



Thunderbolt Display (27-inch) LED Cinema Display (27-inch)

Apple Recycler Guide

July 2023

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About This Guide

Apple Recycler Guides provide guidance for electronics recyclers on how to disassemble products to maximize recovery of resources. The guides provide step-by-step disassembly instructions and information on the material composition to help recyclers direct fractions to the appropriate material recycler.

To conserve important resources, we work to reduce the materials we use and aim to one day source only recycled or renewable materials in our products. A key path to reaching that goal is resource recovery from end-of-life electronics.

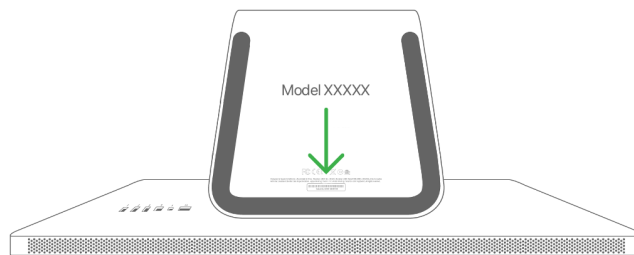
Disassembly procedures are intended to be performed only by trained electronics recycling professionals. The recycler is responsible for independently evaluating and ensuring compliance with all applicable environmental, health, and safety laws related to the work. These include but are not limited to laws relating to the management, handling, shipping, and disposal of the outputs of this work as waste and laws in place to ensure the health and safety of all employees who support this work.

For questions or feedback about this guide, email contactesci@apple.com.

Note: This guide may show images from other similar models, but the procedures are the same.

Identification

You can find the model number of the display on the bottom of the display stand. To view the model number, hold the sides of the display and gently lay the display facedown on a soft, clean towel or cloth.



Model numbers:
A1407, A1316

Directive 2012/19/EU Annex VII Components

Directive 2012/19/EU Annex VII requirements apply to the following substances and components.

Substance/Component	Apple Part Name	Removal Instructions
Printed circuit board if the surface is greater than 10 square centimeters	Main logic boards, display logic boards, light-emitting diode (LED) logic boards, power supply logic board	Follow steps 1–16
Liquid crystal display (LCD) cell if the surface is greater than 100 square centimeters	LCD cell	Follow steps 4–9
External electrical cables	Built-in Thunderbolt cable, built-in universal MagSafe cable, power cord	Follow steps 1–3
No further substances or components as listed in Annex VII		

Safety Considerations

The recycler is responsible for independently evaluating all activities undertaken by its employees to perform or support the work and ensuring compliance with all applicable health and safety laws related to the work. These include but are not limited to laws relating to the health and safety of all employees who perform or support this work. The recycler is also responsible for evaluating the workspace and ensuring that the area in which the work is to be undertaken is designed using ergonomic best practices and meets all ergonomic requirements to ensure the protection of its employees.

Personal Protective Equipment

Personal protective equipment should be worn during the entire recycling process.



Wear hand protection



Wear a mask



Wear eye protection



Wear foot protection



Wear protective clothing

LED Safety

Broken LEDs must be handled properly to ensure the safety of your employees and mitigate any hazards. Package broken LEDs in an appropriate container to properly manage the hazards associated with the materials and store only with compatible materials. All waste must be properly classified, packaged, and labeled in accordance with all relevant laws and regulations.

Hazard Warnings



Broken glass hazard



Chemical exposure hazard



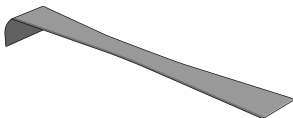
Sharp edges—cut hazard



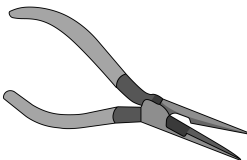
Chemical inhalation hazard

Recommended Tools

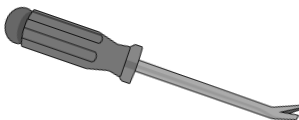
Flat surface scraper



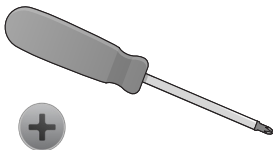
Long-nose pliers



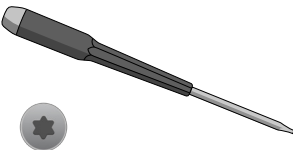
Nail-pulling screwdriver



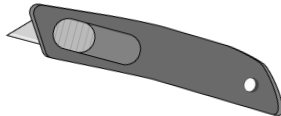
Phillips screwdriver



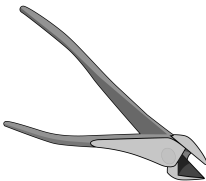
Torx T10 screwdriver



Utility knife

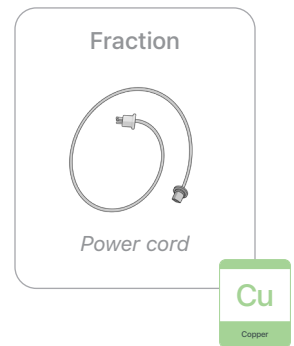
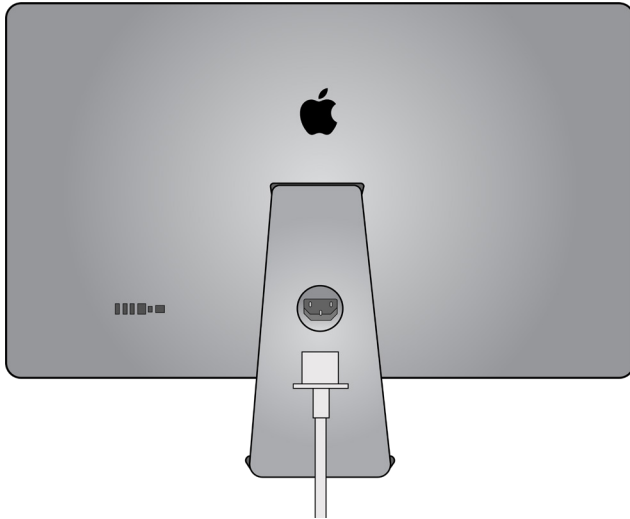


Wire cutters



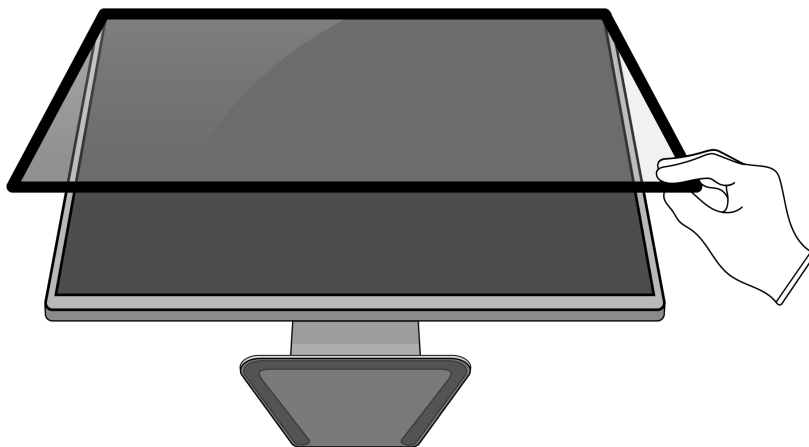
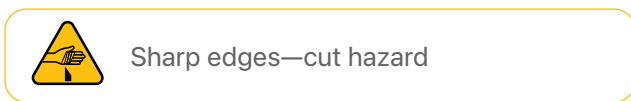
Disassembly Instructions

1. Unplug the power cord.

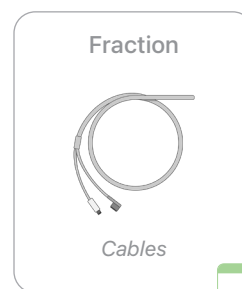
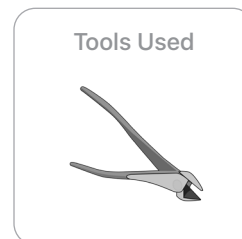
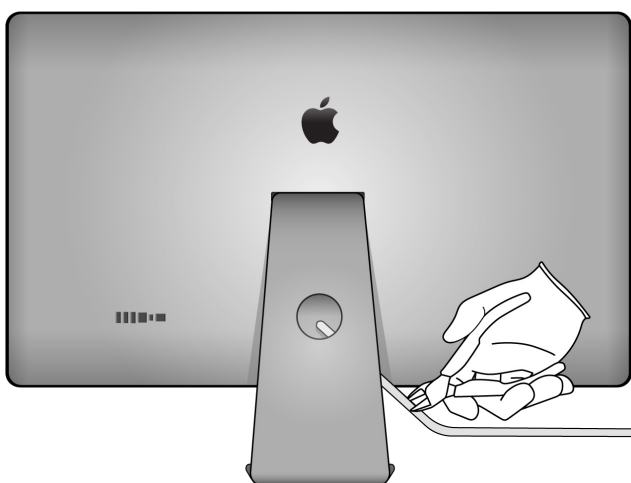


Warning: Before continuing disassembly, wait 10 minutes after unplugging the device for stored energy to discharge.

2. Lift the cover glass to remove it from the magnets.

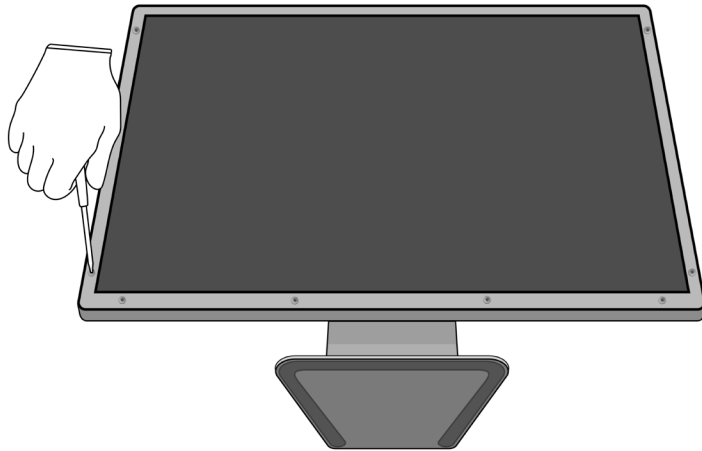


3. Cut off the cables from the back side of the display.

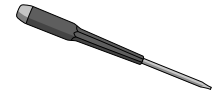


4. Remove the LCD assembly.

» *Remove the eight fasteners holding the LCD assembly to the enclosure.*



Tools Used



Fraction





Fasteners (x8)

Fe

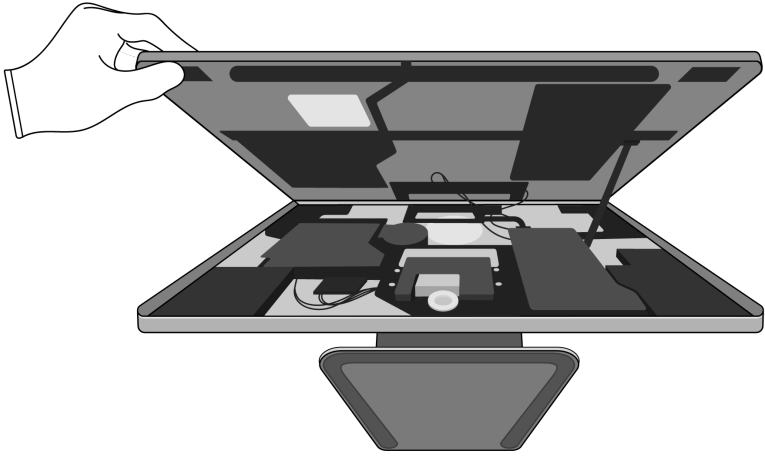
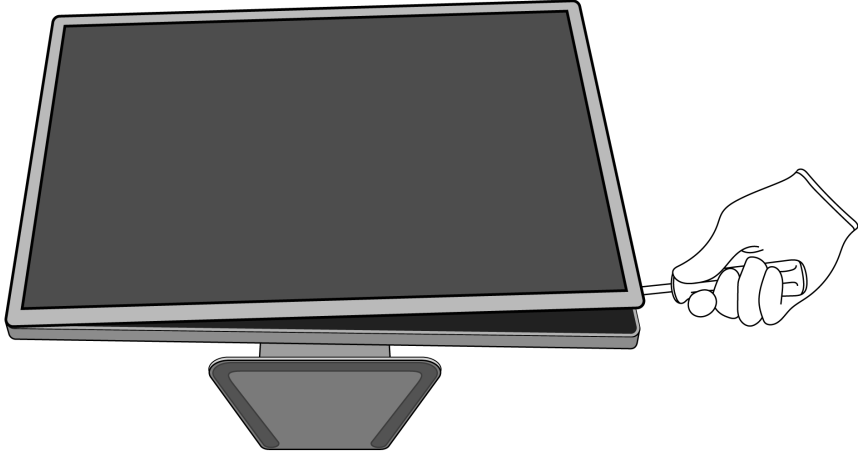
Ferrous

» *Pry up the LCD assembly to remove it from the enclosure.*

 Chemical exposure hazard

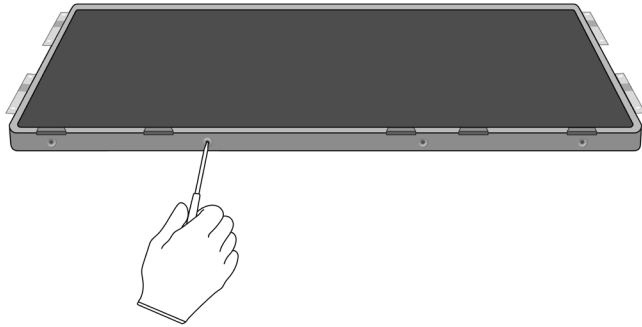
 Sharp edges—cut hazard

Tools Used

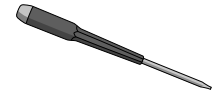


5. Remove the first metal frame.

» Remove the 12 fasteners around the LCD assembly.



Tools Used



Fraction



Fasteners (x12)

Fe

Ferrous

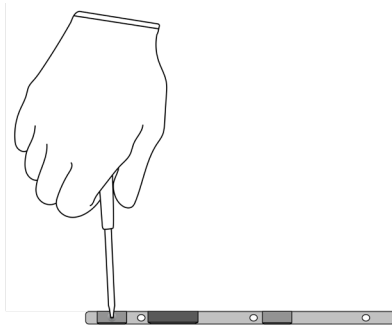
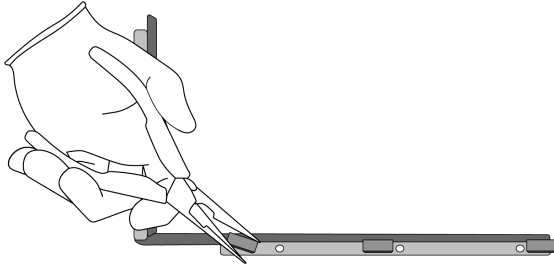
» Pry off the metal frame.



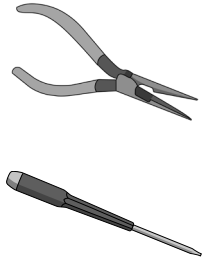
Tools Used



» Remove the 16 magnets and four fasteners from the frame.



Tools Used



Fraction



Magnets (x16)

REE
Rare Earth
Elements

Fraction



Fasteners (x4)



Metal frame

Fe
Ferrous

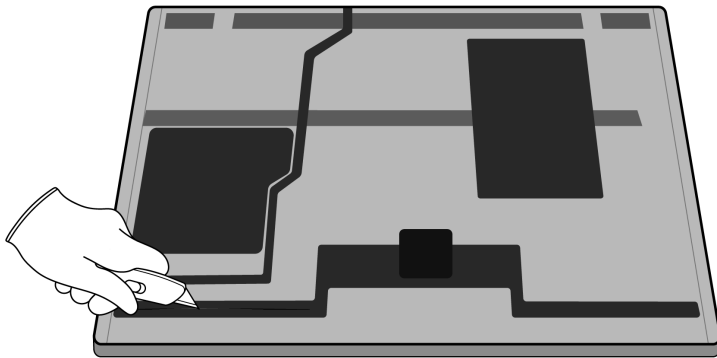
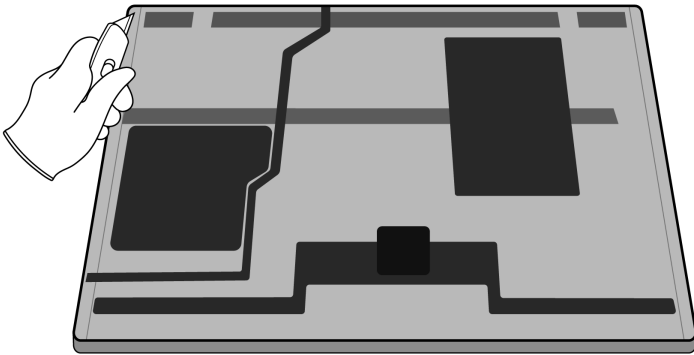
6. Remove the metal cover.

- » *Flip the LCD assembly over and cut the foil surrounding the display and logic board cover.*

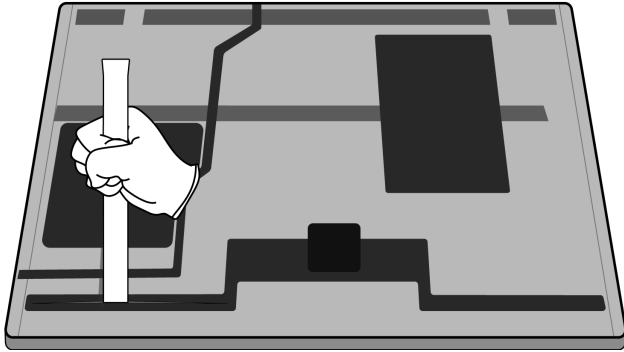


Sharp edges—cut hazard

Tools Used



» Pry off the metal cover, exposing the three logic boards.



Tools Used



Fraction

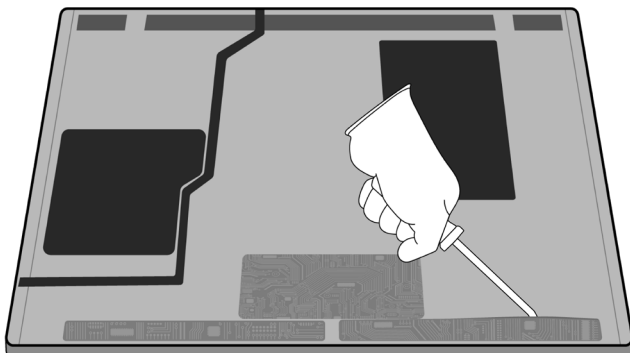


Metal cover

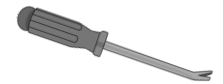
Fe

Ferrous

7. Pry off the three logic boards.



Tools Used



Fraction

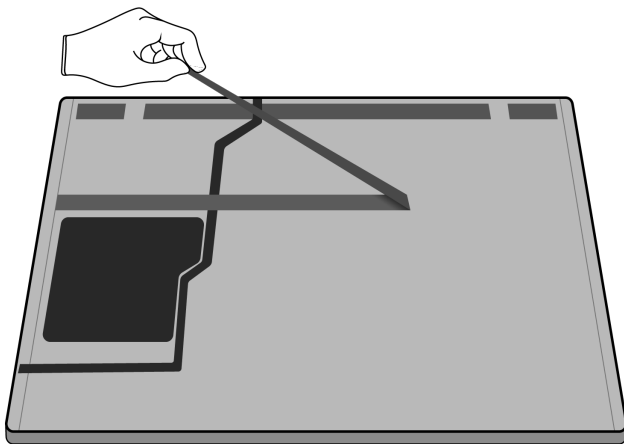
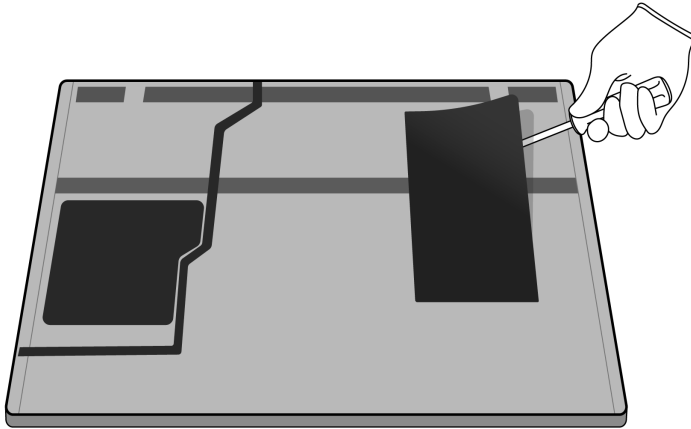


Logic boards

PMs

Precious Metals

8. Remove the remaining plastic sheets and wires from the display module.



Tools Used



Fraction



Plastic sheets

PL

Plastics

Fraction

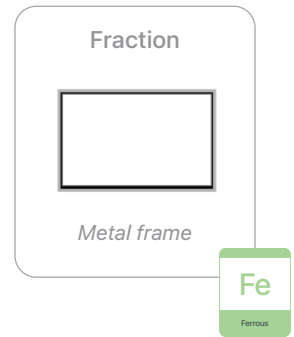
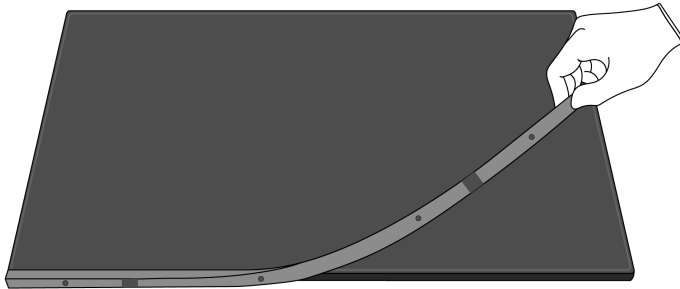


Wires

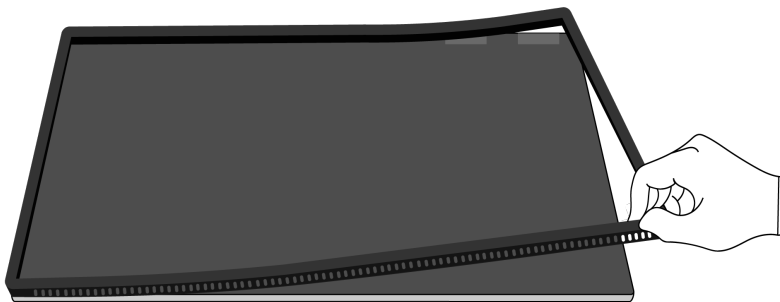
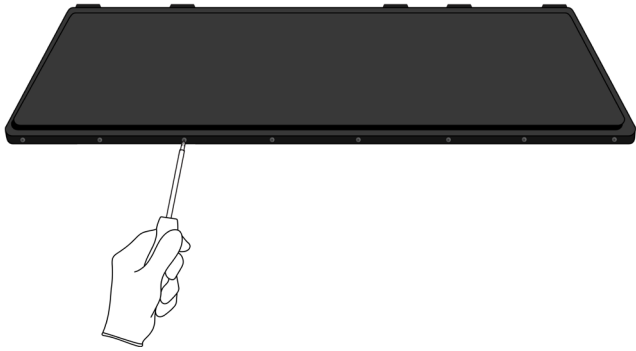
Cu

Copper

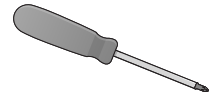
9. Turn the display over and pull off the remaining metal frame.



10. Remove the five fasteners from the plastic frame and lift the frame away.



Tools Used



Fraction



Fasteners (x5)

Fe

Ferrous

Fraction




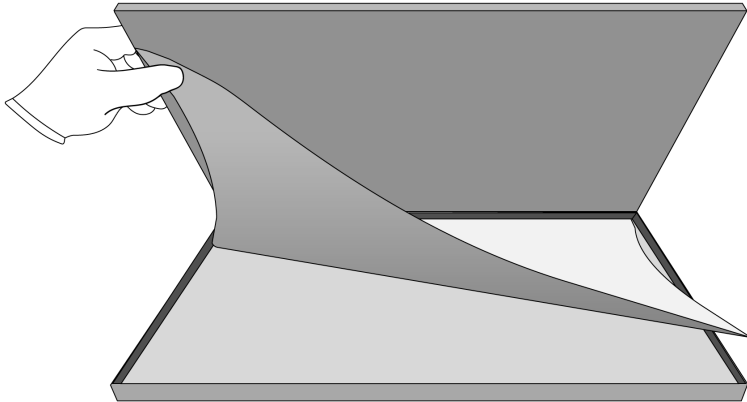
Plastic frame

PL

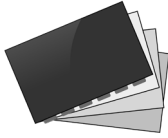
Plastics

11. Remove the LCD cell and the display films.

 Broken glass hazard




Fraction



Display films

PL
Plastics


Fraction



LCD cell

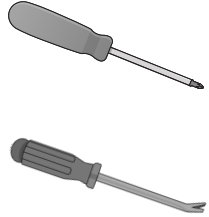
GL
Glass

12. Remove the 20 fasteners from the LED logic boards. Pull off the LED logic boards from the bottom of the mid plate.

 Chemical inhalation hazard



Tools Used




Fraction



Fasteners (x20)

Fe
Ferrous


Fraction



LED logic boards

PMs
Precious Metals

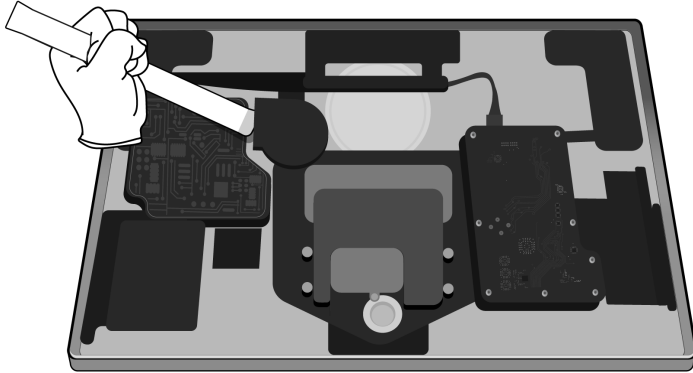
Fraction



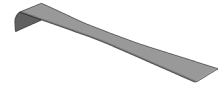
Mid plate

Al
Aluminum

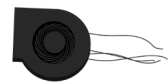
13. Pry off the fan.



Tools Used



Fraction

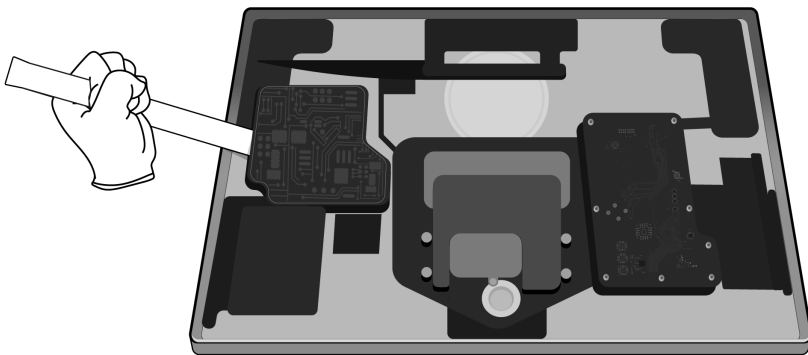


Fan

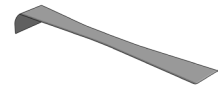
Cu

Copper

14. Remove the power supply logic board.



Tools Used



Fraction



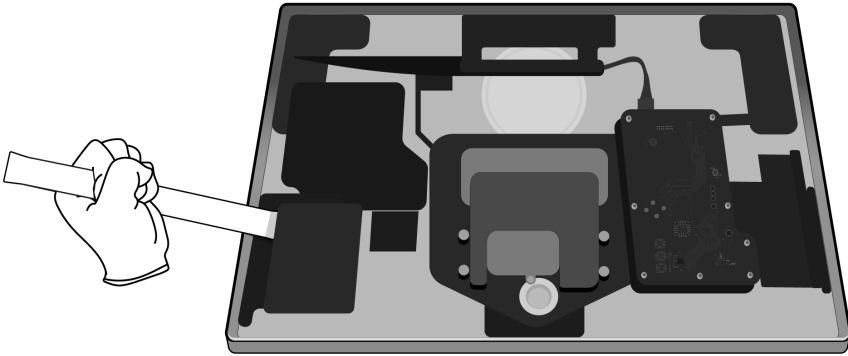
Power supply
logic board

PMs

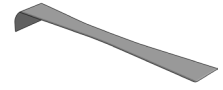
Precious
Metals

15. Remove the speakers.

» Remove the left speaker.



Tools Used



Fraction

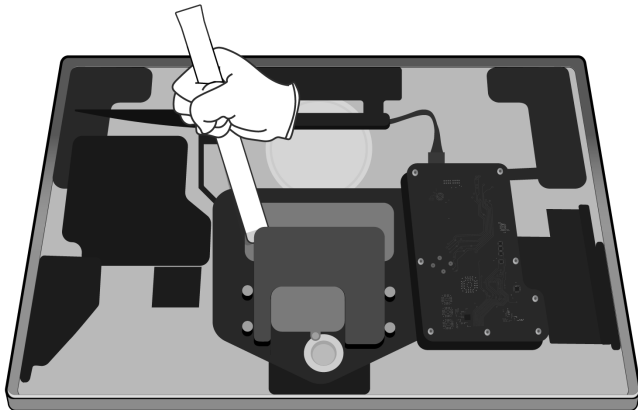


Speaker

REE

Rare Earth
Elements

» Remove the middle speaker.



Fraction

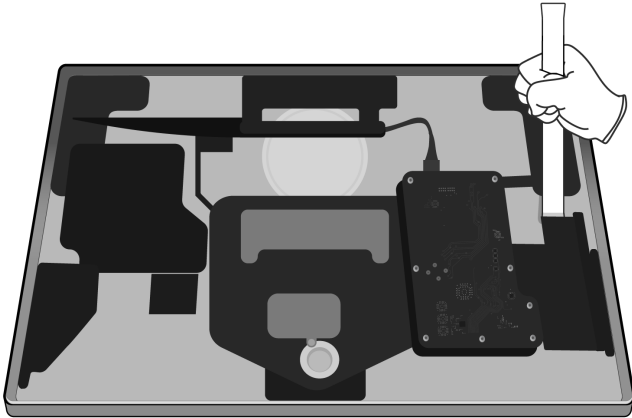


Speaker


REE

Rare Earth
Elements

» Remove the right speaker.



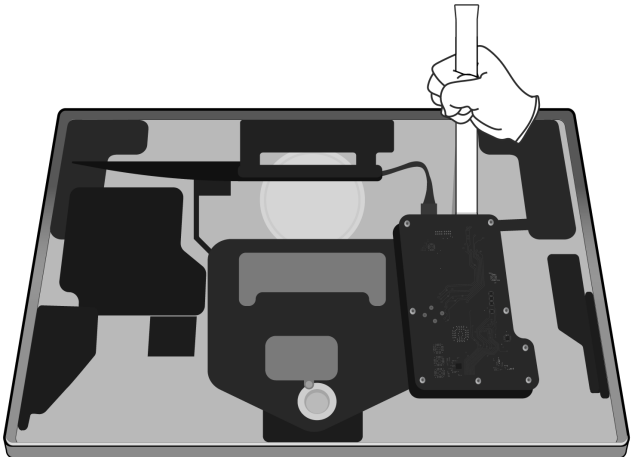
Fraction




Speaker

REE
Rare Earth Elements


16. Remove the logic board.



Tools Used



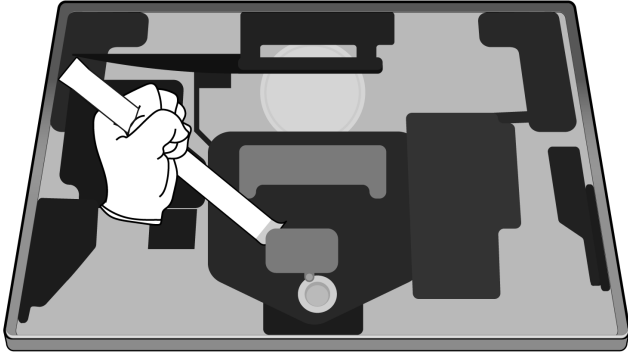
Fraction



Logic board

PMs
Precious Metals

17. Remove the power adapter.



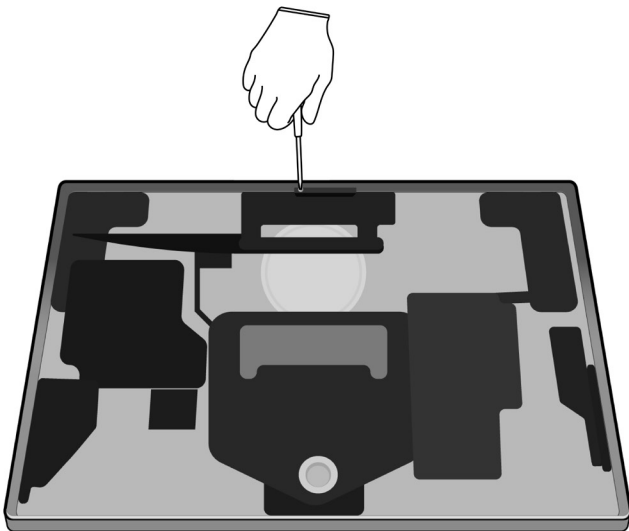
Tools Used

Fraction

Power adapter



18. Remove the two fasteners holding down the camera and microphone. Remove the camera.



Tools Used

Fraction

Fasteners (x2)

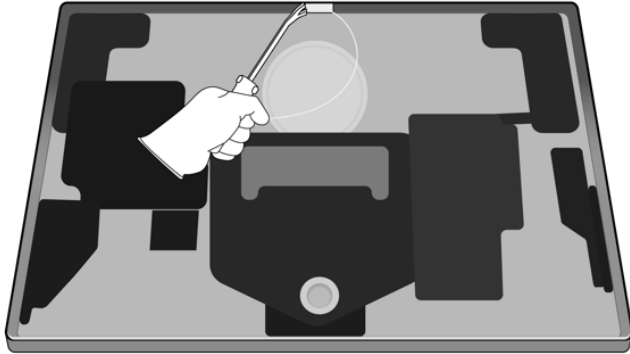


Fraction

Camera



19. Remove the external microphone.



Tools Used



Fraction



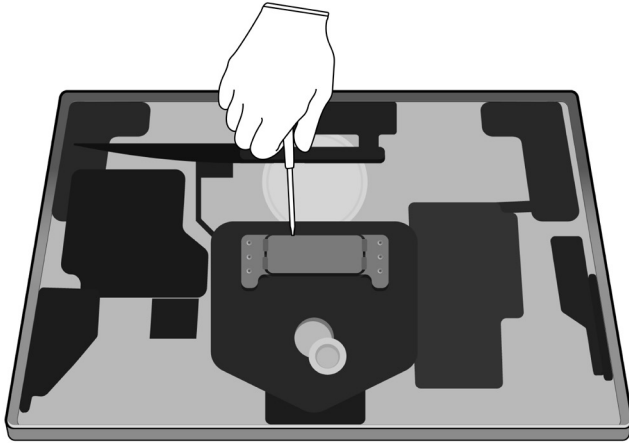
Microphone

Cu

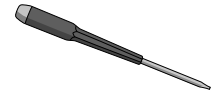
Copper

20. Remove the stand.

- » Remove the eight fasteners holding the display stand to the hinge.



Tools Used



Fraction

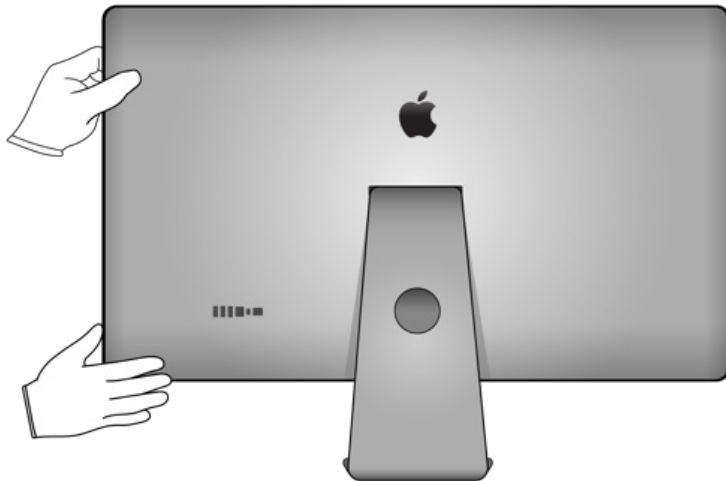


Fasteners (x8)

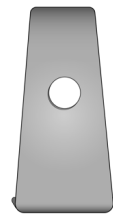
Fe

Ferrous

- » Slide the enclosure away from the stand.



Fraction



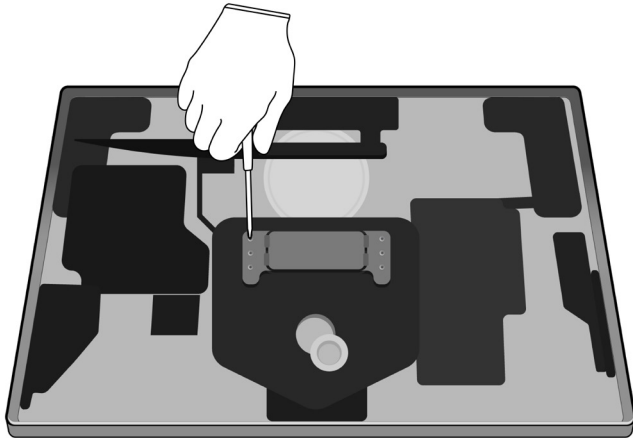
Stand

Al

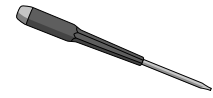
Aluminum

21. Remove the hinge.

» Remove the eight fasteners surrounding the hinge.



Tools Used



Fraction

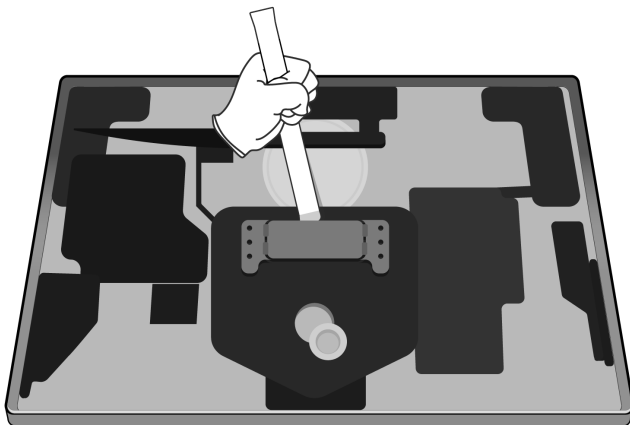


Fasteners (x8)

Fe

Ferrous

» Pry off the hinge.



Tools Used



Fraction

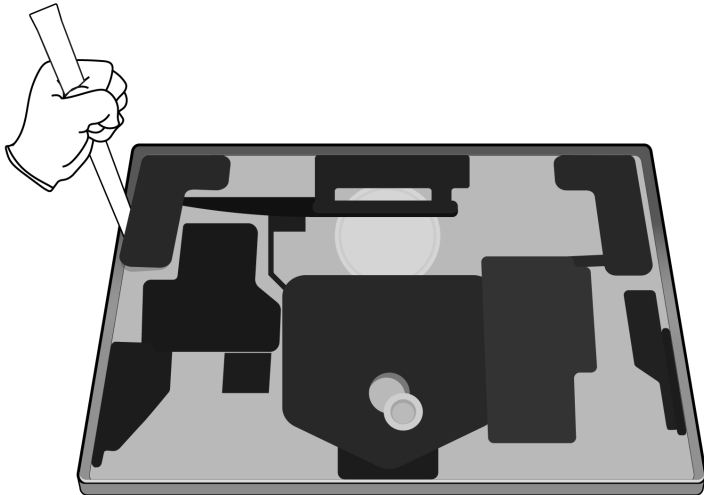


Hinge

Fe

Ferrous

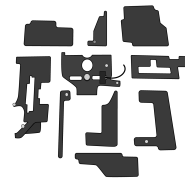
22. Pry off all remaining plastic pieces from the aluminum enclosure.



Tools Used



Fraction



Plastic

PL

Plastics

Fraction




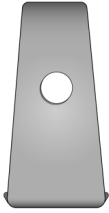




Aluminum enclosure

Al

Aluminum

Material Categorization of Output Fractions

All outputs from this process must be managed, handled, and disposed of in accordance with applicable waste laws and regulations, including but not limited to the Waste Framework Directive and its national enactments in Europe.

Fraction	Downstream Processing
<p data-bbox="435 583 565 615">Aluminum</p>  <p data-bbox="451 827 548 858"><i>Mid plate</i></p>  <p data-bbox="467 1129 522 1161"><i>Stand</i></p>  <p data-bbox="402 1402 597 1434"><i>Aluminum enclosure</i></p>	<p data-bbox="961 583 1269 615">Primary Target Material</p>  <p data-bbox="922 835 1312 867">Potential Additional Materials</p>  

Fraction

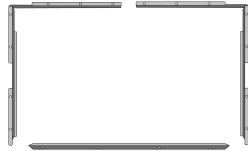
Downstream Processing

Ferrous

Primary Target Material



Fasteners (x67)



Metal frames



Metal cover



Hinge

Fraction

Downstream Processing

Glass



Cover glass



LCD cell

Primary Target Material



Potential Additional Materials



Logic Boards



Logic boards



LED logic boards



Power supply logic board

Primary Target Material



Potential Additional Materials



Fraction

Downstream Processing

Mixed Electronics



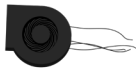
Power cord



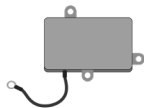
Cables



Wires



Fan



Power adapter



Camera



Microphone

Primary Target Material



Potential Additional Materials



Fraction

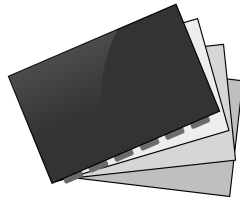
Downstream Processing

Mixed Plastics

Primary Target Material



Plastic



Display films



Plastic sheets



Plastic frame

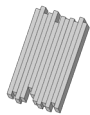
Fraction

Downstream Processing

Rare Earth Magnets



Speakers



Magnets (x16)

Primary Target Material



Potential Additional Materials

