



**Apple Watch Series 2 38mm (2nd generation)**

**Apple Watch Series 2 42mm (2nd generation)**

**Apple Watch Series 3 (GPS)**

**Apple Watch Series 3 (GPS + Cellular)**

## **Apple Recycler Guide**

April 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](mailto:contactesci@apple.com).

**Note:** The enclosures for Apple Watch Series 2 and Apple Watch Series 3 may be aluminum, stainless steel, or ceramic. This guide was created using Apple Watch Series 3 with an aluminum enclosure, but the procedures are the same for each model and enclosure material.

# Identification

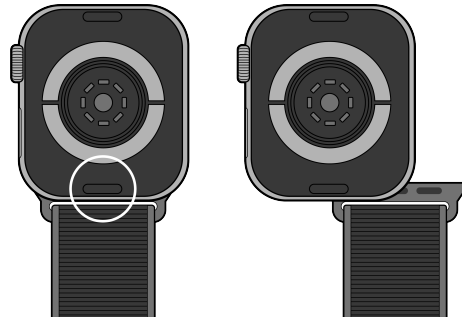
You can find the model number in the band slot of the Apple Watch.



*Model numbers:*

*A1757, A1758, A1816, A1817, A1858, A1859,  
A1860, A1861, A1889, A1890, A1891, A1892*

If the band is attached, press and hold the band release button, then slide the band across to remove it.



# Directive 2012/19/EU Annex VII Components

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

<b>Substance/Component</b>	<b>Apple Part Name</b>	<b>Removal Instructions</b>
Printed circuit board if the surface is greater than 10 square centimeters	Display logic board, main logic board	Follow steps 1–11
External electric cables	Power adapter, magnetic charging cable	Follow step 1
Battery	Lithium-ion polymer battery	Follow steps 1–5
Cover glass and organic light-emitting diode (OLED) display if the surface is greater than 100 square centimeters	OLED display	Follow steps 1–4
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 foot protection



Wear eye protection



Wear a mask



Wear protective clothing

## Battery Safety

This product uses a lithium-ion polymer battery. Before beginning any disassembly work, ensure that a safe working procedure for handling lithium-ion batteries has been established, which could include discharging the batteries so that they can be more safely managed. The following considerations may also be included:

- Remove anything from your person that could conduct energy, such as jewelry and watches, to avoid electric shock to yourself or the logic board.
- To avoid the potential for thermal runaway and the release of potentially noxious fumes, don't puncture, strike, or crush lithium-ion polymer batteries or devices powered by them.
- Don't throw, drop, or bend the battery.
- Don't expose the battery to excessive heat or sunlight.
- Don't use tools that are sharp or conduct electricity.
- Keep your workspace clear of foreign objects and sharp materials.
- Dispose of batteries according to local environmental laws and guidelines.

## Workspace safety guidelines

- Use heat-resistant gloves and safety glasses.
- Keep a sand dispenser within arm's reach (2 feet or 0.6 m) on one side of the workstation, not above the workstation. The dispenser should be a wide-mouthed, quick-pour metal container with a flip-top lid or tray that contains 8–10 cups (1.9–2.4 L) of clean, dry, untreated sand.
- Keep the battery at least 2 feet (0.6 m) from paper and other combustible materials.
- Work in an area with adequate ventilation.

## Handling a thermal runaway

If you notice any of the following signs, a thermal runaway is likely underway, and you should act immediately:

- The lithium-ion polymer battery or a device containing one begins to smoke or emit sparks or soot.
- The battery pouch suddenly and quickly puffs out.
- You hear hissing or popping sounds.

**Don't** use water or an ABC/CO<sub>2</sub> fire extinguisher on a thermal runaway battery or a device containing one. Water and ABC/CO<sub>2</sub> fire extinguishers will not stop the reaction.

**Do** smother the battery or device immediately with plenty of clean, dry sand, dumped all at once. Timing is critical; the faster you pour all the sand, the faster the thermal runaway will stop.

**Do** leave the room for 30 minutes if the thermal runaway causes any irritation.

**Do** wait 30 minutes before touching the battery. Wear heat-resistant gloves and safety glasses to remove the battery from the sand, or use a touchless thermometer to measure the battery temperature. Only touch the battery when the event has finished.

**Do** dispose of the damaged battery or device (including any debris removed from the sand) according to local environmental laws and guidelines.

## OLED Safety

Broken OLEDs must be handled properly to ensure the safety of your employees and mitigate any hazards. Package broken OLEDs 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



Rechargeable battery hazard

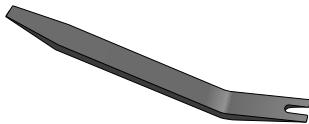


Chemical inhalation hazard

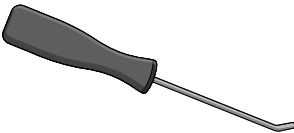


# Recommended Tools

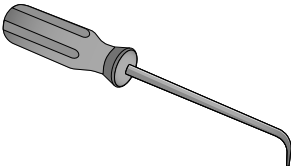
Miniature plastic pry bar



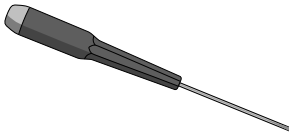
Miniature pry bar



Precision pick



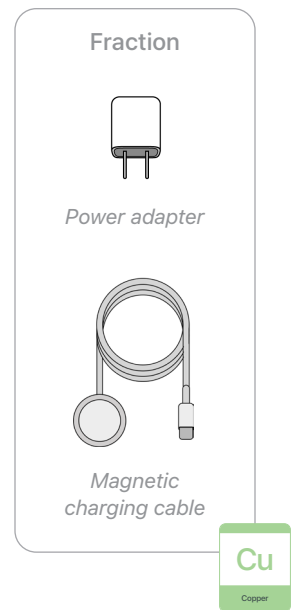
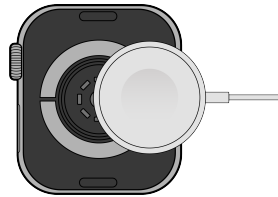
Precision slotted screwdriver



# Disassembly Instructions

1. Remove the power adapter and the magnetic charging cable.

- » *Ensure that the Apple Watch is turned off.*
- » *Unplug the power adapter. Disconnect both ends of the magnetic charging cable.*



## 2. Remove the OLED display.

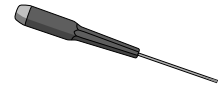


Broken glass hazard

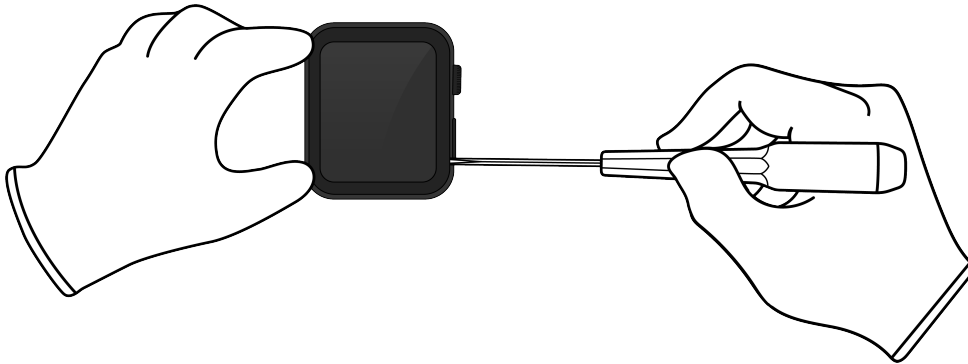


Chemical inhalation hazard

### Tools Used



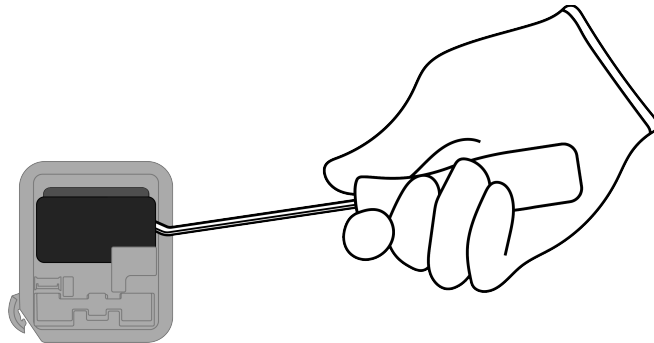
- » *Hold the Apple Watch at the edge of a counter with the display facing up.*
- » *Insert the tool tip between the display and the enclosure. Push the handle down to pry the display from the enclosure.*



- » *Remove the display by hand. Set the enclosure aside.*

### 3. Remove the display logic board.

- » *Lay the display facedown.*
- » *Pry off the display logic board.*



#### Tools Used



#### Fraction

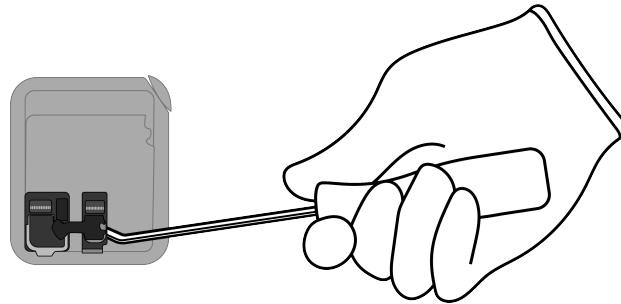


*Display logic board*

**PMs**

Precious Metals

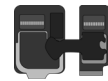
#### 4. Pry off the Force Touch sensor.



##### Tools Used



##### Fraction



*Force Touch sensor*

**Cu**

Copper

##### Fraction




*OLED display*

**GL**

Glass


5. From the enclosure, carefully remove the lithium-ion polymer battery.

 Rechargeable battery hazard

Tools Used

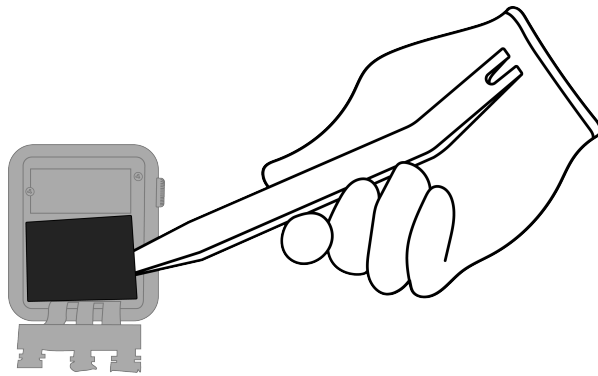


Fraction




Lithium-ion polymer battery

BT  
Battery



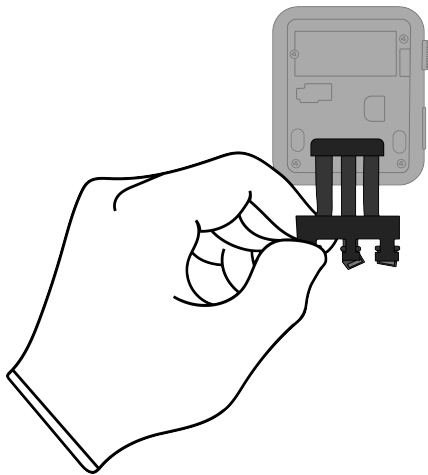
6. Pull off the display ribbon cable by hand.

Fraction

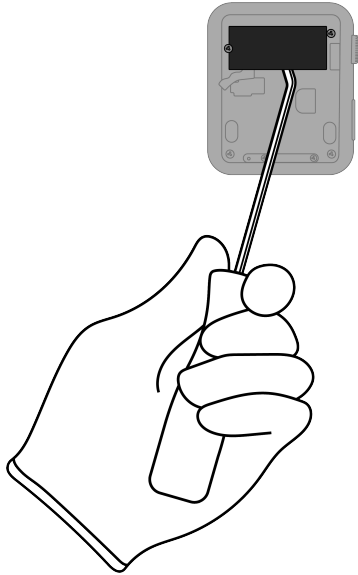


Ribbon cable

Cu  
Copper



7. Pry off the Taptic Engine.



Tools Used



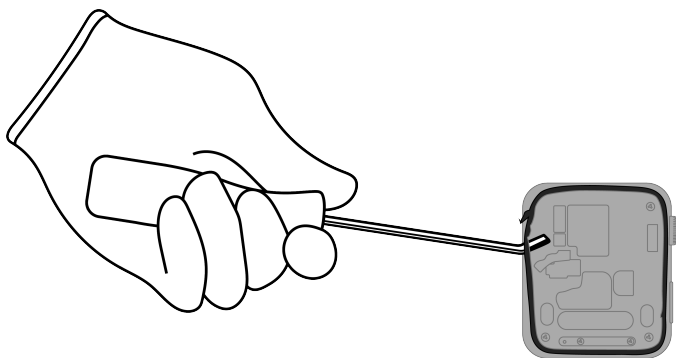
Fraction



Taptic Engine

REE  
Rare Earth  
Elements

8. Pry off the Force Touch gasket.



Tools Used



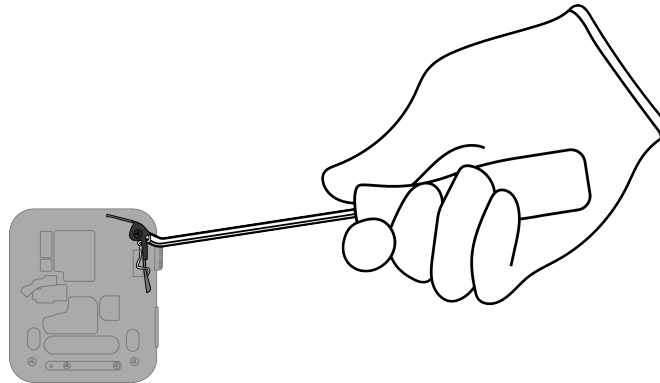
Fraction



Force Touch gasket

Cu  
Copper

**9.** Pry off the antenna.



Tools Used



Fraction

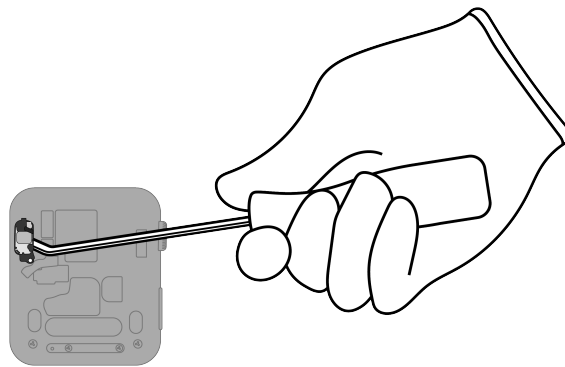


Antenna

**Cu**

Copper

**10.** Pry off the speaker.



Tools Used



Fraction



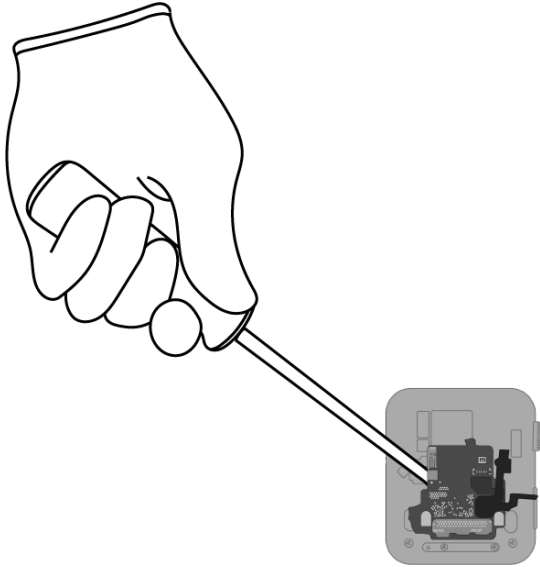
Speaker

**REE**

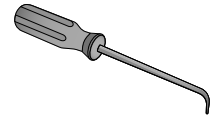
Rare Earth Elements



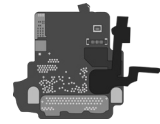
## 11. Pry off the main logic board.



### Tools Used



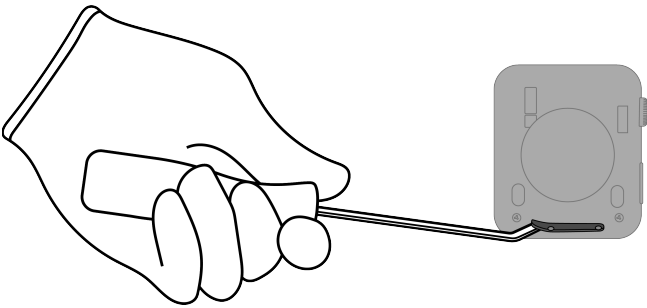
### Fraction



Main logic board

**PMs**  
Precious Metals

## 12. Pry off the ribbon cable assembly.



### Tools Used



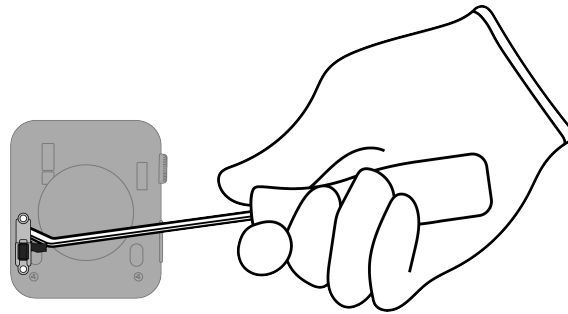
### Fraction



Ribbon cable

**Cu**  
Copper

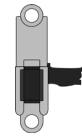
**13.** Pry off the microphone.



Tools Used



Fraction

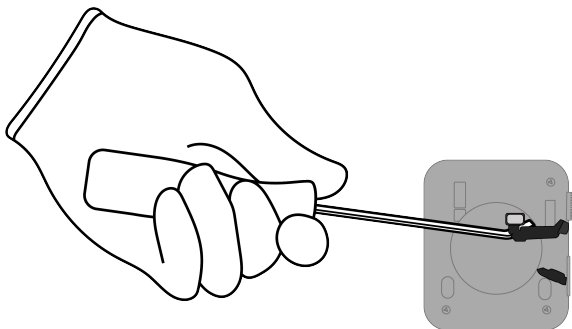


Microphone

Cu

Copper

**14.** Pry off the remaining ribbon cables.



Tools Used



Fraction

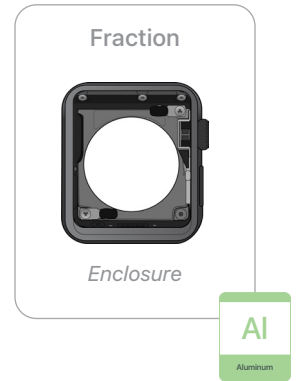
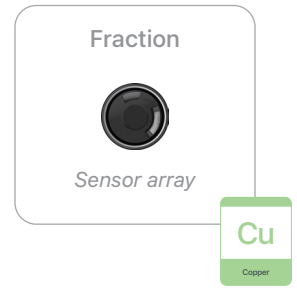
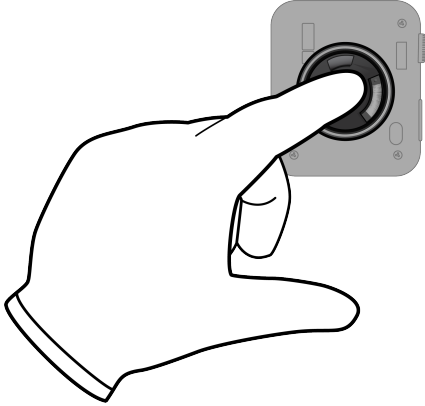


Ribbon cables

Cu




Copper



**15.** Push out the sensor array by hand.



# 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="435 604 570 632"><b>Aluminum</b></p>  <p data-bbox="451 856 553 884"><i>Enclosure</i></p> <p data-bbox="217 926 786 1079"><b>Note:</b> Depending on the material, the enclosures for Apple Watch Series 2 and Apple Watch Series 3 may be processed as aluminum, ferrous (stainless steel enclosures), or mixed electronics (ceramic enclosures).</p>	<p data-bbox="964 604 1276 632"><b>Primary Target Material</b></p>  <p data-bbox="927 835 1313 863"><b>Potential Additional Materials</b></p> 

<p data-bbox="440 1171 565 1199"><b>Batteries</b></p>  <p data-bbox="367 1360 634 1388"><i>Lithium-ion polymer battery</i></p>	<p data-bbox="964 1171 1276 1199"><b>Primary Target Material</b></p> 
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**Fraction**

**Downstream Processing**

**Glass**



*OLED display*

**Primary Target Material**



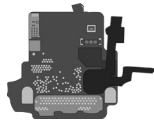
**Potential Additional Materials**



**Logic Boards**



*Display logic board*



*Main logic board*

**Primary Target Material**



**Potential Additional Materials**



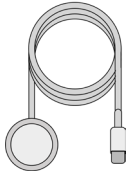
**Fraction**

**Downstream Processing**

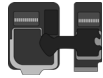
**Mixed Electronics**



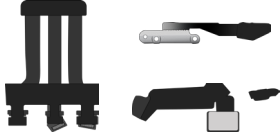
*Power adapter*



*Magnetic charging cable*



*Force Touch sensor*



*Ribbon cables*



*Force Touch gasket*



*Antenna*

**Primary Target Material**



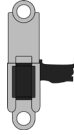
**Potential Additional Materials**



**Fraction**

**Downstream Processing**

**Mixed Electronics (cont.)**



*Microphone*



*Sensor array*

**Rare Earth Magnets**



*Taptic Engine*



*Speaker*

**Primary Target Material**



**Potential Additional Materials**

