

iPhone 12 and iPhone 12 Pro Overview

Scope of this Document

iPhone 12 and iPhone 12 Pro troubleshooting steps, take-apart procedures, and other information about these models only. Separate service guides cover other iPhone models.

Finishes



iPhone 12 is available in:

- Black
- White
- (PRODUCT)RED
- Green
- Blue



iPhone 12 Pro is available in:

- Silver
- Graphite
- Gold
- Pacific Blue

Features

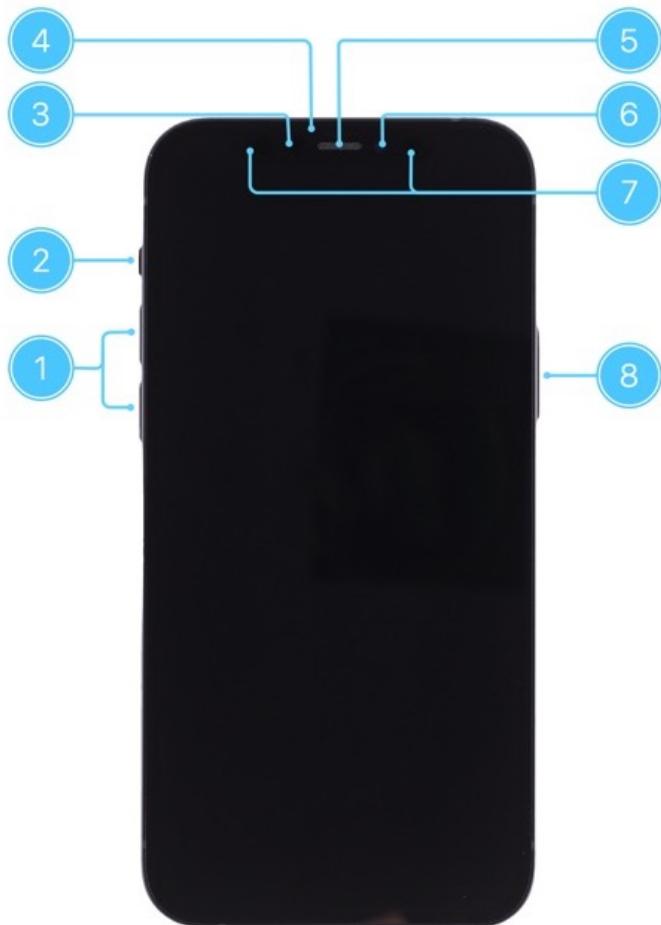
iPhone 12 features:

- A14 Bionic chip with third-generation Neural Engine
- Super Retina XDR display
- 6.1-inch (diagonal) all-screen OLED display
- 5G Cellular
- Dual 12MP Ultra Wide and Wide cameras
- 5.78 ounces (164 grams)
- 12MP TrueDepth camera
- Splash, water, and dust resistant
- 64GB, 128GB, and 256GB

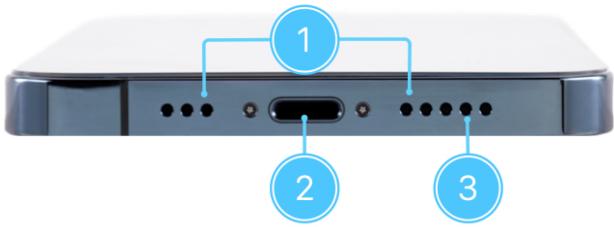
iPhone 12 Pro features:

- A14 Bionic chip with third-generation Neural Engine
- Super Retina XDR display
- 6.1-inch (diagonal) all-screen OLED display
- 5G Cellular
- Triple 12.7MP Ultra Wide, Wide, and Telephoto cameras
- 6.66 ounces (189 grams)
- 12MP TrueDepth camera
- Splash, water, and dust resistant
- 128GB, 256GB, and 512GB

iPhone 12 and iPhone 12 Pro



1. Volume up/down buttons
2. Ring/silent switch
3. Proximity sensor
4. Ambient light sensor
5. Receiver (stereo speaker) and microphone
6. Front camera
7. TrueDepth cameras
8. Side button



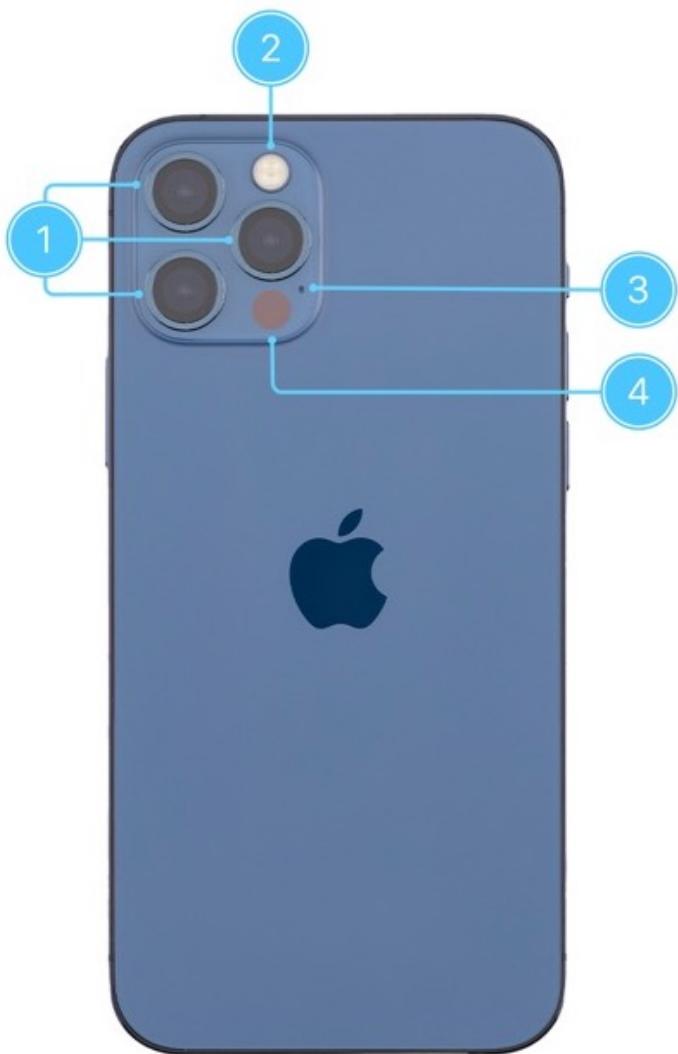
1. Bottom microphones
2. Lightning connector
3. Stereo speaker

iPhone 12



1. Cameras
2. Microphone
3. True Tone flash

iPhone 12 Pro



1. Cameras
2. True Tone Flash
3. Microphone
4. LiDar scanner

Service Considerations

- **Important:** Before servicing a device, ensure that the user has disabled [Find My iPhone](#) (HT201365) and [removed any transit cards](#) (HT209495) in Settings.
- **5G:** [Prepare and activate for 5G on iPhone](#) (HT211828).
- **Two-Factor Authentication:** If performing a whole unit replacement for an iPhone that is a trusted device for [two-factor authentication](#) (HT204915), do not erase the device until the user has set up a replacement iPhone.
- **Post-Repair Diagnostics:** After a battery, display, and camera replacement the device must be configured through [System Configuration](#) (TP1818) in AST 2.
- **Serial Number:** There are several ways to find the [iPhone serial number and IMEI/MEID](#) (HT204073).
- **VMI:** Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) for specific model numbers and configuration codes.
- **Reset and Recovery Mode:**
 - **Reset:** Press the Volume Up button. Then press the Volume Down button. Then press and hold the side button until the screen goes black and the Apple logo appears.
 - **Recovery Mode:** Plug the device into a computer with iTunes open. Press the Volume Up button. Then press the Volume Down button. Then press and hold the side button until the screen goes black and the recovery mode screen appears.
- **Stereo Speakers:** The receiver and bottom speaker are used together as stereo speakers. The left and right sound channels are routed to the speaker or receiver based on the orientation of the iPhone.

New Tools and Fixtures



- There are new tools necessary to remove the display from the iPhone. **Caution:** These tools are not backwards

compatible and previous tools and fixtures are not forward compatible.

1. The Heated Display Removal Fixture (661-17619)



2. The Heated Display Pocket (661-17617)



3. Display Adhesive Press Plate (923-04911)



- After opening the device, use the new 6.1-inch Repair Tray for iPhone 12 and iPhone 12 Pro (923-04908) to support it. The Repair Tray for iPhone 12 and iPhone 12 Pro is identified by a clover on the upper-right corner.



Visual/Mechanical Inspection (VMI) Guide for iPhone

Visual/Mechanical Inspection (VMI) Guide for iPhone

The Visual/Mechanical Inspection helps you determine whether a user's described iPhone issue was caused by a defect in materials and workmanship, accidental damage, or intentional tampering and then determine which service type to use. Devices with defects in materials and workmanship are eligible for service under Apple's Limited Warranty or applicable consumer law. Devices with some forms of accidental damage may be eligible for service under an AppleCare Protection Plan or AppleCare+ (where available) or eligible for out-of-warranty service at a cost to the user.

Apple warrants iPhone against defects in materials and workmanship, when the device has been used normally following Apple's published guidelines, for a period of ONE (1) YEAR globally, except in Turkey where the period is TWO (2) YEARS, from the date of original retail purchase by the end-user purchaser. The warranty covers issues caused solely by manufacturing defects, regardless of accidental damage. The warranty doesn't apply to cosmetic damage, including but not limited to scratches, dents, and broken plastic on ports, or to issues caused by normal wear and tear or aging of the device.

Service Eligibility

Eligible for Service (Returnable Damage)

A device with any of the following conditions is eligible for service:

- Defects in materials and workmanship
- Some forms of accidental damage, such as liquid contact

See Service Eligibility Guidelines section in the model-specific articles listed below for examples of damage eligible for service under the warranty, an AppleCare Protection Plan, AppleCare+ (where available), or applicable consumer law or eligible for out-of-warranty service at a cost to the user.

Ineligible for Service (Nonreturnable Damage)

A device with any of the following conditions is ineligible for service under the warranty or an AppleCare Protection Plan and ineligible for out-of-warranty service:

- Mismatch between the configuration code and the model, capacity, or color
- Intentional tampering or damage
- Disassembled device or missing parts
- Catastrophic damage

Devices with catastrophic damage may be covered for AppleCare+ users.

Non-Apple Parts

Non-Apple parts, defined as all third-party parts and counterfeit parts, affect warranty and service eligibility as follows:

- The presence of non-Apple parts doesn't affect service eligibility or warranty eligibility if the presence of the non-Apple parts hasn't caused the issue for which the user is seeking service.
- If the issue for which the user is seeking service is caused by a non-Apple part, the device is eligible for out-of-warranty service.

Verify Backup of User Data

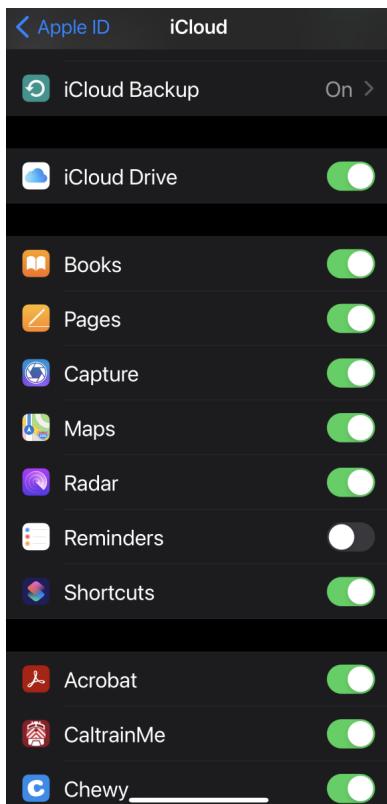
Verify Backup of User Data

Before troubleshooting a user's device, determine whether it is backed up with iCloud or iTunes.

iCloud Backup

An iCloud backup can be verified in one of the following locations:

- Choose Settings > Apple ID > iCloud > iCloud Backup



- Choose Settings > Apple ID > iCloud > Manage Storage > Backups



Learn more about [iCloud](#) and what [iCloud backs up](#)

User data syncing to iCloud

Some important user data can sync to iCloud separately from a backup. If a device needs to be erased and set up as new for software troubleshooting, user data synced to iCloud can be downloaded to the device without the software issue returning.

- Choose Settings > Apple ID > iCloud. Verify that any App containing data important to the user is syncing to iCloud.



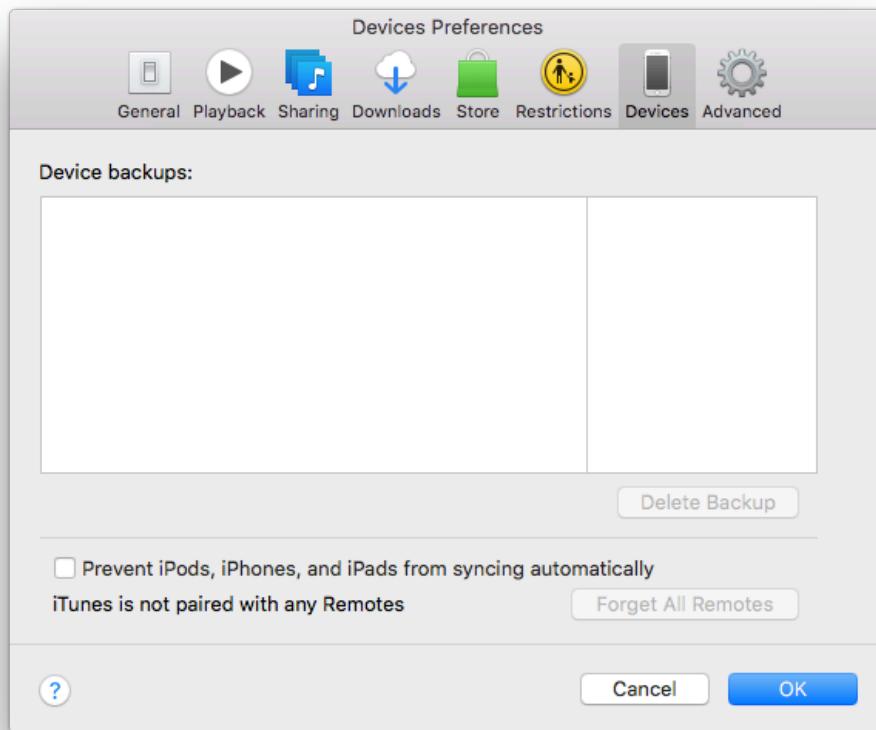
Finder on user's computer (macOS Catalina and later)

1. Connect device to the user's computer with a Lighting to USB cable.
2. Open the Finder on the user's computer.
3. Choose the device from the Locations section of the left column of the Finder window.
4. Verify the latest backup in the Device backups pane.

iTunes on user's computer (macOS Mojave and earlier)

1. Open iTunes on the user's computer.
2. Choose Preferences > Devices.
3. Verify the latest backup in the Device backups pane.

Important: To avoid syncing or backing up a user's device to a test computer, open iTunes, choose Preferences > Devices, and then select "Prevent iPods, iPhones, and iPads from syncing automatically."



Cleaning Procedures

Contents

This article includes the following sections:

- [Required Tools](#)
- [Dock or Lightning Connector \(iPhone, iPad, iPod\)](#)
- [Headphone Jack](#)
- [Speaker and Microphone](#)
- [Receiver \(iPhone\)](#)
- [Cleaning Putty \(iPhone\)](#)
- [Antenna Band](#)
- [SIM Tray](#)
- [Loop Holder \(iPod touch \(5th generation\)\)](#)
- [Lightning Connector for AirPods Charging Case](#)
- [Internal AirPods Charging Case](#)
- [Sanitize AirPods](#)

Required Tools

- Lighted otoscope (or lighted magnifying glass)
- ESD-safe brush (922-9918)
- ESD-safe tweezers
- Microfiber cloth
- Compressed air (for AirPod lightning connector only)
- Foam swab
- Isopropyl alcohol (IPA) wipe
- Nitrile gloves
- Cleaning putty (923-03045) (for iPhone only)
- PVC eraser



Caution: Never use compressed air to clean an iPhone, iPad, or iPod, as it can damage components.

Dock or Lightning Connector (iPhone, iPad, iPod)

Debris in the dock or Lightning connector can cause the following performance issues:

- Unable to charge battery.
- Device not recognized by computer or accessory.

Perform the following steps to clean the device:

1. Turn off the device.
2. Use a lighted otoscope or magnifying glass to inspect for debris.
3. Use an ESD-safe brush to delicately brush out debris. Be careful not to damage any metal contacts.
Note: Avoid brushing debris into the speaker or microphone on either side of the dock or Lightning connector.
4. Use ESD-safe tweezers to carefully remove any large pieces of debris. Be careful not to damage any metal contacts.



Headphone Jack

Debris in the headphone jack can cause the following audio or functional issues:

- Device is stuck in headphone mode and no audio is heard from receiver or speaker.
- Headphone audio is distorted (static or crackles) or is not functioning.
- Headphone audio is only heard in one channel.
- Headphone microphone has distorted sound or no sound.
- Headphone connector will not fully fit into the headphone jack.



Warning: Do not use long metal tools (such as screwdrivers or dental picks) to clean inside the headphone jack as this could puncture the battery.

1. Use a lighted otoscope or magnifying glass to inspect for debris.
2. Use an ESD-safe brush to brush out lint or debris. Use just enough bristles to fit inside the headphone jack. Twist the bristles to loosen and lift out debris.



Speaker and Microphone

Debris blocking the speaker and microphone openings can cause the following audio performance issues:

- Low or distorted volume audio from the speaker.
- Muffled, low volume, or distorted audio recorded from the microphone.

Cleaning Procedure:

1. Use an ESD-safe brush to gently brush cover openings of the speaker and microphone.
Note: Brush debris away from the connector to avoid brushing debris into the dock or Lightning connector.



Receiver (iPhone)

Debris blocking the receiver opening can cause the following audio performance issues:

- Muffled, low volume, or distorted audio through the receiver

Cleaning Procedure:

1. Inspect the receiver for loose debris.
2. Use an ESD-safe brush to gently brush the cover mesh in the receiver opening to remove debris.
Caution: Use extreme care to avoid damaging the microphone embedded within the receiver opening. Avoid using large sweeping motions across the glass, as this could lead to scratches.
3. Use a microfiber cloth to wipe away the loosened debris.



Cleaning Putty (iPhone)

Important: Cleaning putty is only for use on iPhone. Do not use cleaning putty on any other product. Cleaning putty is not intended to replace the ESD-safe brush. Before using cleaning putty, try cleaning the speaker, microphone, and receiver grilles with an ESD-safe brush as described in the cleaning procedures above.

Cleaning putty should only be used on an iPhone that fails the AST 2 Audio Diagnostic test after following the ESD-safe brush cleaning procedures. For more information about AST 2 for iOS, search for article title "AST 2 for iOS Reference Guide."

Note: This procedure can be performed in front of the customer.

Debris blocking the speaker, microphone, or receiver grilles can cause audio performance issues such as:

- Low or distorted volume audio from the speaker and/or receiver.
- Muffled, low volume, or distorted audio recorded from the microphone.

Important:

- Cleaning putty is **only** for use on iPhone. **Do not use cleaning putty on any other product.**
- Do not use the same piece of cleaning putty on more than one device.
- Use the cleaning putty only as described in this procedure.
- Wear nitrile or lint-free gloves.
- Do not use excessive force. Pushing too hard into the speaker, microphone, or receiver grilles can cause damage to the device.

1. Remove the cleaning putty from the package.



2. Knead the cleaning putty until it is roughly 0.5-inch (1.3-cm) round.



3. Press the cleaning putty firmly into the speaker/microphone grille at the bottom of the iPhone.



4. Pull the cleaning putty directly away from the iPhone.

Important: Do not roll the cleaning putty off the iPhone. This could leave small amounts of cleaning putty in the openings.



5. Repeat the process **five times** for **both** the left and right speaker/microphone grilles.



6. Follow the same process to clean the receiver. Repeat the process **five times** for the receiver.





7. Follow the same process to clean the rear microphone. Repeat the process **five times** for the rear microphone.



8. Run the AST 2 Audio Diagnostic test again. If the iPhone fails the diagnostic test, use the same piece of cleaning putty and repeat the entire cleaning procedure. If the iPhone passes the Audio Diagnostic, discard the used piece of cleaning putty.
9. Use a microfiber cloth to clean away any loosened debris or residue.

Antenna Band

Discoloration on the antenna band can sometime occur after a repair. If you see discoloration on the band:

- Use a white PVC eraser to gently buff the area.
- Use a microfiber cloth to clean away any debris left by the eraser.

SIM Tray

Dirt and debris around the SIM tray can cause the following issues:

- Difficulty opening or closing the SIM tray.
- Dirt and debris entering the device when SIM tray is ejected and removed.

1. Eject SIM tray from device.



2. Use an IPA wipe to gently wipe around edges of SIM tray to remove dirt from edges.
3. Use an IPA wipe to gently wipe around edges of SIM tray slot on device to remove dirt from edge.
4. Inspect the SIM tray to verify that dirt has been removed.
5. If any dirt still remains, repeat steps 2 and 3.



Loop Holder (iPod touch (5th generation))

Debris blocking the loop holder can cause the following functional issues:

- Loop holder does not respond to touch.
- Loop holder does not open/close.

1. Use an ESD-safe brush to delicately brush out lint or debris. If needed, use ESD-safe tweezers to pull out any large pieces of lint or debris.



Lightning Connector for AirPods Charging Case

Debris in the Lightning connector can cause the following performance issue:

- Unable to charge the case battery.

Cleaning Procedure:

1. Use a lighted otoscope or magnifying glass to inspect for debris.
2. Blow away any loose debris with compressed air.



3. Use an ESD-safe brush to delicately brush out any remaining debris.



4. If needed, use ESD-safe tweezers to carefully pull out any large pieces of debris.

Caution: Be careful not to damage any metal contacts.

5. Use compressed air to remove any remaining loose debris.
6. Clean the outside of the case with a microfiber cloth.



Internal AirPods Charging Case

Contaminated contacts or debris in the AirPod wells can cause the following performance issue:

- AirPods will not charge

Caution: Do not use compressed air to clean inside the AirPod wells as this can cause debris to get stuck behind the contacts.

1. Use a lighted otoscope or magnifying glass to inspect the AirPod wells for debris and the contacts for contamination.



2. Open an IPA wipe packet and insert the foam swab.



3. Press the foam swab inside the IPA wipe packet to transfer enough alcohol to moisten it.



4. Use the foam swab to gently rub the contacts in a vertical up-and-down motion.

Caution: To protect the spring finger contacts, do not twirl the swab or excessively force it on the contacts.



5. Gently clean out any other debris in the wells and charging case.



Sanitize AirPods

1. Place AirPods on a clean surface.
2. Clean the surface of each AirPod with an IPA wipe.

Important: Avoid getting any liquid on the microphone and speaker meshes and ports marked in the image below.



iPhone 12, iPhone 12 mini, iPhone 12 Pro, and iPhone 12 Pro Max Accessories

Accessories included:

- USB-C to Lightning Cable

Additional accessories (not included):

- 20W Power Adapter
- Lightning to USB Cable (0.5 m)
- Lightning to USB Cable (2 m)
- Lightning to 3.5 mm Headphone Jack Adapter
- Lightning to Micro USB Adapter (some countries)
- Lightning Digital AV Adapter
- Lightning to VGA Adapter
- Lightning to SD Card Camera Reader
- Lightning to USB Camera Adapter
- Lightning to USB 3 Camera Adapter
- Leather Case with MagSafe
- Silicone Case with MagSafe
- Leather Wallet with MagSafe
- Clear Case with MagSafe
- [AirPods](#)
- [MagSafe Charger and MagSafe Duo Charger](#)

*Service strategy for leather and silicone cases: Leather and silicone cases are available as out-of-warranty service parts. Refer to [Visual/Mechanical Inspection \(VMI\) Guide for Apple Cases and Covers](#) (SM268) to identify conditions that may affect warranty coverage.

EarPods

- Built-in remote to adjust volume, control music and video playback, and answer or end calls
- Designed to rest comfortably inside a variety of ear sizes
- Speakers inside are designed to minimize sound loss and maximize sound output



Lightning to USB Cable

- USB 2.0
- Connects iPhone, iPad, or iPod (with Lightning connector) to a computer's USB port to sync and charge, or to a USB Power Adapter to charge from a wall outlet
- Reversible design



Lightning to 3.5 mm Headphone Jack Adapter

- Connects devices that use a 3.5 mm audio plug to a Lightning device
- Compatible with iPhone 5 and later using iOS 10 or later



Lightning to Micro USB Adapter

- Connects iOS devices with a Lightning connector to micro USB cables and chargers to sync and charge device



Lightning Digital AV Adapter

- Supports mirroring of a device's screen to an HDMI-equipped TV, display, projector, or other compatible display in up to 1080p HD
- Requires an HDMI cable (sold separately) for connection to a TV or projector
- Supports both video and audio output



Lightning to VGA Adapter

- Supports mirroring of a device's screen to a VGA-equipped TV, display, projector, or other compatible display in up to 1080p HD
- Requires a VGA cable (sold separately) for connection to a TV or projector
- Does not support audio output



Lightning to SD Card Camera Reader

- Downloads photos and videos from a digital camera
 - Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
 - Compatible with iPhone 5 and later
- Note:** The Lightning to SD Card Camera Reader supports data transfer up to USB 3 speeds on the 10.5-inch and 12.9-inch iPad Pro. All other iOS devices transfer at USB 2 speeds.



Lightning to USB Camera Adapter

- Downloads photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later



Lightning to USB 3 Camera Adapter

- Transfers photos and videos from a digital camera
 - Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
 - Compatible with iPhone 5 and later
- Note:** The Lightning to USB 3 Camera Adapter transfers data at USB 3 speeds when connected to a 10.5-inch and 12.9-inch iPad Pro. All other iOS devices transfer at USB 2 speeds.



Apple Watch and iPhone 6 and later Apple Pay Demo (Retail in Apple Pay countries)

The Apple Pay demo only tests the functionality of Apple Pay hardware in Apple Watch and iPhone 6 and later. It does not affect cards or bank accounts connected to Apple Pay.

Perform the following steps to run the Apple Pay demo:

1. Launch the EasyPay app.
2. Select Apple Pay Demo.
3. Hold the Apple Watch or the top of the iPhone near the back of the Isaac above the PIN pad display. If you are testing an Apple Watch, then double-click the side button to activate Apple Pay.
4. Ask the user to authorize Apple Pay. **Note:** This will not charge the user's card.

Results:

- If the EasyPay app displays a green check mark, then the hardware is functioning correctly.
- If the EasyPay app displays "No Response," then retest. The hardware or software may not be functional, or a compatible card may not have been set up on the device.
- If the Isaac sled displays the "Card Not Accepted Swipe Card" error message and the EasyPay app displays "No Response," then the device hardware or software may not be functional.
- If the EasyPay app displays a red X, then confirm that other point-of-sale (POS) transactions in the store are completing successfully and try a different Isaac. If POS transactions are completing successfully and you are still seeing this error on another Isaac, then the hardware or software may not be functional. The Apple Pay demo requires fully functional POS systems.

Contactless Payment Reader

The Apple Pay test only verifies the functionality of Apple Pay hardware in Apple Watch and iPhone 6 and later. It does not affect cards or bank accounts connected to Apple Pay.

Perform the following steps to run the Apple Pay test:

1. Connect the contactless payment reader to an open USB port on a computer.
2. Hold the Apple Watch or top of the iPhone near the contactless payment reader. If you are testing an Apple Watch, double-click the side button to activate Apple Pay.
3. Ask the user to authorize Apple Pay. **Note:** This will not charge the user's card.

Results

- If the user authorizes Apple Pay: The contactless payment reader will beep and its light will turn green, indicating that the hardware is functional.
- If the user does not authorize Apple Pay: The light on the contactless payment reader will stay red and the iPhone will continue to request authorization, indicating that the hardware is functional.

If neither of the above results occurs, then the hardware may not be functional.

iPhone USB Microscope Camera Setup

The Microinspection Procedure requires the USB Microscope tool (923-03299).

Setup and Use

Important: Do not use the supplied installation CD.

Note: The live video shown in Photo Booth may be inverted if effect is not applied, or if the Photo Booth Camera Flip package was not downloaded and installed.

1. Download the PhotoBoothCameraFlip.pkg at [SD119: Camera Flip Effect Installation Package for USB Microscope Tool](#).
2. Open the Photo Booth Camera Flip Installer and follow the onscreen instructions.
3. Open the USB Microscope box and unpack the USB Microscope. **Note:** Remove the protective lens cap from microscope before use.
4. Plug the USB Microscope into an available USB port on a workstation computer.
5. Open Photo Booth.
6. In Photo Booth, select Camera in the top menu bar.
7. Choose Venus USB2.0 Camera.
8. Click the Effects button.
9. Choose the last page of effects, select Flip.
10. If the Shutter button in the center (below the live video) is not red, click it.
11. When you are ready to take a picture, click the red Shutter button.

USB Microscope Overview

Note: Snapshot Button will not work with Photo Booth. Click the Shutter button in Photo Booth to take a picture.

1. LED Light Control Wheel
2. Snapshot Button
3. Focus Wheel
4. Magnification Ruler



iPhone, iPad, and iPod touch Common Troubleshooting Procedures

When troubleshooting, attempt the common troubleshooting procedures in the order listed in the table below. Click the name of a quick fix procedure for detailed information.

Important:

- The following steps may not be effective for all issues. Apply only the steps necessary to isolate and resolve the user's issue.
- Before servicing a device, verify that the customer has [disabled Activation Lock](#) on the device.

Procedure	Action
Minimal Risk for Data Loss	
Update to Latest Software	Go to Settings > General > Software Update, if available; or Connect the device to a computer and use the latest version of iTunes (macOS Mojave and earlier) or Finder (macOS Catalina) to check for the latest software.
Charge Battery	Connect to a known-good power outlet, using a known-good Apple USB Power Adapter and Lightning to USB Cable to charge the battery. Do not use a computer port or wireless charging to charge. Note: The device may have entered a deep discharge state that requires 20 to 30 minutes of charging to turn on. The charging screen should be visible after two minutes of charging.
Force an App to Close	iPhone with Face ID and iPad with Face ID: <ol style="list-style-type: none">1. Swipe up from the bottom of the screen to see the App Switcher.2. Swipe the app's preview screen up to close the app. iPhone 8 and earlier, iPhone SE, iPad with Home button, and iPod touch: <ol style="list-style-type: none">1. Double-click the Home button to see the App Switcher.2. Swipe the app's preview screen up to close the app.

	<p>A restart forces the device to close all open files and turns off all hardware components.</p> <p>For devices running iOS 11 and later:</p> <ol style="list-style-type: none"> 1. Choose Settings > General > Shut Down. 2. Drag your finger across the slider to turn off the device. 3. Turn on the device by pressing and holding the Sleep/Wake button or side button until the Apple logo appears. <p>iPhone with Face ID and iPad with Face ID::</p> <p><u>Restart</u></p> <ol style="list-style-type: none"> 1. Press and hold either volume button and the side button until the power off slider appears. 2. Drag the slider, then wait 30 seconds for your device to turn off. 3. To turn the device back on, press and hold the side button (on the right side) until you see the Apple logo. <p>iPhone and iPad with Home button, and iPod touch:</p> <ol style="list-style-type: none"> 1. Press and hold the side button or top button until the power off slider appears. 2. Drag the slider, then wait 30 seconds for your device to turn off. 3. To turn the device back on, press and hold the side button or top button until you see the Apple logo.
Greater Risk for Data Loss	
	<p>Perform a reset only if you are unable to do a restart.</p> <p><u>Reset</u></p> <ul style="list-style-type: none"> • iPhone 8 and later and iPad with Face ID: Press the Volume Up button. Then press the Volume Down button. Then press and hold the side button until the screen goes black. Finally, press and hold the side button until the Apple logo appears. • iPhone 7: Press and hold the side button and Volume Down button until the Apple logo appears. • iPhone 6s or earlier, iPad with Home button, and iPod touch: Press and hold the Sleep/Wake button and Home button until the Apple logo appears.
Data Loss	
<u>Erase All Content and Settings*</u>	Erases all user content and settings, including installed apps. From the Home screen, choose Settings > General > Reset > Erase All Content and Settings. If possible, try this before a restore because it is much faster.
<u>Restore*</u>	Erases all user data and restores the device to factory settings. Connect the device to the computer, open iTunes (macOS Mojave and earlier) or Finder (macOS Catalina and later), select the device, click Summary, then click the Restore button.
Not Recommended	
<u>Recovery Mode Restore*</u>	<p>Recovery mode loads only the firmware drivers necessary for a computer to recognize the device.</p> <p>DF Reset and DFU Restore are not necessary to troubleshoot iOS devices. Restore and Recovery Mode Restore take less time to accomplish the same result. If the device will not go into Recovery Mode or will not charge, then follow the troubleshooting steps in the Service Guide.</p>

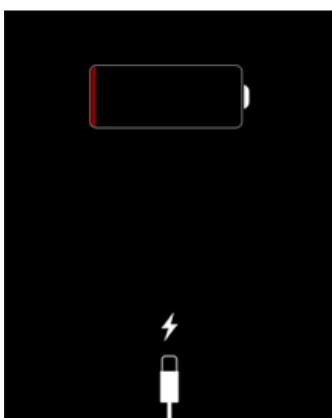
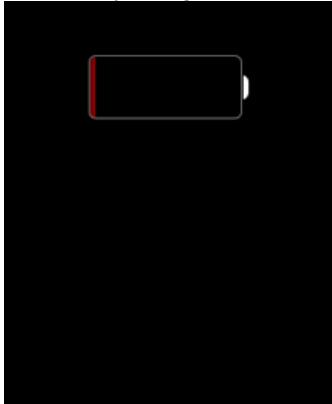
***Caution:** Procedures will delete all user data and settings on the device. If saving content is important to the user, a backup should be made before beginning this process. If restoring user data from either an iCloud or computer backup causes an issue to return, there is no reason to restore from the other backup method as it will lead to the same result.

Charge Battery

The device must have sufficient battery charge to proceed with troubleshooting. A low battery charge can cause many issues.

If the device has any of the following symptoms, connect it to the appropriate USB or USB-C Power Adapter to charge for at least 10 minutes:

- Will not turn on
- Black screen
- Charging screen
- Low battery charge



Note: If the device is extremely low on power, the display may be blank for up to two minutes before the low-battery image appears. To sufficiently charge the battery, use the device-appropriate Apple USB Power Adapter, because it delivers more power than the USB ports of some computers. Once the device has started up to the lock screen, it can be disconnected from the power adapter and connected to a computer.

If troubleshooting or testing will be performed without the device connected to power, make sure the device has a sufficient charge before continuing.

Important:

- Before connecting any cable to the dock connector, Lightning connector, USB-C, or headphone jack, check the ports for debris, contamination, corrosion, liquid, or damage. Clean or remedy these issues before connecting any cables.
- If the device becomes too hot while charging, disconnect and replace the device.
- Only use a known-good Apple USB Power Adapter with an Apple Lightning to USB Cable when charging from a power outlet. While other power adapters may appear to be compatible, their lower power output is not sufficient to charge the device.
- The battery icon in the status bar shows the battery charging status and approximately how much charge is left in the battery. When the device is connected to a power source, a lightning bolt appears beside the battery icon.

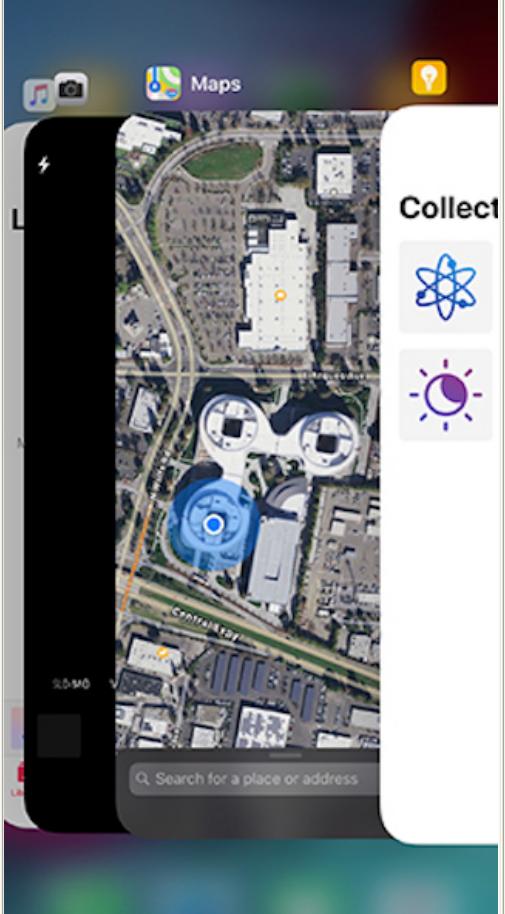
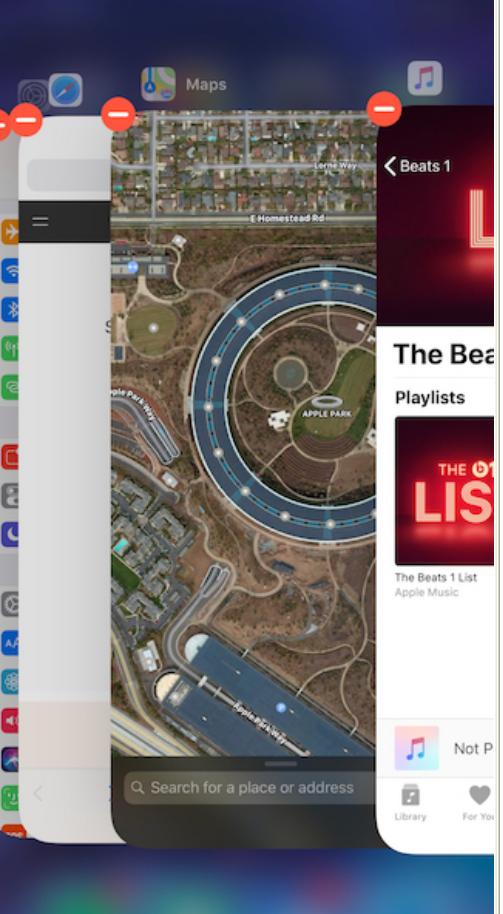
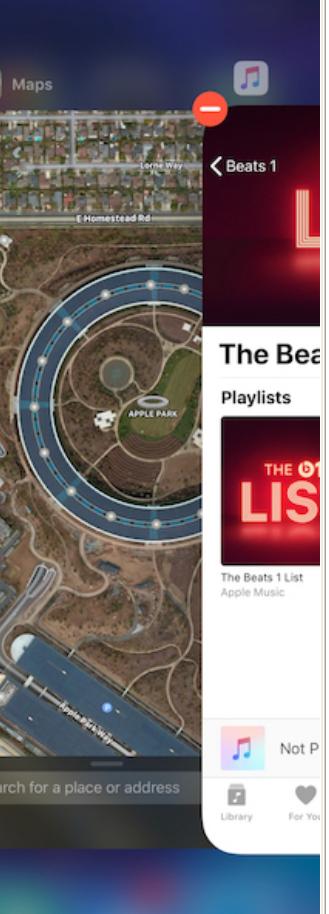
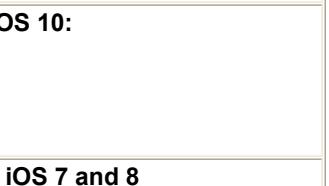


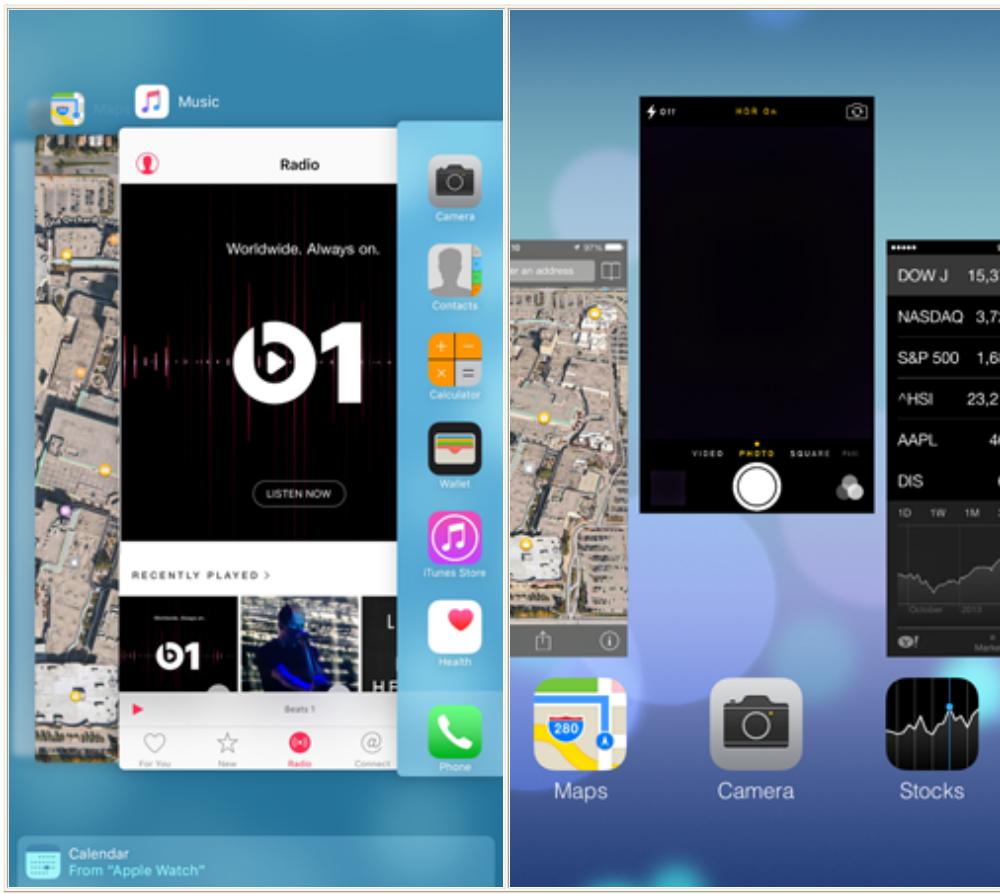
Note: An iPad may take longer to charge while syncing or in use. If the iPad is connected to a source that does not provide sufficient power to charge the device, a “Not Charging” message appears next to the battery icon in the status bar.



Force an App to Close

The following procedure forces an app that is nonresponsive or not performing as expected to close. Forcing an app to close is a recommended first troubleshooting step.

iPhone X or later or iPad running software version 12 or later: 1. Swipe up from the bottom of the screen to see the App Switcher. 2. Swipe up on the app.	iPhone X or iPad running iOS 11: 1. Swipe up from the bottom of the screen to see the App Switcher. 2. Tap and hold the app until the minus button appears. 3. Tap the minus button or swipe up on the app.
iOS 12 or later 	iOS 11 
iPhone with Home button or iPad running iOS 7 through iOS 10: 1. Double-click the Home button to see the App Switcher. 2. Swipe up on the app.	iOS 9 and 10  iOS 7 and 8 



iOS Restart

Restarting saves user data, closes all open applications, turns off all hardware components, and then restarts the device.

A restart can quickly resolve a wide range of issues, including the following issues:

- Apps unexpectedly quit.
- Battery life is shorter than expected.
- Hardware is not performing as expected.
- Interface or apps are slow to respond.
- A computer does not recognize or sync with the device.

Procedure

For devices running iOS 11 and later:

1. Choose Settings > General > Shut Down.
2. Drag your finger across the slider to turn off the device.
3. Turn on the device by pressing and holding the Sleep/Wake button or side button until the Apple logo appears.

iPhone and iPad with Face ID:

1. Press and hold either volume button and the side button until the power off slider appears.
2. Drag the slider, then wait 30 seconds for your device to turn off.
3. To turn the device back on, press and hold the side button (on the right side) until you see the Apple logo.

iPhone and iPad with Home button, and iPod touch:

1. Press and hold the side button or top button until the power off slider appears.
2. Drag the slider, then wait 30 seconds for your device to turn off.
3. To turn the device back on, press and hold the side button or top button until you see the Apple logo.

Note: If the device is unresponsive and won't restart, [reset the device](#) (TP330).

iOS Reset

If the device is unresponsive and will not restart, try to reset it.

Important: Reset the device only if it will not restart.

Key Points

- Resetting the device removes all power for a fraction of a second to turn off the device.
- Resetting the device does not close open files or save data before the device turns off.
- **Caution:** Resetting the device can potentially cause file or operating system damage, requiring a restore.

Procedure

iPhone and iPad with Face ID:

1. Press the Volume Up button.
2. Press the Volume Down button.
3. Press and hold the Side or Top button for at least 10 seconds, until you see the Apple logo.

iPhone 7, iPhone 8, iPhone SE (2nd generation), and iPod touch (7th generation):

- Press and hold both the Volume Down button and the Side or Top button for at least 10 seconds, until you see the Apple logo.

iPhone 6s and earlier, iPad with Home button, and iPod touch (6th generation and earlier):

- Press and hold both the Sleep/Wake button and Home button for at least 10 seconds, until you see the Apple logo.

Erase All Content and Settings

Erasing all content and settings is a quick way to restore the device to factory settings. Erase All Content and Settings can resolve software issues more quickly than a time-consuming restore, but it will not reinstall iOS like a restore does.

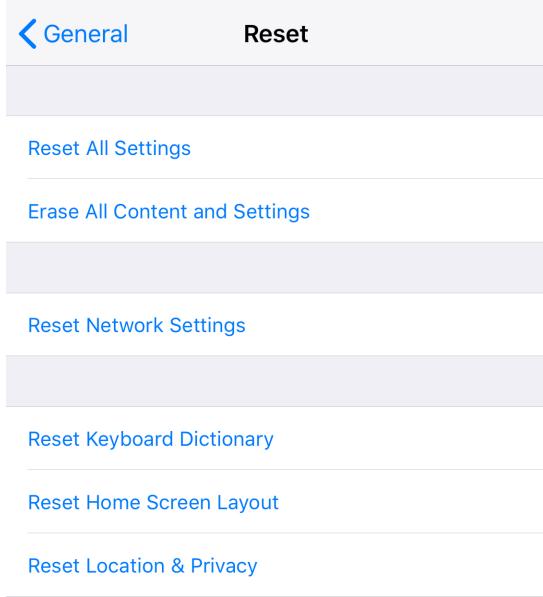


Caution: Erasing all content and settings will delete all user data and settings on the device.

Important: Before servicing a device, verify that the user has [disabled Activation Lock](#) (HT201365) on the device.

Procedure:

1. Choose Settings > General > Reset > Erase All Content and Settings.



If erasing all content and settings does not resolve the issue, proceed with a [Restore](#).

Restore

A restore completely erases the device and installs the latest software version.



Caution: Restoring the device will delete all user data and settings.

Important: Before servicing a device, verify ensure that [the user has disabled Activation Lock](#) (HT201365) on the device.

Key Points:

- A restore erases all user content, settings, and files, and then reinstalls software only.
- A restore is time-consuming, especially if you have to download the restore package.
- If the customer's computer displays an alert with an error code, refer to the following articles:
 - [HT204770: iOS update and restore errors](#)
 - [HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod](#)

Note: When [restoring a device with iTunes \(macOS Mojave and earlier\) or Finder \(macOS Catalina\) on a customer's computer](#) (HT201252), copy or rename the backup folder before proceeding to avoid erasing previous backups.

Procedure for macOS Catalina:

1. Connect the device to a computer.
|
2. Open Finder, select the device from the Locations section of the left column of the Finder window, click Summary, then click the restore button.
3. When the restore is complete, set up the device as new and test it before restoring a backup or syncing content.

Procedure for macOS Mojave and earlier:

1. Connect the device to a computer running the latest version of iTunes.
 - If the device is locked with an unknown passcode or is disabled, refer to [HT204306: If you forgot the passcode for your iPhone, iPad, or iPod touch, or your device is disabled](#).
2. Open iTunes, select the device, click Summary, then click the restore button.
3. When the restore is complete, set up the device as new and test it before restoring a backup or syncing content.

The screenshot shows the iTunes application window for an iPhone X. The device summary is displayed on the left, indicating it's an iPhone X with 256GB storage and an 83% battery level. The main pane is titled "iPhone X" and displays the following information:

iPhone X

Capacity: 238.36 GB
Phone Number: +1 (847) [REDACTED]
Serial Number: [REDACTED]

iOS 11.2.6
Your iPhone software is up to date. iTunes will automatically check for an update again on 3/27/18.

Check for Update | Restore iPhone...

Backups

Automatically Back Up

iCloud
Back up the most important data on your iPhone to iCloud.

This computer
A full backup of your iPhone will be stored on this computer.
 Connect iPhone to [REDACTED]

Manually Back Up and Restore

Manually back up your iPhone to this computer or restore a backup stored on this computer.

Back Up Now | Restore Backup...

Latest Backup:
Yesterday 15:55 to iCloud

Photos Apps 189.19 GB Free Sync Done

Recovery Mode Restore

If a computer cannot detect the device or a specific restore error appears, check the cable connections. If the issue persists, put the device in recovery mode.



Caution: If the device is put in recovery mode and then restored, all user data and settings will be erased.

If you cannot restore the device, even when it is in recovery mode, discuss service and replacement options with the user.

Important: Before servicing a device, verify that [the user has disabled Activation Lock](#) on the device.

Key Points

- Recovery mode loads only the firmware drivers necessary for a computer to recognize the device.

Note: In certain situations, a device will automatically enter recovery mode after an update or restore. If the device is connected to a computer, updating the software may resolve an issue without erasing user data and settings. If updating the software does not work, it may be necessary to restore the device, which will erase all user data and settings.

Procedure

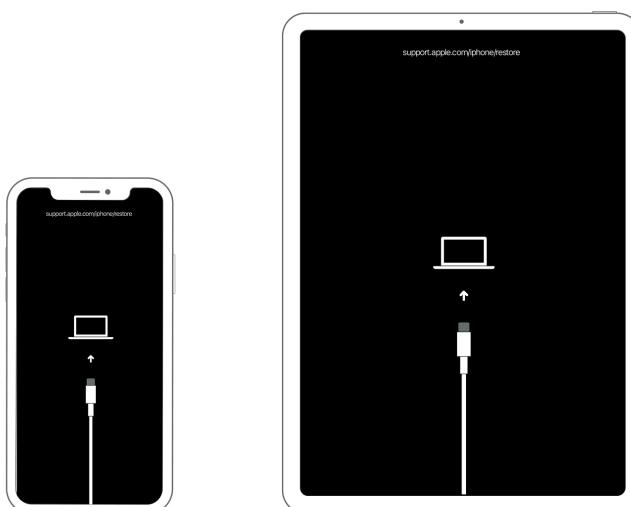
Perform the following steps to put the device in recovery mode. If the device is already in recovery mode, connect the device to a computer and start at step 3.

1. Connect the device to a computer and open the Finder.

Note: You can connect the device to a power adapter instead of a computer and continue with step 2. If you are able to complete step 2 and put the device in recovery mode, disconnect it from the power adapter and connect it to a computer. Then continue with step 3.

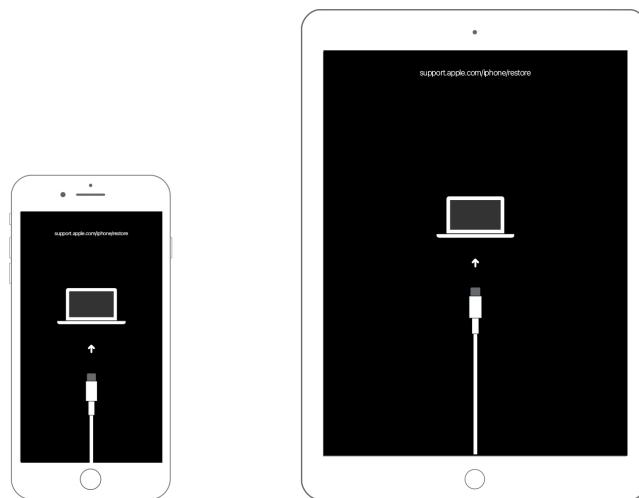
2. While the device is connected, force restart it with these steps:

- **iPad Pro 11-inch and iPad Pro 12.9-inch (3rd and 4th generation):** Press and quickly release the Volume Up button. Press and quickly release the Volume Down button. Press and hold the Top button until the device begins to restart. Continue holding the Top button until the recovery mode screen appears.
- **iPhone 8 and later:** Press and quickly release the Volume Up button. Press and quickly release the Volume Down button. Then, press and hold the Side button until the recovery mode screen appears.

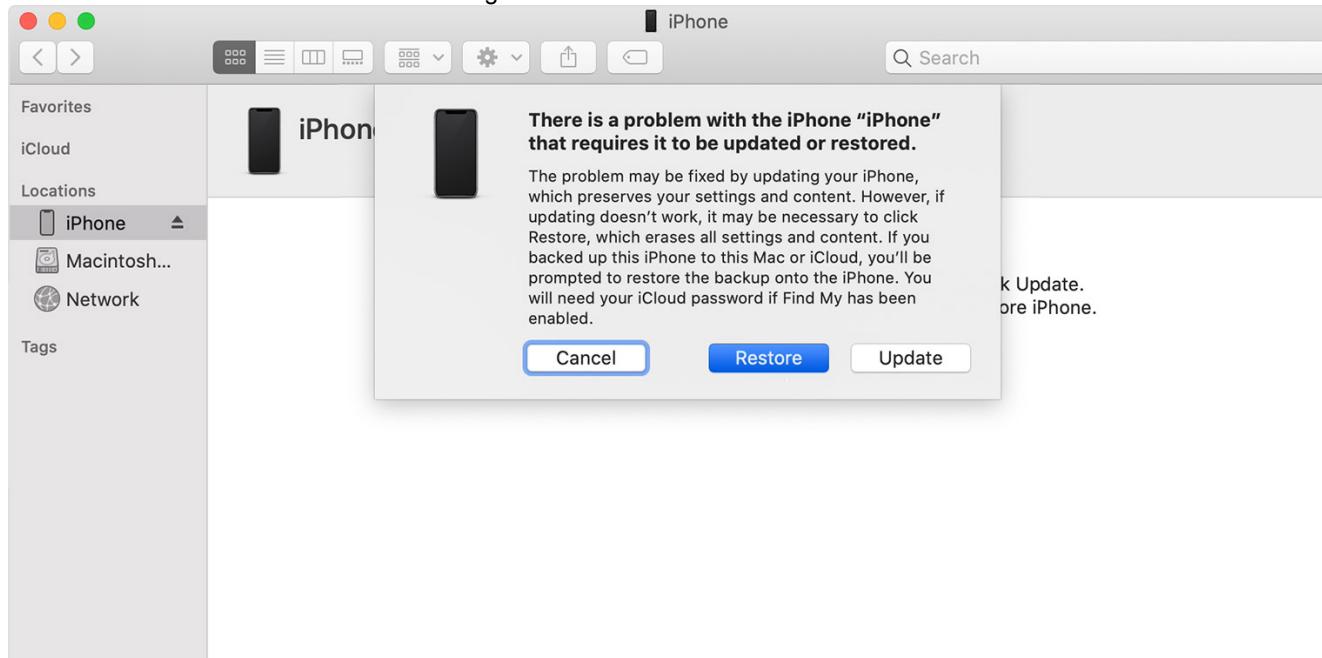


- **iPhone 7, iPhone 7 Plus, and iPod touch (7th generation):** Press and hold the Side (or Top) button until the power off slider appears. Drag the slider to turn off your device. Connect your device to your computer while holding the Volume down button. Keep holding the Volume down button until you see the recovery mode screen.

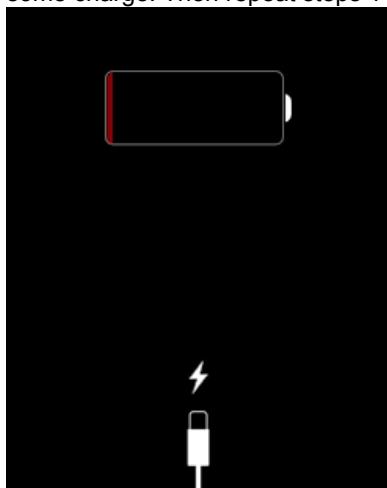
- **iPhone 6s and earlier, iPad, or iPod touch:** Press and hold both the Home and the Top (or Side) buttons at the same time. Keep holding them until the recovery mode screen appears.



3. Use the Finder to update or restore the device. Updating the device may preserve the user data and settings. Restoring the device will erase all user data and settings.



If the charging screen appears, connect the device to a power adapter for at least 10–15 minutes to ensure the battery has some charge. Then repeat steps 1 through 3.



If the recovery mode screen does not appear, repeat steps 1 through 3.

If you decide not to do a restore, you may be able to exit recovery mode by resetting the device.

If you are unable to restore the device, see the appropriate service guide for additional troubleshooting.

Accessory Does Not Function

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">“This accessory is not made to work with iPhone” message when Made for iPhone accessory or no accessory is connected.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">Verify that the accessory’s package has a “Made for iPhone” label and not a “Made for iPod” or “Made for iPad” label. Refer to HT201619: About iPhone, iPad, and iPod accessories.Verify that the device is securely connected to the accessory and not loose, slanted, or partially connected.Try the Lightning connector in both orientations.Refer to the following articles:<ul style="list-style-type: none">HT203284: If you need help with iPhone, iPad, or iPod touch accessoriesHT208277: If you see an ‘Accessory may not be supported’ alertHT208857: Using USB accessories with iOS 11.4.1 and laterFollow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	No	Go to step 2.	\${nodeText.noSymptomCode}		
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}		

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	<code> \${nodeText.yesSymptomCode}</code>	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B91	IPHONE
4.	<p>Check the following articles to verify that the user's accessory is compatible with the user's device:</p> <ul style="list-style-type: none"> • TP1196: iPhone Accessories • HT201619: About iPhone, iPad, and iPod accessories <p>Is the user's accessory compatible with the user's device?</p>	Yes	Go to step 5.	<code> \${nodeText.yesSymptomCode}</code>	
		No	<p>Issue resolved. Advise the user to purchase the correct accessory.</p>	<code> \${nodeText.noSymptomCode}</code>	
5.	<p>Connect the user's accessory to the user's device.</p> <p>Test accessory functionality.</p> <p>Does the accessory function properly?</p>	Yes	<p>Issue resolved by cleaning the device.</p>	<code> \${nodeText.yesSymptomCode}</code>	
		No	<p>Go to step 6.</p>	<code> \${nodeText.noSymptomCode}</code>	
6.	<p>Substitute a known-good similar accessory, if available, and connect it to the user's device.</p> <p>Test accessory functionality.</p> <p>Does the accessory function properly?</p>	<p>Yes</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p>If the user has a third-party accessory, refer to manufacturer for support.</p>	B09	IPHONE ACCESSORY
		No	<p>Go to step 7.</p>	<code> \${nodeText.noSymptomCode}</code>	

	Check	Result	Action	Code	Commodity
7.	Follow the steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes No	Go to step 9. Go to step 8.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
8.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes No	Go to step 9. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B0J	IPHONE
9.	Substitute a known-good similar accessory, if available, and connect it to the user's device. Retest accessory functionality. Does the accessory function properly?	Yes No	Go to step 10. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B0M	IPHONE

	Check	Result	Action	Code	Commodity
10.	<p>Connect the user's accessory to the user's device.</p> <p>Retest accessory functionality.</p> <p>Does the accessory function properly?</p>	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the user has a third-party accessory, refer to the manufacturer for support.</p>	B09	IPHONE ACCESSORY

TV and Video Output Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<p>When using video output adapter, such as Lightning Digital AV Adapter or Lightning to VGA Adapter, the following symptoms may occur:</p> <ul style="list-style-type: none">• Unable to display device content on TV• Unable to display device content on projector• Unable to mirror content• No audio over HDMI when mirroring using GarageBand or iMovie	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Refer to HT202044: About Apple Digital AV Adapters for iPhone, iPad, and iPod touch to verify that the user's device and video output adapter accessory are compatible and supported.2. Try the Lightning connector in both orientations.3. Verify that the cables are plugged into the appropriate input jacks and correct input is selected on TV or projector.4. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Follow steps in TP1045: iPhone Functional Test to test video playback functionality on the user's device.</p> <p>Connect the user's device to the TV or projector with the user's adapter and cable.</p> <p>Test adapter functionality.</p> <p>Does the adapter function properly?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	<p>Substitute a known-good similar adapter and cable, if available, and connect it to the user's device.</p> <p>Test adapter functionality.</p> <p>Does the adapter function properly?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options. If the user has a third-party video adapter, refer to manufacturer for support.	B09	IPHONE ACCESSORY
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes No	Go to step 8. Go to step 7.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
7.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes No	Go to step 8. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B0J	IPHONE
8.	Substitute a known-good similar adapter and cable, if available, and connect it to the user's device. Retest adapter functionality. Does the adapter function properly?	Yes No	Go to step 9. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B0J	IPHONE

	Check	Result	Action	Code	Commodity
		Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
9.	<p>Connect the user's device to the TV or projector with the user's adapter and cable.</p> <p>Retest adapter functionality.</p> <p>Does the adapter function properly?</p>	No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the user has a third-party video adapter, refer to manufacturer for support.</p>	B09	IPHONE ACCESSORY

Apple Pay and Wallet Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none"> • Unable to set up Apple Pay on device • Unable to make contactless payment using Apple Pay on device • Unable to use transit or student ID cards with Apple Pay • Unable to make in-app payment using Apple Pay on device • Apple Pay stopped functioning 	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Important: Before servicing a device, ensure that all transit and student ID cards have been removed from Wallet on the user's device. Also ensure Apple Cash is turned off and any Express Mode-enabled cards are disabled. For more information, refer to the following:</p> <ul style="list-style-type: none"> • OP2152: Service considerations for devices with Apple Pay • RS256: Service considerations for devices with Apple Pay (for Apple Retail users) • HT205583: Manage the cards that you use with Apple Pay • HT209495: Use Express Transit with Apple Pay <p>If the user's device cannot turn on, have the user go to icloud.com on another computer to perform these steps, before servicing the device.</p> <p>Note: If the user's issue is specific to the Home or Side button not responding when pressed, select "Home Button Issues" or "Side Button Issues" from the troubleshooting menu. If the user's issue is specific to Touch ID or Face ID functionality, select "Touch ID Issues" or "Face ID Issues" from the troubleshooting menu. The following procedure is intended for Apple Pay issues only.</p> <ol style="list-style-type: none"> 1. Verify that the user's device is compatible with Apple Pay. 2. Verify that the user's payment card is eligible for Apple Pay. 3. Verify that the user's device has Internet access to complete Apple Pay setup. Internet access is not required for Apple Pay operation. 4. Have the user delete and then reenroll the same payment card to the device to verify if the issue is with the card or the device. <p>Important: Apple Pay card enrollment and authorization process can take up to several hours depending on network conditions.</p> <p>Refer to the following for more information about Apple Pay:</p> <ul style="list-style-type: none"> • HT208733: If you see an Update Failed or Apple Pay Not Available alert after iOS update or restart • HT201469: About Apple Pay • HT204916: Apple Pay participating banks in Canada, Latin America, and the United States • HT206637: Apple Pay participating banks in Europe and the Middle East • HT206638: Apple Pay participating banks and card issuers in Asia-Pacific • HT204506: Set up Apple Pay • HT205630: If you can't add cards to Wallet for Apple Pay • HT205583: Manage the cards that you use with Apple Pay • HT201239: How to use Apple Pay • HT209494: Set up a card in Wallet to ride transit with Apple Pay • HT209545: Pay for transit with Apple Pay if Express Transit mode isn't supported or enabled • HT207958: Where you can ride transit with Apple Pay • HT203027: Apple Pay security and privacy overview

Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p>Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Isolate the user's Apple Pay issue to one of the following scenarios:</p> <ul style="list-style-type: none"> A. The user attempted to make a contactless payment using Apple Pay, or the user attempted to use Apple Pay for transit or student ID. B. The user attempted to make an in-app purchase using Apple Pay. <p>Which issue is relevant?</p>	A	Go to step 4.	\${nodeText.yesSymptomCode}	
		B	Go to step 11.	\${nodeText.noSymptomCode}	
4.	<p>Run the AST 2 MRI diagnostic suite on the user's device to check the Secure Element chip.</p> <p>The Secure Element chip is a crucial component of Apple Pay functionality.</p> <p>Does the device pass all tests?</p>	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	<p>Restart device. If the device does not restart, try to reset it.</p> <p>Rerun the AST 2 MRI diagnostic suite on the user's device.</p> <p>Does the device pass all tests?</p>	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	<p>Follow steps in the following to test Apple Pay NFC hardware functionality on the user's device:</p> <p><u>TP1257: Contactless Payment Reader</u> or <u>TP1282: Apple Pay Demo (Retail in Apple Pay countries)</u></p> <p>Assure the user that the test only checks the functionality of the Apple Pay hardware within the device. The test will not affect cards or bank accounts connected to Apple Pay.</p> <p>Does the device pass all tests?</p>	<p>Yes</p> <p>No</p>	<p>ESCALATION REQUIRED.</p> <p>Issue cannot be duplicated. Contact CSS for additional support.</p> <p>Go to step 7.</p>	B5J	
7.	<p>Follow steps in <u>HT201252: Restore your iPhone, iPad, or iPod to factory settings</u> to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See <u>TP337: Recovery Mode Restore</u>.</p> <p>Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	<p>Yes</p> <p>No</p>	<p>Go to step 9.</p> <p>Go to step 8.</p>	<p> \${nodeText.yesSymptomCode}</p> <p> \${nodeText.noSymptomCode}</p>	
8.	<p>Perform steps in <u>HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod</u> and <u>HT204770: iOS update and restore errors</u> to attempt to restore the device.</p> <p>Did restore complete?</p>	<p>Yes</p> <p>No</p>	<p>Go to step 9.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p> \${nodeText.yesSymptomCode}</p> <p>B0J</p>	IPHONE
9.	<p>Rerun the AST 2 MRI diagnostic suite on the user's device.</p> <p>Does the device pass all tests?</p>	<p>Yes</p> <p>No</p>	<p>Go to step 10.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p> \${nodeText.yesSymptomCode}</p> <p>B5J</p>	IPHONE

	Check	Result	Action	Code	Commodity
10.	<p>Follow steps in the following to test Apple Pay NFC hardware functionality on the user's device:</p> <p><u>TP1257: Contactless Payment Reader</u></p> <p>or</p> <p><u>TP1282: Apple Pay Demo (Retail in Apple Pay countries)</u></p> <p>Assure the user that the test checks the functionality of the Apple Pay hardware within the device only. And will not affect cards or bank accounts connected to Apple Pay.</p> <p>Does the device pass all tests?</p>	<p>Yes</p> <p>No</p>	<p>Issue resolved by restoring the device.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p> \${nodeText.yesSymptomCode}</p> <p>B5J</p>	IPHONE
11.	<p>Run the AST 2 MRI diagnostic suite on the user's device to check the Secure Element chip.</p> <p>The Secure Element chip is a crucial component of Apple Pay functionality.</p> <p>Does the device pass all tests?</p>	<p>Yes</p> <p>No</p>	<p>ESCALATION REQUIRED.</p> <p>Issue cannot be duplicated.</p> <p>Contact CSS for additional support.</p> <p>Go to step 12.</p>	<p>B5J</p> <p> \${nodeText.noSymptomCode}</p>	
12.	<p>Restart device. If the device does not restart, try to reset it.</p> <p>Rerun the AST 2 MRI diagnostic suite on the user's device.</p> <p>Does the device pass all tests?</p>	<p>Yes</p> <p>No</p>	<p>ESCALATION REQUIRED.</p> <p>Issue cannot be duplicated.</p> <p>Contact CSS for additional support.</p> <p>Go to step 13.</p>	<p>B5J</p> <p> \${nodeText.noSymptomCode}</p>	
13.	<p>Follow steps in <u>HT20125: Restore your iPhone, iPad, or iPod to factory settings</u> to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See <u>TP337: Recovery Mode Restore</u>.</p> <p>Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	<p>Yes</p> <p>No</p>	<p>Go to step 15.</p> <p>Go to step 14.</p>	<p> \${nodeText.yesSymptomCode}</p> <p> \${nodeText.noSymptomCode}</p>	

	Check	Result	Action	Code	Commodity
14.	<p>Perform steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 15.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
15.	<p>Rerun the AST 2 MRI diagnostic suite on the user's device.</p> <p>Does the device pass all tests?</p>	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5J	IPHONE

Bluetooth Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Bluetooth accessory not pairing• Bluetooth accessory not recognized• Bluetooth option grayed out in Settings	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Verify that the Bluetooth accessory's package has a "Made for iPhone" label. Refer to HT201619: About iPhone, iPad, and iPod accessories.2. Refer to HT204091: Pair a third-party Bluetooth accessory with your iPhone, iPad, or iPod touch for more information on using Bluetooth accessories with iPhone.3. Verify specific Bluetooth functionality is supported as identified in HT204387: Bluetooth profiles that iOS and iPadOS support.4. Follow steps in HT201205: If you can't connect a Bluetooth accessory to your iPhone, iPad, or iPod touch.5. If the user's issue involves pairing the device with a car stereo, follow steps in HT203412: If your iPhone, iPad, or iPod doesn't connect to or work in your car.6. Go to Settings > Bluetooth and tap the slider twice to verify that you can turn Bluetooth off and on.7. If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.8. Go to Settings > Airplane Mode and turn it on. Wait 15 seconds, then turn it off. This will reset all wireless connections on the device. Retest.9. Reset Bluetooth accessory to delete all paired devices. Refer to the accessory user manual for instructions to reset and unpair the accessory.10. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return device to user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	Run the AST 2 MRI diagnostic suite on the user's device.	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
	Check diagnostic results to verify the presence of Bluetooth hardware. Note: You may need to update the user's device to the latest operating system to run AST 2 MRI. Do not restore the user's device before running AST 2 MRI. Warning: Verify user has a backup or has given consent before proceeding. If AST 2 is not available, then follow steps in TP1045: iPhone Functional Test to test Bluetooth functionality.	No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Does MRI detect Bluetooth?	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
5.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	No	Go to step 5.	\${nodeText.noSymptomCode}	
	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
6.	Run the AST 2 MRI diagnostic suite on the user's device. Check diagnostic results to verify the presence of Bluetooth hardware. If AST 2 is not available, then follow steps in TP1045: iPhone Functional Test to test Bluetooth functionality. Does MRI detect Bluetooth?	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B47	IPHONE
7.	Attempt to pair the device with a known-good Bluetooth accessory. Test for accessory functionality. Does device function as expected with a known-good Bluetooth accessory?	Yes	Issue resolved. Bluetooth accessory is not functioning as expected. Refer user to Bluetooth accessory manufacturer for support.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B47	IPHONE

Cannot Play Media

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Song, video, or other media stored on device will not play on device.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">If user's computer is available, verify that it is authorized in iTunes or Apple Music with the user's Apple ID. Test that media plays on the computer. If media does not play on the computer, this is an issue with the media.Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Determine whether the media was purchased via the iTunes Store (or Apple Music), or if the media was synced directly from the user's computer. Was the media purchased from the iTunes Store or synced from the user's computer?	iTunes	Go to step 4.	\${nodeText.yesSymptomCode}	
		User's Computer	Go to step 5.	\${nodeText.noSymptomCode}	
4.	Download known-good media (for example, a free app or song) to the device to reset the encryption key. Attempt to play original media that previously would not play. Does original media now play?	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	Restart device and resync media from the user's computer.	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
	Attempt to play original media that previously would not play.	No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Does original media now play?				
	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
7.	Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Did restore complete?				
8.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0j	IPHONE
	Attempt to play known-good media on device.	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
	Does known-good media play?	No	ESCALATION REQUIRED. Contact CSS for additional support.	\${nodeText.noSymptomCode}	

Cellular Connectivity Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Calls are dropped• Cannot make or receive calls• Cannot send or receive text messages• Cannot send or receive cellular data while using apps	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Note: If the user cannot be heard while on a telephone or speakerphone call, even while using wired or Bluetooth headphones, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section.</p> <ol style="list-style-type: none">1. If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.2. Refer to HT211828: Prepare and activate 5G on iPhone for information about iPhone and 5G.3. Refer to HT201415: If you see No Service or Searching on your iPhone or iPad to verify device and cellular network compatibility. Some iPhone models may not be compatible with some carrier networks.4. Perform the following steps to verify cellular service on both SIMs:<ol style="list-style-type: none">a. Use Control Center to check for cellular service and signal strength on the active carrier.b. Disable Wi-Fi, then ask the user to open a web page to verify cellular data.c. Choose Settings > Cellular > Cellular Data to change the active data plan to the additional carrier, then repeat step b.d. Ask the user to place a test phone call using both carriers to verify call functionality.5. Perform the following steps to isolate service and cellular issues (references to 5G only apply to models that support 5G):<ol style="list-style-type: none">a. Determine if the user is trying to use dual SIM mode with 5G. If the user is trying to use dual SIM mode, explain that 5G cannot be enabled when using dual SIM mode. 5G is only available when one SIM is enabled.b. On the user's device, check Settings > Cellular > Cellular Plan > Voice & Data to verify that the device has the appropriate rate plan (4G, LTE, 5G) available and can be checked. If not available, ask the user to contact their carrier to determine if the expected rate plan (4G, LTE, 5G) has been enabled on their account.c. Isolate issue to carrier A or carrier B.d. Ask probing questions about environmental conditions. Check the coverage maps for the user's carrier. Verify there is proper coverage in the testing area and in the area where the user is experiencing the issue.e. In Settings, turn on Airplane Mode. Wait 15 seconds, then turn it off. This will reset all wireless connections on the device.f. On the device, go to Settings > General > Software Update to verify that the device has the most up-to-date software. If unavailable, verify software by connecting the device to the computer. Refer to HT204204: Update your iPhone, iPad, or iPod touch.g. On the device, go to Settings > General > About to verify that the device has up-to-date carrier settings. If an update is available, refer to HT201270: Update your carrier settings on your iPhone or iPad.

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| <p>such as Maps, Weather, and Stocks</p> <ul style="list-style-type: none"> • No signal strength indicators • “No Service” message • No cellular connection for calls • Searching for cellular signal • Signal strength shown on user’s device is always very weak • Weak or slow cellular connection • Poor, low, or distorted sound during telephone calls • eSIM or physical nano-SIM setup and activation issues • “Activation Not Supported” message • “SIM invalid or not supported” message • Locked nano-SIM | <p>h. Place a test call in a different, known-good location. If there are no cellular signal strength indicators visible on the device, then move to another location and check for a better signal.</p> <p>i. Restart the device. If the device does not restart, try to reset device.</p> <p>6. On the device, go to Settings > General > About and verify that the following information is present:</p> <p style="margin-left: 40px;">Network: network name
EID: 32-digit number
ICCID: numerical code
IMEI: numerical code</p> <p>Check for a 32-digit number in the Electronic Identifier (EID) field. The presence of an EID number indicates that the eSIM is functioning correctly. If no number is present, the eSIM is not functioning correctly.</p> <p>Verify that the numbers for physical nano-SIM and eSIM are both listed on the iPhone. Note: The user’s iPhone may have two physical nano-SIMs in some countries instead of one physical nano-SIM and one eSIM. Refer to HT204073: Find the serial number or IMEI on your iPhone, iPad or iPod touch for more information.</p> <p>7. If there is no carrier bundle (Carrier displays “Not Available” or ICCID displays “No SIM”), then have the user contact the appropriate carrier support channel for additional iPhone cellular plan activation support.</p> <p>8. Remove and examine the nano-SIM. If the nano-SIM appears to be cut down from a larger size, inform the user that cut SIM cards should not be used with this device. iPhone requires an unmodified nano-SIM. Cut SIMs may cause cellular issues. Refer to HT201420: If you see ‘invalid SIM’ or ‘no SIM’ on your iPhone or iPad for more information.</p> <p>9. Run the Audio diagnostics suite in AST 2. Check diagnostic results to determine if this is an audio issue, and reclassify as appropriate.</p> <p>10. Perform the steps in the following articles to attempt to resolve the user’s cellular connectivity issue:</p> <ul style="list-style-type: none"> • HT201407: If you can't activate your iPhone • HT209044: Using Dual SIM with an eSIM • HT209086: Using Dual SIM with two nano-SIM cards • HT209096: Find wireless carriers that offer eSIM service • HT207126: About models of iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, iPhone X, iPhone XS, iPhone XS Max, and iPhone XR and carrier compatibility • HT201270: Update your carrier settings on your iPhone or iPad • HT201422: If you get an error when trying to activate iMessage or FaceTime • HT204039: Wireless carrier support and features for iPhone in the United States and Canada • HT204168: If you can't make a FaceTime call on your iPhone, iPad, or iPod touch • HT208733: If you see an Update Failed or Apple Pay Not Available alert after iOS update or restart • HT207354: Status icons and symbols on your iPhone • HT201287: Use Messages on your iPhone, iPad, or iPod touch • HT204065: If you can't send or receive messages on your iPhone, iPad, or iPod touch • HT201436: Set up Visual Voicemail on your iPhone • HT207578: Set up cellular on your Apple Watch • HT203032: Make a call with Wi-Fi Calling |
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Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out of warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Examine cellular baseband diagnostic results in MRI to verify cellular baseband presence. Alternatively, on the user's device, go to Settings > General > About. Check the Modem Firmware section to see if it is blank. If the Modem Firmware section is blank, it could indicate a symptom of "No cellular connection." Is the Modem Firmware section blank?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	On the user's device, go to Settings > General > About. Check the EID section to see if it is blank. If the EID section is blank, it could indicate an issue with the eSIM. Is the EID section blank?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
		No	Go to step 5.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	Go to Settings > General > Reset > Reset Network Settings.	Yes	Issue resolved by resetting network settings.	\${nodeText.yesSymptomCode}	
	Warning: Resetting network settings will erase all stored Wi-Fi passwords. Get consent from the user before proceeding.	No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Did resetting network settings resolve the cellular connectivity issue?				
	Run the AST 2 Cellular Radio Frequency Test suite on the user's iPhone, using the shielded box. Check diagnostic results to verify that the iPhone cellular radio is functioning properly. Note: This test suite requires iOS v13.4 or later. You may need to update the user's device to the latest OS to run this test suite. Do all diagnostic tests pass on the user's device?	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
7.	Check diagnostic results to determine which result appears: A. Yellow or cautionary diagnostic result. B. Red or failed diagnostic result. Which diagnostic result is shown?	No	Go to step 7.	\${nodeText.noSymptomCode}	
	A		Follow AST 2 diagnostic result recommendations.	\${nodeText.yesSymptomCode}	
	B		Go to step 8.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	Determine which of the following symptoms was observed on the user's device. The following symptoms indicate "No Cellular Connection": <ul style="list-style-type: none">• No signal strength indicators are visible on the user's device• "No Service" shown in the status bar• No cellular connection for calls or data• "Searching" shown in the status bar	No Cellular Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
8.	The following symptoms indicate "Weak Connection": <ul style="list-style-type: none">• Calls dropped during call• Calls dropped when making or receiving calls• The signal strength shown on the user's device is always very weak• Weak or slow cellular connection for calls or data• Audio quality issues during telephone calls, such as poor, low, or distorted sound	Weak Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE
	Which symptom describes the issue?				
9.	Run the AST 2 Run the Cellular Voice and Service suite on the user's iPhone. Check diagnostic results to look for any relationship between cellular issues, environmental and device conditions, and device behavior and operating conditions. Note: Do not erase or restore the user's device before running this test suite. Is there any correlation between diagnostic results and the user's cellular issues?	Yes No	Go to step 10. Go to step 11.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity	
10.	Ask the user probing questions about the cellular issue, the user's location and environmental conditions, and the device's operating conditions at the time the issues arose.	Yes	The issue is not related to the user's iPhone hardware.	\${nodeText.yesSymptomCode}		
	Explain to the user that the cellular issue could likely be caused by external factors such as normally changing environmental or device conditions, rather than any fault of the OS or the device.		Advise the user to contact the wireless carrier for further support.			
	Gain agreement from the user that the cellular issue is likely to be caused by external factors, and that there is no service issue with the device itself.	No	Go to step 11.	\${nodeText.noSymptomCode}		
	Does the user agree that the cellular issue is likely caused by external factors?					
11.	Identify what SIM type is being used, nano-SIM or eSIM.	nano-SIM	Go to step 12.	\${nodeText.yesSymptomCode}		
	Is the user having issues with the nano-SIM or with eSIM?	eSIM	Go to step 16.			
12.	Go to Settings > Phone > SIM PIN. If the nano-SIM is locked, unlock it. See HT201529: Use a SIM PIN for your iPhone or iPad .	Yes	Issue resolved.	\${nodeText.yesSymptomCode}		
	Did unlocking the nano-SIM resolve the cellular connectivity issue?		Go to step 13.			
13.	Use the SIM removal tool to eject the nano-SIM card tray and reseat the nano-SIM card.	Yes	Issue resolved.	\${nodeText.yesSymptomCode}		
	Did reseating the nano-SIM card resolve the cellular connectivity issue?		Go to step 14.			
14.	Install the user's nano-SIM card into a known-good phone.	Yes	Go to step 19.	\${nodeText.yesSymptomCode}		
	Did installing the nano-SIM card into a known-good phone resolve the cellular connectivity issue?		Go to step 15.			

	Check	Result	Action	Code	Commodity
	Contact the user's cellular carrier and ask the following questions: <ul style="list-style-type: none">• Is the SIM card compatible with the expected (4G, LTE, 5G) rate plan?• Is the appropriate rate plan (4G, LTE, 5G) enabled on the user's account?• Is there an account block related to incompatible plans?• Are there any billing related issues or blocks?• Are there any feature restrictions on the account?• Is there any localized outage information?• Is there a specific resolution to a particular event in the user's area?	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
15.	Perform any updates suggested by the carrier. Did contacting the carrier resolve the cellular connectivity issue?	No	Go to step 19.	\${nodeText.noSymptomCode}	
	Contact the user's cellular carrier and ask the following questions: <ul style="list-style-type: none">• Is the appropriate rate plan (4G, LTE, 5G) enabled on the user's account?• Is there an account block related to incompatible plans?• Are there any billing related issues or blocks?• Are there any feature restrictions on the account?• Is there any localized outage information?• Is there a specific resolution to a particular event in the user's area?	Yes	Issue resolved.	\${nodeText.yesSymptomCode}	
16.	Perform any updates suggested by the carrier. Did contacting the carrier resolve the cellular connectivity issue?	No	Go to step 17.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
17.	Contact the carrier to obtain an eSIM QR code or customized URL and move the user's account to a known-good, unlocked, test iPhone.	Yes	Go to step 19.	\${nodeText.yesSymptomCode}	
	Did this resolve the cellular connectivity issue?	No	Go to step 18.	\${nodeText.noSymptomCode}	
18.	Contact the carrier to determine if the test phone was properly set up and whether there are any network errors that could cause the user's issue on the test or original iPhone.	Yes	Go to step 19.	\${nodeText.yesSymptomCode}	
	Is the cellular call/text issue resolved on the test phone?	No	The issue is not related to the user's iPhone hardware. Advise the user to contact the wireless carrier for further support.	\${nodeText.noSymptomCode}	
19.	Go to Settings > General > Reset > Erase All Content and Settings.	Yes	Issue resolved by erasing all content and settings.	\${nodeText.yesSymptomCode}	
	Select the option to Erase All & Keep Data Plans. This will preserve the eSIM. Important: If the eSIM is erased during troubleshooting, the user will need to obtain a new eSIM to reactivate cellular service.	No	Go to step 20.	\${nodeText.noSymptomCode}	
20.	Warning: Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding. Did erasing all content and settings on the device resolve the cellular connectivity issue?	Yes	Go to step 22.	\${nodeText.yesSymptomCode}	
	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	No	Go to step 21.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
21.	<p>Perform steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 22.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B0J	IPHONE
22.	<p>Rerun the AST 2 MRI diagnostics suite on the user's iPhone.</p> <p>Note: The user's iPhone may have two physical nano-SIMs in some countries instead of one physical nano-SIM and one eSIM.</p> <p>If the user has activated only one SIM in the iPhone, then only one SIM should appear in the diagnostic results.</p> <p>If the user has activated both eSIM and nano-SIM (or both nano-SIMs) in the iPhone, then both eSIM and nano-SIM (or two physical nano-SIMs) should appear in diagnostic results.</p> <p>Check diagnostic results to verify that the iPhone recognizes the expected number of physical nano-SIMs and eSIM, or two physical nano-SIMs.</p> <p>Are diagnostic results as expected?</p>	Yes	Go to step 23.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B33	IPHONE
23.	<p>Determine whether the device has returned to normal operation after restoring it.</p> <p>Contact the carrier if eSIM was used to obtain a new QR code or customized URL.</p> <p>Did restoring the device resolve the cellular connectivity issue?</p>	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 24.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	Determine which of the following symptoms was observed on the user's device. The following symptoms indicate "No Cellular Connection": <ul style="list-style-type: none">• No signal strength indicators are visible on the user's device• "No Service" shown in the status bar• No cellular connection for calls or data• "Searching" shown in the status bar	No Cellular Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B08	IPHONE
24.	The following symptoms indicate "Weak Connection": <ul style="list-style-type: none">• Calls dropped during call• Calls dropped when making or receiving calls• The signal strength shown on the user's device is always very weak• Weak or slow cellular connection for calls or data• Audio quality issues during telephone calls, such as poor, low, or distorted sound Which symptom describes the issue?	Weak Connection	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE

SIM Card Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• “Invalid SIM card installed” message.• “No SIM card installed” message.• “Different SIM detected.” message.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Inserting a non-Apple authorized carrier SIM card can cause SIM alert messages. Verify that the SIM card is authorized to be used with this particular device.2. Inserting a SIM card that is not the SIM used for the device’s current activation can cause SIM alert messages.3. A “Locked SIM” message in the iPhone status bar means that the SIM is locked and a personal identification number (PIN) is required to unlock. If “Locked SIM” message appears, follow steps in HT201529: Use a SIM PIN for your iPhone or iPad.4. Verify that the correct SIM tray is installed in the user’s device. <p>SIM trays vary slightly in size and shape. Using the incorrect SIM tray may prevent the device from detecting an inserted SIM card.</p> <p>Refer to HT202645: Learn which size SIM card your iPhone or iPad uses and HT201337: Remove or switch the SIM card in your iPhone or iPad for more information.</p> <ol style="list-style-type: none">5. Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	<p>Use the SIM Removal Tool to eject the SIM card tray.</p> <p>Did the SIM tray eject?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B91	IPHONE
4.	<p>Inspect the SIM card tray for damage.</p> <p>Verify that the correct SIM tray is installed in the user's device.</p> <p>SIM trays vary slightly in size and shape. Using the incorrect SIM tray may prevent the device from detecting an inserted SIM card.</p> <p>Refer to HT202645: Learn which size SIM card your iPhone or iPad uses and HT201337: Remove or switch the SIM card in your iPhone or iPad for more information.</p> <p>Does the SIM tray appear damaged or incorrect in size or shape?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	Determine if the device has physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE COMPONENT
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
6.	Remove the user's SIM and examine it. If the SIM appears to be cut down from a larger size, inform the user that cut SIM cards should not be used with this device. iPhone requires the proper nano-SIM card. Cut SIMs may cause cellular issues.	Yes	Issue resolved. Replace SIM card with the correct carrier-supported SIM card.	<code> \${nodeText.yesSymptomCode}</code>	
	Does the user's SIM card appear to be cut down from a larger size?	No	Go to step 7.	<code> \${nodeText.noSymptomCode}</code>	
7.	Reinstall the user's SIM card. Verify that the SIM card is fully seated in the enclosure.	Yes	Issue resolved by reseating SIM card.	<code> \${nodeText.yesSymptomCode}</code>	
	Did reseating the SIM card resolve the SIM card issue?	No	Go to step 8.	<code> \${nodeText.noSymptomCode}</code>	
8.	Install the user's SIM card into a known-good phone.	Yes	Go to step 9.	<code> \${nodeText.yesSymptomCode}</code>	
	Did the user's SIM work in a known-good phone?	No	Issue resolved. Replace SIM card with the correct carrier-supported SIM card.	<code> \${nodeText.noSymptomCode}</code>	

	Check	Result	Action	Code	Commodity
9.	Determine if the device has physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B33	IPHONE COMPONENT
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B33	IPHONE

Sync Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Device is not recognized by the computer.Device will not sync.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>1. Connect the device using a known-good Lightning cable to a known-good computer running the latest version of macOS. Verify that the device is recognized by the computer and has the most up-to-date software.</p> <p>Important: If the user's device is running iOS 11.4.1 or later, the following will occur unless you connect the device to the computer while it is unlocked or in recovery mode, or you enter the device's passcode while it's connected:</p> <ul style="list-style-type: none">The device will not be recognized by the computer.The device will not communicate with USB accessories. <p>Attempt to place the device in recovery mode to verify that the device is recognized by the computer. Refer to TP337: Recovery Mode Restore for instructions. Refer to HT208857: Using USB accessories with iOS 11.4.1 and later for more information.</p> <p>2. Verify that the Lightning cable is securely attached to both the device and the computer. 3. Try the Lightning cable in both orientations. 4. Try connecting the device to a different USB 2.0 port on the computer (not on the keyboard or an external hub). 5. Disconnect other USB devices from the computer. 6. Verify that the device accepts power with a known-good power adapter and cord. If the device does not accept power, return to the service guide table of contents and select "Battery Will Not Charge" from the troubleshooting section. 7. Restart the computer and reconnect the device. 8. If the computer is a Windows PC, refer to HT204095: If your computer doesn't recognize your iPhone, iPad, or iPod and HT203188: Restart the Apple Mobile Device Service (AMDS) on Windows. 9. Check for third-party software conflicts. 10. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.</p>

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Are you able to clean the Lightning connector?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	Connect the device to the user's computer with the user's Lightning to USB Cable (if available). Check whether the device is recognized by the computer.	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
	If the user's computer or cable is not available, then answer "No" to the following question. Does the computer recognize the device?	No	Go to step 6.	\${nodeText.noSymptomCode}	
5.	Attempt to sync the device with the computer.	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
	Was the sync successful?	No	Go to step 10.	\${nodeText.noSymptomCode}	
6.	Troubleshooting this issue completely requires a known-good Lightning to USB Cable.	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
	Do you have immediate access to a known-good Lightning to USB Cable?	No	Go to step 8.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
7.	<p>Substitute a known-good Lightning to USB Cable and retest.</p> <p>Does the computer recognize the device?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
		No	Go to step 9.	\${nodeText.noSymptomCode}	
8.	<p>Inspect the user's Lightning to USB Cable for damage.</p> <p>Did you find any damage to the cable or its components?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
		No	Go to step 9.	\${nodeText.noSymptomCode}	
9.	<p>Connect the device to a known-good computer running the latest version of macOS and see whether the device is recognized by the computer.</p> <p>Does the known-good computer recognize the device?</p>	Yes	User needs to reinstall iTunes or macOS (depending on OS version). If reinstall is unsuccessful in eliminating the symptom, user needs to troubleshoot the issue with the computer. If the computer is a Windows PC, refer to HT204275: Remove and reinstall iTunes and related software components for Windows 7 and later.	\${nodeText.yesSymptomCode}	IPHONE ACCESSORY
		No	Go to step 10.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
10.	Put the device into recovery mode and reconnect it to a known-good computer. See TP337: Recovery Mode Restore .	Yes	Go to step 11.	\${nodeText.yesSymptomCode}	
	Warning: Verify that the user has a backup or has given consent before proceeding. Verify if device is now recognized by the computer. Does the known-good computer recognize the device?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
11.	Restore device in recovery mode. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes	Go to step 12.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
12.	Attempt to sync the device with the computer. Was the sync successful?	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	ESCALATION REQUIRED. Contact CSS for additional support.	B0J	

Ultra Wideband Alert Message

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Ultra Wideband Alert message is displayed after updating device.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">An Ultra Wideband Alert message may be displayed after updating the user's device. Verify that this message has appeared on the user's device by going to Settings > General > About. If the Ultra Wideband Alert has been activated then you should see it here, or in Settings > General > About > Important Hardware Messages if there are multiple messages.Refer to HT208733: If you see an Update Failed or Apple Pay Not Available alert after iOS update or restart for more information about this alert.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out of warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Connect the device to a known-good computer running the latest macOS. Try updating the user's device again to resolve the issue. To update iOS, refer to HT204204: Update your iPhone, iPad, or iPod touch .	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B9K	IPHONE
	Verify that the Ultra Wideband Alert message is no longer displayed after updating the user's device. Does the the Ultra Wideband Alert message remain after updating the device using the computer?	No	Issue resolved by updating the device.	\${nodeText.noSymptomCode}	

Wi-Fi Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Unable to locate nearby Wi-Fi network• Unable to connect to Wi-Fi network• Unable to access Internet• Wi-Fi option grayed out in Settings	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Go to Settings > Wi-Fi and verify that you can turn Wi-Fi off and on.2. If the device is in a case, remove the case. Retest to verify if the case is causing signal interference.3. Check Wi-Fi signal strength. If signal strength is low, move closer to the Wi-Fi router or hotspot.4. Follow steps in HT202639: Connect to Wi-Fi on your iPhone, iPad, or iPod touch and HT204051: If your iPhone, iPad, or iPod touch won't connect to a Wi-Fi network. Note: If the network is hidden, you must choose "Other..." and enter the network name to join.5. Go to Settings > Wi-Fi and tap the blue circle to the right of the network name. Choose "Forget This Network" and then connect to a known-good Wi-Fi network.6. Go to Settings > Airplane Mode and turn it on. Wait 15 seconds, then turn it off. This will reset all wireless connections on the device. Retest.7. If the Wi-Fi option is grayed out or dimmed in Settings, tap General > Reset > Reset Network Settings. All network settings, including Wi-Fi passwords, virtual private network (VPN), and access point name (APN) settings will reset.8. Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out of warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	Follow all steps in HT204051: If your iPhone, iPad, or iPod touch won't connect to a Wi-Fi network , including steps to reset network settings on the user's device.	Yes	Issue resolved by resetting network settings.	\${nodeText.yesSymptomCode}	
	Is Wi-Fi issue resolved?	No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Run AST 2 MRI diagnostic suite on the user's device.	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
	Check diagnostic results to verify the presence of Wi-Fi hardware.				
5.	If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to test Wi-Fi functionality.	No	Go to step 6.	\${nodeText.noSymptomCode}	
	Does MRI detect Wi-Fi?				
6.	Follow the steps in TP1045: iPhone Functional Test to test Wi-Fi functionality.	Yes	Issue cannot be duplicated.	\${nodeText.yesSymptomCode}	
	Is the device able to join a known-good Wi-Fi network?	No	Go to step 6.	\${nodeText.noSymptomCode}	
7.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Did restore complete?				
7.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: Get help with iOS update and restore errors to attempt to restore the device.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
8.	Run AST 2 MRI diagnostic suite on the user's device. Check diagnostic results to verify the presence of Wi-Fi hardware.	Yes No	Go to step 9. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	{nodeText.yesSymptomCode} B45	IPHONE
	If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to test Wi-Fi functionality. Does MRI detect Wi-Fi?				
9.	Follow the steps in TP1045: iPhone Functional Test to test Wi-Fi functionality.	Yes No	Issue resolved by restoring the device. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	{nodeText.yesSymptomCode} B45	IPHONE
	Is the device able to join a known-good Wi-Fi network?				

Cracked Glass

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Cracked display or enclosure glass	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>1. Refer to TP1924: Visual/Mechanical Inspection (VMI) Guide for iPhone to determine whether damage is catastrophic.</p> <p>Note: A device with catastrophic damage is not eligible for service.</p> <p>2. Verify whether this issue appears to be safety-related. Refer to HT203291: Addressing cracked iPhone, iPad, iPod touch, or Apple Watch displays and OP44: Handling Potential Product Safety Issues for more information (Apple Retail users refer to RS60: Product Safety Escalations).</p>

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Determine whether the device has a crack in the display or in the enclosure glass.	Display	Go to step 2.	\${nodeText.yesSymptomCode}	
	Does the device have a crack in the display or in the enclosure glass?	Enclosure	Go to step 5.	\${nodeText.noSymptomCode}	
2.	Determine whether the device's display has a hairline crack or multiple cracks. Select "Hairline Crack" if the display has the following symptoms: <ul style="list-style-type: none">• No point of impact• No spiderweb fracturing Select "Multiple Cracks" if the display has any of the following symptoms: <ul style="list-style-type: none">• Multiple cracks• Spiderweb fracturing• LCD fractures under the cover glass• Hairline crack with point of impact	Hairline Crack	Go to step 3.	\${nodeText.yesSymptomCode}	
	Does the device's display have a hairline crack or multiple cracks?	Multiple Cracks	Go to step 4.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B98	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B98	IPHONE

	Check	Result	Action	Code	Commodity
4.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B92	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B92	IPHONE

	Check	Result	Action	Code	Commodity
5.	Determine whether the device's enclosure glass has a hairline crack or multiple cracks. Select "Hairline Crack" if the enclosure glass has the following symptoms: <ul style="list-style-type: none">• No point of impact• No spiderweb fracturing Select "Multiple Cracks" if the enclosure glass has any of the following symptoms: <ul style="list-style-type: none">• Multiple cracks• Spiderweb fracturing• Hairline crack with point of impact Does the device's enclosure glass have a hairline crack or multiple cracks?	Hairline Crack	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B9H	IPHONE
	Multiple Cracks	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B9J	IPHONE	

Display Anomalies

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Pixel anomaliesParticles or debris under glass	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>1. Clean the display with a clean microfiber cloth.</p> <p>Important: Do not use liquids, sprays, or abrasives to clean the device.</p>

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
3.	Run the Display Pixel Anomalies diagnostic suite in AST 2 to generate test patterns that help identify display anomalies. Refer to HT202025: About LCD display pixel anomalies for Apple products released in 2010 and later to determine whether the display anomalies qualify the device for display replacement. Do the observed display anomalies qualify the device for display replacement?	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support. Issue cannot be duplicated.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
4.	Determine if the device has physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B57	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B57	IPHONE

Display Rotation Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Screen does not rotate when device changes orientation	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">Verify that Portrait Orientation Lock is off. Follow steps in HT204547: Rotate the screen on your iPhone or iPod touch to disable it.Hold iPhone in an upright position when rotating between portrait and landscape orientation.Not all apps are designed to rotate. Some may use only portrait or landscape, or switch depending on the content. Follow steps in the Multi-Touch and Accelerometer section of TP1045: iPhone Functional Test to test display rotation (accelerometer) functionality.Follow all steps in TP880: iPhone, iPad, and iPad touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
2.		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	Run the AST 2 MRI diagnostic suite on the user's device.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Check diagnostic results to verify the presence of accelerometer and gyroscope sensor hardware. Note: You may need to update the user's device to the latest operating system to run this test. Do not restore the user's device before running AST 2. To update iOS, refer to HT204204: Update your iPhone, iPad, or iPod touch .	No	Go to step 5.	\${nodeText.noSymptomCode}	
3.	Warning: Verify that the user has a backup or has given consent before proceeding. If AST 2 is not available, then follow steps in the Multi-Touch and Accelerometer section of TP1045: iPhone Functional Test to test display rotation (accelerometer) functionality. Does MRI detect accelerometer and gyroscope sensor hardware?	No	Go to step 5.	\${nodeText.noSymptomCode}	
4.	Follow steps in the Multi-Touch and Accelerometer section of TP1045: iPhone Functional Test to test display rotation (accelerometer) functionality. Does the display rotate properly?	Yes	Issue cannot be duplicated.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
7.	Run the AST 2 MRI diagnostic suite on the user's device.	Yes	Go to step 8.	\$nodeText.yesSymptomCode}	IPHONE
	Check diagnostic results to verify the presence of accelerometer and gyroscope sensor hardware. If AST 2 is not available, then follow steps in the Multi-Touch and Accelerometer section of TP1045: iPhone Functional Test to test display rotation (accelerometer) functionality.		Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.		
8.	Does MRI detect accelerometer and gyroscope sensor hardware?	No	B5C	\$nodeText.yesSymptomCode}	IPHONE
	Follow steps in the Multi-Touch and Accelerometer section of TP1045: iPhone Functional Test to retest display rotation (accelerometer) functionality.		Issue resolved by restoring the device.		
	Does the display rotate properly?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5C	IPHONE

Multi-Touch, 3D, or Haptic Touch Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Multi-Touch slow to respond or not responding.• 3D or Haptic Touch not responding.• Isolated areas not responding to Multi-Touch, 3D or Haptic Touch.• Erratic response to Multi-Touch, 3D or Haptic Touch.• Unexpected Multi-Touch response.• Overly sensitive Multi-Touch, 3D or Haptic Touch response.• Insensitivity to 3D or Haptic Touch response.• Not responding when dragging slider to power off.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Verify that the issue is related to Multi-Touch and not related to the device being unresponsive. View the clock on the Home screen or on the Clock app icon to see if it's keeping time. The second hand on the Clock app icon should move smoothly clockwise around the clock dial. If the clock is not keeping time, this may indicate an unresponsive device. Return to the service guide table of contents and select "Unexpected Freeze, Restart, or Power Off" from the troubleshooting section.2. If the issue is related to 3D or Haptic Touch, then go to Settings > Accessibility > Touch > 3D & Haptic Touch and confirm that the setting is enabled. Note: Not all iPhone models support 3D or Haptic Touch. Skip instructions for 3D or Haptic Touch on iPhone models that do not support these features. Refer to HT205056: Change 3D or Haptic Touch sensitivity on your iPhone and HT205269: Use Touch Accommodations with your iPhone, iPad, iPod touch, or Apple Watch for more information.3. Clean the display with a clean microfiber cloth. Important: Do not use liquids, sprays, or abrasives to clean the device.4. Rule out environmental causes by checking for the use of protective films, cases, gloves, or a stylus. Verify that the user touches the screen with finger pads and not fingernails.5. Quit any apps that are running in the background.6. Follow all steps in TP880: iPhone, iPad, and iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	<code> \${nodeText.yesSymptomCode}</code>	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	<code> \${nodeText.noSymptomCode}</code>	
	Is the device in warranty and eligible for warranty service?				

	Check	Result	Action	Code	Commodity
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	<code> \${nodeText.yesSymptomCode}</code>	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	<code> \${nodeText.noSymptomCode}</code>	
3.	If the symptom is that the user's device is not properly responding to touch, then run the Multi-Touch diagnostic suite in AST 2. If the symptom is that the user's device is exhibiting unexpected touch response or is overly sensitive to touch response, then run the Unexpected Touch diagnostic suite in AST 2. If the symptom is related to 3D or Haptic Touch, then follow steps in the 3D Touch or Taptic Engine sections of TP1045: iPhone Functional Test to test 3D or Haptic Touch functionality.	Yes	Issue cannot be duplicated. Remind user that protective films, cases, styluses, gloves, and fingernails can prevent Multi-Touch and 3D Touch from responding properly.	<code> \${nodeText.yesSymptomCode}</code>	
	If AST 2 is not available, then follow steps in the 3D Touch or Taptic Engine sections of TP1045: iPhone Functional Test to test Multi-Touch and 3D or Haptic Touch functionality. Rotate and test the device in all four directions. Did the display respond as expected?	No	Go to step 4.	<code> \${nodeText.noSymptomCode}</code>	
4.	Isolate the user's issue to one of the following related functions: A. Multi-Touch or Haptic Touch B. 3D Touch Note: These devices support 3D Touch: iPhone 6s, iPhone 6s Plus, iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, iPhone X, iPhone XS, and iPhone XS Max. To which function is the user's issue related?	A	Go to step 5.	<code> \${nodeText.yesSymptomCode}</code>	
	B	Go to step 6.	<code> \${nodeText.noSymptomCode}</code>		

	Check	Result	Action	Code	Commodity
	<p>Note: Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> 1. Open the device. 2. Disconnect the group of flex cables connecting the display to the logic board. 3. Examine each connector for signs of damage or debris. 4. If display flex connectors appear normal and not damaged, reconnect this group of flex cables, gently reseating each connector by lightly pressing on it with two fingers. 5. If any display flex cable appears abnormal or damaged, answer "No" to the question below. 6. Reassemble by installing any removed components, removing and replacing the display adhesive, and closing the device. 	Yes	Issue resolved by reseating internal display flex cables.	\${nodeText.yesSymptomCode}	
5.	<p>If the symptom is that the user's device is not properly responding to touch, then run the Multi-Touch diagnostic suite in AST 2.</p> <p>If the symptom is that the user's device is overly sensitive to touch response, then run the Unexpected Touch diagnostic suite in AST 2.</p> <p>If AST 2 is not available, then follow steps in the Multi-Touch and Accelerometer section of TP1045: iPhone Functional Test to test Multi-Touch and Haptic Touch functionality.</p> <p>Rotate and test the device in all four directions.</p> <p>Did the display respond as expected?</p>	No	Go to step 8.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Isolate the user's 3D Touch symptom to issue A or B. A. <ul style="list-style-type: none">• 3D Touch is not responding.• Isolated areas not responding to 3D Touch.	A	Go to step 8.	\${nodeText.yesSymptomCode}	
	B. <ul style="list-style-type: none">• Insensitivity to 3D Touch response.• Overly sensitive 3D Touch response.	No	Go to step 7.	\${nodeText.noSymptomCode}	
7.	Which issue is relevant? Note: Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps: <ol style="list-style-type: none">1. Open the device.2. Remove and replace the display adhesive.3. Close the device.	Yes	Issue resolved by display adhesive replacement.	\${nodeText.yesSymptomCode}	
	Follow steps in the 3D Touch or Taptic Engine sections of TP1045: iPhone Functional Test to test 3D Touch functionality. Rotate and test the device in all four directions. Did the display respond as expected after display adhesive replacement?	No	Go to step 8.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
8.	Determine if the device has physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B56	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B56	IPHONE

No Video or Poor Image

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• No image on device display• Distorted video• Rainbow effect• Poor image quality• Nonuniform color• Displayed images have incorrect white balance (different color hues than expected)• Bad contrast• Brightness or backlight issues• Light bleed• Horizontal/vertical lines• White screen• Blank/Black screen• Flickering• True Tone setting is missing (on models that support True Tone)	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Note: This troubleshooting procedure is intended for no video or poor image quality issues only. If the device will not turn on, return to the service guide table of contents and select "No Power" from the troubleshooting section.</p> <ol style="list-style-type: none">1. Clean the display with a clean microfiber cloth. Important: Do not use liquids, sprays, or abrasives to clean the device.2. Rule out environmental causes by checking and removing protective films and cases.3. Rotate the device to confirm if the issue is caused by media, software, or the display.4. Connect the device using a known-good Lightning cable to a known-good computer running the latest version of macOS. Verify that the device is recognized in by the computer and has the most up-to-date software. <p>Important: If the user's device is running iOS 11.4.1 or later, the following will occur unless you connect the device to the computer while it is unlocked or in recovery mode, or you enter the device's passcode while it's connected:</p> <ul style="list-style-type: none">• The device will not be recognized by the computer.• The device will not communicate with USB accessories.• The device will appear to have no power. <p>Attempt to place the device in recovery mode to verify if it can turn on. Refer to TP337: Recovery Mode Restore for instructions. Refer to HT208857: Using USB accessories with iOS 11.4.1 and later for more information.</p> <p>If the device cannot be recognized by the computer, return to the service guide table of contents and select "No Power" from the troubleshooting section.</p> <ol style="list-style-type: none">5. Go to Settings > Display & Brightness and turn Auto-Brightness off and on, then adjust the brightness level. Recheck the user's device to see if this resolved the issue. Changing the Auto Brightness setting in this way resets all ambient light sensor properties.6. If the user reports symptoms related to white balance, refer to TP1445: Night Shift.7. Some iPhone models support True Tone display technology. True Tone uses the device's ambient light sensors to adjust the appearance of the displayed image when activated. This can be mistaken as a service issue. Refer to HT202613: Adjust the brightness on your iPhone, iPad, or iPod touch for more information about using brightness settings and True Tone. Follow steps in TP1045: iPhone Functional Test to verify True Tone functionality for iPhone models that support True Tone.8. Go to Settings > General > Accessibility > Display Accommodations and verify that Reduce White Point and Color Filters settings are turned off. If these settings are turned on, the altered screen image may incorrectly be perceived as a display service issue.

9. Plug the device into a known-good 10W or 12W Apple USB power adapter that is connected to AC power until an image appears on the screen, or for up to 10 minutes, whichever comes first. Refer to [TP325: Charge Battery](#) for more information. If the device does not charge or no image appears on the screen after 10 minutes of charging, return to the service guide table of contents and select "No Power" from the troubleshooting section.
10. Follow all steps in [TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures](#) before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	<p>Some device failures may prevent AST 2 diagnostic suites from running.</p> <p>Attempt to run the Display Backlight and Color and Display Image Quality suites for the following models:</p> <ul style="list-style-type: none"> • iPhone 7 • iPhone 7 Plus • iPhone 8 • iPhone 8 Plus • iPhone XR • iPhone 11 • iPhone SE (2nd generation) 	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
3.	<p>Attempt to run the Display Color Uniformity and Display Image Quality suites for the following models:</p> <ul style="list-style-type: none"> • iPhone X • iPhone XS • iPhone XS Max • iPhone 11 Pro • iPhone 11 Pro Max • iPhone 12 • iPhone 12 mini • iPhone 12 Pro • iPhone 12 Pro Max 	No	Go to step 5.	\${nodeText.noSymptomCode}	
	Can these tests run on the user's device?				
	<p>Run the Display Backlight and Color and Display Image Quality suites for the following models:</p> <ul style="list-style-type: none"> • iPhone 7 • iPhone 7 Plus • iPhone 8 • iPhone 8 Plus • iPhone XR • iPhone 11 • iPhone SE (2nd generation) 	Yes	Issue cannot be duplicated.	\${nodeText.yesSymptomCode}	
4.	<p>Run the Display Color Uniformity and Display Image Quality suites for the following models:</p> <ul style="list-style-type: none"> • iPhone X • iPhone XS • iPhone XS Max • iPhone 11 Pro • iPhone 11 Pro Max • iPhone 12 • iPhone 12 mini • iPhone 12 Pro • iPhone 12 Pro Max 	No	Go to step 5.	\${nodeText.noSymptomCode}	
	Does the device pass all tests?				

	Check	Result	Action	Code	Commodity
5.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
	Is the device eligible for a component repair?	No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Determine which of the following symptoms is causing the issue: Blank or Black Screen: Device has power and is recognized by the computer, but the display remains black or is completely white. Image Quality: Distorted video, rainbow effect, poor image quality, nonuniform color, bad contrast, brightness or backlight issues, light bleed, horizontal or vertical lines or blocks, out of focus, flickering, or if True Tone setting is missing (on models that support True Tone). Does the device have blank/black screen symptoms or image quality symptoms?	Blank/Black Screen	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B5H	IPHONE
		Image Quality	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B54	IPHONE

	Check	Result	Action	Code	Commodity
	Note: Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:	Yes	Issue resolved by reseating internal display flex cables.	<code> \${nodeText.yesSymptomCode}</code>	
7.	<p>1. Open the device.</p> <p>2. Disconnect the group of flex cables connecting the display to the logic board.</p> <p>3. Examine each connector for signs of damage or debris.</p> <p>4. If display flex connectors appear normal and not damaged, reconnect the group of flex cables, gently reseating each connector by lightly pressing on it with two fingers.</p> <p>5. If any display flex cable appears abnormal or damaged, answer “No” to the question below.</p> <p>6. Reassemble by installing any removed components and closing the device.</p> <p>7. Retest the device display.</p> <p>Did this resolve the issue?</p>	No	Go to step 8.	<code> \${nodeText.noSymptomCode}</code>	

	Check	Result	Action	Code	Commodity
	Determine which of the following symptoms is causing the issue: Blank or Black Screen: Device has power and is recognized by the computer, but the display remains black or is completely white. Image Quality: Distorted video, rainbow effect, poor image quality, nonuniform color, bad contrast, brightness or backlight issues, light bleed, horizontal or vertical lines or blocks, out of focus, flickering, or if True Tone setting is missing (on models that support True Tone). Does the device have blank/black screen symptoms or image quality symptoms?	Blank/Black Screen	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B5H	IPHONE COMP DISPLAY
8.		Image Quality	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B54	IPHONE COMP DISPLAY

Ambient Light Sensor Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Display does not adjust to varying light environments while auto-brightness on.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">Clean the display with a clean microfiber cloth. Important: Do not use liquids, sprays, or abrasives to clean the device.Rule out environmental causes by checking and removing protective films and cases.Go to Settings > Display & Brightness and turn Auto-Brightness off then on again. Recheck the user's device to see if this resolved the issue.Some iPhone models support True Tone display technology. True Tone uses the device's ambient light sensors to adjust the appearance of the displayed image when activated. This can be mistaken as a service issue. Refer to HT202613: Adjust the brightness on your iPhone, iPad, or iPod touch for more information about using Brightness settings and True Tone. Follow steps in TP1045: iPhone Functional Test to verify True Tone functionality for iPhone models that support True Tone.Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	Run the AST 2 MRI diagnostic suite on the user's device.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Check diagnostic results to verify the presence of ambient light sensor hardware. Note: You may need to update the user's device to the latest operating system to run AST 2 MRI. Do not restore the user's device before running AST 2.	No	Go to step 5.	\${nodeText.noSymptomCode}	
3.	Warning: Verify that the user has a backup or has given consent before proceeding. If AST 2 is not available, follow the steps in TP1045: iPhone Functional Test to test ambient light sensor functionality. Does MRI detect the ambient light sensor?				
4.	Follow steps in TP1045: iPhone Functional Test to test ambient light sensor functionality. Did the display respond as expected?	Yes	Issue cannot be duplicated. Remind the user that protective films and cases can prevent the ambient light sensor from responding properly.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B54	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B54	IPHONE

Burning Smell or Odor

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Device or accessory emits burning, smoky, or other unusual odor.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">Disconnect all accessories from the device.Follow all steps in TP880: iPhone, iPad, and iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Determine whether this is a safety issue. Do not perform procedures that can be a safety risk to you or the user. Have you identified a safety issue?	Yes	ESCALATION REQUIRED. Contact CSS for safety-related issues. Refer to OP44: Handling Potential Product Safety Issues .	\${nodeText.yesSymptomCode}	
	Retail: Document the issue and escalate following the steps in RS60: Product Safety Escalations .				
2.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in either the yellow or red sections of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Go to step 3.				

	Check	Result	Action	Code	Commodity
3.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
4.	Determine presence of the unusual odor.	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
	Can the unusual odor be detected on either the device or an accessory?	No	The issue cannot be duplicated.	\${nodeText.noSymptomCode}	
5.	Determine source of the odor.	Device	ESCALATION REQUIRED. Contact CSS for safety-related issues. Refer to OP44: Handling Potential Product Safety Issues .	\${nodeText.yesSymptomCode}	
	Is the odor coming from the device or an accessory?		Retail: Document the issue and escalate following the steps in RS60: Product Safety Escalations .		
		Accessory	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Advise user to discontinue use of the accessory.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
	Is the accessory made by Apple?	No	Refer the user to the accessory manufacturer for support.	\${nodeText.noSymptomCode}	

Camera Issues

Unlikely causes:

There are no unlikely causes for this issue.

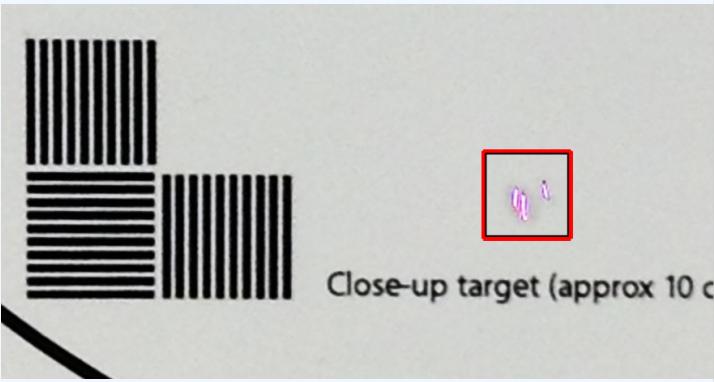
Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Camera app is missing.<ul style="list-style-type: none">• Description: Camera app is not present on user's device.• Camera no preview or LED flash not working.<ul style="list-style-type: none">• Description:<ul style="list-style-type: none">• Camera LED flash not working.• No preview visible in Camera app.• Cannot switch between rear camera and front camera.• Photo or video image quality from one or both cameras is not as expected.<ul style="list-style-type: none">• Description:<ul style="list-style-type: none">• Photos or videos are blurry or fuzzy.• Photos or videos are too dark or too light.• Photos or videos contain colored lines and/or bands.• Photos or videos contain spots.• Photos or videos contain incorrect color balance.• Camera image has a flare, haze, or spot near the edge.• Images taken with the camera have brightly colored "scratches".• Rear camera has issues switching to the telephoto camera for optical zoom beyond 2x in bright light conditions.• Rear camera is unable to focus at infinity.• Dust debris, or other foreign material in rear camera lens.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Inspect for any signs of damage around the rear camera module. Any damage to the rear camera (such as caused by dropping the device) may cause the image stabilization functionality of this camera to malfunction or produce photos with image quality defects, requiring out-of-warranty service.2. For iPhone X only (skip this step for other models): If "Face ID has been disabled." message appears on the Home screen or in Settings, follow steps in HT208186: If an alert says Face ID has been disabled on your iPhone or iPad Pro. Rear camera replacement may resolve this issue.3. Verify that a charger, case, or protective film is not obstructing the camera or flash. Some ferrous or magnetic material, such as cases and lenses, could interfere with the image stabilization functionality of the rear camera. Remove all accessories before testing.4. Follow steps in HT203040: If the camera or flash on your iPhone, iPad, or iPod touch isn't working.5. If the Camera app is missing, verify that it has not been restricted in Settings > General > Restrictions. The user would need to enter their password to disable the restriction. <p>The Camera app can also be restricted by configuration profiles. Check Settings > General > Device Management to verify that a configuration profile is not preventing use of the camera.</p> <ol style="list-style-type: none">6. Take a photo of the iPhone Camera Test Image with both cameras (front camera and rear camera). Inspect the photos to verify image quality for each camera.7. When taking a photo or starting a video recording, the device should play a shutter sound effect. The sound is not played if the Ring/Silent switch is set to silent. If the user's issue is that the camera is not making sound, check that the Ring/Silent switch is set for ring and not silent. <p>Note: In some regions, the sound effects for Camera are played even if the Ring/Silent switch is set to silent.</p> <ol style="list-style-type: none">9. Open Camera, choose Video, turn the flash on, then off, then set it to auto to test flash function.10. Open Control Center and tap the Flashlight button to turn on the LEDs.11. Take a photo with the flash on to turn on all flash LEDs.12. Refer to HT203692: If you see a flare, haze, or spot near the edge of your photo or video to determine if the user's issue involves these symptoms. If so, then this may be expected behavior and is not a service issue.13. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}
	Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}
3.	Follow steps in TP1045: iPhone Functional Test to test functionality of both cameras. If available, then run the AST 2 MRI diagnostic suite on the user's device. Check diagnostic results to verify the presence of front and rear camera hardware.	Front	Go to step 4.	\${nodeText.yesSymptomCode}
	Note: You may need to update the user's device to the latest OS to run this test. Do not restore the user's device before running AST 2. Warning: Verify that the user has a backup or has given consent before proceeding. Determine whether the front camera or rear camera is affected.	Rear	Go to step 10.	\${nodeText.noSymptomCode}
4.	Is the issue related to the front camera or the rear camera? Verify the front camera has one of the following specific issues: Image quality: <ul style="list-style-type: none">• Photos or videos are blurry or fuzzy.• Photos or videos are too dark or too light.• Photos or videos contain colored lines and/or bands.• Photos or videos contain spots.• Photos or videos contain incorrect color balance.• Images taken with the camera have brightly colored "scratches".• Dust debris, or other foreign material in rear camera lens.	Image Quality	Go to step 8.	\${nodeText.yesSymptomCode}
	Not functioning: <ul style="list-style-type: none">• Camera LED flash not working.• Camera hardware not detected in AST 2 MRI.• No preview visible in Camera app.• Cannot switch between rear camera and front camera. Does the camera have image quality issues or is the camera not functioning?	Not Functioning	Go to step 5.	\${nodeText.noSymptomCode}

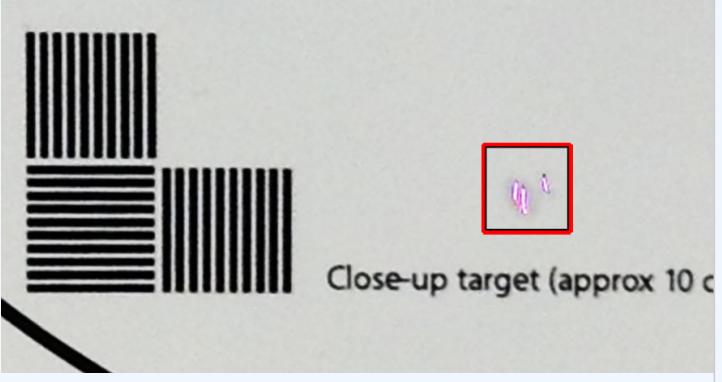
	Check	Result	Action	Code
5.	Follow the steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If restore fails, attempt recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 7.	\${nodeText.yesSymptomCode}
	Warning: Restoring the device will delete all user data. Verify user has a backup or has given consent before proceeding.	No	Go to step 6.	\${nodeText.noSymptomCode}
6.	Did restore complete?	Yes	Go to step 7.	\${nodeText.yesSymptomCode}
	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J
7.	Did restore complete?	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}
	Follow the steps in TP1045: iPhone Functional Test to retest front camera functionality. If available, rerun the AST 2 MRI diagnostic suite on the user's device. Check diagnostic results to verify the presence of front and rear camera hardware. Is the camera functioning after restoring the device?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0N

	Check	Result	Action	Code
8.	<p>Verify that the user's device has the following specific issue:</p> <ul style="list-style-type: none"> Images taken with the front camera have brightly colored "scratches" due to a laser beam contacting and damaging the camera sensor. <p>Damage can be viewed in an image taken with the camera.</p> <p>Note: Damage may not be seen in the camera preview.</p> <p>Take a photo of the iPhone Camera Test Image with the front camera. Inspect the photos in the Camera Roll to locate the damage.</p>  <p>Close-up target (approx 10 cm)</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	BON
		No	<p>Go to step 9.</p>	\${nodeText.noSymptomCode}
9.	<p>Does the user's device exhibit this specific symptom?</p> <p>Clean the glass around the front camera with a microfiber cloth.</p> <p>Follow steps in TP1045: iPhone Functional Test to retest front camera functionality.</p> <p>Is the camera image quality issue resolved?</p>	Yes No	<p>Issue resolved by cleaning the device.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	\${nodeText.yesSymptomCode} BON

	Check	Result	Action	Code
10.	<p>Verify the rear camera has one of the following specific issues:</p> <p>Image quality:</p> <ul style="list-style-type: none"> Photos or videos are blurry or fuzzy. Photos or videos are too dark or too light. Photos or videos contain colored lines and/or bands. Photos or videos contain spots. Photos or videos contain incorrect color balance. Images taken with the camera have brightly colored "scratches". Dust debris, or other foreign material in rear camera lens. <p>Not functioning:</p> <ul style="list-style-type: none"> Camera LED flash not working. Camera hardware not detected in AST 2 MRI. No preview visible in Camera app. Cannot switch between rear camera and front camera. <p>Does the camera have image quality issues or is the camera not functioning?</p>	Image Quality Not Functioning	Go to step 18. Go to step 11.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}
11.	<p>Determine whether the camera or flash is not functioning.</p> <p>Is the camera or flash failing?</p>	Camera Flash	Go to step 12. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B5C
12.	<p>Note: Some iPhone models have multiple rear camera flex cables. Refer to the specific take-apart procedure for the device to perform the following take-apart and reassembly steps:</p> <ol style="list-style-type: none"> Open the device. Remove the cowling on the upper right-hand side of the device. Disconnect the rear camera flex cables and examine the flex cables and connectors. Examine the rear camera connectors on the logic board. <p>Do the camera flex cables or any connector appear intentionally damaged?</p>	Yes No	Return the device to the user. Due to damage, the device is no longer eligible for support. Go to step 13.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}

	Check	Result	Action	Code
13.	Reconnect the camera flex cables, gently reseating the connectors completely by lightly pressing on them with two fingers. Reassemble by installing any removed components and closing the device. Follow steps in TP1045: iPhone Functional Test to retest rear camera functionality.	Yes	Issue resolved by reseating the camera flex cable.	\${nodeText.yesSymptomCode}
	If available, rerun the AST 2 MRI diagnostic suite on the user's device. Check diagnostic results to verify the presence of front and rear camera hardware. After reseating the flex cable, is the rear camera working as expected?	No	Go to step 14.	\${nodeText.noSymptomCode}
14.	Follow the steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If restore fails, attempt recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 16.	\${nodeText.yesSymptomCode}
	Warning: Restoring the device will delete all user data. Verify user has a backup or has given consent before proceeding. Did restore complete?	No	Go to step 15.	\${nodeText.noSymptomCode}
15.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 16.	\${nodeText.yesSymptomCode}
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J
16.	Follow the steps in TP1045: iPhone Functional Test to retest rear camera functionality. If available, rerun the AST 2 MRI diagnostic suite on the user's device. Check diagnostic results to verify the presence of front and rear camera hardware. Is the camera functioning after restoring the device?	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}
	No	Go to step 17.	\${nodeText.noSymptomCode}	
			Service required. Proceed with repair creation to see	

			available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	
17.	Determine if the device has any physical damage that makes this component repair impossible. Is the device eligible for a component repair?	Yes	<p>Note: For serial number entry in the repair transaction, use the serial number associated with the larger camera on the module.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B49
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B49

	Check	Result	Action	Code
	<p>Verify that the user's device has the following issue:</p> <ul style="list-style-type: none"> Images taken with the rear camera have brightly colored "scratches" due to a laser beam contacting and damaging the camera sensor. <p>Damage can be viewed in an image taken with the camera.</p> <p>Note: Damage may not be seen in the camera preview.</p> <p>Take a photo of the iPhone Camera Test Image with the rear camera. Inspect the photos to locate the damage.</p>	Yes	Go to step 24.	<code> \${nodeText.yesSymptomCode}</code>
18.	 <p>Close-up target (approx 10 cm)</p>	No	Go to step 19.	<code> \${nodeText.noSymptomCode}</code>
	Does the user's device exhibit this specific symptom?			
19.	<p>Use a microfiber cloth to clean the rear camera lens.</p> <p>Follow steps in TP1045: iPhone Functional Test to retest rear camera functionality.</p> <p>Is the camera image quality issue resolved?</p>	Yes	Issue resolved by cleaning the device.	<code> \${nodeText.yesSymptomCode}</code>
		No	Go to step 20.	<code> \${nodeText.noSymptomCode}</code>
20.	<p>Verify that the user's device exhibits one or both of the following symptoms with the the rear camera:</p> <ul style="list-style-type: none"> Issues zooming beyond 2x in bright light conditions. Unable to focus at infinity or other focus issues, <p>Does the user's device exhibit either of these symptoms?</p>	Yes	Go to step 21.	<code> \${nodeText.yesSymptomCode}</code>
		No	Go to step 23.	<code> \${nodeText.noSymptomCode}</code>

	Check	Result	Action	Code
	The rear camera in iPhone X requires occasional calibration to maintain focus accuracy. Refer to the Service Considerations section of TP1596: iPhone 8, 8 Plus, and iPhone SE (2nd generation) Overview for more information on rear camera calibration.	Yes	Issue resolved by calibrating rear camera.	\${nodeText.yesSymptomCode}
	If the user's device is an iPhone X, run the AST 2 Rear Camera Calibration Suite to attempt to calibrate the rear camera. For other models, skip this step by replying 'No'.			
21.	Follow these steps when running this calibration: 1. Check for magnetic material (such as metal table, magnets in case, speakers, other nearby devices) and remove it from the device's vicinity before starting the calibration. 2. Ensure the camera application is closed before starting the calibration. 3. Ensure the device is not bumped or moved during the calibration.	No	Go to step 22.	\${nodeText.noSymptomCode}
	Check diagnostic results to verify the camera calibration was successful.			
	After AST 2 completes, follow steps in TP1045: iPhone Functional Test to retest rear camera functionality.			
	After calibration, is the rear camera working as expected?	Yes	Go to step 24.	\${nodeText.yesSymptomCode}
22.	The LiDAR Scanner in iPhone 12 Pro and iPhone 12 Pro Max has the ability to assist rear camera focus under low light conditions. Issues with the LiDAR Scanner in these models may affect rear camera focus. If the user's device is a iPhone 12 Pro and iPhone 12 Pro Max, run the AST 2 LiDAR Scanner suite on the user's device. For other models, skip this step by replying 'Yes'. Check diagnostic results to verify the functionality of LiDAR Scanner hardware. Does the device pass this test?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B28

	Check	Result	Action	Code
23.	<p>Closely inspect the Rear Camera lens area.</p> <p>Verify that the user's device has the following specific issue:</p> <ul style="list-style-type: none"> Dust debris, or other foreign material in Rear Camera lens. <p>Does the user's device exhibit this specific symptom?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Note: For serial number entry in the repair transaction, use the serial number associated with the top or top right camera on the module.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B4B
		No	Go to step 24.	\${nodeText.noSymptomCode}
			Service required. Proceed with repair creation to see available options. If available, choose a modular repair or	

			mail-in repair. Perform a whole unit replacement only if there are no other options.	
24.	Determine if the device has any physical damage that makes this component repair impossible. Is the device eligible for a component repair?	Yes	<p>Note: For serial number entry in the repair transaction, use the serial number associated with the top or top right camera on the module.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B4A
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B4A

Face ID Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Unable to set up Face ID.• Unable to read user's face.• Unable to unlock device using Face ID.• Unable to make a purchase using Face ID.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Note: This procedure is intended for Face ID issues only. If the user's issue is specific to the front or rear cameras, return to the service guide table of contents and select "Camera Issues" from the troubleshooting section.</p> <ol style="list-style-type: none">1. For iPhone X only (skip this step for other models): If "Face ID has been disabled." message appears on the Home screen or in Settings, follow steps in HT208186: If an alert says Face ID has been disabled on your iPhone or iPad Pro. Rear camera replacement may resolve this issue.2. On the device, have the user go to Settings > Face ID & Passcode to verify if their face has been added to Face ID before performing further troubleshooting. If no face has been added, Face ID will be unable to function as expected. Have the user set up Face ID again, to verify that setup functions as expected.3. Learn more about the technology and security built into Face ID to help identify errors made during setup or in how Face ID is used. Refer to the following articles:<ul style="list-style-type: none">• HT208108: About Face ID advanced technology• HT208109: Use Face ID on your iPhone or iPad Pro• HT208114: If Face ID isn't working on your iPhone or iPad Pro4. In Settings > Face ID & Passcode, verify that iPhone Unlock is turned on. If Face ID & Passcode is turned off, Face ID will not unlock the device. Verify that iTunes & App Store is turned on. If iTunes & App Store is turned off, then Face ID cannot be used to make purchases in the iTunes Store, App Store, and Apple Book Store.5. Verify the user's issue. Press the side button to lock the device. Then have the user try to unlock the device with their face. After the lock icon unlocks, swipe up from the bottom of the screen to view the Home screen.6. Ensure that the top of the device, including the front camera, is clean. Check for dirt, debris, oils, lotions, or signs of damage. If necessary, clean the front glass on the user's device using a clean microfiber cloth.7. Check for cases or protective films. Remove them if they are obstructing the top of the device, including the front camera, and then retest for Face ID functionality.8. If user's face does not reliably work on their device, have the user try setting up Face ID on another known-good device.9. Set up Face ID on the user's device with your own face, and retest for Face ID functionality. Important: Remove any nonuser data from the device when testing is complete so that your information is not left on the user's device.10. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Run AST 2 Face ID suite on the user's device. Check diagnostic results to verify the functionality of Face ID hardware. Look for a red or failed diagnostic result.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE
	If AST 2 is not available, follow steps in TP1045: iPhone Functional Test to test Face ID functionality. Is the diagnostic result listed here?	No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Perform the manual Face ID testing procedure in TP1045: iPhone Functional Test . Manual Face ID testing results override AST2 Diagnostic results. Do all tests perform as expected?	Yes	Issue cannot be duplicated.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B35	IPHONE

LiDAR Scanner Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• LiDAR Scanner will not function.• LiDAR Scanner will not measure.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Note: This procedure is intended for LiDAR Scanner issues only. If the user's issue is specific to the front or rear cameras, return to the service guide table of contents and select "Camera Issues" from the troubleshooting section. If the user's issue is specific to Face ID, return to the service guide table of contents and select "Face ID Issues" from the troubleshooting section.</p> <ol style="list-style-type: none">1. Ensure that the top of the device, including the rear cameras, is clean. Check for dirt, debris, oils, lotions, or signs of damage. If necessary, clean the rear camera lens area on the user's device using a clean microfiber cloth.2. Check for cases or protective films. Remove them if they are obstructing the top of the device, including the rear cameras, and then retest for LiDAR Scanner functionality.3. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Run AST 2 Camera - LiDAR Scanner Sensor Check suite on the user's device. Check diagnostic results to verify the functionality of LiDAR Scanner hardware. Look for a red or failed diagnostic result. Is the diagnostic result listed here?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B28	IPHONE
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Check diagnostic results to verify the functionality of LiDAR Scanner hardware. Look for a yellow or cautionary diagnostic result. Is the diagnostic result listed here?	Yes	There may be an issue with the LiDAR Scanner. Try running the test again. Be sure to follow the instructions in the Diagnostic Console regarding device orientation, and do not block the rear cameras.	\${nodeText.yesSymptomCode}	
		No	Issue cannot be duplicated.	\${nodeText.noSymptomCode}	

Proximity Sensor Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Screen stays on during call when iPhone lifted to ear.• Screen immediately turns off when user is making a call.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Clean the display with a clean microfiber cloth. Important: Do not use liquids, sprays, or abrasives to clean the device.2. Rule out environmental causes by checking and removing protective films and cases.3. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Follow steps in TP1045: iPhone Functional Test to test proximity sensor functionality.	Yes	Issue resolved. Remind the user that protective films and cases can prevent the proximity sensor from responding properly.	\${nodeText.yesSymptomCode}	
	Did the display respond as expected?	No	Go to step 4.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
4.	Determine if the device has physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B54	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B54	IPHONE

Side Button Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Side button not working	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>1. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.</p>

Deep Dive

	Check	Result	Action	Code	Co
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes No	Go to step 3. Go to step 2.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
2.	Is the device in warranty and eligible for warranty service? Determine whether the device is eligible for out of warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes No	Go to step 3. Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
3.	Inspect the area in and around the side button on the user's device. If you see any damage or debris, then answer "Yes" to the question below. If the button is either stuck or cannot be pressed, then check for the following: <ul style="list-style-type: none">Substance causing button to be stuck in one positionDebris blocking button so the button cannot be pressed or toggledPhysically broken button Is button stuck, blocked by debris, or physically broken?	Yes No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options. Go to step 4.	B91 \${nodeText.noSymptomCode}	IP

	Check	Result	Action	Code	Co				
	Run the Side Button diagnostic suite in AST 2. This test verifies side button functionality.	Yes	Issue cannot be duplicated.	\${nodeText.yesSymptomCode}					
	Check diagnostic results to verify side button response.	No	Go to step 5.	\${nodeText.noSymptomCode}					
4.	If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test side button functionality.								
	Is the side button responding as expected?								
	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 7.	\${nodeText.yesSymptomCode}					
5.	Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 6.	\${nodeText.noSymptomCode}					
	Did restore complete?								
	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.	Yes	Go to step 7.	\${nodeText.yesSymptomCode}					
6.	Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IP				
	Run the Side Button diagnostic suite in AST 2 to verify side button functionality.	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}					
	Check diagnostic results to verify side button response.	No	Go to step 8.	\${nodeText.noSymptomCode}					
7.	If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test side button functionality.								
	Is the side button responding as expected?								
	Follow instructions in the service guide to open the device.								
	Using iPhone Torque Driver (black) 0.35 kg-fcm and JCIS Bit for cross-head screws (Torque Driver Kit, 923-0248), remove the cowling highlighted in the image below and carefully lift the button flex cable connector to disconnect it.	Yes	Reassemble and return the device to the user. Due to unauthorized modification, the device is not eligible for service.	\${nodeText.yesSymptomCode}					
	<table border="1"> <tr> <td>iPhone 7</td> <td>iPhone 7 Plus</td> </tr> <tr> <td></td> <td></td> </tr> </table>	iPhone 7	iPhone 7 Plus						
iPhone 7	iPhone 7 Plus								

	iPhone 8 iPhone SE (2nd generation)	iPhone 8 Plus				
	iPhone X					
	iPhone XS	iPhone XS Max				
	iPhone XR					
	iPhone 11	iPhone 11 Pro iPhone 11 Pro Max				

	iPhone 12 iPhone 12 Pro	iPhone 12 mini	iPhone 12 Pro Max			
8.						
	Magnify the side button flex connector and inspect it for any films or foreign material that may block access to it.					
	iPhone 7	iPhone 7 Plus		No	Go to step 9.	<code> \${nodeText.noSymptomCode}</code>
	iPhone 8 iPhone SE (2nd generation)	iPhone 8 Plus				
	iPhone X					
	iPhone XS	iPhone XS Max				

		iPhone XR				
	iPhone 11	iPhone 11 Pro iPhone 11 Pro Max				
	iPhone 12 iPhone 12 Pro	iPhone 12 mini	iPhone 12 Pro Max			
Is there a film or foreign material blocking the connector?						
9.	<p>Reconnect the side button flex cable, gently reseating the connector by lightly pressing on it with two fingers. Reattach the cowling and reassemble the device.</p> <p>Run the Side Button diagnostic suite in AST 2 to verify side button functionality.</p> <p>Check diagnostic results to verify side button response.</p> <p>If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test side button functionality.</p> <p>Is the side button responding as expected?</p>				<p>Yes</p> <p>Issue resolved by reseating side button flex cable.</p>	<p> \${nodeText.yesSymptomCode}</p>
					<p>No</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p>B38</p> <p>IP</p>

Temperature Alert

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">User claims device or AC adapter becomes unusually warm during use.Temperature alert message appears.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">When the device is in use or charging, it is normal for it to get warm. The exterior of the device acts as a cooling surface that transfers heat from inside the device to the cooler air outside.Refer to HT201678: Keeping iPhone, iPad, and iPod touch within acceptable operating temperatures.Remove any covers or cases from the device.Follow all steps in TP880: iPhone, iPad, and iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Run the AST 2 MRI diagnostic suite on the user's device.	Yes	Go to step 2.	\${nodeText.yesSymptomCode}	
	Check diagnostic results to verify the presence of multiple temperature warnings.		Issue cannot be duplicated. Refer user to HT201678: Keeping iPhone, iPad, and iPod touch within acceptable operating temperatures .		
	Has the device experienced multiple temperature warnings?	No		\${nodeText.noSymptomCode}	
2.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 3.		
3.	Is the device in warranty and eligible for warranty service?	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).		Return the device to the user. Due to damage, the device is no longer eligible for support.		
	Is the device eligible for out-of-warranty service?	No		\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
4.	Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
6.	Advise user to set up the device as a new device by following the steps in HT202033: Set up your iPhone, iPad, or iPod touch . Attempt to reproduce the temperature warning screen by launching and using a high-bandwidth or graphics-intensive app. Can you reproduce the temperature warning screen?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0M	IPHONE
		No	Issue resolved by restoring the device.	\${nodeText.noSymptomCode}	

Volume Button and Ring/Silent Switch Issues

Unlikely causes:

There are no unlikely causes for this issue.

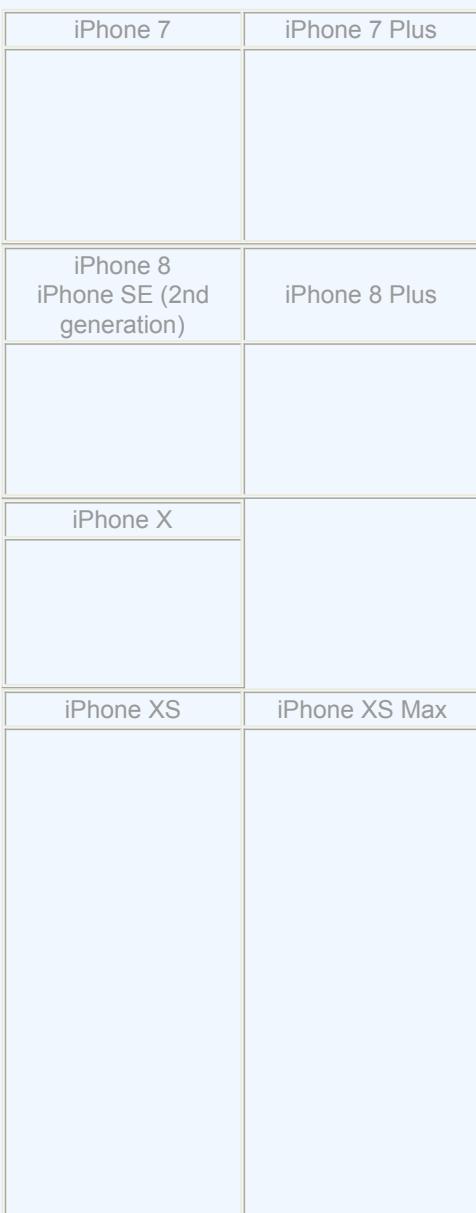
Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Ring/Silent switch not working• Volume buttons not working	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Note: This procedure is for volume buttons and Ring/Silent switch issues only. If device issue is related to the Taptic Engine (vibe motor), return to the list of symptoms and select "No Vibrate" from the troubleshooting section.</p> <ol style="list-style-type: none">1. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	C
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Is the device eligible for out-of-warranty service?				I
	Inspect the area in and around the volume buttons and Ring/Silent switch on the user's device. If you see any damage or debris, then answer "Yes" to the question below. If the button or switch is either stuck or can not be pressed or toggled, then check for the following: <ul style="list-style-type: none">• Substance causing button or switch to be stuck in one position• Debris blocking button or switch so you cannot press or toggle button or switch• Physically broken button or switch	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	
	Is button or switch stuck, blocked by debris, or physically broken?	No	Go to step 4.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	C
	Run the Ring/Silent Switch diagnostic suite in AST 2 to verify Ring/Silent switch functionality.	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
4.	Check diagnostic results to verify Ring/Silent switch response. If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test Ring/Silent switch functionality.	No	Go to step 6.	\${nodeText.noSymptomCode}	
	Is Ring/Silent switch responding as expected?				
	Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume buttons.	Yes	Issue cannot be duplicated.	\${nodeText.yesSymptomCode}	
5.	Check diagnostic results to verify volume buttons response. If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test volume button functionality.	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Are volume buttons responding as expected?				
	Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume up and volume down buttons.	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
6.	Check diagnostic results to verify volume button response. If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test volume button functionality.	No	Go to step 11.	\${nodeText.noSymptomCode}	
	Are volume buttons responding as expected?				
7.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
		No	Go to step 8.	\${nodeText.noSymptomCode}	
8.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	I
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	

	Check	Result	Action	Code
9.	Run the Ring/Silent Switch diagnostic suite in AST 2 to verify Ring/Silent switch functionality. Check diagnostic results to verify Ring/Silent switch response. If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test Ring/Silent switch functionality.	Yes	Go to step 10.	\${nodeText.yesSymptomCode}
	Is Ring/Silent switch responding as expected?	No	Go to step 11.	\${nodeText.noSymptomCode}
10.	Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume buttons. Check diagnostic results to verify volume button response. If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test volume button functionality.	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}
	Are volume buttons responding as expected?	No	Go to step 11.	\${nodeText.noSymptomCode}
	Follow instructions in the service guide to open the device. Use iPhone Torque Driver (black) 0.35 kg-fcm and JCIS Bit for cross-head screws (Torque Driver Kit, 923-0248) to remove the cowling highlighted in the image below and carefully lift the button flex cable connector to disconnect it. 	Yes	Reassemble and return the device to the user. Due to unauthorized modification, the device is not eligible for service.	\${nodeText.yesSymptomCode}

	Check	Result	Action	Code	C
	<p>Reconnect the button flex cable, gently reseating the connector by lightly pressing on it with two fingers. Reassemble the device.</p> <p>Run the Ring/Silent Switch diagnostic suite in AST 2 to verify Ring/Silent switch functionality.</p> <p>12. Check diagnostic results to verify Ring/Silent switch response.</p> <p>If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test Ring/Silent switch functionality.</p> <p>Is Ring/Silent switch responding as expected?</p>	Yes	Go to step 13.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B37	I
	<p>Run the Volume Button diagnostic suite in AST 2 to verify the functionality of the volume buttons.</p> <p>Check diagnostic results to verify volume button response.</p> <p>13. If AST 2 is unavailable, then follow steps in TP1045: iPhone Functional Test to test volume button functionality.</p> <p>Are volume up/down buttons responding as expected?</p>	Yes	Issue resolved by reseating volume up/down button flex cable.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B39	I

Alert Messages

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Alert or error message on device.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Read alert to determine the issue. Many alerts provide additional information or links to resolve the issue. Refer to HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT202778: About the 'Trust This Computer' alert on your iPhone, iPad, or iPod touch.2. Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector.	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
	Are you able to clean the Lightning connector?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE

	Check	Result	Action	Code	Commodity
4.	Disconnect and reconnect the Lightning to USB Cable to ensure a good connection to the user's device.	Yes	Issue resolved by cleaning.	\${nodeText.yesSymptomCode}	
	Disconnect and reconnect the Lightning connector in both orientations.				
	Retest to determine if alert message issue is resolved.		Go to step 5.	\${nodeText.noSymptomCode}	
	Is the issue resolved?				
5.	Go to Settings > General > Reset > Erase All Content and Settings. Warning: Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.	Yes	Issue resolved by erasing all content and settings.	\${nodeText.yesSymptomCode}	
	Did erasing all content and settings resolve the issue?	No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	Did restore complete?	No	Go to step 7.	\${nodeText.noSymptomCode}	
7.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: Get help with iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	Retest to determine if alert message issue is resolved. Is the issue resolved?	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	ESCALATION REQUIRED. Contact CSS for additional support.	B0J	

App Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• App not functioning correctly• App unexpectedly quits (returns to Home screen)• App screen unexpectedly freezes (stops responding)	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Restart the device. If the device does not restart, try to reset it.2. Verify that the app is compatible with the device.3. Follow steps in HT201398: If an app unexpectedly quits, stops responding, or won't open to attempt to resolve the issue.4. Open the App Store on the user's device and tap Updates in the bottom right corner. If any updates are available, then tap Update All in the upper right corner.5. Remove and reinstall affected app.6. Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting. <p>Note: If multiple apps are having similar issues, go to Deep Dive.</p>

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	Run AST 2 MRI diagnostic suite to identify any crashing apps that may unexpectedly stop responding or quit to the Home screen. Note: It is generally not necessary to force an app to close unless the app is unresponsive. Refer to HT202070: Switch apps on your iPhone, iPad, or iPod touch for instructions to view recently used apps. These apps are not open; they are in a suspended state. Are there any crashing apps listed in diagnostic results?	Yes No	Go to step 5. Go to step 4.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
4.	Go to Settings > General > Reset > Erase All Content and Settings. Warning: Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding. Is the app issue resolved?	Yes	Issue resolved by erasing all content and settings. Instruct user how to quit background processes on the device that are not performing as expected. Also advise the user to follow steps in HT202070: Switch apps on your iPhone, iPad, or iPod touch .	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes No	Go to step 7. Go to step 6.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
6.	Follow the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: Get help with iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes No	Go to step 7. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B0J	IPHONE

	Check	Result	Action	Code	Commodity
7.	Advise user to follow instructions in HT202033: Set up your iPhone, iPad, or iPod touch to set up the device as a new device. Retest to determine if the user's device continues to exhibit app issues.	Yes	Issue resolved. If errors were found and fixed or if this was the first successful restore on the device, advise the user to see if the symptoms persist.	\${nodeText.yesSymptomCode}	
	Is the app issue resolved?	No	Go to step 8.		
8.	Determine if the app is an iOS app or a third-party app.	iOS	ESCALATION REQUIRED. Contact CSS for additional support.	\${nodeText.yesSymptomCode}	
	Is the app an iOS app or a third-party app?	Third Party	Reinstall the affected third-party app and refer user to third-party app developer for support.		

Unexpected Freeze, Restart, or Power Off

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Device unexpectedly displays Apple logo, then returns to Home screen and operates normally.Device unexpectedly displays Apple logo, then restarts to Lock screen, requiring Touch ID or passcode to return to Home screen.Device restarts, displays Apple logo, then stops responding.Device screen freezes, but does not restart or turn off.Device stops responding and unexpectedly displays “Connect to iTunes” or “Connect to Computer” screen.Device unexpectedly turns off and requires pressing the Sleep/Wake or Side button to turn device back on. <p>Note: While exhibiting any of the above symptoms, the device may also unexpectedly flash a red, blue, or other color screen.</p>	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">If the device restarts, displays the Apple logo, or turns off while in use, follow steps in HT203899: If your iOS device restarts or displays the Apple logo or a spinning gear unexpectedly before performing any further troubleshooting.For unresponsive devices, determine whether the issue is related to Multi-Touch. View the clock on the Home screen or on the Clock app icon to see if it's keeping time. The second hand on the Clock app icon should move smoothly clockwise around the clock dial. If the clock is keeping time as expected, return to the service guide table of contents and select “Multi-Touch or 3D Touch Issues” from the troubleshooting section.If the device does not respond or turn on, follow steps in HT201412: If your iPhone, iPad, or iPod touch won't turn on or is frozen. Check symptoms in multiple preinstalled Apple apps to verify that this is happening in all apps before servicing the device. If symptoms do not occur with all apps, return to the service guide table of contents and select “App Issues” from the troubleshooting section.If the device has unexpectedly turned off and will not turn on, return to the service guide table of contents and select “No Power” from the troubleshooting section.If the user's device is running iOS 11.3 or later, follow steps in HT208387: iPhone Battery and Performance. Go to Settings > Battery > Battery Health to view Peak Performance Capability. Performance management features may have been applied to help prevent unexpected shutdowns. In iOS 11.3 and later this feature can be disabled. If the user's device is experiencing unexpected shutdowns because the battery was unable to deliver the necessary peak power, performance management may need to remain enabled. If you suspect that the battery may need service, return to the service guide table of contents and select “Battery Life Too Short” from the troubleshooting section.If the user's device is running iOS 11.3 or later, refer to HT208387: iPhone Battery and Performance or view battery health in Settings > Battery > Battery Health for more information about unexpected shutdowns, performance management, and battery health. Where relevant and appropriate, direct the user to these resources or the information contained therein.Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	If the device restarts, displays the Apple logo, or turns off while in use, follow steps in HT203899: If your iOS device restarts or displays the Apple logo or a spinning gear unexpectedly before performing any further troubleshooting. Does the device contain more than two recent logs with the word "panic" in the file name?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B81	IPHONE
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: Get help with iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	<p>Retest to determine if the user's device continues to have this issue.</p> <p>Is the issue resolved?</p>	Yes	Issue resolved. If errors were found and corrected or if this was the first successful restore on the device, advise the customer to see if the symptoms persist.	\${nodeText.yesSymptomCode}	
			Go to step 7.		
7.	<p>Determine if the issue is caused by the device unexpectedly displaying "Connect to iTunes" or "Connect to Computer" screen.</p> <p>Does the device exhibit this symptom?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
			Go to step 8.		
8.	<p>Determine if the issue is caused by the device exhibiting any of the following symptoms:</p> <ul style="list-style-type: none"> • Device unexpectedly displays the Apple logo • Device unexpectedly restarts to the Lock screen • Device unexpectedly turns off and can be turned on again manually <p>Does the device exhibit any of these symptoms?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B81	IPHONE
			Go to step 9.		
9.	<p>Determine if the issue is caused by the device exhibiting any of the following symptoms:</p> <ul style="list-style-type: none"> • Device becomes unresponsive (display appears frozen) • Device restarts and only displays the Apple logo <p>Note: While exhibiting any of the above symptoms, the device may also unexpectedly flash a red, blue, or any other color screen.</p> <p>Does the device exhibit any of these symptoms?</p>	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B85	IPHONE
			ESCALATION REQUIRED. Contact CSS for additional support.		

Headphone Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• No sound in EarPods with Lightning Connector• Sound from only one EarPod• Distorted sound in EarPods with Lightning Connector	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. Refer to HT201869: Use Apple headphones with your iPhone, iPad, and iPod to verify that the user's headphones are compatible with the user's device.2. Follow the steps in HT203026: If your headphones don't work with your iPhone, iPad, or iPod touch.3. Verify that the user's EarPods with Lightning Connector are fully inserted into the Lightning connector. Verify that a case or protective film is not interfering.4. Try the Lightning connector in both orientations.5. Press volume buttons to check volume level.6. Verify that the audio is not paused.7. Check Settings > Music > Volume Limit.8. Go to Settings > General > Accessibility and verify that Mono Audio is turned off. <p>Note: If the user has intentionally turned on Mono Audio, do not turn it off.</p> <ol style="list-style-type: none">9. Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B91	IPHONE
4.	<p>Connect the user's EarPods with Lightning Connector to the user's device.</p> <p>Play known-good media and listen to the audio using the user's headphones.</p> <p>Did the device play audio as expected?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	<p>Substitute known-good EarPods with Lightning Connector.</p> <p>Play known-good media and listen to the audio using the known-good EarPods with Lightning Connector.</p> <p>Did the device play audio as expected?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the user has third-party headphones, refer to manufacturer for support.</p>	B09	IPHONE ACCESSORY
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes No	Go to step 8. Go to step 7.	\${nodeText.yesSymptomCode} \${nodeText.noSymptomCode}	
7.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: Get help with iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes No	Go to step 8. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B0J	IPHONE
8.	Continue to use known-good EarPods with Lightning Connector with the user's device. Play known-good media and listen to the audio using the user's headphones. Did the device play audio as expected?	Yes No	Issue resolved by restoring the device. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B68	IPHONE

Headphone Microphone Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• No audio from mic on EarPods with Lightning Connector• Distorted sound from mic on EarPods with Lightning Connector• Buttons on EarPods with Lightning Connector do not function	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. This procedure is intended for headphone microphone issues only. If the issue is with the device microphone, return to the list of symptoms and select "Microphone Issues" from the iOS Sound section of the troubleshooting menu2. Refer to HT201869: Use Apple headphones with your iPhone, iPad, and iPod to verify that the user's headphones are compatible with the user's device.3. Follow the steps in HT203026: If your headphones don't work with your iPhone, iPad, or iPod touch.4. Verify that the user's EarPods with Lightning Connector are fully inserted into the Lightning connector. Verify that a case or protective film is not interfering with the connection.5. Try the Lightning connector in both orientations.6. Follow all steps in TP880: Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	<p>Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector.</p> <p>Are you able to clean the Lightning connector?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Connect the user's EarPods with Lightning Connector to the user's device.</p> <p>Open the Voice Memos app.</p> <p>Use the user's EarPods with Lightning Connector microphone to create and play a recording.</p> <p>Did the device record audio as expected?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	
5.	<p>Connect the user's EarPods with Lightning Connector to the user's device.</p> <p>Navigate to the Home screen on the user's device to perform button tests on the user's EarPods with Lightning Connector.</p> <p>Press the volume up button followed by the volume down button. The volume should appear on the device's screen along with the word "Headphones". The volume setting should increase and decrease as these buttons are pressed.</p> <p>Press and hold the center button to activate Siri (or Voice Control if Siri has been disabled). Observe the device's display to confirm whether Siri or Voice Control appears when the center button is pressed and held down.</p> <p>If any of the above button tests do not perform as expected, then select the "No" answer.</p> <p>Do all button tests perform as expected?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Connect known-good EarPods with Lightning Connector to user's device. Open the Voice Memos app.	Yes No	Go to step 7.	\${nodeText.yesSymptomCode}	
	Using EarPods with Lightning Connector, create a recording and play it back. Did the device record audio as expected?		Go to step 8.	\${nodeText.noSymptomCode}	
7.	Connect known-good EarPods with Lightning Connector to the user's device. Navigate to the Home screen on user's device to perform button tests on the EarPods with Lightning Connector. Press the volume up button followed by the volume down button. The volume should appear on the device's screen along with the word "Headphones". The volume setting should increase and decrease as these buttons are pressed.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options. If the user has third-party headphones, refer to manufacturer for support.	B09	IPHONE ACCESSORY
	Press and hold the center button to activate Siri (or Voice Control if Siri has been disabled). Observe the device's display to confirm whether Siri or Voice Control appears when the center button is pressed and held down. If any of the above button tests do not perform as expected, then select the "No" answer. Do all button tests perform as expected?		Go to step 8.	\${nodeText.noSymptomCode}	
8.	Go to Settings > General > Reset > Erase All Content and Settings. Warning: Erasing all content and settings will delete all user data on the device. Verify user has a backup or has given consent before proceeding.	Yes	Go to step 12.	\${nodeText.yesSymptomCode}	
	Open Voice Memos app. Use the known-good EarPods with Lightning Connector to create and play a recording. Did the device record audio as expected?	No	Go to step 9.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
9.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 11.	\${nodeText.yesSymptomCode}	
	Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 10.	\${nodeText.noSymptomCode}	
10.	Did restore complete?				
	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: Get help with iOS update and restore errors to attempt to restore the device.	Yes	Go to step 11.	\${nodeText.yesSymptomCode}	
11.	Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
	Open the Voice Memos app. Use the known-good EarPods with Lightning Connector to create and play a recording.	Yes	Go to step 12.	\${nodeText.yesSymptomCode}	
	Did the device record audio as expected?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B68	IPHONE

	Check	Result	Action	Code	Commodity
12.	Connect known-good EarPods with Lightning Connector to the user's device. Navigate to the Home screen on user's device to perform button tests on the EarPods with Lightning Connector. Press the volume up button followed by the volume down button. The volume should appear on the device's screen along with the word "Headphones". The volume setting should increase and decrease as these buttons are pressed.	Yes No	Issue resolved. Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	\${nodeText.yesSymptomCode} B68	IPHONE
	Press and hold the center button. This should activate Siri (or Voice Control if Siri has been disabled). Observe the device's display to confirm whether Siri or Voice Control appears when the center button is pressed and held down. If any of the above button tests do not perform as expected, then select the "No" answer. Do all button tests perform as expected?				

Microphone Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Microphone not functioning• Distorted sound from microphone• User cannot be heard during telephone call• Poor, low, or distorted sound during telephone call	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. If the issue is with the microphone built in to the Apple headphones, return to the service guide table of contents and select "Headphone Microphone Issues" from the troubleshooting section.2. Verify that a case or protective film is not obstructing the microphone.3. Follow steps in HT203792: If the microphones on your iPhone aren't working and HT203794: If you hear no sound or distorted sound from your iPhone, iPad or iPod touch speaker.4. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	<p>Check the following microphone locations for debris obstruction:</p> <ul style="list-style-type: none"> • Bottom of device • Receiver mesh • Back of device near rear camera <p>Follow steps in TP320: Cleaning Procedures to clean the device.</p> <p>Are you able to clean the device?</p>	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	<p>Run the Audio Test suite in AST 2 to verify that all microphones function properly on the user's device.</p> <p>If the device fails the speaker or receiver test, then return to the service guide table of contents and select "Speaker and Receiver Issues" from the troubleshooting section.</p> <p>If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to verify that all microphones function properly on the user's device.</p> <p>Does the user's device pass all audio tests?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	
5.	<p>If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call the user's device.</p> <p>Note: The phone does not need to be an iPhone.</p> <p>Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.</p> <p>Was audio quality as expected?</p>	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	Warning: Restoring the device will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Did restore complete?				
7.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
	Did restore complete?				
8.	Run the Audio Test suite in AST 2 to verify that all microphones function properly on the user's device.	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
	If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to test microphone sound quality.	No	Go to step 10.	\${nodeText.noSymptomCode}	
	Does the user's device pass all audio tests?				
9.	If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call the user's device. Note: The phone does not need to be an iPhone. Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE
	Was audio quality as expected?				

	Check	Result	Action	Code	Commodity
10.	<p>Examine the results of the AST 2 Audio Test suite.</p> <p>Determine which microphone failed the diagnostic test:</p> <ul style="list-style-type: none"> A. Front Mic B. Bottom Mic - Left B. Rear Mic B. Bottom Mic - Right <p>If the speaker or receiver tests failed, then return to the service guide table of contents and select "Speaker and Receiver Issues" from the troubleshooting section.</p> <p>Which microphone failed the audio test?</p>	A B	<p>Go to step 11.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	\${nodeText.yesSymptomCode} B64	IPHONE
11.	<p>Determine if the device has any physical damage that makes a component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B64	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B64	IPHONE

No Ringer Sound

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• No or low ringer sound	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. If issue is with headphone audio, then return to the service guide table of contents and select "Headphone Issues" from the troubleshooting section.2. Follow steps in HT203794: If you hear no sound or distorted sound from your iPhone, iPad, or iPod touch speaker.3. Check that the Ring/Silent switch is set for ring and not vibrate.4. Press volume buttons to check volume level.5. Check ringer volume in Settings > Sounds & Haptics.6. iPhone is capable of using the receiver as a second speaker. Ask the user questions to determine if the issue involves this capability. If the issues involves this capability, then first ensure that the following settings are configured as listed: Note: Different settings could cause audio output to be low in volume or only emitted from one of the two speakers, which could be mistaken for a service issue. a. On the device, go to Settings > General > Accessibility. b. Scroll down to the HEARING section. c. Verify that all hearing devices and Mono Audio are turned off. d. Adjust the audio volume balance to the center of the range. 7. Make sure a case or protective film is not obstructing the speaker or receiver. Note: There is only one speaker at the bottom of the device. The other opening is a microphone. The receiver is covered with mesh and located on the front of the device, toward the top of the display, next to the front-facing camera. 8. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Check the speaker and receiver for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the speaker and receiver. Are you able to clean the speaker and receiver?	Yes	Go to step 4.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	Run the Audio Test suite in AST 2 to verify that the speaker and receiver function properly on the user's device. If the device fails the microphone tests, then return to the service guide table of contents and select the "Microphone Issues" from the troubleshooting section. If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to verify that the speaker and receiver function properly on the user's device. Does the user's device pass all audio tests?	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	Go to Settings > Sounds & Haptics > Ringtone and select a ringtone.	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
	Does the device ring?	No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Go to Settings > General > Reset > Erase All Content and Settings. Warning: Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.	Yes	Issue resolved by erasing all content and settings.	\${nodeText.yesSymptomCode}	
	Go to Settings > Sounds & Haptics > Ringtone and select a ringtone.	No	Go to step 7.	\${nodeText.noSymptomCode}	
7.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
	Did restore complete?	No	Go to step 8.	\${nodeText.noSymptomCode}	
8.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
9.	Run the Audio Test suite in AST 2 to verify that the speaker and receiver function properly on the user's device. If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to test speaker and receiver sound quality. Does the user's device pass all audio tests?	Yes	Go to step 10.	\${nodeText.yesSymptomCode}	
		No	Go to step 11.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
10.	Go to Settings > Sounds & Haptics > Ringtone and select a ringtone.	Yes	Issue resolved by restoring the device.	<code> \${nodeText.yesSymptomCode}</code>	
	Does the device ring?	No	Go to step 11.	<code> \${nodeText.noSymptomCode}</code>	
11.	Determine which component failed the diagnostic test: speaker or receiver. If the device failed the Receiver (Stereo Speaker) test, select 'Receiver'.	Speaker	Go to step 12.	<code> \${nodeText.yesSymptomCode}</code>	
	If the device failed one or more microphone tests, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section. Which component failed the diagnostic test?	Receiver	Go to step 13.	<code> \${nodeText.noSymptomCode}</code>	
12.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE COMP SPEAKER
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE

	Check	Result	Action	Code	Commodity
13.	Determine which receiver diagnostic test the device failed: A. Receiver B. Receiver (Stereo Speaker) If the device failed both tests, select B. Which receiver diagnostic test did the device fail?	A	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE
	B	Go to step 14.	\${nodeText.noSymptomCode}		
14.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options. Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.	B7A	IPHONE COMP DISPLAY
	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A		

No Vibration

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Device does not vibrate when expected	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>Note: This procedure is for vibration issues only. If the issue is related to the Ring/Silent switch, return to the service guide table of contents and select "Volume Buttons and Ring/Silent Switch Issues" from the troubleshooting section.</p> <ol style="list-style-type: none">Turn the Ring/Silent switch on and off.Check Vibrate settings for both Silent and Ring in Settings > Sounds & Haptics.Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Use the Visual Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on. Turning on the Vibrate on Ring setting will momentarily activate the vibration motor. Does the device vibrate?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
3.	On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on. Turning on the Vibrate on Ring setting will momentarily activate the vibration motor. Does the device vibrate?	No	Go to step 4.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
	Go to Settings > General > Reset > Erase All Content and Settings. Warning: Erasing all content and settings will delete all user data on the device. Verify that the user has a backup or has given consent before proceeding.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
4.	On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on. Turning on the Vibrate on Ring setting will momentarily activate the vibration motor. Does the device vibrate?	No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore . Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding. Did restore complete?	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
6.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device. Did restore complete?	Yes	Go to step 7.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
7.	On the device, go to Settings > Sounds & Haptics and turn the Vibrate on Ring setting from off to on. Turning on the Vibrate on Ring setting will momentarily activate the vibration motor. Does the device vibrate?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Go to step 9.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
8.	Turn the Ring/Silent switch off and on to momentarily activate the vibration motor. Does the device vibrate?	Yes	Issue resolved or cannot be duplicated.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B37	IPHONE
9.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B32	IPHONE COMPONENT
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B32	IPHONE

Speaker and Receiver Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• No sound from speaker at base of device• No sound from receiver• Distorted sound from speaker or receiver• User cannot be heard during telephone call• Poor, low, or distorted sound during telephone call• Low or no sound out of bottom speaker or receiver when playing stereo audio	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. If issue is with headphone audio, then return to the service guide table of contents and select "Headphone Issues" from the troubleshooting section.2. Follow steps in HT203794: If you hear no sound or distorted sound from your iPhone, iPad, or iPod touch speaker.3. Press volume buttons to check volume level.4. Verify music or audio is not paused.5. Check Settings > Music > Volume Limit.6. This device is capable of using the receiver as a second speaker. Ask the user questions to determine if the issue involves this capability. If the issues involves this capability, then first ensure that the following settings are configured as listed:<p>Note: Different settings could cause audio output to be low in volume or only emitted from one of the two speakers, which could be mistaken for a service issue.</p><ol style="list-style-type: none">a. On the device, go to Settings > Accessibility.b. Scroll down to the HEARING section.c. Verify that all hearing devices and Mono Audio are turned off.d. Adjust the audio volume balance to the center of the range.<p>Note: There is only one speaker at the bottom of the device. The other opening is a microphone.</p><p>The receiver is covered with mesh and located on the front of the device, toward the top of the display, next to the front-facing camera.</p>7. Verify that a case or protective film is not obstructing the speaker or receiver.8. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	Yes No	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device in warranty and eligible for warranty service?		Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes No	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is the device eligible for out-of-warranty service?		Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Check the speaker and receiver mesh openings for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the device. Are you able to clean the speaker and receiver?	Yes No	Go to step 4.	\${nodeText.yesSymptomCode}	
			Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
4.	Run the Audio Test suite in AST 2 to verify that the speaker and receiver function properly on the user's device. If the device fails the microphone tests, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section. If AST 2 is not available, or if the user's issue involves low or no sound when playing stereo audio through the bottom speaker and the receiver, then follow the steps in TP1045: iPhone Functional Test to verify that the speaker and receiver function properly on the user's device. Does the user's device pass all audio tests?	Yes No	Go to step 5.	\${nodeText.yesSymptomCode}	
			Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
5.	If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call the user's device. Note: The phone does not need to be an iPhone.	Yes	Issue resolved by cleaning the device.	\${nodeText.yesSymptomCode}	
	Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected.	No	Go to step 6.	\${nodeText.noSymptomCode}	
6.	Was audio quality as expected?				
	Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore .	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
7.	Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Did restore complete?				
8.	Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	Did restore complete?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
8.	Run the Audio Test suite in AST 2 to verify that the speaker and receiver function properly on the user's device.	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
	If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to test speaker and receiver sound quality.	No	Go to step 10.	\${nodeText.noSymptomCode}	
8.	Does the user's device pass all audio tests?				

	Check	Result	Action	Code	Commodity
9.	If the symptom is that the user cannot be heard during a telephone call, then use a known-good phone to call to the user's device. Note: The phone does not need to be an iPhone. Have a short phone conversation. Speak in a normal voice and listen to verify if audio is present in both directions, and that audio quality is as expected. Was audio quality as expected?	Yes	Issue resolved by restoring the device.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7B	IPHONE
10.	Determine which component failed the diagnostic test: speaker or receiver. If the device failed the Receiver (Stereo Speaker) test, select 'Receiver'. If the device failed one or more of the microphone tests, then return to the service guide table of contents and select "Microphone Issues" from the troubleshooting section. Which component failed the diagnostic test?	Speaker	Go to step 11.	\${nodeText.yesSymptomCode}	
		Receiver	Go to step 12.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
11.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	IPHONE COMP SPEAKER
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B63	
12.	Determine which receiver diagnostic test the device failed: A. Receiver B. Receiver (Stereo Speaker)	A	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B7A	IPHONE
	If the device failed both tests, select B. Which receiver diagnostic test did the device fail?	B	Go to step 13.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
13.	Determine if the device has any physical damage that makes a component repair impossible. Is the device eligible for a component repair?	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B7A	IPHONE COMP DISPLAY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B7A	IPHONE

Battery Life Too Short

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Battery runs out of power quickly.• Battery does not hold a charge.• Short play time.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. On the device, go to Settings > Battery to check power consumption by app. If the user's device is running iOS 11.3 or later, refer to HT208387: iPhone Battery and Performance or view battery health in Settings > Battery > Battery Health for more information about unexpected shutdowns, performance management, and battery health. Where relevant and appropriate, direct the user to these resources or the information contained therein.2. Refer the user to www.apple.com/batteries to learn about optimizing battery settings.3. Check the status bar battery level icon. It reflects the remaining battery life, including battery percentage. Turn on the battery percentage indicator using Settings > Battery.4. Check that the correct USB Power Adapter is being used to charge the device. Other power adapters may not provide enough power to charge the device.5. Connect to a power outlet and charge the device with a known-good 10W or 12W Apple USB Power Adapter for 10 minutes. Refer to TP325: Charge Battery for more information.6. For iPhone models that support wireless charging, follow the steps in HT208078: How to wirelessly charge your iPhone.7. Try the Lightning connector in both orientations.8. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.9. Refer to HT201954: Unauthorized modification of iOS can cause security vulnerabilities, instability, shortened battery life, and other issues. <p>Note: If any of the above checks indicate that the device has no power and does not turn on, then return to the service guide table of contents and select "No Power" from the troubleshooting section.</p> <p>Important: Battery and charge indicators can fluctuate briefly when connecting the device to power or waking it from sleep. If this occurs, wait a few seconds, then check again. Battery percentage can remain at 99 percent with a full charge. This is expected behavior and does not indicate a battery or hardware issue.</p>

Deep Dive

	Check	Result	Action	Code	Commodity
1.	<p>Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.</p> <p>Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.</p> <p>Is the device in warranty and eligible for warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	<p>Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).</p> <p>Is the device eligible for out-of-warranty service?</p>	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	<p>Run AST 2 MRI diagnostic suite to verify battery condition.</p> <p>Check diagnostic results for a result of "Passed" or "Normal."</p> <p>Do not restore the user's device before running AST 2.</p> <p>Is the battery condition "Passed" or "Normal"?</p>	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	<p>Determine if the device has any physical damage that makes this component repair impossible.</p> <p>Is the device eligible for a component repair?</p>	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE

	Check	Result	Action	Code	Commodity
5.	Follow Service Guide steps to open device and attempt battery removal. If you have not yet replaced the battery in the user's device, then answer "Yes" to the question below to begin a repair and order the battery.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options. Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.	B8A	IPHONE COMP BATTERY
	Warning: If the battery tab breaks off or is otherwise not able to be removed, then do not use tools to pry up battery. In this situation, answer "No" to the question below. Was battery removal successful without the battery tab breaking?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE
6.	Use diagnostics to determine usage and standby time. If usage time is the same as standby time, then the device has not been able to go to sleep because of active use or something else preventing the device from sleeping. Note: The device is awake whenever the display is on, or when the user is making or receiving a call, using apps, listening to music, browsing the web, sending or receiving email, using location services such as GPS, or when an app is refreshing in the background. Are usage times and standby times equal?	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	No	Go to step 7.	\${nodeText.noSymptomCode}		

	Check	Result	Action	Code	Commodity
7.	<p>View MRI diagnostic results to determine any crashing apps that may be draining the battery.</p> <p>Note: It is generally not necessary to force an app to close unless the app is unresponsive. Refer to HT202070: Switch apps on your iPhone, iPad, or iPod touch for instructions to view recently used apps. Recently used apps are not open. Recently used apps are in a suspended state.</p> <p>Are there any crashing apps listed in diagnostic results?</p>	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
		No	Go to step 9.	\${nodeText.noSymptomCode}	
8.	<p>Restart the device. If the device does not restart, try to reset it.</p> <p>Have the user use the device for several minutes, then allow the device to sleep for several minutes.</p> <p>Note battery level before and after usage to determine if battery life issue persists.</p> <p>Does battery life issue persist?</p>	Yes	Go to step 11.	\${nodeText.yesSymptomCode}	
		No	<p>Issue resolved by restarting or resetting device.</p> <p>Advise the user to follow steps in HT201398: If an app unexpectedly quits, stops responding, or won't open.</p>	\${nodeText.noSymptomCode}	
9.	<p>Run the Battery Usage diagnostic suite in AST 2.</p> <p>Check diagnostic results to look for any apps that may be consuming large amounts of battery power.</p> <p>If AST 2 is not available, then go to Settings > Battery and look for any apps that may be consuming unusually large amounts of battery power.</p> <p>Are there any apps listed that show unusually high battery usage?</p>	Yes	Go to step 10.	\${nodeText.yesSymptomCode}	
		No	<p>Unable to duplicate issue.</p> <p>Refer the user to www.apple.com/batteries to learn about optimizing battery settings.</p>	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
10.	<p>For each app that shows unusually high battery usage, ask the user how often and how long the app is used.</p> <p>Explain to the user that the battery issue could likely be caused by the user using the app continuously over a long period of time, rather than any fault of the app itself, the OS, or the device.</p> <p>Gain agreement from the user that lengthy app usage is likely to be the cause of the battery life issue, and that there is no service issue with the device itself.</p> <p>Does the user agree that the battery life issue is likely caused by lengthy app usage?</p>	Yes	<p>Issue resolved.</p> <p>Refer the user to www.apple.com/batteries to learn about optimizing battery settings.</p>	\${nodeText.yesSymptomCode}	
	No		Go to step 11.	\${nodeText.noSymptomCode}	
11.	<p>Follow steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore.</p> <p>Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did restore complete?</p>	Yes	Go to step 13.	\${nodeText.yesSymptomCode}	
	No		Go to step 12.	\${nodeText.noSymptomCode}	
12.	<p>Perform the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.</p> <p>Did restore complete?</p>	Yes	Go to step 13.	\${nodeText.yesSymptomCode}	
	No		Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE

	Check	Result	Action	Code	Commodity
13.	Advise user to follow steps in HT202033: Set up your iPhone, iPad, or iPod touch to set up the device as a new device. Have user use device for several minutes, then allow the device to sleep for several minutes.	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE
	Note battery level before and after usage to determine if battery life issue persists after restoring the device. Does battery life issue persist?	No	Issue resolved by restoring the device. Advise the user to follow steps in HT201398: If an app unexpectedly quits, stops responding, or won't open .	\${nodeText.noSymptomCode}	

Battery Will Not Charge

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Battery will not charge from USB Power Adapter.• Battery charge icon does not show that device is fully charged.• Device turns off immediately after disconnecting power adapter.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <p>If Activation Lock cannot be disabled normally due to the device not turning on, you may need to turn off Activation Lock through iCloud.com.</p> <ol style="list-style-type: none">1. Follow the steps in HT201569: If your iPhone, iPad, or iPod touch won't charge.2. Follow the steps in HT208078: How to wirelessly charge your iPhone.3. Use of a very thick case, or a case with metal present in it, could impact charge performance when charging wirelessly. Remove all accessories before testing.4. Check that the correct USB power adapter is being used to charge the device. Other power adapters may not provide enough power to charge the device.5. Plug the device into a known-good 10W or 12W Apple USB Power Adapter and Lightning to USB Cable to charge the battery. Allow up to 10 minutes for the device to respond. Refer to TP325: Charge Battery for more information.6. Try the Lightning connector in both orientations. <p>Important: Battery and charge indicators can fluctuate briefly when you connect the device to power or wake it from sleep. If this occurs, wait a few seconds and then check again. Battery percentage can remain at 99 percent with a full charge. This is expected behavior and does not indicate a battery or hardware issue.</p> <ol style="list-style-type: none">7. If any of the above checks indicate that the device has no power and does not turn on, then return to the service guide table of contents and select "No Power" from the troubleshooting section.8. If the user's device is running iOS 11.3 or later, refer to HT208387: iPhone Battery and Performance or view battery health in Settings > Battery > Battery Health for more information about unexpected shutdowns, performance management, and battery health. Where relevant and appropriate, direct the user to these resources or the information contained therein.9. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
1.	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility. Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Inspect the area in and around the side button on the user's device. If you can see any damage or debris, answer "Yes" to the question here. If the side button is either stuck or cannot be pressed, check for the following: <ul style="list-style-type: none">• Substance causing button to be stuck in one position• Debris blocking button so you cannot press button• Physically broken button Is the side button stuck, blocked by debris, or physically broken?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Check the Lightning connector for debris obstruction. Follow steps in TP320: Cleaning Procedures to clean the Lightning connector. Are you able to clean the Lightning connector?	Yes	Go to step 5.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B91	IPHONE
	Plug the device into a known-good 10W or 12W Apple USB Power Adapter and Lightning to USB Cable to charge battery.	Charging Screen / Black Screen	Go to step 21.	\${nodeText.yesSymptomCode}	

	Check	Result	Action	Code	Commodity
		OS Screen	Go to step 6.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	Run AST 2 MRI diagnostic suite to verify battery condition.	Yes	Go to step 9.	\${nodeText.yesSymptomCode}	
	Check diagnostic results for a result of "Passed" or "Normal."	No	Go to step 7.	\${nodeText.noSymptomCode}	
	Do not restore the user's device before running AST 2.				
	Is the battery condition "Passed" or "Normal"?				
7.	Determine if the device has any physical damage that makes a component repair impossible.	Yes	Go to step 8.	\${nodeText.yesSymptomCode}	
	Is the device eligible for a component repair?	No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B8A	IPHONE

	Check	Result	Action	Code	Commodity
8.	<p>Follow Service Guide steps to open device and attempt battery removal.</p> <p>If you have not yet replaced the battery in the user's device, then answer "Yes" to the question below to begin a repair and order the battery.</p> <p>Warning: If the battery tab breaks off or is unremovable, then do not use tools to pry up battery. In this situation, answer "No" to the question below.</p> <p>Was battery removal successful without the battery tab breaking?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>Refer to the Service Guide to complete all applicable procedures and diagnostic suites after part replacement to ensure that the new part operates properly with the rest of the system.</p>	B8A	IPHONE COMP BATTERY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B8A	IPHONE
9.	<p>Check the battery icon in the upper right-hand corner of the screen.</p> <p>Is device currently charging?</p>	Yes	Go to step 12.	\${nodeText.yesSymptomCode}	
		No	Go to step 10.	\${nodeText.noSymptomCode}	
10.	<p>Follow the steps in HT201252: Restore your iPhone, iPad, or iPod to factory settings to restore the device using the computer. If the restore fails, attempt a recovery mode restore. See TP337: Recovery Mode Restore.</p> <p>Warning: Restoring the device will delete all user data. Verify that the user has a backup or has given consent before proceeding.</p> <p>Did the restore complete?</p>	Yes	Go to step 12.	\${nodeText.yesSymptomCode}	
		No	Go to step 11.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
11.	<p>Follow the steps in HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod and HT204770: iOS update and restore errors to attempt to restore the device.</p> <p>Did the restore complete?</p>	Yes	Go to step 12.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B0J	IPHONE
12.	<p>Allow the device to charge for two more minutes, then unplug the device.</p> <p>Did the device immediately turn off?</p>	Yes	Go to step 24.	\${nodeText.yesSymptomCode}	
		No	Go to step 13.	\${nodeText.noSymptomCode}	
13.	<p>Test the device with the user's Apple accessory, if available.</p> <p>Does the user have their Apple USB Power Adapter, Lightning to USB Cable, and wireless charger?</p>	Yes	Go to step 14.	\${nodeText.yesSymptomCode}	
		No	Issue resolved. Remind the user to verify the functionality of their power adapter, Lightning to USB cable, and wireless charger that are used to charge the device.	\${nodeText.noSymptomCode}	
14.	<p>Connect the user's USB Power Adapter with a known-good Apple Lightning to USB cable.</p> <p>Does the device charge?</p>	Yes	Go to step 16.	\${nodeText.yesSymptomCode}	
		No	Go to step 15.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
15.	<p>Connect a known-good USB Power Adapter with user's Lightning to USB cable.</p> <p>When testing the user's Lightning to USB cable, try connecting the cable in both orientations, and bend the cable to ensure there is no intermittent connection within the cable.</p> <p>Does the device charge?</p>	Yes	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the adapter is not made by Apple, refer user to manufacturer for support.</p>	B09	IPHONE ACCESSORY
		No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B83	IPHONE
16.	<p>Inspect the user's Lightning to USB Cable.</p> <p>Refer to HT204566: Identify counterfeit or uncertified Lightning connector accessories to inspect the user's Lightning to USB Cable to ensure it is made by Apple or a certified third party.</p> <p>Is the user's Lightning to USB cable made by Apple or a certified third party?</p>	Apple	Go to step 17.	\${nodeText.yesSymptomCode}	
		Third Party	<p>Issue resolved.</p> <p>Refer the user to cable manufacturer for support.</p>	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
17.	<p>Connect a known-good USB Power Adapter with the user's Lightning to USB cable.</p> <p>When testing the user's Lightning to USB cable, try connecting the cable in both orientations, and bend the cable to ensure there is no intermittent connection within the cable.</p> <p>Does the device charge?</p>	Yes	Go to step 18.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B09	IPHONE ACCESSORY
18.	<p>Check MRI diagnostic results to verify the presence of wireless charging hardware.</p> <p>If AST 2 is not available, then follow the steps in TP1045: iPhone Functional Test to test wireless charging functionality.</p> <p>Does MRI detect wireless charging?</p>	Yes	Go to step 19.	\${nodeText.yesSymptomCode}	
		No	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B86	IPHONE

	Check	Result	Action	Code	Commodity
	<p>Use a known-good compatible wireless charging pad (such as 923-02267 Wireless Charging Pad) that is connected to AC power.</p> <p>Disconnect the wired charging cable before testing wireless charging. Charging will default to the wired connection if both are used simultaneously.</p> <p>Place the user's iPhone directly on the top of the charging pad to charge it.</p> <p>Verify that the iPhone is in the middle of the charging pad and facing up.</p>	Yes	Go to step 20.	\${nodeText.yesSymptomCode}	
19.	<p>Verify that the iPhone is charging (observed lightning charging symbol on the top right corner of the device screen).</p> <p>View the battery percentage indicator on the user's iPhone. Continue to charge the iPhone on top of the charging pad for about 30 seconds, and confirm that the battery percentage level has increased.</p> <p>Refer to HT208078: How to wirelessly charge your iPhone for more information about wireless charging.</p> <p>Does the user's iPhone charge wirelessly?</p>	No	<p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	B86	IPHONE
20.	<p>Connect the user's iPhone to the user's wireless charger.</p> <p>Does the user's iPhone charge wirelessly?</p>	<p>Yes</p> <p>No</p>	<p>Issue cannot be duplicated.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p> <p>If the charger is not made by Apple, refer user to manufacturer for support.</p>	\${nodeText.yesSymptomCode} B09	IPHONE ACCESSORY

	Check	Result	Action	Code	Commodity
21.	Identify if the image seen on the user's device is the charging screen or a black screen. Do you see a charging screen or a black screen?	Charging Screen	Go to step 22.	\${nodeText.yesSymptomCode}	
		Black Screen	Go to step 23.	\${nodeText.noSymptomCode}	
22.	Allow the device to charge for two more minutes, then unplug the device. Did the device immediately turn off?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	Go to step 23.	\${nodeText.noSymptomCode}	
23.	Charge the device for up to 10 minutes, or until the device wakes to a display, whichever comes first. Did the device wake to an OS screen?	Yes	Go to step 6.	\${nodeText.yesSymptomCode}	
		No	Go to step 24.	\${nodeText.noSymptomCode}	
24.	1. Open the device. 2. Inspect the battery connector to ensure that it is fully seated onto logic board. Is battery connector fully seated?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	Go to step 25.	\${nodeText.noSymptomCode}	
25.	If the battery connector is either disconnected or partially seated, then disconnect the battery connector and inspect for damage. Look for damage on both the battery cable and the logic board connectors. Is any damage found on the battery connector?	Yes	This device has unauthorized modifications. Document test failure, process a repair. Return the device to the user.	\${nodeText.yesSymptomCode}	
		No	Go to step 26.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
26.	Reconnect the battery connector to the logic board, ensuring that the connector is fully seated onto the logic board. Retest: Allow the device to charge for two more minutes, then unplug the device. Did the device immediately turn off?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	Issue resolved.	\${nodeText.noSymptomCode}	

No Power

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">Will not turn on	<ol style="list-style-type: none">Connect the device using a known-good Lightning cable to a known-good computer running the latest version of macOS. If the device is recognized by the computer, then the device has power. Restore the device if prompted. Important: If the user's device is running iOS 11.4.1 or later, the following will occur unless you connect the device to the computer while it is unlocked or in recovery mode, or you enter the device's passcode while it's connected:<ul style="list-style-type: none">The device will not be recognized by the computer.The device will not communicate with USB accessories.The device will appear to have no power.Attempt to place the device in recovery mode to verify if it can turn on. Refer to TP337: Recovery Mode Restore for instructions. Refer to HT208857: Using USB accessories with iOS 11.4.1 and later for more information.Plug the device into a known-good 10W or 12W Apple USB power adapter that is connected to AC power until an image appears on the screen, or for up to 10 minutes, whichever comes first. If the device charges or an image appears on screen, then the device has power. If the device does not charge or no image appears on screen after 10 minutes of charging, then continue to the next step. Refer to TP325: Charge Battery for more information.Follow steps in TP330: iOS Reset to reset the device. If an image appears on screen, then the device has power.Reconnect the device using a known-good Lightning cable to a known-good computer running the latest version of macOS. If the device is recognized by the computer, then the device has power. Restore the device if prompted.Follow steps in HT201412: If your iPhone, iPad, or iPod touch won't turn on or is frozen. Note: If any of the above checks indicate that the device has power and turns on, then go back and select another troubleshooting article.Refer to OP1760: Using HDI diagnostics for iPhone and iPad service (including No Power On / NPO). If this procedure is available, use it to help isolate no power issues with the user's device.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service. Is the device in warranty and eligible for warranty service?	No	Go to step 2.	\${nodeText.noSymptomCode}	
2.	Determine whether the device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI). Is the device eligible for out-of-warranty service?	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
		No	Return the device to the user. Due to damage, the device is no longer eligible for support.	\${nodeText.noSymptomCode}	
3.	Complete all steps in the internal inspection section of the VMI Guide. Important: <u>For mail-in repairs only:</u> Do not perform an internal inspection unless the externally visible liquid contact indicator (LCI) has been triggered, or is damaged or missing: the depot will perform an internal inspection of the components as well as a micro-inspection, if necessary. <u>For whole unit swaps in store:</u> Perform VMI checks and any relevant micro-inspections, including an internal liquid damage check. Did the user's device pass all tests in this procedure?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B83	IPHONE
		No	This device has unauthorized modifications. Return the device to the user. <u>Instructions for AASPs:</u> Document test failure, process a repair, use part number 011-0659 Micro-Inspection 1. <u>Instructions for Apple Retail:</u> Document test failure by attaching photos to Service Non-Repair Case, use part number S4981Z/A SVC, MI SCREENING.	\${nodeText.noSymptomCode}	

Wireless Charging Issues

Unlikely causes:

There are no unlikely causes for this issue.

Quick Check

Symptoms	Quick Check
<ul style="list-style-type: none">• Users iPhone does not charge wirelessly.• Users iPhone does not properly identify MagSafe accessories.	<p>Run the AST 2 MRI diagnostic suite prior to troubleshooting. Check for any service restrictions in the diagnostic results.</p> <ol style="list-style-type: none">1. For Wireless charging issues:<ol style="list-style-type: none">A. Verify that the customer's wireless charging accessory is Qi-certified.B. When placing devices to be charged on top of the wireless charging accessory's pad, ensure it is facing up and in the center of the pad.2. For MagSafe accessory detection issues, ensure the wireless charging accessory is an Apple MagSafe accessory.3. Remove any third party case that might interfere with testing of the device's functionality.4. Refer to HT211829: How to use your MagSafe Charger with iPhone 12 models for more information about using this accessory.5. Follow the steps in HT201569: If your iPhone or iPod touch won't charge.6. Follow the steps in HT208078: How to wirelessly charge your iPhone.7. Follow all steps in TP880: iPhone, iPad, iPod touch Common Troubleshooting Procedures before performing further troubleshooting.

Deep Dive

	Check	Result	Action	Code	Commodity
	Use the Visual/Mechanical Inspection (VMI) Guide to identify conditions that affect warranty and service eligibility.	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
1.	Important: Only damage described in the green section of the VMI is eligible for warranty service. Damage described in the yellow or red section of the VMI is not eligible for warranty service.	No	Go to step 2.	\${nodeText.noSymptomCode}	
	Is the device in warranty and eligible for warranty service?				
2.	Determine whether device is eligible for out-of-warranty service (yellow section of VMI) or is ineligible for service (red section of VMI).	Yes	Go to step 3.	\${nodeText.yesSymptomCode}	
	Is device eligible for out-of-warranty service?	No	Return the device to the user. Due to damage, device is no longer eligible for support.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
3.	Refer to HT201559: Restart your iPhone to restart the user's iPhone before performing further troubleshooting. Re-test to verify if the issue has been resolved. Is the issue resolved?	Yes	The issue was resolved by restarting the user's iPhone.	\${nodeText.yesSymptomCode}	
		No	Go to step 4.	\${nodeText.noSymptomCode}	
4.	Check MRI diagnostic results. Look for wireless charging failures. Was a wireless charging failure detected by MRI?	Yes	Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.	B86	IPHONE
		No	Go to step 5.	\${nodeText.noSymptomCode}	
5.	Isolate the issue: A. Wireless charging is not working properly on the user's iPhone. B. User's iPhone does not detect MagSafe accessories. Which issue is relevant?	A	Go to step 6.	\${nodeText.yesSymptomCode}	
		B	Go to step 7.	\${nodeText.noSymptomCode}	

	Check	Result	Action	Code	Commodity
6.	<p>Use a known-good MagSafe Wireless Charging accessory or a known-good compatible wireless charging pad (such as 923-02267 Wireless Charging Pad) that is connected to AC power.</p> <p>Place the user's iPhone directly on the top of the charging pad to charge it.</p> <p>Verify that the iPhone is in the middle of the charging pad and facing up.</p> <p>Verify that the iPhone is charging (observed lightning charging symbol on the top right corner of the device screen).</p> <p>View the battery percentage indicator on the user's iPhone. Continue to charge the iPhone on top of the charging pad for about 30 seconds, and confirm that the battery percentage level has increased.</p> <p>Refer to HT208078: How to wirelessly charge your iPhone for more information about wireless charging.</p> <p>Does the user's iPhone charge wirelessly?</p>	<p>Yes</p> <p>No</p>	<p>Go to step 7.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p><code> \${nodeText.yesSymptomCode}</code></p> <p>B86</p>	IPHONE
7.	<p>Test user's iPhone with known-good MagSafe accessory.</p> <p>Refer to HT211829: How to use your MagSafe Charger with iPhone 12 models for more information about using this accessory.</p> <p>Observe on the user's iPhone screen whether the appropriate animation has played when the known-good MagSafe accessory is attached to the user's phone.</p> <p>Was the appropriate animation observed on the user's iPhone screen?</p>	<p>Yes</p> <p>No</p>	<p>The issue is related to the user's MagSafe accessory. Return to the Troubleshooting menu and enter the user's MagSafe accessory serial number to troubleshoot that product.</p> <p>Service required. Proceed with repair creation to see available options. If available, choose a modular repair or mail-in repair. Perform a whole unit replacement only if there are no other options.</p>	<p><code> \${nodeText.yesSymptomCode}</code></p> <p>B86</p>	IPHONE

iPhone 12, iPhone 12 mini, iPhone 12 Pro, and iPhone 12 Pro Max Take-Apart General Information

Before You Begin

- Refer to the Visual/Mechanical Inspection (VMI) Guide to determine whether the device has accidental damage. Check for an activated liquid contact indicator (LCI) before opening the device. Remove the SIM tray to view the externally visible LCI.
- Remove all cases and screen protectors.
- Verify the user-reported symptoms and identify the necessary repair parts.
- Drag the slide to power off slider to ensure that the device is turned off.

Electrostatic Discharge (ESD) Precautions

[Always take proper ESD precautions when opening iPhone](#) (OP100). Work on a properly grounded ESD-safe mat and wear a properly connected ESD-safe wrist strap.

Required Tools

Servicing iPhone 12, iPhone 12 mini, iPhone 12 Pro, and iPhone 12 Pro Max requires the following tools:

- Heated Display Removal Fixture (661-17619)
- 6.1-inch Repair Tray, iPhone 12 and iPhone 12 Pro (923-04908)*
- 6.7-inch Repair Tray, iPhone 12 Pro Max (923-04909)*
- 5.4-inch Repair Tray, iPhone 12 mini (923-04907)*
- 6.1-inch Heated Display Pocket, iPhone 12 and iPhone 12 Pro (661-17617)*
- 6.7-inch Heated Display Pocket, iPhone 12 Pro Max (661-17618)*
- 5.4-inch Heated Display Pocket, iPhone 12 mini (661-17616)*
- Display Adhesive Press iPhone 12 and iPhone 12 Pro (923-04911)*
- Display Adhesive Press iPhone 12 Pro Max (923-04912)*
- Display Adhesive Press iPhone 12 mini (923-04910)*
- Display Protective Cover, iPhone 12 and iPhone 12 Pro (923-04878)
- Display Protective Cover, iPhone 12 Pro Max (923-04880)
- Display Protective Cover, iPhone 12 mini (923-04876)
- Back Protective Cover, iPhone 12 and iPhone 12 Pro (923-04877)
- Back Protective Cover, iPhone 12 Pro Max (923-04879)
- Back Protective Cover, iPhone 12 mini (923-04901)
- Heat resistant gloves
- Adhesive Cutter (923-01092)
- ESD-safe tweezers
- ESD-safe wrist strap
- ESD-safe workstation
- iPhone battery fixture (923-02657)
- Torque driver (gray), 0.55 kgf cm (923-00738)
- Torque driver (green), 0.45 kgf cm (923-00105)
- Torque driver kit (923-0248) includes:
 - Torque driver (black), 0.35 kgf cm (923-0245)
 - Torx security bit (923-0247)
 - JCIS bit for crosshead screws (923-0246)
- Microstix bit (923-01290)
- Superscrew bit (923-02066)
- Microfiber polishing cloth
- Digital Barcode scanner (923-01232)
- Black stick (922-5065)
- Packing tape
- SIM removal tool (922-8417) or paper clip (size #1)
- Ethanol wipes or Isopropyl alcohol (IPA) wipes

* These tools are distinguished by a symbol in the corner of the tool:

- iPhone 12 and iPhone 12 Pro - clover
- iPhone 12 Pro Max - double diamond
- iPhone 12 mini - heart

Repair Tray



Heated Display Pocket



Display Adhesive Press



Torque drivers limit the amount of force applied to a screw when you tighten it (by turning it clockwise). They don't limit the amount of force applied to a screw when you remove it (by turning it counterclockwise). You must tighten all screws to a specific torque value during a repair. Use the torque driver called for in the take-apart instructions to set each screw to the correct torque value. The correct driver is also noted in the screw diagram section of the Internal View, Parts List, Screw Diagram for each model.

- Torque driver (gray), 0.55 kgf cm (923-00738)
- Torque driver (black), 0.35 kgf cm (923-0245)
- Torque driver (green), 0.45 kgf cm (923-00105)



iPad, iPhone, iPod, Apple Watch Device Safety

Battery Handling

iPad, iPhone, iPod, and Apple Watch include a lithium-polymer rechargeable battery. When you use and repair this battery under reasonable conditions and according to instructions, it should not present a health hazard. The contents of the battery are encapsulated. But if the contents are released or damaged, they may present potential health and safety hazards. Avoid exposure to heat and open flame. Don't puncture, deform, crush, or incinerate a battery, as a thermal runaway reaction and excessive heating may result.



Warning: Non-Apple batteries require a specific [battery discharge procedure](#).

Warning: If the battery is dented, punctured, swollen, or otherwise damaged, then stop the repair. Don't remove the battery from the device. Replace the whole unit.

Warning: Don't reuse or reinstall a loose battery or a battery that has been removed. Install a new battery. If a new battery is unavailable, replace the whole unit.

Thermal Runaway Events with Lithium-Ion (LiO) / Lithium-Polymer Batteries

The following statements are intended as guidance only. Only properly trained and equipped personnel should respond to a thermal runaway event.

The most effective way to prevent a lithium-ion/lithium-polymer battery thermal event is to discharge the battery before opening the device or working on or near the battery. (A battery with a charge of less than 25 percent can't produce a thermal event.)

If a battery begins to smoke, spark, hiss, or pop, it's most likely undergoing a thermal runaway. The most effective way to stop the reaction is to immediately smother the battery with plenty of clean, dry sand. This will smother the reaction and limit the amount of smoke produced.

Don't use water or an ABC or CO₂ fire extinguisher on a thermal runaway battery, as they will not effectively stop the reaction and will create a bigger mess to clean up.

Cleanup

1. Sweep up used sand, remove any debris, and return the remaining clean sand to the quick-pour container for future use. Add more sand to the container from supplementary sand containers as needed.
2. Wipe the workstation with water. Use an ESD-mat cleaning solution on the affected area.
3. Return batteries and debris removed from the sand according to your location's recycling and scrap procedures.

Personal Protection

Always apply protective display covers when handling cracked or broken glass. Vacuum workstations thoroughly after handling devices with broken glass. Safety glasses are recommended, but not required in all situations. Refer to the matrix below for scenarios, safety mitigation measures, and safety glasses guidelines.

Scenario	Safety Mitigation	Safety Glasses Usage
Handling cracked display glass (Mac)	Safety glasses, packing tape, protective gloves, vacuum	Required
Cleaning debris with canned air	Safety glasses	Required
Handling cracked display or back glass (iPhone, iPad, iPod)	Safety glasses, display or back protective covers (if available for the device), packing tape, vacuum	Optional
Battery handling	Battery safety training and battery covers (if available for the device)	Optional

Other personal protection to note:

- **Respiratory Protection:** Not necessary under normal conditions.
- **Disposable Gloves:** Use disposable latex or nitrile gloves when handling a leaking battery.

First Aid

Inhalation	The contents of an open battery or the smoke from a thermal runaway event may cause respiratory irritation. Leave the area if necessary for comfort. Get fresh air and medical attention if you're feeling sick.
Ingestion	Ingesting a lithium-ion battery is highly unlikely as the contents are mostly solid, and any liquid (ester-based electrolyte) that might drip out of a damaged battery is limited to a few drops. But don't touch your fingers to your mouth while handling a damaged battery to avoid ingesting contents. Don't induce vomiting. Wash out your mouth with water. Get medical attention following exposure or if you're feeling sick.
Skin Contact	The contents of an open battery may cause skin irritation. Flush contaminated skin with plenty of water. Remove any contaminated clothing. Continue to rinse your skin for at least 15 minutes. Get medical attention. Wash your clothes before reuse.
Eye Contact	The contents of an open battery may irritate your eyes. Immediately flush your eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Continue to rinse your eyes for at least 15 minutes. Get medical attention if irritation persists.

Disclaimer: The above information is provided for your information only. The information and recommendations set forth above are made in good faith and are believed to be accurate as of the date of preparation. Apple Inc. makes no warranty, either expressed or implied, with respect to this information and disclaims all liability from reliance on it.

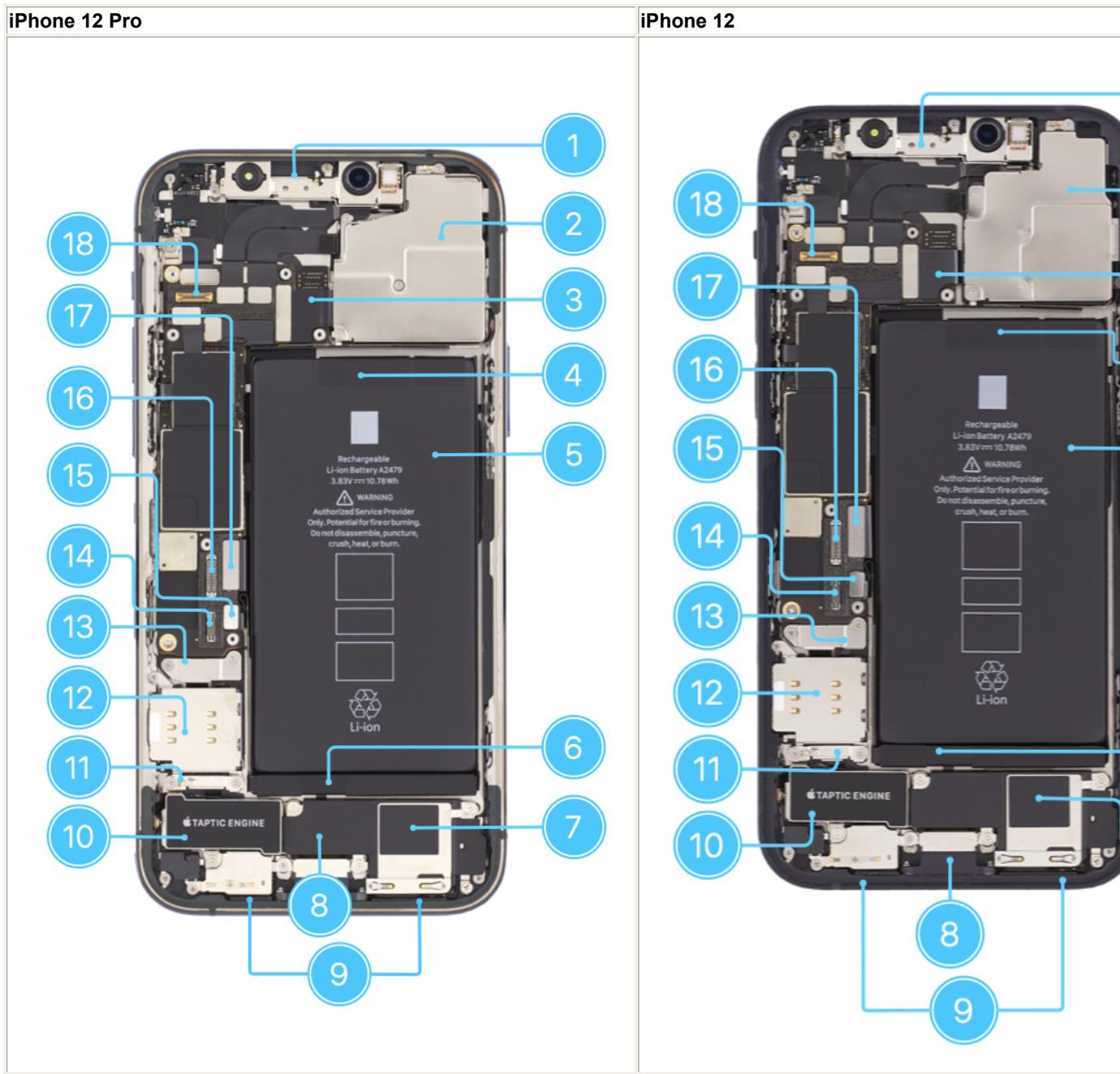
Handling Broken Glass

iPad, iPod, and Apple Watch displays, as well as iPhone 8 and later back covers are made of glass. The glass could break if the device is dropped on a hard surface, receives a substantial impact, or is crushed, bent, or deformed. If the glass chips or cracks, don't attempt to remove it. Perform the following steps:

- Attach a protective display cover or packing tape to the display before removal to prevent injury or scattering of glass.
- Use a vacuum to remove any glass shards from the work surface and display.
- Don't let the display cover or tape go over the edge of the display.
- Refer to the device's Visual/Mechanical Inspection (VMI) Guide for warranty eligibility and service eligibility.

iPhone 12 and iPhone 12 Pro Internal View, Parts List, Screw Diagram

Internal Views



1. TrueDepth camera assembly
2. Cameras
3. Camera Flex
4. Battery adhesive tabs
5. Battery
6. Speaker
7. Lightning connector
8. Bottom microphones
9. Taptic Engine
10. Taptic Engine cowling
11. SIM Card Reader
12. SIM Card Reader cowling
13. Touch flex connector
14. Battery flex connector
15. Display flex connector
16. Dock flex connector
17. Sensor flex connector
18. Sensor flex connector

Parts List

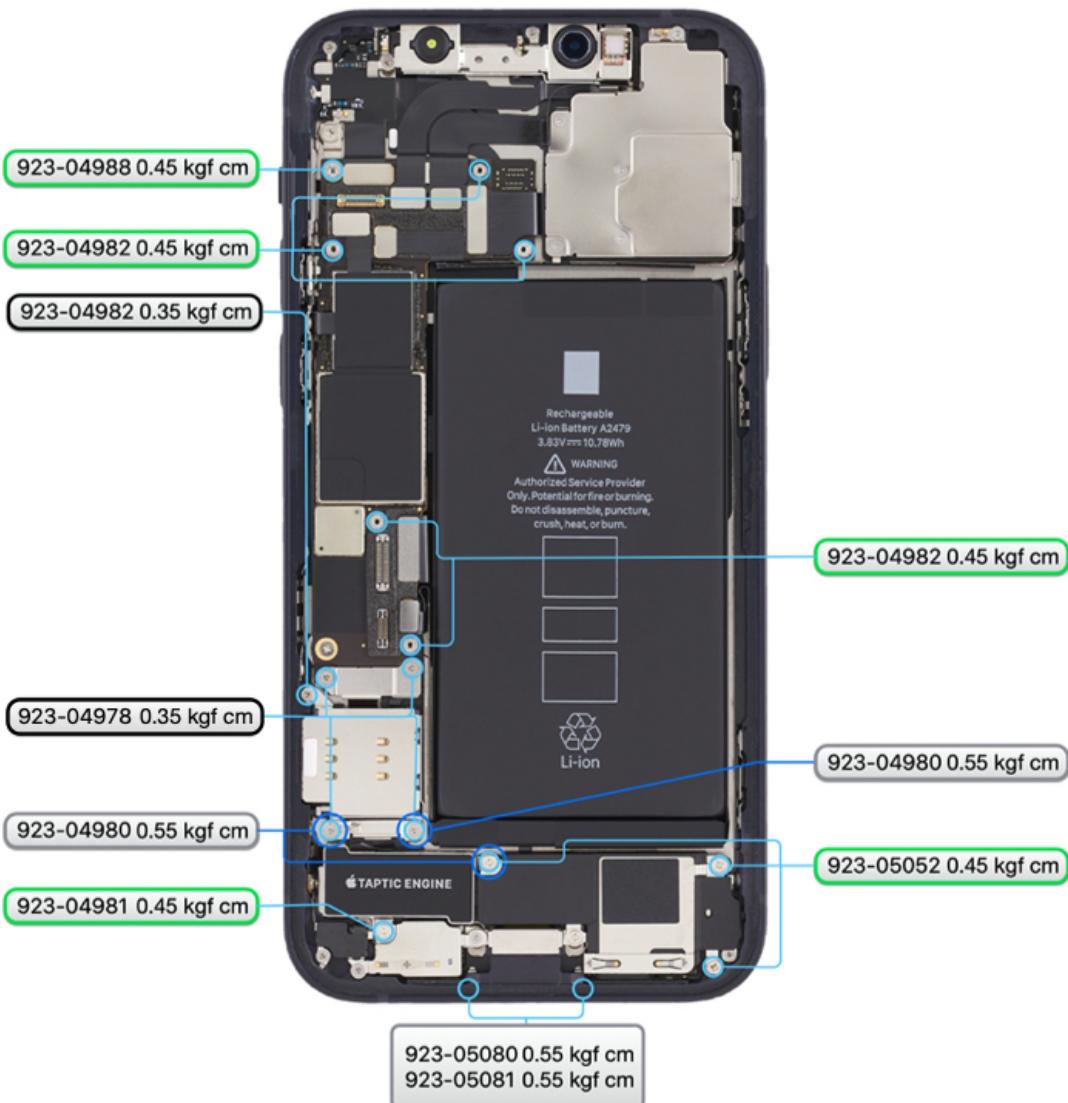
Description	Part Number	Kit Contents (order screws separately)	Screws
Battery Kit	661-17920	1 battery	
Camera	661-17922 iPhone 12 Pro 661-17921 iPhone 12	1 camera	
Camera Cowling	923-04990 iPhone 12 Pro 923-04989 iPhone 12	10 cowlings	923-05054 iPhone 12 Pro 923-05055 iPhone 12 Pro 923-05068 iPhone 12 923-05069 iPhone 12
Display	661-18504 iPhone 12 Pro 661-18503 iPhone 12	1 display 1 screw kit	923-05034 Screw kit
Display Adhesive	923-04894 iPhone 12 Pro 923-04893 iPhone 12	30 display adhesive sheets Important: Adhesive expires after 18 months and should be discarded. Each box of adhesive has a (9D) number on the top right corner of the part label. The first two numbers indicate the year and the second two numbers indicate the week. The expiration date is 18 months from the date in the (9D) number.	
Display Cowling, Upper	923-04985	10 cowlings	923-04988 923-04982
Display Cowling, Lower	923-04987	10 cowlings	923-04982
Security Screws		100 screws	923-05064 iPhone 12 Pro, graphite 923-05065 iPhone 12 Pro, silver 923-05066 iPhone 12 Pro, gold 923-05067 iPhone 12 Pro, pacific blue 923-05080 iPhone 12, black 923-05081 iPhone 12, white
SIM Tray, iPhone 12	923-05070 single, black 923-05071 single, white 923-05072 single, green 923-05073 single, (PRODUCT)RED 923-05074, single, blue 923-05075 dual, black 923-05076 dual, white 923-05077 dual, green 923-05078 dual, (PRODUCT)RED 923-05079 dual, blue	1 SIM tray	
SIM Tray, iPhone 12 Pro	923-05056 single, graphite 923-05058 single, silver 923-05059 single, gold 923-05060 single, pacific blue 923-05057 dual, graphite 923-05061 dual, silver 923-05062 dual, gold 923-05063 dual, pacific blue	1 SIM tray	
Speaker	923-04915	1 speaker	923-05052

SIM Card Reader Cowling	923-04983	10 cowlings	923-04984
Taptic Engine	923-04979	1 Taptic Engine	923-04980 923-04981
Taptic Engine Cowling	923-04977	1 Taptic Engine	923-04984 923-04981

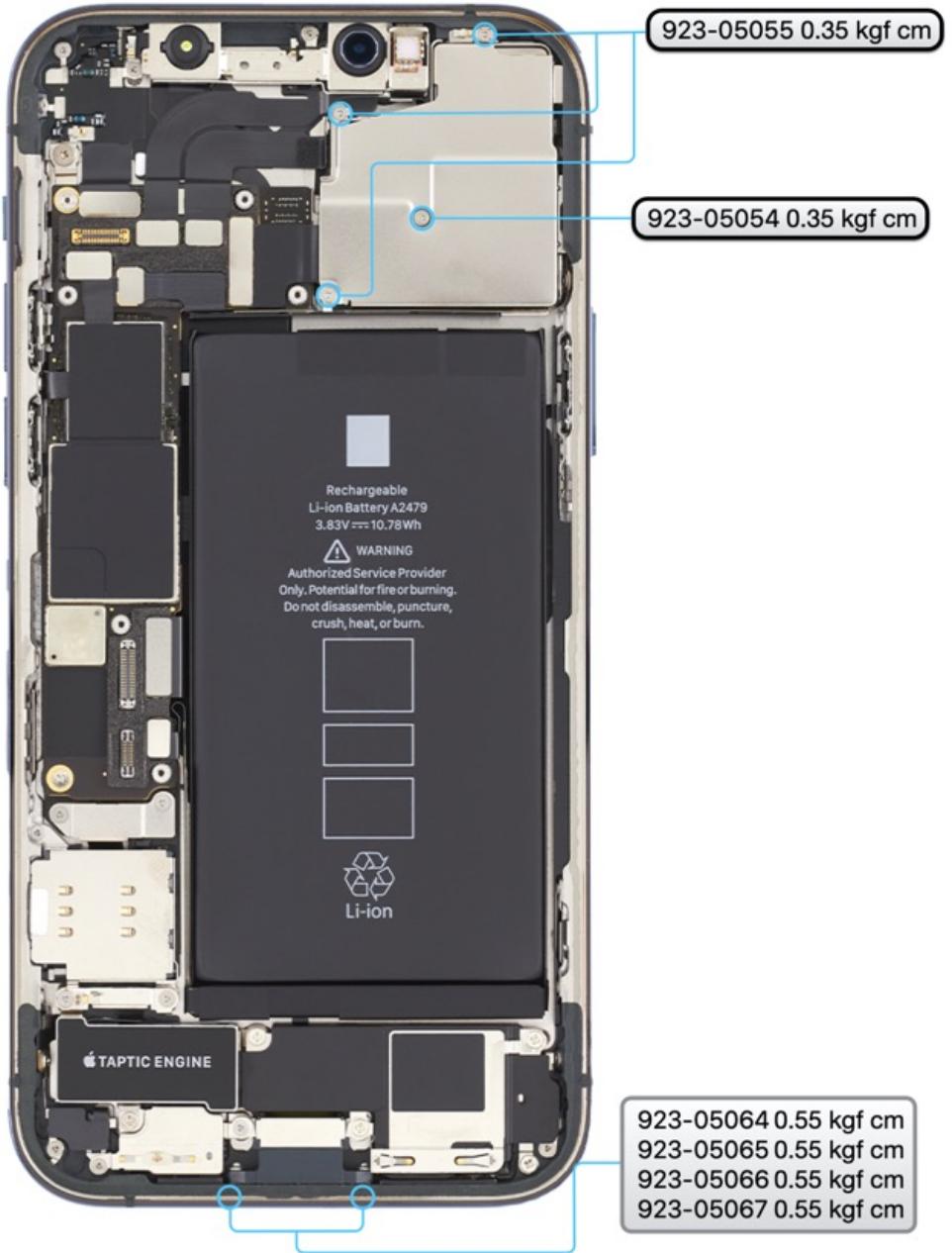
Screw Diagram

Use the black torque driver (0.35 kgf cm) for screws marked with a black outline.
 Use the green torque driver (0.45 kgf cm) for screws marked with a green outline.
 Use the gray torque driver (0.55 kgf cm) for screws marked with a gray outline.

iPhone 12 and iPhone 12 Pro



iPhone 12 Pro

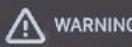


iPhone 12

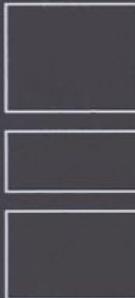


Location of Grounding Springs iPhone 12 and iPhone 12 Pro

Rechargeable
Li-ion Battery A2479
3.83V == 10.78Wh



WARNING
Authorized Service Provider
Only. Potential for fire or burning.
Do not disassemble, puncture,
crush, heat, or burn.



Li-ion

APPLE TAPTIC ENGINE

iPhone 6 and later SIM Tray

First Steps

- Turn off the device.

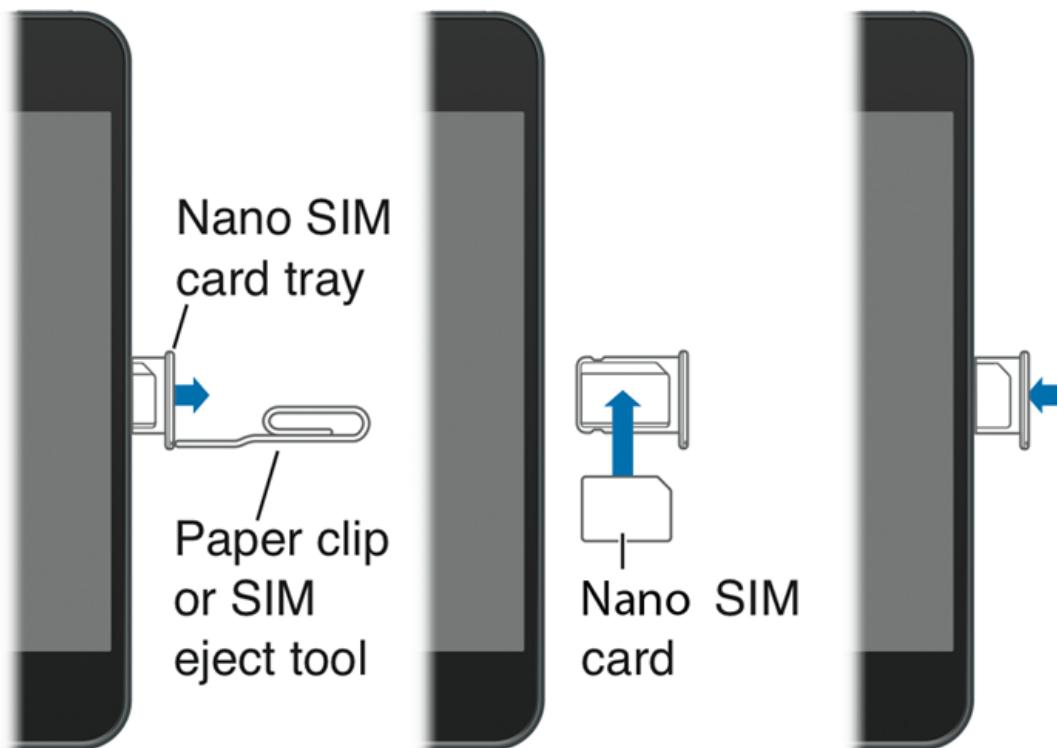


Tools

- SIM removal tool (922-8417) or paper clip (size #1)

Steps For Removal

1. Insert the end of the SIM removal tool (922-8417) or paper clip (size #1) into the hole on the SIM tray.
2. Firmly push the tool straight in to eject the tray.



Steps For Reassembly

Note the orientation of the SIM tray and card before inserting it into the device.

Caution: Do not force the SIM tray into position. Forcing the SIM tray into position may damage the inside of the device.



iPhone 12 and iPhone 12 Pro Open

First Steps

- Only Apple-certified technicians should perform this procedure.
- Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) to determine whether any accidental damage is present.
- Remove all cases and screen protectors.
- Follow electrostatic discharge (ESD) precautions.
- Turn off the device.
- Make sure you have completed the training and reviewed the service video [SV443: iPhone 12 and iPhone 12 Pro Open Video](#) prior to beginning this procedure.



Warning: If the display glass is broken, put on safety glasses and cut-resistant gloves. Use a vacuum cleaner to remove any glass shards from the workspace or the display. Affix a display protective cover or packing tape to the display before removal to prevent injury or scattering of glass. Do not install the display cover or packing tape over the edge of the display.

When installing a Display Protective Cover (923-04878) for iPhone 12 and iPhone 12 Pro, firmly press the cover onto the broken display to remove air bubbles and work the adhesive into the cracks in the glass. The cover should be left to settle into place up to 12 minutes for more damaged displays before attempting to remove the display. The longer the display protective cover is left on the display, the stronger the bond between the cover and the broken glass.

If the back glass is broken, adhere a Back Protective Cover (923-04877) for iPhone 12 and iPhone 12 Pro before attempting a repair. If the protective cover does not adhere to the device or if there is no glass for the film to adhere to, do not attempt a repair. Devices with this type of damage require a whole unit replacement.

Tools

1. Torque driver (black, 0.35 kgf cm) (923-0248)
2. Security bit (923-0247)
3. Micro stix bit (923-01290)
4. Black Stick
5. Heated Display Removal Fixture (661-17619)
6. 6.1-inch Heated Display Pocket for iPhone 12 and iPhone 12 Pro (661-17617)
7. Adhesive Cutter (923-01092)
8. 6.1-inch Repair Tray (923-04908) for iPhone 12 and iPhone 12 Pro
9. Ethanol wipes or Isopropyl alcohol (IPA) wipes
Heat resistant gloves (not pictured)



Steps For Removal



Caution: Never reinstall a screw after it has been removed. Install only new screws. Most iPhone screw grooves are covered in adhesive that can't be reused. Discard screws according to your local recycling guidelines.

Warning: You must wear heat resistant gloves to perform this procedure.

1. Use any torque driver and security bit to remove and discard two security screws, one from each side of the Lightning connector.



2. Turn the Heated Display Removal Fixture on. You will see a check mark indicating it is ready for use.



3. Insert the iPhone into the Heated Display Pocket, bottom end first and display facing up.



Caution: Carefully insert the phone into the Heated Display Pocket to avoid scratches or other cosmetic damage to the phone.



4. Fold the side clamp down to lock the iPhone into place.



5. Put on the heat resistant gloves and insert the Heated Display Pocket into the Heated Display Removal Fixture.



6. Slide the bottom of the tray onto the rail of the fixture. Keep sliding until you hear it the click into place.



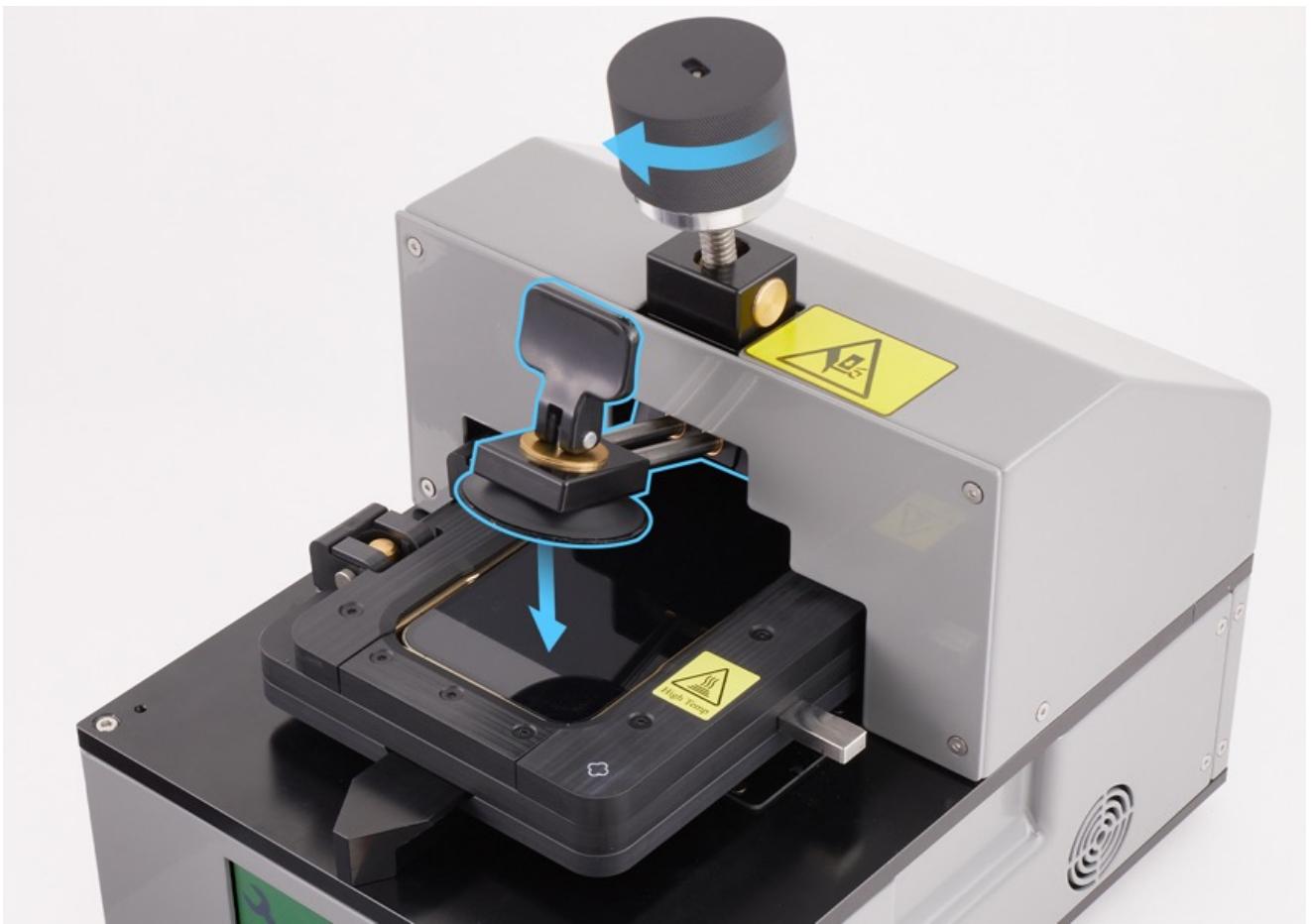
7. The display of the Heated Display Removal Fixture will turn red indicating that the Heated Display Pocket is warming. When the Heated Display Pocket has reached the correct temperature, a two minute timer will start.



Caution: You must wait the entire two minutes before proceeding any further. Failure to do so could result in damage to the iPhone that could require a whole unit replacement. If you don't wait the entire two minutes the fixture will error out and you will have to begin the procedure again.



- When two minutes are up, the display on the Fixture will turn green. Turn the knob clockwise to lower the suction cup. Stop the suction cup right before it touches the iPhone display. **Note:** The fixture will beep until the suction cup is lowered.



9. The suction cup assembly slides in and out, allowing proper placement for different sized iPhones. Slide the suction cup assembly so that the edge of the suction cup is on the edge of the iPhone. Do not allow the suction cup to hang off the edge of the iPhone.



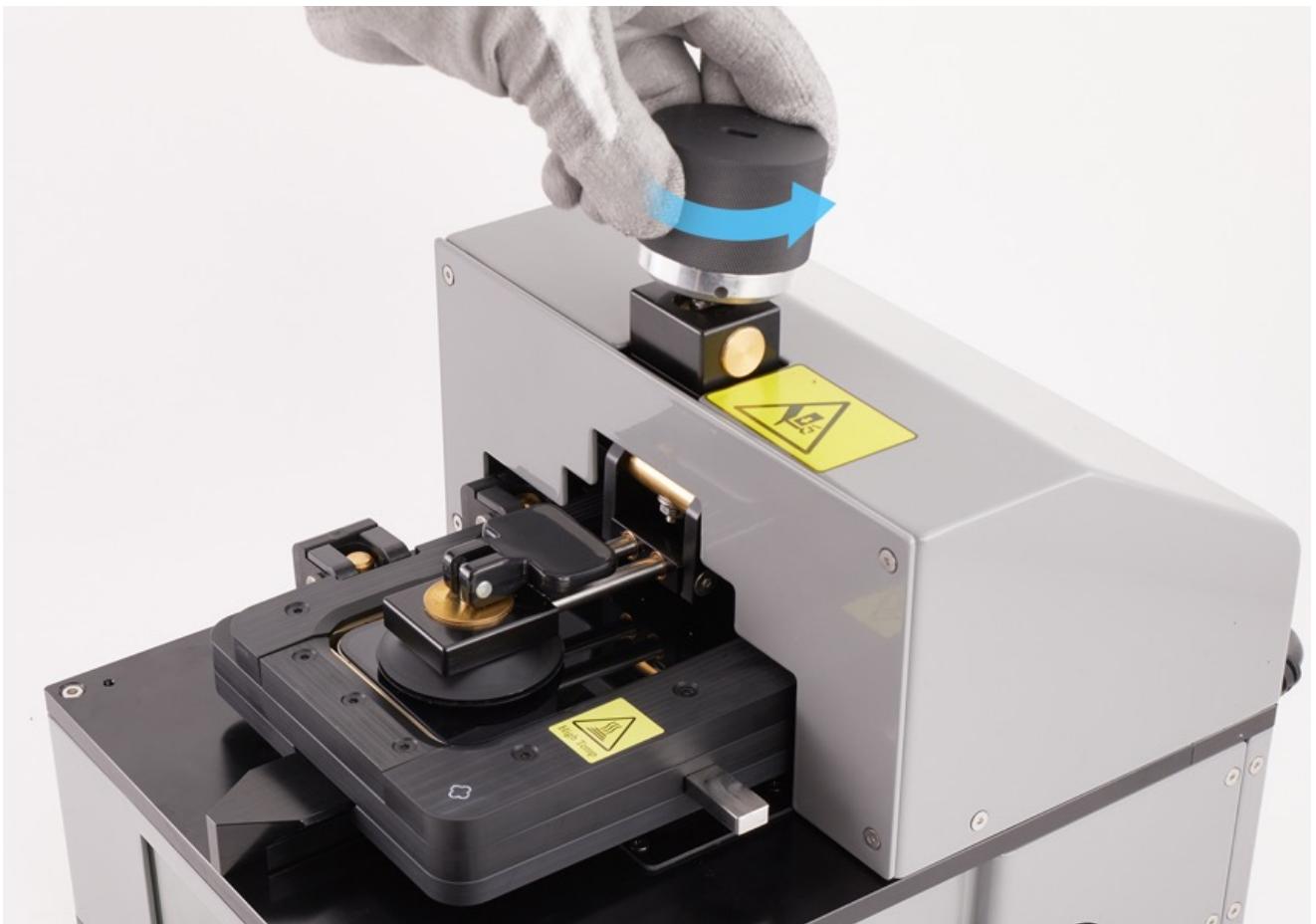
Caution: Failure to line up the suction cup properly could result in damage to the iPhone.



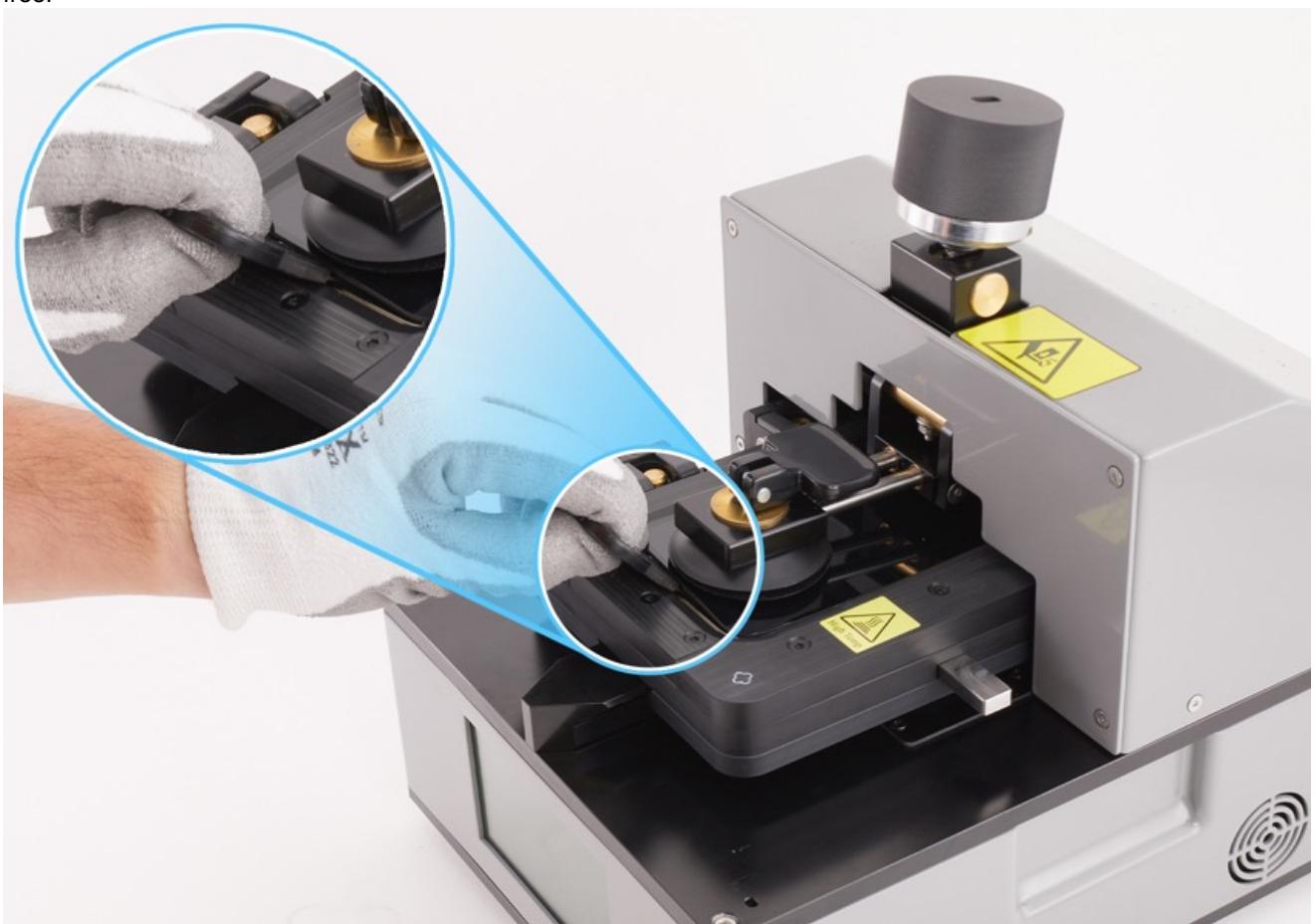
10. Turn the knob clockwise so that the suction cup is touching the iPhone firmly. Flip the suction cup lever to lock the suction cup onto the iPhone display.

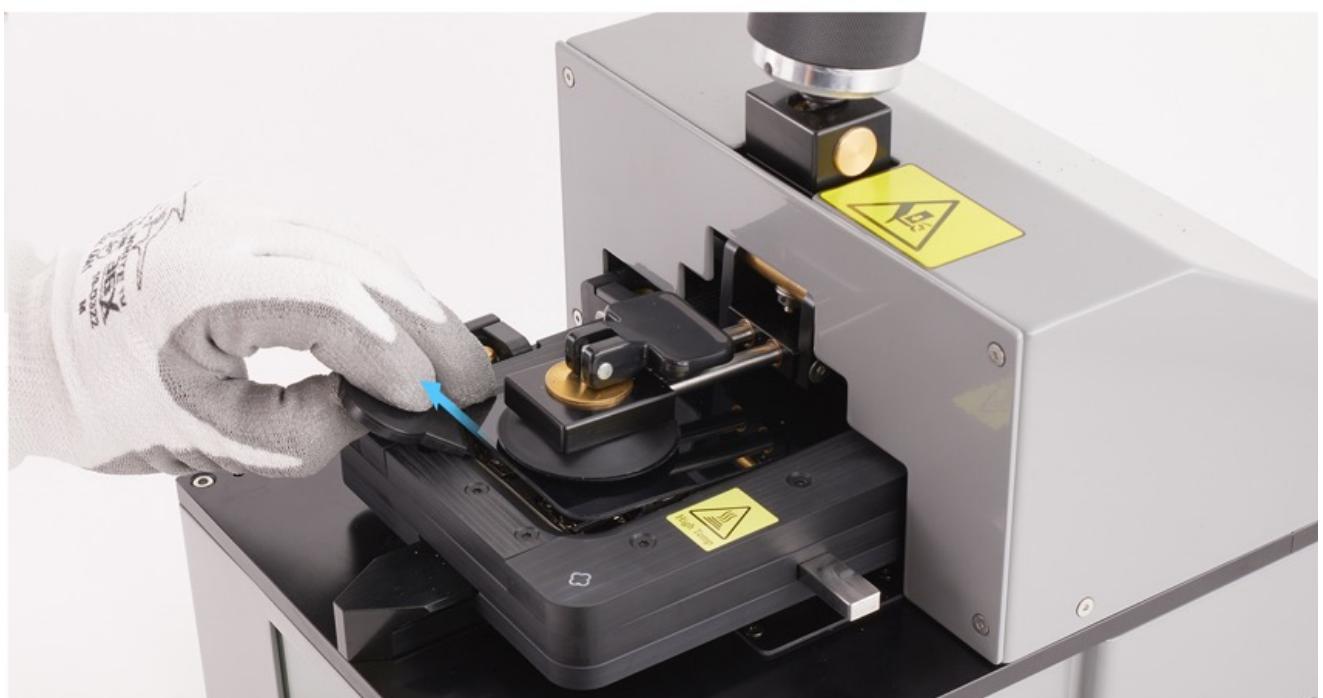
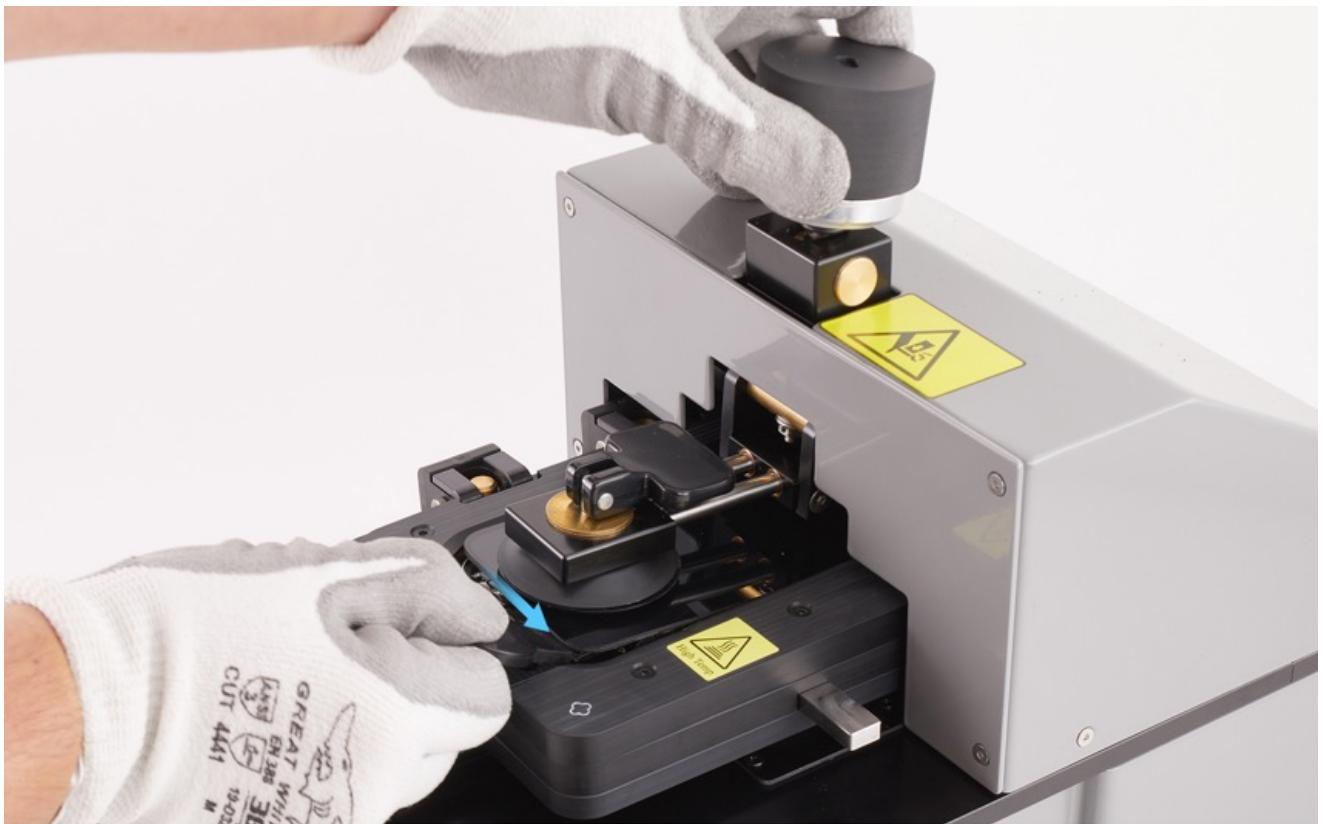


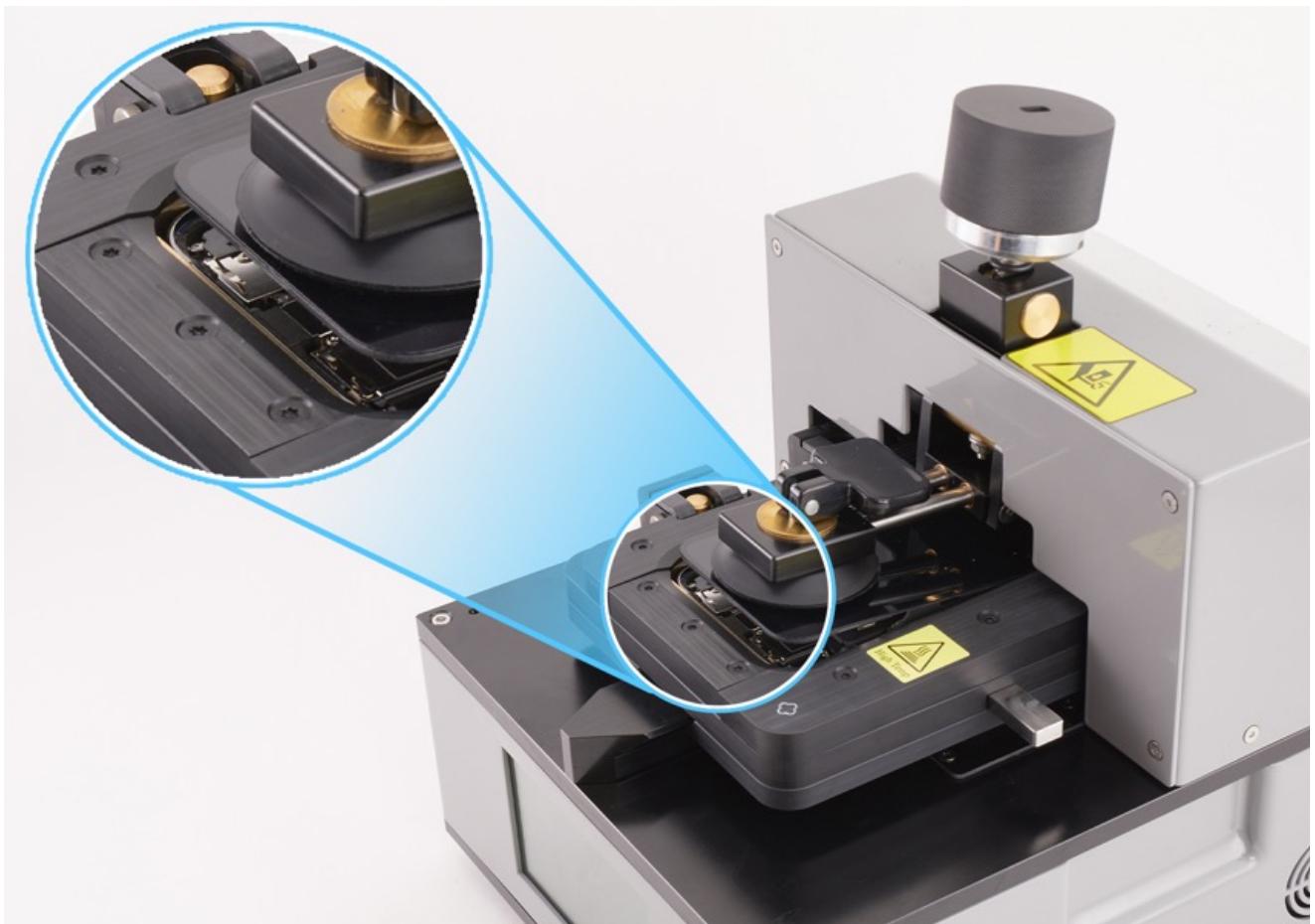
11. Slowly turn the knob on the adapter counterclockwise until the display begins to separate from the enclosure. If you do not see a gap between the display and the enclosure right away, wait 30 seconds. If there is still no gap after 30 seconds turn the silver section of the knob counterclockwise.



- Once a gap appears between the display and the enclosure insert the Adhesive Cutter between the display and the enclosure. Run the cutter between the display and the enclosure to the left and to the right until the top of the display is free.







13. Lift the lever up and it is recommended to use a black stick to release the suction cup.



14. Press the eject button to release the Heated Display Pocket from the Heated Display Removal Fixture.



15. With both hands, slide the Heated Display Pocket out of the Heated Display Removal Fixture.



16. Hold the iPhone in the top third and remove it from the Heated Display Pocket.



17. Remove the heat resistant gloves and place the iPhone into the repair tray. Slightly slide the display toward the bottom and insert the Adhesive Cutter between the display and the enclosure near the top of the display. Start in the middle. Run the cutter between the display and the enclosure until the display is free.

Note: Use the cutter at the angle shown in the image below.



Important: To avoid damaging the display flex connectors, do not tilt the display more than five degrees.



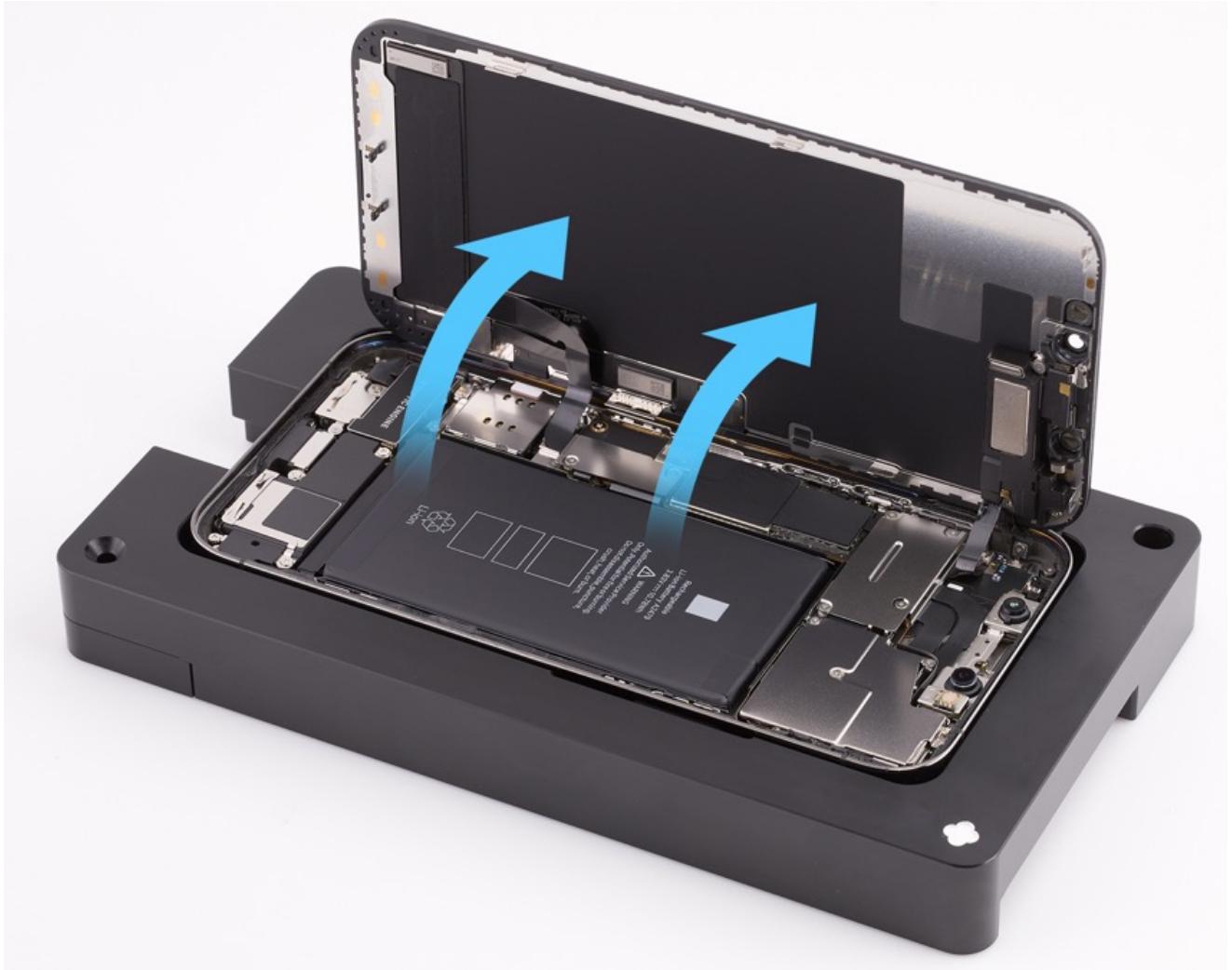
18. Place the suction cups in the repair tray.



Caution: Make sure that the display clips are released before tilting the display to avoid damage to the enclosure or display. Do not damage the display flex connectors while lifting the display.

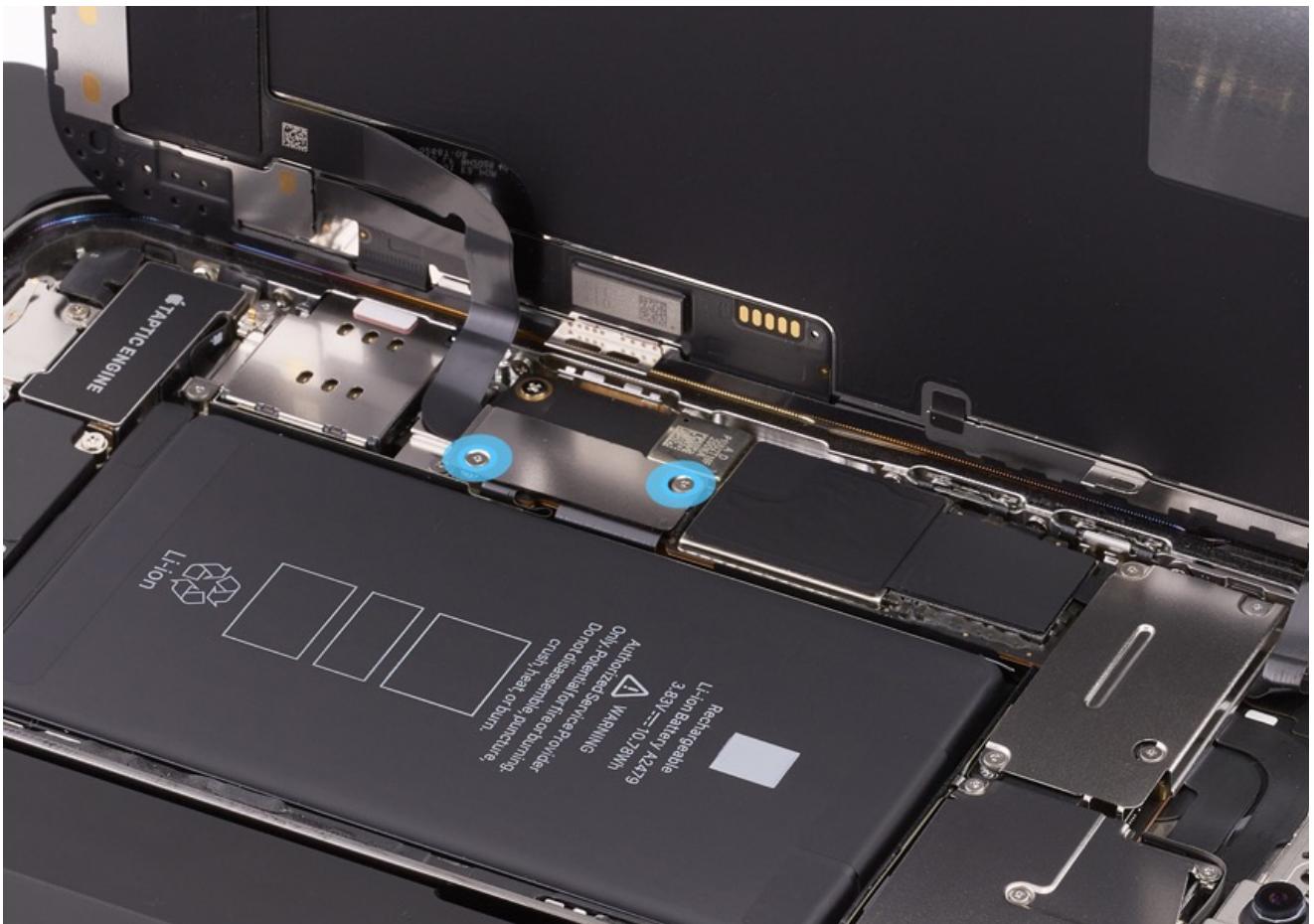
19. Then carefully lift the display away from the enclosure and adhere display to the suction cups by pressing on the sides of the display. **Note:** Be aware the clover icon in the repair tray will be at the bottom of the tray when the tray is positioned correctly.

Important: Do not press the back of the display to secure the display to the suction cup as it may cause damage to the functionality of the display.



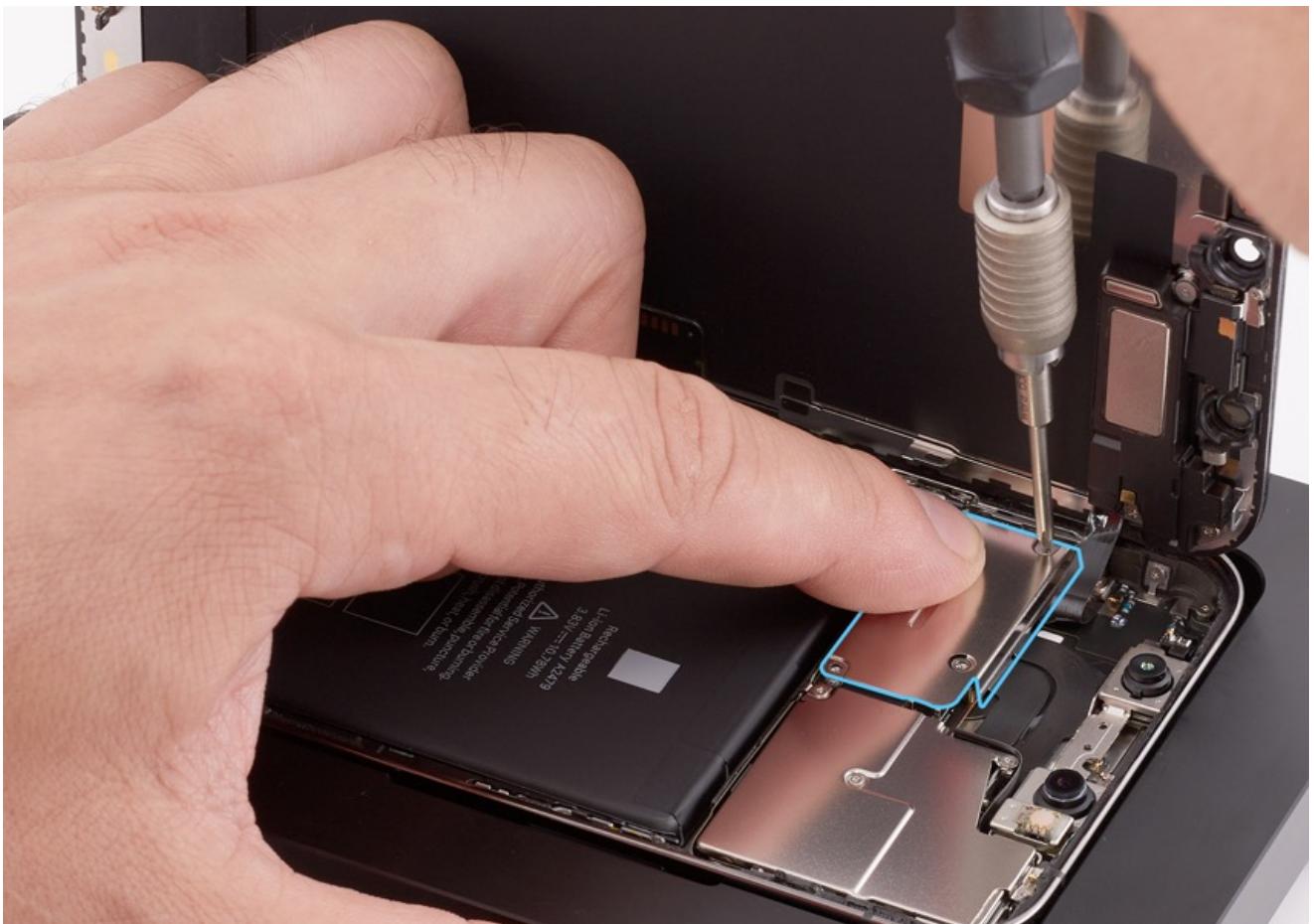
Warning: If the battery is dented, punctured, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Reassemble and replace the whole unit. Follow [iPhone safety instructions](#) (TP328).

20. Remove and discard the two Micro stix screws from the lower display cowling. Remove the cowling and save for reuse.



21. Remove and discard the four Micro stix screws from the upper display cowling. Hold the cowling in place while removing the upper right screw last.

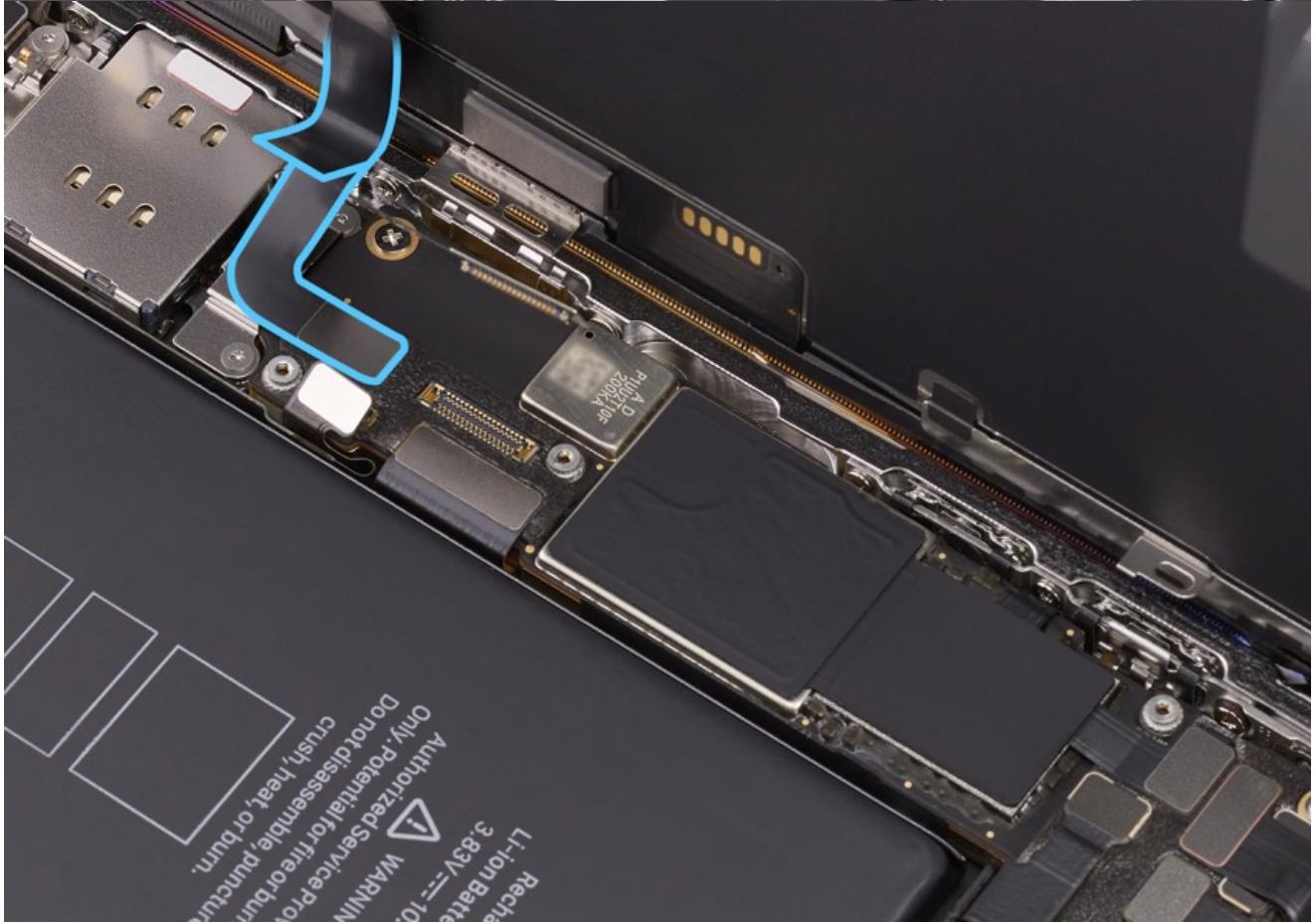




22. It is recommended to use tweezers to lift the cowling up and disengage the hinge. Remove the cowling and save for reuse.
23. Disconnect the battery connector.



24. Disconnect the two display connectors from the logic board.

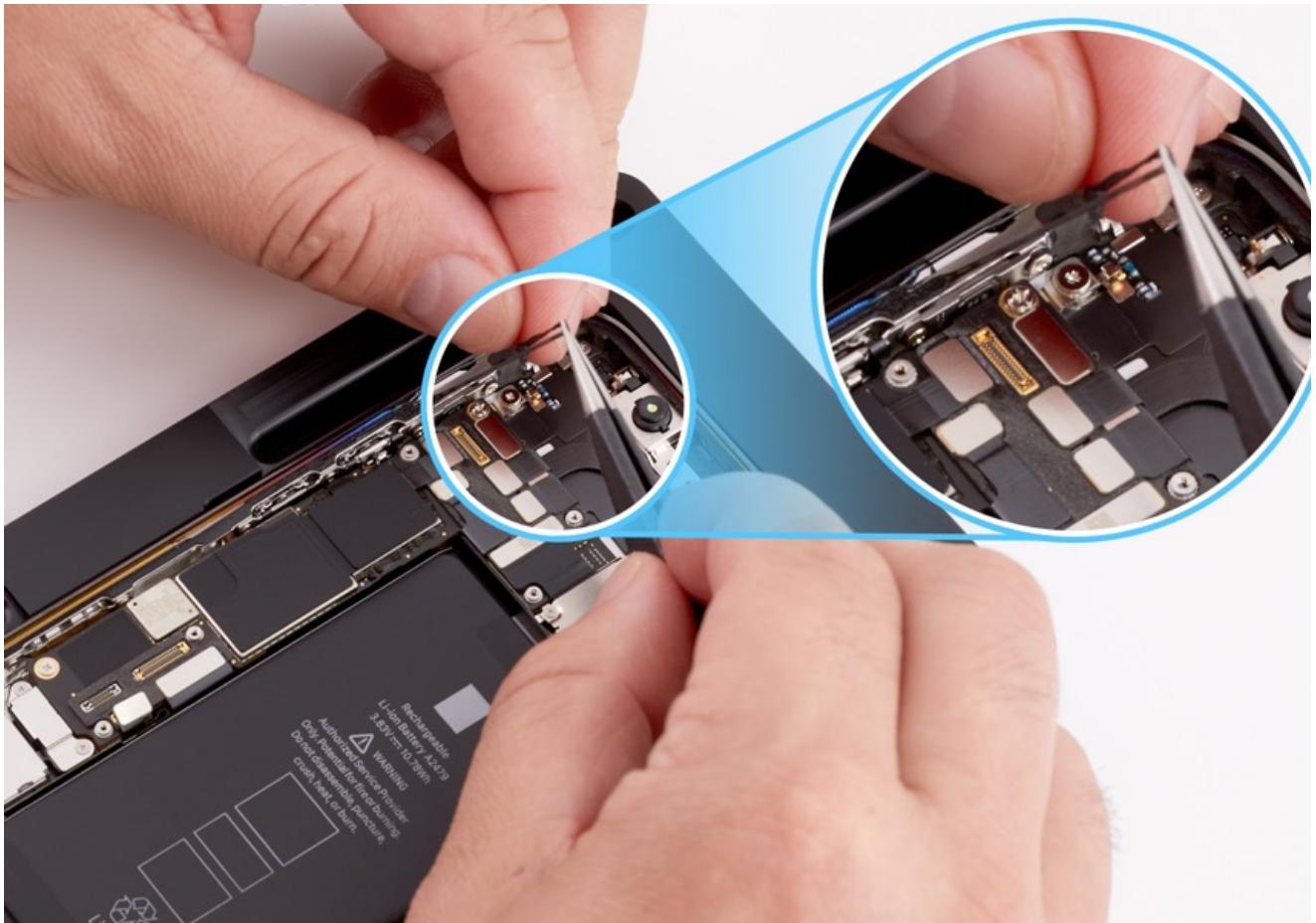


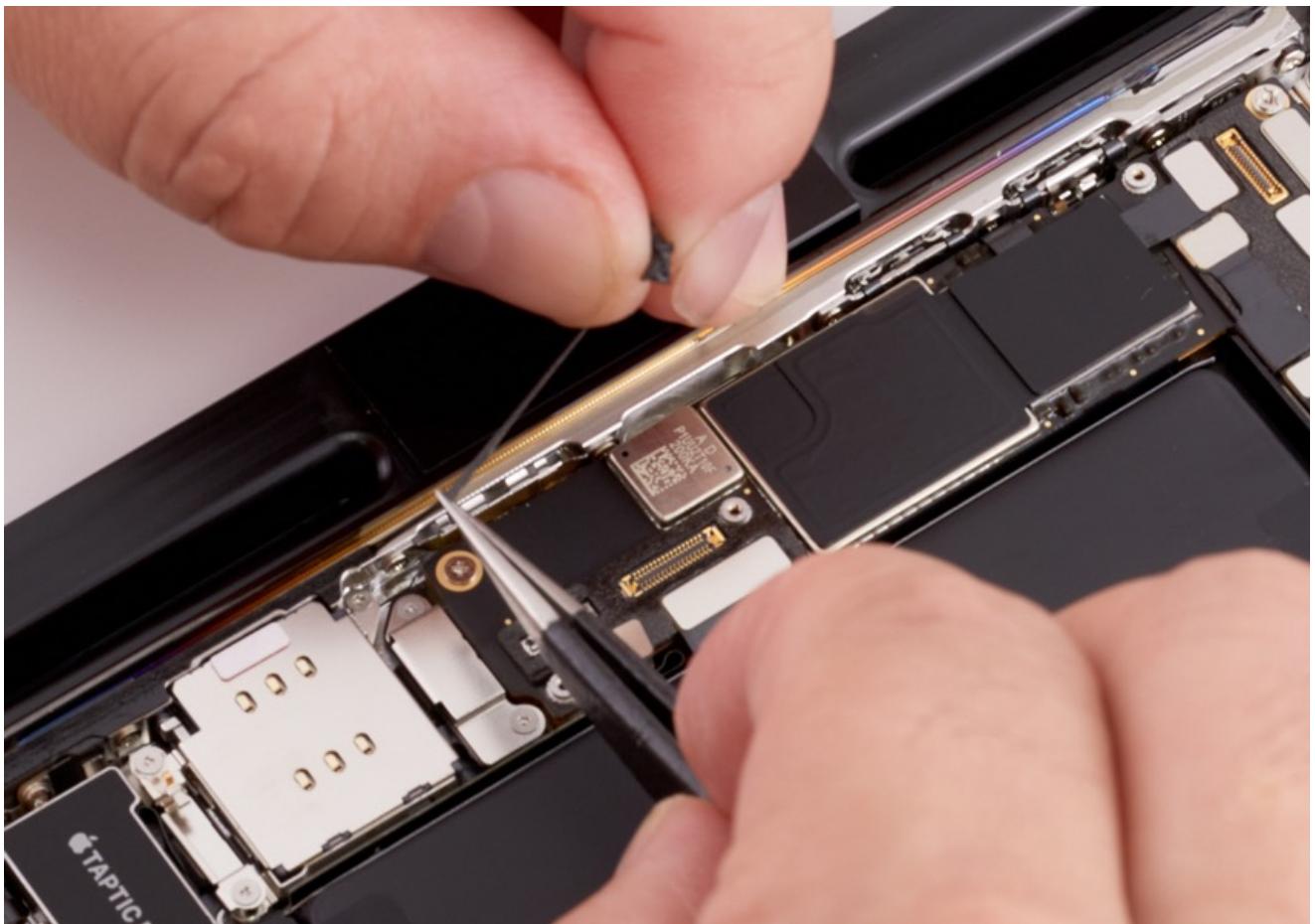
25. Disconnect the sensor flex from the logic board.



26. Remove the display assembly from the enclosure.
27. Use tweezers and your fingers to pick and pull the adhesive as you move around the enclosure to remove all of the adhesive from the enclosure.

Refer to [SV443: iPhone 12 and iPhone 12 Pro Open Video](#) for video instruction on the recommended adhesive removal method.





28. Clean the enclosure thoroughly with an ethanol wipe. If one is not available, use an IPA wipe. Thorough cleaning ensures a proper seal during reassembly.

Steps For Reassembly

Perform the [iPhone 12 and iPhone 12 Pro Close \(RP1718\)](#) procedure.

iPhone 12 and iPhone 12 Pro Replace Display Assembly

First Steps

- Only Apple-certified technicians should perform this procedure.
- Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) to determine whether any accidental damage is present.
- Remove all cases and screen protectors from the device.
- Follow electrostatic discharge (ESD) precautions.
- Turn off the device.



Warning: If the display glass is broken, put on safety glasses and material handling gloves. Use a vacuum cleaner to remove all glass shards from the workspace and display. Affix a protective display cover or packing tape to the display before removal to prevent injury or scattering of glass. Do not install the protective display cover or tape over the edge of the display.

When installing a Display Protective Cover (923-04878) for iPhone 12 and iPhone 12 Pro, firmly press the cover onto the broken display to remove air bubbles and work the adhesive into the cracks in the glass. The cover should be left to settle into place up to 12 minutes for more damaged displays before attempting to remove the display. The longer the display protective cover is left on the display, the stronger the bond between the cover and the broken glass.

If the back glass is broken, adhere a Back Protective Cover (923-04877) for iPhone 12 and iPhone 12 Pro before attempting a repair. If the protective cover does not adhere to the device or if there is no glass for the film to adhere to, do not attempt a repair. Devices with this type of damage require a whole unit replacement.

Important:

- Display calibration software requires a publicly released version of iOS. For iPhones running beta or SDK versions of iOS, perform a recovery mode restore before attempting display replacement and calibration.
- Check for bezel damage that would interfere with proper seating of the display assembly. If bezel damage is present, replace the whole unit.



Tools

- Bar code scanner

Steps For Removal

1. Perform the [iPhone 12 and iPhone 12 Pro Open](#) (RP1664) procedure.

Steps For Reassembly

1. Remove all packaging from the replacement display.
2. Use a replacement display and follow the reassembly steps in [iPhone 12 and iPhone 12 Pro Close](#) (RP1718).

3. **For Retail:** Scan the static known bad board serial number or type “OLDSERIALNUMBER” in English when prompted.

If the KBB part is a non-Apple battery, when prompted for the KBB serial number, scan the barcode below or type “OLDSERIALNUMBER” in English. The serial number field isn't case sensitive.



For AASPs: Refer to the “Adding Display Parts to GSX” section of [OP1796: Creating a Carry-In Repair for iPhone display repairs](#).

4. **Important:** The battery, display, and camera procedures are not complete until the System Configuration in AST 2 has been run successfully. The device must be configured with the new component through [System Configuration in AST 2](#) (TP1818).
5. **Important:** Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).

iPhone 12 and iPhone 12 Pro Camera

First Steps

- Perform the [iPhone 12 and iPhone 12 Pro Open](#) (RP1664) procedure.

Important:

- Only Apple-certified technicians should perform this procedure.
- Wear nitrile or lint-free gloves to prevent contamination of the camera lens.
- Avoid touching the TrueDepth cameras and nearby components.
- When entering the serial number for the repair transaction, for iPhone 12 use the serial number of the bottom larger camera and for iPhone 12 Pro use the serial number on the top camera.

iPhone 12 Pro



iPhone 12



Tools

1. Black torque driver (923-0245)
2. Green torque driver (923-00105)
3. Gray torque driver (923-00738)
4. Micro stix bit (923-01290)
5. JCIS bit for crosshead screws (923-0246)
6. ESD-safe tweezers
7. Black stick (922-5065)
8. Nitrile or lint-free gloves



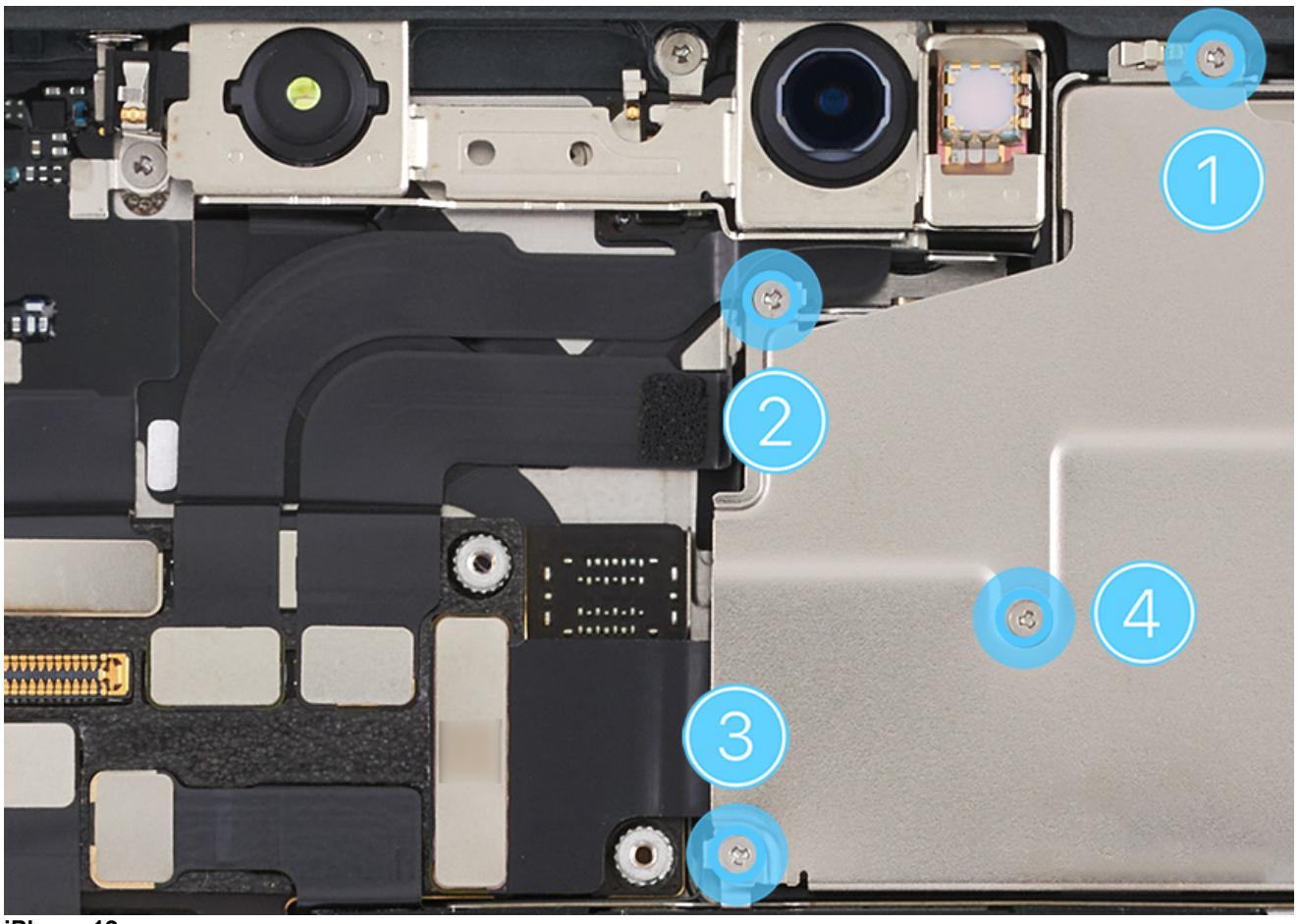
Steps For Removal



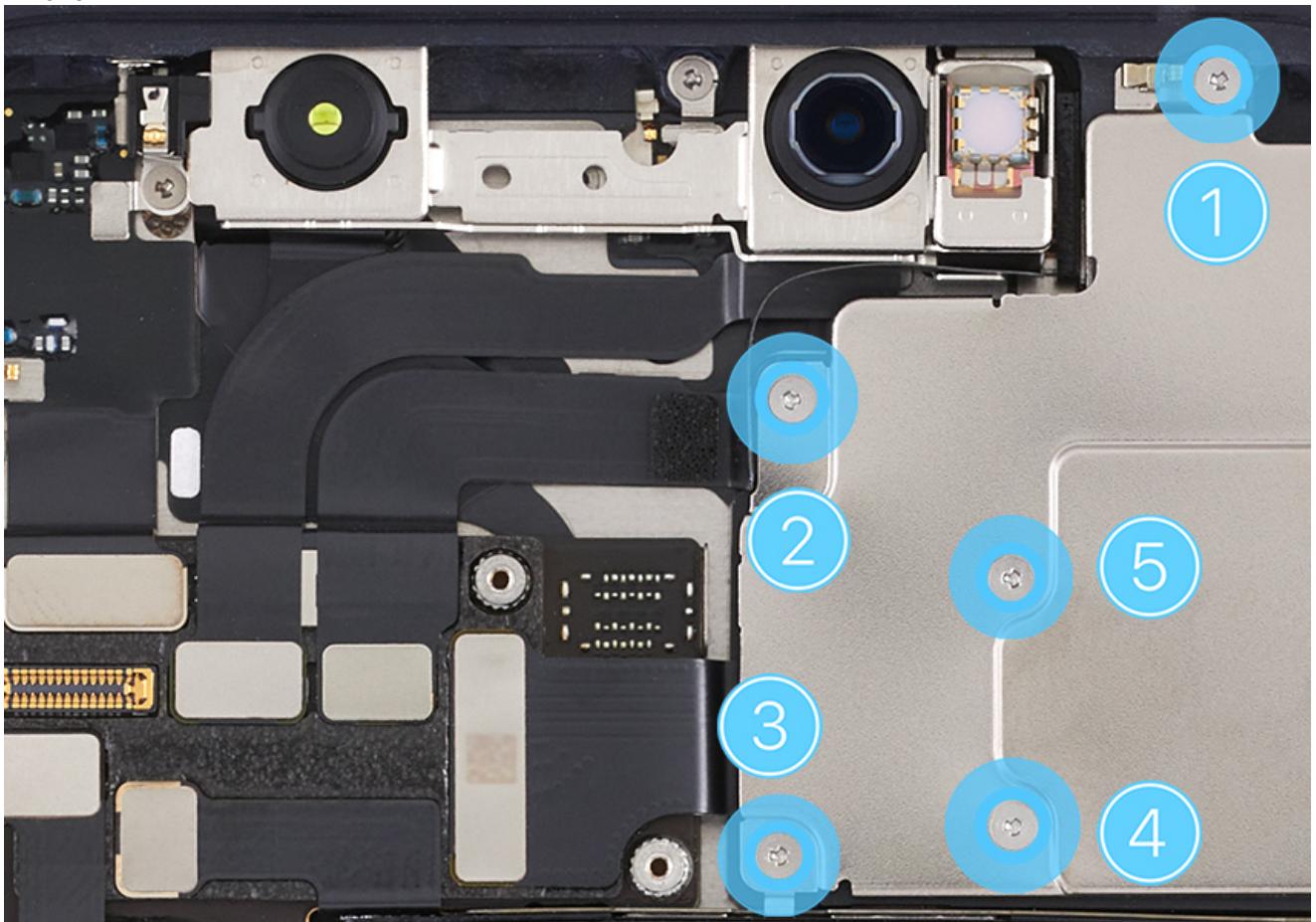
Caution: Never reinstall a screw after it has been removed. Install only new screws. Most iPhone screw grooves are covered in adhesive that can't be reused. Discard screws according to your local recycling guidelines.

Note: With the exception of the camera cowling, the procedure for removing and replacing the camera in iPhone 12 and iPhone 12 Pro is the same. Images are of iPhone 12 Pro.

1. Use the torque driver and Micro stix bit to remove and discard four screws from the iPhone 12 Pro camera cowling and five screws from the iPhone 12 camera cowling in the order pictured.
Important: Avoid touching the TrueDepth camera components and the grounding clips.
iPhone 12 Pro



iPhone 12



2. Use tweezers to remove the cowling and save it for reuse.

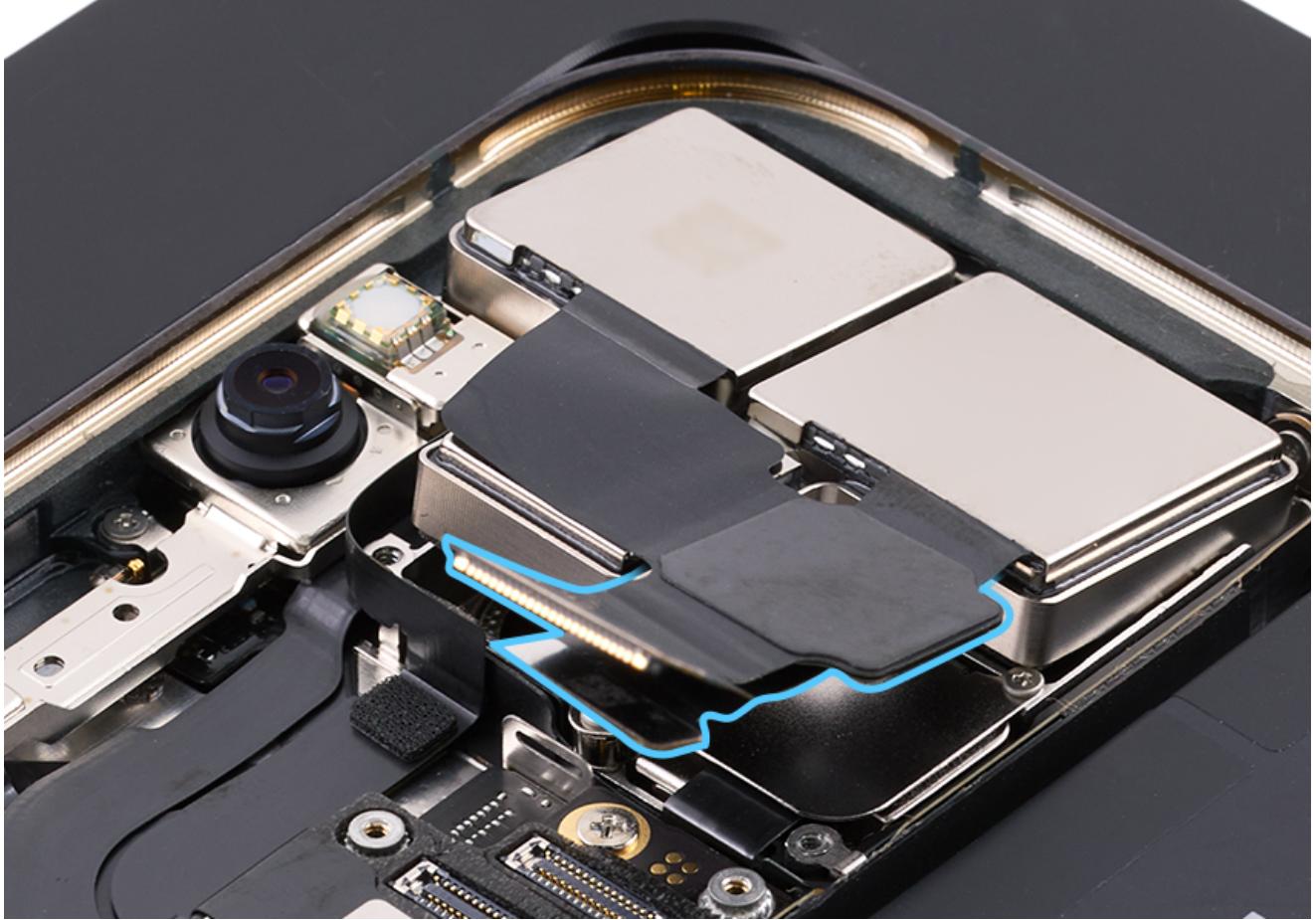


3. Use tweezers to gently disconnect the two flex connectors. Note that one flex connectors covers the other.





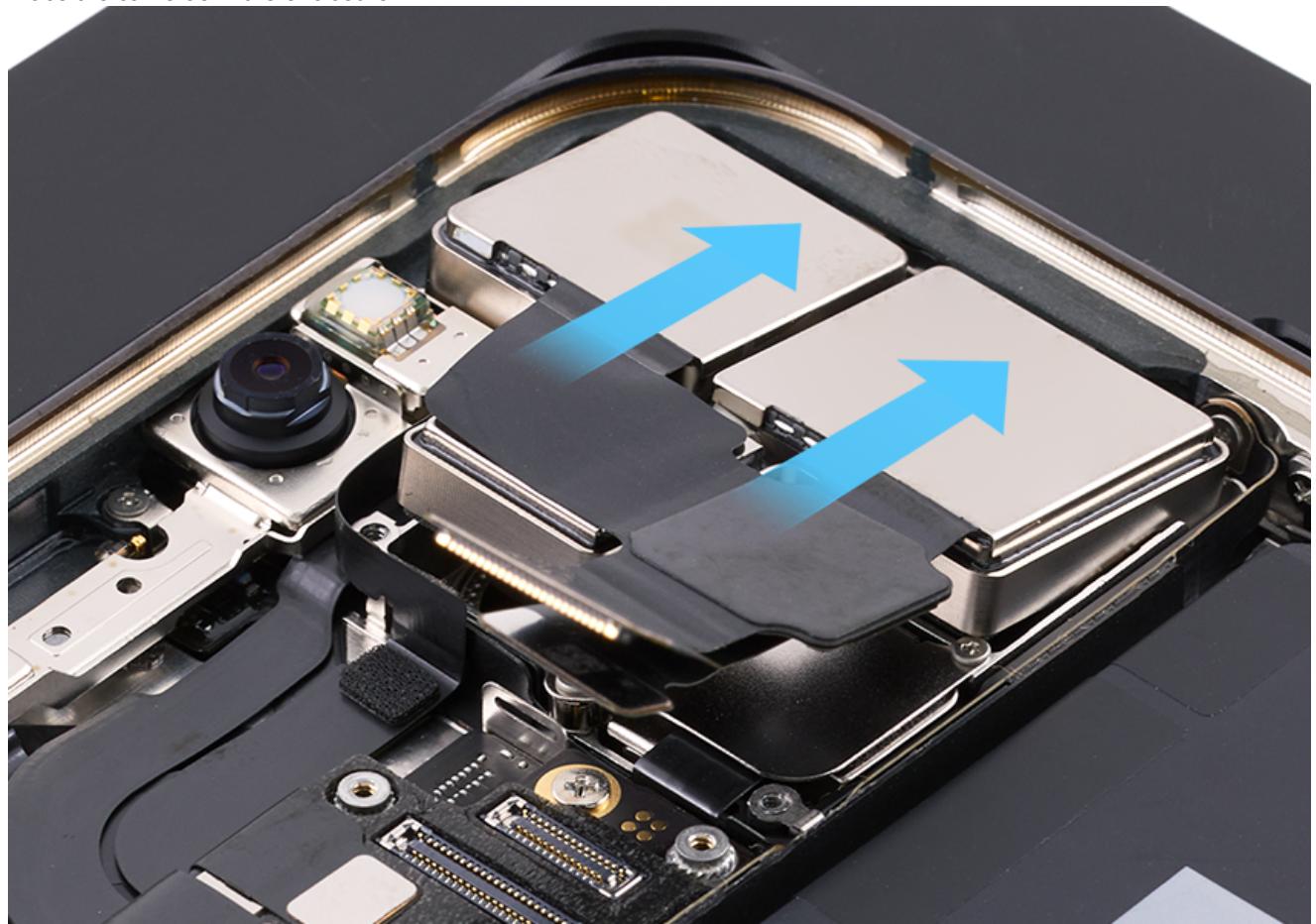
4. Gently hold the flex connectors together and lift the camera out of the enclosure.



Steps For Reassembly

Important: Put on gloves before handling the camera.

1. Keep the camera pointed down as you remove the protective lens cover from the replacement camera to avoid getting dust on the lens.
2. Place the cameras in the enclosure.

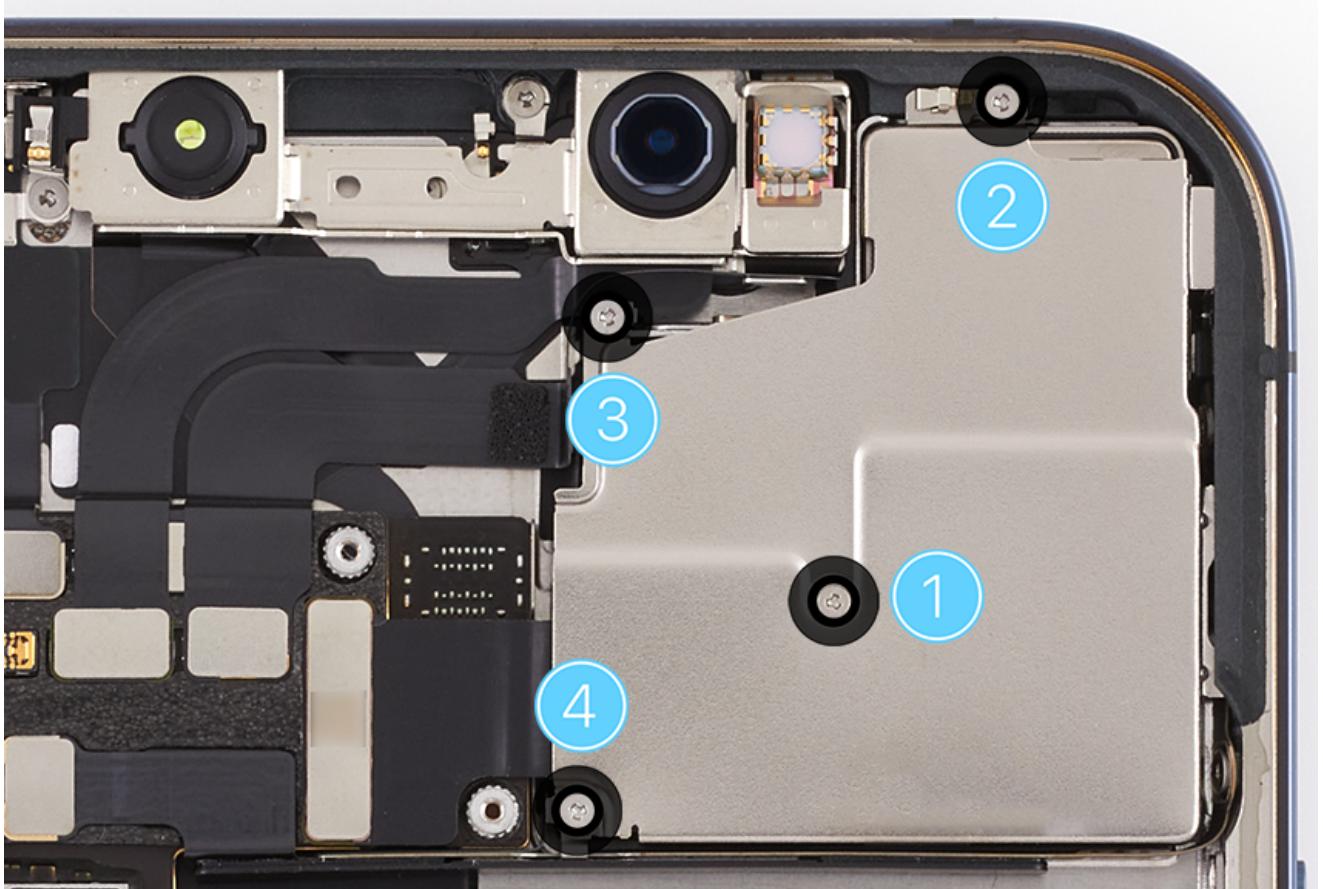


3. Connect the two camera flex connectors to the logic board, bottom connector first.
4. Lightly press on the camera to ensure it is seated properly then use tweezers to reinstall the camera cowling.
Important: Make sure the tabs on the cowling are seated in the slots in the enclosure and the grounding spring is not damaged. If the cowling is not seated correctly it may affect display image quality.

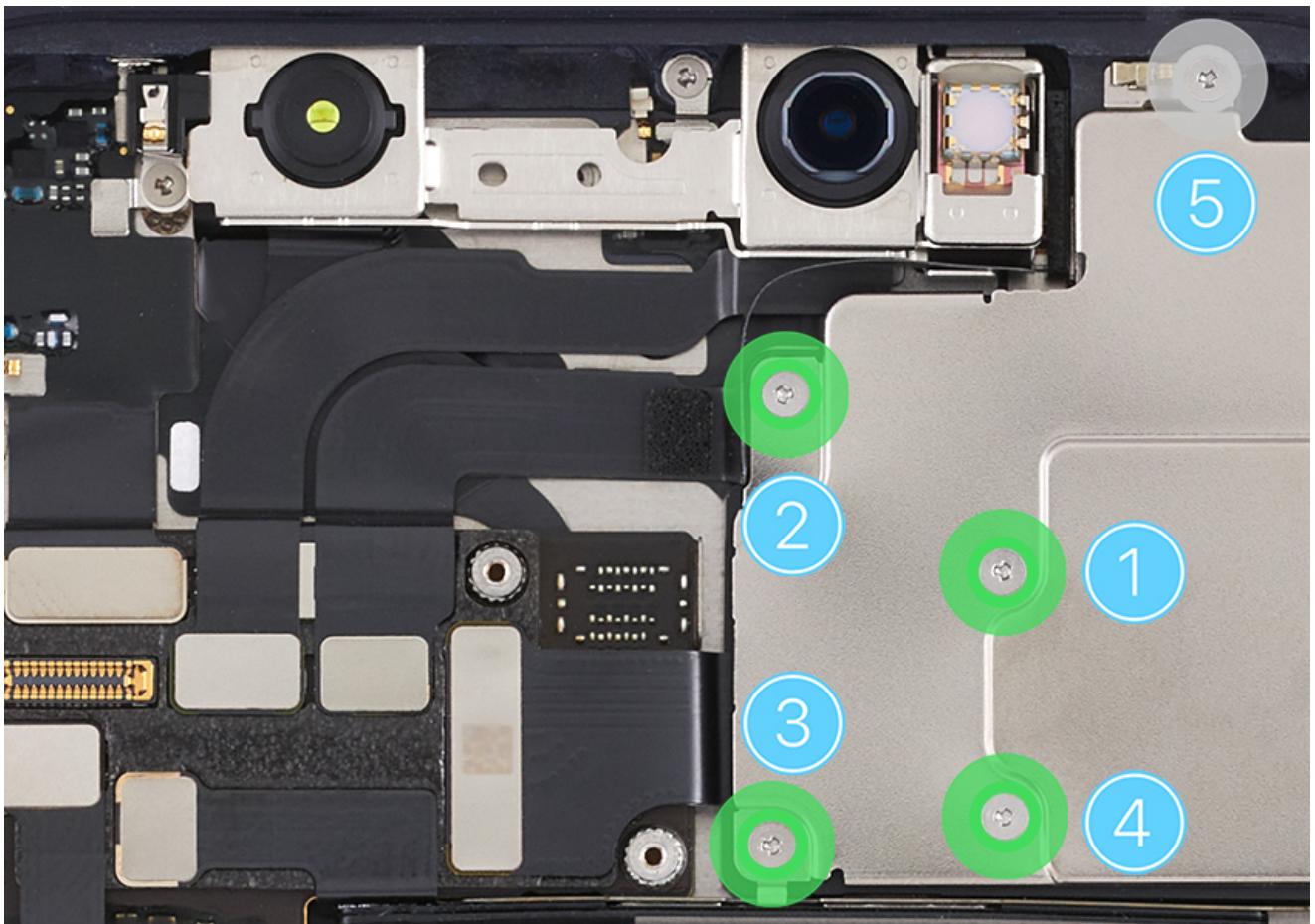




5. For iPhone 12 Pro use the black torque driver and Micro stix bit to install four new Micro stix screws (923-05054, middle) and (923-05055, outer) into the camera cowling.



6. For iPhone 12 use the green torque driver and Micro stix bit to install four new Micro stix screw (923-05068) and use the gray torque driver and JCIS bit to install one cross head screw (923-05069, top).



7. Follow the reassembly steps in the [iPhone 12 and iPhone 12 Pro Close](#) (RP1718) procedure.
8. **Important:** The battery, display, and camera procedures are not complete until the System Configuration in AST 2 has been run successfully. The device must be configured with the new component through [System Configuration in AST 2](#) (TP1818).
9. **Important:** Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).

If the KBB part is a non-Apple battery, when prompted for the KBB serial number, scan the barcode below or type "OLDSERIALNUMBER" in English. The serial number field isn't case sensitive.



iPhone 12 and iPhone 12 Pro Speaker

First Steps

- Perform the [iPhone 12 and iPhone 12 Pro Open](#) (RP1664) procedure.

Important:

- Only Apple-certified technicians should perform this procedure.



Tools

1. Torque driver (green) (923-00105)
2. JCIS bit for crosshead screws (923-0246)
3. ESD-safe tweezers
4. Black stick (922-5065)



Steps For Removal



Caution: Never reinstall a screw after it has been removed. Install only new screws. Most iPhone screw grooves are covered in adhesive that can't be reused. Discard screws according to your local recycling guidelines.

1. Use the torque driver and the JCIS bit to remove four crosshead screws.



2. Use a black stick or your fingers to lift the speaker out of the enclosure.

Steps For Reassembly

1. Check the enclosure to verify the rubber gasket is still in place.



2. If the rubber gasket is out of place or has come out, it is recommended to use tweezers to replace it or realign it.



3. Tilt the speaker slightly and place it into the enclosure. **Caution:** Be careful not to damage the grounding springs on the speaker.



4. Use a green torque driver and JCIS bit to install four new crosshead screws (923-05052).



5. Follow the reassembly steps in the [iPhone 12 and iPhone 12 Pro Close](#) (RP1718) procedure.
6. **Important:** Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).

iPhone 12 and iPhone 12 Pro Taptic Engine

First Steps

- Perform the [iPhone 12 and iPhone 12 Pro Open](#) (RP1664) procedure.
- Remove the [speaker](#) (RP1667).

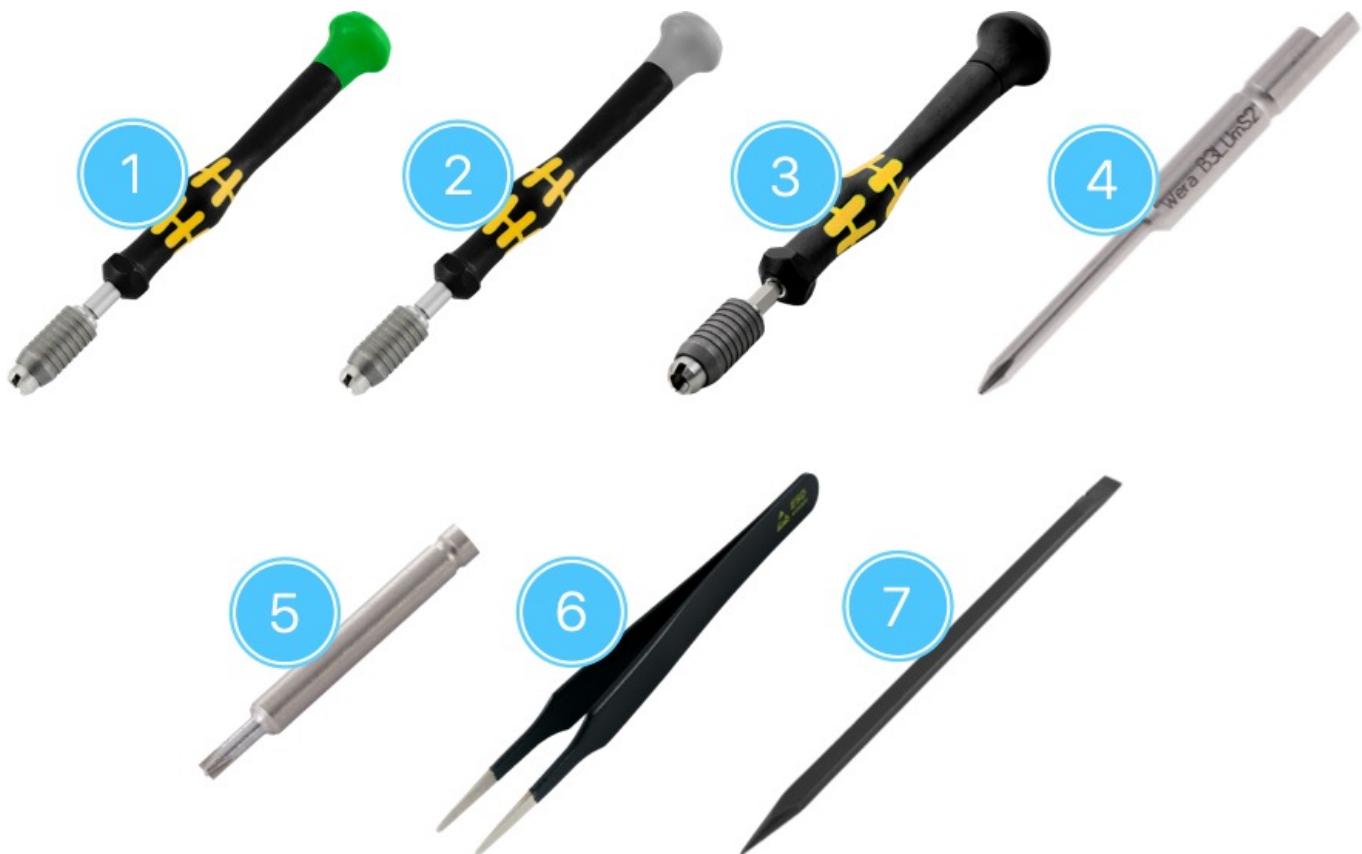
Important: Only Apple-certified technicians should perform this procedure.



Tools

1. Torque driver (green) (923-00105)
2. Torque driver (gray) (923-00738)
3. Torque driver (black) (923-0245)
4. Micro stix bit (923-01290)
5. Superscrew bit (923-02066)

6. ESD-safe tweezers
7. Black stick (922-5065)

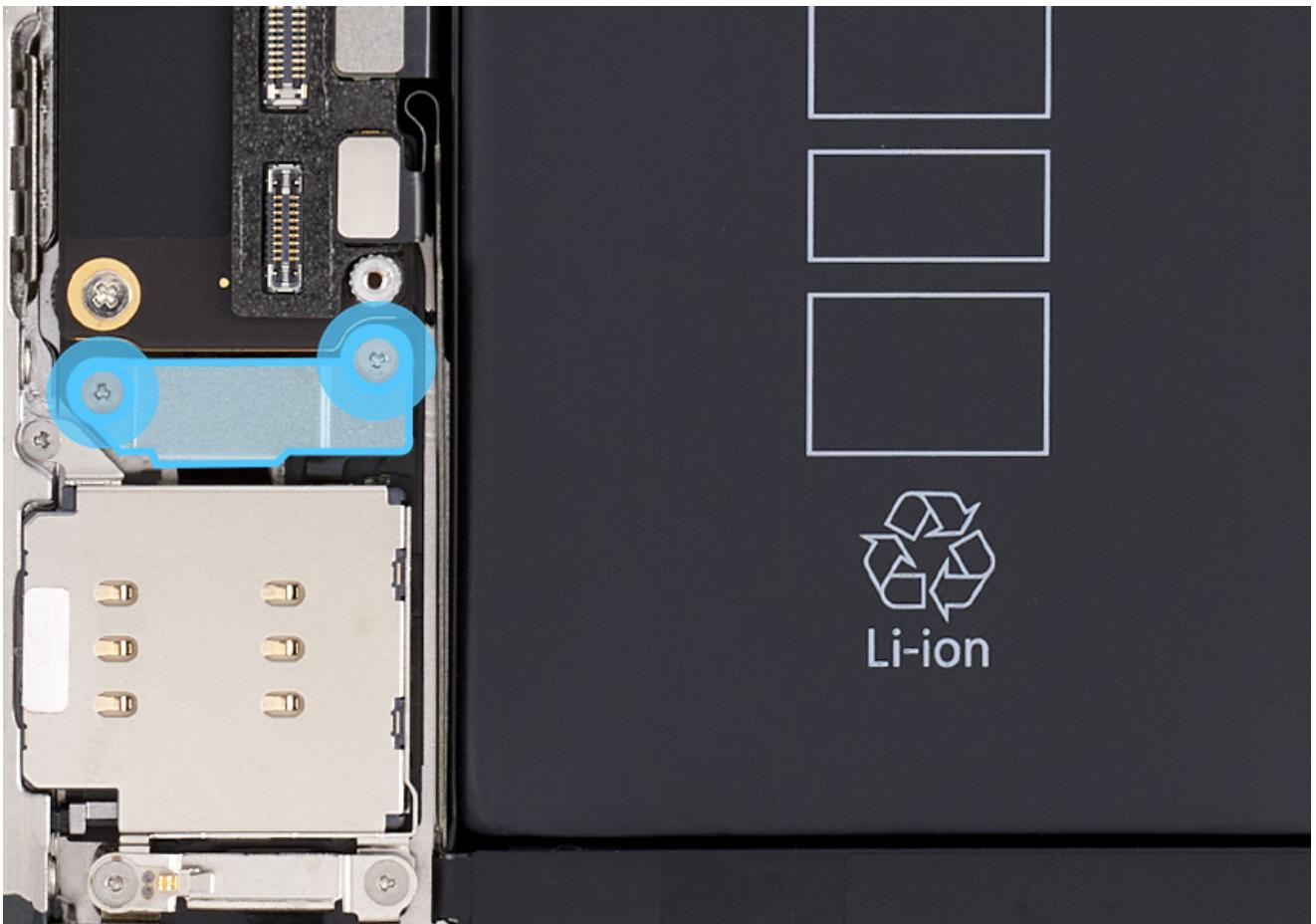


Steps For Removal



Caution: Never reinstall a screw after it has been removed. Install only new screws. Most iPhone screw grooves are covered in adhesive that can't be reused. Discard screws according to your local recycling guidelines.

1. Remove the SIM tray.
2. Use a torque driver and Micro stix bit to remove and discard two screws from the SIM Card Reader cowling.



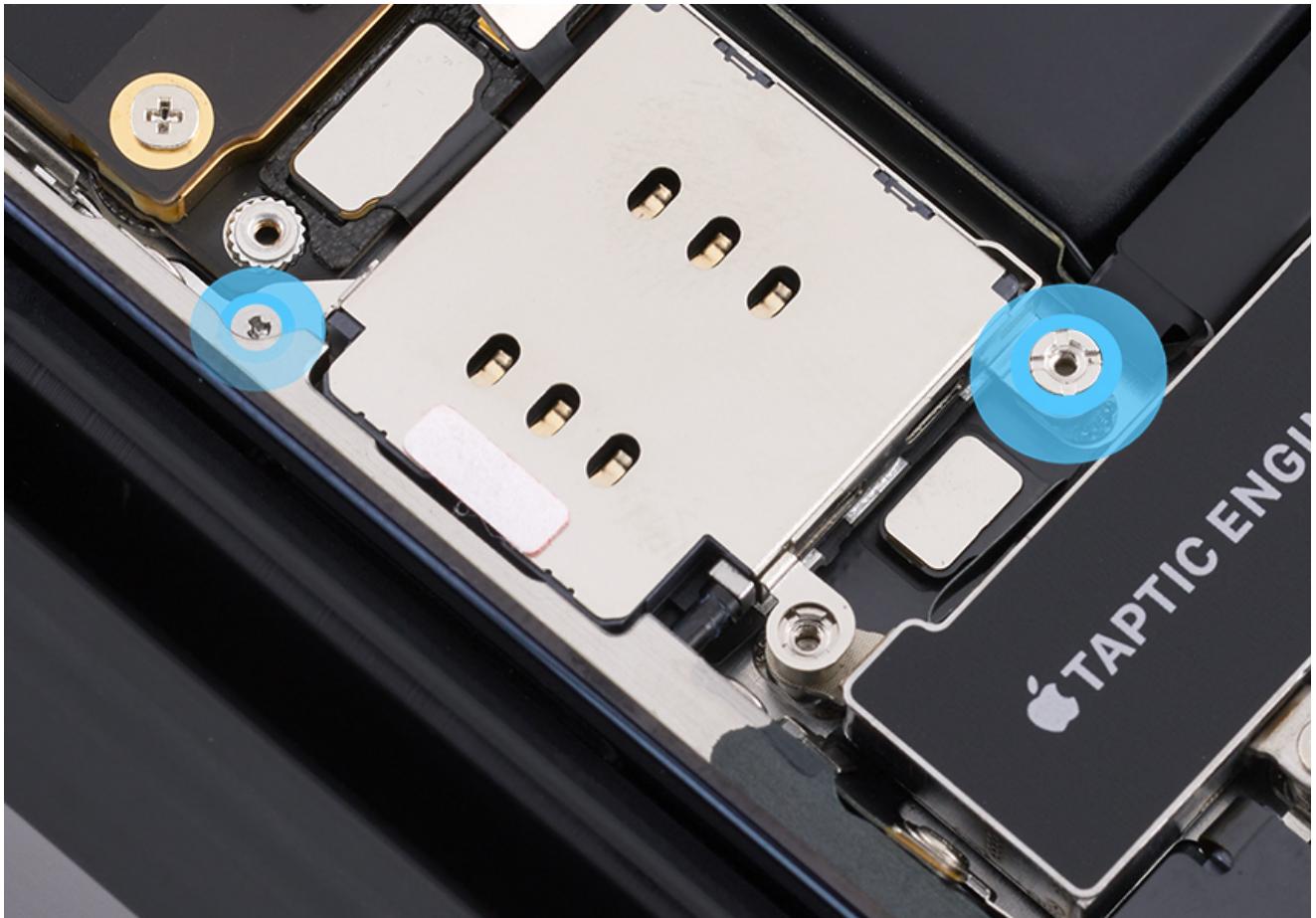
3. Use a torque driver and Micro stix bit to remove and discard two screws from the Taptic Engine cowling.



4. Use tweezers to disconnect the SIM Card Reader flex connector.



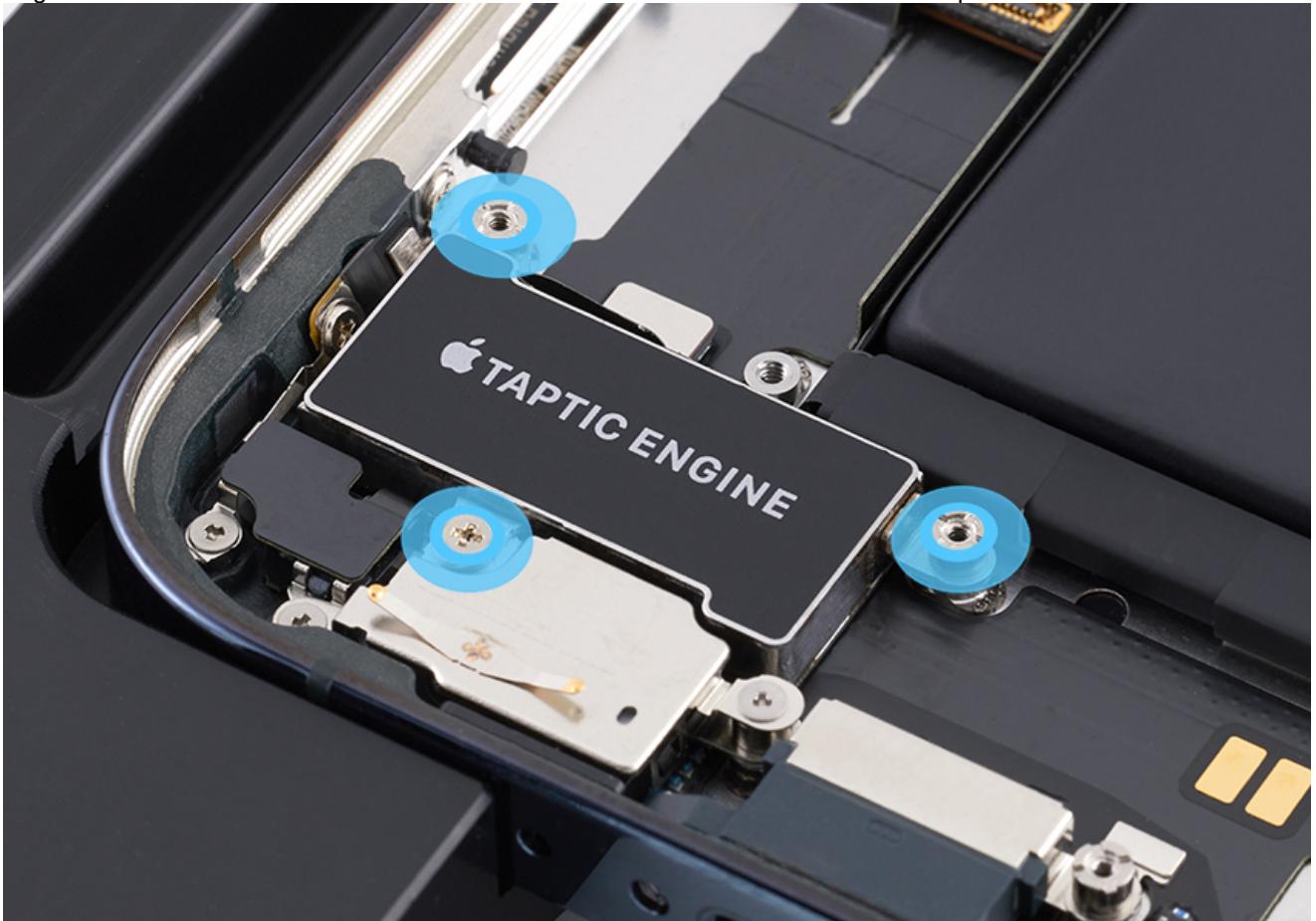
5. Use a torque driver and a Micro stix bit to remove and discard one screw from the upper corner of the SIM Card Reader and use a Superscrew bit to remove and discard one Superscrew from the lower left corner of the SIM Card Reader.



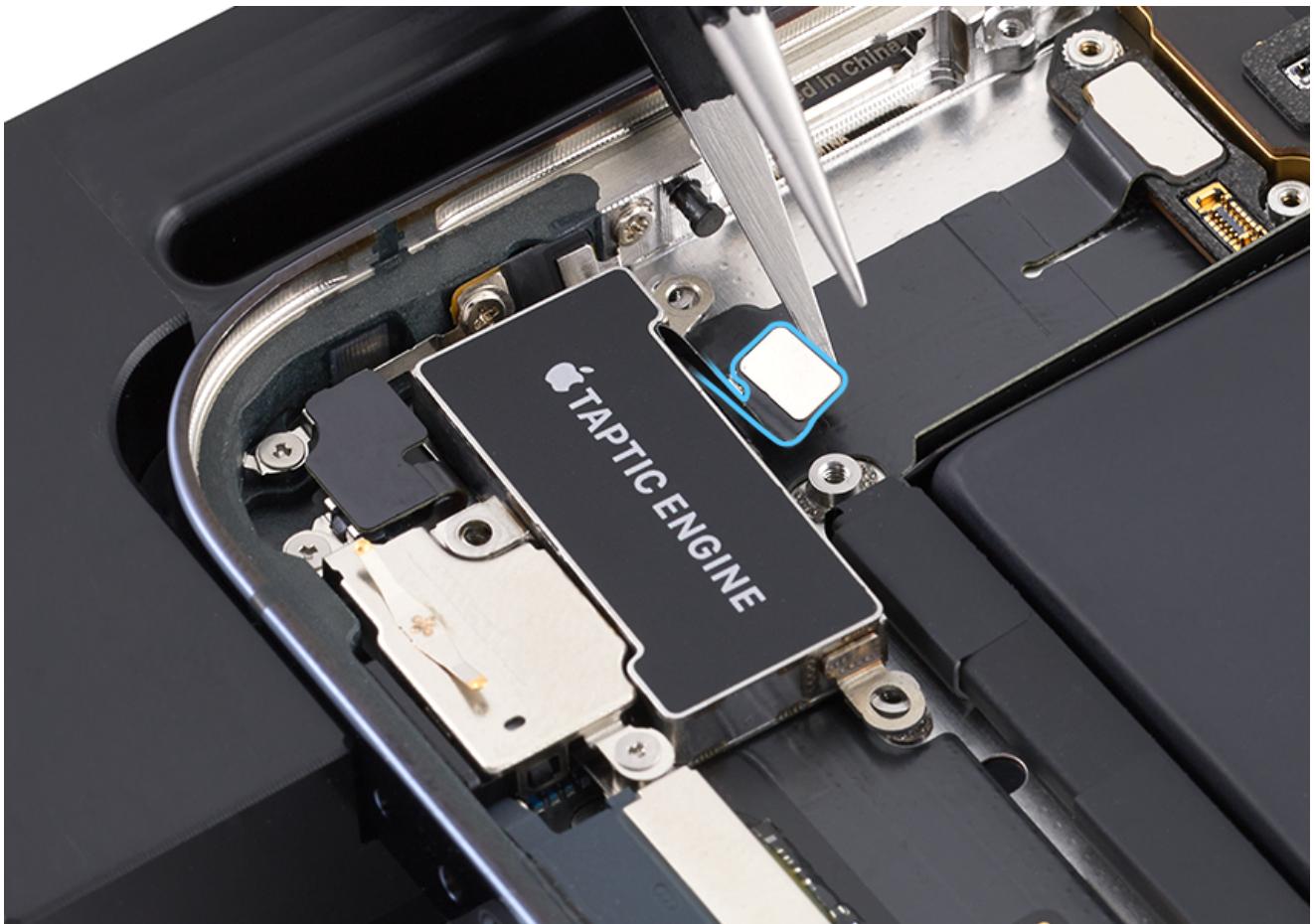
6. Remove the SIM Card Reader.



7. Use a torque driver and a Superscrew bit to remove and discard two Superscrews from the corners of the Taptic Engine and use a JCIS bit to remove and discard one crosshead screw from the middle position.



8. Use tweezers to disconnect the Taptic Engine flex connector.



9. Remove the Taptic Engine.

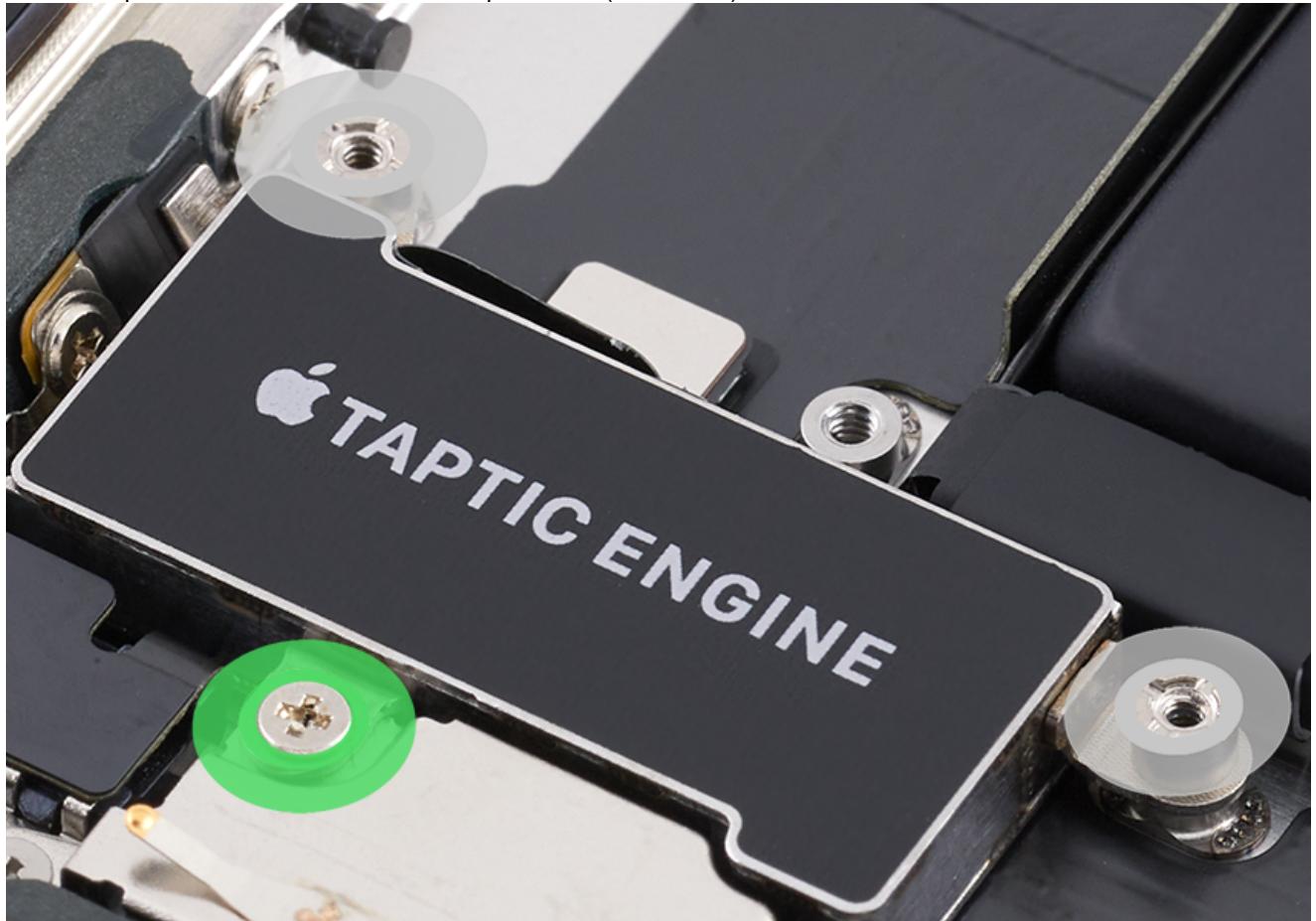
Steps For Reassembly

1. Position the Taptic Engine (923-04979) in the enclosure.
2. Connect the Taptic Engine flex connector.

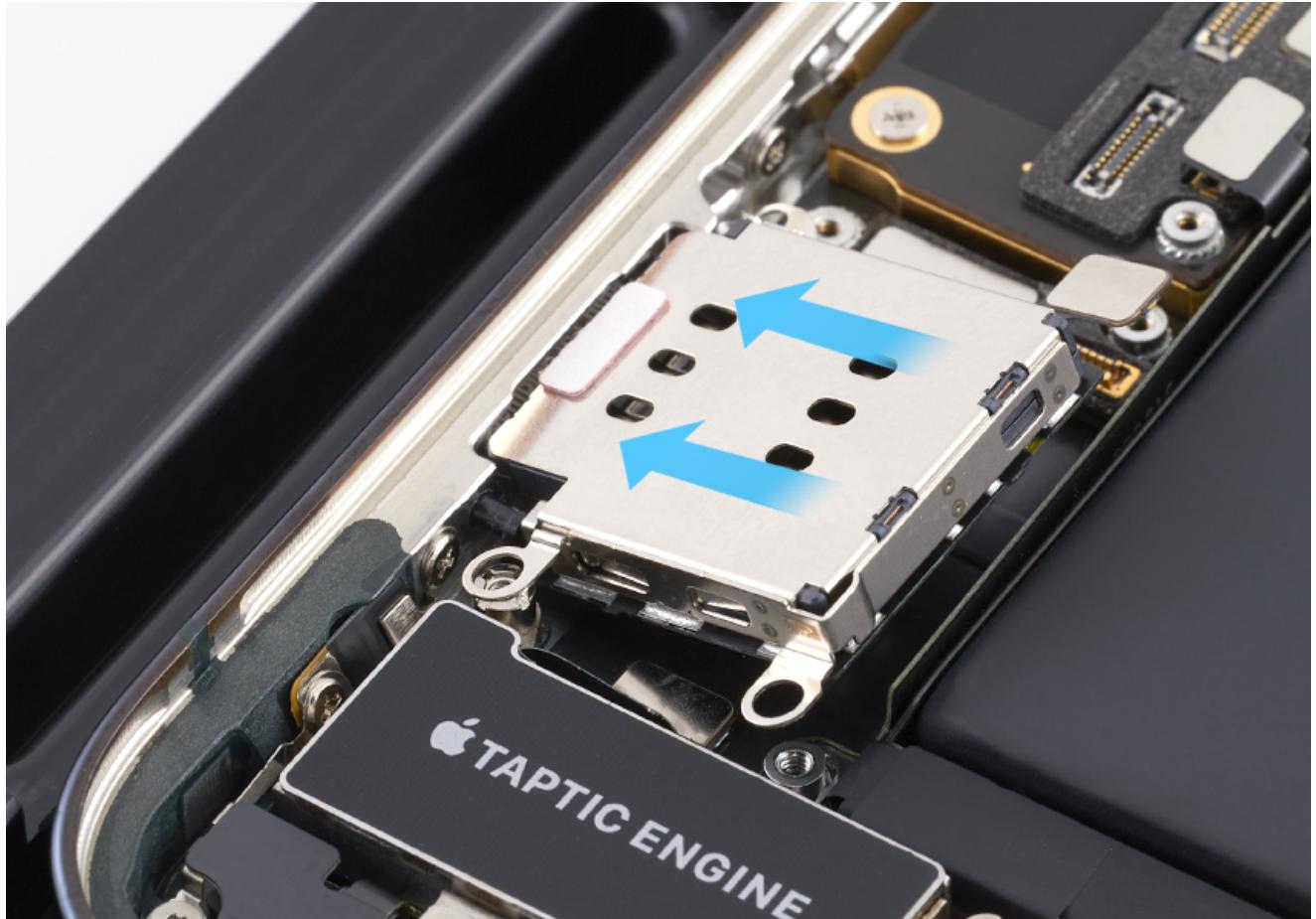


3. Use the green torque driver and JCIS bit to install one new crosshead screw (923-04981). Use the gray torque driver

and the Superscrew bit to install two new Superscrews (923-04980).



4. Reinstall the SIM Card Reader.



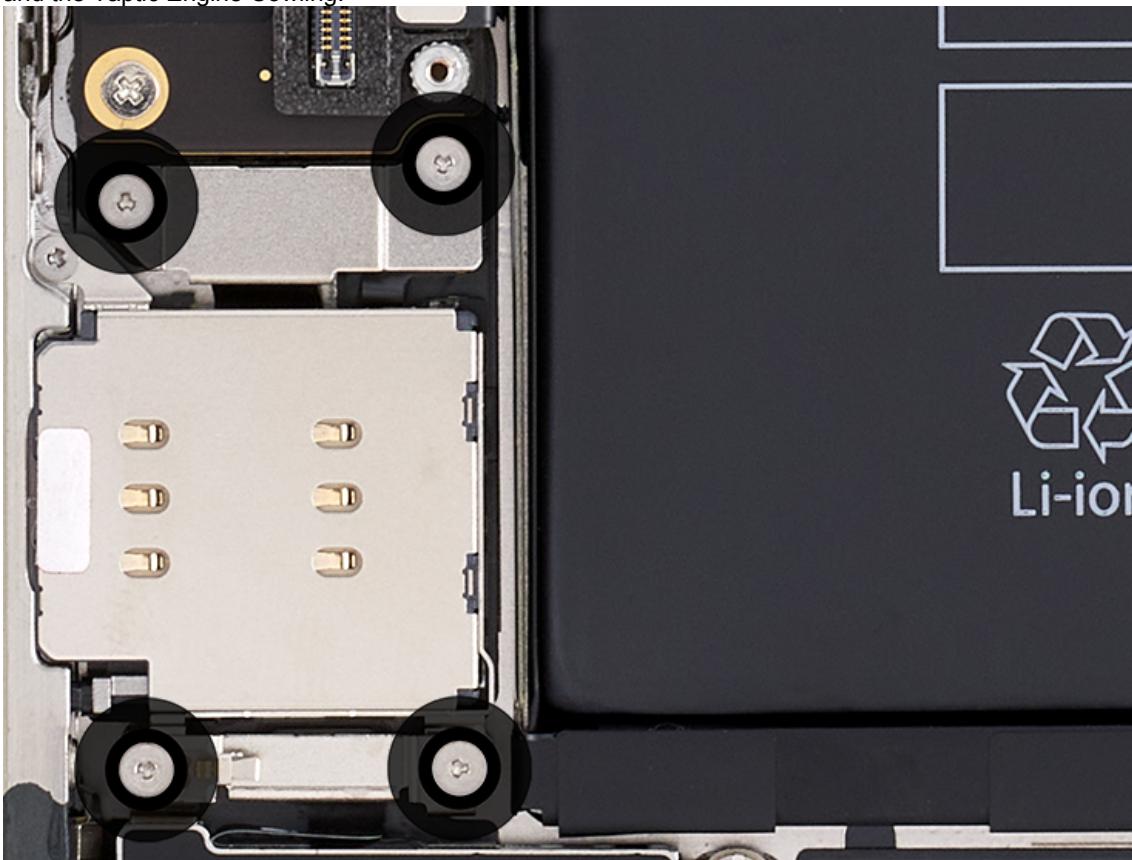
5. Use the black torque driver and Micro stix bit to install a new screw (923-04982) in the upper left corner of the SIM Card Reader. Use the gray torque driver and Superscrew bit to install a new screw (923-04980) in the lower right corner of the SIM Card Reader. Connect the SIM Card Reader flex connector.



6. Verify the grounding spring on the Taptic Engine Cowling is not damaged.



7. Use a black torque driver and the Micro stix bit to install four new screws (923-04978) in the SIM Card Reader cowling and the Taptic Engine Cowling.



8. Reinstall the [speaker](#).

9. Follow the reassembly steps in the [iPhone 12 and iPhone 12 Pro Close](#) (RP1718) procedure.

10. Reinstall the SIM tray.

11. **Important:** Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).

iPhone 12 and iPhone 12 Pro Battery

First Steps

Important: Only Apple-certified technicians should perform this procedure.

Select locations only: This procedure is only for locations with Carry-In Repair enabled for select model iPhone display and battery repairs.

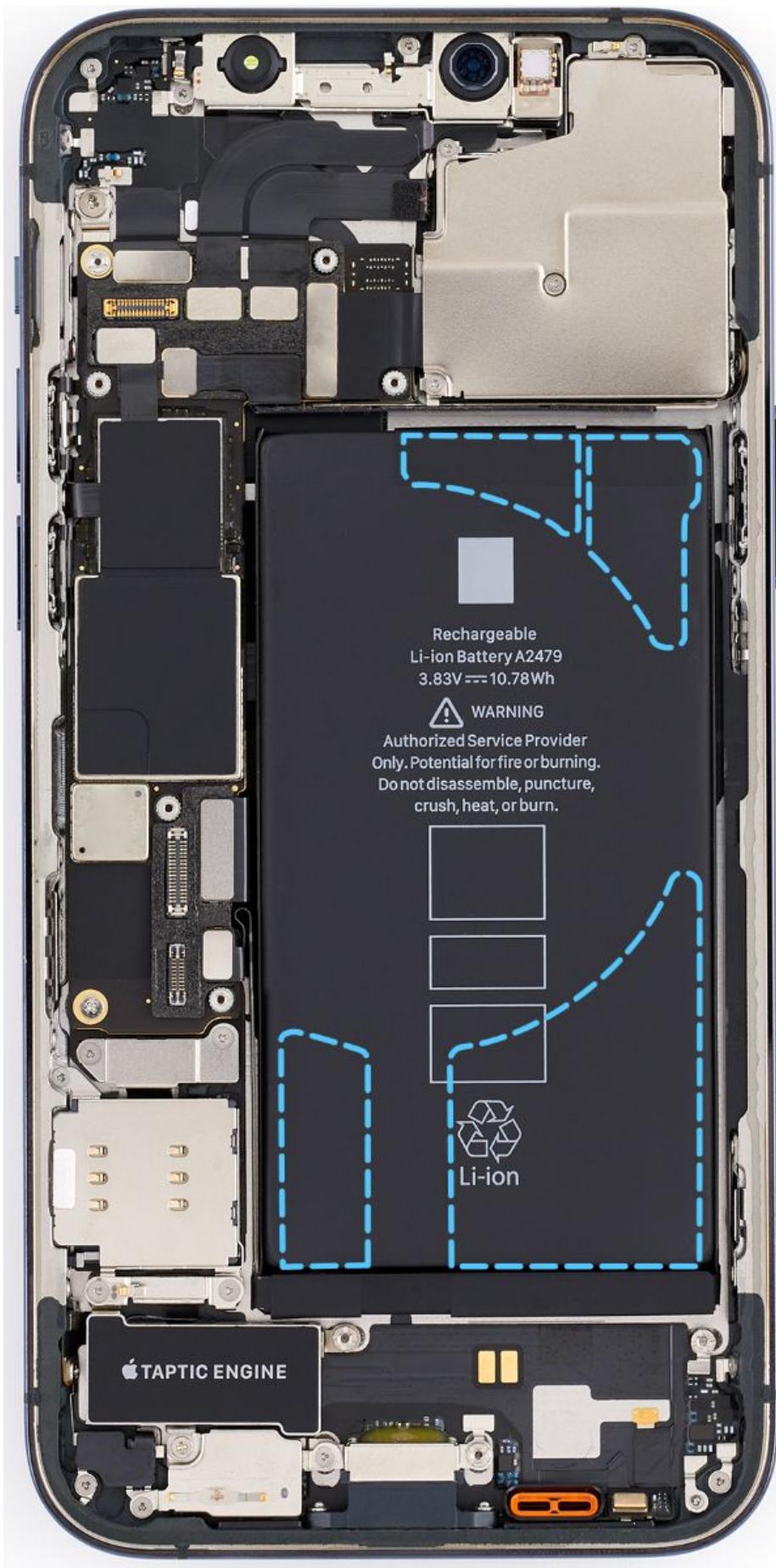


Warning:

- Review [iPhone Safety](#) (TP328).
- Perform the [iPhone 12 and iPhone 12 Pro Open](#) (RP1664) procedure.
 - If the device contains a non-Apple battery, first refer to [Battery Discharge Procedure](#) (TP1729).
 - If the battery is dented, punctured, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Reassemble and replace the whole unit. Refer to [iPhone Safety](#) (TP328).
 - Do not reuse or reinstall a loose battery or a battery that has been removed. Replace it with a new battery. If a new battery is unavailable, replace the whole unit.
- Remove the [speaker](#) (RP1667).



Location of battery adhesive



Tools

1. ESD-safe tweezers
2. Black stick (922-5065)
3. Gray torque driver (923-00738)

4. Super screw bit (923-02066)
5. Isopropyl alcohol (IPA) wipes
6. Repair tray (923-04908)
7. iPhone Battery Fixture (923-02657)
8. Nitrile or lint-free gloves



Steps For Removal



Caution: Never reinstall a screw after it has been removed. Install only new screws. Most iPhone screw grooves are covered in adhesive that can't be reused. Discard screws according to your local recycling guidelines.

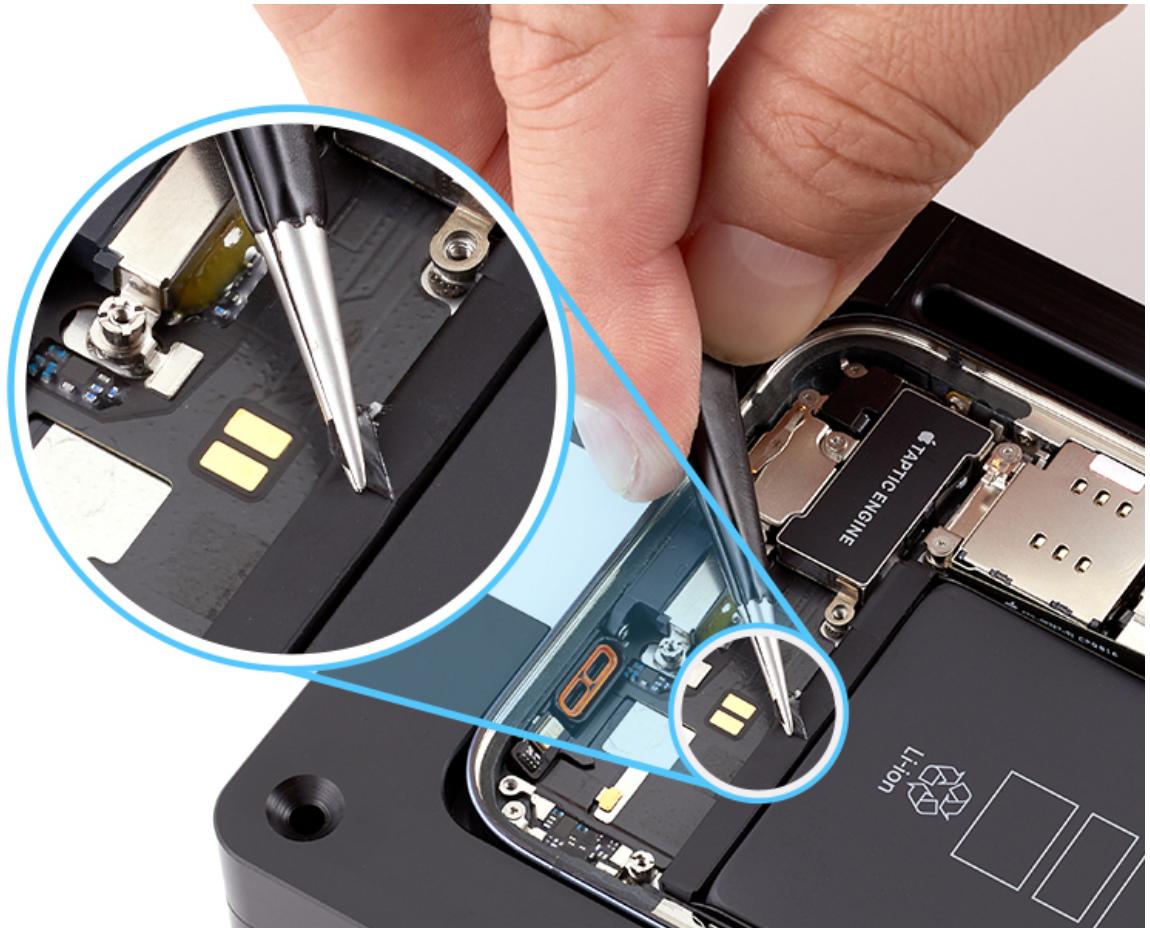
1. Remove and discard one Superscrew from the upper right corner of the Taptic Engine.



2. Locate the four battery adhesive tabs.



3. Start with the bottom right tab, and use tweezers to gently lift the battery adhesive tabs from the battery.

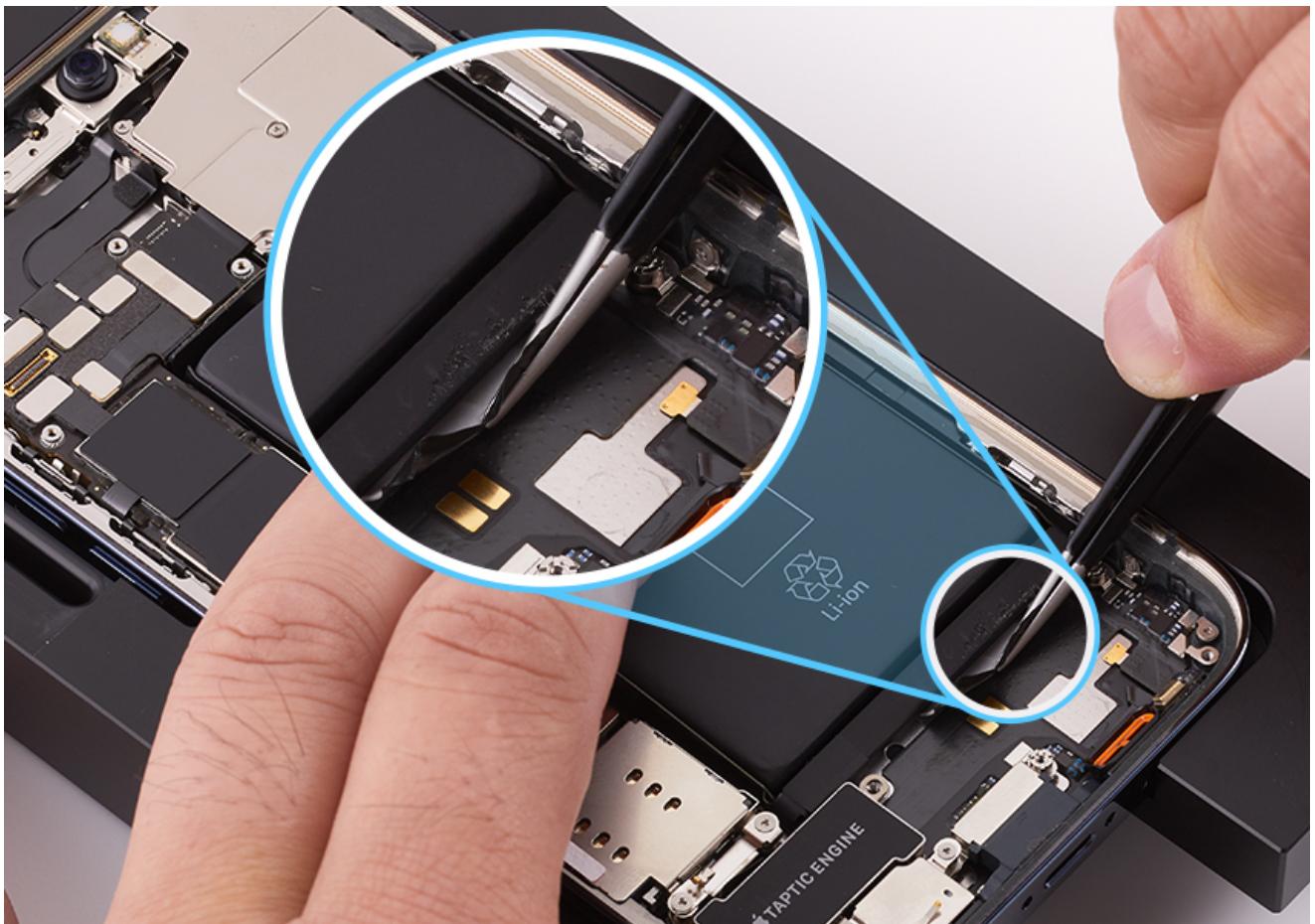


4. Hold down the battery with one hand and use the ESD-safe tweezers to grasp the battery adhesive tab.

Use the tweezers to peel the battery adhesive away from the battery.



5. Grip the adhesive tab with the tweezers and separate the battery tab completely from the battery before starting to roll the adhesive.



6. Keep the tweezers close and parallel to the battery and twist until you see white adhesive on the tweezers.
Important: Make sure the white adhesive is wrapped around the tweezer before beginning to pull.

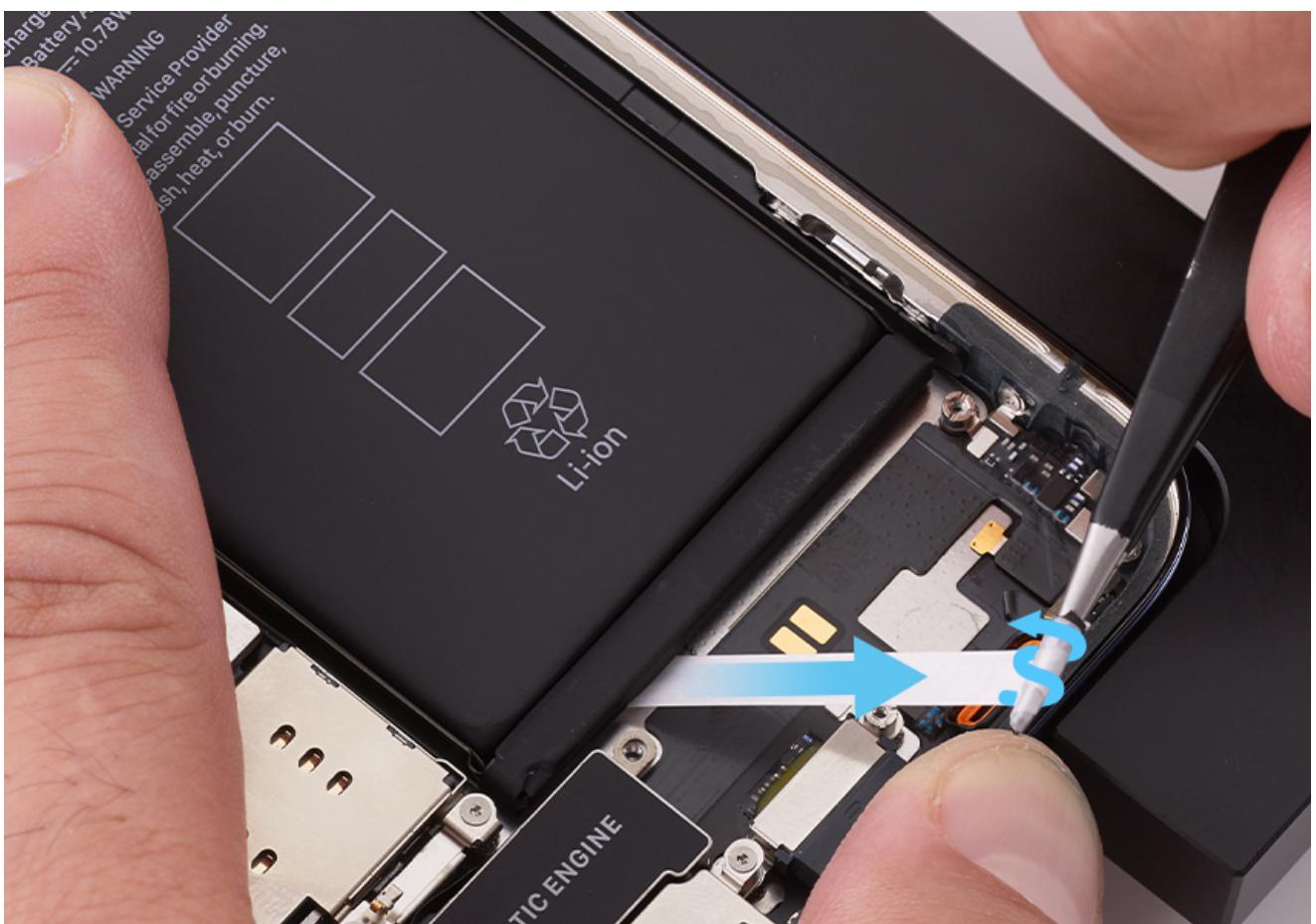


7. Extend the tweezers and stretch the adhesive outward. Continue to twirl and pull until the adhesive releases.
Important: Avoid pulling the adhesive strips against components or screws.

Note: If a battery adhesive strip breaks, then use ESD-safe tweezers to try to retrieve it. If the battery adhesive strip cannot be retrieved, then attempt to remove the remaining ones.



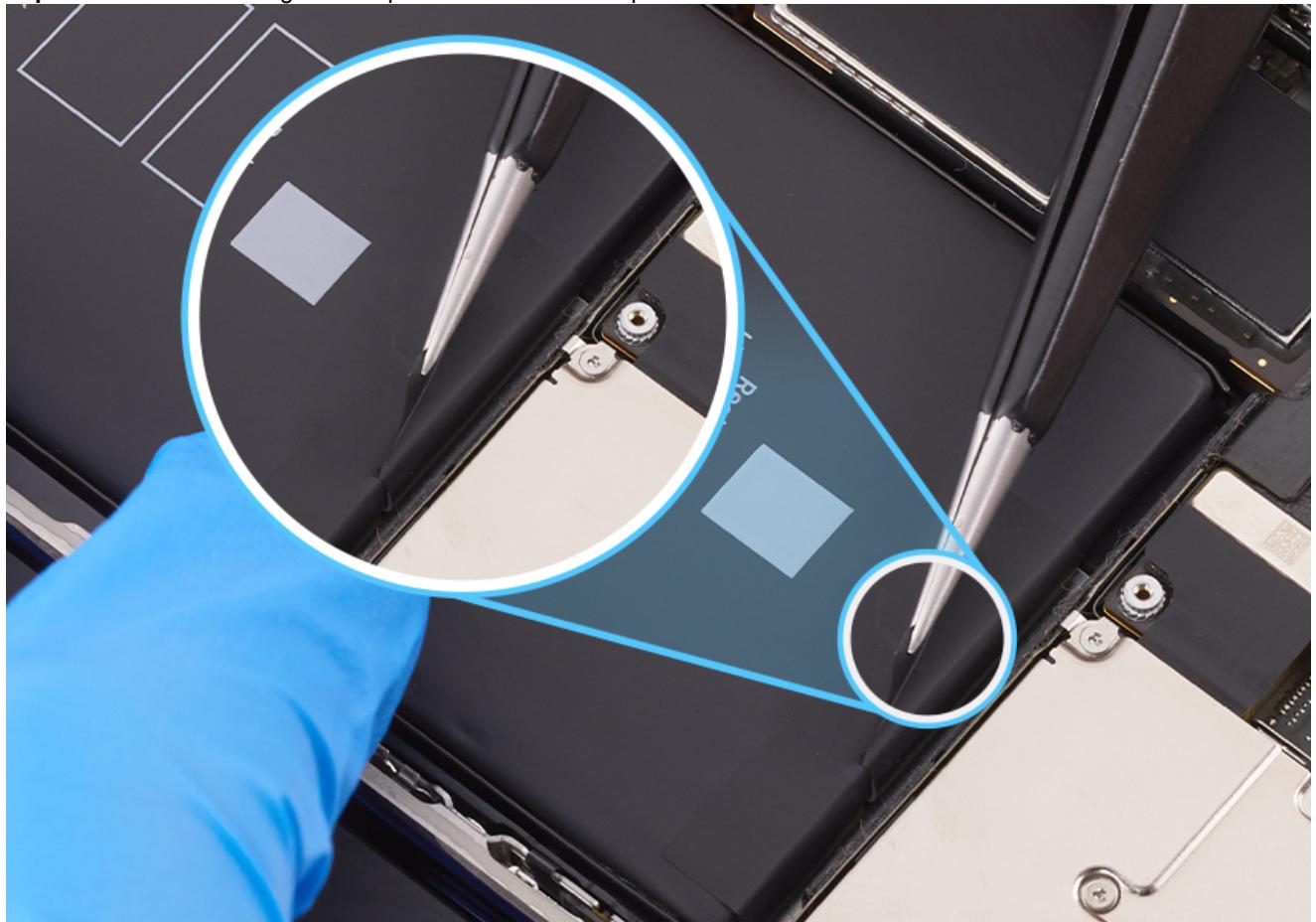
8. Repeat the same twist and pull movements on the lower left adhesive tab. **Important:** Pull the lower left tab at an angle to avoid catching the strip on any components. Continue until adhesive releases.
Note: If a battery adhesive strip breaks, then use ESD-safe tweezers to try to retrieve it. If the battery adhesive strip cannot be retrieved, then attempt to remove the remaining ones.



9. Put on nitrile or lint-free gloves and repeat the process with the top battery tabs. Gently peel the battery adhesive tabs

from the battery. Once they are peeled up, use ESD-safe tweezers to carefully wrap the adhesive around the tip of the tweezers.

Important: Avoid touching the components of the TrueDepth cameras.



- Keep the tweezers in the channel while you twirl the adhesive in place until you reach the end of the adhesive strip.





Warning: Don't use tools to pry up the battery. If adhesive strips break and can't be retrieved, replace the whole unit.

11. Remove the battery from the enclosure.

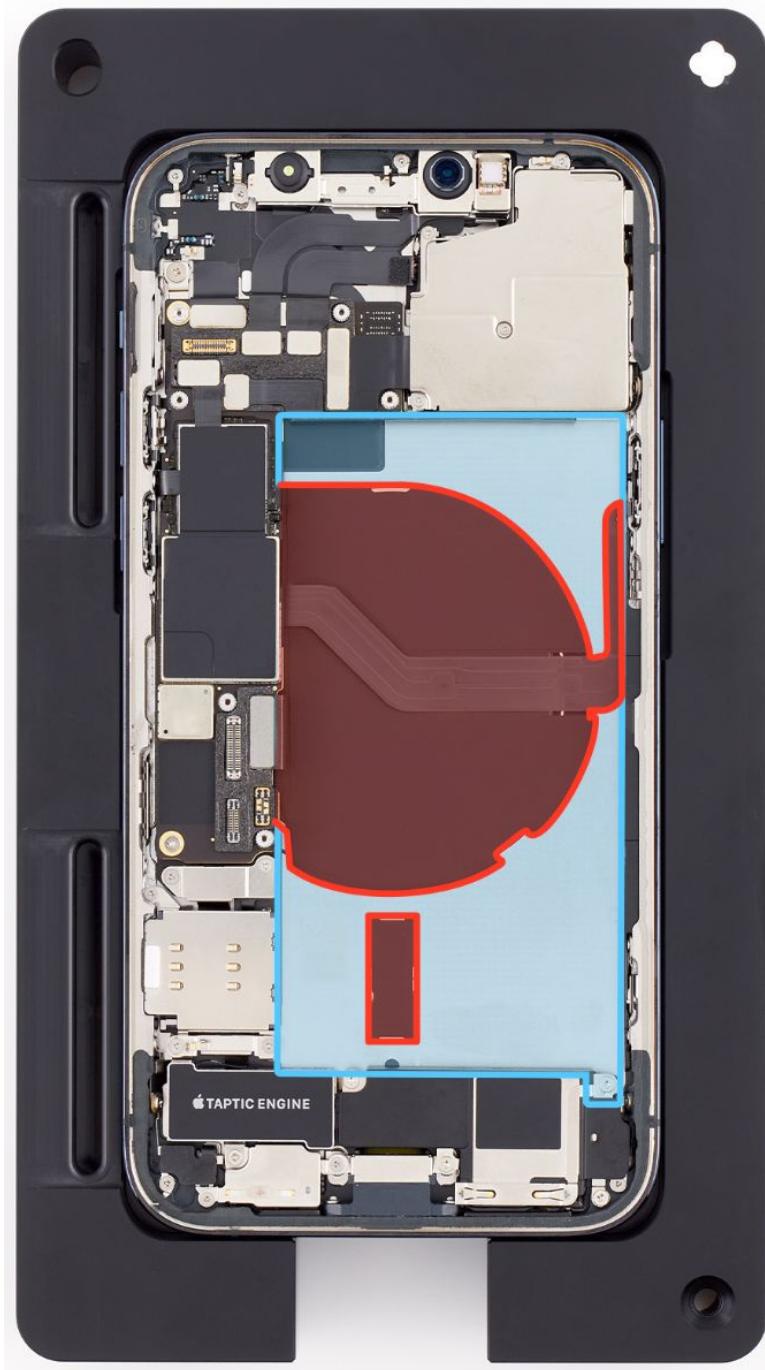
Steps For Reassembly

1. Reinstall the [speaker](#) (RP1667).
2. Use a gray torque driver and a Superscrew bit to install a new Superscrew (923-04980) into the upper right corner of the Taptic Engine.
3. Use IPA wipes on the area marked in blue in the image below to remove any remaining adhesive from the enclosure underneath the battery.

Important: Avoid the wireless charging unit outlined in the red as IPA wipes may damage the Mylar.



Caution: Check that no screws have become attached to the circle marked in red before replacing the battery.



4. Peel the pink release liner from the battery to expose the adhesive that will attach to the enclosure. Do not remove the

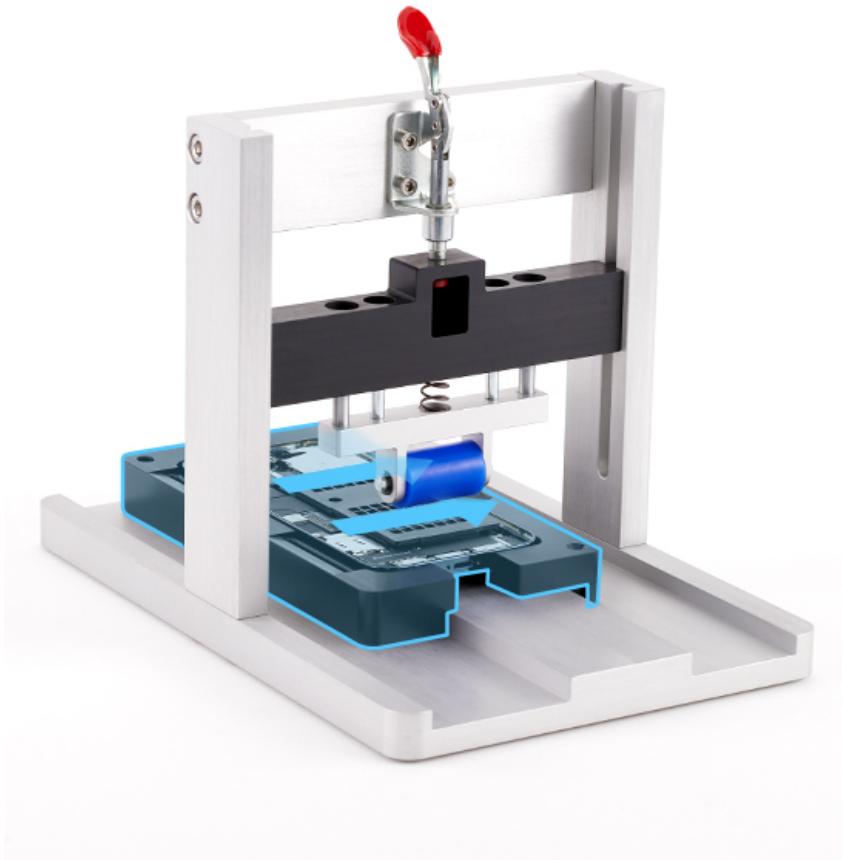
protective cover.



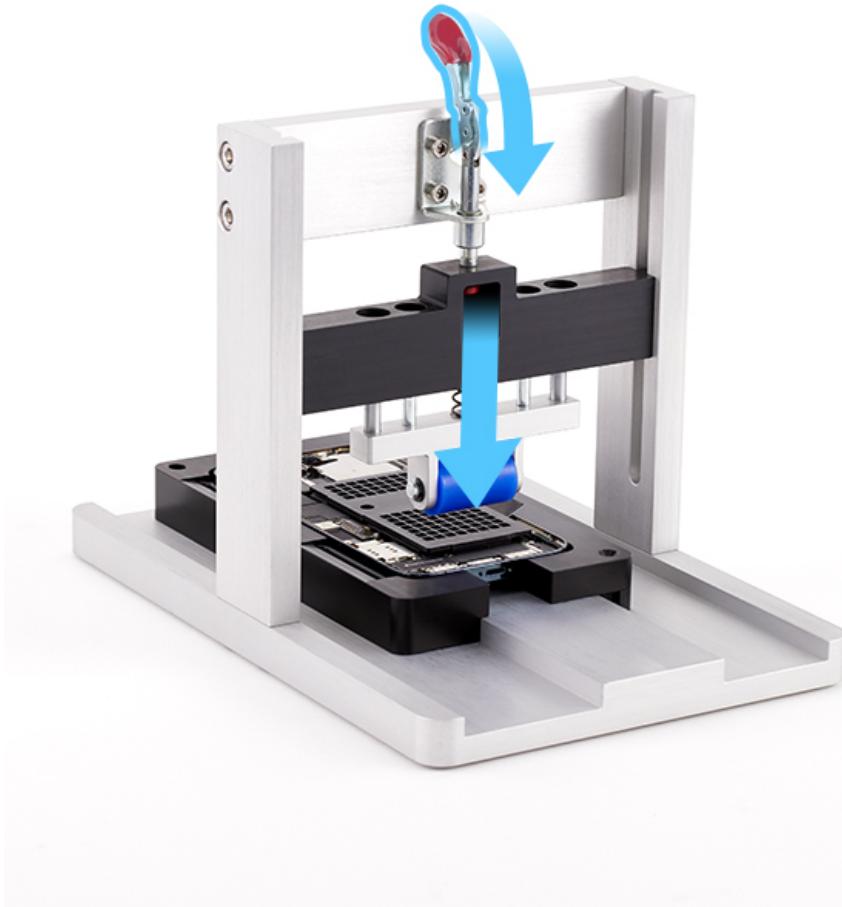
- Position the battery in the enclosure without adhering it to the enclosure. Align the battery cap to the top of the Speaker first (1) and then to the logic board (2). Then lower the battery into the enclosure.



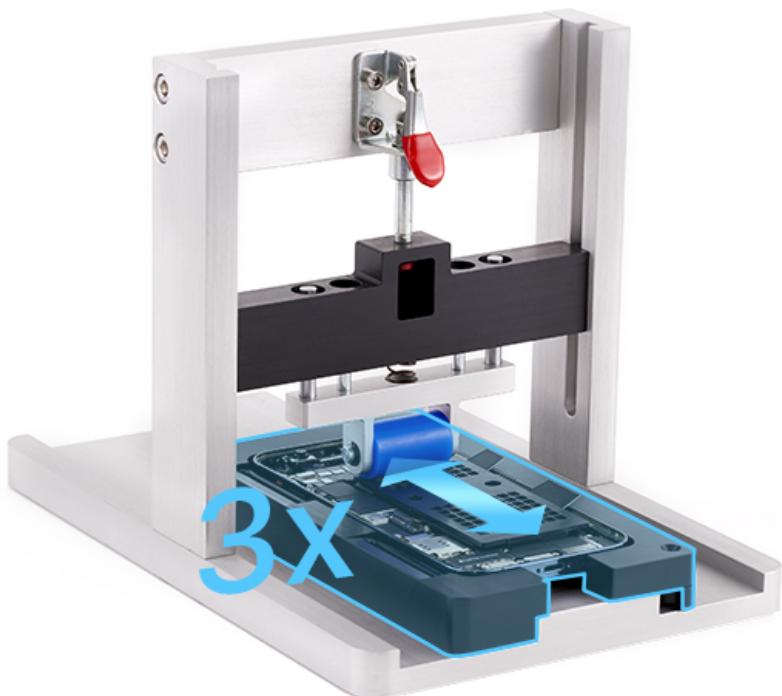
- Place the iPhone in the repair tray into the battery fixture. Align the left slot on the repair tray with the pin on the fixture.



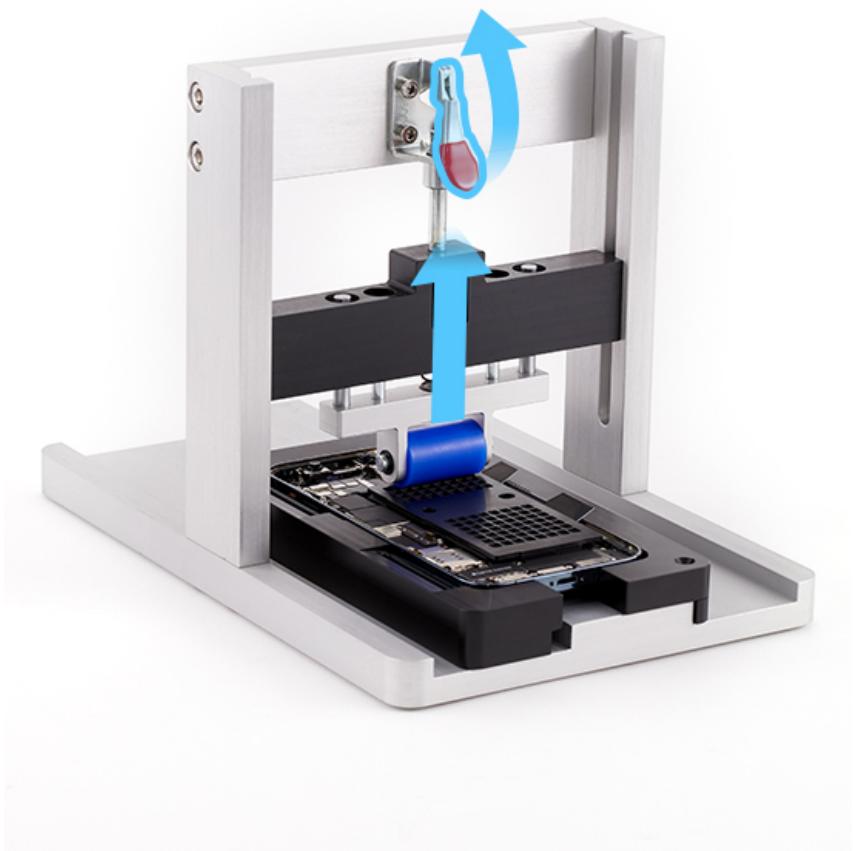
7. Lower the red lever to move the pressure roller into place above the battery.



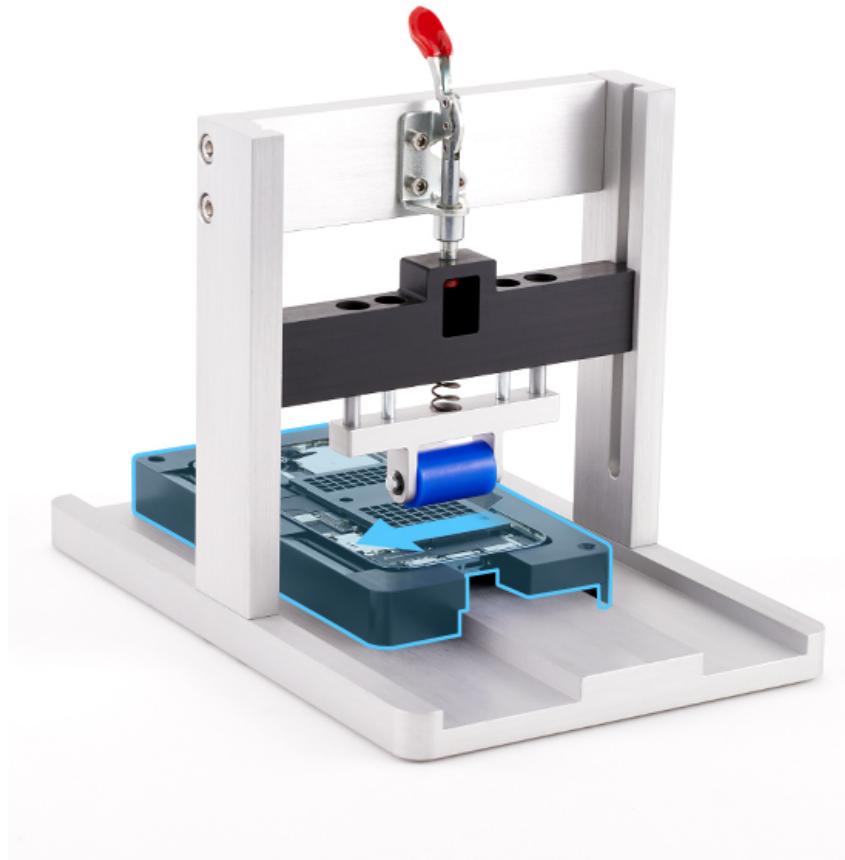
8. Slide the repair tray back and forth through the battery fixture three times to adhere the battery to the enclosure.



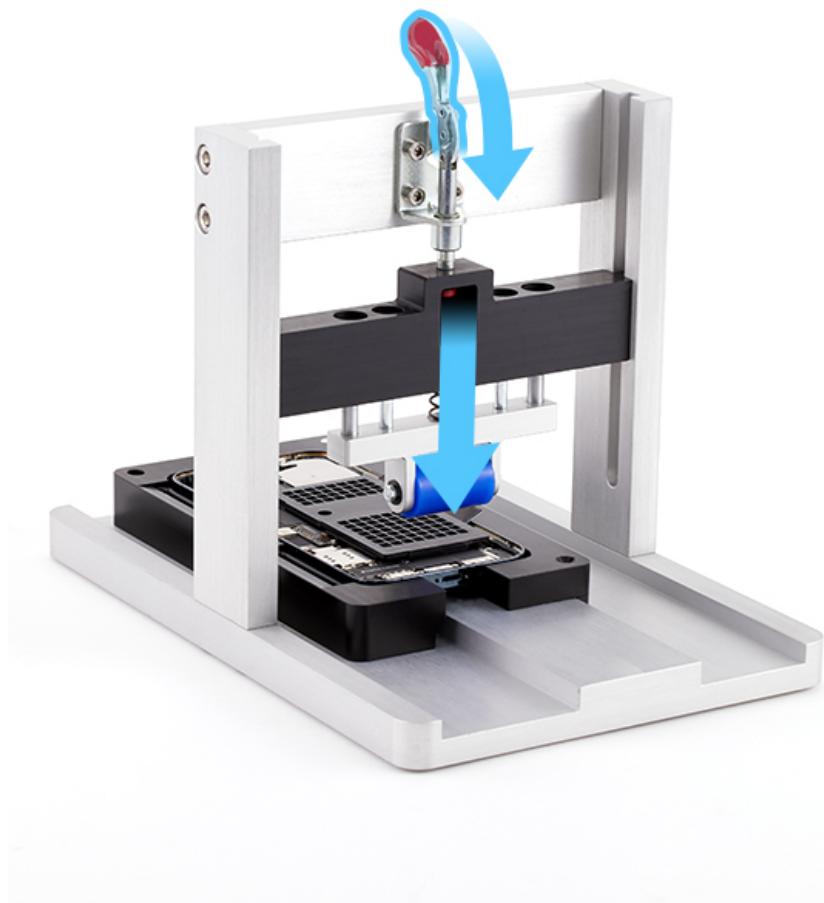
9. Raise the red lever.



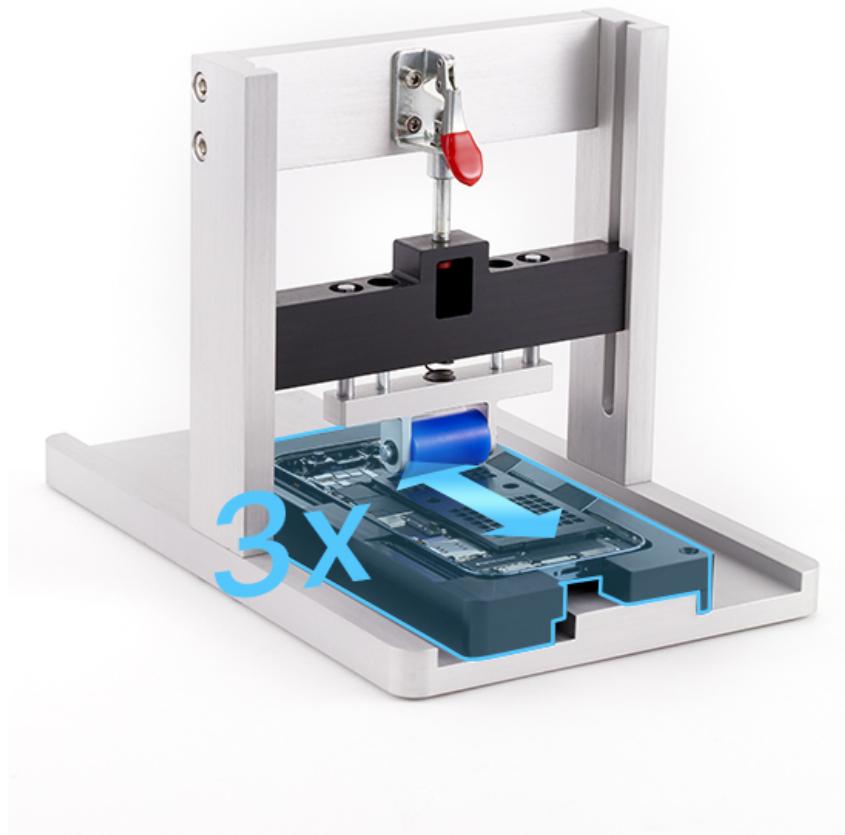
10. Move the repair tray to the next slot.



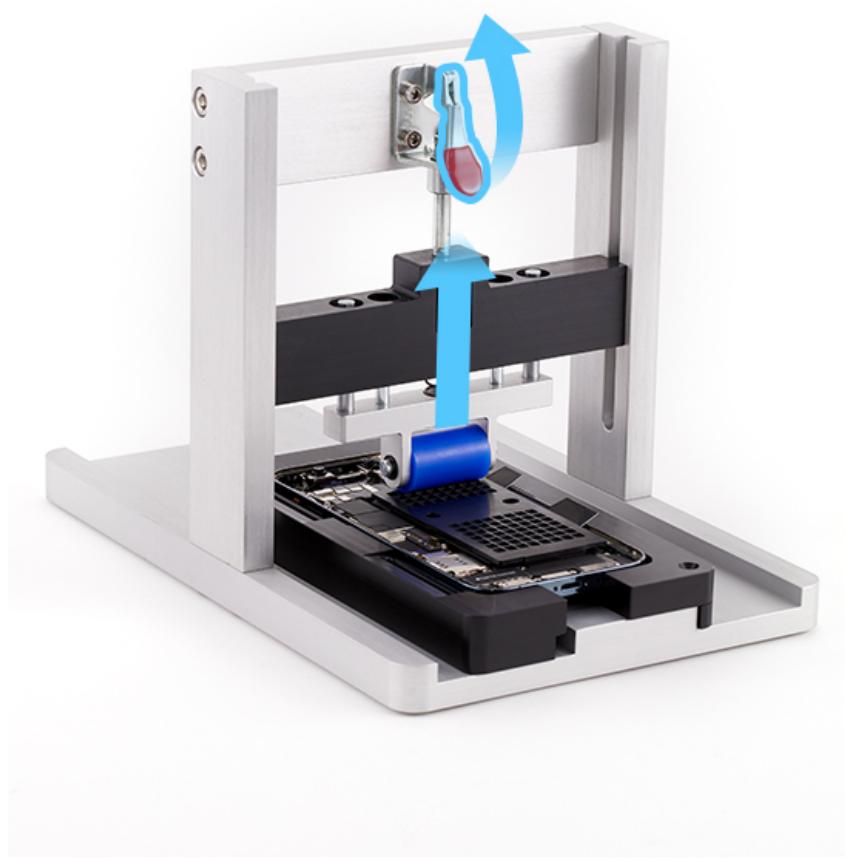
11. Lower the red lever.



12. Slide the repair tray back and forth through the battery fixture three times to adhere the battery to the enclosure.



13. Raise the red lever and remove the repair tray from the fixture.



14. Pull the release tabs on the protective cover to remove it from the battery. Hold the edges of the battery cover when pulling the tabs. Do not apply pressure over the tab that you are releasing.

Important: Before you remove the battery cap, be sure you have performed steps 6 through 13.



15. Perform the [iPhone 12 and iPhone 12 Pro Close](#) (RP1718) procedure.
16. Gently shake the iPhone and listen for a battery rattling sound. If the battery is moving, then [open](#) (RP1664) the iPhone and replace the battery with a new battery.
Important: Before you remove the battery cap, be sure you have performed steps 6 through 13.
17. **Important:** The battery, display, and camera procedures are not complete until the System Configuration in AST 2 has been run successfully. The device must be configured with the new component through [System Configuration in AST 2](#) (TP1818).
18. **Important:** Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).

If the KBB part is a non-Apple battery, when prompted for the KBB serial number, scan the barcode below or type "OLDSERIALNUMBER" in English. The serial number field isn't case sensitive.



iPhone 12 and iPhone 12 Pro Close

First Steps

- Only Apple-certified technicians should perform this procedure.
- Refer to the [Visual/Mechanical Inspection \(VMI\) Guide](#) to determine whether any accidental damage is present.
- Follow electrostatic discharge (ESD) precautions.

Tools

1. Black torque driver (923-0248)
2. Gray torque driver (923-00738)
3. Security bit (923-0247)
4. Micro stix bit (923-01290)
5. Display Adhesive Press Plate for iPhone 12 and iPhone 12 Pro (923-04911)
6. Black stick (922-5065)
7. 6.1-inch Repair Tray (923-03570) for iPhone 12 and iPhone 12 Pro
8. Display Press (661-08916)



Steps For Removal

Perform the [iPhone 12 and iPhone 12 Pro Open \(RP1664\)](#) procedure.

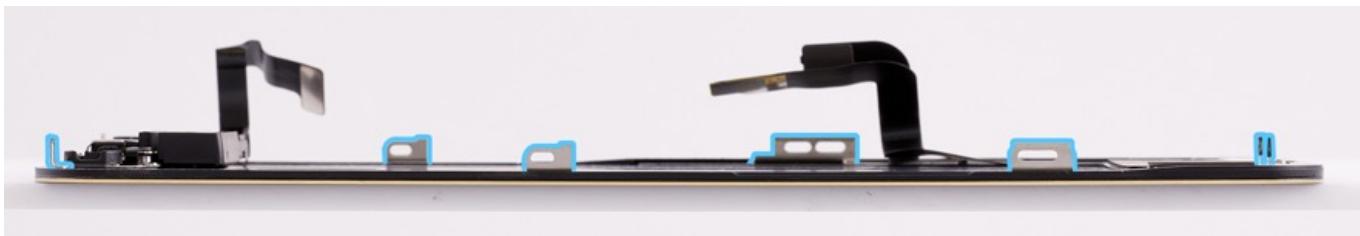
Steps For Reassembly



Caution: Never reinstall a screw after it has been removed. Install only new screws. Most iPhone screw grooves are covered in adhesive that can't be reused. Discard screws according to your local recycling guidelines.

Important: Before reinstalling or replacing the display, do a visual inspection of the iPhone and the display.

- Inspect the display clips for damage before reassembly. Verify that the clips are not bent or damaged. If they are damaged, a display replacement is required.



- Verify that the TrueDepth camera is correctly in position with the top edge fitted under the lip of the enclosure. If the TrueDepth camera is out of position, the Face ID feature on the iPhone may not work when the display is reassembled.

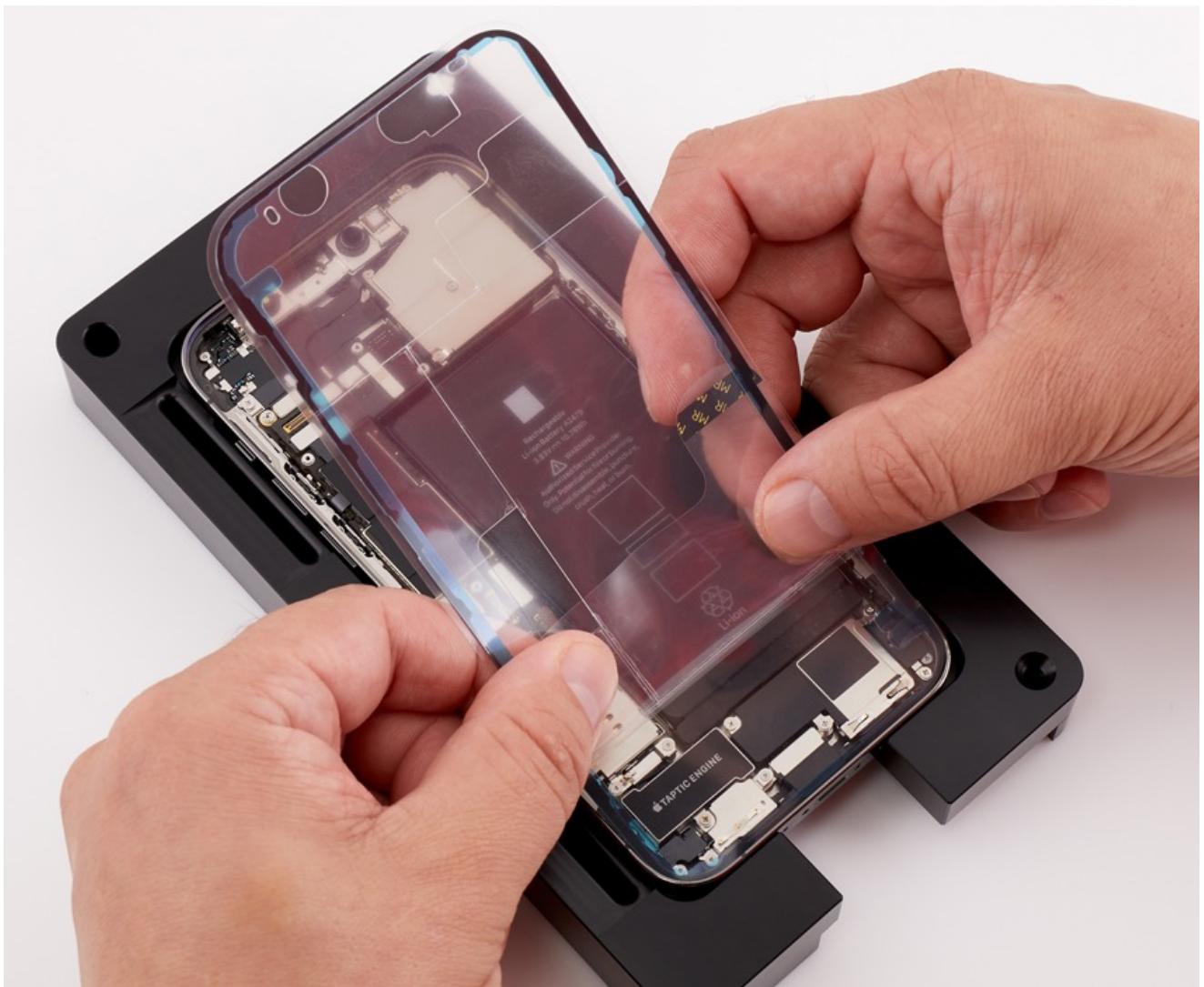


- If the TrueDepth camera is out of place, move it away from the grounding clip with a black stick and carefully insert the tab into place to seat the camera.



Important: Make sure that all adhesive is removed from the display and enclosure before applying new adhesive.

- With the tab on the bottom right side, align the correct display adhesive with the enclosure (923-04894 for iPhone 12 Pro, 923-04893 for iPhone 12).



2. Starting at the bottom edge of the enclosure, slowly remove the bottom release liner while pressing the upper adhesive onto the enclosure.

Important: Do not remove the top release liners.



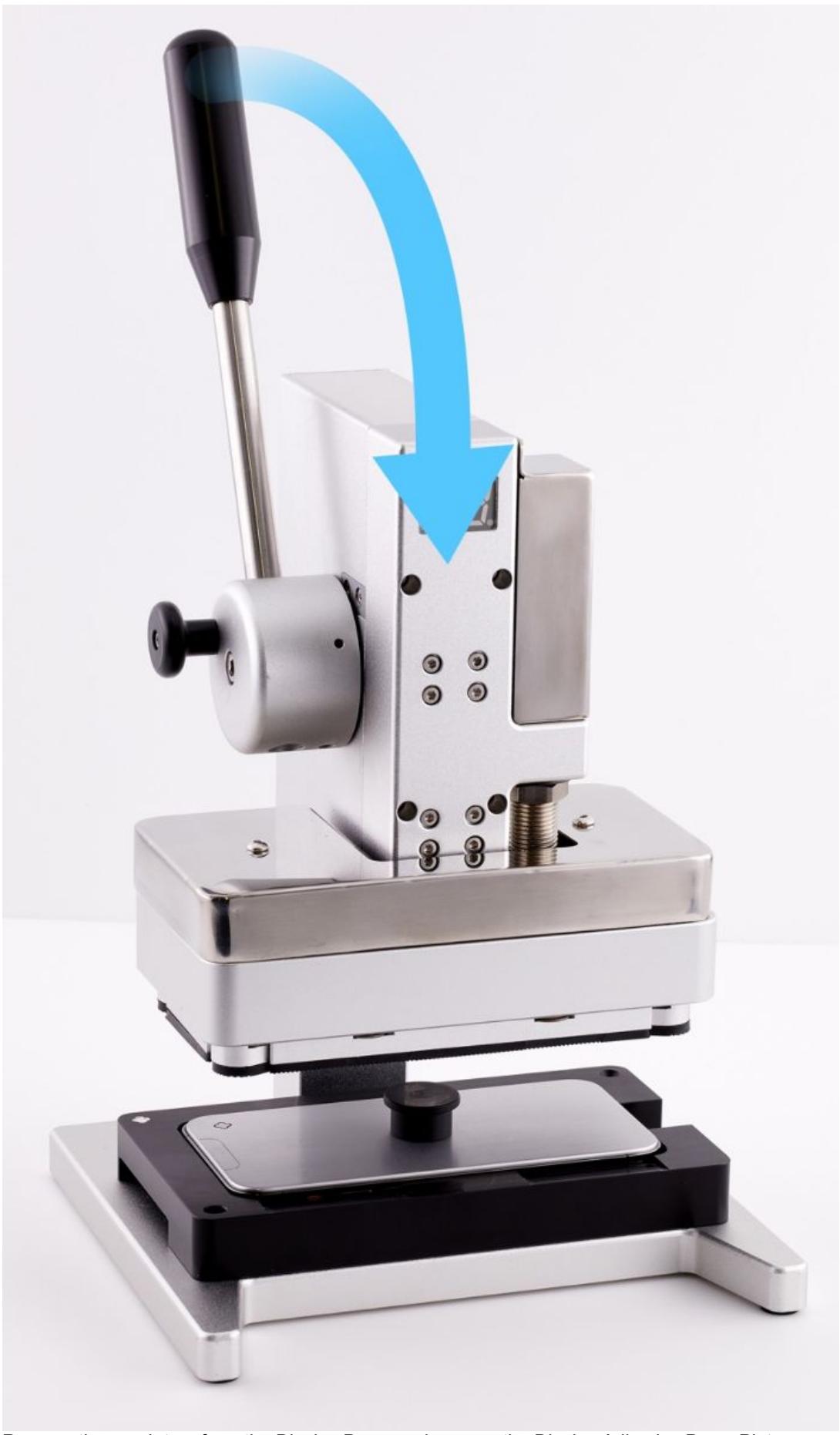
3. Place the Display Adhesive Press Plate on top of the iPhone with the icon in the top right corner.



4. Place the iPhone and repair tray in the Display Press.



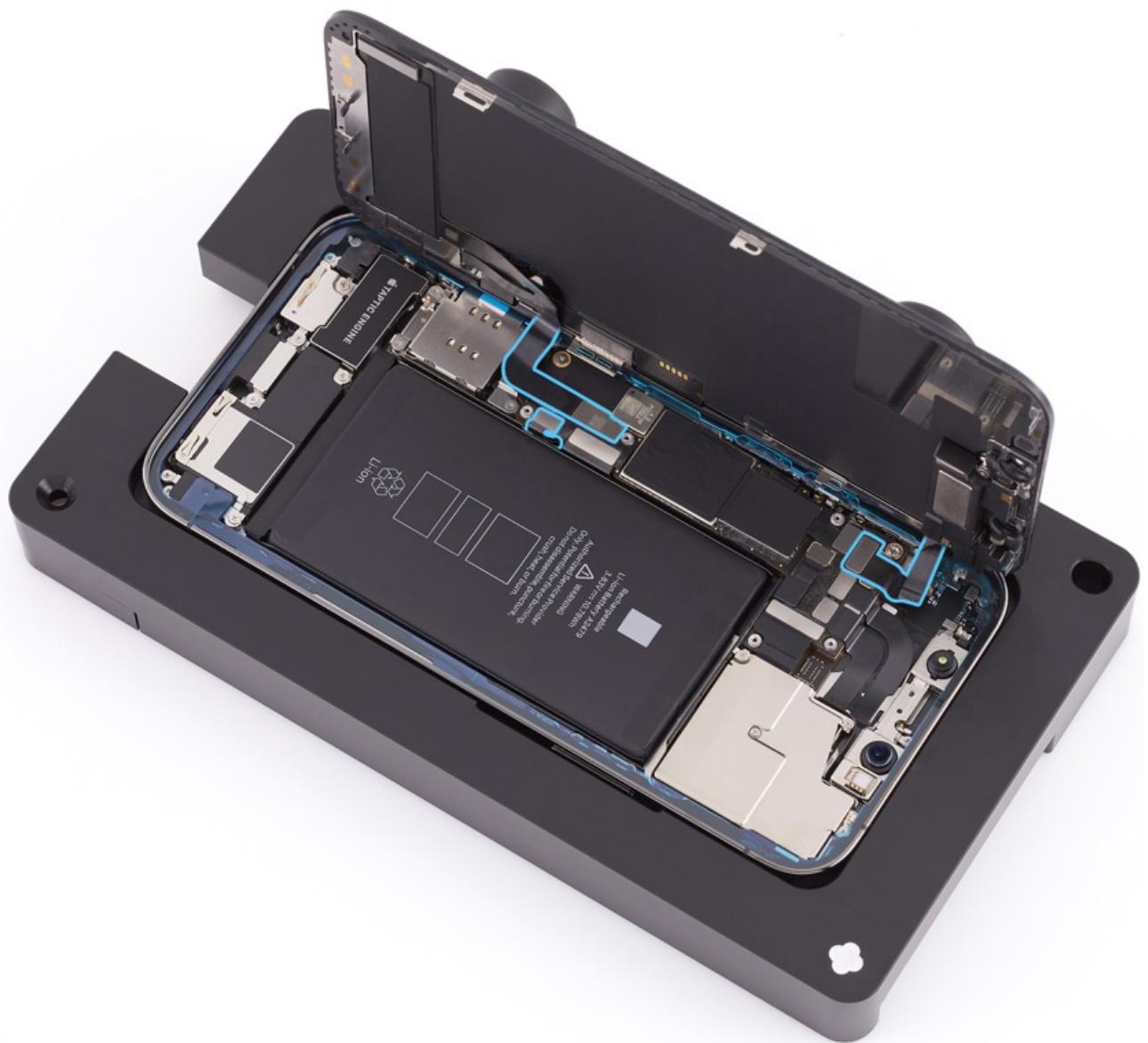
5. Lower the handle and press the iPhone until the beep (30 seconds). **Caution:** The press plate must be engaged in the Display Press for the full 30 seconds otherwise the adhesive will not bond correctly to the enclosure and the display will not align and adhere properly.



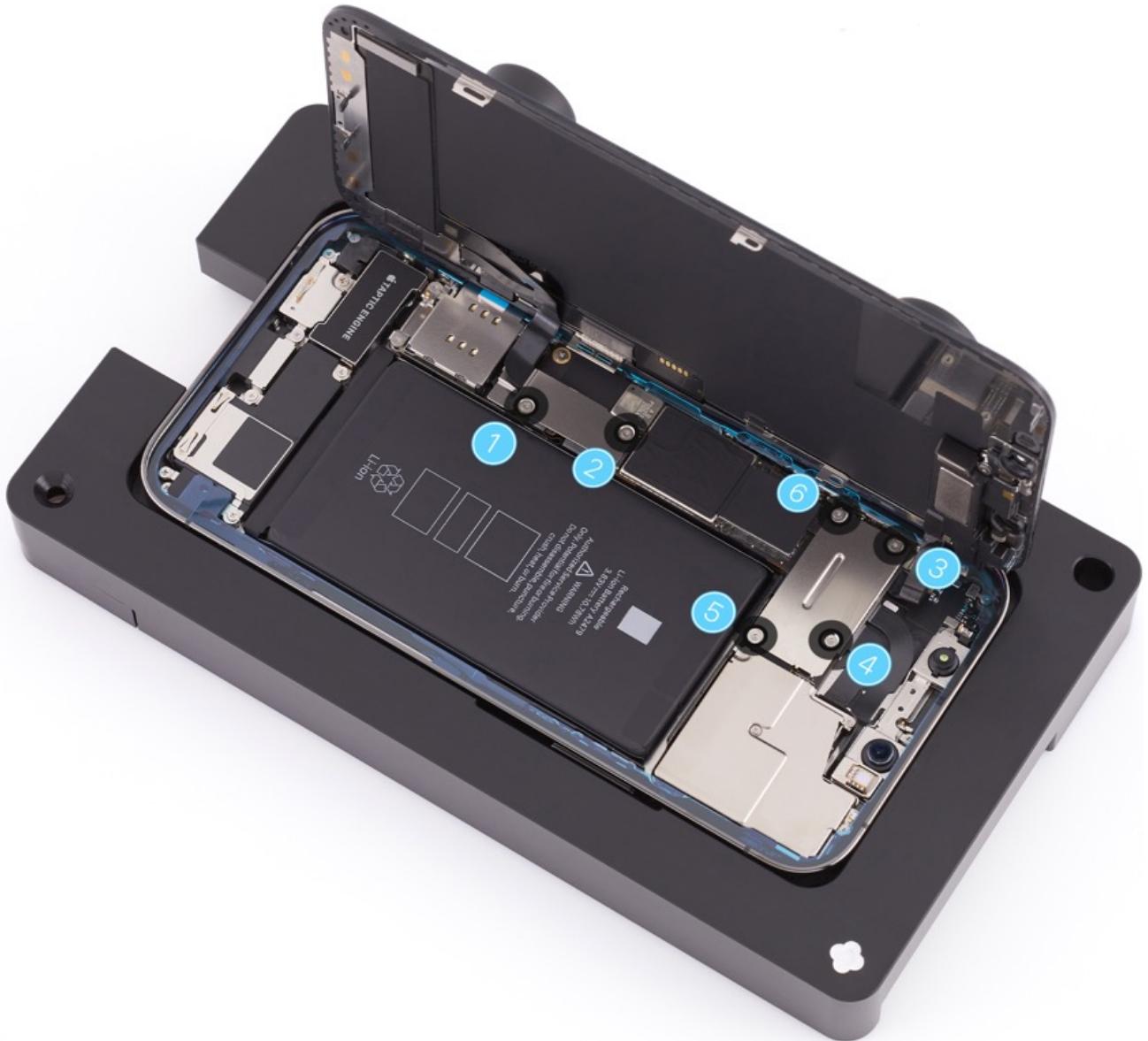
6. Remove the repair tray from the Display Press and remove the Display Adhesive Press Plate.
7. Remove the release liner starting at the center section of the top release liner, followed by the three sections running along the top, right, and bottom edges.
Important: Do not remove the remaining release liners located on the edge of the enclosure.



8. Connect the flex connectors and then secure the display to the suction cups. **Important:** Do not press the back of the display to secure the display to the suction cup. Pressing the back of the display may affect functionality.

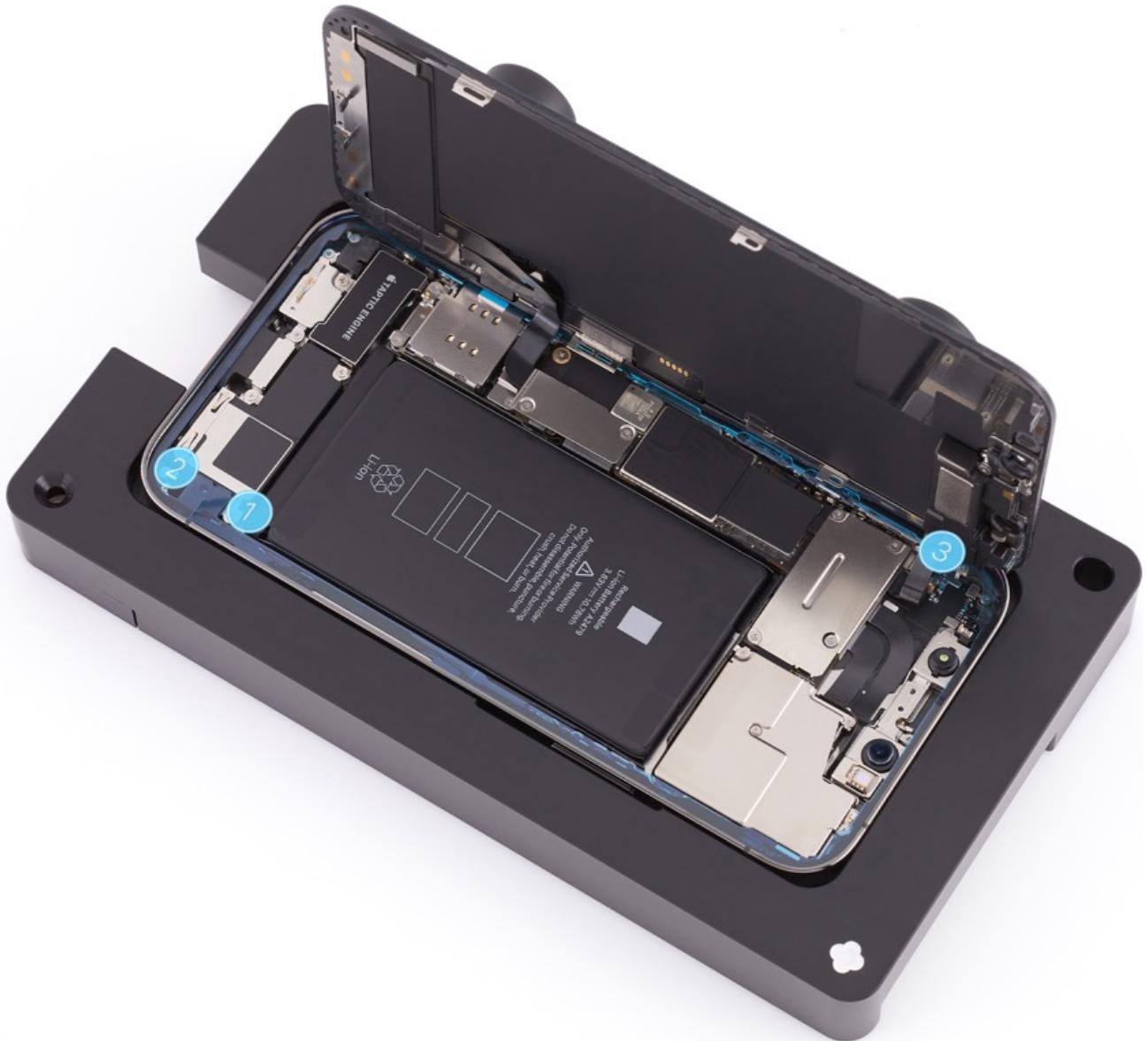


9. Use the black torque driver to install five new Micro stix screws 923-04982 (positions 1, 2, 4, 5, 6) and 923-04988 (position 3) into the display cowlings in the order shown below.



10. Peel the release liner in the order shown below.

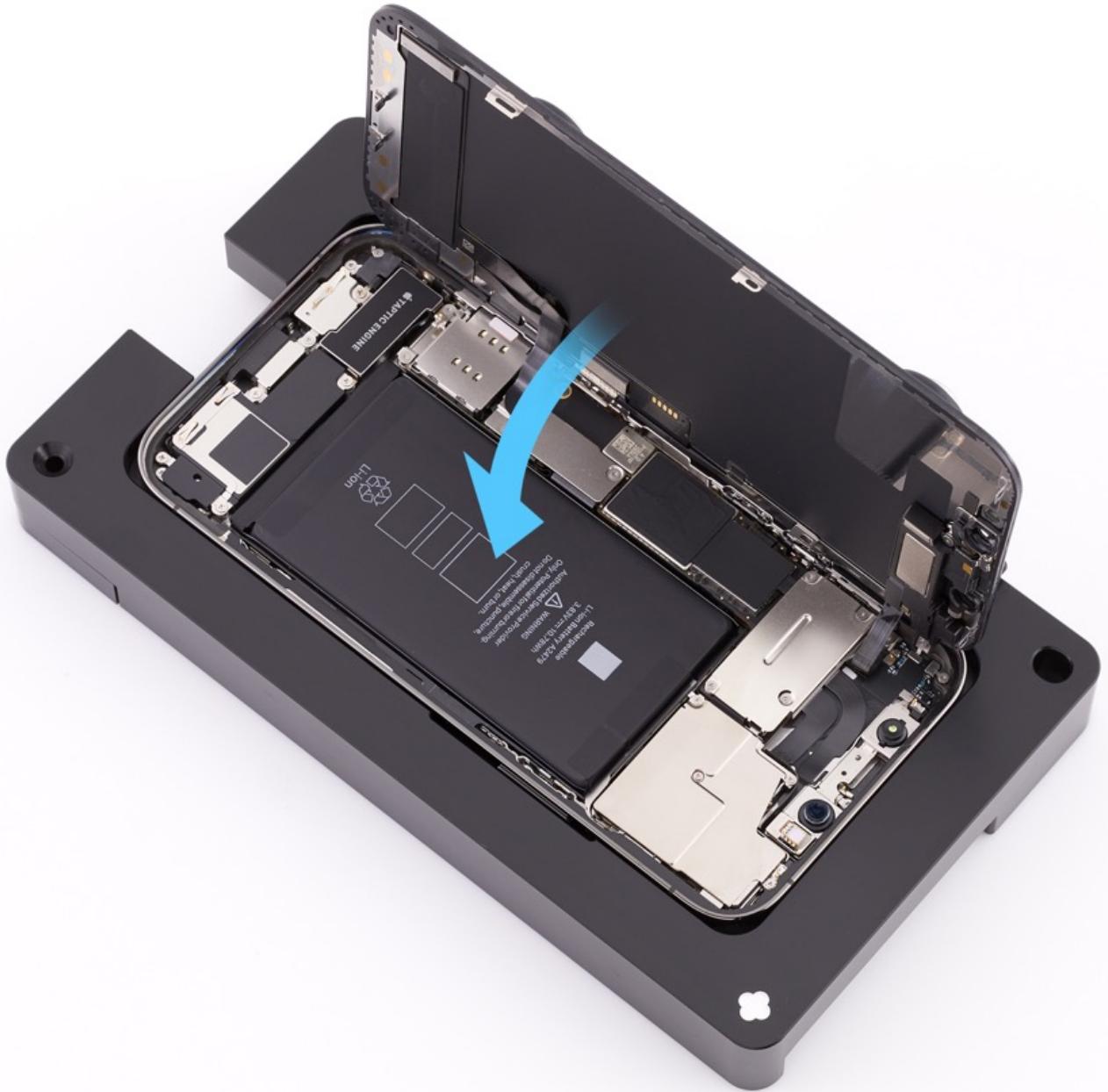
Important: Avoid touching the components of the TrueDepth cameras and nearby components.



11. Inspect the display adhesive to make sure it is in the correct position and not damaged or wrinkled. If the adhesive is damaged remove the adhesive and reapply.
12. Perform the TrueDepth camera alignment check again.
13. Release the suction cups from the display. Tip the display to the left.

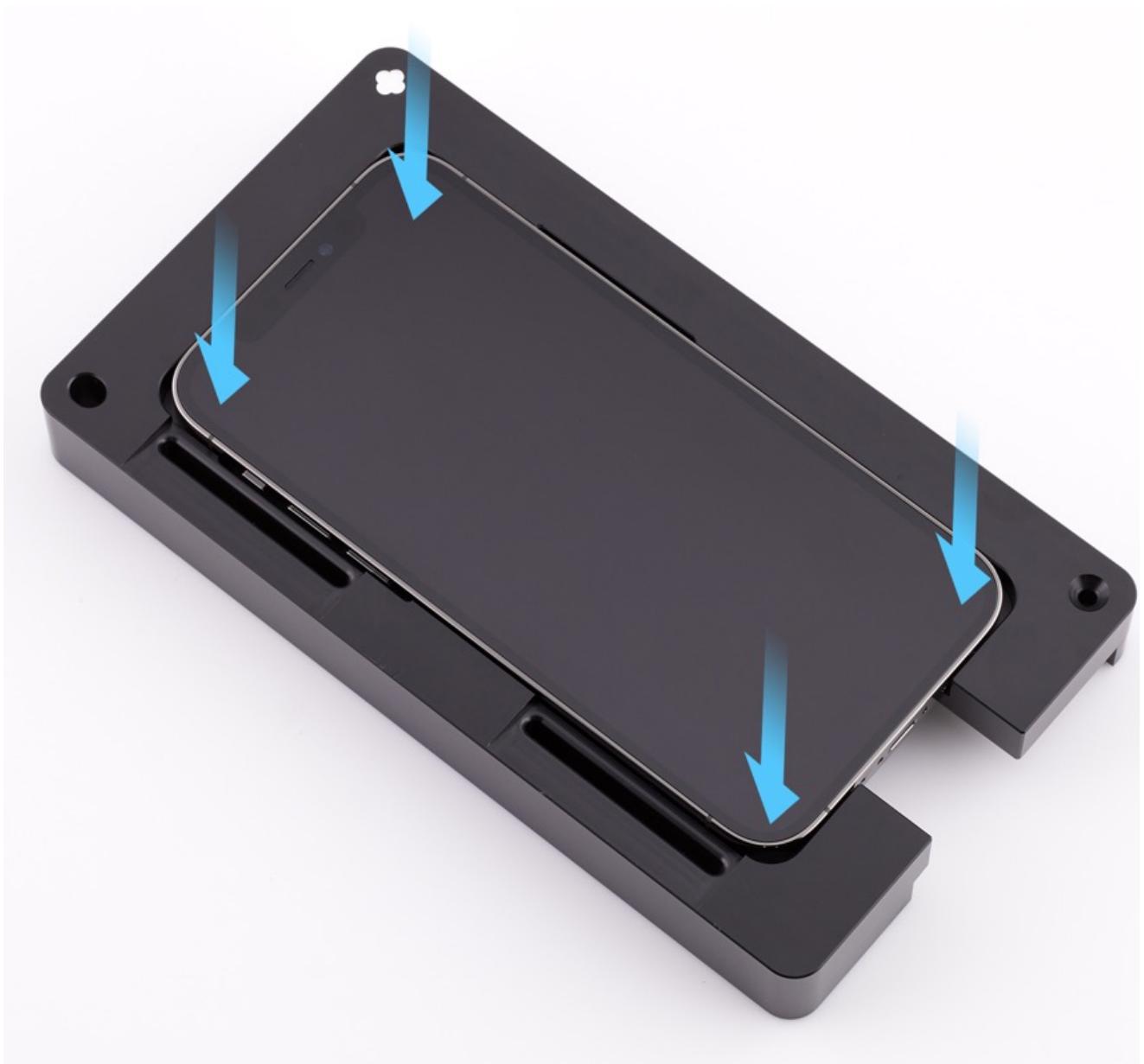


Warning: If the battery is dented, punctured, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Reassemble and replace the whole unit. Follow [iPhone safety instructions](#) (TP328).



13.

14. Remove the suction cups. Check the display flex is not pinched, then press all corners of the display simultaneously, then press along the edges of the display until you hear a click and the display is flush with the enclosure.



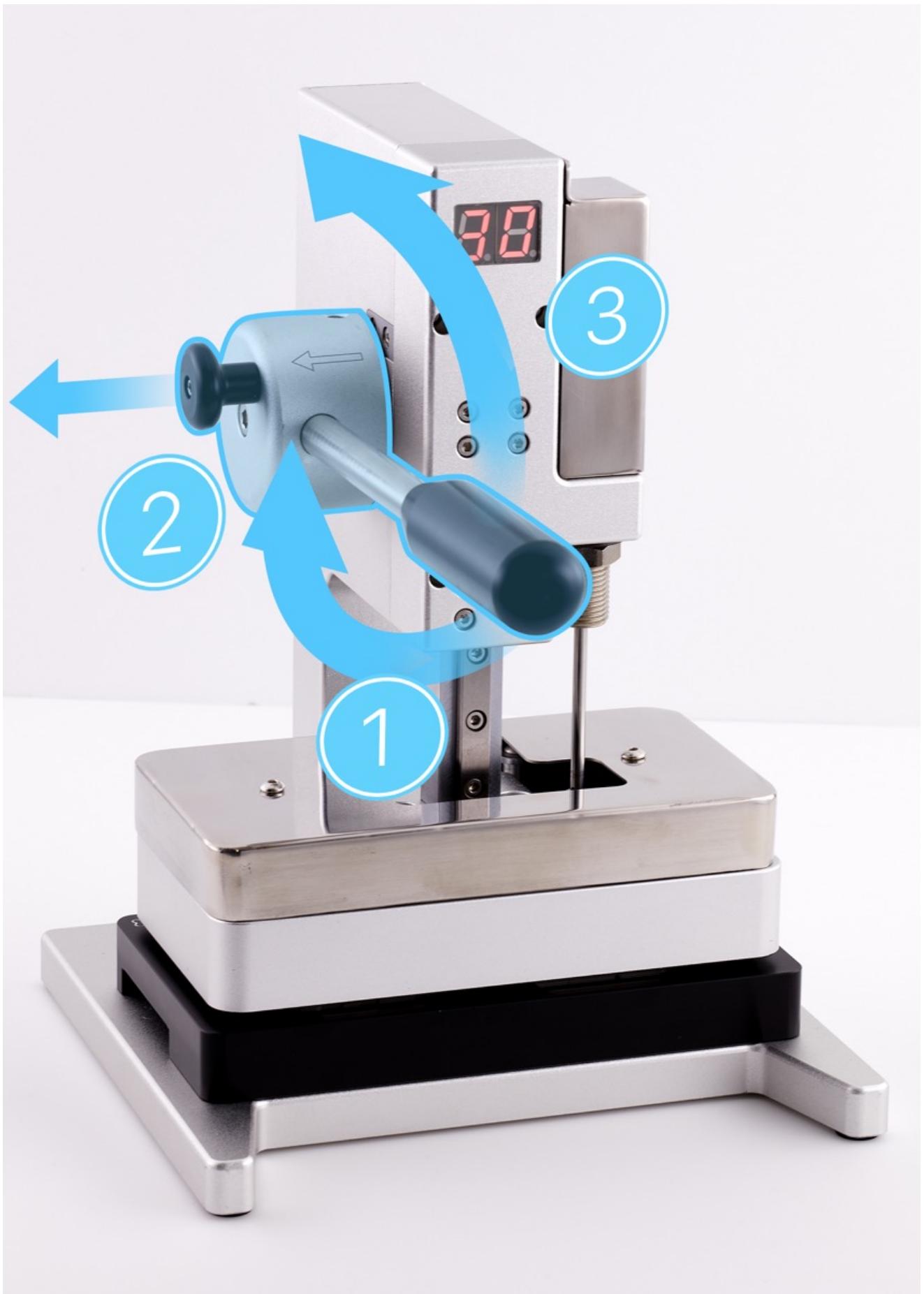
Important: Ensure the display flexes are not trapped between the display and enclosure. Check the edges of the device to make sure they are not raised. Feel the edge of the display for variations. If the display is not flush, then remove the display, check the flexes for damage, and repeat reassembly steps.



15. Place the repair tray with the iPhone into the Display Press and pull the lever down until the press locks.
Important: Use the Display Press to ensure a proper seal. Display calibration may fail if you do not complete this step.



16. Wait until the press timer beeps, then hold the lever down slightly (1), pull the release knob (2), and lift the lever up (3).
Important: Use the Display Press to ensure a proper seal. Display calibration may fail if you do not complete this step.



17. Remove the device from the Display Press.
18. While the iPhone is still in the repair tray, lightly press down on the display while using the gray torque driver and security bit to install two new security screws, one on each side of the Lightning connector. If the screws do not sit flush, then remove and discard the screws, and replace with new screws. If the new screws still do not sit flush, then remove and reinstall the display.



- 923-05064 iPhone 12 Pro Graphite
- 923-05065 iPhone 12 Pro Silver
- 923-05066 iPhone 12 Pro Gold
- 923-05067 iPhone 12 Pro Pacific Blue
- 923-05080 iPhone 12 Black
- 923-05081 iPhone 12 White

19. **Important:** The battery, display, and camera procedures are not complete until the System Configuration in AST 2 has been run successfully. The device must be configured with the new component through [System Configuration in AST 2](#) (TP1818).
20. **Important:** Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).

System Configuration for iOS

Select locations only: This procedure is only for locations with Carry-In Repair enabled for select model iPhone display, camera, and battery repairs.

For some models of iPhone, the repair is not complete until the System Configuration has been run successfully. See the chart below for when System Configuration is required.

Important: If you are servicing iPhone XS, iPhone XS Max, iPhone XR, iPhone SE (2nd generation), before beginning the System Configuration process, verify the iPhone is running iOS 13.4 and later.

Post Repair

1. After a battery, camera, or display replacement, the device must be configured with through System Configuration in AST
2. Follow these steps.

- Be sure the part number of the component has been entered correctly and saved in your repair system.
- Create a diagnostic session in AST 2 using the iPhone serial number.
- The diagnostic suites list will populate and "System Configuration" will be grayed out. To make System Configuration available, start up the iPhone in [Diagnostics Mode](#).
- Select "System Configuration" from the list when it becomes available. System Configuration will run and configure the device with the new component.
- After System Configuration completes successfully:
 - Devices running iOS 14.0 or later will automatically restart into Diagnostics Mode for running post-repair diagnostics.
 - Devices running earlier iOS versions will shut down. To run post-repair diagnostics, start up the device into Diagnostics Mode.

Important:

- System Configuration will not run with beta versions of iOS. To perform System Configuration the iPhone must be restored to the current shipping software. For more information refer to [Restore Shipping Software](#).
 - If System Configuration remains grayed out and does not become available in the diagnostics list, check that the battery part number was added correctly, saved in your repair system, and the iPhone was started in Diagnostics Mode.
 - If System Configuration is not performed, an "Important Battery Message" or "Important Display Message" will pop up on the display. If that happens, turn off the iPhone and perform the System Configuration at that time. When the iPhone is then turned back on, the message will pop up again but should go away within 15–20 seconds.
2. Turn the device on and start up into [Diagnostics Mode](#) if needed.
 3. Run the appropriate [AST 2 diagnostic suite](#) (TP1570). If AST 2 isn't available, perform the [iPhone functional test](#) (TP1045).
 4. If the KBB part is a non-Apple component, when prompted for the KBB serial number, scan the barcode below or type "OLDSERIALNUMBER" in English. The serial number field is not case sensitive.



When System Configuration is Required

Device	Battery	Display	Camera
iPhone XR	•		
iPhone XS	•		
iPhone XS Max	•		
iPhone 11	•		
iPhone 11 Pro	•		
iPhone 11 Pro Max	•		
iPhone SE (2nd generation)	•		
iPhone 12	•	•	•
iPhone 12 mini	•	•	•
iPhone 12 Pro	•	•	•
iPhone 12 Pro Max	•	•	•

LiDAR Scanner Calibration for iPhone

LiDAR scanner calibration is required after all rear camera repairs for iPhones equipped with a LiDAR scanner. Calibration ensures the rear cameras and LiDAR scanner are correctly aligned for optimal performance.

The calibration procedure is performed while running the [System Configuration suite](#) (TP1818) after completing a rear camera repair.

Supported devices:

- iPhone 12 Pro
- iPhone 12 Pro Max

First Steps:

- Prepare the environment to be scanned.
- Make sure the environment is well-lit. Be sure to turn on overhead lights in the room and workstation lighting. Good lighting will make for a more efficient scan and will minimize errors due to poor visibility.
- Use a location that will provide a variety of depth for the scan. It is best to have larger objects such as a wall, stools/chairs, and repair benches at varying distances from the device.
- Medium objects such as computers, display presses, or boxes can also be used in the scene to add complexity.
- Small items such as repair tools and power adapters or flat items such as paper or portable devices don't offer sufficient size to assist in calibration, however they won't negatively affect the scan.
- Avoid heavy traffic locations. People can be scanned if they are still, but will adversely affect the scan if moving quickly. For example, a coworker performing a repair at a nearby repair station, speaking on a phone, or working on a computer is ok for the scan.

Before you scan:

- Wipe down the back lens of the cameras and the LiDAR sensor with a clean microfiber cloth to remove any dust or fingerprints.
- Verify the device has sufficient charge because the calibration procedure takes approximately five minutes.

Procedure:

- Be sure the part number of the rear camera has been entered correctly and saved in your repair system.
1. Enter the device's serial number to start a diagnostic session.



Diagnostics & Tools



Additional Information

2. The diagnostic suites list will populate and System Configuration will be grayed out. To make System Configuration available, start up the iPhone in Diagnostics Mode.

[Results](#)

Diagnostics & Tools

Suggested use: For evaluating camera image quality after repair.[Show More...](#)

TOOLS



Battery Drain Tool

Drains the battery to a specified level. Actual drain time will vary depending on the initial battery charge level. Requires Diagnostics Mode, refer to GSX article TP1570 if needed.

90-150 minutes



Battery Charge Level Check

Suggested use: For devices with expanded batteries.

< 1 minute

[Show More...](#)

System Configuration

A repair completion tool that performs required system configuration after applicable repairs. This suite becomes available after applicable service part information is saved in a repair and when the device is in Diagnostics Mode. For more information, refer to GSX article TP1818. Requires iOS 14.1 or later.

1-2 minutes



3. Select System Configuration from the list when it becomes available.



< Results

Diagnostics & Tools

Suggested use: For evaluating camera image quality after repair.[Show More...](#)

TOOLS



Battery Drain Tool

Drains the battery to a specified level. Actual drain time will vary depending on the initial battery charge level. Requires Diagnostics Mode, refer to GSX article TP1570 if needed.

90-150 minutes



Battery Charge Level Check

Suggested use: For devices with expanded batteries.

< 1 minute

[Show More...](#)

System Configuration

A repair completion tool that performs required system configuration after applicable repairs. This suite becomes available after applicable service part information is saved in a repair and when the device is in Diagnostics Mode. For more information, refer to GSX article TP1818. Requires iOS 14.1 or later.

1-2 minutes



- Calibration instructions will appear in the Diagnostic Console. Read the instructions and then press Continue.



< Results

Cancel

Running

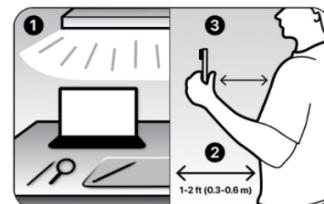
System Configuration

1-2 minutes

IMPORTANT: Review all steps before proceeding.

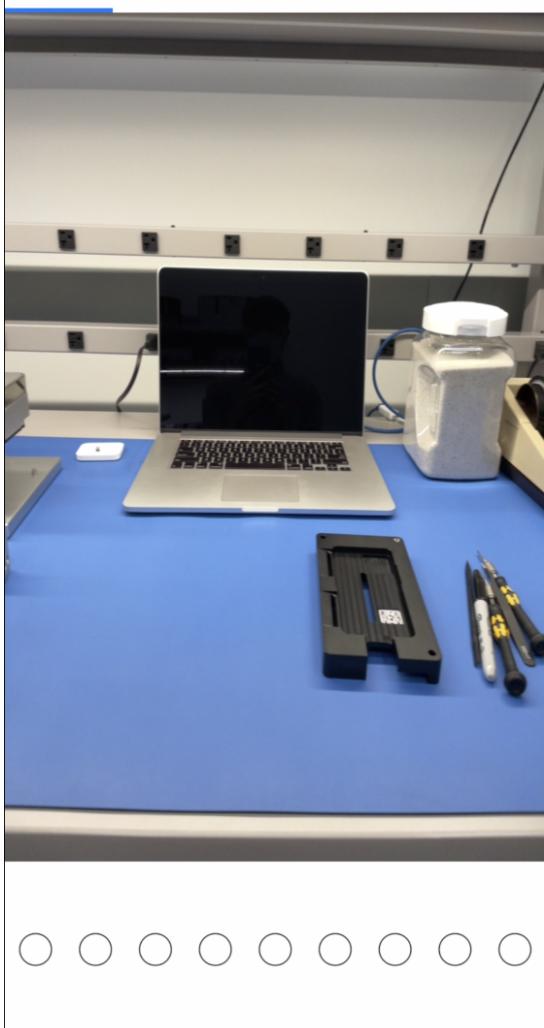
1. Use a well-lit workstation with several objects on the bench such as a computer or display, tools, and fixtures.
2. Sit or stand between 1 - 2 ft (0.3 - 0.6 m) from the workstation.
3. Hold the device in portrait mode and rest your elbow on your body to help with stabilization.
4. Start scanning by slowly panning back and forth to the left and right of the starting point. The field of view while panning should include the entire workstation.

Note: The calibration process will take approximately five minutes to complete. Refer to GSX article TP1953 for more information.

[Continue](#)

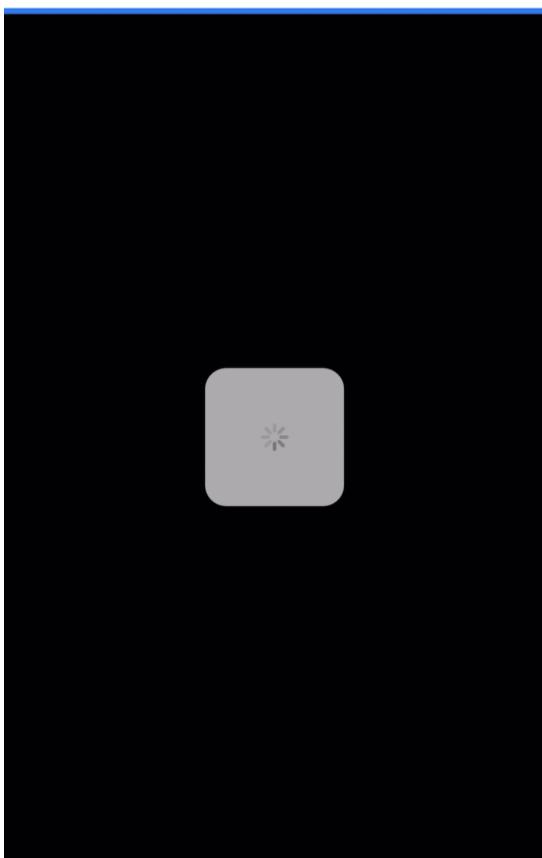
5. Select a language and begin the scanning process.
6. Sit in a chair or stand facing the workstation, about one to two arm lengths from the edge of the bench.
7. Hold the phone in portrait orientation just below eye level. Point the rear camera straight ahead.
8. Rest your elbows against your body to stabilize the phone.
9. Once video from the rear camera appears on the display, slowly turn to your left and right, covering about a 90 degree field of view. If you are sitting in a chair, swivel left and right to get the proper motion and distance. A full arc from left to right and back again should take four to six seconds. As you move, very slowly tilt the phone up and down a little to include objects in the room and increase the variation of depth.

Scan Slowly



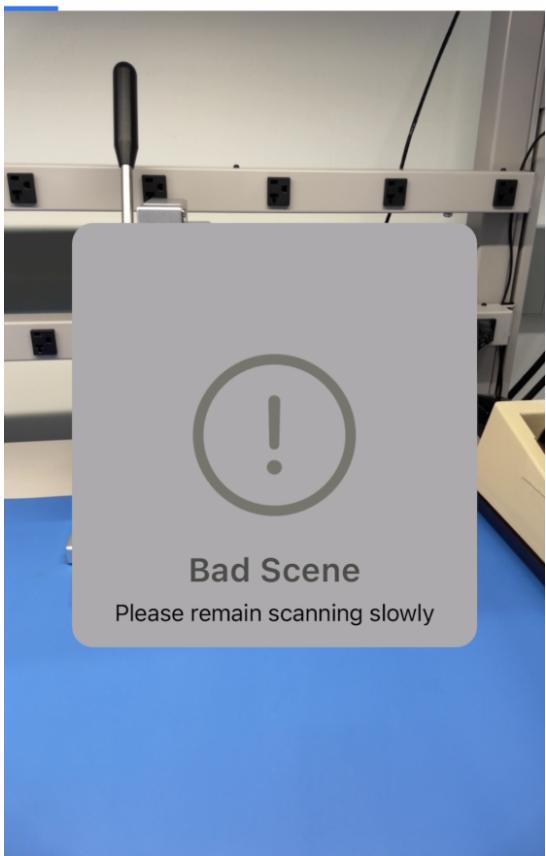
10. Continue to scan back and forth throughout the nine scanning phases. The display on the iPhone will show progress throughout the calibration procedure. At the end of each phase, the display will show "Calibrating..." for a few seconds and then return to the video scene for the next scan. You can continue scanning while the display shows "Calibrating..."

Calibrating...

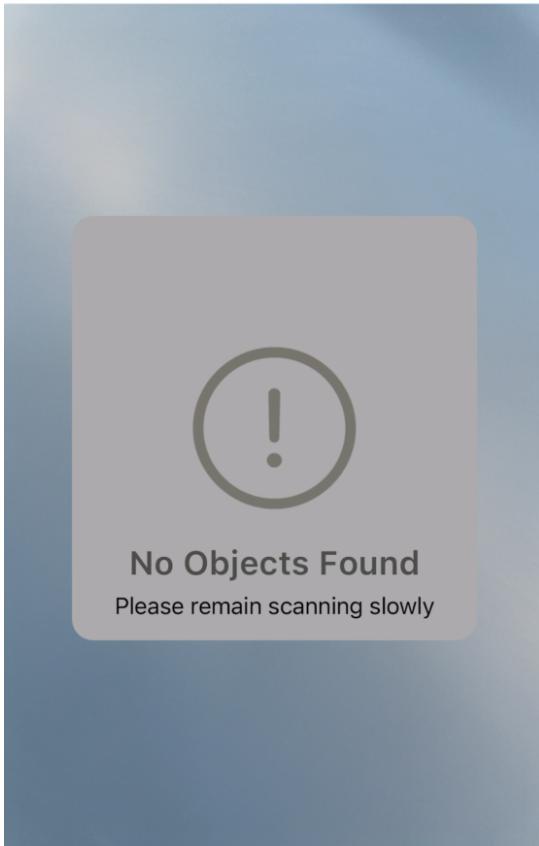


Note: The iPhone display will show warnings if the environment being scanned does not have enough objects with varying depths, the phone is too close to an object, or if the phone is moved too quickly during the scan. If you receive a warning, go back to First Steps at the top of this article and set up the environment again.

Scan Slowly



Scan Slowly



11. Once all nine scanning phases are complete, the suite will end and results are presented in the Diagnostic Console.

Troubleshooting

Below are the possible error messages you might see if the calibration does not complete successfully.

Message	Solution
An error occurred when attempting to calibrate.	Try performing the calibration again. If the issue persists, replace whole unit.
The calibration was unable to complete because it was canceled.	Perform the calibration again.
Unable to calibrate.	Be sure to follow the calibration instructions and try performing the calibration again. For more information refer to System Configuration in AST 2 (TP1818).
Unable to detect scannable items within the allotted time.	Perform the calibration again. For more information refer to System Configuration in AST 2 (TP1818).

Completing an iPhone Repair

Test Functionality

Test the device according to the procedures outlined in [TP1045: Functional Test](#). Test the affected functions to attempt to repeat the original issues reported by the user.

Make sure the device is 100 percent operational before returning it to the user.

Verify Cellular Account

Make sure that the user's SIM card is installed and ask the user to verify that their phone number is correct in Settings > Phone.

Clean Device

Clean the device with a microfiber polishing cloth. **Caution:** Do not use chemicals or liquids.

Handle Defective Parts

Return all defective modules to Apple. Reuse the packaging that contained the replacement parts.

iPhone Functional Test

The iPhone functional test determines the functional state of an iOS device before and after a repair. Before a repair, use the iPhone functional test to determine if additional service is needed. After a repair, for devices running 10.3 or later, use [Diagnostics Mode](#) (TP1570) to run the AST 2 Post-Repair Diagnostic to verify the device's functionality. Devices running iOS 10.2.1 or earlier should continue to use the functional tests listed in this article. **Note:** Some feature-specific tests may not apply to the device under test.

Attempt to repeat the original issue or issues reported by the user and verify that no new issues are present after opening the device. If the user is reporting battery issues, use AST 2 to test the battery. Confirm that the device is fully operational before returning it to the user. Use [AST 2 diagnostics](#) (TP1279) to assist in testing for reported issues.

Test the following components:

1. Charging
2. Wireless Charging
3. MagSafe - iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max
4. Cellular and Wi-Fi Connectivity, Video Playback, and Speaker Sound Quality
5. Bluetooth
6. Headset and Proximity Sensor
7. Bottom Mic, Speaker, and Receiver Sound Quality
8. Cameras, Rear Mic, and Front Mic
9. LiDAR Camera
10. Multi-Touch and Accelerometer
11. Buttons, Switches, and Vibe
12. Ambient Light Sensor
13. Location Services
14. Touch ID - For iPhones with a Home button
15. Test 3D Touch and Taptic Engine - iPhone 6s and later, except iPhone SE, XR, 11, 11 Pro, 11 Pro Max
16. Test Haptic Touch - iPhone SE, XR, 11, 11 Pro, 11 Pro Max and iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max
17. Taptic Engine - iPhone XR, 11, 11 Pro, 11 Pro Max, SE (2nd generation), iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max
18. True Tone Display - iPhone 8 and later
19. Face ID - iPhone X and later, except iPhone SE (2nd generation)

1. Test Charging

- a. Plug the USB charging cable into a USB power adapter, then plug the adapter into the wall.
- b. Connect the Lightning to USB Cable to the device. Verify that either a lightning bolt appears beside the battery icon in the status bar or a large battery icon appears on the lock screen.

2. Test Wireless Charging

- a. Run the Mobile Resource Inspector (MRI) diagnostic suite in AST 2 to test for the presence of wireless charging hardware.
- b. Connect the wireless charger to power. Use the power adapter that came with the accessory or a power adapter recommended by the manufacturer.
- c. Place the charger on a level surface or other location recommended by the manufacturer.
- d. Place the device on the charger with the display facing up. For best performance, place the device in the center of the charger or in the location recommended by the charger manufacturer.
- e. Verify that either a lightning bolt appears beside the battery icon in the status bar or a large battery icon appears on the lock screen.
- f. Charge the device for at least 15 seconds to ensure continuous charging.

3. Test MagSafe for iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max

- a. Place the device on a MagSafe wireless charging accessory. Make sure the phone is placed properly on the pad, in the middle of the pad with maximum contact between the phone and the pad.
- b. Confirm on the device that charging is taking place.
- c. Leave the device on the charging pad for about 15 seconds and check that the battery percentage has gone up.
- d. Attach a MagSafe case or wallet accessory to the device and observe whether the animation for the MagSafe accessory is shown on the screen and properly identifies the accessory that is attached.

4. Test Cellular and Wi-Fi Connectivity, Video Playback, and Speaker Sound Quality

- a. Run the Mobile Resource Inspector (MRI) diagnostic suite in AST 2 to test for the presence of Wi-Fi hardware.
- b. Check that the user's SIM card is installed. Ask the user to verify that their phone number is correct in Settings > Phone.
- c. Call an approved toll-free number to test phone call cellular connectivity and sound quality.
- d. Go to Settings > Wi-Fi and connect to a known-good 2.4GHz Wi-Fi network.



- e. Play video from apple.com and verify that the video and audio play correctly. This will test the video playback and the speaker. For iPhone 7 and later, hold the device in landscape orientation. Go to Settings > General > Accessibility and adjust balance to the left, and then to the right. Be sure that Mono Audio is turned off. Replay the video to test the left and right speakers in isolation.
- f. Repeat steps d and e while connected to a 5GHz network, if available.

5. Test Bluetooth

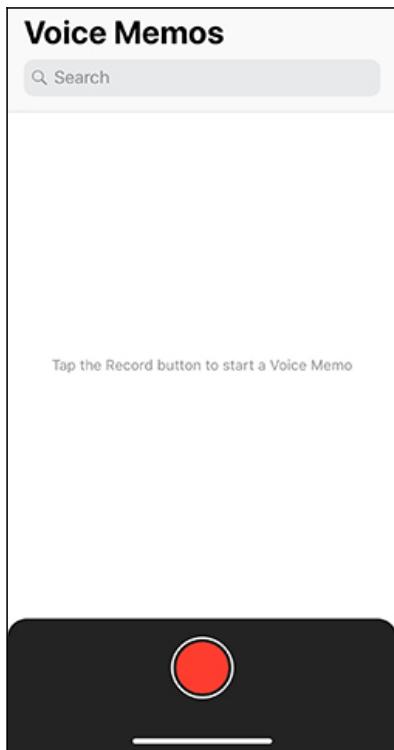
- a. Run the MRI diagnostic suite in AST 2 to test for the presence of Bluetooth hardware.
- b. Make a known-good Bluetooth device available locally. Check that the Bluetooth device is on and discoverable.
- c. On the customer's device, go to Settings > Bluetooth.
- d. Verify that Bluetooth is on. The device will search for nearby Bluetooth devices.



- e. Pair the user's device with the Bluetooth device.
- f. To unpair the device, tap the blue circle to the right of the device's name and then tap "Forget this Device."

6. Test Headset and Proximity Sensor

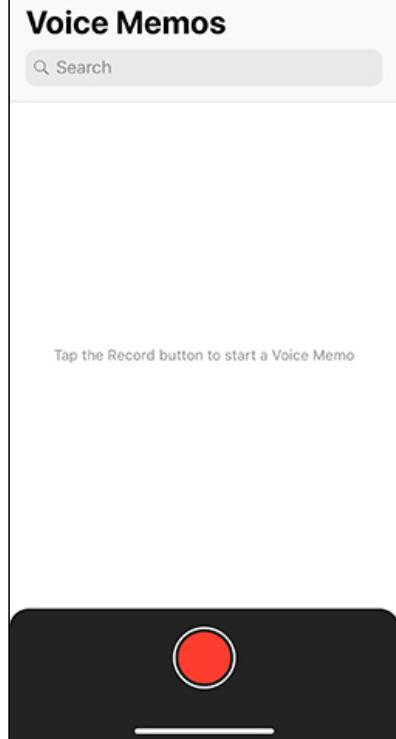
- a. Open the Voice Memos app.



- b. Tap the red circle to start recording.
- c. Connect EarPods to the device.
- d. Blow into the headset microphone to verify functionality.
- e. Tap the red stop button to end the recording.
- f. Tap the play button.
- g. Listen to the playback through the EarPods, and adjust the volume using the headset remote control.
- h. Make a test phone call with a known-good SIM and with full cellular signal strength for at least one minute.
 - During the call, verify the sound quality of the EarPods and headset microphone.
 - During the call, place your hand over the top front of the device to cover the proximity sensor. The screen should go black.
 - Remove your hand to uncover the proximity sensor. The call screen should reappear.

7. Test Bottom Mic, Speaker, and Receiver Sound Quality

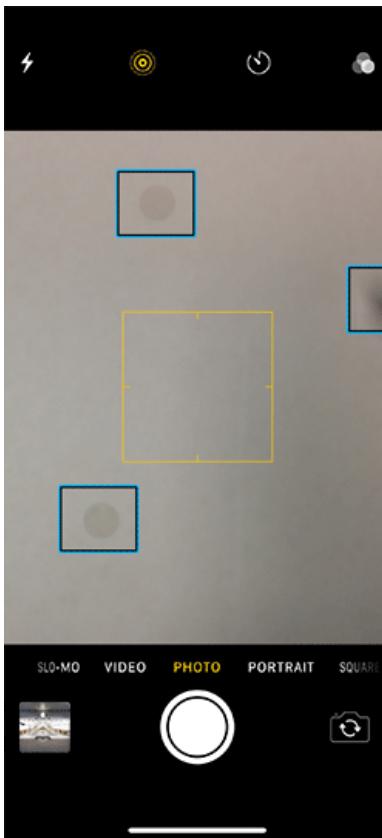
- a. Open the Voice Memos app.



- b. Record a short voice memo by tapping the red circle.
- c. When finished recording test audio, tap the red stop button.
- d. Tap the play button.
- f. Make a test phone call with a known-good SIM and with full cellular signal strength for at least one minute. During the call, verify the sound quality of the receiver, speaker, and microphone.

8. Test Cameras, Rear Mic, and Front Mic

- a. Run the MRI diagnostic suite in AST 2 to test for the presence of front and rear cameras.
- b. Remove any protective case that may interfere with the camera lens or flash.
- c. Download the [iPhone Camera Test Image](#) (PDF) and print out a color copy on unlaminated white paper. Do not modify, alter, or laminate the copy.
- d. Open the Camera app. Aim the back of the device at a clean sheet of blank white paper.
- e. Slowly move the device to inspect the preview image for anomalies, such as circles and dust spots.



f. Record video with the camera. Test the camera and rear mic by checking the recording for video and audio quality.

g. Take photos and check focusing with the camera.

- Start in landscape orientation and hold the device eight inches (~20 cm) from the test image.
iPhone 6 or later: The test image should quickly come into focus.
Other models: Once steady, the yellow focus square should appear briefly and the test image should be in focus.
- Keep the device in landscape orientation and hold the device three feet (~1 m) from the test image.
iPhone 6 or later: The test image should quickly come into focus.
Other models: Once the device is steady, the yellow focus square should appear shortly, with the test image eventually brought into focus.
- Rotate the device to portrait orientation and hold the device three feet (~1 m) from the test image.
iPhone 6 or later: In a well-lit room, the test image should stay in focus as you rotate. If the room is not well lit, the yellow focus square may appear. The image should not jump around or be severely out of focus during rotation.
Other models: Once the device is steady, even though the test image is already in focus, the yellow focus square may still appear in the preview indicating that the camera is trying to refocus. This is normal. Once the focus is complete, the test image should still be in focus.
- Keep the device in portrait orientation and hold the device eight inches (~20 cm) from the test image.
iPhone 6 or later: The test image should quickly come into focus.
Other models: Once the device is steady, the yellow focus square should appear shortly, with the test image eventually coming into focus.
- Verify that the primary colors are representative of the printed test image and that there are no dark spots near the edges of the photo.

h. Change the focus area and set the exposure: The yellow square on the screen shows the area where the camera is focusing the shot. Tap the screen to focus on the circle of the test image.

i. Turn on the flash.

- If possible, take the photo in a dim or darkened area to show where the flash is lighting.
- Check that the flash is lighting the circle in the test image and that the flash is not shifted to one side.

j. Pinch the screen, then drag the slider at the bottom of the screen to zoom in or out.

k. Touch the icon to select the FaceTime or TrueDepth camera. Repeat steps d through i (above) to test the

FaceTime or TrueDepth camera, front mic, and the Retina Flash. **Note:** The FaceTime or TrueDepth camera does not zoom, and only has a flash on iPhone 6s and later. The Retina Flash is only available in photo, portrait, and square modes. It may be easier to hold the printed test image in front of the iPhone to test the FaceTime camera.

Additional Testing for iPhone 5c and later:

Use the camera slow-motion mode to record short videos of the printed test image and verify video quality.

- a. Switch the camera to slow-motion mode and keep the device in either landscape or portrait orientation.
- b. Set to 1x zoom, hold the device eight inches (~20 cm) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.
- c. Stay in 1x zoom, hold the device three feet (~1 m) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.
- d. Tap 1x to switch to 2x zoom, hold the device three feet (~1 m) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.
- e. Stay in 2x zoom, hold the device 20 inches (~50 cm) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.

Adjust Rear Camera

The rear camera for iPhone 4, 4s, and 5 can become misaligned when removing and reinstalling the back cover (iPhone 4 and 4s) or the display assembly (iPhone 5). Adjustment can be made by gently pushing the camera module in the direction needed for proper alignment.

Important: Do not touch the lens of the camera with bare fingers. Only touch the surrounding area or use gloves to ensure debris or fingerprints are not transferred to the camera lens.

Clean Rear Camera

Check the rear camera lens for scratches that could affect image quality. Use a clean microfiber polishing cloth to remove smudges from the rear camera lens.

9. Test LiDAR camera

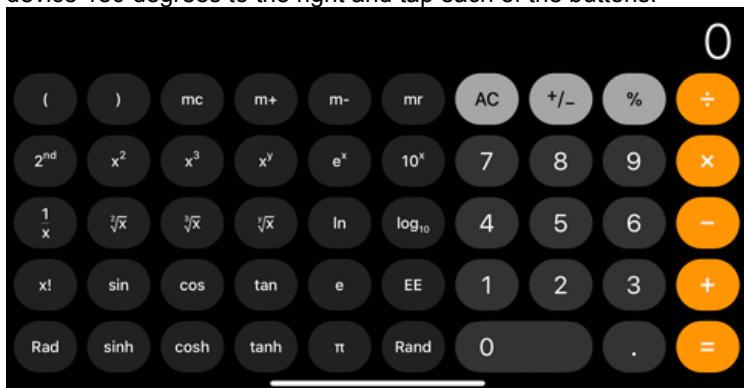
- a. Connect the device to Apple WiFi.
- b. Run AST2 LiDAR camera diagnostics tests: Go to diagnostics.apple.com on your laptop Enter the system serial number when prompted and follow the directions on screen to complete the AST2 LiDAR diagnostics.

10. Test Multi-Touch and Accelerometer

- a. Run the following AST 2 diagnostic suites: use Multi-Touch to test for Multi-Touch response issues; use Unexpected Touch to test for overly sensitive touch response issues; use MRI to test for the presence of Multi-Touch and Accelerometer hardware.
- b. Open the Calculator app to test all but the top section of the screen. Hold the device in a vertical plane (upright), not horizontal (flat). Tap each button on the calculator to verify activity.



c. Rotate the device 90 degrees to the left to launch the scientific calculator. Tap each of the buttons. Rotate the device 180 degrees to the right and tap each of the buttons.



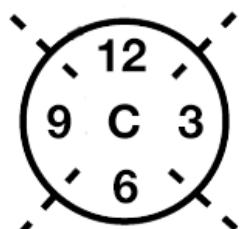
11. Test Buttons, Switches, and Vibe

a. Run each of the button and switch diagnostic suites in AST 2. Each suite tests the functionality of a specific button or switch.

b. Test the Home button using the following steps, depending on model:

iPhone 6s, 6s Plus, SE (1st generation), and earlier

- Test clicks and double-clicks on the Home button.
- Press and hold the Home button for Voice Control or Siri.
- With the display off, press the center of the Home button and verify that the display turns on.
- Use the pointed end of a black stick to repeat the same test for the top, bottom, left, and right edges of the Home button (as shown by the numbers in the image below). The display should turn on when pressing any of these five locations.



- If no functional issues are found after testing the button with a black stick, use your finger or thumb to test for button stiffness, looseness, or mechanical symptoms.

iPhone 7, 7 Plus, 8, 8 Plus, and iPhone SE (2nd generation)

- Test single-clicks and double-clicks on the Home button.

- Press and hold the Home button for Voice Control or Siri.
- With the display off, press the center of the Home button and verify that the display turns on.
- When pressing the Home button, verify that the haptic feedback simulates a physical button press.
- If the Home button does not respond in the above steps, test Touch ID functionality in Section 10 of this article.

c. Use your finger to repeatedly press the volume buttons and verify that the sound level indicator on the display is changing.

d. Use your finger to toggle the Ring/Silent switch back and forth and look for a bell icon on the screen.

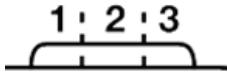
e. Press the Ring/Silent switch and verify that the bell icon does not appear on the screen. **Note:** Do not toggle the switch.

f. Test the vibrate function.

1. Go to Settings > Sounds & Haptics > Ringtone > Vibration.
2. Choose S.O.S.
3. Verify that the phone vibrates in the correct pattern.

g. Locate the Sleep/Wake or side button on the device, near the top right corner or right edge. (All iPhone models)

- Use the pointed end of a black stick to press the left side of the button (1) once, to put the device into sleep mode (the display will turn off).
- Use the pointed end of a black stick to press the center of the button (2) once, to wake the device.
- Use the pointed end of a black stick to press the right side of the button (3) once, to put the device into sleep mode (the display will turn off).
- Use your finger to press the button again to wake the device.
- Use your finger to press and hold down the button until "slide to power off" appears on the screen.



h. If no functional issues are found after testing buttons with a black stick, use your finger or thumb to test for button stiffness, looseness, or mechanical symptoms.

12. Test Ambient Light Sensor

The ambient light sensor automatically adjusts the display brightness to an appropriate level for the current ambient light conditions. The ambient light sensor brightens the display when using the device in a bright light environment, and dims the display in low light.

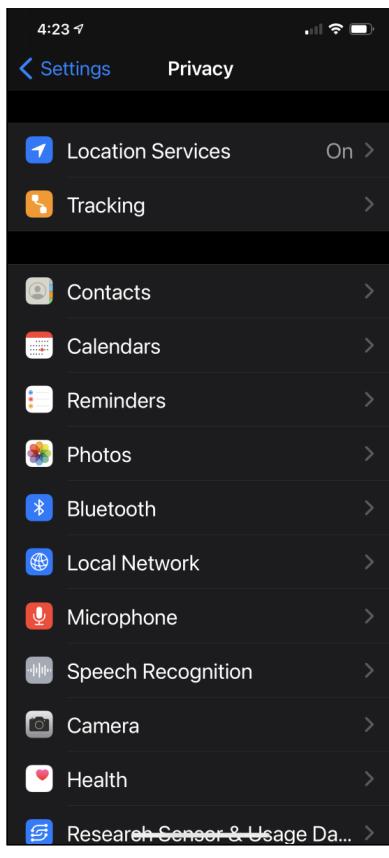
- a. Run the MRI diagnostic suite in AST 2 to test for the presence of ambient light sensor hardware.
- b. Toggle Auto-Brightness off and then on in Settings > General > Accessibility > Display Accommodations.
- c. Press the Sleep/Wake button or side button to put the device into sleep mode.
- d. In a bright light environment, cover the top third of the front of the device to block the light (the base of your hand works well). The ambient light sensor is located near the receiver.
- e. Press the Sleep/Wake or side button to wake the device. While the ambient light sensor is covered, the display should be dim.
- f. Uncover the top of the device. After a few seconds, the display should return to its normal brightness.

13. Test Location Services

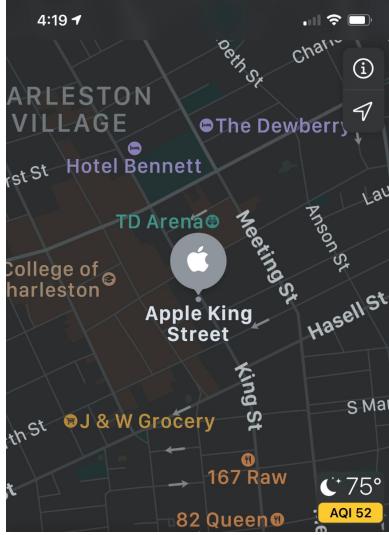
Location services depend on data service availability. Data services are subject to change and may not be available in all areas. This may result in unavailable, inaccurate, or incomplete maps, directions, or location-based information. Maps uses Wi-Fi hotspots to determine the most accurate location. Refer to [HT203033: About privacy and Location Services in iOS 8 and later](#) for more information.

- a. Run the MRI diagnostic suite in AST 2 to test for the presence of gyroscope and compass hardware.

- b. Go to Settings > Privacy > Location Services and turn on Location Services.

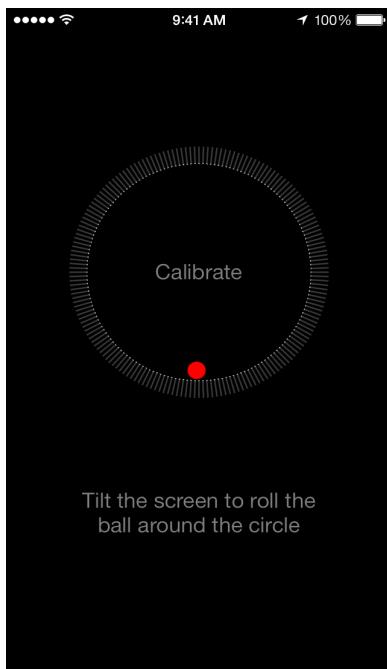


c. Open the Maps app and tap the arrow in the lower left corner of the screen. Maps should display the device's current location.



d. Open the Compass app.

e. When the device displays the calibration alert, tilt the screen to roll the red ball around the circle.



- f. Verify that when the iPhone is rotated, the heading shown on the screen changes according to the motion of the device.

14. Test Touch ID - For iPhones with a Home button

This test should be performed with the user. Ensure that the Home button and your finger are clean and dry.

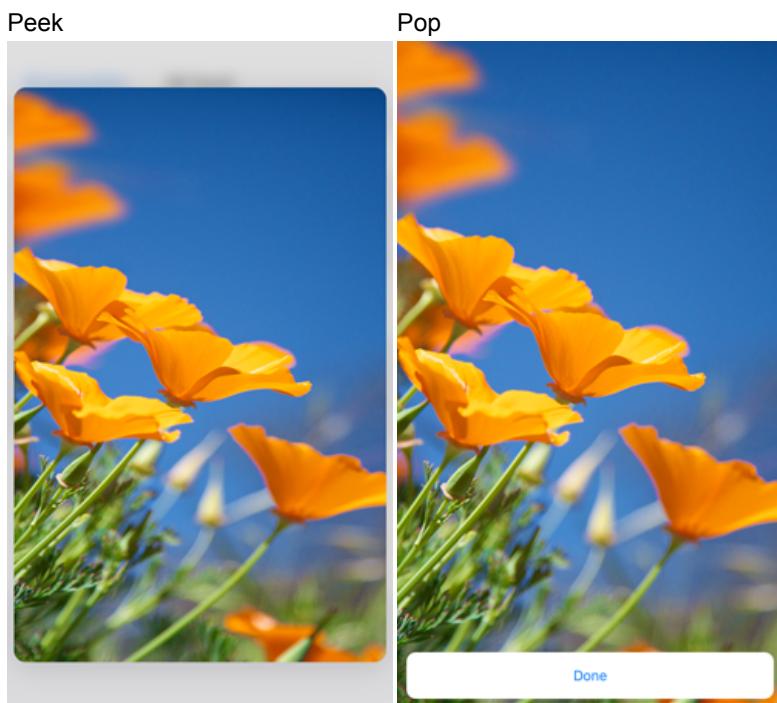
- a. Run the MRI diagnostic suite in AST 2 to test for the presence of Touch ID hardware.
- b. Go to Settings > Touch ID & Passcode and tap "Add a Fingerprint..."
- c. Hold the device as you normally would when touching the Home button.
- d. Touch your finger to the Home button and hold it there until you feel a quick vibration or you are asked to lift your finger. **Tip:** Do not press the button, just touch it lightly.
- e. Continue to touch and lift your finger slowly, making small adjustments to the position of your finger each time.
- f. Once the initial scanning is complete, you will be asked to adjust your grip in order to capture the edges of your fingerprint.
- g. Hold the device as you normally would when unlocking it, touching the adjacent outer areas of your fingertip instead of the center portion you initially scanned.
- h. Press the Sleep/Wake button or side button to lock the screen.
- i. Press the Home button, Sleep/Wake button, or side button once to wake the device and keep your finger lightly on the Home button. The device will unlock when the fingerprint is recognized.

15. Test 3D Touch and Taptic Engine - iPhone 6s and later, except iPhone SE, XR, 11, 11 Pro, 11 Pro Max

This test should be performed with the user.

Note: The iPhone must pass the Multi-Touch test above or the AST 2 Multi-Touch, Unexpected Touch, and MRI diagnostic suites.

- a. Go to Settings > General > Accessibility > 3D Touch and confirm that the 3D Touch setting is enabled and sensitivity is set to Medium. 3D Touch must be enabled for 3D Touch and Taptic Engine functionality.
- b. Go to Settings > General > Accessibility > Vibration to enable the Taptic Engine.
- c. Use the 3D Touch Sensitivity Test to check the Peek and Pop functions. Look for the visual feedback and feel for the haptic feedback.



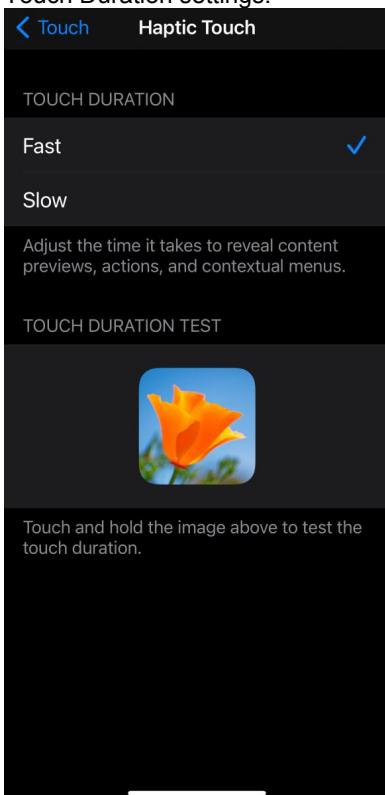
- d. Press the Home button to return to the Home screen.
- e. Hold the device with the display perpendicular to the floor.
- f. Firmly press on one icon in the center of the display to test 3D Touch. Look for visual feedback. If the app does not support 3D Touch, then the area around the app icon will blur momentarily and provide haptic feedback then return to the Home screen. If the app supports 3D Touch, then a contextual menu will appear with a blurred background.



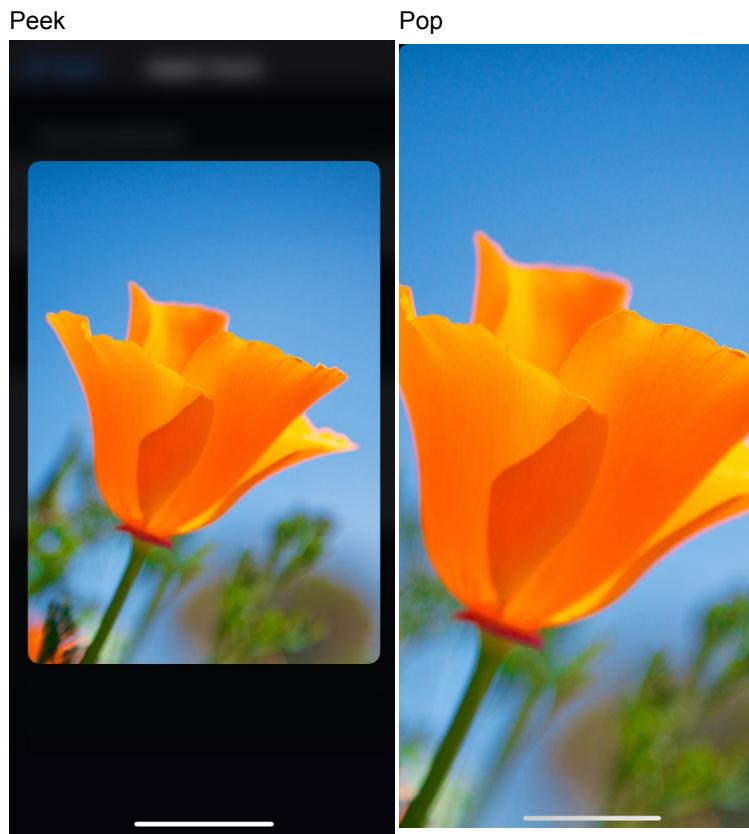
- g. Feel for haptic feedback when pressing the app icons.
- h. Hold the iPhone with the display parallel to the floor and repeat steps f and g.

16. Test Haptic Touch - iPhone SE, XR, 11, 11 Pro, 11 Pro Max and iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max

- a. Go to Settings > Accessibility > Touch to enable the Vibration option.
- b. Go to Settings > Accessibility > Touch > Haptic Touch to verify Peek and Pop functions for both Fast and Slow Touch Duration settings.



- c. Touch and hold the image to Peek, then tap again to Pop:



17. Test the Taptic Engine - iPhone XR, 11, 11 Pro, 11 Pro Max, SE (2nd generation), iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max

This test should be performed with the user to verify the Taptic Engine.

- a. Tap Ringtones in Settings > Sounds & Haptics
- b. Tap Vibration.
- c. Tap Rapid and verify the iPhone vibrates as expected.

18. Test True Tone display - iPhone 8 and later

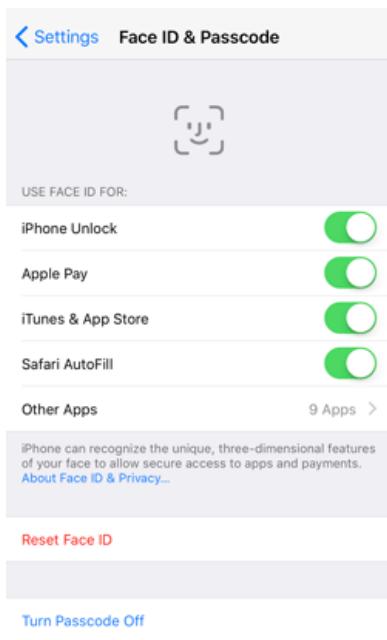
This test should be performed with the user to verify the True Tone display.

- a. Toggle True Tone off and then on in Settings > Display & Brightness
- b. Make sure that the tint of the white displayed changes when True Tone is toggled on and off.

19. Test Face ID - iPhone X and later, except iPhone SE (2nd generation)

This test should be performed with the user to verify Face ID.

- a. Go to Settings > Face ID & Passcode
- b. Tap Reset Face ID if Face ID has been enabled.



c. Tap Set Up Face ID.



d. Ask the user to follow the onscreen instructions.

[Cancel](#)



How to Set Up Face ID

First, position your face in the camera frame. Then move your head in a circle to show all the angles of your face.

[Get Started](#)