button is pressed.	Yes	Power supply functioning. If system still won't boot, go to **Won't Start Up**.	
	No	Replace DC power cable harness. Go to step 8.	**X03**
8. Press power button and verify if system turns ON.	Yes	Issue solved with replaced DC power cable harness.	
	No	Replace power supply. Go to step 9.	**P01**
9. Press power button and verify if system turns ON.	Yes	Issue solved with replaced power supply.	
	No	Reinstall power supply and replace logic board.	**M01**

Note: If No Power symptom persists after all steps have been followed use minimum configuration troubleshooting to proceed. Try disconnecting hard drive(s), optical drive, AirPort, , SD card modules and Bluetooth/Camera cable to determine if one of them is preventing the power supply from functioning.

Won't Start Up

Quick Check

Symptoms	Quick Check
Won't Start Up • No startup chime. • Error tones during startup. • Grey screen with fan noise, or other noise. • Will not progress beyond Apple logo or spinning gear.	**1.** Isolate OS by starting up from original install media for this computer, from a same-model computer in Target Disk Mode, or from a compatible known-good OS on an external drive. Both AirPort and Bluetooth services are available when booted from the Install disk. **2.** Reset SMC and PRAM to clear any stored, corrupted information. **3.** Start up in Safe Mode by holding shift key down during startup to load only required kernel extensions and disable all startup and login items. See **kBase #HT1564: Mac OS X: What is Safe Boot, Safe Mode?** **4.** If system generates error tones there may be an issue with the SDRAM. See **kBase #HT2341: Intel-based Mac: Power On Self Test RAM error codes** **5.** Identifying when in the startup process the computer hangs can help isolate the issue. See **kBase #HT2674: Intel-based Mac: Startup sequence and error codes, symbols** for information on the Macintosh startup sequence, and error codes and symbols used. **6.** Run latest available service utilities.

Deep Dive

Check	Result	Action	Code
1. Boot computer to Apple Hardware Test on the internal hard drive or an inserted Install DVD by holding down the D key at startup. Verify if system boots up from any of these volumes.	Yes	Run the extended tests and proceed with results. If AHT passes or boots with a memory error, go to step 2.	
	No	Go to step 2.	
2. Remove installed SDRAM, and test with known-good SDRAM. Verify if computer starts up properly now.	Yes	SDRAM issue. Reinstall one of user's SDRAM modules and retest. Proceed one by one to find the faulty SDRAM module, and replace it.	**X02**
	No	Go to step 3.	

3. Wait 15 seconds after computer was powered down then disconnect AirPort card from logic board. Verify if computer starts up properly now.	Yes	Go to **AirPort Card Kernel Panic**.	
	No	Go to step 4.	
4. Startup with Alt key to select and start from the Install DVD inserted in the optical drive, or from an external bootable volume connected. Verify if computer starts up properly from alternate bootable volume.	Yes	Go to **Hard Drive Not Recognized**.	
	No	Go to step 5.	
5. Disconnect optical drive cable and retest. Verify if computer starts up properly now.	Yes	Reconnect optical drive and go to **Optical Drive Not Recognized**.	
	No	Go to step 6.	
6. Remove coin battery on back of logic board (you will need to completely remove logic board to do this), and leave out for approximately 1 minute. Then reinstall battery. This will reset logic board. Verify if computer starts up properly now.	Yes	Issue resolved by logic board reset. Measure DC voltage on battery touching battery with red probe, and grounding with black probe. If voltage is 2.7v or less, replace battery. For multimeter help, see **kBase #HT3250: Diagnostics: Using a digital multimeter**.	
	No	Replace logic board.	**M02**

Intermittent Shutdown

Troubleshooting Shutdown Causes

Always run the latest Apple service utilities to check for any abnormal value reading from a thermal, a voltage, or a current sensor, or from a fan speed meter. The log files may also report the cause of a previous shut down(s). Collect all available info from user on shut down occurrence details: periodicity, power state when issue happens, running applications, running time before shutdown. Shutdown events have four different types of causes:

1. User-related shut downs:
A computer shut down event may be caused by user operation. Shuttting down the computer (by selecting the Shutdown menu, by keeping pressed the Power button for at least 4 seconds, or by programming a timed shutdown in the Energy Saver preferences) should not be considered as a failure unless power button is defective. Suggested steps for troubleshooting:

- reset the SMC,
- check energy saver preferences settings,
- test the Power On button for a intermittent shorting issue (which would force down the computer.).

2. Activity-related system shut downs:
The system could not succeed the standard shutdown process and had to force shutdown, or an installed watchdog detected that an application did not respond within specified time (this watchdog can be enabled on Mac O X Server Energy Saver preferences). These shut downs may be linked to system settings, devices drivers, applications or operating system freezes. Suggested steps for troubleshooting:

- check the system logs and activity monitor utility for clues on the freezing process,
- check for available software and firmware updates for installed device drivers, applications, or operating system,
- start the system from a known-good and up-to-date bootable drive for issue reproduction.

3. Power-related system shut downs:
External power source was removed. These shut downs are due to power management, excessive thermal/voltage/current status, poor connections or defective power sources. Suggested steps for troubleshooting:

- reset the SMC
- check secure AC cable, AC inlet and Power Supply board connections to logic board,

4.Hardware-related system shut downs:
One of the temperature, voltage or current sensors reached a specified limit. These shut downs are due to temperature, voltage, current, fan speed or other hardware related sensor values getting out of range. Suggested steps for troubleshooting:

- check for all sensors connections and values using Macintosh Resource Inspector and locate sensors using the sensors table of the General Troubleshooting chapter,
- check for fan(s) operation,
- check for cleanliness of the heatsink fins and the air flows,
- check for correct seating of the heatsink on logic board and presence of thermal material.

Quick Check

Symptoms	Quick Check
Intermittent Shutdown • Powers off during startup. • Powers off during desktop use. • Computer restarts spontaneously. • Powers off when waking from sleep.	**1.** Make sure that power cord is securely attached to the back of computer, and is not hindered by a desk or other furniture. **2.** Plug computer directly into an AC outlet to test if a surge protector or UPS is causing issue. **3.** Open System Preferences > Energy Saver > Schedule and make sure that a "Shut Down" event is not scheduled. **4.** Isolate OS by starting up from original install media for this computer, from a same-model computer in Target Disk Mode, or from a compatible known-good OS on an external drive. Both AirPort and Bluetooth services are available when booted from the Install disk. **5.** Reset SMC and PRAM to clear any stored, corrupted information. **6.** Start up in Safe Mode by holding shift key down during startup to load only required kernel extensions and disable all startup and login items. See **kBase #HT1564: Mac OS X: What is Safe Boot, Safe Mode?**

Deep Dive

Check	Result	Action	Code
1. Activity related shutdowns: Reset SMC and PRAM and verify that shutdown issue still happens.	Yes	Check with known-good bootable drive. Go to step 2.	
	No	Shutdown cause was related to SMC or pRAM programmed shutdown settings or corruption, and was resolved by reverting them to default settings.	
2. Booting from known-good bootable drive , verify that shutdown issue still happens.	Yes	Go to step 3.	
	No	Shutdown events do not happen on known-good OS. Reinstall Mac OS on user hard drive, update OS with latest version and check if any firmware update is available.	
3. Power related shutdowns: With known-good AC power cord and AC outlet, Verify if system continues to restart or shutdown	Yes	Go to step 4.	
	No	AC power cord / outlet issue. Issue resolved.	**X03**
4. Disconnect hard drive power cable from hard drive and startup the computer from other bootable media (like Install DVD, a same model computer in Target Disk Mode, or a compatible known-good OS on an external drive). Verify if system continues to restart or shutdown.	Yes	Go to step 5.	
	No	Possible bad software or hard drive. Go to **Hard Drive Not Recognized**.	
5. Inspect and reseat AC inlet connection to power supply (the smaller of the 2 cables connected to power supply), and DC power cable from power supply to logic board. Verify if damage is observed on the cables or connectors.	Yes	Replace damaged cable. Retest. Return to step 1 if problem continues.	**X03**
	No	Go to step 6.	
6. Install known-good power supply. Verify if system continues to restart or shutdown.	Yes	Reinstall original power supply. Go to step 7.	
	No	Issue resolved with power supply replacement.	**P02**

7. Replace DC power cable, which supplies power to logic board, hard drive, and LED backlight board. Verify if system continues to restart or shutdown.	Yes	Go to step 8.	
	No	Issue resolved with DC power cable replacement.	**X03**
8. Hardware-related shutdowns: Run latest available Apple service diagnostics and verify if a sensor failure is reported.	Yes	-If a temperature or a fan sensor failure is reported, go to step 9. -If a voltage or a current sensor failure is reported test with known-good power supply board. If issue persists, replace logic board.	**M23**
	No	Setup ASD to loop test suite for burn in tests and go to step 9. If no failure is found after burn in tests, return unit to user for no failure found.	
9. Verify if a thermal sensor or fan failure is reported by diagnostics.	Yes	-If fan not running failure, check for fan cable seating and retest. If same failure after retest replace fan with known-good fan and retest. If issue does not happen with known-good fan, replace user's fan. -If an over temp failure reported, check for cause of over temp, like obstructed vent, dust in heatsink fin, clogged fan and retest. If still failing replace part where sensor is located (logic board, power supply, hard drive or sensor cable) according to the sensor location table in General Troubleshooting chapter. Go to step 10.	**X22** **M23** **P17** **X03**
	No	Go to step 10.	
10. Isolate if issue solved Verify if shutdown/issue does is fixed.	Yes	Issue resolved.	
	No	Replace logic board with corresponding symptom: -if for thermal error cause -if for other cause	**M18** **M08**

Kernel Panic, System Crashes

Quick Check

Symptoms	Quick Check
Kernel Panic, System Crashes • Kernel Panic on startup or desktop use. • System freeze during use. • System freeze upon wake from sleep.	**1.** Isolate OS by starting up from original install media for this computer, from a same model computer in Target Disk Mode, or from a compatible known-good OS on an external drive. Both AirPort and Bluetooth services are available when booted from the Install disk. **2.** Ensure that all software and firmware updates for this model have been installed to take advantage of any available bug fixes. **3.** Reset SMC and pRAM to clear any stored, corrupted information. **4.** Start up in Safe Mode by holding shift key down during startup to load only required kernel extensions and disable all startup and login items. See **kBase #HT1564: Mac OS X: What is Safe Boot, Safe Mode?** **5.** Check the panic.log, located /Library/Logs/Panicreporter, for information in the back trace that may give clues about the kernel panic. **6.** For more information, see **kBase #HT1392: About "You need to restart your computer" (kernel panic) messages**.

Deep Dive

Check	Result	Action	Code
1. Boot the computer to Apple Hardware Test on internal hard drive or an inserted Install DVD by holding down the D key at startup. Verify if system boots up from any of these volumes.	Yes	Run extended tests and proceed with results. If AHT passes or boots with a kernel panic, go to step 2.	
	No	Go to step 2.	
2. Remove all peripheral devices including keyboard and mouse. Verify if system starts without kernel panic.	Yes	Add peripheral devices one at a time until kernel panic repeats. Replace device causing issue.	
	No	Go to step 3.	

3. Use known-good SDRAM in the system. Verify if system start without kernel panic now.	Yes	Install user's SDRAM one by one and retest. If kernel panic repeats, replace affected SDRAM. Verify if correct SDRAM specification is being used.	**X01**
	No	Go to step 4.	
4. Wait for 20 seconds after shutdown and disconnect AirPort card from logic board. Verify if system starts without kernel panic now.	Yes	Go to **AirPort Card Kernel Panic**.	
	No	Go to step 5.	
5. Disconnect SATA cable from hard drive and startup to the Install DVD in the optical drive or from an external volume. Verify if system starts without kernel panic now.	Yes	Go to **Hard Drive Not Recognized**.	
	No	Go to step 6.	
6. Disconnect Bluetooth/Camera cable and microphone cable from logic board. Verify if system starts without kernel panic now.	Yes	Go to **Bluetooth issues**, **Camera Issues** or **Audio: Microphone** symptom flow as appropriate.	
	No	Go to step 7.	
7. Disconnect SD board cable on logic board. Verify if system starts without kernel panic now.	Yes	Go to **SD Card Not Recognized**.	
	No	Go to step 8	
8. Disconnect optical drive and test. Verify if system starts without kernel panic now.	Yes	Go to **Optical Drive Not Recognized**.	
	No	Replace logic board.	**M06**

No Video

Unlikely cause: hard drive, optical drive, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
No Video • No image. • Backlight failure.	**1.** Check brightness setting. **2.** For no-video issues, connect an external display to Verify if iMac video circuitry is functioning. If image appears on external display go to Backlight Issue/No Backlight. **3.** Reset SMC.

Deep Dive

Check	Result	Action	Code
1. Verify boot chime present and fans running when system powered ON. (Reset SMC and clear PRAM, reseat Backup Battery on logic board if necessary and retest for proper boot up.)	Yes	Power ON self test OK. Boot sequence started. Go to step 2.	
	No	Go to **Won't Start Up**.	
2. Verify if image is visible on built-in LCD panel.	Yes	Video present. Verify system functionality and return to user or jump to appropriate troubleshooting flow.	
	No	Go to step 3.	
3. Connect supported external display. Verify if image appears on external display when system is booted.	Yes	External display detected by system. Video circuitry on logic board functional. Inspect DisplayPort cable to back of panel connection. Reseat and test again. If you continue to have problems go to **Backlight Issue/No Backlight**.	
	No	Go to step 4.	

4. Disconnect AC, remove glass and LCD panel to access **diagnostic LEDs** on center of logic board. Reconnect AC and verify if LED #3 turns on shortly after system powers on.	Yes	Logic board communicating with video card. Go to step 5.	
	No	If LED #3 does not turn ON reseat video card and retest, then replace video card and repeat step 4. If issue persists, replace logic board.	**M03** **M03**
5. Locate **diagnostic LEDs** on logic board and verify if LED #4 turns on shortly after system powers on.	Yes	Logic board communicating with LCD panel. Go to **Backlight Issue/No Backlight**.	
	No	Replace DisplayPort cable. Go to step 6.	**X03**
6. Locate **diagnostic LEDs** on the logic board and verify if LED #4 turns on shortly after system powers on.	Yes	Video controller functional and communicating with LCD panel. Go to **Backlight Issue/ No Backlight**.	
	No	Video controller unable to communicate with LCD panel. Reseat cables first. If issue persists, replace LCD panel. Retest.	**L03**

Corrupted Video

Unlikely cause: power supply, hard drive, optical drive, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Corrupted Video • Text and graphics appear fuzzy • Image corrupted	**1.** Verify Mac OS X version installed is the build number supported for the hardware. Make sure user didn't migrate over an old version. Refer to **kBase #HT1159: "Mac OS X versions (builds) included with Intel-based Macs"** **2.** Set System Preferences > Displays to native resolution of LCD. Non-native resolutions are unable to produce optimal clarity. **3.** Clean outside surface of glass panel. **4.** Make sure all relevant firmware and software updates have been applied. Graphics driver updates may be included with software updates. **5.** Boot from install DVD or another known-good volume to determine whether a potential software/driver issue exists. **6.** When issue occurs, take a screenshot of the display (Command-Shift-3). View screenshot file on a known-good computer. If image corruption can be seen in the screenshot then issue is with the video drivers, software, or video/logic board. If issue cannot be seen in the screenshot then LCD panel and DisplayPort cable should be tested further.

Deep Dive

Check	Result	Action	Code
1. Boot from Install DVD and Verify if issue is still visible.	Yes	Go to step 2.	
	No	Issue likely caused by software or driver issue. Troubleshoot for software issues. Make sure all software and firmware updates have been installed.	
2. Verify if issue is visible on an external display.	Yes	Issue is NOT caused by internal LCD display. Go to step 3.	
	No	Go to step 6.	
3. Remove video card, inspect connector for damage or corrosion. Reinstall video card and retest. Verify if issue still occurs.	Yes	Replace video card. Go to step 4.	**M04**
	No	Issue resolved by reseating video card.	
4. Verify if video corruption issue is still present.	Yes	Replace logic board. If a video card was replaced, reinstall the user's original video card. Go to step 5.	**M04**
	No	Issue resolved with replacement video card.	
5. Verify if video corruption issue is still present with replacement logic board installed.	Yes	Return to step 1 and retest.	
	No	Issue resolved with replacement logic board.	
6. Inspect glass panel. Verify if issue is caused by condensation or contaminants on inside/ outside surface of glass panel, or on surface of LCD panel.	Yes	Clean glass and/or LCD using procedures in Glass Panel take-apart chapter. Identify possible sources of contamination (nearby cigarette/cooking smoke, heavy airborne dust, etc.) to prevent recurrence. Condensation should dissipate after computer has been running a few hours.	
	No	Go to step 7.	

7. Disconnect DisplayPort cable between LCD display and logic board, and verify if there is damage to cable or connectors. Repeat with vertical sync cable connected between LCD panel and LED backlight board.	Yes	Replace DisplayPort cable or any other damaged part/ module.	**X03**
	No	Reinstall DisplayPort cable and vertical sync cable. Go to step 8.	
8. Verify if issue is still visible after reinstalling/replacing DisplayPort cable and vertical sync cable.	Yes	If video corruption symptom appears to be like a rolling image (bad location of the top of image), replace v-sync cable and go to step 9. Else replace DisplayPort cable and go to step 9.	**X03** **X03**
	No	Issue resolved with reseating/ replacing damaged cable(s).	
9. Verify if issue is still visible after replacing DisplayPort cable or/ and vertical sync cable.	Yes	Replace LCD panel.	**L04**
	No	Issue resolved with replacing the cable(s).	
10. Verify if issue is still present with replacement LCD panel installed.	Yes	Contact Apple Technical Support.	
	No	Run Apple Service Display Utility Diagnostic and enter the receipt code in the "Repair Notes" section. Issue resolved with replacement of LCD panel.	**L04**

Burnt Smell/Odor

Unlikely cause: speakers, microphone, rear housing

Quick Check

Symptoms	Quick Check
Burnt Smell/Odor • Burning smell • Unusual odor	**1.** Verify that computer is the source of the odor. **2.** If system is new, see **kBase #TA22044: "New Equipment: Odors May Be Present Short-Term"** **3.** Disconnect all third-party devices and check to see if any external device is the source of odor. **4.** Inspect air intake and air outlets for obstructions. To prevent overheating make sure there is sufficient clearance to allow air to flow unobstructed into and out of the system. **5.** Verify if system is functional.

Deep Dive

Check	Result	Action	Code
1. Verify if source of the odor can be identified by visually inspecting each module and its associated cables for signs of burned or damaged components, smoke residue, burned traces, or melted or damaged wiring,	Yes	Replace affected module(s). Go to step 2	**P08**
	No	Unable to locate source of odor. Go to step 3.	
2. Disconnect all third-party devices and cables. Power ON system and verify if smoke or strong odor returns.	Yes	Power down system immediately. Go to step 3.	
	No	System functions correctly. Verify system functionality with third-party devices and cables and return system to user if problem has been resolved. Consult third-party companies as needed for issues with those products.	

3. Verify if source of odor can be located using your nose.	Yes	Check all AC and DC power cables for pinch or damage. Replace affected module(s) and retest system.	**P08**
	No	Contact Apple for assistance if you feel that there is a possible safety issue with computer that has not been resolved in previous steps.	

Uncategorized Symptoms

Quick Check

Symptoms	Quick Check
Uncategorized Symptoms • Unable to locate appropriate symptom code.	**1.** Make sure system is plugged into a known-good outlet. **2.** Listen for boot chime, fan, optical drive, or hard drive noise which indicates system is powering up. If noise is heard, go to **Won't Start Up**. If no noise is heard go to **No Power, Dead Unit**. **3.** Attempt to boot from Install DVD to isolate possible software issues.

Deep Dive

Check	Result	Action	Code
1. Verify if existing symptom code applies to issue reported by 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. Provide as much detail as possible.	**N99**

Display

Backlight Issue/No Backlight

Unlikely cause: hard drive, optical drive, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Backlight Issue/No Backlight • No image • Partial backlight failure • Backlight flickers • Display dim	**1.** Check for Software Update. **2.** Verify that System Preferences > Displays > Brightness control setting is above minimum. **3.** If no image on built-in display, connect external display to verify if iMac video circuitry is functioning. If no image visible on external display, go to **No Video**.

Deep Dive

Check	Result	Action	Code
1. Verify boot chime present and fans running when computer powered ON. (Reset SMC and clear PRAM if necessary for proper boot up.)	Yes	Power on self test OK. Go to step 2.	
	No	Go to **Won't Start Up**.	
2. Verify if image is visible on built-in LCD panel, with adjustable backlight level.	Yes	Video present. Verify system functionality and return to user or go to appropriate troubleshooting flow.	
	No	Go to step 3.	
3. Connect supported external display. Verify if any image appears on external display after system has booted.	Yes	External display detected by system. Video circuitry on logic board functional. Go to step 4.	
	No	Go to **No Video**.	
4. Verify if LCD backlight is ON by looking for faint glow from display when viewed in darkened room with brightness set at maximum.	Yes	LED backlight is functioning. Go to step 7.	
	No	Go to step 5.	

5. Shine bright (low heat) flashlight onto front of LCD. With computer powered ON verify if a faint image is visible.	Yes	LCD panel functional but backlight is missing or dim. Remove LCD panel and inspect and reseat the following cable connections: -Output cable between lower end of LED backlight board and lower end of LCD panel. -Vertical sync cable between upper end of LED backlight board and LCD panel. -DC power cable between upper right of LED backlight board and power supply. Replace any damaged cable. Reinstall LCD panel and go to step 6.	**X03**
	No	No image or backlight. Go to step 7.	
6. Power ON system. Verify if image is now visible on LCD panel with correct backlight level.	Yes	Issue resolved.	
	No	Replace LED backlight board. Retest. If issue persists, go to step 7.	**M04**
7. Inspect and reseat DisplayPort cable between LCD panel and logic board. Power ON system. Verify if image is visible on built-in LCD display.	Yes	Issue resolved.	
	No	Replace DisplayPort cable. If issue persists, replace LCD panel. Retest.	**X03** **L03**

Noise / Unstable Flickering

Unlikely cause: camera, microphone

Quick Check

Symptoms	Quick Check
Noise / Unstable Flickering • Unstable image • Flickering image • Humming noise from display • High frequency noise from display	**1.** Verify that intake vent on bottom of computer is not obstructed. **2.** Inspect system for third party software that is being used to set fan speeds to a higher than normal RPM. Some users may install this software to monitor and control internal temperatures, potentially causing higher fan speeds to generate higher than expected noise levels.

Deep Dive

Check	Result	Action	Code
1. Verify if user issue is due to flickering, or to an unstable video image on the LCD.	Yes	Suspected flickering issue. Go to step 2.	
	No	For audible noise issues go to step 8. All other issues go to appropriate.	
2. Connect a supported external display to the mini DisplayPort on rear of computer. Verify if issue occurs with external display.	Yes	Suspect issue with video circuitry. Go to **Corrupted Video**.	
	No	Video circuitry OK. Go to step 3.	
3. Disconnect and carefully inspect all four cables on back of LCD panel for signs of damage, corrosion, or pinched wires.	Yes	Replace damaged cable(s) where needed, otherwise reattach connectors. Retest.	**X03**
	No	Go to step 4.	
4. Power ON computer and verify if issue still occurs.	Yes	If connections are secure and display is still flickering, go to step 5.	
	No	Issue resolved.	

5. Shine bright (low heat) flashlight into front of LCD. Verify if an image is being displayed when flickering issue is occurring.	Yes	Image present but backlight is flickering. Replace vertical sync cable (between LCD panel and upper end of LED backlight board) and retest. If issue persists, replace LED backlight board.	**X03** **M04**
	No	Replace DisplayPort cable between LCD panel and logic board, and retest.	**X03**
6. Verify if noise varies when adjusting brightness level up and down.	Yes	Noise seems to be generated by vertical sync cable. Inspect and replace.	
	No	Noise is from another source. Go to step 7.	
7. Verify if noise can be heard when computer is set up with user seated in normal user position. Adjusting brightness level up and down may be necessary to recreate issue.	Yes	Replace LED backlight board. Go to step 8.	**M04**
	No	Noises that are not audible from the normal user position are considered acceptable.	
8. Verify if noise is still present.	Yes	Replace LCD panel. If noise still present, go to **Noise/ Hum/Vibration**.	**L06**
	No	Issue resolved.	

LCD Image Issues

Unlikely cause: power supply, hard drive, optical drive, fans, speakers, camera, microphone

Quick Check

Symptom	Quick Check
LCD Issues • Incorrect/missing colors • Distorted/blurred image • Pixel anomalies • Vertical/horizontal lines • Non-uniform brightness	**1.** Allow display to reach normal operating temperature for about a minute before evaluating front-of-screen performance. **2.** Check display preferences for use of custom display profile. **3.** Check brightness setting. **4.** Clean glass panel while checking for dust/debris.

Deep Dive: General

Check	Result	Action	Code
1. Verify if issue is incorrect/ missing colors.	Yes	Go to **incorrect/missing colors.**	
	No	Go to step 2.	
2. Verify if issue is distorted/ blurred image.	Yes	Go to **distorted/blurred image.**	
	No	Go to step 3.	
3. Verify if issue is bright or dark pixel anomalies.	Yes	Go to **pixel anomalies.**	
	No	Go to step 4.	
4. Verify if issue is vertical or horizontal lines.	Yes	Go to **vertical/horizontal lines.**	
	No	Go to step 5.	
5. Verify if issue is non-uniform brightness.	Yes	Go to **non-uniform brightness.**	
	No	LCD functioning OK. Return to appropriate symptom flow if user issue is still present.	

Incorrect/Missing Colors

Unlikely cause: power supply, hard drive, optical drive, fans, speakers, camera, microphone

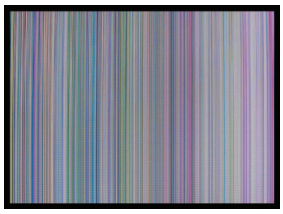
Quick Check

Symptoms	Quick Check
Incorrect/Missing Colors • Wrong color display • Color/contrast issues	**1.** Allow display to reach normal operating temperature for about a minute before evaluating front-of-screen performance. **2.** Verify if System Preferences > Display settings are configured to use default display profile. **3.** Verify System Preferences > Universal Access > Display "Enhance contrast", "Use grayscale", and "Black on White/White on Black" settings are set to defaults.

Deep Dive

Check	Result	Action	Code
1. Verify computer has been warmed up for about a minute.	Yes	Go to step 2.	
	No	Warm up computer for about a minute. Go to step 2.	
2. Verify if all four cables on back of LCD panel are secure at both ends.	Yes	Go to step 3.	
	No	Reseat connections, replace damaged cable(s) if needed. Retest.	**L14**
3. Go to System Preferences > Desktop & Screen Saver > Desktop and set color to Solid Gray Light. Verify if incorrect/missing color issue affects entire display.	Yes	Suspect poor video connection. Replace DisplayPort cable between LCD panel and logic board.	**L14**
	No	Go to step 4.	
4. Set up computer side-by-side with a known-good, same-model computer showing same image. Verify if issue is noticeably worse on display being tested.	Yes	Replace LCD panel.	**L02**
	No	Small variations in color uniformity across display are normal and do not warrant replacement of LCD.	

Distorted/Blurred Image



Unlikely cause: power supply, hard drive, optical drive, fans, speakers, camera, microphone

Quick Check

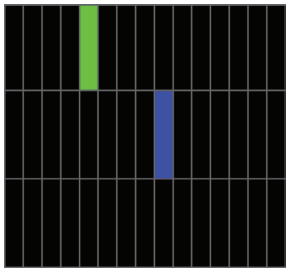
Symptoms	Quick Check
Distorted/Blurred Image • Text and graphics appear fuzzy • Image corrupted	**1.** Set System Preferences > Displays to native resolution of LCD. Non-native resolutions are unable to produce optimal clarity. **2.** Clean outside of glass panel. **3.** Boot from install DVD to determine if a potential software issue exists.

Deep Dive

Check	Result	Action	Code
1. Boot from Install DVD and verify if issue is still visible.	Yes	Go to step 2.	
	No	Issue likely caused by software or driver issue. Troubleshoot for software issues. Make sure all software updates have been installed.	
2. Verify if issue is visible on an external display attached to mini DisplayPort.	Yes	Issue NOT caused by internal LCD panel. Go to step 3.	
	No	Go to step 6.	
3. For systems without video card, go to step 4. If a video card is present, remove video card, inspect connector for damage or corrosion then reinstall. Verify if issue still occurs.	Yes	Replace video card. Go to step 4.	**M24**
	No	Issue likely caused by poor video card connection.	
4. Verify if distorted/blurred image issue is still present.	Yes	Replace logic board. For systems with a video card, reinstall the user's original video card. Go to step 5.	**M04**
	No	Issue resolved.	
5. Verify if issue is still present with replacement logic board installed.	Yes	Return to step 1 and retest.	
	No	Issue resolved.	

6. Inspect glass panel. Verify if issue is caused by condensation or contaminants on inside surface of glass panel.	Yes	Clean glass and/or LCD using procedures in Glass Panel take-apart chapter. Identify possible sources of contamination (nearby cigarette/cooking smoke, heavy airborne dust, etc.) to prevent recurrence. Condensation should dissipate after computer has been running a few hours.	
	No	Go to step 7.	
7. Remove DisplayPort cable between LCD panel and logic board, and verify if there is damage to cable or connectors.	Yes	Replace DisplayPort cable.	**X03**
	No	Reinstall DisplayPort cable. Go to step 8.	
8. Verify if issue is still visible after reinstalling DisplayPort cable.	Yes	Replace LCD panel. Go to step 9.	**L04**
	No	Issue resolved.	
9. Verify if issue is still present with replacement LCD panel installed.	Yes	Return to step 1 and retest.	
	No	Issue resolved.	

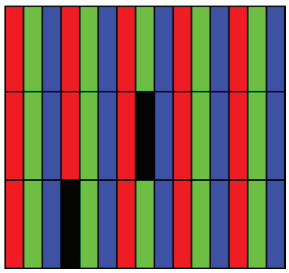
Pixel Anomalies



Unlikely cause: logic board, power supply, hard drive, optical drive, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Pixel Anomalies • Dark dot anomalies • Bright dot anomalies • Debris on inside surface of glass panel • Debris on surface of LCD panel	**1.** Clean outside surface of glass panel. **2.** See **kBase #HT1721: About LCD display pixel anomalies.**



Deep Dive

Check	Result	Action	Code
1. Determine if "defects" are dust/debris on surface of glass panel or LCD.	Yes	Clean glass and/or LCD using procedures in Glass Panel take-apart chapter.	
	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 panel 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 panel meets dark pixel defect specifications. Go to step 4.	
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 panel is operating within specifications for pixel defects. Do NOT replace LCD panel.	

Vertical/Horizontal Lines

Unlikely cause: power supply, hard drive, optical drive, fans, speakers, camera, microphone





Quick Check

Symptoms	Quick Check
Vertical/Horizontal Lines • Vertical lines • Horizontal lines	**1.** Boot from install DVD to determine if potential software issue exists. **2.** Verify if issue is visible on an external display.

Deep Dive

Check	Result	Action	Code
1. Boot from Install DVD and verify if issue is still visible.	Yes	Go to step 2.	
	No	Issue likely caused by software or driver issue. Troubleshoot for software issues. Make sure all software updates have been installed.	
2. Verify if issue is visible on an external display attached to mini DisplayPort.	Yes	Issue NOT caused by internal LCD. For systems with a video card, go to step 3. For systems without a video card, go to step 4.	
	No	Go to step 6.	
3. If a video card is present, remove video card and inspect connector for damage or corrosion then reinstall. Verify if issue still occurs.	Yes	Replace video card. Go to step 8.	**M24**
	No	Issue likely caused by poor video card connection.	
4. For systems without video card, horizontal lines may be related to a failing RAM module. Verify if video issue only happens AFTER Apple logo and spinning wheel appear.	Yes	Issue only happens AFTER Apple logo and spinning wheel appear. Go to step 5.	
	No	Issue present before Apple logo and spinning wheel appear. Go to step 8.	
5. Start with shift key down (safe mode) to disable system extensions. Verify if issue still happens when booting in safe mode.	Yes	Go to step 8.	
	No	No video issue when booting in safe mode. Go to step 6.	

6. Isolate with only one memory module installed, then with the other one. Test with known-good memory. Verify if issue only happens with specific RAM module(s).	Yes	Replace affected RAM module.	**X02**
	No	Go to step 7.	
7. Isolate with one known-good memory module installed in one memory slot. Repeat by testing in other memory slots Verify if issue only happens with specific memory slot of logic board.	Yes	Replace logic board and retest.	**M07**
	No	Go to step 8.	
8. Remove DisplayPort cable between LCD panel and logic board and verify if there is damage to cable or connectors.	Yes	Replace DisplayPort cable. Go to step 9.	**X04**
	No	Reinstall DisplayPort cable. Go to step 9.	
9. Verify if issue is still present after reinstalling DisplayPort cable.	Yes	Replace logic board. If video card was present, reinstall original video card. Go to step 10.	**M04**
	No	Issue resolved.	
10. Verify if issue is still present with replacement logic board installed.	Yes	Go to step 11.	
	No	Issue resolved.	
11. Reinstall original logic board and verify if issue is still present with original logic board reinstalled.	Yes	Replace LCD panel.	**L04**
	No	Issue resolved. If a video card was present, reinstall original video card.	

Non-Uniform Brightness

Unlikely cause: power supply, hard drive, optical drive, fans, speakers, camera, microphone



Quick Check

Symptoms	Quick Check
Non-Uniform Brightness • Brightness not uniform • Color not-uniform	**1.** Verify System Preferences > Displays > Brightness slider is set above minimum. **2.** Allow display to reach normal operating temperature for about a minute before evaluating front-of-screen performance. **3.** Visually inspect glass panel for presence of dust, cigarette smoke, or other contaminants. Clean glass panel if needed. **4.** Run latest available service utilities to check for correct LCD panel temperature.



Deep Dive

Check	Result	Action	Code
1. Determine if brightness uniformity issue is visible after display has warmed up for about a minute.	Yes	Go to step 2.	
	No	Display backlight can take a minute to stabilize. Retest. If issue still not visible return computer to user.	
2. Look at user-provided examples showing brightness uniformity issue. Determine if variation in uniformity appears excessive when compared to another same-model computer.	Yes	Go to step 3.	
	No	Demonstrate to user that LCD performs similarly to another computer of the same model.	
3. Remove glass panel and loosen screws securing LCD panel. Determine if brightness uniformity improves.	Yes	Inspect for mechanical interference with screws or cables making contact with back of LCD. Reseat components & cables, retest.	
	No	Go to step 4.	
4. Remove LCD panel, then inspect and reseat backlight cables. Determine if brightness uniformity improves.	Yes	One or more backlight cables were loose.	
	No	Replace LCD panel.	**L07**

Cosmetic Defects

Symptoms	Quick Check
Cosmetic Defects to LCD • Cracked LCD • Scratched LCD polarizer • Scorched or melted LCD • LCD impact damage • Foreign material on LCD or back side of glass panel.	**1.** Determine if damage was caused by user environment, accidental damage, or abuse. If applicable, inform user that Apple does not warrant damage caused by accident, abuse, misuse, flood, fire, earthquake, or other external causes. For more information, refer to: http://www.apple.com/legal/warranty **2.** For dark and bright pixel anomalies see Pixel Anomalies.

Uncategorized Symptoms

Quick Check

Symptoms	Quick Check
Uncategorized Symptoms • Unable to locate appropriate symptom code.	**1.** Make sure brightness level is set above minimum. **2.** Clean glass panel to make sure external contaminants are removed prior to evaluating display performance. **3.** Allow LCD display to warm up approximately 15 minutes before evaluating display color and brightness uniformity performance.

Deep Dive

Check	Result	Action	Code
1. Verify if existing symptom code applies to issue reported by 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. Provide as much detail as possible.	**N99**

Mass Storage

Hard Drive Not Recognized

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Drive Not Recognized **Drive No Boot** • Flashing Question Mark • Boots to Grey Screen • Boots to Blue Screen • Boots to Prohibitory Symbol (Review **kBase #HT2674: Intel-based Mac: Startup sequence and error codes, symbols**)	**1.** Use a known-good mouse. A stuck mouse button will not allow boot. **2.** Boot from Install DVD. Use Disk Utility to verify S.M.A.R.T. status of internal hard drive. **3.** Use Disk Utility to repair Mac OS X on disk. **4.** Verify that user's data is backed up and that user authorizes erasing disk and reinstalling software. **5.** Use Target Disk Mode to mount user's drive on a known-good computer. Use Disk Utility on host computer for Quick Checks 2 through 4.

Deep Dive

Check	Result	Action	Code
1. Boot from Install DVD and run Disk Utility. Verify if user's drive is available for Disk Utility to repair.	Yes	Go to step 2.	
	No	Go to step 5.	
2. Run Disk Utility's "Repair Disk" function and verify if it completes successfully.	Yes	Go to step 3.	
	No	Go to step 4.	
3. Reboot computer. Verify if system boots successfully and that Disk Utility "Verify" function reports no errors.	Yes	Data error. Issue resolved.	
	No	Go to step 4.	
4. With user's permission, erase internal drive and reinstall Mac OS. Verify if installation process completes.	Yes	Go to step 8.	
	No	Go to step 5.	

5. Check that the 4 wire SATA power cable (carrying 12v and 5v DC) is correctly connected to the Hard Drive. Inspect internal hard drive SATA and power cable and connectors for bent pins, or other damage to the cable(s).	Yes	Replace any damaged SATA Bus or SATA Power cable. For the internal SATA drive, the DC power comes from the main DC power cable harness. Go to step 8.	**X03**
	No	Go to step 6.	
6. Reseat internal hard drive SATA data cable at logic board and drive ends, and verify if computer boots up successfully.	Yes	Go to step 8.	
	No	Replace hard drive SATA cable. Go to step 8.	**X03**
7. Test with a known-good bootable drive. Verify if system boots successfully and that Disk Utility "Verify" function reports no errors.	Yes	Reinstall user's drive. Go to step 9.	
	No	SATA data cable was verified or replaced, and known-good drive is installed: -If hard drive does not spin up when system is powered on, replace DC power harness; if the no spinning issue persists after DC cable was replaced, replace Power Supply. -If hard drive spin up sound can be heard when system is powered on, but system cannot boot from it , replace logic board.	**X03** **P99** **M19**
8. Reboot computer. Verify if system boots successfully and that Disk Utility "Verify" function reports no errors.	Yes	Issue resolved. Return system to user.	
	No	Go to step 7.	
9. Reboot computer. Verify if system boots successfully and that Disk Utility "Verify" function reports no errors.	Yes	Issue resolved.	
	No	User's hard drive appears to be defective. Go to step 10.	
10. Replace affected internal drive. Boot from system-specific Install DVD and reinstall Mac OS X with drive format option. Verify if drive is formatted correctly (GUID partition table) and that software restore was successful.	Yes	Issue resolved by replacing affected internal drive.	**H01**
	No	SATA data cable verified/ replaced and new drive installed, Check with known-good restore DVD. If restore failure still happens, go to step 11.	

11. If restore from Install DVD is unsuccessful, startup a known-good Intel Mac system with T key pressed (to enter Target Disk Mode), insert the iMac Install DVD in its optical drive and connect it to the user's system via a FireWire cable. Startup user's system while holding Option key, then select and boot from the Install Disc DVD and restore system software. Verify if software restore was successful.	Yes	Restore failure seems to be due to user's internal optical drive or media issue. Go to Optical Drive Read/Write Error.	
	No	Restore failure seems to be due to internal SATA bus issue. Replace logic board.	**M19**

Hard Drive Read/Write Errors

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Drive Read/Write Error **Drive Bad Sector/Defective** **Drive Formatting Issues** • Cannot save documents • Read/write error message • Hang when accessing or saving data	**1.** Boot from Install DVD. Use Disk Utility to verify S.M.A.R.T. status of internal hard drive. **2.** Use Disk Utility to repair internal hard disk. **3.** Verify that user's data is backed up and that user authorizes erasing disk and reinstalling software. **4.** Use Target Disk Mode to mount user's drive on a known-good computer. Use Disk Utility on host computer for Quick Checks 2 through 3.

Deep Dive

Check	Result	Action	Code
1. Run Disk Utility 'Repair Disk' function, and verify if it completes successfully.	Yes	Go to step 2.	
	No	Go to step 3.	
2. Reboot computer. Verify if system boots successfully and that Disk Utility "Verify" function reports no errors.	Yes	Data error. Issue resolved.	**H07**
	No	Go to step 3.	
3. With user's permission, erase internal drive(s) containing Mac OS X, and reinstall it. Verify if installation process completes.	Yes	Go to step 6.	
	No	Go to step 4.	

4. Inspect internal hard drive SATA power and data cables and connectors for bent pins, or other damage to the cable.	Yes	Replace damaged cable. Go to step 6.	**H04**
	No	Go to step 5.	
5. Reseat SATA cable on internal hard drive and logic board ends. Verify if computer starts up.	Yes	Go to step 6.	
	No	Replace internal hard drive SATA data cable. Go to step 6.	**H04**
6. Reboot computer. Verify if system boots successfully and Disk Utility "Verify" function reports no errors.	Yes	Issue resolved.	
	No	Go to step 7.	
7. Test with known-good bootable drive. Verify if system boots successfully and Disk Utility "Verify" function reports no errors.	Yes	Reinstall user's drive, go to step 8.	
	No	SATA data cable verified or replaced and known-good drive installed used without success. Replace logic board.	**M19**
8. Reboot computer. Verify if system boots successfully and that Disk Utility "Verify" function reports no errors.	Yes	Issue resolved.	
	No	User's drive appears to be defective. Go to step 9.	
9. Replace user's drive. Verify if drive formats correctly with a GUID partition map and installs Mac OS without errors.	Yes	Issue resolved by replacing user's drive.	**H03**
	No	SATA data cable verified or replaced and new drive did not resolve issue. Replace logic board.	**M19**

Hard Drive Noisy

Unlikely cause: LCD panel, logic board, power supply, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Hard Drive Noisy • Noise during start up • Noise during operation • Noise when drive is copying or saving data	**1.** Boot from Install DVD. Use Disk Utility to verify S.M.A.R.T. status of hard drive. **2.** Use Disk Utility to repair disk. **3.** Determine if noise is comparable to another machine of the same model. See **kBase #TS3204: iMac (Late 2009) Evaluating normal noises**.

Deep Dive

Check	Result	Action	Code
1. Boot from the Install DVD and run Disk Utility. Verify if user hard drive is available for Disk Utility to repair.	Yes	Go to step 2.	
	No	Go to **Hard Drive Not Recognized**.	
2. Run Disk Utility 'Repair Disk' function and verify if it completes successfully.	Yes	Go to step 3.	
	No	Go to step 4.	
3. Restart the computer. Verify if the noise is still present.	Yes	Go to step 4.	
	No	Issue resolved. Return system to user.	
4. Remove glass and LCD panel, check that internal hard drive thermal sensor cable is present, is the correct type for the installed drive model, is well connected and retest (with an external display connected). Verify if the noise comes from the center fan.	Yes	Replace thermal sensor cable with correct part number (see Exploded View to identify the part number, and Take Apart chapter for correct installation).	
	No	Go to step 5.	
5. Disconnect internal hard drive SATA data cable and retest (with an external display connected). Verify if the noise is still present.	Yes	Noise issue still present, but does not appear to be caused by hard drive. Go to **Noise/ Hum/Vibration**.	
	No	Go to step 6.	

6. Remove hard drive and verify if rubber vibration isolation grommets are properly installed in hard drive bracket (attached to hard drive) and to mechanism in rear housing (where hard drive pins insert).	Yes	Go to step 7	
	No	If grommets are missing or damaged, replace hard drive bracket or mechanism as appropriate. Go to step 7	
7. Restart system and verify if the noise is still present.	Yes	Go to step 8	
	No	Reseating or replacing the drive rubber grommets / bracket solved noise issue.	
8. Reconnect user's drive and, with user's permission, erase hard drive and reinstall Mac OS. Verify if installation process completes.	Yes	Go to step 9.	
	No	Replace hard drive. Go to step 10.	
9. Restart system and verify if the noise is still present.	Yes	Replace hard drive. Go to step 10.	
	No	Software related issue.	
10. With replacement hard drive installed, reboot computer. Verify if noise is still present.	Yes	Replacement hard drive did not resolve issue. Go to step 11 to check for other source of noise.	
	No	Issue resolved by replacing hard drive.	**H06**
11. Disconnect hard drive SATA and power connections then boot from the Install DVD. Verify if noise is caused by fans.	Yes	Go to **Fan Failures/Thermal Issues**.	
	No	Go to step 12.	
12. Disconnect hard drive and optical drive then boot from an external volume. Verify if noise disappears when optical drive has been disconnected.	Yes	Possible optical drive or media issue. Go to **Optical Drive Noisy**.	
	No	Noise issue still present, but does not appear to be caused by hard drive. Go to **Noise/ Hum/Vibration**.	

Optical Drive Not Recognized

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Drive Not Recognized/Mount • Discs inject and eject, but do not appear in Finder	**1.** Check Finder Preferences and make sure "CD's, DVD's and iPods" is checked under "Show these items on the desktop" in the General section. **2.** Check affected optical media for presence of physical damage(s) on its surface. **3.** Test with known-good optical media. **4.** Use System Profiler Serial-ATA section to see if optical drive appears. **5.** Check System Profiler Serial-ATA section for presence of an inserted optical media.

Deep Dive

Check	Result	Action	Code
1. Verify if optical drive is listed in Serial-ATA section of System Profiler.	Yes	Go to step 2.	
	No	Go to step 3.	
2. Test both CD and DVD media. Verify if optical drive can read both CD and DVD media.	Yes	No issue, or possible intermittent issue. Gather more information from user.	
	No	If both types of media fail, check that Finder Preferences are set to "show CD's and DVD's", then go to step 3. If only one type of media fails, drive has a laser pickup issue. Replace optical drive.	**J03**
3. Connect known-good optical drive to SATA cable. Verify if both CD and DVD media are read reliably.	Yes	SATA cable and port on logic board appear good. Go to step 5.	
	No	Go to step 4.	

4. Reseat SATA cable connections at optical drive and logic board (cable connects to back of logic board). Verify if both CD and DVD media are read reliably.	Yes	Go to step 6.	
	No	Replace optical drive SATA cable and test. If issue persists, replace logic board. Go to step 6.	**X03** **M19**
5. Connect original optical drive to known-good SATA cable. Verify if both CD and DVD media are read reliably.	Yes	SATA cable issue. Replace SATA cable. Go to step 6.	**X03**
	No	Replace optical drive.	**J03**
6. Test read compatible known-good CD and DVD media (Install DVD). Verify if media is recognized and reads reliably.	Yes	Issue resolved.	
	No	Replace optical drive.	**J03**

Optical Drive Won't Accept/Eject Media

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Drive Won't Accept Media **Drive Won't Eject Media** • Cannot insert a disc into drive • Cannot eject a disc from drive	**1.** Check affected optical media for presence of physical damage(s) on its surface. **2.** Use System Profiler Serial-ATA section to see if optical drive appears. If not, go to **Optical Drive Not Recognized**. **3.** Restart computer and hold down mouse button or keyboard eject key to cycle optical drive. **4.** Inspect optical drive slot for obstructions

Deep Dive

Check	Result	Action	Code
1. Verify if optical drive is listed in System Profiler device tree for Serial-ATA devices.	Yes	Optical drive communicating with logic board. Go to step 5.	
	No	Go to step 2.	

2. Verify SATA cable connections between optical drive and logic board. Visually inspect cables and connectors for any debris, damage or bent pins. Verify if optical drive is listed in System Profiler device tree.	Yes	Optical drive communicating with logic board. Go to step 5.	
	No	Replace damaged cables and retest. If connections are good and no visible cable damage, go to step 3.	**X03**
3. Connect known-good optical drive to SATA cable. Verify if known-good optical drive is listed in the System Profiler device tree.	Yes	Go to step 4.	
	No	Suspect bad SATA cable. Go to step 7.	
4. With known-good optical drive installed, test for media inject/eject. Verify if drive accepts and ejects known-good media.	Yes	Known-good optical drive resolved inject/eject issue. Replace optical drive.	**J03**
	No	Go to step 7.	
5. Inspect optical drive slot during disc insert/eject. Verify if discs can be inserted easily and don't get scraped during insertion/ejection.	Yes	Go to step 6.	
	No	Verify correct optical drive bezel alignment with enclosure. Reseat optical drive then retest. If issue persists, replace optical drive.	**J03**
6. With known-good optical media (Install DVD), test for media inject/eject. Verify if drive accepts and ejects known-good media.	Yes	Media issue. No repair necessary. Suggest user investigate use of different media.	
	No	Go to step 3.	
7. Replace SATA cable then test for media inject/eject. Verify if drive injects and ejects known-good media.	Yes	SATA cable resolved issue. Return system to user.	**X03**
	No	SATA cable verified or replaced, and optical drive verified or replaced. Replace logic board and retest.	**M19**

Optical Drive Read/Write Error

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Drive Read/Write Data Error • Errors when writing optical media. • Errors when reading optical media. • Hang when accessing or preparing to write data.	**1.** Check that optical media is not physically damaged. **2.** Run latest service utilities to check for optical drive thermal sensor. **3.** Test optical media in a known-good optical drive in the same type of computer to rule out media issue. **4.** Check with known-good discs like the Install DVD that came with the computer. **5.** For write issues, check with known-good media that performs well in a known-good optical drive in the same type of computer.

Deep Dive

Check	Result	Action	Code
1. Verify if media is free to spin without optical drive scraping edge or surface of media.	Yes	Go to step 3.	
	No	Go to step 2	
2. Reseat optical drive in enclosure and verify that a media can be inserted without being scratched	Yes	Go to step 3	
	No	Replace optical drive and retest.	**J05**
3. Test both CD and DVD media. Verify if drive can read both CD and DVD media.	Yes	Go to step 7.	
	No	If both types of media fail, check that Finder Preferences are set to "show CD's and DVD's", then go to step 4. If only one type of media fails, drive has a laser pickup issue. Replace optical drive.	**J03**
4. Install known-good optical drive and verify if both CD and DVD media are read reliably.	Yes	Both SATA cable and port on logic board appear good. Go to step 6.	
	No	Go to step 5.	

5. Continue to use known-good optical drive. Reseat optical drive SATA+Power cable connection at logic board ends (cable connects to back of logic board). Verify if both CD and DVD media are read reliably.	Yes	Go to step 6.	
	No	Replace SATA cable and retest. If issue persists, replace logic board. Go to step 7.	**X03** **M19**
6. Reinstall user's optical drive and verify if both CD and DVD media are read reliably.	Yes	Go to step 7.	
	No	Replace user's optical drive.	**J03**
7. Test write data to compatible CD and DVD media. Verify if burned media is recognized and read reliably.	Yes	Issue resolved.	
	No	Run ODD sensor and ODD fan tests in ASD: If errors found check ODD sensor and ODD fan connections to logic board (read/write errors may be due to drive getting too hot). If no errors are found while running latest Apple diagnostics, replace optical drive.	**J03**

Optical Drive Not Performing to Specifications

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Optical Drive Not Performing to Specifications • Read or write speeds slower than expected	**1.** Test optical media in another computer of the same type to rule out media issue. **2.** For write issues, check with known-good media that performs well in another computer and drive of the same type. **3.** Run latest service utilities to check optical drive thermal sensor status.

Deep Dive

Check	Result	Action	Code
1. Test both CD and DVD media. Verify if optical drive can read both CD and DVD media.	Yes	Go to step 5.	
	No	If both types of media fail, check that Finder Preferences are set to "show CD's and DVD's", then go to step 2. If only one type of media fails, drive has a laser pickup issue. Replace optical drive.	**J03**
2. Connect known-good optical drive to SATA cable. Verify if both CD and DVD media are read reliably.	Yes	SATA cable and port on logic board good. Go to step 4.	
	No	Go to step 3.	
3. Reseat SATA cable connections at optical drive and logic board (cable connects to back of logic board). Verify if both CD and DVD media are read reliably.	Yes	Go to step 5.	
	No	Replace SATA cable and test. If issue persists, replace logic board. Go to step 5.	**X03** **M19**
4. Connect original optical drive to known-good SATA cable. Verify if both CD and DVD media are read reliably.	Yes	SATA cable issue. Replace SATA cable. Go to step 5.	**X03**
	No	Replace optical drive.	**J03**
5. Test write data to compatible CD and DVD media. Verify if burned media is recognized and read reliably.	Yes	Issue resolved.	
	No	Go to step 6.	

6. Media that is out of balance may not perform well at higher speeds even though higher speeds may be supported by the optical drive. Verify if slowing requested burn speed allows discs to be written reliably.	Yes	Media issue. No repair necessary.	
	No	Go to step 7.	
7. Test write data to compatible CD and DVD media. Verify burned media is recognized and reads reliably.	Yes	Issue resolved.	
	No	Check ODD sensor and ODD fan in latest service utilities: If errors found check ODD sensor and ODD fan connections to logic board (read/write errors may be due to drive being too hot). If no errors are found while running diagnostics, replace optical drive.	**J03**

Optical Drive Noisy

Unlikely cause: LCD panel, power supply, fans, speakers, camera, microphone

Quick Check

Symptoms	Quick Check
Optical Drive Noisy (J04) • Noise during boot • Noise during operation • Noise when drive is copying or writing data	**1.** Test optical media in another computer of the same type to rule out media issue. **2.** Check with known-good discs like the Install DVD that came with the computer. **3.** Verify if noise occurs without media in optical drive. If so, verify if noise made by hard drive or fans. **4.** Refer to **kBase #TS3204: iMac (Late 2009) Evaluating normal noises**.

Deep Dive

Check	Result	Action	Code
1. Test optical drive with different source of media. Does the noise issue remain?	Yes	Go to step 2.	
	No	Issue due to unbalanced media. Recommend using different media.	
2. Reseat optical drive in enclosure. Does noise issue remain?	Yes	Go to step 3.	
	No	Issue resolved by reseating drive in enclosure.	
3. Install known-good optical drive in enclosure. Does noise issue remain?	Yes	Go to step 4.	
	No	Replace optical drive.	**J04**
4. Compare system with similar model for optical drive noise in operation and verify that noise level is similar.	Yes	Noise level of optical drive appears to be within specification. Return system to user.	
	No	Check for other causes of noise in the system.	

SD Card Will Not Insert Into Slot

Unlikely cause: LCD panel, logic board, optical drive, hard drive

Quick Check

Symptom	Quick Check
SD Card will not insert into slot • SD memory card does not fully seat into slot • Card slot does not align with enclosure.	**1.** The SD card must be a 32 mm by 24 mm by 2.1 mm. You can also use thinner cards, such as Multi Media Cards (MMC). **2.** Clear any obstruction in SD card slot.

Deep Dive

Check	Result	Action	Code
1. Verify if known-good SD card fits in slot.	Yes	Ask user to replace defective or out-of-spec SD card.	
	No	Loosen the SD board screws, then insert known-good SD card again. Go to step 2.	

2. Verify if known-good SD card now fits in slot.	Yes	Tighten SD reader board screws. Go to step 3.	
	No	Replace SD card reader, retest.	**X24**
3. Verify if SD card now ejects and inserts without issue.	Yes	Issue resolved by SD card reader alignment.	
	No	Replace SD card reader.	**X24**

SD Card Not Recognized

Unlikely cause: LCD panel, logic board, optical drive, hard drive

Quick Check

Symptom	Quick Check
SD Card Not Recognized • Card does not show up on desktop or in System Profiler	**1.** Insert user's SD card into a known-good system and verify that it functions properly. If card cannot be read, contact card manufacturer for support options. **2.** Verify SD card slot with known-good SD card. **3.** Check correct drivers are installed for user's SD card type. Standard SD cards are supported by Mac OS X, but others may require specific driver software to be used.

Deep Dive

Check	Result	Action	Code
1. Verify if SD card inserts correctly in SD slot.	Yes	Go to step 2.	
	No	Go to **SD Card Will Not Insert Into Slot**.	
2. Unlock and insert user's SD card and verify it shows up on desktop or in System Profiler.	Yes	Go to step 6.	
	No	Go to step 3.	
3. Insert a known-good unlocked SD card and verify if read/write capabilities are working.	Yes	User's SD card not functioning properly. Contact card manufacturer for support.	
	No	Go to step 4.	

4. Run System Profiler and verify if SD card reader is now listed in USB devices.	Yes	Go to step 5.	
	No	Reseat SD cable at SD card reader and logic board If issue persists, replace SD cable. If issue persists after cable was replaced, replace SD card reader. If issue persists after card reader was replaced, replace logic board.	**X03** **X24** **M17**
5. Verify if a known-good unlocked SD card can now be correctly read and written.	Yes	Go to step 6.	
	No	Replace SD card reader.	**X24**
6. Lock the user's SD card and verify if it can't be written.	Yes	Issue resolved.	
	No	Replace SD card reader.	**M17**

Uncategorized Symptoms

Check	Result	Action	Code
1. Verify if existing symptom code applies to issue reported by 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. Provide as much detail as possible.	**N99**

Communications

AirPort/Bluetooth Issues

Quick Check

Symptoms	Quick Check
AirPort/Bluetooth Issues • Unable to join networks or pair devices • AirPort card or functionality not available • Bluetooth card or functionality not available • Intermittent device or connection dropouts • Limited wireless range	**1.** Verify that AirPort or Bluetooth is turned ON, and for AirPort issues make sure that a network is selected. **2.** (AirPort) Run the Apple System Profiler and verify that installed AirPort card supports the channel number used by the wireless access point. **3.** (AirPort) Check if the wireless access point requires special connection and encryption protocols. **4.** (AirPort) Check for nearby sources of interference such as microwave ovens or cordless phones. See **kBase #HT1365: AirPort: Potential source of interference.** **5.** (AirPort) Check the number of users trying to use AirPort in the area for possible network congestion (available bandwidth). **6.** (Bluetooth) If user complaints about a Bluetooth issue with an input device, first use a known-good Bluetooth input device to perform tests with computer. Then test user's Bluetooth device on known-good computer to define which side is creating the communication issue. See **kBase #TS3048: Troubleshooting wireless mouse and keyboard issues.** **7.** Isolate potential OS issues by starting up from original Install media for the computer, a same-model computer in Target Disk Mode, or compatible known-good OS on an external drive. Both AirPort and Bluetooth services are available when booted from Install disc.

Deep Dive

Check	Result	Action	Code
1. Open System Profiler. AirPort is listed under Network, while Bluetooth is listed under USB. Verify if both AirPort and Bluetooth cards are recognized.	Yes	Install all available software updates for AirPort/Bluetooth and re-test. If issue persists after software update, go to step 4 for AirPort, or go to step 6 for Bluetooth.	
	No	Go to step 2 for AirPort. Go to step 6 for Bluetooth.	
2. (Airport) Wait at least 15 seconds after computer has been shutdown and reseat AirPort card connection on logic board. Verify if AirPort card is now listed in Apple System Profiler.	Yes	Issue resolved by reseating AirPort card.	
	No	Wait at least 15 seconds after computer has been shutdown and replace AirPort card and re-test. Go to step 3.	**N01**
3. (Airport) After card has been replaced, verify if AirPort card is now listed in Apple System Profiler.	Yes	Issue resolved by replacing AirPort card.	
	No	Replace logic board and re-test.	**M11**
4. (Airport) Enable AirPort and verify if known local AirPort networks are available, or create a computer-to-computer network with another Macintosh computer using AirPort. See **http://docs.info.apple.com/article.html?path=AirPort/5.0/en/ap2110.html**. Verify if you connect successfully.	Yes	Issue resolved.	
	No	Go to step 5.	
5. (Airport) Check and reseat the two antennas to the AirPort card. Verify if you can connect to known AirPort network.	Yes	Issue resolved.	
	No	Replace AirPort card. If issue persists, replace AirPort antenna(s). If the damaged antenna is embedded in rear housing behind Apple logo, replace rear housing.	**N04** **X03**

6. (Bluetooth) Verify that computer and known-good Bluetooth device are both in discoverable mode. Verify if you can now successfully and reliably pair the device.	Yes	Issue resolved.	
	No	If Bluetooth cannot be enabled, replace Bluetooth/camera cable. If issue persists replace Bluetooth card and retest. Go to step 8. If Bluetooth can be enabled but Bluetooth communication persists, replace Bluetooth antenna. Go to step 7.	**X03** **N15** **X03**
7. (Bluetooth) Re-test with new Bluetooth antenna and verify if Bluetooth issues are resolved.	Yes	Issue resolved.	
	No	Replace Bluetooth card.	**N15**
8. (Bluetooth) Re-test with new Bluetooth cable/card and verify if Bluetooth issues are resolved.	Yes	Issue resolved.	
	No	Replace logic board.	**M11**

AirPort Card Kernel Panic

Quick Check

Symptoms	Quick Check
AirPort Card Kernel Panic • Kernel Panic on startup • Kernel Panic or freezing while attempting to connect to WiFi networks • Kernel Panic while transferring data on WiFi networks	**1.** Isolate OS by starting up from original Install media for this computer, a same-model computer in Target Disk Mode, or compatible known-good OS on an external drive. AirPort and Bluetooth services are available when booted from the Install disk. **2.** Ensure that all software and firmware updates for the computer and AirPort have been installed.

Deep Dive

Check	Result	Action	Code
1. Wait at least 15 seconds after computer has been shutdown before disconnecting AirPort card from logic board. Verify if computer now starts without kernel panic.	Yes	Reseat AirPort card and retest. If problem continues replace AirPort card. Go to step 2.	
	No	Kernel panic not related to AirPort. Restart from Install DVD or known-good bootable external drive and check Panic.Log file on user's hard drive to find out which is the crashing I/O interface. Also troubleshoot installed Mac OS X software.	
2. With replacement AirPort card installed, verify if computer starts now without kernel panic.	Yes	AirPort card issue. Issue resolved.	**N13**
	No	Replace logic board.	**M11**

Ethernet Port/Device Issue

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
Ethernet Port/Device Issue • No Ethernet device present • Unable to access network resources • Ethernet device shows no connection • Ethernet device unable to an IP address • Slow network performance	**1.** Check Ethernet cable for damage. Try a known good Ethernet cable – CAT5 or better recommended for 100Mbps+ connections. **2.** Check Ethernet ports on the computer and wall/ switch for dust, debris, damage or bent pins. **3.** Ensure distance from networking infrastructure is less than 300 feet/ 105 meters. **4.** Verify port, cable and network hardware with a known good system. Isolate firewall, MAC address filtering or hardware access control devices. **5.** Isolate OS by starting up from original Install media for this computer, a same-model computer in Target Disk Mode, or compatible known-good OS on an external drive.

Deep Dive

Check	Result	Action	Code
1. Visually inspect Ethernet port of computer and ensure that all pins will make physical contact with the Ethernet cable.	Yes	Go to step 2.	
	No	Pins are damaged, bent flat or missing. Replace logic board.	**M24**
2. Boot from original Install media. Verify Network Link status is active by using Network Utility under the "Info" tab. Verify if the Link Status is "Active".	Yes	Go to step 3.	
	No	If same Ethernet cable gives an "Active" link status on a known-good, same-model computer, replace logic board.	**M10**
3. Connect computer to another Mac using CAT5 Ethernet cable. See article http://docs.info.apple.com/article.html?path=Mac/10.6/en/8429.html. Verify if you connect successfully.	Yes	Ethernet communication good. Go to step 4.	
	No	If same Ethernet cable and computer connects to a known-good, same-model computer, replace logic board.	**M10**

4. Check for speed and duplex issues on network. Open System Preference > Network; click the Advanced button, then the Ethernet tab. Verify if the speed and duplex reported are what is expected.	Yes	Go to step 5.	
	No	Change speed and duplex settings. See article **http://docs.info.apple.com/article.html?path=Mac/10.6/en/8711.html**. Go to step 6.	
5. Check for MTU (Maximum Transmission Unit) issues. See **kBase #HT2532: Mac OS X: How to change the MTU for troubleshooting purposes**. Verify if changing MTU settings on computer resolves issue.	Yes	Go to step 6.	
	No	Ethernet controller damaged. Replace logic board.	**M10**
6. If changing speed, duplex or MTU settings allows connectivity, check with a known-good, same-model computer. Verify if known-good computer produces the same results.	Yes	Check with ISP or Network Administrator concerning speed, duplex & MTU settings.	
	No	Verify with known good OS. If issue persists, replace logic board.	**M10**

Wireless Input Device Doesn't Pair

Quick Check

Symptoms	Quick Check
Wireless Input Device Doesn't Pair • Can't get system to recognize a Bluetooth keyboard, mouse or trackpad	**7.** Check computer with a known-good Bluetooth input device to test computer side. **8.** Test Bluetooth device side with a known-good Mac OS X 10.6.x up to date computer with installed Bluetooth device driver. **9.** Ensure that device is being used within 30-foot range for Bluetooth devices. **10.** See **kBase #TS3048: Troubleshooting wireless mouse and keyboard issues.**

Deep Dive

Check	Result	Action	Code
1. Without any wired input devices connected, and with a known-good Apple wireless mouse /trackapd in discoverable mode, startup the computer. Verify if computer shows the Bluetooth Mouse Setup Assistant.	Yes	Bluetooth hardware is active. Go to step 6.	
	No	Go to step 2.	
2. Connect a wired mouse and run Apple System Profiler. Verify if Bluetooth interface is listed under USB in System Profiler.	Yes	Bluetooth hardware is present. Go to step 6.	
	No	Remove glass and LCD panel, reseat both ends of cable between Bluetooth board and logic board. Go to step 3.	
3. Using an externally connected display, run Apple System Profiler and verify if Bluetooth interface is listed under USB in System Profiler.	Yes	Bluetooth hardware is now present. Go to step 6.	
	No	Replace Bluetooth cable. Go to step 4.	**X03**
4. Run Apple System Profiler. Verify if Bluetooth interface is listed under USB in System Profiler.	Yes	Bluetooth hardware is now present. Go to step 6.	
	No	Replace Bluetooth board. Go to step 5.	**N15**
5. Run Apple System Profiler. Verify if Bluetooth interface is listed under USB in System Profiler.	Yes	Bluetooth hardware is now present. Go to step 6.	
	No	Replace logic board.	**M11**
6. Run Software Update and apply any available Bluetooth updates. Activate Bluetooth in System Preferences (or Apple menu icon) then select "Configure a new Bluetooth device" (or run Bluetooth Mouse Setup Assistant). Verify if a known-good Bluetooth mouse/trackpad is seen.	Yes	Bluetooth discovery is now active. Go to step 7.	
	No	Replace Bluetooth antenna.	**X03**
7. With a known-good Apple Wireless mouse/trackpad on and in discoverable mode, verify if you can successfully pair the device with the assistant.	Yes	Check for stability. Go to step 8.	
	No	Go to **Wireless Input Device Loses Connection**.	

8. With known-good Apple Wireless mouse/trackpad paired, verify if the device stays connected.	Yes	Issue resolved.	
	No	Inspect and reseat Bluetooth antenna cable. Replace a damaged antenna cable, or Bluetooth board if its antenna connector is damaged. Go to step 9.	**X03**
9. With user's mouse/trackpad paired, verify if the mouse stays connected.	Yes	Antenna issue. Issue resolved. Resassemble system.	
	No	Go to **Wireless Input Device Loses Connection**.	

Uncategorized Symptoms

Quick Check

Symptoms	Quick Check
Uncategorized Symptoms • Unable to locate appropriate symptom code.	**1.** Verify System Preferences/Network settings are configured appropriately to support communication method. **2.** For Ethernet connection issues verify that cable being used functions when used with another known-good system. **3.** For wireless connection issues review user environment to determine whether possible interference from other 2.4GHz communications devices might be contributing to issue. See **kBase #HT1365: AirPort: Potential sources of interference**

Deep Dive

Check	Result	Action	Code
1. Verify if existing symptom code applies to issue reported by 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. Provide as much detail as possible.	**N99**

Input/Output Devices

Apple Remote Inoperable

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
Apple Remote Inoperable • Apple Remote doesn't bring up Front Row • Apple Remote doesn't control iTunes • Apple Remote doesn't control computer volume	**1.** Make sure Apple Remote is within 30 ft. of computer, and has an unobstructed line-of-sight to computer. **2.** Make sure lens end of Apple Remote is pointing directly at front of computer. **3.** Make sure "Disable remote control infrared receiver" checkbox in System Preferences > Security is not checked. **4.** Ensure that all software and firmware updates for this model have been installed to take advantage of any available bug fixes.

Deep Dive

Check	Result	Action	Code
1. Open Photo Booth or iChat's video preview window. Point Apple Remote at built-in camera and press any button on Apple Remote. Verify if a white, flashing light is visible in video preview.	Yes	Apple Remote is functioning. Go to step 2.	
	No	Replace Apple Remote battery. Go to step 3.	
2. Open System Preferences > Security. Verify if "Unpair" setting is available in this preference panel.	Yes	Click "Unpair" button to disable possible pairing with another Apple Remote. Go to step 4.	
	No	Possible IR board issue. Go to step 5.	
3. With replacement battery, verify if white flashing light is visible coming from Apple Remote in video preview window.	Yes	Battery issue. Issue resolved.	**X05**
	No	Apple Remote defective. Replace Apple Remote.	**X04**

4. After clicking "Unpair", verify if the computer now responds to the Apple Remote.	Yes	Pairing issue. Issue resolved.	
	No	Possible IR board issue. Go to step 5.	
5. Open Apple System Profiler. Verify if "IR Receiver" is listed in USB list of devices.	Yes	IR board reporting on USB bus. Check for lens block. Go to step 6.	
	No	Inspect and reseat IR cable connection to logic board. Go to step 7.	
6. Check that IR board is correctly fitted and aligned with Apple window and that lens is not blocked by any foreign material and re-test. Verify if computer responds to Apple Remote.	Yes	Lens blocked or sensor not aligned with window. Issue resolved.	**X03**
	No	Lens damaged or inoperable. Replace IR board. Go to step 7.	
7. After reseating or replacing IR board, verify if "IR Receiver" is listed under USB in Apple System Profiler, and that computer now responds to Apple Remote.	Yes	IR module reseated/replaced. Issue resolved.	**X03**
	No	If IR board was only reseated, replace IR cable. Go to step 8.	
8. After replacing IR cable, verify if "IR Receiver" is listed under USB in Apple System Profiler, and that computer now responds to Apple Remote.	Yes	IR cable replaced. Issue resolved.	**X03**
	No	Replace IR board. Go to step 9.	
9. After replacing IR board, verify if "IR Receiver" is listed under USB in Apple System Profiler, and that computer now responds to Apple Remote.	Yes	IR board replaced. Issue resolved.	**X03**
	No	Replace logic board.	**M23**

Audio: Microphone

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
Audio: Microphone • Microphone not working • Microphone audio garbled • No sound	**1.** Verify that no tape, sticky notes, or other objects are blocking microphone located on top of computer near camera. Microscopic perforations on top of computer must be free of obstructions in order for microphone to function. **2.** Go to System Preferences > Sound > Input. Verify that sound input device is set to internal microphone. **3.** Go to System Preferences > Sound > Input. Verify that "Input volume" setting is set above minimum level. **4.** Go to System Preferences > Sound > Input. Verify that "Input level" indicator moves when speaking into microphone.

Deep Dive

Check	Result	Action	Code
1. Verify if boot chime is present when system is powered ON. Make sure audio output preferences are not set to mute.	Yes	Go to step 2.	
	No	Reset PRAM and retest.	
2. Make sure no cables are connected to external sound input/output ports. Go to System Preferences > Sound > Input and verify that "Internal microphone" is an available option.	Yes	Go to step 3.	
	No	Replace audio cable.	**M09**
3. Go to System Preferences > Sound > Input and verify if "Input volume" is set above minimum sensitivity.	Yes	Go to step 4.	
	No	Set "Input volume" slider to middle position. Retest.	
4. Go to System Preferences > Sound > Input and verify if "Input level" indicator moves when speaking into microphone.	Yes	Microphone and audio input functioning. Go to step 6.	
	No	Suspect bad microphone connection. Reseat microphone connector on logic board. Go to step 5.	

5. Inspect microphone cable routing and verify if cable is pinched or damaged.	Yes	Replace rear housing (microphone cable not available separately).	**L14**
	No	Go to step 6.	
6. Record sound sample using GarageBand or iMovie. Verify if sound quality of sound sample is normal during playback.	Yes	Microphone circuitry OK. Return system to user.	
	No	Replace logic board.	**M09**

Audio: Built-in Speakers Have Distorted Sound

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
Audio: Built-in Speakers Have Distorted Sound • No audio from one or both speakers. • Audio from speakers distorted	**1.** Go to System Preferences > Sound > Output. Verify that sound output device is set to internal speakers and that balance control is set to the center position. **2.** Obtain known-good high-quality sound file or use iTunes Store sound samples to evaluate sound quality. Verify suspect sound files on another system to determine if distortion is caused by computer or sound file. **3.** Set volume control to mid-range. Overdriving built-in speakers can cause distortion.

Deep Dive

Check	Result	Action	Code
1. Go to System Preferences > Sound > Output. Set speaker balance 100% to LEFT speaker and play a known-good sound file. Verify if sound is generated by LEFT speaker and that sound quality is acceptable.	Yes	LEFT speaker and amplifier circuitry OK. Go to step 2.	
	No	Distortion detected in LEFT speaker. Set Balance slider to middle position. Go to step 3.	
2. Set speaker balance 100% to RIGHT speaker and play a known-good sound file. Verify if sound is generated by RIGHT speaker and that sound quality is acceptable.	Yes	RIGHT speaker and amplifier circuitry OK. Set Balance slider to middle. Go to step 3.	
	No	Distortion detected in RIGHT speaker. Go to step 4.	

3. Connect external speakers or headphones to audio-out port and play a known-good sound file. Verify if sound quality is acceptable.	Yes	Suspect bad speaker. Go to step 4.	
	No	Audio CODEC or amplifier issue suspected. Replace logic board and retest.	**M09**
4. Inspect LEFT and RIGHT speaker cones and speaker connection cable for damage. Verify if speakers have visible damage.	Yes	Replace damaged speaker. Retest.	**L11**
	No	Go to step 5.	
5. Install known-good speaker into location where distorted sound was heard. Verify if sound quality improves.	Yes	Replace speaker.	**L11**
	No	Speaker amplifier issue suspected. Replace logic board.	**M09**

Audio: Built-in Speakers Have No Sound

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
Audio: Built-in Speakers Have No Sound • No audio from one or both speakers. • Audio from speakers distorted	**1.** Go to System Preferences > Sound > Output. Verify that sound output device is set to internal speakers. **2.** Go to System Preferences > Sound > Output. Verify that "Output volume" setting is set above the minimum level and that "Mute" checkbox is not selected. **3.** Go to System Preferences > Sound > Output. Verify that "Balance" slider is set to middle position so left and right speakers are both used.

Deep Dive

Check	Result	Action	Code
1. Verify if boot chime is present when system is powered ON. Make sure audio output preferences are not set to mute and volume is set to mid-range.	Yes	Go to step 2.	
	No	Reset PRAM and retest.	

2. Make sure no cables are connected to external sound input/output ports. Go to System Preferences > Sound > Output and verify that "Internal speakers" is an available option.	Yes	Go to step 3.	
	No	If "Headphones" is the only available sound output device, replace audio cable. If "Digital output" is the only available sound output device, reseat audio cable to logic board. If issue persists, replace audio cable. If issue persists, replace logic board.	**L11** **L11** **M09**
3. Go to System Preferences > Sound > Output. Set speaker balance 100% to LEFT speaker and play a known-good sound file. Verify if sound is generated by LEFT speaker and that sound quality is acceptable.	Yes	LEFT speaker and amplifier circuitry OK. Go to step 4.	
	No	No audio in LEFT speaker. Go to step 7.	
4. Set speaker balance 100% to RIGHT speaker and play a known-good sound file. Verify if sound is generated by RIGHT speaker and that sound quality is acceptable.	Yes	RIGHT speaker and amplifier circuitry OK. Set Balance slider to middle. Go to step 5.	
	No	No audio in RIGHT speaker. Go to step 7.	
5. Verify if user-reported audio issue has been resolved.	Yes	Issue no longer present. Return system to user.	
	No	Go to step 6.	
6. Boot system from Install DVD or another known-good bootable volume. Verify if issue still occurs.	Yes	Go to step 7.	
	No	Known-good boot volume works OK. Troubleshoot for software issue. Isolate if issue is application-specific or a possible OS conflict.	
7. Connect external speakers or headphones to audio-out port and play a known-good sound file. Verify if sound quality is acceptable.	Yes	Logic board, internal speakers, and audio-out port functioning correctly. Return system to user.	
	No	Go to step 8.	
8. Disconnect and carefully inspect audio connectors assembly and its connection to logic board for damage such as bent pins or pinched/cut wires.	Yes	Replace damaged audio connectors asembly. If issue persists, verify if symptom has changed.	**L14**
	No	Replace logic board.	**M09**

Camera Issues

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans, speakers, microphone

Quick Check

Symptoms	Quick Check
Camera Issues • Camera not detected • No green LED for camera • Excessive blooming • Poor White Balance • Poor Focus • Green image • Image distortion	**1.** Launch Apple System Profiler and confirm that system's USB hub and built-in camera are visible. **2.** Verify camera lens and glass panel are clean and free of contaminants. Clean glass panel if needed. **3.** Launch Photo Booth to verify that green indicator LED near camera lens turns on and image quality is acceptable.

Deep Dive

Check	Result	Action	Code
1. Launch Apple System Profiler and verify built-in camera is visible in USB list of devices.	Yes	Camera recognized. Go to step 2	
	No	Inspect and reseat camera cable connection on logic board. Go to step 2.	
2. Launch Photo Booth. Verify if green LED near camera lens turns ON and image appears normal.	Yes	Camera functioning. Return system to user.	
	No	Remove glass and clean both sides. Clean camera lens. If issue persists, replace camera cable. If issue persists, replace camera. If issue persists, replace logic board.	 **X07** **X07** **M13**

FireWire Device Not Recognized

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
FireWire Device Not Recognized • FireWire hard drive not recognized • FireWire optical drive not recognized • FireWire camera not recognized • FireWire printer not recognized	**1.** For external FireWire drives, make sure any external power source is plugged in and operating to isolate a power issue with the device. **2.** Test a known-good FireWire device to isolate a failed peripheral issue. **3.** Test a known-good FireWire cable to isolate a FireWire cable issue. **4.** Ensure that all software and firmware updates for this model have been installed to take advantage of any available bug fixes. **5.** Launch Apple System Profiler and verify if the affected FireWire device is visible on FireWire bus. If yes, then FireWire port and cable are functioning properly. Contact FireWire device manufacturer to verify that device is supported.

Deep Dive

Check	Result	Action	Code
1. Unplug all FireWire devices from computer. Reset PRAM. Reconnect FireWire device in question. Verify if FireWire device is recognized.	Yes	Issue resolved.	
	No	Possible logic board failure. Go to step 2.	
2. Use a known-good FireWire cable with a known-good FireWire device (such as another Mac in Target Disk Mode). Verify if FireWire device is recognized.	Yes	Try FireWire device in question with a known-good computer of same model. Go to step 3.	
	No	FireWire not recognized. Replace logic board.	**M12**
3. Verify if FireWire device is recognized on a known-good same model computer.	Yes	Go to step 4.	
	No	Device may need additional power. Use a powered FireWire hub. Go to step 5.	

4. Verify if FireWire device is recognized with a known-good FireWire cable on user's computer.	Yes	FireWire cable issue. Issue resolved.	
	No	FireWire device may need additional power. Go to step 5.	
5. Using a powered FireWire hub, and having installed any software or firmware updates for the device, verify if FireWire device is now recognized.	Yes	Device recognized. Required additional power from hub or update. Issue resolved.	
	No	Device may require additional software, or there may be a conflict in the Mac OS. Go to step 6.	
6. Create a new user in System Preferences > Accounts and log out current user. Log in on new user account and verify if FireWire device is now recognized.	Yes	Software Issue. Troubleshoot software on User account. Issue resolved.	
	No	Apply all Mac OS and FireWire specific updates. If issue persists, contact device manufacturer for support. FireWire port and cable have been verified.	

USB Device Not Recognized

Unlikely cause: LCD display, power supply, hard drive, optical drive, fans

Quick Check

Symptoms	Quick Check
USB Device Not Recognized • USB wired keyboard/mouse not recognized • USB external drive not recognized • USB camera not recognized • USB printer not recognized	**1.** Reset SMC. **2.** For printers and external USB drives, make sure any external power source is plugged in and operating to isolate a power issue with device. **3.** The iMac has 4 USB ports on rear of computer. Try each port to isolate a particular port malfunction. **4.** Test with a known-good wired keyboard or mouse to isolate a failed peripheral issue. **5.** Test with a known-good USB cable when dealing with a printer or external USB drive, to isolate a USB cable issue. **6.** Ensure that all software and firmware updates for this model have been installed to take advantage of any available bug fixes. **7.** Launch Apple System Profiler and verify if device is visible on USB bus. If yes, then the USB port and cable are functioning properly. Contact device manufacturer to verify that device is supported.

Deep Dive

Check	Result	Action	Code
1. Unplug all USB devices from the computer except for USB keyboard and mouse. Start computer and reset PRAM. Verify if USB keyboard and mouse are recognized.	Yes	Test with all USB ports to ensure all USB ports working as expected. Replace logic board for any port failures.	
	No	Reset SMC. Go to step 2.	
2. Verify if Bluetooth Mouse Setup assistant launches after startup.	Yes	Bluetooth detected, but external USB devices not recognized. Go to step 3.	
	No	Disconnect USB keyboard and mouse. Go to step 4.	

3. Verify if a known-good USB keyboard and mouse are recognized.	Yes	Test original USB mouse and keyboard. Replace if still not recognized. Go to step 5.	
	No	External USB ports not functioning. Replace logic board.	**M15**
4. With no USB devices connected, restart computer. Verify if Bluetooth Mouse Setup assistant launches after startup.	Yes	Bluetooth detected. Go to step 3.	
	No	Bluetooth not recognized. Internal and external USB not functioning. Replace logic board.	**M15**
5. With known-good USB keyboard and mouse working, test USB peripheral in question (USB hard drive or printer, etc.) Verify if device is recognized in Apple System Profiler under USB.	Yes	Device recognized. Test in all USB ports to ensure all USB ports working as expected. Replace logic board for any port failures.	**M15**
	No	Device may require more power than supplied by USB ports. Test with a powered USB hub. Go to step 6.	
6. Verify if using a powered USB hub resolves the issue.	Yes	Test device on the same USB port of a same-model computer without any other USB port populated. If other computer does not require a powered USB hub to allow the device functionality, replace logic board.	**M15**
	No	The computer's USB ports and cable have been verified. Ensure all software and firmware updates have been applied for computer and device. If issue persists, contact device manufacturer for support.	

Wired Keyboard Does Not Function Properly

Quick Check

Symptoms	Quick Check
Wired Keyboard Does Not Function Properly • Some or all keys on the keyboard don't work • Eject key or Caps Lock key doesn't seem to work • Some keys don't work as expected	**1.** Reset SMC **2.** Open System Preferences > Universal Access > Mouse & Trackpad and verify that Mouse Keys is turned OFF. When enabled, Mouse Keys can disable functionality of some or most keys, depending on keyboard used. **3.** The iMac has 4 USB ports on rear of computer. Make sure to try each port to isolate a particular port malfunction. **4.** Test with a known-good wired keyboard to isolate a failed peripheral issue. **5.** Test wired keyboard on a known-good, same-model computer. If it works on the other computer, this may indicate a bad USB port if keyboard doesn't work at all on user's computer, or a software issue if keyboard is working but not as expected on user's computer. **6.** Ensure that all software and firmware updates for this model have been installed to take advantage of any available bug fixes.

Deep Dive

Check	Result	Action	Code
1. Verify if all keys on keyboard work.	Yes	Go to step 2.	
	No	Go to **Keyboard: Specific Keys Do Not Respond**.	
2. Verify if Caps Lock is working as expected.	Yes	Go to step 3.	
	No	Go to **Keyboard: Specific Keys Do Not Respond**	
3. Verify if media Eject key is working as expected. Note that to prevent accidentally ejecting media, Mac OS X adds a slight delay to the media Eject key before it takes effect.	Yes	Go to step 4.	
	No	Go to step 5.	

4. Open System Preferences > Speech. Verify if the "Speak selected text when the key is pressed" checkbox is selected.	Yes	The key combination to speak text cannot be used for any other purpose. Either disable, or change to a more rare key combination (including Shift, Command, Option and Control).	
	No	Go to step 6.	**M15**
5. With optical media in the drive, hold the media Eject key. Verify if the eject symbol appears on screen and that optical media is ejected if present.	Yes	Normal media eject key delay. No repair necessary.	
	No	Go to **Optical Drive Won't Accept/Eject Media**.	
6. Open System Preferences > Language and Text > Input Menu. Check "Keyboard Viewer". From the Input Menu (flag) in the Menu Bar, choose "Show Keyboard Viewer". Verify if keys pressed appear in Keyboard Viewer.	Yes	Keys recognized. Go to step 9.	
	No	Keys not recognized. Replace keyboard.	**K01**
7. Open TextEdit or another text application and try typing something using the non-responding keys. Verify if they are typed in this other application.	Yes	Application-specific issue. Troubleshoot application.	
	No	Create a new user account in System Preferences > Accounts, log out from current user and log in with new user to isolate a User account related issue. If issue persists, reinstall Mac OS X from Install DVD.	

Keyboard: Specific Keys Do Not Respond

Quick Check

Symptoms	Quick Check
Keyboard: Specific Keys Do Not Respond • One or more keys do not respond when pressed • Key sticks • Keycap missing	**1.** If wireless keyboard is being used verify that it is properly paired with computer. Go to **Wireless Input Device Doesn't Pair** symptom flow to resolve pairing issues. **2.** The caps lock key has a built-in delay to reduce accidental activation and must be held for approximately ½ second for it to be activated. See **kBase #TS1578: Keyboard Caps Lock modified to reduce accidental activation**. **3.** Inspect keyboard for signs of liquid spills or other contamination. Apple's warranty does not cover accidental damage. **4.** If keycap is loose attempt to reattach it. **5.** Use the Keyboard Viewer menu to check every key. **6.** Recheck keyboard with a known-good computer. with an up to date Mac OS X 10.6.x **7.** Replace keyboard if issue is confirmed (K01 for inoperative keys, K17 for wrong/falling keycaps).

Wired Keyboard/Mouse Not Recognized

Quick Check

Symptoms	Quick Check
Wired Keyboard/Mouse Not Recognized • USB wired keyboard/mouse not recognized when plugged in. • Mouse scroll ball not working or not working as expected. • Mouse buttons not working or not working as expected.	**1.** Reset SMC. **2.** The iMac has 4 USB ports on rear of computer. Make sure to try each port to isolate a particular port malfunction. **3.** Test with a known-good wired keyboard or mouse to isolate a failed peripheral issue. **4.** Test a mouse when connected directly to ports on the back of iMac to isolate a keyboard USB port issue. **5.** Ensure that all software and firmware updates for this model have been installed.

Deep Dive

Check	Result	Action	Code
1. Verify if computer recognizes keyboard or mouse when plugged into rear USB ports on back of iMac.	Yes	Test device in all USB ports to ensure all other USB ports are working as expected. Replace logic board if any USB port on rear fails. Replace keyboard if any USB port on keyboard fails. Go to step 2.	**M15** **K11**
	No	Go to **USB Device Not Recognized**.	
2. Verify if keyboard is working as expected.	Yes	Go to step 3.	
	No	Go to **Wired Keyboard Does Not Function Properly**.	
3. Verify if Mighty Mouse has an issue with scroll ball.	Yes	See **kBase #HT1537: How to clean Mac products**.	
	No	Go to step 4.	
4. Verify if mouse has an issue with buttons.	Yes	Go to step 7.	
	No	Go to step 5.	
5. Verify if mouse has an issue with tracking.	Yes	Go to step 6.	
	No	Go to step 7.	
6. Try using mouse on another surface. Non-reflective, opaque surfaces without repetitive patterns work best. The surface should be clean but not shiny. Verify if mouse tracks correctly when used on another surface.	Yes	Surface issue. Issue resolved.	
	No	Go to step 7	
7. See **kBase #HT1581: Troubleshooting Mighty Mouse and determining expected behavior**. Verify if this article resolves issue.	Yes	Issue resolved.	
	No	Replace wired Mighty Mouse.	**K99**

Wireless Input Device Does Not Pair

Quick Check

Symptoms	Quick Check
Wireless Input Device Does Not Pair with computer • Apple Wireless Keyboard/Magic Mouse/Magic Trackpad not recognized when powered on. • Unable to pair Bluetooth input device with computer. • Apple Magic Mouse buttons not working. • Apple Magic Trackpad clicking/ tracking/tapping actions not working.	**1.** Remove/ reinstall batteries into device to check they were not reversely inserted. **2.** Ensure that all software and firmware updates have been installed to take advantage of any available bug fixes. **3.** Ensure that the Bluetooth device software has been installed on test computer. **4.** Install known-good charged batteries in Bluetooth device. Press power button to check that green LED stays lit for at least 3 seconds. **5.** Review **kBase #TS3048: Troubleshooting wireless mouse and keyboard issues**. **6.** Use a known-good up-to-date Mac OS X computer with Bluetooth enabled in Bluetooth Preferences, where a known-good similar Bluetooth device could be previously paired, and where a wired mouse is connected. **7.** Try to pair the affected Bluetooth device using the Bluetooth Setup Assistant Utility. **8.** (Apple Wireless Keyboard , Magic Mouse or Magic Trackpad) Download and run the Bluetooth Service Diagnostic utility (available in the Disk Images page of GSX/Service Source). **9.** (Apple Wireless Keyboard , Magic Mouse or Magic Trackpad) After Bluetooth Service Diagnostic utility passed, pair the device again, using the Bluetooth Setup Assistant.

Deep Dive

Check	Result	Action	Code
1. (Apple Wireless Keyboard, Magic Mouse, Magic Trackpad) With known-good charged batteries and known-good up to date Mac OS X computer with the Bluetooth device software installed, run the Bluetooth Service Diagnostic utility (available in the Disk Images page of GSX/Service Source) and verify that all tests pass.	Yes	Go to step 2.	
	No	Replace defective Bluetooth device specifying the code provided by Bluetooth Service Diagnostic or corresponding symptom code: -does not connect -no LED when turned on -click does not work -cursor jumpy, jittery -intermittently stops responding -gestures do not work -battery life too short -physically damaged	**K15** **K09** **K13** **K12** **K08** **K02** **K16** **K16**
2. Try to pair Bluetooth device using the Bluetooth Setup Assistant, and verify that device can be recognized and used.	Yes	Issue does not happen with known-good batteries. If device was using standard batteries, go to step 5 to retest with user batteries. If device had fully charged Apple rechargeable batteries, go to **Apple Battery Charger does not charge batteries.**	
	No	Go to step 3.	
3. (Apple Wireless Keyboard , Magic Mouse, Magic Trackpad) Run again the Bluetooth Diagnostic Utility and check the "Restore Factory settings" option at final window, and verify that test passes.	Yes	Go to step 4.	
	No	Replace defective Bluetooth device specifying the code provided by Bluetooth Service Diagnostic or corresponding symptom code: -intermittently stops responding -gestures do not work -battery life too short	**K08** **K02** **K16**
4. Try to pair Bluetooth device using the Bluetooth Setup Assistant. Verify that device can be recognized and used.	Yes	Issue resolved.	
	No	Go to **Wireless Input Device Loses Connection**.	

5. Reinstall user's batteries in device and try to pair Bluetooth device using the Bluetooth Setup Assistant. Verify that device can be recognized and used.	Yes	Issue resolved.	
	No	Recommend that user replace batteries. If device had fully charged Apple Rechargeable Batteries, go to **Apple Battery Charger does not charge batteries.**	

Apple Wireless Mouse/Magic Trackpad Erratic Tracking

Quick Check

Symptoms	Quick Check
Apple Wireless Mouse/Magic Trackpad erratic tracking. • Cursor tracking is jumpy. • Tracking /Clicking/Tapping actions not working.	**1.** Verify all software and firmware updates have been installed to take advantage of any available bug fixes. **2.** Verify the Bluetooth device software has been installed. **3.** Verify that user is not using more than three Dual Link Bluetooth input devices at the same time on same computer. **4.** Cover the entire pad surface for some seconds to reset it. **5.** Clean mouse sensor/ pad surface. **6.** Review **kBase #TS3048: Troubleshooting wireless mouse and keyboard issues**. **7.** Use a known-good up-to-date Mac OS X computer with Bluetooth enabled in Bluetooth Preferences, where a known-good similar Bluetooth device could be previously paired, and where a wired mouse is connected. **8.** (Apple Wireless Keyboard , Magic Mouse or Magic Trackpad) Download and run the Bluetooth Service Diagnostic utility (available in the Disk Images page of GSX/Service Source), checking the Restore Defaults Settings option. **9.** (Apple Wireless Keyboard , Magic Mouse or Magic Trackpad) If Bluetooth Service Diagnostic utility passes, try to pair again the device using the Bluetooth Setup Assistant. **10.** Replace defective Bluetooth device specifying the code provided by Bluetooth Service Diagnostic.

Wireless Input Device Loses Connection

Quick Check

Symptoms	Quick Check
Wireless Input Device Loses Connection • Apple Wireless keyboard, Magic Mouse, Magic Trackpad or other Bluetooth input device loses connection.	**1.** Verify that user is first clicking/pressing a key to wake input device. See **kBase #HT3081: Click the mouse button to re-establish a connection to your Apple wireless mouse or trackpad**. **2.** Verify if device has been paired to computer previously. **3.** Remove and reinstall batteries for device. **4.** Press power button and check that green LED stays lit for around 3 seconds. **5.** Test with known-good batteries. **6.** Ensure that user is not using more than three Dual Link Bluetooth devices, at same time on same computer. **7.** Ensure other devices pair and keep connection without issue on the computer. If not, jump to **AirPort/Bluetooth Issues**. **8.** Ensure that device is being used within 30-foot range for Bluetooth devices. **9.** Ensure that the latest Mac OS X Software and Firmware updates have been applied. **10.** See **kBase #TS3048: Troubleshooting wireless mouse and keyboard issues.**

Deep Dive

Check	Result	Action	Code
1. Open System Preferences > Bluetooth. Paired items and their connection status are shown. Verify if device is listed.	Yes	Device has been paired. Go to step 2.	
	No	Device is not paired. Make device discoverable and open Bluetooth Setup Assistant. Go to step 3.	
2. Make sure device is on. In System Preferences > Bluetooth, select device and from the Action menu (gear) choose "Connect". Verify if device connects successfully.	Yes	Go to step 7.	
	No	Delete pairing in System Preferences. Go to step 3.	

3. With the device on, run Bluetooth Setup Assistant. Verify if you can successfully pair the device.	Yes	Go to step 7.	
	No	Restart computer. Go to step 4.	
4. With device on, run Bluetooth Setup Assistant. Verify if you can successfully pair device.	Yes	Go to step 7.	
	No	Create a new Admin User. Go to step 5.	
5. Log into new Admin User account. With device on, run Bluetooth Setup Assistant. Verify if you can successfully pair device with new user account.	Yes	User account issue. Troubleshoot software on User account. No hardware repair needed.	
	No	Remove the following file: /Library/Preferences/com.apple.Bluetooth.plist Go to step 6.	
6. Restart computer, With device on, run Bluetooth Setup Assistant. Verify if you can successfully pair device.	Yes	Go to step 7.	
	No	Go to **AirPort/Bluetooth Issues**.	
7. With device paired and connected, verify if device connection is stable if used normally.	Yes	Issue resolved.	
	No	Check wireless device manual to verify if device is being used in accordance with manufacturer's specifications (range, OS support, battery types). Go to step 8.	
8. Verify if Apple wireless input device is performing to stated specifications.	Yes	Educate user. Issue resolved.	
	No	Replace defective Apple wireless input device according to symptom: -intermittent stops responding -gestures do not work -battery life too short	**K08** **K02** **K16**

Apple Battery Charger Does Not Charge Batteries

Quick Check

Symptoms	Quick Check
Apple Battery Charger Does Not Charge Batteries • No Amber/Green status LED visible on charger when batteries are installed and charger is connected to AC. • Amber status LED is flashing • When installed in the input device, the batteries don't power it. • Batteries only provide limited run time when used. • Batteries show leak/inflation signs	**1.** Ensure that only NiMH AA rechargeable batteries are used with the Apple Battery Charger, that they are correctly installed, with correct polarity orientation. If Amber status LED still flashes when these batteries are installed, they are likely to be defective. **2.** Ensure that NiMH AA rechargeable batteries were left charging for at least 5 hours (LED will go Green when a full charge has been reached, then will turn off to conserve energy). **3.** Test with known-good AC duckhead plug. **4.** Quickly test user's Apple Battery Charger for charge of a known-good set of NiMH AA rechargeable batteries . If no Amber or Green status LED is seen with this set, replace battery charger (P01). **5.** Quick check user's NiMH AA rechargeable batteries for charge status when installed in a known-good Apple Battery Charger. If no Amber/Green status LED is seen, replace Apple battery set (P01).

Deep Dive

Check	Result	Action	Code
1. Verify status LED goes ON (Green or Amber) when a known-good set of NiMH AA rechargeable batteries is installed and charger is connected to AC outlet.	Yes	Go to step 2.	
	No	Check batteries fit and are correctly seated in case. If issue persist, replace defective Apple Battery Charger.	**P01**
2. Verify status LED goes Amber when a set of known-good discharged or only partly-charged NiMH AA batteries is installed.	Yes	Go to step 3.	
	No	LED remains Green while known-good inserted batteries are still not fully charged (charger never initiates a charge): Replace defective Apple Battery Charger.	**P10**

3. Verify status LED will go Green when a known-good set of partly charged NIMH AA batteries was installed and had been left for some hours (up to 5 hours if a fully discharged set was installed in charger). **Note:** Status LED may turn OFF after charge has been completed more than an hour.	Yes	When charge of the known-good batteries set has ended (status LED turned to Green), insert them in a known-good input device and go to step 4.	
	No	LED remains Amber (never ends charging). Replace defective Apple Battery Charger.	**P10**
4. Check Battery Level in System Preferences > Trackpad or Mouse. Depending on device type, battery type, and time since last full charge, the battery level displayed should vary from 80% to almost full. Verify that battery level shows at least 80% charge.	Yes	Charge functionality confirmed. Return Apple Battery Charger to user and recommend to check rechargeable batteries set.	
	No	Charger does not correctly charge batteries Replace defective Apple Battery Charger.	**P10**

Uncategorized Symptoms

Quick Check

Symptoms	Quick Check
Uncategorized Symptoms • Unable to locate appropriate symptom code.	**1.** Reset SMC. **2.** Verify that external I/O device (where applicable) works on a known-good, same-model computer. **3.** For third party I/O devices, make sure necessary software is installed and up-to-date, and that device is supported with user's system.

Deep Dive

Check	Result	Action	Code
1. Verify if existing symptom code applies to issue reported by 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. Provide as much detail as possible.	**N99**

Mechanical

Noise/Hum/Vibration

Unlikely cause: LCD panel, glass panel, enclosure, cables

Quick Check

Symptoms	Quick Check
Noise/Hum/Vibration • Buzzing noise • Rattling noise • Ticking noise • Squeaking noise	**1.** Verify that the vents on the bottom and back of the system are free of dust and other obstructions that might inhibit proper airflow through the system. **2.** Launch Applications/Utilities/Activity Monitor. Determine whether an application or process is consuming a high percentage of CPU bandwidth. CPU-intensive applications can cause the fans to run fast in order to maintain the proper internal system temperatures. If needed, quit the application or restart the system to resolve the issue. **3.** Eject optical media from optical drive. Out-of-balance optical media can generate audible noise. To resolve try a different brand of media. For additional information, go to **Optical Drive Noisy** symptom flow. **4.** Tilt display to hinge limits to determine if mechanical noise is generated by the hinge mechanism. For additional information, go to **Stand/Hinge Issues** symptom flow. **5.** Play sound sample at loud and soft volume levels to determine if the noise is caused by the left/right speakers or the amplifier circuit. Plug external headphones to identify whether the noise comes from audio out or from other source. For additional information, go to **Audio: Built-in Speakers Have Distorted Sound** symptom flow. **6.** Adjust the display brightness to determine whether the noise is related to the brightness level. For additional information, go to **Noise/ Unstable Flickering** symptom flow. **7.** Run latest available Apple service utilities.

Deep Dive

Check	Result	Action	Code
1. Disconnect AC, remove glass and LCD panel and verify if any tape or gasket on back of LCD panel, any cable label, or cable wire is touching the fan blades and causing a ticking noise.	Yes	Secure the material so it doesn't touch fan blades. If tape adhesive has lost its stickiness, replace that section of tape.	
	No	Go to step 2.	
2. Run latest available Apple service utilities and verify if if it reports one or more errors.	Yes	Locate affected part and check for correct cable seating. Use **Diagnostic error Codes table** and sensors location table (in General Troubleshooting) to decode error. Follow instructions in table for resolving error, then retest.	
	No	Go to step 3.	
3. Verify if noise sounds like one or more fans are spinning faster than expected.	Yes	Reset SMC by disconnecting power cord for ~15 seconds then retest. If issue continues go to step 3.	
	No	Go to step 6.	
4. Verify if noise changes when optical drive is being accessed or media is inserted or ejected.	Yes	Suspect issue with optical drive or media used. Go to **Optical Drive Noisy** symptom flow.	
	No	Go to step 5.	
5. Mute the system volume. Verify if issue still occurs.	Yes	Go to step 6.	
	No	Suspect issue with speakers or audio amplifier circuitry. Go to **Audio: Built-in Speakers Have Distorted Sound** symptom flow.	
6. Adjust brightness on display between maximum and minimum settings. Verify if issue changes depending on brightness level.	Yes	Suspect issue with LCD display or backlight controller board. Go to **Noise/Unstable Flickering** symptom flow.	
	No	Go to step 7.	
7. Remove fans and rotate blades. Verify if fan blades spin smoothly without interference from fan housing.	Yes	Go to step 8	
	No	Replace affected fan.	**P04**

8. Reinstall fans while carefully ensuring that there are no cables routed under or near fan assembly that might cause interference with fan blades. After reassembling system verify if noise issue is resolved.	Yes	Noise issue resolved. Suspect issue caused by interference from wiring or possible distortion or fan housing when installed in system.	**P04**
	No	Go to step 9.	
9. Temporarily remove LCD display then power ON system. Verify if source of noise can be located. **Caution:** The exposed power supply poses a serious shock hazard. Take proper precautions when working around an energized system.	Yes	Identify, inspect, and if necessary replace part that caused noise issue.	**P04**
	No	Go to step 10.	
10. Disconnect these major modules/parts (hard drive, optical drive, fans, LCD display) one at a time then power ON the system. Determine if noise issue goes away when one of the modules is disconnected. **Caution:** The exposed power supply poses a serious shock hazard. Take proper precautions when working around an energized system.	Yes	Identify, inspect, and if necessary replace part that caused noise to disappear when it was disconnected from the system.	**P04**
	No	All parts verified. Verify that correct symptom flow is being used.	

Fan Failures / Thermal Issues

Unlikely cause: speakers

Quick Check

Symptoms	Quick Check
Fan Failures / Thermal Issues • System feels very hot • Fan(s) not operating • Fan(s) running fast • System is noisy	**1.** Verify that vents on bottom and back of system are free of dust and other obstructions that might inhibit proper airflow through the system. **2.** Verify that computer is not exposed to direct sunlight which may heat up enclosure, making it feel hot to the touch. **3.** Verify computer is not running hotter than expected for normal operation. If possible, compare to a similarly configured system. Note: Power supply is located in upper left corner where highest temperatures can usually be felt. **4.** Launch Applications/Utilities/Activity Monitor. Verify if an application or process is consuming a high percentage of CPU bandwidth. CPU-intensive applications can cause fans to run fast in order to maintain proper internal system temperatures. If needed, quit the application or restart the system to resolve issue. **5.** Reset SMC by unplugging power cord for ~15 seconds. **6.** Run latest available Apple service utilities.

Deep Dive

Check	Result	Action	Code
1. Run latest available Apple service utilities and. verify if one or more errors are reported.	Yes	Suspect possible fan or sensor error. Go to the sensors location table (in General Troubleshooting) to decode error. Follow instructions in table for resolving error, then retest.	
	No	Go to step 2.	
2. Verify if noise sounds like one or more fans running faster than expected.	Yes	Fans running fast. Reset SMC by disconnecting power cord for ~15 seconds then retest. If issue continues go to step 3.	
	No	Go to step 3.	

3. Verify if any tape, gasket, cable label, or cable is touching the fan blades and causing a ticking noise	Yes	Secure the material so it doesn't touch fan blades. If tape adhesive has lost its stickiness, replace that section of tape	
	No	Go to step 4.	
4. Remove fans and rotate blades. Check for any dust that could be clogging the fans. Verify if fan blades spin smoothly without interference from fan housing and fan blades are all intact.	Yes	Go to step 5.	
	No	Replace affected fan(s).	**X23**
5. Run latest available Apple service utilities then ASD in stand-alone tests looping mode, to verify if all sensor or fans related tests pass.	Yes	Noise issue resolved.	
	No	Check for correct sensors/fans connections on logic board. Check for pinched cables. Compare with known-good similar system, and check for unlisted sensors. Replace affected sensor/fan.	**X22**

Stand/Hinge Issues

Symptoms	Quick Check
Stand/Hinge Issues • Bent stand • Broken hinge • Stripped screw/head • Stripped screw boss • Unable to install VESA mount (if supported on this model)	**1.** Determine whether damage caused by user / technician environment, accidental damage, or abuse. If so, inform user/technician the failures are not covered by Apple warranties. Refer to http://www.apple.com/legal/warranty **2.** For hinge noise issues replace hinge mechanism. **3.** For information on selecting the adequate iMac VESA Mount Adapter and which computer models are supported, refer to installation manuals available at http://support.apple.com/manuals/#desktopcomputers

Physical Damage

Symptoms	Quick Check
Physical Damage • Broken glass • Bent stand • Broken hinge • Stripped screw/head • Stripped screw boss • Dent or scratch to chassis	**1.** Verify if damage caused by user environment, accidental damage, or abuse. If applicable inform the user that Apple does not warrant damage caused by accident, abuse, misuse, flood, fire, earthquake, or other external causes. For more information refer to: http://www.apple.com/legal/warranty

Uncategorized Symptoms

Check	Result	Action	Code
1. Verify if existing symptom code applies to issue reported by 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. Provide as much detail as possible.	**N99**

Apple Technician Guide

Take Apart

iMac (21.5-inch, Mid 2010)

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General Information

Opening the Unit

- The iMac (21.5-inch, Mid 2010) 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 iMac (21.5-inch, Mid 2010):
- 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 Torx T8 screwdriver
- Magnetized Torx T6 screwdriver
- Phillips #2 screwdriver
- Black stick (nylon probe, Apple part #922-5065) or other non-conductive nylon or plastic flat-blade tool
- Kapton tape
- Thermal paste syringe (Apple part #922-9625) for camera
- Magnifying glass, for reading serial number etched on bottom of stand
- 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

In addition, the following software programs are required for troubleshooting:
- Apple Service Diagnostic (ASD), version 3S140
- Apple Hardware Test (AHT), version 3A195 or 3A197
- Bluetooth Service Diagnostic (BSD)

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
- 922-8258 – ESD bags, 24"x20", Pkg of 5. To prevent buildup of static charges which may attract dust particles, store LCD panel in an ESD bag when it is removed from unit.
- 922-8259 – Microfoam bag to store glass panel, Pkg of 5
- 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

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 the 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 of 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.

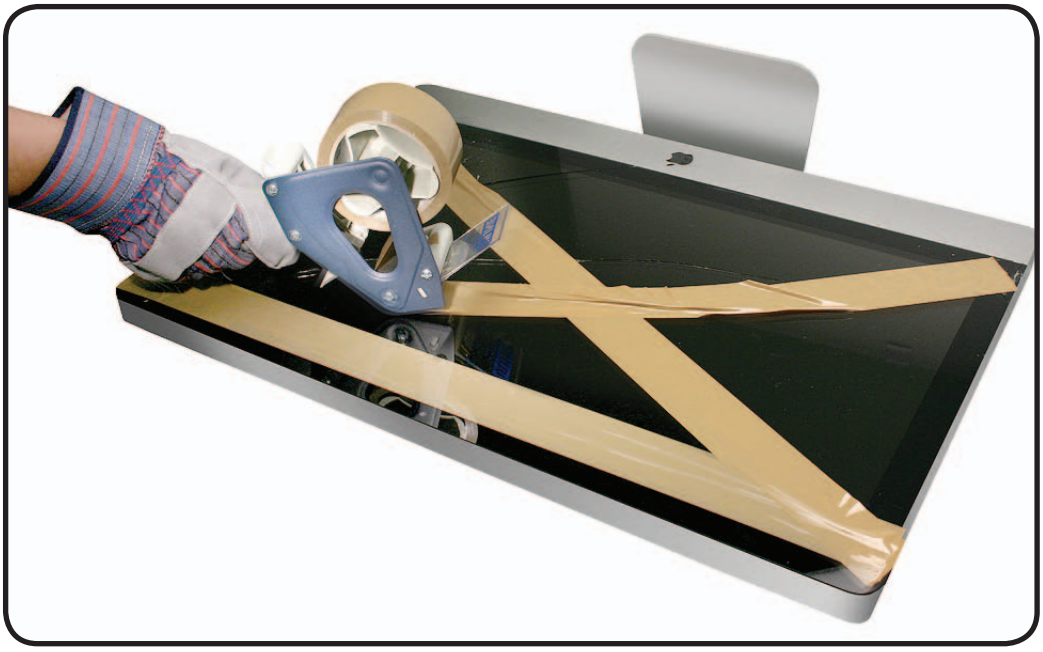
1. Put on the safety glasses and leather gloves.
2. Lay the computer on a smooth, clean work surface.



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."



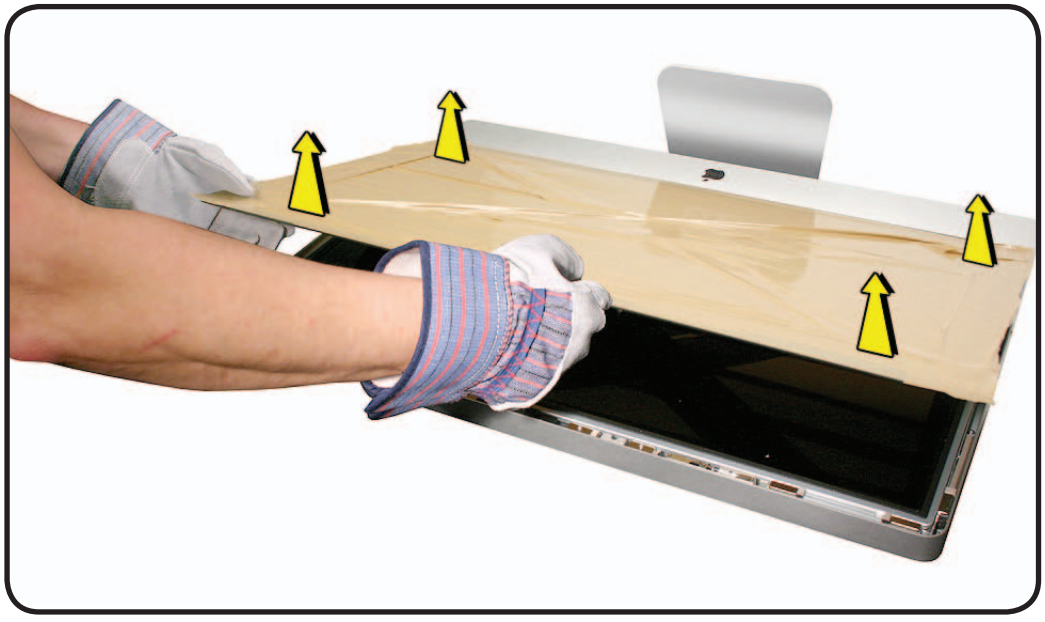
5. Continue applying tape horizontally, thoroughly covering the broken glass. Most of the glass will still be attached to the steel ring that runs around the perimeter of the glass panel.



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

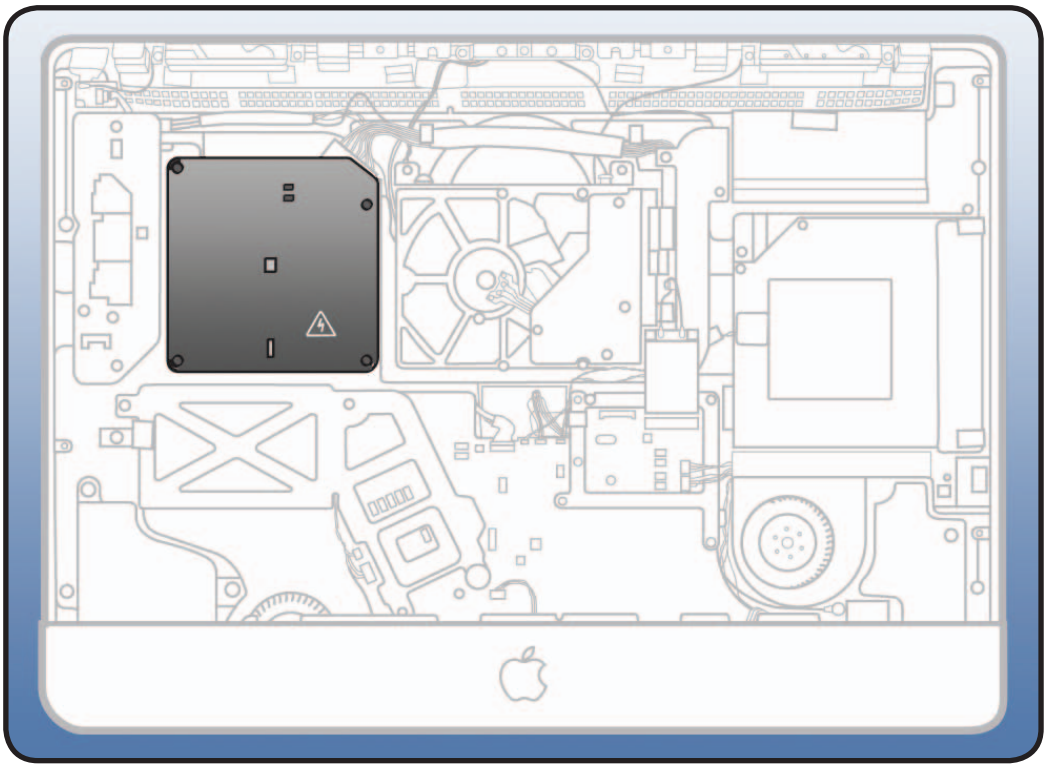


Warning: HIGH VOLTAGE: The AC/DC power supply PCB remains powered up whenever system is plugged in, whether or not system has been turned on. Use extreme caution when troubleshooting system with glass panel and LCD panel removed.

- **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 iMac system 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.**

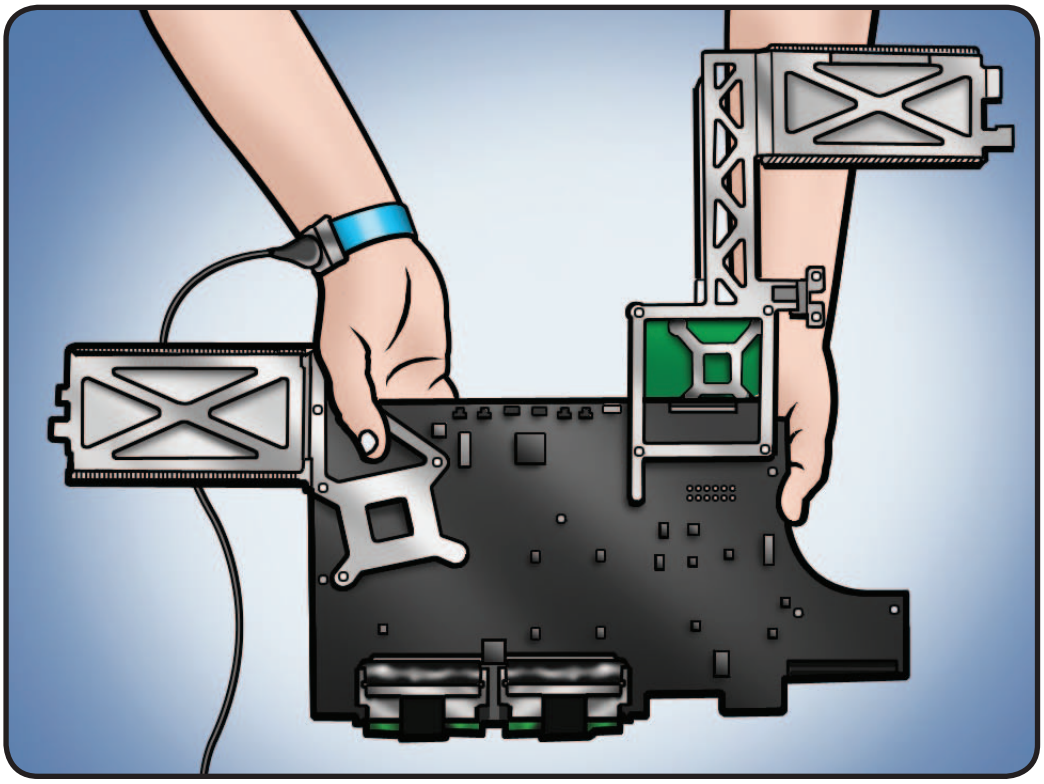
Use extreme caution when working around power supply. The power supply contains a high voltage capacitor that may remain charged for several minutes even when computer is unplugged. Never touch leads on top side of power supply, especially capacitor leads located near warning sign.

Important: If computer is shut down by removing power cord, allow power supply a good 2-3 minutes to discharge capacitors before handling it. However, if you select "Shut Down" via the Apple menu, the computer will discharge power supply capacitor almost immediately.



Logic Board Handling

IMPORTANT: Always use two hands to support the logic board, video card and heatsinks. Handling incorrectly could flex the board and damage chips and circuitry. **Never** handle the board by heatsink or video card.



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 manual, you may notice small differences in appearance between the image pictured and the computer you are servicing. However, although appearance may differ, steps and sequence are the same unless noted.

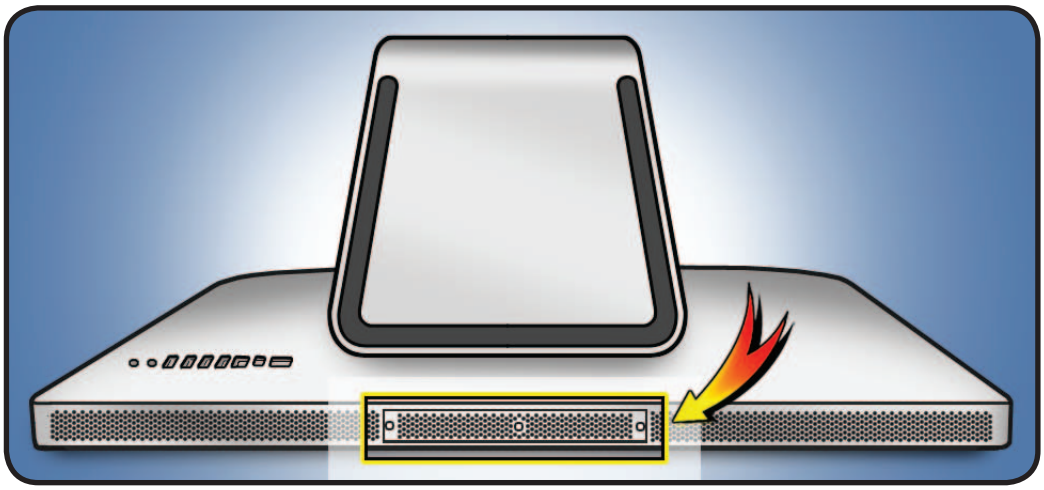
Screw Sizes

All screw sizes shown are approximate and represent the total length of the screw.

Access Door

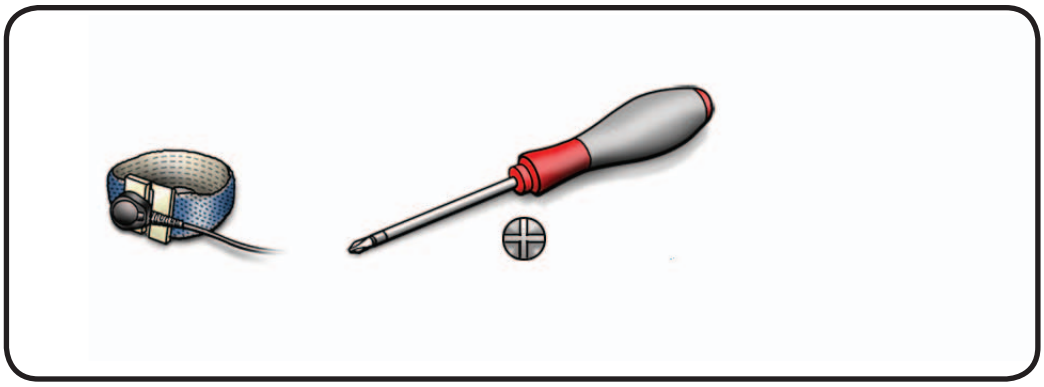
First Steps

- Shut down computer.
- Unplug all cables and the power cord.
- Put on ESD strap.
- Place computer face down on a clean, flat surface so the bottom is facing you.

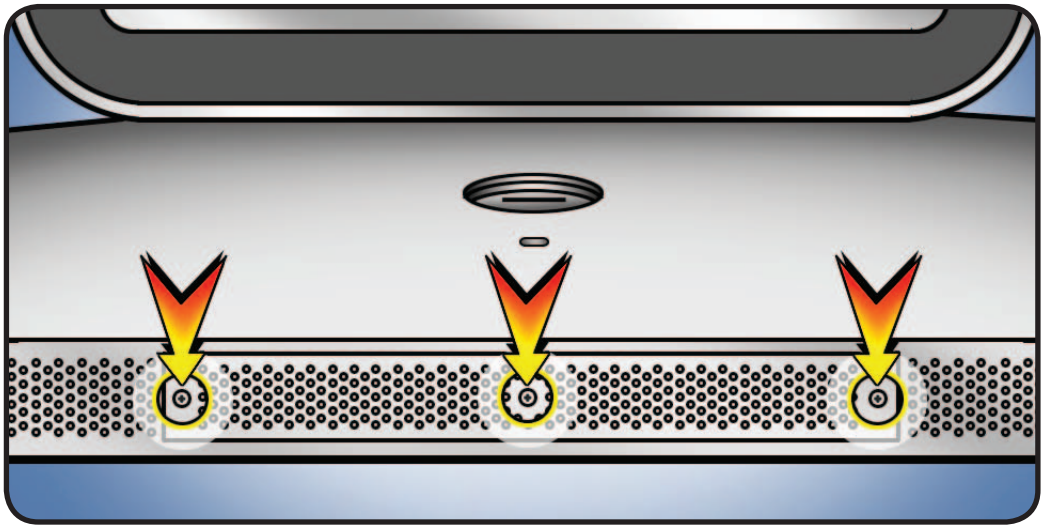


Tools

- ESD wrist strap
- Phillips #2 screwdriver



Removal



1 Raise the stand and loosen 3 captive Phillips #2 screws.

2 Remove access door.

Important: To ensure proper cooling, iMac should not be operated without access door installed.

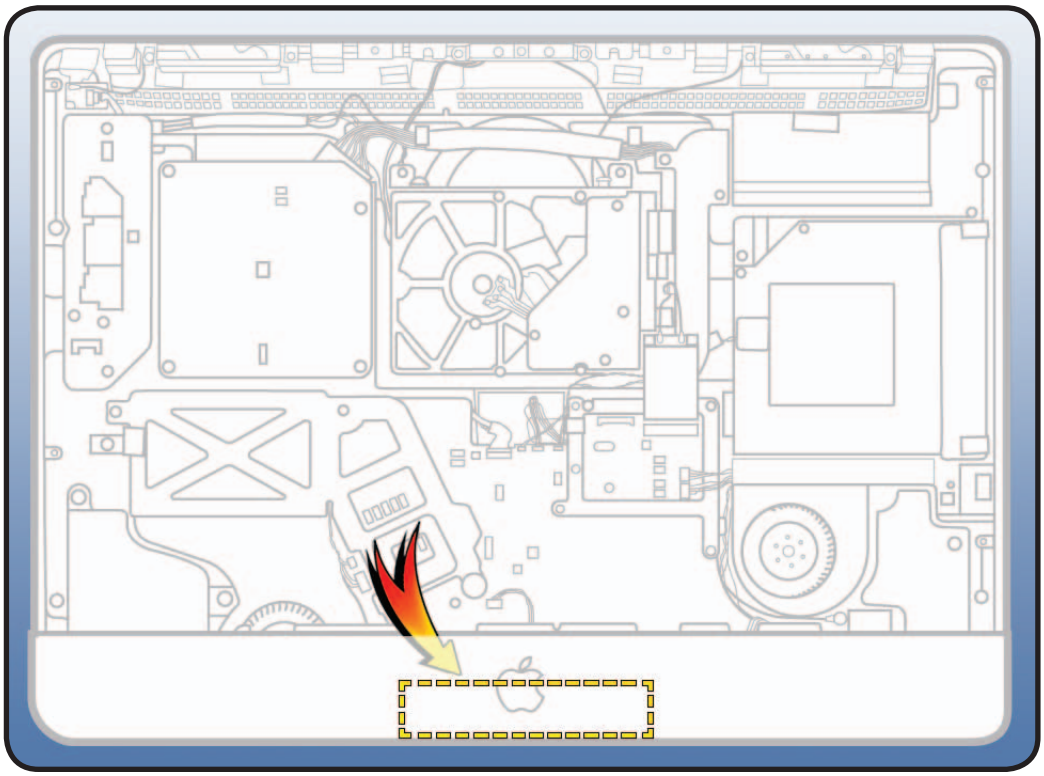
Memory

First Steps

Remove:

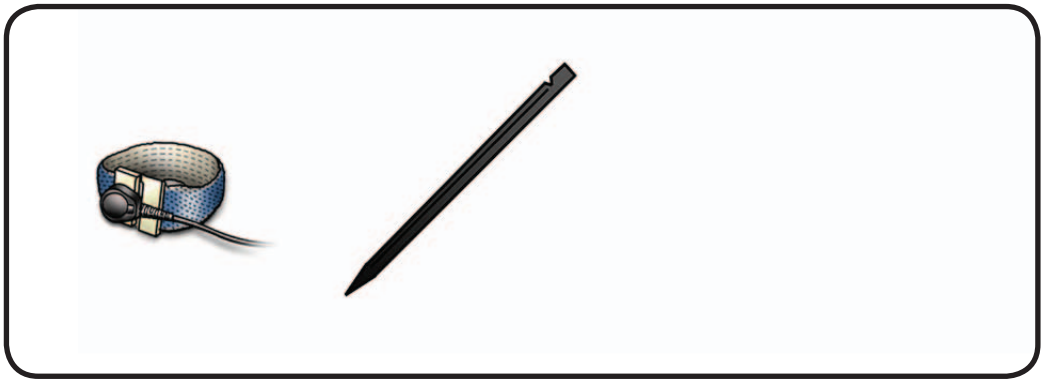
- Access Door

Note: This computer uses PC3-10600, DDR3, 1333 MHz, 204-pin SO-DIMMs. The maximum amount of memory is 16GB, with a 4GB DIMM installed in each slot.

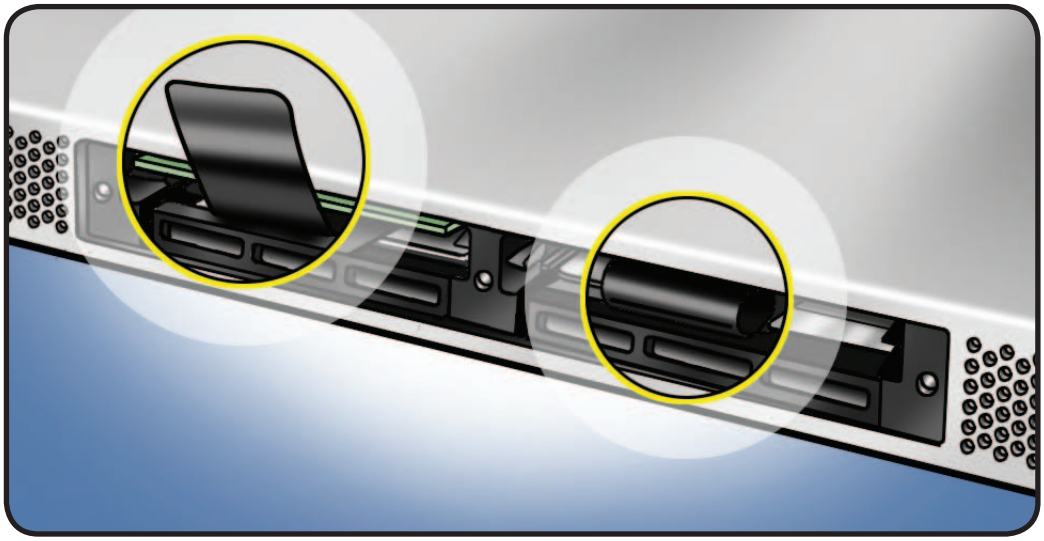


Tools

- ESD wrist strap
- Black stick



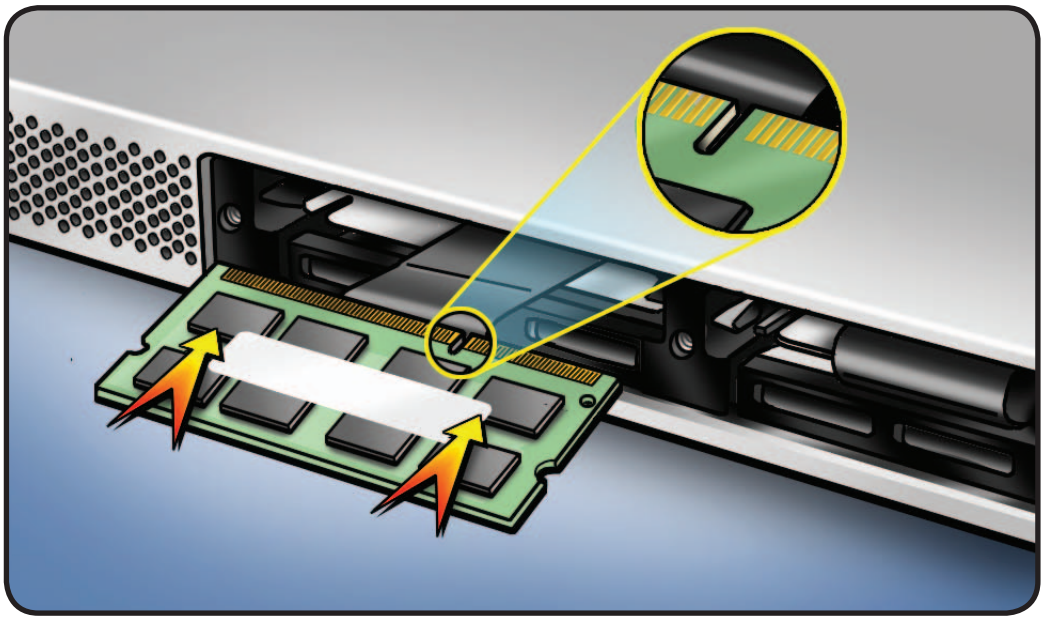
Removal



1 Untuck tabs in memory compartment.

2 Pull tab to eject installed memory module.
Tip: For better grip, attach double-stick tape to end of tabs.

Reassembly



1 Orient notch on memory with notch in memory compartment.

2 Press memory firmly into slot until you hear a click.

3 Tuck black plastic tabs into memory compartment.

4 Replace access door and tighten 3 captive screws.

Important: To ensure proper cooling, iMac should not be operated without access door installed.

Glass Panel

First Steps

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

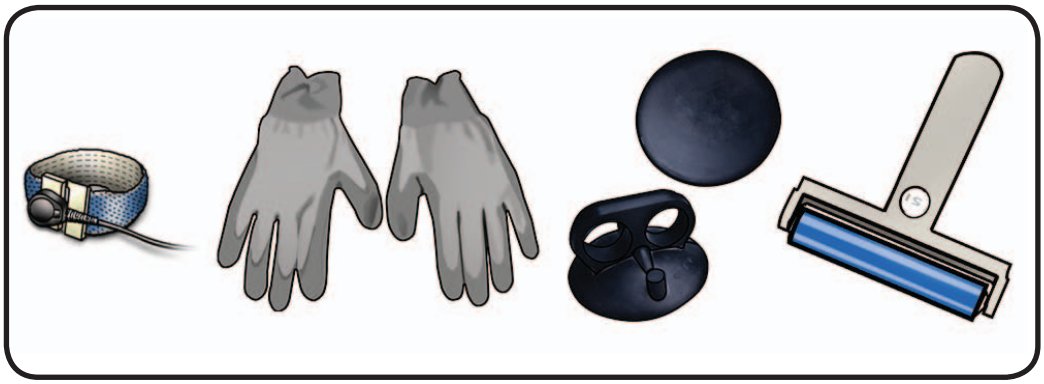
Caution: The glass panel is not tempered and will break into sharp pieces if mishandled. A scratched or broken glass panel is not covered by warranty.

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.

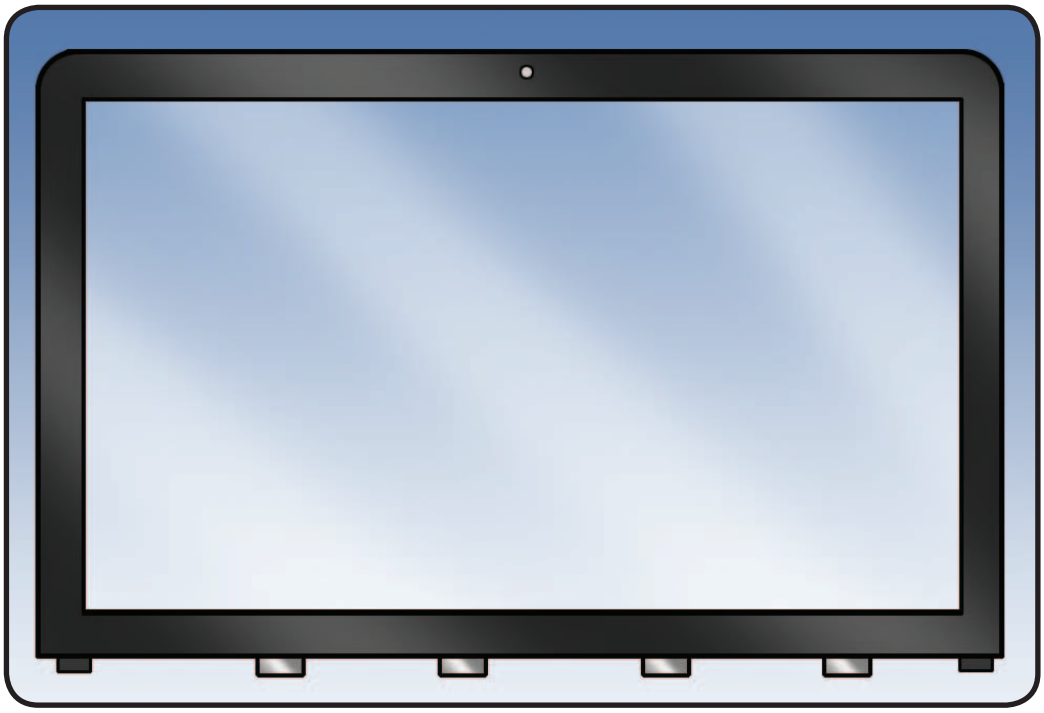


Tools

- 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.

Caution: The glass panel has tabs along bottom that align with rear housing. Be careful not to damage tabs when removing glass panel.

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

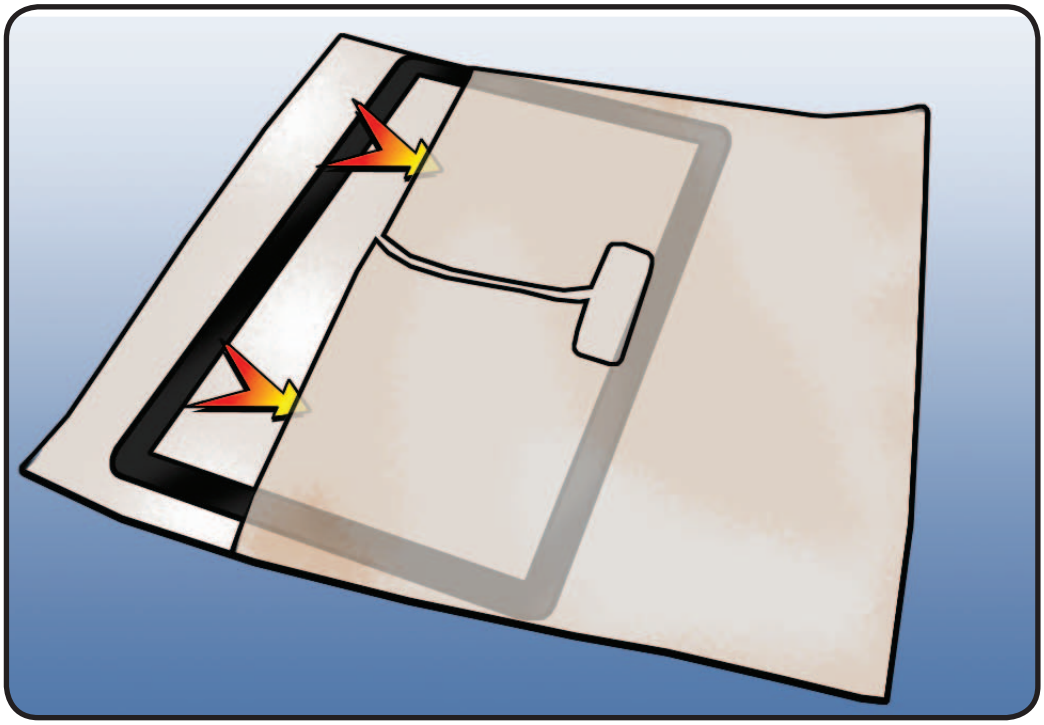


1 Glass panel can be removed in various ways:

- Lay computer on its back and press clean suction cups in opposite corners on clean glass panel, or...
- Lay computer on its back and press clean suction cups in top right and left corners on clean glass panel, or...
- Stand computer upright and use your finger nails to pull glass forward along top edge

2 Lift panel up and off.

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

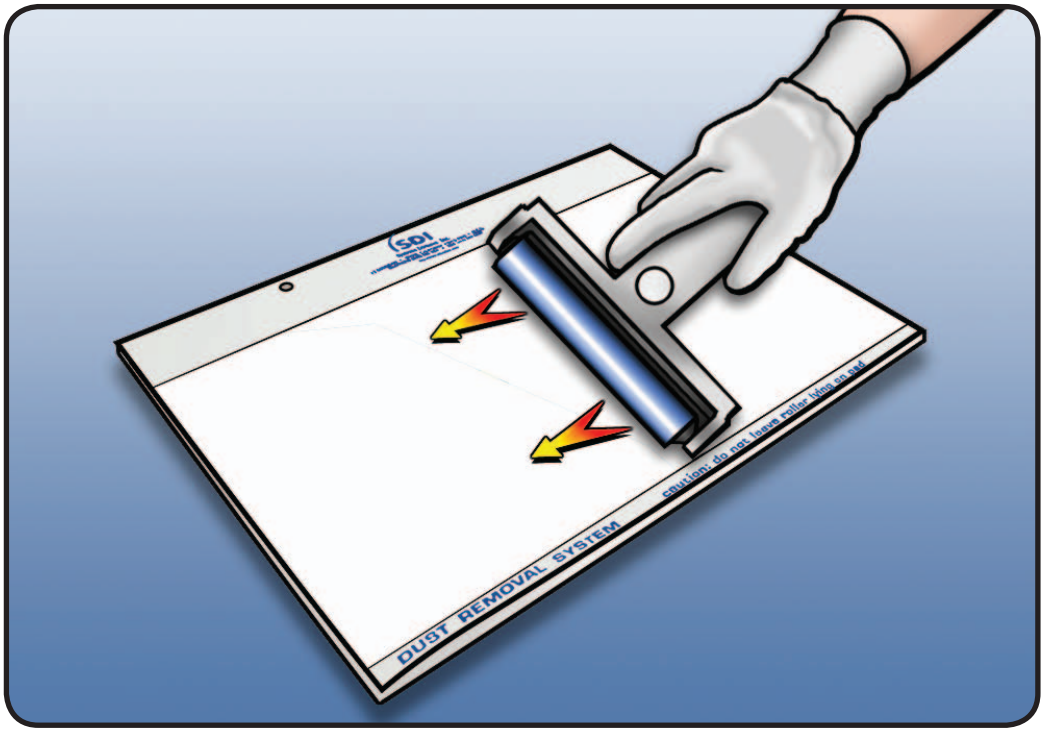


Reassembly

1 Remove protective covering from silicone roller and sticky sheet.

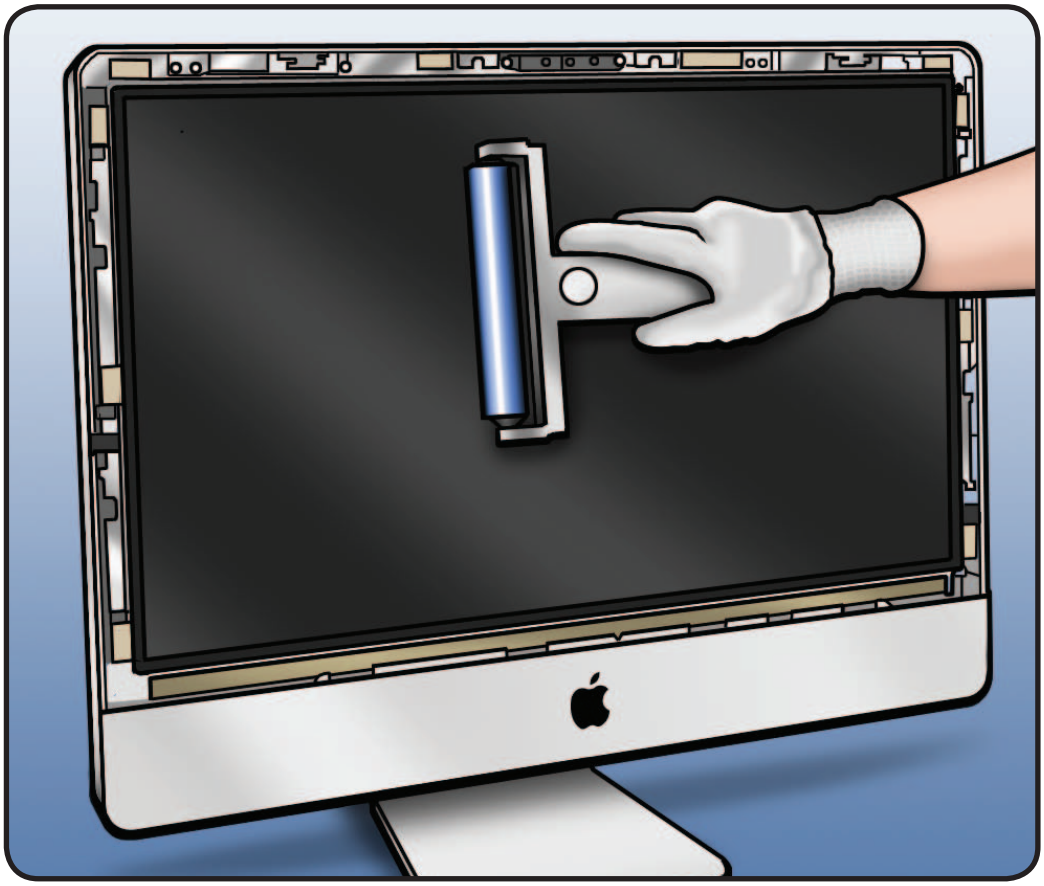
2 Clean silicone roller by rolling it back and forth a few times on sticky sheet.

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.

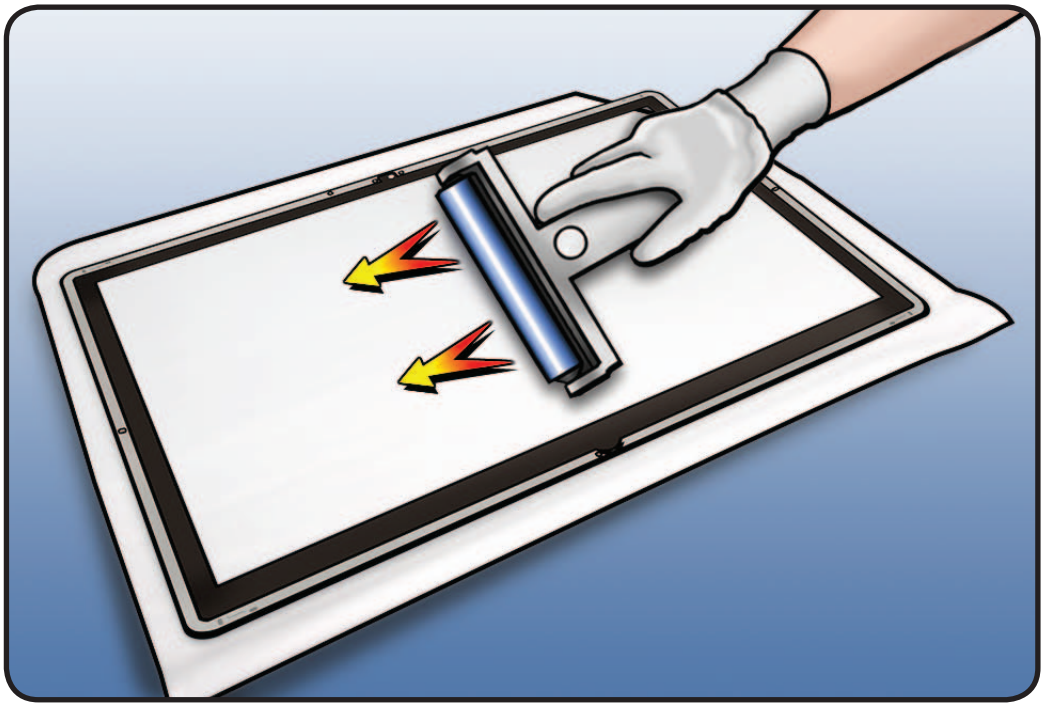
4 Roll silicone roller over LCD panel to remove any particles.



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.



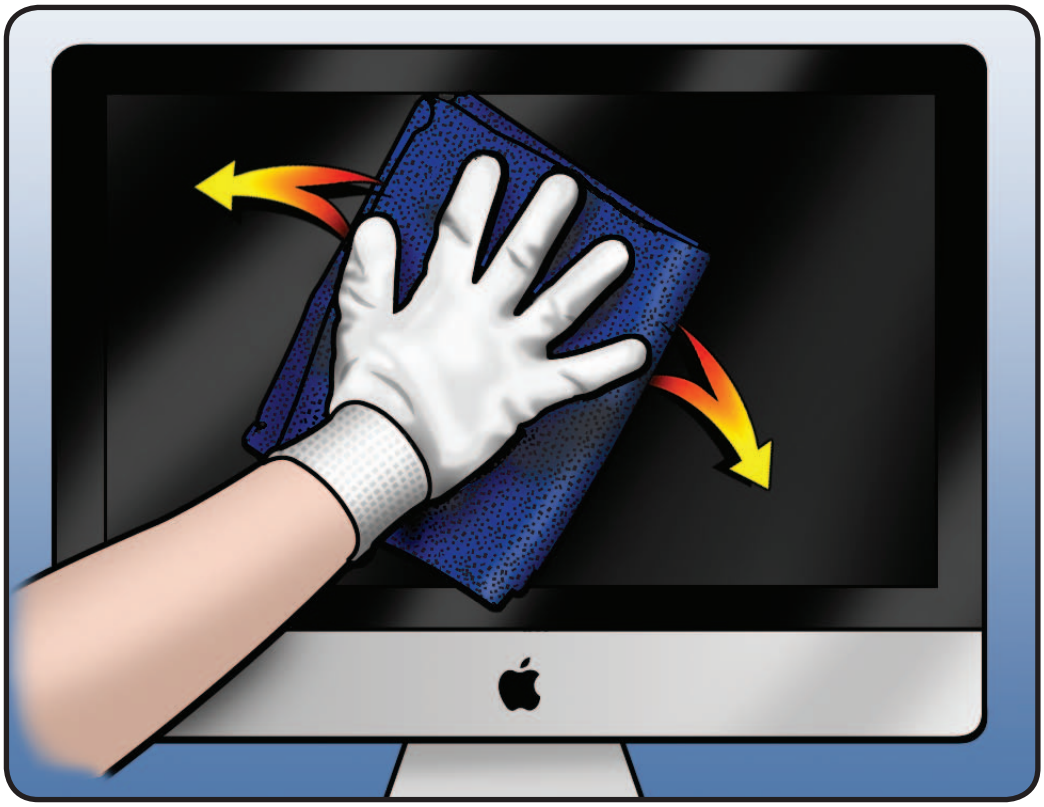
7 Wearing clean gloves, place glass directly onto unit, aligning tabs along bottom with notches in rear housing. Magnets will catch it and hold it in place.

Make sure glass is 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

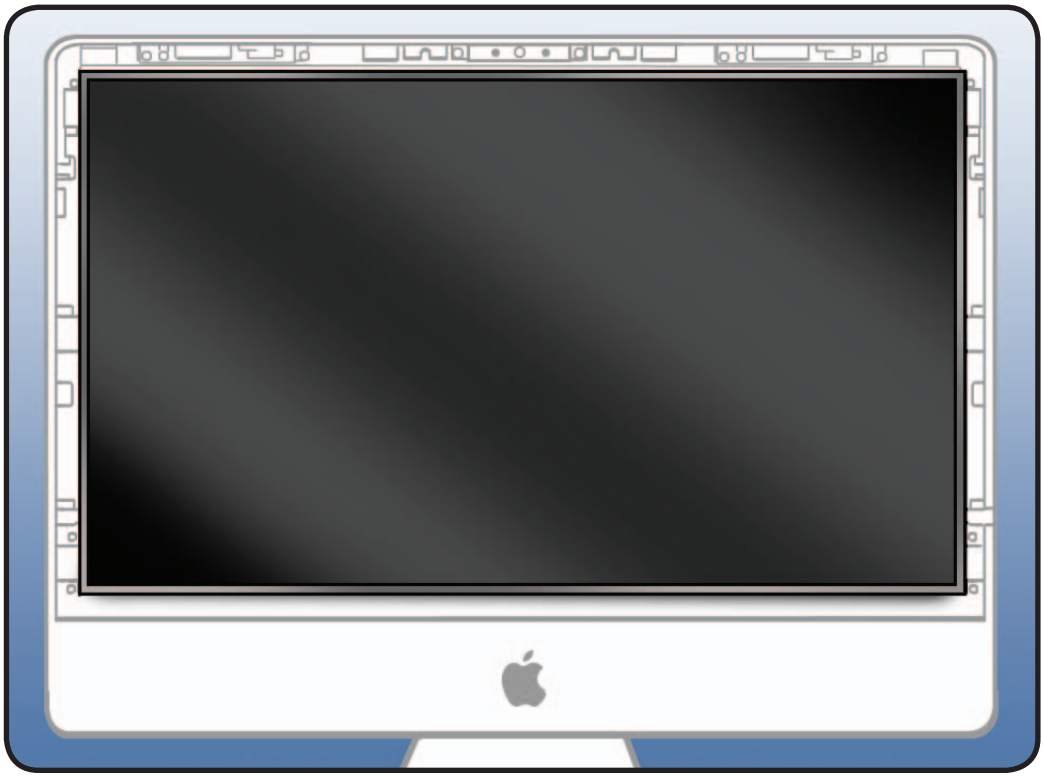
First Steps

Remove:

- Glass Panel

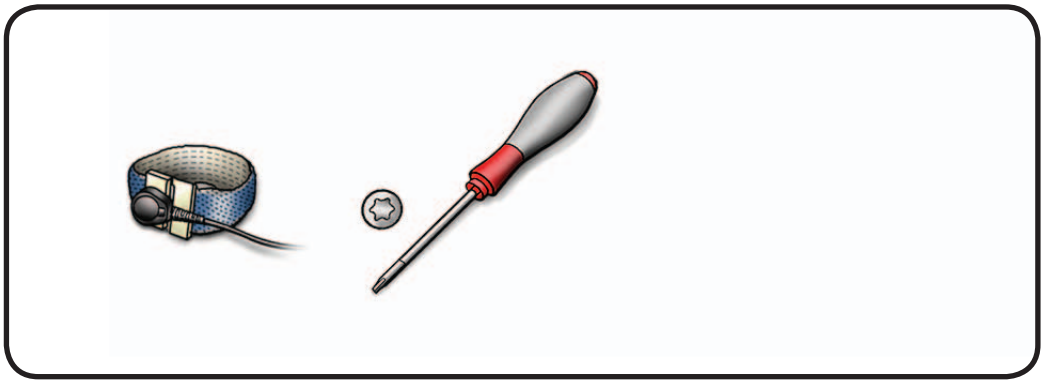


Caution: Do not press on front surface of LCD panel when handling.



Tools

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



Removal

1 Remove T10 screws:
(8) 922-9246



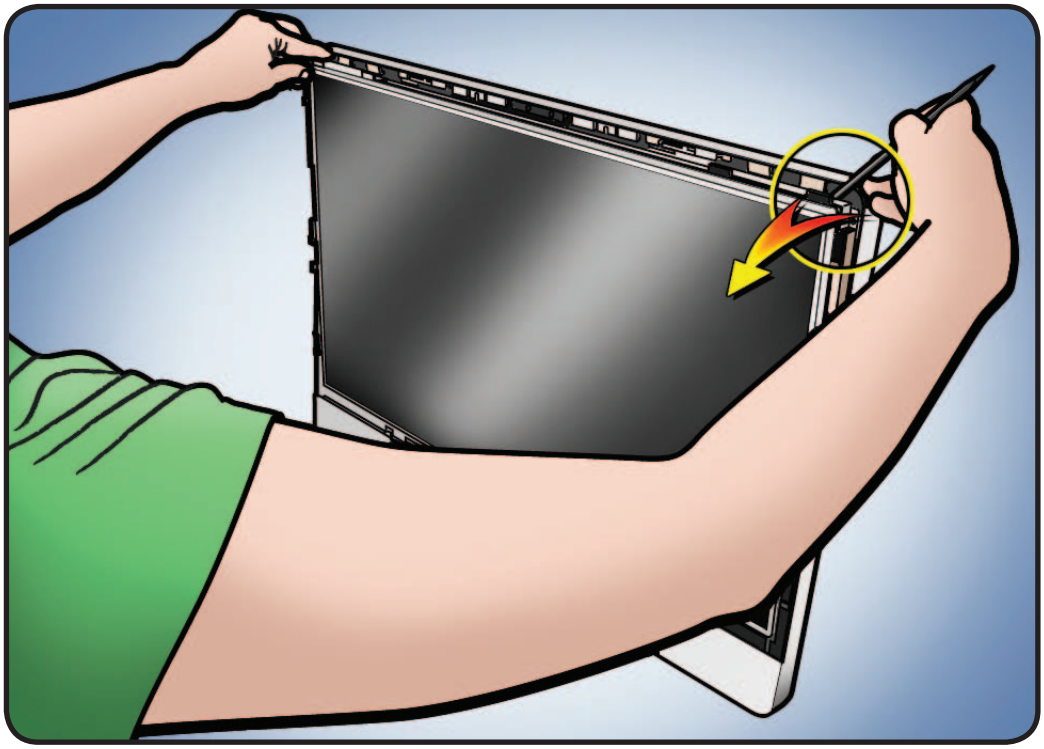
Reassembly Note:
Do not overtighten LCD screws, which could cause light leakage after unit is reassembled.



2 With computer standing up and facing you, pull the LCD forward slightly from the top edge to access cables inside.



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

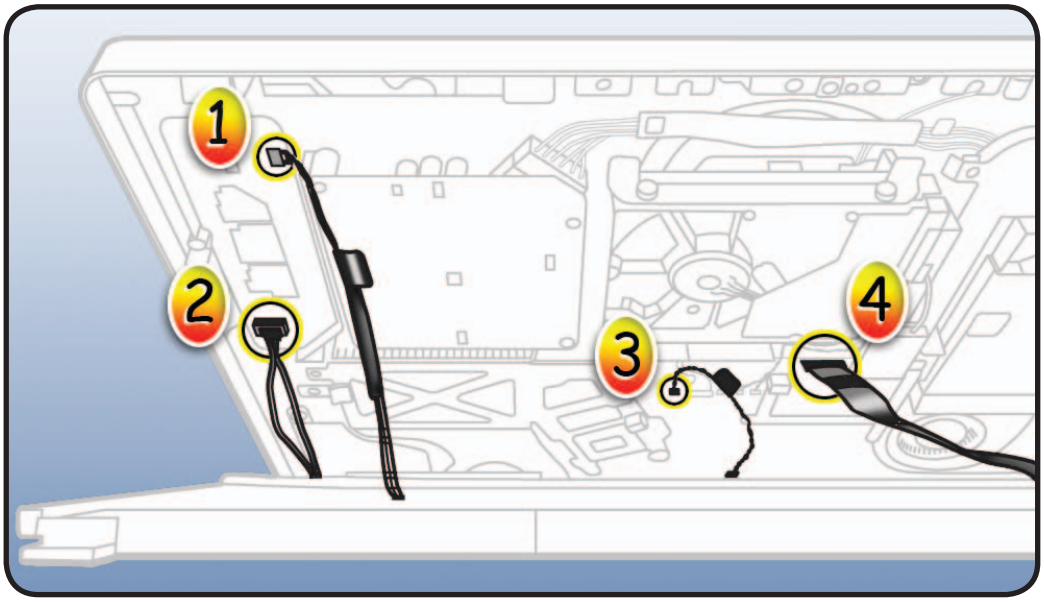


3 Looking down into computer, disconnect 4 cables:

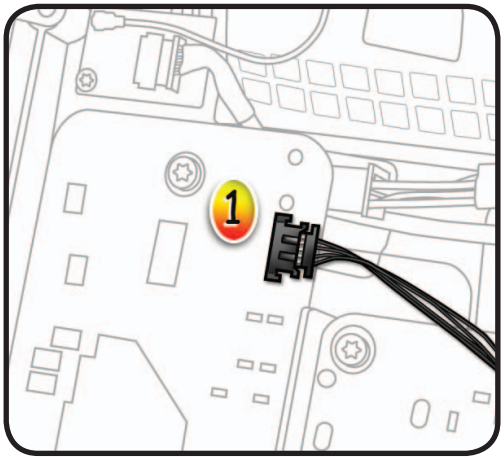
- #1: vertical sync
- #2: backlight power
- #3: display temp sensor
- #4: DisplayPort

Reassembly Note: Verify that all cables are firmly seated into connectors!

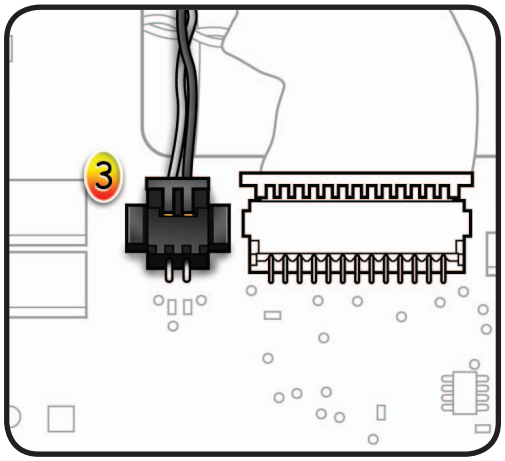
Replacement Note: A new LCD panel includes all four cables attached.



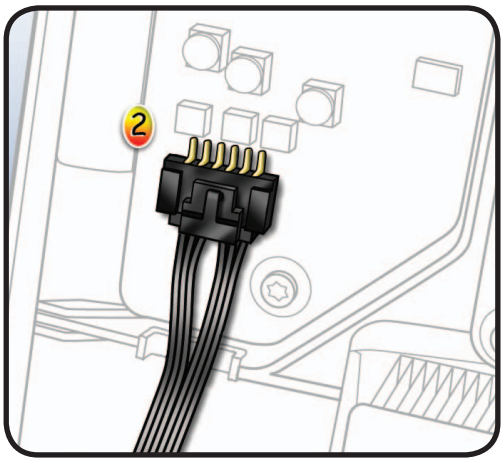
LEFT: Close-up of #1 vertical sync cable at top of LED backlight board. Pull straight out of connector.



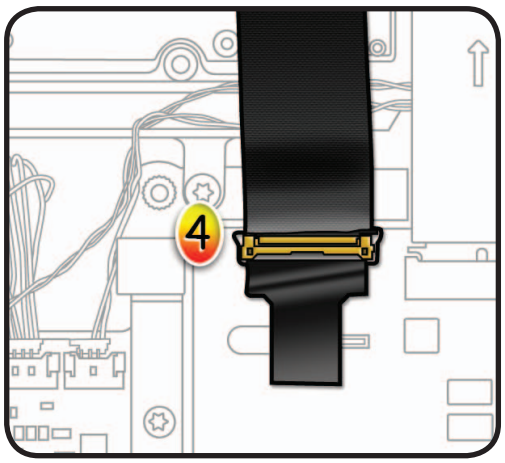
RIGHT: Close-up of #3 display temp sensor cable at top center of logic board. Pull straight up.



LEFT: Close-up of #2 backlight power cable at bottom of LED backlight board. Pinch and pull cable down from connector.

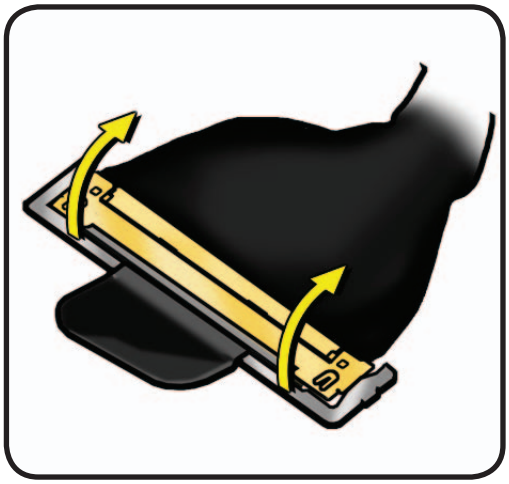


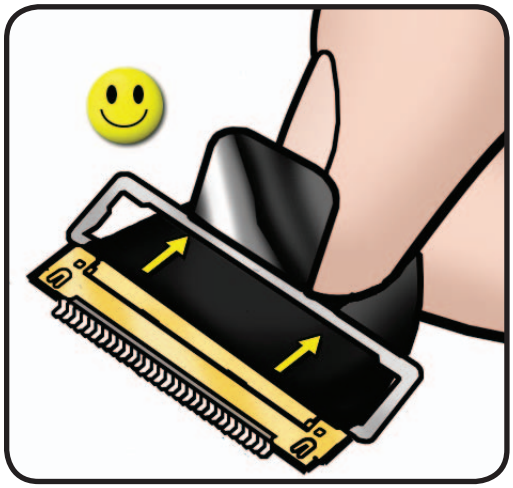
RIGHT: Close-up of #4 DisplayPort cable at top center of logic board. Flip up locking bar and then pull cable straight out of connector (see detail on next page).



Detail of DisplayPort Connector

- This is a thin, multi-pin horizontal insert connector like those used in portable computers.
- Use fingernails or tweezers to remove evenly.
- Slide connector into receptacle on same horizontal plane as board.



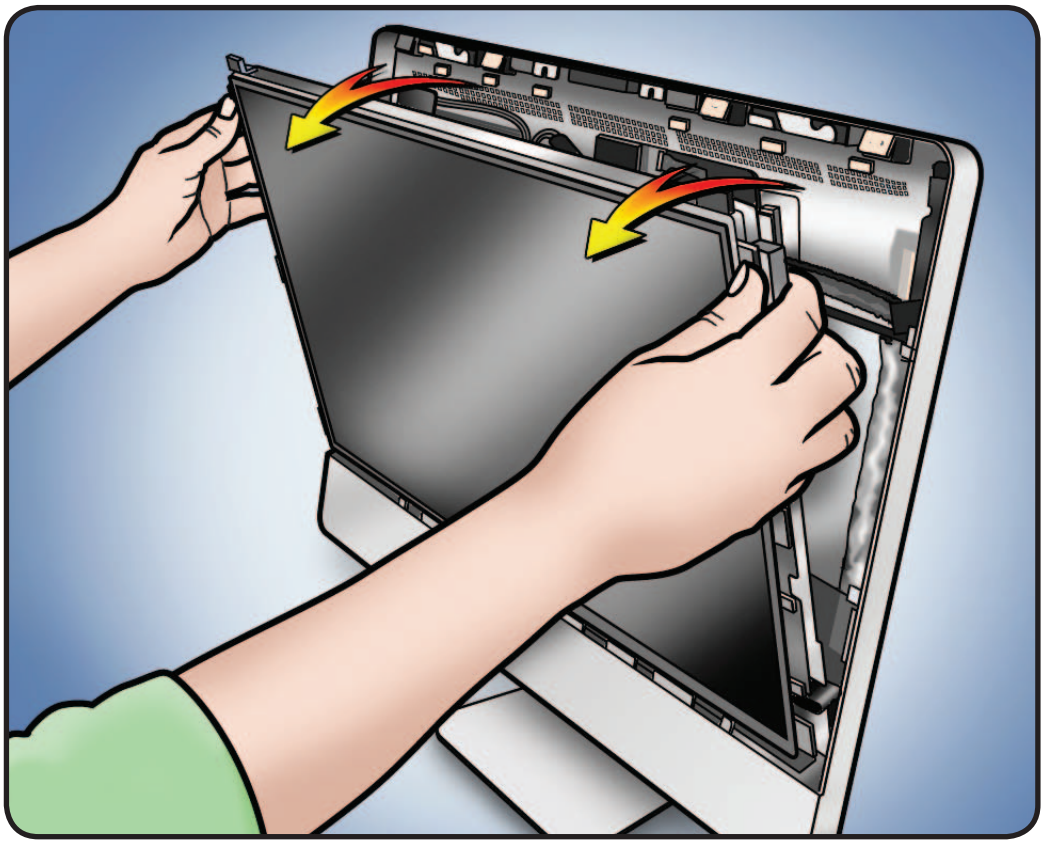


4 Lift LCD panel off rear housing.

Important:

- Handle panel by edges only
- Use two hands to lift and move the panel
- Never hold panel with only one hand
- Don't touch the panel surface

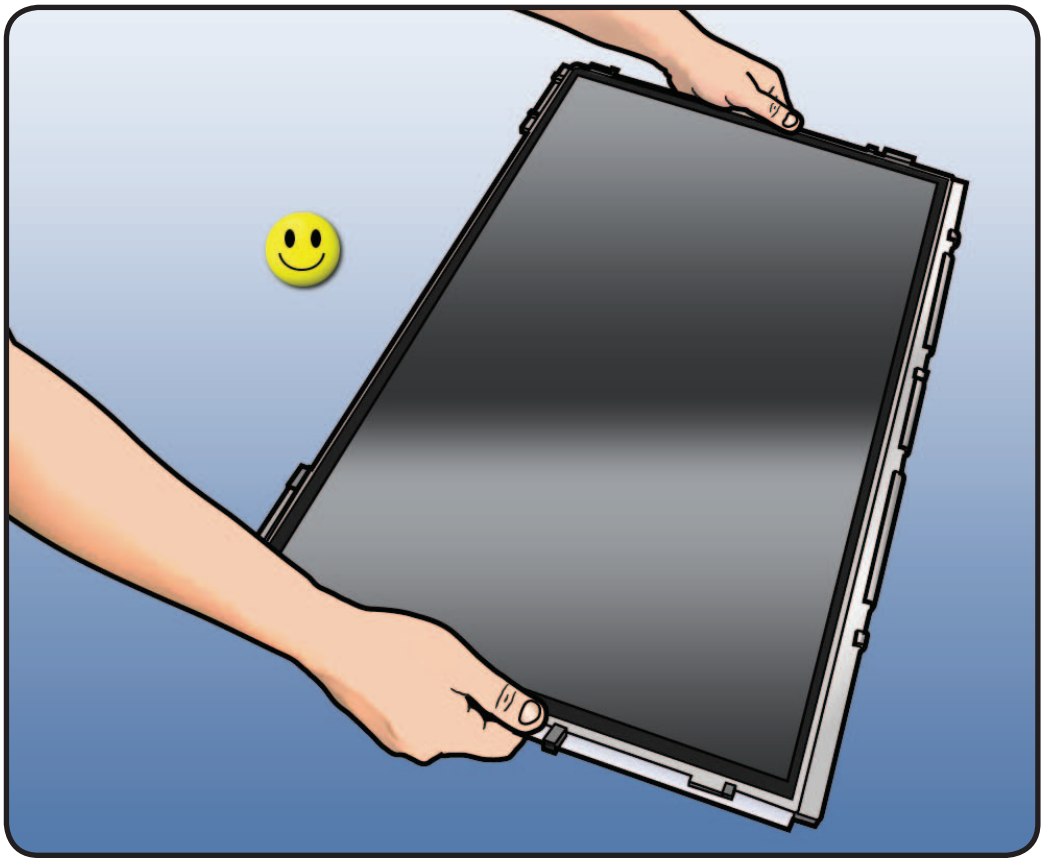
Replacement Note:
A new LCD panel includes all cables. There is nothing to transfer from old panel.



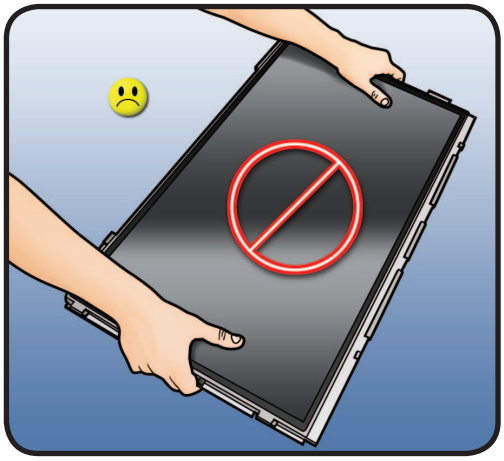
Handling LCD Panel

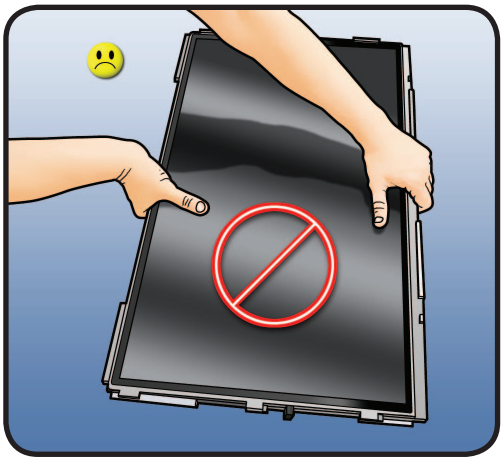
1 **Important:** Handle LCD panel by edges only.

Use two hands to carry the panel.

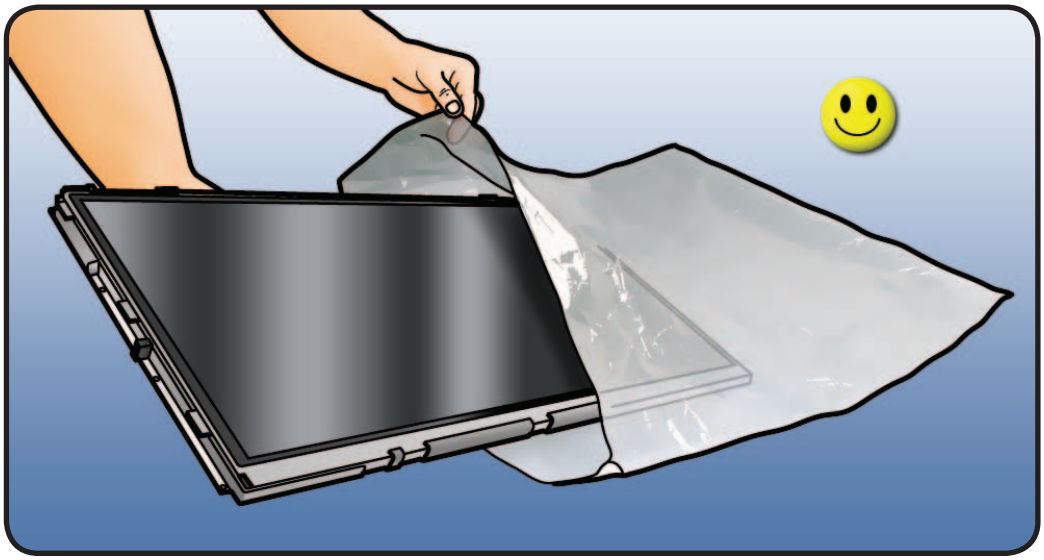


2 Never touch LCD surface or hold LCD panel with one hand. It could damage the LCD panel.





3 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.



DisplayPort Cable

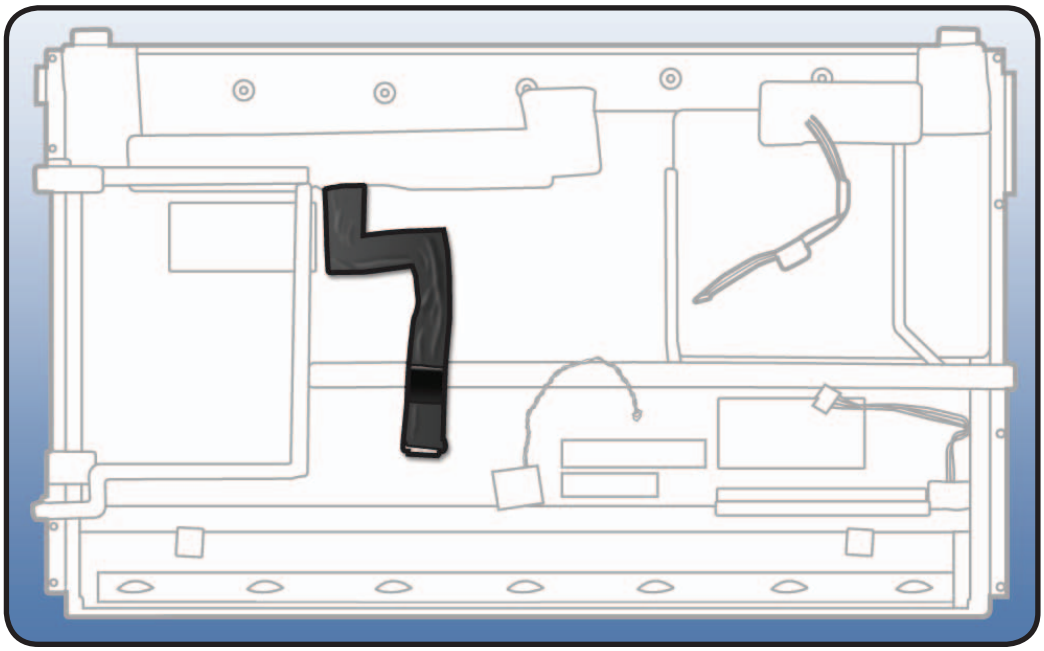
First Steps

Remove:

- Glass Panel
- LCD Panel

Note: A new LCD panel includes a new DisplayPort cable.

Replacement Note: A new DisplayPort cable includes a piece of foil tape and a piece of black mylar tape.



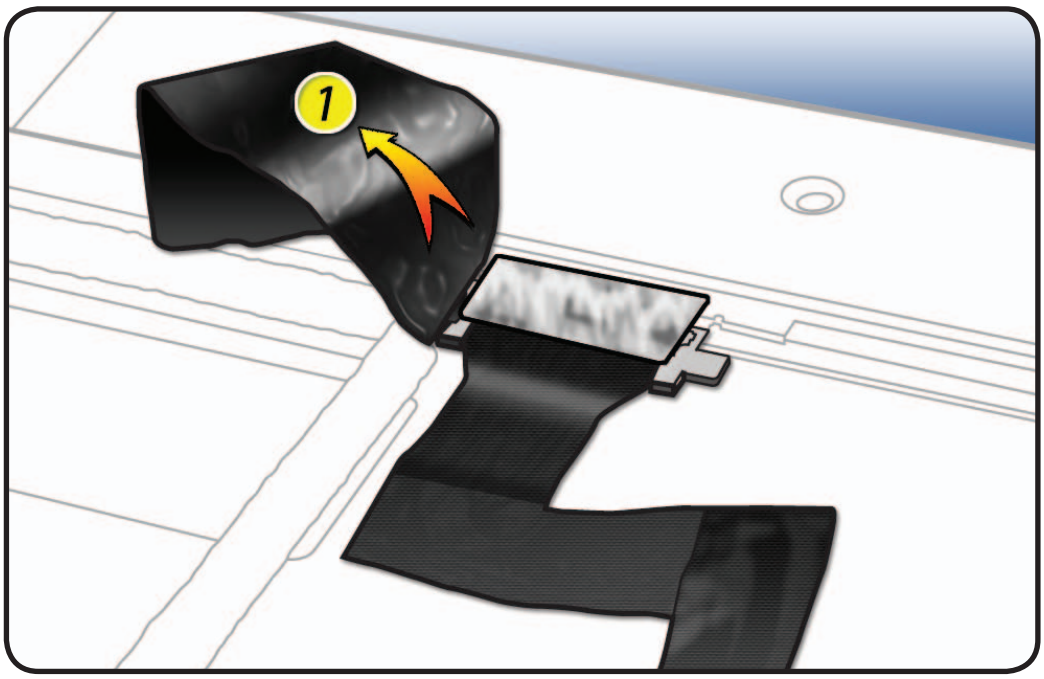
Tools

- ESD wrist strap



Removal

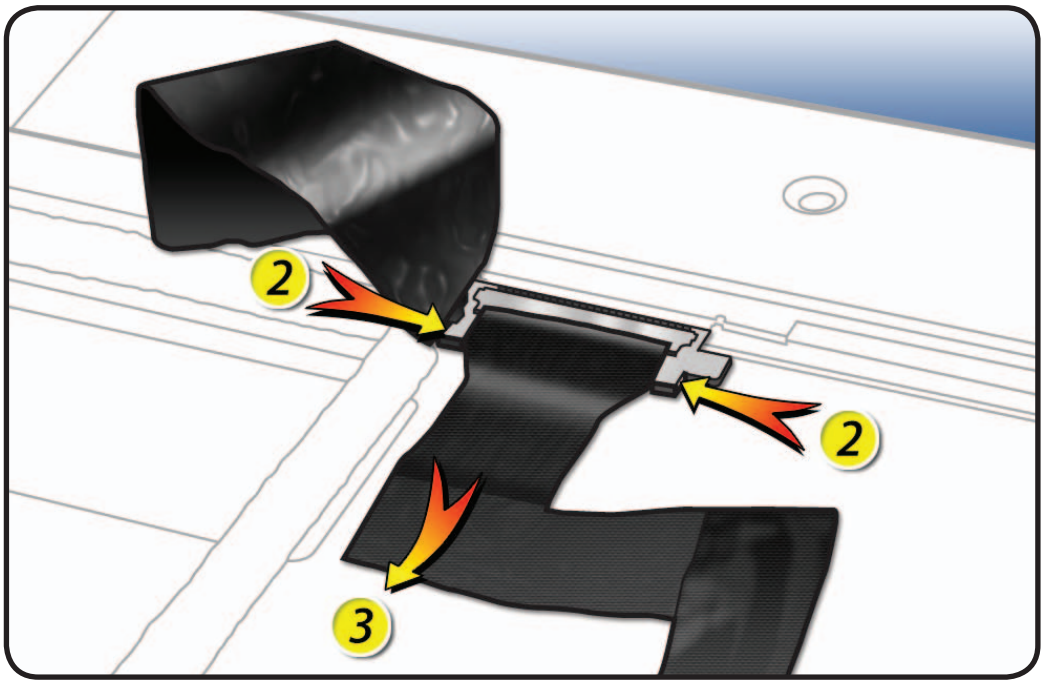
1 Peel back black mylar tape and foil tape covering connector.



2 Press in on both side release clips at the same time.

3 Gently pull cable out of connector.

Reassembly Note:
Insert cable securely into connector and replace all mylar tape.



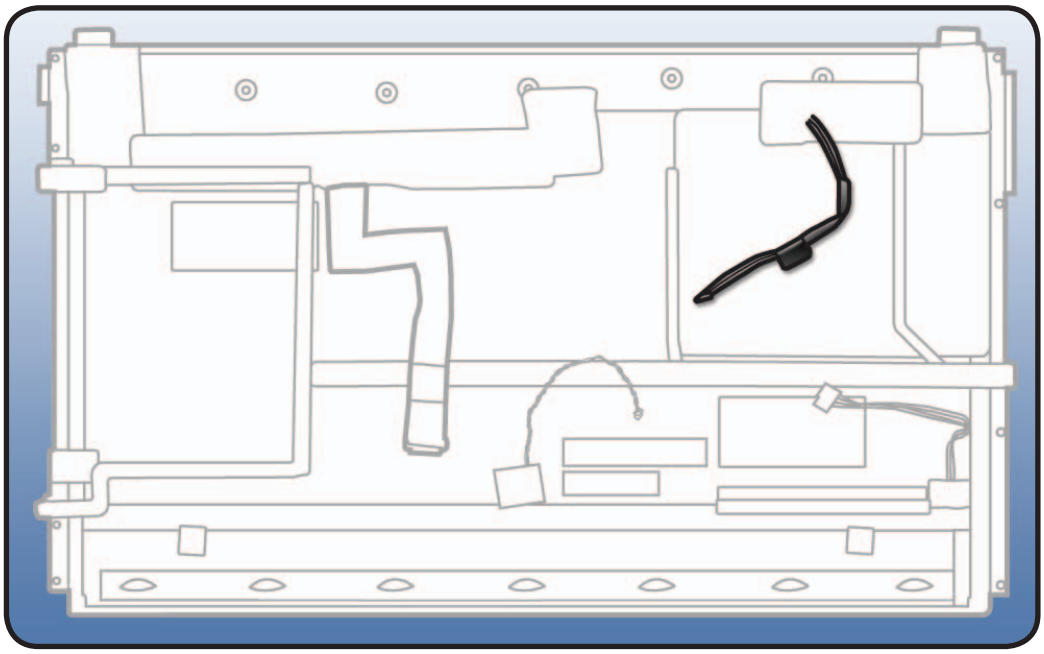
Vertical Sync (V-Sync) Cable

First Steps

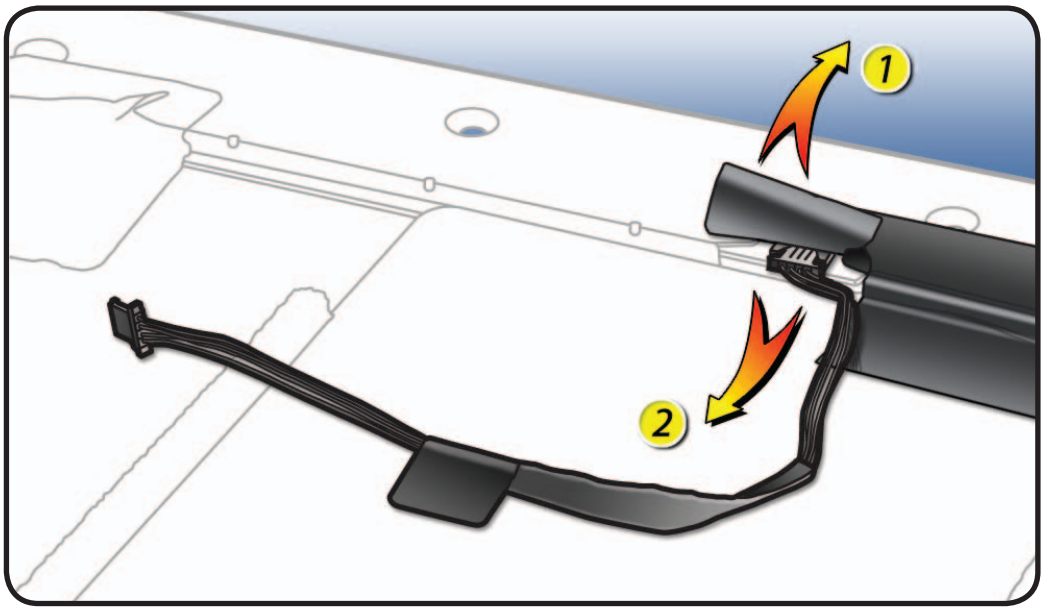
Remove:

- Glass Panel
- LCD Panel

Note: A new LCD panel includes a new Vertical Sync Cable.



Removal



1 Peel back black mylar securing cable to LCD panel.

2 Pull cable straight out of connector.

Reassembly Note: Insert cable securely into connector and replace all mylar tape.

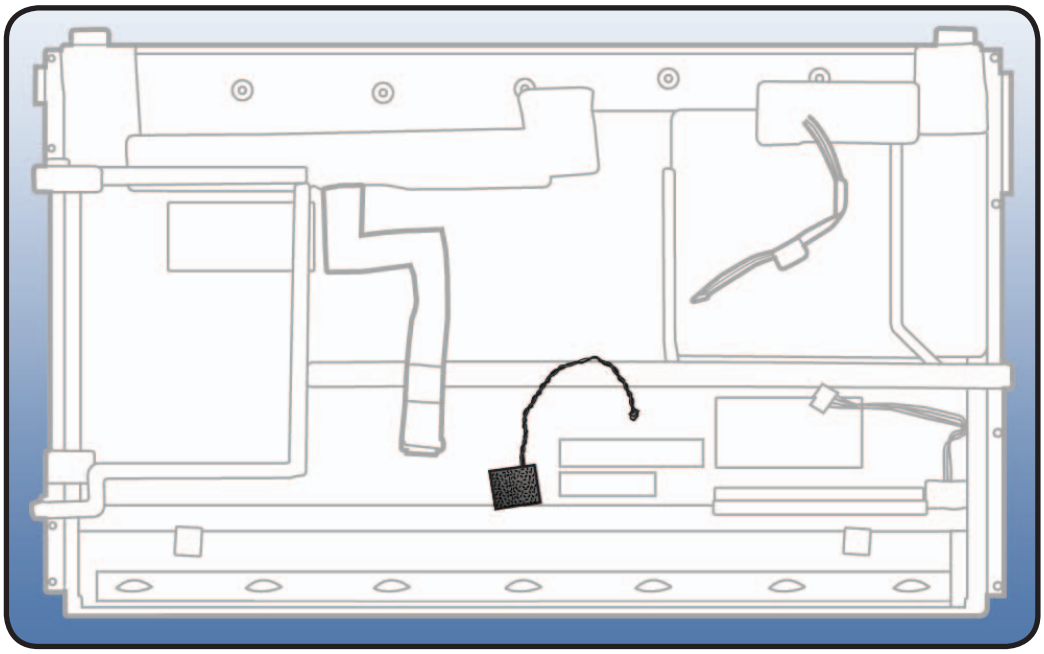
LCD Temp Sensor Cable

First Steps

Remove:

- Glass Panel
- LCD Panel

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

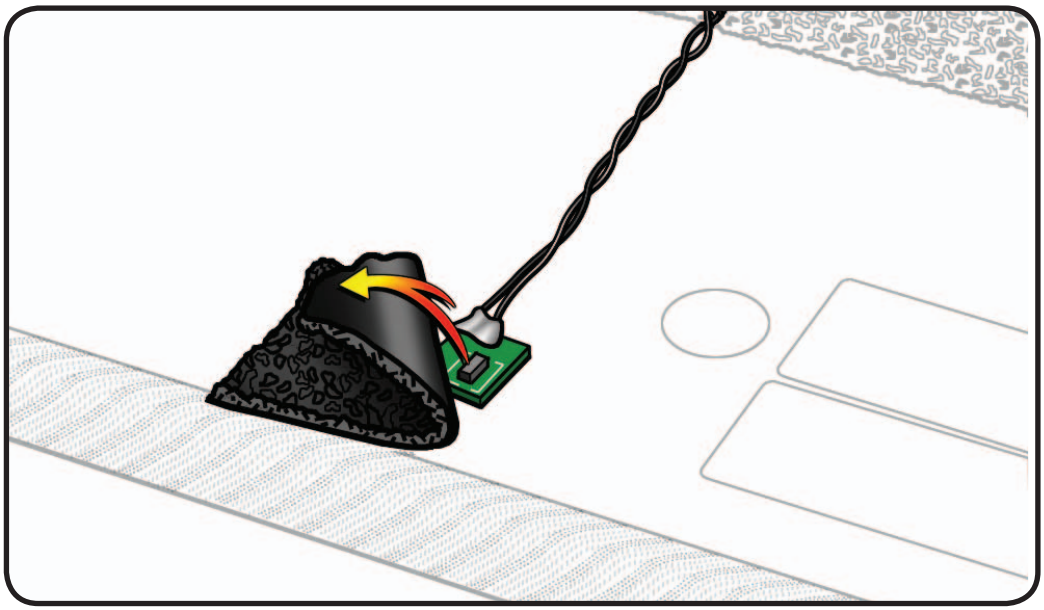


Removal

1 Peel back foam gasket covering sensor.

2 Remove sensor from LCD panel.

Replacement Note: Peel and stick new sensor and fully cover with gasket to isolate sensor from internal air temperature.

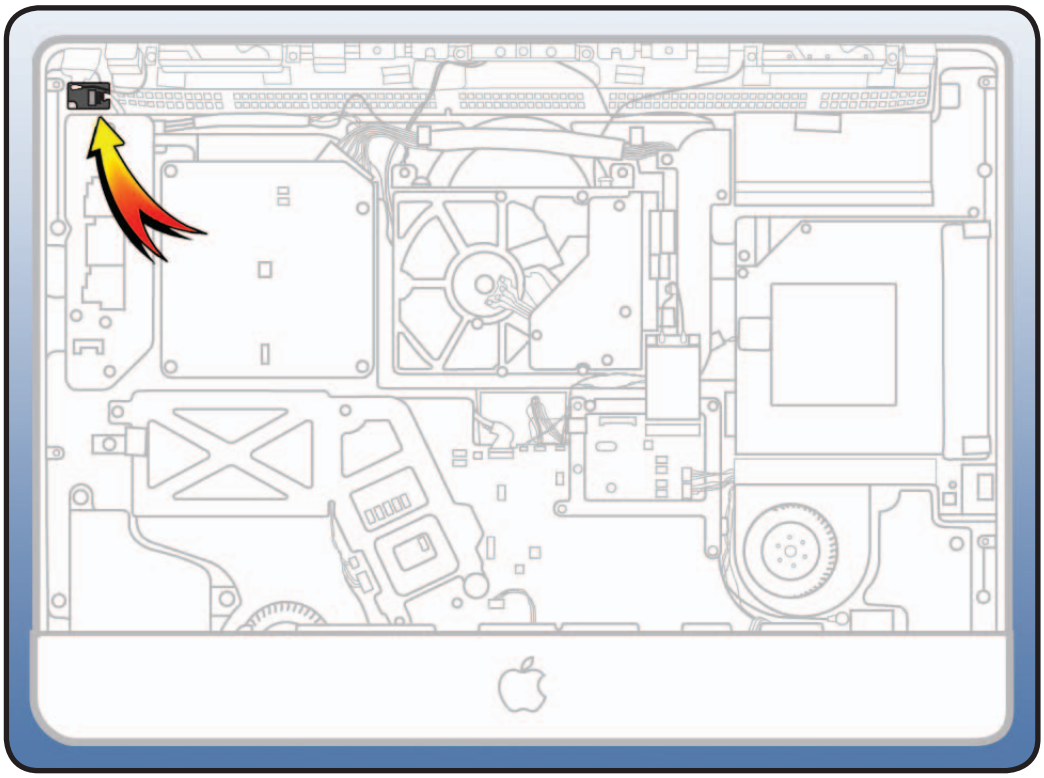


Bluetooth Board

First Steps

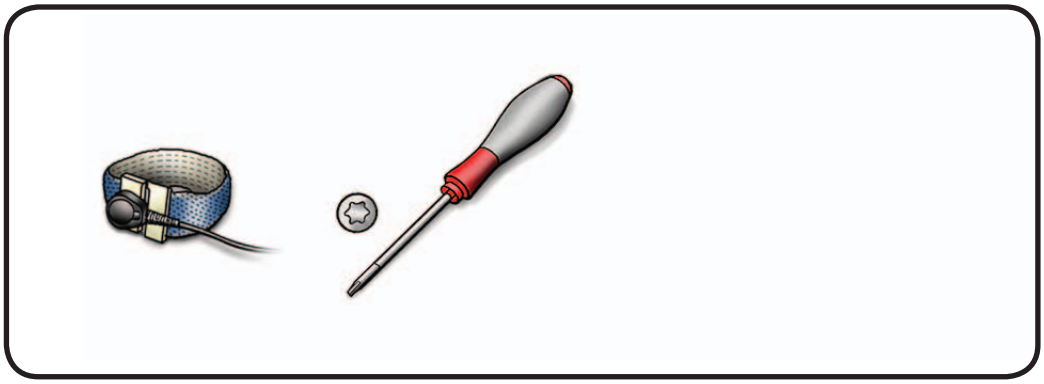
Remove:

- Glass Panel
- LCD Panel

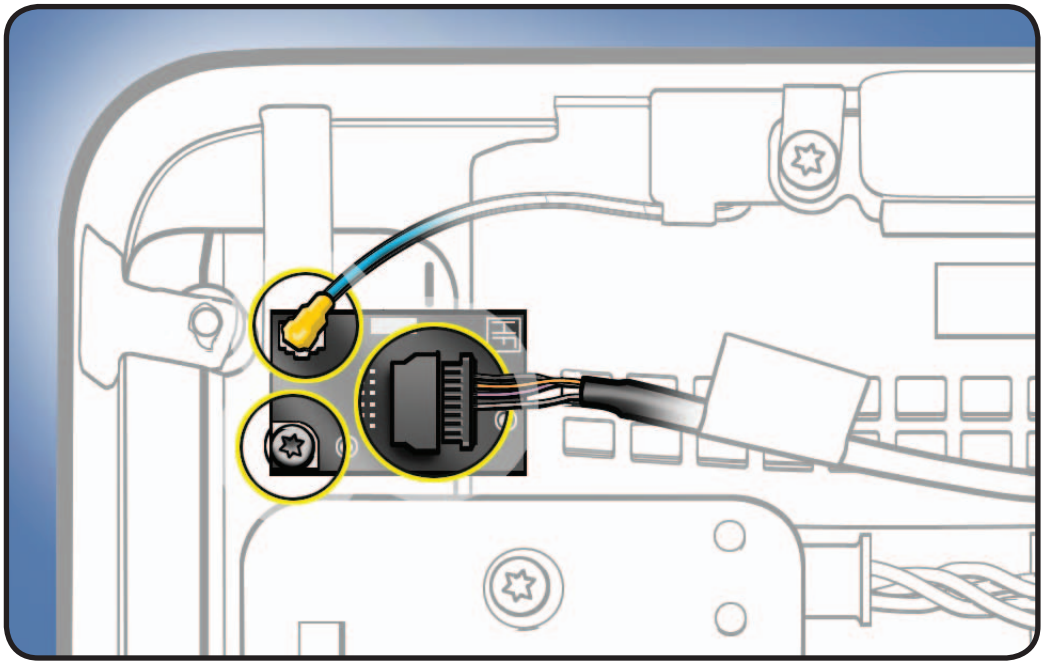


Tools

- ESD wrist strap
- Torx T8 screwdriver



Removal



1 Remove T8 screw:
(1) 922-9247



2 Disconnect blue antenna cable.

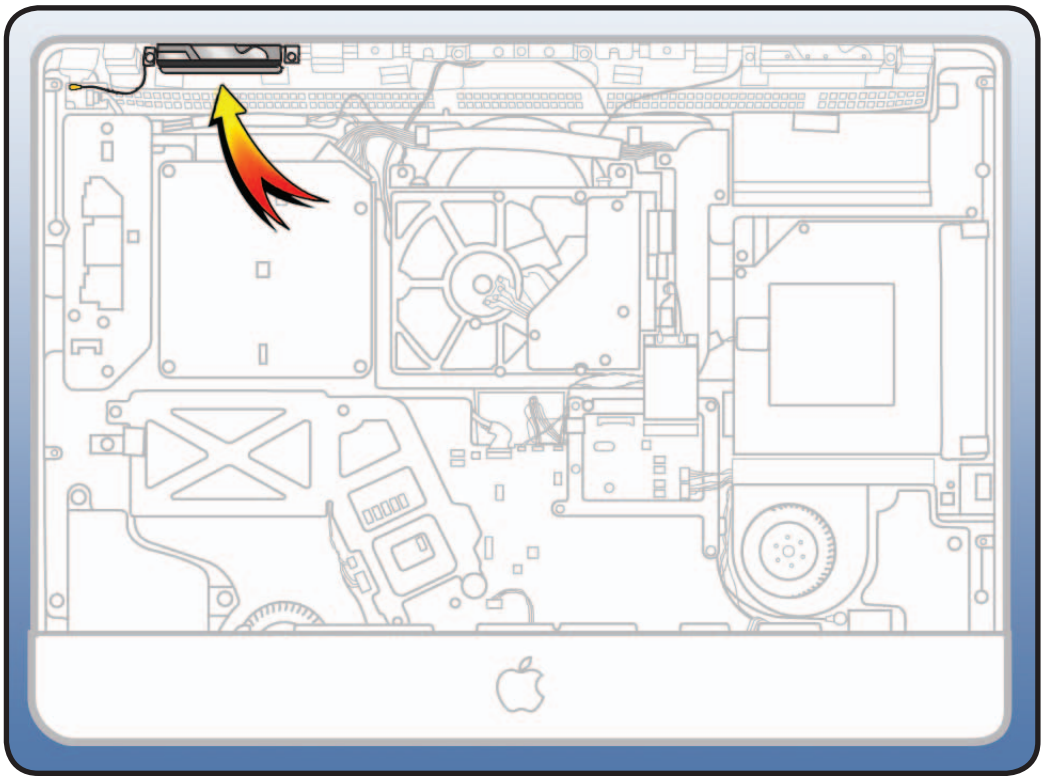
3 Disconnect black cable.

Bluetooth Antenna

First Steps

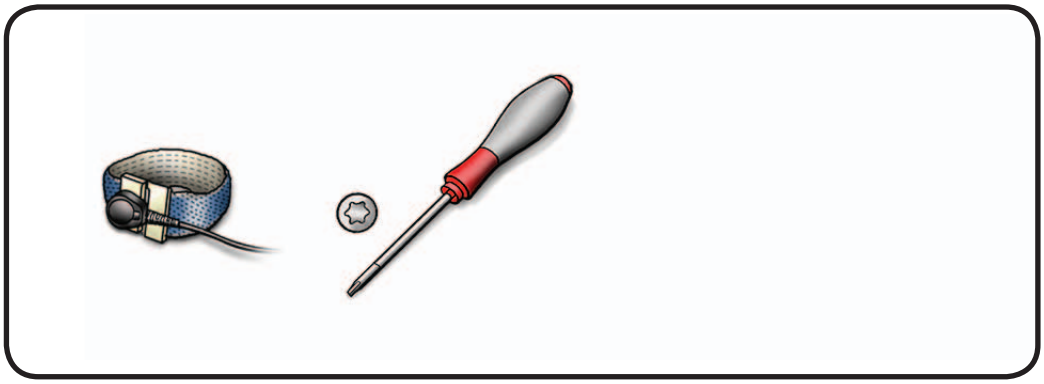
Remove:

- Glass Panel
- LCD Panel



Tools

- ESD wrist strap
- Torx T8 screwdriver

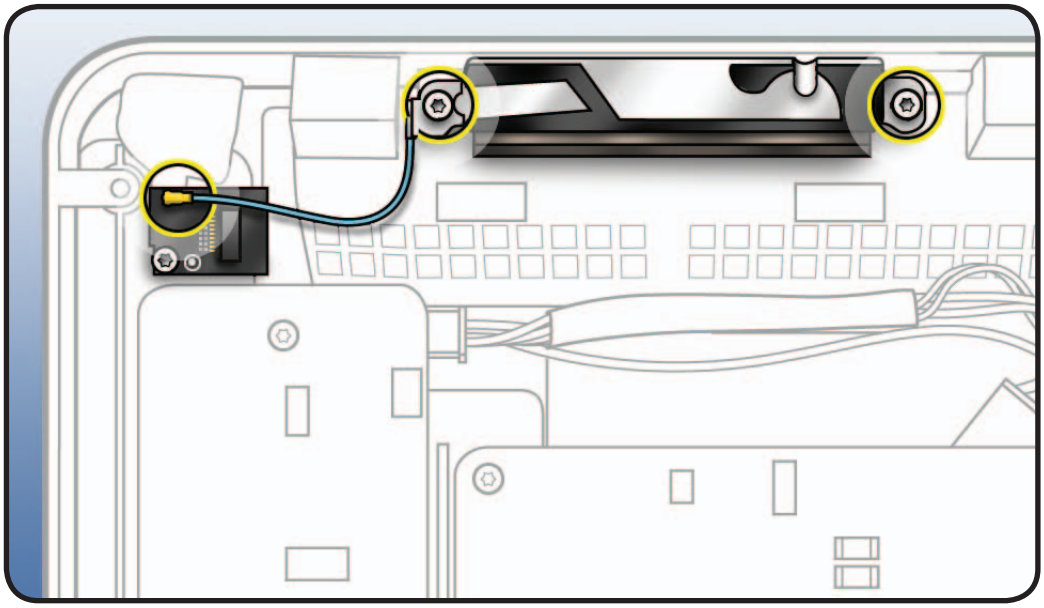


Removal

1 Remove T8 screws:
(2) 922-4723



2 Disconnect blue antenna cable from Bluetooth board.

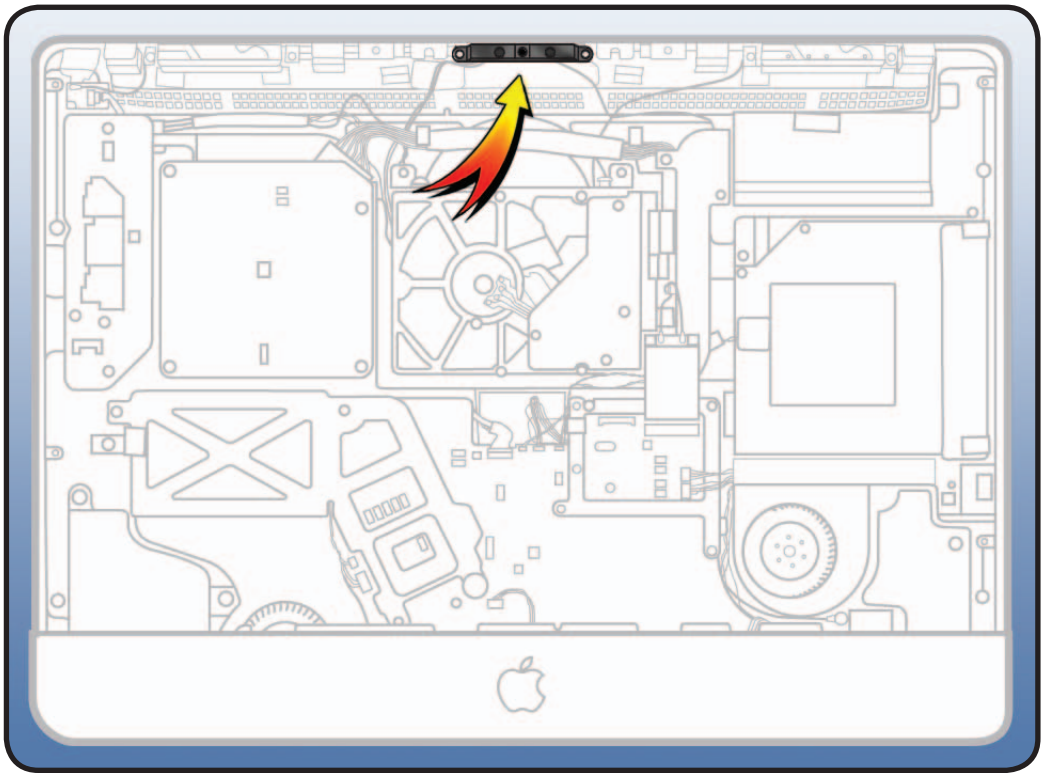


Camera

First Steps

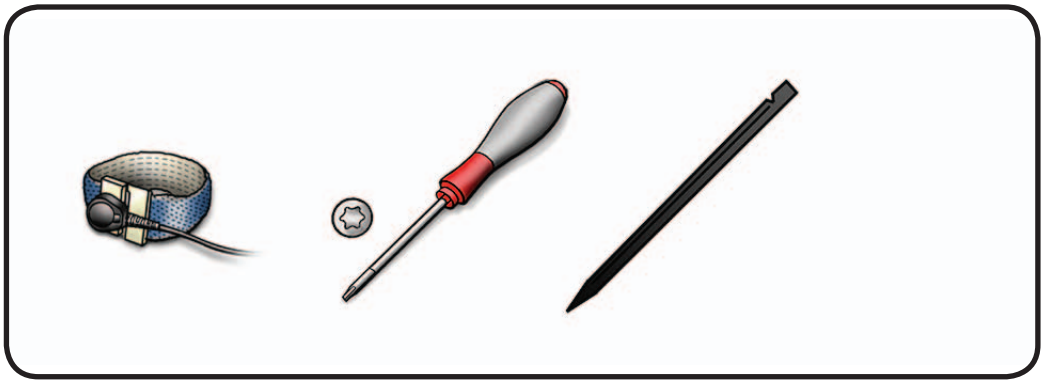
Remove:

- Glass Panel
- LCD Panel



Tools

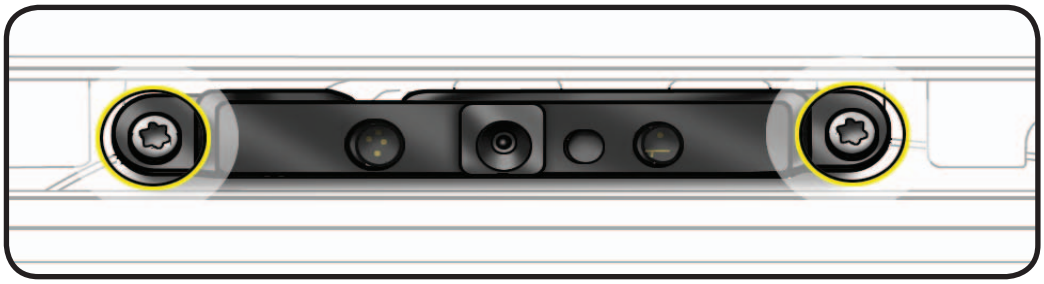
- ESD wrist strap
- Torx T10 screwdriver
- Black stick



Removal

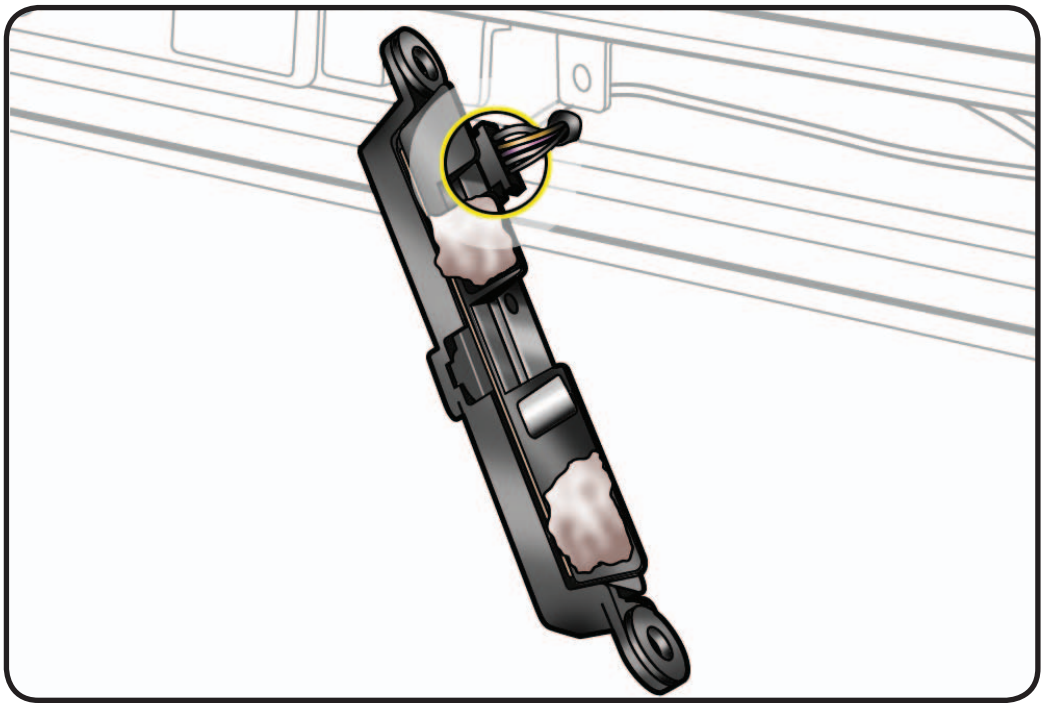
1 Remove T10 screws:
(2) 922-9239



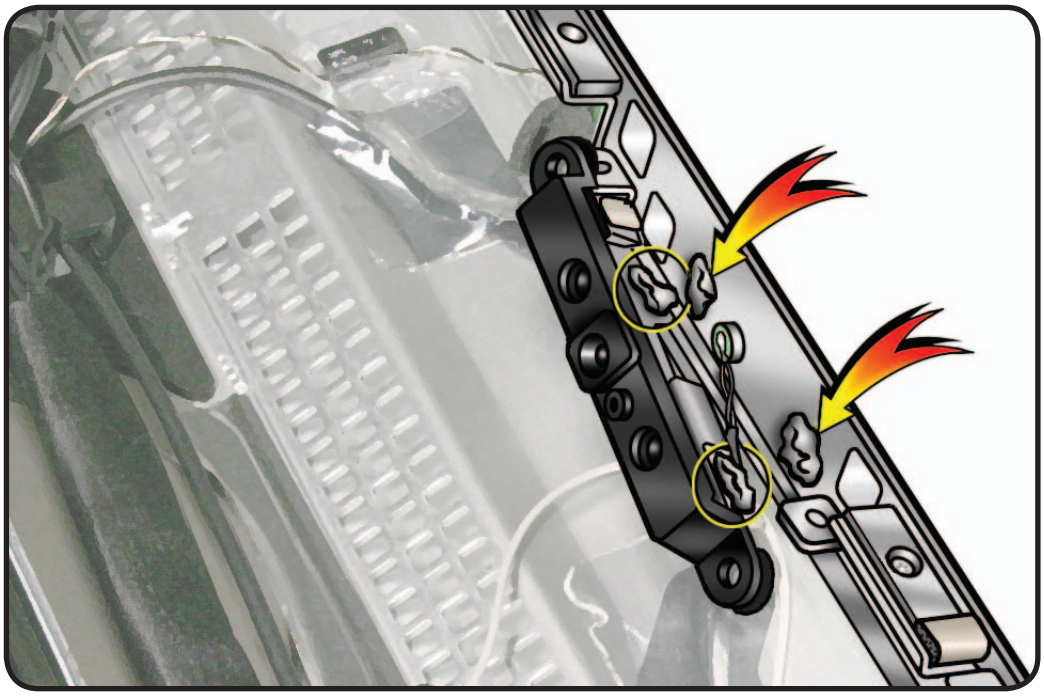


2 Lift camera out of rear housing.

3 Disconnect cable from camera.



Reassembly



1 Thermal paste is required between camera and rear housing. Reuse the thermal paste.

2 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.

Important: The white thermal paste used on camera should NOT be used for any other purpose (such as portable computer heatsinks).

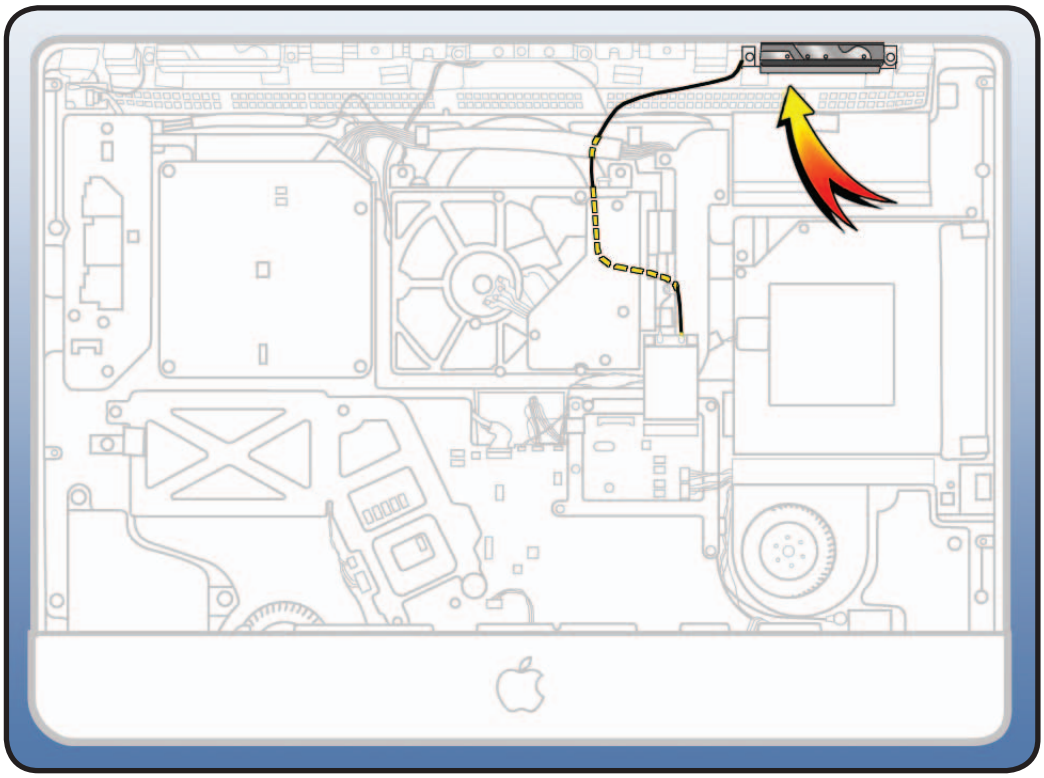
AirPort Antenna

First Steps

Remove:

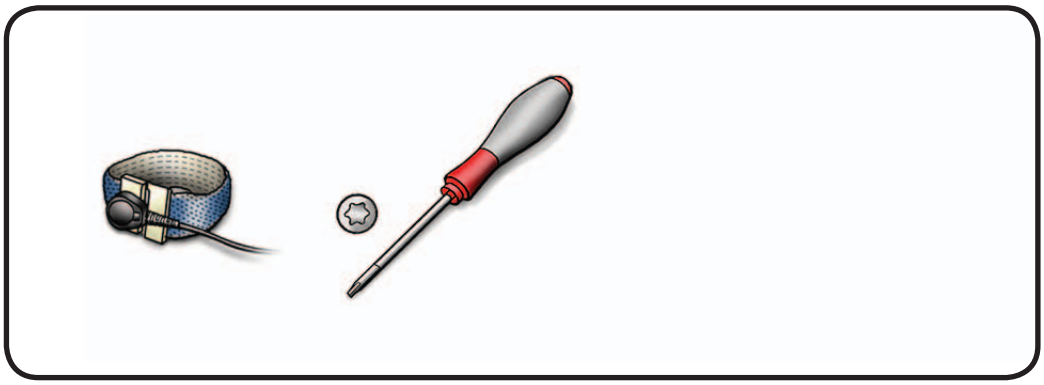
- Glass Panel
- LCD Panel

Note: There is a second AirPort antenna built-in to rear housing behind Apple logo on back of iMac, however, it is not removable and can only be repaired via rear housing replacement.

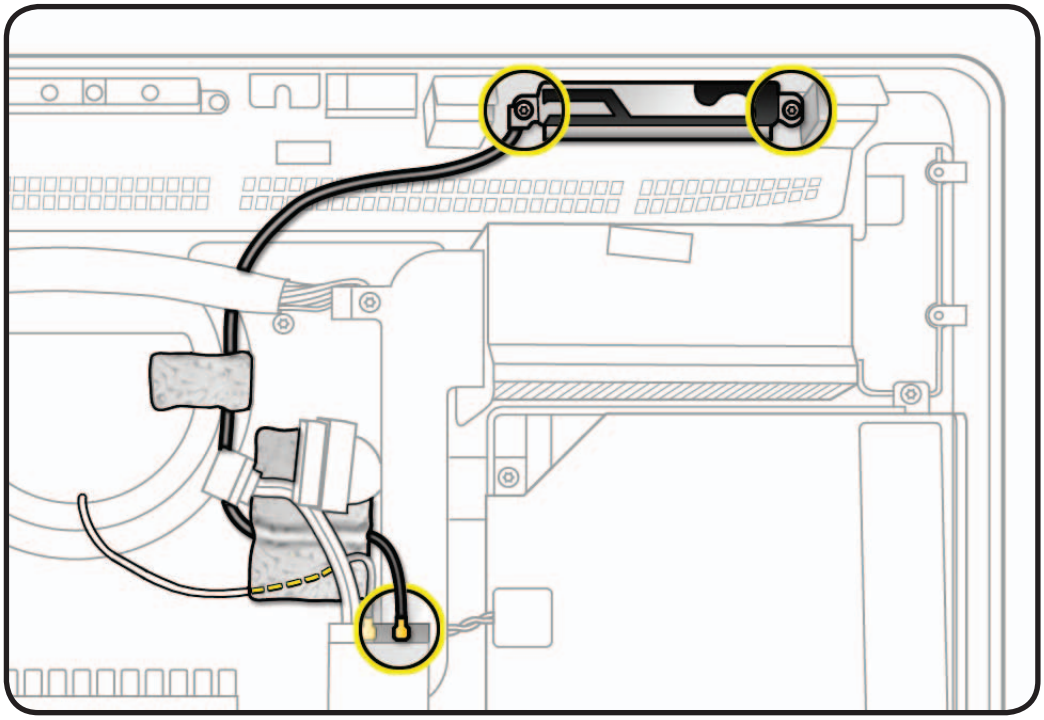


Tools

- ESD wrist strap
- Torx T8 screwdriver



Removal



1 Disconnect black antenna cable from AirPort card.



CAUTION: Be careful not to damage antenna connectors as it may induce antenna or rear housing replacement (lower antenna is part of rear housing).

2 Peel up aluminum foil tape securing antenna cable to rear housing.

3 Remove T8 screws:
(2) 922-4723

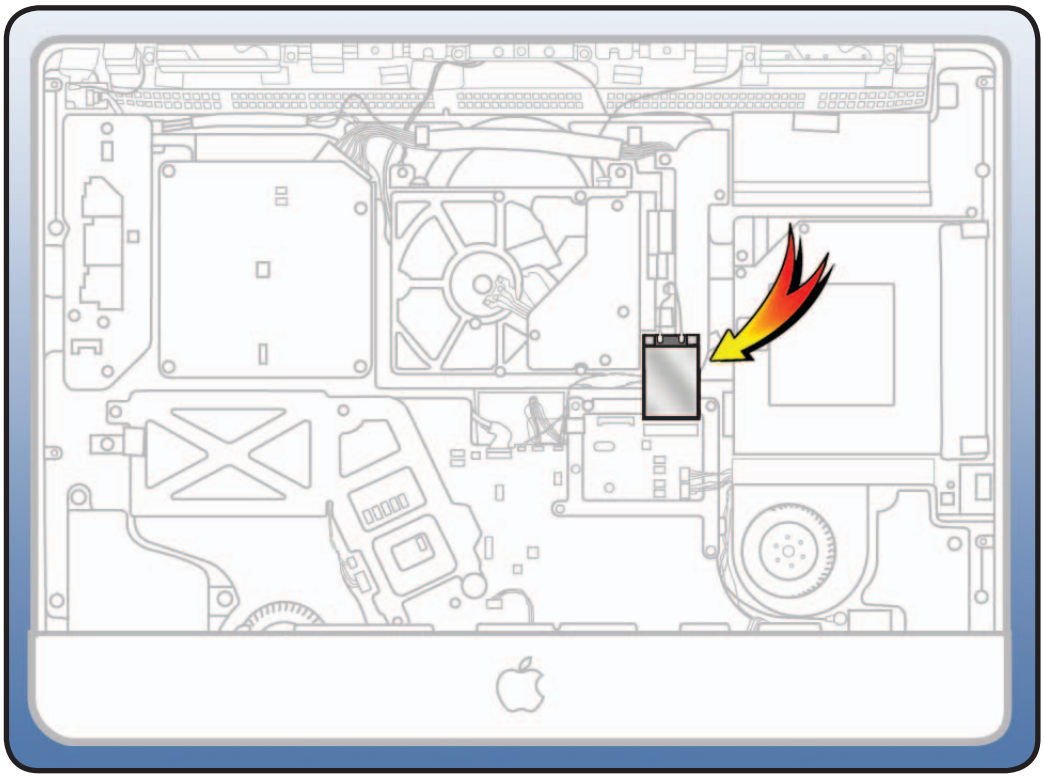


AirPort Card

First Steps

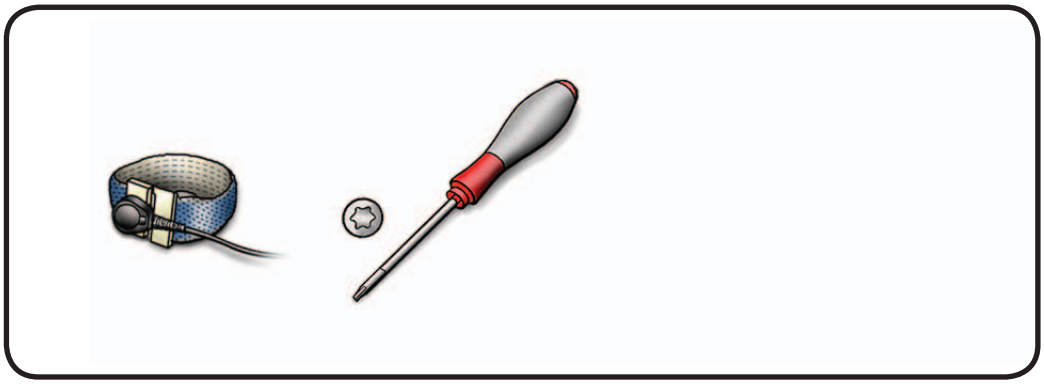
Remove:

- Glass Panel
- LCD Panel

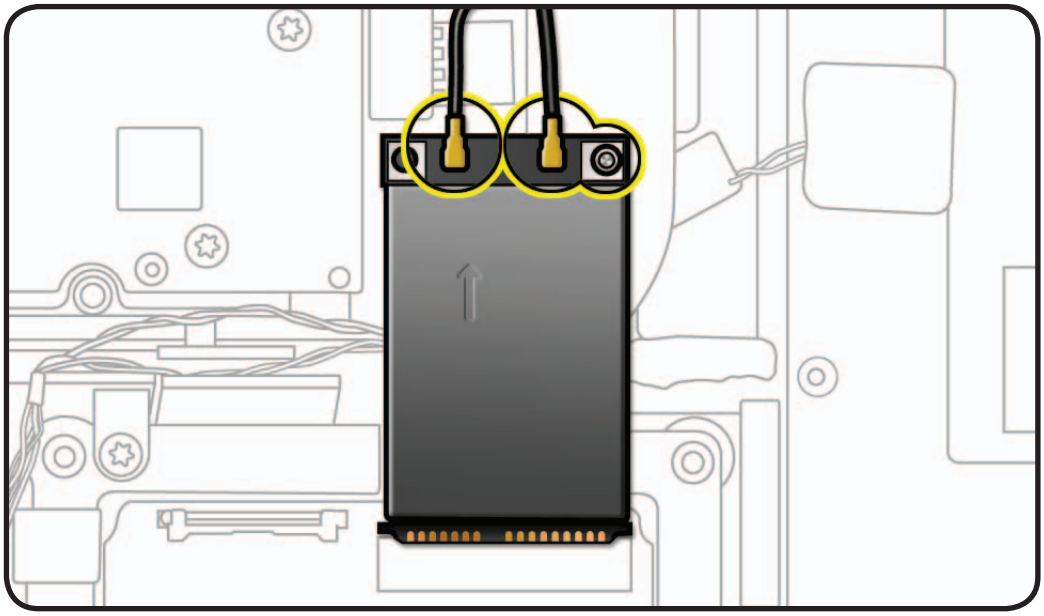


Tools

- ESD wrist strap
- Torx T6 screwdriver



Removal



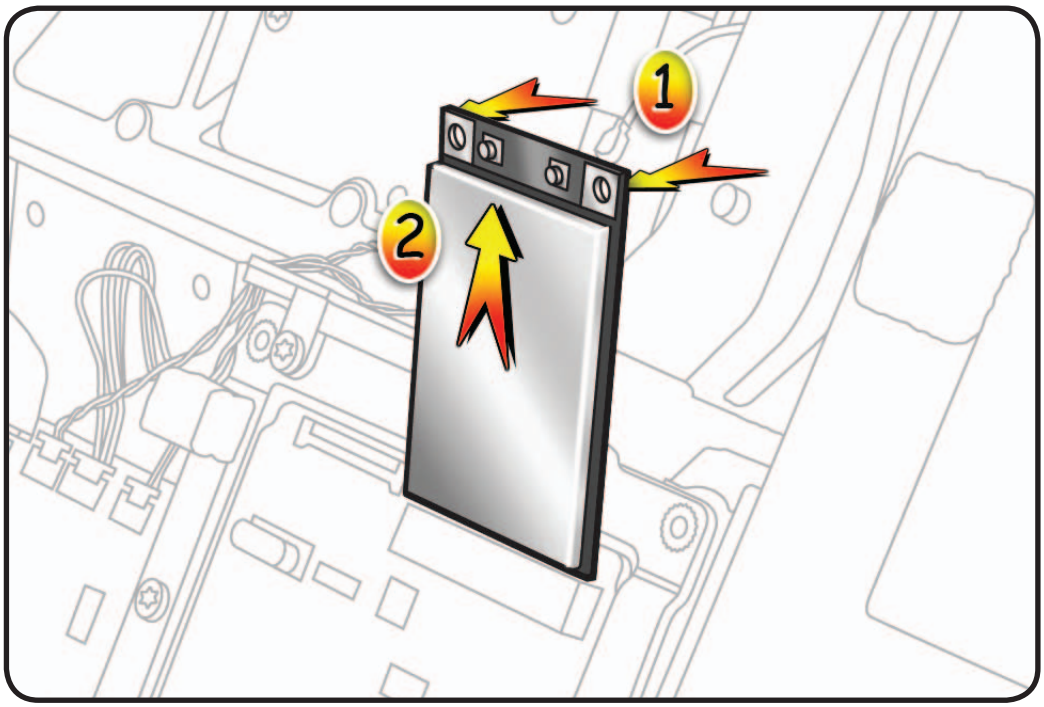
1 Remove T6 screw:
(1) 922-8579



2 Disconnect 2 antenna cables.



CAUTION: Be careful not to damage antenna connectors as it may induce antenna or rear housing replacement (lower antenna is part of rear housing).



3 (1) Tilt AirPort card away from logic board, then (2) hold card by edges and pull it out of the slot.

Reassembly Note: Card must be inserted at this angle.

LED Backlight Board

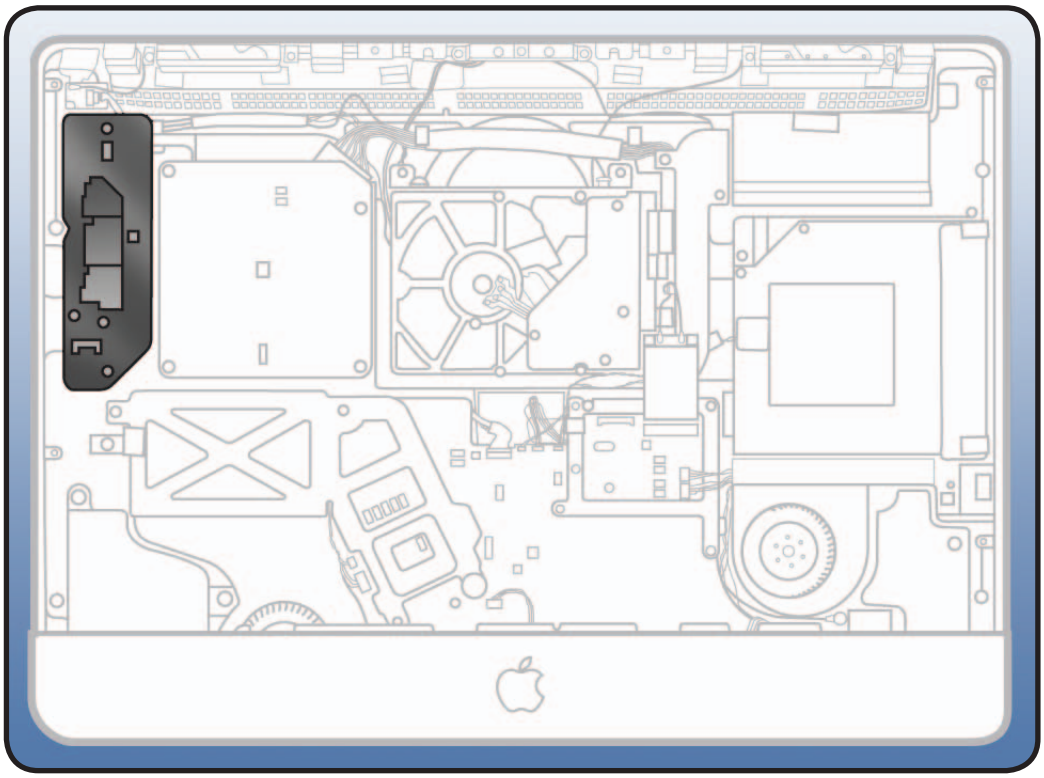
First Steps

Remove:

- Glass Panel
- LCD Panel

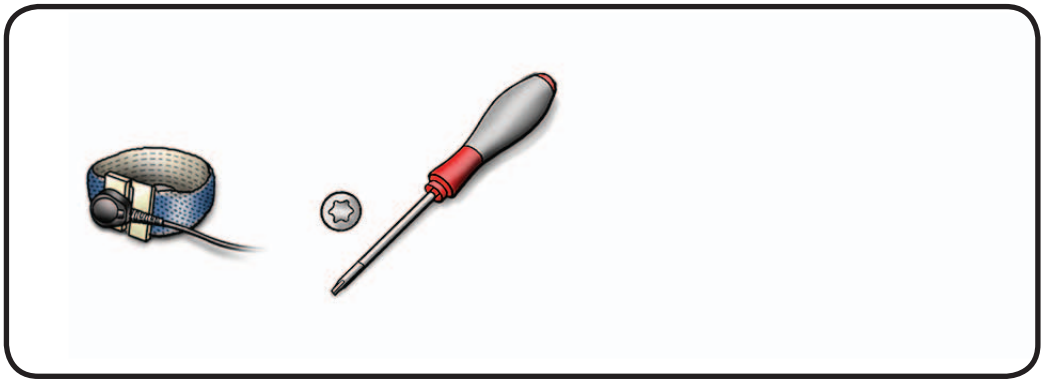


Warning: HIGH VOLTAGE: Use extreme caution when working around the capacitors in top right corner of backlight board, which contain high-voltage that may remain charged for several minutes even when computer is unplugged. Never touch leads on top side of backlight board.



Tools

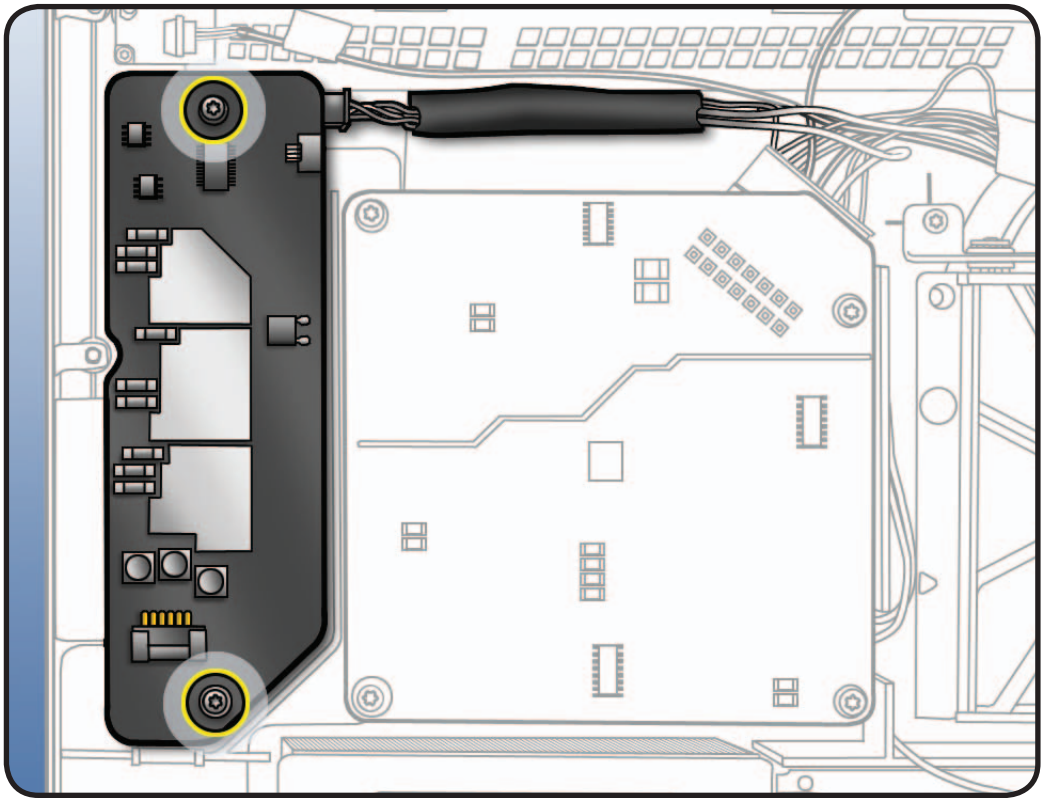
- ESD wrist strap
- Torx T10 screwdriver



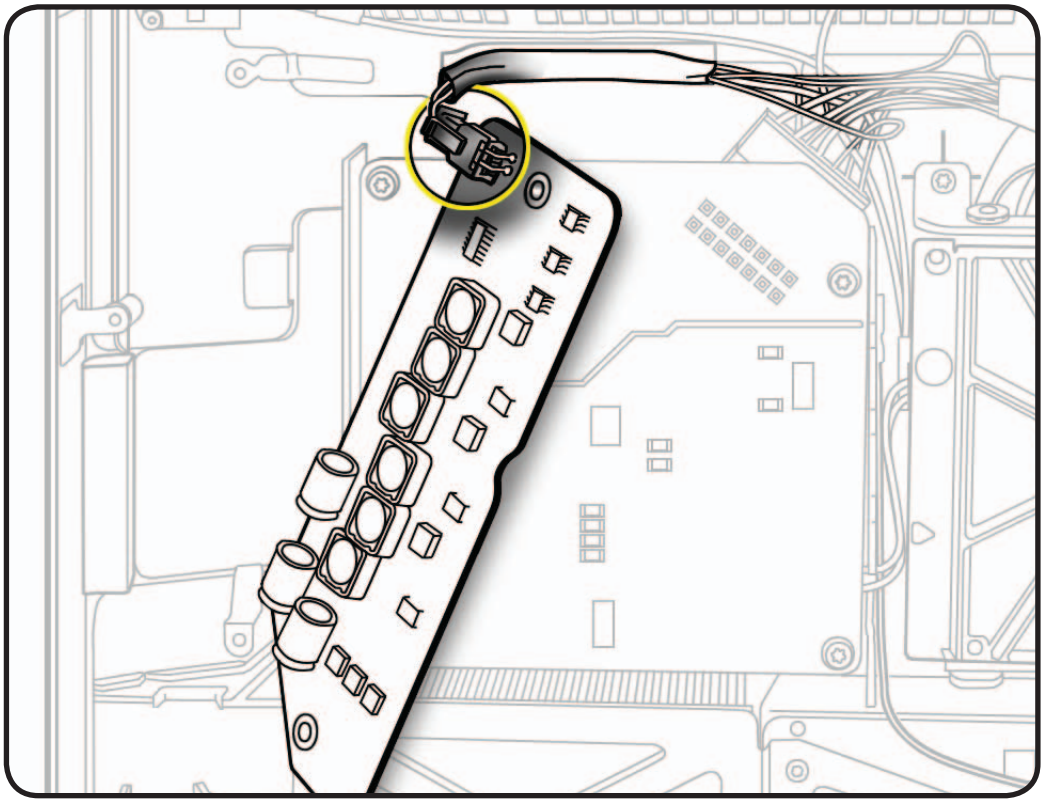
Removal

1 Remove T10 screws:
(2) 922-6850





2 Lift up board, flip over, and disconnect power connector.



Power Supply

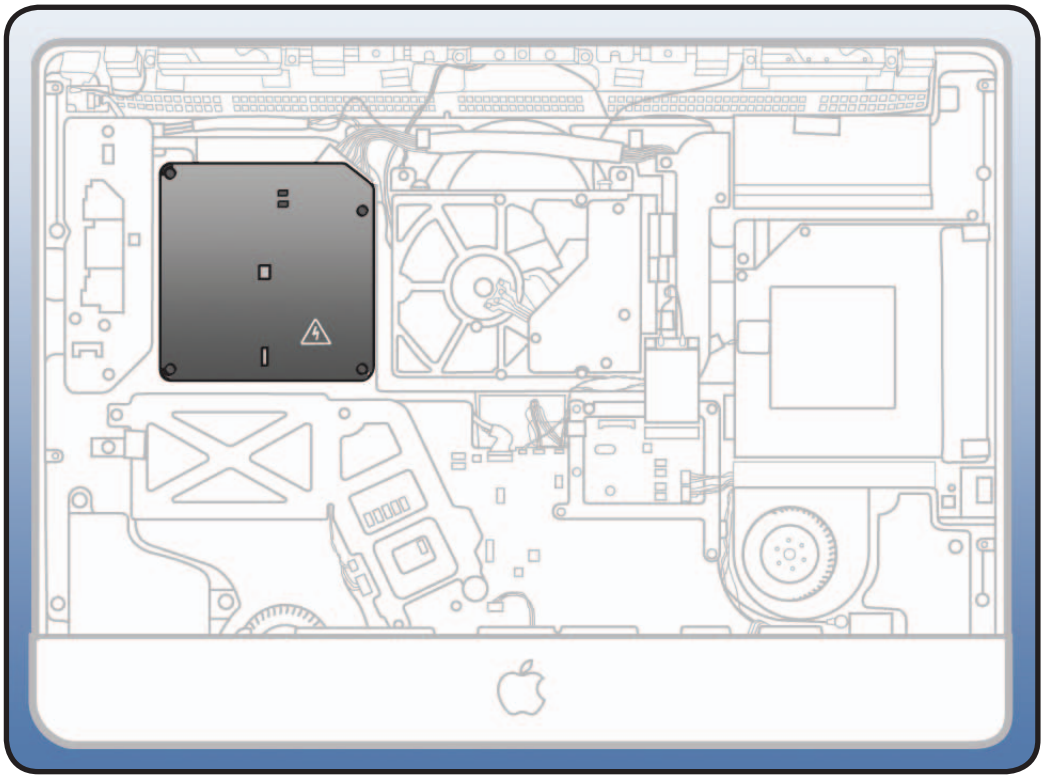
First Steps

Remove:

- Glass Panel
- LCD Panel

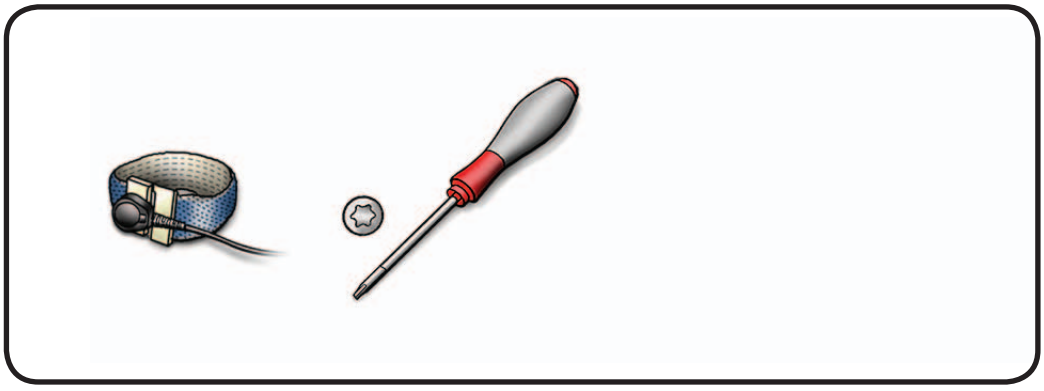


Warning: HIGH VOLTAGE: Use extreme caution when working around the power supply, which contains a high-voltage capacitor that may remain charged for several minutes even when computer is unplugged. Never touch leads on top side of power supply, especially those near warning sign.



Tools

- ESD wrist strap
- Torx T10 screwdriver



Removal

1 Remove T10 screws:

- (1) 922-6850, short (S)

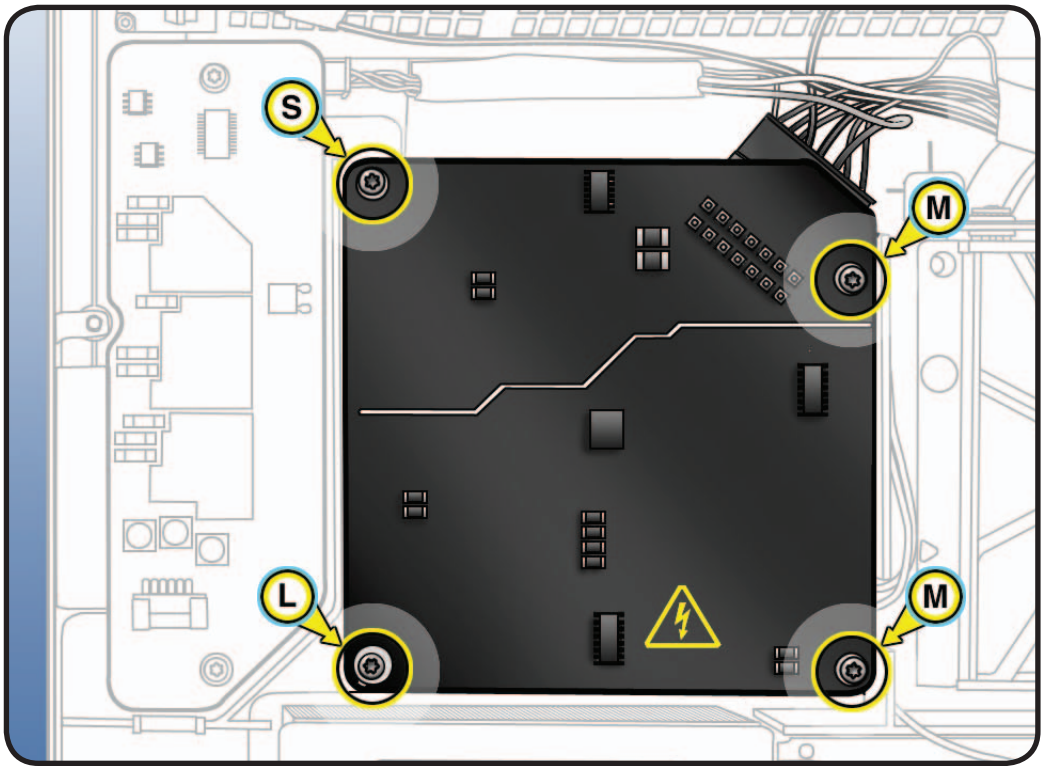


- (1) 922-9593, long (L)

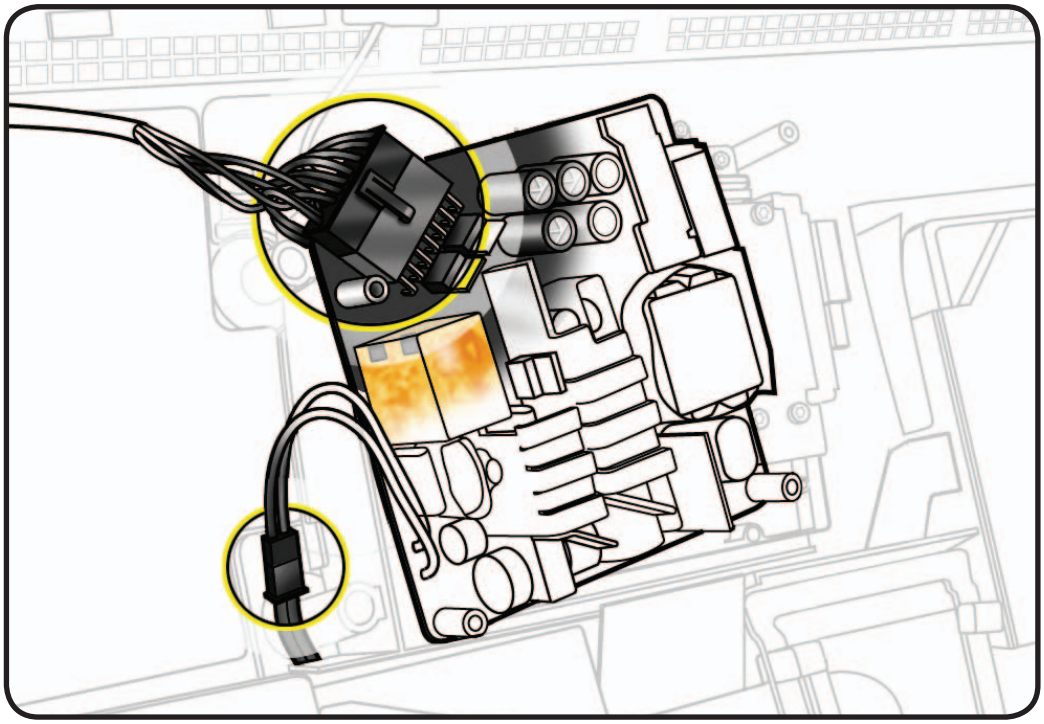


- (2) 922-9244, machine, medium (M)





2 Lift up, flip over and disconnect 2 cables.

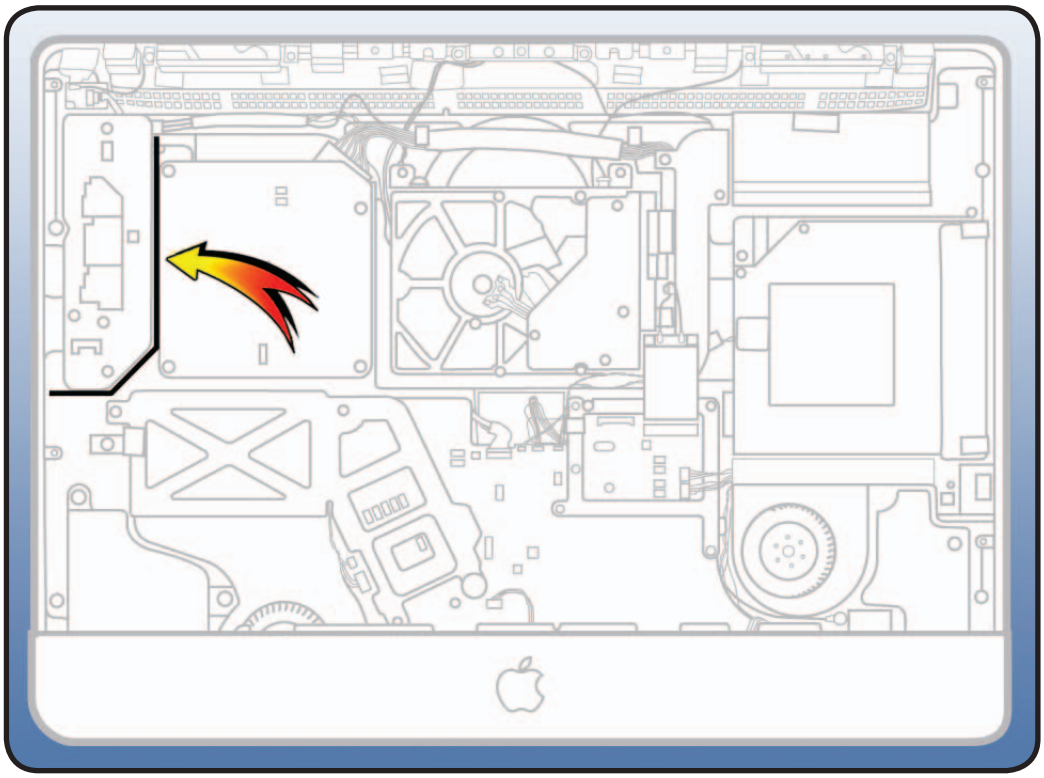


Backlight Pressure Wall

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply



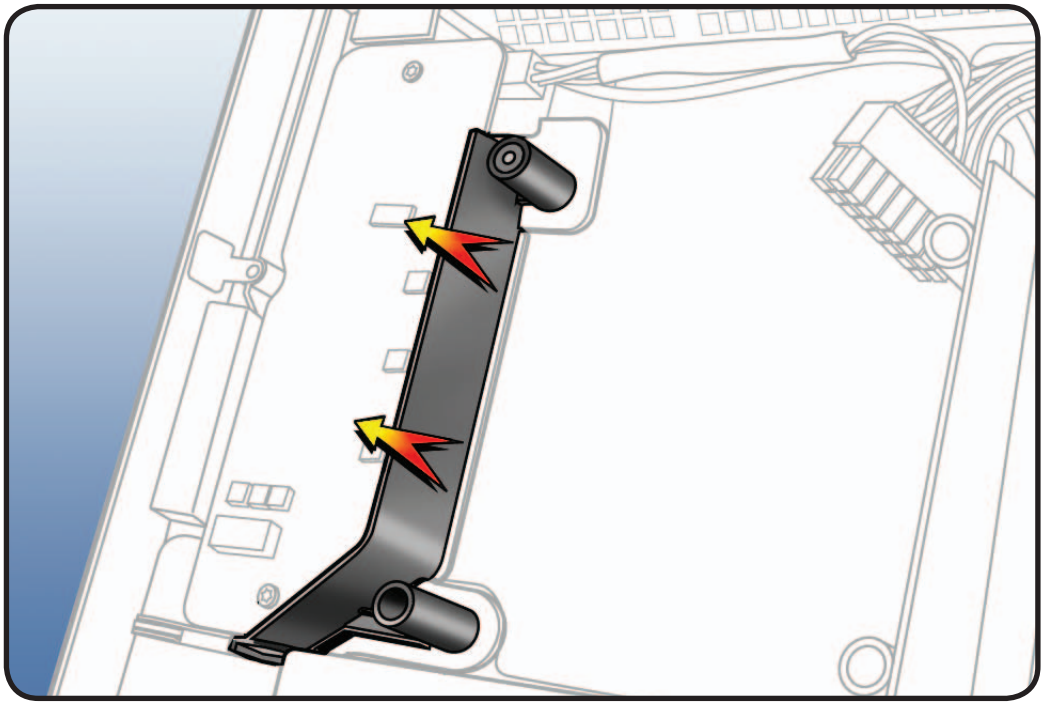
Tools

- ESD wrist strap



Removal

1 Lift pressure wall off posts in rear housing.

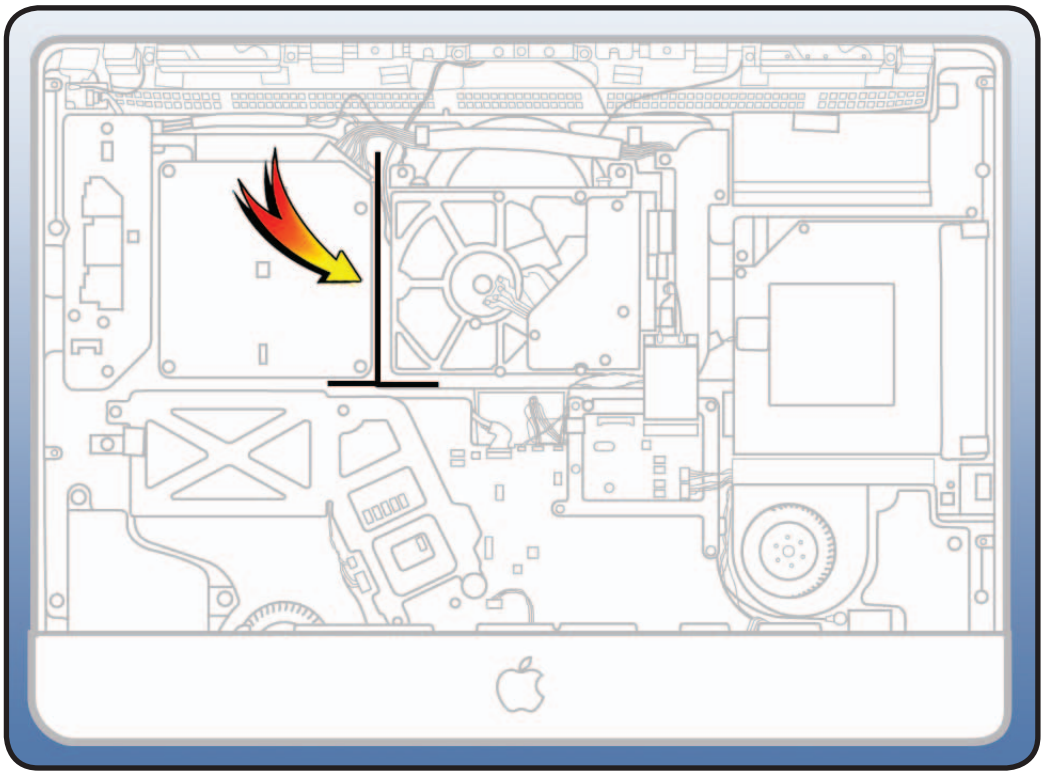


Power Supply Pressure Wall

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply



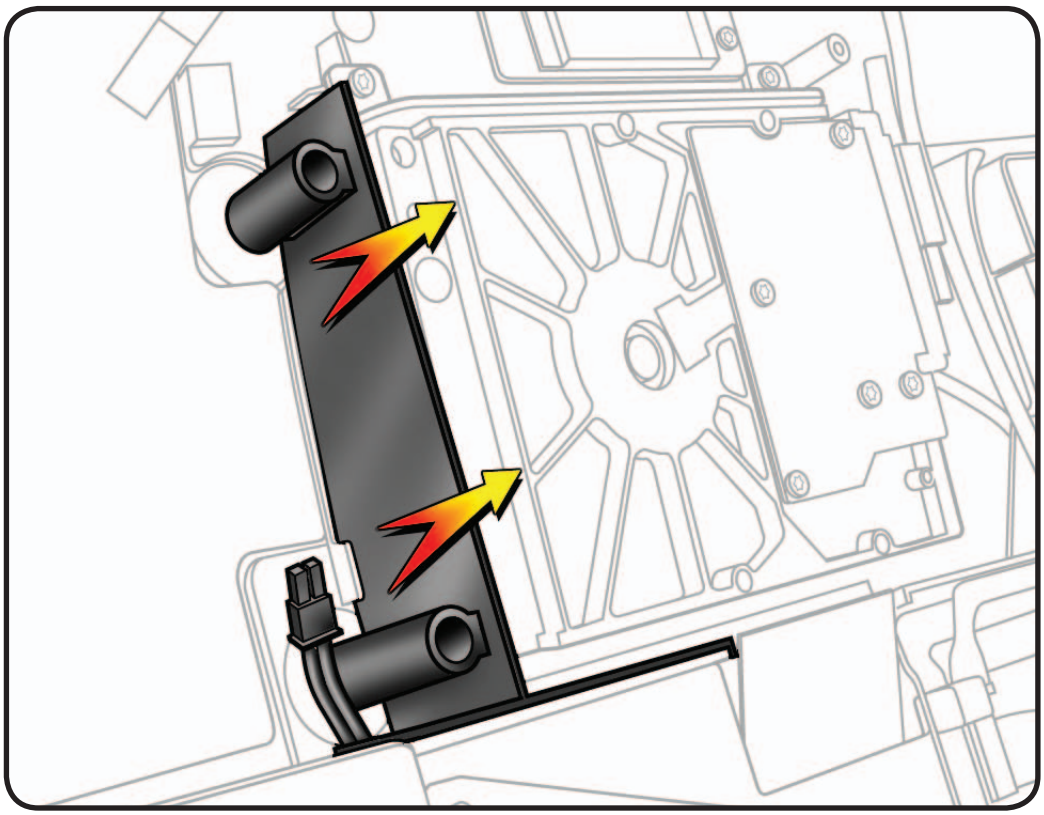
Tools

- ESD wrist strap



Removal

1 Lift pressure wall off posts in rear housing.

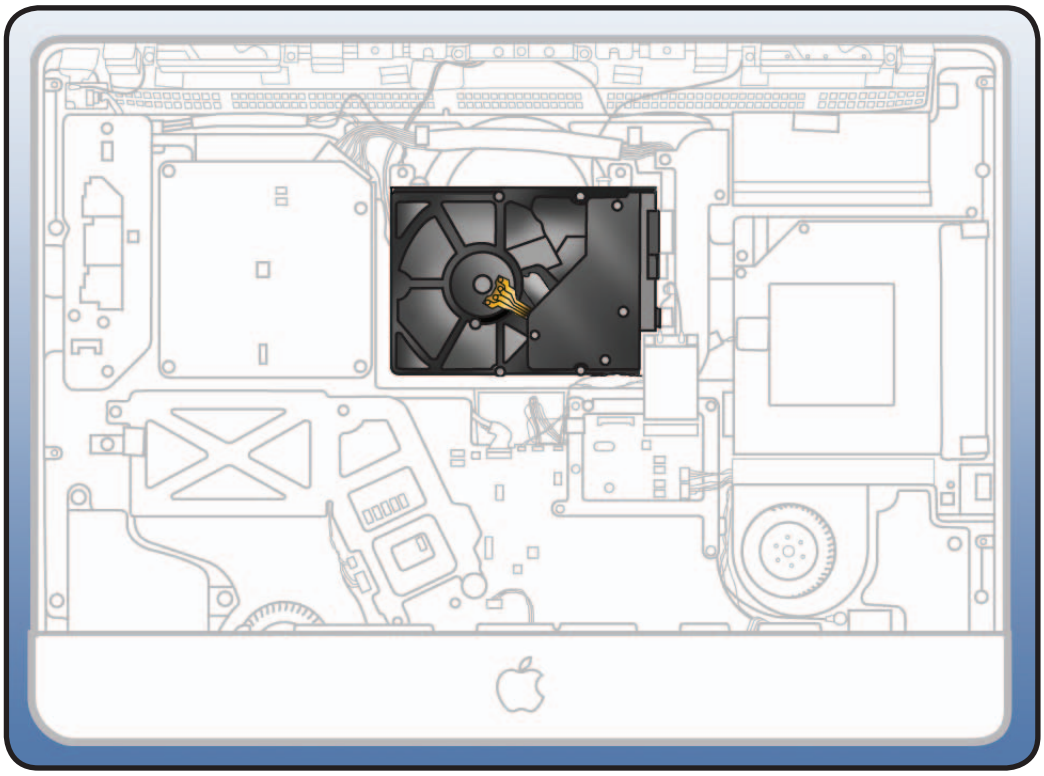


Hard Drive

First Steps

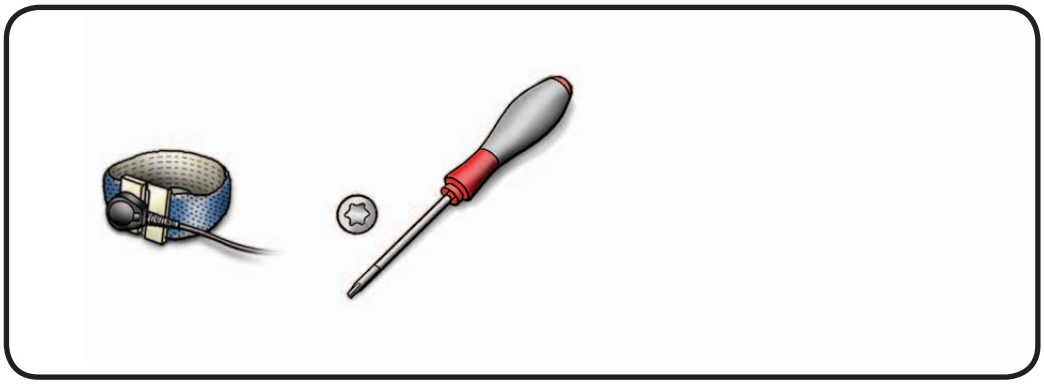
Remove:

- Glass Panel
- LCD Panel



Tools

- ESD wrist strap
- Torx T10 screwdriver
- Torx T8 screwdriver



Removal

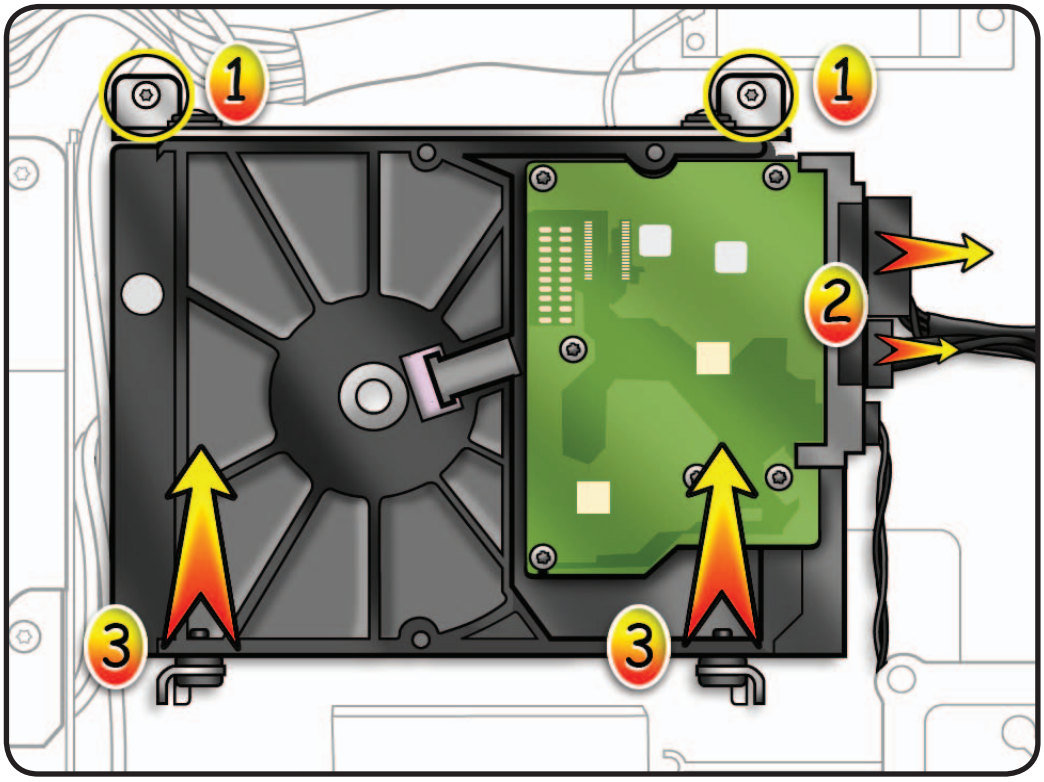
1 Remove T10 screws:
(2) 922-6850



2 Disconnect 2 cables:
- HD power cable
- HD data cable

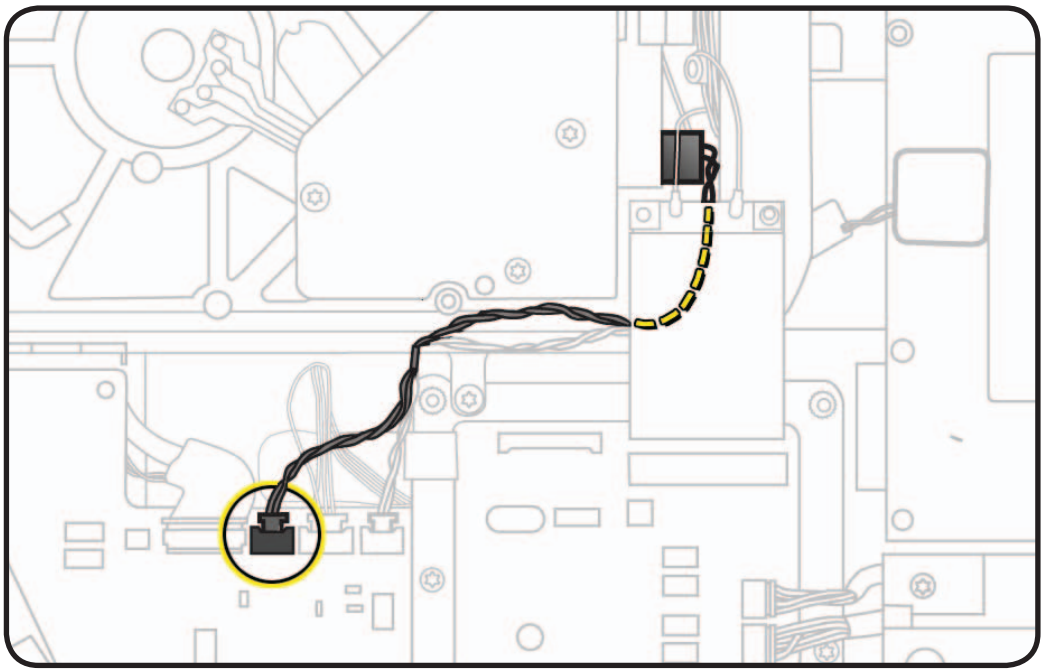
Leave small HD temp sensor cable attached to drive.

3 Slide hard drive up slightly to lift pins out of 2 rubber grommets in mechanism.



4 Disconnect HD sensor cable from top of logic board.

Important: Do not disconnect HD sensor cable from hard drive. Each drive manufacturer has a different type of sensor cable, which is provided with a replacement drive.



Reassembly

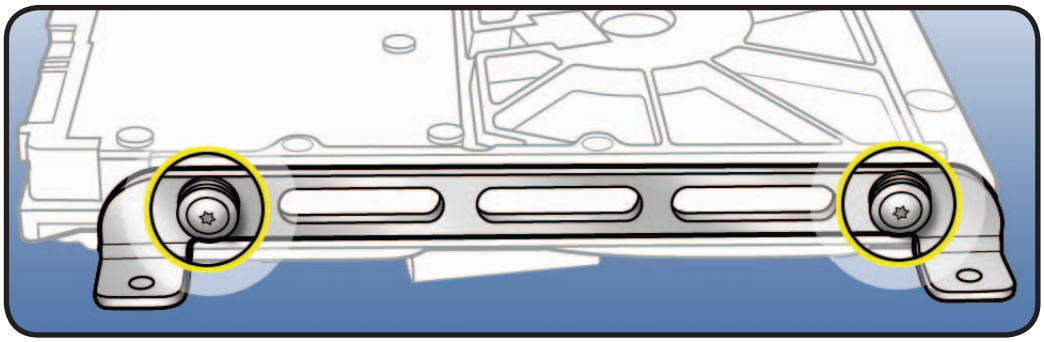
1 **Replacement Note:** If installing a new hard drive, transfer the following:

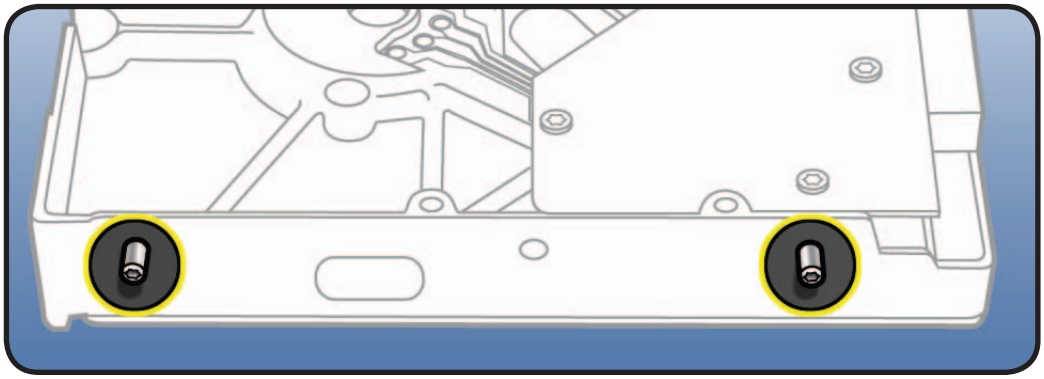
- hard drive bracket
- (2) T8 screws 922-9136



- (2) T8 screw pins 922-7001





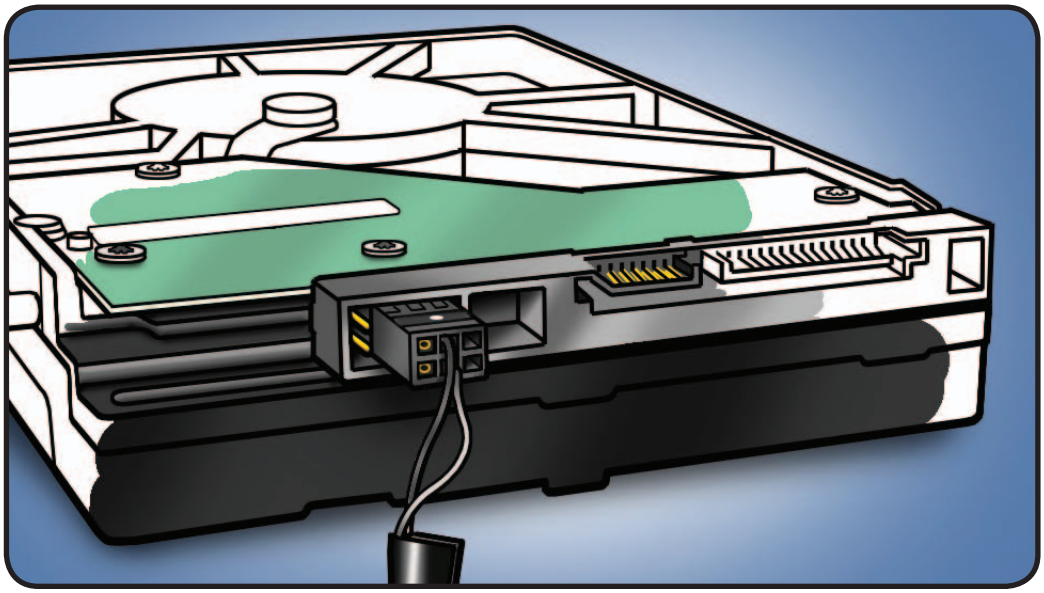


2 **Note:** Each hard drive vendor has a unique sensor cable. Do not mix and match temp sensor cables.

3 **Important:** When installing a Western Digital drive:

- orient drive with circuit board facing up (as shown);
- connect temp sensor cable to hard drive pins as shown, leaving 2 left pins unconnected.

  If sensor cable is installed incorrectly, hard drive fan will run at full speed.



Hard Drive Sensor Cable

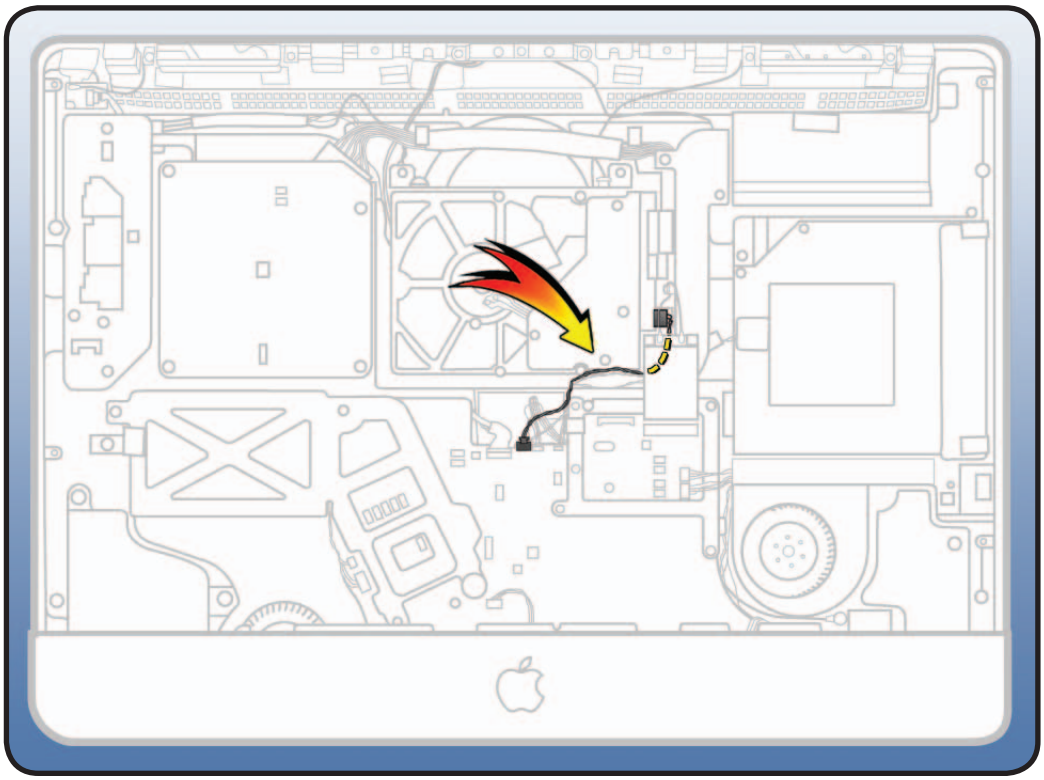
First Steps

Remove:

- Glass Panel
- LCD Panel
- Hard Drive

Note: Each hard drive manufacturer has a different type of sensor cable, which is included with a replacement drive.

If replacing sensor cable only, be sure to order correct cable for drive manufacturer.

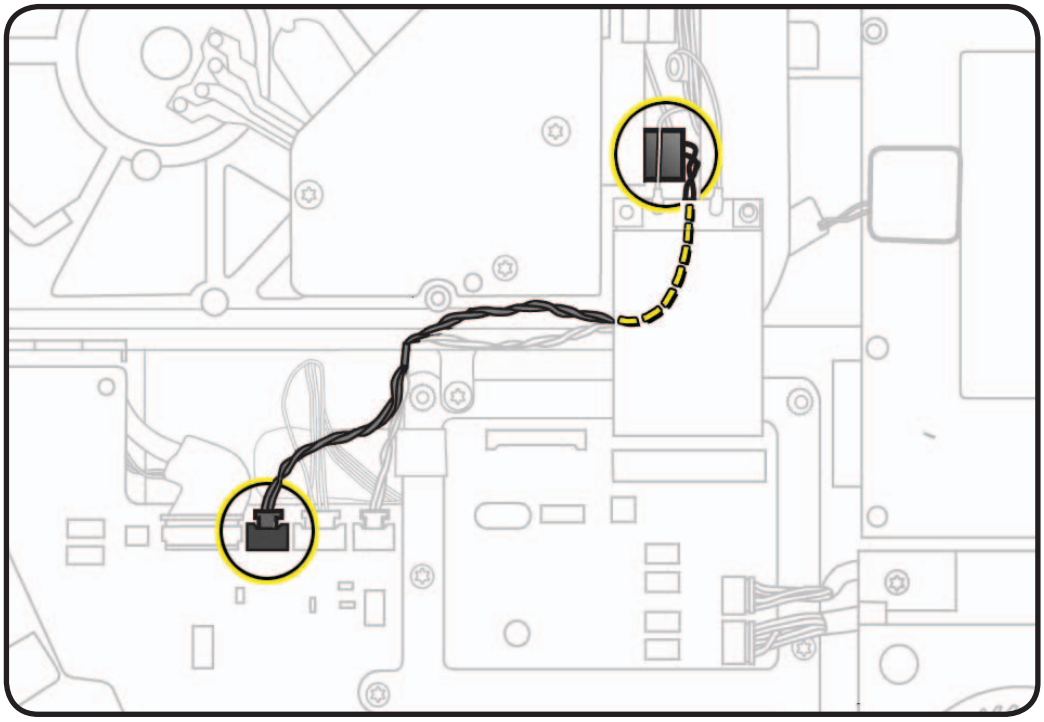


Tools

- ESD wrist strap



Removal

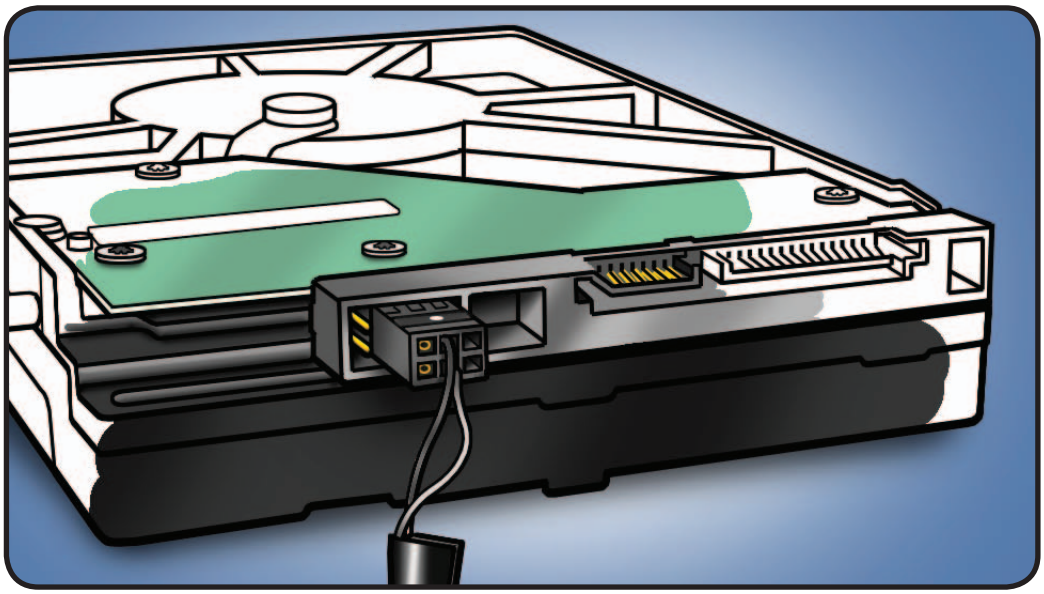


1 Disconnect cable from hard drive and logic board.

Note: Do not reuse temp sensor cable. A new sensor cable is included with each replacement drive.

Each hard drive manufacturer has a unique sensor cable.

Reassembly



1 **Important:** When installing a Western Digital drive:

- orient drive with circuit board facing up (as shown);
- connect temp sensor cable to hard drive pins as shown, leaving 2 left pins unconnected.

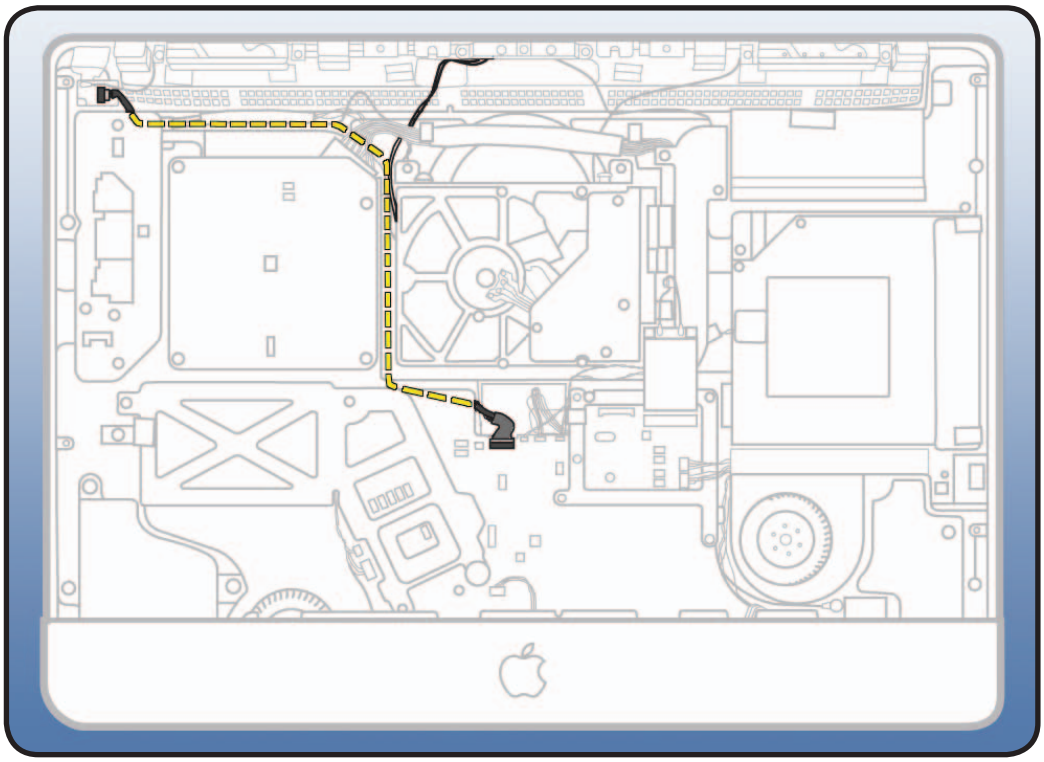
If sensor cable is installed incorrectly, hard drive fan will run at full speed.

Bluetooth/Camera/Sensor Cable

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Power Supply Pressure Wall
- Hard Drive
- Camera



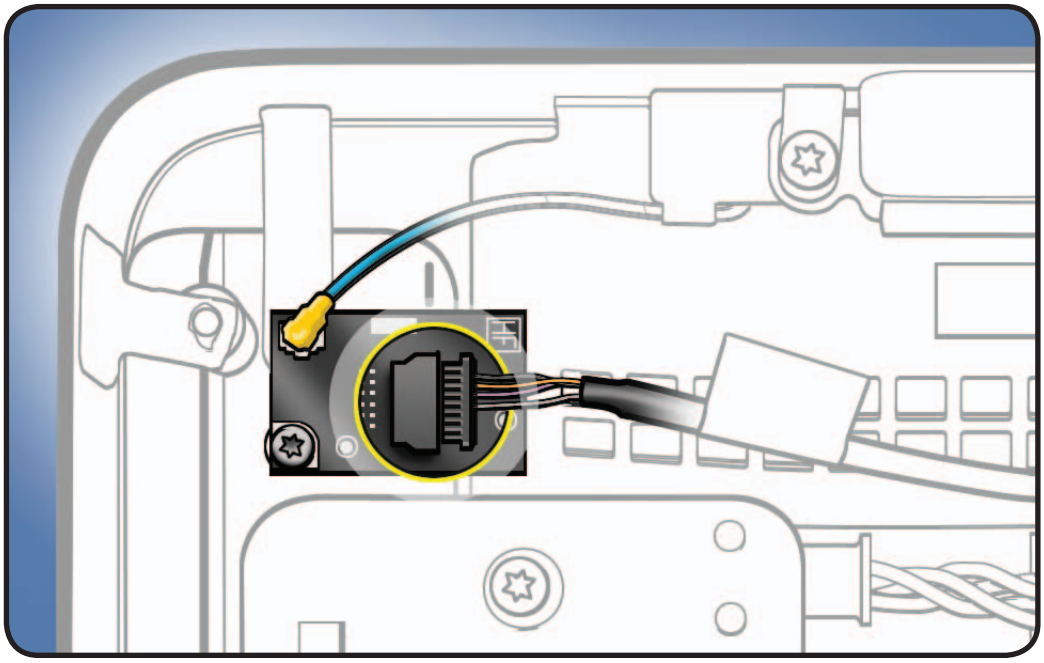
Tools

- ESD wrist strap

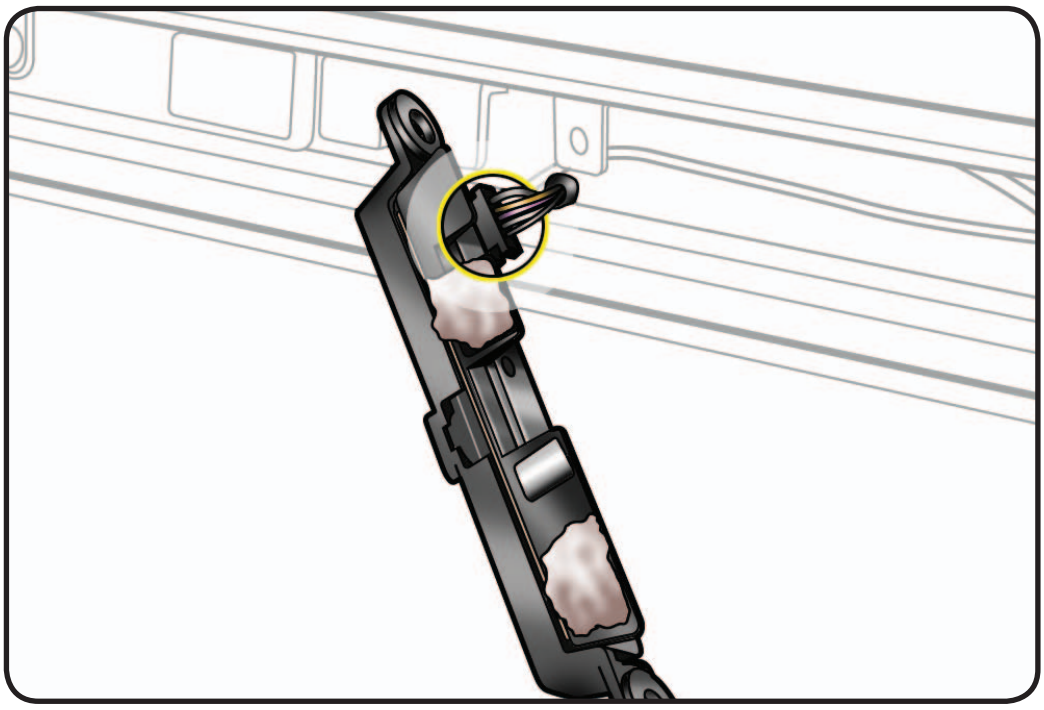


Removal

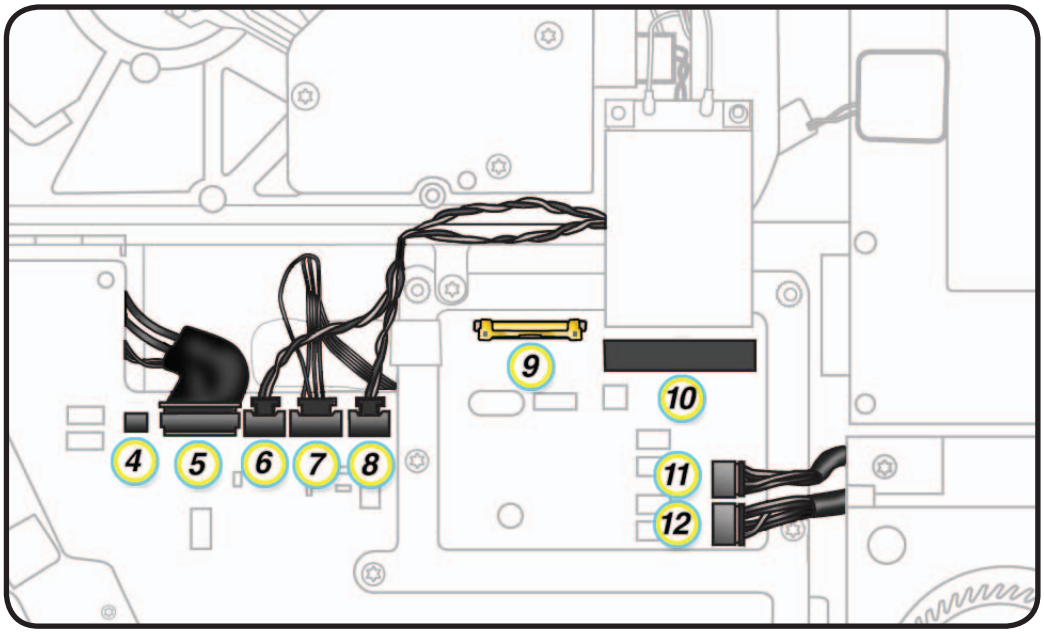
1 Disconnect cable from Bluetooth board.



2 Disconnect cable from camera.

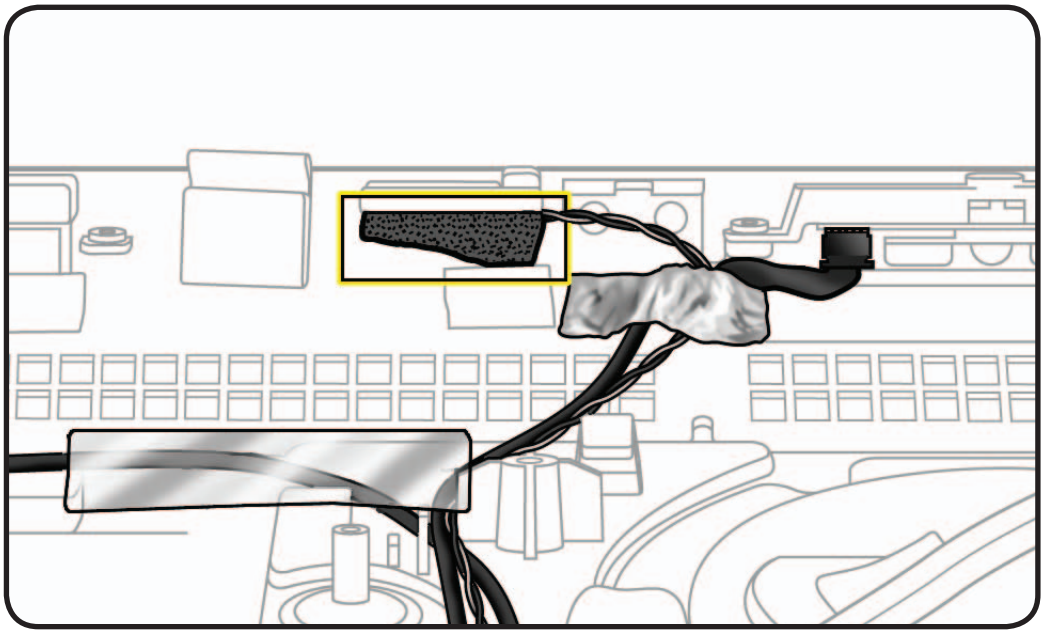


3 Disconnect cable (#5) from top center of logic board.



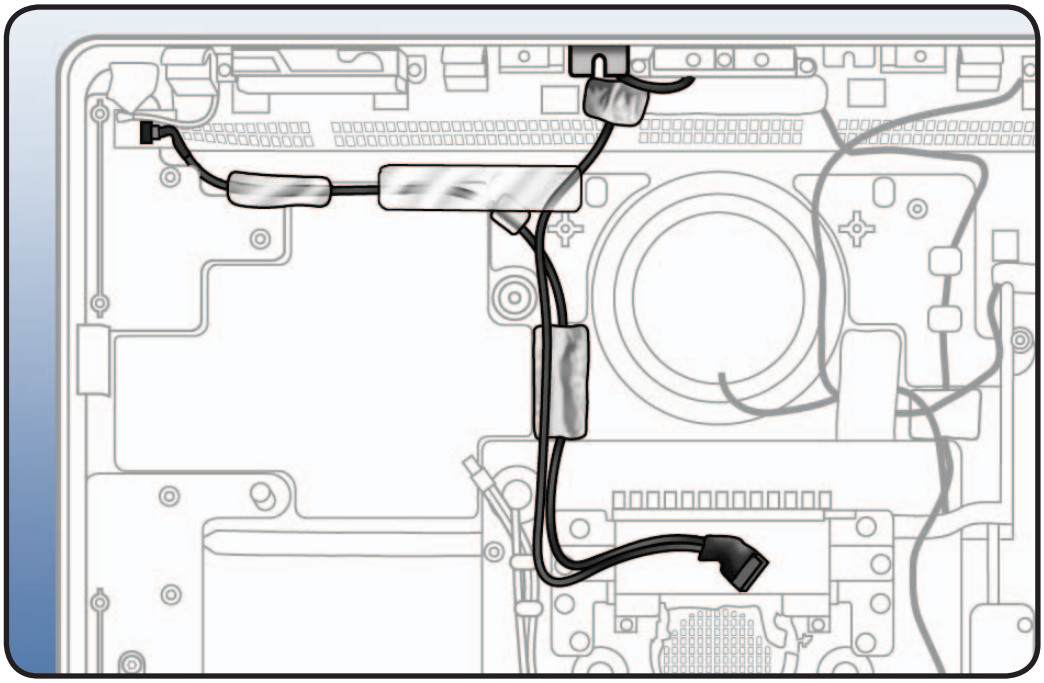
4 Remove gasket securing temp sensor to top inside of rear housing, to left of camera, behind a magnet support.

Reassembly Note: A replacement cable includes a new gasket. Peel & stick to secure temp sensor to top inside of rear housing.



5 Observe cable routing and tape placement for reassembly. Refer to photograph in Internal Views section.

6 Peel up foil tape and clear tape securing cable to rear housing.



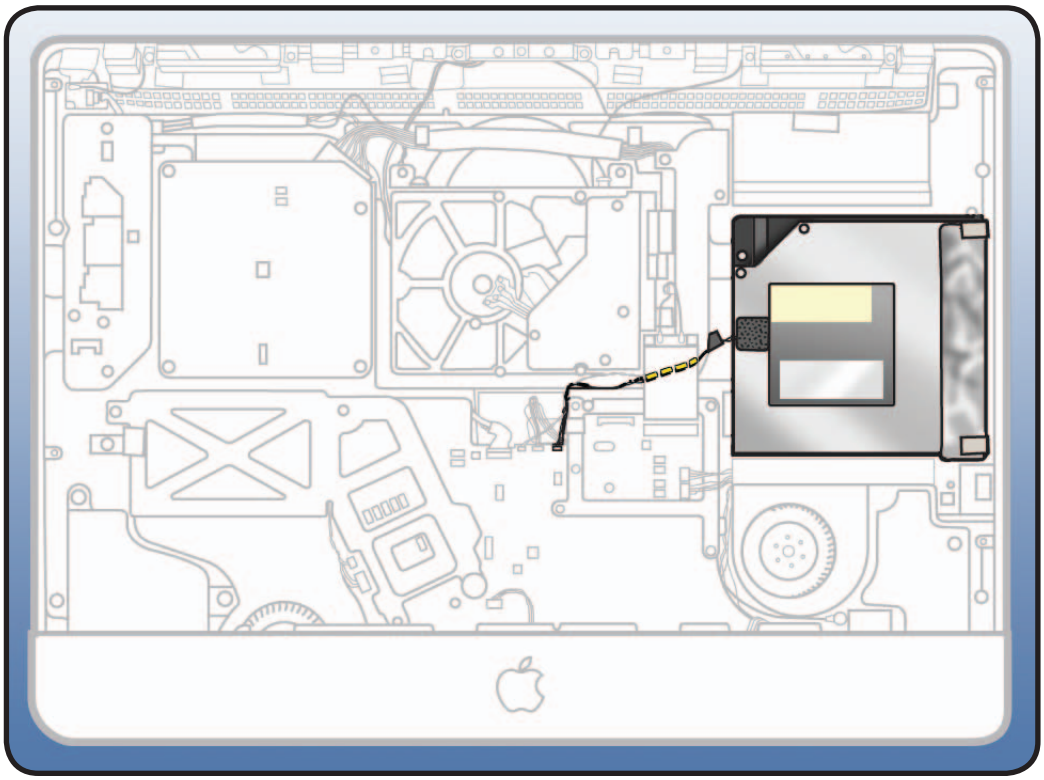
Optical Drive

First Steps

Remove:

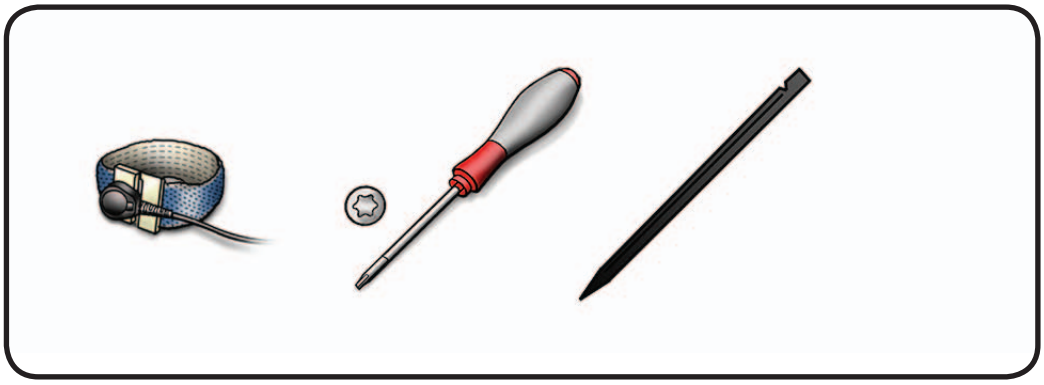
- Glass Panel
- LCD Panel

Important: When servicing optical drive, handle it by edges only. Pressing elsewhere on drive could damage internal mechanism.



Tools

- ESD wrist strap
- Torx T10 screwdriver
- Black stick



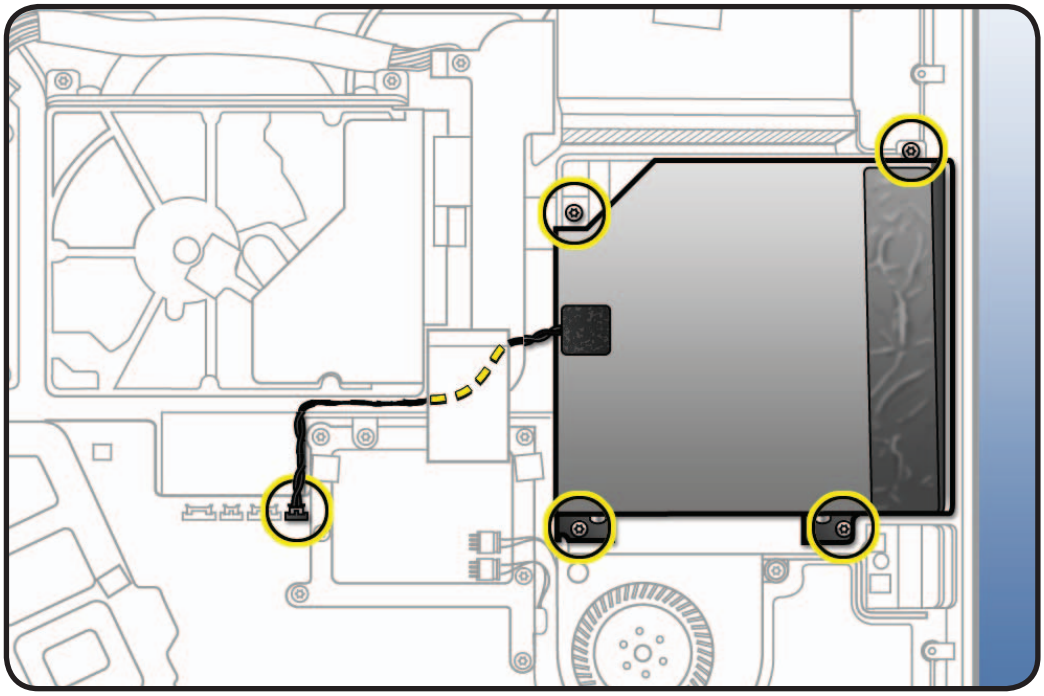
Removal

1 Remove T10 screws:
(4) 922-6850



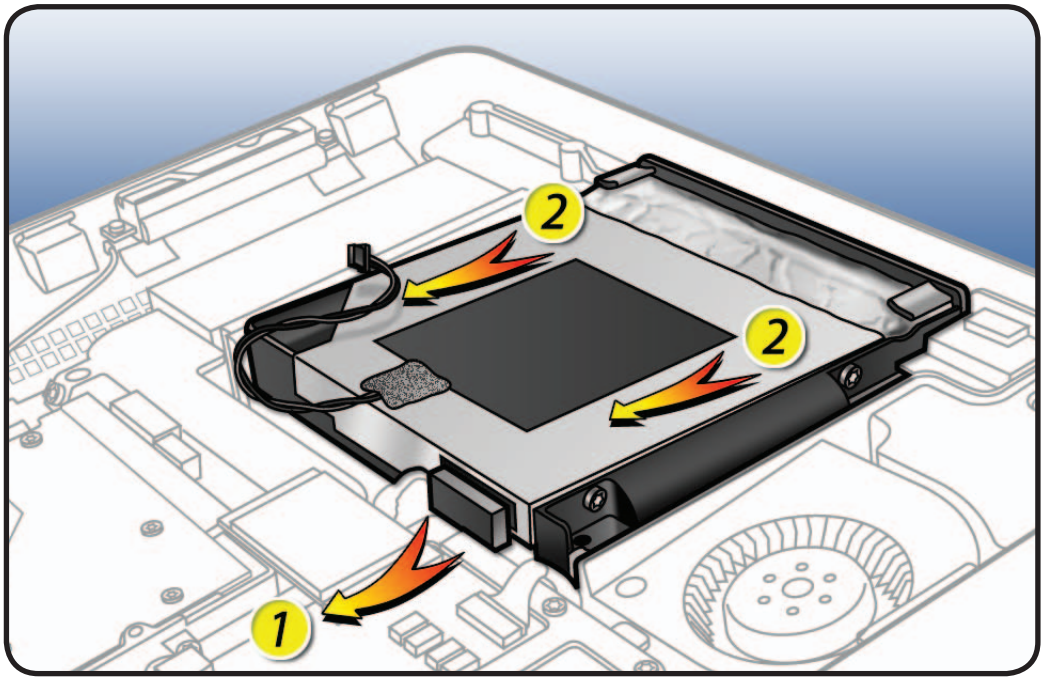
2 Disconnect temp sensor cable from connector on top middle of logic board.

Note: No need to remove sensor cable from optical drive. A replacement drive will include a new sensor cable.



3 Lift optical drive slightly and wiggle data cable away from optical drive. A black stick may be helpful.

4 Pull optical drive away from slot opening in rear housing.



Replacement Note: A new optical drive includes the bezel. Do not remove or transfer the bezel.

Reassembly Note: Reinstall drive and insert optical media to check that drive is correctly aligned with rear housing.

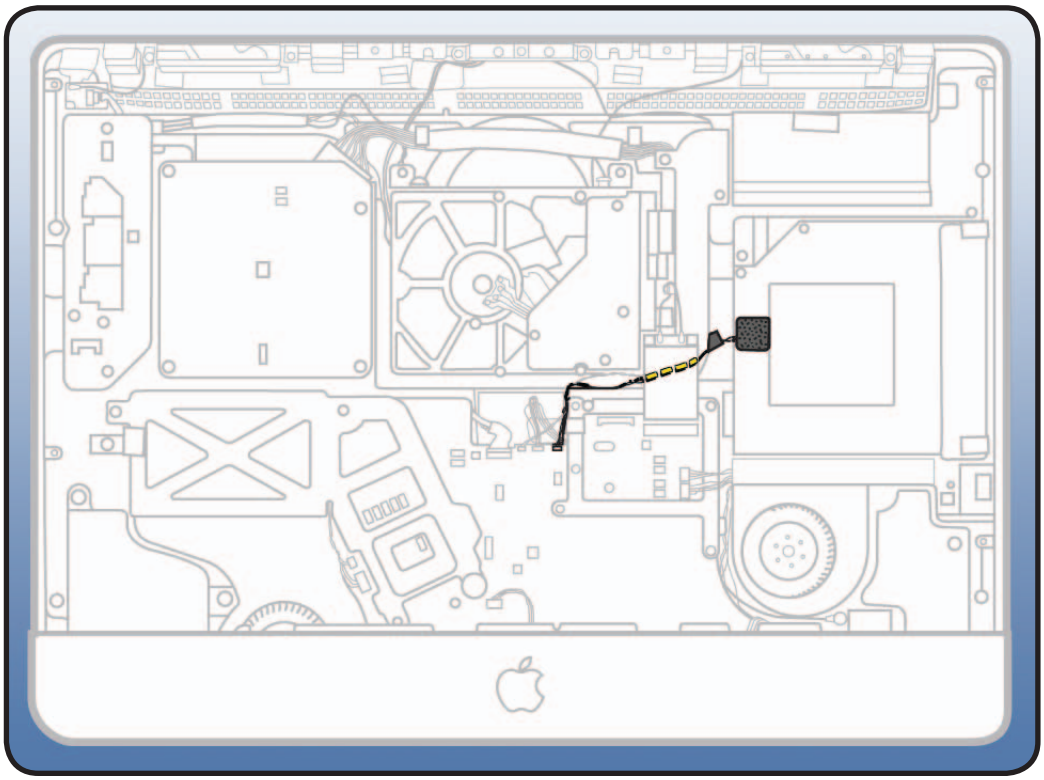
Optical Drive Sensor Cable

First Steps

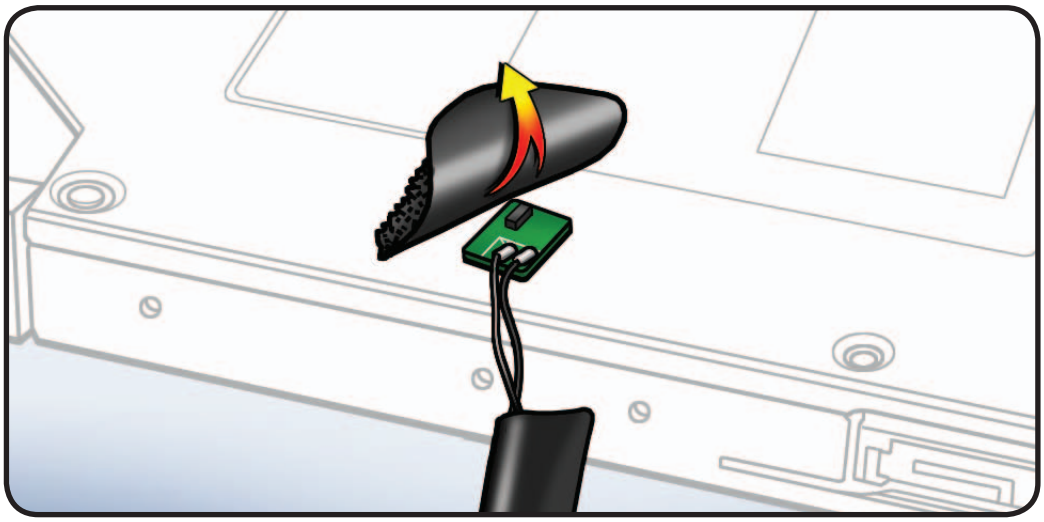
Remove:

- Glass Panel
- LCD Panel

Note: A new optical drive includes a new sensor cable. This procedure is only used when replacing just the sensor cable.



Removal



1 Peel back foam gasket and remove sensor from optical drive.

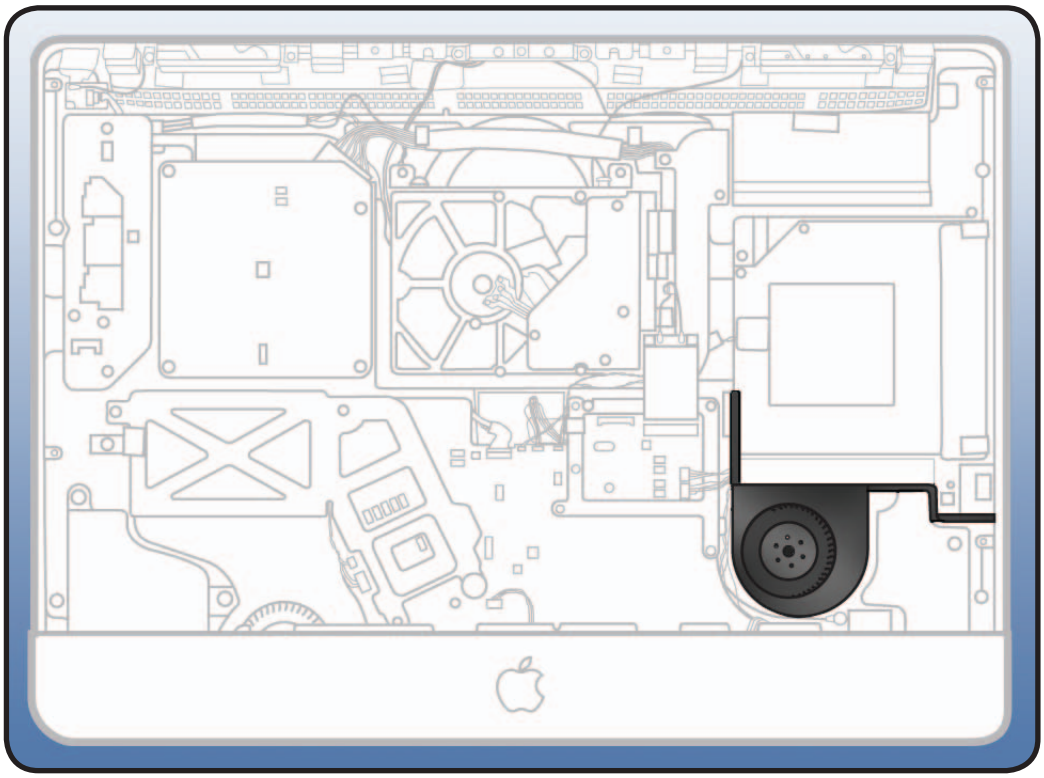
Replacement Note: Peel and stick new sensor and fully cover with gasket to isolate sensor from internal air temperature.

Optical Drive Fan

First Steps

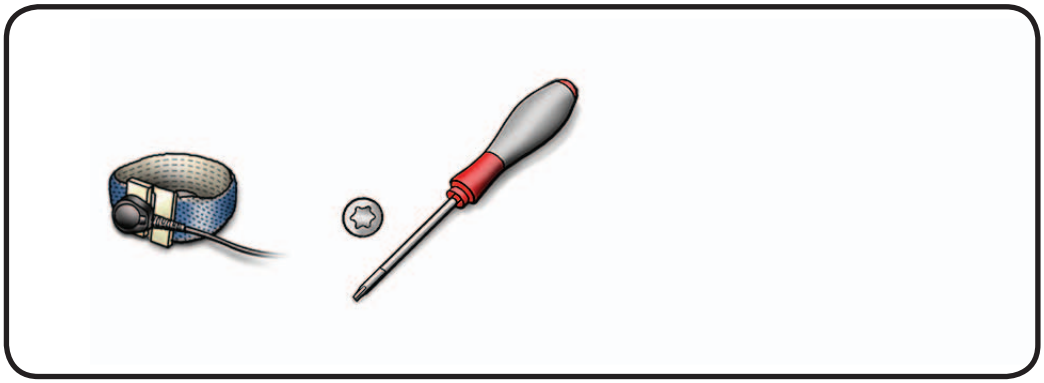
Remove:

- Glass Panel
- LCD Panel
- Optical Drive



Tools

- ESD wrist strap
- Torx T10 screwdriver

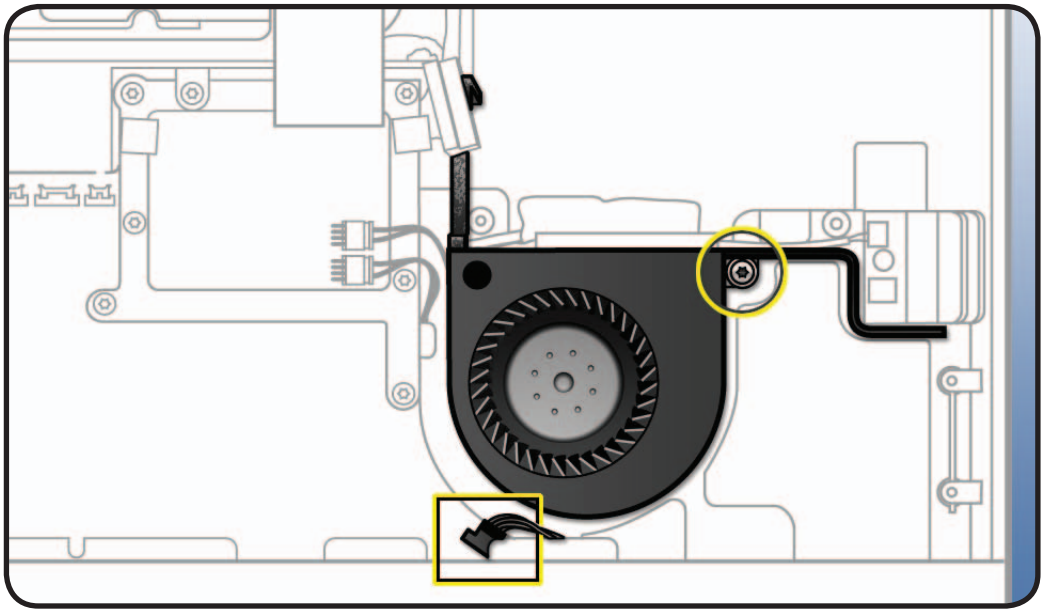


Removal

1 Remove T10 screw:
(1) 922-9236



2 Lift fan up off 2 guide posts in rear housing and disconnect cable from logic board.



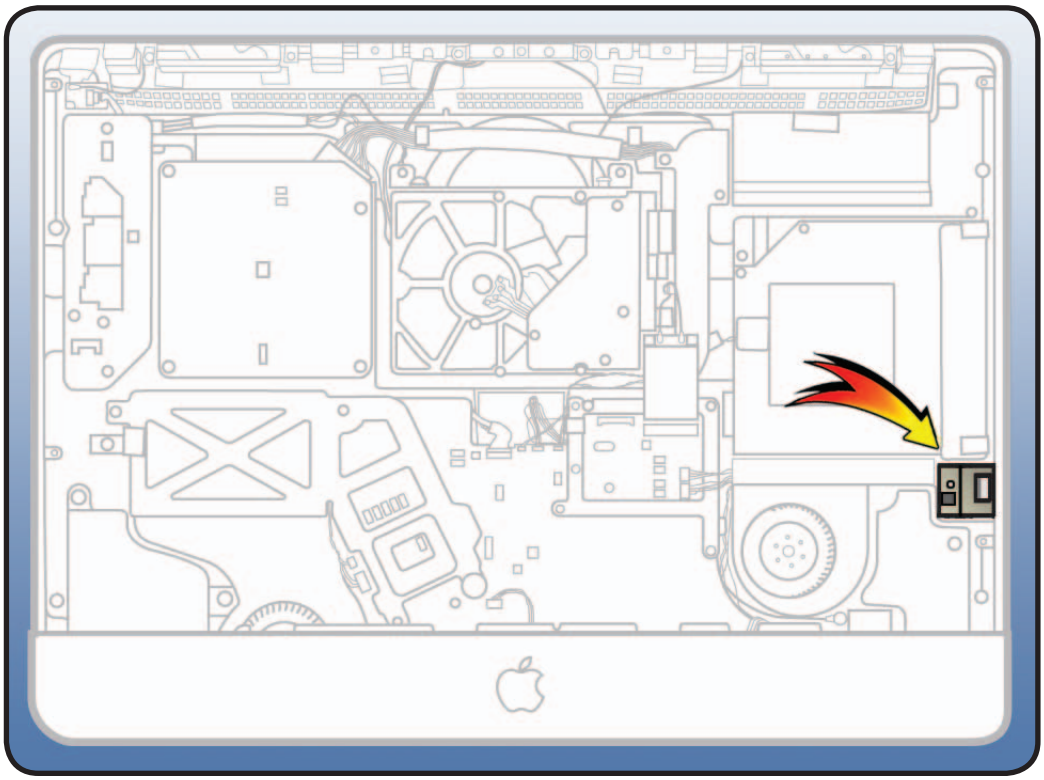
SD Card Reader

First Steps

Remove:

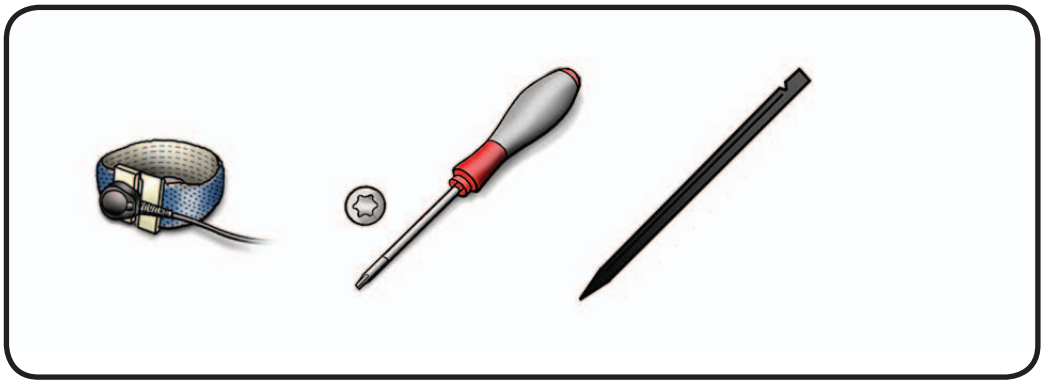
- Glass Panel
- LCD Panel

Important: The SD card reader must be replaced like-for-like, with an SD card reader that has the same EEE code.



Tools

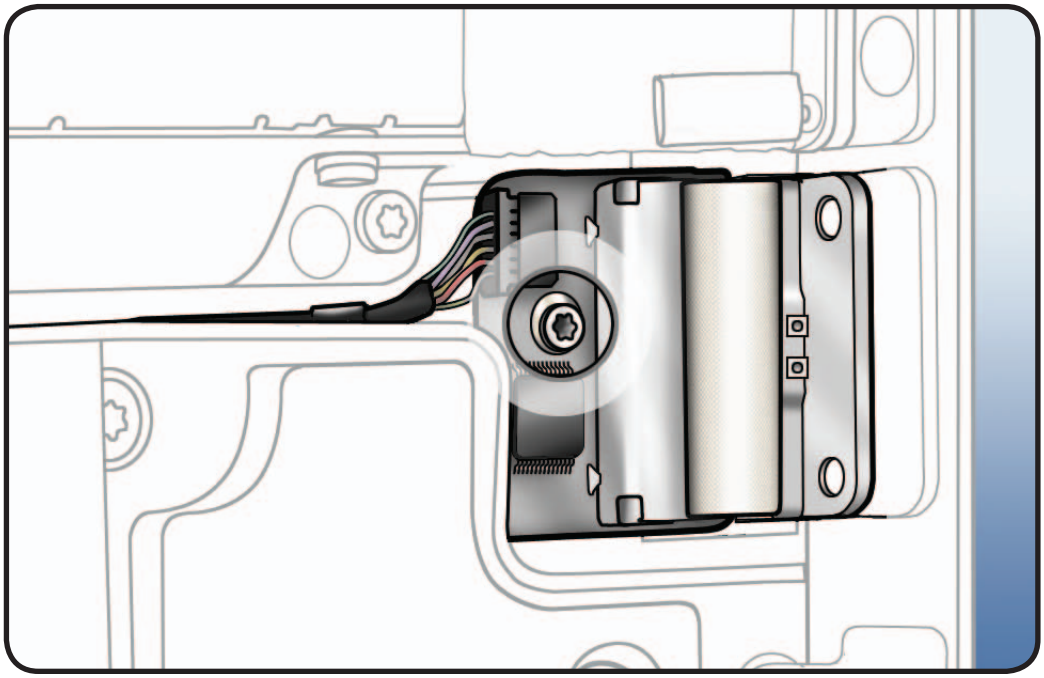
- ESD wrist strap
- Torx T8 screwdriver
- Black stick



Removal

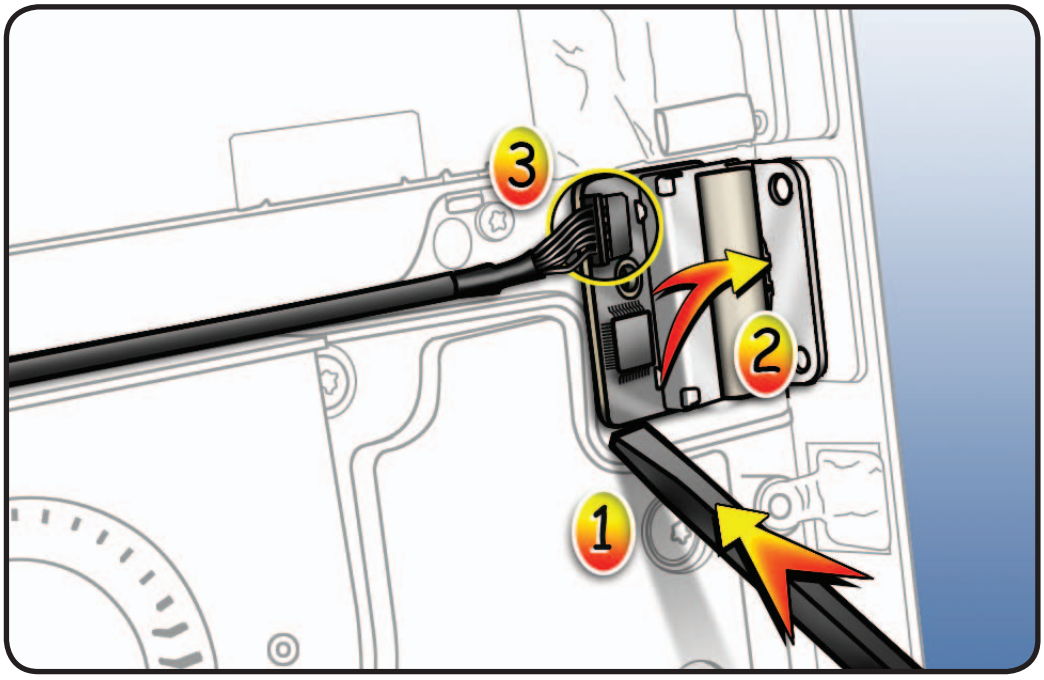
1 Remove T8 screw:
(1) 922-9241





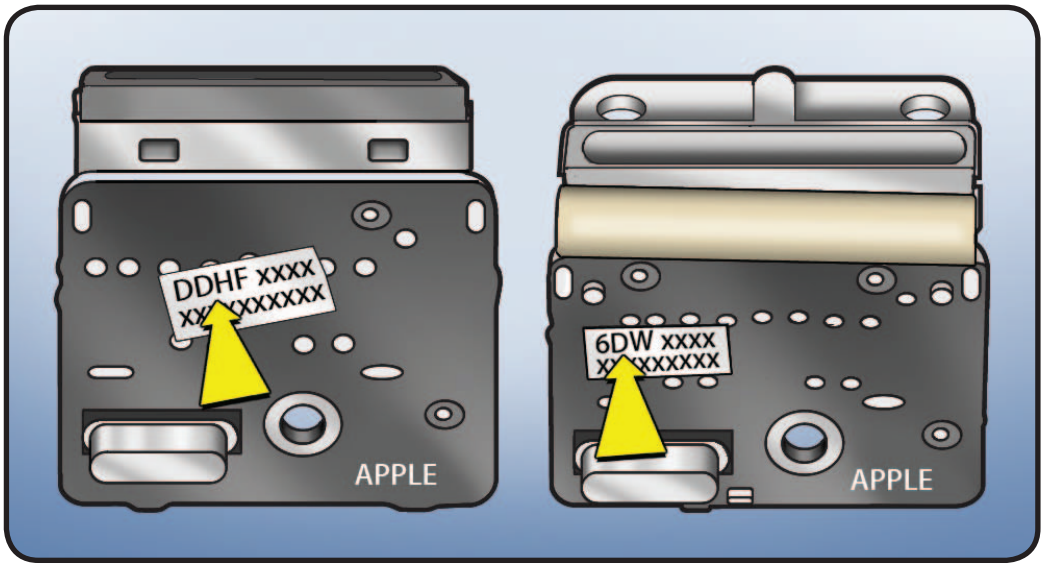
2 Using a black stick, gently pry SD card reader up and out of rear housing.

3 Disconnect cable.



Replacement Note:
The SD card reader must be replaced like-for-like, with an SD card reader that has the same EEE code.

- Look at sticker on underside of old SD card reader. The EEE code will read DDHF or 6DW.
- Compare old SD card reader to both parts in the kit and use the new SD card reader with matching EEE code.



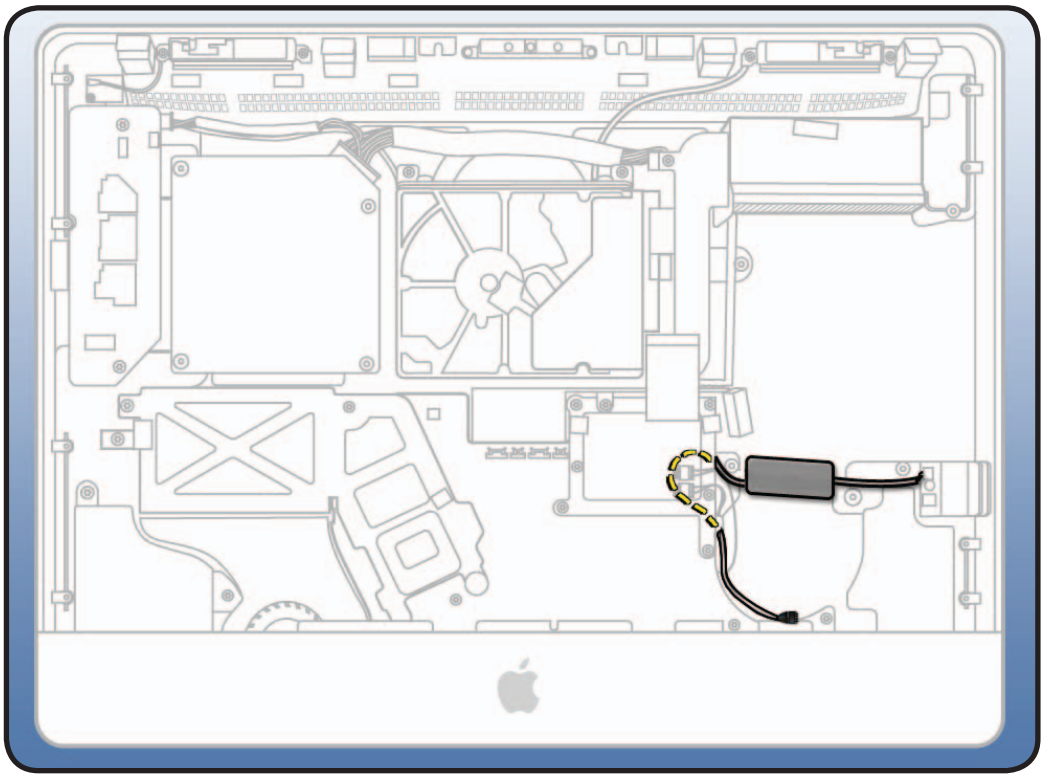
SD Card Reader Cable

First Steps

Remove:

- Glass Panel
- LCD Panel
- Optical Drive
- Optical Drive Fan

Note: The SD card reader and cable are also part of the rear housing. A new rear housing includes a new SD card reader and cable.



Tools

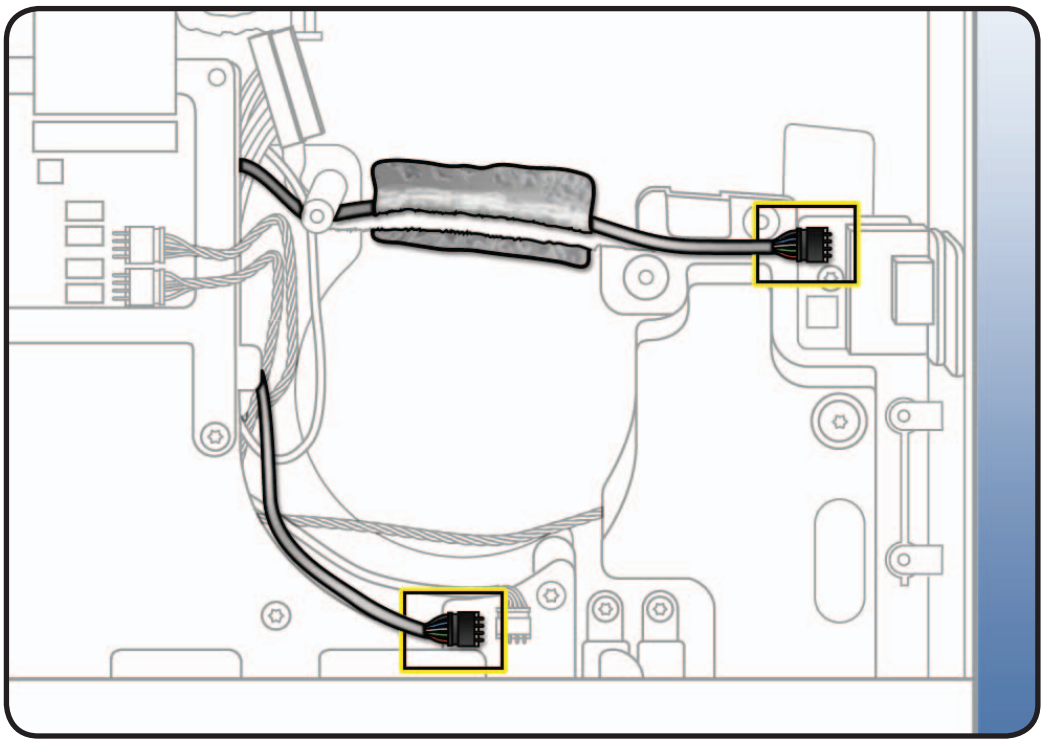
- ESD wrist strap



Removal

1 Disconnect cable from SD card reader and logic board.

2 Peel up foil holding cable to rear housing.



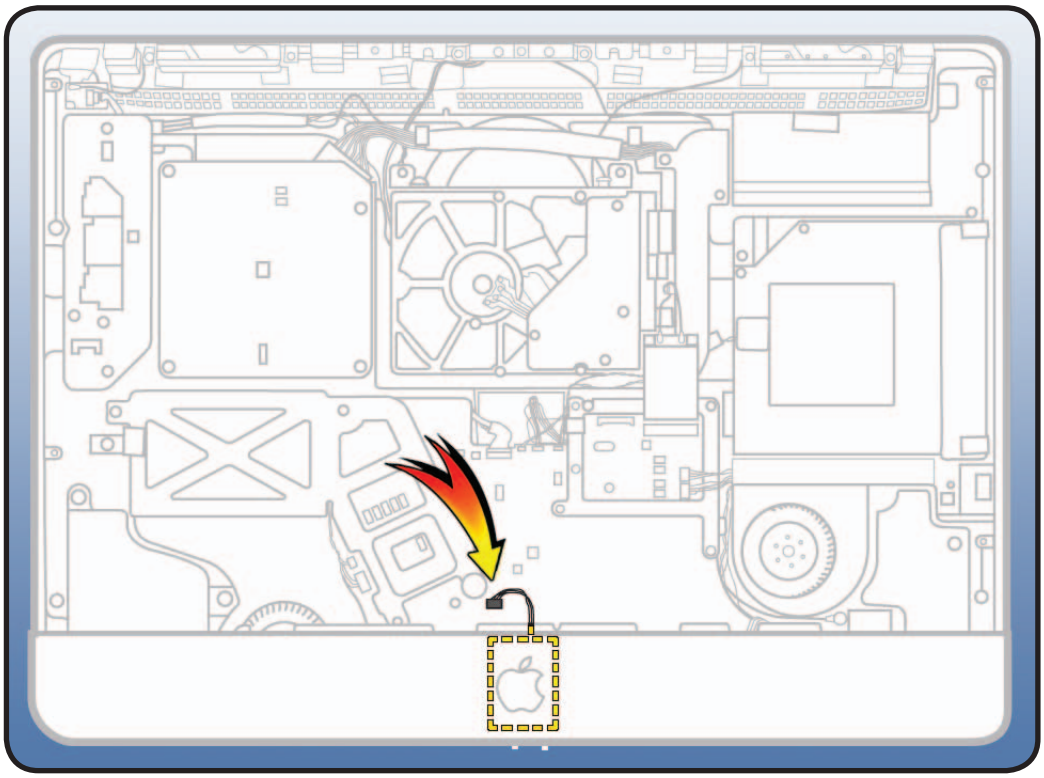
IR Board & Cable

First Steps

Remove:

- Glass Panel
- LCD Panel

Note: A new IR board includes a new cable. The cable is not available as a separate part.



Tools

- ESD wrist strap

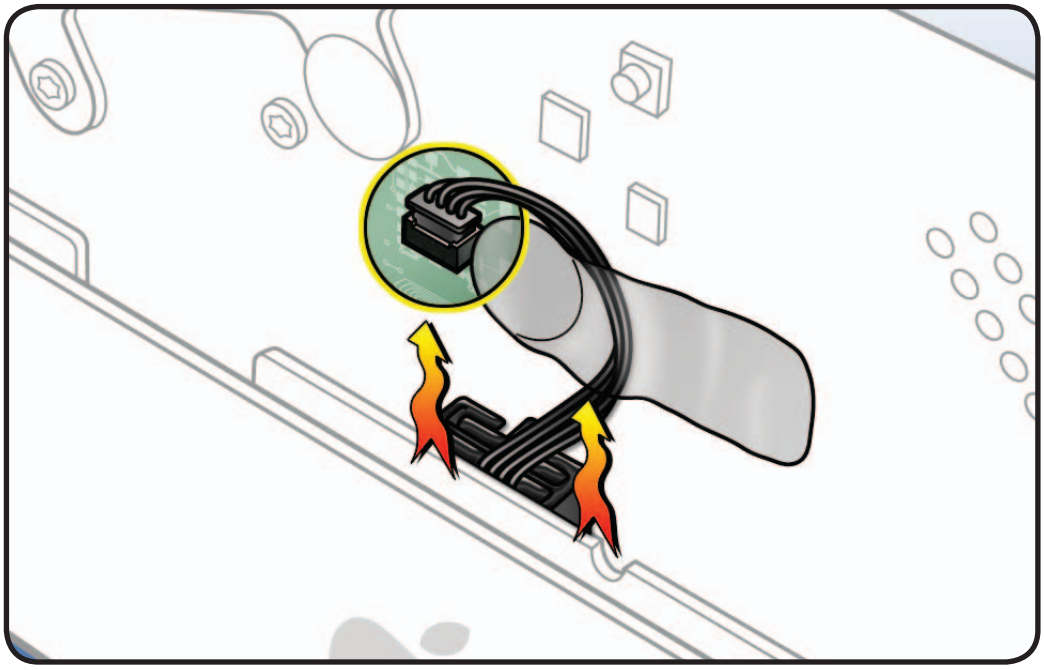


Removal

1 Disconnect IR cable from logic board.

2 With 2 fingers, wiggle IR mounting bracket up and off mounting post.

Reassembly Note:
Pull the front housing out slightly to make room for IR mounting bracket to slide onto IR mounting post.



Logic Board

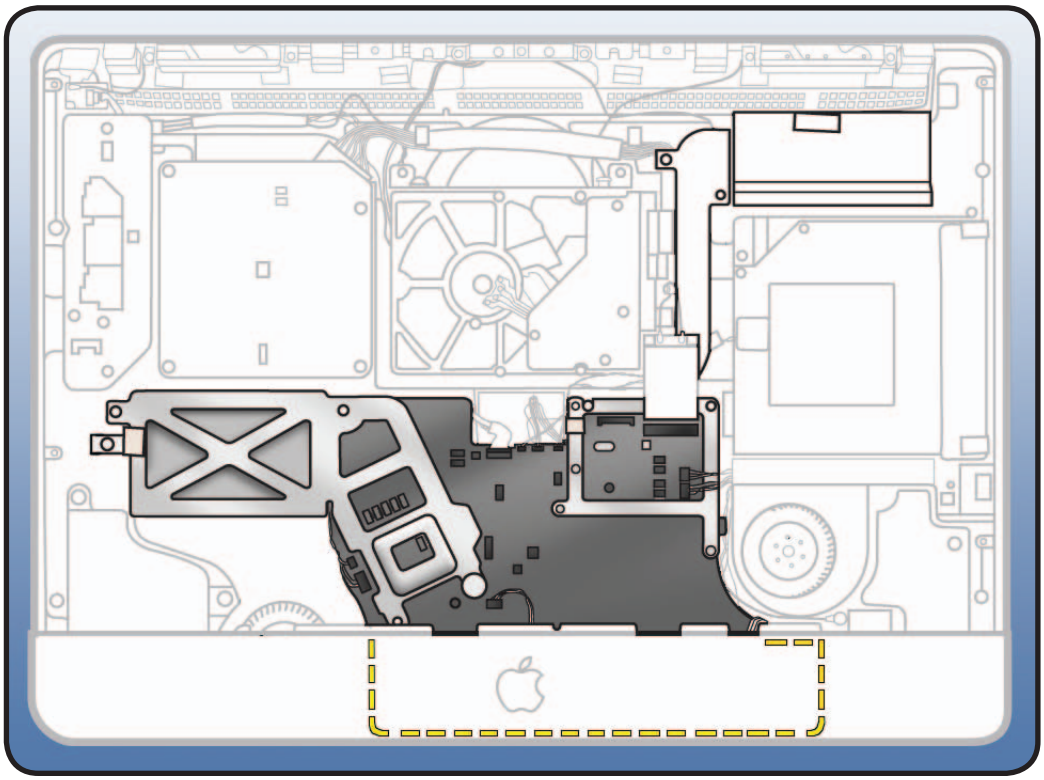
First Steps

Remove:

- Access Door
- Memory

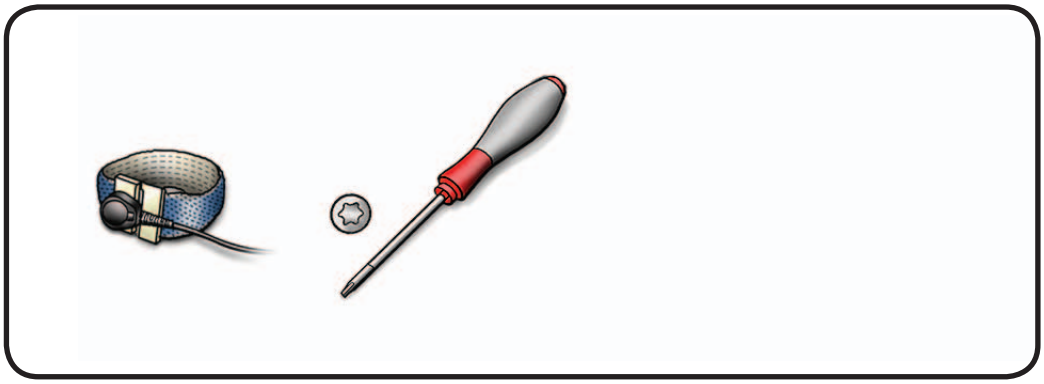
Tip: The logic board is much easier to reinstall if memory is removed.

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card



Tools

- ESD wrist strap
- Torx T10 screwdriver



Removal

1 Remove T10 screws:

- (2) 922-6800, short (S)



- (2) 922-9237, medium 20mm (M)

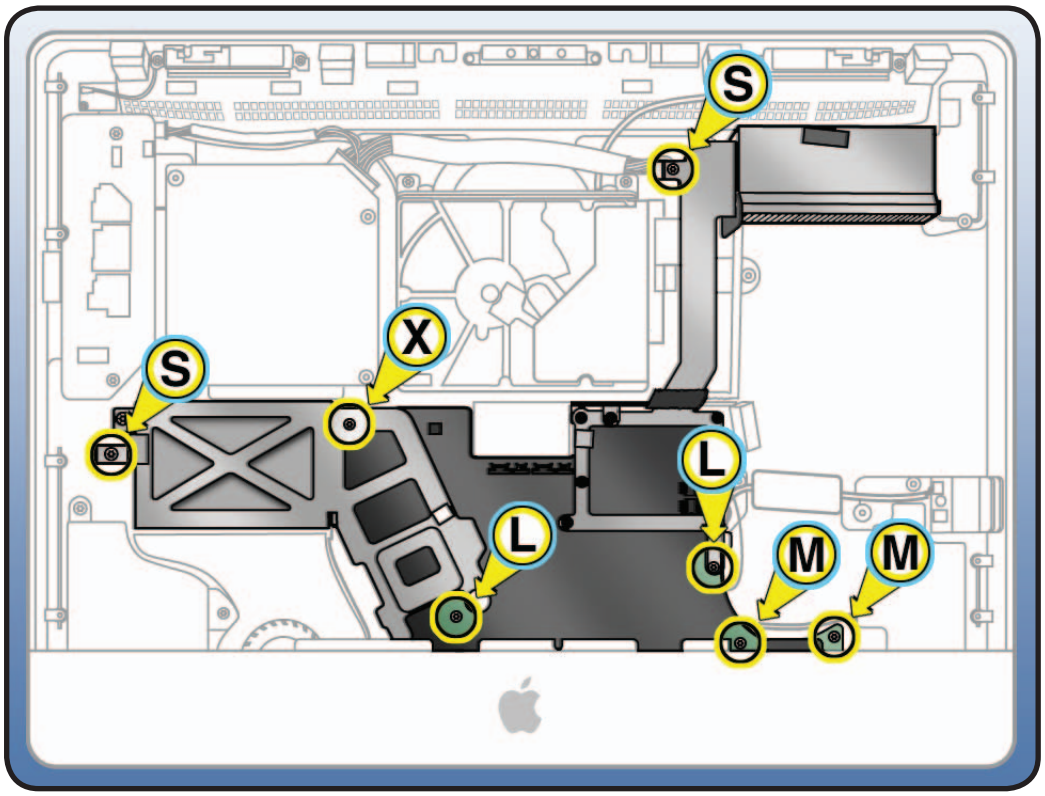


- (2) 922-9243, long 24mm (L)



- (1) 922-9594, extra long 29mm (X)

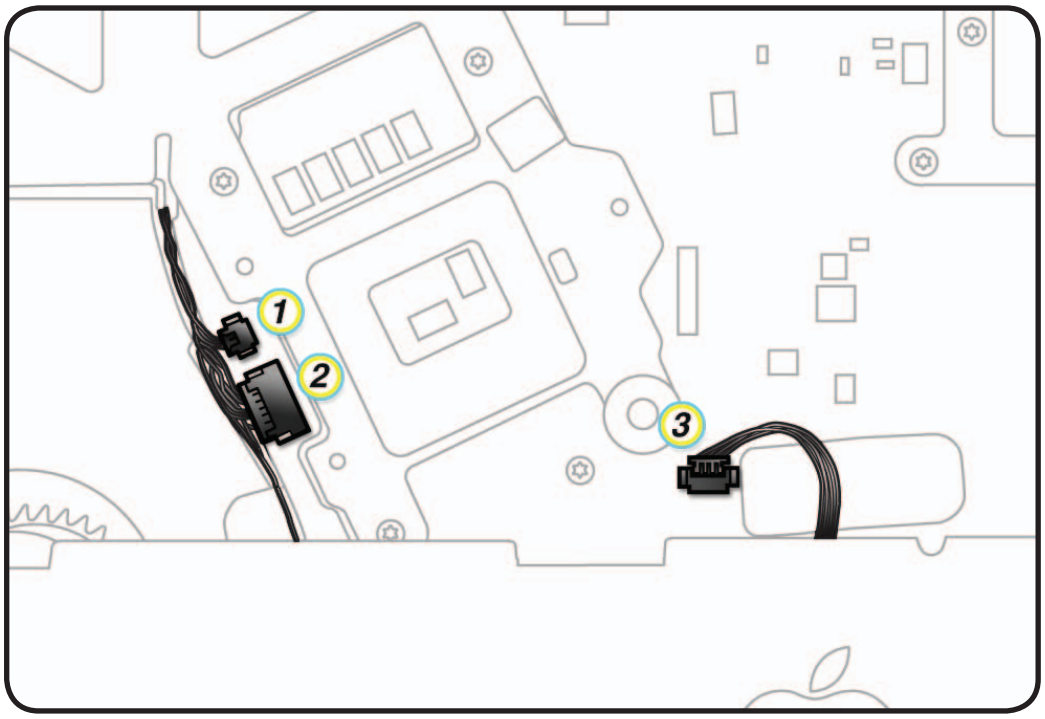




2 Disconnect cables from left side of logic board:

- power button (1)
- CPU fan (2)

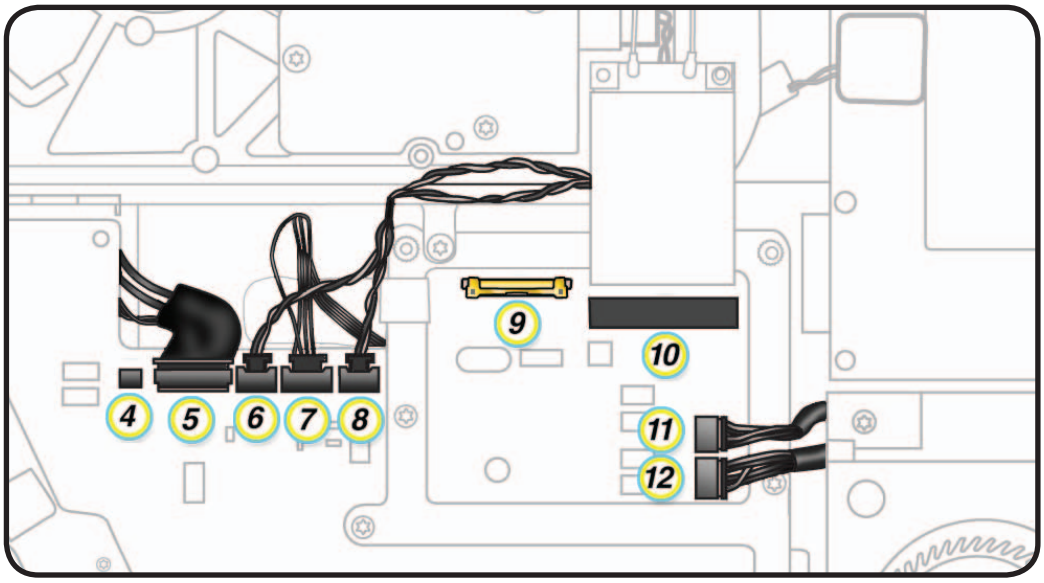
Note: IR cable (3) should have already been disconnected.



3 Disconnect cables from top center of logic board:

- camera/Bluetooth/ sensor (5)
- hard drive sensor (6)
- hard drive fan (7)
- right speaker (11)
- left speaker (12)

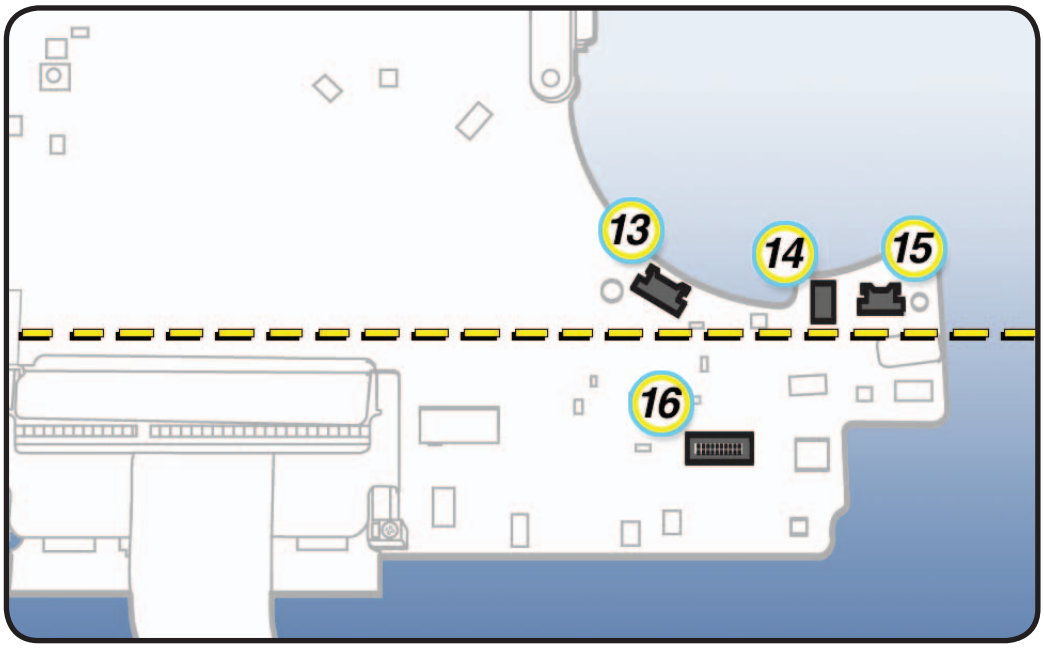
Note: LCD temp sensor (4), optical drive sensor (8), DisplayPort (9) cables and AirPort card (10) should have already been disconnected.



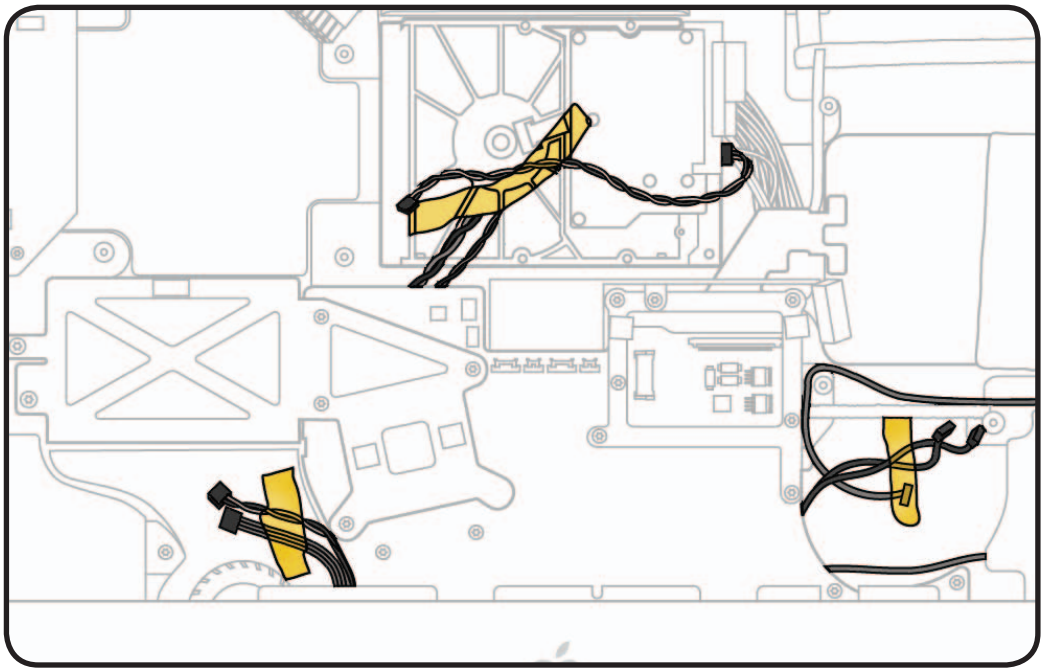
4 Disconnect SD card reader cable (14) and microphone (15) from right side of logic board:

Note: Optical drive fan cable (13) should have already been disconnected.

Note: Audio cable (16) connects below the aluminum chin and won't be accessible until logic board is lifted out of rear housing.



5 Tape cables back so they do not get trapped under logic board during reassembly.

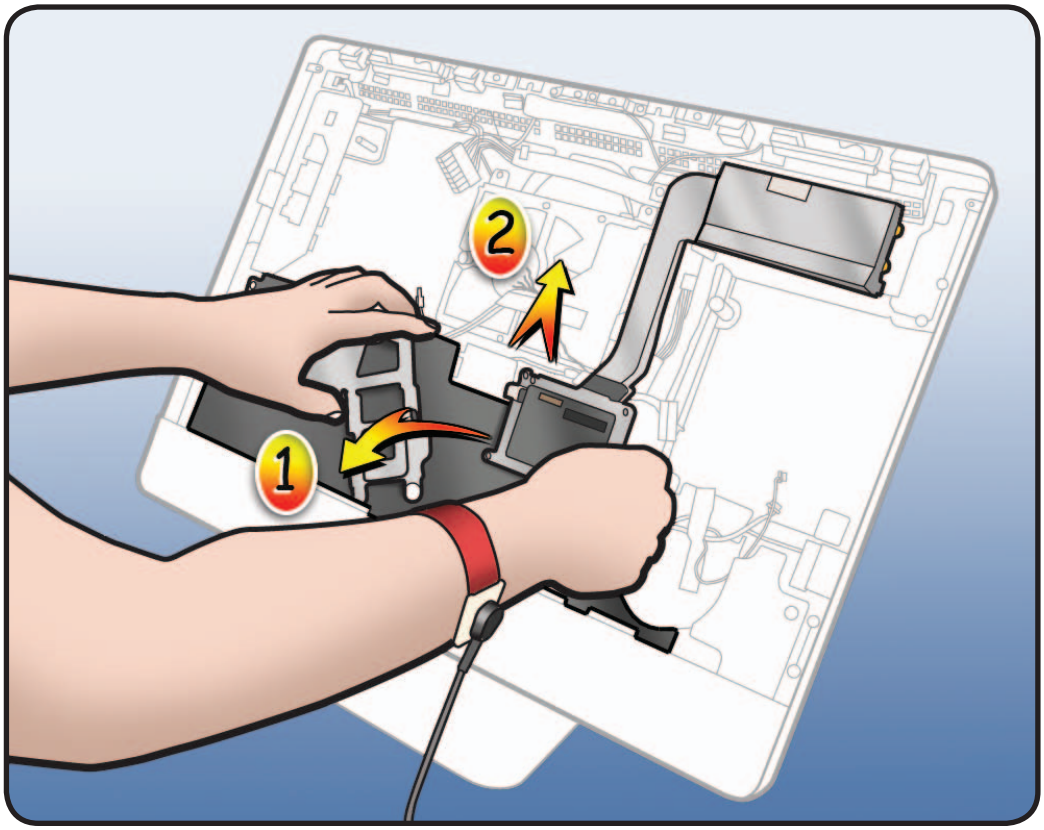


6 Lift logic board up and out of rear housing.

Careful! There are several cables that still need to be disconnected from front and back sides of logic board as it is removed from rear housing. See steps on next 2 pages.

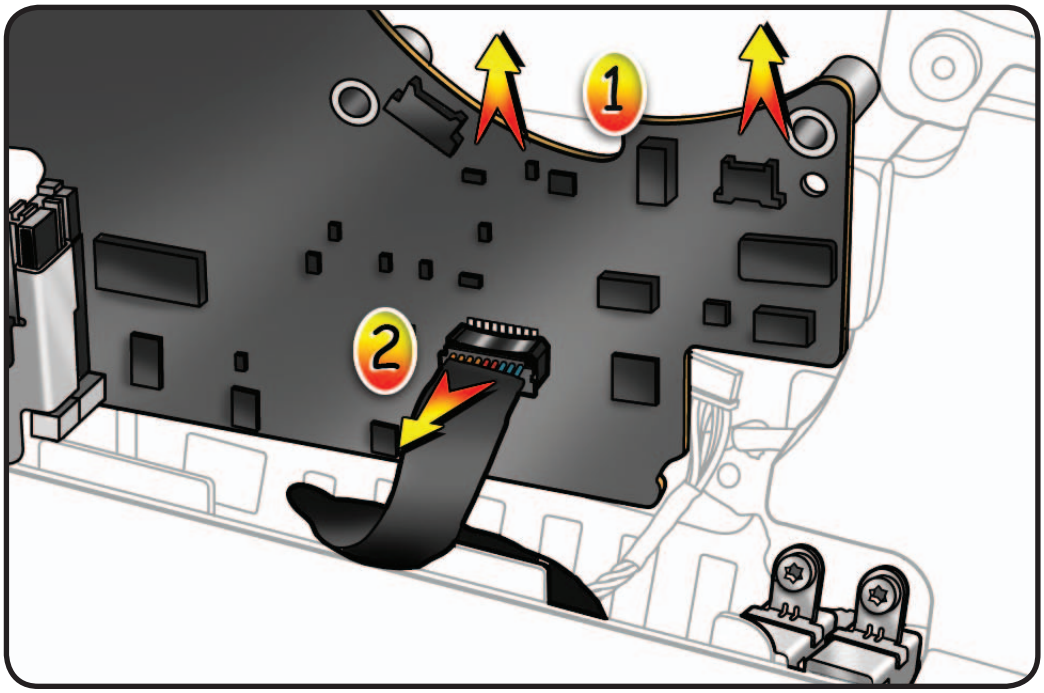
Reassembly Note:
To help properly align logic board into rear housing:

- Push up gently with your thumb on lower edge of video card heatsink.
- Plug in USB, Ethernet, and/or Mini DisplayPort cables as you tighten screws.

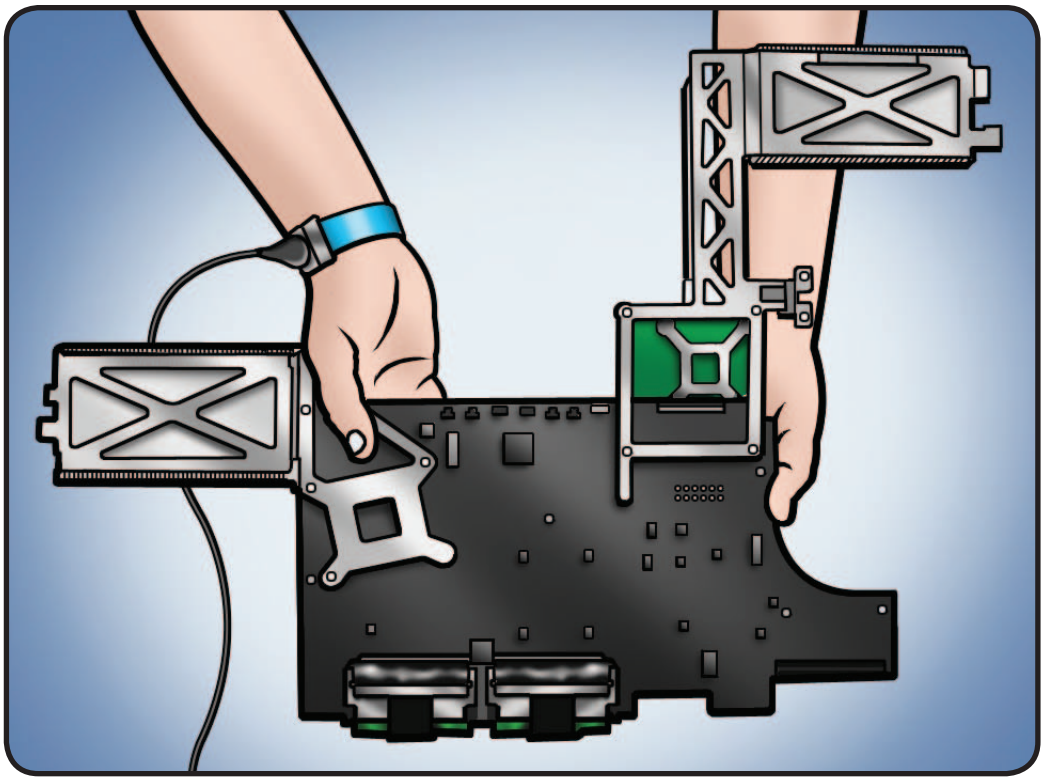


7 While lifting logic board, disconnect audio cable.

Reassembly Note:
Be sure to reconnect the audio cable prior to reseating logic board into rear housing.

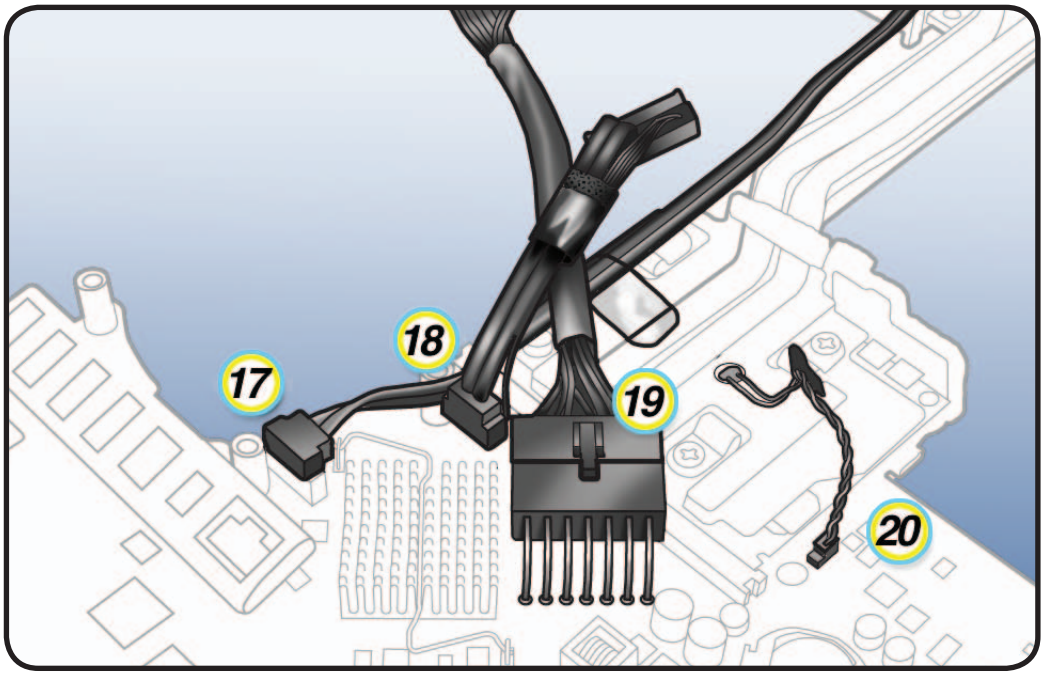


Important: Always use 2 hands to support logic board and heatsink. Handling board incorrectly could flex board and damage chips and circuits. **Never** handle board by heatsink or metal frame.



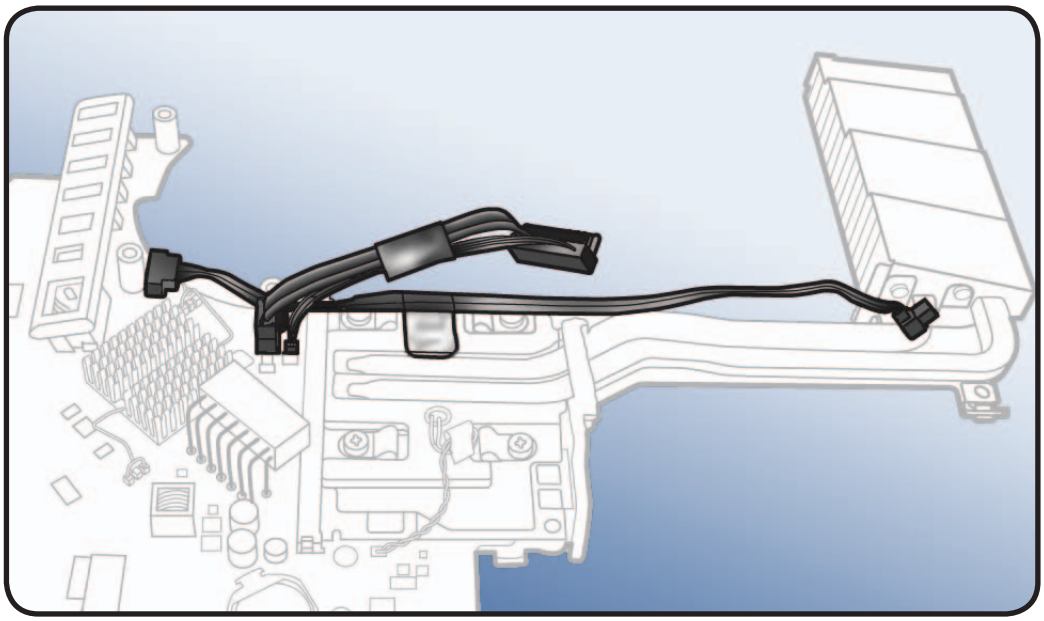
8 On back side of logic board, disconnect hard drive data cable (17), optical drive data cable (18, has 2 cable ends), and DC power cable (19).

Note: Video card cable (20) only needs to be disconnected if you are replacing or transferring the video card.



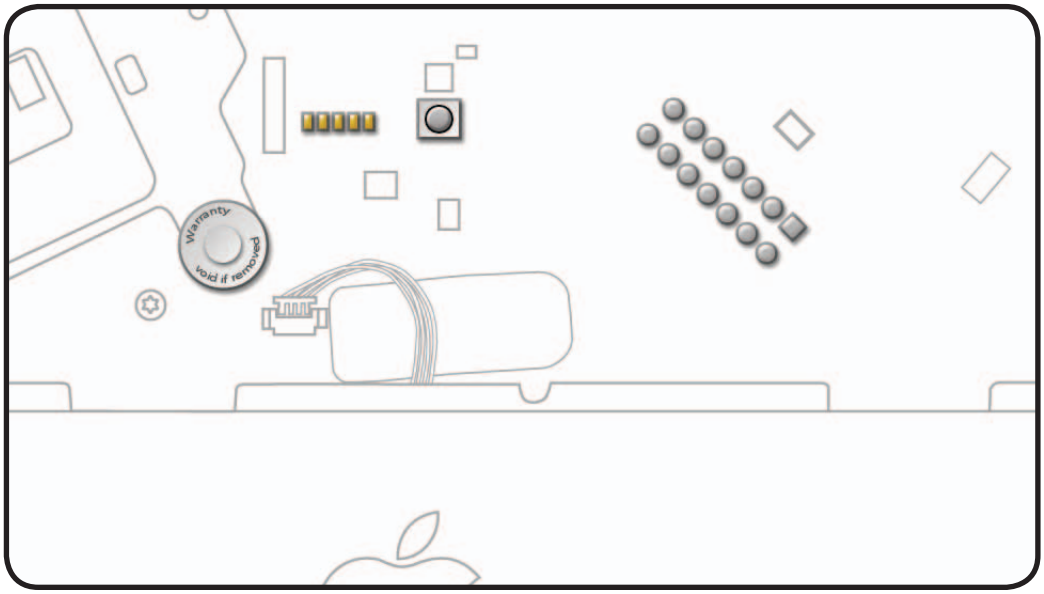
Reassembly Note: Observe how hard drive data cable routes between screw standoff and optical drive data cable connector on logic board.

Reapply clear tape to secure hard drive data cable to video card as shown.



Replacement

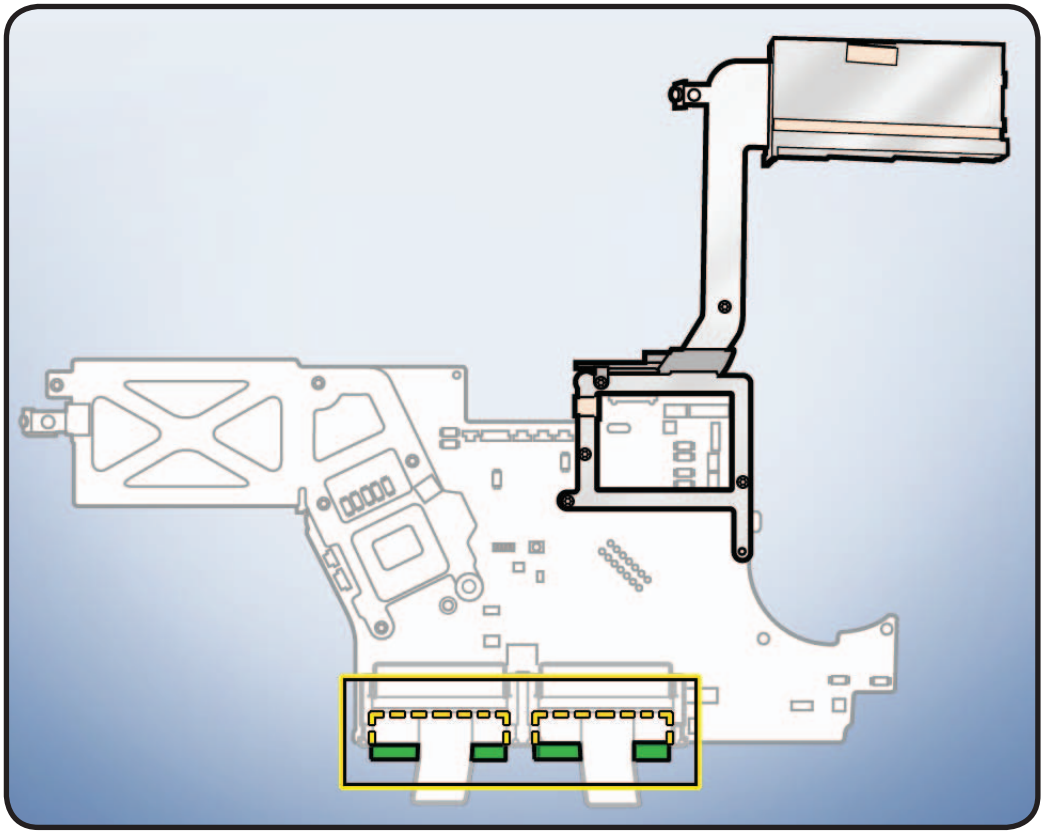
If installing a new replacement logic board, note 4 things:



1 Verify that tamper indicator labels on front and back of heatsink assembly are intact. If labels have been removed or tampered with, logic board is not eligible for exchange.

2 Transfer the following to new logic board:

- memory (install after logic board is in place)
- video card
- video card bracket
- small video card pressure wall



3 Apply new Ethernet ID label (included in box with new logic board) to bottom of stand.

4 Use the **Blank Board Serializer tool** to set computer's serial number on new logic board.

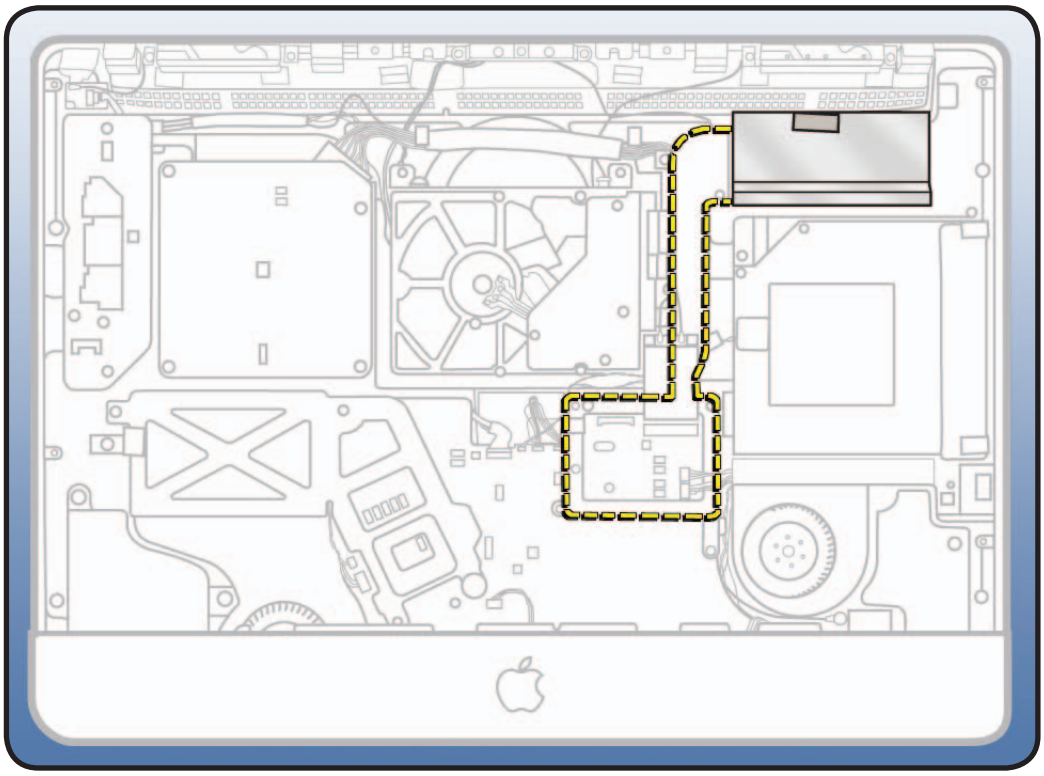
Video Card

First Steps

Remove:

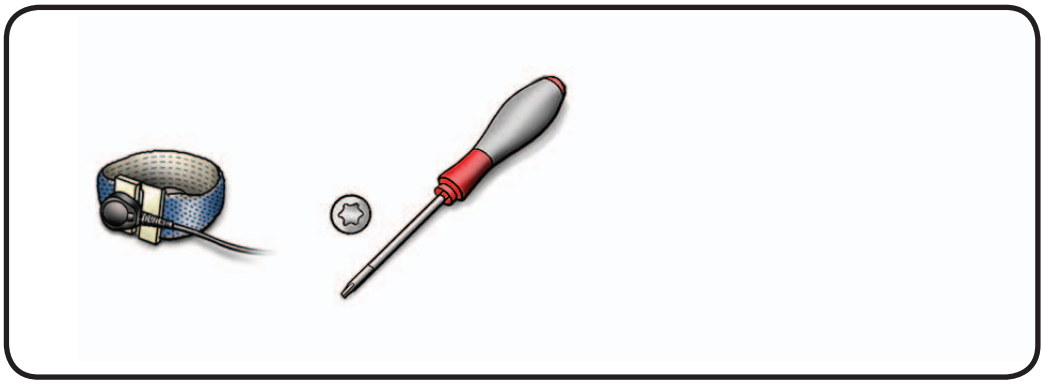
- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board

Note: Video card attaches to back side of logic board.



Tools

- ESD wrist strap
- Torx T10 screwdriver
- Torx T8 screwdriver



Removal

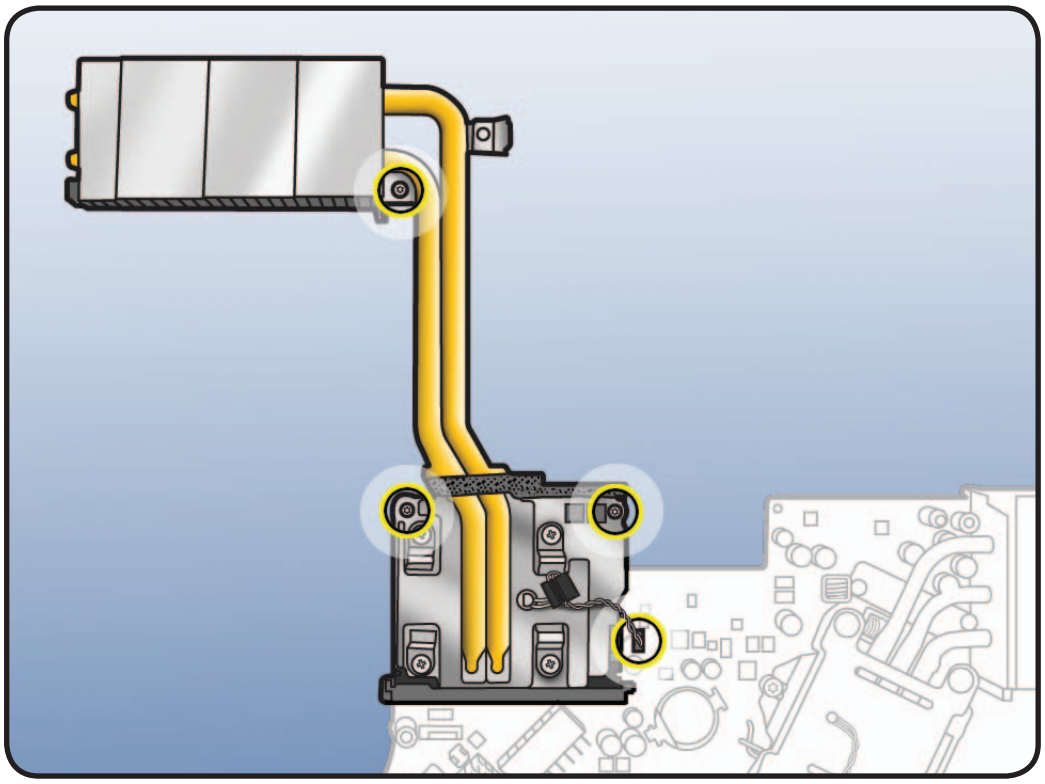
1 Remove T10 screw near heatsink:
(1) 922-7971



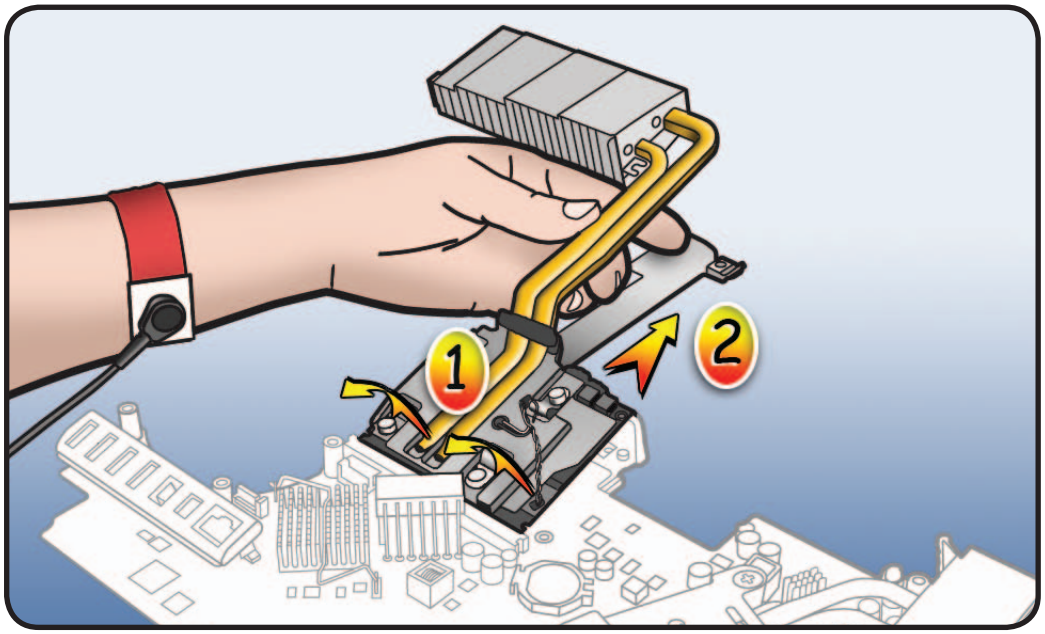
2 Remove T8 screws on video card:
(2) 922-4723



3 Disconnect cable from logic board.



4 (1) Lift up video card and heatsink and (2) slide card out of slot on logic board.

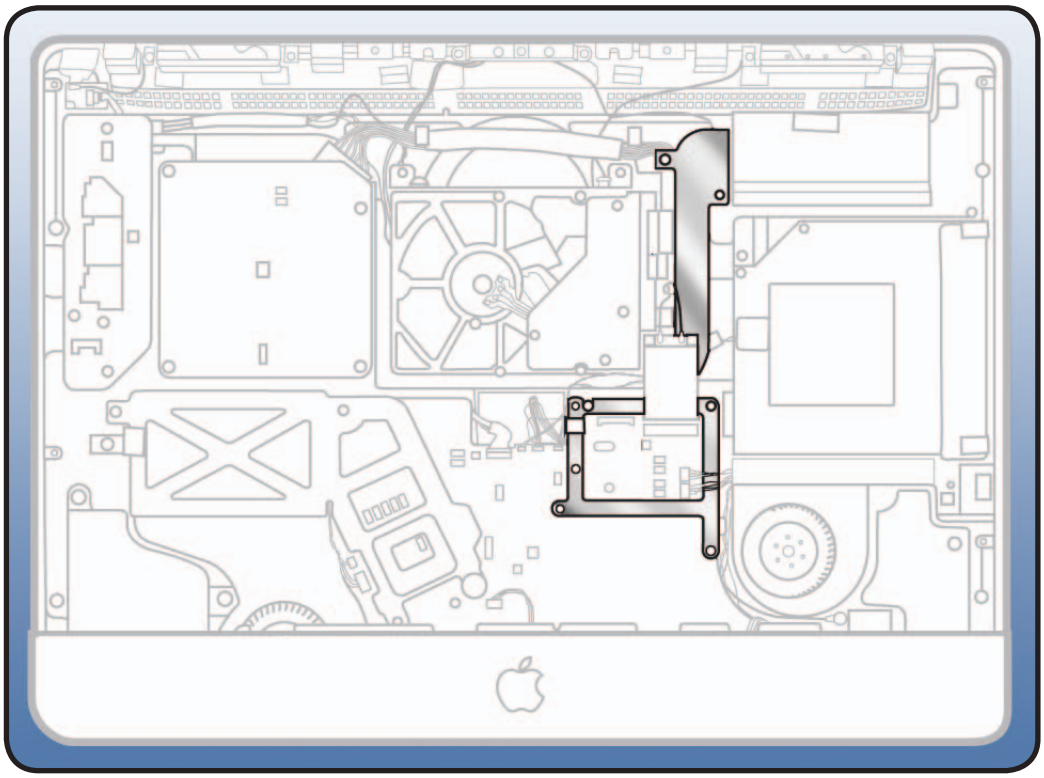


Video Card Bracket

First Steps

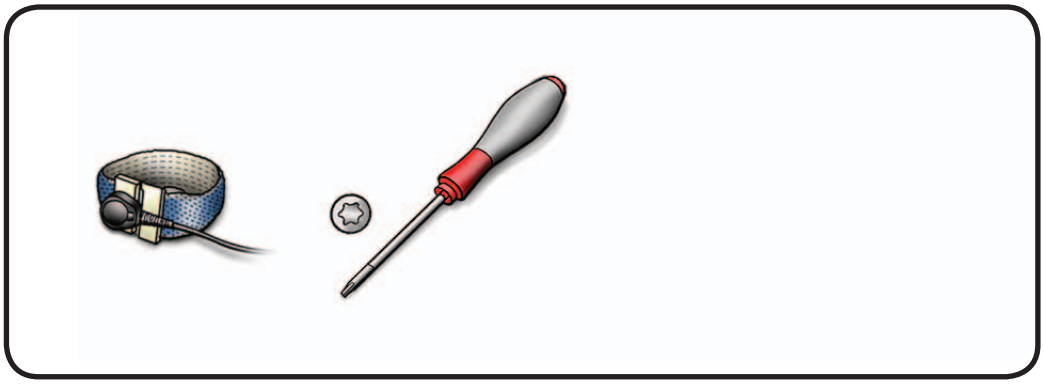
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board
- Video Card



Tools

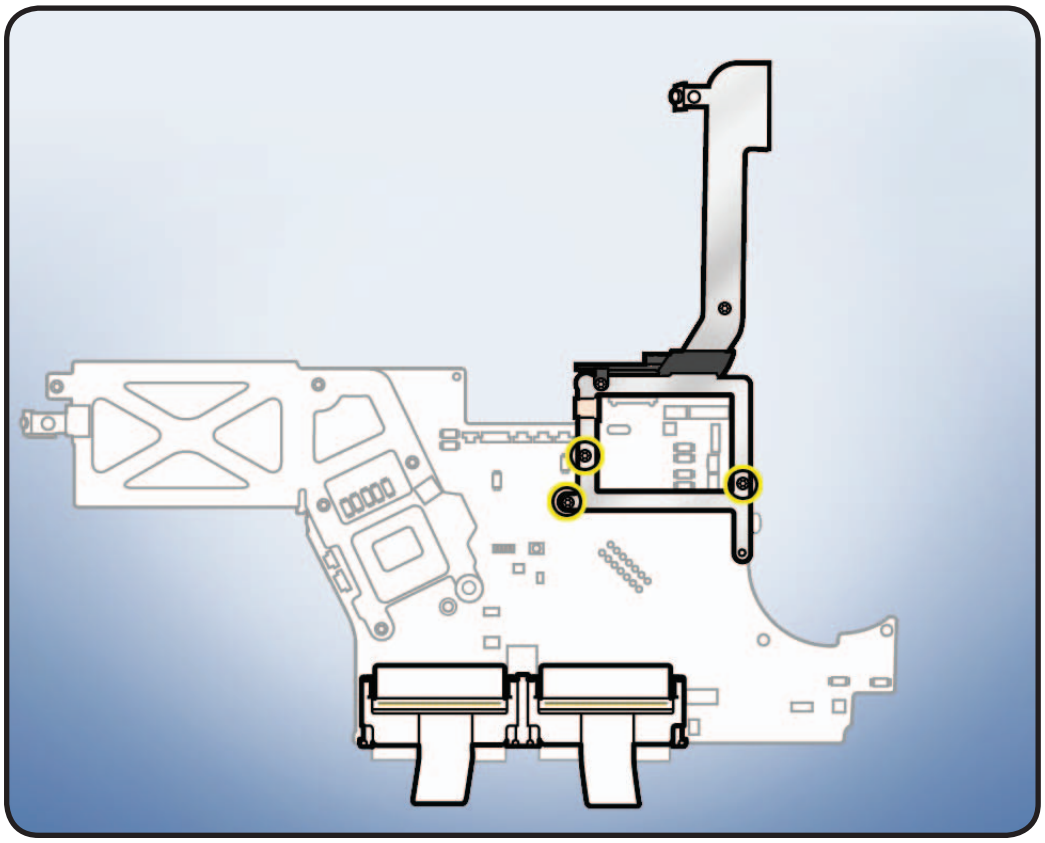
- ESD wrist strap
- Torx T8 screwdriver



Removal

1 Remove T8 screws:
(3) 922-4723





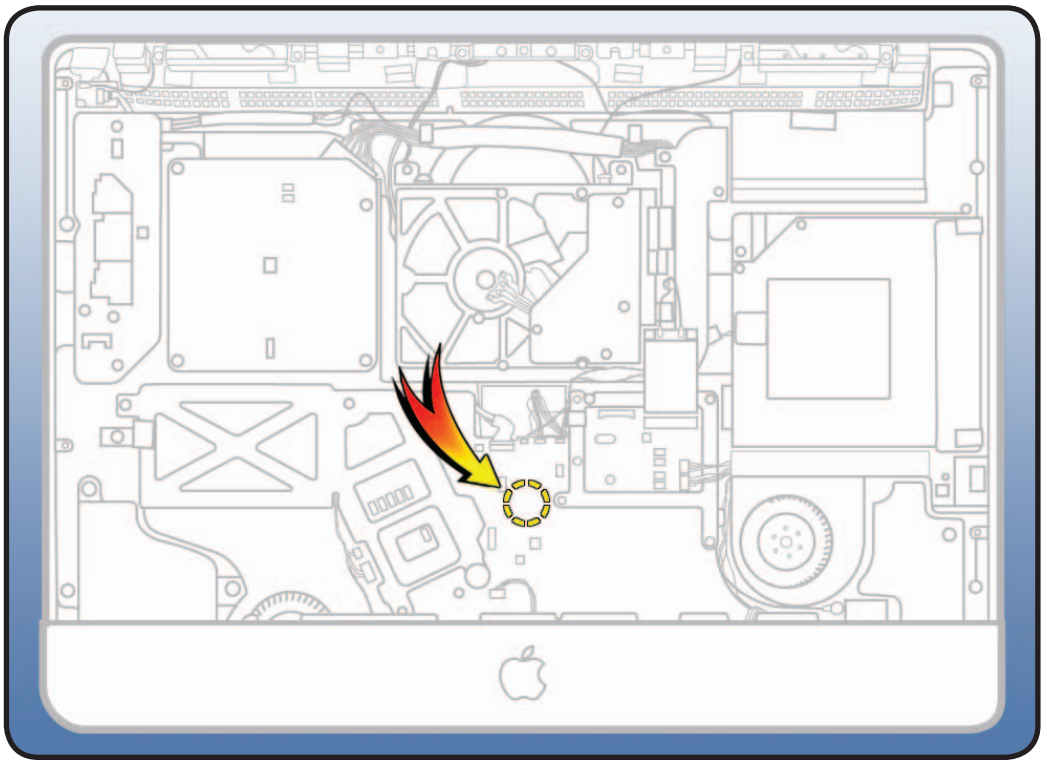
Battery

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board

Note: Battery is located on back side of logic board.



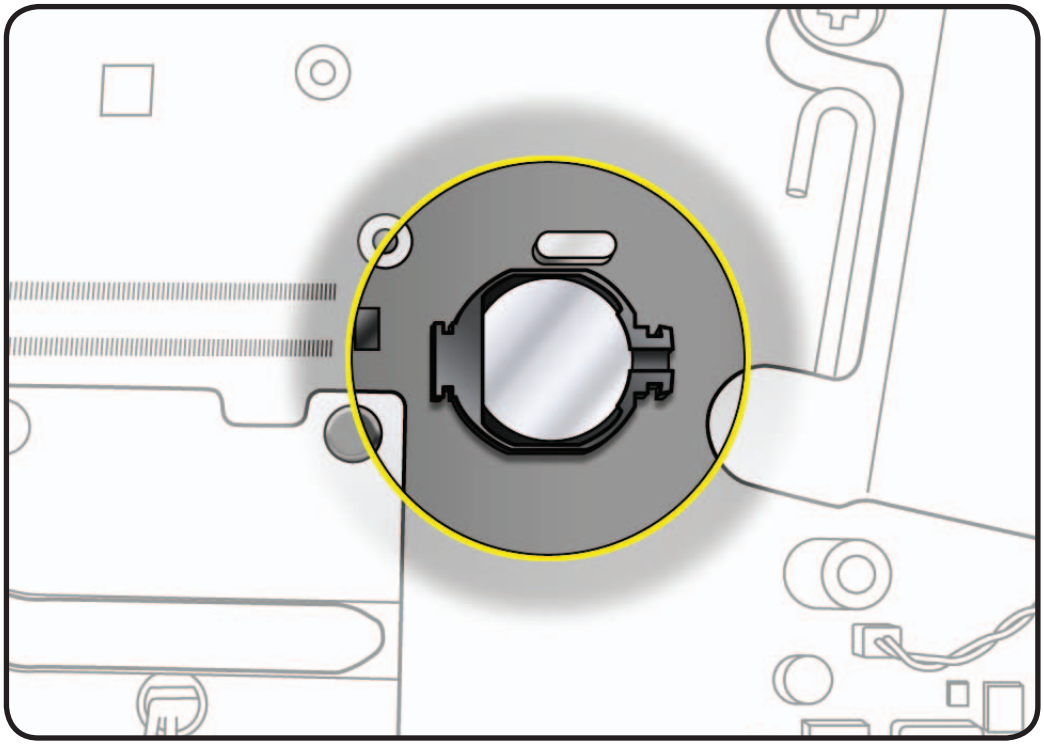
Tools

- ESD wrist strap
- Black stick



Removal

1 Use a black stick to pry battery from socket on back side of logic board.



Reassembly

1 Make sure battery socket is open and free of dust.

2 Press battery (922-9626) into socket with engraved markings (+ side) facing up.

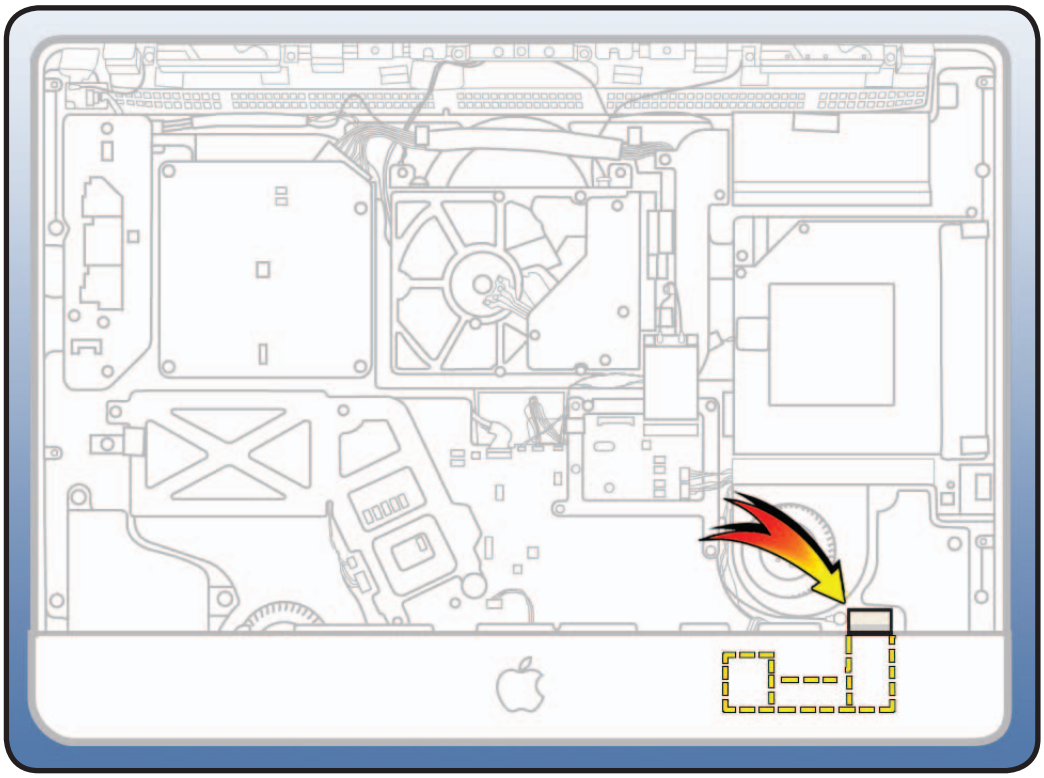


Audio Cable

First Steps

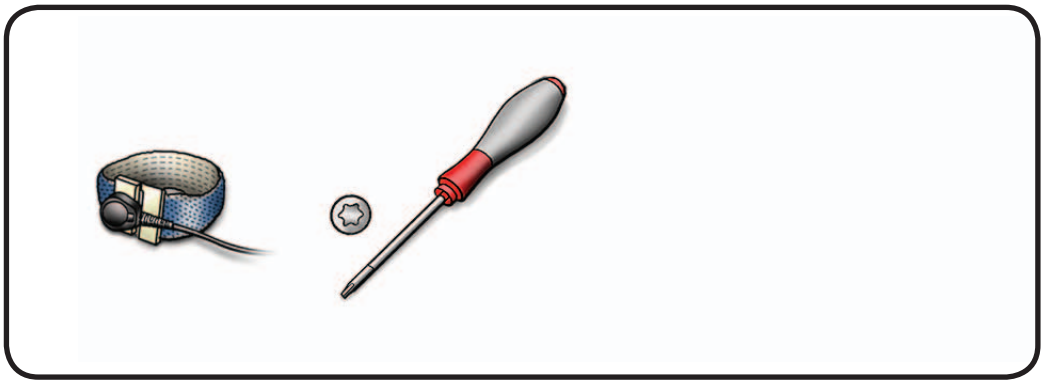
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- Logic Board



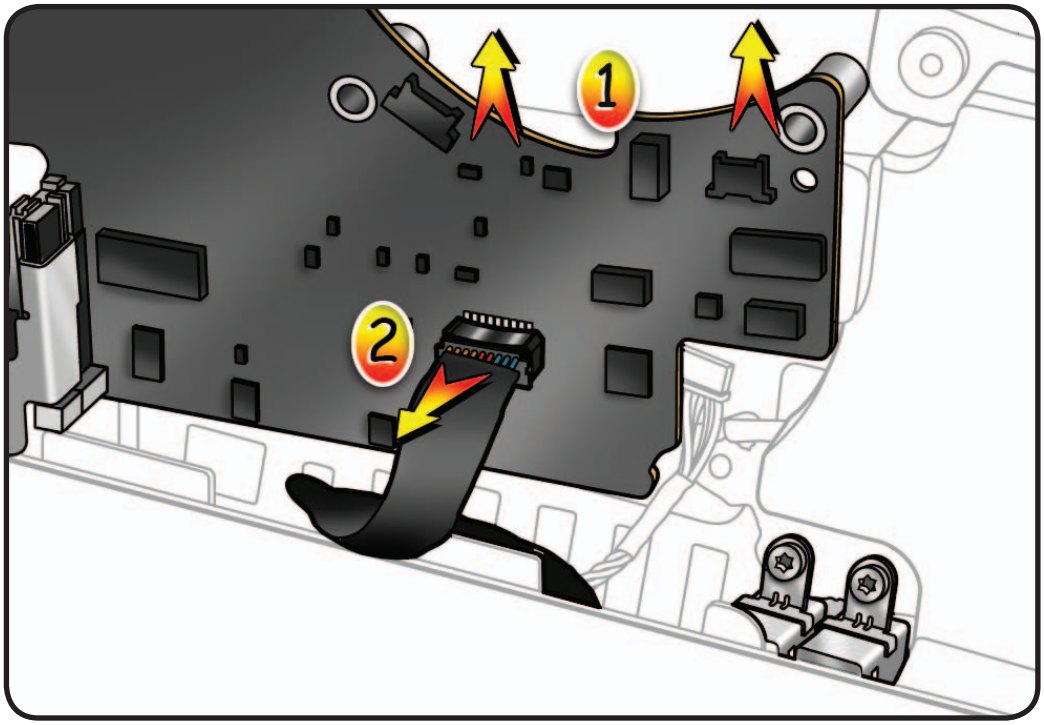
Tools

- ESD wrist strap
- Torx T10 screwdriver



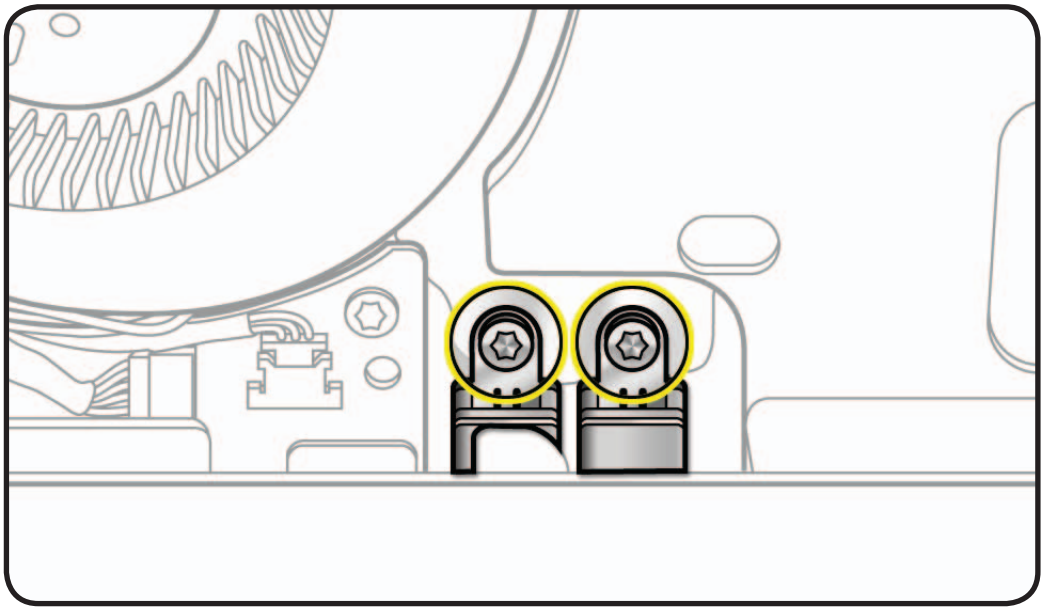
Removal

1 **Note:** Audio cable connector is beneath aluminum chin and is not accessible unless logic board is removed.

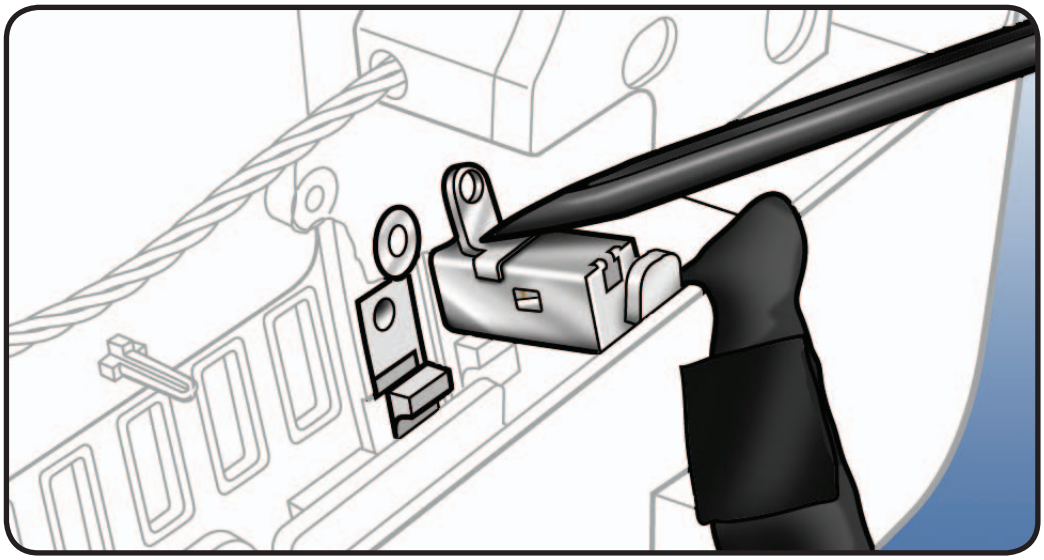


2 Remove T10 screws:
(2) 922-9245

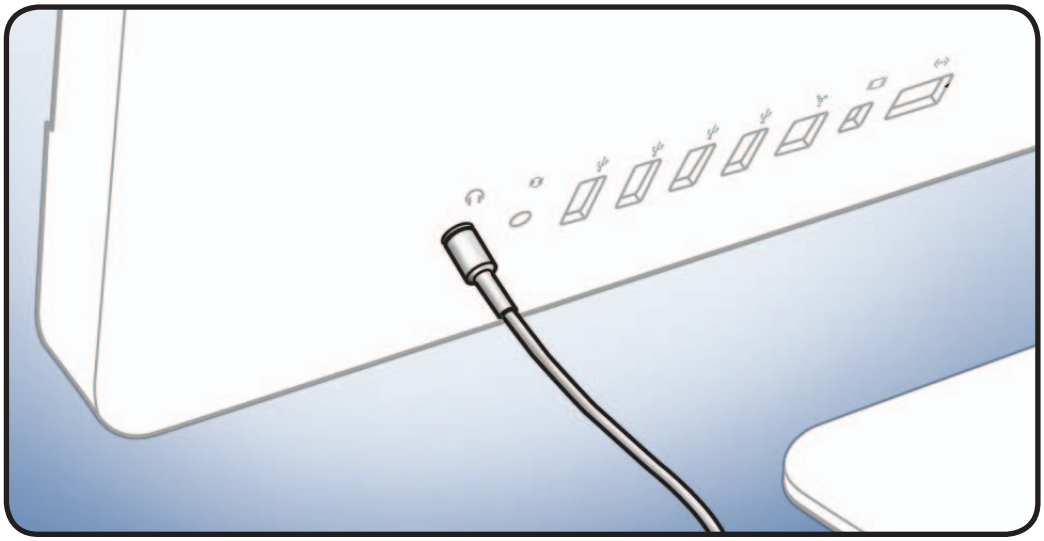




Reassembly Note:
A black stick can be helpful for guiding and aligning audio ports with rear housing.



Reassembly Note:
Plugging in earbuds or headphones can also help keep audio cable aligned while tightening screws.



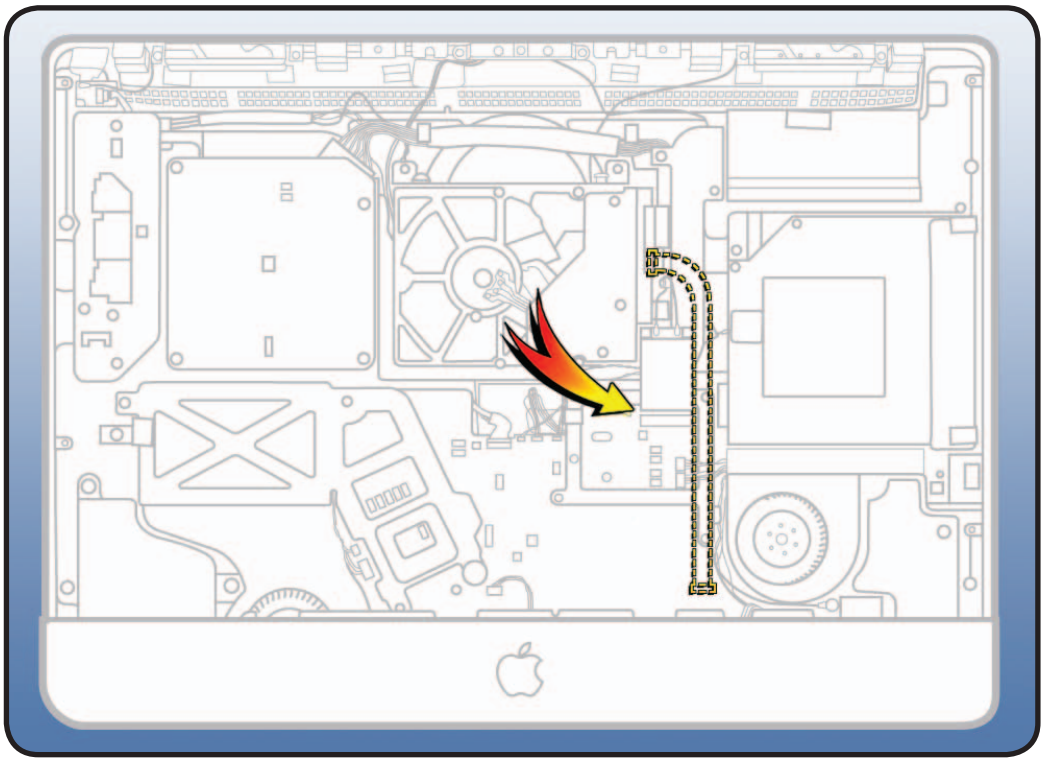
Hard Drive Data Cable

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board

Note: One end of hard drive data cable attaches to back side of logic board.



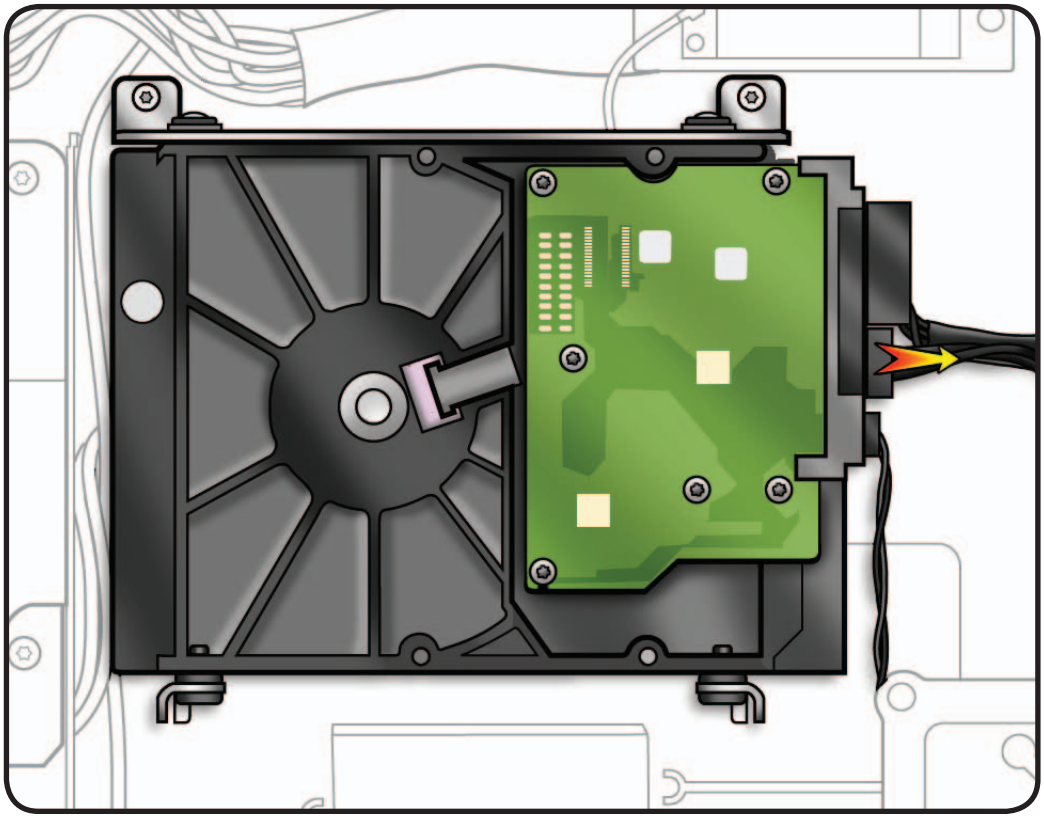
Tools

- ESD wrist strap

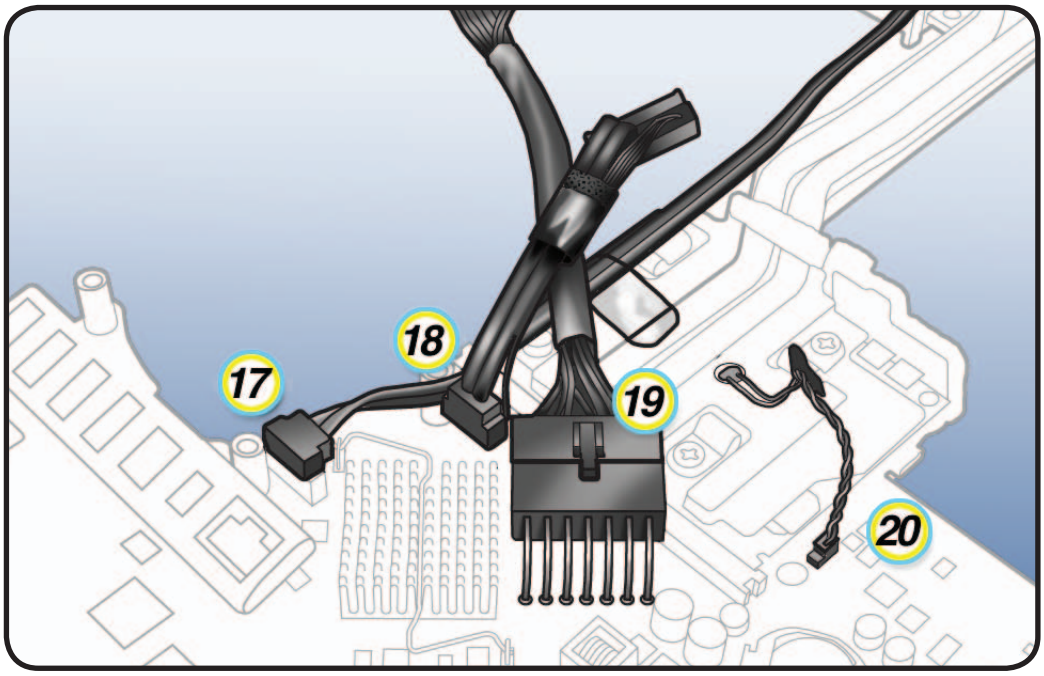


Removal

1 Disconnect data cable from hard drive.

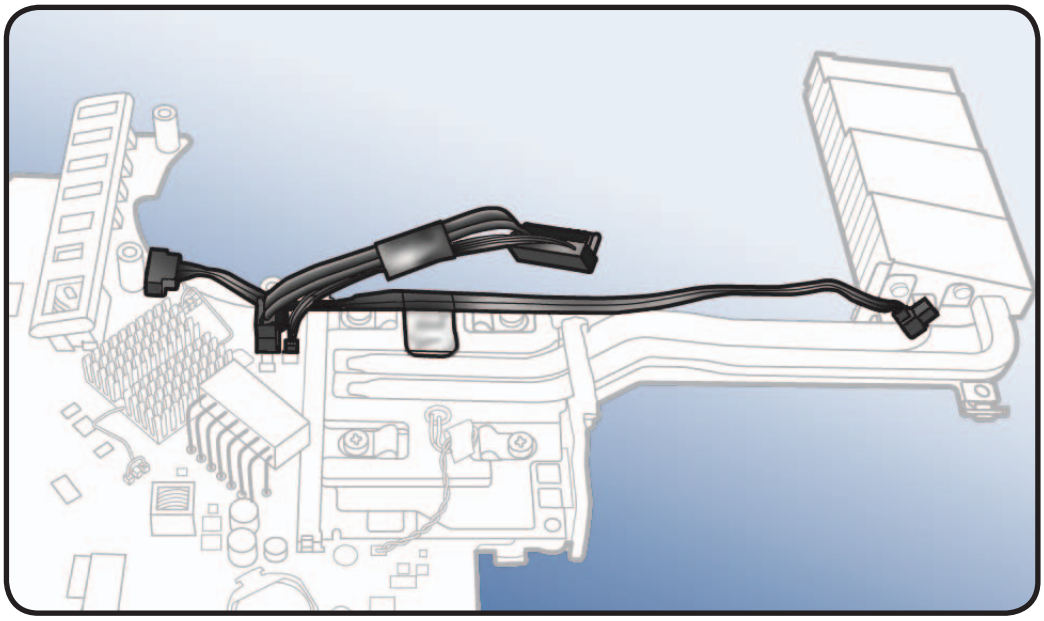


2 Disconnect hard drive data cable (#17) from back side of logic board.



Reassembly Note:
Observe how hard drive data cable routes between screw standoff and optical drive data cable connector on logic board.

Reapply clear tape to secure hard drive data cable to video card as shown.



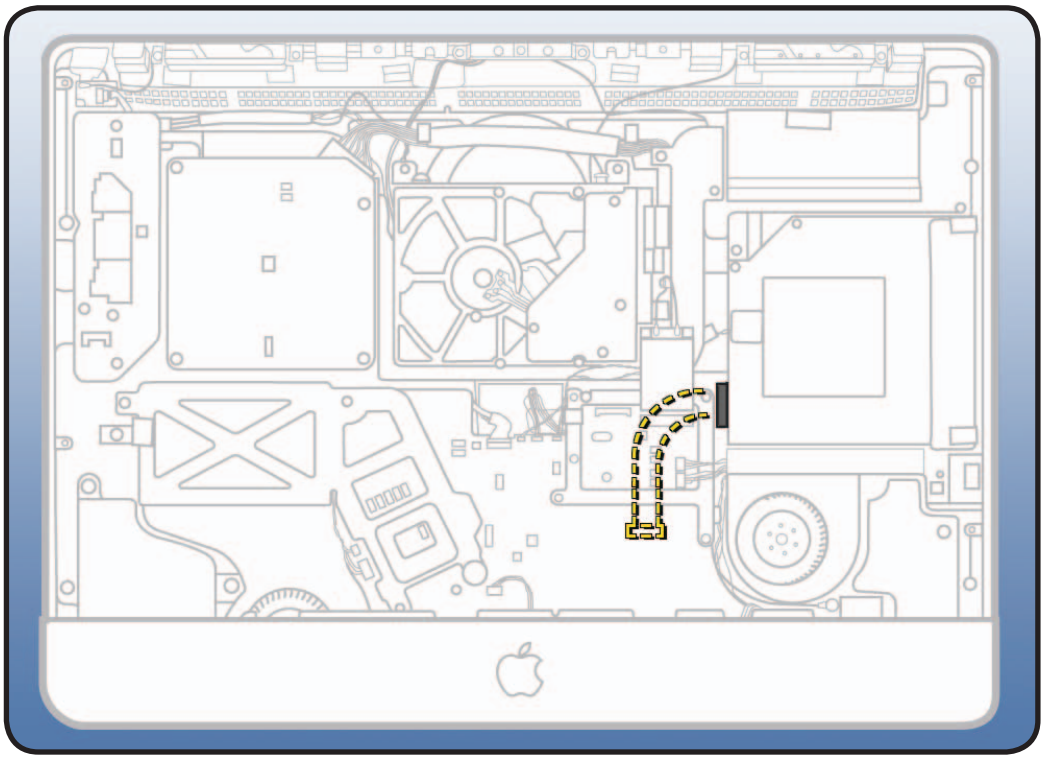
Optical Drive Data Cable

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board

Note: One end of optical drive data cable attaches to back side of logic board.



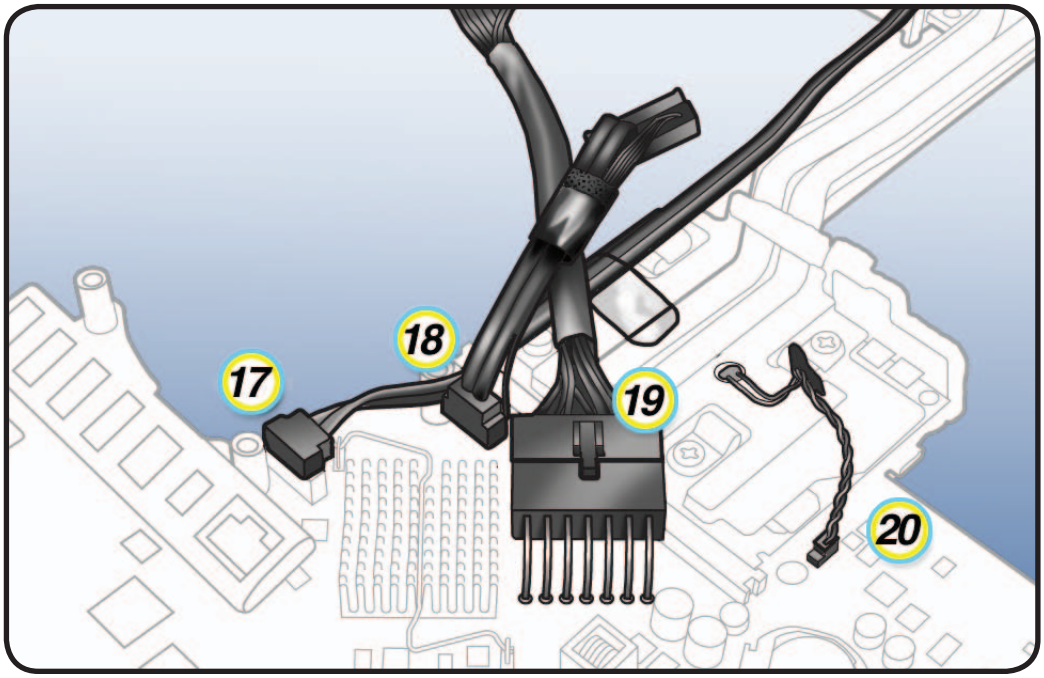
Tools

- ESD wrist strap

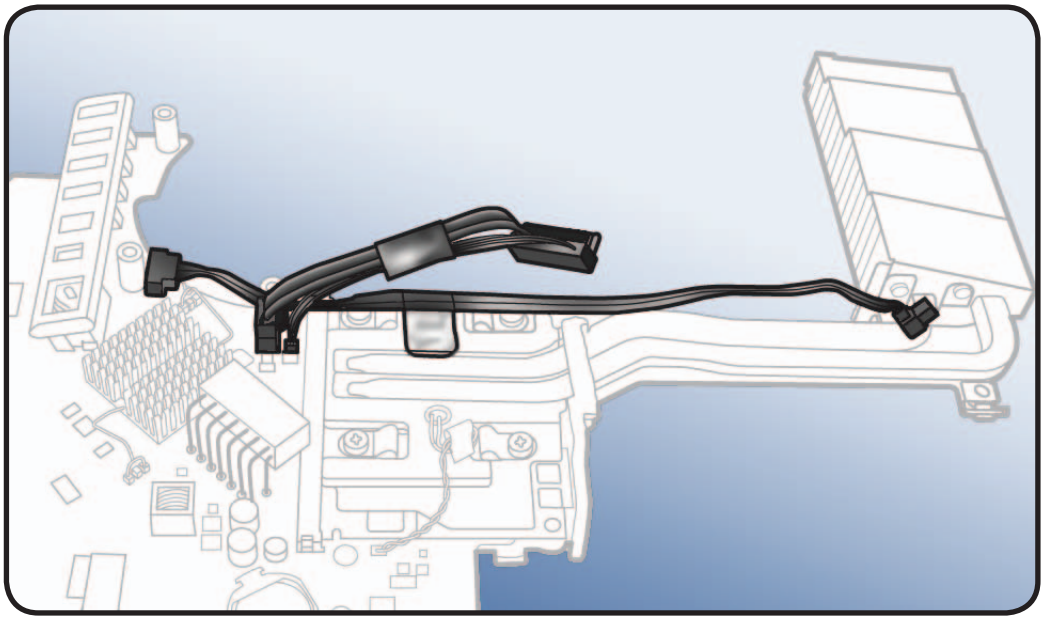


Removal

1 Disconnect optical drive data cable (#18, has 2 cable ends) from back side of logic board.



Reassembly Note: Observe how hard drive data cable routes between screw standoff and optical drive data cable connector on logic board.

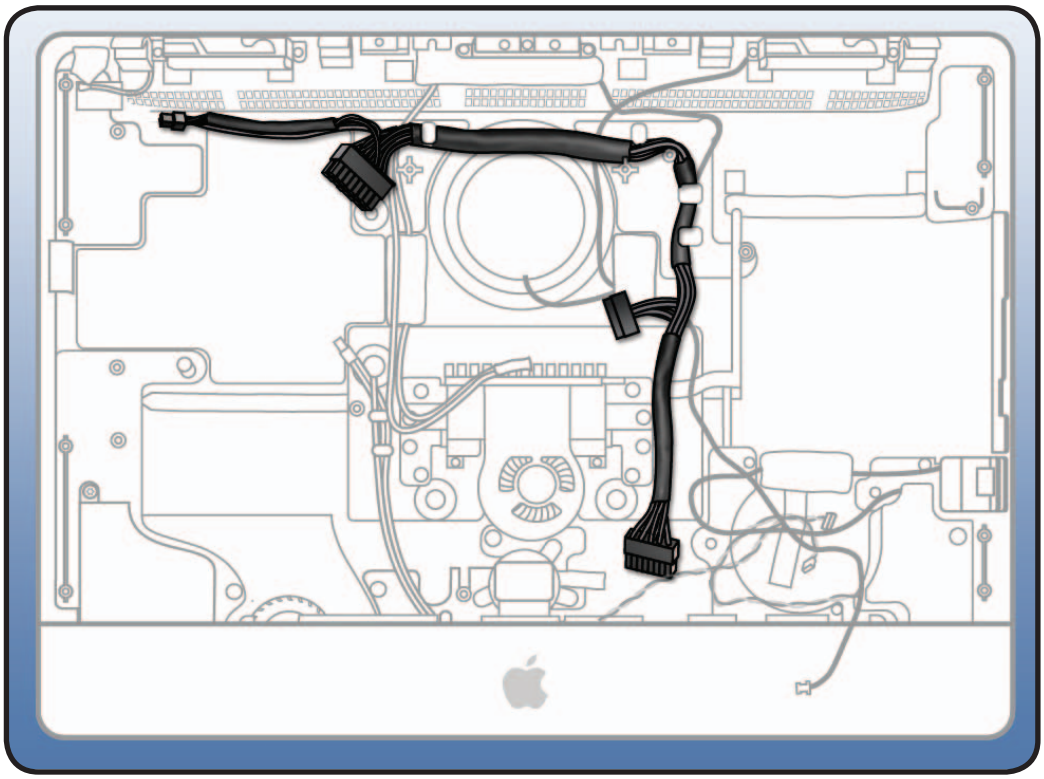


Cable, AC/DC/SATA/Backlight Power

First Steps

Remove:

- Glass Panel
- LCD Panel
- LED Backlight Board
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board



Removal

1 Observe cable routing for reassembly. Refer to photograph in Internal Views section. There is adhesive on top left section of cable, and 4 clips secure cable to rear housing. The bottom right section routes through indentation in optical drive pressure wall.

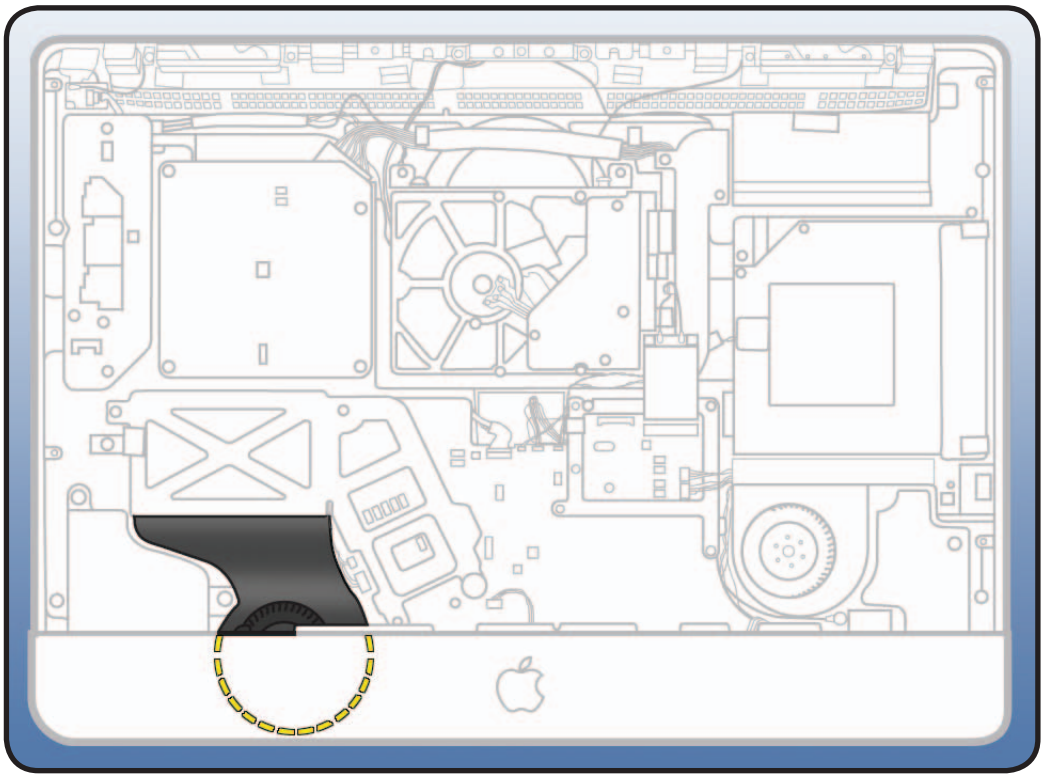
2 Lift cable out of rear housing.

CPU Fan

First Steps

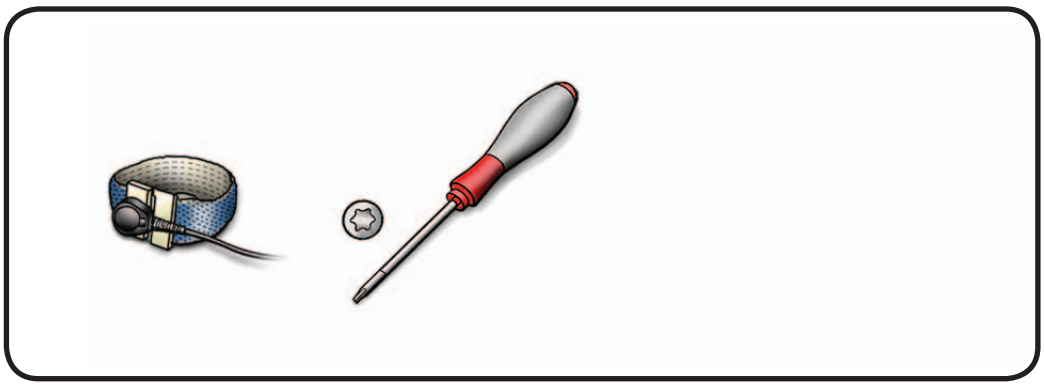
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board



Tools

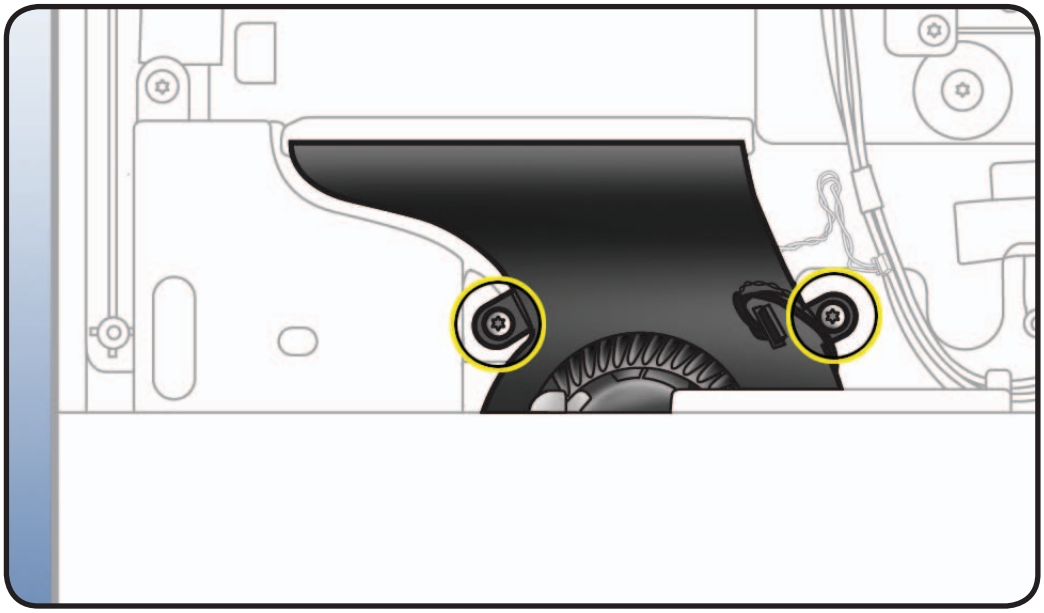
- ESD wrist strap
- Torx T10 screwdriver



Removal

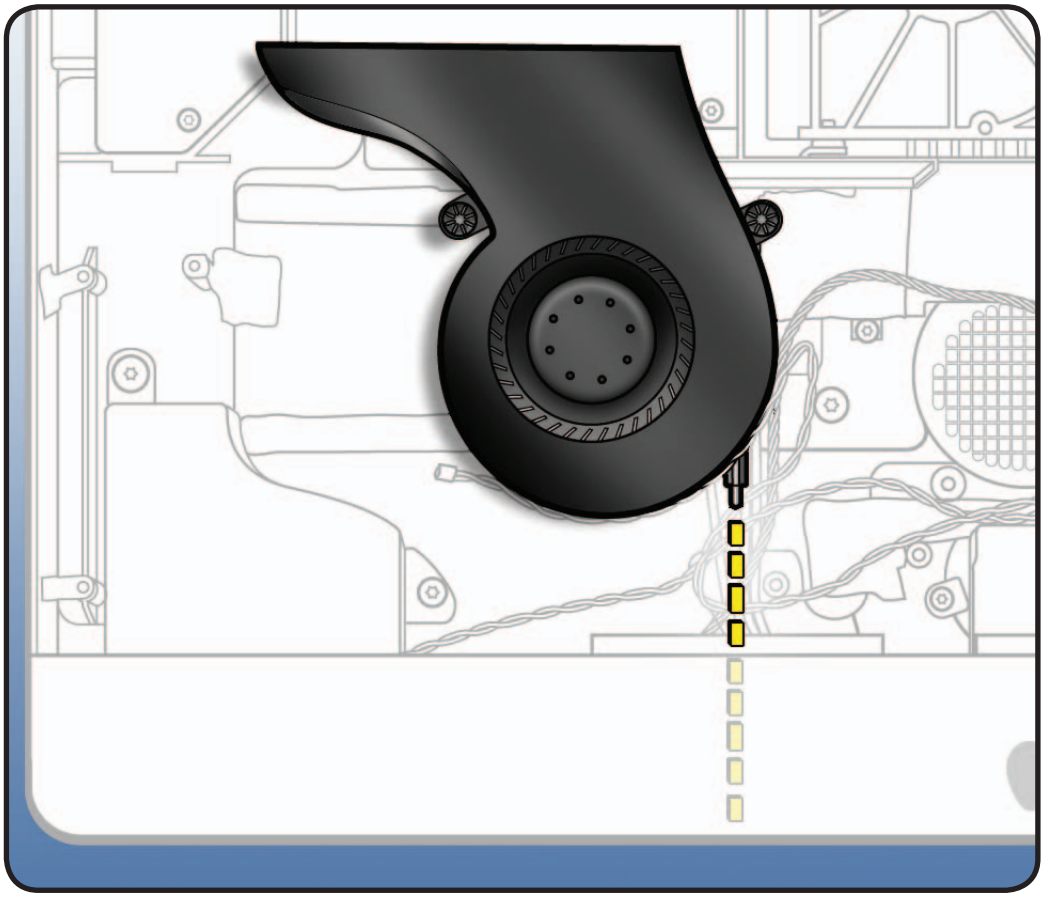
1 Remove T10 screws:
(2) 922-9236





2 Lift fan up and out of rear housing.

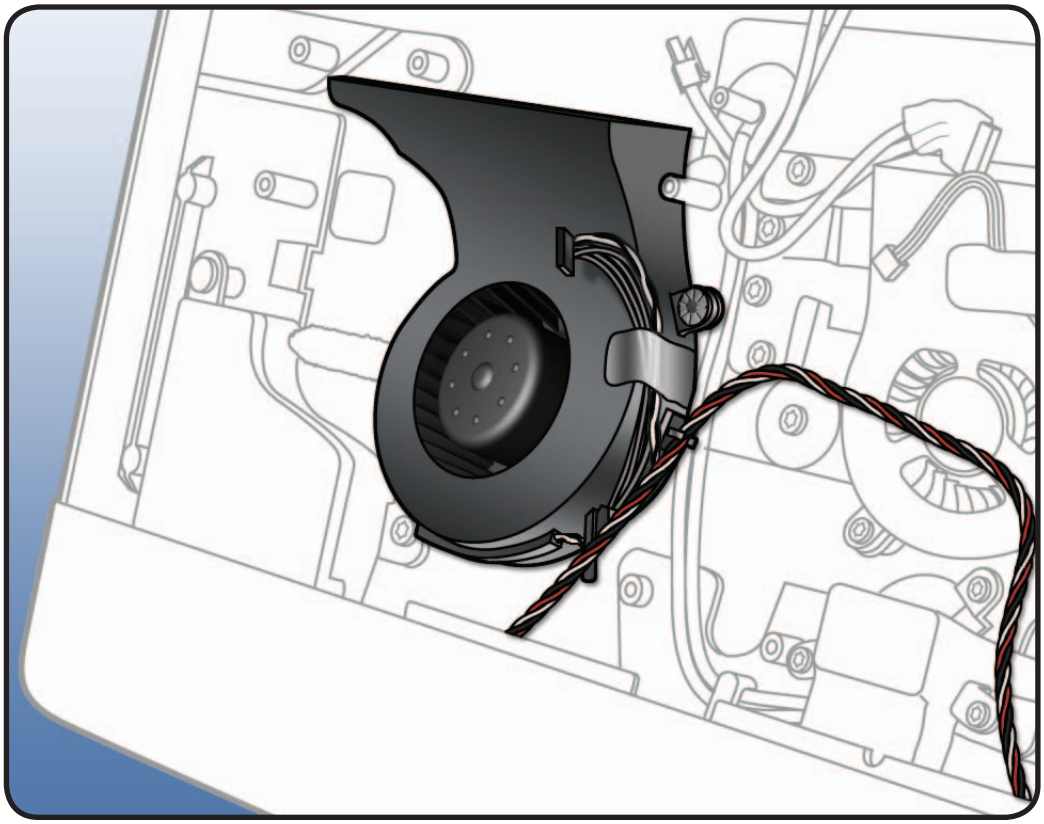
3 Note guidepost on fan that will fit into bottom of rear housing on reassembly.



4 Note routing of left speaker cable through clip on CPU fan.

Unlike previous models, the ambient temp sensor cable is integrated with CPU fan and cannot be removed.

5 Remove left speaker cable from CPU fan.

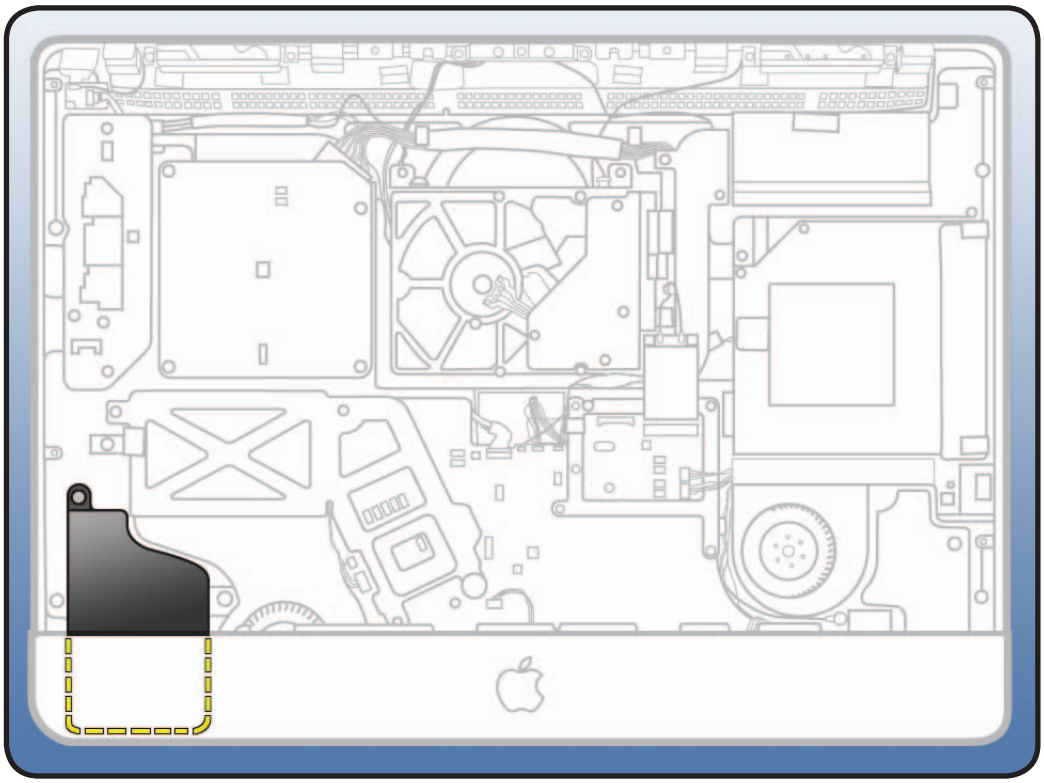


Left Speaker

First Steps

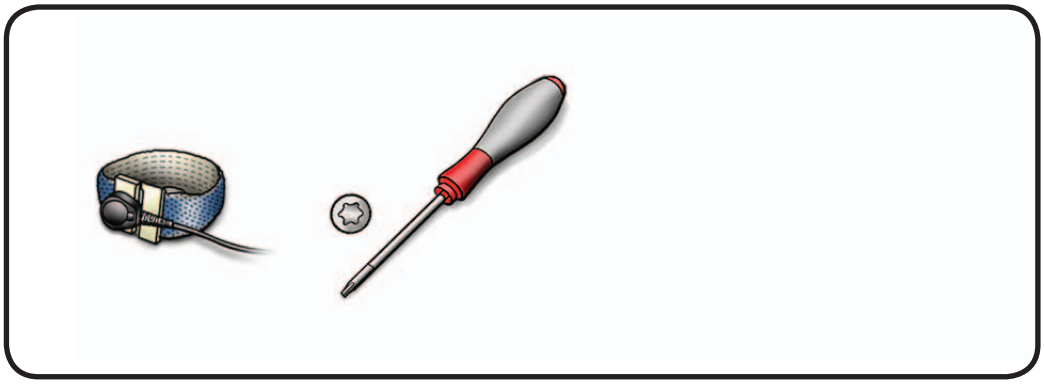
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board
- CPU Fan



Tools

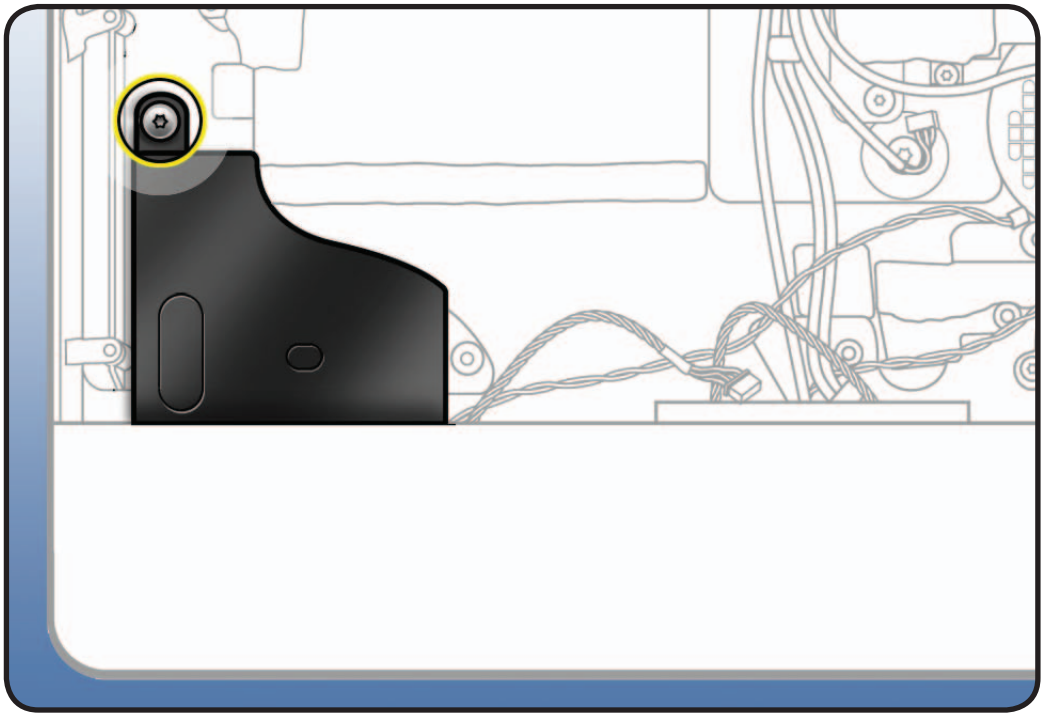
- ESD wrist strap
- Torx T10 screwdriver



Removal

1 Remove T10 screw:
(1) 922-9242

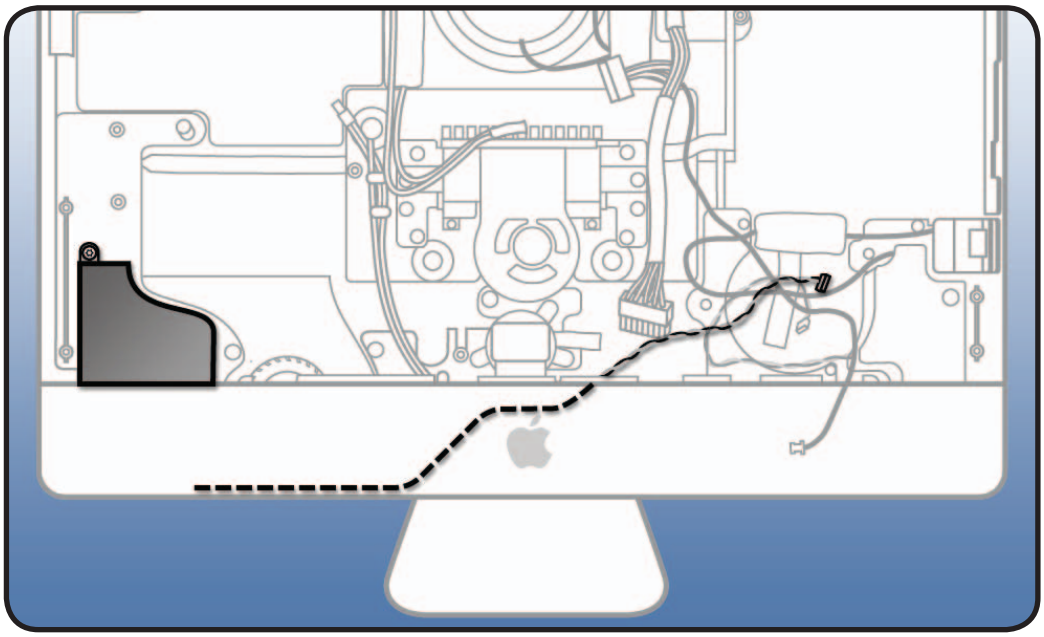




2 Remove tape securing cable to rear housing.

3 Observe cable routing for reassembly. Refer to photograph in Internal Views section.

4 Rotate speaker to the right and lift out of rear housing.

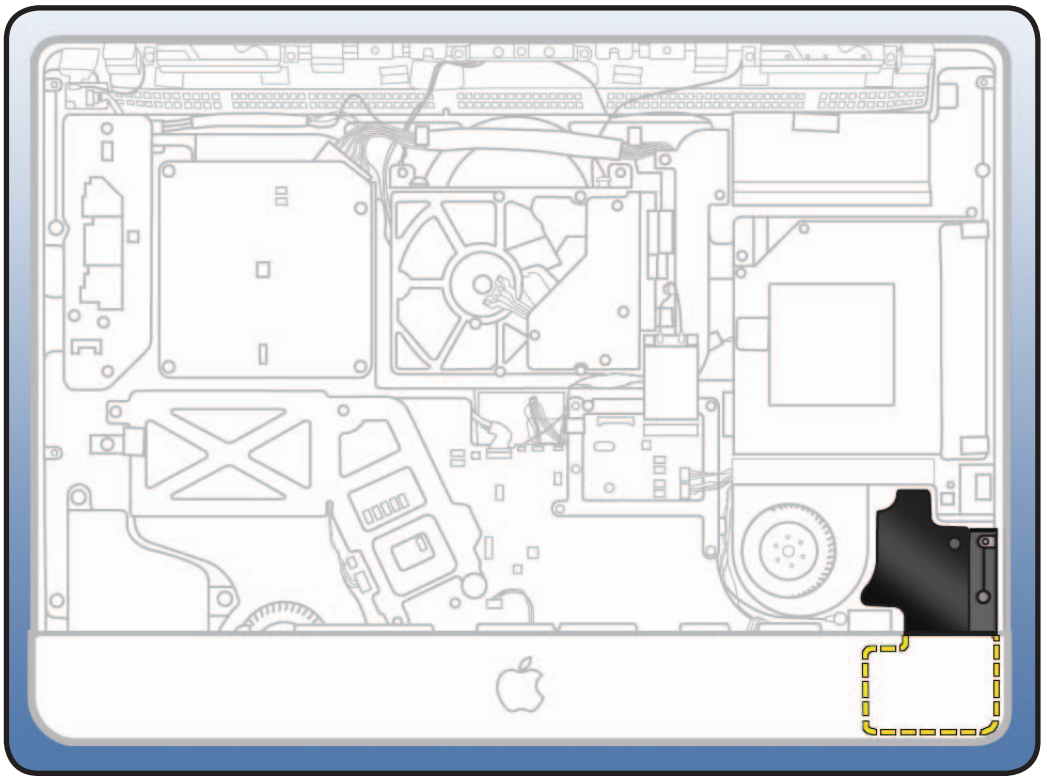


Right Speaker

First Steps

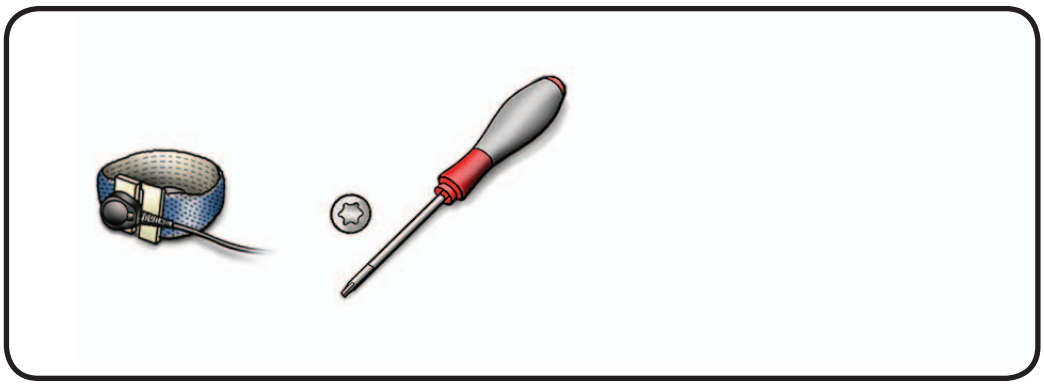
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board
- Audio Cable

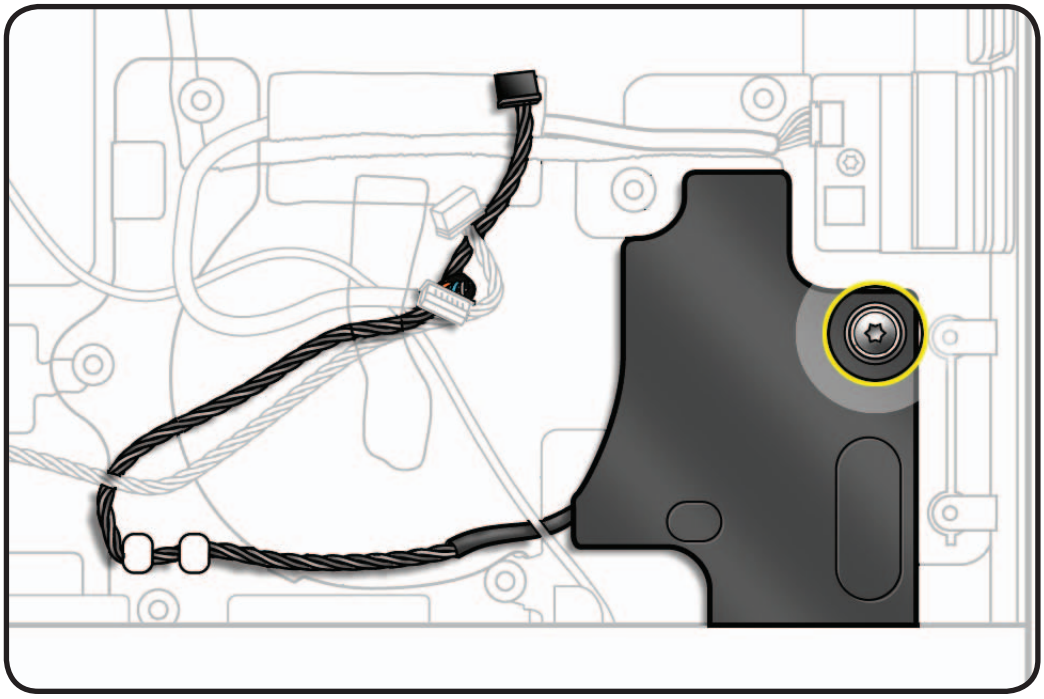


Tools

- ESD wrist strap
- Torx T10 screwdriver



Removal



1 Remove T10 screw:
(1) 922-9242



2 Note cable routing through guide in rear housing.

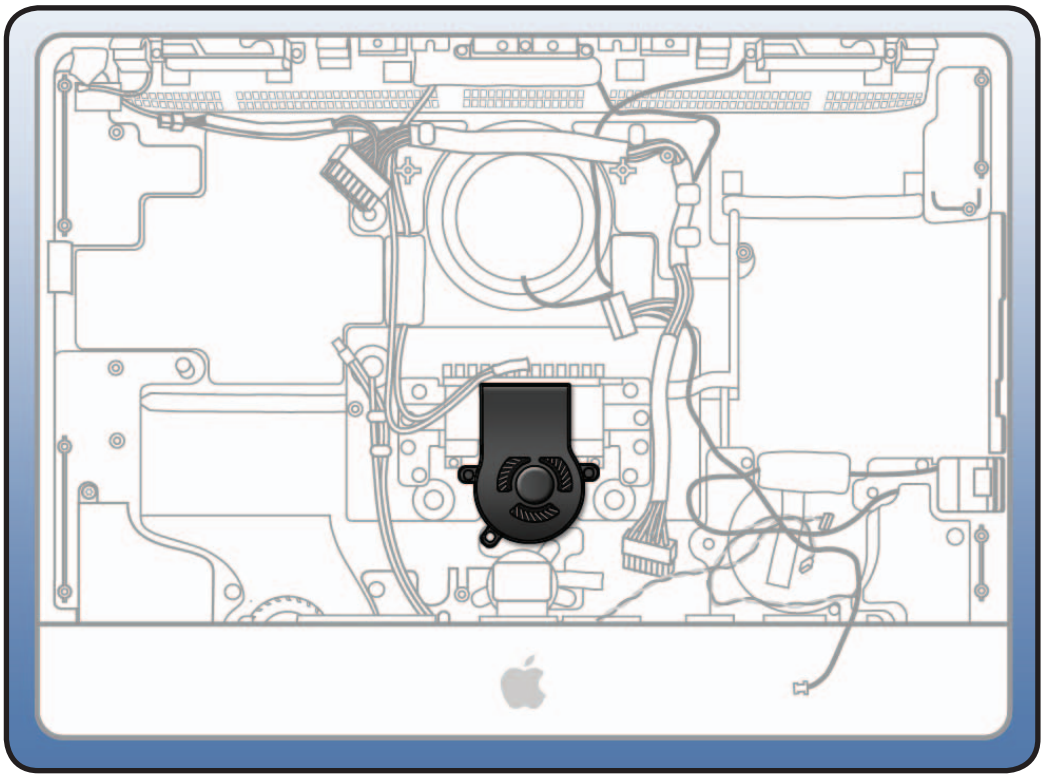
3 Rotate speaker to the left and lift out of rear housing.

Hard Drive Fan

First Steps

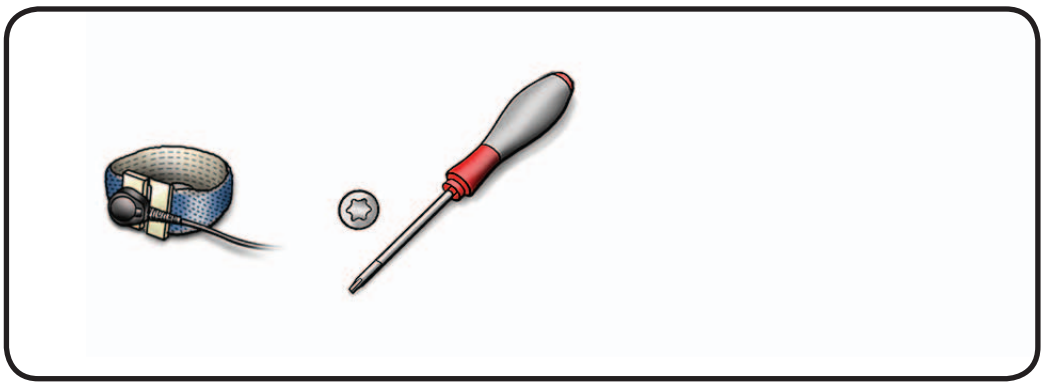
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board



Tools

- ESD wrist strap
- Torx T10 screwdriver

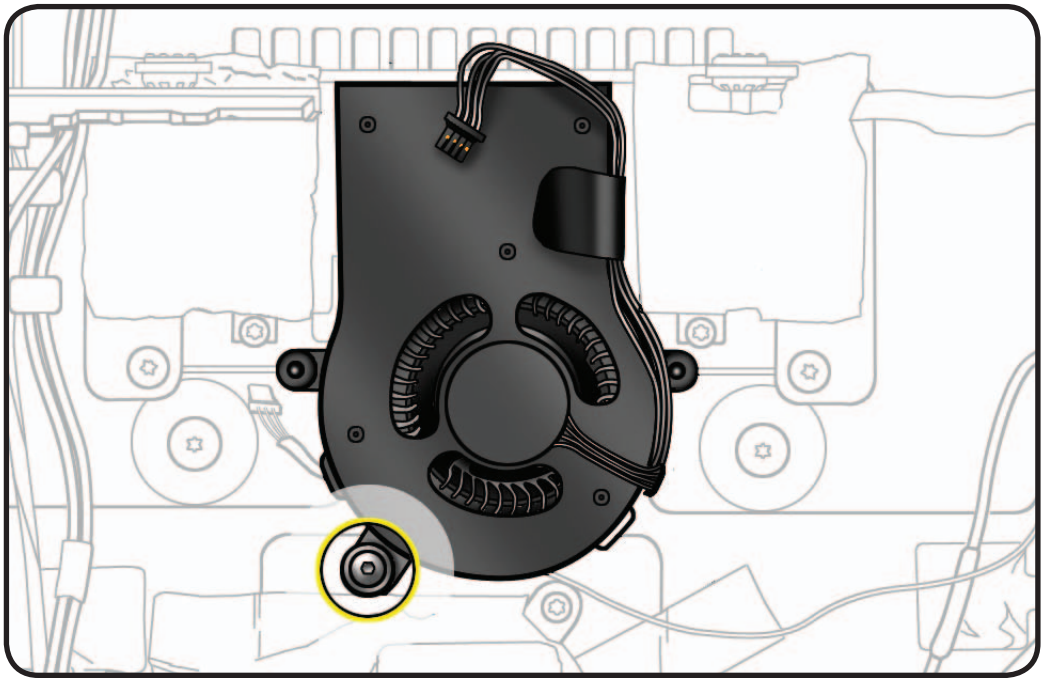


Removal

1 Remove T10 screw:
(1) 922-9236



2 Lift fan straight up and off guide posts.

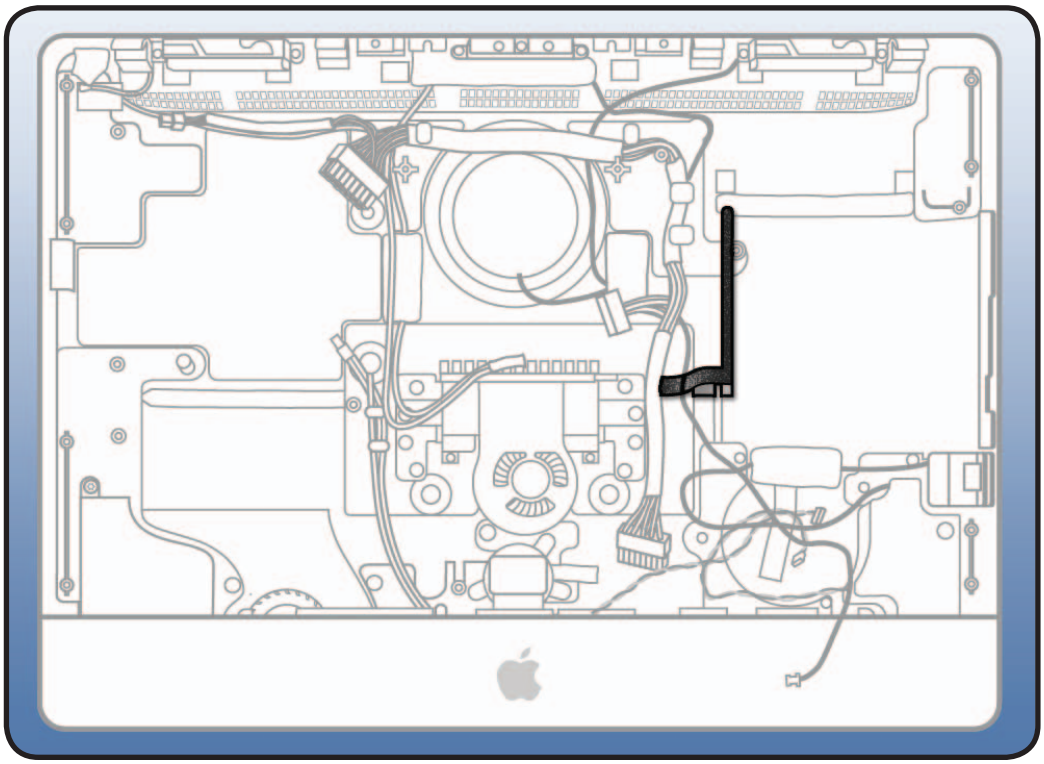


Optical Drive Pressure Wall

First Steps

Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board



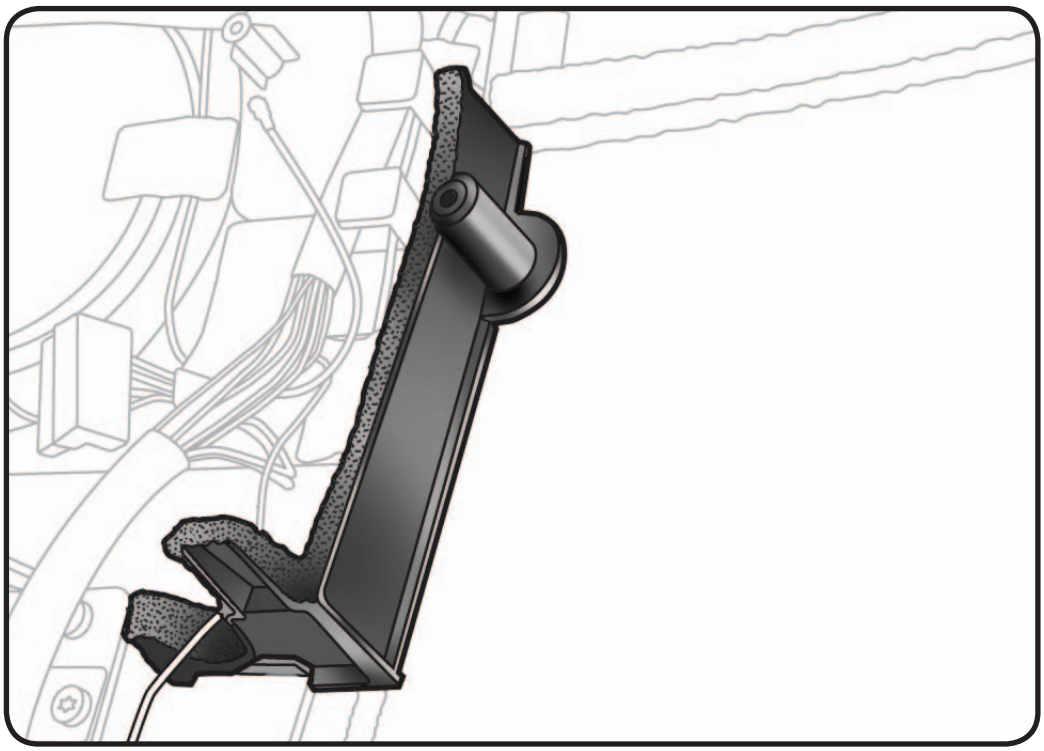
Tools

- ESD wrist strap



Removal

1 Lift pressure wall off posts in rear housing.

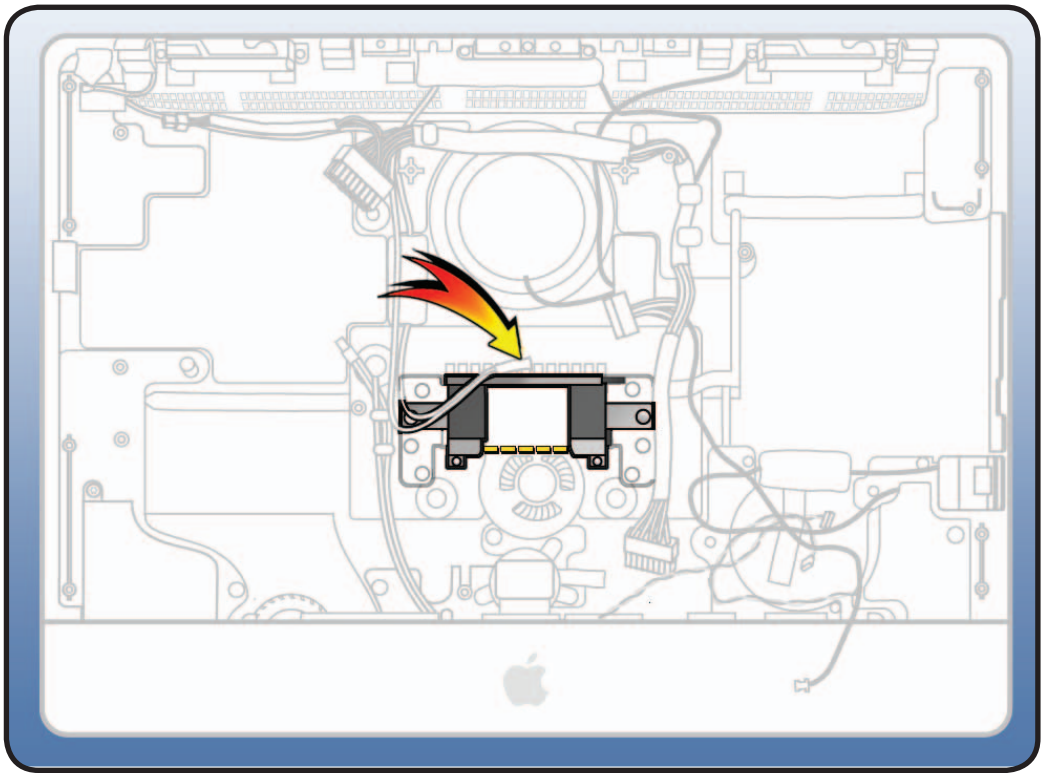


Mechanism Cover

First Steps

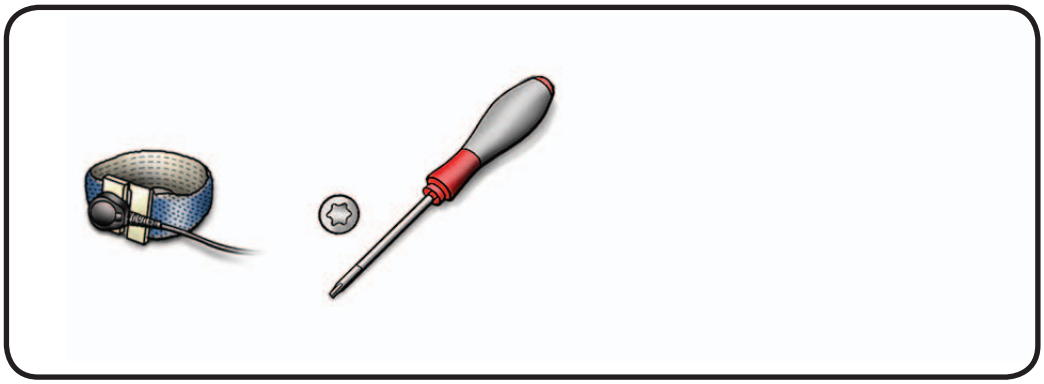
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board
- Hard Drive
- Hard Drive Fan

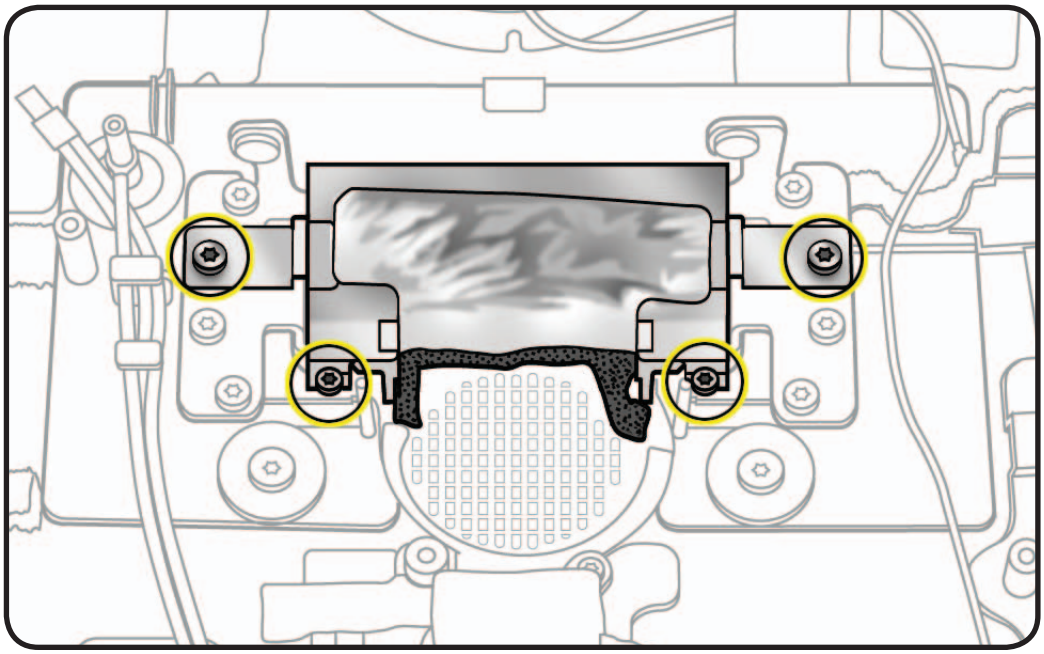


Tools

- ESD wrist strap
- Torx T10 screwdriver



Removal



1 Remove T10 screws:

- (2) 922-9238 (same screws used on mechanism)



- (2) 922-6800 (smaller screws closer to rear housing vent)



2 Peel up foil and half-circle foam gasket.

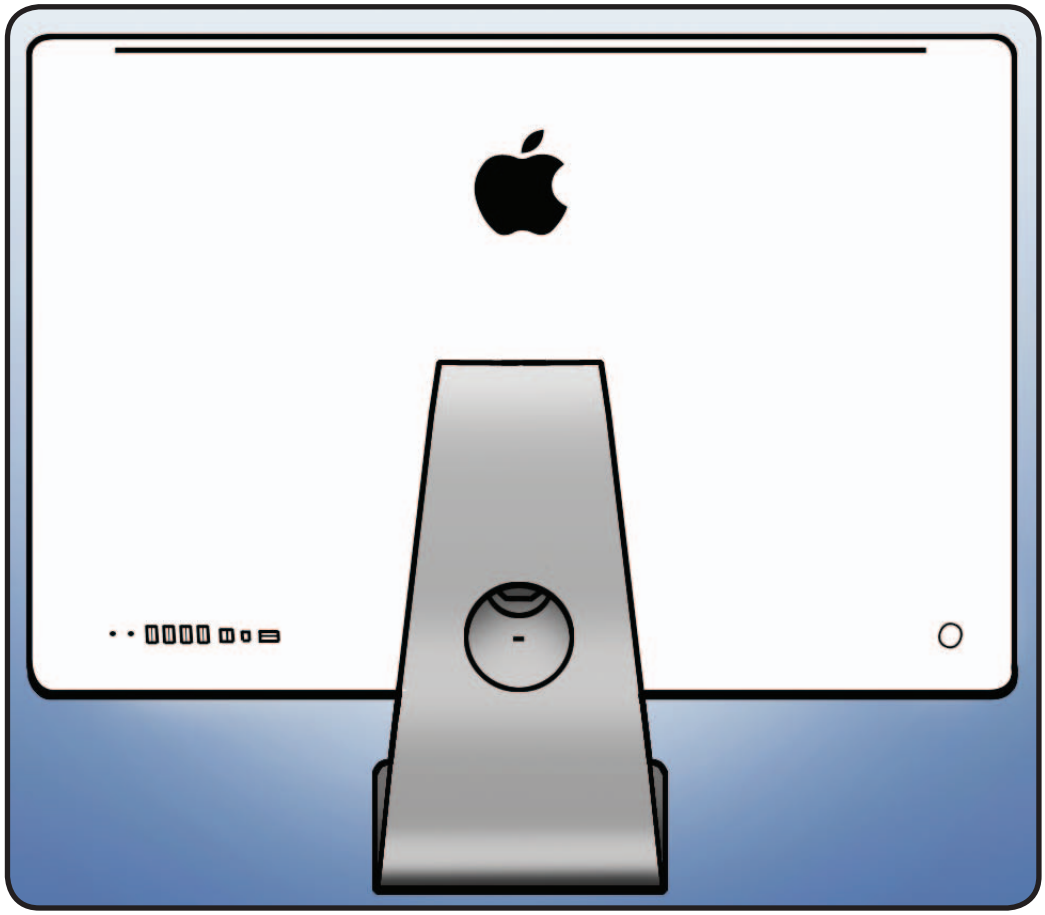
Replacement Note: Reinstall foil and gasket as shown.

Stand

First Steps

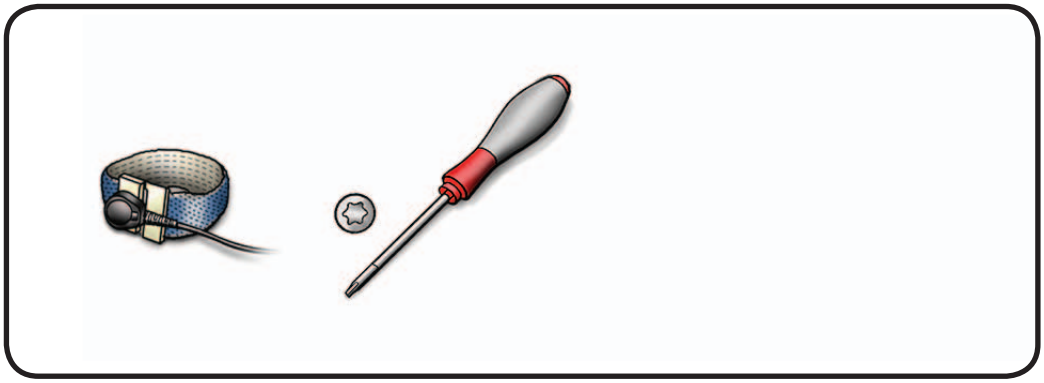
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board
- Hard Drive
- Hard Drive Fan
- Mechanism Cover



Tools

- ESD wrist strap
- Torx T10 screwdriver

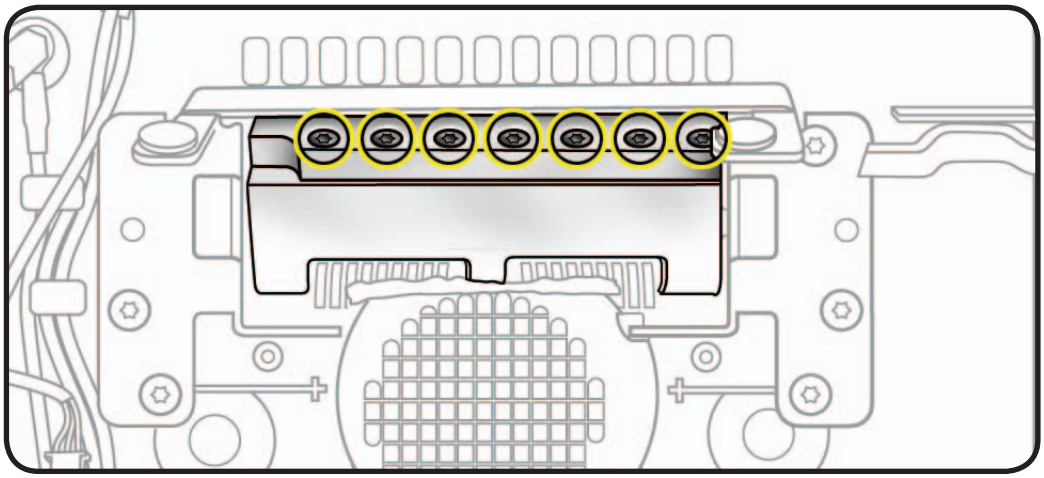


Removal

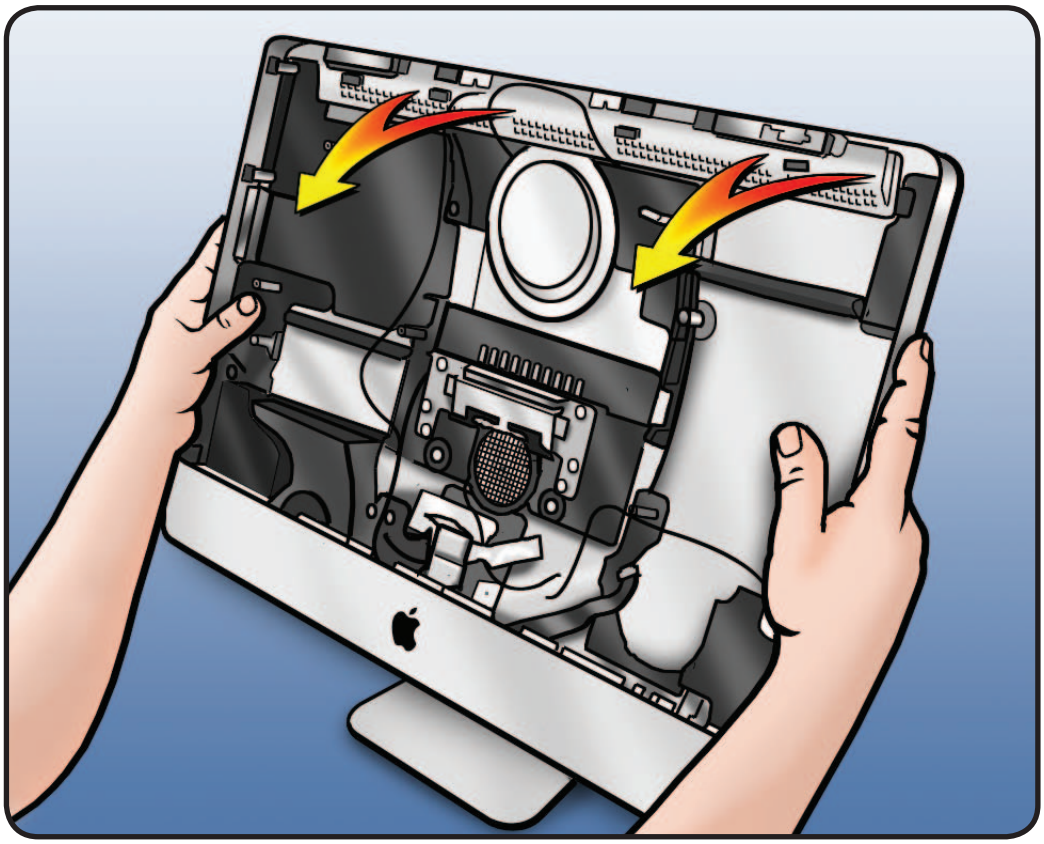
1 Remove T10 screws:
(7) 922-8209



Replacement Note: Reinstall furthest left and right screws first and then reinstall middle 5 screws.



2 Lift rear housing off stand.

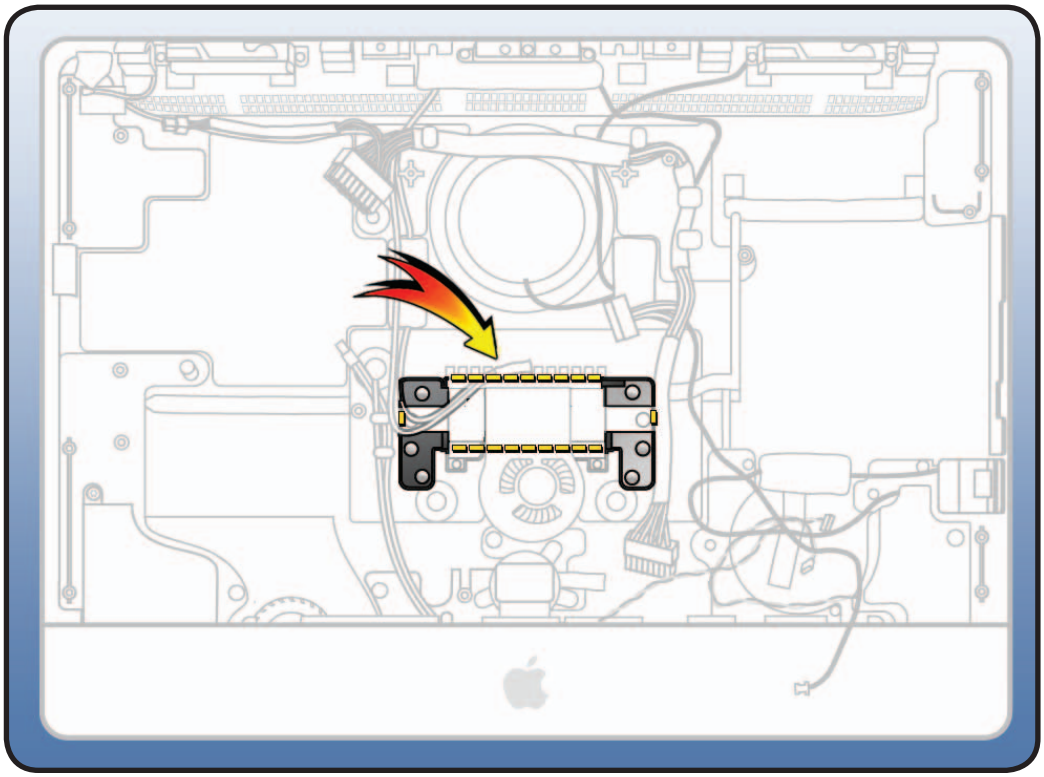


Mechanism

First Steps

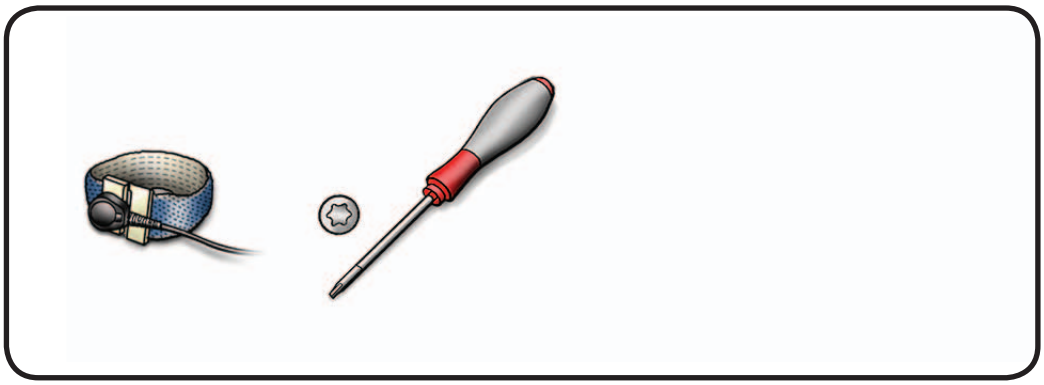
Remove:

- Glass Panel
- LCD Panel
- Power Supply
- Backlight Pressure Wall
- Power Supply Pressure Wall
- Optical Drive
- Optical Drive Fan
- IR Board
- AirPort Card
- Logic Board
- Hard Drive
- Hard Drive Fan
- Mechanism Cover
- Stand



Tools

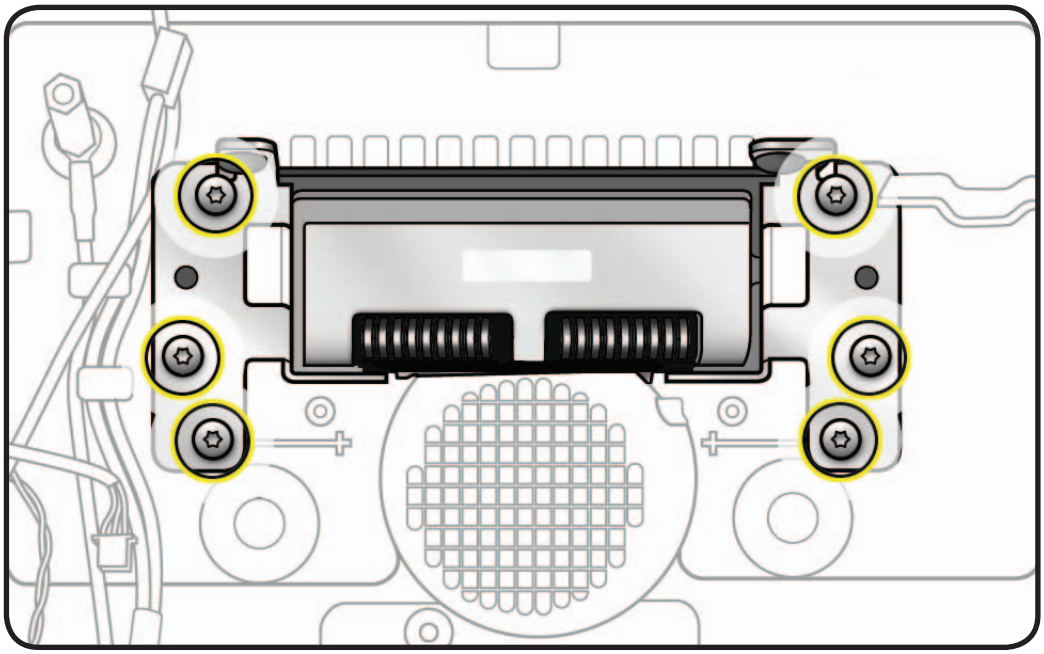
- ESD wrist strap
- Torx T10 screwdriver



Removal

1 Remove T10 screws:
(6) 922-9238



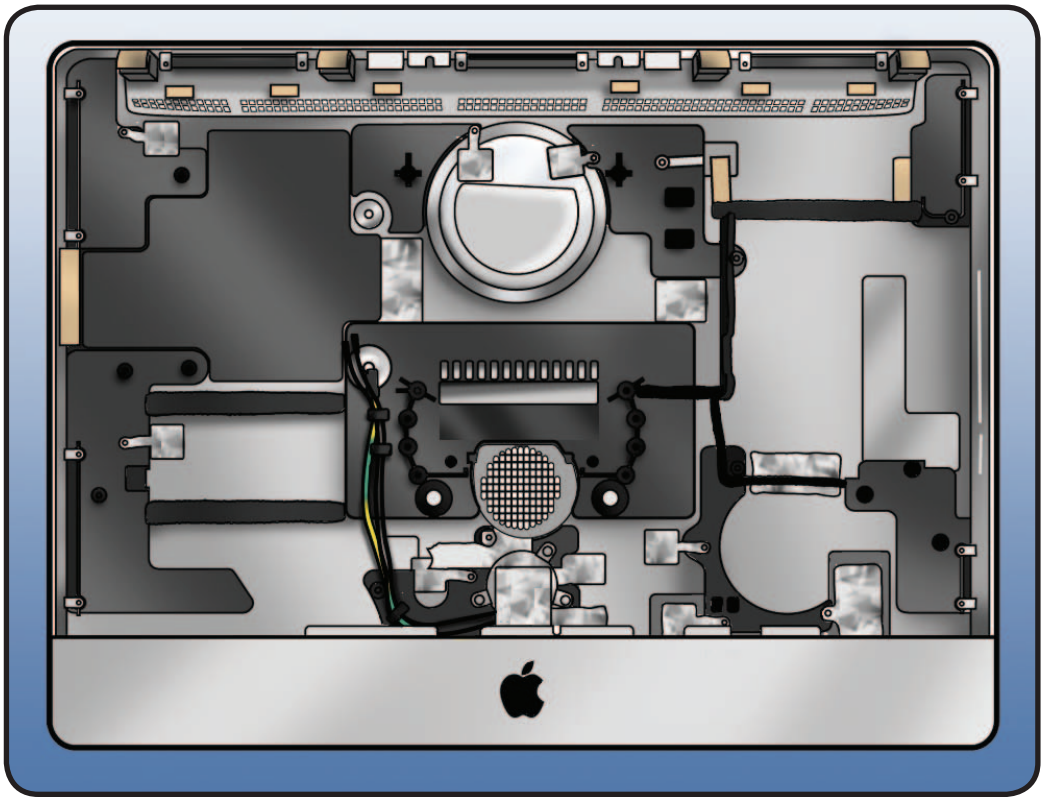


Rear Housing

First Steps

Remove:

- Glass Panel
- LCD Panel
- Bluetooth Board
- Bluetooth Antenna
- Camera
- AirPort Antenna
- LED Backlight Board
- Power Supply
- Hard Drive
- Bluetooth/Camera/ Sensor Cable
- Optical Drive
- Optical Drive Fan
- IR Board & Cable
- AirPort Card
- Logic Board
- Audio Cable
- DC Power Cable
- CPU Fan
- Left Speaker
- Right Speaker
- Hard Drive Fan
- Mechanism Cover
- Stand
- Mechanism



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

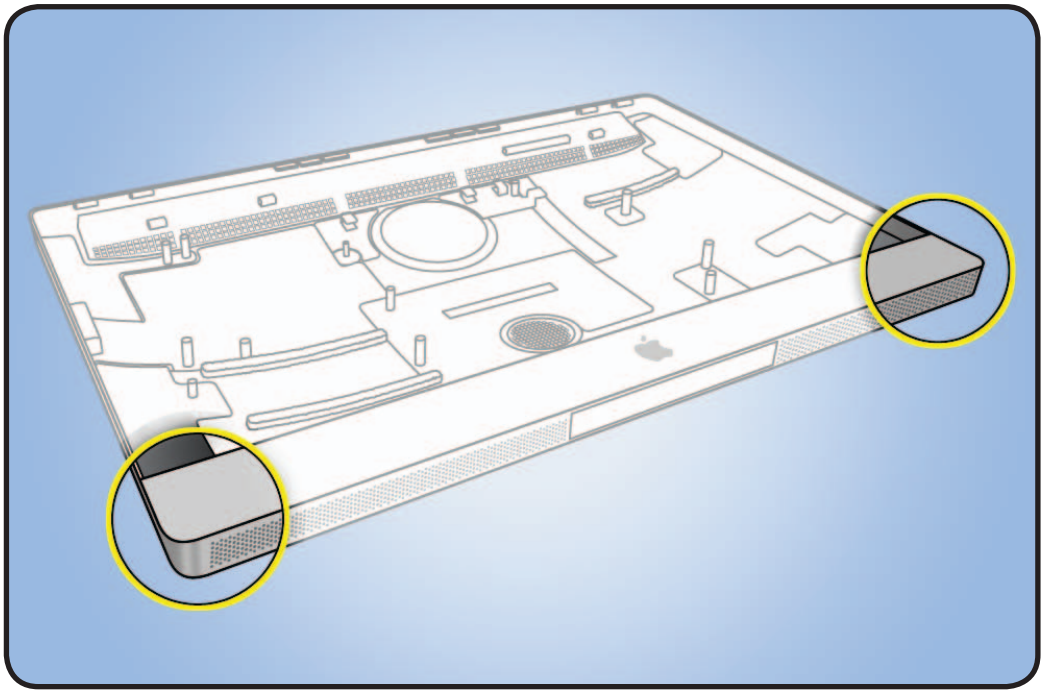
A new rear housing includes the following parts, which are also available separately:

- SD card reader and cable

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

- optical drive bezel kit (see procedure on next page)
- AirPort antenna in silver circle behind Apple logo on back of computer
- microphone cable
- power button and cable
- AC inlet

Handling Rear Housing

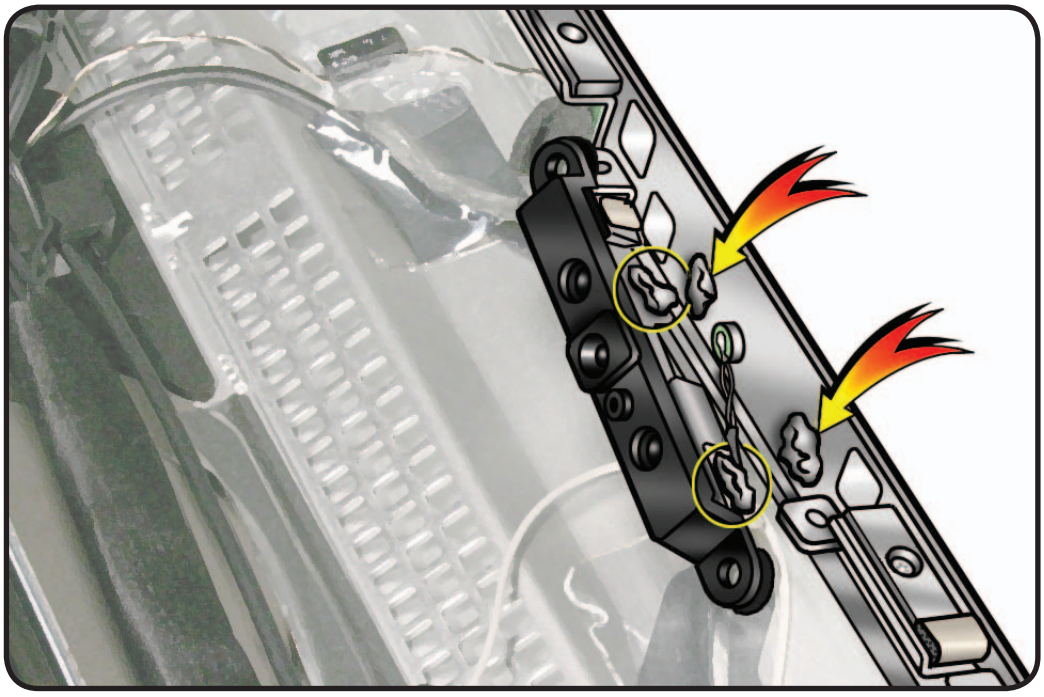


Important: Handling rear housing part incorrectly could flex aluminum and cause alignment issues.

Always handle rear housing with 2 hands in the lower left and right corners.

Never carry rear housing with a single hand, or by holding the aluminum "chin" (where Apple logo appears on front).

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.
Important: This white thermal paste should NOT be used for any other purpose (such as portable computer heatsinks).

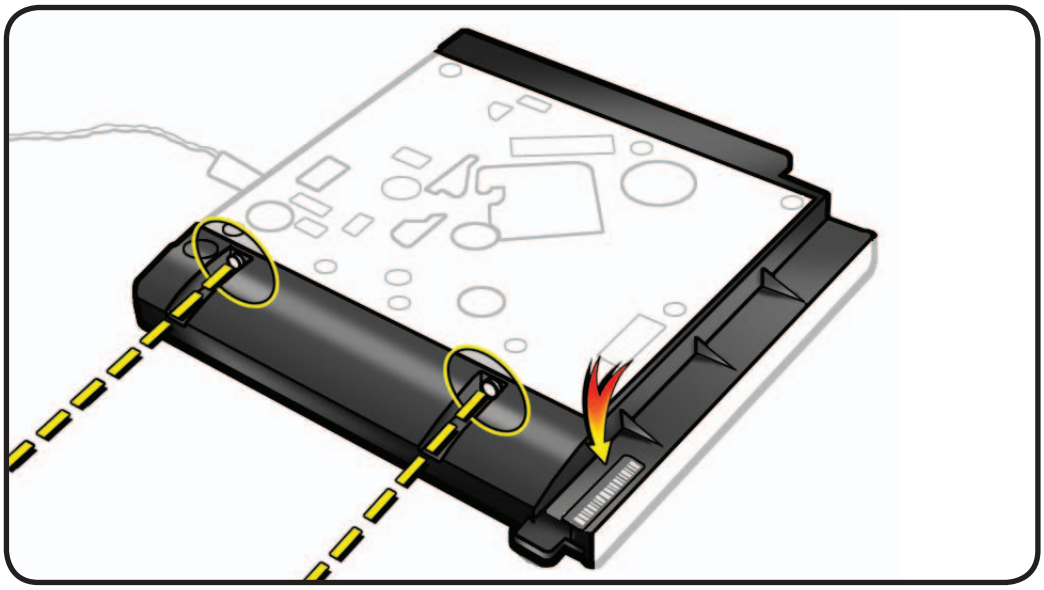
Optical Drive Bezel Replacement

When replacing the rear housing, if the unit has a Sony optical drive, it may need a different optical drive bezel. A new bezel kit is included with a new rear housing.

Check the EEE code in the serial number of the bezel (not of the mechanism; see image below for location of serial number sticker). The EEE code is located at the end of the serial number, starting with the 4th digit from the end.

- If EEE code is A2W, continue with this procedure.
- If EEE code is **not** A2W, do not replace the bezel.

1 Remove foil tape and gaskets. Examine plastic tabs under foil tape. Notice that some tabs go on the outside surface and some on inside surface of the drive.

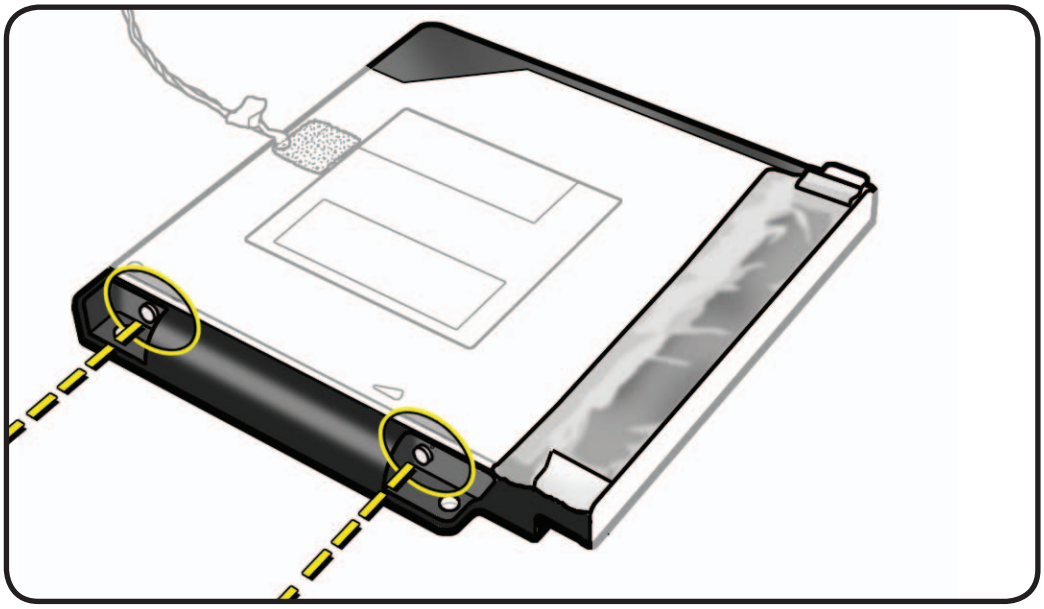


2 Remove 4 bezel screws, 2 on each side.

3 Remove old bezel and install new bezel, taking care that tabs are properly aligned.

4 Reinstall 4 screws.

5 Apply new foil tape and 2 gaskets (included with new bezel kit) as shown.



6 Once computer is fully reassembled, test optical drive (inject, read, eject) before returning to customer.

Apple Technician Guide

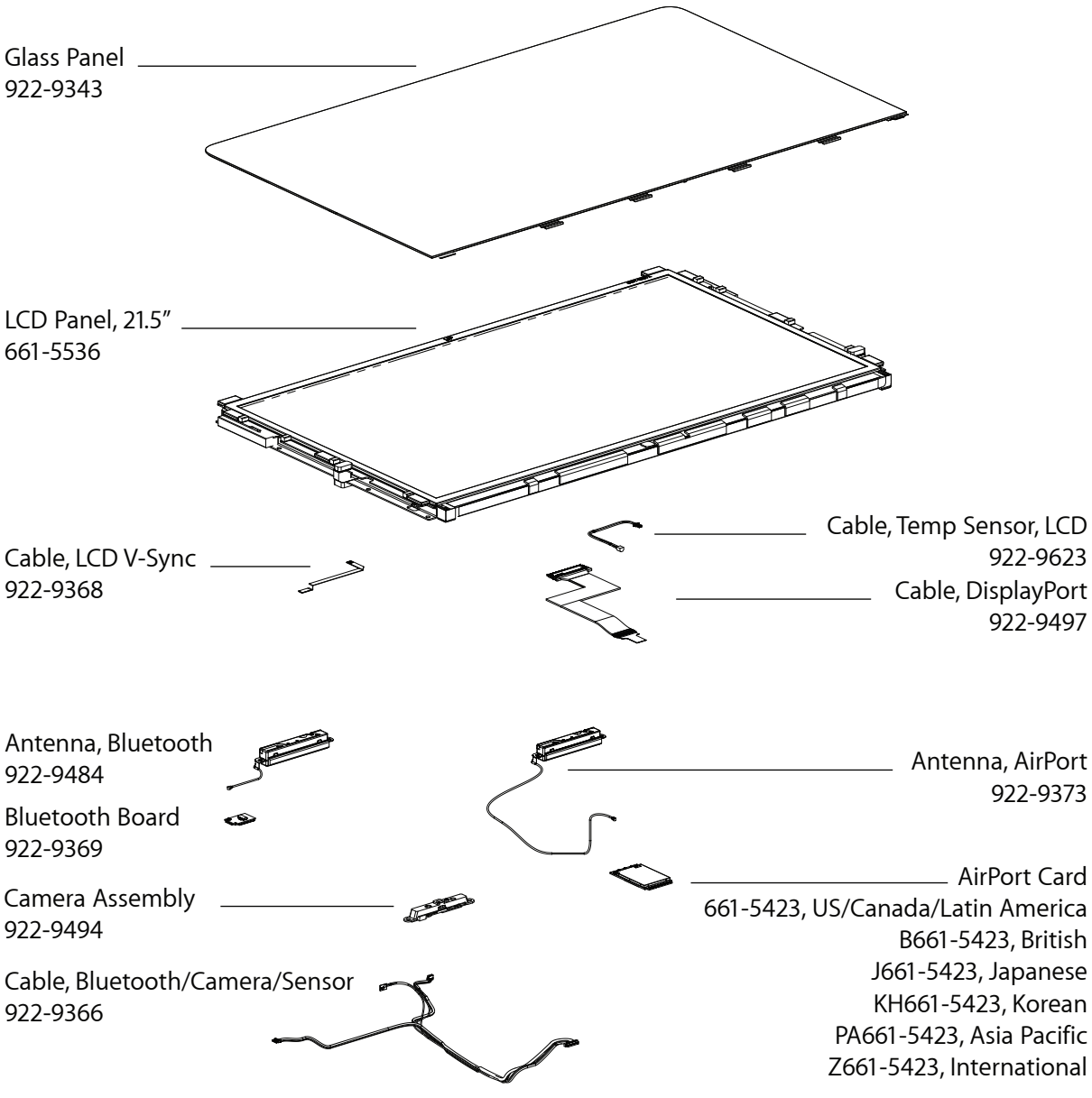
Views

iMac (21.5-inch, Mid 2010)

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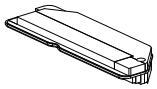
Exploded Views

iMac (21.5-inch, Mid 2010), Part 1



iMac (21.5-inch, Mid 2010), Part 2

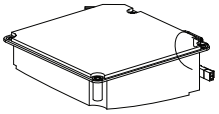
LED Backlight Board
661-5537



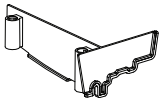
Pressure Wall, Backlight
922-9282



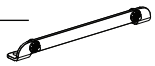
Power Supply, 205W
661-5299



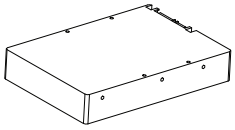
Pressure Wall, Power Supply
922-9281



Bracket, Hard Drive
922-9135

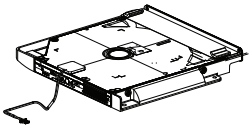


Hard Drive
661-5516, 3.5", 7200, SATA, 500GB
661-5517, 3.5", 7200, SATA, 1TB
661-5518, 3.5", 7200, SATA, 2TB



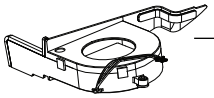
Cable, Temp Sensor, Hard Drive
922-9215, Hitachi
922-9216, Seagate
922-9622, Western Digital





Optical Drive
661-5519

Cable, Temp Sensor,
Optical Drive
922-9624



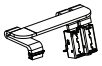
Optical Drive Fan
922-9120



SD Card Reader
922-9498



Cable, SD
Card Reader
922-9430

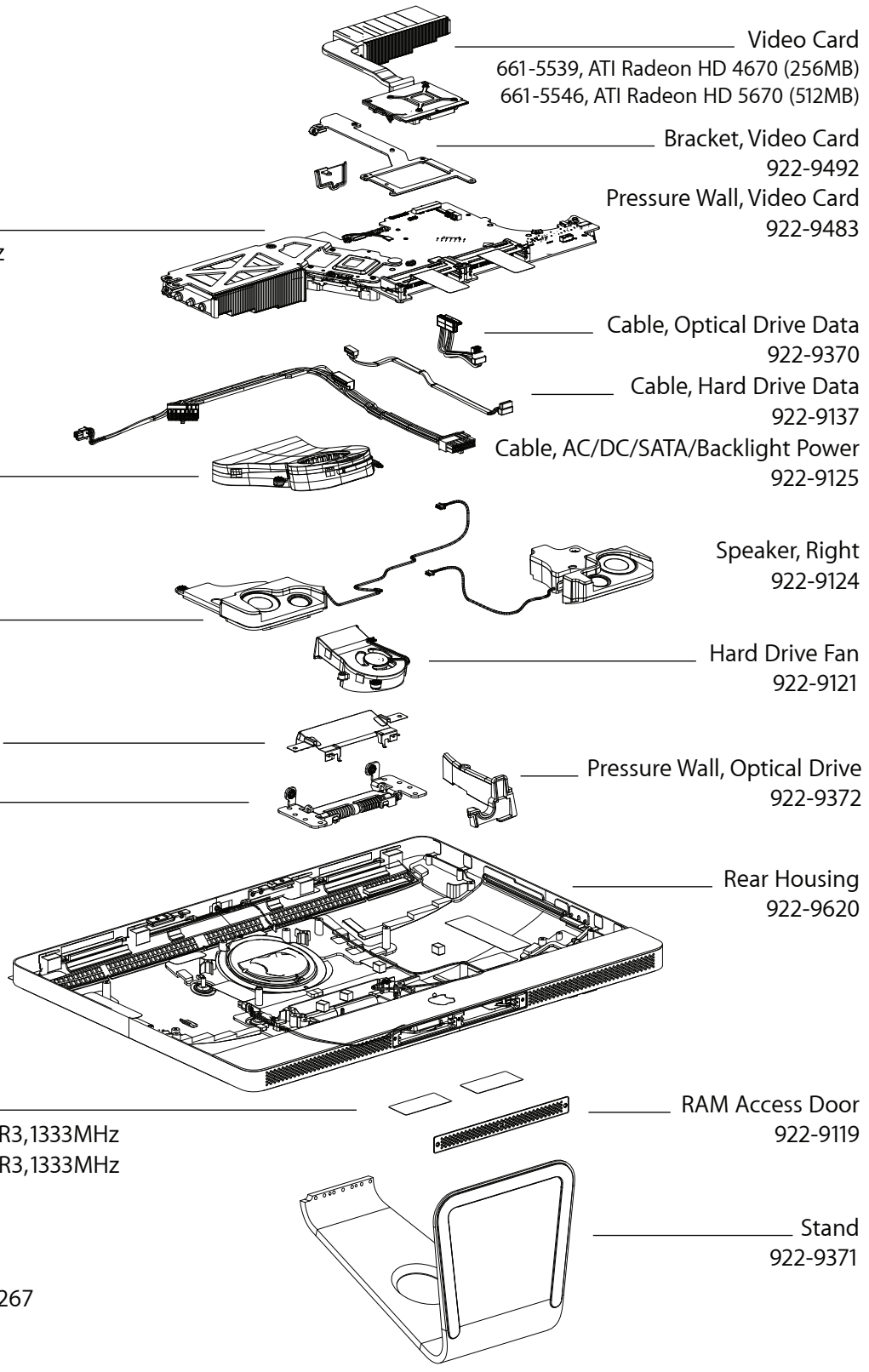


Cable, Audio I/O
922-9367



IR Board with Cable
922-9146

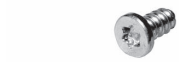
iMac (21.5-inch, Mid 2010), Part 3



Screw Chart

Note: Screws are not to scale.

922-9246 T10  LCD panel (8)	**922-9239** T10  Camera (2)	**922-4723** T8  Bluetooth antenna (2), AirPort antenna (2), video card (2), video card bracket (3)
922-9247 T8  Bluetooth board (1)	**922-8579** T6  AirPort card (1)	**922-6850** T10  LED backlight (2), Power supply, top left (1), Hard drive (2), Optical drive (4)
922-9593 T10  Power supply, bottom left (1)	**922-9244** T10  Power supply, machine (2)	**922-9241** T8  SD card reader (1)
922-9136 T8  Hard drive bracket to HDD (2)	**922-7001** T8  Hard drive pins (2)	**922-9236** T10  Optical drive fan (1), CPU fan (2), Hard drive fan (1)

922-6800 T10  Logic board, short (2), Mechanism cover, small (2)	**922-9237** T10  Logic board, medium 20mm (2)	**922-9243** T10  Logic board, long 24mm (2)
922-9594 T10  Logic board, extra-long 29mm (1)	**922-7971** T10  Video card (1), Video card pressure wall (1)	**922-9245** T10  Audio cable (2)
922-9242 T10  Right speaker (1), Left speaker (1)	**922-9238** T10  Mechanism cover (2), Mechanism (6)	**922-8209** T10  Stand (7)
922-7018 T10  Optical drive bezel to ODD (4)		

External Views

Front View

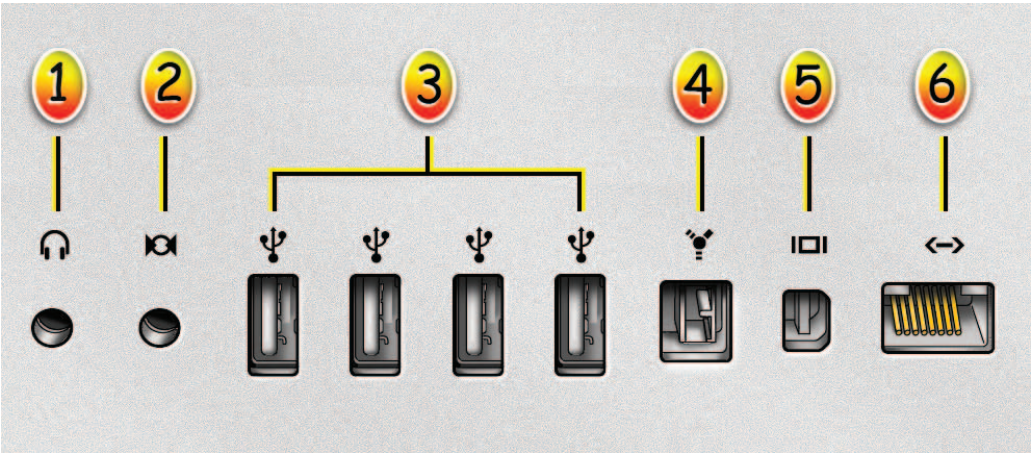


Rear View



I/O Ports

1. Headphone-out/optical digital audio-out
2. Audio-in/optical digital audio-in
3. (4) USB 2.0
4. FireWire 800
5. Mini DisplayPort
6. Gigabit Ethernet



Internal Views

Photo of Components below LCD

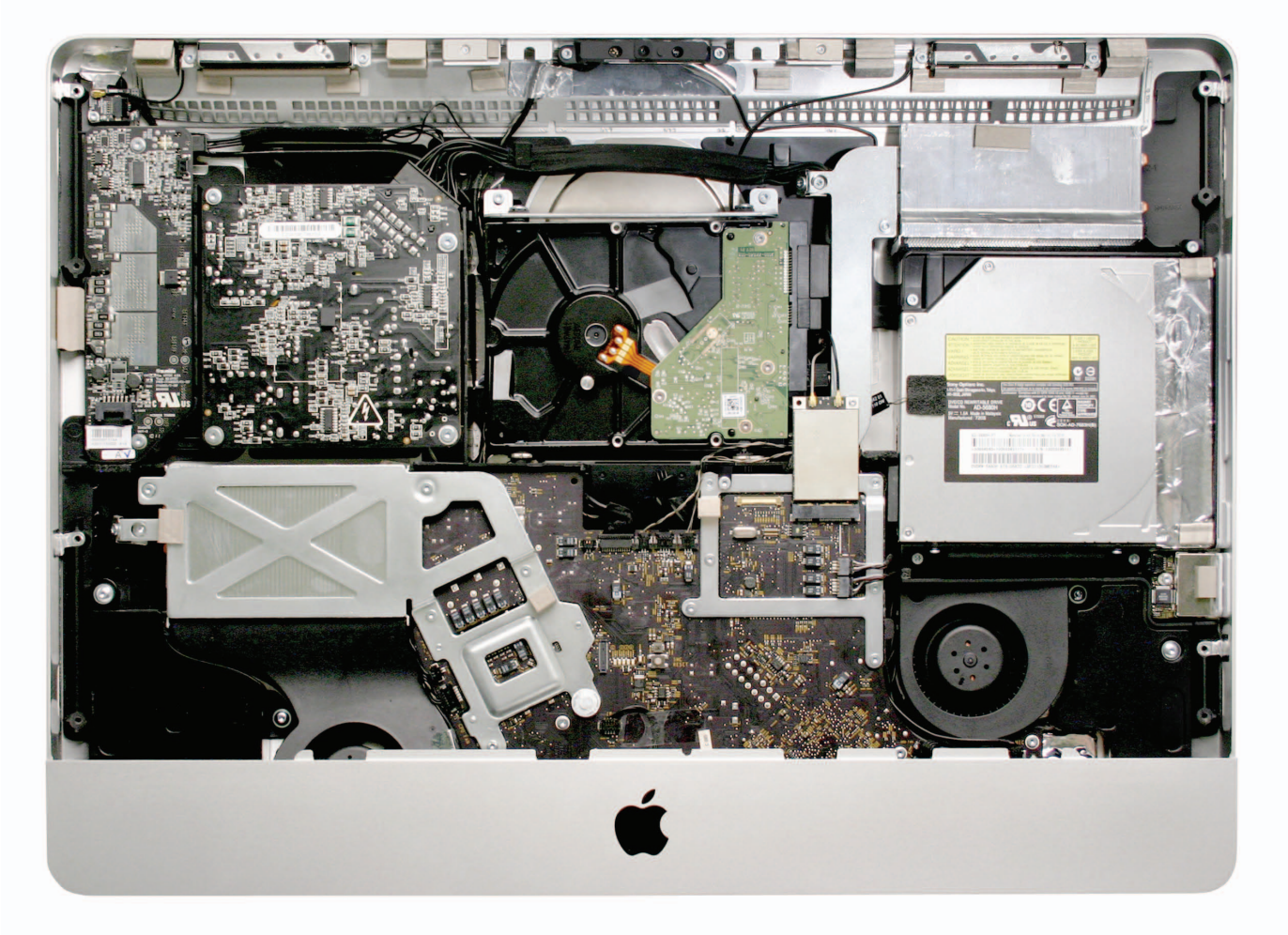
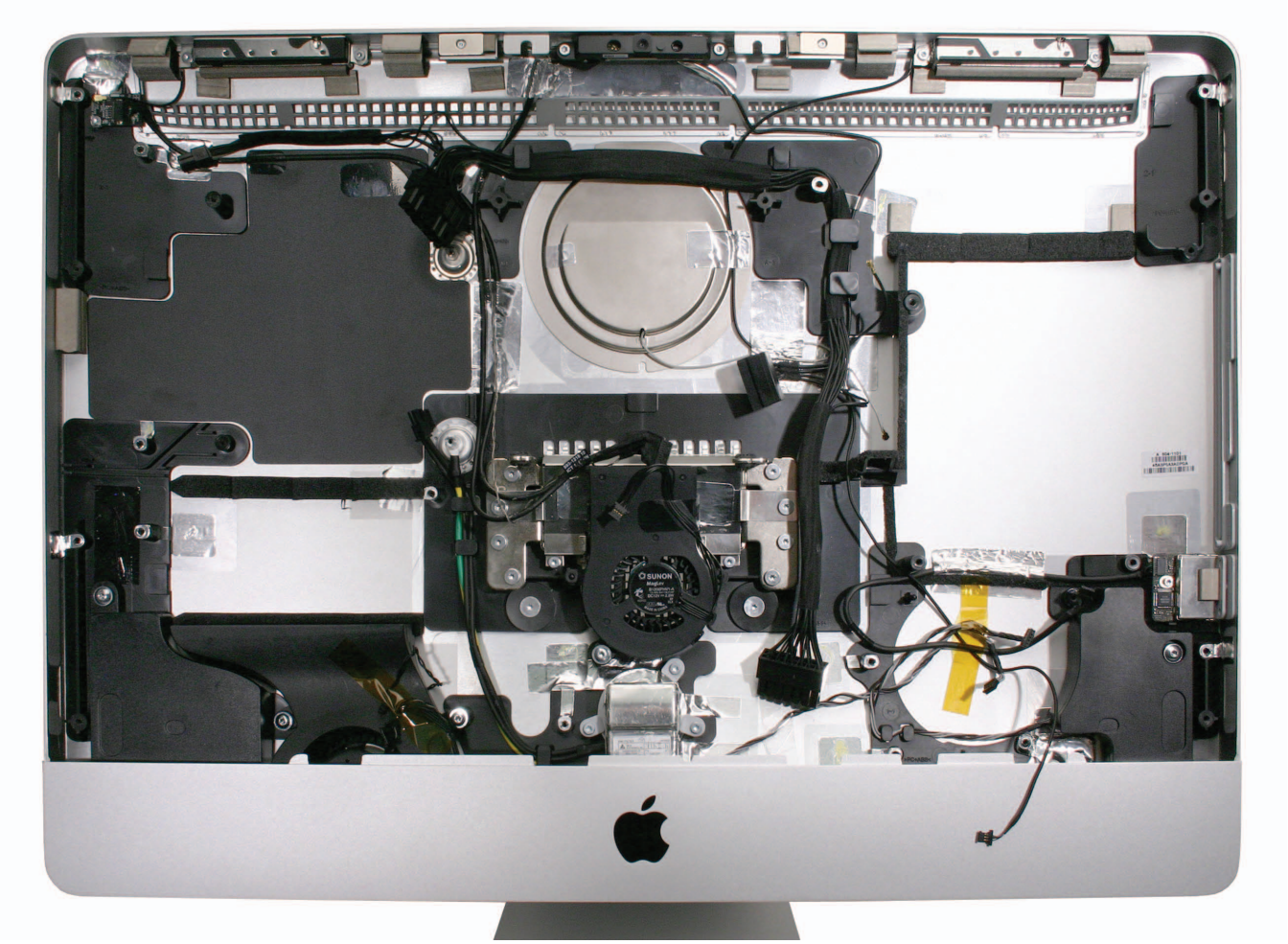
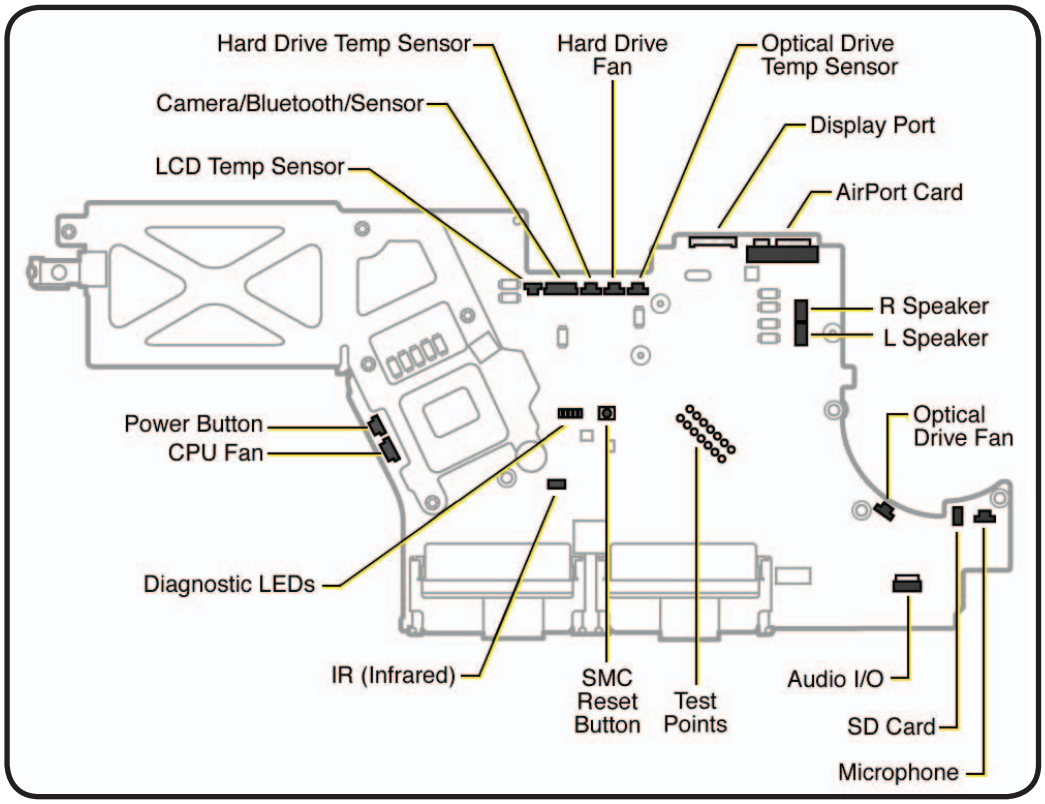


Photo of Components below Logic Board



Logic Board, Front Side



Logic Board, Back Side

