	gned by Apple Inc., who determines internal systems, designs, and prices. iPhones contain many hardware elementation to external OEM companies, maintaining a high degree of control over the end product.	nents in its specifications. Apple
Contents  Screen and input  3D Touch and Haptic Touch	duction to external <u>OEM</u> companies, maintaining a fight degree of control over the end product.	
Sensors Proximity sensor Ambient light sensor Accelerometer		
Magnetometer Gyroscopic sensor Radio Fingerprint sensor Barometer		
Facial recognition sensor  Audio and output  Battery  Camera		
Storage SIM card Liquid contact indicators Included items		
Payments Taptic Engine See also External links		
	nerations is a 3.5 inches (90 mm) liquid crystal display with scratch-resistant glass; The one on the iPhone 5, 50	
(140 mm); The iPhone X, XS, and (170 mm). The capacitive touchscr 320×480 (HVGA) at 163 ppi; those (120 mm) models, with 750×1334 a initial models were using twisted-new twis	hone 6, 6S, 7, 8, second generation SE, and third generation SE is 4.7 inches (120 mm); the iPhone 6 Plus, 6S Plus 11 Pro with 5.8 inches (150 mm); The iPhone XR, and 11 with 6.1 inches (150 mm); and the iPhone XS Max teen is designed for a bare finger, or multiple fingers for multi-touch sensing. The screens on the first three generated and iPhone 4S have a resolution of 640×960 at 326 ppi; the 4 inches (100 mm) models, with 64 at 326 ppi; the 5.5 inches (140 mm) models, with 1080×1920 at 401 ppi; and the 5.8 inches (150 mm) model X, the ematic (TN) LCDs. Starting with iPhone 4, the technology was changed to in-plane switching (IPS) LCDs. The iPhone X is the first iPhone to use an OLED display. It has a near bezel-less screen with a ≈19.5:9 aspect respectively.	and 11 Pro Max with 6.5 inches generations have a resolution of 0×1136 at 326 ppi; the 4.7 inches with 1125×2436 at 458 ppi. The Phone 5 model's screen results in
The touch and gesture features of the necessary electrical conductivity; [3] feature a fingerprint-resistant oleoperature in the iPhone has a minimal hardward section of the iPhone has a minimal hardwa	he iPhone are based on technology originally developed by <u>FingerWorks</u> . Most gloves and <u>styli</u> prevent the [4][5][6] although <u>capacitive styli</u> can be used with iPhone's finger-touch screen. The iPhone 3GS and later also <u>phobic</u> coating. Coating. The iPhone is situated directly to the only physical menu button is situated directly	atio. L-1
interface. Earlier models included a Apple's fingerprint recognition feature with the exception of the iPhone method. [8]	'Home button" because its primary function is to close the active app and navigates to the home screen of the a rounded square, reminiscent of the shape of icons on the home screen. However, new models which include are Touch ID (which use the Home button as the fingerprint sensor) have no symbol. The iPhone X and later, SE (2nd generation), don't have a Home button but instead Face ID, a facial recognition authentication is located on top of the device on earlier models. In the newer models starting with the iPhone 6, it is on right	The top and side of an iPhone 5S, externally identical to the SE (2016). From left to right, sides:
of the device. It serves as the unit's silences the ringtone, and when pre iPhone 4 has two separate circular panel, known as a rocker switch, who Directly above the volume controls	s power button, and also controls phone calls. When a call is received, pressing the sleep/wake button once essed twice transfers the call to voicemail. Situated on the left spine are the volume adjustment controls. The buttons to increase and decrease the volume; all earlier models house two switches under a single plastic nich could reasonably be counted as either one or two buttons.  is a ring/silent switch that when engaged mutes telephone ringing, alert sounds from new & sent emails, text tions, camera shutter sounds, Voice Memo sound effects, phone lock/unlock sounds, keyboard clicks, and	wake/sleep button, silence switch, volume up, and volume down.
spoken auto-corrections. This switch the camera shutter or Voice Memoratal on all later models. The touch A software update in January 2008 lacking GPS hardware. Since the iPl	ch does not mute alarm sounds from the Clock application, and in some countries or regions it will not mute sound effects. [9] All buttons except Home were made of plastic on the original first-generation iPhone and ascreen furnishes the remainder of the user interface.  8 allowed the first-generation iPhone to use cell tower and Wi-Fi network locations trilateration, [10] despite hone 3G generation, the iPhone employs A-GPS operated by the United States. Since the iPhone 4S generation	The head of a maldiple on a CC of
3D Touch and Haptic Touch The <u>iPhone 6S</u> and 6S Plus, introduce technology, and a new Taptic Engin	uced in 2015, feature <u>3D Touch</u> displays which allow the screen to recognize how hard it is being pressed using ne to provide haptic feedback. In addition to visual cues, 3D Touch uses the Taptic Engine to provide a taction $\frac{1}{2}$ .	le sensation relative to the force
All iPhones starting with the iPhone on all iPhones starting with the iPhone functionality of 3D Touch but cannot	cate to the user that a light or deep press action has been completed. An example of how this technology was useressing to open it, a feature dubbed 'Peek and Pop' by Apple. [13]  e 6s (with the exception of the <u>first-generation iPhone SE</u> and <u>iPhone XR [14]</u> ) had this feature. Starting in 2019 one 11/ <u>iPhone 11 Pro</u> , and its software features were removed from <u>iOS 13</u> and later in favour of Haptic Touch. Hot detect pressure, as the display lacks integrated capacitive sensors. Actions that previously required a deep preser associated with the applied pressure but rather the touch duration. Due to the migration from 3D Touch to Haptic Touch Touch to Haptic Touch Tou	however, 3D Touch was omitted laptic Touch retains much of the ss now only require a long press,
can update to <u>iPadOS 13</u> , along wit functionality with the iOS 13 and iP	th the <u>first-generation iPhone SE</u> and <u>seventh-generation iPod touch</u> , which previously did not support 3D Tou adOS 13 updates, although without any haptic feedback.	ch, gained similar Haptic Touch
and authenticate purchases with Ap  Proximity sensor  A proximity sensor deactivates the	display and touchscreen when the device is brought near the face during a call. This is done to save battery p	ower and to prevent inadvertent
buttons. A phone case, dirt or grime  Ambient light sensor	s. <sup>[15]</sup> The iPhone's proximity sensors detect the ear and switches off the light, saving power and stopping the face, or a software problem may cause the proximity sensor to malfunction. [16]  e display brightness which saves battery power and prevents the screen from being too bright or too dark. [17]	
•	change the colour and intensity of the iPhone screen to match the ambient light, resulting in more natural-locallable around the iPhone and other apple products, such as the iPod and iPad. The device changes the screen be not minimize eye strain. [18]	
browsing, web browsing, and music upside-down, with the Home butto applications, such as email, and int	orientation of the phone and changes the screen accordingly, allowing the user to easily switch between portrain playing support both upright and left or right widescreen orientations. Unlike the <u>iPad</u> , the iPhone does not above the screen, unless the running program has been specifically designed to do so. The 3.0 update added troduced shaking the unit as a form of input (generally for <u>undo</u> functionality). The accelerometer can also be tracking purposes, primarily as a <u>pedometer</u> . Starting with the iPhone 5S, this functionality was included in led chip	ot rotate the screen when turned landscape support for still other used to control third-party apps,
radio signals can interfere with the	e iPhone 3GS, which is used to measure the strength and direction of the magnetic field in the vicinity of the device in magnetometer requiring users to either move away from the interference or re-calibrate by moving the device in es a Compass app, which was unique at time of release, showing a compass that points in the direction of the mag	a figure-eight motion. Since the
	ion iPod touch, and the iPad 2, a three-axis gyroscope was included. This sensor will run on six axes due to the co sons of the implementation was to enhance gaming mechanics such as the sensitivity and responsiveness aspec	
to the chip. Later iterations of the i	ained a chip capable of receiving <u>radio</u> signals; [21] however, Apple has the FM radio feature switched off because (Phone (starting with the iPhone 7), however, do not contain radio chips at all. [22] A campaign called "Free Radio such as Apple to enable the radio on the phones they manufacture, reasons cited were that radio drains less pow	io On My Phone" was started to
such as the 2016 Fort McMurray Williams  Fingerprint sensor  Until 2017, iPhone models starting	ildfire. <sup>[23]</sup> from <u>iPhone 5S</u> (excluding the <u>iPhone 5C</u> ) featured Apple's <u>fingerprint recognition</u> sensor. It is used for unlocki	ng the device and authenticating
starting with the <u>iPhone X</u> . The fin approve transactions. It's compatible <b>Barometer</b>	none 6) using <u>Touch ID</u> . It is located in the home button. Touch ID has been replaced by Face ID (excluding the gerprint sensor uses the user's biometric information to give the user quick access to the device. It can also be le with iPhone, iPad, and iPod touch.  The content is used to determine air pressure and elevation. [24]	e used to open applications and
position and navigational features by Facial recognition sensor  Starting with the iPhone X, a facial	by determining the altitude through evaluating air pressure. The barometers will allow the device to be pinpointed recognition sensor, named the TrueDepth camera system, is featured. It is used for unlocking the device and fo	l.
Face ID. It can also be used for Anir  Audio and output  On the bottom of the iPhone, the loudspeaker above the screen that s	ere is a speaker to the left of the dock connector and a microphone to the right. There is an additional erves as an earpiece during phone calls. The iPhone 4 includes an additional microphone at the top of the unit	waterontroating paronases asing
for noise cancellation, and switched Volume controls are located on the The 3.5 mm TRRS connector for the after which time it was moved to the making it incompatible with most be mounted headphone socket. Cars experience of the controls are located on the Transfer of the Control of the Con	es the placement of the microphone and speaker on the base on the unit—the speaker is on the right. [25] left side of all iPhone models and as a slider in the iPod application.  The headphones is located on the top left corner of the device for the first five generations (original through 4S), the bottom left corner. The headphone socket on the first-generation iPhone is recessed into the casing, headsets without the use of an adapter. Subsequent generations eliminated the problem by using a flush-quipped with an auxiliary jack allow handsfree use of the iPhone while driving as a substitute for Bluetooth.	From left to right is the headphone jack, microphone, Lightning connector, and built-in speaker on the base of the iPhone 5S.
The iPhone 7 and later have no 3.5 mm headphone jack), or (for tradicular Lightning port. This adapter is available. Apple's own headset has a multiput third-party headsets designed for the	mm headphone jack, [28] and instead headsets must connect to the iPhone by Bluetooth, use Apple's Lightning tional headsets) use the Lightning to 3.5 mm headphone jack adapter, which is included with iPhone 7 up us lable for purchase at several leading retailers. [29]  rpose button near the microphone that can play or pause music, skip tracks, and answer or end phone calls with the iPhone also include the microphone and control button. [30] The current headsets also provide volume controls in the audio jack carries this extra information.	ntil iPhone X and plugs into the hout touching the iPhone. Some
The built-in <u>Bluetooth 2.x+EDR</u> supage A2DP. While non-sanctioned third-from exchanging multimedia files, so Composite [33] or component [34] vio	pports wireless earpieces and headphones, which requires the <u>HSP profile</u> . Stereo audio was added in the 3.0 upports solutions exist, the iPhone does not officially support the <u>OBEX file transfer protocol</u> . The lack of the such as pictures, music and videos, with other Bluetooth-enabled cell phones.	se profiles prevents iPhone users
output <sup>[35]</sup> without audio, and HDM  Battery  The iPhone features an internal reclapattery is not user-replaceable. [27][	If output, [36] with stereo audio, via dock adapters.  thargeable lithium-ion battery. Like an iPod, but unlike most other mobile phones at the time of its launch, the [37] The iPhone can be charged when connected to a computer for syncing across the included USB to dock	
to charge directly from an AC ou connecting an iPhone to a charger v	g an iPod. Alternatively, a USB to AC adapter (or "wall charger", also included) can be connected to the cable tlet. Some models of the iPhone support wireless charging. [38] A distinction to Android devices is that while powered off causes it to power on rather than showing a battery indicator without booting. [39][40] units to determine battery life. Apple's website says that the battery life "is designed to retain up to 80% of its e charge cycles". [41]	
claims. [42][43][44][45] This is also re iPhone 3G its lowest rating of two of the battery malfunctions or dies warranty lasts one year from purchase.	prematurely, the phone can be returned to Apple and replaced for free while still under <u>warranty</u> . [48] The ase and can be extended to two years with <u>AppleCare</u> . The battery replacement service and its pricing was not	
The Foundation for Taxpayer and consumers have to pay to have the besides Since iOS 10.2.1, Apple has institute whose batteries are degraded, in order	ty the product was launched; [49][50] it is similar to how Apple (and third parties) replace batteries for iPods. Consumer Rights, a consumer advocate group, has sent a complaint to Apple and AT&T over the fee that pattery replaced. [49]  ed a policy of employing "performance management" techniques (including CPU throttling) on iPhone devices der to maintain device stability and prolong their lifespan. These changes came in the wake of reported issues tain iPhone models following the release of iOS 10.1.1. In response to criticism over the practice, including	Replacing the battery requires disassembling the iPhone unit and exposing the internal hardware
add additional battery health information. Since July 2007, third-party battery screwdriver and an instruction leaflinstall the new battery. The iPhone	planned obsolescence, Apple announced that it would offer discounted battery replacements for iPhone 6 and nation on a future version of iOS (iOS 11.3, which also allows users to disable this throttling). [51][52][53]  y replacement kits have been available [54] at a much lower price than Apple's own battery replacement program let, but as with many newer iPod models the battery in the first generation iPhone has been soldered in. Therefore 3G uses a different battery fitted with a connector that is easier to replace. [55] The iPhone X features a different read to the sides instead of folded over the top, therefore making repairs a little more difficult than before [56]	These kits often include a small re, a soldering iron is required to
A patent filed by the corporation, puser's habits to moderate the hands	red to the sides instead of folded over the top, therefore making repairs a little more difficult than before. [56] published in late July 2013, revealed the development of a new iPhone battery system that uses location data sets' power settings accordingly. Apple is working towards a power management system that will provide feature ay from a power source to modify energy usage and a detection function that adjusts the charging rate to best suits and the charging rate to be set suits.	es such as the ability to estimate
optical zoom, flash or <u>autofocus</u> , ar iPhone 3G via a third-party app ava	and iPhone 3G (2008) have a <u>fixed-focus</u> 2.0- <u>megapixel</u> camera on the back for digital photos. It has no addess not natively support video recording. Video recording is possible on the first-generation iPhone and ilable on the App Store or through <u>jailbreaking</u> . iPhone OS 2.0 introduced <u>geotagging</u> for photos.	
OmniVision, the camera can also can and directly uploaded to YouTube of The 2010 iPhone 4 introduced a 5.0 It also has a backside-illuminated state.	megapixel camera with autofocus, auto white balance, and auto macro (up to 10 cm). Manufactured by apture 640×480 (VGA resolution) video at 30 frames per second. The video can be cropped on the iPhone or other services.  Departure of the camera (2592×1936 pixels) that can record video at 720p resolution, considered high-definition. Sensor that can capture pictures in low light and an LED flash that can stay lit while recording video. The iPhone 4 also has a second camera on the front that can take VGA	The iPhone 4 is the first generation
photos and record <u>SD</u> video. Saved The 2011 iPhone 4S' camera can sh volume-up button as a shutter trigg.  The <u>iPhone 5</u> (2012) and <u>iPhone 4S</u>	recordings may be synced to the host computer, attached to email, or (where supported) sent by MMS. oot 8-MP stills and 1080p video can be accessed directly from the lock screen and can be triggered using the er. The software makes use of the built-in gyroscope to artificially stabilize the image while recording video. running $\underline{iOS 6}$ or later, can take panoramas using the built-in camera app, $\underline{[61]}$ and the $\underline{iPhone 5}$ can also take hough only at 0.9 megapixels (1280×720), as with the later $\underline{iPhone 5}$ .	to have two cameras. The <u>LED flash</u> for the rear-facing camera (top) and the forward-facing camera (bottom) are available on the iPhone 4 and subsequent models.
The camera on the <u>iPhone 5</u> are proteiphone's camera lens and finger.  The camera on the <u>iPhone 5</u> reporte	otected by a <u>sapphire</u> lens cover, as are all subsequent models. <sup>[64]</sup> In 2014 <u>Apple</u> consumed "one-fourth of the wo	
accessed from the lock screen direct The 2013 iPhone 5S widens the apseparately adjusting in 1,000 combinations.	phone can be configured to bring up the camera app by quickly pressing the home key twice. On all iPhoretly.  Description of $f/2.2$ and features $f/2.2$ and $f/$	ve white balance in low light by e same resolution to increase the
though optical image stabilization of With the release of $\underline{iOS 8}$ , the iPhotime. [71]	de phase detection autofocus, while only the 6 Plus has Optical Image Stabilization. Both models can shoot 1080p of the latter is unfunctional during video recording, making the iPhone 6s Plus of 2015 the first with optical video one 4S and later models can now shoot time-lapse videos, with its capability to switch frame rates automatical content of the desired with a second video of the desired with a second video of the desired with a second video of the desired vi	stabilization. <sup>[70]</sup> lly as the recording increases its
from 1.3 to 5 megapixels, though very utilises the screen's backlight as from the user may change the resolution exhaustion of internal storage capacitants.	e outfitted with a 12-megapixel camera, with $4K$ video capability at 30fps, both for the first time on iPhone. The video resolution remains at 720p. Other features added are <i>Live Photos</i> , which captures a short video along a nt camera flash, though less powerful than the rear LED lamp. [72]  In down to 1080p or 720p in the system settings outside of the camera application, where lower resolutions extent, and reduces power consumption. [73]	photo, and <i>Retina Flash</i> , which end the recording duration until
1.2 megapixels, like the iPhone 5 and The 2016 iPhone 7 features optical is lens cameras (both 12 MP). Both metelephoto lens, which enables 2× optical camera software allows up to 10× optical in the control of the co	image stabilization on its rear camera, a feature that was previously exclusive to the Plus models, and the 7 Plus is nodels have a 7 MP front-facing camera, with video resolution increased from 720p to 1080p. The second cotical zoom, allowing for the level of detail that the center crop of a 48-megapixel photo with the non-tele cameraligital zoom. The rear cameras on the 7 and 7 Plus both have an $f/1.8$ aperture, as compared to $f/2.2$ on the iPlus ligital zoom.	s the first iPhone to feature dual- camera on the iPhone 7 Plus is a a's field of view would have. The nones 6 and 6 Plus, though the 7
The 2017 iPhone 8 camera remains frames per second, slow-mo at 108 LED True Tone flash with 2× better	ot optically stabilized. [28][75] It also has a new quad-LED True Tone flash, which is brighter compared to its predest largely the same as its predecessor, but it features a larger sensor and a newer color filter. The camera can a $\frac{\text{op}}{\text{op}}$ in 240 frames per second. The new camera system also enables Portrait Lighting, which defines the light in light uniformity and Slow Sync. [76]  lost the same as the iPhone 8's camera, but the telephoto lens has an aperture of f/2.4 and optical image stability	lso now record <u>4K</u> at 60 and 24 a scene. It also features a quad-
has Portrait Mode and Portrait Light The iPhone XS, XS Max, and XR ha also features Smart HDR, using th	Iting, due to the new TrueDepth camera system. [78]  It we an updated 12MP (1/2.55") sensor size with a 1.4 $\mu$ m pixel size. The XS series has a telephoto lens, while the local power of A12 Bionic chip, along with the Neural Engine, machine learning, artificial intelligence, and some ge. [79] The devices film with stereo audio instead of mono audio for the first time on iPhone, even though two	ower end XR has only one lens. It advancements to provide better
the 11 Pro and 11 Pro Max. The from The second-generation iPhone SE's fps, stereo recording and cinematic	ax introduced an <u>ultrawide</u> lens; the latter two became the first triple-camera iPhones. The 11 has a dual-lens set camera is now capable of recording video at 4K as a result of a new 12 MP sensor, and can also capture slow-mo camera hardware is the same as the iPhone 8, but adds Portrait mode, Portrait lighting, Smart HDR, extended video stabilization.  Mode to all camera lenses, including the TrueDepth camera. It also uses Deep Fusion in more situations, and	tion footage. lynamic range for video up to 30
sensor-shift stabilization for better Pro's f/2.0 aperture.	s is available for the iPhone 12 and 12 mini, and up to 60 FPS for the 12 Pro and 12 Pro Max. The 12 Pro Max a low-light photos and more details. The telephoto camera can now zoom up to 2.5x on the Pro Max, albeit with a essible through the system settings allows saving HDR photos in both the high dynamic range and normal variant	a f/2.2 aperture instead of the 12
iPhone 8 / 8 Plus, iPhone X  64 GB  64 GB	iPhone storage (iPhone 8 – iPhone 12 Pro / Pro Max)  (R, iPhone 11 iPhone XS / XS Max, iPhone 11 Pro / Pro Max iPhone SE (2nd Gen.) iPhone 12 / 12 Mini iPhone 12 Pro / I  64 GB 64 GB 128 GB	Pro Max
	256 GB	<b>6)</b> <sup>[85]</sup>
4 GB       8 GB         8 GB       16 GB         16 GB       32 GB    SIM card	16 GB     16 GB       32 GB     64 GB       64 GB     128 GB       128 GB     256 GB	
top of the device. The SIM tray can iPhone 3G and 3GS in the United S	M card to identify themselves to the GSM network. The SIM sits in a tray, which is inserted into a slot at the be ejected with a paper clip or the "SIM ejector tool" (a simple piece of die-cut sheet metal) included with the tates and with all models elsewhere in the world. [86][87] Some iPhone models shipped with a SIM ejector tool dubbed "Liquidmetal". [88] In most countries, the iPhone is usually sold with a SIM lock, which prevents the ent mobile network. [89]	
The <u>CDMA</u> model of the iPhone 4, j An iPhone 4S activated on a CDMA network. A CDMA-activated iPhone	ust the same as any other CDMA-only cell phone, does not use a SIM card or have a SIM card slot.  A carrier, however, does have a SIM card slot but does not rely on a SIM card for activation on that CDMA e 4S usually has a carrier-approved roaming SIM preloaded in its SIM slot at the time of purchase that is used roved international GSM networks only. The SIM slot is locked to only use the roaming SIM card provided by	An iPhone 5S with the SIM slot open. The SIM ejector is still placed in the eject hole.
the CDMA carrier. [91]  In the case of Verizon, for example their account has been in good stant this way will reject any non-international stantage.	e, one can request that the SIM slot be unlocked for international use by calling their support number and request the past 60 days. [92] This method only unlocks the iPhone 4S for use on international carriers. An iPhotoinal SIM cards (AT&T Mobility or T-Mobile USA, for example).  The nano-SIM in order to save space internally. The iPhone XS and later iPhones added eSIM support in additional carriers.	one 4S that has been unlocked in
support Dual SIM functionality.  Liquid contact indicated All iPhones (as well as many other of the contact indicated as many other or many oth		ct with water; the iPhone 3G and
approving warranty repair or replace.  The iPhone's indicators are more exbehind a battery cover. These indicators	ement. However, with the adoption of water resistance as a feature of the iPhone, this practice is no longer in use sposed than those in some mobile phones from other manufacturers, which carry them in a more protected local ators can be triggered during routine use, by an owner's sweat, [94] steam in a bathroom, and other light environm policy for iPhones and similar products, allowing customers to request further internal inspection of the phone to	tion, such as beneath the battery nental moisture. [95] Criticism led
cleaning cloth. The first generation while charging and syncing. The iPh	documentation, and a <u>dock connector</u> to <u>USB</u> cable. The first generation and 3G iPhones also came with a iPhone includes a stereo <u>headset</u> ( <u>earbuds</u> and a microphone) and a plastic dock to hold the unit upright none <u>3G</u> includes a similar headset plus a SIM eject tool (the first generation model requires a paperclip). The tool and a revised headset, which adds volume buttons (not functional with previous iPhone versions). [31][97]	
The iPhone 3G and 3GS are compared USB power adapter, or "wall charge America, Japan, Colombia, Ecuador In October 2020, at the iPhone 12	tible with the same dock, sold separately, but not the first generation model's dock. [98] All versions include a ger", which allows the iPhone to charge from an AC outlet. The iPhone 3G and iPhone 3GS sold in North r, and Peru [99][100] include an ultracompact USB power adapter.	The contents of the box of an iPhone 4. From left to right: iPhone 4 in plastic holder, written documentation, and (top to bottom) headset, USB cable, wall
chip, Touch ID fingerprint scanner	h of the <u>iPhone 6</u> , Apple announced <u>Apple Pay</u> , a mobile payment system. The feature, aimed to "revolutionize" ( <u>Face ID</u> on iPhone X and later), <u>Apple's Wallet</u> app, and a dedicated "Secure Element" chip for encrypted of the physical and online. [102]	bottom) headset, USB cable, wall charger.  the way users pay, uses an NFC
exception of the CDMA model of th	oth physical and online. [102]  gine to vibrate when a notification or alert, incoming call, etc. iPhone models before the iPhone 4S use an eccent are iPhone 4. The iPhone 4S and CDMA iPhone 4[103] use a linear resonant actuator vibrator, which usually uses a 5, 5C, and 5S uses an eccentric rotating mass motor. It is unsure as to why Apple decided to switch back. However,	less power and creates a quieter
linear resonant actuator vibrator.	Engine for vibration and haptic feedback, which works similar to the eccentric rotating mass motor. [105]	er, the ir hone o and o rius use a
<ul> <li>Macintosh hardware</li> <li>External links</li> <li>Technical specifications (all months)</li> </ul>	odels) (http://support.apple.com/specs/iphone) at Apple Inc.	
<ol> <li>Fingerworks, Inc. (2003). "iGes</li> <li>Wilson, Tracy (June 20, 2007).</li> </ol>	ations" (https://www.apple.com/iphone-x/specs/). Apple Inc. Retrieved 2017-09-14. sture Game Mode Guide" (http://users.erols.com/rwservices/pens/biblio05.html). fingerworks.com. Retriev "How the iPhone Works" (http://electronics.howstuffworks.com/iphone.htm). <i>HowStuffWorks</i> . Retrieved Jun 7). "The Ultimate iPhone Frequently Asked Questions" (http://poque.blogs.nytimes.com/2007/01/11/the-ul	e 6, 2008.
<ul> <li>d-questions/). The New York Tire</li> <li>5. Pogue, David (January 13, 200) Retrieved June 6, 2008.</li> <li>6. "How the iPhone's touchscree</li> <li>7. Slivka, Eric (June 10, 2009). "Medical Street Programme 10, 2009).</li> </ul>		st-part-2/). The New York Times. ine 6, 2008.
<ul> <li>p/12/iphone-x-release-date-ap</li> <li>9. manuals.info.apple.com/en_U 8105745/http://manuals.info.a</li> <li>0. XFF; et al. (June 13, 2008). "Me 2009.</li> </ul>	2017). "iPhone X: new Apple smartphone dumps home button for all-screen design" (https://www.thegua.com/en-button-screen). <i>The Guardian</i> . Retrieved September 12, 2017. S/iphone_user_guide.pdf (http://manuals.info.apple.com/en_US/iphone_user_guide.pdf) Archived (https://apple.com/en_US/iPhone_User_Guide.pdf) March 8, 2012, at the Wayback Machine. (PDF). Retrieved Noven mo: iPhone does not use triangulation" (http://www.howardforums.com/printthread.php?t=1383413). How GALILEO" (https://galileognss.eu/is-your-phone-using-galileo/). Retrieved 2019-08-16.	web.archive.org/web/2012030 aber 6, 2011.
<ol> <li>Betters, Elyse (March 11, 2015 33176-what-is-force-touch-app 3. "iPhone 6s – 3D Touch – Apple tp://www.apple.com/iphone-6</li> <li>"Does the iPhone XR have 3D 5. John, Steven (August 20, 2019)</li> </ol>	). "What is Force Touch? Apple's haptic feedback technology explained – Pocket-lint" (https://www.pocket-lole-s-haptic-feedback-technology-explained). <i>Pocket-lint</i> . Retrieved November 19, 2018.  2" (https://web.archive.org/web/20151204044155/http://www.apple.com/iphone-6s/3d-touch/). 2015-12-04/s/3d-touch/) on December 4, 2015. Retrieved 2021-01-07.  Touch?   The iPhone FAQ" (https://www.iphonefaq.org/archives/976797). <i>www.iphonefaq.org</i> . September 1 or "How to fix or reset the proximity sensor on your iPhone if it's not working properly" (https://www.busine	. Archived from the original (ht 2, 2018.
<ul> <li>John, Steven. "How to fix or re-iphone). Business Insider. Retr</li> <li>Costello, Sam (12 September 2 Lifewire. Retrieved 2019-11-13.</li> </ul>	2019). "All About the Sensors That Make the iPhone So Cool" (https://www.lifewire.com/sensors-that-make-	iphone-so-cool-2000370).
html?articleID=200900669). <i>EE</i> June 6, 2008.  20. "iPod touch – A Guided Tour" (from the original (https://www.l.). Glaser, April (July 8, 2016). "Yo	). "There's more to MEMS than meets the iPhone" (https://web.archive.org/web/20070929095647/http://web.archive.org/web/20070929095647/http://web.archived from the original (http://www.eetimes.com/showArticle.jhtml?articleID=200900669) on Section (https://web.archive.org/web/20080514121314/http://www.apple.com/ipodtouch/guidedtour/tour/mediur.vapple.com/ipodtouch/guidedtour/tour/medium.html) on May 14, 2008. Retrieved September 23, 2008. ur Phone Has an FM Chip. So Why Can't You Listen to the Radio?" (https://www.wired.com/2016/07/phones.co	n.html). Apple Inc. Archived
smartphone/). <i>Wired</i> .  2. "Apple says iPhone 7 and iPhodio-features/). <i>9to5Mac</i> . 2017-023. Harris, Sophia (May 15, 2016). ne-telecoms-1.3577447). Cana	one 8 do not contain FM radio chips or antennas, in response to FCC request" (https://9to5mac.com/2017/0	9/28/iphone-7-iphone-8-fm-ra ws/business/fm-radio-cellpho
25. "Apple – iPhone 4 – Size, weight Archived from the original (http://encyclope	ht, battery life, and other specs" (https://www.webcitation.org/5quBTT6io?url=http://www.apple.com/iphor tps://www.apple.com/iphone/specs.html) on July 1, 2010. Retrieved July 1, 2010. edia2.thefreedictionary.com/Tip+and+ring). The Computer Language Company Inc. Retrieved March 15, 20 ine 30, 2007). "Apple iPhone review" (https://www.cnet.com/products/apple-iphone/review/). CNET. Retrieved ations" (https://www.apple.com/iphone-7/specs/). Apple Inc. Retrieved October 20, 2016.	009. red March 23, 2017.
ment-lightning-to-3-5mm-hea Frakes, Dan (May 14, 2008). "R 2009.  1. "Apple Earphones with Remot 2009.  2. Sadun, Erica (January 26, 2009)	dphone-adapter-for-9/). Review: iPhone headsets" (http://www.macworld.com/article/133445/2008/05/iphoneheadsets.html). <i>Macw</i> e and Mic" (http://store.apple.com/us/product/MB770G/B?fnode=MTY1NDA1MA&mco=MTM3NTI1ODk). A b). "iBluetooth team achieves OBEX file transfer" (https://arstechnica.com/apple/2009/01/ibluetooth-team-a	orld. Retrieved January 10, pple Store. Retrieved May 19,
Ars Technica. Retrieved March "Apple Composite AV Cable" (h. "Apple Component AV Cable" (h. "Apple VGA Adapter" (http://st. "Apple Digital AV Adapter" (http://st.	·	2011. 2011. MjU4NjE&mco=MjE1Mjg1OTQ).
<ul> <li>37. Oryl, Michael (July 3, 2007). "Re Burn. Archived from the origin 18. "How to wirelessly charge you 19. "charger – Why does my iPhorn-to-charge). Ask Different.</li> <li>40. "Is there a way to charge my in 19.</li> </ul>	eview: Apple iPhone, In-Depth" (https://web.archive.org/web/20100106163724/http://www.mobileburn.com/nal (http://www.mobileburn.com/review.jsp?Id=3526) on January 6, 2010. Retrieved January 10, 2009. Ir iPhone X, iPhone 8, or iPhone 8 Plus" (https://support.apple.com/en-us/HT208078). Apple Inc. December turn on when I plug it in to charge?" (https://apple.stackexchange.com/questions/38715/why-does-my-iPhone while it is turned off?   The iPhone FAQ" (https://www.iphonefaq.org/archives/97310). www.iphonefaccom/questions/38715/why-does-my-iPhone while it is turned off?   The iPhone FAQ" (https://www.iphonefaccom/archives/97310).	7, 2017. Retrieved 2017-12-29. phone-turn-on-when-i-plug-it-i
<ul> <li>"Batteries – Service and Recycle."</li> <li>Cheng, Jacqui (July 14, 2008). "Retrieved March 23, 2017.</li> <li>Lam, Brian (July 11, 2008). "iPh Kramer, Staci D. (July 9, 2008). p-dyn/content/article/2008/07</li> </ul>	ling" (https://www.apple.com/batteries/service-and-recycling/). <i>Apple</i> . Retrieved 2021-01-08. The Second Coming: Ars goes in-depth with the iPhone 3G" (https://arstechnica.com/apple/2008/07/iphone 3G Review" (https://gizmodo.com/5024412/iphone-3g-review). <i>Gizmodo</i> . Retrieved June 23, 2009. "First iPhone 3G Reviews: Mossberg: Battery 'Significant Problem'; Pogue: Limited 3G, Good Audio" (https://o9/AR2008070900177.html). <i>The Washington Post</i> . Retrieved June 23, 2009.	e3g-review/6/). <i>Ars Technica</i> . //www.washingtonpost.com/w
<ul> <li>Mossberg, Walt (July 8, 2008). June 23, 2009.</li> <li>"2008 Business Wireless Smar and Associates. November 6, 2</li> <li>Krazit, Tom (November 6, 2008 March 23, 2017.</li> </ul>	"Newer, Faster, Cheaper iPhone 3G" (http://ptech.allthingsd.com/20080708/newer-faster-cheaper-iphone-tphone Customer Satisfaction Study" (http://www.jdpower.com/corporate/news/releases/pressrelease.asp2008. Retrieved June 10, 2009.  8). "Apple's iPhone wins J.D. Power award" (https://www.cnet.com/news/apples-iphone-wins-j-d-power-award)	ox?id=2008240). J. D. Power
<ul> <li>18. "iPhone Service Frequently As Lee, Ellen (July 11, 2007). "Will Francisco Chronicle. Retrieved J.</li> <li>10. Wong, May (July 8, 2007). "Apply I). The Washington Post. Retrieved J.</li> </ul>	ole Issues Battery Program for IPhone" (https://www.washingtonpost.com/wp-dyn/content/article/2007/07 red July 8, 2007. er iPhones slowed to prevent battery issues" (https://www.zdnet.com/article/apple-slowing-down-older-iph	/08/AR2007070800562_pf.htm
<ul> <li>Patel, Nilay (December 27, 201 8/16827248/apple-iphone-bates)</li> <li>Byford, Sam (2018-02-07). "Ho Retrieved 2020-01-09.</li> <li>Topolsky, Joshua (July 31, 2007 ment-kit-appears/). Engadget.</li> </ul>	19). "Apple apologizes for iPhone slowdown drama, will offer \$29 battery replacements for a year" (https://tery-replacement-price-slow-down-apology). <i>The Verge</i> . Retrieved September 9, 2019. w to turn off iPhone throttling in iOS 11.3" (https://www.theverge.com/2018/2/7/16984234/how-to-iphone 7). "iPhone's first sketchy battery replacement kit appears" (https://www.engadget.com/2007/07/31/iphone Retrieved March 23, 2017.	-throttling-ios-11-3). <i>The Verge</i> .
Note: 15. Wilson, Mark (July 10, 2008). "Retrieved January 10, 2009.  16. "iPhone X Teardown" (https://windows.iphone iPhone 3Gs – Technic iphone 3Gs – Technic iphone 3Gs – Technic iphone iPhone 3Gs – Technic iphone iPh	The iPhone 3G Battery Is Quasi-Replaceable" (https://gizmodo.com/5023983/the-iphone-3g-battery-is-quasi-www.ifixit.com/Teardown/iPhone+X+Teardown/98975). <i>iFixit</i> . 2017-11-03. Retrieved 2017-11-16. 013). "Apple Working On Location-Aware Battery Management For iPhone" (https://techcrunch.com/2013/nt-for-iphone/). <i>TechCrunch</i> . Retrieved March 23, 2017. al Specifications" (https://web.archive.org/web/20100611002036/http://www.apple.com/au/iphone/iphone/	07/25/apple-working-on-locati
Archived from the original (https://www.nchived.com/specificalled)  Archived from the original (https://www.nchived.com/specificalled)  Proposed Foresman, Chris (September 1 phone-4-and-ios-41/). Ars Techived.  What's New in iOS 6" (https://www.nchived.com/specificalled)  Proposed Foresman, Chris (September 1 phone-4-and-ios-41/). Ars Techived.  Techived from the original (https://www.nchived.com/specificalled)  Archived from the original (https://www.nchived.com/specificalled)  Foresman, Chris (September 1 phone-4-and-ios-41/). Ars Techived.  Technical com/specificalled)  Technical com/specifical c	tps://www.apple.com/au/iphone/iphone3gs-specs.html) on June 11, 2010. Retrieved June 21, 2010. al Specifications" (https://www.apple.com/au/iphone/specs.html). Apple Inc. Retrieved June 21, 2010. 3, 2010). "HDR photography with iPhone 4 and iOS 4.1: how good is it?" (https://arstechnica.com/apple/20 nica. Retrieved March 23, 2017. www.apple.com/ios/whats-new/). Apple Inc. Retrieved October 7, 2012. www.apple.com/iphone/features/). Apple Inc. Retrieved October 7, 2012.	10/09/hdr-photography-with-i
<ul> <li>Costello, sam (2020-01-22). "Si 621). Lifewire.</li> <li>Warren, Tom (4 October 2016) apphire-camera-lens-analysis)</li> <li>Wakabayashi, Daisuke (2014-1 Street Journal. ISSN 0099-9660</li> <li>"iPhone 5 Camera Problem" (h</li> </ul>	nap Photos and Record Video on an iPhone at the Same Time" (https://www.lifewire.com/take-photo-while ). "Apple's iPhone 7 camera lens uses pure sapphire despite test claims" (https://www.theverge.com/2016/. <i>The Verge</i> . Retrieved 15 December 2021.  1-19). "Inside Apple's Broken Sapphire Factory" (https://online.wsj.com/articles/inside-apples-broken-sapp (https://www.worldcat.org/issn/0099-9660). Retrieved 2021-12-14.  https://archive.today/20130131111646/http://pointerbrain.com/iphone-5-camera-has-a-problrm). Archived	10/4/13160180/apple-iphone-s hire-factory-1416436043). <i>Wall</i>
erbrain.com/iphone-5-camera 7. "Our tests find 'purple haze' et /10/our-tests-find-purple-haze eports.org/electronics/2012/1 Neues iPhone 4S (http://www. m/translate?&sl=de&u=http:// Biphone%2B4s%26hl%3Den%	i-has-a-problrm) on January 31, 2013. Retrieved October 9, 2012.  ffect isn't limited just to the iPhone 5" (https://web.archive.org/web/20121028140852/http://news.consume-problem-isnt-limited-just-to-the-iphone-5.html). Consumer Reports. October 10, 2012. Archived from the ocour-tests-find-purple-haze-problem-isnt-limited-just-to-the-iphone-5.html) on October 28, 2012. Retrieve spiegel.de/netzwelt/gadgets/0,1518,789946,00.html), by Der Spiegel, 5 October 2011 (Translation by Googleww.spiegel.de/netzwelt/gadgets/0,1518,789946,00.html&oi=translate&ct=result&resnum=1&prev=/searcesa%3DG%26biw%3D1024%26bih%3D627%26prmd%3Dimvns))	erreports.org/electronics/2012 riginal (http://news.consumerr d October 25, 2012. e (https://translate.google.co ch%3Fq%3Dder%2Bspiegel%2
•	7). "The iPhone 5s Review" (https://www.anandtech.com/show/7335/the-iphone-5s-review/10). <i>www.anandt</i>	ecn.com. p. 10. Retrieved

'0. Smith, Chris (25 September 2015). "iPhone 6s vs. iPhone 6s Plus: OIS 4K video recording shows the true potential of Apple's new camera" (https://bgr.com/2015/09/25/iphone-6s-plus-4k-ois-video/). BGR. Retrieved 17 April 2021.

"How Apple's new Retina Flash — 5 years in the making — brightens up selfies on the iPhone 6s" (https://appleinsider.com/articles/15/09/10/how-apples-new-retina-flash----5-years-in-the-making----brightens-up-selfies-on-the-iphone-6s). *Apple Insider*. September 10, 2015. Retrieved April 24, 2020.

"3. "4K-Videos: iPhone 6s mit 16 GB in wenigen Minuten gefüllt" (https://www.giga.de/smartphones/iphone-6s/news/4k-videos-iphone-6s-mit-16-gb-in-wenigen-minuten-gefuellt/). GIGA (in German). 10 September 2015.

75. Rehm, Lars (2016-09-12). "iPhone 7 Plus dual-cam only offers stabilization in wide-angle lens, report says" (https://www.dpreview.com/news/5458766074/iphone-7-plu s-dual-cam-only-offers-stabilization-in-wide-anlge-lens). DPReview. Retrieved 19 April 2021.

'8. "How Apple's iPhone X TrueDepth Camera Works" (https://www.extremetech.com/mobile/255771-apple-iphone-x-truedepth-camera-works). ExtremeTech. 2017-09-14. Retrieved 2017-12-30.

'9. "What are HDR, Auto HDR & Smart HDR shooting modes and how do they boost my iPhone photography game?" (https://www.idownloadblog.com/2018/09/19/about-smart-hdr/). idownloadblog. 2018-09-18. Retrieved 2020-04-24.

"Apple iPhone XS review" (https://www.gsmarena.com/apple\_iphone\_xs-review-1827p6.php). *GSMArena.com*. 2018-04-19. p. 6. Retrieved 19 April 2021. "There is one final improvement in the iPhone XS camera – stereo recording for the video capture."

"Apple iPhone XR review" (https://www.gsmarena.com/iphone\_xr-review-1842p6.php). *GSMArena.com*. 2018-10-23. p. 6. "A new addition for iPhones this year is stereo audio recording, which works as you'd expect."

32. "How to Use your iPhone 4/4S Microphones Properly" (https://www.iphoneincanada.ca/how-to/how-to-use-your-iphone-44s-microphones-properly/). iPhone in Canada Blog. 22 March 2012. "The iPhone 4 debuted with dual microphones, as announced on stage by Steve Jobs in 2010 at WWDC."

3. "How do I save both normal and HDR photos to the iPhone camera roll?" (https://www.iphonefaq.org/archives/973374). The iPhone FAQ. 2014-03-13. Retrieved 29 May

"when was the iphone 6s and 6s plus storage doubled – Google Search" (https://www.google.com/search?q=when+was+the+iphone+6s+and+6s+plus+storage+double d&safe=active&ssui=on). www.google.com. Retrieved 2021-05-27.

'4. Beavis, Gareth Beavis (October 5, 2020). "iPhone 7 review" (https://www.techradar.com/reviews/phones/mobile-phones/iphone-7-1327947/review/5). *TechRadar*.

'6. "Apple iPhone 8 Plus – Full phone specifications" (https://www.gsmarena.com/apple\_iphone\_8\_plus-8131.php). www.gsmarena.com. Retrieved 2017-11-16.

77. "Apple iPhone X – Full phone specifications" (https://www.gsmarena.com/apple\_iphone\_x-8858.php). www.gsmarena.com. Retrieved 2017-11-16.

34. "iPhone – Compare Models" (https://www.apple.com/iphone/compare/). *Apple*. Retrieved 2021-05-27.

"Pamoving SIM card" (http://cupport.apple.com/kh/HT1/29) Apple Inc. July 10, 2009, Petrioved June 11, 2009

2021.

'1. "The Secret behind the time-lapse function in the iOS 8 Camera app" (https://9to5mac.com/2014/10/01/iphone-time-lapse/). 9to5mac. 2014-10-01. Retrieved 2019-06-06.

<ul> <li>17.</li> <li>18.</li> <li>19.</li> <li>10.</li> <li>11.</li> <li>12.</li> <li>13.</li> <li>14.</li> <li>15.</li> <li>16.</li> <li>17.</li> <li>18.</li> <li>19.</li> </ul>	Diaz, Jesus (June 9, 2008). "iPhorant-must+buy). Gizmodo. Retrieval Hughes, Neil (August 17, 2010). m_ejector_tool_for_apples_iphora "Wireless carrier support and feapple Inc. "iPhone 4 – Size, weights Slivka, Eric. "Sprint Offers Clarificates international-micro-sim-unloom Miller, Matthew. "International tre-is-how-to-sim-unlock-your-veapple "iPhone and iPod: Liquid damage Retrieved December 25, 2010. Martin, David (April 19, 2009). "See Respers, Lisa (April 14, 2009). "See Respers, Lisa (April 14, 2009). "See Retrieved November 5, 2009. Epstein, Zach (November 9, 2010 olicy!). Boy Genius Report. Retrieval Tapple Earphones with Remote January 26, 2011. "Apple iPhone 3G Dock" (http://s"Apple – Support – Apple Ultrace.	"Liquidmetal created SIM ejectone_ipad.html). AppleInsider. Retreatures for iPhone" (https://supplht, battery life, and other specs cation on iPhone 4S Internation cking/). MacRumors. Retrieved Justiavelers: Here is how to SIM untrizon-apple-iphone-4s/6712). ZE ge is not covered by warranty" (here was a some small one). "Apple Amends Internal iPod ved January 7, 2011.  and Mic" (http://store.apple.com/store.apple.com/store.apple.com/us/product/ME	akes It Instant Must-Buy" (her tool for Apple's iPhone, iPrieved January 1, 2012. Port.apple.com/kb/HT20403 " (https://www.apple.com/ipal Micro-SIM Unlocking" (https://www.apple.com/ipal Micro-SIM Unlocking" (https://support.apple.com/kb/DNet. Retrieved July 13, 2012 http://support.apple.com/kb/P" (https://www.cnet.com/nert phone users" (http://edition/uk/product/MB770G/B?fn/uk/product/MB770G/B?fn/484G/A). Apple Store. Retries	ad" (http://www.appleinsidel.org). Apple Inc. December 23. Shone/specs.html). Apple Inc. Japane Inc. J	er.com/articles/10/08/17/ , 2016. Retrieved January 2 nc. Retrieved June 23, 2010 (2011/10/13/sprint-offers	liquidmetal_created_si 28, 2017. clarification-on-iphone- cernational-travelers-he c. August 27, 2010. ded March 23, 2017. ndex.html). CNNipod-water-damage-p nc. Retrieved
10. 11. 12. 13. 14. 15.  Reti	"Apple – Support – Apple Ultrace Retrieved January 9, 2009.  "Apple – Support – Apple Ultrace gram/countries.html). Apple Inc. "Apple announces iPhone 12 anne-12-mini-a-new-era-for-iphone Jeffries, Adrianne (September 9, e-6-nfc-mobile-payment). The Veiphone 4S and iPhone 4 (CDMA) Ye, Shen (April 8, 2015). "The scin November 19, 2018.  Wuerthele, Mike. "Inside the iPhed). AppleInsider.  Trieved from "https://en.wikipedia.org/w/miles page was last edited on 15 May 2022 to is available under the Creative Commodemark of the Wikimedia Foundation, Inc.	ompact USB Power Adapter Exc.  Retrieved January 9, 2009.  d iPhone 12 mini: A new era for e-with-5g/). Apple Newsroom.  2014). "Apple Pay allows you to erge. Retrieved May 28, 2017.  Vibrator - iFixit Store (https://weence behind Force Touch and the none 7: Apple's Taptic Engine, exercise (https://weence.com/stitle=IPhone_hardware&old/statistics.)  A at 11:58 (UTC).  Ons Attribution-ShareAlike License 3.0; and apple is a stribution-ShareAlike License 3.0; and apple is a stribution-ShareAlik	hange Program – Latin Ame iPhone with 5G" (https://www.iphone with you ww.ifixit.com/Store/iPhone/ ne Taptic Engine" (https://www.iphoned" (https://appleinsid	rican Countries" (https://www.apple.com/sg/newsroor ur iPhone 6" (https://www.t iPhone-4S-and-iPhone-4-CI ww.imore.com/science-beh er.com/articles/16/09/27/ir	ww.apple.com/support/usm/2020/10/apple-announdheverge.com/2014/9/9/60 DMA-Vibrator/IF115-015?oind-taptics-and-force-touchside-the-iphone-7-apples-	badapter/exchangepro es-iphone-12-and-ipho 84211/apple-pay-iphon =1) h). <i>iMore</i> . Retrieved taptic-engine-explaine