

The UK's best-selling Apple mag!

116
PAGES OF
HELP & ADVICE

> Issue 310 > March 2017
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Mac FORMAT



Enhance YOUR MAC

New accessories
to make your Mac
better than ever!

mac OS Sierra

Time Machine

Data Recovery

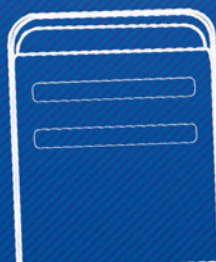
iOS 10



The Genius Handbook

A Self-Help Manual for Macs

It's-a
me!
Mario on
iPhone
The world's most
famous plumber
is back. Review
& tips p103



iCloud issues



Bluetooth & Wi-Fi



Data recovery

MODELS SUPPORTED: iMAC, MAC PRO, MACBOOK PRO, MACBOOK, MACBOOK AIR

TURN TO PAGE 30



Make the most of your desktop

> Practical productivity tips
for multiple monitors

Future

Smart Home Starter Kit

> Give your house an IQ boost



Mac | iPhone | iPad | Apple Watch | iCloud | iTunes | Photos

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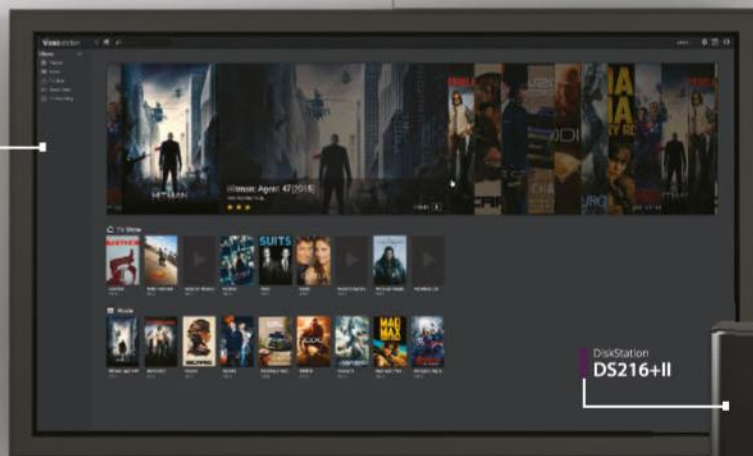


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Mac
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PRESENTS

iOpener

Game-changing tech from the world of Apple and beyond



AirBar's developer is considering versions for other MacBook models.

AirBar

Turn your MacBook into a touchscreen device

The iPad Pro and Apple Pencil make an amazing painting device, but they aren't cheap. If you have a 13-inch MacBook Air and would rather make use of that for your artistic output, AirBar could come in handy. It's a sleek aluminium bar that, once plugged into one of your MacBook's USB ports, transforms its display into a touchscreen. It works with any input device, from an Apple Pencil or brush, to your finger or even a banana, the developer claims. It also told us it's planning to roll out support for other MacBooks in the future, so keep your eyes peeled.

> \$99 (about £82) > **INCLUDES** AirBar strip
> **WEBSITE** air.bar/mac > **WORKS WITH** 13-inch MacBook Air

Military grade iPad protection **dux plus** for iPad Pro 9.7" & 12.9"



The **dux plus** provides best-in-class protection for your iPad Pro 12.9" or 9.7" device.

Product Features

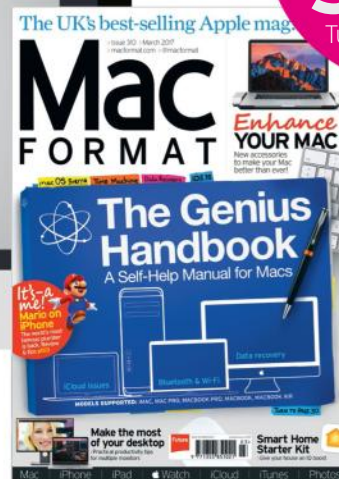
- Built-in storage and protection for the Apple Pencil
- Protective polycarbonate and rubberised bracket
- Durable and water resistant polyurethane cover to ward off occasional drips or spills
- Patented magnetic closure allows for easy folding for typing or viewing



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➤ Going to the Genius Bar can be a humbling experience for most of us. Whether it's because we've done something completely unspeakable to our kit - potentially involving coffee - or simply because our Mac isn't working and we have no clue why. It's not fun. That's why, starting on page 30, we've imagined what information a **secret Apple handbook** would include so that you might never go to the Genius Bar again. And if you do, at

least you'll have a rudimentary knowledge of what's going on.

This issue you'll also find a **review and tips on Super Mario Run**, a game that sparked memories in everyone on the team; turn to page 103 for that. There's also a full report of **everything Apple-related at CES**, the annual electronics show, starting on page 14. And there's a really handy four-page tutorial on page 56 to take the stress out of turning your house into an **automated smart home**.

Finally from me, on page 75 **Luis has worked up another brilliant project** in which he gets a 20-year-old keyboard to work with his modern setup, just for the love of that evocative 90's click.

SIMON KIRRANE
EDITOR
editor@macformat.com

Meet the team



Alan Stonebridge
Production Editor

➤ Having comprehensively conquered Super Mario Run, Alan's been thinking about selling old Apple kit to buy a Switch. Mission accomplished, Nintendo.



Alex Blake
Commissioning Editor

➤ It's the season of love, and that means Alex is declaring his love for all people... who give him free Apple kit. iPhones get extra love points.



Paul Blachford
Managing Art Editor

➤ Paul's hoping there's a new iMac coming from Apple very soon, with Intel's Kaby Lake eight-core i7 CPUs, married to powerful new AMD discrete graphics.



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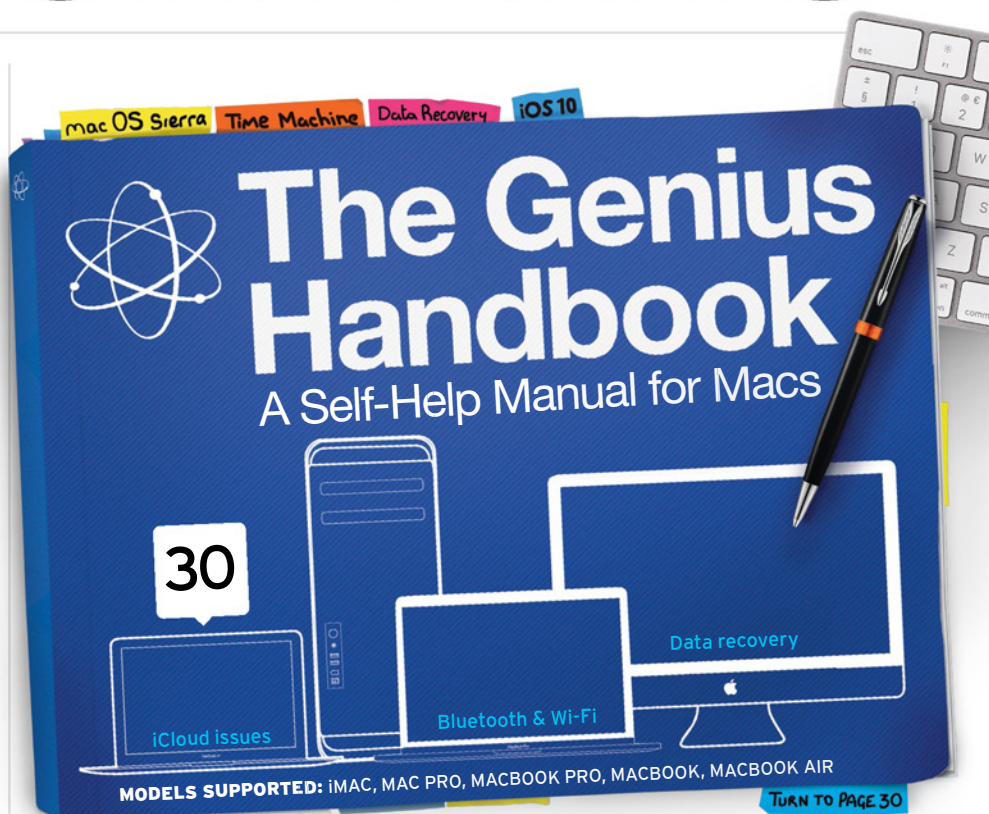
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*INCLUDES PRINT AND DIGITAL EDITIONS

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headphones
and speakers



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**LOVE
YOUR
MAC**

> Inspiring ideas for
revamping old Apple kit





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APPLE CORE

EDITED BY **SIMON KIRRANE** ›



APPLE RUMOUR

Apple Watch This Space

A slimmer, round-faced watch may be the future

› Apple Watch has been a solid success. In true Apple style it has sold well and disrupted the market while simultaneously broadcasting the device's functionality the world over. So maybe it's time for the Apple Watch revolution to keep turning. We've investigated a number of Apple patents and it seems change may be on the way.

US patent application 2016/0231815 shows that Apple is looking at moving haptic response to the wristband of the Watch - a move that would free up room to make the Watch slimmer or add extra functionality - fancy one with a camera?

Another patent application (2016/0351098) reveals plans for an 'Electronic Device Having Display With Curved Edges' - or, a round-faced watch, as you'll find on most watches and which has always seemed a safe bet.

Alex says...



The Apple Watch hasn't won everyone over, so this is Apple's chance to really wow people



1

1

SLIMMER

› Fashion has always been a key aspect of Apple Watch's design and, when it comes to watches, slim and elegant is always a winning combination. Or, the vacated space could be used to pack in more features.

2

CIRCULAR DESIGN

> Rectangular watches are all well and good, but watches traditionally are circular, and if Apple have solved that problem technically you would expect them to look at introducing a circular watch - plenty of other companies do them.

3

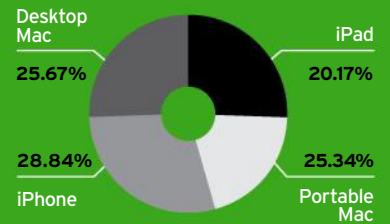
CAMERA

> In last issue's iOpener, we featured the CMRA strap with a built-in camera. There's potential now for Apple to place a camera on the Watch itself. This would make selfies even simpler to take.

Mac
FORMAT

THE POLL

WE ASKED... What will your next Apple purchase be in 2017?



> Log on and see next issue's big question!
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RUMOUR MILL

> Hot on the heels of the tech giant's latest moves...

1

BEST IN GLASS

> iPhone 8 gossip is reaching pre-launch fever pitch, and a persistent tale is that it will be fitted with an edge-to-edge glass OLED screen.

2

MAGNETIC PENCIL

> The latest rumour about the second-generation Pencil comes from Apple's patent application for a version with a magnetic element to attach it to an iPad and maybe iPhone.

3

32GB MACBOOK PRO

> Stories are circulating about a 15-inch MacBook Pro with 32GB memory coming in Q3; this could be the pro portable we've been waiting for!



4

HAPTIC WRISTBAND

> This potential development is at the heart of this particular rumour. Shifting the haptic response to the strap allows for more precise feedback, as well as freeing up space in the Watch itself.



CLASSIC APPLE FACTS ZERO

BUTTONS ON THE APPLE PRO MOUSE

➤ Apple's rebound from the disastrous 'hockey puck' mouse was the Pro Mouse, Apple's first one to ship with an LED sensor instead of a trackball. Jobs loved its 'zero button' design when the designers showed him a concept.

4 MONTHS

LIFESPAN OF THE MACINTOSH IIx COMPUTER

➤ One of Apple's shortest-lived products was the Macintosh IIfx. With a measly 16MHz processor and a price tag of \$3,000, it was available from October 1992 to February 1993.

\$750K

PRICE OF APPLE'S '1984' SUPER BOWL ADVERT

➤ Now considered an advertising classic, Apple's '1984' advert was originally viewed as a disaster by the company's board. At a budget of \$750,000, it had to work - and thankfully for Jobs and Wozniak, it did.

MacBook Pro approved Consumer Reports gives thumbs up

Watchdog changes mind after slating new MacBook Pro over battery issues

Watchdog Consumer Reports made the news recently by refusing to recommend the latest MacBook Pro over battery life concerns. However, after meeting with Apple, it has reversed its decision.

Originally, Consumer Reports had stated that the latest MacBook Pro performed erratically during its battery tests and thus refused to recommend it. Apple issued a statement claiming that Consumer Reports had used a developer setting in Safari that caused "an obscure and intermittent bug." It first released a fix in a macOS 10.12.3 beta.

For its part, Consumer Reports said it used the setting (which disables browser

Consumer Reports had previously criticised the new MacBook Pro for its erratic battery life.

caching) because "we want the computer to load each web page as if it were new content from the internet, rather than resurrecting the data from its local drive", thus giving more consistency to MacBook test results.

Since then it has retested the MacBook Pro with Apple's fix applied, which has resulted in more consistent results. Consumer Reports now recommends the device.

Apple shakes up review process on App Store

Changes are coming to how customers leave reviews and how developers respond to them

Big changes are coming to the App Store, both for customers and app developers. In abridged notes for the release of the iOS 10.3 developer beta, Apple revealed it is introducing a way for app and game developers to solicit feedback from customers.

However, developers can only do this three times per year, and this counter does not reset when new versions are released. Users can universally disable prompts to leave ratings and reviews, will be able to post reviews from within apps rather than going to the App Store, and

can use 3D Touch on iPhone to mark reviews as helpful.

Furthermore, developers will be given a right of reply to reviews on the app stores for iOS and Mac, which will be visible to all customers. Before, developers did not have any connection to customers unless they had collected information via user registration, and had no right of reply on the App Store.

Apple hasn't given a timeline for the implementation of the changes, saying only that apps already on the App Store won't have to change their review prompt behaviour immediately.

APP OF THE MONTH



[MAC APP]

Logic Pro X 10.3 £199.99

Touch Bar support comes to Apple's music production app



Apple has updated its popular music production app Logic Pro X to version 10.3, bringing several notable changes, such as support for the Touch Bar introduced on some Late 2016 models of MacBook Pro.

Among the long list of changes are greater support for automation and plug-ins, as well as stability tweaks, editing improvements, performance boosts and more.

The update also brings with it a new interface and improved sharing between Logic and GarageBand for iOS; the Share to GarageBand command enables you to add new tracks to a Logic project from your iPhone or iPad over iCloud.

Logic Pro X 10.3 is introduced at a time when Apple's UK prices have been brought into line with US prices, so Logic Pro X now costs £199.99 instead of its previous £149.99.



[MAC GAME]

SHADOW TACTICS £34.99



A stealth game in the old style, where sneaking through the shadows trumps stabbing and slicing. With meticulous attention to detail coupled with expansive, branching levels, it rewards patience, cunning and judicious use of quick saves.

Why you need it: Real-time, tactical stealth games live on.

What's it best for: Sneaky killing without leaving a trace.



[iOS APP]

WEATHER LINE £2.99



The maker of Dark Sky has updated its Weather Line app for iOS 10. We love its clarity and clutter-free layout. It makes great use of 3D Touch's Quick Actions, and forecasts rain, temperature, sunshine and more by the hour, day or month. It's a great little app.

Why you need it: Makes forecasts clear and easy.

What's it best for: Quick, beautiful weather info.



[iTUNES STORE]

ALISON KRAUSS - WINDY CITY £8.99



The bluegrass legend's first solo album in 17 years has been in the works since 2013. Krauss said she wanted to make an album of songs older than she was, each with special personal significance to her. With such promise, it's worth waiting four years for.

Why you need it: Classics from the queen of bluegrass.

What's it best for: Krauss connecting with her heritage.

APPLE TV

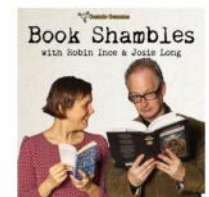
> Our top picks of what's worth watching and playing this month



[MOVIE]

THE GIRL ON THE TRAIN £13.99

A commuter witnesses the lives of others via her train window, but becomes involved when a woman goes missing.



[PODCAST]

BOOK SHAMBLES FREE

Josie Long and Robin Ince interview guests on their reading habits, no doubt making you even guiltier about your piles of unread books.



[TV SHOW]

A SERIES OF UNFORTUNATE EVENTS NETFLIX

Lemony Snicket's books hit the small screen to widespread acclaim. By turns funny and heartbreaking.

Apple's most expensive products IN NUMBERS

Last year, Apple raised eyebrows with UK price rises for its hardware, yet the cost of a MacBook Pro is small fry compared to this costly kit.



1

£13,500

➤ Apple bought Multi-Touch gesture company FingerWorks in 2005 and used its patents while developing the touchscreen iPhone. FingerWorks' stock grew 2,000% as a result.



NEXT ISSUE

➤ Apple employs masses of people, but what do they all do? Find out next issue!

4

\$12,000

➤ Unbelievably fast at the time of its 1990 launch, the Macintosh IIfx cost between \$9,000 and \$12,000 depending on configuration. Speed didn't stop it being discontinued two years later, though.



3

➤ The Apple Lisa was one expensive piece of kit – it cost nearly \$10,000 when it launched in 1983. That's roughly \$24,000 today, or just under £20,000.

\$9,995

➤ It feels a bit unloved these days, but a maxed-out Mac Pro will still cost you a pretty penny. Choose all the upgrades (with no accessories) and you'll pay nearly nine grand.



2

£8,759

5

\$7,499

➤ Apple may have been struggling in 1997, but that didn't stop it bringing out the Twentieth Anniversary Macintosh, with a radical design and a price tag to match.





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Camera
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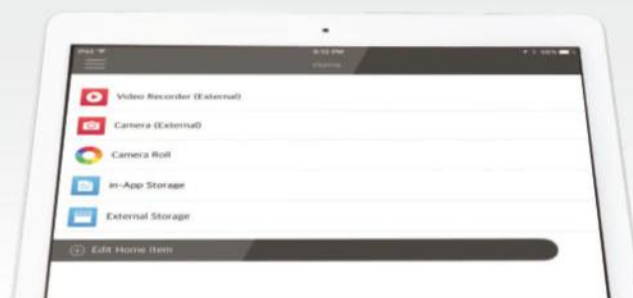
Camera Roll



In-App Storage



External Storage



Mac FORMAT SHOW REPORT

Enhance
YOUR MAC
COVER
STORY!

For our latest
subscription offer
see page 44!



Thunder forecast

It was a bumper year for Thunderbolt 3 at CES, so what shiny new kit can you expect for your Mac? **WRITTEN BY ALEX BLAKE >**

Apple doesn't frequent the Consumer Electronics Show (CES), but that doesn't mean the show isn't relevant to

Apple fans. This year, the event proved to be especially so thanks to the abundance of Thunderbolt 3 equipment, spurred into life no doubt by Apple's adoption of the standard on its latest MacBook Pro models. So let's take a look at the tech that was on show, and what should be coming to your Mac soon.

A bolt from the blue

Thunderbolt 3 is a big step up for Apple's MacBook Pro range. For starters, it doubles the bandwidth of its predecessor to 40Gbps (that's an impressive 5GB/sec) and also halves power consumption. This enables you to simultaneously run two 4K displays at 60Hz and charge a 2016 MacBook Pro over a single cable. That last bit is also important: where Thunderbolt 2 could send power from your Mac to peripherals, the new standard can deliver up to 100W of power to your Mac; the latest 15-inch MacBook Pro requires 87W, while the 13-inch version needs just 61W.



LaCie is updating its range of high-end storage devices by adding Thunderbolt 3 capability.

Apple's
penchant for
USB-C ports
has created a bit
of a dilemma



Elgato's Thunderbolt 3 Dock will bring more expansion options to the MacBook Pro.

Of course, the arrival of Thunderbolt 3 ports on computers means there were plenty of third-party Thunderbolt 3 and USB-C cables and adaptors at CES. One of the most interesting is an updated model of Griffin's BreakSafe, the company's take on Apple's MagSafe USB-C cable, which is conspicuously absent from the latest models of MacBook and MacBook Pro. Griffin unveiled a 60W version of this last year, and the new one can carry 100W of power, which is enough to charge the 15-inch MacBook Pro.

Speaking of which, Apple's penchant for USB-C-shaped ports on its MacBooks has created a bit of a dilemma – you may be tempted by the Touch Bar or improved specs on the 2016 MacBook Pro, but you'll be unable to connect your older devices without buying adaptors. Several companies hope to simplify the need for them by connecting peripherals and power through a single cable from a well-equipped Thunderbolt 3 dock.

Among those companies is Elgato, which announced a dock with two Thunderbolt 3 ports, three USB-A (3.0) ports, a Gigabit Ethernet port, a DisplayPort (1.2) connector, a 3.5mm mic input and a 3.5mm headphone jack. Elgato says this will enable you to power your MacBook Pro via one of the Thunderbolt ports (for up to 85W of power), and connect two 4K displays at 60Hz, the first via the remaining Thunderbolt port and the second using the DisplayPort connection.



Thunderbolt 3 came out in force at CES 2017, which is good news for Apple users.

Henge Docks announced its variation on the theme in the form of a Horizontal Docking Station with 13 ports, a Vertical Docking Station, and a Tethered Docking Station on which you can rest your MacBook. All use Thunderbolt 3 (the 'Tethered' model comes in a USB-C version, too) and can power your laptop. So if you're thinking of getting a new MacBook but are put off by its lack of port diversity, an appealing range of solutions are set to be available very soon.

Thunderbolt 3 isn't just about charging and expanding your ports, though. Asus revealed two Thunderbolt 3-compatible displays, QNAP announced a NAS storage device with Thunderbolt 3 connectivity, while LaCie showed off its d2 Thunderbolt 3 drive, which houses up to 10TB of storage and enables you to daisychain two 4K displays, a single 5K display, or even up to six d2 drives in total from a single port on your Mac.

Graphic images

Another interesting development at CES was a little more ambiguous when it comes to support from Apple. While there has been chatter for some time about Apple natively supporting external GPUs in its Macs in the future, this is still not officially possible at the present time. That didn't stop companies like Zotac and MSI from rolling out their own external GPU enclosures at CES. Both contain an internal power supply to charge the enclosure and a computer (though some only provide 60W power), as well as several USB 3.0 and Quick Charge USB 3.0 ports. Graphics cards are sold separately. Naturally, these

These devices could provide a huge graphical boost to your MacBook Pro

It might make your MacBook look like a tank, but Henge Docks' Horizontal Dock has 13 ports.



Henge Docks' Vertical Docking Station is an elegant way to make use of Thunderbolt 3 on your desk.

devices could provide a huge graphical boost to your MacBook, radically improving its gaming performance, among other things.

The main issue here is macOS support, the future of which is uncertain, though it is possible to make use of an external GPU with your MacBook when running Windows in Boot Camp. However, in macOS you have to hook up an external display, as the video feed from the external graphics card isn't passed to your MacBook Pro's internal display.

However, some people have reported success when using an external GPU on a Mac Pro running macOS Sierra. It is possible that Apple will officially roll out native support for external graphics cards in the future, but you'll have to use workarounds for now.

Right now Thunderbolt 3 may seem to be a pain thanks to the need for USB-C adaptors, but it looks set to bring a major boost to MacBooks in the near future.





MATT BOLTON...

A FRESH VIEW
ON APPLE, FROM
OUR DESKTOP
TO YOURS

> Has Apple abandoned the high-visibility pros who make its products look good, or has the definition of 'pro' simply changed with the times?

In the great MacBook Pro Brouhaha (Late 2016), some stalwart Apple pros pointed out that 16GB of RAM isn't enough for their use. Often this argument came with discussion that these high-end pros are halo users, and that Apple should support them because the fact that this 1% of pros are very visible Apple users in their field helps the other 99% either feel good about buying Apple, or maybe even makes them choose Apple in the first place. The argument itself is an admission that the needs of that 1% are too niche to support: provide for us because we make you look good, even though you don't make big money from us directly. (I make this latter claim confidently because, if Apple did make big money from the 1%, we wouldn't be having this discussion. We'd all be using 32GB MacBooks.)

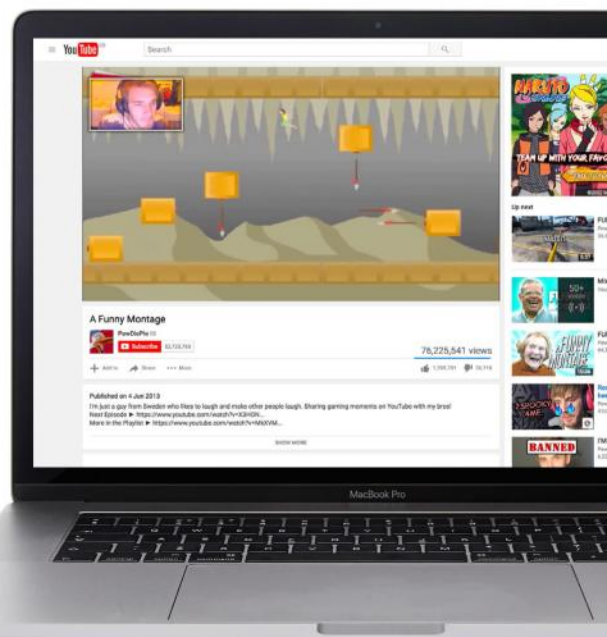
Visible Mac-using pros have historically given Apple a cachet that helps the whole price/value proposition. It helped me personally choose a Mac for video editing work, which is how I got into Apple in the first place. However, like so much in our new truth era, it's possible for this point to be both right and wrong. These long-time visible pros might say they will

have to abandon the Mac, harming Apple's marketing. But marketing is fickle. What if having the right visible pro users is still important, but that these long-term pros aren't the right ones?

'Creative pro' is a much more flexible term than it's ever been, because the options to make money

from being creative are more flexible. The money to justify a MacBook Pro isn't just in well-resourced positions at large companies – anyone can sell their art online, or get adverts on their videos, or put an ebook onto the Kindle Store. And with the right following, they can turn it into real money to make it

'Creative pro' is now a much more flexible term than it's ever been



their full-time job. A big-money, high-prestige creative job? Maybe not. A pro? For sure.

Consider the YouTuber: young men and women who are able to produce slick videos from anywhere. They are flexible in their production, because popularity comes from frequent engagement, not lengthy creative gestation. They don't even really need 16GB of memory for their video work, let alone 32GB, but they do need portability and good battery life. They need something powerful enough, but light so they can work anywhere and at any time. And for a new generation of teenagers getting ready to go off to university and study digital creative arts, they and their peers in other disciplines are the visible pros, not motion graphics editors or web back-end developers who need 32GB of memory.

I have sympathy for people who feel that Apple is leaving them behind when it makes compromises like those in the most recent MacBook Pros. But I don't think the problem is that Apple is abandoning us by changing its approach. I'd say its approach is consistent – it's the world it's addressing that changed.

ABOUT MATT BOLTON

> Matt has been charting changes at Apple since his student days, and has since gone from fixing and selling its kit to writing about it. He's sceptical of tech industry hyperbole, but still gets warm and fuzzy on hearing "one more thing".



AKVIS Sketch

Turn Photos Into Amazing Pencil Sketches



akvis.com



APPLE IN QUOTES

MING CHI-KUO
bit.ly/2jPGMP3

“We believe [Apple] is leaning toward facial recognition technology.”

Analyst says Apple may move away from fingerprint tech in future

BOZOMA SAINT JOHN
apple.com

“Apple is a unique company, in that the art and the science sit together very nicely.”

Apple marketing executive says the company is perfectly balanced

PETER THIEL
facebook.com

“It’s not an area where there will be any more innovation.”

Facebook board member confidently asserts Apple is out of iPhone ideas

ZANE LOWE
apple.com

“Every day something is changing... for people who love music and entertainment.”

Apple Music DJ says Apple is at the forefront of a changing music industry

APPLE CORE Split View

SPLIT VIEW

> The MacFormat team debates the hot Apple issues of the day, using their iPhones of course!

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Turn to page 44

“WHAT DO YOU MOST WANT TO SEE IN MACOS 10.13?”



Simon says...



Alex says...

I know it seems minor, but better window snapping would be a fantastic boost for my workflow. It’s one thing Windows does pretty well 🙌

I’m impatient for some groundbreaking innovation. Something truly new. I take the point about tweaks but I feel Apple needs to start blowing our minds again.

I take it the Touch Bar wasn’t mind-blowing enough for you 😏

I love the Touch Bar’s ambition but it’s 50:50 innovation/frillery right now. I want my life to be easier – like having Handoff on steroids 🦋 where I can move files between all my devices seamlessly, for example.

That would be great. Currently it’s too separated – Handoff for documents you’re currently working on but AirDrop 📁 for transferring files, say. A single method would be ideal.

I long for when Apple released something and we exclaimed ‘Of course!’ I also want 10.13 to be called Eureka. 💡

NEXT ISSUE > What’s the best Apple product you’ve bought?

Siri...ously?



I like to think of myself as
‘one size fits all.’

“Do you prefer to be on iPhone or Apple Watch?”

tap to edit



MORE MEMORY FOR YOUR MOBILE DEVICES



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COMPETITION Creative audio bundle

PRIZES
WORTH
£559



Win Creative headphones and speakers!

Whether you want music at home or on the go, enter for your chance to win one of four sets of awesome audio equipment from Creative

> Want to give your audio equipment a complete refresh for 2017? Now's your chance, because we've got a whole haul of speakers and headphones to give away this issue, courtesy of Creative. Each set contains one Nuno speaker, one pair of Outlier Sports headphones, and two Nuno Micro speakers.

The Creative Nuno is a small, understated speaker with audio that packs a punch. Clad in woven fabric, its six-hour battery and classy looks make it ideal whether you're chilling at home or out and about, while its Bluetooth functionality will banish wires for good.

For top-notch audio on the go, the Outlier Sports headphones are a great choice. Their sweatproof and wireless design makes them great for runners, and with 11 hours of battery life they'll see you through the day. Their clever design means they won't fall out any time soon either.

Each winner will also receive two Nuno Micros, so you'll be able to enjoy your music in even more rooms thanks to their Bluetooth connectivity. The Nuno Micro's small size also means that you can easily pop them in a bag when you head out.

> THE QUESTION

For a chance to win one of these amazing audio bundles from Creative, simply answer this question:

How long do the Outlier Sports' batteries last?

- A) 5 hours
- B) 9 hours
- C) 11 hours

For more information about Creative's speakers, headphones and full range of other products, direct your web browser to creative.com.

HOW TO ENTER...

- > To enter, you can visit our website at bit.ly/mfcreative.
- > For full terms and conditions, go to bit.ly/mfcreative. By sending your entry, you agree to these competition rules and confirm you are happy to receive details of future offers and promotions from Future Publishing Limited and carefully selected third parties.
- > This competition closes on **13 March 2017**. Over 18, GB residents only.



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› Essential kit to elevate your abode from 'home' to 'smart home'



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APPLE HOME

EDITED BY **CLIFF JOSEPH** ›



**LIVE
SMARTER**

The smart home is here - live the Apple dream today!

It started with satnav, and now other digital tech is transforming the driving experience for millions of people every day



he rumours about Apple developing a smart car, codenamed Project Titan, have been flying around

for a couple of years now. They surfaced again recently when Apple notified the US Traffic Safety Administration that it was "investing heavily in machine learning and automation... including transportation".

But you don't have to wait years for an Apple Car to come along to get digital driving tech in your car - you can add it to your existing car right now.

We take satellite navigation for granted these days, but there's a variety of other devices now finding a home in millions of cars, including dashcams, advanced entertainment systems and, of course, Apple's own CarPlay technology, which enables you use key iPhone apps right on the dashboard of your car.

Rather than wait to see whether an Apple-branded car or a partnership with a car maker actually happens, here's our guide to the best devices and technology that can upgrade your wheels right now.

CarPlay can be added to many car models, and it doesn't have to cost you a fortune either.



Get started with In-Car Smart



Explained

OBDII

➤ Most cars sold since the mid-1990s have a connector for OBD-II (on-board diagnostics 2.0, known as EOBD in Europe). You can read the diagnostic data with a handheld scanner, and there are many iOS apps that can help you to store and interpret the data, too.

Tech

Explore the innovative smart kit you can add to your existing car today

Despite all the rumours, it's still unclear whether Apple will release its own self-driving smart car, or if it's simply focussing on intelligent driving software it could license to car manufacturers. In any event, nobody is expecting the famously secretive company to unveil anything for a few years yet.

In the meantime, there are still plenty of ways to add some Apple tech to your car - in fact, you can already buy cars that have Apple software built right into them. Apple's CarPlay technology is a display and controller for your dashboard that enables you to control key apps on your iPhone. If your vehicle supports CarPlay (see apple.co/2j2vFSc) and has a compatible screen installed on its dashboard, you can connect your iPhone to it and see and interact with apps such as Maps, Messages and Music without handling the phone. You can use Siri for hands-free voice commands, telling it to play your favourite playlist, for example, or "call the office" so you can tell someone you're stuck in traffic.

Get a hands-free car phone

CarPlay made big strides in 2016, and there are now dozens of manufacturers, from Audi to Volkswagen, that include CarPlay as a

standard feature in many of their latest models. But you don't need to go out and buy a brand new car, as there are plenty of car accessories that allow you to use your iPhone while you're driving.

Safety is all-important, and there are many hands-free kits that use Bluetooth to connect to your iPhone so you can make or take calls while driving, and talk to Siri. Prices start as low as £20 for a basic model such as the Olixar Clip (bit.ly/2jscMpo).

One of our favourite hands-free kits is the Parrot MiniKit Neo HD 2 (bit.ly/2jTx3aw), which is a little more expensive at around £80, but includes additional features such as an app that remembers the location of your car when you park. Also consider Pure's Highway 600 (£150, bit.ly/2jMubKK), a high-quality DAB radio upgrade for your car, which also provides hands-free calling and Siri support.

Hey Siri, find me a satnav

Satnav systems are probably the smart car tech most people are familiar with, and TomTom makes a number of satnav models that work with Siri, starting at around £200 for the TomTo Go 520 (bit.ly/2knrYVc) and going up to £350 for the top-of-the-range Go 6200 (bit.ly/2js7NFI).

Pioneer makes several entertainment systems that will give your car a really high-tech upgrade. They include the company's dashboard displays and full



Which cars support CarPlay?

> Apple's done a good job getting support for CarPlay, and a number of major car makers announced their support in 2016. Some compatible cars are flashy, expensive speedsters, such as the Ferrari Spider, but there are plenty of more affordable family options available, too. Many Volkswagen models have had CarPlay since early 2016, and Ford says it will support the system across its range from 2017 on.

Which apps work with CarPlay?

> As you'd expect, Maps is a key app for use with CarPlay. Beyond that, Apple intentionally focusses on audio-based apps that don't require you to take your eyes off the road while you're driving. These include Music, Audiobooks and Phone, and there are third-party apps too, including Spotify and Deezer for music and Overcast for podcasts.



CarPlay's audio focus includes reading out text messages.

APPLE HOME In-car smart

TomTom's Go 520 works with Siri and can read out text messages and call contacts hands-free.



What Is Siri Eyes Free?

Even if a car doesn't include CarPlay, it may still support Siri Eyes Free, a feature that allows you to activate Siri by holding a button on your car's steering wheel without taking your eyes off the road. In 2015, Ford provided a free software update that added support for Siri Eyes Free to millions of older cars not equipped for CarPlay.



Siri Eyes Free was introduced all the way back in iOS 7.

What about my car insurance?

Some companies offer around a 10% discount if you add a dashcam to your car. They include AXA and SwiftCover, while the RAC offers a flat-rate £30 off. Some insurers prefer specific camera types, and may want you to have it professionally installed, so check this with yours.

The Dash Cam 20 from Garmin detects incidents and saves footage of them.



support for CarPlay. They start at around £329 for the entry-level SPH-DA120 (bit.ly/2jse43U). Some of the company's CarPlay systems enable you to connect a rear-facing camera and view its output on the dashboard screen to help you with parking, although these tend to be more high-end models costing £600 or more.

We're fans of JBL's speaker systems, so we're very much looking forward to its first entry into the automobile market - the Legend CP100 (bit.ly/2js3IXe). Like its Pioneer rivals, it includes a dashboard display with support for CarPlay and an option for connecting a rear-view camera, although it should be more affordably priced at around £320. It's due to become available in early 2017.

Add a new vantage point

Cameras are increasingly popular in cars. It started with action cams that were stuck onto the dashboard and used to record footage during races, or for TV shows like Top Gear. Action cam specialist GoPro soon saw the potential here and released a series of dashboard mounts and accessories for the company's popular Hero cameras. There's a more down to earth use for dashcams too. Apart from anything else, the footage from one may prove you weren't at fault in the event of an accident. Some insurance companies will offer discounts if you have a dashcam fitted in your car. You can get a basic

Porsche's Panamera 4S supports CarPlay - but you don't have to spend tens of thousands to get smarts in your car



model such as the Mio MiVue 600 (bit.ly/2knK35v) for around £80, but also consider more advanced models such as the RAC03 (£160, bit.ly/2jXgU4g) or Thinkware F750 (£180), which include additional safety features, such as collision warnings if you get too close to the car in front, or if you start to drift across lanes without realising it.

A lot of accidents happen when drivers are reversing, and a new category has recently appeared to help with this: back-up cams. These attach to the back of a vehicle to provide a clearer view than you might get from your normal rear-view mirror. As we've mentioned, dashboard systems like JBL's Legend let you observe a rear-view camera on your dashboard. Several companies make rear-view cameras, such as the low-cost BC30 from Garmin (£135, bit.ly/2jTOS9v).

Thinkware makes several kits that include both front and rear cameras, such as the Dash Cam X550, which is a bit pricey at £300 (bit.ly/2kmKUY7) but includes advanced features such as GPS tracking, and the ability to warn you of nearby speed cameras. It even has a Mac app for viewing recordings, in case you want to create a library of driving videos or use them in video editing projects.



iFacts...

More than 200

> Number of car models that now support CarPlay. (Apple)

20%

> Motorists who think it's okay to use social media if sitting in traffic. (RAC)

14%

> Motorists who admit to taking photos or video with their smartphone while driving. (RAC)

48%

> Motorists who admit to making or taking calls in stationary traffic (RAC).



FIVE OF THE BEST

Five of the smartest gadgets to make your car clever >



Pioneer SPH-DA120 £329

pioneer-car.eu

> You can give your in-car entertainment system a major upgrade with touch controls and support for CarPlay. Pioneer provides its own apps that can play a variety of digital music formats, and you can connect a rear-facing camera to the screen.



Pure Highway 600 £150

pure.com

> Pure brings its years of audio expertise to this high-quality DAB radio. It also works with Siri and acts as a hands-free kit for phone calls. You can stream over Bluetooth, and the clever Go button lets you tag tracks you hear on the radio.



RAC RAC03 £160

racshop.co.uk

> Though it's not the cheapest dashcam, the RAC03 is one of the best. It includes a large mirror that fits over your normal rear-view mirror and houses the 4MP camera, which records the view ahead and also warns you if you get too close to another vehicle.



TomTom GO 520 £210

tomtom.com

> This satnav throws in several other high-tech features beyond rivals. It supports Siri and can read out text messages while you're driving. Built-in Wi-Fi also enables you to download maps and software updates without a computer.



Cobra JumPack CPP 8000 £80

cobraelectronics.co.uk

> More brute force than smart tech, the JumPack could be a lifesaver in an emergency. It looks like a conventional battery pack with a USB port for charging your iPhone, yet it's powerful enough to jump-start a car, and even includes jump cables.



Explained

AFTERMARKET

> The aftermarket is the automotive industry's equivalent to buying upgrades and add-ons for your computer or phone. Any accessories or parts you buy after the original purchase of your car, such as a dashcam or CarPlay kit, are referred to as an aftermarket sale.



UP FRONT

> A basic dashcam will simply record the road ahead, providing a useful record in the event of an accident. More advanced models provide additional features, such as a warning if you get too close to the car in front.

REAR VIEW

> Backup (or reversing) cameras that provide a clear view of the area behind your car are increasingly popular. However, you'll also need a display on your dashboard in order to view what they see.

Some insurance companies will offer discounts if you add a dashcam to your car



Genius Tip!

> CarPlay was updated as part of iOS 10 back in September 2016, and gained new features such as the ability to mark the location of your car in Maps automatically when your iPhone moves beyond Bluetooth pairing range. Learn more about that feature at apple.co/2j4P4Ph.

HOW TO Get started with CarPlay >



1 CarPlay kit

JBL's Legend CP100 features a 6.75-inch touchscreen, and all the electronics needed to work with CarPlay on your iPhone. It has a microphone for voice calls and Siri, and can even connect to a rear-view parking camera.

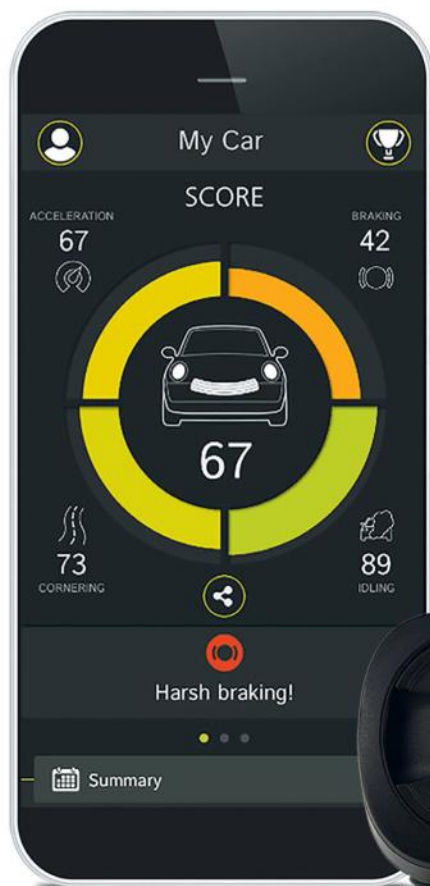


2 In-car entertainment

Once installed in your vehicle, it acts like a standard in-car entertainment system, with AM and FM radios, and music playback from USB devices. The Phone button switches over to CarPlay and connects to your iPhone.

> WHAT ELSE SHOULD I CONSIDER?

WHEN THINGS GO WRONG



Smart technology isn't just for your home – it can keep your car healthy and safe, too



he OBD-II (or EOBD) system we mentioned earlier is really aimed at professional mechanics

who understand what's going on under the bonnet in your car.

However, TomTom's Curfer (£60, bit.ly/2jT9Sh1) makes OBD data more accessible to the rest of us.

Essentially a fitness tracker for your car, it includes an adaptor that

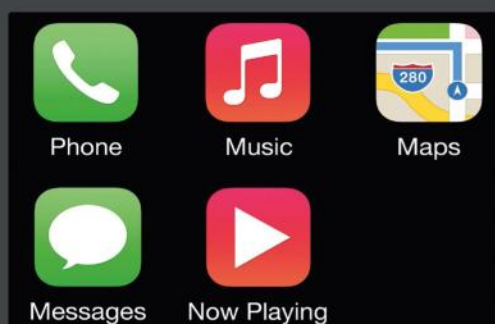
TomTom's Curfer provides feedback about your acceleration, cornering, braking and idling, scores your journeys and gives tips for improving.



plugs into your vehicle's OBD connector and transmits data to its companion iPhone app. However, it's a lot easier to understand than most OBD apps, and it includes a simple system of warnings if it detects anything that might cause a problem.

Another handy maintenance tool is Snooper's Tyre Pilot STP1600 (£160, bit.ly/2jXhvDn), which uses Bluetooth to transmit information about tyre pressure to its iPhone app. Up to 16 sensors can be fitted.

Finally, if you find yourself in a pinch, we'd definitely recommend the Cobra JumpPack CPP 8000 (£80, bit.ly/2kk7bWm). This looks like a conventional battery pack that you can use to charge your iPhone while you're driving, but it's so powerful that it can jump-start the battery on many small or medium-size cars, and could really get you out of trouble on a cold, winter morning.



3 Keep your eyes on the road
Beyond navigation using Maps, CarPlay focusses on audio-based apps like Music and Phone that don't require you to take your eyes off the road. Compatible third-party apps include the UK-based Radioplayer.



4 Hey, Siri
You can call upon Siri, of course, to use it in your car just as you would with only your iPhone to hand. You can ask it to open Maps and locate a particular destination, play some music, or make a call to your office.

Jargon Buster

> **DIN slots** are those on the dashboard in which a car audio system fits. A single-DIN slot is 180mm wide and 50mm high. However, CarPlay kits and other audiovisual systems require double-DIN slots, which have the same width but are double the height.

> WHAT YOU NEED NEXT...

HOME GADGETS >

Indoors or outdoors, here's the tech you need for your smart Apple Home

Yamaha Disklavier Enspire £14,000

uk.yamaha.com



Many companies make multiroom speaker systems, yet Yamaha's MusicCast range of more than 30 different

speakers, soundbars and home cinema systems leaves most of its rivals looking rather tame. More important, though, is that Yamaha also has a long history of producing musical instruments, including the new Disklavier Enspire range of pianos, which are the latest additions to the MusicCast line-up.

The Enspire is a high-tech piano that works as part of a multiroom audio system. First and foremost, it's a traditional acoustic piano you can play at home or even in a concert hall. It's also packed with digital technology, including the ability to stream your piano party pieces to Yamaha speakers around your digs. Other features include the ability to record your performances, which is great if you're a musician or studying the subject. There's also a headphone socket so you can practice quietly.

If you're not that musically gifted, there are 500 recordings stored on the piano, covering genres such as classical piano solos, jazz, and even a few pop tunes, too. And the

The Enspire includes the ability to stream to Yamaha speakers around your home, and record performances



Enspire doesn't simply play back these songs like a glorified speaker – it plays the piano parts itself, with the keys and pedals moving by themselves, thanks to a built-in 'servo drive' mechanism.

For another £140 per year, you can subscribe to the Yamaha Radio service and use your iPhone or iPad to download thousands of additional pieces of music available from Yamaha, including special recordings by piano wizards such as Jamie Cullum and Sarah McLachlan that are designed to show off the Enspire's versatility.

Scaling the range

There are 14 models in the Enspire range, starting at around £14,000 for the Enspire DU1, an upright piano that's suitable for homes or schools where space is a bit tight. Step up to £22,000 and you get a baby grand model, the DGB1K, while a full-scale classical grand piano such as the Enspire DC7X comes in at around £55,000.

For even more smart home advice subscribe today!

See page 44

The Enspire Controller app for iPhone and iPad is instrumental to using the smart piano's clever features. You'll need to provide an iOS device, though.



Samsung Family Hub Fridge Freezer

£2,999

samsung.com/uk



It's taken a while, but the Samsung super-fridge has finally gone on sale in the UK, and the company has

introduced a second model that's a bit more affordable too. The 60cm-wide Family Hub Fridge Freezer costs £3,000, yet it includes the same range of smart features as the £5,000, 90cm-wide, two-door model. Those features include a 21.5-inch HD screen and three internal cameras that enable you to check what you need to pick something up on the way home.



Smart ideas

Can you hear me at the back?

Siri works really well as long as you have your iPhone close by, but it can struggle to understand commands if you shout at it across the room, or if there's music playing in the background. Recent reports suggest that the Amazon Echo has similar problems too, but a company called Audyssey has come up with a far-field voice recognition system that can improve the range and accuracy of things like Siri and the Echo. Called eVR, it uses special algorithms to clean up voice signals so that they are more easily recognised by the small mics used in most devices.

Audyssey claims eVR can hear voices clearly from up to 19 feet away, even when there's music playing in the same room. Rather than launching products of its own, it hopes to licence eVR to other companies - it wouldn't be the first time Apple bought a company that has technology that it wants for the iPhone or the Mac.



AirBolt Smart Travel Lock

£70

theairbolt.com



Keep an eye on your bags with the new AirBolt smart lock, which you control over Bluetooth from an app on your

iPhone. It enables you to track your bag too, sounding a buzzer if it starts to move beyond Bluetooth range. If it truly gets lost, the lock can message other AirBolt users nearby and prompt the companion app on their phones to tell you where your bag is from anywhere in the world.

Withings Steel HR

£170

withings.com/uk



Withings is the latest company to come up with a hybrid smartwatch that ditches a digital screen for

a more traditional analogue watch face. The Steel HR is available in three styles, with a 36mm face in black or white, and a 40mm model in black only. As you might guess from the HR bit of its name, it can monitor your heart rate as you run, walk or swim, and it displays your data on a small digital counter set within the main face. The Steel HR can also alert you to incoming calls and text messages from your iPhone, and has a built-in alarm feature too, which can be set to vibrate instead of playing a sound.



NEXT ISSUE > Get smart about your home's security before someone takes advantage

mac OS Sierra

Time Machine

Data Recovery

iOS 10



The Ge Handb

A Self-Help Manual for Macs

iCloud issues

Bluetooth & Wi-Fi

MODELS SUPPORTED: iMAC, MAC PRO, MACBOOK PRO, M

Genius Book

Data recovery

MACBOOK, MACBOOK AIR

If only there were a secret Apple handbook we could all use. Well, **Nik Rawlinson** has conjured one up for us.

What do you do when your Mac goes wrong? Over 11 pages, we will unveil the answers in this notional but much-needed handbook. You'll learn how to diagnose problems with unresponsive Macs, non-communicative network connections, uncooperative backups, and macOS mishaps. A word of advice before you begin: don't let on to friends and family about your newfound skills, or you'll be forever plagued by requests for help and advice.



Oh no, I've broken my Mac!

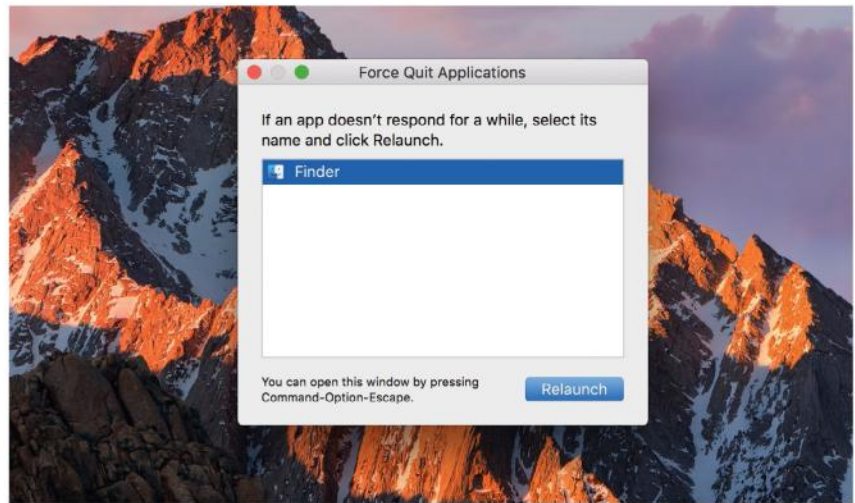
First of all, don't panic - many common problems are surprisingly simple to fix

There's an optical disc stuck in my drive

If the eject icon next to the disc in Finder doesn't work, and neither does dragging the disc's desktop icon to the Trash, open Terminal and enter `drutil eject`; if that also fails, shut down your Mac, then power it on again, holding down the primary mouse button or trackpad while the Mac starts up.

I'm seeing frequent kernel panics

An unexpected black screen overlaid by a multilingual error message is about as serious a problem as Macs ever get. If it's caused by a software glitch, it's usually fixed with a simple restart. However, if it happens often, check your Mac's memory is properly seated (assuming it has removable modules) and other components you've added recently are securely connected.



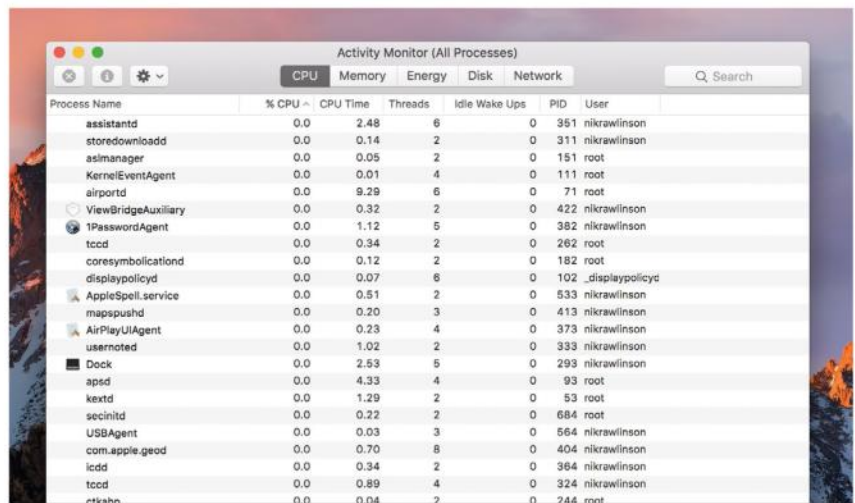
Finder is unresponsive

You can't force Finder to quit like other apps - it's always open - but you can force it to restart. Place the pointer over Finder's icon in the Dock, hold down $\square$ and then press and hold down the trackpad or mouse button; from the menu that appears, choose Relaunch. Beware that doing this will terminate any file operations that are in progress.



I can't empty the Trash

The operating system locks files that it's using or previewing, so if you can't empty the Trash entirely there's a good chance one of its contents is still required by macOS or an app. Quit your apps and try again. If that doesn't work, it could be that one of its contents is locked. Open Finder's application menu, hold A and click the Empty Trash option (note that the ellipsis after it disappears when A is held, meaning you won't be asked to provide additional instruction in a dialog). Still no luck? Open Terminal, enter `sudo rm ~/.Trash.*` and provide an admin account's name and password as confirmation, then press $\square$.



I'm forever seeing spinning beach balls

Seeing the beach ball now and then is to be expected - it often appears when an app is waiting for storage to catch up with its requests, say - but if it's happening frequently, check in Activity Monitor (located in /Applications/Utilities) for apps that are excessively consuming resources, or which have become unresponsive. If the same culprits show up again and again, either reinstall them, see if there's an update with fixes or, failing those approaches, try to find an alternative app.

The essential mac OS Solutions checklist

Essential advice that will help you keep your Mac, files and macOS in tip-top condition

Do

1. Keep macOS and your apps up to date. If updates delivered through the Mac App Store aren't set to install automatically (in its System Preferences pane), regularly check the store's Updates tab, and use any Check for Updates command or check the websites of apps obtained elsewhere.

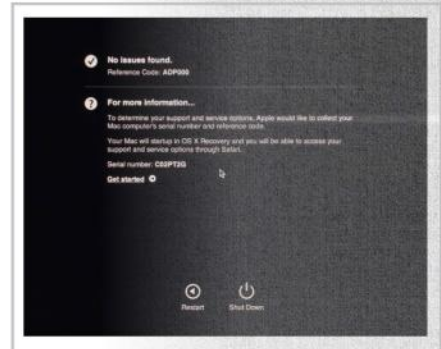
Don't

2. Disable Gatekeeper in Security & Privacy in System Preferences (its options are listed under 'Allow apps downloaded from' there). Though it may be annoying when it stops you installing apps from unknown sources, it gives you pause for thought, and is easy enough to circumvent for one-off installs.



My Mac is becoming forgetful

If your Mac forgets volume, screen resolution, startup disk or other system settings, try resetting its NVRAM (non-volatile random-access memory). Shut down, then power on again and hold **⌘+⌥+P+R** till you've heard the startup sound twice (or for at least 20 seconds on a late 2016 MacBook Pro), then let go and allow startup to complete.



Diagnosing other hardware problems

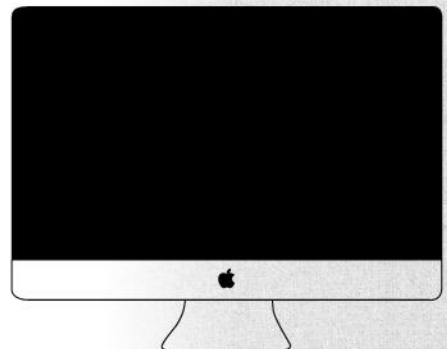
Hold **D** while starting up your Mac to open Apple Diagnostics, or **⌘+D** to open it over the internet if it can't be found on your Mac's storage. (If your Mac is from prior to June 2013, you'll use Apple Hardware Test instead; see apple.co/2je4tN4 for details).

All being well, you should see the code ADP000, which means no problems have been found. Anything else suggests an error, which will either give you a starting point for your own investigation, or guidance when talking to a professional engineer. Apple documents the meanings of diagnostic codes at apple.co/2j4AGey.



Is it time give up and start over?

Back up all of your data, just in case you change your mind, then hold **⌘+R** immediately after powering on or restarting your Mac to enter the Recovery system. When you see a window that lists four options, choose Disk Utility from it, use it to erase your startup disk, then quit Disk Utility and choose the option to reinstall macOS; this will confirm over the internet that your hardware's eligible to run macOS, so ensure it has a reliable Wi-Fi or Ethernet connection to the outside world.



My Mac is dead

If your Mac won't turn on, the problem may lie with its power supply. Exercise extreme caution while trying both a different wall socket and a different lead if you have one, then check the fuse in the plug if you can. If none of these suggestions helps, you may find that the problem is internal, such as a transformer or the power switch itself. The latter two are difficult and risky fixes, for which we'd recommend a trip to your local Genius Bar or Authorised Service Provider – turn to page 42 for details.

Do

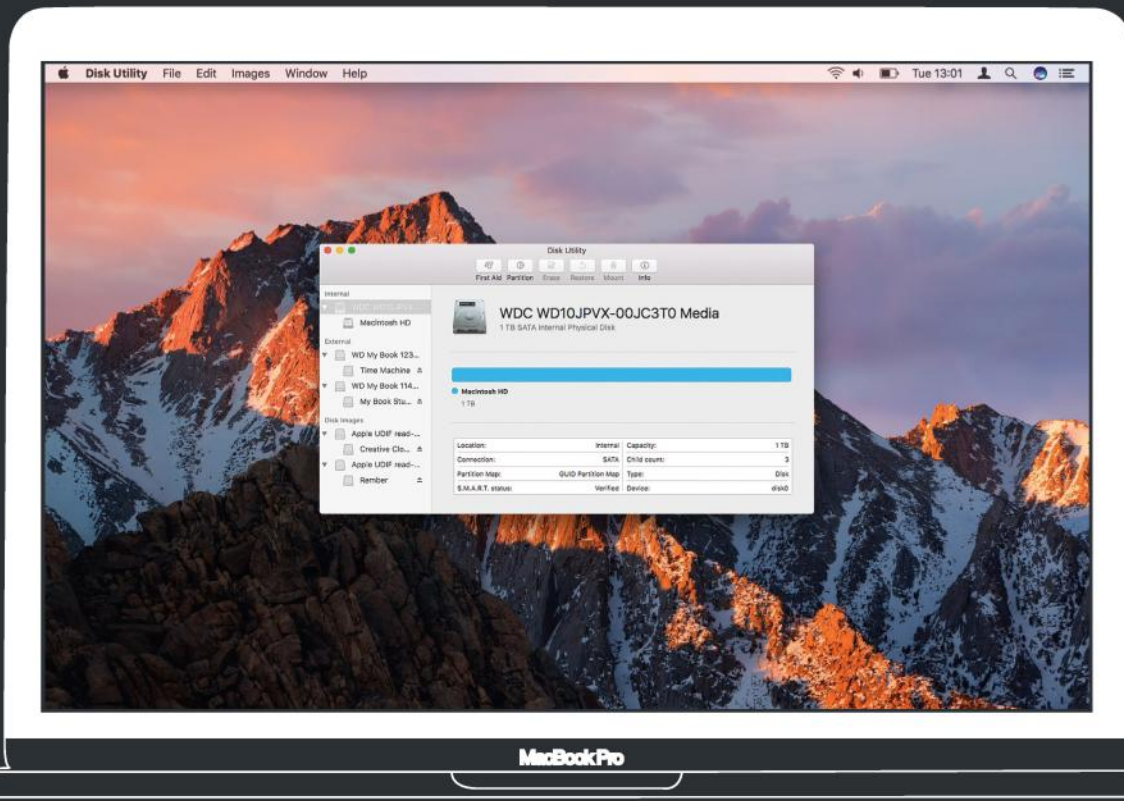
3. Where a utility or feature of your Mac has a menu bar icon, such as Bluetooth, Wi-Fi, sound controls, Time Machine and others, holding Alt and clicking that icon often reveals useful diagnostic information or menu items that are otherwise hidden.

Don't

4. Set simple passwords: they make it too easy for others to gain access to your Mac. Use Keychain Access's Password Assistant (click the key button when adding a new entry to open it) to create passwords and get feedback on their strength.

Help! I have problems with my files

From damaged drives to broken Bluetooth, many problems can throw up file errors



Random files are unusable

If your files are corrupting or becoming inaccessible, check your Mac's storage isn't failing. Internal drives incorporate SMART (Self-Monitoring, Analysis and Reporting Technology), which will alert you to developing problems so you can salvage your data before the drive becomes unusable. In Disk Utility, select the drive in the sidebar (not a volume on it) and check its SMART status at the bottom of the window. If it says anything other than 'Verified', back up your data and replace the drive as a matter of urgency.



I can't share over AirDrop

Check both devices against 'What you need' at apple.co/2eA1elc, and Bluetooth and Wi-Fi are on. If receiving on a 2012 or older Mac, click "Don't see who you're looking for?" then 'Search for an older Mac' on the sender; iOS devices can't send to them. If the receiver's an iOS device and the sender can't see it, try AirDrop's Everyone option on it. Personal Hotspot (Settings > Mobile Data) mustn't be active. 'Block all incoming connections' in a Mac's firewall (page 40) prevents receipt, of course. Toggling Wi-Fi can fix devices' inability to see each other.

Spotlight results lists have become unmanageable

Strip down what Spotlight includes in its search results by unchecking what you don't need through its pane in System Preferences. Use the same pane's Privacy tab to exclude files and folders entirely - perhaps a drive that contains only very archived project files you rarely need.

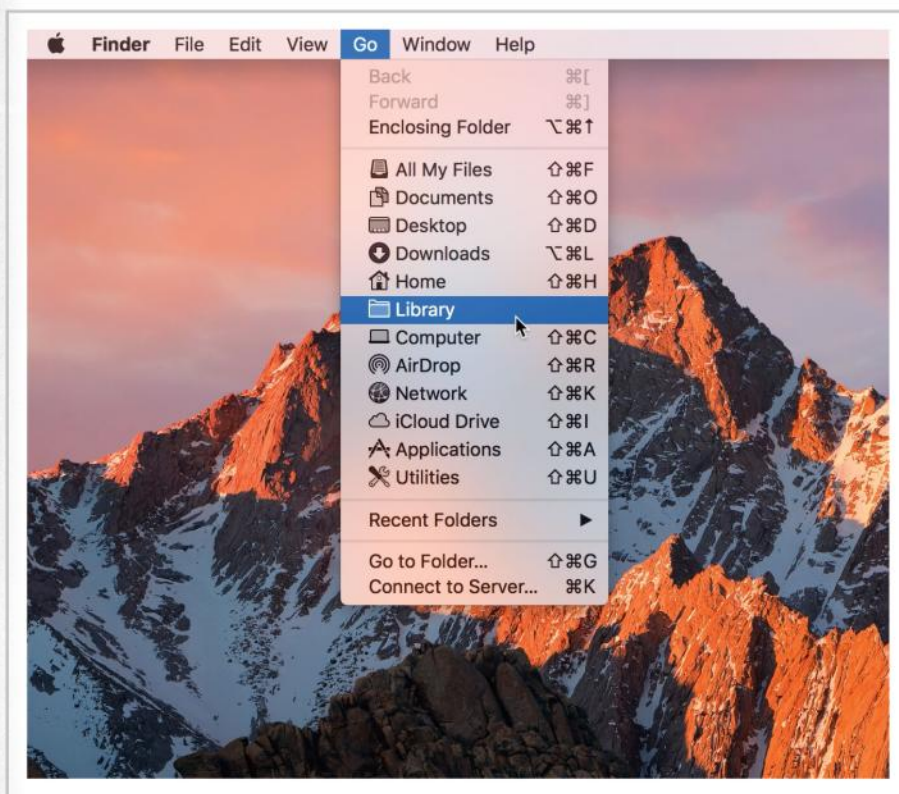
The essential mac OS Solutions checklist

Do

5. If your Mac won't start up properly, try to enter safe mode by holding $\text{⌘} + \text{Z}$ as soon as you power it on. If it then starts properly, disable login items one at a time (in Users & Groups preferences), then try starting up normally. Repeat until you find the culprit.

Don't

6. Share user accounts. You can create as many accounts as you want, so give each person who'll use your computer their own. This applies to iCloud accounts too; to share calendars, music, iBooks and more, click Set Up Family in the Users & Groups pane.



I can't access the Library folder

There are two Library folders on your Mac: one at the top of your startup disk for assets shared by all user accounts, and one in your account's folder. The latter holds your preferences and other personal items, and is usually hidden. To open it, switch to Finder, hold **⌘** and pick **Go > Library**, or press **⌘+⇧+G** and enter **~/Library** in the dialog.

I've accidentally deleted a file I need

If you don't have a Time Machine or other backup, and the file has been removed from the Trash, step away from your Mac so you don't risk overwriting the file's data; there's a good chance it's still on the drive, and reference to it has simply been removed from the file system. Apps like Data Rescue (about £94, prosofteng.com) can often recover 'lost' files by interrogating a drive directly, rather than through its index, and are a lot less expensive as a first course of action than a professional recovery service.

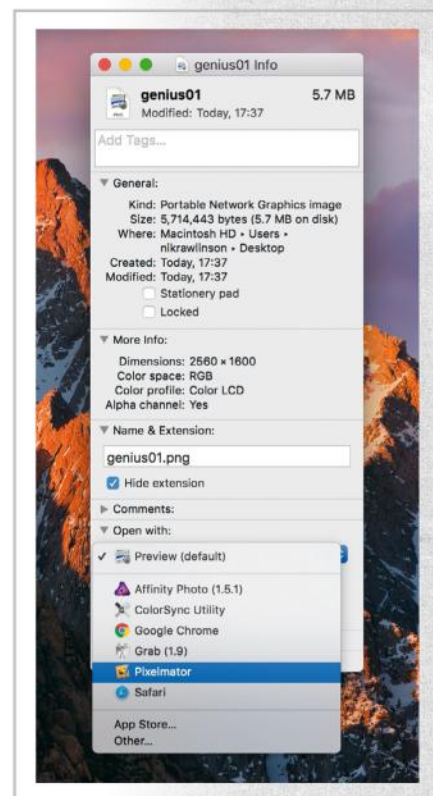
I can't access my files from another computer

Make sure the Mac you want to access is awake and connected to the same network as the one you're using. If you still can't see the remote Mac under Shared in Finder's sidebar, return to it and check File Sharing is enabled in System Preferences' Sharing pane. If that Mac still doesn't appear in the other's Finder sidebar, try connecting to it directly: in Finder, press **⌘+K** and enter **smb://[machine name].local**, replacing [machine name] with the name shown at the top of the other Mac's Sharing pane.

Double-clicking a file doesn't open the associated app

Check that files of that type are still associated with the expected app: select one, press **⌘+I** and ensure the app is listed in the 'Open with' section. If the wrong app is listed there, pick the correct one from the pop-up menu, then click the Change All button to set that as the new default app for this file type.

If the app is already running, it may have hung. Press **⌘+⌘+esc** to bring up the Force Quit Applications dialog and check whether it says 'Not Responding' alongside the app's name. If it does, select the app and click the Force Quit button, and then try double-clicking the file again. If not, try dragging the file onto the app's Dock icon, or using the app's **File > Open** command.



Do

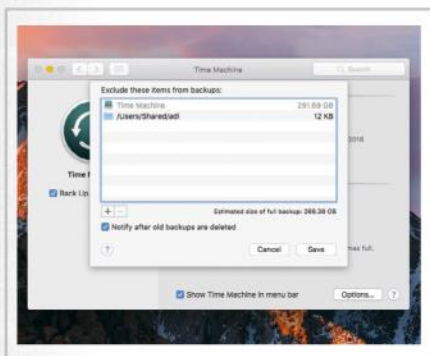
7. Learn helpful startup key combinations to diagnose problems, change the drive or mode in which your Mac starts up, reset the memory that holds certain system settings, and more. Apple maintains a list of startup shortcuts at bit.ly/2jeOILg.

Don't

8. Make every account an administrator. Create a standard user account for daily use to reduce the possibility of an app or user making harmful changes. Additionally, use System Preferences' Parental Controls pane to further monitor your kids' actions.

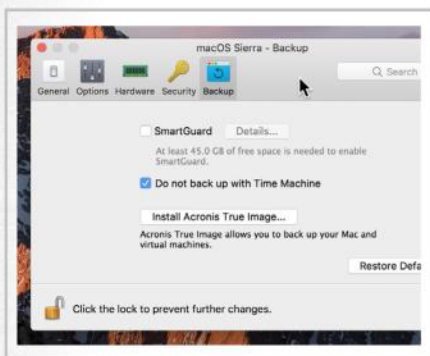
I've got trouble with backups

Don't ignore stalled, incomplete or missing backups if you value your files



The files I need aren't in Time Machine

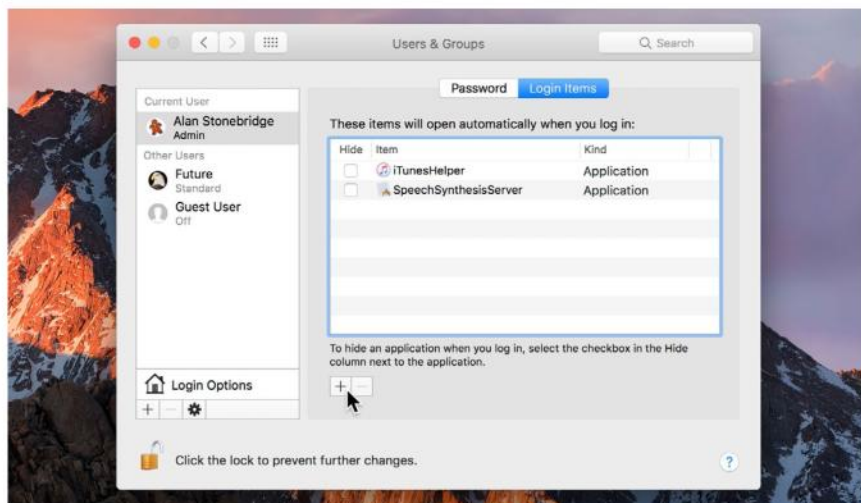
Check the drive or folder in which they're stored isn't excluded from the backup set. Open the Time Machine pane in System Preferences and click Options. If the drive or folder is listed here, it's excluded from Time Machine's backups: select it and click the - (minus) button. If your backups are on a network drive - a Time Capsule or a NAS with Time Machine support - check their health: hold and click Time Machine's menu bar icon, and choose Verify Backups; macOS will detail any problems it finds.



Time Machine is taking too long to back up

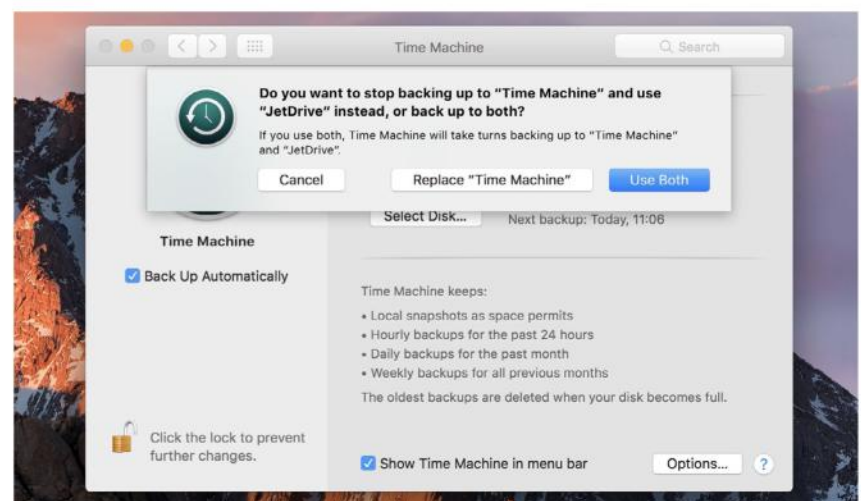
The first backup creates a complete copy of your Mac's contents. Later ones should be quicker as Time Machine then only saves incremental changes to files. If using a NAS drive or Time Capsule, check both get a strong signal from your network and, if you can, connect both to the same access point.

If you run another operating system in a virtual machine (VM) within macOS, follow the advice from your virtualisation tool's developer on how to back up your VMs: refer to bit.ly/2jUPJVA for VMware Fusion and bit.ly/2k3Ygrd for Parallels Desktop.



Time Machine isn't backing up at all

Check the drive is connected and shows up in Finder. If you're backing up to a local drive, use a port on your Mac rather than an external hub. Don't use a USB port in a display that's set to sleep after a while; that will disconnect the drive. If Time Machine backs up to a NAS drive, ensure your Mac connects to it at login: in Users & Groups preferences, click your account, Login Items, then +, select the drive and click OK.



My Time Machine drive is getting full

Time Machine is designed to automatically remove very old incremental files when it runs out of space. It does so automatically; to be informed when it happens, in Time Machine's preferences click Options and turn on 'Notify after old backups are deleted'. Or, connect a new drive and switch to using it ahead of time. It's worth having a second routine to archive files in a way that won't see them disappear over time.

The essential
mac OS Solutions
checklist

Do

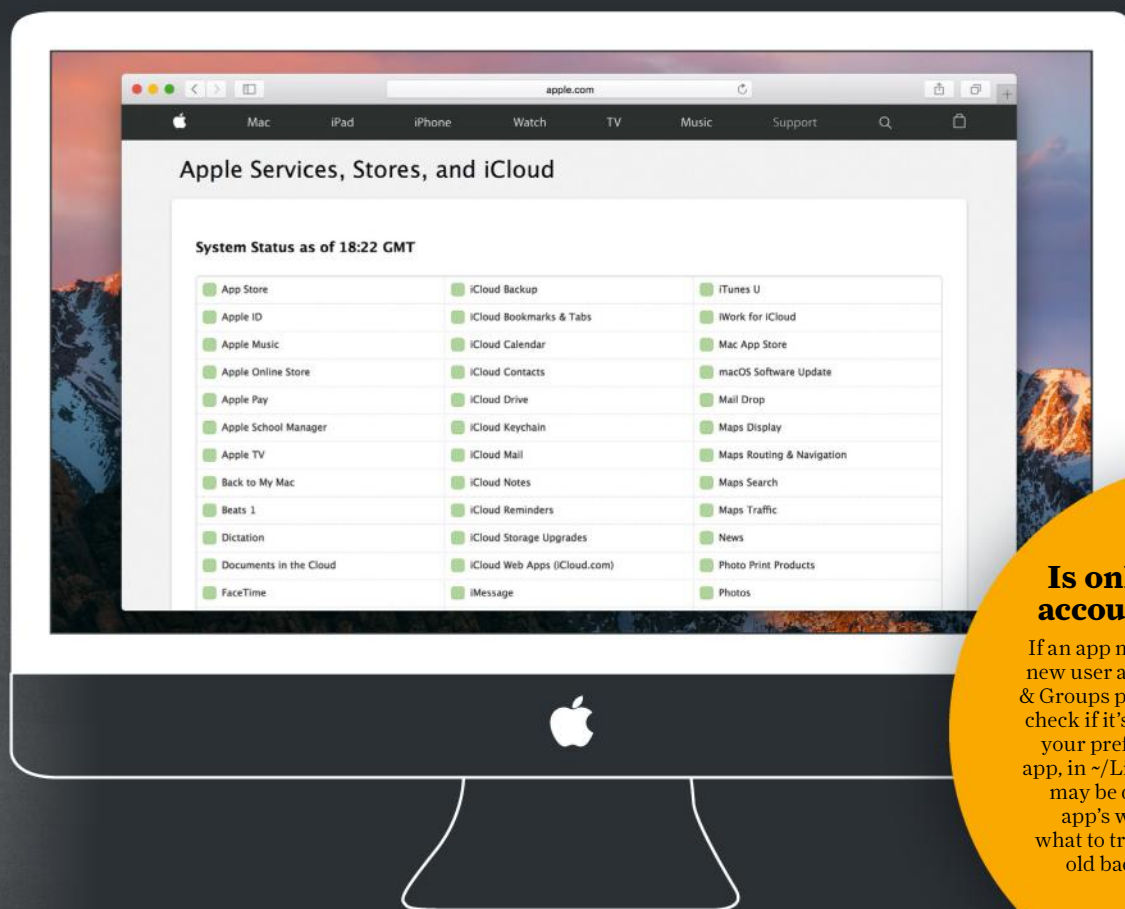
9. Use the Utilities folder, which is located in your Mac's Applications folder. There's a wealth of useful apps in it that can help diagnose and fix problems with networking, displays, passwords, and more. Console can shed light on logged errors.

Don't

10. Risk losing your data. With Time Machine built in to your Mac's operating system, there's no excuse for not backing up - particularly when external hard drives are now so affordable; a 1TB portable model can be bought for about £50.

I'm having trouble with iCloud

Down-to-earth solutions for Apple's online storage and personal data service



Is only your user account affected?

If an app misbehaves, create a new user account in the Users & Groups pane, log in to it, and check if it's affected too. If not, your preferences file for that app, in `~/Library/Preferences`, may be damaged; check the app's website or developer what to try restoring from an old backup or trash so the app can recreate it.

How do I know whether a problem is my problem or Apple's?

iCloud tends to be very stable and its various services exhibit excellent uptime. However, like all online services it can suffer outages from time to time. Check the service status at apple.com/uk/support/systemstatus before tinkering with anything to see whether a problem is at Apple's end or yours.

My account is unexpectedly full

Sierra can make extensive use of iCloud by storing your Documents and Desktop folders in iCloud Drive so they are available on all your devices. You may have enabled this when you installed Sierra, or later on. While useful, this can quickly eat up space; adding more costs money. To switch it off, in System Preferences' iCloud pane click Options next to iCloud Drive, then uncheck Desktop & Documents Folders. Empty versions appear on your Mac; manually drag items back from those in iCloud Drive.

I want to control which photos are synced

If you choose not to store your photos in iCloud Photo Library, you can still get them from your iOS device to your Mac without plugging in a cable. In iCloud's preferences, click Options next to Photos and turn on My Photo Stream. On iOS, enable My Photo Stream in Settings > iCloud > Photos; pics upload when that device is on Wi-Fi. Photo Stream stores the 1,000 most recent pics for 30 days; Photos for Mac automatically adds items from the stream if Copy Items to the Photos Library in its General prefs is on.

I'm getting persistent error messages

We've experienced problems with iCloud authentication on several Macs since upgrading to macOS Sierra. They manifest as a persistent dialog warning that it's not possible to access various iCloud services. Fortunately the fix is simple: sign out and in again in System Preferences' iCloud pane. During this, you have the option to remove synced data from your Mac; though it ought to reappear when you sign in again, the belt-and-braces approach is to decline so you retain a copy on your Mac throughout.

Do

10. Send crash reports to developers. If you use El Capitan or earlier, try Console: check lines in system.log from before a crash and copy to your app's developer. Sierra's Console can be less useful; consider opting in to auto-sharing reports - see bit.ly/SieCo.

Don't

12. Leave windows open when quitting apps if your startup disk is a hard drive. In System Prefs' General pane, turn on 'Close windows when quitting...' so documents don't reopen with their app; then you won't be held up by those you forgot were open.



13 PORTS. ENDLESS

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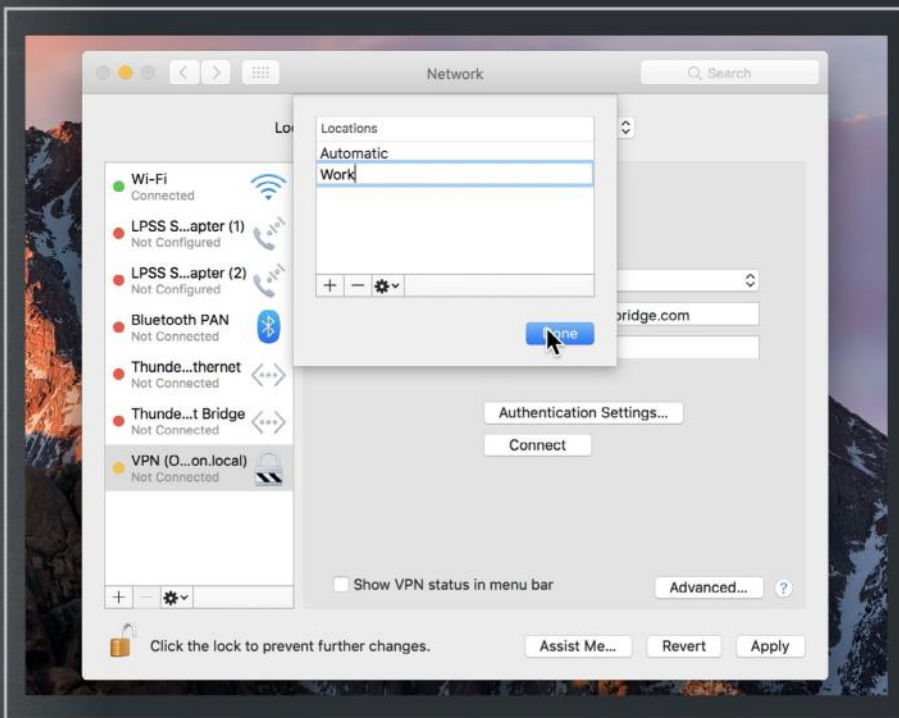
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Thunderbolt 3 ports
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Help! I've got networking issues

Once the realm of specialists, many problems can now be fixed with easy tweaks



My browser can't connect to some sites

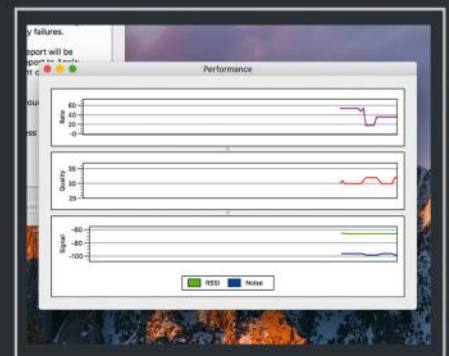
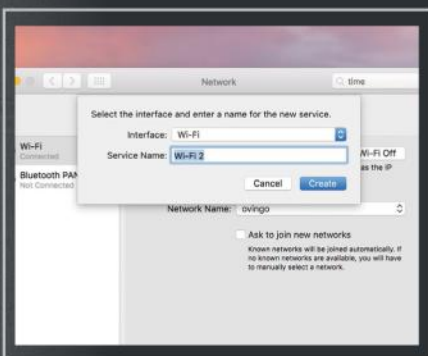
Your DNS (Domain Name System) server might be having problems or set to block access to the sites you need. In System Preferences' Network pane, select your active connection in the left pane and then click Advanced. Switch to the DNS tab, make a note of any existing settings in case you should need to reinstate them, then delete them. Add these two new entries, 8.8.8.8 and 8.8.4.4, which will set your Mac to use Google's DNS servers instead.

I often need to change network settings

MacOS is good at detecting and using the most appropriate settings itself, and will do so as long as the Location pop-up menu in System Preferences' Network pane is set to Automatic; all network interfaces will be active and macOS will check which can provide an internet connection and use it.

If you can't get online or use other network services at once place where you take your Mac, choose Edit Locations in the pop-up, click + and give the new location a name, then click Done. Click the cog under the list on the left and pick Set Service Order to what's appropriate to that location.

In turn, select each interface, click the cog and choose whether it should be active. For any interface you need active, select it and click Advanced, set it up however the network administrator has advised - for Wi-Fi, *don't* remove networks you need from the Preferred Networks list as that'll remove them from all locations - and click OK, then Apply. To switch between location settings, use the + > Location menu.



Wi-Fi just won't work

Still not working? Try temporarily removing your Mac's Wi-Fi connection. In System Preferences' Network pane, select Wi-Fi in the left pane, then click the - (minus) button. Immediately add it back by clicking the + to create a new Wi-Fi connection with default settings.

I'm having longer-term issues with Wi-Fi

Use Wireless Diagnostics (enter its name in Spotlight, or hold ⌘ and click the Wi-Fi icon in the menu bar) to inspect your connection and compile a diagnostics report that you can read through yourself or send to Apple or another support agent - say, your ISP if you're trying to get it to send a replacement router. If these tests don't reveal immediate issues, opt to monitor your connection over time and watch for problems from the background. Check out the options in the tool's Window menu for other useful tools.

The essential mac OS Solutions checklist

Do

13. Enable macOS's firewall to boost your Mac's defences against any unwanted connections from other computers. Turn it on in System Preferences' Security & Privacy pane and then configure it by clicking Advanced.

Don't

14. Run unnecessary services. If your Mac is the only computer on your network, go to System Preferences' Sharing pane and turn off screen and file sharing at the very least.



How do I reset my preferences?

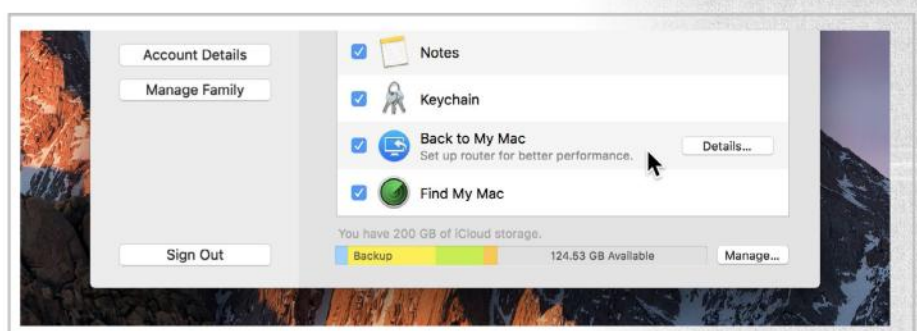
First, make a full backup of your system. Turn off Wi-Fi. You need to copy five files related to network preferences to a removable drive, so you can restore them if necessary. In Finder, browse to the top of your Mac's startup disk and then dig into `/Library/Preferences/SystemConfiguration`. Move (as opposed to copy) the following files to your removable drive, then eject that drive:

`com.apple.airport.preferences.plist`
`com.apple.network.eapolclient.configuration.plist`
`com.apple.wifi.message-tracer.plist`
`NetworkInterfaces.plist`
`preferences.plist`

Restart your Mac and turn on Wi-Fi again; macOS will recreate those files, which should no longer include any problems that existed in the versions you removed.

I can't connect remotely using Back to my Mac

Ensure both Macs are signed in to the same iCloud account and that Back to My Mac is enabled in their iCloud panes. In the remote Mac's Energy Saver pane, set it to wake for network access. Your router must support UPnP or NAT-PMP; use its admin tool to enable it - usually that tool's accessed by going to the router's address in a browser. To find out its address, click the Wi-Fi icon and look under your network's name. Still can't connect? Go to apple.co/2jVvWVK.



Do

15. Test multiple configurations before seeking help. If you have a network problem, is it your Mac, your network, or the remote computer? If a peripheral isn't working, connect it to another Mac before replacing it, as it may not be at fault.

Don't

16. Get complacent. Macs are among the most secure personal computers available, but that could change without notice - if a flaw is exploited, say. Only install apps from trusted sources and don't add web browser extensions you don't fully understand.

Repair options

If you still haven't found a solution, here's advice on getting professional help

After trying out all of our solutions, taking your broken or faulty kit back to Apple for repair may seem like the best solution. After all, who knows more about it than the company that made it in the first place? That said, Apple isn't always the cheapest or most convenient option for getting your kit working again.

Before getting work done at a Genius Bar, compare Apple's prices with those charged by your local Authorised Service Provider (apple.co/2fBpTU0), and third parties such as Timpson, which offers an iPhone screen replacement service. Prices are usually determined by the time a repair will take and whether any parts need replacing, so it pays to shop around.

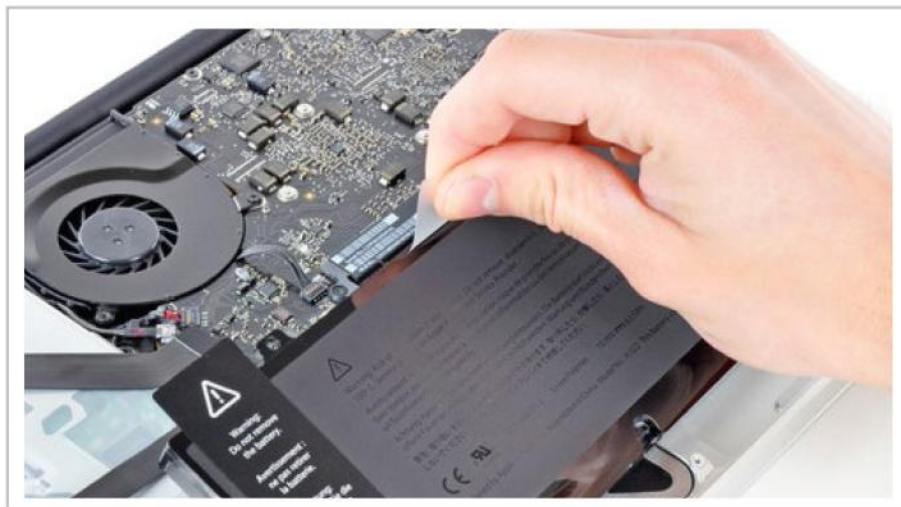
Even if you plan to use a local repair shop, go to getsupport.apple.com, click 'See your products' and sign in with your Apple ID to see the warranty status of your devices, and whether consumer law might still apply to them. From here, you can book an appointment for a repair, not only with Apple but also members of its authorised support network nationwide.

Peripheral repair

In most instances, we would recommend against taking peripherals such as your keyboard, mouse, trackpad or printer for repair. If your service provider charges hourly rates for labour, then in many cases it'll work out less expensive to replace those devices. Make sure you dispose of the broken kit in a responsible manner; many local authorities will take small electrical items as part of their recycling collection, but check with your local council's website before assuming this applies in your area.

iPhone screen replacement

This is one of the quickest (and probably most common) iPhone fixes. Outside of warranty, Apple asks £126 for a 'regular-size' iPhone from the iPhone 5 onwards, and £146 for the larger 'Plus' variants. Geek Squad (geeksquad.co.uk) undercuts it, starting at £99, and pop-in high street shops will often trim that further. Take care in choosing who to use; a fat-fingered engineer might invoke the dreaded Error 53 on a Touch ID-enabled device (see apple.co/2kxBNzA) and brick your iPhone.



MacBook battery repair

Replacement batteries cost between £129 (for MacBook Air) and £199 (for 12-inch MacBook and the MacBook Pro with Retina display) when supplied and installed by Apple. In later models they aren't user serviceable parts, but with older portable Macs DIY replacements are possible. Duracell batteries for older MacBooks cost around £50 and are available from duracelldirect.co.uk.



Hard drive replacement

Checking in for a faulty hard drive replacement will often involve two separate costs: one covering labour, which should include the initial investigation to fully diagnose the problem (Genius Bars don't charge for diagnosis) and one for the new part. Expect to pay around £99 for labour on a Mac mini, say. This service won't necessarily include the transfer of your data, so ensure you have a backup before handing over your Mac. For security reasons, also ask for the faulty drive back so you can personally ensure it's safely destroyed prior to disposal.

Data recovery

Broken and corrupted hard drives are a frequent cause of lost data, which is why we recommend running both Time Machine and a second backup service at the same time - the latter ideally offsite - to protect your files. If you lose your data, consider its

worth, as the cost of recovery can run to thousands of pounds, depending on the time the job takes. Specialists like Kroll Ontrack (bit.ly/2kxBOTy), which has several decades' experience in this field, can turn around your data in as little as 12 hours.

Your files are precious and they're often irreplaceable. Don't entrust them to anyone lacking appropriate training, and if you use a service centre rather than a data recovery specialist, discuss their history, experience and processes so you know what to expect.

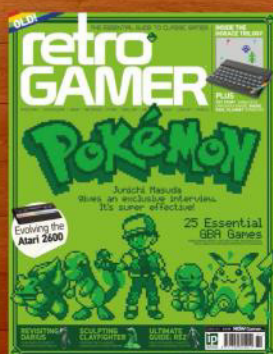


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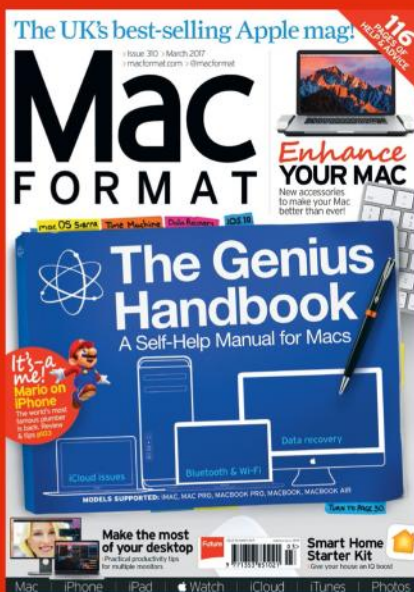
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APPLE SKILLS

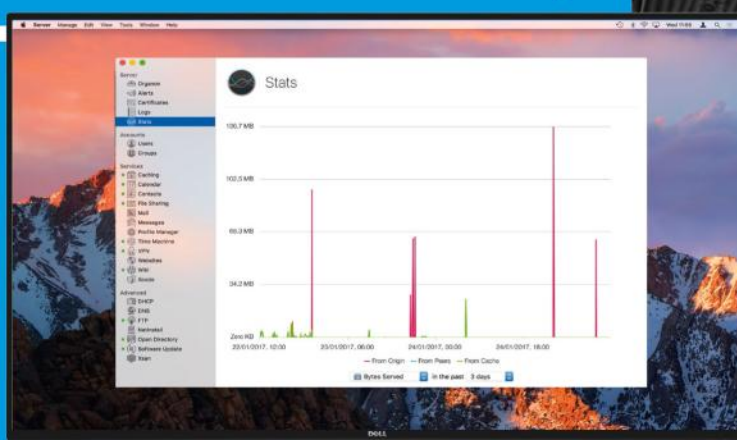
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NEW IDEAS

Your new-look guide to getting more from your Apple kit

TURN A SPARE MAC INTO A TIME CAPSULE
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› Understand iOS gestures

› A *tap* is a brief contact of (usually) one finger on your device's screen.

› To *drag* is to move a finger across the screen to scroll or pan around content.

› *Swipe* means move one or more fingers across an item or the screen, then let go.

› A *flick* is like swiping, but it's quicker, and is often used to scroll content more quickly.

› *Pinch* means move two fingers together or apart, usually to zoom in or out.

› *Touch and hold* means lightly rest your finger on an item and wait for a reaction.

› Master Mac keyboard shortcuts

› When you see a shortcut like **⌘+⌥+C**, hold all but the last key, then press that one.

› **⌘** is the Command key, which is also labelled *cmd*.

› **⌥** means the Option key, labelled *alt* or *opt*.

› **⌃** means the Control key, labelled *ctrl*, and shown as **^** in shortcuts in the menu bar.

› **⇧** is the Shift key, which is typically just labelled *shift*.

› **⌫** means the Delete key, which deletes to the left of the

insertion point. Press **⌘+⌫** to delete to the right.

› **⇥** is the Tab key, which shifts the focus between *some* controls in windows and web forms. Turn on Full Keyboard Access in System Preferences to jump between *all* controls.

Animate in RapidWeaver

Use custom code and plug-ins to add movement to your website

IT WILL TAKE

> 30 minutes

YOU WILL LEARN

> How to add animated content to web pages made in RapidWeaver.

YOU'LL NEED

> RapidWeaver 7.
Stacks, Animatelt and
Static Height plug-ins.

Stacks makes
RapidWeaver
more flexible
for adding
animation to
your website



Two decades ago, the internet was very different: broadly static, text-based, and - from a visual standpoint - rather dull.

Today, though, you can run rich and complex animations - and even entire games - in a web browser, without the need for plug-ins like Flash to do so.

The rapid evolution of web standards made all this possible. Developers, browser makers and users demanded new features, standards bodies smashed out better specifications, and browser makers integrated them into their software. But while the nature of coding for the web is modular, component-based and flexible, adding advanced capabilities such as animation to a page can be a mite trickier with software like RealMac's RapidWeaver

Because RapidWeaver simplifies creating websites by way of an interface that's akin to a desktop publishing tool, you get what you're given, and generally work within strict templates. This is great for grabbing a design, adding content, and flinging the result at your web host, but restrictive if you fancy animating some of your content.

However, that doesn't mean you can't add animation to websites made in RapidWeaver;

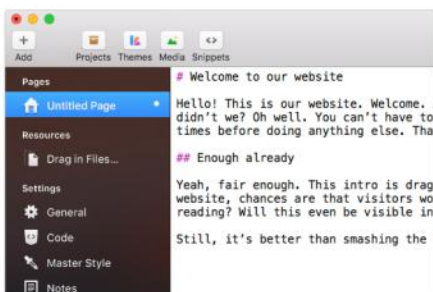
you just have to get your hands a bit dirtier than usual. As we'll show in the walkthroughs, some basic animation can be added on a site-wide basis purely through the use of custom CSS - a process that takes only minutes and is entirely free. Elsewhere, you might delve into Stacks, a plug-in that turns RapidWeaver into a more flexible tool, to which you can bolt on any number of add-ons, some of which are animation-oriented. (Stacks costs about £41, but you can try it out for free.)

Show some restraint

Note that you should always take care when adding animation. Some users find animated content overbearing, and extreme examples can result in motion sickness. Also, depending on the trigger that starts an animation playing, you may find that your creations only work in certain environments.

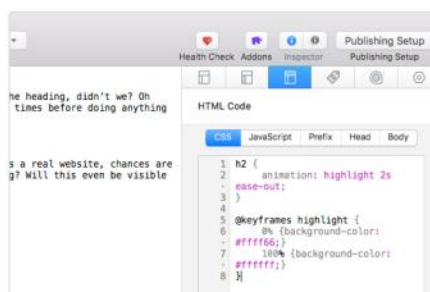
In addition, animation can tax patience as much as browsers, so use it sparingly and tastefully, rather than have every element on your site twitch about like it's had itching powder pitched down its shirt. And, as ever, remember to test your work across all platforms before making it live, if the site in question is deemed important. **Craig Grannell**

HOW TO Highlight headings >



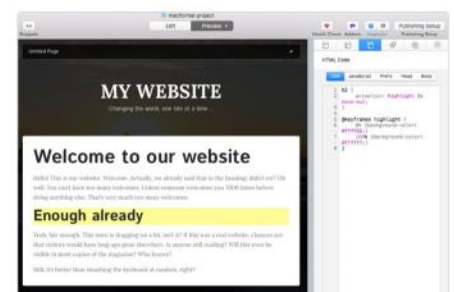
1 Create the page

Add a new Markdown or Styled Text page to your project. Add some content to it, and be sure to include a level two heading - styled using `##` in Markdown, or by picking Heading 2 in the `<>` pop-up menu in a Styled Text page's bottom bar.



2 Add the code

Under Code in the sidebar, select CSS. Add `h2 { animation: highlight 2s ease-out; }` and `@keyframes highlight { 0% { background-color: #ffff66; } 100% { background-color: #ffffff; }` to the style sheet. Now click Preview.



3 Test the result

The level two heading's background should start yellow and fade, temporarily drawing the eye. If you only want this effect on one page, select that page on the left, open the inspector's HTML tab, click CSS and add the code from step 2.

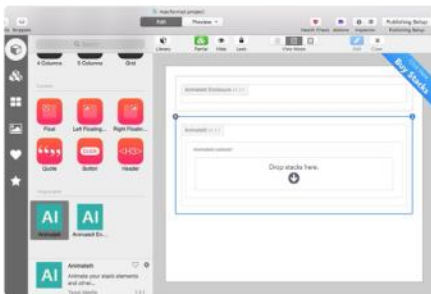
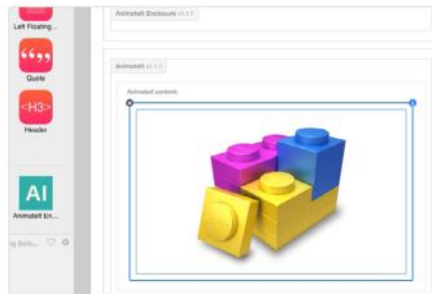
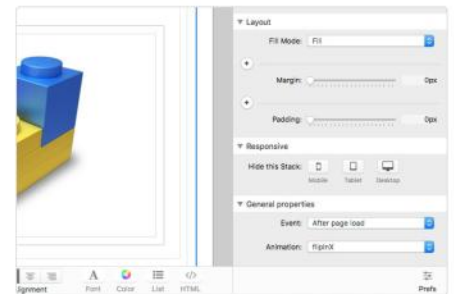


Understanding Stacks

Modular building blocks for RapidWeaver >

The Stacks plug-in provides a radical alternative for creating RapidWeaver pages. After installing it, add a new Stacks page to your project and click the Library button at the top-left corner to see components you can drag to the canvas, making it a cinch to fashion complex layouts. Other plug-ins, such as Animatelt in our walkthrough, require Stacks to function, and are also added to your project by dragging them to the canvas. Note you can continue to use other RapidWeaver page types after installing Stacks; chances are you won't want to.

HOW TO Transition an image >



1 Make a Stacks page

Install Stacks (yourhead.com) and its Animatelt (tsooj.net) add-on and restart RapidWeaver. Create a new Stacks page, drag an instance of Animatelt Enclosure to the canvas, and then drag and drop a single instance of Animatelt below it.

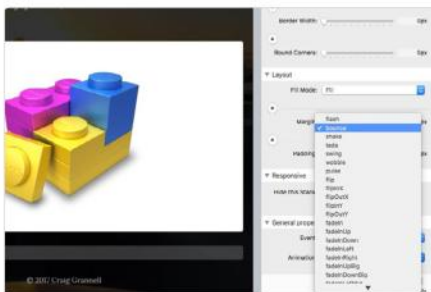
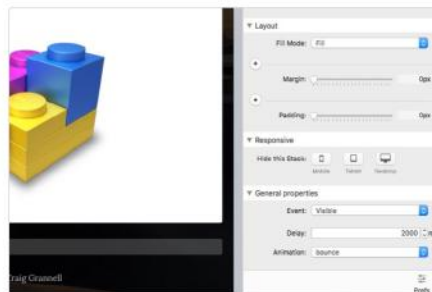
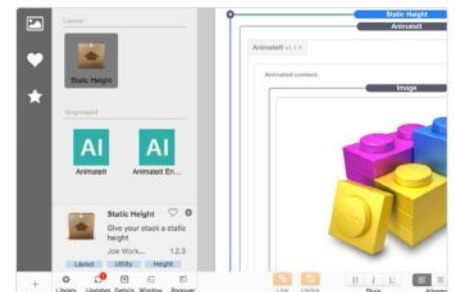
2 Add an image

Inside the Animatelt stack you'll see an area that says 'Drop stacks here'. Drag an Image stack onto it, then drag a small image into the Image stack. (You'll need to find something suitable on your Mac or drag something in from Safari.)

3 Configure settings

Select the Animatelt stack (so its border turns blue) and then open the Inspector. On the sixth tab, under General properties, set Event to 'After page load' and Animation to 'flipInX'. Preview your page to take a look at the animation.

HOW TO Experiment with Animatelt >



1 Play with previews

When in RapidWeaver's Preview mode, you can still access the Inspector and update the properties of your Animatelt stack as long as it was selected in Edit before you clicked Preview. Try different Animation settings in that pop-up menu.

2 Set a time delay

If you find an animation is occurring too quickly, you can add a delay before it plays. Set Event to Visible and Delay to 2000ms. Your animation will now play after two seconds. However, the page layout may 'shift' when the image loads.

3 Fix layout issues

To fix the shifting layout, install the Static Height stack (free, bit.ly/2iHWuen). Add it to your canvas and then drag the Animatelt stack inside it. Adjust the height, width and scale settings of your elements to suit your page's design.

Take control of windows

Discover techniques to tame your workspace, including Sierra's new tricks

IT WILL TAKE

> 10 minutes

YOU WILL LEARN

> How to resize and reposition windows quickly and precisely.

YOU'LL NEED

> macOS Sierra, yet many tips work as far back as OS X Lion.

At last, macOS has a simple way to make a window fill the entire desktop



How often do you find yourself dragging a window to roughly the place you want it to fill, and then dragging from a couple of its edges to make it the size you want?

Sadly, macOS doesn't have an equivalent to Microsoft's Window Snap tech to enable you to quickly make a window fill the left or right half of the desktop. However, it has some hidden shortcuts that are more powerful.

In these two pages you'll learn techniques that will help you to wrangle windows more efficiently, so you can quickly get on with more pressing tasks. If you're wondering why you haven't found these shortcuts already, it's because they're the sort of hidden features that require someone to tell you about, or highly insightful experimentation on your part.

Some of the shortcuts you'll learn about on these two pages have been part of the Mac operating system for years, so you can benefit from them even if you have no choice but to run an old version. For example, OS X Lion was the first version to enable resizing from any window edge or corner, which you can combine with holding one or two modifier keys to resize a window in two directions at once, for example.

If your Mac is running Sierra, though, you can enjoy additional enhancements Apple has added in this iteration. The great news here, especially if you've switched from a Windows PC, is that there's at least an equivalent to the Maximize command found in Microsoft's operating system, so you can make a window fill the desktop with a double-click. Related to that, you can instantly snap a window's edge or corner to the same position of the overall desktop - no cumbersome dragging required!

If you need even more control

Earlier, we mentioned Windows Snap. After reading these pages, you may find yourself pining for something more like it, especially if you've recently switched from a PC. One of the following third-party tools will help you out.

The simpler option is Magnet (£3.99, Mac App Store). It enables you to drag a window or press a key combo to make the window fill a specific quarter or half of the desktop, or even the whole screen. Your more powerful option is Moom (£7.99, Mac App Store). A highlight is its ability to save and restore window layouts in an instant by pressing a keyboard shortcut. For now, though, let's look at what comes free with your Mac. **Alan Stonebridge**

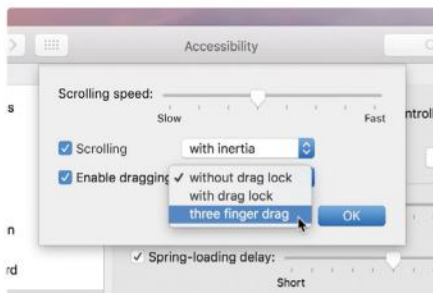
HOW TO Quickly and comfortably resize a window >

rs and features

and by up to 2TB

5 G6 doesn't overheat

OUT MORE



1 Resize a window

The basic method of resizing a window is to position the pointer over a corner or edge so the cursor changes to a double-headed arrow, then hold the mouse or trackpad button and drag in the direction you want the window to grow or shrink.

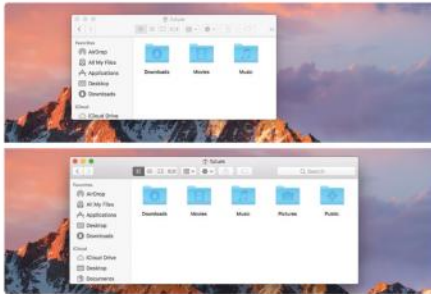
2 A trackpad trick

To resize by moving three fingers on the trackpad, rather than pressing as you drag a finger, go to System Preferences' Accessibility pane, select Mouse & Trackpad, click Trackpad Options and set 'Enable dragging' to 'three finger drag'.

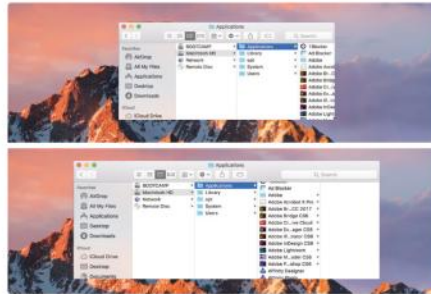
3 Resize in two directions

You can resize a window so that the opposite edge or corner mirrors the movement of the one you drag: hold $\square$ while dragging an edge or corner. This is great for making a window wider - to accommodate a wide web page, say.

HOW TO Make big changes even more quickly >



1 Maintain proportions
Hold $\square$ while resizing a window and its relative width and height will be kept the same. The window is anchored at the point opposite to the one you drag from. Note, the proportions may be overridden below a minimum width or height.

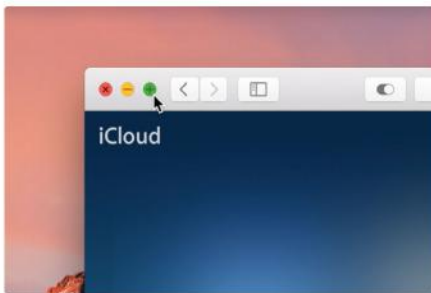


2 Combine the keys
By holding down both $\square$ and $\square$ and then dragging from a corner or edge, the resizing operation is then anchored at the centre of the window and you end up moving all four of the window's edges inwards or outwards in unison.



3 Picture-in-picture video
This feature, available in Safari, iTunes and other apps in Sierra, pops a video into its own window that snaps to a screen corner and stays there even if you switch to a full-screen app. Hold $\square$ when dragging it to position it arbitrarily.

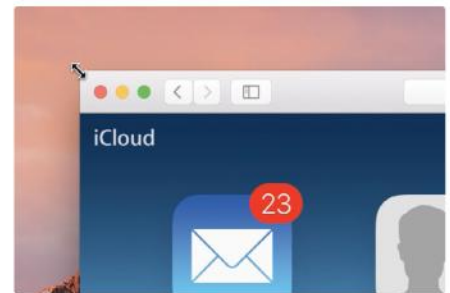
HOW TO Make a window fill the desktop >



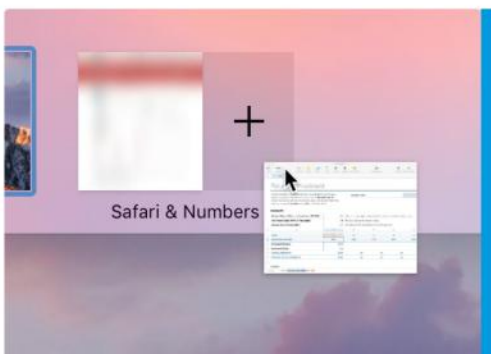
1 The Zoom command
You won't see the word Maximize in a Mac app's Window menu, but you will see Zoom. This command expands a window to fill what's thought to be the best fit for its content. As a shortcut, hold $\square$ and click on a window's green button.



2 Fill the desktop
On systems before Sierra, expanding a window to fill the desktop requires you to hold $\square$ and drag from whichever of the window's corners is furthest from its corresponding screen corner; the window will grow outwards in all four directions.



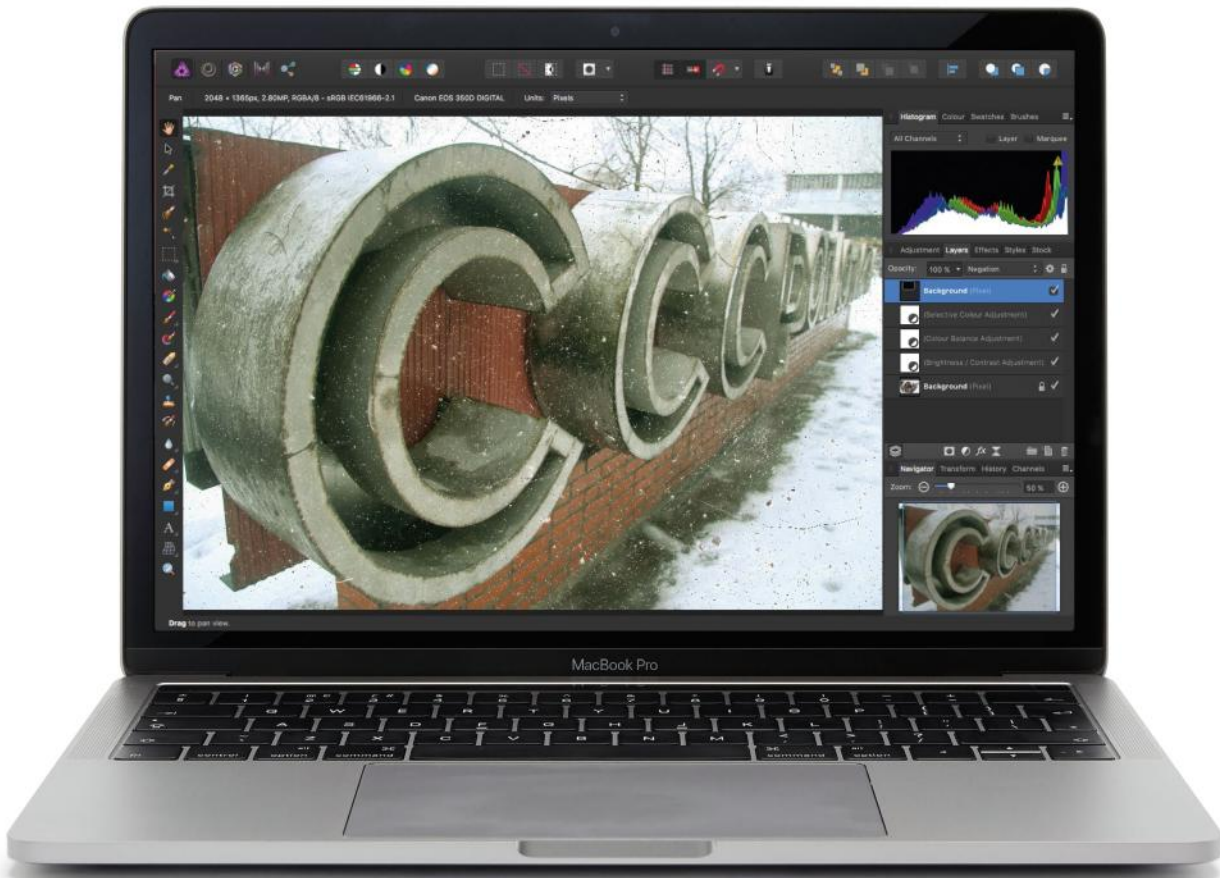
3 A shortcut in Sierra
It's much easier in Sierra. Hold $\square$ and double-click on *any* window corner. This works in many built-in and third-party apps, an exception being iTunes - but perhaps you keep it at a fixed size, or use its Mini Player when you need space.



View two apps side by side >

Full-screen mode isn't just for focussing on one app

Split View (OS X 10.11 or higher) quickly puts two apps alongside each other, if they both support full-screen mode. In Mission Control (see apple.co/2iZmx1G), drag a window to an empty spot on the top bar, then drag another onto the space that created. In that space, drag the divider to adjust the screen split. To exit, put the pointer over the space in Mission Control and click the arrows that appear. Note: two apps may not combine if the screen resolution is too low. On a Retina display, picking a higher 'Looks like' resolution in the Displays pane may overcome this.



Make a photo look older

Create impressively vintage-looking photos in just a few minutes

IT WILL TAKE

> 15 minutes

YOU WILL LEARN

> How to use Affinity Photos' adjustment and live filter layers.
How to apply a scratch overlay to a picture.

YOU'LL NEED

> Affinity Photo.
A few photos with vintage subjects.



If there's one thing to be grateful for about modern photography, it's that digital photos are nothing if not

consistent. When photographers shot on film, all sorts of variables - from the age of the film, to the humidity in which it was used, as well as other factors - affected how images turned out once they were processed. Even in perfect conditions, different films could produce very different looking images. These days, one image from a decent digital sensor will turn out, assuming the same settings, roughly the same as another. If you're shooting raw photos, that often means rather flat images; even if you allow your camera to apply a few JPEG tweaks to the picture, you still won't get an enormously different image.

For reportage photographers this is an enormous blessing: images can be produced safe in the knowledge that colours will be accurate, details will be sharp and that images won't be rejected by picture editors who aren't sold on the look of a particular type of film.

However, it's a double-edged sword: images with a 'vintage' style hold enormous appeal: given the right subject they can be enormously evocative. Just look at the overjoyed reaction by photographers when Kodak announced in January that it was planning on bringing back its Ektachrome film by the end of 2017. There's certainly plenty of evidence of the enduring popularity of vintage-style images on photo sharing sites such as Instagram, where the most popular filters peg back the contrast and saturation of images to produce finished shots that look older than they are.

Tools of the trade

Modern photographers can have the best of both worlds: capturing accurate, realistic images in their camera and then selectively editing the most interesting ones to be given a vintage makeover. Of course, there are plenty of one-shot filters out there to do the job in a single click (we really like VSCO's range of free filters; see apple.co/2iCZULT), but there

Learning to do this manually is very useful in developing editing skills

EXPLAINED... Where to look in Affinity Photo >

1

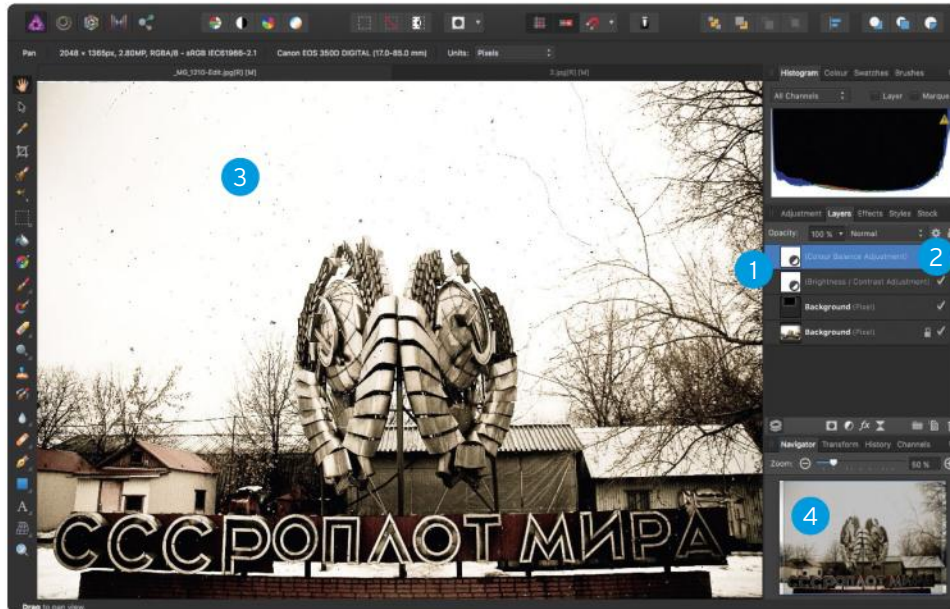
Adjustment layers

> These are the best way to alter an image in the app as they're adjustable and non-destructive.

2

Colour balance adjustment

> This changes the way colours look, enabling you to create new visual effects quickly.



3

A weathered appearance

> You can create a dust or scratch effect yourself, or use one of the free options available online.

4

Choose the right image

> Don't just run a vintage effect over every photo you take - be selective!

are lots of benefits to learning to do the job manually. The style you apply can be varied slightly with each image, and learning to control different aspects of an image is very useful to developing your image-editing chops.

Here, we'll use Affinity Photo to produce an aged, vintage-style effect on carefully selected images, making the most of both our editing skills and the source material. This is a preset-free zone: you'll do everything using standard image-editing tools and tricks, so you can turn the intensity of the effect up or down to suit your image.

In doing this, it's best to use adjustment layers. These sit on top of your image, rather than permanently changing its original pixels. That means there's less chance of damaging that original file (always possible if you shoot JPEG rather than raw files), and changes can be revised. Affinity Photo's Live Filter Layers are a similar tool, which work the same way but make groups of edits to an image in order to produce a particular effect.

The second thing to bear in mind is that it's good practice to work in Affinity Photo's own file format. This is the default option when you first press **⌘+S**, and means you'll be working in a non-destructive format. Only create a JPEG when you don't want to make further changes, by choosing **File > Export**.

Our aim is to produce a weathered, washed-out effect - as if a photo has sat in the sun for decades. Our two main tasks are to introduce a slight colour cast - shifting all the colours in the image slightly - and reduce the image's contrast, so there's less difference between the brightest and darkest parts. While this will result in a picture that's flatter and less dramatic than the original, in concert with the colour cast and a few other bells and whistles (such as a very subtle vignette and perhaps some digitally-introduced dust and scratches), you should end up with a shot that really looks the part.

The picture we've chosen, of an old Soviet sculpture in Moscow, is perfect for this kind of treatment. The subject matter is antiquated, and as with many images that benefit from slightly more ambitious editing, the light the image was shot in was pretty poor, resulting in quite an underwhelming image.

Accelerated ageing

Reducing contrast is a good starting point. In **Layer > New Adjustment Layer > Brightness/Contrast Adjustment**, you'll drag the contrast slider to the left, which will flatten the image slightly. Don't go too far, as that will make the image look a little hazy; stick to a relatively restrained leftwards pull. Close the dialog and



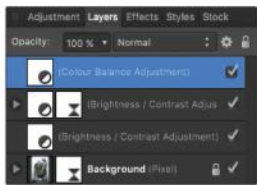
Jargon Buster

> **Colour balance** means shifting the hue of all the colours in an image, usually so neutral ones look correct rather than exhibiting a colour cast.



Genius Tip!

> Keep your changes subtle! The more striking the difference is between your original and finished shots, the less likely you are to convince viewers.



Jargon Buster

> **Adjustment layers** are layers that sit on top of your original image and change how it looks, without permanently altering the original.

note the Layers palette on the right-hand side of the app. The bottommost layer is your original image, and the adjustment is the one above it, which you can rename to something more descriptive name by clicking it.

Clearing the check box to the right of the adjustment layer will disable its effect - handy if you want a reminder of how things looked without it. To tweak an adjustment layer's settings, double-click the layer. As we'll make multiple adjustment layers in the same image, it's useful to bear that ability in mind.

The basics of colour correction - used here for the opposite of their normal job of bringing a photo's colours into closer line with reality - are simple. Choose Layer > New Adjustment

Layer > Colour Balance Adjustment and decide how you want your image to look. You can rebalance it using the sliders - make it more blue and it'll simultaneously become less yellow. More red equals less cyan, and so on. At this point it's worth researching historical or vintage images and deciding precisely what style to ape - unless you've got an innate feel for exactly what makes a 'vintage' picture, it's worth formulating a plan before you dive in.

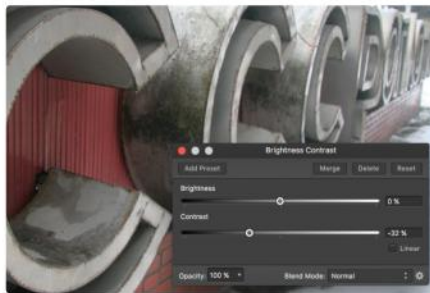
Our final image here uses a neat scratch overlay. You can make these in Affinity Photo, but, as ever, heroes on the internet have done it for you. Head to bit.ly/2k0I5Mj to download a pack of overlays that apply a subtle finishing touch to vintage images. **Dave Stevenson**

HOW TO Create a vintage effect in Affinity Photo >



1 Find the right frame

This shot is ripe for giving a vintage treatment. It's interesting while not very well executed, but the subject has plenty of old-school appeal. Some interesting processing should forgive the wonky composition, too.



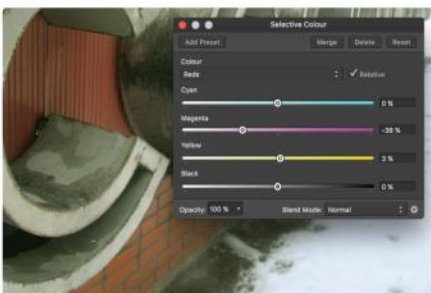
2 Contrast reduction

Choose Layer > New Adjustment Layer > Brightness/Contrast Adjustment. Drag the contrast slider left to flatten the image slightly - however, don't go too far. As ever, subtlety is the key.



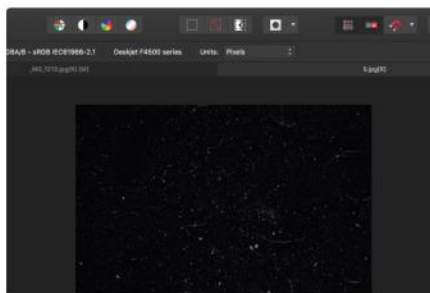
3 Quirky colour balance

Pick Layer > New Adjustment Layer > Colour Balance Adjustment. You can vary the application of this effect depending on the image: here, we want to bring out the cold-looking greens and yellows to produce an old, weathered effect.



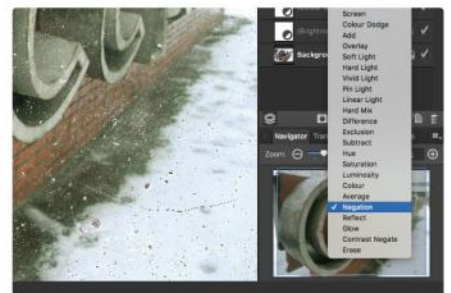
4 Selective adjustment

From the same sub menu as before, choose Selective Colour Adjustment this time. Dragging the cyan slider to the left will pull a little heat out of the obviously modern brickwork that features in the sculpture's plinth in our photo.



5 Scratch master

If you didn't do so earlier, head to bit.ly/2k0I5Mj to download free dust and scratch overlays. Open one, press **⌘+A** to select it, then copy and paste it into a new layer over your image. The scratches will temporarily obscure your photo.



6 Blending mode

Select your scratch layer, then click the blend mode pop-up menu (which says 'Normal') and move the pointer over its options; your image will show through. Pick the mode you prefer, and consider lowering the layer's opacity for subtlety.

LOSE YOURSELF IN A WORLD OF

Vinyl

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OXFAM

Start your smart home

Learn how to set up and control your HomeKit

IT WILL TAKE

> 30 minutes

YOU WILL LEARN

> How to set up your accessories, arrange them in rooms, and set up scenes to control several with one tap.

YOU'LL NEED

> iOS 10's Home app.
At least one HomeKit-compatible accessory.



Technology that enables you to control your home from your smartphone or tablet is becoming more common, and the range of such accessories that works with iOS devices is growing all the time.

Among them are lighting, motion sensors, thermostats and much more. Apple provides a system that enables these devices to work together and be controlled from your iPhone or iPad. It's called HomeKit, and you control accessories compatible with it in the Home app that's included for free with iOS 10.

Perhaps you want to install smart lighting, environmental sensors to check temperature and humidity, smart plugs so you can switch devices such as lamps and heaters on or off in response to a sensor, or motion sensors to light your path if you get up during the night. You can even control accessories in groups using scenes, and activate scenes using Siri by saying things like "Hey Siri, it's film night".

Initially, you'll need to set up your accessories in the Home app, which acts as a hub to monitor and control them. Add accessories by scanning stickers on them (or their packaging or documentation), then optionally tell the app which room each accessory is located in to make things easier to manage.

Accessory compatibility

When you're buying smart accessories, look out for the Works with Apple HomeKit badge. The Home app only works with accessories that support HomeKit - this doesn't mean you can't use other kinds of smart accessory with iOS, only that you can't control or automate



them in Apple's app, which we're focussing on here. Non-HomeKit devices are controlled in their own apps and some can be automated using services like IFTTT.com.

However, some devices work with both HomeKit *and* other systems. Philips Hue is an example; it supports HomeKit through a bridge, a device that plugs in to your router and relays commands it receives from the Home app to the lights. Bridges also have to be added to Home, and enable the accessories they work with to also appear there despite not independently supporting HomeKit.

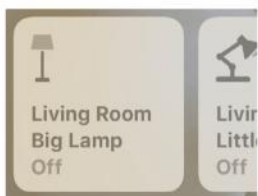
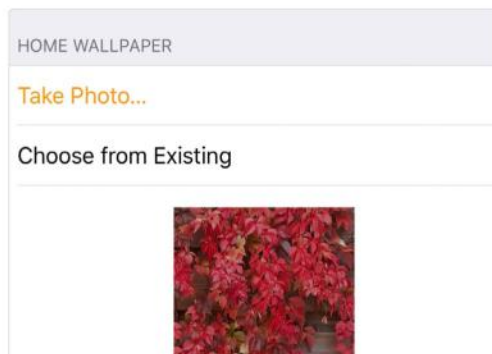
Here you'll learn how to set up and manage your HomeKit accessories. When that's done, turn to page 58 to find out how to make your abode truly clever by setting up automated responses to events. **Alan Stonebridge**

Look out for the Works with Apple HomeKit badge to tell if a device will work with the Home app

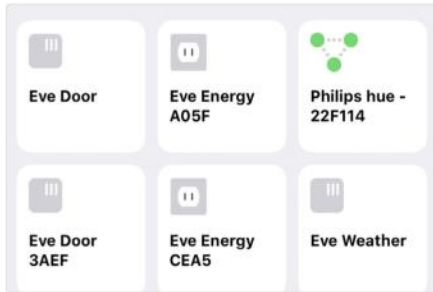


Genius Tip!

> If your iOS device lacks 3D Touch, rather than pressing firmly on an item to edit it, hold your finger on it for a short time (a long press).



HOW TO Set up and manage HomeKit accessories >



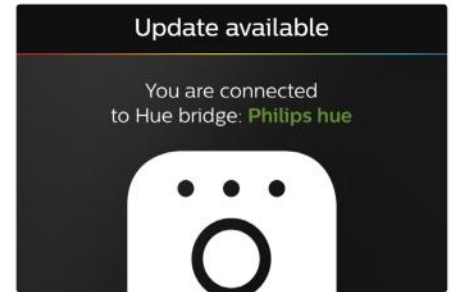
1 Get started

Skip Home's intro page, then tap Add Accessory on the My Home page to see nearby HomeKit-compatible accessories waiting to be added. If you don't, tap the sentence at the bottom for advice. Otherwise, tap one to connect to it.



2 Add an accessory

Align the accessory's sticker with your iPhone camera's view to scan it and add the accessory to your home. Name the accessory, and add it to a room if you want. Making it a favourite adds it to the Home page and Control Centre.



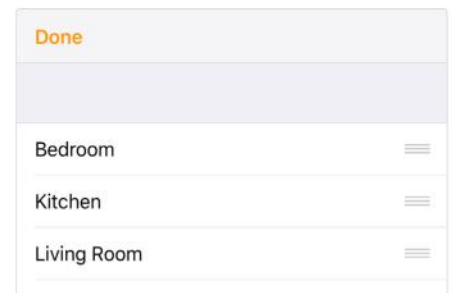
3 Check for updates

To add more accessories, tap +, then Add Accessory. After doing this in the Home app, it's worth downloading and opening any app its maker provides, as it may have additional controls, including the ability to install firmware updates.



4 The Home overview

Tap Home for a status summary and favourite accessories. Tap the arrow (top left) to rename your home, give others control, and see if a 4th-gen Apple TV or iPad 4 or newer, set as a hub in Settings > Home, is reachable for remote access.

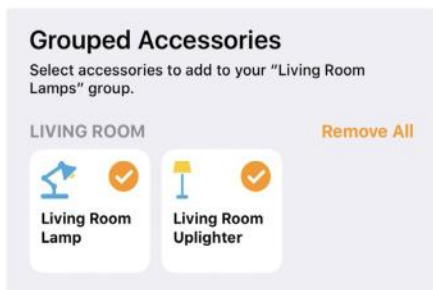


5 Edit the summary

In the Home page, tap Details to see which accessories contribute to the summary. Apply a long/deep press to an accessory in Home or Rooms, tap Details, then Status and Notifications and set the Include in Status switch as you want it.

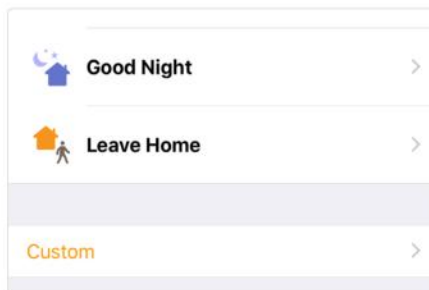
6 Organise your rooms

Tap Rooms in the bottom bar and swipe horizontally to see what's in each. Tap the list icon, Room Settings, then Edit to set the order in which rooms appear. Tap Done then Edit to drag accessories in the room you're viewing into a new order.



7 Group accessories

To control things as a group, long or deep press on an accessory, tap Details, then Group with Other Accessories. Name the group, tap accessories to add, then tap Done. Their tiles are replaced by one that toggles all of them on or off.



8 Create a scene

Scenes set more complex statuses of multiple accessories in one tap. They can also be triggered by conditions such as your location, temperature, or motion in a room. Tap + on the Home or Rooms page, Add Scene and then Custom.



9 Configure your scene

Enter a name. Tap Add Accessories, those to include in the scene, then Done. Apply a long/deep press to accessories in turn to set their statuses. A scene can be turned on or off from any room it affects, and Home if set as a favourite. Tap Done.

Automate your smart home

Make your abode truly clever with automatic responses to events

IT WILL TAKE

> 15 minutes

YOU WILL LEARN

> How to automate your home based on your location, the time, or a change in an accessory's status.

YOU'LL NEED

> iOS 10's Home app.
Ideally a few HomeKit accessories that are already set up.

The Home app enables you to set the status of accessories in response to data or events



Connecting your smart home accessories to the Home app gives you the ability to check the status of sensors and

toggle devices on or off at will, but that's just the foundation of making your home smarter. Things get really clever when you use sensor data, the time of day or a change in your location to trigger behaviours, such as turning on a heater when you leave work so your home is warm when you arrive there.

The Home app's Automation tab is the key to doing this. There you can define conditions that will cause an accessory or scene to turn on or off. Automations can change the status of a single accessory, or they can activate multiple scenes at once. For example, an automation might turn on lights in multiple rooms at sunset, and set the brightness level of each light to a suitable intensity to suit that time of day and their location, so that you aren't dazzled if you happen to be home. Or, you might set one light to turn on along with your heating when you leave work, but only if the sun has set, suggesting that it's winter.

You can disable automations to ensure they don't run, say in summer or when you're away, rather than deleting them and having to

recreate them at a later date. The Home app marks those that are disabled as such, to help you find and turn them on again.

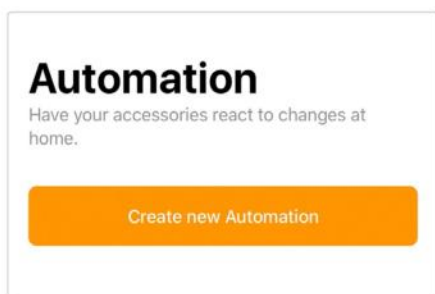
Third-party apps

In the tutorial on page 56 we mentioned it's worth downloading whatever apps the maker of your HomeKit accessories provides, so you can receive firmware updates. Automation is another good reason to do so, as these apps may provide features that Home does not.

For example, Elgato's Eve app shows historical sensor readings, and with the Eve Energy smart plug you can tell that app how much you pay for electricity to help keep track of how much an appliance is costing you. Day to day, Elgato's app can more finely react to changes in numeric sensor readings than Home, such as humidity and temperature, so you can set a dehumidifier, heater or fan to turn on if they drift outside your comfort zone.

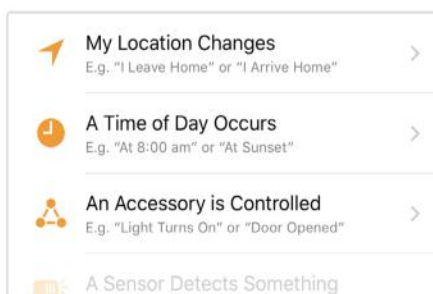
Apple introduced the Home app in iOS 10. It hasn't seen major changes in the months since then, so there are some aspects that are less than great. For automations, if you set up many of them, they become a little tedious to browse and manage – we've got some pointers to help you with that. **Alan Stonebridge**

HOW TO Set up home automations >



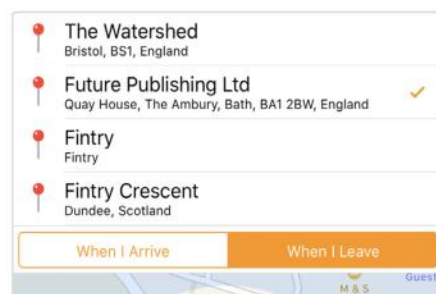
1 Create an automation

Tap Automation in the bottom bar of the Home app. The first time you do this there's only one thing you can do next: tap the 'Create new Automation' button. You'll then be shown a list of possible trigger conditions.



2 Pick a trigger type

An automation can be triggered by your arrival at or departure from a place; a time of day; when your actions change a device's status, such as opening a door or turning off a light; or when a sensor detects, for example, smoke or motion.

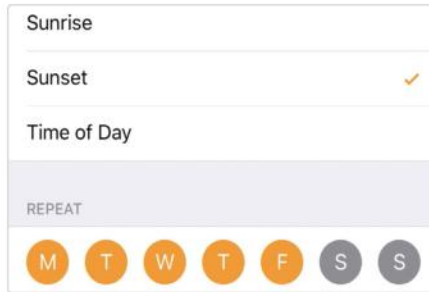


3 Automate by location

Choose location and you'll see a map with your position marked, above which are locations you've searched for in the past, plus a search bar to look up a new place. Pick a place, then tap either When I Arrive or When I Leave above the map.

CONTINUED... Set up home automations >

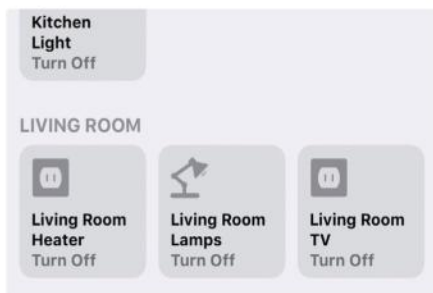
4 Step title to go here
Next, drag the blue handle on the edge of the circular boundary that's shown around the location you chose, so that the boundary roughly covers the distance at which you want your automation to occur. Finally, tap Next.



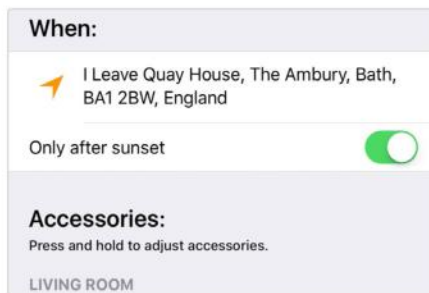
5 Automate by time
When automating by time, you have three options: sunrise or sunset, which will adjust automatically during the year, or a precise, fixed time. Below, tap the days so that only those on which the automation should occur are highlighted.



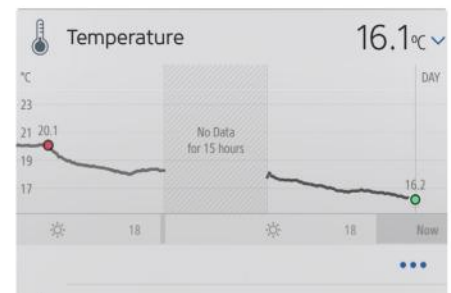
6 Automate by status
The remaining two trigger types activate when an accessory's status changes due to your action or sensor data. Tap the accessory that'll trigger the automation, tap Next, then pick the state at which your automation will kick in.



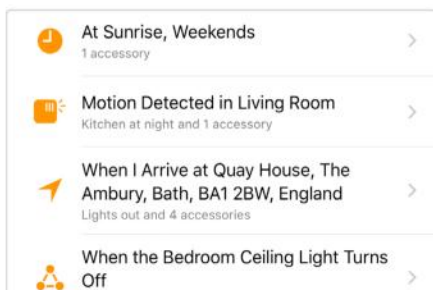
7 Set accessory response
After setting up your trigger, you'll be shown scenes you've set up, and all your accessories listed by room. Tap one or more of those you want to control, then Next. You'll then see a summary of your trigger and what will be controlled.



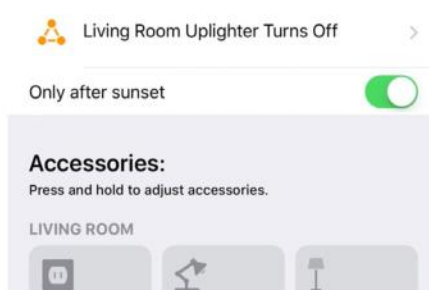
8 Contextual options
Depending on the trigger, you may see an option to limit the automation to after sunset. Apply a long/deep press to a scene or accessory, set its desired state and tap outside the controls to return to the summary. Once all are set, tap Done.



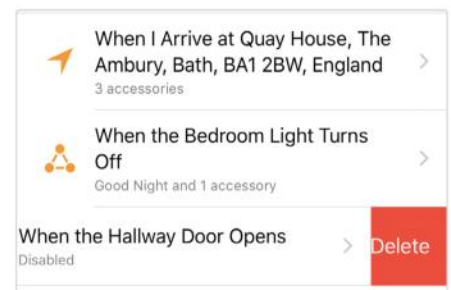
9 Check automations
Tap Automation in the bottom bar at any time to see the routines you've set up. It includes those created in Home or an accessory's own app, which may provide extra features, such as this chart of historical readings in Elgato's Eve app.



10 Identify automations
As the list of automations grows, you'll need to scroll down to reach the button to create one. Sadly, automations can't be reordered or renamed, but the trigger icons to their left go a little way to helping you find the one you want to edit.

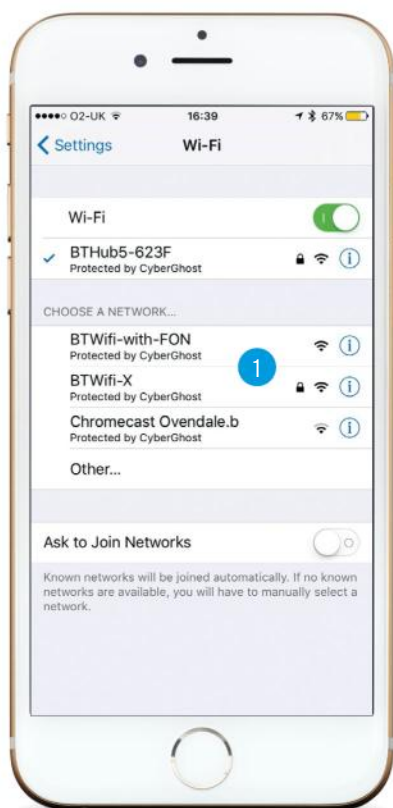
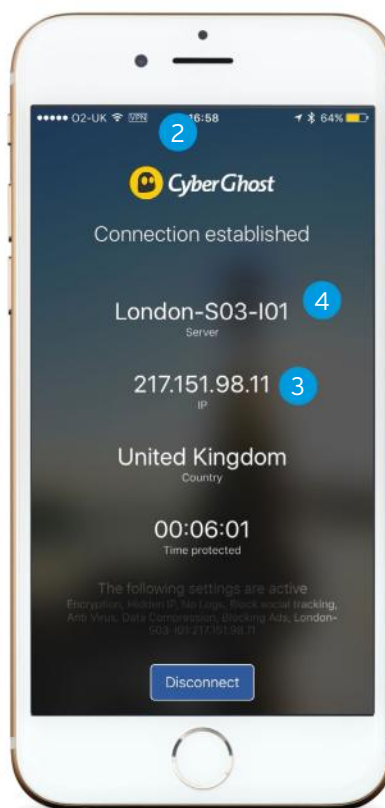


11 Automation summaries
Each row mentions accessories and scenes it controls, which can help you to distinguish the one you want to edit. You'll see a number if there are too many to list, so you may still end up having to tap through to identify the correct one.



12 Disable or delete
Tap an automation and you'll find a switch that enables you to disable it - say, because you don't want your heating on in summer even after sunset. If you no longer need an automation, swipe left on it in the automations list and tap Delete.

- 1 **Protected by CyberGhost**
 > In Settings > Wi-Fi this status under a network confirms it's protected by CyberGhost's VPN.
- 2 **VPN active**
 > You'll know when you're connected to the VPN due to this symbol in the top bar.



- 3 **Your IP address**
 > Every online device has a unique address. CyberGhost hides your real IP address to provide you with anonymity online.
- 4 **VPN server**
 > The app shows the location of the server you're using - close by is generally better.

Stay secure on public Wi-Fi

Use a virtual private network to encrypt your traffic and hide where you are

IT WILL TAKE

> 30 minutes

YOU WILL LEARN

> What a VPN can do for you, and the settings you should be using.

YOU'LL NEED

> CyberGhost.
iOS 9.0 or higher.



If you want to keep your data secure, you should use a Virtual Private Network (VPN).

This is a method by which internet-connected devices can encrypt their communications when using an untrusted public network.

A VPN encrypts the links between your device and a website's server. This means that your Internet Service Provider (ISP) can't see the websites that you've visited, only that you've connected to the VPN. A simple analogy is imagining a VPN like a tunnel. Your ISP can see you enter the tunnel, but can't see where you go once you exit it.

This gives you a level of anonymity over your IP address, as well as greater protection against hackers looking to gain access to your data, especially when you're using a public Wi-Fi networks - but be warned, if you're using an unencrypted connection your details can still prove to be vulnerable.

VPNs can also get around governmental blocks on the internet, but use them with caution; in some countries, such as the United Arab Emirates, using a VPN is illegal. The UK government recently passed the Investigatory

Powers Act 2016, which mandates that ISPs record the websites you visit, and obliging companies to decrypt that data. Learn more about this legislation at bit.ly/2jjwxAu.

Choose your VPN

There are many VPN tools on the App Store, so it can be difficult to choose the best one. Hotspot Shield and the premium NordVPN are popular, the latter especially since it claims its US, Canada and UK-based servers are fast enough for video streaming.

In this tutorial, though, you'll learn about CyberGhost (apple.co/2iyuvKK), which offers a free service for iOS devices, and the company behind it publishes a transparency report every year to prove it isn't tracking your activity. You can read more about that at bit.ly/2iHmXII. Whichever VPN you choose, it's vital that it's with a company you trust - if you can justify it, go for a premium product.

As you'll see in the walkthrough, trying out a VPN adds its configuration profile to your iOS device, which you can see in Settings > General > VPN. If you remove the CyberGhost app from your device, its configuration profile is removed along with it. **Adam Smith**

There are many VPN tools on the App Store, so it can be difficult to choose the best one

HOW TO Make sense of CyberGhost >



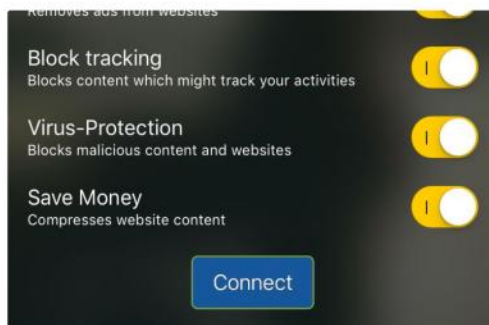
1 Get started

CyberGhost asks to add a VPN configuration to your device. Once done, choose whether to allow the app to show you notifications. At the page with five dots under it, swipe left till you see 'Surf Anonymously' and then tap Options.



2 Basic Security

The first item sets the country you'd like to appear to be in, which is set to Automatic by default. The three items below (encryption, masking your IP address, and no logging) are always-on features of using CyberGhost's VPN.

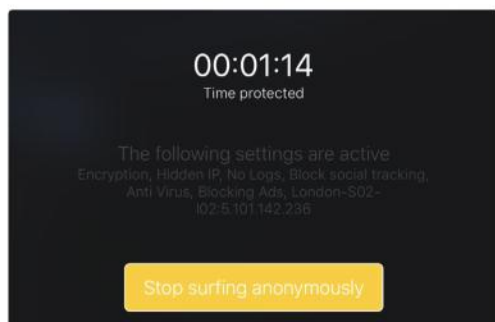
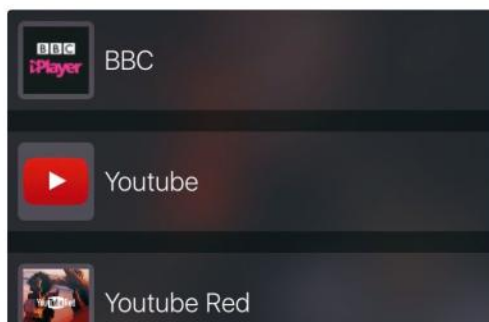


3 Block tracking

Tracking by sites is blocked by default. If a site doesn't like this, access to it will be entirely blocked. Virus-Protection is also normally on; if CyberGhost detect known and potential malware on a site, it'll block access to that site.

4 Compress website content

The final setting is normally off. If you enable it, images are reduced in quality before they're sent to your device, helping pages load faster by reducing how much data is received. On a mobile data plan, this can save money.



5 Start surfing

When the settings are as you want them, tap Start Surfing. The app takes a moment to connect to its VPN, then a VPN badge appears in the top bar. Switch to Safari or whatever app you need to use privately and use it as normal.

6 Access video services

In CyberGhost, stop surfing anonymously. Swipe right to 'Secured Streaming', tap Choose Website, a service, then a country. It's accessed through a server there and relayed over an encrypted connection that hides your location.



Jargon Buster

> For greater security, check whether a VPN service provides a split tunnel, where access to internet services is unsecured but reduces bandwidth usage, or a full tunnel that encrypts all of your traffic.



Genius Tip!

> Always check the terms and conditions of free VPNs in case their business model turns you into a product. Some may sell anonymised data to third parties.



Add a server to your home

Reuse a spare Mac for networked backups and to speed up iCloud Drive

IT WILL TAKE

> 1 hour

YOU WILL LEARN

> How to configure macOS Server and its Time Machine and Caching features.

YOU'LL NEED

> macOS Server

The ability to cache iCloud Drive data is great if your broadband data is capped



Apple's commitment to its networking hardware seems to be at a halt, to the point that its AirPort team was recently rumoured to have been disbanded.

With the future of AirPort Extreme and Time Capsule routers apparently under threat, you may be looking elsewhere for a device to centralise Time Machine backups for all the Macs in your home. Many third-party network drives come with Time Machine support, but you could press an older Mac into service instead.

The advantages of this are numerous. Firstly, you can plug in (and swap out) external storage, so you never have to worry about running out of room. Secondly, a USB drive represents much better value than a Time Capsule. Thirdly, external drives perform much quicker when plugged directly into a Mac (particularly if it has USB 3.0) rather than going through the slower USB 2.0 port on an AirPort Extreme or Time Capsule.

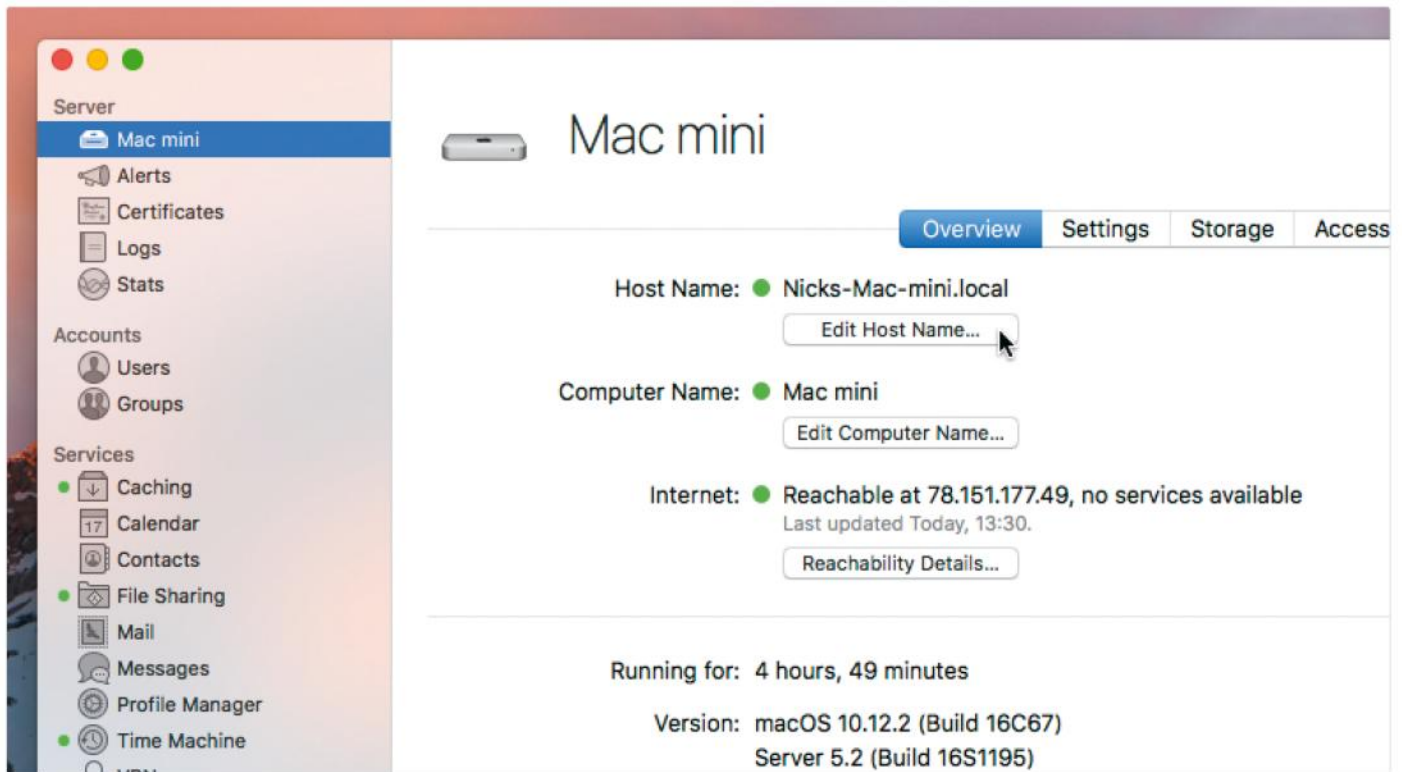
To do this, you'll need to purchase macOS Server (£14.99, Mac App Store). This installs as

an app within an existing version of macOS, and it comes with additional benefits too, from setting up centralised folder sharing to the caching of iCloud Drive data, which can save you time and potentially money if you're on a metered internet connection.

What you need to know

Your Mac will need to be running OS X 10.11.6 or higher to run the latest version of macOS Server, which might not be practical if you're using an older Mac. The trouble is, Apple has made it difficult – but not impossible – to buy and install an older version of the app (which used to be more simply dubbed 'Server').

We're going to focus on Macs running OS X 10.8 Mountain Lion or higher, because that's the point where Server changed from being sold as a complete operating system to an app that runs on top of the regular one. If your old Mac is running either OS X 10.8 or OS X 10.9 (Mavericks), go to apple.co/2iAwuU4 and click the relevant link in the archived article. This will open the Mac App Store and show you the



The idea of running macOS Server may seem intimidating, but it offers a couple of features that are easy to set up and beneficial even in a home setting.

correct version of Server for your system (2.2.5 for Mountain Lion; 3.2.2 for Mavericks) for you to buy, or redownload if you bought it previously. Note that certain features - like caching personal data from iCloud Drive - aren't available in these earlier releases.

Things are a bit easier if your old Mac is running Yosemite. If you won't upgrade it to El Capitan, search the Mac App Store for 'macOS Server', then purchase it - you'll be told the current version isn't compatible and instead be offered the most recent version that will work. Accept this, and it'll download and install on your soon-to-be server.

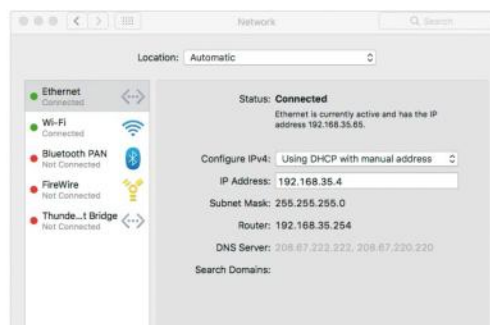
Once the Server app is installed, you'll find it in the Applications folder. Before opening it for the first time, make sure the Mac's network connection is configured properly. First, we strongly recommend you connect the server to your router using an Ethernet cable; while you can use Wi-Fi, Ethernet offers faster performance and a more stable connection.

Second, assign the server a static IP address on your network, so that it has a permanent identity that makes it easier for other Macs to locate and connect to it. To do this, go to System Preferences > Network, select the Ethernet connection if necessary, then change the 'Configure IPv4' pop-up menu to 'Using DHCP with manual address'. Next,

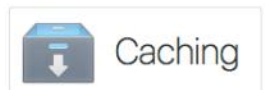
give the Mac a static IP address; check the range from which your router allocates addresses - often of the form 192.168.0.x, where x is a number between 0 and 255 that isn't assigned to another device on the same network. When you've done that, click Apply.

A little bit of basic setup

Server works best when you limit access to specific users and groups. Open the app and click Continue to set it up. Once done, you'll see its main screen, which gives an overview of the computer, and lists available services in the sidebar. Select Users under the Accounts heading on the left. You'll see your own user account has already been added. Click + to add other members of your household.



Be sure to assign your server a static IP address on your network to make it easy for other devices to find.



Jargon Buster

> A **cache** is an area of storage that holds data that's used often, by several devices, or both, primarily to provide a faster means of accessing that data.



Genius Tip!

> Select File Sharing in Server's sidebar to set up shared folders. By default, guest access should be disabled, but open a folder's settings preferences to be sure.

EXPLAINED... macOS Server's Caching feature >

1

Permissions

> By default, the cache works only for devices on your network; it's best, then, to leave these settings alone.

2

iCloud data

> If you use iCloud Drive, check this box in order to speed up syncing its data among all your devices.

3

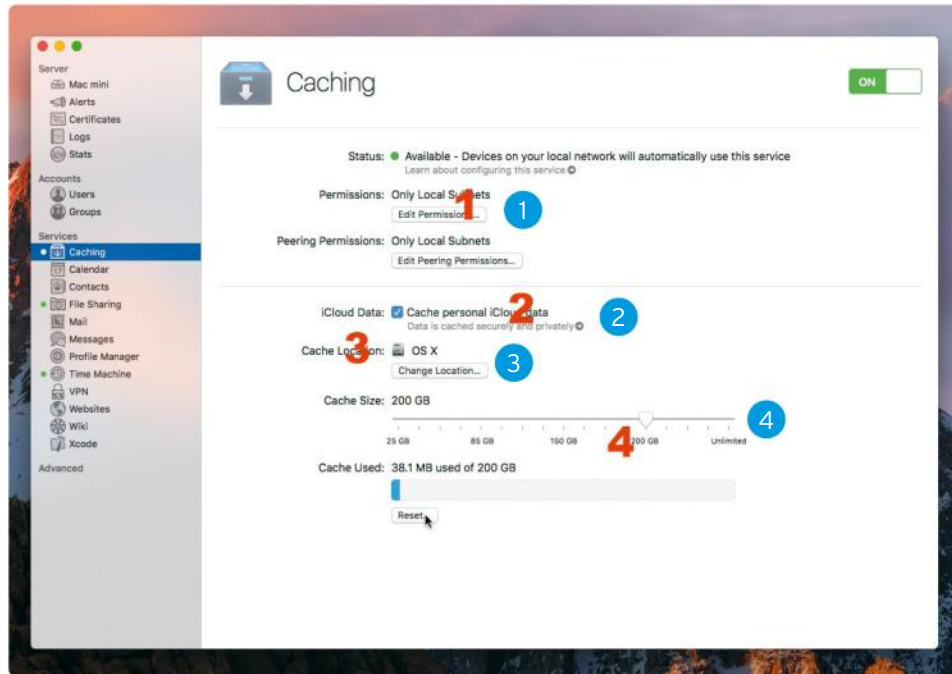
Cache location

> This setting enables you to pick an external drive with more space to store cached data.

4

Cache size

> If space is an issue, use this slider to limit the cache's size. Clicking Reset will clear the entire cache.



VPN

Jargon Buster

> A **VPN (virtual private network)** gives access to a private network while connected to another one over a secure and encrypted connection back to it.



Genius Tip!

> Limit the impact of a failed hard drive by configuring Server to store your Time Machine backups and cache on separate disks.

You'll want to create accounts that match the ones on your household's Macs, so you may need family members to provide their account name and password – though not mandatory to match what they use on their own Mac, that simplifies matters. Make sure Home Folder is set to 'None – Services only'. We also suggest leaving the 'Allow user to administer this server' box unchecked, so you are the only person in control of your server.

Click Create. By default, a new user will have access to all enabled services. If you want to restrict access, **⌘**-click a username, choose Edit Access to Services and then clear the checkbox next to any service you don't want that person to use. You can hold **⌘** to select multiple users, then **⌘**-click one of them and choose Edit Access to Services to apply the same rights to all of them at once.

Set up some features

Follow the walkthrough opposite to set your server as Time Machine's target for Macs on your network. After that, your next task is to use Server's caching capabilities; macOS Sierra can put your Desktop and Documents folders in iCloud Drive to make it available on all your devices. If you have switched this on, you'll want to use iCloud caching to speed up syncing and cut internet bandwidth usage – crucial if you're on a metered connection.

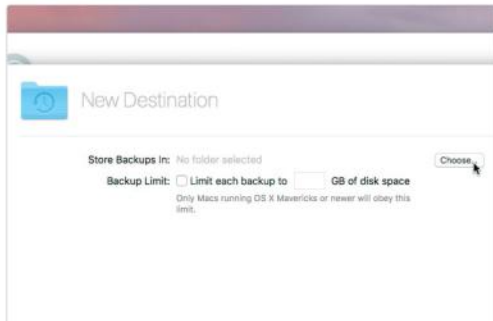
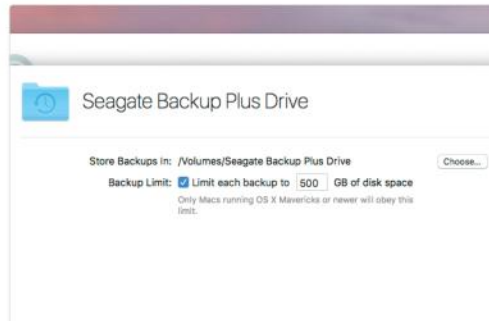
The trick is to leave your server switched on 24/7, so whenever your other devices are connected to your network, any changes they make to your iCloud Drive are cached on the server as well as uploaded to iCloud, and other devices on your network retrieve them from the cache rather than downloading them from the internet. When a device is away from your own network, or if your server isn't running, files will still sync with iCloud as normal.

The benefits should be clear, and the more people who use iCloud Drive across multiple personal devices, the bigger the benefit. The annotation above shows how easy it is to set up the Caching feature. It also works for app purchases, iBooks, system updates and more (see apple.co/2jwJGJO), which can lead to further bandwidth savings and improved performance when your devices are able to retrieve data from the cache on your network.

Server is primarily aimed at businesses, yet it has other uses that may interest you at home or in a small business: creating wikis, centralising shared folders, and using a virtual private network (VPN) to provide an encrypted connection to home over the internet.

Even if you only want to back up your Macs wirelessly, and you have a spare one to run the app, the cost of Server and a hard drive saves you lots of money compared to an AirPort Extreme or a Time Capsule. **Nick Peers**

HOW TO Set up Time Machine backups >

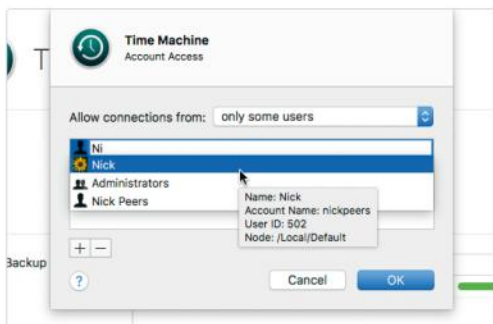
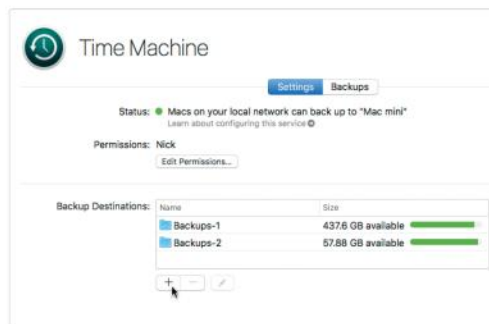


1 Choose backup drive

Select Time Machine in Server's sidebar and turn on the switch (top right). You'll be asked to pick a destination in which to store backups of your other Macs. Click Choose and select a folder on any connected drive.

2 Set storage limits

If the server is using OS X 10.9 or higher, you can cap the space available to each user. Check 'Limit each backup to' and enter a value; the lower it is, the fewer backups a Mac can keep before old ones are removed.

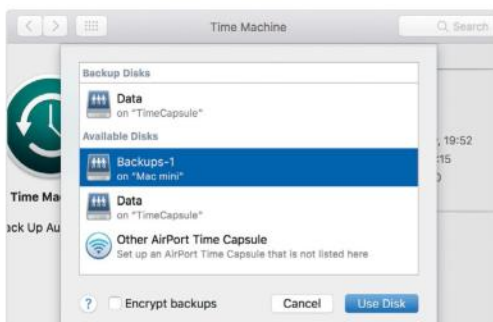
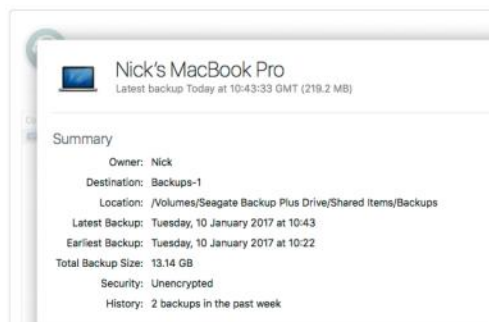


3 Restrict user access

Another way to manage Time Machine is to limit which users can access it. Click Edit Permissions, select 'only some users' and click OK. Click + to add names - start typing, then select a user from the suggestions that appear.

4 Add more storage

Alternatively, if you start to run out of space, purchase another drive, connect it to your server and then click + under Backup Destinations to add its space, which will be used once the original drive is full.



5 Connect from other Macs

In System Preferences > Time Machine on another Mac, click Select Disk, select your server from the list of destinations, click Use Disk, and enter the username and password of the corresponding person's account.

6 Monitor backup usage

In macOS Server, select Time Machine, then click the Backups tab. A list of connected Macs and any ongoing or completed backups will be listed. Double-click one to reveal details, such as its history, or to delete backups.



Jargon Buster

> **DHCP (Dynamic Host Configuration Protocol)**

is used by your router to hand out IP (Internet Protocol) addresses to each of your devices to uniquely identify them.



Genius Tip!

> **Server's Software Update**

feature enables you to manage which updates from Apple are available for your other Macs to install.



148
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GENIUS TIPS



EDITED BY **HOWARD OAKLEY** ›



**EXPERT
ADVICE**

Our resident genius solves your Mac and iOS problems



My new Mac runs slower

Q

I replaced my old 27-inch iMac (Late 2012) with a late 2015 model of the same size. Its performance seems inferior to my old iMac, although that had a Fusion Drive, unlike the new one. It often shows the spinning beach ball, and prior to shutting down it shows a screen with colour patterns. Is there something wrong with it?

by JAN SHORTT

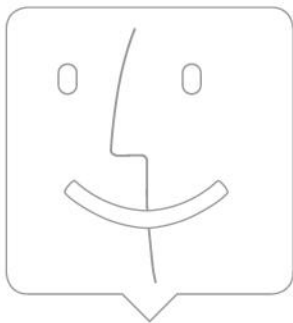
A

Odd display effects at shutdown can be an early sign of graphics card problems. Disconnect all peripherals apart from keyboard, mouse, and network connection, and hook up your keyboard and mouse to USB ports. Shut the iMac down, wait a few seconds, and hold down **[D]** as you start

up the Mac again to run Apple Diagnostics. If its tests record an error, contact Apple Support or take the Mac to a Genius Bar.

Check the Mac thoroughly for old software, particularly extensions and persistent services which might have migrated from your old iMac. You shouldn't be seeing the beach ball so often; Activity Monitor and EtreCheck (free, etrecheck.com) can provide clues.

Another trick that may help is to download and install the latest macOS Sierra Combo update from Apple's site (bit.ly/2j6Dbf7) over the top of your existing installation. After that, you may need to force your Mac to check for later security data: in System Preferences, click the App Store icon, disable 'Automatically check for updates', then enable it again.



macOS >

Shine a spotlight on sagacious solutions to your most maddening Mac maladies

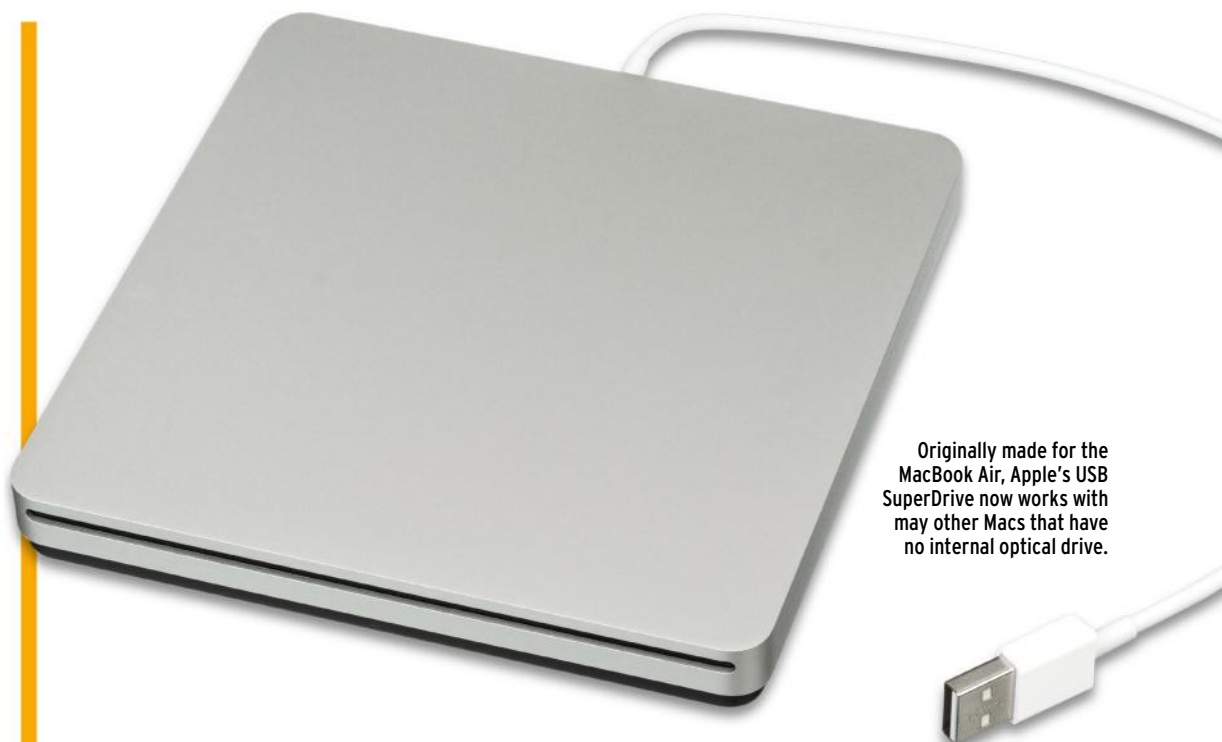
macOS quick-fire questions >

How can I get a menu bar on both of my displays?

> On a Mac running Mavericks or later, go to System Preferences' Displays pane and clear the checkbox labelled Mirror Displays; each display will have its own menu bar. On earlier versions of OS X, only the primary display had a menu bar. Move it to the one you want by dragging it from one to another in the layout preview shown in the Arrangement tab.

Why isn't my Magic Keyboard working?

> Connect it to a USB port on your Mac using its Lightning cable. If it still doesn't work over a cable, it has failed, so contact Apple Support. Otherwise, in Bluetooth prefs turn on the menu bar icon; use it to check the keyboard's battery level. Fully charge it. The keyboard should then work without the cable.



Originally made for the MacBook Air, Apple's USB SuperDrive now works with many other Macs that have no internal optical drive.

USB SuperDrive can't play DVDs

Q Some years ago, I bought an Apple USB SuperDrive to connect to my 2013 iMac. Since upgrading to OS X El Capitan, the drive stopped playing DVD video discs, although it still works with DVD and CD data, and CD audio discs. I've tried various solutions, including resetting the SMC and NVRAM to no avail. Why won't my SuperDrive work any more?

by SUSAN WALLACE

A This depends on exactly which model of iMac you have. OS X and macOS Sierra are configured to support the SuperDrive only if that model wasn't offered with an internal SuperDrive. Apple stopped including an internal SuperDrive (even as an

option) starting with the late 2012 iMac range. On a model that doesn't include a SuperDrive, your external one should work fine when connected to a USB port on the Mac; avoid connecting it through a hub. (On older Macs with an internal SuperDrive, Apple annoyingly disables its USB SuperDrive in software.)

Upgrading to Sierra might fix the issue, although that's unpredictable. It's drastic too, and perhaps unfeasible if you have hardware or apps that are incompatible with it.

We've found forum posts on Apple's site in which others have complained about the same issue. If someone you know has a third-party USB DVD drive, ask if you may borrow it to see whether it eliminates the problem. If so, you might consider buying a third-party drive - they're affordable, and more likely to work with a wide range of different Macs. However, before you spend any money, it's worth calling Apple Support (apple.co/2jDUFka) to see if it can shed light on the root cause of this.

Will my colorimeter work in Sierra?

Q I spent five hours failing to install software to support a ColorMunki Design colorimeter on my new iMac, which runs Sierra. Is it compatible. If not, what are the alternatives?

by DEAN ROME

A X-Rite hasn't updated the software for its ColorMunki devices for two years. It won't install in Sierra, and appears to be incompatible. This is a shame, as they're still on sale, and work well when their software does.

X-Rite also offers a considerably more expensive and capable system in its i1Photo Pro 2, which costs about £1,500. X-Rite lists Sierra among the compatible operating

systems, along with older versions of OS X back all the way back to 10.8.

Datacolor's Spyder5 series offers a more affordable alternative. System requirements for all four models - Express (around £120), Pro, Elite and Studio) - list compatibility with Sierra.



X-Rite's i1Photo Pro 2 is a cutting edge colorimeter.

Sierra support for an old printer

Q I've upgraded my MacBook Pro to Sierra, but discovered that it won't add my old printer, a Canon MP640, for which there doesn't seem to be a driver. Canon support has told me that I have two options: buy a new printer, or downgrade to El Capitan. What can I do?

by MATT KNIGHT

A Oddly, Apple lists your printer as being supported in Sierra using its existing driver, although Canon reports that it isn't supported. You have three options: replace the printer, try the old printer driver, or try Gutenprint.

Provided that you've updated Sierra to at least version 10.12.1, you may be able to get the last (2015) version of the driver from Canon's support site to install and work properly, as Apple says you should. If that doesn't work,



When a printer's software is no longer supported by the latest macOS, see if Gutenprint includes a replacement.

you'll have to uninstall the driver and pick another option.

Gutenprint, (bit.ly/2jaEmLh), supports many older printers, and we've found reports online that version 5.2.11, the latest stable one, works with Sierra. That site has instructions on installing it. For recent printers, it often works as well as their original drivers did.

If neither works, someone using an older system may get good use out of your MP640, and it would be sensible for you to replace it.

Why do letters duplicate on my Magic Keyboard?

> This appears to be a persistent bug, probably in the Bluetooth drivers in El Capitan and Sierra. It occurs in letters that can't ordinarily repeat. Sadly, slowing down the Key Repeat setting in Keyboard preferences has no effect. One thing to try is to simply unpair the keyboard from your Mac and then repair it.

Can I use a Mac's USB-C adaptor to charge other stuff?

> Apple and compatible USB-C chargers can be used to directly charge iOS devices, as well as the Magic TrackPad 2, Mouse 2 and Keyboard. This requires a USB-C to Lightning cable. Apple's own cable comes in 1m (£19) and 2m (£29) lengths. This can prove invaluable for travelling with a Mac with USB-C.





Mac Software >

Ease your app-fuelled anxieties and get your productivity back on track with this advice

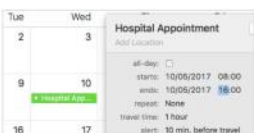
Software quick-fire questions >

iTunes stopped syncing my iPod classic. Why?

> Officially, the current version still supports your iPod, and should work. Apple provides detailed guidelines at apple.co/2j4akGd on how to tackle such problems. Given your iPod's age, if the advice on that page doesn't bring resolution, it's perhaps time to retire the device as it may well have a hardware fault.

Can I control the order of printing all-day items?

> Calendar offers only rudimentary controls for printing, which normally means all-day items are printed in the order in which they're entered. You can't alter that except by changing from all-day to timed scheduled events. You might be able to force the app to ignore entry order by hiding and then showing calendars.



Photos, Lightroom and Pixelmator?

Q When I switched from iPhoto to Photos, all my photos migrated correctly, and Photos has worked great since. Now I want to get more creative, and have bought Pixelmator and Adobe Photoshop Lightroom to explore. They seem to import my old iPhoto pictures, but stop at 2014, so I've had to import subsequent photos manually. How can I resolve this?

by NEIL GABRIEL

A Once you've migrated your iPhoto library to Photos, the latter app should appear as a source in the pop-up menu in Pixelmator's Photo Browser (choose View > Show Photo Browser to show it). There is no similar browser built in to

Lightroom for accessing the contents of Photos' library, so you have to export images from Apple's app to a folder, edit those copies, and optionally import them back into Photos.

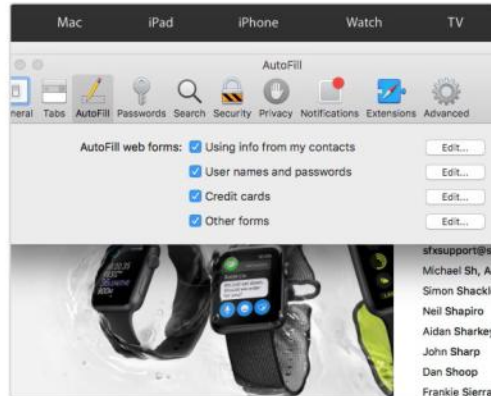
In Pixelmator's Photo Browser, the pop-up menu at the top of the window should list the Pictures folder, your Photos library and, it seems, your old iPhoto library. However, even with Photos selected there, you may still have trouble accessing all of its library's contents, depending on whether you have enabled iCloud Photo Library in Photos' preferences and subsequently selected the Optimize Mac Storage. Read apple.co/2iLvGYI for more info about this scenario and how to work around it; make sure you read the note at the bottom for an ongoing (yet storage-intensive) solution.

AutoFill is confused about my identity

Q Something's gone wrong with Safari's AutoFill feature on my Mac. It used to use the correct info from my Contacts card, but now it uses that from my wife's card. I cannot seem to get it to switch back and stay there. What's wrong?
by BILL NATALIE

A Normally it's simple to correct an AutoFill errors like this, because all that's happened is that the Contacts card that's set as your identity has become changed. In Safari's preferences, click on the Autofill tab. Click Edit to the right of the option labelled 'Using info from my contacts' or similar to view and edit the card in Contacts from which Safari is pulling information.

If that's set correctly, nothing else in macOS should alter that. But if you're signed in to iCloud on your Mac and another device, using the same Apple ID on each, the second one can change the Contacts card that's used.



Set the Contacts card used by Safari in its AutoFill prefs. iCloud Keychain propagates this choice to all your devices.

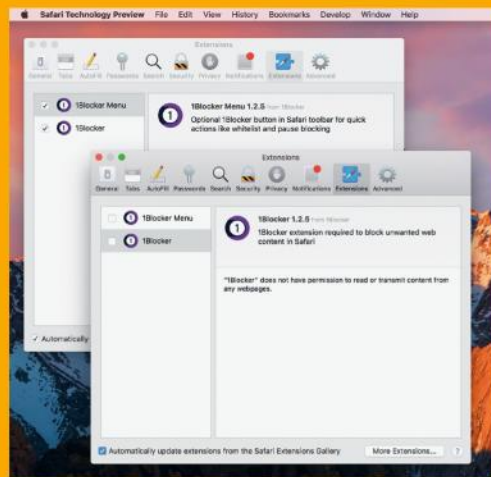
If your wife is sharing your Apple ID, using it to sign in to iCloud on her Mac or iOS device, and both of you have iCloud Keychain enabled, she may be undoing your choice by changing AutoFill to use her card; iCloud Keychain will cause it to change for you too. She should use her own Apple ID to avoid this sort of conflict.

Safari often shows the beach ball

Q After updating Sierra to 10.12.2, Safari has become unusable, as it quickly gets stuck with a spinning beach ball and I have to force it to quit. When the browser is not running, EtreCheck says everything is fine, but when Safari's open performance is 'poor', and the browser uses 99% of the CPU. Can I reset Safari, or would another browser work better?
by ROBERT ASPINALL

A The most likely causes of this are malware (or 'unwanted' software), an incomplete update, or an incompatible extension/plugin. Run the latest version of your favourite malware checker or Malwarebytes to look for the former, and download and install the latest Sierra Combo Update from Apple to fix the latter.

Old plug-ins and extensions, particularly ad blockers, can also cause this. Check the folders /Library/Internet Plug-ins, ~/Library/



You can try Safari Technology Preview without carrying across potential issues from Safari, such as extensions.

Internet Plug-ins, and ~/Library/Safari/Extensions for those, and remove them unless you're confident that they're up to date, stable and compatible with Sierra 10.12.2.

It's worth trying Safari Technology Preview (free, apple.co/2jzTOrM); it shares some minor preferences with Safari, but maintains its own for things like active extensions. If it's affected as well, try Firefox, Chrome or Opera.

Why won't Acrobat Reader DC print my documents?

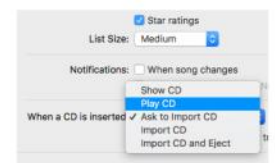
> Some people find that printing PDFs causes an error stating there are no pages selected to print. This may fix itself if you disable Enhanced Security in the app's preferences. You should be able to print as JPEG in the Print dialog. As to the cause, it may be a conflict with Sierra, and we haven't heard of it affecting rival products.

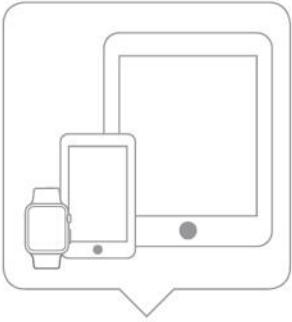
Can I make a new Photos library for a project?

> Yes. Though the app makes albums for things like screenshots, it's good sense to put some images in a separate library - a project like yours, or pics you want to exclude from iCloud Photo Library. Open a Finder window, browse to the Photos app, then hold **⌘** and double-click the app. It'll start with a dialog offering to create a new library, or to pick which library to open.

How can I play rather than rip audio CDs?

> Insert the disc and decline iTunes' offer to import it. When the track list appears, click the play button. You can play discs by default: in iTunes' General prefs and set 'When a CD is inserted' to Play CD.





iOS Software >

Swipe away your touchscreen troubles and rekindle your love of Apple's mobile devices

iOS software quick-fire questions >

Why don't some voicemails play or show numbers?

> When you tell your iPhone to access voicemail, it uses the one that's run by your mobile network, rather than a service provided by Apple. For problems with voicemail, contact your network's support desk; it's best placed to investigate why that information is missing.

How can I view the length of each music track?

> As of iOS 10, you can only see the length of the track that's playing. Previous versions showed the track durations on the right when browsing your library or playlists, but no longer. It's possible this may return, as star ratings have, but perhaps not, as durations disappeared when Apple cleaned up the Music app's cluttered interface.



Unreliable notifications

Q Following a recent iOS upgrade, notifications on my wife's and my iPhones have changed. When a message arrives, we normally get a tone and vibration, but subsequent incoming messages once we've replied don't result in either. We don't appear to have changed any settings, so how can we correct this?

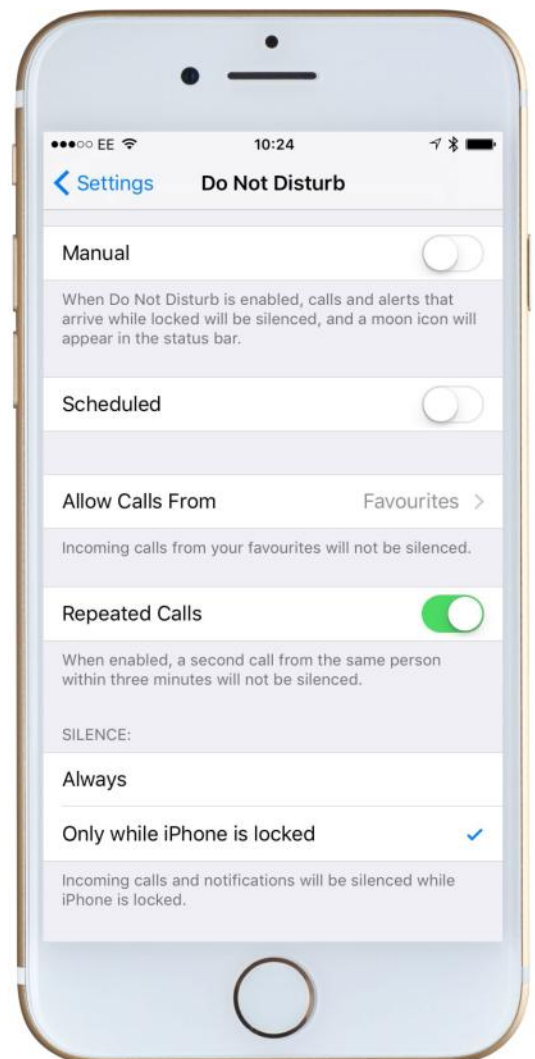
by ANDREW PRITCHARD

A So many people have experienced this after recent updates that it's hard to know whether it's intentional or a common bug. There certainly doesn't seem to be an option to control it, unless it occurs only when Do Not Disturb is switched on. In that case, go to Settings > Do Not Disturb and check that Repeated Calls is switched on, so that a second call or message from the same person within three minutes still should result in an audible notification.

The first thing to check is whether it occurs when Do Not Disturb is on and, if so, that repeated calls are allowed through

This problem gets worse when you have multiple devices, such as Macs and iPads, all using the same Apple ID. In theory, all should tell you about incoming messages, but you may be notified only on an inappropriate device you aren't using, such as your home Mac when you're at work.

Some people have found that a 'soft' reset of their iPhone restores normal behaviour. To do that, hold down the Sleep/Wake and Home



Enabling Repeated Calls in Do Not Disturb should prevent them being silenced, but it doesn't fix erratic notifications.

buttons at the same time (on iPhone 7, use the volume down button in Home's place), for at least ten seconds until you see the Apple logo.

The Watch seems to be the most reliable Apple device for notifications right now, but it's a high price to pay just to work around this.

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LOVE YOUR MAC

EDITED BY **LUIS VILLAZON** >

REUSE OLD KIT

Inspiring ideas for revamping your old Apple devices



Step back in type

Like the creaking of a ship's timbers beneath the feet of an old sea captain, the sound of a keyboard clicking away is the song I listen to all day long as I work. But Apple's modern, low-profile keyboard lacks the romance of days gone by. Its light, rubbery touch is undoubtedly better than the unyielding, stale-biscuit action of the model before it – the one with the clear plastic, crumb-catching bezel. Best of all was the Apple (Standard) Keyboard from the late 1980s. It had the longest and lightest action of any Apple keyboard and made a wonderful sound, like a string of firecrackers going off.

That keyboard was left behind 20 years ago, not because there was anything wrong with it, just that everyone moved to USB. It's like trying to charge your phone from a wall socket abroad – the electricity is basically the same, but you need an adaptor to use it in that country. Well, the past is a foreign country too, and I'm going to build myself an adaptor for the '80s.

There's something satisfying about the sound a keyboard like this one makes as you type on it.



LUIS'S APPLE CLASSIC!

- The Macintosh II was the first Mac with separate monitor and system boxes. This arguably made it the first ugly Mac, with nothing stylistically to choose between this and an IBM PC from 1987. But the performance was way ahead of the PC, with higher screen resolution, more colours, a faster CPU, and the NuBus – the first plug and play expansion bus for home computers. This was also the first Mac that could be powered on from the keyboard, thanks to the ADB bus's power-on pin.



Hardware quick-fire questions >

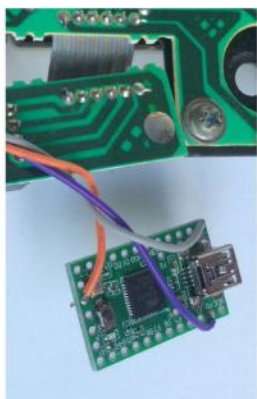
How can I check whether my Teensy board is working?

> If you're concerned your clumsy soldering has fried the board, plug it in to your Mac over USB and check the LED.

It should immediately blink because that's the default program that's preinstalled. When you press the reset button on the board, the LED should turn off and the Teensy Loader app on your Mac should recognise the board. If it does all this, your Teensy board is fine.

The pointer jumps to the top left when I connect the ADB keyboard

> This is a known problem on some systems that occurs when the pull-up resistor is omitted (see the article body for more info). Solder a resistor of between 1,000 and 10,000 ohms between the data and 5V power pins on the board and it should cure the problem.



Changing buses >

Dig your old Apple keyboard out of the attic and modify it to work over USB

The Apple Desktop Bus (ADB) first appeared on the Apple IIGS in 1986 and was also used on every Mac from then until the iMac in 1998. Like USB, it's a serial connector that can be daisy-chained from one device to another. The old Apple keyboard has an ADB port on each side: you use one to connect the keyboard to the Mac and the other is used by the ADB mouse.

The connector uses an S-Video plug, which can only plug in one way round, so there's no need for the infuriating USB ritual of trying it one way, then the other way, then back to the first way. ADB uses four wires: two for power and ground, one for the data, and one to carry the power-on signal that enables the keyboard to be used to turn on the Mac.

USB devices also use four wires. However, they lack a power-on pin. Also, there are two data wires instead of one, both of which carry the same data, just with reversed voltages to

help eliminate noise. So in practice USB and ADB are both single-channel serial interfaces, and they should be electrically compatible.

The catch is that the ADB controller formats the data for each key press in a different way than USB. I could deal with this at the Mac end by writing a low-level OS X keyboard driver that identifies which port I'm using and decodes the signals directly. However, this would be quite tricky to do, prone to breaking with future operating system upgrades, and I'd need to install it on each computer to which I connect the ADB keyboard. A better solution is to reformat the signals into USB-speak on the keyboard itself.

As luck would have it, someone who goes by the name of Hasu over on the geekhack.org forum wrote a program to do this several years ago. The program runs on the Teensy 2 microcontroller, which is like an Arduino but smaller. I bought one from Amazon (£11.50,



It may look ugly to youthful eyes, but the action on this keyboard is second to none.



amzn.to/2j343NA) and it arrived with me about three weeks later, having travelled all the way from China.

Probing pins

The wiring side is fairly straightforward. The keyboard opens up with three Phillips screws on the underside and each ADB port has a small circuit board for the ADB controller. The Wikipedia page for ADB has a pin diagram for the connector, and I used the continuity tester on my multimeter to work out the corresponding points on the circuit board for the power and ground pins. I soldered leads to each of these and connected them to the VCC (+5V) and GND (ground) pins on the Teensy. Then I soldered a data wire to the FO pin on the Teensy but left it unconnected at the other end. Before I soldered it onto the keyboard, I wanted to check which side of the ADB controller I needed to connect it to. To do that I needed to install the program on the Teensy and run some tests.

And so we arrive at this instalment's Tricky Problem. The procedure for compiling code for the Teensy and transferring it to the board is theoretically easy enough (see the step-by-step guide on page 78), but I just couldn't

persuade my desktop Mac to recognise that there was a Teensy on the other end of the USB cable. The Teensy powered up just fine, and apparently reacted correctly when I pressed the reset button. But to the Mac, it was as though I'd stuck the other end of the USB cable in my ear.

Unbelievable coincidence

The page at bit.ly/2iZJ2Dc suggests that the most likely explanation is that the USB cable is faulty, which is ridiculous because I use that cable all the time, but I changed it anyway for one from my big box of spares. That didn't work either, and neither did two others. Now, obviously, it is implausible that four separate cables would all be faulty, so I spent a couple of hours searching online and trying various different options for TeensyLoader. Nothing worked. It was at this point that it occurred to

USB and ADB are both single-channel serial interfaces and should be electrically compatible

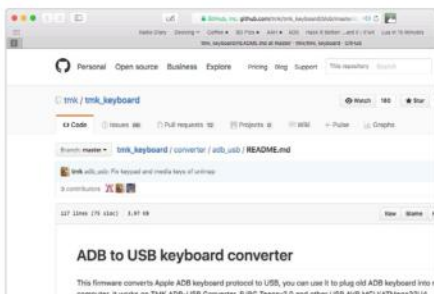
The Teensy board can be tucked neatly in the space above the ADB controller.

LEARN MORE!

Discover the history of Apple peripherals on page 114.



HOW TO Program your Teensy microcontroller >



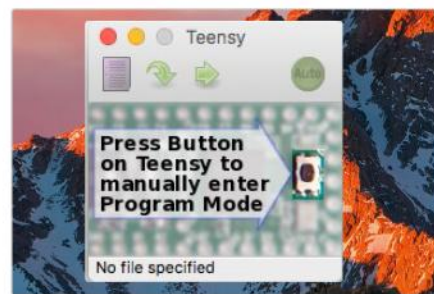
1 Get the source code

The source code of the ADB converter program is free on GitHub. To download it, open Terminal and use `git clone git://github.com/tmk/tmk_keyboard.git` to download it to a folder, `tmk_keyboard`, in your home folder. Before you can use the program, the source code needs to be compiled into a binary file for the Teensy.



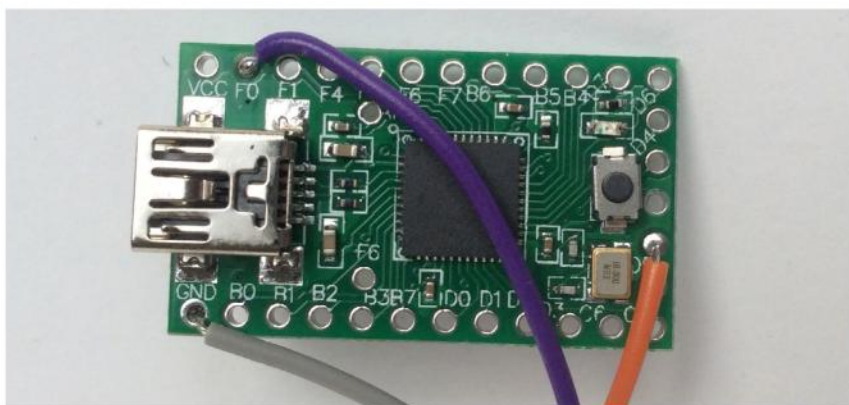
2 Compile the program

Download the CrossPack compiler from bit.ly/2iAf99t, then hold `⌘`, click its .pkg file and choose Open; if you double-click it, macOS won't run it as it's from an unidentified developer. In Terminal, enter `cd tmk_keyboard/converter/adb_usb` to switch to the source code's folder, then enter `make` to compile the program.



3 Install the firmware

To upload the .hex file CrossPack created, you need Teensy Loader from bit.ly/2ibVcov. Open its disk image and copy the app to Applications, then open it from there. Connect the Teensy to your Mac over USB and press the board's reset button. Open the .hex file in Teensy Loader and choose Operation > Program.



The Teensy microcontroller's board needs just three wires to be soldered to it.

me that although I use that USB cable all the time, I only ever use it to charge devices; I don't actually send any data down the cable. Connecting phones and quadcopters and cameras directly to a Mac with a USB cable is so '90s. So I checked the cable with my SLR camera and, sure enough, the Mac didn't see it as a storage device. With growing incredulity, I tried the other three cables in turn and none of them worked - they were all just cheap charging cables without their data pins connected. After a quick trip to Amazon to order a replacement (£4.49, Amazon Basics), I gave up for the day.

Adios, ADB

The next morning, I tore open the utilitarian cardboard package and double-checked all the pin connections on the new cable: all looked

good. After that, uploading the ADB converter program was done in three clicks of a mouse. With the Teensy running, I held down a key on the ADB keyboard and probed with the unsoldered end of the data wire on the ADB controller board until I started seeing letters appear on the Mac's screen.

Next, I soldered in this connection properly and added a 10,000-ohm pull-up resistor between the data and power pins. This helps the signal voltages to stabilise quickly between key presses. The internal pull-up resistor on the Teensy might be strong enough to do this on its own, but adding an external one can help to eliminate noise from the data line.

To run the USB cable out of the keyboard case, I could have drilled a new hole in the case to accommodate it, or enlarged the existing one for the ADB port. Instead, I decided to desolder and remove one of the ADB ports altogether. I might change my mind about this conversion in the future, of course, and it would be easier to solder the old ADB connector back on than to fill in a hole in the keyboard's plastic case.

Even after this hardware modification, the ADB port on the other side continues to work, so I'm still able to use the keyboard with my Macintosh SE when I need to. I could even use it to run my old ADB 'ball' mouse with my Intel Mac mini if I wanted - but even I'm not *that* nostalgic for the '80s!

Next Issue!

> Luis embarks on a program of ruthless optimisation for his ageing 2012 Mac mini. His goal: it must boot up before the kettle boils!

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Setups made easy!

For some people, one display just isn't enough. **Craig Grannell** shows how several can benefit you, connectors you'll encounter, and a host of clever apps



There was a time when you would be thrilled at getting your hands on a 'gigantic' 17-inch CRT monitor that weighed about as much as a hatchback. Today, though, genuinely huge flat-screen displays are cheap, and so you might be tempted to grab one (or perhaps even two), attach it to your Mac and revel in acres of desktop space.

Should you? That depends. We scoured the web for actual science about the benefits of multiple displays. Unsurprisingly, quite a lot of it was written by companies that make displays. Still, the gist of the more impartial research is this: having access to more pixels can boost your efficiency – to a point. It depends on the tasks you're doing and how you best focus on them.

This article, then, explores the ins and outs of using multiple displays. It's designed as a primer for the features within macOS,

an overview of enhancements provided by third-party apps, and also to give you ideas of how to best use several screens.

So, whether you're feeling hemmed in by your tiny MacBook Air, or want to offload tasks to a second screen – be it connected to your Mac, or a remote iPad – read on for essential tips and insight that'll help you get more value from all those extra pixels.



nitor



Configure your displays

1 Arrange displays

In System Preferences' Displays pane, use the Arrangement tab to define the relative virtual positions of your displays (they don't have to be side by side). Drag the menu bar strip to the display you want to be considered the main one.

2 Set resolutions

A display's resolution can be adjusted in the Display tab. Default is the recommended resolution, but Scaled offers others. Holding ⌘ and clicking Scaled may reveal more options beyond the initial range that's shown.

3 Mirroring options

By default, additional displays extend your desktop, giving you more room to work. But should you want the same image to be shown on your Mac and all connected displays, put a check mark next to the Mirror Displays item.

4 Detect displays

External displays should be automatically detected by your Mac (but ensure the correct input is selected on your monitor if it has manual controls). If not, hold ⌘ so the Gather Windows button becomes Detect Displays and click it.



Understand your displays



What your Mac can do

Apple's new MacBook Pro can drive two 4K displays. To put that in perspective, along with its own Retina display, equivalent to running two additional 21.5-inch Retina iMac displays – that's a lot of pixels!

However, before you splurge on the biggest, shiniest display you can find, be mindful this capability in part comes from Thunderbolt 3 ports, which deliver staggering bandwidth. So, you need to find out what your own Mac's capable of – and the older your Mac, the more restricted your choice will be.

If you can settle for a low pixel density panel, even a 2010 MacBook Pro is capable of driving an external 23-inch screen along with its internal panel. To see what your Mac can handle, note its details from [Apple > About This Mac](#), and then visit [everymac.com](#). Find your Mac on the site and read the '2nd Display Support' section under tech specs to learn what connections you can use and the maximum supported resolution of each. That way, you'll avoid making an expensive second-screen blunder.

Apple tends to simplify where connectors are concerned; the original iMac obliterated proprietary ports in favour of USB, and the new MacBook Pro has only Thunderbolt 3 and a headphone jack. However, Macs have featured various display connectors over the past decade or so, and their different capabilities potentially complicate buying a display.

Macs have featured various display connectors with different capabilities over the years

If you have a new MacBook Pro and the money, go for a Thunderbolt 3 display. They're pricey, but look great and simplify connectivity to a single cable, even carrying data to any USB ports they have. However, cheaper options from the likes of Dell tend to

offer a larger selection of ports. Dell's U2715H, for example, has HDMI, Mini DisplayPort and DisplayPort, enabling its use with a wide range of recent (and not so recent) Macs. You just have to ensure before buying a display that your Mac's capable of driving it – see 'What your Mac can do' to the left.

Be mindful of optimal resolutions. As well as a screen's size, consider its pixel dimensions; if two have a 2560x1440-pixel resolution but one of them is several inches larger than the other, content on the bigger

one will appear less sharp since there are fewer pixels per inch. Displays with a high pixel density (Apple calls its own of this kind a 'Retina display') vastly increase the pixel count, but are more costly and need a fairly recent Mac to run; see apple.co/2iVquUf for details.

Make the connection



DVI

Various flavours of DVI existed from 1999, and started arriving on Macs with 2002's PowerBook G4 and Power Mac G4. A year later, a Mini-DVI port was introduced on the 12-inch PowerBook G4, and later added to many other Macs before being phased out in favour of Mini DisplayPort.



HDMI

This connector is commonly used in HDTVs and related kit. It first showed up on the Mac mini in 2010. 2012's MacBook Pro with Retina display and the 2013 revision to the Mac Pro also gained an HDMI port. Most 2010 or later Macs without one can connect to a display that has an HDMI input by using an adaptor.

Multi-monitor tricks

The key benefits of using multiple displays are flexibility and focus – often simultaneously. If you're a digital artist using the likes of Illustrator, Photoshop or Pixelmator, you can dedicate one display to artwork. This means your work is never covered by tool palettes, and your palettes residing on their own display means more of them can be kept on screen at any given moment.

Similar advantages can be had in audio and video apps. With Logic Pro X, choose Window > Open Main Window to open a second window, and fiddle with the layouts until one display is primarily a mixing desk and the other is used for tapping out notes. In Final Cut Pro, put the viewer on a secondary display to get a more detailed, larger look at your edit. (Sadly, Apple's consumer equivalents to these apps – GarageBand and iMovie – are resolutely single-screen only.)

Spread things out

Dual displays are also great when you require ongoing access to multiple apps. Whether penning a potential best-seller or fine-tuning a presentation for work, having one display devoted to an office or writing app and another for research can be efficient. If you use a minimalist word processor like iA Writer, you can have that full-screen on your MacBook, turning it into a futuristic typewriter, while a larger display contains Safari, a mind-mapping tool like MindNode,

or inspirational imagery in Preview. Similarly, if you use Windows-only software, run it in Parallels Desktop on one display, leaving the other for macOS; this can work really well if you're a web designer and need to test sites across browsers on both operating systems.

Alternatively, you might want to monitor data of some kind – to keep an eye on your schedule in Calendar, for example. To keep an eye on your schedule, rather than switching to that app and away from whatever you're doing. Similarly, you might stick Mail on a second screen so you can glance at emails when they come in, rather than getting a notification, opening the app, and getting sucked into a billion other messages. Or, if you hate productivity,

go for the ultimate procrastination setup of using a second display for YouTube, Twitter and Facebook.

Comfort counts

Incidentally, whichever of these ideas takes your fancy, pay close attention to ergonomics. It's best to have your primary display right in front of you, your eyes in line with towards the top of the screen. The other should be easy to turn to and briefly use.

If you spend a long time interacting with any display that's set at an angle, ensure you can shift your chair and input devices accordingly. Don't spend a long time twisted in your seat, tapping on an awkwardly placed keyboard, or you may give yourself back problems later on.



Mini DisplayPort

This miniaturised take on DisplayPort arrived in 2008. Initially proprietary, it was later rolled into the DisplayPort standard. It debuted on the aluminium MacBook and 15-inch MacBook Pro, and was soon added to Apple's entire line of Macs. The 12-inch MacBook was the first subsequent model without it.



Thunderbolt

The original Thunderbolt was backwards compatible with DisplayPort and arrived on Apple kit with 2011's MacBook Pro. However, it wasn't just about sending video to displays – it can carry data as well. The latest version, Thunderbolt 3, uses a USB-C connector, and the MacBook Pro with Touch Bar has four such ports.



USB-C

Apple's 2015, 12-inch MacBook was the first Mac to include a USB-C port. Controversially, you had to make do with one to cater for almost all your power and connectivity needs. (The only other physical connection was a headphone jack!) After its late 2016 addition to the MacBook Pro, expect new Macs in 2017 to adopt USB-C, too.

Take control

One of the snags with using multiple displays is that managing what's on your desktop can require more effort.

Stick with vanilla macOS and it can become tiresome to arrange windows and drag them between displays.

Fortunately, third-party utilities provide you with an extra degree of control in these key areas. Moom (about £8, manytricks.com) and BetterTouchTool (from £4, boastr.net) both enable you to set up commands for manipulating windows. Want to drag a

window to make it fill half of the screen? Done. Swipe with five fingers to fling a window to your other display? Easy. Fancy using keyboard shortcuts instead, to send windows between screens and resize them? No problem. Read the walkthrough below to see how rapidly you can set up such behaviours.

For switching a display resolutions, we recommend Resolutionator (about £3, bit.ly/2iNxxHL). Normally you have to go to System Preferences' Displays pane, move the pointer to the relevant screen and then fish about for a new resolution. Resolutionator simply requires you to click its menu bar icon and select a new resolution from the submenu that corresponds to the

or BetterTouchTool, you don't have to remove your hands from the keyboard to make adjustments.

A slimline, portable screen

Another type of dual-screen setup is rather different. Duet Display (£7.99, duetdisplay.com) is actually an iPad app that talks to a free companion app on your Mac. You connect your iPad and Mac using a Lightning cable, whereupon Duet turns the iPad into a display for the Mac. The iPad's Retina display means the resulting visuals can be pin-sharp (though there's a touch of lag at higher quality settings). Duet becomes really interesting on macOS 10.12.2 or higher, where it can mimic Apple's Touch Bar

tech, enabling you to try a brand-new control method.

A nuisance of having a ton of screen real estate is finding the pointer, but there's a solution baked

into macOS. In System Preferences' Accessibility pane, select Display on the left and ensure 'Shake mouse pointer to locate' is enabled. If it is, wiggling the pointer temporarily enlarges it.

Improve your focus

It's worth noting that even if you don't have a second display for your Mac, you may still have multiple screens. Perhaps your iPhone or iPad is idle when you're working on your Mac. Depending on your needs, you might improve focus and efficiency by making better use of such a device.

If you often head down an email rabbit hole while trying to work, offload dealing with email to your iPad. Or, if you find iTunes sucks up resources on your Mac, plonk your iPhone in a speaker dock.

Remember, you can quickly move tasks between Macs and iOS devices using Handoff (apple.co/1RLlojO). Or, use Typeeto (£7.99, Mac App Store) to type on other devices using your Mac's keyboard.

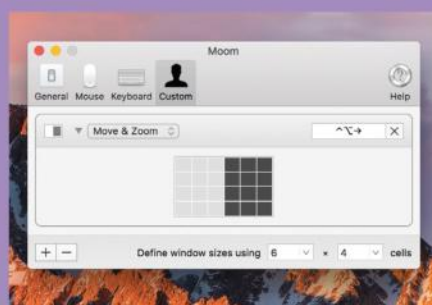


Keep getting sucked into Twitter? Make it an iPad-only thing.

Third-party utilities provide you with extra control over arranging windows across multiple displays

screen on which you want to set a new resolution. There's also an optional system-wide shortcut for bringing up a switcher window that can be controlled entirely by keyboard - so, as with Moom

Manage windows on multiple displays



1 Use Moom

In Moom's preferences, click Custom and then + (bottom left) to create a new shortcut. Set it to Move & Zoom and fill the right-hand side of the grid. Click in the box to the top right of the grid and press **⌘+⌘+⌘+⌘**. Now when you use that shortcut, the current window will resize to fill the right half of the display.



2 Move between displays

Create a second shortcut and set its behaviour to Move to Other Display. Click the rightmost radio button and then enable 'Loop through displays'. Set the shortcut to **⌘+⌘+⌘+⌘**. Each time you press this key combo, the current window will move to the next display, eventually coming full circle.



1 Notebook stand

You may want to raise your MacBook so it's more comfortable to glance at when focussing on your larger external screen. Consider Griffin's sturdy Elevator (£35, amzn.to/2jPbu8D), Lavolta's laptop table (£30, amzn.to/2k4mApG), or, if money's tight, a pile of books.

Accessorise!

2 VESA mount adaptor

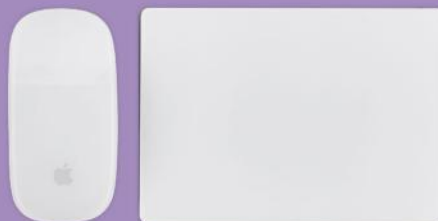
If you fancy saving desk space and your display is compatible, use a VESA mount adaptor to hang the monitor on a wall like a picture. Do carefully research the right one for your display, along with the suitability of your wall, though – and ensure the monitor's vertical position will be just right prior to drilling.



3 Apple's Magic accessories

If you're adding a second display to a portable Mac, it pays to make it bigger than the built-in one, and to put your MacBook to the side and invest in other

input devices. Though others options exist, Apple's Magic Keyboard and Magic Trackpad are very nice – however, their prices rose in October to £99 and £129.



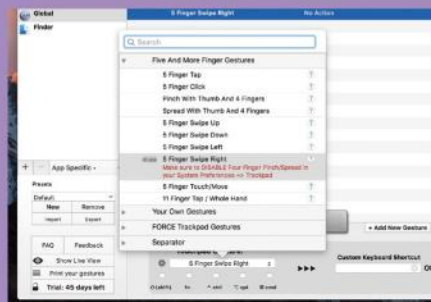
4 Logitech C920 HD

Most monitors don't come with a webcam. You can, of course, get by using FaceTime or Skype through your MacBook's built-in camera (or use an iPhone), or you could pop a webcam on your larger external monitor. Logitech's are among the best, and this one's £60 (amzn.to/2iEWGg5).



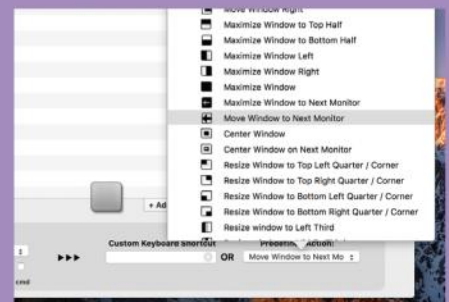
3 Test and expand

Open a Finder window and press the shortcut from step 2 a few times. Try interchanging it with the shortcut from step 1. Open Mail and put it on your Mac's second screen, open a new message by pressing **⌘+N**, and move it to your other screen. Powerful, huh? Now add any other shortcuts you want.



4 Use BetterTouchTool

You can add similar functionality to a trackpad. In BetterTouchTool, select Trackpads, click Add New Gesture and set the gesture to 5 Finger Swipe Right. Click the Predefined Action pop-up and pick Move Window to Next Monitor. Just like with Moom, performing this gesture repeatedly will take a window full circle.



5 Move and resize

BetterTouchTool offers two more actions for moving a window between displays: Maximise Window to Next Monitor makes it as big as possible (but doesn't switch it to full-screen mode); Center Window on Next Monitor centres the window on the next screen as soon as it's moved there.



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APPLE CHOICE

EDITED BY **ALEX BLAKE** >



BUYING ADVICE

Our authoritative reviews help you make more informed choices



**LIBRATONE
Q ADAPT
ON-EAR p91**

> Manifesto - our ratings explained

> Our reviews are totally independent; we're not affiliated with Apple or anyone else, nor are we influenced by advertisers. You can trust us to give an honest assessment of a product's worth.

The prices quoted for products are correct at the time of writing and are

the best we can find from a reputable online dealer, excluding delivery.



> A brilliant thing in all regards, and worth every penny



> Strongly recommended; any flaws are only minor concerns



> Worth considering, though there may be better options



> Fundamentally flawed; look at alternatives as a priority



> A waste of your money and everyone's time; do not buy!

> The **MACFORMAT** Awards



> Awarded to a five-star product we believe is truly exceptional in its category. Given solely at the discretion of the Editor.



> Given to a hardware or software product that might not be the very best in its category, but is a noted for affordability.



> Our group test winner gets this award for being the best of its kind when pitted against other comparable products.

Hexo+

Crowd-funded drone takes flight

Reviewed by **CHRIS BARNES**

> £699 > **FROM** Squadrone System, hexoplus.com > **FEATURES** 10-15 minutes flight time, 5,000mAh 3S Li-Po battery, 40mph max speed, 1.15kg (without gimbal, battery or camera)



Hexo+ doesn't come with a camera, but is compatible with GoPro's range of action cams.



Simon says...

> Drones are advancing at a rate of knots, but the technology is at the place where it's difficult to know when to make the leap to purchase. For me, though, this is awfully close, potentially as close as it gets: the Hexo+ is attractive in terms of both utility and affordability.

This is no ordinary drone – it's autonomous, meaning it'll follow your every move, hands-free.

On paper, the Hexo+ is the most powerful drone of its kind, but how does it measure up in terms of quality, performance and price?

Despite its ample size, it's light enough to be transported to filming locations, even with the gimbal attached and a battery installed. Assembly is a cinch, but once complete the gimbal's power cable is left exposed. Built-in safety features should ensure that every landing is soft, but we'd expect a slicker, more integrated design given the cost.

Additional batteries cost £90 each; that's cheaper than other brands, but still steep considering the average 15 minutes of flight time per battery (dependent on conditions and which camera movements are selected).

The Hexo+ uses a phone's GPS position, via the free Hexo+ app, along with four other sensors (accelerometer, gyroscope, barometer, magnetometer) to pinpoint where the subject is and how it's moving to ensure optimum tracking and framing. It takes just 21 seconds from switching the drone on to it syncing with GPS, and connecting your iPhone to the drone



It's not the smallest drone, but Hexo+ is light enough to be taken out on shoots with ease.

via Bluetooth is a simple affair.

When you select one of the 12 available camera movements, the drone takes off and makes four 90-degree turns to calibrate before flying into position, where it hovers, ready to execute the camera movement. We can't emphasise enough how quickly this process happens, and if space is limited, the drone will crash.

Follow Me fun

Camera movements are selected by a single tap within the app's menu; the drone flies into position and awaits your command to start shooting. Highlights include Hover High, where the drone sits directly above you, taking in a huge amount of the landscape and moving with you. Shooting with this setting on a snow-capped mountain or golden beach would look incredible. The panoramic 360, Fly In/Out and Slide Sideways modes are also great for perfectly capturing that moment when you conquer your next mountain peak.

Follow Me is the most spectacular mode and the main reason to buy this drone. We tested it by hurtling down a sloping field on a mountain bike. High winds added even more for the Hexo+ to tackle, but it kept pace, its six



Hexo+ drone **APPLE CHOICE**

ALTERNATIVE CHOICES



DJI Phantom 4 **£999**

SPECIFICATIONS

- > FROM dji.com
- > 12.4MP camera
- > 4K video footage at 30fps
- > 28-minute flight time
- > Comes with remote controller
- > Autonomous flight



Yuneec Typhoon H
£1,279

SPECIFICATIONS

- > FROM yuneec.com
- > 12.4MP camera
- > 4K video footage at 30fps
- > 25-minute flight time
- > Comes with remote controller
- > Autonomous flight

Hexo+ was funded on Kickstarter, where it raised a massive \$1.3m.

propellers working hard to maintain stability. Reaction to sudden bursts of speed or movement is instant, and the gimbal's 3-axis stabilisation keeps the camera fixed firmly on the subject.

The connection between the drone and a smartphone is consistently strong. Initially, it's disconcerting being followed by an autonomous drone, and the instinct is to keep looking up for reassurance that it's there, but the drone's movements are precise and eventually trust takes over.

Hexo+ doesn't come with a camera, but its gimbal is GoPro-compatible. With the drone airborne, camera *movements* can be easily changed via the app, but not camera *settings* (it's simply strapped to the gimbal, rather than using any wired connection).

A big problem we've had with other drones is that with forward motion the drone tilts, the gimbal angles to accommodate this shift, and the propellers encroach on camera footage. Thankfully, the Hexo+'s props are smaller and positioned deliberately higher than the camera, eradicating this problem. It's a small but thoughtful touch.

The combination of the stability of the body, the accurate movement of the gimbal

and the overall quality of compatible GoPro cameras meant that our footage was superb.

Take control

Autonomy has its place with drones, then, but what if you want to feel a controller in your hands? Well, Hexo+ is also compatible with a number of remote controllers, should you want to fly it manually.

Hexo promises quarterly firmware and app updates, and we've already caught wind of a forthcoming function called Magic Wand, which will open the drone up to Minority Report-style gesture control from your smartphone. We'd also love the option to map GPS points within the app (as offered by rival DJI's Waypoints flight mode). Time will tell how much scope there is for these upgrades.

Kickstarter products are rarely perfect from version 1.0, and it's still early days for the Hexo+, but this is an impressive start for the fledgling brand. The price may prove too high for some people, but the Hexo+ is an exciting product with bags of potential.

Mac FORMAT VERDICT

> Not quite there yet, but we're excited to see where updates take this drone next.



- + Accurate tracking
- + Great stability
- + Impressive app
- Lengthy one-hour charging time

Creative Nuno

Small, but perfectly formed

> £40 > **FROM** Creative, creative.com > **FEATURES** Bluetooth 2.1 + EDR, 3.5mm line-in, mic, six-hour battery

Mac FORMAT VERDICT

> Not that powerful, but it's a terrific little speaker for listening to music at home.



- ⊕ Good sound
- Modest bass

Creative has come over all Zen with its Nuno Bluetooth

speaker. Taking its name from the Japanese word for 'cloth', the Nuno is an elegant little portable speaker that is ideal for listening to gentle music in a bedroom, or sitting out in the garden.

The Nuno measures just 6.5cm high, 18.7cm wide and 6cm deep, and weighs a mere 400g, so it's easy to carry from room to room around your home, or slip into a backpack when you're travelling. It has Bluetooth for mobile devices, a 3.5mm socket for wired



The lightweight Nuno is ideal for moving around your home.

connections, a mic for voice calls, and a rechargeable battery that should last about six hours. Our only minor concern is that the smart fabric cover might not cope very well with the elements in the great outdoors, so this speaker is probably best suited to indoor use, with the occasional foray into the garden in summer.

It sounds pretty good, though – especially for a

small speaker costing just £40. The sound is clear and detailed in the mid- and high frequencies, with more body than we'd expect from such a little device. It's not spectacularly loud, and the bass isn't very strong, but it'll work a treat if you just want some nice background music when you're lounging around at home, or in a hotel or holiday apartment.

CLIFF JOSEPH

Cambridge Audio Yoyo (S)

A portable subwoofer speaker

> £150 > **FROM** Cambridge Audio, cambridgeaudio.com > **FEATURES** Bluetooth, 3.5mm line-in, 13.5x24.5x6.5cm

Mac FORMAT VERDICT

> It's not cheap, but the Yoyo (S) is a portable speaker that punches above its weight.



- ⊕ Built-in subwoofer
- ⊕ Clear, detailed sound

This is a classy, compact speaker that produces a surprisingly big sound.

It's a bit larger than a typical portable speaker so you'll certainly notice it in a bag. But, to be fair, you can still pick it up with one hand quite easily and carry it around.

There's a very good reason for its dimensions and 1.25kg weight, as the Yoyo (S) is one of the few portable speakers to include a proper subwoofer to enhance its bass output.



The Yoyo (S) includes a built-in subwoofer to help boost bass frequencies.

The end result is an expansive sound that carries more weight than most other speakers of this size, while still managing to retain clarity and warmth in the mid- and high frequencies. The Yoyo (S) isn't amazingly loud, but it can fill most medium-sized rooms with music, and could even work as your main speaker in your living room.

Cambridge doesn't cut corners on other features,

either. There's Bluetooth for mobile devices, and a 3.5mm socket for connecting over a cable. Also included is a 14-hour rechargeable battery, and a microphone for making voice calls. Cambridge also throws in a set of adaptors for UK, EU and US plug sockets, ensuring you've got an impressive and compact speaker that'll earn its keep wherever you want to use it.

CLIFF JOSEPH

Libratone Q Adapt On-Ear

Excellent noise cancelling
headphones for fashionistas

Reviewed by **LEWIS LEONG**

> £219 > **FROM** Libratone, libratone.com > **FEATURES** Bluetooth 4.1,
3.5mm cable included, touch controls, 20-hour battery life

Libratone
has done an
excellent job
with its first
pair of on-ear
headphones

How do you stand out in
a sea of noise cancelling
headphones? Libratone

believes the answer is beautiful and
intuitive design. It's minimalistic,
with smooth ear cups that feature
hidden controls on their undersides.
While most noise cancelling headphones
have obvious grilles for their microphones,
Libratone has hidden this pair's four mics
behind the ear cup 'forks' for a sleek look.

The right ear cup houses a touchpad,
which lets you skip tracks, control volume,
play/pause and activate Siri. We liked the
intuitive controls of the touchpad, but were
often frustrated by taps to play and pause
music going unregistered. Helpfully, music
pauses automatically when you take off the
headphones. You adjust volume by dragging
your finger clockwise to make music louder,
or counterclockwise to make music quieter.

Resting your whole palm on the trackpad
activates Hush mode, which pauses your
music and lets you hear the outside world
without taking off the headphones.

There are different levels of active noise
cancellation (ANC), including one that
Libratone calls 'CityMix', which is handy for
maintaining situational awareness while
you're walking. There are four levels of noise
cancellation, and the one button toggle makes
it easy to jump between settings.

The ANC performance is impressive; at
maximum setting, the headphones drowned
out a majority of the outside noise, including
voices, typing and other people's music.

These headphones don't just look good –
they're well built, too. The ear cups are
attached to metal rods that slide smoothly

These are stylish
headphones, but
they're well built and
sound great too.



into the headband. They're not notched, so
you can get the perfect fit quickly. The band
is covered in a durable fabric and its pads are
covered in comfortable leather. We had no
issue listening all day long, which we can't say
for many on-ear headphones.

Speaking of all day, these cans are rated
for 20 hours of playback, and our testing
showed that number to be accurate. There's a
3.5mm cable included for wired playback, but
using it means you'll lose out on the ANC.

Sweet sounds

As for their audio output, you get a balanced
sound signature with a slight warm tilt. The
mid range is very well represented and bass
has satisfying impact. The bass can sound a
bit loose at times, but only audiophiles will
likely notice. Imaging is good, enabling you
to hear instruments around you, instead of
having the sound focussed inside your head.

Still, Libratone has done an excellent job
with its first on-ear headphones. The Q Adapt
On-Ear offers unique styling, great build
quality and good sound. We love the touchpad
for its intuitive controls, but hate that our taps
and swipes don't register every time.

If you want ultraportable noise-cancelling
headphones that sound good and stand out
from the crowd, these are a great choice.
They're not cheap, but they're worth it.

Mac FORMAT VERDICT

> Quite expensive, but
a good choice for
audiophiles and
fashion lovers alike.



- + Beautiful design
- + Adjustable ANC
- + Excellent battery life
- Finicky touchpad

G-Drive slim SSD USB-C 500GB

Pick up speed with this fast drive

> £157 > **FROM** G-Technology, g-technology.com/uk
> **FEATURES** USB 3.1 Gen 2, Type A and C cables included



This isn't the smallest USB-connected SSD we've seen, but it is the quickest.

Mac FORMAT VERDICT

> If you want to copy large files quickly and you have USB-C, look no further than this.



- ⊕ Mostly great speeds
- Minor speed drops

This may look like a 2.5-inch hard drive, but in your hand you can tell it's not.

Its maker draws attention to the G-Drive's 9.9mm-thick body, but its 127g – though not the lightest drive we've tested – is just as attractive. Aluminium bar its plastic trim, we would've liked it to come with a carrying sleeve.

The drive is claimed to achieve transfer rates up to 540MB/sec. USB-connected SSDs we've tested in the past

have peaked at 440MB/sec; over a USB-A cable, and this one performed similarly to them when using a USB-A to USB-C adaptor to connect it to a Late 2016 MacBook Pro.

But, over its USB-C cable, peak transfer rates when reading files were just a few megabytes per second less than what's quoted. Peak, mean average and minimum sequential transfer rates were all healthily ahead of

our old favourite, Samsung's T3, peaking at 534.7MB/sec when reading and 496.1MB/sec when writing.

In our difficult random read and write tests, which use small file sizes up to 1MB, the G-Drive exhibited excellent speeds, except for randomly reading files upwards of 256KB, where it lagged behind the T3 – but not enough to be a concern.

ALAN STONEBRIDGE

Netgear Orbi

Faultless networking for large homes

> £370 > **FROM** netgear.co.uk > **FEATURES** 802.11ac Wave 2, tri-band (AC3000) Wi-Fi, beamforming, MU-MIMO, four Gigabit Ethernet ports, USB 2.0 port

Orbi has two units, which create a mesh network in your home.



Mac FORMAT VERDICT

> So very expensive, yet great for getting total Wi-Fi coverage in a large home.



- ⊕ Superb coverage
- Do you really need it?

Orbi is designed to banish Wi-Fi deadspots and is specifically designed for large, busy homes. Orbi consists of a tri-band Wi-Fi router that you connect to your broadband, and a separate satellite that you place in an area where your wireless signal isn't so good. Together you get a strong, robust and reliable signal from a single mesh network, so your devices can receive the best possible signal throughout your home.

As it's a mesh network, there's one network name

(SSID) as opposed to having several extenders each with their own network name.

Setting up Orbi is a piece of cake and synchronising the satellite is easy. You can also plug in several wired devices to both units, so if you have the satellite near your TV you can connect other devices such as Apple TV and games consoles, too.

Orbi has one rather big downside – it costs an awful lot of money. Indeed, it's such a high upfront cost that you'll want to be sure you need it. Unless you have a truly huge house – in which case you

will need Orbi – you'd be better off buying a high-end tri-band router for less than £200 to see if that improves your signal before splurging on Orbi. DAN GRABHAM

Kodak Pixpro SP360 4K

An affordable VR action cam

Reviewed by **NICK ODANTZIS**

> £749 > **FROM** Kodak, kodakpixpro.com > **FEATURES** 2880x2880-pixel video at 30fps, 12.4MP sensor, 235° lens, splashproof case, Wi-Fi, remote control

Don a VR headset and you'll feel like you're actually there... at least, that's the idea

Mac FORMAT VERDICT

> As far as VR action cameras go, Kodak's Pixpro SP360 4K is an admirable stab at the genre.



- ⊕ Immersive footage
- ⊕ Easy to use
- ⊕ Relatively good value
- The Mac software feels unprofessional

The advent of virtual reality (VR) has begun to shake up the action cam scene. Some cams do VR with one lens, which limits you to a 360-by-240-degree view, so detail behind the lens is lost. In the case of Kodak's new Pixpro SP360 4K, two cameras are bolted together, their lenses pointing away from each other to capture detail all around. Naturally, this sort of imagery is perfectly suited to VR – don a headset and you'll feel like you're actually there, experiencing the action first-hand. Or, at least, that's the idea.

The SP360 4K tries to address the failings of its predecessor, the SP360, which lacked 4K. First, there's a big resolution boost. Second, it adds full 360-degree spherical immersion. So, does it work, and can it persuade you to part with your regular action cam?

You can buy a single pack, but the dual pack has the advantage of a wrist-mounted remote control option. Mounting accessories are limited to a suction mount and an extending selfie stick. £750 is a huge amount, but other options can cost more – GoPro's Omni costs an eye-watering £4,199; it delivers triple the resolution, but it does virtually the same thing, so the SP360 4K is great value for money.

Kodak's camera won't win hearts and minds with its design. It has a simple set of controls on one side, an LCD on the other, and provides access to its ports and memory card slot beneath a plastic tab. The case is splashproof, but more extreme tasks will require an underwater case. Its build quality feels pretty solid, though in practice we found the buttons to be a little flimsy at times, particularly the record button, which would occasionally get stuck in the housing.

The screen is tiny too, which makes reading on the fly a little tricky. Thankfully, the menu is easy to use: one button controls the capture type (video or photo), and another changes settings.



Though imperfect, this is a good way to get started with VR.

A Wi-Fi button is also present.

The interface's party piece is the remote control, which you can mount on your wrist or on the selfie stick.

This gives you quick access to the major controls. We love that the camera goes into auto-standby when you tap the record button, and wakes again with another tap; it saves battery power, though that's still eaten up a little too fast.

Pairing the two cameras takes longer, but isn't onerous, and it's essential when syncing dual-camera movies so you can stitch them together later on.

So-so software

That brings us to the software, which simply isn't that good. On a Mac there are two apps: one for editing videos and one for stitching them together. They lack polish, and neither is very easy to use. The camera's iOS app does much the same thing, but is a bit more refined and a mite more intuitive. You can connect to it using Wi-Fi, which makes for easy settings adjustment, as well as playback and setting up your shots before you start filming.

As for the results, we had mixed feelings. You get a brilliant new perspective for action movies, but the quality doesn't rival the static image you get from a regular 4K action cam. The slow motion offering disappoints too, and stitching is a little hit and miss.

If you want top-notch image quality, get a GoPro. But if you want to bring your videos to life and dip your toes into VR, this is a great and (relatively) inexpensive option.

Prynt

Make your photos come alive

> £130 > **FROM** Prynt, prynt.co > **FEATURES** Zink printing, Lightning connector, 8.5x14.2x4.4cm with iPhone fitted



Prynt is a different take on augmented reality printing.

Mac FORMAT VERDICT

> Fun video prints and decent image quality are offset by some design and app quirks.



- ⊕ Video prints are fun
- ⊖ No Bluetooth

Last issue we looked at two handheld printers, but we weren't blown away; can Prynt do any better? Well, it's a little different, relying on a Lightning connection rather than Bluetooth. Slot your iPhone into the camera-lookalike case and off you go.

Prynt relies on inkless Zink tech for its 3x2-inch prints. Like the previous mini printers we reviewed, image quality isn't amazing, but it's not terrible either. Images are reasonably sharp, but come with noticeable horizontal banding. Still, it's not like

you're going to be hanging them on the wall, so it's not really a deal-breaker.

In the Prynt app you can take new photos, load snaps from your library, or create video 'stories'. This is the most interesting part of Prynt; you choose a photo as a 'cover' (the picture that's printed out) and attach one or more videos to create a story. Once your pic has been printed, point your iPhone's camera at it and the video plays on the screen using the not-quite magic

of augmented reality. It's fun, and given the so-so quality of the printouts, is probably the bit you'll stick around for.

We had some minor niggles with the app, and the case is a bit bulky. The lack of Bluetooth is also a strange choice, making Prynt work with Lightning iPhones only. We also wonder how long the video printing novelty will last. **ALEX BLAKE**

Blue Microphones Raspberry

A tiny but talented mic

> £204 > **FROM** Blue Microphones, bluemic.com
> **FEATURES** Internal Acoustic Diffuser, built-in monitoring

Mac FORMAT VERDICT

> Raspberry's a really nice portable mic for podcasting, Skype, and mobile music too.



- ⊕ Great sound
- ⊖ FaceTime support

Sound is fleeting: what you don't catch is gone for ever. That's why musicians and podcasters care so much about microphones. The better the mic, the more sound you capture. Speech is clearer, vocals more punchy, and instruments more alive.

Usually, good recording means costly microphones, but Blue begs to differ. The Raspberry is barely bigger than a harmonica. It has a

cute '50s-retro design in metal and leather, and it promises 24-bit sound. It works with macOS over USB and iOS over Lightning.

And it delivers; on a desk for podcasting, it punches above its weight, delivering clear speech without picking up much of the room's own sound; you'll need a high-frequency filter if the gain's up and the subject's far away.

Up close, it excels. It has the intimate, breathy, bassy sound that flatters any voice: whether you're rapping or ranting it has great clarity and depth, and its grille makes it largely immune to the sibilants and plosives that send many other mics into the red. It sounds a little

The Raspberry is good enough to be your main mic.



flat when you're really going for it. FaceTime on iOS can't use it. Otherwise it's great for making podcasts and music. **GARY MARSHALL**



Handy for notes and sketches

> £140 > **FROM** Wacom, wacom.com
> **FEATURES** Bluetooth, 5GB free cloud storage

Paper and pen ★★★★★ <

We reviewed the A4 version of the Folio, but there's an A5 model too, and both include a wraparound cover that can hold an iPad. The Folio lets you write on normal paper, but Wacom's digital pen needs special ink refill cartridges.

How it works ★★★★★ <

Wacom's Inkspace app pairs the Folio to your iOS device using Bluetooth, then you can start scribbling. You press a button on the Folio to store each page in the app, and pages can be stored online in your free cloud storage account too.

Is it art? ★★★★★ <

The Inkspace app has some basic drawing tools, but the Folio works best for simple notes and sketches, rather than complex art. It can store 100 pages if your iOS device is out of range, and it can export to Dropbox and Evernote.

The small print ★★★★★ <

Wacom gives you 5GB of free cloud storage (around 6,000 pages), but the bad news is that you have to buy special refill cartridges for the Folio's digital pen. You get one spare cartridge in the box, but after that they'll cost you about £12 for a pack of three cartridges.

Reviewed by **CLIFF JOSEPH**



ISKN Slate

Powerful yet prone to a weakness

> £159 > **FROM** ISKN, iskn.com > **FEATURES** Ring sensor for pencils, Bluetooth, 8GB internal storage

Paper and pen ★★★★★ >

The A5 Slate lets you write on ordinary paper using the special ink pen included in the box. It also includes a small 'Ring' sensor you can attach to your own pencils, if they are no larger than 7.4mm thick and have no metal parts.

How it works ★★★★★ >

The Slate has 8GB of storage for your files, or you can use its Imagink app to transfer files to your iOS devices over Bluetooth. It runs on Macs too, so you can connect the Slate and see your drawings directly on your Mac's screen.

Is it art? ★★★★★ >

The Slate is more graphics-oriented than the Folio – in fact, Imagink can be used as a standalone drawing app on a Mac or iOS device. It includes several different brush and pen styles, as well as layers, and can import photos.

The small print ★★★★★ >

The magnetic Ring sensor is very useful if you like to sketch with your own pencils. However, the Slate is very allergic to metal, and you're warned to keep metal objects at least 10 inches away – which could be a problem for those of us who live in the 21st century.

> The ink refills are pricey, but the Folio does a good job of taking your handwritten notes and sketches and storing them online or on your iOS device.



**Mac
FORMAT
VERDICT**

> The Slate is a good option to quickly capture drawings and sketches, but its allergy to metal seems like a Kryptonite-level weakness.



THE BEST 4K DISPLAYS



Whether you do high-end image editing or just want to bask in the glory of so many pixels, 4K displays are where it's at

Reviewed by **KEITH MARTIN**

There's nothing quite like a large, high-resolution display, especially if you work with graphics. 4K displays have been around for a while, and some of the latest models are showing the benefits of this maturity, but the price drops we've seen for these screens over the last couple of years have slowed. They're fine for doing serious work, but they're certainly not cheap.

A 4K display's resolution is either 4096x2160 or 3840x2160 pixels, which you may also see mentioned as 'ultra-high-definition' (UHD). You can drive a 4K display from pretty many Macs made in the last three or four years, although running at 60Hz rather than 30 can be a challenge – refer to Apple's list at bit.ly/4KMacs for details.

The '4K' label doesn't define the physical size of the display, which is why in this group test we've looked at three 27-inch models and two

enormous 32-inch screens. Technically, none of these are actual Retina-class displays, but the 'smaller' screens pack in an impressive 163 pixels per inch. At this level you could choose to work with Apple's 'larger, sharper' display-scaling tricks or run as a large, fine-grained desktop. Four of the models we looked at use IPS technology and one uses VA. See Things to Consider for what this means in practice.

4K DISPLAYS ON TEST...

- > AOC U3277PWQU
- > Asus MX27UQ
- > BenQ PD3200U
- > Lenovo ThinkVision X1
- > Philips 272P7VPTKEB

Image is everything

A couple of these displays include built-in webcams and one can also automatically dim and even blank the screen if nobody is in front of it

for a while. Those can be nice, but remember they're extras. Whether you're a professional graphic designer or someone with wider-ranging requirements, if you're looking for a good 4K display then you'll be demanding a lot from the screen itself. That's why we've made image reproduction quality our overriding priority.

How we tested

> The image rendering and fidelity of these displays is critical. We tested each one using a Datacolor Spyder5Elite colorimeter, using it to assess the colour accuracy in particular. We also assessed how easy it is to use the on-screen controls to make adjustments. Features like speakers are nice, but accuracy of the display itself is the bottom line.



Things to consider...

Everything you need to know before getting started

- 1 The big question: IPS or VA?**
IPS (in-plane switching) panels are more expensive to manufacture than VA (vertical alignment), but they handle wider viewing angles. With large VA panels, looking from the centre to sides can show contrast shifts.
- 2 60Hz connection challenge**
Running at 60Hz gives smoother movement. Sadly, at 4K this needs HDMI 2.0, which Macs still don't have, or DisplayPort 1.2. Use a Mini DisplayPort cable, or wait for a Mac-compatible USB-C to HDMI 2.0 adaptor.
- 3 Small or far away?**
Adjust your display to run in pixel-for-pixel 'more space' mode, where you'll have

acres of room but everything's small, or with macOS scaling things smoothly to render at normal size but in greater detail.

- 4 10 bits don't make a byte**
Displays that work internally with 10 bits per colour (10bpc) - giving you over 1 billion colours - rather than just 8 bits are able to render subtle colour gradients without visible banding. All these display process 10-bit colour.
- 5 Personal speakers**
All these displays have built-in speakers, but you shouldn't expect too much. The Lenovo and Asus sound quite usable, and the Asus also acts as a Bluetooth speaker. But they're all personal rather than party things.



Higher...

> Philips' BDM4037UW is a 40-inch IPS display that curves to counter the extreme side-to-side viewing angle. It'll set you back £589.



...or lower?

> AOC's U2879VF display is more affordable at £307. It uses cheaper TN screen technology so just be aware of colour and contrast shifts.

Test 1 Design

Who is the fairest of them all?



> All the screens in this group are fairly sleek. If you're a fan of chrome, the Asus is the most striking with its silver bezel and chrome ring base; the others are all shades of mid- or dark grey. But they would all look good in a high-end studio. It's the Asus and especially the Lenovo that

look eye-catchingly thin – particularly at the top. Both the AOC and BenQ are relatively angular, almost industrial from the side, with bezels that look solid but not obtrusive.

The Lenovo display is a bit of a curious one in terms of appearance. Its speakers are behind a grille array that runs along the bottom of the display, far more obvious than any other speaker arrangement but very stylishly done. Its webcam is surprisingly functional; it sits on a slim articulated arm, can tilt to face the desk and has its own LED light.

TEST RESULTS

AOC U3277PWQU	★★★★★	Lenovo ThinkVision X1	★★★★★
Asus MX27UQ	★★★★★	Philips 272P7VPTKEB	★★★★★
BenQ PD3200U	★★★★★		

Test 3 Ease of use

An easily forgotten factor



> You'll probably only ever set up a display once, but it's important that it doesn't frustrate. The AOC needs a crosshead screwdriver and a soft place for the screen while you work, but the others are all simpler. Tilt adjustment is universal, but only the AOC, BenQ and Philips add swivel,

height adjustment or the rarely-used portrait rotation.

It's the on-screen display controls (OSD) and control buttons that you'll deal with most. BenQ uses a touch-sensitive bezel with LED bumps that help fingers find the spots. Asus's method of mapping physical buttons to on-screen options takes getting used to, and Philips tucked its buttons out of sight, which is sleek but unhelpful. In contrast, Lenovo's designers really considered the user: its buttons are easy and positive, and there's even a dedicated volume control.

TEST RESULTS

AOC U3277PWQU	★★★★★	Lenovo ThinkVision X1	★★★★★
Asus MX27UQ	★★★★★	Philips 272P7VPTKEB	★★★★★
BenQ PD3200U	★★★★★		

Test 2 Picture Quality

Quality is critical for large displays



> A 4K display is no longer a rare beast, but it's something that will appeal particularly to designers, video editors, and anyone else who works with large visual projects. This means the quality of the display itself is critical, so we tested with both moderately low and office-level

ambient lighting. In addition, each screen warmed up for an hour before we ran our tests to ensure full image stability.

Our Spyder5Elite colorimeter tests showed that, while none of these displays achieved full coverage of the Adobe RGB colour space (a rare thing indeed), the 32-inch AOC came much closer than the rest at 92%. The Asus, BenQ and Lenovo all got 80%, while the Philips achieved 81%. The difference between 80% and 81% is too little to bother with, and the AOC's higher score is significantly undermined by its VA panel technology. In practice this means you must sit face-on to see colours and contrast accurately. With a screen this wide, that's not possible across the entire width... so things will always look a little different in parts of the screen. For gaming that's not a big deal, but any kind of graphics creation can suffer.

Colour us impressed

Contrast ratio, the difference between the darkest and lightest tones, is an interesting statistic. It's bandied about a lot, and high ratios can make a difference in brighter environments. We've noted scores at 50% brightness in particular, as that's likely to be a real-world average brightness setting. AOC's display achieved 1330:1, a score almost twice as high as the rest, so if your environment is strongly lit and can't be muted,

The best brightness setting is the one that balances with your surrounding ambient lighting conditions

this will hold out better. However, in normal conditions this isn't as critical as many believe. The scores of all the others (even the lowest ranking, for Philips at 700:1) are

more than good enough for work done in typical conditions.

Related to this is absolute brightness. The best brightness level setting is one that balances with your surrounding ambient lighting. Pushing a display to its maximum brightness in lower lighting conditions is dazzling and can interfere with accurate colour perception.

TEST RESULTS

AOC U3277PWQU	★★★★★	Lenovo ThinkVision X1	★★★★★
Asus MX27UQ	★★★★★	Philips 272P7VPTKEB	★★★★★
BenQ PD3200U	★★★★★		

THE WINNER Lenovo ThinkVision X1

Style, substance and a few tricks up its sleeve

All the displays tested have good points. AOC's VA panel put it out of the running, but it's still a useful screen in general. Philips' display is a great all-rounder, and the Asus performed well and looks stylish. Ultimately, however, they didn't impress as much as the final two: the Lenovo and the BenQ.

BenQ's display is easy to set up, performs very well and has loads of ports, including an SD card reader. It's a display any professional would really love to use. It is, however, a step up in cost. The Lenovo isn't the cheapest either, but it's really impressive: the display quality is excellent and the panel itself is impressively slim. Its extras impress, too: the speakers are decent, the controls have been truly

The Lenovo ThinkVision X1 is a great display with features that set it apart

thoughtfully designed, and the webcam can act as a document scanner. It's a great display with features that set it apart.



The Lenovo is impressively slim, performs very well, and the webcam's usefulness surprised and impressed us.



Alex says...

> I use a 4K display at home, but it's nowhere near 32 inches in size. That kind of space really lets the resolution come into its own. Mine is an IPS display though, which is an important thing to consider if you do any graphical or video work. It's no use working with a monitor on which colours keep changing based on your viewing angle!

> How do they compare?



THE SPECS	> AOC U3277PWQU	> Asus MX27UQ	> BenQ PD3200U	> Lenovo ThinkVision X1	> Philips 272P7VPTKEB
WEBSITE	aoc-europe.com	asus.com	benq.co.uk	lenovo.com	philips.co.uk
PRICE	£602	£530	£695	£601	£637
INPUTS	1x HDMI, 1x DisplayPort, 1x DVI, 1x VGA	1x HDMI, 1x DisplayPort	2x HDMI, 1x DisplayPort, 1x Mini DisplayPort	1x HDMI, 1x DisplayPort	1x HDMI, 2x DisplayPort, 1x Mini DisplayPort, 1x VGA
USB PORTS	4	1 (SuperSpeed charging only)	4	4 (+ 1x USB-C)	3
TILT	+24° to -5°	+20° to -5°	+20° to -5°	+22° to -5°	+30° to -5°
SWIVEL	165° to -165°	No	45° to -45°	No	175° to -175°
HEIGHT ADJUSTMENT	Yes (13cm)	No	Yes (15cm)	No	Yes (15cm)
PIVOT	Yes (90°)	No	Yes (90°)	No	Yes (90°)
WEBCAM	No	No	No	On arm, fully positionable	Pops up from display body
VESA-MOUNT COMPATIBLE?	100mm VESA-compatible mount sockets	No	100mm VESA-compatible mount sockets	100mm VESA-compatible mount sockets	100mm VESA-compatible mount sockets
CONTRAST AT 50% BRIGHTNESS	1330:1	850:1	700:1	720:1	800:1
PANEL TYPE	VA (vertical alignment)	IPS (in-plane switching)	IPS (in-plane switching)	IPS (in-plane switching)	IPS (in-plane switching)
PIXEL DENSITY (PPI)	138	163	138	163	163
> DESIGN	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
> PICTURE QUALITY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
> EASE OF USE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
FINAL VERDICT	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Artistry Photo Pro

Instagram meets Photoshop

> £29.99 > **FROM** It's About Time Products, helloiat.com

> **NEEDS** OS X 10.11 or higher

Mac FORMAT VERDICT

> Imperfect yet easy to use, there are some powerful tools available in this app.



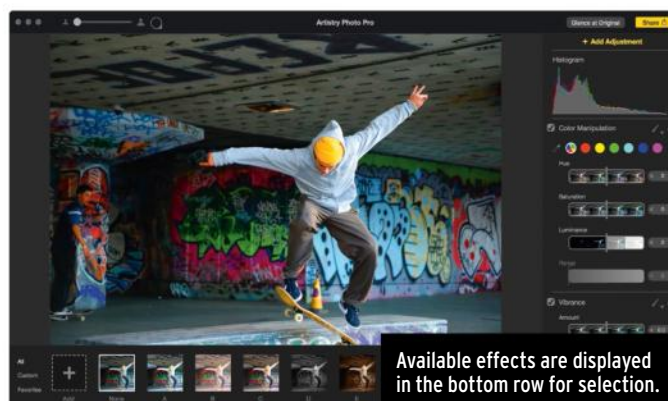
⊕ Easy to use

● No crop control

This app wants to be the Instagram of your Mac. Getting started is easy – just open an image and choose a filter.

Next, use the adjustment controls to tweak the image.

Simple numbers and sliders make the edits easy, and a series of thumbnails indicates their impact. You can also apply additional effects by selecting the 'Add Adjustment' option. There's a good selection of options available and the thumbnail makes it easy to experiment, but a couple of basic controls (crop and straighten) are



Available effects are displayed in the bottom row for selection.

missing. However, we were told an extension to connect the app to Photos is imminent, which will solve that issue.

You can paint in an effect using the controls revealed by clicking the paintbrush icon to the right of each adjustment title. There's an option to detect the edges in your image to limit changes to specific areas, but we had mixed success with it. While the selective adjustment feature

can be useful, it can also get frustrating because you have to click on the brush icon twice every time you want to adjust the size, hardness or opacity of the brush, or switch to the eraser to correct a mistake. Moreover, if you change your mind about the effect you want to use and click on a different one in the bottom row, your carefully crafted painting is lost.

ANGELA NICHOLSON

Photo Wormhole

Access-all-areas editing extension

> 79p > **FROM** Alexander Zats, zats.io

> **NEEDS** macOS 10.12 or higher

Mac FORMAT VERDICT

> Great if you love Photos' convenience yet your editor doesn't integrate with it.



⊕ Great price, effective

● Initially confusing

Photos is great, but there are plenty of editing apps that don't provide an extension to integrate with it.

Photo Wormhole enables you to open just about any editing software from within Photos.

When editing an image in Photos, choosing Extensions > Photo Wormhole first opens the image in Wormhole's window. The interface is clean and uncomplicated, but it isn't immediately obvious how to access external photo editors; you need to right-click or secondary-click with two fingers (weirdly, **ctrl**-clicking



Photo Wormhole recognises apps on your Mac that can open images.

doesn't work) to see the Open With menu, which lists all your apps that can receive an image, and you just click on the one you want to use.

The tool recognised all the editing packages we tried, including Adobe Photoshop, Affinity Photo, Capture One, Snapseed and DXO Optics Pro, to name just a few.

Once you've made your choice, the editing software opens with the image from

Photos showing. The app looks the same as normal and there's no indication that it was opened via Wormhole.

When you're finished, you save the image and close it in the editing app before returning to Photos, where you'll see the original image alongside the edited version. Even after you click Save Changes, you can still revert to the original to undo your edits. ANGELA NICHOLSON

Primitive

Painting with geometry starts to take shape

Reviewed by **ADAM BANKS**

> £7.99 > **FROM** Michael Fogleman, primitive.lol
> **NEEDS** OS X 10.10 or higher



The process takes a little while to complete, but part of the fun is watching it happen

Mac FORMAT VERDICT

> Turn photos into art with an unusual and beautifully effective process of creative visual reduction.



- + Very simple to use
- + Custom options
- + Creative interaction
- No saved settings or undo tool

When talking in computer graphics terms, 'primitives' are the simplest shapes a system can draw – such as circles, cubes, spheres and so on – from which more complex designs are constructed. 3D artists will be familiar with the concept, but photographers don't usually think this way: our primitives are square pixels, and we just throw enough of them at the job for an acceptable level of dumb accuracy.

Over the years, a lot of work has been done on how photographic images could be represented by primitives, not least for the purposes of file compression. Now, Michael Fogleman, the science software engineer who created Primitive, has applied that kind of thinking to a new take on automatic painting.

Import a picture, pick a type of primitive (triangles, circles, rectangles, or curves) and the app works out how to get as close as it can to the original by overlaying this shape at diminishing sizes. Click More Options and you can give it extra rules.

The process takes a little while to complete, but part of the fun is watching it

happen. It starts with large areas, then adds detail until you click Stop. The method looks strikingly similar to how a painter would work. You can also use the Drawing mode to do the painting yourself: the canvas starts blank, and wherever you click, shapes are generated, so you could, for example, build up detail in key areas of your image, while leaving the background as big, bold shapes.

Frustratingly, curves tended to spread far beyond where we clicked – possibly as a limitation of the algorithms involved – but other shapes were more responsive. You can even switch shapes part way through. It's rare to find an 'art' filter that so successfully enables you to produce unique results without skilled technique but through thoughtful, genuine creative decisions.

Creative control

By default, Primitive does its artistic stuff on a downscaled version of your photo, between 256 and 1,024 pixels wide. You can use the full resolution if you don't mind a lot of waiting, but 1,024 pixels gave as much detail as we wanted. That means you could also work on a small area already cropped from a much larger photographic scene.

When you're finished, the result can be exported as a bitmap at any size or, much more interestingly, as an SVG vector file, which you can then edit to your heart's content in an app like Adobe Illustrator or Affinity Designer. And even when we let Primitive run until the image looked almost as detailed as the original picture, there were few enough shapes (a case of thousands, not millions) to edit comfortably – a remarkable effect. We regret the lack of an undo option or saved settings, but these are minor concerns.



Primitive enables you to adjust all of these settings before it gets down to work, or at any time during the process.

iA Writer 4

Zen and the art of focussed writing

> £7.99 > **FROM** Information Architects, ia.net

> **NEEDS** OS X 10.11 or higher

Mac FORMAT VERDICT

> iA Writer is the kind of app people either love or hate. We're in the former camp.

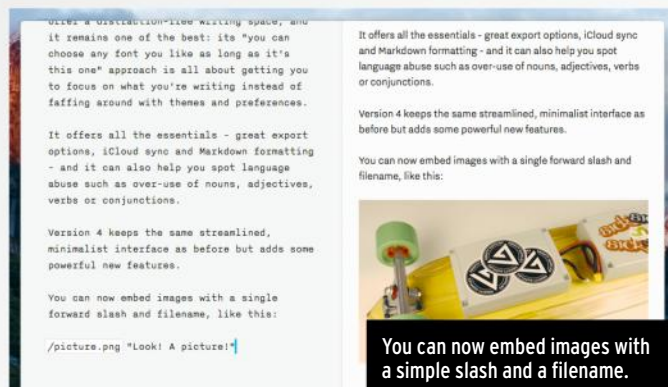


- ⊕ Linking files is easy
- ⊕ Supports templates

This app was one of the first to offer a distraction-free writing space, and it remains one of the best.

Its 'you can choose any font you like as long as it's this one' approach is all about getting you to focus on what you're writing rather than faffing around with themes and preferences.

It offers all the essentials: great export options, iCloud sync as well as Markdown formatting, and it can also help you spot language abuse such as overuse of nouns, adjectives, verbs and more.



Version 4 keeps the same minimalist interface as in previous editions, but adds some powerful new features. You can now embed images with a simple forward slash and filename, and you can do the same with text files or CSV tables. That means you can create master documents containing multiple text files (a book, say, or a lengthy report), or pull in text blocks you've saved previously.

CSV embedding means your Markdown text can include properly formatted tables, which is really handy.

However, because it doesn't give you access to your Mac's file system, you need to drag images or external files to its sidebar before you can add them with a slash. That's a minor niggle; the embedding is a welcome addition to a great app. **GARY MARSHALL**

Infuse Pro 5

Get your videos on all your devices

> £9.99 > **FROM** FireCore, firecore.com

> **NEEDS** iOS 8.0 or higher, 4th-generation Apple TV (optional)

Mac FORMAT VERDICT

> A great-looking and versatile streaming video player for both iOS and tvOS.



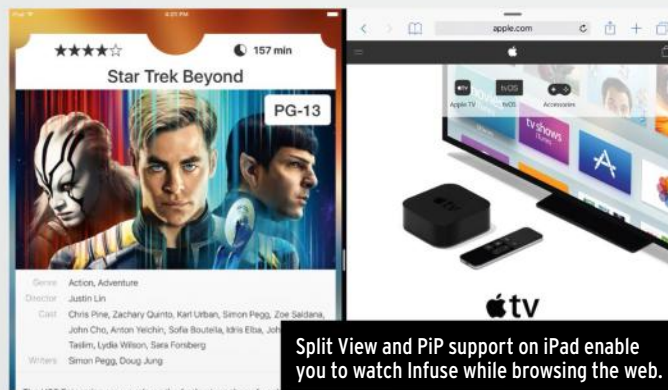
- ⊕ Useful cloud smarts
- Sometimes wrong art

Watching TV shows and films from a large library on iOS or Apple TV can be an exercise in frustration.

Devices are limited in what can be stored at any given time, and using iTunes to transfer files to them is the opposite of fun.

Infuse Pro 5 provides a better way: point it at shared folders on your network or a cloud service and it has a rummage, presents a list of items to play, and streams your selection to your device.

Visually, Infuse is a treat. On iOS and tvOS, folders are



shown as large thumbnails - or cover artwork if the app correctly interprets the filename. When it doesn't, you can edit the title - handy should your 'toddler and dog' video be erroneously listed as *Edge of Darkness*.

This version has further niceties: on Apple TV, its home screen highlights in-progress and recently added items; on iPad, there's Split View and Picture-in-

Picture (PiP) support; and cross-device sync worked seamlessly in our testing.

The app's performance fared well, too. Playback was generally snappy, although shared folders took a long time to appear on Apple TV. However, support for subtitles worked very well, with them being downloaded automatically for films and shows that lack subtitle files. **CRAIG GRANNELL**

Super Mario Run

Nintendo's famous mascot confidently bounds onto iPhone and iPad at last

Reviewed by **ALAN STONEBRIDGE**

> Free (£7.99 IAP to unlock all levels) > **FROM** Nintendo, supermariorun.com
> **NEEDS** iOS 8.0 or higher, internet connection to play

Playing in portrait keeps you on edge in case a shell you've kicked rebounds right back at you



Mac FORMAT VERDICT

> Polished to the level you'd expect from Nintendo, it's just a shame the best bit, Tour mode, is so brief.



- ⊕ Well designed levels
- ⊕ Forgiving mechanics
- ⊖ Needs a persistent internet connection
- ⊖ Beyond Tour mode, it gets rather repetitive

Mario's on your iOS devices at last, in an approximation of his classic 2D platforming adventures that you can play with one hand – all you need to do is tap on the screen. The core of the game is Tour mode, in which Mario runs automatically through 24 courses (three of which are free) to rescue Princess Peach from Bowser for the umpteenth time in 32 years.

Tapping to control Mario has nuance: the longer your finger's on the screen, the higher he jumps, and you can tap to make him spin and slow his descent. He can jump off walls, and collect power-ups to grow taller or be endowed with invincibility. There are extra characters with special moves to unlock too.

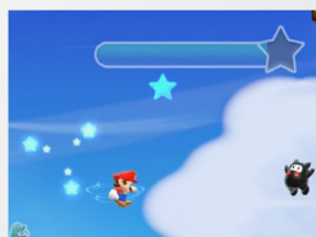
The game can only be played in portrait, which keeps you on edge in case an enemy whose shell you've kicked rebounds at you. There's some replayability in collecting coins, as you can connect to friends online and compare your success in every course.

Rally the Koopa Troopas

Nintendo clearly hopes the Toad Rally mode and the map of the Mushroom Kingdom will increase the game's value. In the latter, coins you've collected are used to add buildings and other items, but it's really just a consequence of grinding away at the game, with little impact on gameplay. Toad Rally pits you



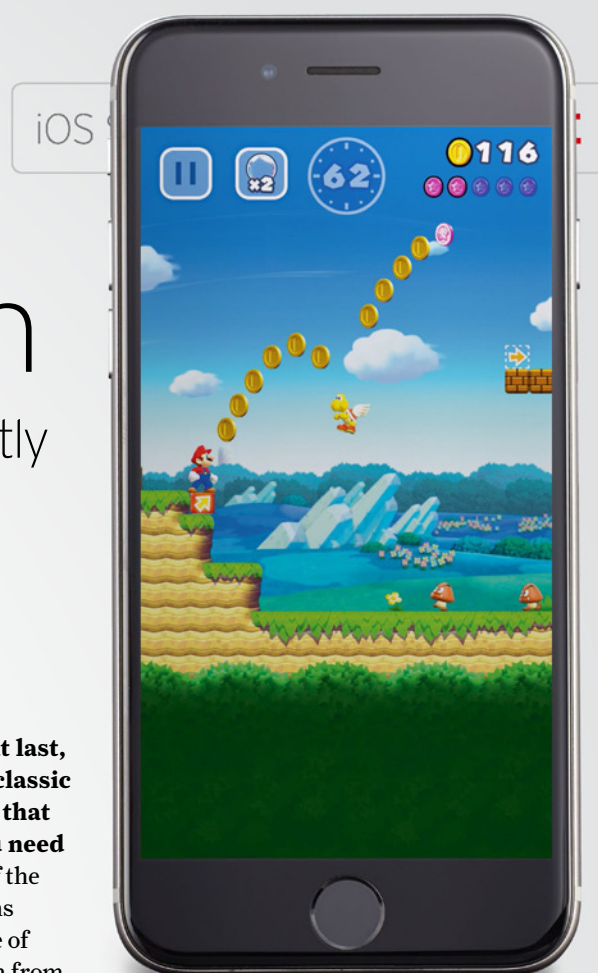
When Mario lands on an enemy, hold a finger on the screen to use it as a springboard and reach high-up items.



In Toad Rally, stomp enemies, collect pink coins and perform tricks to fill the star meter and get more coins.



When Mario collects a star, coins are attracted to him just by passing close by – an essential tactic in Toad Rally.



There's plenty of space at the bottom of an iPhone to tap without your fingers obscuring the action.

against a player online to collect coins in courses that are generated on the fly from smaller segments; that seems clever until you realise they've grown familiar. Cheering crowds gather if you perform special moves, and join the winner's kingdom; the more who ally with you, the larger Peach's castle gets – but, again, it's just a grind for numbers.

The only meaningful things you can add are pipes to three courses that'll challenge even skilled players. It's done by collecting five hard-to-reach coloured coins in each of Tour mode's courses, each of which has three variations, for a total of 360 coins. In this, the game gets replayability right by focussing on a true achievement, if you're determined.

Despite questionable long-term appeal, Super Mario Run is well worth your time, especially if you've enjoyed Ubisoft's older (yet just as good) Rayman running games.

STORE GUIDE

EDITED BY **ALEX BLAKE** >

Your complete guide to the best Apple hardware and third-party accessories

Welcome to MacFormat's Store Guide, the place to go to find out about all the Apple kit that matters, whether you're looking for your next iPhone or a powerful new desktop Mac. We've chosen our top products from Apple's product line-up, plus the best third-party kit that meets our quality standard.

Whether you're a recent convert or a seasoned Apple user, we highlight a model of each product that's ideally suited to your needs. So, check our handy tables to see which Mac, iPad or iPhone is best for you. We've also highlighted the gold standard in audio, storage, cameras, and many other categories to complement your Mac or iOS device with the best accessories.

> Who's it for?

ENTRY LEVEL

> You're just getting started in the world of Apple and need to know where to begin.

UPGRADER

> A firm Apple user, you're ready to move on and get even more from your tech.

HIGH END

> Apple is your life. You prize quality and want the best that money can buy.

R = Retina display

> Inside your buying guide...

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UPDATED
OCT 2015
EXPECTED
EARLY 2017



iMac

> Ever since the famous Bondi Blue iMac debuted way back in August 1998, Apple's all-in-one desktop computer has been setting standards in gorgeous design and powerful performance. Apple's spirit of innovation was as clear back then as it is today - the iMac was the first Macintosh to abandon the floppy disk in favour of USB ports, and its bright, colourful aesthetic set it apart as a playful pretender in a world of staid beige boxes.

These days Apple is again pushing boundaries with the iMac, blessing all of its 27-inch models with the world's best display, which has a massive 5K (5120x2880) resolution and a wider colour gamut than previous models. Add in a quad-core Intel Core i5 processor (configurable from 3.2GHz up to 4.0GHz), 8GB of memory, a fast and capacious Fusion Drive, and a powerful AMD Radeon R9 graphics processor - and the large iMac is *the* desktop system to own. In 2015, Apple introduced the first 21.5-inch iMac with a Retina 4K (4096x2304) display. All except the entry-level, 21.5-inch model have a quad-core processor.

> Choose an iMac

	> MODEL	> KEY SPECIFICATIONS	> PRICE
ENTRY LEVEL	21.5-inch 2.8GHz quad-core Intel Core i5	MEMORY 8GB of 1867MHz LPDDR3 GRAPHICS Intel Iris Pro Graphics 6200 STORAGE 1TB (5,400rpm) hard drive DISPLAY 1920x1080 (IPS, sRGB gamut) ALSO Magic Mouse 2, Magic Keyboard	£1,249
UPGRADER	21.5-inch 3.1GHz quad-core Intel Core i5	MEMORY 8GB of 1867MHz LPDDR3 GRAPHICS Intel Iris Pro Graphics 6200 STORAGE 1TB (5,400rpm) hard drive DISPLAY Retina 4K (IPS, P3 gamut) ALSO Magic Mouse 2, Magic Keyboard	£1,449 R
HIGH END	27-inch 3.3GHz quad-core Intel Core i5	MEMORY 8GB of 1867MHz DDR3 GRAPHICS AMD Radeon R9 M395 STORAGE 2TB Fusion Drive DISPLAY Retina 5K (IPS, P3 gamut) ALSO Magic Mouse 2, Magic Keyboard	£2,249 R

UPDATED
APR 2016
EXPECTED
2017



MacBook

> The baby of Apple's laptop family, the MacBook was updated in early 2016 with slightly improved specs and a new Rose Gold colour. Weighing in at just 0.92kg, it's Apple's most lightweight laptop but still packs in a 226ppi pixel density in its 12-inch Retina display.

The MacBook is powered by an Intel Core M processor (at 1.1GHz, 1.2GHz or 1.3GHz), which doesn't require a fan to keep cool, so the MacBook runs silently. It also features a Force Touch trackpad, which can trigger different responses as you apply more pressure. All models of the MacBook come with 8GB of 1866MHz memory, with no option to add more, and Intel HD Graphics 515 - that's 25% faster than the previous iteration - and there are 256GB or 512GB flash storage options. There are four colour options: Silver, Space Grey, Gold, and the new Rose Gold.

> Choose a MacBook

	MODEL	KEY SPECIFICATIONS	PRICE
ENTRY LEVEL	12-inch 1.1GHz dual-core Intel Core m3	MEMORY 8GB of 1866MHz LPDDR3 GRAPHICS Intel HD Graphics 515 STORAGE 256GB SSD	£1,249
UPGRADER	12-inch 1.2GHz dual-core Intel Core m5	MEMORY 8GB of 1866MHz LPDDR3 GRAPHICS Intel HD Graphics 515 STORAGE 512GB SSD	£1,549
HIGH END	12-inch 1.3GHz dual-core Intel Core m7	MEMORY 8GB of 1866MHz LPDDR3 GRAPHICS Intel HD Graphics 515 STORAGE 512GB SSD	£1,684

UPDATED
OCT 2016
EXPECTED
OCT 2017



MacBook Pro

> Apple debuted the new MacBook Pro in October with an OLED strip of app-specific controls called the Touch Bar. This replaces the function keys with a row of context-sensitive shortcuts.

The Force Touch trackpad was made larger to provide more room for gestures, and the keyboard was also updated with a second-generation version of the butterfly keys found in the 12-inch MacBook. Memory speed in all models except the entry-level 13-inch was upgraded to 2133MHz, and all new models are thinner and lighter.

The ports saw substantive changes, too. You'll now get either two or four Thunderbolt 3 ports (depending on the model), which are also compatible with USB-C devices, and through which you charge the MacBook Pro. The 13-inch and 15-inch sizes remain, although the entry-level 13-inch lacks a Touch Bar.

> Choose a MacBook Pro

	MODEL	KEY SPECIFICATIONS	PRICE
ENTRY LEVEL	13-inch 2.0GHz dual-core Intel Core i5	MEMORY 8GB of 1866MHz LPDDR3 GPU Intel Iris 540 STORAGE 256GB SSD Touch Bar No	£1,449
UPGRADER	13-inch 2.9GHz quad-core Intel Core i5	MEMORY 8GB of 2133MHz LPDDR3 GPU Intel Iris 550 STORAGE 256GB SSD Touch Bar Yes	£1,749
HIGH END	15-inch 2.6GHz quad-core Intel Core i7	MEMORY 16GB of 2133MHz LPDDR3 GPU Radeon Pro 450 STORAGE 256GB SSD Touch Bar Yes	£2,349

UPDATED
DEC 2013
EXPECTED
SOON



Mac Pro

From
£2,999

> If you need power - and we mean *serious* power - this is the computer for you. Even the entry-level model comes with 12GB of memory, a quad-core 3.7GHz processor, 256GB of speedy PCIe flash storage and dual AMD FirePro D300 graphics cards. However, with a high cost, last being updated in 2013, and Thunderbolt 3 debuting in the new MacBook Pro, it's worth holding out for the next version.

UPDATED
OCT 2014
EXPECTED
EARLY 2017



Mac mini

From
£479

> A welcome update in 2014 brought a £100 price drop to the most affordable Mac, but rises in late 2016 added £80 back on. The mini has some interesting talking points: the entry-level model has a 1.4GHz dual-core Intel Core i5 processor and 4GB of memory, making it one of the lowest-spec Macs around, adn with a 500GB hard drive and no display. Higher end models come with 1TB storage (Fusion Drive and SSD options are available), 8GB of memory, a better graphics processor and either a 2.6GHz or 2.8GHz Intel Core i5 for £679 and £949. Those models can be upgraded to a Core i7, but there aren't any quad-core options available.



iPhone

> The iPhone 7 represents a big update, no doubt about it. Apple introduced an amazing dual-camera setup in the Plus model, which allows for 2x optical zoom and on-the-fly depth-of-field effects.

Both sizes feature the improved A10 Fusion chip, a redesigned Home button with haptic feedback, better battery life, Lightning EarPods, and storage ranging from 32GB to 256GB.

The iPhone 6s and 6s Plus are still available, and are great devices in their own right. With 3D Touch giving you a greater range of interactions with apps, plus a 12MP rear camera with 4K video recording and Live Photos, consider them if the iPhone 7 is too expensive.

And let's not forget the iPhone SE. Though it lacks 3D Touch, it packs in many of the 6s's features, such as the A9 chip and M9 motion coprocessor, and has a more compact 4-inch screen.

> Choose an iPhone

	> MODEL	> KEY SPECIFICATIONS	> PRICE
ENTRY LEVEL	iPhone SE (4-inch display)	CAPACITY: 64GB PROCESSOR: A9 3D TOUCH No CAMERA 12MP photos, 4K video recording	£429
UPGRADER	iPhone 6s (4.7-inch display)	CAPACITY: 128GB PROCESSOR: A9 3D TOUCH Yes CAMERA 12MP photos, 4K video recording	£599
HIGH END	iPhone 7 Plus (5.5-inch display)	CAPACITY: 128GB PROCESSOR: A10 Fusion 3D TOUCH Yes CAMERA 12MP photos (dual-camera), 4K video	£819



iPad

> Apple didn't change much in the way of its iPad range during its September event, but it did tweak its iPad storage options and prices. The iPad Air 2 and iPad mini 4 and iPad mini 2 now start at 32GB instead of 16GB - rejoice!

But it wasn't all good news. Thanks to currency fluctuations post-Brexit, Apple has raised iPad prices (despite lowering them in the US).

On the software side, the iPad adds multitasking features, which are a boon for productivity. You can slide a second app over the right side of the one you're working in, then dismiss it to get back to work. Picture in Picture enables you to watch video in a corner of the screen. Those two features work on the Air 2, mini 2 and Pro and newer models. There's also Split View, on the Air 2, mini 4 and Pro, which lets you work on two apps side by side.

> Choose an iPad

	> MODEL	> KEY SPECIFICATIONS	> PRICE
ENTRY LEVEL	iPad mini 4	CAPACITY 32GB PROCESSOR A8 CONNECTIVITY Wi-Fi CAMERA 8MP TOUCH ID Yes	£379
UPGRADER	iPad Air 2	CAPACITY 128GB PROCESSOR A8X CONNECTIVITY Wi-Fi CAMERA 8MP TOUCH ID Yes	£469
HIGH END	12.9-inch iPad Pro	CAPACITY 128GB PROCESSOR A9X CONNECTIVITY Wi-Fi CAMERA 8MP TOUCH ID Yes	£819



iPad Pro From £549

> The iPad Pro comes in 9.7-inch and 12.9-inch sizes, packed with either 32GB, 128GB or 256GB of storage. All models except the 32GB, 12.9-inch one are available with the option of mobile network connectivity. The Pro's A9X chip is the most powerful in any iOS device, and it has an impressive four-speaker sound system, too. Adding the pressure-sensitive Apple Pencil makes it an accomplished drawing tool.



Apple Watch

From £269

> The Watch has already made Apple the second biggest watchmaker in the world. Apple is continuing this push with Apple Watch Series 2, which sees a big update to the Watch. It's water-resistant to 50 metres so you can take it for a swim, it has a faster dual-core processor and GPU, and a brighter display. There's also built-in GPS, which can measure routes, pace and distance when you're out on a run or hike without needing an iPhone.

Apple also introduced a ceramic model to replace the gold Edition, and has partnered with Nike to create the Apple Watch Nike+, a range of runner-oriented models. The Hermès straps come in new colours and designs, too.

BEST BUYS... curated picks of third-party kit >> **MONITOR****ViewSonic VP2772****£650**

viewsonic.com



> If you're not fussed about 4K but still want exceptional image quality, this IPS display is truly superb. It offers 99% coverage of the Adobe

RGB colour space, 10-bit colour and a 2560x1440-pixel resolution. It has HDMI 1.4, DVI and Mini DisplayPort connections, and four USB 3.0 ports for expansion.

> **NETWORK STORAGE****QNAP TS-251+ 6TB****£480**

qnap.com



> We know a good NAS drive when we see one, which is why the 6TB TS-251+ won *MF302's* group test. It's one of the

quickest NAS drives we've seen lately, with transfer rates of over 105MB/sec for large files. It has an HDMI port and a remote control for watching your media directly on your TV set. Four USB ports top it off.

> **PRINTER****Brother HL-3150CDW****£108**

brother.co.uk



> This versatile laser printer got the nod in *MF300's* group test. Its light design, feature list, and impressive print quality make it a great

choice for home office users. AirPrint and Wi-Fi connectivity means it plays nice with your iOS devices. It's not great for printing photos, but is a winner at everything else.

> **ULTRA HD MONITOR****Philips 328P6VJEB****£573**

philips.co.uk



> We love this display. At 32 inches diagonally it's big enough to make its 4K resolution worthwhile, and its colour rendering is excellent - 100% of sRGB,

93% of Adobe RGB and 97% of the P3 gamut that Apple's new MacBook Pro uses. It's big, bold, beautiful and superb for productivity and colour work alike.

> **WIRELESS ROUTER****D-Link AC3200 (DIR-890L)****£209**

dlink.com



> Being a tri-band router, this blows every other router we've seen out of the water when it comes to speed. We saw speeds of 600Mbps between two

Macs in the same room. Wi-Fi speeds hit up to 3.2Gbps, so its three channels mean it's no slouch there either. It's costly, but is a worthy investment if speed is your thing.

> **IP CAMERA****Logi Circle****£130**

logitech.com



> Winner of *MF299's* group test, the Logi Circle is packed with features. It's so easy to use and can be powered by batteries, making it highly portable.

With a wide 135° field of vision, it captures plenty of detail, and is very affordable. The Logi Circle is a barnstorming all-rounder, and looks great on your mantelpiece.

NEW!> **EXTERNAL SSD****G-Technology G-Drive Slim SSD USB-C****£157**

g-technology.co.uk



> Most USB SSDs we've tested have peaked at about 440MB/sec, but not this 500GB one; it peaked at 496.1MB/sec for write speeds and

534.7MB/sec when reading, very close to the claimed 540MB/sec. It lagged a bit in our random read test, but for copying big files over USB-C, this is the drive to pick.

> **THUNDERBOLT DOCK****CalDigit Thunderbolt Station 2****£210**

caldigit.com/uk



> Our *MF297* group test winner got the nod for its beautifully compact form and superb menu bar tool, which lets you eject individual drives as you

please (something its rivals failed to offer). It's not the most laden with ports, but has everything that most people will need, and comes in at a great price point.

> **MACBOOK BAG****Knomo Hanson****£90**

knomobags.com



> Deceptively spacious inside, the Hanson is full of well-padded pockets to protect your precious portables. It's extremely comfortable, distributing

weight well so your shoulders don't feel the strain, and is rather good looking, but remains subtle enough not to attract the attention of light-fingered thieves.

BEST BUYS... curated picks of third-party kit >

> WIRELESS SPEAKER

**Bowers & Wilkins
Zeppelin Wireless** £499
bowers-wilkins.co.uk



> This airship-inspired speaker is certainly striking, but it's more than just a looker, with crisp, clear treble and refined bass output over previous

Zeppelin models. Support for Bluetooth, Spotify Connect and AirPlay makes for plenty of connectivity, and dynamic EQ ensures controlled bass at all volumes.

> IN-EAR HEADPHONES

**Optoma NuForce BE
Sport3** £80
optoma.co.uk



> These in-ear buds prove that the wireless future is a bright one. They feel reassuringly solid and fit remarkably well, even when you're out on a run

or in the gym. They're IP55-rated for dust, sweat and rain resistance and have great battery life, balanced sound and incredible noise isolation. Great, affordable buds.

> BLUETOOTH TRACKER

Tile Slim
From £23
thetileapp.com



> The little tracking device that won us over in issue 299 has been made even smaller with the new Slim model. It's now far more portable than before, and

easily slips into your wallet as it's about as thick as two credit cards. With a great app and a loud alarm, your valuables will be kept safer than ever with this little beauty.

> PORTABLE SPEAKER

Libratone Zipp
£144
libratone.com



> Want a multiroom audio system in your home? This is your best option, hands down. It cleaned up in MF309's group test, scoring five stars in every

test category. From top-notch sound to tons of great features, the Zipp is a superb choice. It even boasts AirPlay for great integration with Macs and iOS devices.

> PORTABLE BATTERY PACK

**Apple iPhone 7 Smart
Battery Case** £89
apple.com/uk



> Despite that silly-looking hump on its back, the official battery case for the iPhone 7 is rather impressive. It's easy to fit, the buttons feel great,

and the soft inner lining protects against scratches. It isn't the largest capacity case, yet it has more than enough juice for busy days, and the bump is surprisingly comfy.

NEW! > MICROPHONE

**Blue Microphones
Raspberry** £204
bluemic.com



> Don't be fooled by this mic's small form factor; it punches hugely above its weight. Its close-up sound is intimate and bassy, and brings out the best in any

voice. No matter whether you're recording an interview, creating a podcast or just jamming with your band, its clarity and depth makes it easy to recommend.

> ON-EAR HEADPHONES

**Sennheiser PXC 550
Wireless** £330
sennheiser.com



> We love these wireless cans. They're comfortable and lightweight, and their long-lasting battery keeps them going for 22 hours. Sound quality is amazing:

wide, rich and detailed, with plenty of bass, too. The controls take some getting used to, but active noise cancellation is superb and the EQ allows plenty of customisation.

> ACTION CAMERA

GoPro Hero4 Session
£150
gopro.com



> GoPro has built a truly formidable reputation for itself as an action cam champ, and rightly so. The Hero4 Session may be compact, but it's a

great all-rounder. Internal waterproofing, an outstanding app and impressive video quality, combined with an affordable price tag, make it a firm favourite at MacFormat.

> FITNESS SMARTWATCH

Garmin Vivoactive HR
£184
garmin.com



> Packed full of tracking features for a host of sports, and filled with genuinely insightful metrics, this is a fitness smartwatch for nearly

any occasion. Its battery will last you days, perfect for the odd weekend hiking trip. With all this, it's not hard to see why it won MF308's group test.

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CONTACTS • REMINDERS • TIME MACHINE
AUTO SAVE AND VERSIONS • PREVIEW



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- Take stunning night sky photos using your iPhone
- Keep an old Mac in service with an alternative OS
- Should Apple become a media company in 2017?
- Add a Touch Bar to your Mac using an iPad
- Fend off nuisance calls with improved call blocking

ISSUE 311
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Have your say on all things Apple!

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and your questions to
letters@macformat.com

LETTER OF THE MONTH!



SECURITY LOCKDOWN

➤ In the February issue (*MF309*), there was a item in the macOS section of Genius Tips in which a reader asked about an app that they couldn't run because their Mac stated it was damaged and should be moved to the Trash. Your response was to agree with the Mac and that they should load a new version of the app.

I have this happen to me a few times; if the reader is running Sierra then I think the problem lies within its version of Gatekeeper, from which Apple has omitted the 'Anywhere' option, prompting this warning. There is a workaround in Terminal [...] Once done, the Anywhere option is reinstated in the Security & Privacy pane, which you can use to run the app as normal. Hope you can pass this tip on.

by PETER WALKER

SIMON SAYS... The reason for trusting the Mac and trying a fresh copy of the app is that the warning might rightfully be triggered after an app is modified, and so its code no longer matches the original security signature that allowed it to run. It's a safety measure against software that may be infected with malware. There are times when such software isn't actually a threat; Apple mentions AppleScript and some legacy apps as modifying themselves without malicious intent. Howard's reply is the safest course of action for most people though, and we agree with Apple's decision to hide the Anywhere option so untrusted code can't run amok - which is why we decided cut the instructions text in the letter above.

WHATEVER HAPPENED TO THE POPSLATE 2?

➤ I have a question about an advert for popSlate 2 in the October 2016 issue's iOpener, where you feature cutting-edge products. I was taken in by this and bought a popSlate. At that time it was due for release soon, then dates got pushed back. The last communication I can find from the company is from November, when it said the device was due in December.

Now I cannot get anyone from popSlate to respond. So I'm wondering if you've heard anything about the popSlate's release or from other people who have bought this product?

by DEAN ROME

ALEX SAYS... We've been hoping to get the device in for review ever since we featured it on that page, but we've had no luck getting a review unit from the company to date.

We're a little concerned that the most recent posts on popSlate's Facebook and Twitter accounts are from 13 May 2016. That said, the company appears to have maintained its Frequently Asked Questions document for the device; it includes a question about delivery (see bit.ly/2kGvXwP), where a company representative apparently suggests the version for iPhone 6 would ship in December, and that iPhone 7 models can be expected to be despatched from late February.

The FAQ also mentions cancellation of orders (bit.ly/2jmOoty). Under that question are comments from several other customers expressing their disappointment at delays and a lack of communication from the manufacturer after contacting its official support email address. If you're at all concerned by this, we recommend you use whatever protection your payment method offers to secure a refund.

FALLING FROM THE CLOUD

➤ Regarding Tim Powys-Lybbe's letter and Alan's reply (*MF308*), I am a Virgin Media customer, and wished to install a third-party router with a built-in VPN server capability, as its Super Hub does not offer this feature.

I spoke to Virgin Media's help desk and was advised on how to switch its Super Hub into bridge (modem-only) mode and then daisychain the new router between the modem and my home network. (There's a set of instructions provided on the Super Hub's browser-based interface, which I found a little ambiguous).

I chose the (reasonably priced) ASUS RT-66U, which provided me

with a fairly easy method of setting up the VPN server, as well as a dynamic link (DNS) address to my network, which has survived several changes of IP address from my service provider. The built-in firewall seems to have repelled several attempts to access my network by unwanted hackers.

by EMLYN BARRY VARGUS

ALAN SAYS... It's interesting to hear you suspect an attempt to breach your security. Without exact details (and a real security expert to hand), we can't verify that's genuinely what happened but, without wanting to panic everyone, it's wise now more than ever to be cautious about your network's security.

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➤ Share your images with us by using the hashtag #MacFormat and we'll print the best here in the magazine. While you're there, follow @MacFormat (Twitter) and @MacFormatUK (Instagram).

Death of an iPod

BY PHIL902000

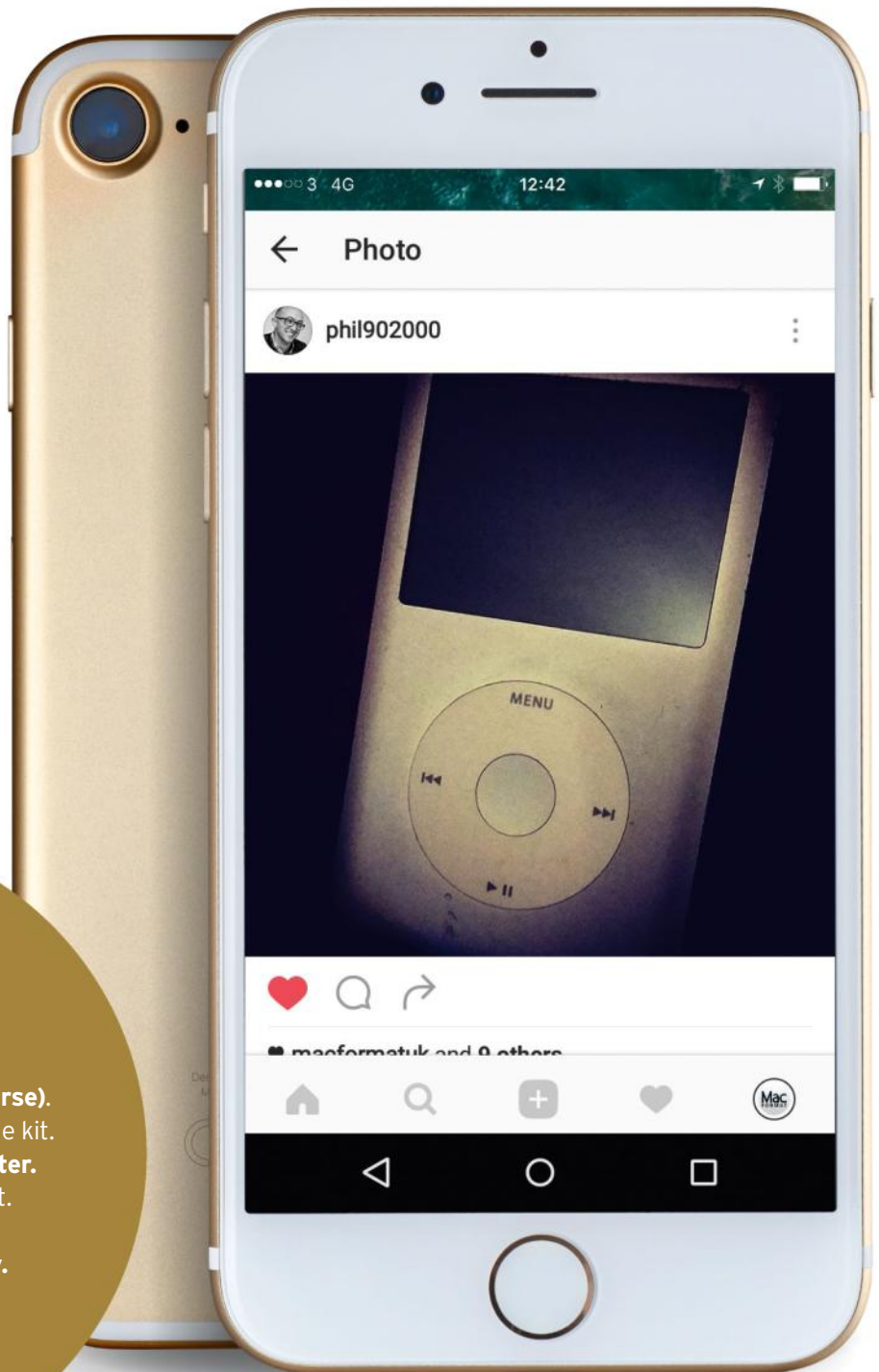
EQUIPMENT iPhone 7 Plus

This shot by @phil902000 on Instagram chronicles, in grainy, faded light, the slow demise of a 15-year-old companion. It's a sad but unavoidable fact that all of our Apple kit will eventually shuffle off, and we think this funereal shot captures that horrible truth perfectly. Well done, Phil!

Share your pics with us using the hashtag #MacFormat. In each issue we'll pick our favourites to feature on this page. In the meantime, we'll repost your photos through our Instagram account. So, give us a follow...

WHAT TO DO!

- **1** Open an Instagram account.
- **2** Follow @MacFormatUK (of course).
- **3** Take a picture of your lovely Apple kit.
- **4** Share it on Instagram or Twitter.
- **5** Use the hashtag #MacFormat.
- **6** Feel the warm glow of an appreciative Apple community.
- **7** See if you made it onto the pages of this very magazine!
- **8** Repeat.



Time Machine...

Uncovering the roots of today's Apple technology

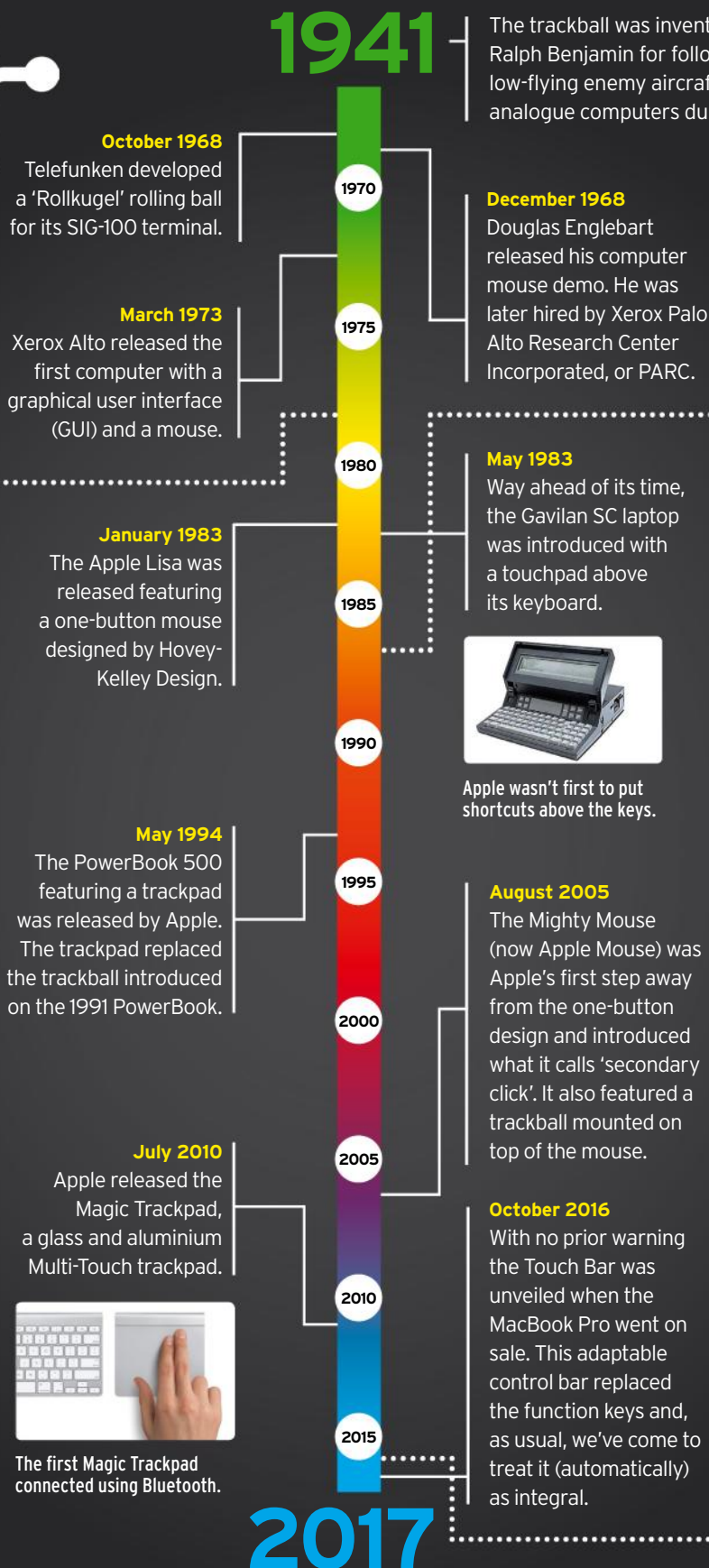
Let your fingers do the walking on this brief history of Apple's various interfaces over the years, from tech to track aircraft in wartime to 2016's introduction of the Touch Bar.

A legendary visit to Xerox PARC

In Winter 1979 and in return for a share deal on Apple's upcoming IPO (December 1980), Steve Jobs and other Apple employees were invited to visit Xerox's research centre. There, Apple first saw the GUI and the mouse - two items that would eventually make their way to the Lisa and the Mac.



A mouse based on pre-Xerox plans by Englebart.



The first Magic Trackpad connected using Bluetooth.

The wheels on the bus

From 1986 on the Apple IIgs until 1998 and the introduction of USB on the iMac, it was the ADB (Apple Desktop Bus) that connected Apple's input devices. Legend has it that Steve Wozniak developed it in just a month on his own after seeking out a task for himself.



Apple wasn't first to put shortcuts above the keys.

Can you feel the Force?

A highlight at the launch of the Apple Watch in March 2016, Force Touch is Apple's innovative pressure-sensitive tech. It enables you greater control and uses haptic feedback to provide you with information at your very fingertips. The technology features on Apple Watch, the 12-inch MacBook, and recent MacBook Pro models, as well as the Magic Trackpad 2.



The MacBook Pro gained Force Touch in May 2015.

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