



# **Longevity, by Design**

June 2024

# Contents

<b>Apple's approach to longevity</b>	<b>3</b>
Spotlight on reliability testing	5
OS support	6
<b>Apple's principles on repairability</b>	<b>7</b>
Designing for repairability	8
<b>Principle 1: Environmental impact</b>	<b>9</b>
Spotlight on carbon emissions	9
<b>Principle 2: Access to repair services</b>	<b>10</b>
<b>Principle 3: Safety, security and privacy</b>	<b>11</b>
Spotlight on third-party battery safety	12
<b>Principle 4: Transparency in repair</b>	<b>13</b>
Parts and service history	13
The truth about parts pairing	14
Third-party parts used in repair	15
<b>Expanding access to repair services</b>	<b>17</b>
<b>Looking forward</b>	<b>19</b>
<b>Frequently asked questions</b>	<b>20</b>
<b>Sources and endnotes</b>	<b>23</b>

# Apple's approach to longevity

At Apple, we are always working to create the best experience for our customers, which is why we design products that last. Designing for longevity is a company-wide effort, informing our earliest decisions long before the first prototype is built and guided by historical customer-use data and predictions on future usage. It requires striking a balance between durability and repairability while not compromising on safety, security and privacy.

We are continuously striving to increase product longevity through new design and manufacturing technologies, ongoing software support, and expanded access to repair services. We also make it easy for customers to give their products a second life by simplifying the process to securely wipe their devices in preparation for resale or trade-in.

Our approach is working. Apple lead the industry in longevity as measured by the value of our second-hand products, increasing product lifespans and decreasing service rates.

---

**"Designing the best, longest-lasting products in the world requires striking a balance between durability and repairability, while providing ongoing software updates – and we're constantly looking for new and innovative ways to accomplish that mission."**

John Ternus, Senior Vice President of Hardware Engineering



## Value of second-hand devices

Apple products hold their value longer than competitor devices, making them more likely to be passed on to new users. In many of our key markets, such as the US and within Europe, iPhone retains at least 40% more of its value compared to Android smartphones, with the valuation difference increasing for even older models of iPhone.<sup>1</sup> Additionally, as of January 2024, iPhone 7, which was introduced in 2016, still had monetary value for Apple Trade In in the United States.<sup>2</sup> In fact, hundreds of millions of iPhone users own second-hand devices.

**40% more value retained**  
in iPhone over competitors



## Product lifespan

The longevity of Apple products continues to increase. There are hundreds of millions of iPhone devices that have been in use for more than five years – and that number is still growing. And Apple products remain in use longer than competitor devices.<sup>3,4,5</sup>

**5+ years old**  
age of hundreds of millions of iPhone devices still in use



## Service rates

How infrequently a product requires a repair over its lifespan is the strongest indicator of quality and reliability. The newest generations of Apple devices are much less likely to need a repair compared to devices released just a few years ago. For example, from 2015 to 2022, out-of-warranty repair rates were down by 38%. For iPhone, overall repairs for accidental damage have decreased by 44% since the introduction of improved enclosures starting with the iPhone 7 lineup. When liquid ingress protection was introduced with iPhone 7 and iPhone 7 Plus, repairs for liquid damage decreased by 75%. Improving reliability and maintaining quality are two of the most important factors to increase the longevity of our devices.

**38% decline**  
in out-of-warranty service rates between 2015 and 2022

---

**The reliability of our hardware will always be our top concern when seeking to maximise the lifespan of products.**

---

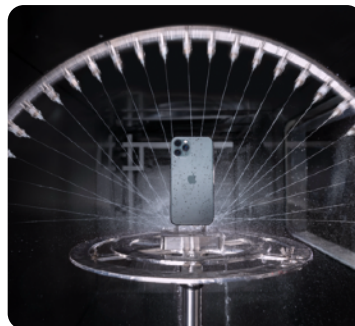


**Spotlight on reliability testing**

We are committed to building the best products for our customers. Our engineering teams look for every opportunity to achieve high levels of durability for every material used, part selected and product assembled. To do this, we have a rigorous reliability testing process that goes hand in hand with the development of our products and repair processes. Reliability testing is not a step that comes at the end – it's intrinsically part of the entire product development life cycle. Not only do insights from early testing help inform component and design improvements, but we begin exploring potential sources of failure even before the first prototype is built. This tight integration allows us to identify any issues early on and make changes to materials, parts or product design accordingly. We do ongoing testing until each product is launched, but we don't stop there. As customer-use patterns evolve, we continue to update our test suites to ensure our product quality improves year after year.

Our tests are designed to mimic real-world usage. During testing, we expose products to liquids and foods, harsh chemicals, skincare products, intense UV light and abrasive materials, to name a few. We also subject devices to stress tests that allow us to examine how they react to stressors, including vibrations experienced in a moving vehicle, strain from being sat on and impacts from accidental drops on hard surfaces. These tests, conducted across tens of thousands of prototype devices every year, are designed to make sure Apple products are dependable through life's everyday moments. We are proud that we go beyond the industry-standard checklist for reliability testing – our test suites are bespoke to every product line.

For example, early generations<sup>6</sup> of iPhone were susceptible to failure if exposed to liquids, such as accidental spills, getting caught in the rain or drops in water – so our design teams iterated until they were able to achieve robust liquid ingress protection, which decreased repair rates by 75% with iPhone 7 and iPhone 7 Plus. While these changes required the addition of adhesives, seals and gaskets that made repairs more complex, the remarkable improvements to product longevity justified a slight increase in repair complexity. The reliability of our hardware will always be our top concern when seeking to maximise the lifespan of products. The reason is simple: the best repair is the one that's never needed.



To test for IPX3/4 water resistance, Apple use a swing arm with nozzles to simulate water spraying or splashing on iPhone.



To test for IPX7/8 water immersion protection, Apple submerge iPhone inside a pressurised vessel to simulate pressure experienced underwater.

## OS Support

A key pillar of product longevity is software support, especially security updates and bug fixes. Apple have a demonstrated track record of providing widely adopted, long-lasting operating systems (OS) that extend well beyond the historical industry norm, with OS feature updates as far back as six years from the device's original release. Our most recent release, iOS 17, is compatible with 24 iPhone models introduced since 2018. iPadOS 17 is compatible with iPad models introduced since 2018, and macOS Sonoma is compatible starting with Mac computers introduced in 2017. But even after an Apple product can no longer be updated with Apple's newest OS, we strive to provide our customers with critical security updates. For example, as recently as March 2024, we released an update to iOS 15 that covered products as far back as iPhone 6s, which was introduced in 2015.<sup>7</sup> Every OS released is optimised for the product it supports through extensive functional, power and stability testing, and our goal is to maintain or improve its performance.

### Devices supported by current operating systems

	macOS Sonoma	iOS 17	iPadOS 17
<b>2017</b>	iMac Pro	–	iPad Pro 12.9-in. (2nd gen)
<b>2018</b>	MacBook Pro (15-in.) MacBook Pro (13-in., Four Thunderbolt 3 ports) MacBook Air (Retina, 13-in.) Mac mini	iPhone XR iPhone Xs iPhone Xs Max	iPad Pro 12.9-in. (2nd gen) iPad Pro 10.5-in.
<b>2019</b>	MacBook Pro (16-in.) MacBook Pro (13-in., Two Thunderbolt 3 ports) MacBook Pro (13-in., Four Thunderbolt 3 ports) MacBook Pro (15-in.) MacBook Air (Retina, 13-in.) iMac (Retina 5K, 27-in.) iMac (Retina 4K, 21.5-in.) Mac Pro	iPhone 11 iPhone 11 Pro iPhone 11 Pro Max	iPad mini (5th gen) iPad Air (3rd gen) iPad (7th gen)
<b>2020</b>	MacBook Pro (13-in., M1) MacBook Pro (13-in., Two Thunderbolt 3 ports) MacBook Pro (13-in., Four Thunderbolt 3 ports) MacBook Air (M1) MacBook Air (Retina, 13-in.) iMac (Retina 5K, 27-in.) Mac mini (M1)	iPhone SE (2nd gen) iPhone 12 mini iPhone 12 iPhone 12 Pro iPhone 12 Pro Max	iPad (8th gen) iPad Air (4th gen) iPad Pro 11-in. (2nd gen) iPad Pro 12.9-in. (4th gen)
<b>2021</b>	MacBook Pro (16-in.) MacBook Pro (14-in.) iMac (24-in., M1)	iPhone 13 mini iPhone 13 iPhone 13 Pro iPhone 13 Pro Max	iPad (9th gen) iPad mini (6th gen) iPad Pro 12.9-in. (5th gen)
<b>2022</b>	MacBook Pro (13-in., M2) MacBook Air (M2) Mac Studio	iPhone 14 iPhone 14 Plus iPhone 14 Pro iPhone 14 Pro Max	iPad Air (5th gen) iPad (10th gen) iPad Pro 11-in. (3rd gen) iPad Pro 11-in. (4th gen) iPad Pro 12.9-in. (6th gen)
<b>2023</b>	MacBook Pro (16-in.) MacBook Pro (14-in.) MacBook Air (15-in., M2) Mac mini Mac Studio Mac Pro	iPhone 15 iPhone 15 Plus iPhone 15 Pro iPhone 15 Pro Max	–
<b>2024</b>	MacBook Air (13-in., M3, 2024) MacBook Air (15-in., M3, 2024)	–	iPad Air 13 in. (6th gen) iPad Air 11 in. (6th gen) iPad Pro 11-in. – M4 (7th gen) iPad Pro 13-in. – M4 (7th gen)

# Apple's principles on repairability

The ability to repair a device and access repair services are important considerations when designing long-lasting products. However optimising for repairability alone may not yield the best outcome for our customers or the environment. Apple strive to improve the longevity of devices by following a set of design principles that help resolve tensions between repairability and other important factors – including impact to the environment; expanding access to repair services; preserving the safety, security and privacy of our customers; and enabling transparency in repair. This also requires careful analysis of anonymised historical data and predictions of future customer usage so that priority is given to those product modules that will potentially have the highest frequency of needing repair.

---

**“Repairability is an essential component of longevity, yet optimising for repairability alone may not yield the best outcome for our customers or the environment.”**

John Ternus, Senior Vice President of Hardware Engineering

## Designing for repairability

At Apple, our goal is to design products to withstand the rigours of everyday use, while minimising the need for maintenance or repair. Strategically designing for repairability without compromising on durability is a key pillar of device longevity. For example, to enable easy battery replacement, we use advanced adhesives to robustly secure batteries that are designed to release when stretched in a specific direction.

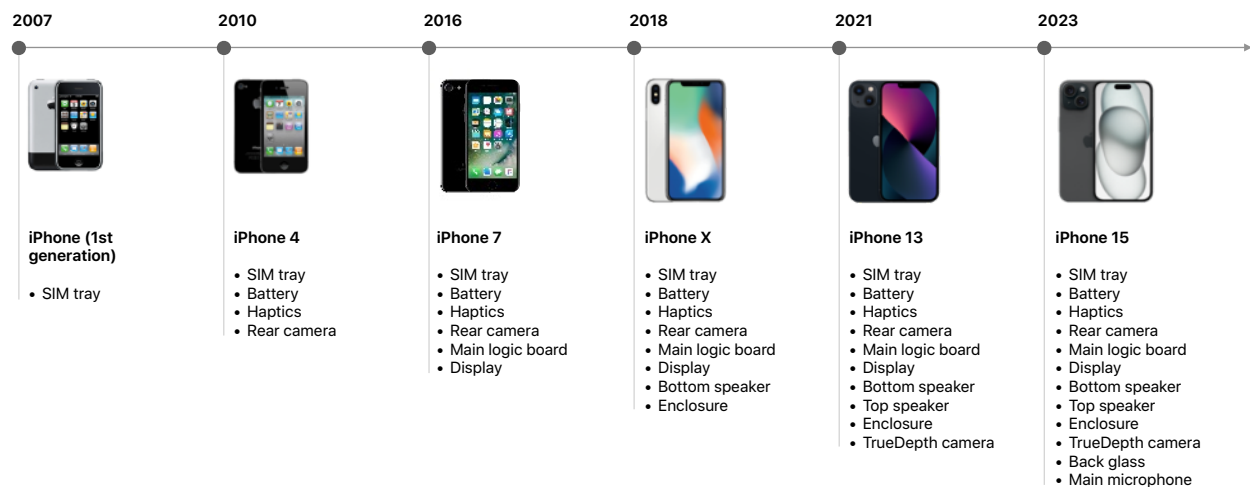


iPhone batteries are secured using advanced adhesives that are designed to release when stretched in a specific direction, enabling battery replacement.

With each new generation of iPhone, teams iterate to improve repairability. Most recently, that included the design of an entirely new chassis structure that allowed easier repair of the back glass. The iPhone 15 lineup is the most repairable ever: 11 key modules can be repaired, including the back glass, battery, display and cameras. Enabling iPhone back glass repair as an individual module lowered the cost of repair for customers by over 60%.<sup>8</sup>

We're also in the process of making significant improvements to the repairability of Mac laptops, iPad and Apple Watch. For example, MacBook Air, MacBook Pro and iPad batteries were recently redesigned to be easier and faster to replace – and we're committed to designing all products with serviceable batteries. We also want to ensure each device meets our customers' expectations for quality and reliability of Apple products following a repair.

### Repairable iPhone modules





## Principle 1: Environmental impact

Apple have set an ambitious goal to become carbon neutral for our entire carbon footprint by 2030. Our work starts with bringing new clean energy online across our supply chain. More than 320 Apple suppliers have committed to using renewable electricity, and over 18 million tonnes of greenhouse gas emissions were avoided in 2023.<sup>9</sup> We're building our products with more recycled and renewable materials than ever. In financial year 2023, 22% of the materials we dispatched in our products came from recycled sources.<sup>10</sup>

Prioritising product longevity, rather than enabling reparability in isolation, can also create meaningful reductions in environmental impact. Our customers and the environment are best served by enhancing a product's durability while selectively focusing on modularity and reparability for those parts most frequently in need of repair.



### Spotlight on carbon emissions

Designing highly repairable products is often considered to be a best practice to reduce environmental impact and extend longevity, but it is not always true. Sometimes prioritising durability results in lower carbon emissions. This has also been confirmed by the EU Joint Research Centre and included in relevant EU standards.<sup>11</sup>

Prioritising reparability is important for consumables or components susceptible to accidental damage, which are more likely to need repair. For example, the iPhone display and battery are two modules that need replacement most often and are designed to be repairable. It's also why we heavily invest in improving the durability of both through Ceramic Shield and long-lasting batteries.

However, prioritising reparability can be misguided when the need for a service is infrequent – an internal case study on the iPhone charging port helps to demonstrate this. The iPhone charging port is part of a highly durable module that includes microphones and other components that can be repaired as a unit, but rarely requires replacement. Making the charging port individually replaceable would require additional components, including its own flexible printed circuit board, connector and fasteners that increase the carbon emissions required to manufacture each device. The higher manufacturing carbon emissions are only justified if the charging port requires replacement in at least 10% of devices. In fact, the actual service rate was below 0.1%, meaning Apple's existing design approach yields lower carbon emissions over the lifetime of the device.

This case study is just one example detailing that prioritising reparability above all else is not always the answer. Similar conclusions have been reached on other modules, such as laptop display assemblies, system memory architectures and tablet back cover assemblies.<sup>12</sup> Best practices for extending longevity while minimising environmental impact will vary by product, its customer use cases and the need for repair – there is no one-size-fits-all solution.

---

**For more information  
about Apple's  
environmental efforts,  
visit [apple.com/uk/  
environment](https://apple.com/uk/environment)**

---

## Principle 2: Access to repair services

Repairs are inherently disruptive, but if a repair is needed, we seek new ways to offer convenient access to safe, reliable and secure repairs – whether by Apple, a third-party repair shop or the customer directly – to help solve the issue as quickly as possible. That's why we've doubled the size of our industry-leading service and repair network in the last five years by adding more professional service providers. It's also why Apple launched Self Service Repair in 2022, providing customers with access to genuine Apple parts, tools and repair manuals – and why we continue to expand repair access to more products and regions. In fact, 85% of the US population is within a 30-minute drive of an Apple Store, Apple Authorised Service Provider (AASP) location or Independent Repair Provider (IRP). In the United Kingdom, that's true for 82% of the population, and in Italy and Germany, it's 89%.

We're also committed to continuing to support customers who choose to use third-party repair services, parts and repair tools so that their repair is completed to the Original Equipment Manufacturer's (OEM) standards and with the highest post-repair reliability possible. Apple warranties are not affected by repairs outside Apple's authorised network or through the use of third-party parts or third-party tools, unless the product is damaged during the course of the repair. We will not actively disable a third-party part designed to be manufactured to the same specifications of our products unless it impacts customer security and privacy, which is currently limited to biometric parts.

## Principle 3: Safety, security and privacy

Customer safety, security and privacy should never be compromised during or after a repair.

Apple give repair technicians and consumers access to our cloud-based diagnostic system, which uses remote software tools to diagnose potential issues. This approach eliminates the need for repair professionals to request customer passwords and potentially compromise security or privacy.

Apple devices contain a lifetime of personal data – only the device's owner should have access to it.

Apple ensure the critical personal biometric information that protects customers' data and is used in features such as Face ID and Touch ID is stored on the device securely. That level of security is expected from organisations such as banks and credit card companies for the use of Apple Pay, as well as from government entities issuing digital IDs. If a third-party Face ID or Touch ID sensor is introduced during a repair, malicious actors can potentially access a customer's sensitive data or steal their information. We know that these types of threat are not theoretical – in a 2023 study, security researchers were able to bypass the biometric protections of three popular PC fingerprint sensors using external hardware.<sup>13</sup>

There are also critical safety protections in place for the lasers used in many iPhone and iPad models. In order to ensure these lasers are compliant with safety standards, multiple hardware safeguards operate simultaneously. Introducing a third-party part can compromise these protections and potentially lead to emissions in excess of safety limits.

That's why, during the repair process, Apple and AASPs only use genuine Apple parts, which have been rigorously engineered and tested to meet our standards – we do not use third-party parts because we cannot guarantee their safety, privacy and security protections, or their quality or performance. In fact, in a new, independent study of third-party smartphone replacement batteries, none of the batteries tested fully complied with global battery safety standards.<sup>14</sup>

---

## 88% of third-party batteries tested in a UL Solutions study caught fire or exploded in at least one test.

---



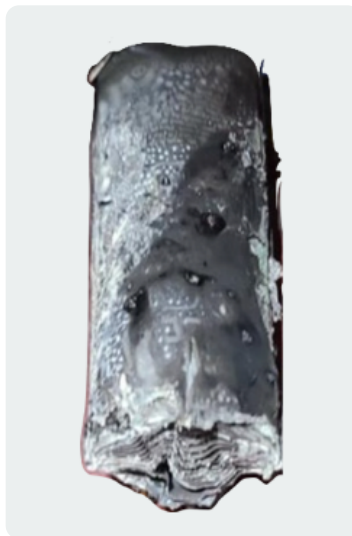
### Spotlight on third-party battery safety

According to a new UL Solutions report on the safety of third-party (also called aftermarket) phone batteries, the majority of batteries tested failed to comply with the safety requirements that OEM batteries must meet and “purchasing aftermarket batteries brings with it safety risks”.<sup>15</sup>

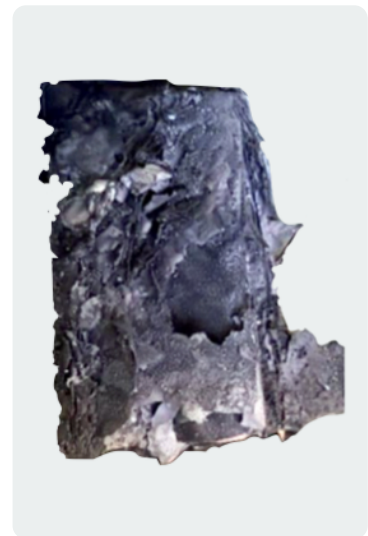
In this study, 33 brands of third-party batteries were sourced from North America, China and Europe, and multiple samples of each were tested to local battery safety standards, culminating in over 1,200 test results. The study included a range of tests from short circuiting at varying temperatures to behaviour in low pressure environments. UL found that 88% of the batteries caught fire or exploded in at least one of the tests that OEM batteries are required to pass. For the batteries sourced in North America, 100% had at least one test failure resulting in smoke, fire or explosion.

The UL Solutions study demonstrates that there is a vast range of quality levels when it comes to third-party batteries and consumers should scrutinise the source of their batteries to ensure they are tested appropriately for compliance to safety standards.

While Apple do not disable the use of third-party batteries, transparency is critical. It is important to notify consumers when a third-party battery is installed so they are aware of the potential risk to their safety.



Third-party battery after an External Short-Circuit test, which is intended to simulate an unintended circuit fault.



Third-party battery after an Abusive Overcharge test, which is intended to simulate charging the battery beyond its intended limits.

## Principle 4: Transparency in repair

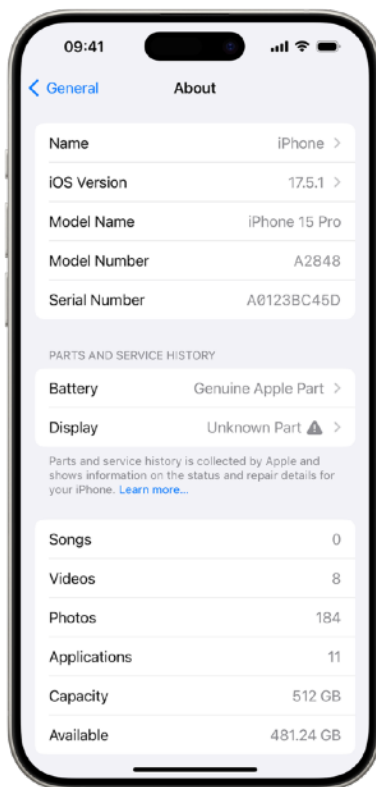
### Parts and Service History

Customers have a right to transparency – that is, to know if their device has been repaired and whether parts critical to safety, security or privacy are designed by Apple. For example, the introduction of a third-party biometric sensor could compromise user authentication or an improperly manufactured battery could jeopardise safety. That's why Apple introduced a feature called **Parts and Service History** with our Self Service Repair programme. Apple remain the only smartphone manufacturer that alert customers if their device has been repaired and whether its parts are made by Apple.

Repairers in Apple's IRP network are free to offer third-party parts in addition to genuine Apple parts. Today, there is only one scenario whereby Apple will disable a third-party part: when a third-party Face ID or Touch ID sensor is installed, we will disable authentication to ensure security and privacy. Other aspects of the part unrelated to authentication, such as cameras or buttons, continue to operate per the capability of the part installed. Apple will also display a one-time notification the first time the device restarts after a repair, and a persistent message in Parts and Service History because Apple cannot verify the integrity of the part.

Access to Parts and Service History also enables prospective second-hand device owners to inspect the device's repair history prior to purchase, which is increasingly important as the market for second-hand devices continues to grow. This is why Apple continue to increase visibility to repair history and the origin of parts used in repairs to consumers: it serves as a safeguard to ensure customers receive the parts they believe they are purchasing from repair providers.

If a user's iPhone has undergone repair of a major component, a Parts and Service History section will appear in their iPhone settings. If the service was completed using genuine Apple parts and calibration was successful, the user will see a "Genuine Apple Part" message. If the service was completed with a third-party part or calibration was not successful, they will see an "Unknown Part" message. Not having this messaging would result in consumers being unaware of prior repairs that could potentially compromise functionality or threaten user safety and security.



A Parts and Service History section in iPhone settings will appear if a user's iPhone has undergone repair.

## The truth about parts pairing

Parts pairing is the practice of using software to identify component parts through a unique identifier. Apple use parts pairing to make access to repairs easier and more transparent to customers while also ensuring every device – and the data stored on it – remains secure and performs optimally. It is not to pressure consumers to go to Apple for their repairs – in fact, Apple conduct less than one third of out-of-warranty repairs. Additionally, in-warranty and out-of-warranty repair rates for Apple between 2015 and 2022 are down by 78% and 38%, respectively, reflecting increased device quality and reliability.

Parts pairing was launched with iPhone 5s and Touch ID to protect our customers from unauthorised access to their data. Over time, Apple continued to expand measures to protect customers as more third-party parts, such as batteries, began to flood the market.

The security of Apple's devices is designed so that no one at Apple or anywhere else can gain access to a customer's sensitive data. This extends to our repair processes as well. Starting in 2018, Apple introduced a secure diagnostic and repair mode to allow a technician to diagnose and repair issues with a customer's device without requiring the customer to disclose their passcode. Replacing security components, such as the Face ID or Touch ID sensor, in a device should never allow someone to bypass the protection of the customer's passcode or biometrics before, during or after a repair.

Additionally, calibration is an important aspect of the repair process and many parts require calibration unique to that part to ensure customers have consistent performance on their Apple devices. For example, the True Tone and Auto-Brightness features rely on accurate communication between a product's display and light sensors.<sup>16</sup> To achieve this, each device's light sensor must be individually calibrated with its display to account for variations in manufacturing. This calibration data is generated for every device manufactured and is stored securely on Apple's calibration servers, reducing cost and the time required to complete a repair in the field. After a repair, it can be downloaded to the device easily, ensuring parts are calibrated accurately. Without loading the calibration data unique to the display, iOS software is not able to interpret data from the light sensors, which adversely impacts True Tone and Auto-Brightness functions. Cloud-based calibration data also avoids the need to store data on the part itself, which enhances reliability in situations where a memory module fails.

Apple have taken steps in recent years to streamline calibration to make it more efficient, and ensure it is available to all independent repair providers and through Self Service Repair.

In 2023, the process was updated so calibration could be completed without contacting Apple. Additional changes are planned in 2024 to enable pairing and calibration for used Apple parts, which are taken from an existing product and installed in another device during a repair, for our most recent iPhone models. This will further reduce the cost of repair and overall environmental impact, while also increasing consumer choice when seeking a repair. Starting later in 2024, the process for calibrating a used Apple part will be the same as calibrating a new Apple part in the repair of supported devices – it will happen automatically on the device without the need to purchase the part from Apple.

Additionally, customers and service providers will no longer need to input a device's serial number to the Self Service Repair store to purchase a new part for most repairs.

We're also extending Activation Lock for iPhone to cover individual parts, to help deter stolen parts from entering the market. Activation Lock is a feature that Apple introduced in response to requests from customers and law enforcement to help deter device theft. During a repair, if a device detects that a supported part came from another iPhone with Activation Lock or Lost Mode enabled, we will restrict calibration for that part. This enhancement to the Activation Lock feature further extends our commitment to protecting our users while increasing consumer choice when it comes to repairs.

In addition, Apple are continuously improving support for third-party parts used in repairs. In the case of a third-party part for which calibration is not available on Apple's cloud-based calibration servers, the Apple device will attempt to activate the part and allow it to operate to its best possible performance while transparently reflecting the device's repair history.

### **Third-party parts used in repair**

Apple warranties are not affected by repairs outside Apple's authorised network or through the use of third-party parts or third-party tools, unless the device is damaged during the course of the repair. Customers always have the ability to choose which parts they use for repair, and their device will maintain functionality, provided the use of a third-party part does not pose a risk to consumer security or privacy.

Many of our customers choose third-party parts for out-of-warranty repairs, including third-party displays and batteries. When third-party parts that may present a potential risk are installed, Apple will display a one-time notification the first time a device restarts after a repair, and a persistent message in Parts and Service History in the device's Settings. The one-time notification enables customers to validate that the expected part was used in the repair, and a customer – or subsequent owner – can always find a record of the repair in the device's Settings. These notifications never impact the functionality or usability of the device.

Due to the fact that Apple do not have calibration data for third-party parts, the device software will use either existing or default calibration settings.

One example is True Tone, which uses advanced sensors to adjust the colour and intensity of the display to match ambient light so images appear more natural. True Tone requires precise calibration to function properly, and it is not possible to engage a default calibration for third-party displays, which can result in unexpected behaviour. For this reason, Apple disable the True Tone feature when third-party displays are used, but enables all other aspects of the display. In an effort to offer more complete support for third-party parts, starting later in 2024, Apple will allow consumers to activate True Tone with third-party parts to the best performance that can be provided.

They will be able to deactivate True Tone in Settings if the display does not perform to their satisfaction.

Currently, battery health metrics, such as maximum capacity and cycle count, are not presented to consumers whose devices have third-party batteries. This is because the accuracy of these metrics cannot be verified by Apple. In fact, an Apple internal analysis has found that some third-party batteries sold as new are actually second-hand, with battery health metrics manipulated to appear as new. In an effort to improve support for third-party batteries, starting later in 2024, Apple will display battery health metrics with a notification stating that Apple cannot verify the information presented. When selecting a third-party battery for repair, we encourage all consumers to confirm that the product meets stringent safety requirements.



# Expanding access to repair services

We believe customers should have convenient access to safe and reliable repairs that do not compromise the security, privacy and the functionality of their device. That's why we've continued to improve access to repair services for both professionals and individual consumers.

Over the last five years, Apple have doubled the number of professional service locations to over 10,000 – offering more ways for customers to access repair services.

---

## Repair service milestones

2018	Same-day iPhone display repair available at Apple Authorised Service Providers (AASP)
2019	Independent Repair Provider (IRP) launches in US for iPhone
2020	IRP expands to Mac IRP expands to Europe and Canada
2021	IRP expands globally
2022	Self Service Repair launched in US for iPhone Self Service Repair expands to M1 Mac devices, launches in 8 countries in Europe
2023	Self Service Repair expands to iPhone 14 and to additional Mac devices System Configuration updated for Self Service Repair Launched Diagnostics for Self Service Repair in the US Self Service Repair expands to 32 countries in Europe
2024	Self Service Repair expands to more Mac devices Diagnostics expands to Europe Streamlined System Configuration process for Mac devices

## Service and repair options for Apple devices

	Apple Stores and Mail-in Apple Repair Centres	Apple Authorised Service Providers (AASPs)	Independent Repair Providers (IRPs)	Self Service Repair
<b>Cover</b>	500+ Apple retail stores* Mail-in service*	5,000+ locations At-home services*	5,000+ locations	33 countries and 24 languages
<b>Diagnostics</b>	●	●	●	●
<b>Repair documentation</b>	●	●	●	●
<b>Third-party parts**</b>	○	○	●	○
<b>Apple-certified training</b>	●	●	●	○
<b>Calibration support</b>				
Genuine Apple parts	●	●	●	●
Used Apple parts	○	○	Coming soon	Coming soon
<b>Tools</b>				
Apple tools for purchase	●	●	●	●
Apple tools for hire	○	○	○	●
Third-party tools**	○	○	●	○

● Available    ○ Not Available

\* In selected locations

\*\* IRPs and individual consumers have the option of using third-party parts and tools in repair.

# Looking forward

At Apple, our approach to longevity is guided by data and our commitment to building the best products in the world. Team members across all disciplines are constantly innovating to make sure every product exceeds expectations for durability and performance while protecting the safety, security or privacy of our users when their device needs a repair.

This journey is one that will never be over, because as materials, testing and technology advance, so too will the ways that we use them to make our products stand the test of time. Products that are durable, reliable and – when it benefits our customers and the environment – repairable. When a repair is required, we protect user data, provide visibility into the parts that were used and, if needed, disable a feature for the protection of the device's owner. And throughout this process, we reduce our impact on the environment.

That's our commitment to our customers, to future generations and to the planet we call home.

# Frequently asked questions



## **Do Apple engage in “planned obsolescence”, the practice of intentionally designing devices that rapidly become obsolete, to drive sales of new products?**

Absolutely not. We take tremendous pride in designing products that stand the test of time. There are hundreds of millions of iPhone devices that have been in use for more than five years – and that number is still growing. And while some of our competitors are just starting to promise multi-year OS updates for their products, Apple pioneered the practice of providing free updates to our consumers over a decade ago to keep products lasting longer. We also make it easy for customers to give their products a second life by streamlining the process to securely wipe their devices in preparation for resale, donation or trade-in.



## **Is designing for repairability better for the environment?**

When we design a product, we balance a variety of factors to create the best outcome for both our customers and the environment. For example, the earliest generations of iPhone were prone to failure when exposed to liquids, such as getting caught in the rain or from accidental spills. So our design teams worked to achieve robust liquid ingress protection, which involved adding seals, gaskets and adhesives – and had the consequence of making repairs more complex – but resulted in failure rates plummeting by 75%. So from an environmental point of view, it made sense to design for durability despite the increase in repair complexity because it drastically minimised the need for repair in the first place. There are also scenarios when designing for repairability is best for the environment, for example when a replaceable battery would extend the lifespan of a product. For us, the best design decision is the one that increases product longevity – because that’s paramount for our customers and our planet.



### **What is Apple doing to create more customer choice when it comes to repairs?**

We have doubled the size of our industry-leading service and repair network in the last five years by adding more professional service providers, and we're expanding Self Service Repair to even more products and regions. We're committed to continuing to support customers who use third-party repair services, parts and repair tools – in fact, most out-of-warranty repairs use third-party parts.

To further expand customer choice, we're also excited to announce that starting later this year, we're making used Apple parts – taken from an existing product and installed in another device during a repair – as easy to use as new Apple parts in the repair of selected products. This will reduce overall environmental impact and the cost of repair.

We will continue to expand repair options as new technologies and innovations emerge – our goal is to give consumers more choice while ensuring repairs are reliable, safe and high-quality. That said, the best repair is one that isn't needed. We're also proud that repair rates are down dramatically: from 2015 to 2022, out-of-warranty repair rates were down by 38%, while devices simultaneously are lasting longer and remaining in use longer.<sup>17</sup>



### **Why is it important to inform customers on what type of part was used in their repair?**

Not all parts are manufactured to the same standards. A new independent study by UL Solutions examined dozens of third-party lithium-ion batteries and found that none of the batteries tested met existing safety standards – and 88% failed so catastrophically that they caught fire.<sup>18</sup> That's why Apple are the only smartphone company that transparently provide a device's repair history, including the origin of any repaired parts, through a feature called Parts and Service History. Considering that millions of iPhone devices in use are second-hand, it's critical for customers to have access to their device's repair history so they're aware if it contains parts that could potentially compromise their safety, security or privacy.



### **Why is parts pairing, the practice of using software to identify component parts through a unique identifier, important?**

Parts pairing is critical to ensuring our customers' security and privacy. It accomplishes this in numerous ways, including deterring bad actors from cloning parts to bypass security protections and access customer data, which is not a theoretical threat. In a 2023 study, security researchers were able to bypass the biometric protections of three popular PC fingerprint sensors using external hardware.<sup>19</sup> Calibration is another important part of the repair process, ensuring Apple devices operate to their full potential. If a third-party part is used in a repair, calibration will not be supported and the Apple device will attempt to activate the part and allow it to operate to its best possible performance.

It's important to note today that Apple do not disable third-party parts except in the context of biometrics, which only applies to the introduction of third-party Face ID and Touch ID sensors that could result in compromised user data. While parts pairing does add a step to the repair process, it's a key element of our strategy to ensure our customers' data is secure, they have transparency when it comes to the parts used in repairs and their product is one that lasts.



### **Do Apple support right to repair legislation?**

Apple were the first smartphone manufacturer to come out in support of federal regulation for repair in the US. We believe that consumers and businesses would benefit from laws that balance repairability with customer safety, product performance and integrity. Laws can help ensure transparency for consumers about the type of parts used in a repair, maintain privacy, data and device security features that help to deter theft, and allow manufacturers to focus on building new products that comply with those regulations – all while reducing the confusion created by potentially conflicting approaches within countries and across borders.

# Sources and endnotes

1. Based on the trade-in value of iPhone relative to its launch purchase price compared to competitor Android phones on a variety of trade-in platforms.
2. Applies specifically to Apple's US Trade In programme.
3. Michael Levin and Josh Lowitz, "iPhone Owners Keep Phones Longer Than Android Owners", *CIRP – Apple Report* (blog), 25 October 2023, <https://cirppapple.substack.com/p/iphone-owners-keep-phones-longer>.
4. Kantar ComTech Global, CQ1'24 Mobile Study, data for US.
5. Cunningham, Andrew, "iPhone vs. Android: Which Is Better for You?" *New York Times Wirecutter*, 27 January 2021, <https://www.nytimes.com/wirecutter/reviews/ios-vs-android/>.
6. Generations prior to iPhone 7.
7. Apple, "Apple security releases", Apple Support, <https://support.apple.com/HT201222>.
8. The cost of back glass repair for customers decreased by 66% for iPhone 15 Pro and iPhone 14 Pro models and decreased by 64% for iPhone 15 Pro Max and iPhone 14 Pro Max models.
9. Apple, "2024 Environmental Progress Report", *Environmental Progress Report*, 18 April 2024, [https://www.apple.com/environment/pdf/Apple\\_Environmental\\_Progress\\_Report\\_2024.pdf](https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2024.pdf).
10. "Apple Environmental Progress Report".
11. Publications Office of the European Union, "Guidance for the Assessment of Material Efficiency: Application to Smartphones", Publications Office of the EU, 2020, <https://op.europa.eu/en/publication-detail/-/publication/19c79488-4641-11ea-b81b-01aa75ed71a1/language-en>.
12. T. Ebert, et al. "Product Design Strategies for Decarbonization and Resource Efficiency", *Electronics Goes Green*, 2024, ISBN 978-3-00-079329-5, [https://online.electronicsgoesgreen.org/login/?redirect\\_to=https://online.electronicsgoesgreen.org/papers](https://online.electronicsgoesgreen.org/login/?redirect_to=https://online.electronicsgoesgreen.org/papers), pp. 108–113.
13. Jesse D'Aguanno and Timo Teräs, "A Touch of Pwn – Part I", 21 November 2023, <https://blackwinghq.com/blog/posts/a-touch-of-pwn-part-i/>.
14. UL Solutions, "Safety Concerns of Aftermarket Smartphone Lithium Batteries", 2024 <https://www.ul.com/insights/safety-concerns-aftermarket-smartphone-lithium-batteries>.
15. "Safety Concerns of Aftermarket Smartphone Lithium Batteries | UL Solutions", 2024.
16. Vampola, Kenneth J., Guocheng Shao, Warren S. A. Rieutort-Louis, Ming Xu, Mahesh Chappalli and Abbas Jamshidi Roudbari, "12-1: Invited Paper: Through-OLED Display Ambient Color Sensing", *Digest of Technical Papers* 53, no. 1, 1 June 2022, pp. 117–20. <https://doi.org/10.1002/sdtp.15431>.
17. Repair rates based on Apple internal data for customers who purchased AppleCare+.
18. "Safety Concerns of Aftermarket Smartphone Lithium Batteries | UL Solutions", 2024.
19. D'Aguanno and Teräs, "A Touch of Pwn – Part I".



© 2024 Apple Inc. All rights reserved. Apple and the Apple logo are trademarks of Apple Inc., registered in the US and other countries.

Other product and company names mentioned herein may be trademarks of their respective companies.