

The UK's best-selling Apple mag!

116
PAGES OF
HELP & ADVICE

> Issue 312 > May 2017
> macformat.com > @macformat

Mac FORMAT



NEW LOOK!
iPHONE 7

> **PLUS** The new faster and cheaper 9.7-inch iPad

**SPRING
CLEAN
SPECIAL!**



**Your Mac
questions
answered**

> 6 pages of expert help and advice

DETOX your Mac

- ✓ Get an instant performance boost
- ✓ Fix critical system errors
- ✓ Clean up junk files



**Protect
your
home**

> Motion sensors that work with your Mac

**5 ways
Apple
changed
the world**

> From digital music to app ecosystems



**Hidden
features
of Maps**

> Get more from the iPhone app

REVIEWED

**Apple
AirPods
rivals**

> The hottest alternative Bluetooth earphones for iPhone



**Design
a book!**

> Create the perfect multimedia book in Apple's iBooks Author



Synology®



SYNOLOGY ROUTER
RT1900ac

Smart WiFi
for your home



Video Station



DiskStation
DS216+II



DS216play | DS716+II | DS216+II

4K TRANSCODING & STORAGE SOLUTION



4K VIDEO TRANSCODING

Transcode 4K videos to make them suitable for all screens and bandwidths whether they are local media players or remote mobile devices.

TURN YOUR NAS INTO A MEDIA CENTRE

Access and share all the multimedia files stored on your Synology NAS anytime, anywhere for home or work through our large range of apps.

STORE AND STREAM YOUR MEDIA

Stream digital content with Roku, Apple TV, Chromecast, Samsung TV and all Bluetooth, Airplay and DLNA devices effortlessly.

For where to buy visit www.synology.com



Available mobile Apps



Synology's
Media
Accolades



Mac
FORMAT
PRESENTS

iOpener

Game-changing tech from the world of Apple and beyond



The MobileCinema i70 is a hugely portable projector, so is great for office presentations and movies with friends.

MobileCinema i70

A powerful projector in the palm of your hand

'Pico' projectors are tiny, but the MobileCinema i70 is tinier still. It's 8.5cm wide and less than 2cm tall, so you can just pop it in a pocket and take it to a friend's house. It connects to your iPhone via Bluetooth, but also has a Mini HDMI port to connect it to your Mac. In fact, thanks to that wireless connectivity and its internal battery, it's both portable and cable-free. And you also get surprisingly good sound quality for such a small box. The visuals aren't cinema quality, but the MobileCinema i70 is perfect if you need a mini projector that's easy to carry around.

› £238 › **INCLUDES** MobileCinema i70, HDMI cable, USB cable

› **WEBSITE** aiptek.de › **WORKS WITH** iOS 7.1 or higher, OS X 10.10 or higher

LOSE YOURSELF IN A WORLD OF

Vinyl

FIND YOURSELF IN
OXFAM'S ONLINE SHOP

oxfam.org.uk/shop



OXFAM



SUBSCRIBE TODAY!
SAVE UP TO 83%!
Turn to page 46



> We've had another change around here on *MacFormat*, this month. Our long-standing Production Editor, Alan Stonebridge is off to edit our US sister title, *Mac|Life*, while he's being replaced by *Mac|Life*'s erstwhile Operations Editor, Jo Membery who now has to get used to subbing copy in UK English instead of US English again. So, I'd like to congratulate Al on his new editorship and extend a big two-gallon hat welcome to Jo!

This issue we take a deep dive into a subject that will be top of the list for many Mac users, especially if you've got an older machine - freeing up space and improving performance. We'll show you all the little tricks you need to know to eke that last little bit of power from your processor.

Also this issue, we lift the lid on Apple AirPods and their rivals, reveal five unexpected ways that Apple changed the world, show you how to protect you home with Apple compatible security devices and bring you a great selection of tips for macOS Sierra.

Enjoy the issue and I'll see you again on 9 May for more from the exciting world of Apple. It's about time Apple released some new Macs, so here's hoping...

GRAHAM BARLOW
EDITOR-IN-CHIEF
editor@macformat.com

Meet the team



Jo Membery
Operations Editor

> Fresh from subbing copy on our US title, *Mac|Life*, Jo has to adapt to life without apple pie, waffles and baseball. We think she'll cope somehow.



Alex Blake
Commissioning Editor

> An office refurb led to Alex unearthing an old iMac G3 external floppy drive. He still can't believe files haven't always been in the cloud.



Paul Blachford
Art Editor

> Faced with (once again) having to photograph two objects that were completely different sizes for this month's head-to-head, Paul has decided perspective is his friend.



macformatuk.tumblr.com >



facebook.com/macformat >



twitter.com/macformat >



Instagram.com/MacFormatUK



Mac FORMAT

> Issue 312
> May 2017
> macformat.com

CONTENTS



8

APPLE CORE >

8 RUMOUR & NEWS

> The core Apple news you need to know about

11 APPS & GAMES

> Our top picks of the month for Mac and iOS

12 APPLE FACTS

> Amazing stats from the world of Apple

14 LETTERS

> Have your say on all things Apple-related

16 MACFORMAT INVESTIGATES

> We look at the future of the iPhone

20 OPINION

> Will 2017 see Apple innovating again?

22 SPLIT VIEW

> The team's views on the latest Apple tech

APPLE HOME >

25 APPLE HOME

> Build the smart home of the future today

26 SMART HOME SECURITY

> Secure your home with tags and sensors

29 FIVE OF THE BEST

> Our pick of smart security accessories



SPRING
CLEAN
SPECIAL!

DETOX your Mac

- ✓ Get an instant performance boost
- ✓ Fix critical system errors
- ✓ Clean up junk files

32

The future of the iPhone

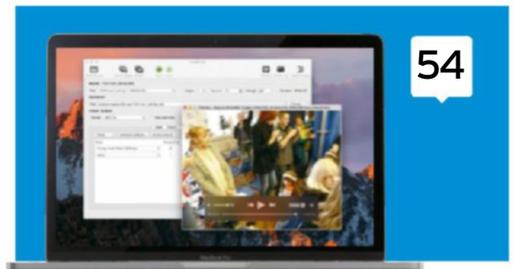
With sales stumbles and innovative rivals, could the iPhone go the way of the BlackBerry?

16



GENIUS TIPS >

- 69 GENIUS TIPS**
> Howard Oakley solves Mac and iOS issues
- 70 NETWORKING**
> Wi-Fi woes and connection conundrums
- 72 SOFTWARE**
> Ease app-fuelled anxieties with our fixes
- 74 iOS SOFTWARE**
> Swipe away your touchscreen troubles



APPLE SKILLS >

- 50 CREATE YOUR OWN BOOK**
> Publish your novel with iBooks Author
- 53 MANAGE WEB CONTENT**
> Use Pocket to tag and search Safari sites
- 54 CONVERT VIDEO TO MP4**
> Make old videos playable on all your devices
- 56 FIND YOUR WAY WITH MAPS**
> Find points of interest and get directions
- 58 CUSTOMISE YOUR NEWS**
> Sort RSS feeds to tailor your news bulletins

SIERRA SKILLS >

- 62 MASTER MISSION CONTROL**
> Work more efficiently with multiple desktops
- 64 FACEBOOK INTEGRATION**
> Keep in touch with your Facebook contacts
- 66 USE RECOVERY MODE**
> Recover from serious Mac issues

SUBSCRIBE TODAY!



SAVE UP TO 83%!

Turn to page 46

INCLUDES PRINT AND DIGITAL EDITIONS



90

APPLE CHOICE >

- 89 APPLE CHOICE**
> New kit and apps - we've got all the latest hardware and software reviews
- 104 STORE GUIDE**
> Get help with picking your next piece of Apple kit and the best add-ons to go with it

How Apple accidentally changed the world

82

REGULARS >

- 76 BACK ISSUES**
> Head here if you've missed an issue
- 112 NEXT MONTH**
> What's coming in MF313 on 9 May
- 113 PHOTO STREAM**
> Send us your Apple-related shots

> macformat.com > @macformat

77

LOVE YOUR MAC

> Inspiring ideas for revamping old Apple kit





What's inside

8-10

RUMOUR & NEWS

› Word on the grapevine about future Apple kit

11

APPS & GAMES

› Our top picks of the month for Mac and iOS

12

APPLE FACTS

› Apple CEOs in numbers

14-15

LETTERS

› Have your say on all things Apple

16-19

INVESTIGATES

› Is Apple's smartphone dominance at risk?

20

OPINION

› Matt Bolton looks at the next iPhone release

22

SPLIT VIEW

› Will 4K support warrant an Apple TV upgrade?



Contact us

› Email your queries to letters@macformat.com

› Join the conversation at facebook.com/macformat or on Twitter [@macformat](https://twitter.com/macformat)

APPLE CORE

EDITED BY **GRAHAM BARLOW** ›



APPLE RUMOUR

Virtual Mac keyboard

A MacBook Pro with a virtual keyboard is on the horizon

› Recent patents have revealed that Apple is working on a MacBook Pro with a very special keyboard. The keyboard is actually a second display - just imagine that the current Touch Bar has been given growth hormones and has taken over the entire keyboard area. The second display could then be used as a virtual keyboard, sketch pad or simply as an extension of the screen.

Details of the device are buried in the iPad Pro's Smart Keyboard patent application, which shows Apple is considering a future version of the keyboard with a display instead of physical keys. Combined with haptic feedback, it could mark the end for physical keyboards, as we swap clicks for taps on a permanent basis.

Paul says...



Apple's shallow MacBook keyboard was divisive, and this will be even more so; Apple has to get it feeling right!



1

APPLE PEN

› The second display could also be used with the Apple Pen, so that you could use the area to jot down sketches, or create works of art and share them with ease.



2

2

GLASS LAYER

> Imagine a smooth glass layer where the keyboard used to be, then imagine you can use it to display any sort of keyboard and you see the possibilities.

3

HAPTIC FEEDBACK

> A separate patent has been filed for a screen with haptic feedback, so the keys could vibrate. The lack of physical feedback is a drawback of current virtual keyboards.

4

VIRTUAL HISTORY

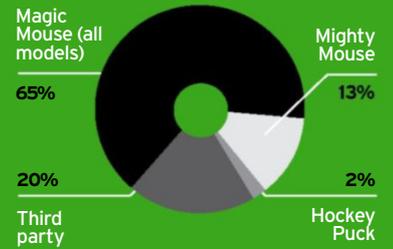
> The idea of a virtual keyboard on a Mac is not new. It's been kicking around since 2012 when a patent relating to it was first filed.



Mac
FORMAT

THE POLL

WE ASKED... What was your favourite Apple mouse of all time?



> Log on and see next issue's big question!
twitter.com/macformat
facebook.com/macformat

RUMOUR MILL #

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

1

macOS 11

> We can expect the next major version of macOS to be announced at WWDC 2017 on 5 June, but macOS 10.12.4 should be out any day now.

2

iPHONE EDITION

> Rumours are circulating that the upcoming iPhone 8 could be called the 'iPhone Edition', and launch well after the iPhone 7S and iPhone 7S Plus in September.

3

4K IPHONES

> Future iPhones could support 4K graphics and faster gaming with next generation PowerVR Furian GPU architecture.



CLASSIC APPLE FACTS

400KB

MACINTOSH 512K FLOPPY DISK CAPACITY

Apple killed off the floppy drive in Macs with the iMac G3, but back in 1984 they were all the rage. The Macintosh 512K nickname: 'Fat Mac' came with a drive that could read 400KB floppy disks built in.

\$7,300

LAUNCH PRICE OF MACINTOSH PORTABLE

Apple's first battery-powered portable laptop cost a mind-boggling \$7,300 in 1989, around £11,500 today. It was powerful, but didn't sell well.

100,000

TOTAL NUMBER OF APPLE PIPPIN UNITS PRODUCED

Considered one of Apple's worst mistakes, the Pippin games console (made in conjunction with Bandai) was limited to a production run of just 100,000 units. There were reportedly more accessories made for it than actual units.

Apple launches red iPhone, updates iPad

New video editing app, boosted iPhone SE and changes to Swift Playgrounds also released

Apple is well known for unveiling new products at flashy events, but it doesn't always work that way. In early March it decided to quietly launch or update a number of products with a simple change to the Apple Store website.

Perhaps most noteworthy of the changes, at least visually, was the introduction of a PRODUCT(RED) iPhone 7 and 7 Plus. The phones come in a red finish and are available with 128GB or 256GB of storage, with prices ranging from £699 to £919. A portion of that cost will go towards fighting HIV/AIDS in Sub-Saharan Africa.

Out of Air

The iPad range also got an important update. The iPad Air 2 has been phased out and replaced with a 9.7-inch device simply named 'iPad'. This features a brighter Retina display and a faster A9 chip (the Air 2 came equipped with an A8X chip). It's also slightly thicker and heavier than the Air 2, and also lacks a laminated display.

That said, it has seen a price drop, costing £339 for a 32GB model and £429 for a 128GB version. That makes it the most affordable tablet Apple has released to date. Apple also

The iPad Air has been phased out; in its place we have the 'iPad' with a brighter display and faster chip.



A portion of the profits from the PRODUCT(RED) iPhones will go towards fighting HIV/AIDS in Sub-Saharan Africa.

unveiled Smart Covers for iPad in charcoal grey, white, midnight blue, pink sand and red to match the PRODUCT(RED) iPhone, plus a range of new iPhone 7, 7 Plus and Apple Watch straps in various colours and designs.

Apple hasn't finished there. The iPhone SE has had a noticeable storage bump, with options being doubled to 32GB and 128GB, costing £379 and £479 respectively. The iPad mini 4 now has more capacity (128GB instead of 32GB) for the same price as before. Also, the iPad mini 2 has now been discontinued.

On the software side of things, Apple debuted Clips, a free iOS video creation app.

This combines video, photos and music and 'lets users create animated captions and titles using just their voice'.

There are also filters and various effects to create 'expressive videos' that can be quickly shared to social media and video websites.

Finally, Swift Playgrounds, the coding app for iPad, now supports five extra languages: Simplified Chinese, Japanese, French, German and Latin American Spanish.

Apple's other CEOs IN NUMBERS

Apple's current CEO, Tim Cook, is the company's sixth big boss. But who helped to lay the foundations? We look at the numbers behind the numero unos...



> Mike Markkula, Apple's second CEO, was hands-on with Apple engineering. He persuaded Steve Wozniak to build a 3.5-inch floppy drive into the Apple II to differentiate it from its rivals.

1
007

> Apple's first CEO, Michael Scott, was its fifth employee, but registered himself as employee number seven as a joking reference to James Bond.

500

> Gil Amelio was the final CEO before Steve Jobs' return, lasting roughly 500 days. His actions arguably saved the company, before Jobs ousted him in a boardroom coup.

30

> Before taking charge of Apple in 1983, John Sculley had become Pepsi's youngest ever marketing vice-president at the age of 30. That marketing know-how helped him instantly click with Steve Jobs.

1986

> CEO Michael Spindler introduced Japanese language support to the Macintosh in 1986, overseeing explosive growth in the country; this made it one of only two computers to support the language in Japan.



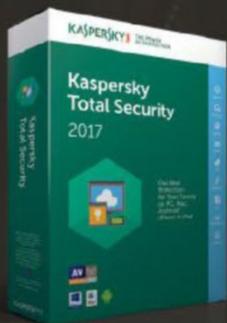
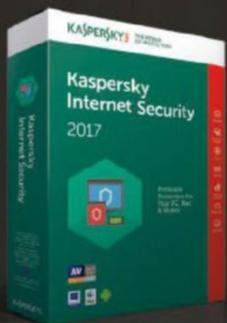
3:45am

> Tim Cook is not one for lie-ins, waking up at 3:45am every morning. On the morning of Apple's 9th March 2015 event he got up at 4:30am, quipping that he had "slept in".

NEXT ISSUE

> 1976: We take a look at Apple's first year in numbers.

I want to be
unhackable.



That's why I want a solution that protects me from online threats and keeps me worry-free.

Get protected now at Kaspersky.co.uk

KASPERSKY

THE POWER OF PROTECTION



Nothing guarantees complete protection, so please exercise caution online. December 2016 Which? award applies to Kaspersky Internet Security 2017.
© 2017 Kaspersky Lab. All rights reserved. Registered trademarks and service marks are the property of their respective owners.



CONTACTS

Have your say on all things Apple!

Contact us

► Email your queries and your questions to letters@macformat.com

LETTER OF THE MONTH!



Where did 'Bounce' go?

► In Mac OS X Lion, whenever I received Junk mail or unwanted advertising, I used to bounce it back. This method got rid of it and did not tell the sender that their email had reached a valid address, or that the email had been opened. It worked, and gone really was gone.

With the El Capitan upgrade, 'Bounce' has bounced off! Now we have to either drag the

offending junk straight to the Trash (no problem there if you spot it in time), or, if I inadvertently do open it, there may be an 'unsubscribe' option which often does not work. On those occasions when it does work, it seems to generate more from the same sender or, just now, a phone call to my ex-directory number about the same subject. When I questioned the lady at the other end she admitted that unsubscribing sent my address to an international marketing database for follow up. However, she wouldn't divulge how she got my number. I terminated the call.

Is there a hidden way of bouncing, or can Apple Almighty be persuaded to give it back to us?

BY PETER WHICKMAN

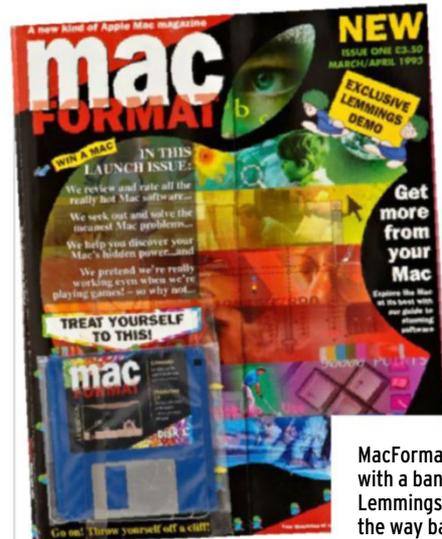
GRAHAM SAYS... When Apple removes a feature it usually has a good reason for doing so. Bounce was removed because a lot of the time spammers aren't sending it from their actual email address, they're spoofing the address of somebody else, and when you bounce the email back you end up either sending the bounce back to a false email address, or worse, to an innocent third party. There are Automator scripts you can find online for creating your own Bounce feature in Mail, but we'd recommend not doing it as this feature was removed for a reason.

So, what to do? The easiest solution is to use a Gmail, Yahoo or iCloud email address, as these services have solid server-side spam filtering, so you'll find that the offending emails are already in the Spam folder and don't interfere with your regular inbox.

STAR LETTER PRIZE!

Win a Creative NUNO

► The author of our Star Letter receive a prize each issue. This issue its the Creative NUNO, a portable, wireless speaker with high-performance speakers under its cloth covering. Find out more at: <http://uk.creative.com>



MacFormat launched with a bang, and a Lemmings demo, all the way back in 1993.

REMINISCENCES OF MACFORMAT

► I bought my first Mac, an SE/30, back in April 1993 from a man in Orpington. Travelling back to Birmingham on the train, clutching my precious cargo, I bought a magazine for entertainment - *MacFormat*. The first issue for you, the first Mac for me, and also the first Mac magazine that I ever bought.

That issue kept me entertained for hours - Lemmings was on the cover disk! I bought the full version on the strength of that demo. £39, I think it cost!

I still have that SE/30 on my desk - in fact, I'm writing this email on it, although it will be sent via a Mac Pro (the old SE/30 can't handle modern email systems). Since then though, I've become a software developer - and it's a tough business these days. The world is awash with bad software, and it's nigh on impossible for the good stuff to struggle to the surface, to get noticed - and hence get sales. Looking at that old *MacFormat*, software prices have dropped to junk levels - it seems that few people value software anymore, they expect it to be free.

My most popular app, MailRaider Pro, sells on its own merits - I just about make enough money for continued development to be worthwhile. Remarkably, it does so without ever having been reviewed by a magazine. My latest app, an addictive game for iOS and macOS, has taken over a year of my life to

WHEN THE MUSIC STOPS

> Your article in Issue 309 on Apple Music was informative, but was based – as is so often the case nowadays – on one huge assumption. That you have a good internet connection. Now I do at home, with fast WiFi, and 4G when out and about. But I'm writing to you at this moment from a cruise ship where internet connection is by satellite. It takes one back to those dial-up days, when you went online because you needed to, and then quickly logged off, except satellite is far more expensive as well.

This cruise is when I realised that nearly all my hundreds of hours of bought and downloaded music have been migrated to iCloud, and I have had the disastrous realisation that I have hardly any music with me on my phone. The connection is far too slow and expensive to download this music now, so I'm left bereft. The same would be true – and worse – if I was on a camping holiday, etc. When I get home, I'll re-download my music to my phone, and will very likely unsubscribe from Apple Music.

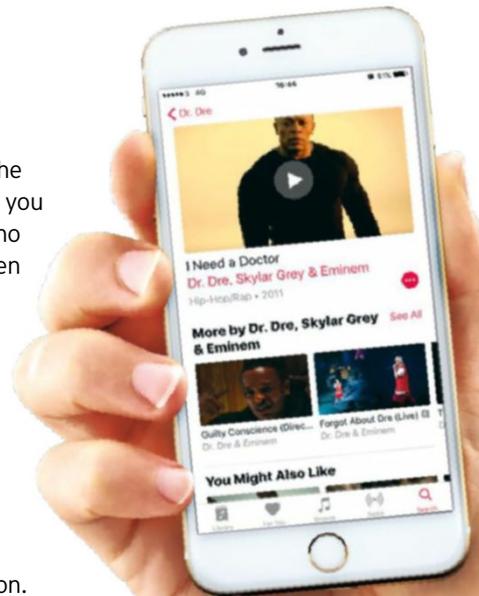
Your article only serves to look at the frills and

benefits of Apple Music and completely ignores the major disadvantage, that you could well find you have no music on your phone when you actually have time to listen to it.

BY MIKE ARNOLD

ALEX SAYS... It's true, we live in a connected world, and many of the Mac's core features are starting to depend on a decent internet connection.

With an Apple Music subscription there's nothing to stop you downloading tunes to your iPhone so they can be played offline before you go on a trip.



Back in issue 309 we extolled the virtues of Apple Music.

finish – and, over the past three months, has made me less than seven quid. Which is a pity, because it's a damn good game. If you still had a cover disk, I'd make you a demo version!

by PASCAL HARRIS

ALEX SAYS... Thanks for sharing your memories Pascal, I'm sure it will stir a few fond memories of getting their first Mac amongst other readers of *MacFormat*. How things get noticed on the App Store is one of those strange quirks of fate that can often not feel fair at all. Quite often it's a combination of chance and timeliness. However, it's worth remembering the amazing opportunity that the App Store presents and the app economy it created. See my feature on page 85 for details of the way it changed the world.

SUCCESSFUL SUPPORT

> So, knowing it was a risk, I bought a mid 2012 MacBook Pro 13-inch from an auction, replaced the cracked screen, installed a 1TB hard drive and 16GB of RAM. The result? A terrific laptop – fast as you like and my outlay was less than £550. A bargain!

Now updated to Sierra, the sole remaining issue was Time Machine –



If you've got the skills then buying a broken Mac and repairing it is a cheap route to ownership.

it just wouldn't work. Self-help got me nowhere so eventually I went to Apple Support, expecting "No, not any more, out of warranty". Expecting to be told to go away, my case was escalated to advanced support, and solved after a couple of tries (by removing a corrupted document). So, I am really writing to thank the Apple Support team (and StephanieB in particular). Great job, I'm a happy camper.

by ANDY WILSON

GRAHAM SAYS... Always nice to hear a story of good customer support from Apple, Andy. The strong after-sales support is one of the main reasons that people go the Apple route.

What do you think?

WHAT WAYS DO YOU THINK THAT APPLE CHANGED THE WORLD?

> This issue the team debated all the unexpected ways Apple changed the world, but what do you think? Did we pick the right ones? Let us know your favourite world-changing Apple moment and you could be featured in next issue's Contacts page! **Missed it? Turn to p76**



Mac FORMAT

INVESTIGATES

The future of the iPhone

With sales stumbles and innovative rivals, could the iPhone go the way of the BlackBerry? **WRITTEN BY ALEX BLAKE >**

Apple's money-making ability is legendary. In 2016, the firm made a staggering \$44.9 billion in profits, making it the most profitable company in the world. In fact, it took 79% of all smartphone profits in that time, despite only holding a 14.5% market share. If there's a secret code to making money, Apple has cracked it.

And, as that market share figure indicates, Apple has achieved record financial successes despite selling fewer phones than some of its rivals. You would think this would be an indication of Apple's rude health, but not everyone sees it that way. People have been predicting the downfall of Apple in the smartphone world for some time now – do they indeed have a point? We dived in to see if Apple's iPhone dominance could be about to falter.

No Steve Jobs

For all of Apple's record profit-making in the Tim Cook era, there are still grumbles – some of them quite loud – about his leadership. He's no Steve Jobs, they say. They compare the removal of the iPhone's headphone jack to the advances under Jobs' watch (slightly unfairly, perhaps) as a sign that Apple doesn't innovate any more.

Long-time Apple watcher Joe Wilcox put it this way: "Much of the 'Ah-ha!' moments during a Jobs' One More Thing unveiling –

Apple might
find itself too
far behind its
rivals to be able
to catch up



Apple's iPhone launch had a major impact on BlackBerry sales.

and user experience that followed – sparked the 'you didn't know you needed [it]' realization. Is that really the emotional reaction to an over-sized tablet or new features like 3D Touch? Honestly?"

He's not the only one who has concerns about the iPhone's future direction. Renowned developer Marco Arment famously suggested that Apple could go the way of BlackBerry if its rivals' gambles on artificial intelligence (AI) proved successful.

Smart and intelligent

Google, Facebook, Amazon and more are pouring money into AI, while Apple – though not totally absent – hasn't made headlines in quite the same way. But Arment highlights Google as being particularly strong in this field when it comes to things like "search, relevance, classification, and complex natural-language queries" that he feels will be hugely important in the coming years. In his words, Apple's competitors are "far ahead of them, and the gap is only widening."

Arment says that BlackBerry didn't fail because it made bad phones, but because the purpose of a smartphone changed when Apple released the iPhone. Similarly, if AI suddenly becomes integral to smartphones, Apple might find itself too far behind its rivals to be able to catch up, despite being very good at making smartphones at the moment.

Of course, for the time being this is

For our latest
subscription offer
see page 46!





speculation on Arment's part, but it highlights the recurring fear among Apple watchers that the company isn't innovating enough under Cook's tenure as CEO.

The iPhone SE is Apple's budget offering, but it still costs almosts three times the price of a budget Samsung model.

An Indian summer?

Also of note is the iPhone's recent sales stumble. Revenues from iPhone sales fell for the first time ever in 2016, where sales in quarters 2, 3 and 4 were all lower than their 2015 counterparts. Of course, we're not talking dramatic slumps or freefall losses, but it was a striking turn for a product that has known nothing but growth since it launched.

Sales have since recovered well, but the incident indicated that the iPhone is perhaps not as resilient as was first thought, and that sales – at least in Apple's key markets – will not always be so strong. That's potentially a worrying sign for Apple, as iPhone sales make up around two-thirds of its revenue at present. If the iPhone falters further, the company's dominant financial position could come under threat.

Apple's rivals have already begun to look elsewhere for growth opportunities, and Apple is no different. The consensus among many smartphone pundits is that India is the prime location for expansion.

The country recently outstripped the

Apple only
ships around
2% of Indian
phone sales
at present

US to become the world's second largest market for smartphone sales, sitting only behind China. However, the average price of a phone in India is expected to be around \$102 in 2018; most iPhones sell for many times that. With its expensive, premium products, Apple may be poorly positioned to take advantage of India's huge potential for growth.

In order to boost sales in India, Apple may be forced to introduce lower-priced iPhones like the iPhone SE. That could eat into its huge profit figures, eroding the advantage it currently has despite not selling as many smartphone units as its rivals.

It's already tried importing and selling refurbished iPhones in India, but that was rejected due to an Indian law that requires products to source 30% of their materials locally. That law was relaxed in June, and Apple will start making iPhones in India this year, according to *The Hindu* newspaper.

But is it too late? Apple only ships around 2% of Indian phone sales at present. In a country deemed to be the next explosive market for smartphones, that could spell

Apple makes premium products at premium prices. But should the smartphone giant be increasing its sales by offering more budget options?



trouble. Even if everything falls into place – it starts making iPhones in India and opens its first Apple Store in the country – its premium price tag and refusal to lower it may still work against it.

Crucially, the Indian phone market is led by Samsung, Apple's bitter rival. Market analyst Tarun Pathak at Counterpoint Technology Market Research estimates that of the 85 million phones Samsung has sold in India, 25 million – almost a third – are from its budget-friendly Galaxy J range. Apple has no comparable device; its iPhone SE sells for almost three times the price.

And if Apple can't take advantage of the Indian market in the way its rivals are, its smartphone dominance may start to slip.

Cook's recipe for success

Still, while Apple hasn't yet cracked India, it has a lot going for it. For one thing, it has at its helm a man whose flair for supply chain management has led to him being labelled an operations "guru" and a "genius".

While Jobs was the company visionary, Tim Cook (as Chief Operations Officer under Jobs) helped to forge Apple's legendary profitability. "Cook's control over day-to-day operations shaped what would become the financially ginormous tech titan that marvels the industry today," states Wilcox. So even though it has barely any presence at all in India, Apple

The budget-friendly Galaxy J range is hugely popular in India.



Tim Cook helped to forge Apple's legendary profitability



has the supply chain clout and experience to potentially overturn this deficit.

It's strong in other areas, too. In the words of *International Business Times* writer Rishabh Jain, "With its own operating system, an app store, its own manufacturing supply chain and most importantly, a huge and loyal customer base, Apple easily trumps every other smartphone company in terms of profit. Apple's image as a premium device maker and the desirability of its devices has gone a long way to put the company at the top." That won't change any time soon.

One positive indicator of Apple's iPhone fortunes is the app economy. As we show on page 82, this has been an unprecedented success story for Apple, generating as much as \$5.4 billion in Q4 2016 alone.

All in the numbers

As well as its huge financial payouts, the App Store serves to tie users in to the iOS ecosystem. If you've paid for a load of apps and are used to working with them, that might make you reluctant to switch over to Android. If Apple can keep people in its iOS ecosystem and buying new iPhones, that can only be a good thing for the company.

And let's not forget China, the world's biggest market for smartphones. Apple sold 44.9 million iPhones in China in 2016 – that's down from 2015 sales of 58.4 million, but, given Apple's phenomenal profit margins, would still have brought in a huge amount of money. The sheer number of smartphone consumers in China means that even if Apple finishes in fifth place in terms of sales (as it did in 2016), it can still make huge profits –



Apple is remaining surprisingly quiet on the subject of AI. As other smartphone manufacturers continue to make developments, is Apple at risk of falling behind?

Apple is hardly operating from a position of weakness... but it needs to be working on AI right now

Though not well known in the West, Oppo outsold all other smartphones in China over the course of 2016.



The iOS ecosystem is a significant factor in consumers staying loyal to the Apple brand.

There are reasons to be concerned when looking in from the outside, but Apple has always been a company that keeps its cards close to its chest. It's working to make up its shortfall in India, and may well be cooking up something that changes the smartphone industry in the way the iPhone did in 2007.

Perhaps the only significant concern when it comes to smartphones is AI. Marco Arment makes the point that "Becoming a major big-data AI services company doesn't happen completely in secret and suddenly get released to the world, completed, in a keynote." Apple needs to be working on this right now, and that's hard to conceal; we've seen no major signs yet.

If the AI gamble Google and others are taking proves lucrative, Apple's smartphone dominance may be at risk. But the thing about gambles is that they don't always pay off - if this doesn't, Apple has little to worry about.

the economy of scale means it doesn't even need to be number one.

Money-making machine

Speaking of huge numbers, there's also the scale of how much money Apple makes from iPhones globally, which we alluded to earlier. According to Bloomberg's Shira Ovide, Apple and Samsung have been dominant for a long time. She cites Mike Walkley, market analyst at Canaccord:

"According to his data, since early 2012 - practically an eternity in the smartphone business - Apple and Samsung together have generated 100% or more of all operating profits among makers of premium-priced smartphones." That figure works out because all other smartphone manufacturers have either just broken even or lost money.

Apple is hardly operating from a position of weakness. It may have some significant challenges on the horizon, but if there's one thing it 'gets', it's selling smartphones.





MATT BOLTON...

ON THE EVE OF ITS 10TH ANNIVERSARY, THE IPHONE IS IN DANGER OF FALLING BEHIND FOR THE FIRST TIME

The iPhone has led the pack ever since its introduction. When it was announced in January 2007, Steve Jobs called it a “revolutionary and magical product that is literally five years ahead of any other mobile phone.” In fact, Apple wasn’t just ahead of the competition in terms of design, but in thought process too. Even upon its release, the likes of RIM and Nokia still saw it as a novelty for a small market, not likely to eat into their customer bases. But the iPhone devoured all. Only Google saw the *Independence Day*-like shadow coming from the iPhone as the danger it was, and immediately changed development of its nascent Android OS to ape the iPhone (rather than the BlackBerry-alike it was until then).

Since then, every time the others have caught up to the iPhone, Apple has pulled away again. The quality of plastic cases was improved, then Apple moved to metal and glass.

Resolutions increased, then Apple showcased 300+dpi Retina displays. Cameras got better, then Apple included a DSLR-level image processor. Processors got faster, then Apple made its own that crushed the competition.

Except last year. The iPhone 7 is Apple’s best iPhone ever, no doubt, with improvements all over the

place, but it wasn’t a big design leap forward. Whereas normally after its September event, competitors look through the cloud of dust to see the iPhone streaking over the horizon, here they saw it sauntering down the street at a leisurely pace.

No matter how waterproof or Jet Black it became, or how many cool internal features were added, there was no denying that the iPhone 7 was essentially the same design as the iPhone 6, released two years before – and we knew this design would be around for at least a year.

The result is that the competition has not only caught up, but is starting to stride ahead. The new wave of phones come with striking designs and really

The iPhone 7 was hardly a jaw-dropping reincarnation. Let’s hope for more significant steps forward in 2017...



With other manufacturers upping the ante and making impressive technological advances, Apple needs to start calling the shots again with its next iPhone release.

cool features. Near edge-to-edge displays that offer high dynamic range and even 4K. Slo-mo recording at 960fps (though I bet you’ll see this in the next iPhone). 20-megapixel dual Leica-engineered cameras. And that’s before Samsung announces its next flagship.

The simple truth is that, if we get an iPhone 7S this September rather than a full-on iPhone 8, Apple not only won’t pull away from the pack, it won’t even be at the front when it comes to design. Of course, the overall experience will still be great, but I’d be concerned about an Apple that doesn’t lead on experience *and* design. As Steve Jobs said, “Design is how it works.” Any Apple product that stagnates in its design is stagnating at its core. And looking at Apple’s line-up across the board in the last year or more, this could apply to way too many products for comfort.

I hope that 2017 is the year Apple reveals it’s been saving energy for a sprint, and it retakes its place at the front.

ABOUT MATT BOLTON

➤ Matt is the editor of Future’s flagship technology magazine *T3* and has been charting changes at Apple since his student days. He’s sceptical of tech industry hyperbole, but still gets warm and fuzzy on hearing “one more thing”.

When a product stagnates in its design, it stagnates at its core, too





Did you know that European forests, which provide wood for making paper and many other products, have grown by 44,000km² over the past 10 years? That's more than 1,500 football pitches every day![†]

Love magazines? You'll love them even more knowing they're made from natural, renewable and recyclable wood



[†]UNFAO, Global Forest Resources Assessment 2005-2015.

Two Sides is a global initiative promoting the responsible use of print and paper which, when sourced from certified or sustainably managed forests, is a uniquely powerful and natural communications medium.

There are some great reasons to [#LovePaper](#)
Discover them now,
twosides.info





APPLE IN QUOTES

STEVE JOBS
apple.com

“I’ve never met someone who knows technology who knows how to connect with people.”

Jobs thought Genius Bars would never work, but later changed his mind

JONATHAN ZDZIARSKI
zdziarski.com

“Privacy is sacred; our digital lives can reveal so much about us.”

Security expert joins Apple to work on privacy issues

TONY CHRISTOPHER
landmarkusa.com

“Steve Jobs... was looking for a way to connect Apple to its customers.”

Designer recounts Jobs’ ‘Apple Café’ idea - later replaced by Apple Stores

LUCA MAESTRI
apple.com

“The App Store is doing incredibly well, the quality and quantity of content continues to improve...”

Apple Chief Financial Officer is pleased with the App Store’s performance

APPLE CORE Split View

SPLIT VIEW

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

SUBSCRIBE TODAY!
SAVE UP TO 83%!
Turn to page 46

“DO YOU THINK 4K WILL JUSTIFY BUYING A FIFTH-GEN APPLE TV?”



Jo says...



Paul says...

I'd have to know what kind of price point it'll come in at - you know, Amazon's Fire TV supports 4K, and that's just £80. 📺 🔥

Yeah, but the storage doesn't really compare, and you get all the benefits of Apple compatibility - being able to play stuff I've bought on iTunes is great. 📺 👍

But the last incarnation was not much of a leap. The Apple TV needs 4K support as a bare minimum offering in the next upgrade. You can shoot 4K on your iPhone 6s 📱, but you can't play it in 4K through Apple TV!

Granted, that's a frustration, but I haven't actually made the upgrade to a 4K TV 📺 yet, so that's a moot point!

Personally, I don't think I'd upgrade for the 4K feature alone, especially if we're still talking over £100. Apple still needs to think where the Apple TV sits when it comes to gaming too... 🎮 😞

I've heard rumours of more storage options, so the entry level one might turn out to be pretty affordable. If the next Apple TV comes with an A10 chip and 4K, then I'll definitely be tempted. 😊



Siri...ously?



'You can adjust many of the vision settings.'

“I can't see the wood for the trees, can you help?”

tap to edit



Recycle your magazine and seven days later it could come back as your newspaper.



The possibilities are endless.

www.recyclenow.com

Mac Spares & Repairs

- New & recycled parts for your Mac, iPad and iPhone
- Next day UPS delivery
- Trade discounts
- Refurbished Macs with 3 month warranty
- Repair service, uk-wide collection

thebookyard

thebookyard.com

08456 800 256

mac2cash.com

Turn your Mac to cash in 48 hours!

Quote → Collect → Inspect → Pay

Just enter your serial number for an instant quote ...

Fast Simple Safe

We buy working and faulty Macs, iPads & iPhones. Free collection.

Brought to you by thebookyard

Slash your internet, TV & phone bills!

One quick call.
Thousands of deals.

We do the hard work for you:

- 1 Call free and speak to our London based impartial experts.
- 2 We review over 6,000 deals from the top UK providers to find the right one for you - with our Lowest Price Guarantee.
- 3 Our experts do the hard work, answer your questions and even arrange your installation!

We're proud to be the only service to be accredited by Ofcom for TV, broadband and home phone comparison



LOWEST PRICE GUARANTEE

Save up to **£408*** per year

83%* of our customers save

Freeview

plusnet

sky

orange

O₂

BT

Virgin media

Primus saver

TalkTalk

Call us free and we'll do the hard work!

0800 466 1053

www.techradarstores.co.uk/digitalsave Or text "DEAL" to 8 1400 and we'll call you

Experts available:
Monday-Friday 8am-8pm,
Saturday 9am-5.30pm,
Sunday 10am-5.30pm

simplifydigital

*20% of Simplifydigital customers received an average saving of £408. Data based on 1,538 records between 1st of Jan 2010 to 8th Nov 2010. ** Out of 445 consultations between 01/01/2010 and 03/05/2010, 368 Simplifydigital customers saved money by signing up to our recommended deal. Lowest Price Guarantee Terms and Conditions apply - see www.simplifydigital.co.uk/lowest-price-guarantee for full details. Standard SMS network charges apply.

BUY, FLY AND EVEN MAKE YOUR OWN DRONE



NEW TECHLIFE  HANDBOOK FROM THE MAKERS OF **T3**

THE COMPLETE GUIDE TO DRONES



148
PAGES OF KIT TUTORIALS & TIPS

OUT NOW!

 <p>WHAT TO BUY The best new drones</p>	 <p>HOW TO FLY In-depth tutorials</p>	 <p>MAKE MOVIES Awesome video & stills</p>	 <p>GO DIY Build your own drone</p>	 <p>PRO TIPS Get your licence</p>
---	---	--	--	---

DELIVERED DIRECT TO YOUR DOOR

Order online at <https://www.myfavouritemagazines.com>
or find us in your nearest supermarket, newsagent or bookstore!



What's inside

25-29

SMART SENSORS

> Check out smaller but no less important parts of a truly smart home

28

MIX & MATCH

> Use HomeKit as a hub for a mix of security combinations

29

FIVE OF THE BEST

> Discover the best security products for your Apple home



Contact us

> Email your queries and your questions to letters@macformat.com

> Keep up to date by following us on Twitter @macformat

> Join the conversation at [facebook.com/macformat](https://www.facebook.com/macformat)

> Get the latest subscription offers at macformat.com

APPLE HOME

EDITED BY **CLIFF JOSEPH** >



LIVE SMARTER

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

Cameras aren't the only option for protecting your home; there's a range of devices that you can use to create your own DIY security system



Last month we looked at the huge explosion in sales of security cameras, which are now far and away the most popular products in the entire smart home category.

But for many people a camera is just the starting point from which they can build a more extensive home security system. You can extend your security coverage with additional sensors that can detect movement in darkened rooms, or

someone opening a door or window when you're away from home. You can buy sirens to scare off intruders, or provide additional protection for your home with water and smoke sensors that can warn you of fires or floods.

These sensors aren't all that expensive either, so you can mix and match devices to build your own personal security system, or buy an affordable starter kit that includes everything you need in a single box.



You can buy complete security kits, or go for a hub that works with various accessories.



Get started with Home Security

Security cameras are increasingly popular, but you can expand your home security system with these affordable sensors and starter kits

What is a contact sensor?

> A contact sensor is actually two sensors that work together to protect doors and windows. One sensor is attached to the door/window, while the second sensor is attached to the frame.

When the door/window is closed, the two sensors are in contact - but if the door/window opens the contact is broken and the sensor sends you an alarm.

What about locks?

> Old-fashioned locks are obvious candidates for smart tech.

However, August Home - a leader in the smart lock field - tells us that US locks aren't always suitable for the European market. The best bet here in the UK is Yale, with its Keyfree and Conexis range of locks (yale.co.uk).



A security camera is the ideal starting point for your home security system, but even the most advanced cameras have

their limitations. A camera can only look out for activity in one specific room or location, and even cameras that have a night vision mode can only see things a few metres away once it gets really dark. You could buy additional cameras to cover other areas - but with high-quality cameras costing £120-£200 each that can quickly turn out to be very expensive.

But cameras aren't the only security option available for the smart home. Once you've got a camera you can also purchase a number of other security devices, such as motion sensors that can detect movement even in dark rooms, or contact sensors that can tell when a door or window has been opened. As well as helping to monitor areas that might not be easily visible to a camera, these sensors are generally a lot cheaper, so you can buy several to cover different rooms around your home.

Security matters

Like a security camera, a motion sensor or contact sensor can connect to your home Wi-Fi network and send an alert to an app on your iPhone if it detects any suspicious activity. But while you can generally buy any camera and quickly set it up to work with your iPhone, these other types of

security sensors rarely just work on their own. In most cases they are specifically designed to work in conjunction with other devices made by the same manufacturer.

If you own Netatmo's popular Welcome camera (£199) then you can use the Welcome to control additional 'tags' that monitor doors and windows (and also the company's forthcoming Security Siren). The tags are well priced - just £90 for a pack of three - but they don't work on their own, so do you have to budget for the Welcome camera as well.

Once you've got a camera, you can purchase motion or contact sensors, too

When you're starting from scratch, the cheapest option is probably to buy a starter kit that includes a number of different security devices. If you don't already own a camera, you could consider D-Link's Smart Home Security Kit, which costs £215, but includes a security camera along with an ear-splitting siren, and one contact sensor for a door or window. Panasonic really goes to town here, offering a range of kits that contain different combinations of security cameras, sensors and sirens. Prices start



Explained

PIR

➤ Some motion sensors can detect sound and vibrations, but most affordable home sensors tend to use PIR technology (Passive Infrared), which can detect infrared light emitted from the warm bodies of people or animals. This allows them to monitor darkened rooms where ordinary cameras may not work very well.

APPLE HOME Security Series



Are there any hidden costs?

> Many motion sensors and contact sensors are sold on their own - but will often require a control hub in order to work properly. That's why it's often better to buy a starter kit that already includes the control hub. And, as we discovered last month, some security cameras require a monthly subscription if you want to store your video recordings online.

Mix and match?

> Apple's HomeKit software, and the Home app in iOS 10, can allow products from different manufacturers to work together - so your D-Link Omnia camera can see you arrive home and automatically turn on your Philips Hue lights. Unfortunately, there aren't many security products that currently support HomeKit, so it's probably best to stick with products from a single manufacturer when you're first getting started.



The Netatmo Welcome camera is quite costly, but you can get three additional tags for £90.

at £129 for a basic kit with one motion sensor and one contact sensor, and go right up to £380 for a comprehensive Home Monitoring Kit Twin Camera Kit that includes two cameras - one for indoors, and a weatherproof camera for outdoors - along with two contact sensors, a motion sensor, and a smart plug that you can use to turn your lights on to deter intruders.

Samsung takes a different approach with its SmartThings Starter Kit (£199). The SmartThings kit doesn't include a camera, opting instead for a motion sensor, a contact sensor, smart plug, and a 'presence sensor' that you can attach to a key ring or an item of clothing so that it can tell you when a child or other family member arrives or leaves home. If you do want a camera, the SmartThings kit can be used to control Samsung's separate SmartCam HD Pro (£129), and Samsung has done a good job of working with other companies - pay attention, Apple! - to make their products compatible with SmartThings. There are security cameras from both Netgear and D-Link that will work with the SmartThings kit, along with some of the latest smart locks from Yale, Philips' Hue lights, and even multiroom speaker systems from Bose.

Regardless of manufacturer, one thing these kits have in common is the inclusion of a central control hub that connects to your home router and links the different security devices together. Once you have the hub set up you can extend your home security system by purchasing additional sensors - typically for £30-50 each - and



Samsung, D-Link and Panasonic all provide a good selection of add-on sensors, including motion and contact sensors, sirens, and also smoke and water detectors that can provide additional protection against floods and fire.

Devolo sells a starter kit, although this isn't entirely focused on security. However, you can buy its hub - called the Home Control Central Unit - for £110, and then build your own mix-and-match security system by choosing from the company's selection of standalone components and sensors.

The odd man out here is Elgato, with its Eve Motion (£45) and Eve Door And Window (£35) sensors. These are affordably priced and - unlike most of their rivals - they don't require you to buy a separate control hub from Elgato in order to use them. The catch here is that they use Apple's HomeKit software, so you do need to have an AppleTV or iPad set up at home, which effectively acts as the control hub for the sensors instead. So while a security camera is still the best place to start, there are plenty of options available that allow you to extend your security system to cover key rooms and locations around your home even on a quite modest budget.

Once you have a central control hub set up, you can extend your home security by adding additional sensors



iFacts...

198,706

Burglaries recorded by police in the UK, for the year to September 2016. (UK Office For National Statistics)

3%

That 198,706 total is actually an increase of 3% from the previous year. (ONS)

79%

The good news is that the majority of crimes in the UK result in 'minor or no injury'. (ONS)

34%

Home owners in the US still think a dog is the best security option. (August Home)

FIVE OF THE BEST

We recommend the best security products for your Apple Home >



D-Link Omna 180
£200

dlink.com

> D-Link supports Apple's HomeKit software. As well as providing 1080p resolution, night vision, and a 180-degree wide angle lens, the Omna 180 can be used to control other HomeKit-compatible devices, such as Philips Hue or Elgato sensors.



Netatmo Tags
£90

netatmo.com

> These contact sensors provide a quick and easy way of extending the Netatmo Welcome security system. You need the Welcome to control the tags, but three tags for £90 means you can cover a number of locations.



Panasonic Home Monitoring Twin Camera Kit
£380

panasonic.com

> This kit includes two cameras - one for indoor use, one for outdoor use - along with two contact sensors, a motion sensor, smart plug and control hub. There's an iOS app, but the kit also includes a 'remote control' handset.



Samsung SmartThings Starter Kit
£199

samsung.com

> Samsung's starter pack provides motion, contact and presence sensors, and a smart plug. There's no camera, but the kit is compatible with other manufacturers' products, so it's a good option for mix-and-match security.



Yale Conexis L1
£270

yale.co.uk

> There aren't many smart locks available in the UK just yet, but Yale's Conexis range is a good start. You can unlock the L1 just by turning your iPhone like a key, and the Yale app also allows you to send digital keys to other family members too.



13 PORTS. ENDLESS

OWC THUNDERBOLT 3 DOCK

Thunderbolt 3 Dock delivers more connectivity, more power, and more charging capability than ever before — all at the fastest speeds possible today. Drive two 4K displays, connect and charge up to six USB devices, work with legacy FireWire devices, enjoy pristine audio, wired networks, and read SD cards, all at speeds up to 40Gb/s and all through a single cable. The possibilities are endless.

Pre-order yours today from these fine retailers: _____

Macupgrades.co.uk

macupgrades.co.uk



mrsystems.co.uk

academia
the technology group

edu.store.academia.co.uk



SS POSSIBILITIES.



SD Card Reader
Expanded Analog Audio In/Cut
USB 3.1 Gen 1



USB 3.1 Gen 1
S/PDIF
FireWire 800
Gigabit Ethernet
Thunderbolt 3 ports
mini DisplayPort

SPRING
CLEAN
SPECIAL!

DETOX your Mac

Nate Drake shows us how to
cleanse our operating systems and
revitalise slow-performing Macs



Unlike certain other operating systems, macOS is built extremely efficiently and does not need to be 'defragmented' to keep ticking over nicely.

However, as with every machine, Macs sometimes experience performance issues. In this guide, we will explore some common problems along with ways to clean out unnecessary files to speed up macOS.

If you're reading this guide, congratulate yourself on deciding to investigate further rather than assuming that there must be a hardware defect with your Mac or that you have a virus.

Hardware faults and malware can cause your system to perform poorly but it is much more likely that this is a problem you can solve from the comfort of your own home without installing any additional software.

Before following any of the steps in this guide, try to focus on the issues you've been experiencing. Does the system perform slowly, for instance, only when you open a particular video game but work fine when you're playing

videos in QuickTime? If so, the issue may relate only to that particular application.

If your issues relate to apps using the internet such as FaceTime, try to test with another device to see if the problem lies with your home internet connection rather than the Mac itself.

Once you're satisfied that the issue relates to macOS as a whole, feel free to follow the steps in this guide. If at all possible, we recommend that you back up your data first.



With this guide, you can make sure your Mac is as clean and tidy as your workspace. (Piles of paperwork just out of shot.)



Spring cleaning

Safely remove the clutter of redundant files from your Mac



Although macOS is very efficient in terms of using files, over time temporary data and third-party software can affect

the speed of your system. These are the most common culprits when it comes to poor system performance. You may wonder how you can fix such issues if the files and apps causing the problems are still being accessed in macOS? The answer is safe mode – a special way of starting up your Mac whereby macOS will only load software which was originally installed.

The safety of safe mode

In addition to preventing third-party apps from launching, safe mode will check your hard drive and try to repair corrupted files. It will also try to delete unnecessary system and kernel caches.

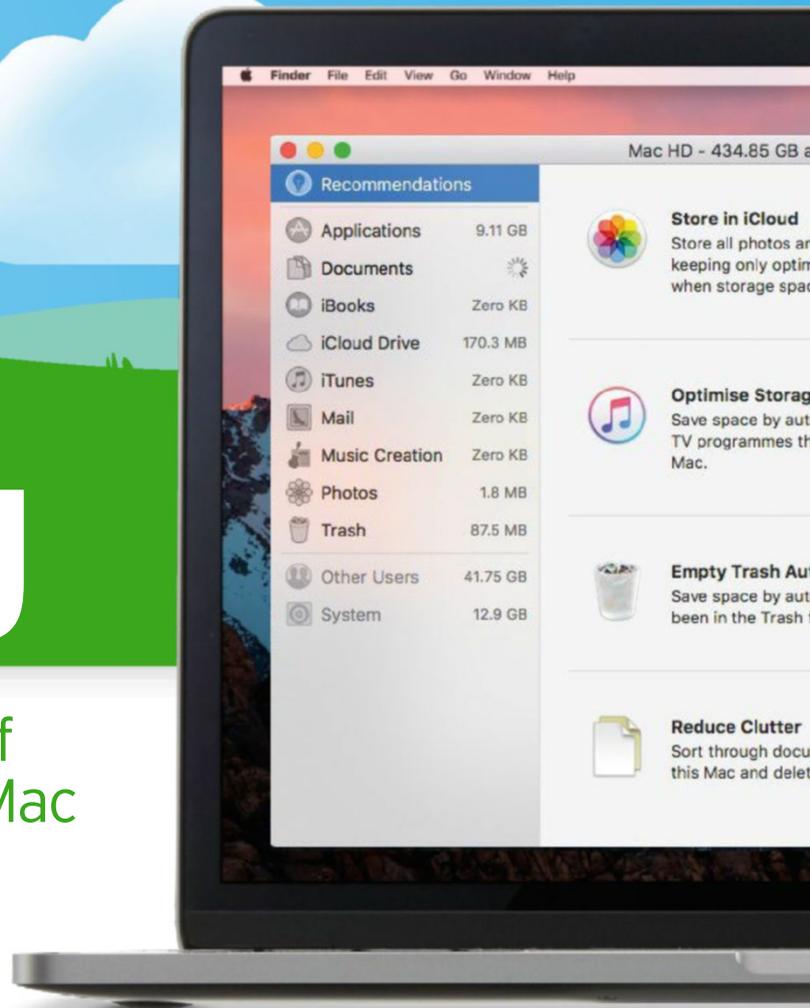
This guide assumes you are running the most recent version of macOS Sierra which has special options for configuring file storage. If you have not yet upgraded to Sierra, you can do so from the Mac App Store. To get started, shut down your Mac. When the Mac is fully powered off, press and hold down **⇧** until you see the login window. Log in as normal. Note that if you have used FileVault to encrypt your disk, you may have to do this twice.

You will see a small, grey loading bar inching across the screen. This shows that the system is entering safe mode. If macOS needs to repair your disk or there are a large



The grey loading bar will appear when you start safe mode. It may take some time for macOS to load.

Click on Storage then Manage – the options here help you to streamline your file storage to free up space

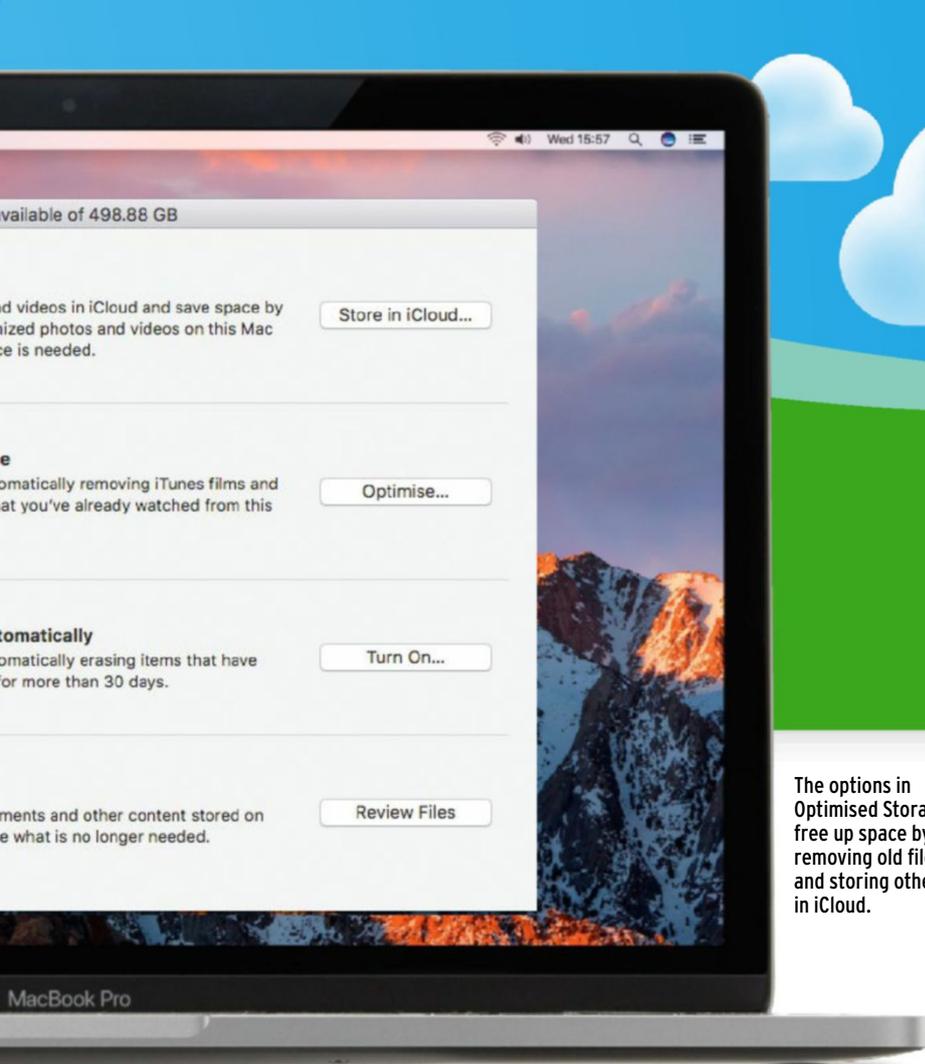


amount of cache files to clear, this can take some time, so be patient.

When the login screen appears, you will see the words ‘Safe Boot’ in the menu bar. (Safe mode and safe boot are different names for the same thing). Log in to your own account as you would normally. Safe mode only uses very basic graphics drivers, so don’t worry if you see flickering on your screen. Once you’re on the desktop, click the **⌘** and choose About this Mac from the menu bar. Next, click on the Storage tab, then the Manage button. The options in this window presents several ways to save storage space.

Click the button next to Store in iCloud. You’ll see an option here to optimise your files in the Desktop and Documents folders, meaning it’ll put those folders and their contents in iCloud Drive. This makes them accessible on all devices on which you can access that storage area. This will save space on your hard drive, but will only improve performance if you have a reliable, fast internet connection. Remember that your iCloud account only comes with 5GB of free storage, and it could take a long time to upload everything.

Click Optimise Storage to remove watched films and TV shows; you can



The options in Optimised Storage free up space by removing old files and storing others in iCloud.

keeping regular Time Machine backups.

The final option, Reduce Clutter, identifies large files you may no longer need. Click Review Files to see an itemised list of files. You can hover over files either to delete them or show them in the Finder. While this is a quick and easy way to delete large amounts of data, be careful not to remove anything important. Run a Time Machine backup before removing files. Some files will have an X next to their name – click this to send them to the Trash. Other files may be part of an app, so may need to be deleted from there.

If a file or folder is taking up large amounts of space but you need it, such as your iTunes Library, you may be able to store it online or on an external drive.

Another culprit for hogging space is your Downloads folder. Items in here have been downloaded from the internet so are almost certainly replaceable. Click the Downloads tab to view and delete items.

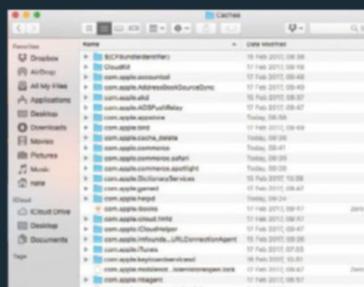
On the subject of apps, take a look at the items in the Optimised Storage window's sidebar that have data that's taking up lots of space. If you back up your iOS device to the Mac, click iOS Files to see if any large backups are taking up space. You may prefer to remove these and switch to using iCloud.

Go to System Preferences and click Users and Groups on the Login Items. Click on the padlock (bottom left of the window) and enter your password to allow you to make changes. This window details which apps start when you first log in to your account. Click on an app to highlight it and click the '-' button to remove unnecessary files. This doesn't remove the application, it just won't start up as soon as the desktop appears, which can improve system performance.

always download movies again. You can also choose only to download recent email attachments or better yet, only download attachments when you click on them. Click on the third option, Empty Trash Automatically, to delete files that have been in the Trash for over 30 days. Remember to

Cache in and clear up

Your Mac stores temporary files in cache folders. Apps can perform poorly while trying to access a corrupt or non-existent cache file. If so, you can manually clear cache folders. Doing so will not remove applications or cause you to lose personal data, but you should still make a Time Machine backup first. Open Finder and choose Go, then Go to Folder. Enter '/Users/yourusername/Library'. Open Caches; choose Edit > Select All. Delete the files. If the Mac has more than one user account, log in to each and repeat the steps. Choose Go again and then Computer. Double-click your startup disk then open Library and the Caches folder. Delete files there, too. Restart, then in Finder, choose File > Empty Trash.



The caches folders contain only temporary data so you can delete these files safely.



Keep your Mac healthy

Examine your apps and remove anything you don't need



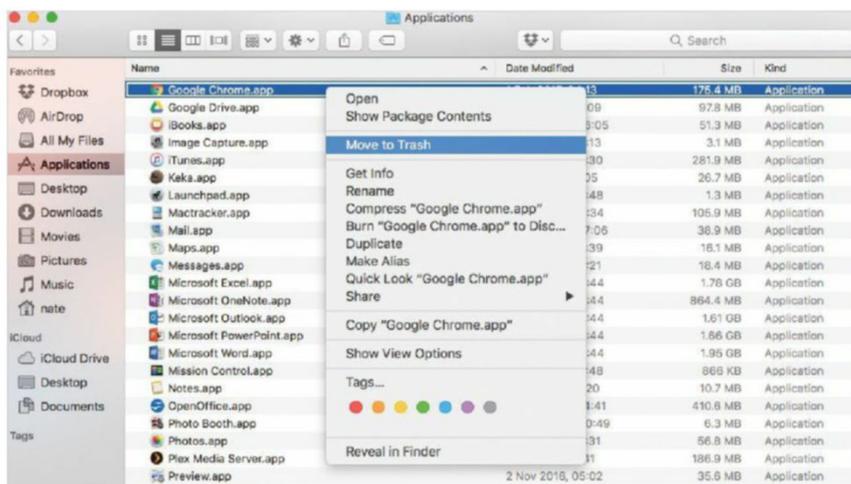
In the previous section, we explored ways to optimise file storage on your Mac by increasing the amount of free space available. This included

reviewing which apps are set to start up when you first log in to the macOS desktop.

There are applications which are available both from the Mac App Store and the internet at large which claim to automate the process of speeding up your Mac. Some of these simply automatically search for large files to delete and free up your caches, which we already did in the previous section.

People who make malware often prey on people's insecurities by disguising malicious apps that pretend to clean up your Mac but instead bog it down with junk. Even reputable apps, such as virus scanners, will sometimes cripple your machine with multiple 'threat

ctrl-click any app you no longer use and then choose Move to Trash.



detection' warnings about harmless files.

In view of the above, we do not recommend any third-party software to fix a slow Mac. You should examine the apps you already have installed to make sure that they're necessary – too many applications running at once is a common cause of poor system performance.

Back to safe mode

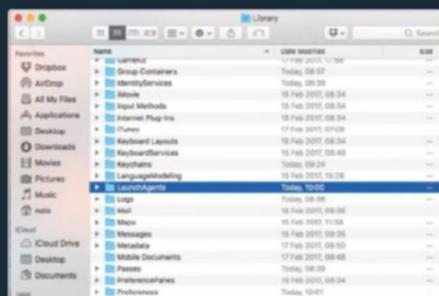
You cannot remove an application while it's running so, as in the previous section, make sure you start up your Mac in safe mode. If you're unsure if your Mac is still in safe mode, check System Information.

Removing an app doesn't necessarily remove all related files. For instance, removing GarageBand will not delete the sound library. This said, make sure to run a Time Machine backup before proceeding further in case you accidentally remove something of importance. Open your Mac's Applications folder. Carefully read through the list of apps. In general, the system will not let you delete any apps which are built in, such as Safari, but you can remove third-party ones.

Remove an application by clicking on it once to select it, then choosing File > Move to Trash. You should do this for any apps you don't recognise, or no longer use. You will be asked to enter your Administrator password when removing apps. Simply type it in, then press Return. When removing an app, head over to System Preferences to see if it has an entry there. If so, **ctrl-click** and choose Remove <name> Preference Pane.

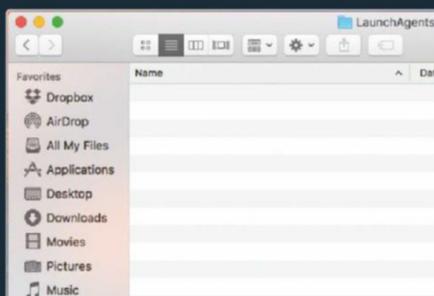
Watch out in particular for multiple applications that do the same thing. Some inexperienced users believe, for instance, that installing two antivirus apps makes you twice as safe. In reality, this offers no extra security and, in fact, can make your Mac go haywire as

HOW TO Prevent malware by clearing LaunchAgents >



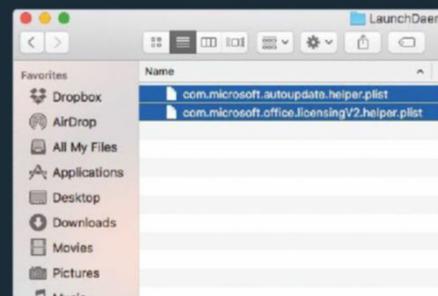
1 Clear the LaunchAgents Folder

In Finder, choose Go > Go to Folder then type '/Users/yourusername/Library'. If there's a folder named LaunchAgents, delete anything you don't recognise inside it. Repeat this step for each user account on your Mac.



2 Clear System LaunchAgents folder

In Finder, choose Go once again, then Computer. Double-click on your startup disk and then open the Library folder. Find the folder named LaunchAgents here and once again delete any unrecognised files inside it.



3 System LaunchDaemons & StartupItems folder

Click the back arrow (top left of Finder window); open the LaunchDaemons folder. Delete any unrecognised files; do the same for the StartupItems folder. Restart your Mac and empty the Trash.

the two apps interfere with one another.

Removing an application works like a charm as far as legitimate applications go but sometimes malicious apps can reside elsewhere on your Mac.

Sort startup apps

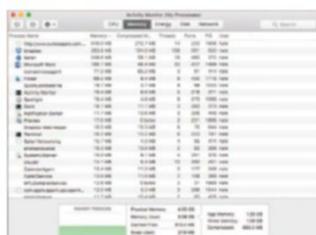
Although you previously checked the Login Items in System Preferences for apps which start up on boot, there are also several folders on the Mac hard drive which list startup apps. Go through the steps in the tutorial above to review and remove these if necessary. Doing so will not remove the applications themselves but simply make sure you have to launch them yourself from the Dock or from the Applications menu after log in.

After following these steps you may find that if you had antivirus software on your Mac, it no longer launches automatically.

This is not really a cause for concern.

Although it's not entirely true to say "Macs don't get viruses", most malware and viruses are written for Microsoft Windows.

While your Mac is unlikely to be infected, the antivirus software itself will take up large amounts of system resources when performing routine scans. Consider only launching antivirus when you need to scan individual files or uninstall it altogether. Remember that



Click on any process to select it, then the X button to kill it.

Removing a legitimate app is fine, but malicious apps can reside elsewhere on your Mac

provided you're keeping regular backups with Time Machine, even if you do accidentally download a virus, you can restore your system to a point before it was infected.

Using Activity Monitor

Once you have restarted your Mac, if your system is still running slowly. Click on the magnifying glass at the top right of the screen, type 'Activity Monitor', then press Return.

Activity Monitor lists all currently running processes. Click the Memory tab at the top of the window then the Memory column below to list apps, from those that consume the most memory, to the least. You can click on a running process to select it and click the X at the top left to stop it altogether.

Naturally, video conferencing with a friend over FaceTime will be more resource hungry than simply opening Calendar, so do not be surprised if certain apps hog more memory. However, if you believe an application is taking up too much memory, make a note of it so you can troubleshoot it further later on.

If the application is part of macOS, such as FaceTime, you may need to reinstall macOS to fix the problem, which we will cover later. If it is a third-party application, try removing it and reinstalling it. If this fails to speed up your system, try to find an alternative app.



Move your media

Consider keeping large files on an external hard drive



o, in general, the more free space you have on your Mac, the faster it will run. This is fine in theory but the Mac is made to be used. What if you

have a large music and video collection or thousands of family photos?

If you have a reliable internet connection, some of your data can be stored in iCloud. You have already seen how iTunes content you purchase can be removed after you play it.

If you are an Apple Music subscriber, you can also enable iCloud Music Library, whereby all your iTunes music can be uploaded and streamed over other devices. This is handy in terms of saving space as you can delete files locally from your Mac and redownload them as and when you want to listen to them. However, beware of doing this if the original on your Mac is of a higher quality than 256Kbps in AAC format; the copy stored in iCloud will be more compressed. This feature, however, is not always ideal. It doesn't work well with Family Sharing and certain content, such as home videos, can't be stored in iCloud this way.

A simpler solution is to store your entire iTunes library on an external drive. This gives you access to every single kind of media file even when internet is patchy. Follow the steps in the tutorial to do this. Only delete your original iTunes Media folder on your Mac once you're happy everything is working correctly.

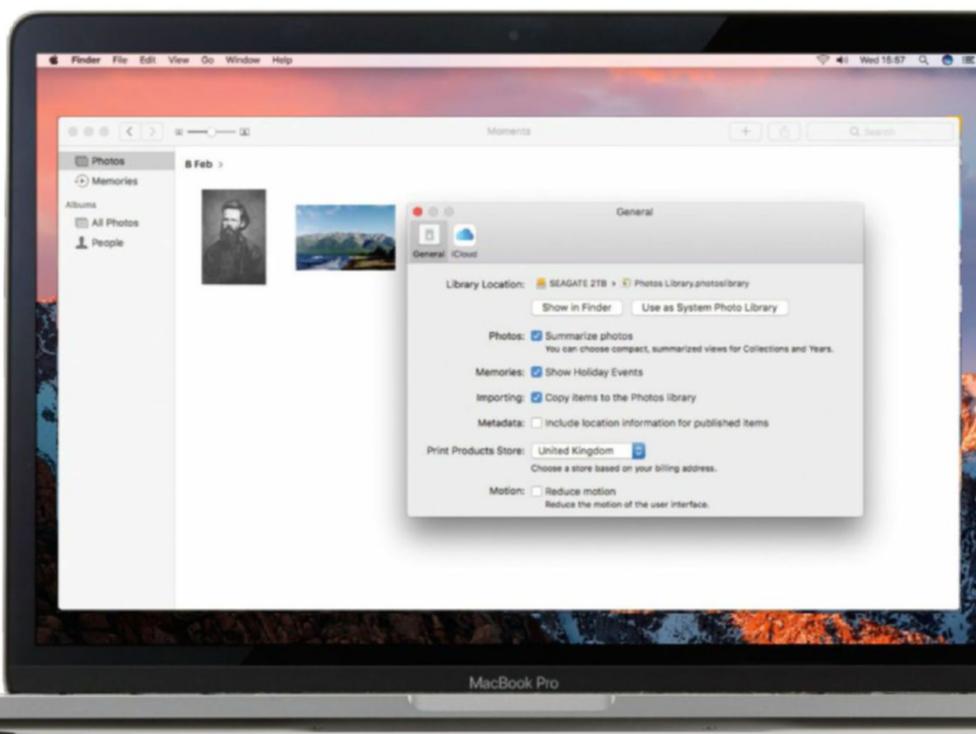
In order to proceed, you're going to need an external hard drive. The online Apple Store sells external drives that have been formatted for macOS but, in practice,

Open the Photo library from the external drive then select it permanently from Photos Preferences.

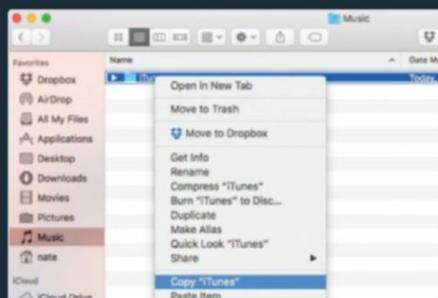
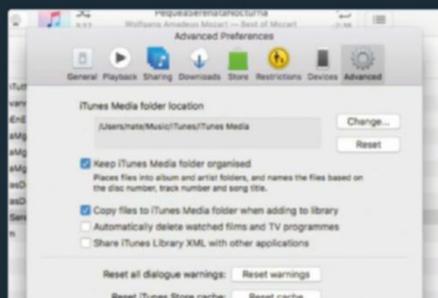
any USB 3.0 compatible external drive is fine, although you may need to format it first. See page 44 for help with this.

Do not be tempted to use the same external drive both for backing up with Time Machine and for storing your media. Time Machine deletes older backups as space runs out, so you don't want it to be vying for storage with your music collection. If you can afford it, purchase a drive which supports connecting via Thunderbolt, which is much faster than USB.

Once your iTunes collection has been moved, consider transferring other libraries to the drive as well. Your Photos library, which is found in your Pictures folder can be quickly and easily moved to an external drive by selecting Edit > Copy and Edit > Paste. Once the transfer is complete, double-click the new copy



HOW TO Store your iTunes library on an external drive >



1 Consolidate iTunes files

Open iTunes and click iTunes > Preferences. Click on the Advanced tab and make sure 'Copy Files to iTunes Media folder when adding to library' is checked. Click OK, then click on File > Library > Consolidate files.

2 Move your iTunes folder

In Finder, navigate to Music/iTunes in your account's folder. Click once to select the iTunes folder then **⌘-C** to copy it. Navigate to your external drive and choose Edit > Paste. Don't delete the original iTunes folder just yet.

3 Update iTunes

Open iTunes and click Preferences. In the Advanced Tab click on the Change button besides 'iTunes Media Folder location'. Navigate to the new iTunes Media folder on your external drive, and click Open.

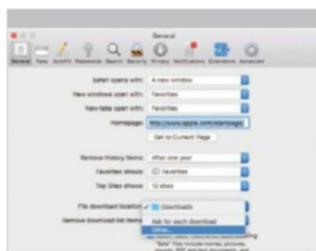
of the library then choose Photos > Preferences. The new photo library will be listed beside Library Location. Click on Use as System Photo Library to make this change permanent. As with iTunes, only delete the original library on your Mac once you're sure your photos are safe.

iMovie and Safari

The iMovie app, which is used for editing home videos can also take up huge amounts of space. Moving the library is very simple but first open the app itself and select your library from the Libraries list. Next Click File > Consolidate Library Media. This should make sure that any video clips, images and so on are stored within the library itself.

Next, quit iMovie and, in Finder, go to your account's Movies folder. Move the library in the same way as for the Photos app by using Edit > Copy, navigating to the external drive and choosing Edit > Paste, then double-clicking to open. Bear in mind that the original copies of any videos or images you imported into iMovie will still be in their original location, so you may need to delete these manually, along with the original iMovie library. As before, only do this once you're sure your media is safe.

By default, the Safari web browser on your Mac saves any downloaded content to your user account's Downloads folder. Over time this folder will grow in size, slowing down



Click File Download Location > Other to move future downloads onto an external drive.

your system. Fortunately you can change the location of your Downloads folder. Open Finder and navigate to your external drive. Choose File > New Folder. Name your new folder and press Return.

Open Safari and click Safari > Preferences. In the General tab, find File Download Location. Click Downloads, then Other. You can now select the new folder you created on the external drive. Click Open to select it. From now on Safari will store all downloads on the drive.

If you do choose to store content on the external drive, while this may speed up your system, remember that the drive must be connected at all times for you to access your content. This may sound obvious but if certain apps like Photos cannot access your library on the external drive they may create a local one in your account's folder with none of your personal data. If this happens, open the library on your external drive once again by double-clicking.

Remember that Time Machine does not, by default, back up external drives. You can change this by opening System Preferences, clicking Time Machine, then on Options at the bottom right. Highlight your external drive in the list and click the '+' button to include it in backups to your Time Machine drive. This may take up a lot of space so make sure your Time Machine drive has plenty available.

The Safari browser saves downloaded content in your home folder; over time this will slow down your system

Further tips and tweaks

Dig a bit deeper for more system-sapping culprits



With unnecessary files and apps removed and large files moved to an external drive, if there's still no noticeable improvement in system performance, there are further modifications you can make.

First, check for new system updates. You can usually do this by opening the App Store and clicking Updates. If you're having trouble with the Mac App Store, consider downloading a Combo Update directly from the Apple Support website.

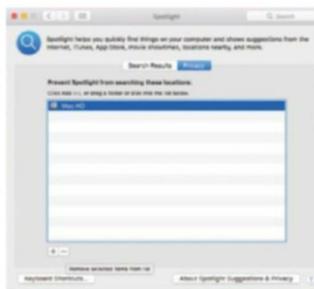
In the Spotlight

The Spotlight search feature – accessed by clicking on the magnifying glass at the top right – functions as a system-wide search engine. Each time you create or modify content, Spotlight ‘indexes’ it so you can find it later on. As handy as this indexing is, it can sometimes go awry. You also may not want to index certain folders for privacy reasons.

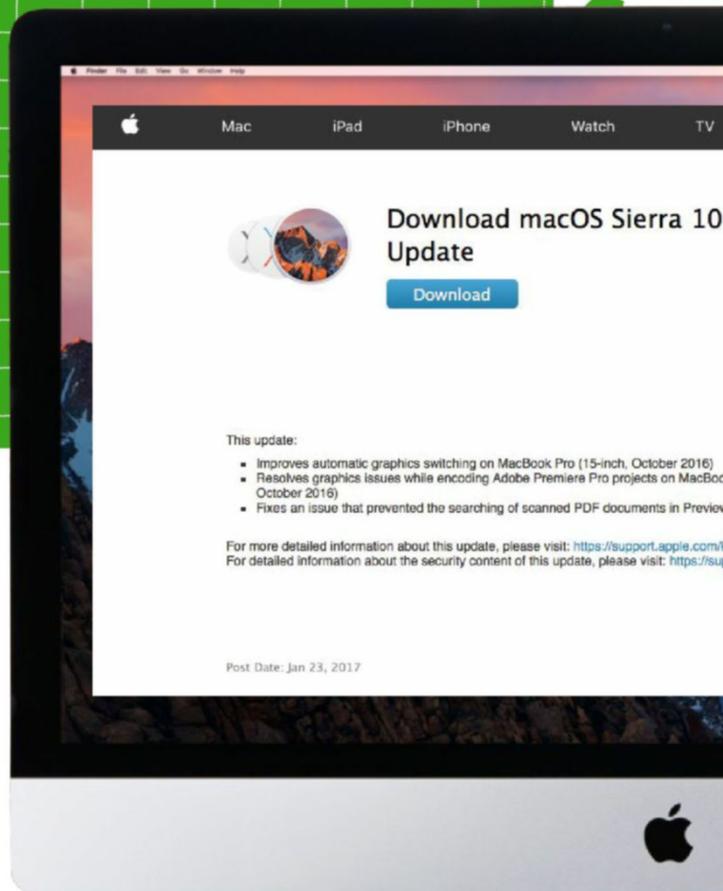
If macOS gets stuck reindexing files, this can slow down your system. Go to the Spotlight pane in System Preferences. Click on the Privacy tab to see locations which are excluded from indexing. Click the ‘+’ button and choose your startup disk, which is usually named Macintosh HD. You will see a warning message stating that this will disable the search feature. Click OK.

Select on your Mac hard drive in the Privacy tab and remove it from the list using the ‘-’ button. These steps force the Mac to ‘reindex’ your data, which can improve

If it's been a while since you updated, use a combo update to download all files in one go.



Add the Macintosh HD, then remove with the ‘-’ button reindex Spotlight.

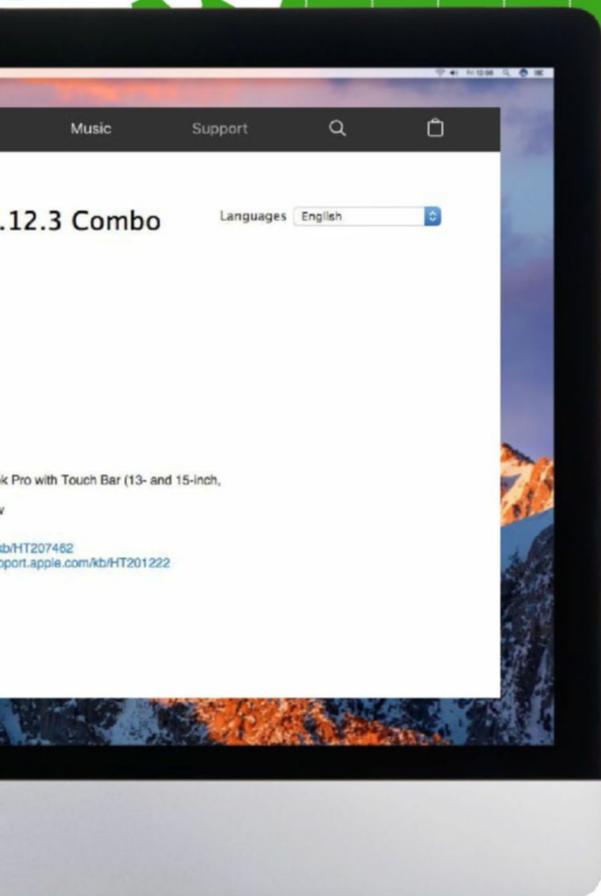


search speeds. If you do not want to index certain folders such as your personal Documents folder, take this opportunity to add them now using the ‘+’ button once again.

Leave the Mac on for a few hours to allow reindexing to complete. You can check the progress by clicking the Spotlight icon again.

Fixing Finder

By default, when you open Finder, it will display every file in your account. If you have a large number of files this can take a long time to load. You can change the default view from All My Files to something else by opening Finder's Preferences. In the General tab, find ‘New Finder Windows Show’ and click on the pop-up menu to change to another location, such as your home folder. If Finder is still sluggish, click Go and Go to Folder. Type ‘~/Library/Preferences/’ and press Return. Choose View > As List. Find the file named ‘com.apple.finder.plist’ and move it onto your desktop. Restart your Mac, then delete that file from the desktop.



Excruciating extensions

Most browsers support extensions - software add-ons, such as allowing you to save passwords. Sometimes clicking on the wrong link results in malicious extensions being installed. Usually these are designed to show adware - pop-up advertisements which are annoying and can slow down your system. While in Safe Mode, open Safari, then click Safari > Preferences. In the new window, click Extensions to see what you have installed. If you don't recognise an extension, clear the checkbox to disable it. Click More Extensions to browse legitimate extensions for Safari. Install both Adblock Plus (adblockplus.org) and Ghostery (ghostery.com) to avoid harmful links and prevent websites from tracking you easily. Log out and repeat for each user on your Mac.



Click Uninstall to remove extensions you don't recognise.

Forcing your Mac to 'reindex' your data can improve search speeds

available amount of memory. As the system runs out of 'virtual memory', it will start to use your hard drive temporarily to free up memory for other tasks. You can tell the system to purge its virtual memory by clicking Spotlight and typing 'Terminal'. Open Terminal and type `sudo purge`, then `↵`. Enter your password and press `↵` again. The system's virtual memory will be cleared. More recent versions of macOS try to use memory efficiently, so this will probably not hugely speed up your system on newer Macs.

Delete GarageBand Loops

GarageBand stores files in several locations, which can take up large amounts of space. Consider removing unnecessary audio loops. Open Finder and click Go, then Go to Folder. Type 'Macintosh HD/Library/Audio/Apple Loops' and press `↵`. Delete loops you no longer require and empty the Trash.

Disabling FileVault

Thanks to FileVault 2 and the recent trend towards SSDs in MacBooks, encrypting your system should not reduce performance noticeably. There are many online guides which recommend disabling FileVault to increase system performance. While it is true that using FileVault requires slightly more resources, as data has to pass through an 'encryption layer', disabling the feature is unlikely to make much difference and leaves data vulnerable. If you have already enabled FileVault, we recommend you leave it as it is.

Purge virtual memory

Previously, we used Activity Monitor to see which processes were running and check the

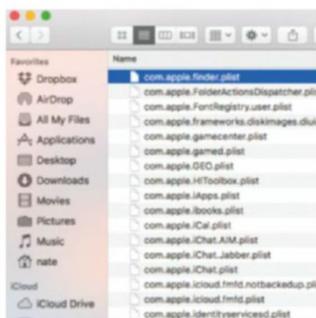
Reset SMC

Resetting the SMC (System Management Controller) is usually done to fix problems with starting up your Mac in the first place but it can help to remedy a sluggish system.

If you have a desktop machine, resetting the SMC is as simple as unplugging it from the wall, waiting 15 seconds, then plugging it back in. Wait five seconds then power on.

If you have a MacBook, shut it down fully and disconnect the charger. Next, with your left hand, hold `⌘`, `⌃` and `⌥` together while holding down the power button with your right hand. If you have a 2016 MacBook Pro with Touch a Touch Bar, the Touch ID button is also the power button. Keep all these keys pressed for 10 seconds, then release.

If the SMC reset fails to improve the Mac's performance, there's likely a hardware fault or your system files have been damaged. Read the next section for tips on attempting to repair damaged files and reinstall macOS.



Delete the `com.apple.finder.plist` file, then restart your Mac to fix a sluggish Finder.

Time Machine backups



Don't back out of backing up - it's so easy to set up



Having run through all the previous potential fixes, if your Mac is still running slowly, you'll need to take more drastic steps. While

your Mac may be experiencing hardware failure, if it is still functioning, however slowly, it's more likely the problem has to do with your system software. If this is the case, try to run a backup of your Mac before doing anything else.

Time Machine

Your Mac has a built-in app for running backups named Time Machine. Time Machine makes daily backups of your data which it can then save either to an external hard drive or to an AirPort Time Capsule. The latter can create a fast wireless network and are useful for backing up several Macs, but an external USB hard drive is the simplest and cheapest option.

The first time you connect an external hard drive, macOS will ask if you wish to use the drive for backing up. Click Use as Backup Disk to have Time Machine automatically format the drive to be compatible with your Mac and begin transferring files. This process will erase any data already on the drive, so try to have a dedicated one just for backing up. The capacity of the drive should be at least equal to the hard drive inside your Mac. For instance, if you have a 500GB hard drive in your Mac, use a 1TB external drive for backups.

All the data on your Mac will be backed up. You can go to System Preferences' Time Machine pane to view the status of your backups at any time.

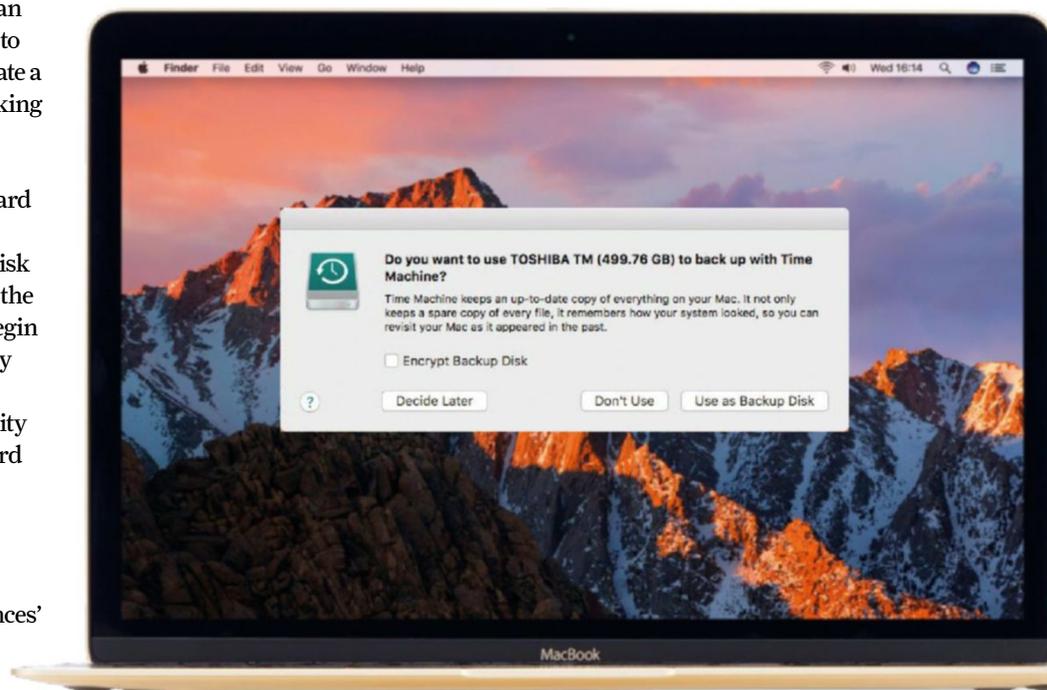
From here you can click 'Show Time Machine in Menu Bar' to display a Time Machine icon at the top right of the screen. Click this once to quickly view the status of backups. If you have already been using Time Machine, click this and choose Backup Now before proceeding further.

System Restore

Time Machine performs a complete initial backup, and subsequently keeps incremental backups of only files that have changed since the previous backup. It can display backups in chronological order so you can, for instance, easily retrieve a three-month-old version of a Pages document.

The Recovery feature of macOS even allows you to restore your system to exactly how it was on the date a backup was previously run. This

The first time you connect a new hard drive, choose 'Use as Backup Disk'. The Mac will do the rest.

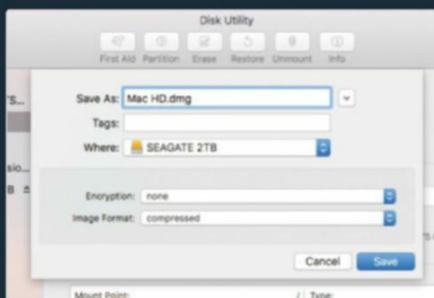


HOW TO Create an image of your Mac's hard drive >



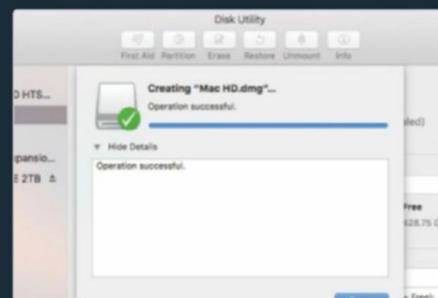
1 Launch Disk Utility

Power on your Mac and hold down **⌘ + R** to start up in macOS Recovery. Choose Disk Utility. Next, click on your Macintosh hard drive on the left-hand side. If you're using FileVault, choose File > Mount and enter your password.



2 Create Image

Choose File > New Image > Image from Macintosh HD. In the panel that appears, open the Where pop-up menu and select your external drive. Under Format choose Compressed. Now choose Save.



3 Verify Image

The image creation process can take several hours. Once complete, eject your external drive and connect it to a working Mac. Double-click on the .dmg file to open it on the new Mac to verify it can be mounted like a real disk.

can be useful if, for instance, your computer has some form of malware and you backed up just before it took hold of your system.

This feature, however, isn't very useful if your system is running poorly due to corrupted system files. The reason for this is quite simple – if any of your system files were damaged at the time the backup was made, your Mac will simply be replacing files with older versions of themselves which may also be damaged. You're likely to have more success by erasing the hard drive and restoring data from the backup manually.

Target Disk Mode

The above steps assume that your system is running to the extent that you can actually run Time Machine. If this isn't the case and you don't have a recent backup, you still may be able to retrieve your personal files before wiping your machine and reinstalling macOS.

If you have access to two Macs with FireWire or Thunderbolt ports and the right cable, you may be able to use your Mac in Target Disk Mode. This is extremely simple to do. First connect the FireWire/Thunderbolt cable between the two Macs, then switch on your own Mac while holding down **T**.

A picture of a disk should appear on your screen. On the other Mac, your computer's



Technically, you could choose the first option – Reinstall macOS – to restore your system but it may not improve performance.

Time Machine backups are cumulative, so it only saves files that have changed since the previous backup

hard drive should then be accessible under Devices in Finder's sidebar. Your personal data should be stored in the Users folder. It's easiest to copy the folder named after your user account to the new computer. You can copy your own files back over to the old Mac once you've erased and reinstalled macOS by putting that computer into Target Disk Mode.

Last resorts

If you cannot use Target Disk Mode, you may be able to create an 'image' of your Mac's hard drive using Disk Utility in macOS Recovery (go to apple.co/2nPc4bW for further advice on this). Once the copy process is complete, you'll need to connect the drive to another Mac – you may want to do this at your local Genius Bar – to check that the files have been copied over properly.

This process doesn't always work if files are corrupted. Your best bet in this scenario is to purchase an external hard drive and install macOS to it. You can then start up your Mac from that drive and try to access your files on the Mac's internal hard drive.

This won't help you recover applications but you can copy and paste over any data you created in your home folder, located in /Users. The simplest way to do this is to copy the entire home folder to the desktop.



Reinstalling macOS

Fix your faulty system files by reinstalling the OS



Once you have backed up your data, you can eliminate any corrupted files by erasing the Mac's hard drive and reinstalling macOS.

This is done in the macOS Recovery system. This is a separate area of your hard drive which contains tools to diagnose and fix problems such as the system running slowly or failing to start up.

Access the Recovery system by powering on your Mac and holding down **⌘+⌥+R**. With luck you'll see a welcome screen in various languages and an arrow button you can click to continue.

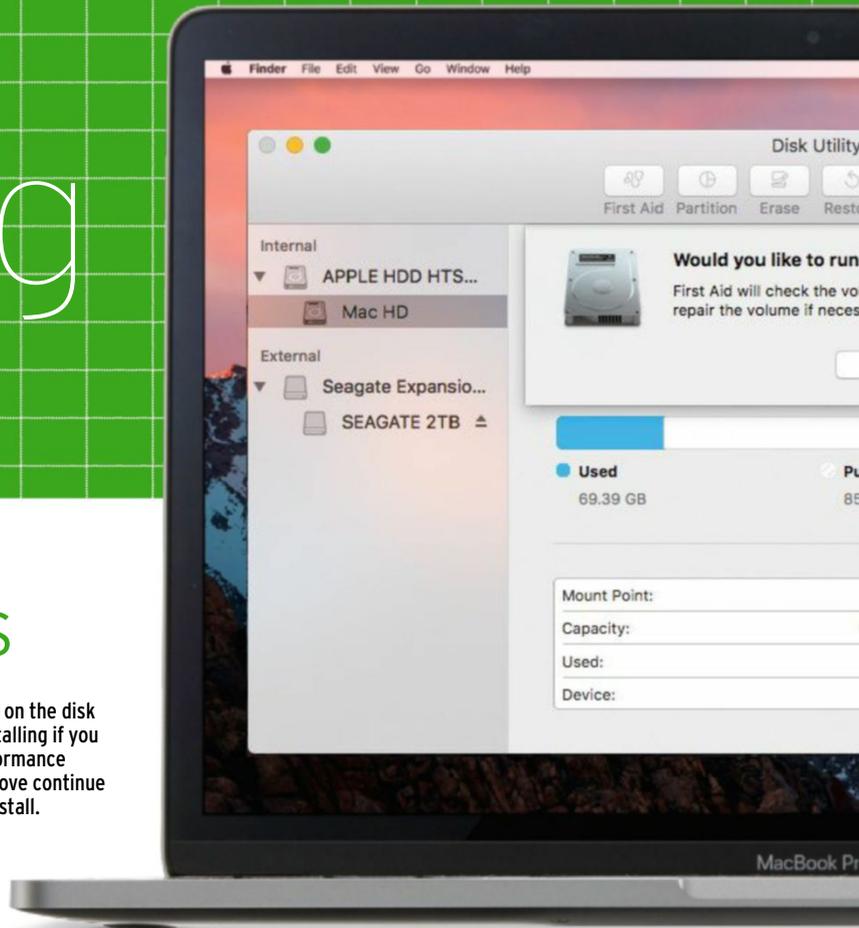
If for any reason Recovery fails to load, restart your Mac, start up with **⌘+⌥+R** held instead. You'll see a message stating 'Starting Internet Recovery'. If you see the Choose Network option, select your Wi-Fi network and enter its password to download Recovery.

Once the Recovery system has loaded, double-click on the fourth option, Disk Utility. Disconnect your back-up drive before going further, so you don't accidentally wipe it.

Inside Disk Utility

Erasing is a scary word, so it helps to think of resetting your Mac back to its factory settings. Once Disk Utility has loaded, you can select your hard drive in the left pane and run First Aid to try to fix damaged sectors. Note, though, that this process also runs when you start the Mac in Safe

Run First Aid on the disk before reinstalling if you wish. If performance doesn't improve continue with the reinstall.



Choose your Mac's usual startup disk to begin downloading and installing macOS to it.

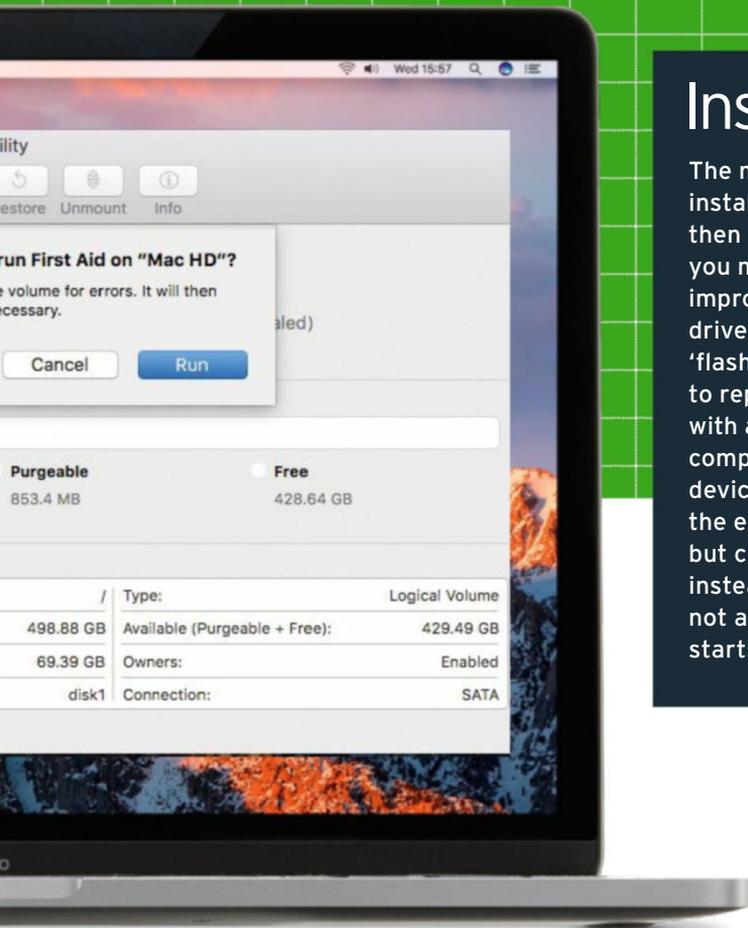
Mode, as you did in the previous section, so it may not make a difference.

It's also possible to reinstall macOS 'in place' which replaces only system files and leaves your personal files untouched. However, this is time consuming and not guaranteed to fix the issues you've been experiencing. Ensure your Mac's usual startup disk drive is selected on the left. This is usually named 'Macintosh HD'. Next, click the Erase button in the toolbar.

Make sure that the format of the drive is 'Mac OS Extended (Journaled)', then click the Erase button, bottom right. You'll be asked to confirm then the drive will be erased. This should only take a few seconds.

Quit Disk Utility and you'll be returned to the macOS Utilities window. If you connect to the internet via Wi-Fi, look at the top right corner of the screen and click on the Wi-Fi icon. Check that there is a black tick next to your own Wi-Fi network. If not, click it and enter your password.

Next, click Continue to begin reinstalling macOS. Click Continue again on the setup page and then on the blue Continue button. macOS Recovery will check which system



Installing to an external drive

The macOS Recovery system can install the OS to an external drive, then boot from it. If you use an SSD, you may find the speed of your Mac improves considerably, as these drives have no moving parts and use 'flash' memory. Your best option is to replace your Mac's hard drive with an SSD, but this can be tricky compared to plugging in an external device, and could invalidate your warranty. To proceed, connect the external drive and follow the steps detailed in this section, but choose your SSD (under External in Disk Utility's left pane) instead of the Mac's internal hard drive. Select the SSD itself, not a volume on it. Once complete, hold down **⌘** as the Mac starts up and select the SSD to start up from it.



Hold down **⌘** at startup and select the external drive to start up from it.

your Mac is eligible to run. Click to agree to the terms and conditions. You'll now be asked where you wish to install macOS. Choose the drive you erased moments ago, unless you want to install macOS on an external drive (see above), then click Install.

The Recovery system will download the version of macOS you had installed to your hard drive; the time taken will vary depending on your connection speed.

Setup Assistant

Once the reinstall has completed, the Mac will go through the Setup Assistant, just as it did the day you first bought it. The options here are fairly self-explanatory and you can change any of these after the process is complete. If you have a recent Time Machine backup, you can quickly restore your user account using Migration Assistant. This only copies across personal files, such as Documents and Pictures and Application settings, without affecting the system files themselves. Connect your Time Machine drive to the Mac before proceeding.

In the Transfer Information section of the Setup Assistant, the system will ask

If you have a recent Time Machine backup, you can restore your user account using Migration Assistant



You can choose to bring back all your data but it's best just to tick your user account and download applications later.

if you want to transfer information 'From another Mac, Time Machine Backup or Startup Disk'. Select this and then click on your Time Machine drive when it appears, then click Continue at the bottom of the screen. If your backups were encrypted, the system will ask for their password. The next page asks which info to transfer. It's best only to select your home folder - leave Applications, Other Files, and Computer & Network Settings unchecked. You can reinstall Applications from the Mac App Store or download them from the internet.

The Setup Assistant will begin 'migrating' (copying) data from your most recent Time Machine backup to the computer. Once it's complete you'll be able to log in with your previous password. If you use your Apple ID to log in and have since changed your password, it will be the same password you used at the time you ran the backup; after logging in it'll update to your new one.

If you have erased your hard drive and reinstalled macOS, this should have eliminated any software issues. If the system is still slow and you chose to migrate your data from a previous backup, try repeating the above steps and set up an entirely new user account without any of your data. This will help you know for sure whether the problem is with your Mac's hardware.

If you're still experiencing issues, then it's best to have your device examined at a Genius Bar or an Authorised Service Provider (locate.apple.com).

TRY 5 ISSUES FOR £5*

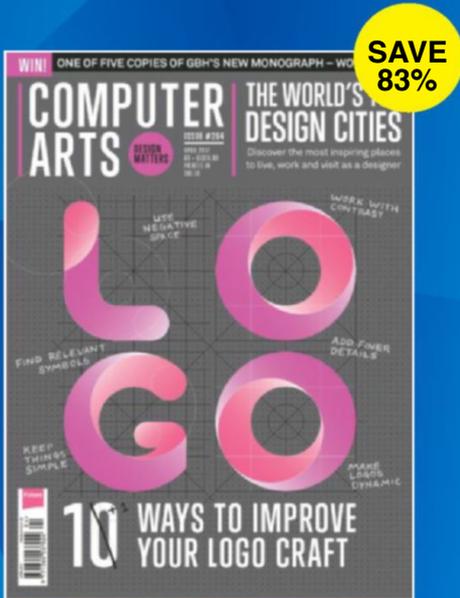


SAVE
UP TO
83%

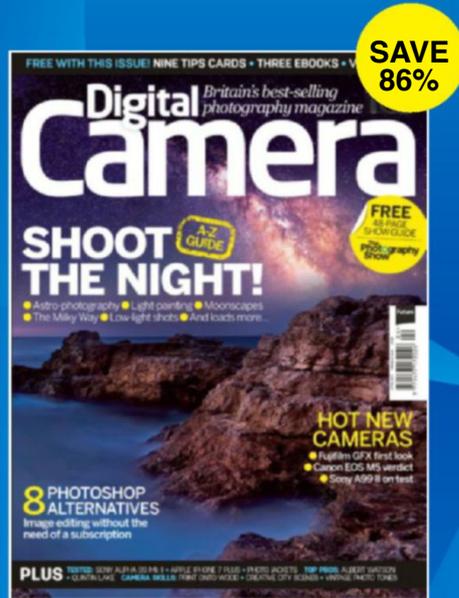
- ✓ Never miss an issue
- ✓ Delivered to your home
Free delivery of every issue, direct to your doorstep
- ✓ Get the biggest savings
Get your favourite magazine for less by ordering direct

Simply visit
myfavouritemagazines.co.uk/springtech

Choose from our best-selling magazines



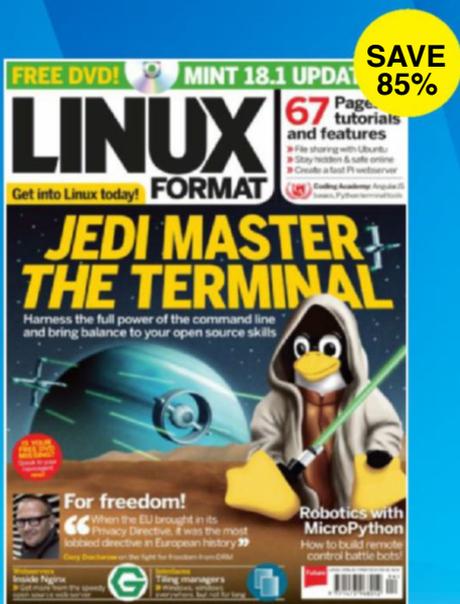
Computer Arts



Digital Camera



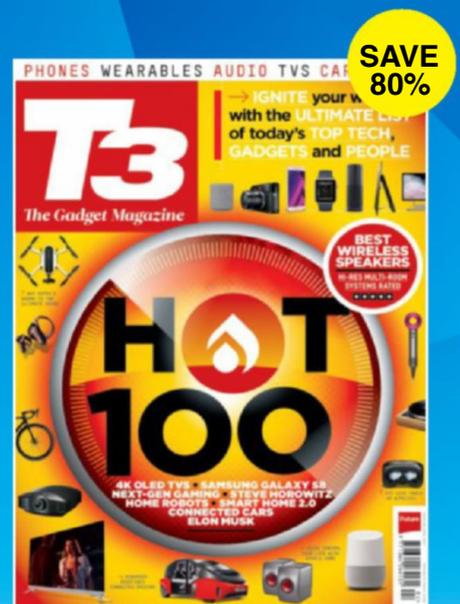
PhotoPlus



Linux Format



N-Photo



T3

Hotline 0344 848 2852⁺

*TERMS AND CONDITIONS Savings compared to buying 13 full-priced issues from the UK newsstand. The trial offer is for new UK print subscribers paying by Direct Debit only. You will receive 13 issues in a year. Full details of the Direct Debit guarantee are available upon request. If you are dissatisfied in any way, you can write to us or call us to cancel your subscription at any time and we will refund you for all unmailed issues. Prices correct at point of print and subject to change. Offer ends 31/05/17. *Calls will cost 7p per minute plus your telephone company's access charge.

OFFER ENDS
31 MAY
2017

THE ULTIMATE macOS Sierra HANDBOOK

148
PACKED PAGES

The *No.1* guide to making the most of your Mac



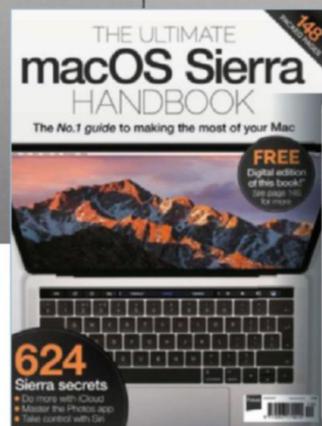
624

Sierra secrets

- Do more with iCloud
- Master the Photos app
- Take control with Siri

Buy your copy today!

<http://bit.ly/2jqBUBb>





What's inside

50-52 CREATE A BOOK IN IBOOKS AUTHOR

> Create textbooks or pen a novel with this free app

53 IN YOUR POCKET

> View saved web content at any time on any device

54-55 CONVERT OLD VIDEO TO MP4

> Get old video files working again

56-57 FIND YOUR WAY WITH MAPS

> Get directions, and more, from iOS 10 Maps

58-59 GET THE NEWS YOU WANT

> Create a personal news service with Reeder

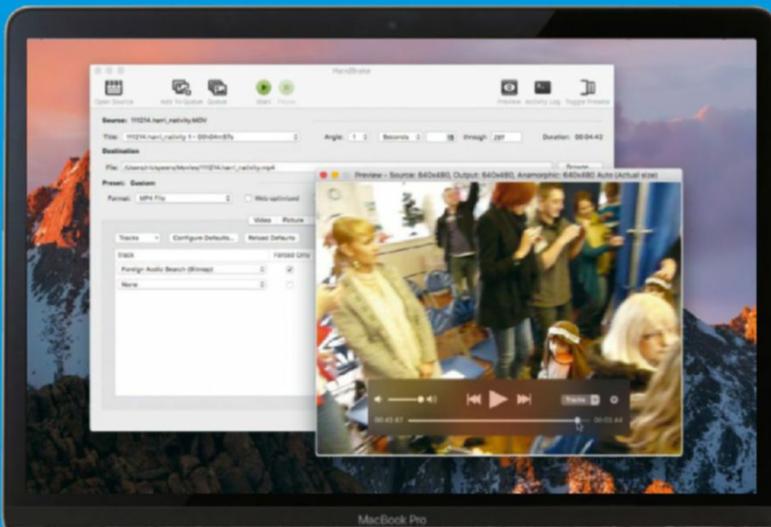
APPLE SKILLS

EDITED BY **JO MEMBERY** >



NEW IDEAS

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



CONVERT OLD VIDEO TO MP4
p54

> 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.

Create a book in iBooks Author

Create snazzy textbooks or pen your next novel with this free app

IT WILL TAKE

> 30 minutes

YOU WILL LEARN

> How to create, modify then export your book

YOU'LL NEED

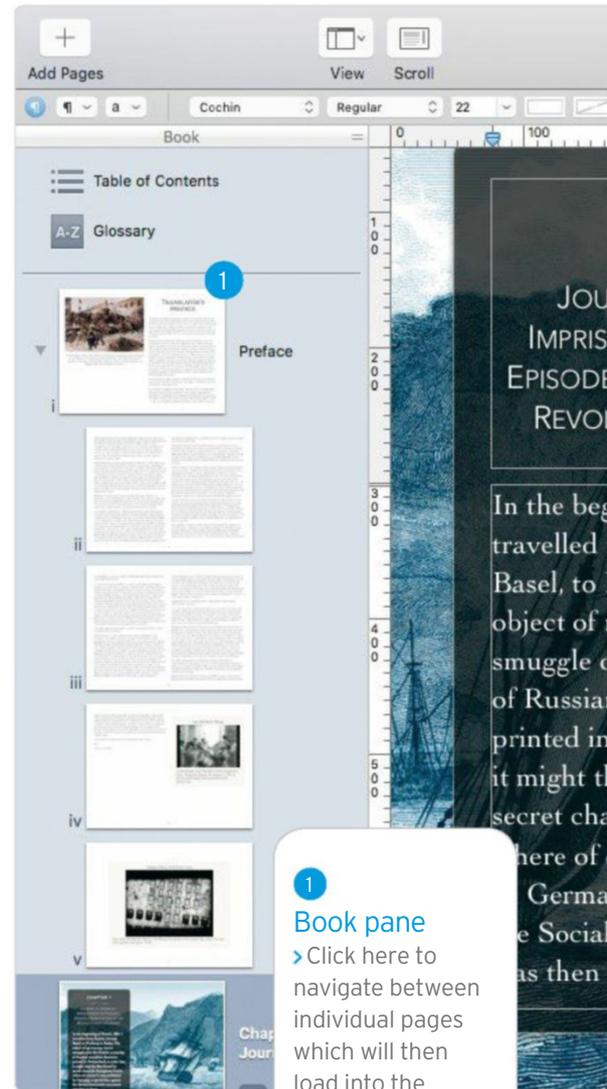
> OS X 10.11 or later, an iTunes Connect Account, iTunes Producer



Are you a budding author? Perhaps you want to pen the next great British novel or have an idea for a textbook.

The iBooks Author app allows you to easily create your own book from scratch, using a variety of fonts and multimedia.

Start by choosing your template and page layout, then add text, pictures, videos and more. The app is tech savvy, allowing you to add interactive content, such as surveys and animated images too. The interface is very much drag and drop; you can move content from Finder such as images and text will flow around it. If you decide not to sell exclusively through iTunes U, you can also export your book in PDF or ePub format. With over one billion Apple devices in use around the world, there's no reason not to get started. You retain the copyright on any original content in your work. **Nate Drake**



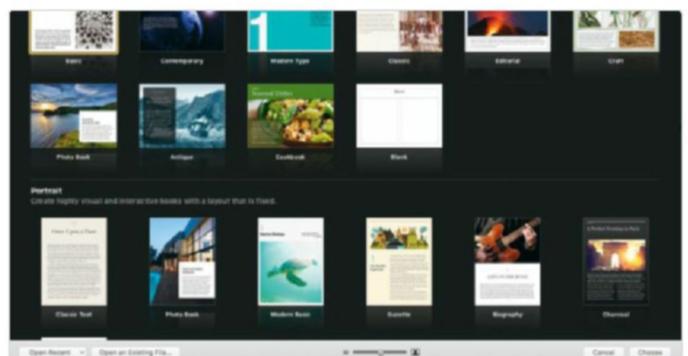
1 Book pane
> Click here to navigate between individual pages which will then load into the preview pane.

HOW TO Create your book >



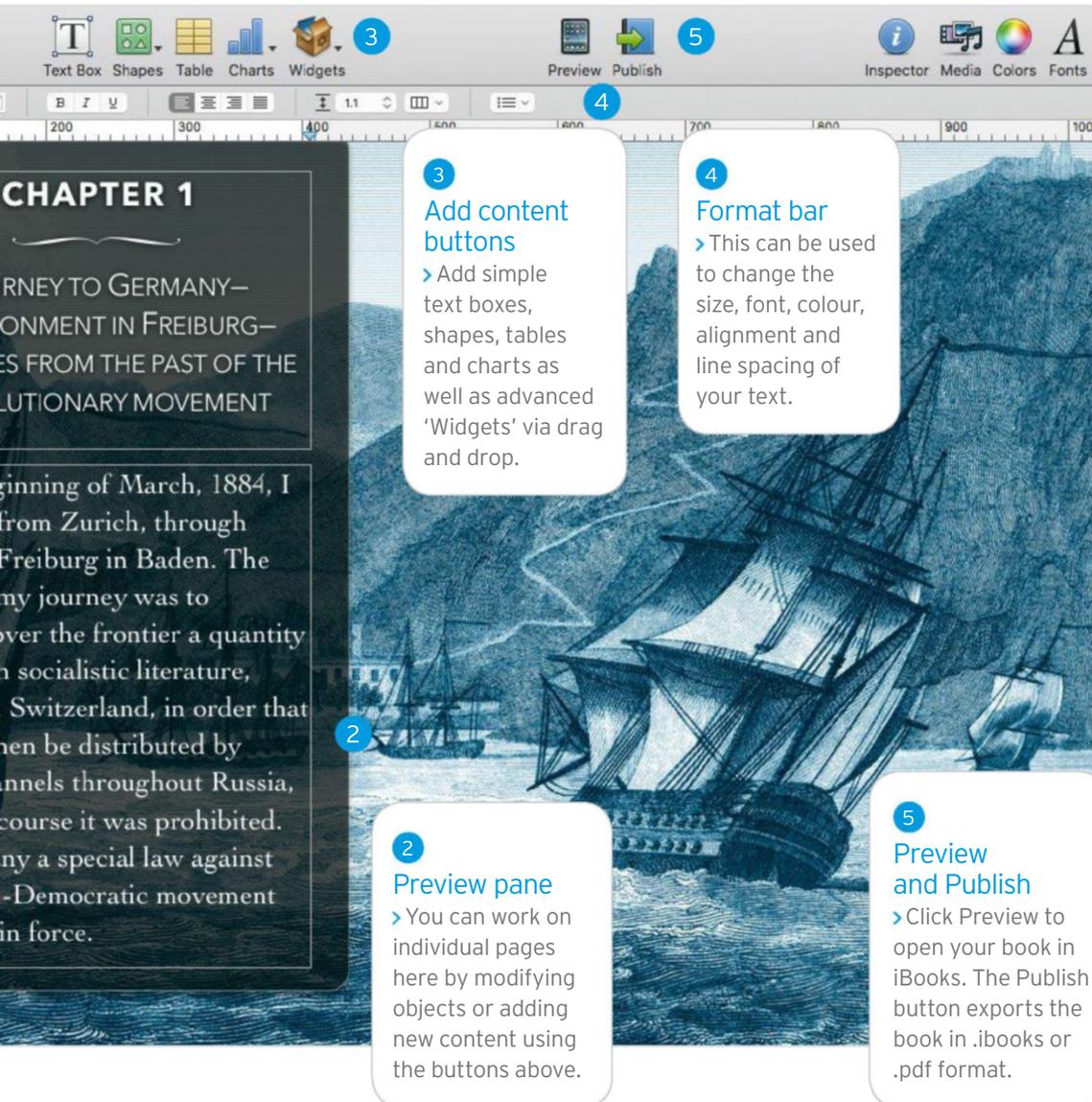
1 Install iBooks Author

Open the Mac App Store and type 'iBooks Author' in the top right. Click Install under the name of the app, which is around 405MB and sign in with your Apple ID when prompted. Finally click Open to launch.



2 Choose template and layout

You will now be asked to choose a template. These are grouped into Portrait and Landscape layouts. Landscape is best for photo albums and cookbooks. Portraits are better for novels. Click Choose when you're done.



3 Add content buttons
 > Add simple text boxes, shapes, tables and charts as well as advanced 'Widgets' via drag and drop.

4 Format bar
 > This can be used to change the size, font, colour, alignment and line spacing of your text.

2 Preview pane
 > You can work on individual pages here by modifying objects or adding new content using the buttons above.

5 Preview and Publish
 > Click Preview to open your book in iBooks. The Publish button exports the book in .ibooks or .pdf format.

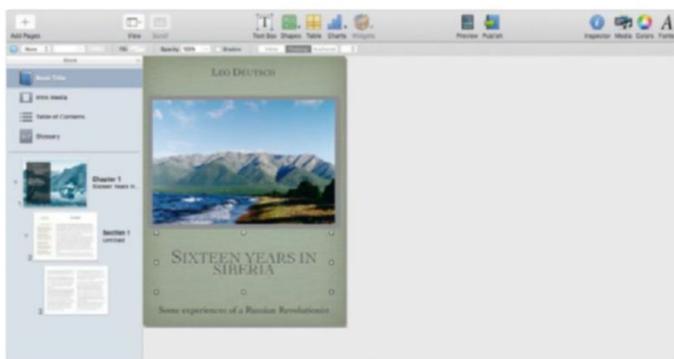
Jargon Buster

- > **Template** The initial settings of your book, such as the layout and basic fonts.
- > **Widgets** Advanced features for ebooks like adding a YouTube video.

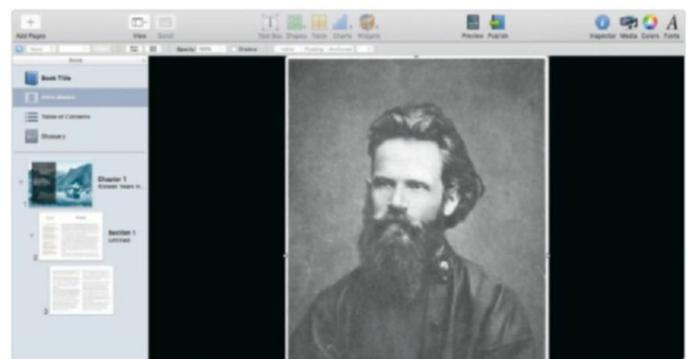


Genius Tip!

> Project Gutenberg (www.gutenberg.org) has thousands of free books you can use to practise with iBooks Author before writing your own.



3 Create your book cover
 Click Book Title in the Book pane. Click on Book Title and 'Lorem ipsum' and write the title and author. Right-click on the stock image and choose Delete. Open Finder and drag in your own cover image.



4 Choose intro media
 Click Intro Media in the Book pane. You can drag in an image or movie here just as you did with the cover. Any video content will be 'optimised' for use with iBooks but will still increase the size of the file.

HOW TO Create your book >



5 Add preface

Right-click Chapter 1 in the Book pane, then click Delete Chapter. Click the '+' (Add Pages) button at the top left, then Chapter > Preface. Click on Untitled in the Book pane to give the Preface a name.

6 Modify content

Click on the 'Lorem ipsum' box. Use **⌘ + A** to select all text. Either type or paste in your own text for the preface. You can also delete the stock image on the left and drag in one of your own as you did before.

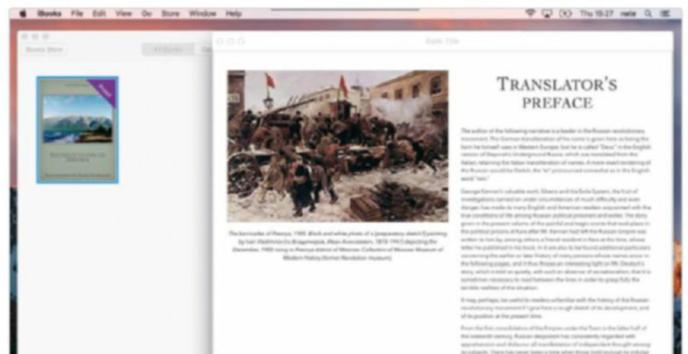
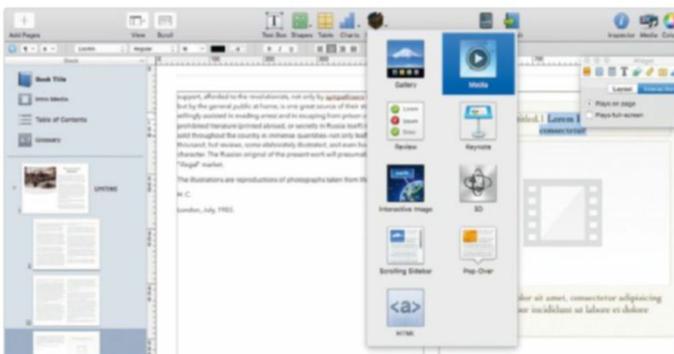


7 Add chapters

Click the Add Pages button and choose Chapter > Chapter. Click Untitled in the Book pane to name this chapter, then modify the 'Lorem ipsum' text. Change the size/font using the format bar at the top.

8 Add pages

Click on Chapter where you wish to add pages, then click the Add Pages button. Hover over Pages. Click on the page type, eg Two Column, and it will appear. Jump to the page by clicking on it in the Book pane.

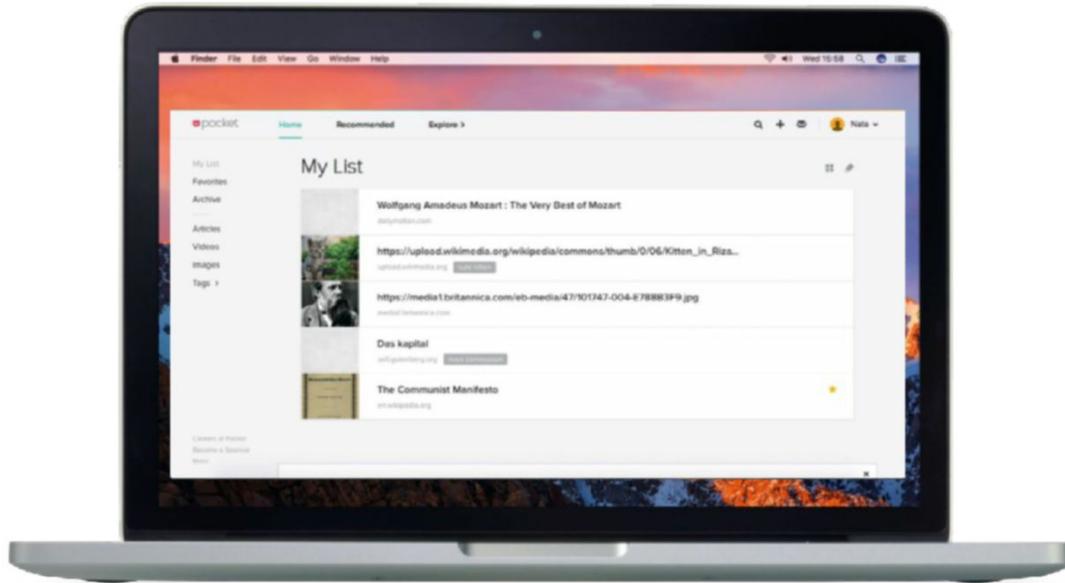


9 Insert widgets

The easiest way to add new content to pages is simply to drag and drop it into the page. Click the Widgets button at the top for more advanced features, eg an HTML page with an embedded Youtube video.

10 Preview and export

Once you're finished, click Preview at the top to open the book in iBooks. If you want to publish through iTunes, visit support.apple.com/en-gb/HT201183 to register as an author. Alternatively, choose File > Export to save the book as a PDF.



Save content for later

View your saved web content at any time on any device with Pocket

IT WILL TAKE

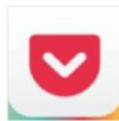
> 5 minutes

YOU WILL LEARN

> How to use Pocket with Safari to manage your websites

YOU'LL NEED

> A Mac with Safari 5.0.1 or later



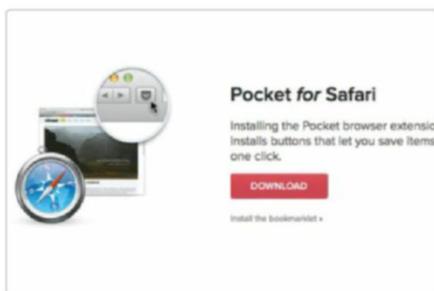
Students and researchers

rejoice! The basic version of the Pocket extension is now available free for Safari and allows you to tag and search through previously saved web content. Once added, the Pocket button appears to the left of your address bar. Click this any time or right-click on media to save to your Pocket list. Life is made even simpler with Pocket List's features including adding tags and favouriting content to allow you to search for it more easily.

iOS users can take Pocket with them by installing the app from the iTunes Store, then saving content to their Pocket List via the Share menu. Simply sign in with your Pocket account to sync content between your iOS device and the Mac.

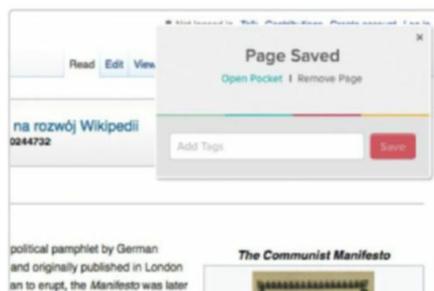
This guide focuses on the Pocket extension for Safari but it's also available for other major browsers. There's even a dedicated Pocket app in the Mac App Store if you prefer working offline. Juggling web pages has never been so simple! **Nate Drake**

HOW TO Install Pocket and manage websites >



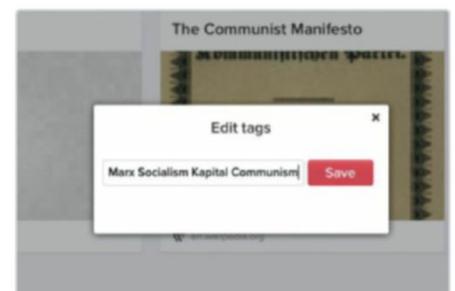
1 Install Pocket

In Safari, go to getpocket.com/safari. Click Download to go to the Safari Extensions Gallery. Click Install Now. Sign up for Pocket and log in. Pocket will now install. Click Start Saving to begin.



2 Save your content

Click the Pocket button to the left of the address bar on any page. A confirmation will appear. For videos/images, right-click then Save to Pocket. Click Open Pocket to see saved pages.

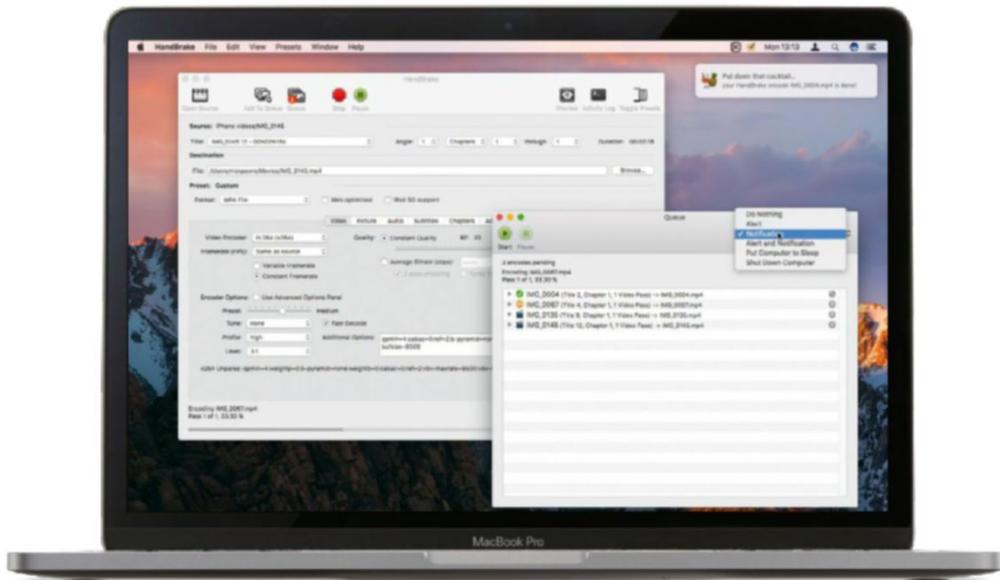


3 Favourites and Tags

Hover over any item to view the options at the bottom right. Click the star to favourite an item. Click Edit tags to add keywords. Click Tags on the left-hand side to search content by keyword.

Convert old video to MP4

Get old video files working again with all your Apple devices



IT WILL TAKE

> 15 minutes

YOU WILL LEARN

> Convert video to MP4/H.264 format; tweak quality settings

YOU'LL NEED

> Handbrake (www.handbrake.fr), a collection of old video files



Ever struggled to get video to play on your Mac, iPad or other device (such as your Apple TV)? That's because

video is made up of multiple components: the file itself (known as the 'container'), plus its content in the form of its video and audio (known as 'codecs'). It's possible to mix and match these to the extent that two seemingly identical files with the same file extension behave in different ways - as in, one will play, the other won't.

These days, the safest solution is to ensure

all your video files conform to a standard that will work across all your devices. But if you've got a collection of videos - particularly older files - that don't conform, what can you do?

The answer lies with a free, open-source tool called Handbrake (handbrake.fr). This miracle worker can convert just about any video file into a standard format, which basically translates into a MP4 container (in other words, a file with a .mp4 or .m4v file extension) and H.264 video codec and AAC audio codec. Read on to discover how.

Nick Peers

EXPLAINED... Handbrake basic settings >

1

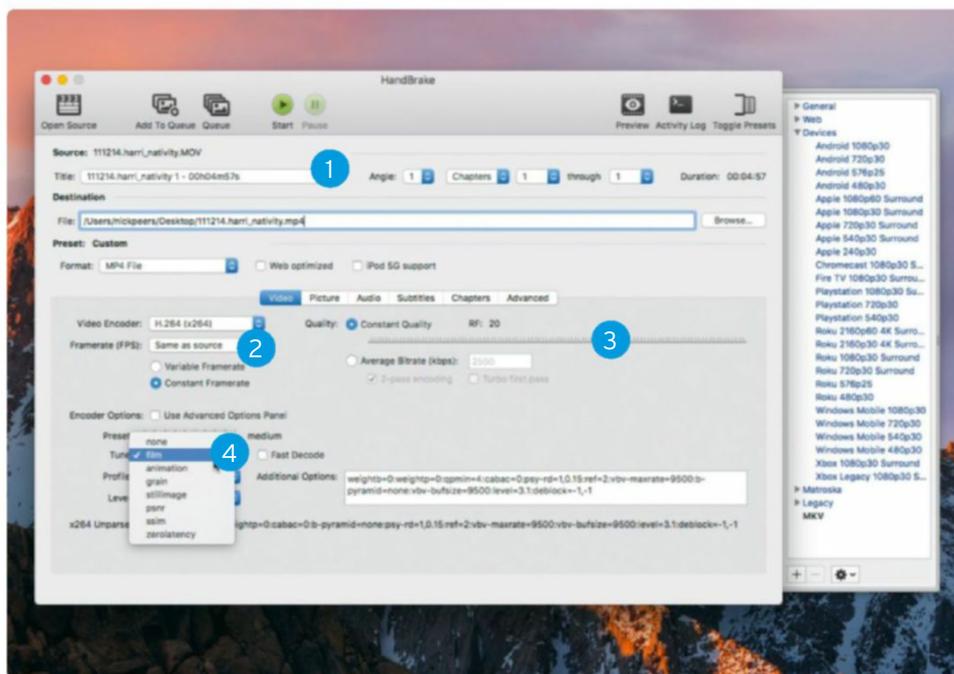
Source

> Select your file, plus limit your selection by angle, chapters, seconds or frames if applicable.

2

Encoder

> Choose H.264 (x264) for max compatibility. Set FPS to 'same as source', constant framerate.



3

Quality

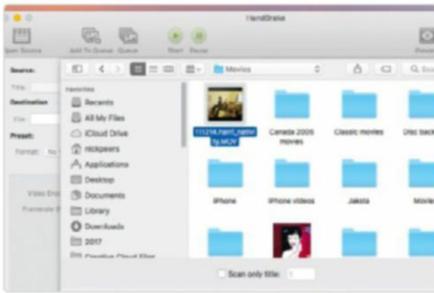
> Increase the RF for greater compression, but lesser quality. Aim for 20 (HD) or 21-22 (SD).

4

Encoder options

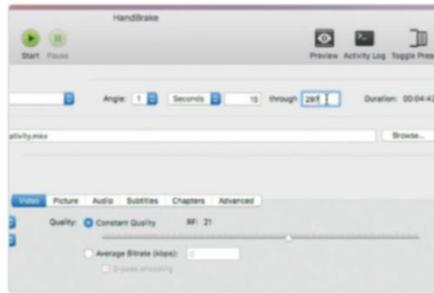
> Set the type of video using the Tune dropdown menu, nudge the preset slider up to Very Fast.

HOW TO Convert video in Handbrake >



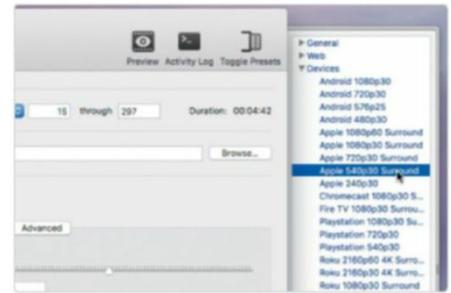
1 Select source

When Handbrake opens, select the video file (or folder containing multiple files) that you wish to convert. If you select a folder full of files, select the first video you wish to convert via the Title drop-down.



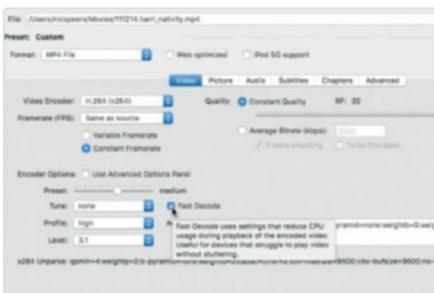
2 Choose clip length

You can trim unwanted parts from the video file using the Chapters drop-down menu to select Seconds or even Frames to choose exactly what to keep - simply set your start and end times, frames or chapters.



3 Select a preset

Click Toggle Presets if necessary to reveal a set of optimised presets for different devices. To make your video play on any Apple device, choose one of the Apple settings, such as 540p30 for non-HD movies.



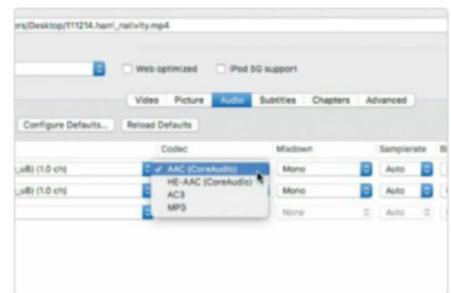
4 Set basic settings

The default Video tab is where you tweak basic quality settings. See the annotation for a guide to doing so. Tick Fast Decode to ensure your video plays without stuttering on all devices, even low powered ones.



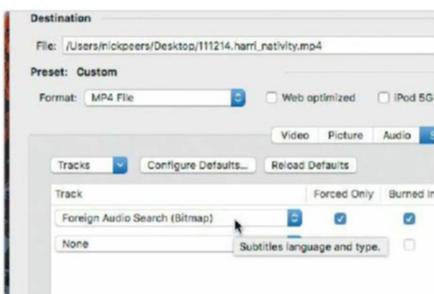
5 Tweak Picture settings

Switch to the Picture tab. The default settings should be fine here - however, if your finished movie suffers from motion judder or a 'combing' effect, experiment with different Decomb and Detelecine filter settings.



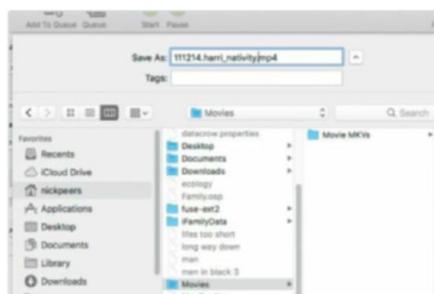
6 Select audio stream

Click Tracks > Add All Tracks if no audio track has been added on the Audio tab. Select AAC (CoreAudio) as your codec, and use the Mixdown drop-down menu to choose between stereo, mono or surround (if offered).



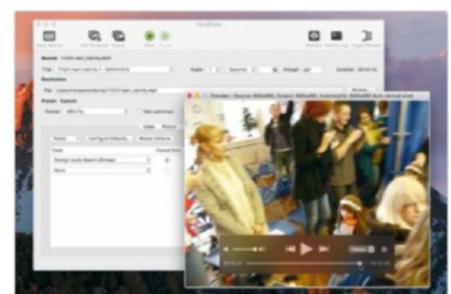
7 Add subtitle track

If your original video has embedded subtitles, select it under Subtitles. If the video contains subtitled content (such as foreign speech), choose Foreign Audio Search and tick both Forced Only and Burned In.



8 Convert video

Click Browse... next to Destination to choose where to save your converted file. Click Start to convert the video now. Once complete, play the video - if it's not the desired quality, change the settings and try again.

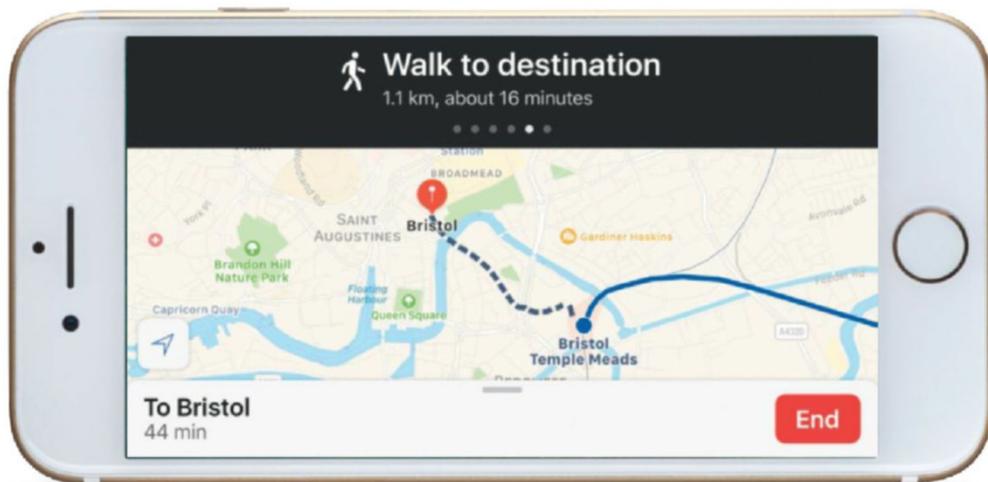


9 More tips

Click Add to Queue to set up multiple videos for conversion. When done, click Start to process them in sequence. If experimenting with different settings, click Preview to see their effect on a 30-second clip.

Find your way with Maps

Find points of interest and get directions in iOS 10's Maps app



IT WILL TAKE

> 5 minutes

YOU WILL LEARN

> How to search for places, get turn-by-turn directions and take a detour

YOU'LL NEED

> An iPhone with internet and GPS connections



Apple's Maps app has come along leaps and bounds since its rather poor debut in 2012.

As well as plotting directions to get from A to B by car or on foot, it now offers public transport directions in the UK, and it can tell if a ride booking service that serves where you are has its own app, and provides links to download and use them.

You may still find Maps doesn't know as much about businesses as Google Maps, so the more info you provide the better. 'Pickwick Lodge Farm B&B', say, might not be enough -

a town, a street, or especially a postcode will help. The app stores some recently viewed maps on your iPhone, but you need an internet connection to access these.

For turn-by-turn navigation, it's a good idea to get a windscreen mount for your iPhone. GPS drains the battery faster than usual, so an in-car charger is advisable.

In Settings > Maps, if Show Parked Location is on and your car has Bluetooth or CarPlay tech, Maps marks your car's location when you park to help you find it again.

Rob Mead-Green

EXPLAINED... Navigating the Maps app >

1

Info panel

> This initially shows a search bar and places nearby. It changes as you search or tap the map.

2

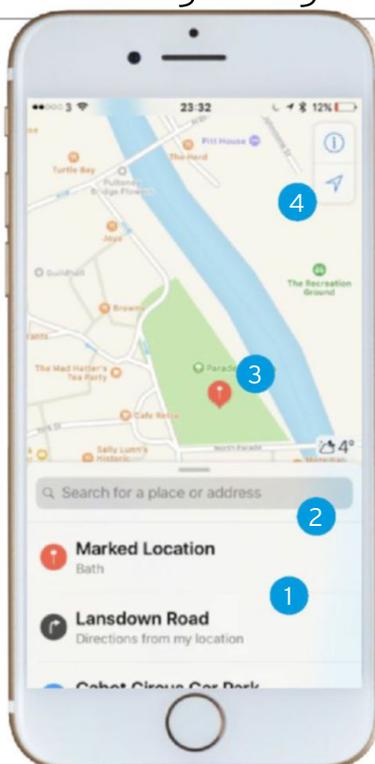
Search bar

> Enter a place name, address or postcode. Enter a Contact's name for their address info.

3

Mark location

> Drop a pin by holding a finger on the map. The info panel shows the address and distance.



4

Your location

> Tap the arrow to recentre on location. Tap again to reorient to the direction you're facing.

5

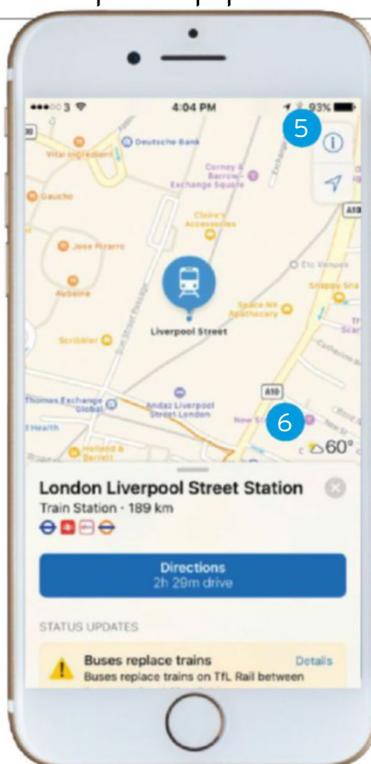
More options

> Tap the 'i' for more options, such as switching between map and satellite views.

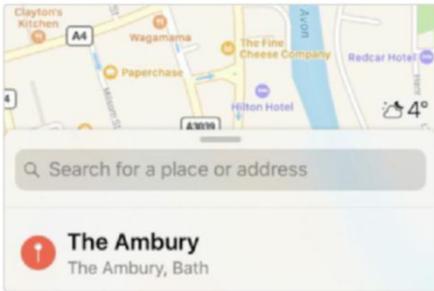
6

Weather conditions

> This shows the weather and temperature right now at the location that the map is currently on.

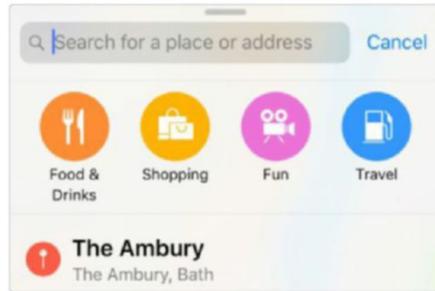


HOW TO Use turn-by-turn directions >



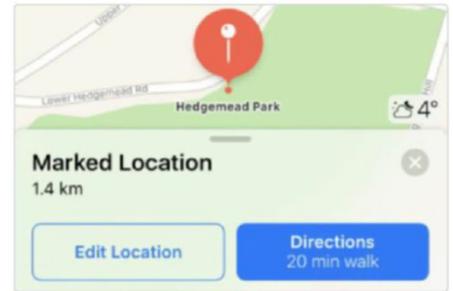
1 Where to?

The app shows the map and the info panel. Swipe up on the panel to browse smart suggestions of where you might want to go, including any address on the Clipboard, the last pin you placed, past searches, and your favourite places.



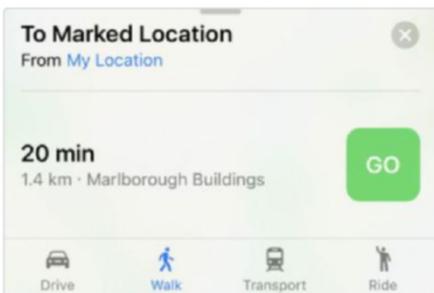
2 Specific destinations

To go elsewhere, tap the search bar and enter details if you have somewhere specific in mind, or tap the category icons below the bar to find nearby amenities; tap one on the map or panel for details and an option to get directions to it.



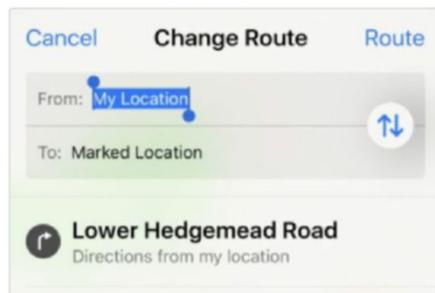
3 Manually pinpoint

Alternatively, pinch and swipe the map to find where you want to go, then rest a finger on it to mark it with a pin. Swipe up on the panel to take an action - share the location, set it as a favourite, fine-tune the pin's placement and more.



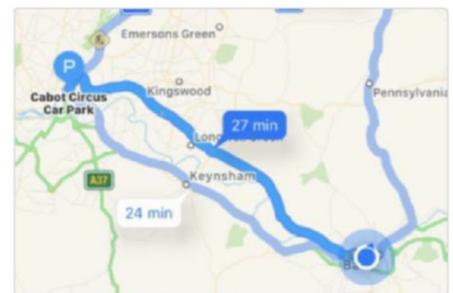
4 Get route suggestions

With a destination set, tap the blue button on the panel for a route, starting where you are. At the foot of the screen, choose a mode of travel: driving, walking, public transport or a ride booking service (if there's an app that covers your area).



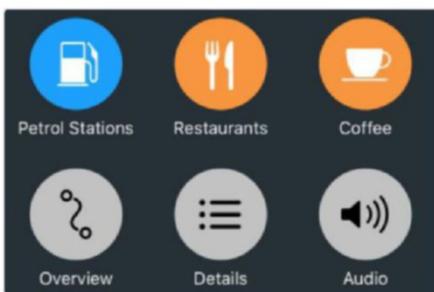
5 Overview and options

Tap the words 'My Location' to set a new starting point, then tap Route to refresh the route. For public transport, tap Leaving Soon to set a travel time. In the panel, tap the route for a list of directions, and to share them.



6 Alternative routes

Alternative routes are shown as fainter lines; tap one to select it, or swipe up for a list. You'll see Options below - Driving Options enables you to avoid tolls and motorways; for public transport, Transport Options shows different types.



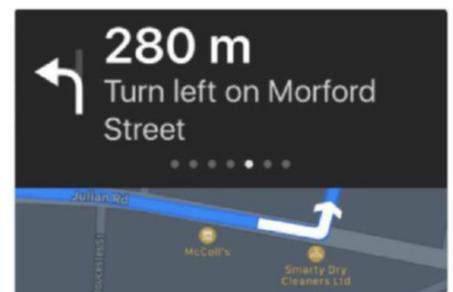
7 Get a better view

Tap Go next to a route to start being guided. Tap the summary at the foot of the screen for options to divert for petrol or refreshments; tap one and you'll see how much time it'll add. An option at the screen's top resumes your main journey.



8 Changing a journey

To stop turn-by-turn navigation or alter the route, say to avoid traffic jams, tap End, then start again. You can press the Home button and use other apps during a journey - the status bar turns blue. Tap the bar to resume directions.



9 Look ahead

When you're following the app's walking directions, the bar at the top of the screen, which shows the next instruction to follow, has a series of dots under it. Swipe horizontally on the bar to see later turns along the route.

APPL



Get the news you want

Create your own personal news service with the powerful Reeder 3 app

IT WILL TAKE

> 15 minutes

YOU WILL LEARN

> How to combine multiple RSS newsfeeds and aggregator services

YOU'LL NEED

> iPhone/iPad, iOS 9 or later, Internet access



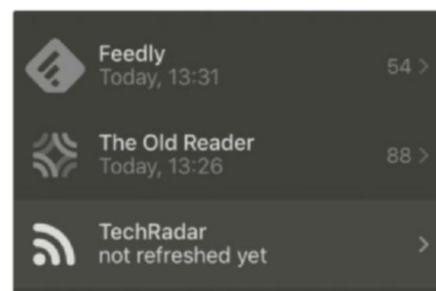
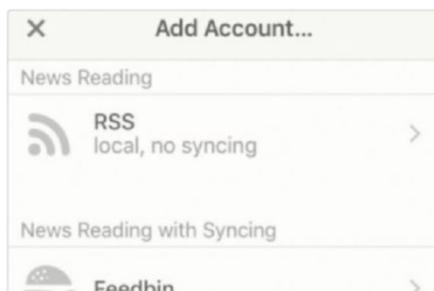
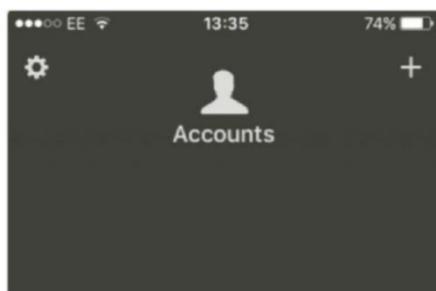
Apple's News app is a handy way of gathering news stories from a wide range of newspapers and magazines,

yet it barely scratches the surface of all the information that is available on the Internet every day. Another way of creating your own personal news service is to use RSS newsfeeds (Really Simple Syndication).

Many companies and websites have their own individual RSS feeds - such as our colleagues at TechRadar (techradar.com)

- and there are 'aggregator' services such as Feedly and Feedbin that work like Apple News by drawing together lots of newsfeeds from around the web. But if you're a real news junkie, you can really take control by using Reeder, a newsreader app that can combine multiple newsfeeds and aggregator services. The new Reeder 3 iOS app costs £4.99, but it'll earn its keep by making sure you've always got plenty of interesting reading material when you're travelling or just chilling out at the weekend. **Cliff Joseph**

HOW TO Manage your reading matter



1 Power to the people

Reeder is a power-user app for news junkies. It assumes that you already know how RSS services work, so when you launch Reeder for the first time it simply presents you with a blank screen and leaves you to get on with it.

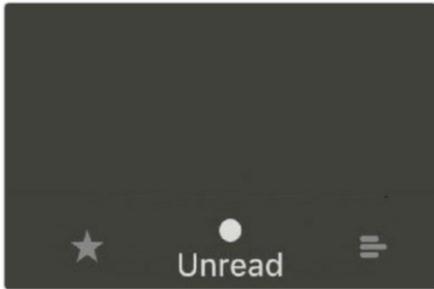
2 Pick and mix

Click the '+' symbol at the top of the screen to see the services that Reeder supports. You can subscribe to RSS feeds from individual websites, or link Reeder to your account on an aggregator service such as Feedly.

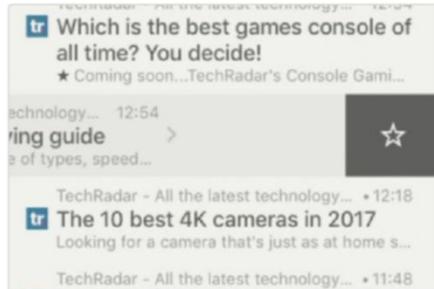
3 Read all about it

If you want some suggestions to get started, try Feedly, The Old Reader and TechRadar. Feedly does have its own app - as do most of its rivals - but using Reeder allows for multiple services within a single app.

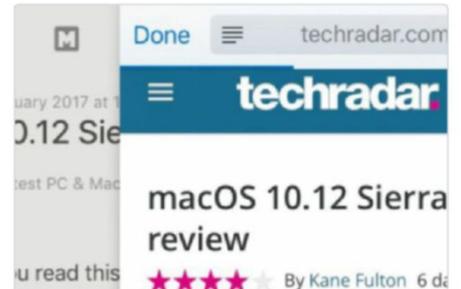
CONTINUED... Manage your reading matter >



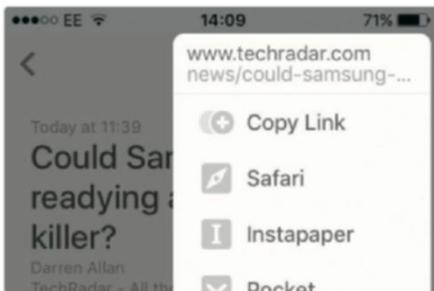
4 Browsing the news
At the bottom of the screen, you'll find icons for three 'filter' modes. The first icon displays 'star' news items that you want to keep for later. The second icon only displays unread items, while the third icon shows everything.



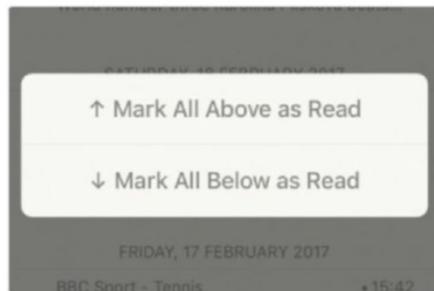
5 On the slide
Reeder borrows a few tricks from Apple's Mail app to help you manage the daily barrage of news. Sliding your finger to the right quickly marks an item as read or unread, while sliding left will 'star' it as an item to remember.



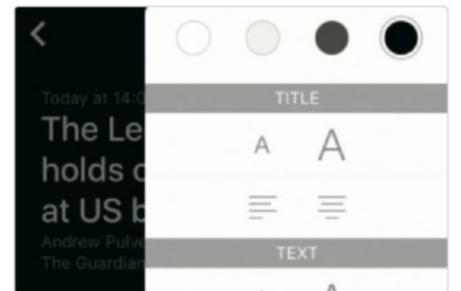
6 Digging deeper
If you want to follow up a particular story, you can slide your finger left again while reading, and Reeder will open the original story in its built-in web browser, allowing you to explore the publisher's website and related stories.



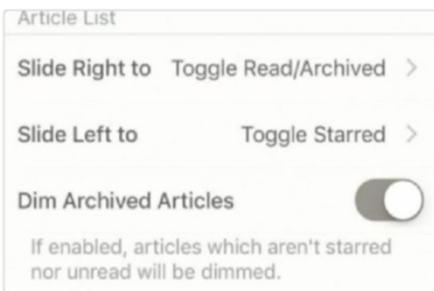
7 Save it for later
If you want to keep a story for future reference then you can add it to your Safari reading list, or save it to an external service such as Instapaper or Evernote. And, of course, you can share stories on Facebook and Twitter.



8 News management
If you've fallen a bit behind with your reading, you can quickly mark multiple news items as 'read' to get them out of the way. Just tap-and-hold on any news item and you can mark all the stories above it or below as 'read'.



9 Easy on the eye
If you're using Reeder on an iPhone with a relatively small screen then you can change the typeface and size to improve readability. People with poor eyesight can also change the colours used for both text and background.



10 Controlling the news
By default, Reeder displays the newest items first, but its General Settings menu allows you to show the oldest items instead. You can change other settings too, such as the way that the left and right swipe commands work.



11 Information overload
Although Feedly collects newsfeeds from around the web, you can manage those feeds within Reeder, rather than having to switch back to the Feedly app. You can unsubscribe feeds or, say, merge 'tennis' into a more general 'sporty' list.



12 Refreshing Reeder
The Refresh menu is a key option. Background refresh can drain your battery quickly, so it's best to tell Reeder to check for new stories 'On Start'. You can also refresh stories manually, by using the iOS pull-down gesture.

PHONES WEARABLES AUDIO TVS CARS HOME

T3

The Gadget Magazine

→ **IGNITE** your world
with the **ULTIMATE LIST**
of today's **TOP TECH**,
GADGETS and **PEOPLE**



↑ WHY GOPRO'S KARMA IS THE ULTIMATE DRONE



→ RINSPEED REDEFINES CONNECTED DRIVING



→ VOICE CONTROL YOUR LIFE WITH GOOGLE HOME



BEST WIRELESS SPEAKERS
HI-RES MULTI-ROOM SYSTEMS RATED
★★★★★



↑ HTC VIVE TAKES VR WIRELESS

HOT 100

4K OLED TVS • SAMSUNG GALAXY S8
NEXT-GEN GAMING • STEVE HOROWITZ
HOME ROBOTS • SMART HOME 2.0
CONNECTED CARS
ELON MUSK



ON SALE NOW!

AVAILABLE AT WHSMITH, MYFAVOURITEMAGAZINES.CO.UK
OR SIMPLY SEARCH FOR T3 IN YOUR DEVICE'S APP STORE

SUBSCRIBE TODAY AND SAVE! SEE WWW.MYFAVOURITEMAGAZINES.CO.UK/T3





What's inside

62-63

MASTER MISSION CONTROL

> Work more efficiently with multiple desktops

64-65

FACEBOOK INTEGRATION

> Sierra keeps you in touch with Facebook contacts

66-67

RECOVER FROM MAJOR PROBLEMS

> What to do if macOS Sierra won't start



Genius Tip!

> **Optimise your storage** Go to System Preferences > iCloud and click Options next to iCloud Drive. If you choose Optimise Mac Storage, files that you don't use very often will be uploaded to iCloud. You'll still see the file names on your Mac; simply click on a file name to download the file from iCloud again and open it.

SIERRA SKILLS

EDITED BY **GRAHAM BARLOW** >



NEW SECTION

Your new-look guide to getting more from macOS Sierra



MASTER MISSION CONTROL
p62

> macOS Sierra requirements

> macOS Sierra works on Macs dating back to 2010, and MacBook and iMac to 2009.

> You need to be running Mac OS X 10.7 or later.

> You need 8.8GB of available storage.

> Back up your Mac before upgrading; go to support. apple.com/en-gb/HT201250

for advice on using Time Machine.

> Go to the Mac App Store and download the free macOS Sierra upgrade.

> The benefits of running macOS Sierra

> macOS Sierra introduces Siri to the Mac.

> You can use Apple Pay on your Mac with macOS Sierra.

> Picture-in-picture - extract a video from a website and watch it from your desktop.

> By default, Desktop and Documents folders are uploaded to iCloud Drive.

> macOS offers the smartest continuity features to date.

> You can now start/pick up an iPhone call from your Mac.

> You can also send and receive SMS text messages from your desktop.

> Handoff works with a number of built-in apps, allowing you to start work on one device and finish off on another.

Master Mission Control

Work more efficiently with multiple desktops in macOS Sierra

IT WILL TAKE

> 15 minutes

YOU WILL LEARN

> How Mission Control can help organise your apps and your desktop

YOU'LL NEED

> macOS Sierra
(some features work in older versions)



Mission Control has been a feature of OS X (now macOS) since 2011, when it appeared as part of OS X 10.7 Lion, but its roots go back to Exposé, which made its debut back in 2003 with OS X 10.3 Panther.

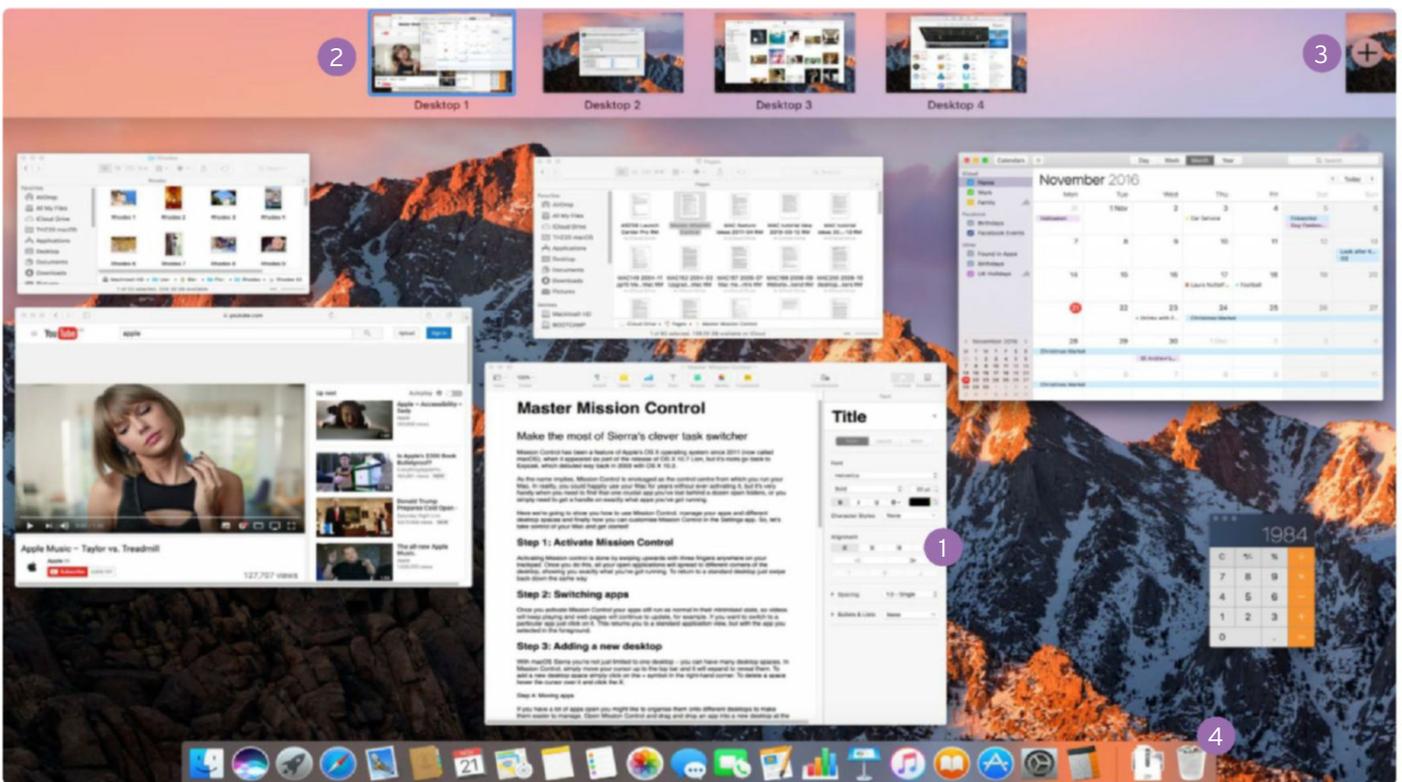
As the name implies, Mission Control can act as the control centre from which you run your Mac. In reality, you could use your Mac for years without ever activating it, but it's handy when you need to find that one crucial app you've lost, or you simply need to get a handle on which apps you have running.

Apple refined Mission Control with the release of OS X El Capitan in 2015: the desktop background in Mission Control is not blurred like it was in previous versions, and thumbnails of virtual desktops don't appear until you cursor moves over them.

Here we're going to show you how to use the features of Mission Control in macOS Sierra, how to manage your apps and different desktop spaces, and how you can customise Mission Control in the Settings app. So, let's take control of your Mac and get started!

Alan Stonebridge

EXPLAINED... Stay in control >



1 **Running apps**
> When you enter Mission Control, all the apps currently running minimise to their own well organised areas of the screen, so you can see what's going on.

2 **Top bar**
> Move the cursor to the top of the screen in Mission Control to reveal the top bar, where you can access all your desktop spaces.

3 **Desktop spaces**
> The desktop spaces you've created, like multiple monitors to swap between, can be accessed from the top bar. Click the + to open a new space.

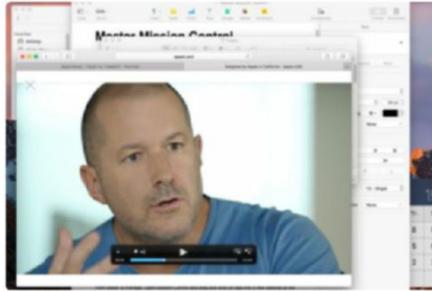
4 **The Dock**
> The Dock stays visible throughout Mission Control, which means you can still launch your favourite apps at any time.

HOW TO Navigate Mission Control in Sierra >



1 Activate Mission Control

To activate Mission Control, swipe up with three fingers on your trackpad. All open applications will spread to corners of the desktop, showing exactly what's running. To return to a standard desktop just swipe back down the same way.



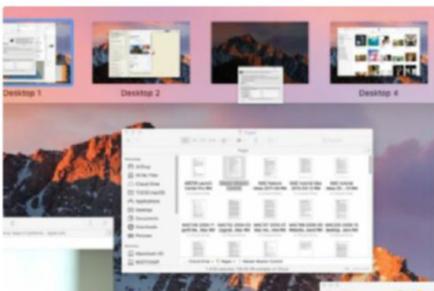
2 Switching apps

Your apps still run as normal in their minimised state, so videos keep playing and web pages update. To switch to a particular app, click on it. This returns you to a standard application view, but with the app selected in the foreground.



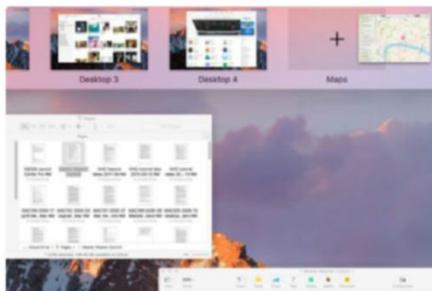
3 Adding a new desktop

With macOS, you can have many desktop spaces; in Mission Control, move your cursor to the top bar to reveal them. To add a new space, click the + in the right corner. To delete a space, hover the cursor over it and click the X.



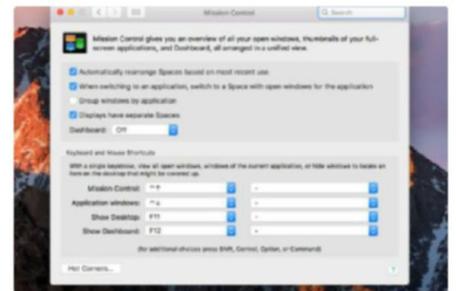
4 Moving apps

To organise apps into different desktops, open Mission Control and drag and drop an app into a new desktop at the top of the screen. Drop it onto the + symbol at the top right and you'll create a new desktop to drop the app into.



5 Adding app spaces

You can drag apps to the top bar and let them 'float'. These apps don't belong to a desktop - they can be accessed via Mission Control or the $\square + \rightarrow$ app switcher. You can drop another app on them to enter Split View mode.



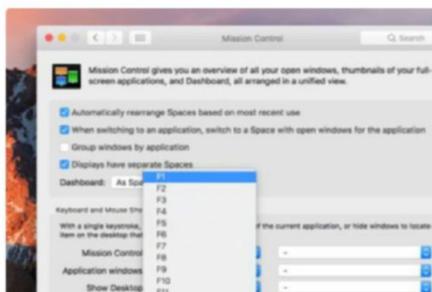
6 Mission Control settings

To customise Mission Control, open up System Preferences from the Dock and choose Mission Control in the top line of icons. Here you can choose a different way of launching Mission Control from the pop-up menu. Try it!



7 Dashboard settings

Dashboard is turned off by default in macOS Sierra. In Mission Control's settings you can turn it back on and overlay Dashboard onto your desktop or give it its own space. Choose an option and hit $F12$ to launch Dashboard.



8 Change shortcuts

You can change keyboard, trackpad or mouse shortcuts to Mission Control, Dashboard and Show Desktop in Mission Control settings, but if you press \square , ctrl , \square or fn while looking through, you'll find you can add these keys to the choices.



Group by app

By default, thumbnails in Mission Control are displayed as a single layer in Sierra. To change this, check 'Group windows by application' in the Mission Control settings.

Facebook integration

Sierra keeps you in touch with Facebook contacts all the time

IT WILL TAKE

> 5 minutes

YOU WILL LEARN

> How to make social networking simpler from your Mac

YOU'LL NEED

> macOS Sierra, a Facebook account

macOS Sierra makes it easy to share pics or web pages on social media sites



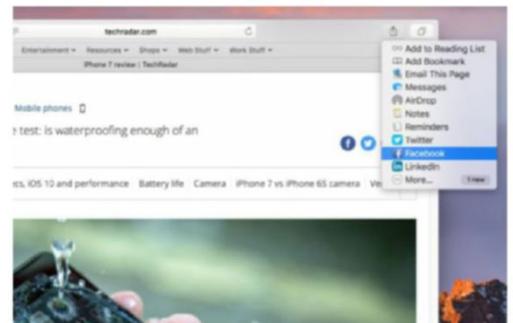
macOS Sierra integrates well with social networks, making it easy to share pictures or web pages via Flickr or Vimeo, post to Twitter and more.

Here we'll focus on Facebook, but the principles are the same for the other supported social networks.

Once you have Facebook configured, you can send things to it from a range of apps. Your Facebook friends are added to Contacts, complete with profile photos. Any changes they make to their details on Facebook are updated automatically in the Contacts app.

Facebook notifications come straight to Notification Center. You can post to Facebook without needing to sign in through a browser, because you're already signed in with your Mac's OS. You can share photos, web pages and all kinds of other content directly from the Share button, which appears in a wide range of apps; simply select Facebook from the list, add a note, click Post and it's done.

Once you sign into Facebook in macOS Sierra, you can connect and share with friends directly from your desktop. If Location Services is switched on on your Mac and you've given Facebook access to it, you can share your location with your Facebook posts



Once you sign into Facebook in macOS Sierra, you can connect and share with friends directly from your apps.

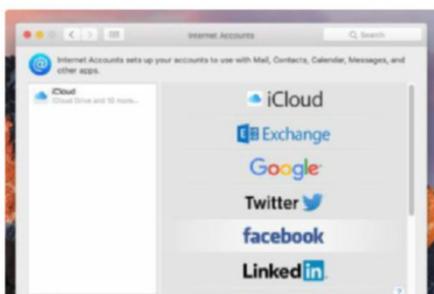
by clicking the location indicator at the foot of the Facebook Share Sheet.

You can choose to share each post with a different group, rather than all your Friends, by selecting a group from the drop-down list at the top left of the Facebook Share Sheet.

If you opt to share a photo to Facebook, you can choose which album to put it in. This option appears as a drop-down list at the top right corner of the Facebook Share Sheet; or you can simply add it to your Timeline.

In these guides, we'll explain how to link your Facebook account to macOS Sierra then show you some of the options this gives you in a range of different apps. **Craig Grannell**

HOW TO Connect your account >



1 Link your Mac

Open System Preferences and click Internet Accounts. This is where you manage online accounts for email, appointments and social networking for the likes of Facebook and Twitter. Click Facebook in the list of services to begin.



2 Choose Facebook

In the right pane, you'll see a range of online services that integrate directly with macOS Sierra, including social networks. Choose Facebook, then enter your Facebook username and password. Click Next to continue the process.



3 Permission summary

Sierra provides you with a summary of permissions that you'll be granting, including access to Facebook contacts, the ability to post updates and photos and working with apps. When you're done, click Sign In to finish.

HOW TO Master Facebook's features within Sierra >



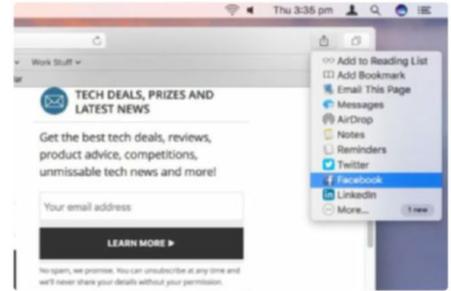
1 Contacts

Sierra accesses Facebook contacts and imports them into local Contacts so you can use them from any application on your Mac. If you change your Facebook password, return here, click Details and provide your new password.



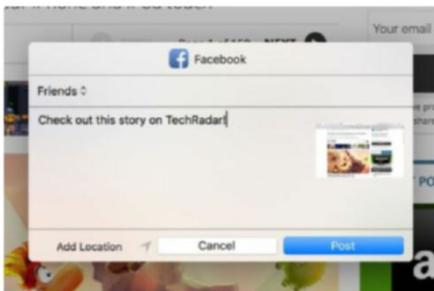
2 Import friend photos

To import contact photos from Facebook avatars, select your Facebook account in the Internet Accounts pane in System Preferences. Click Get Profile Photos, then click Update Contacts to download the pics to your address book.



3 Share a page

Now you're set up, sharing a web page via Facebook is easy. In Safari, browse to a web page. Click the Share button in the address bar and you'll see a drop-down list of sharing options. Select Facebook from the list to share the link.



4 Add a message

You'll see a Facebook Share Sheet. Click the drop-down list (top left) to set who to share the page with - by default, all friends, but you can choose a list (set up via the Facebook website). Type your status update, then click Post.



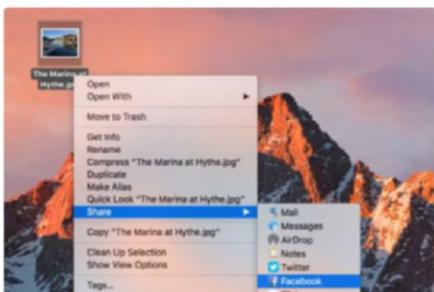
5 Use Location Services

You can automatically add your location to a post. Click the Location Services arrowhead (bottom left of the Share Sheet), and you'll be taken to the Privacy options to configure the service to allow Facebook to use your location.



6 Privacy options

You can select applications that you want to have access to your location. Ensure Facebook is ticked, return to the Share Sheet and click again to add location, then Post. For other privacy options, visit the Facebook website.



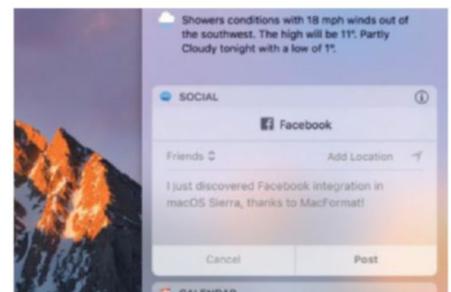
7 Post a photo

Sharing a photo via Facebook is just as easy as sharing a web page. In Finder, locate the picture, then right-click on it and select Share > Facebook. Now simply choose the people you want to share it with, and add a brief message.



8 Choose an album

At the top right of the Share Sheet is a drop-down list that enables you to choose where to post the picture. Select an existing photo album, or Timeline to add it to your Facebook timeline. Click Post to publish it to your friends.



Sharing made easy

Open Notification Center, go to the Today view and click Edit at the bottom. Click the green + alongside Social and a Social widget will be added to the left-hand pane.

Recover from major problems

Tools to get you out of a sticky situation if macOS Sierra won't start

IT WILL TAKE

> 15 minutes

YOU WILL LEARN

> How to get your Mac up and running again after a serious issue

YOU'LL NEED

> macOS Sierra (some features work in older versions)



Recovery is a built-in set of tools, hidden until you start up your Mac holding down $\text{⌘} + \text{R}$ when you hear the startup

chime. You should only need to use it in a rare emergency - typically when some drastic glitch prevents macOS Sierra loading.

Recovery looks like macOS, but capabilities are limited to essential maintenance tools to help you get up and running after a critical problem. Apple has made restoring a Mac from a Time Machine backup almost as easy as turning on that feature in the first place. In fact, it's even possible to download and

reinstall the whole operating system. If you're daunted by the prospect of fixing something you perhaps don't understand, then there's one feature of Recovery that you'll find invaluable: its web browser. With it, you can search for solutions, go online to book a Genius Bar appointment, or look up the contact details of an authorised repair centre if there are no Apple stores close to you.

Recovery's other features include the ability to reset any user account's password, should one be forgotten. Check out support.apple.com/en-gb/HT202860 for more on this.

Alan Stonebridge

EXPLAINED... Recovery mode >



1 **Rescue options**
 > Recovery allows you to... roll back to an earlier state using Time Machine; install macOS over itself, or erase the internal disk first for a completely clean start.

2 **Research a problem**
 > The Safari web browser is available in Recovery to research problems.

3 **Disk Utility**
 > You can run diagnostic scans of your Mac's storage, or erase it altogether.

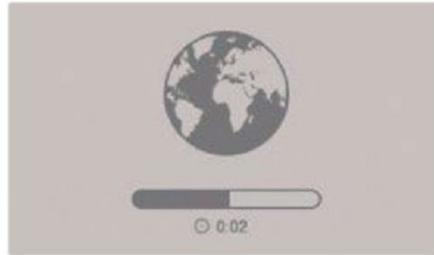
4 **Additional utilities**
 > Firmware Password Utility increases security; Network Utility tests connectivity; Terminal enables you to perform detailed diagnosis using various commands.

HOW TO Use Recovery's various options >



1 Start Recovery Mode

To start Recovery from your Mac's internal storage, hold **⌘+R** at the startup chime. To start it from an external drive, hold **⌘+R** instead; when a list of available startup volumes appears, choose the one with an external drive icon and 'Recovery' in its label.



2 Internet Recovery

If a Recovery partition isn't available, holding **⌘+R** will start Internet Recovery (on models released since OS X Lion, and some earlier models - see support.apple.com/en-gb/HT204904). This shows a globe and a progress bar while the software is downloaded.



3 macOS Utilities

When Recovery has loaded, it displays a list of four commonly needed tasks. 'Get Help Online' opens the Safari web browser. If your Mac uses Wi-Fi to get online, click the Wi-Fi icon at the top right corner to ensure that it is connected to your usual network.



4 Get help online

You can use this version of Safari to research your technical problem by visiting support.apple.com, to look more broadly with a search engine, and to browse to apple.com/uk/retail to book a Genius Bar appointment for professional help at an Apple retail store.



5 Disk problems

If macOS won't start, select Disk Utility before resorting to more drastic options and check that your Mac's drive is shown under Internal on the left. Select the row that isn't indented and click First Aid in the toolbar to verify and attempt to repair structural problems.



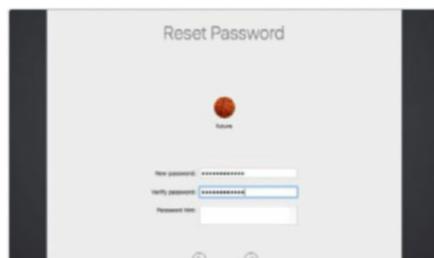
6 Restore backups

If you haven't excluded system folders from your backups, your Mac can be restored to an earlier state. Choose the Time Machine option, identify your backup disk, pick an earlier state from the list, and follow the prompts to restore your startup disk. This can take a while.



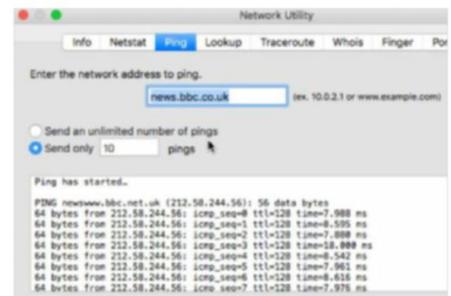
7 Reinstall macOS Sierra

The Reinstall option downloads the same version of macOS (or OS X) you have and installs it over any existing copy, retaining your files and settings. This can fix some damage to the system. The download is several gigabytes, so it may take quite a while to download.



8 Reset a password

If someone forgets their account password, choose Utilities > Terminal. Type `resetpassword` into that app and press **↵**. In the next window, select your startup disk, select the account from the list, type a new password into the boxes, and click Save.



Check the connection

In Utilities > Network Utility, the Ping tab enables you to check that network traffic can reach other devices on your network and websites outside of it.

Technology
Tips Guide

FREE
Digital version
with this
book!

iCLOUD

437 TIPS FOR MAKING MORE OF
APPLE'S CLOUD SERVICE & iTUNES

148
pages of
practical
advice



Future

Apple

Available at all good newsagents or visit
www.myfavouritemagazines.co.uk/computer



What's inside

69

macOS

› Adobe Acrobat and macOS Sierra PDF-printing issues

70-71

NETWORKING

› Solving Wi-Fi woes and connection conundrums

72-73

SOFTWARE

› Sagacious solutions to software snags

74

iOS SOFTWARE

› Swipe away your touchscreen troubles and love iOS once again



Contact us

› Email your queries and your questions to genius@macformat.com

› Keep up to date by following us on Twitter @macformat

› Join the conversation at facebook.com/macformat

› Get the latest subscription offers at macformat.com

GENIUS TIPS



EXPERT ADVICE

Our resident genius solves your Mac and iOS problems

EDITED BY **HOWARD OAKLEY** >

Acrobat Reader not printing



When I try to print from Adobe Acrobat Reader DC on my MacBook Pro Late 2011 running Sierra, I see a 'There are no pages selected to print' error message, although they print from my Mac mini, or using Foxit Reader or PDF Reader Pro Free. Unlike Acrobat, they can't open some PDFs, so how can I print them?

by RICHARD GELLING



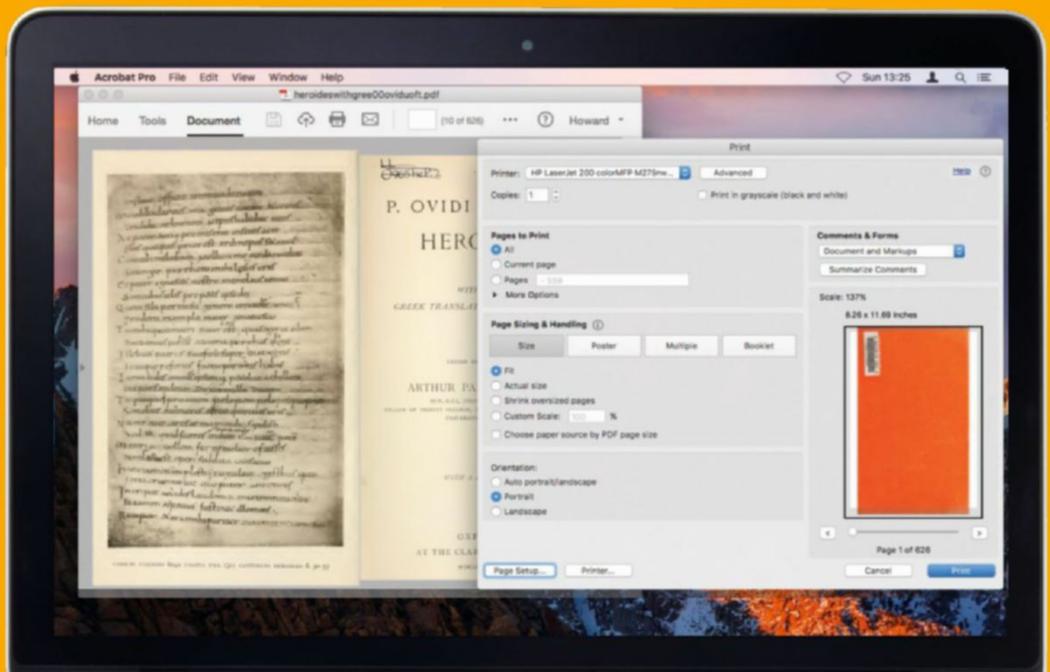
Some users find that disabling Enhanced Security within Acrobat Reader's preferences fixes this error. Others work around it by printing to JPEG image files, then printing those using another app. But for some, no matter what they try, the error persists.

Can't print from Acrobat Reader? You may have to try another app.

It's almost certainly a problem specific to Sierra, resulting from its new PDFKit library, which has broken many apps. Some bugs have been fixed in successive updates to the initial release of 10.12, but this particular one with Adobe Acrobat Reader DC seems to have persisted on certain models of Mac.

Until Apple and Adobe address the issue and deliver a fix, hopefully in the next update to Sierra, you'll have to work around it by using a different app. Even the bundled Preview is worth trying, particularly as Apple has recently fixed at least some of its bugs.

You could also consider upgrading to a paid version, such as Adobe Acrobat Pro, which doesn't appear to suffer the same glitches.





Networking >

We help to solve your Wi-Fi woes and connection conundrums

Networking quick-fire questions >



How can I connect my studio, it's 50m from the router?

> Over open ground, 2.4GHz Wi-Fi can reach up to 90m, but signals weaken with any significant obstructions. A better bet may be outdoor grade Ethernet cabling, which can be up to 100m in length without performance loss. Cable is best run overhead, or buried in plastic piping.

Can I put my own RJ45 plugs onto Ethernet cable?

> Yes, and it's easier if you can buy or borrow two special tools: one for cutting the outer jacket, the other to crimp the plug on, available from electronics retailers. The process using those tools is illustrated at bit.ly/belden_modplug_cat6 and numerous YouTube videos.

Reliable sharing

Q My iMac and MacBook Pro already share access to my modem router, using an Ethernet wired connection and Wi-Fi, respectively. What's the best way to share files regularly between them?
by IAN DAVIES

A Macs have many methods of sharing files, from ad hoc AirDrop over Wi-Fi, to iCloud Drive, which is ideal when you're connected to the internet in another location, but inefficient on a local network. If they're already accessing the same modem router, the simple way is to turn File Sharing on for your iMac as a 'server', then connect to it from the MacBook Pro. In the Sharing pane, select the File Sharing item at the left, and add a shared folder such as your whole Home folder. Ensure you have Read & Write access to that in the list of Users at the

right, and check the box to turn file sharing on. Note the Computer Name given there. On your MacBook Pro, open Finder's preferences, and show Connected servers and Bonjour computers in the sidebar. Your iMac should then appear in the Finder sidebar.

If it doesn't, use the Connect to Server command in the Finder's Go menu to bring up the connection dialog. You can connect there by typing in the IP address of the server, in a form similar to `smb://192.163.1.4`. This is simpler when using fixed IP addresses, and SMB is now preferred over AFP.

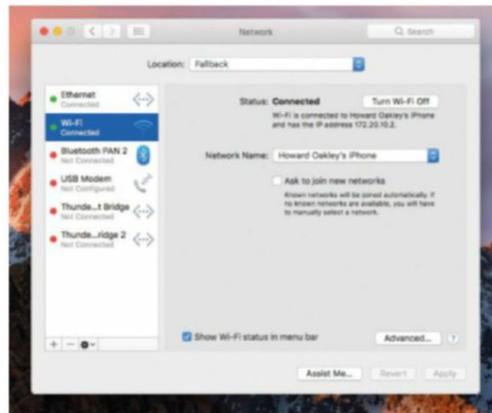
Then enter the iMac's user name and password, not that for the MacBook Pro. When you're done, just eject that shared item, and turn File Sharing off.

Share your whole Home folder, giving read and write access. Note that Macs now prefer SMB connections rather than AFP.





Turn on Personal Hotspot in Settings on your iPhone. You can change the password to something easier to enter, but keep it secure.



Open the Network pane, and duplicate your current Location, naming the copy Fallback. Connect that to your iPhone's Wi-Fi network.

Can I turn Wi-Fi off on a BT Home Hub?

> Yes. Ensure your Mac is connected to it by wired Ethernet. Open admin service using your browser and, depending on the model, enter the Advanced Settings and turn 5GHz and 2.4GHz wireless options off.

Is there a free VPN service for Macs?

> Some like Total VPN have free options but impose usage caps or advertising, and may perform poorly. They might suit light and occasional users. With VPN there's always the risk that your connection may not be fully secured.



Fallback internet connection

Q When we lose mains power, our broadband often goes down too. Is there any way to switch my MacBook Pro over to using my iPhone's mobile connection?

by DAVE WILLIAMS

A You can maintain power to a modem router from a UPS, which will keep your end working, but if local comms cabinets lose power and drop the connection, that won't help. Provided that you can afford

the data use on your mobile account, and get a decent connection speed, you can set your iPhone up to provide a Personal Hotspot, and a fallback internet connection for your Mac.

Switching to that setup is quicker and simpler if you save it in the Network pane as a Location. When your regular connection goes down, all you then have to do is turn the iPhone's hotspot on, and switch location on your Mac. For more on setting up a Personal Hotspot, go to support.apple.com/en-gb/HT204023.

AirPort Extreme as a bridge

Q We have an AirPort Extreme 802.11ac connected to our Uverse router. Since I set up the AirPort, it reports 'Setup over WAN' and 'Double NAT'. Our old AirPort Extreme worked fine in Bridge mode, but when I try that with our new one, including turning DHCP off, it blocks Wi-Fi access. Are those status reports acceptable?

by JOHN LEE

A You're correct: in your setup, a Wi-Fi base station should operate in Bridge mode, and shouldn't serve DHCP, as your Uverse router does that. You can turn the DHCP server off and set it to use a fixed IP address from a static block allocated



The AirPort Extreme uses the Double NAT scheme to work around having two DHCP servers active.

on your router, but that can be fiddly. The consumer solution is the 'Double NAT' scheme which your new AirPort Extreme uses to work around having two DHCP servers active. It only becomes a nuisance if you need to use IP addresses to trace a network problem.

You should also disable the feature to permit setup over WAN, as that could allow an intruder to take control of the network.

However, as your AirPort base station lives inside your router's firewall, provided that's configured to block all incoming connections, there is no real risk.

The purist dislikes this approach, but if it works well, it's wise to leave it alone.



Software >

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

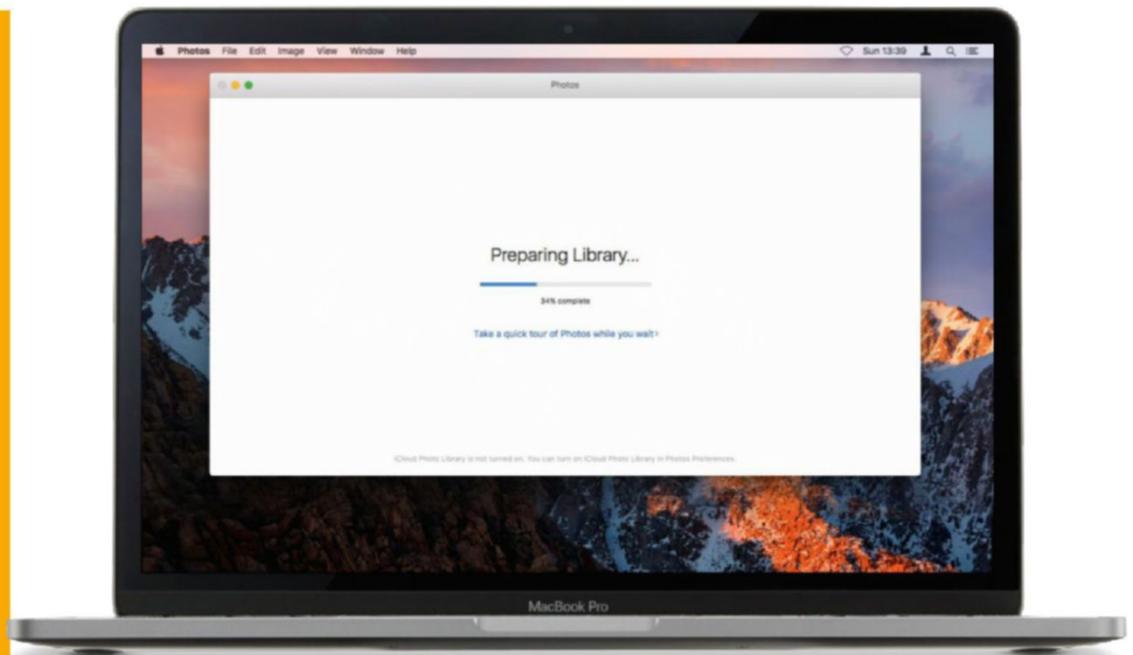
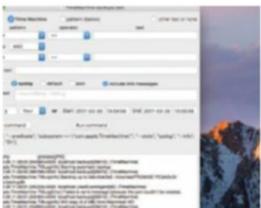
Software quick-fire questions >

How secure are collaboration services like Slack?

> Slack and other collaborative working services are based on IRC, which can be secured, and can be run through a VPN service. However, your chats are stored on remote servers which may be vulnerable to attack and legal means of obtaining their content. For better privacy and security, use end-to-end encrypted group messaging instead.

Does Console have a memory leak?

> While Console is open, it collects all fresh log entries, and over time these grow to consume lots of memory. Quit the app when it's not in use, as eventually it can even slow your Mac down. Instead use my free utility Consolation to browse past log entries.



When you open an old iPhoto library using Photos, it's converted to the new format, which can take a long time.

Lost iPhoto library

Q I'm running macOS Sierra 10.12.2 on a MacBook Pro, and have about 10,000 pictures in my main iPhoto library, and a smaller library of old scanned images. I moved these to a NAS, which worked fine at first. Now the larger library has suddenly renamed itself, and I'm unable to access the smaller library at all. If I hold the Alt key when opening iPhoto, that smaller library isn't offered as an option either. How can I find that missing library?
by DAVID PERRY

A Assuming you've checked that your NAS is running healthily and hasn't suffered any problems which might have affected that library, this may well be a result of iPhoto's age and remaining bugs. iPhoto's photo libraries consist of a huge

number of folders, with their own indexing system and database, which are separated from the metadata that provides information about the images. Trying a manual recovery isn't really feasible.

Your best prospect is to return to the most recent backup from before this occurred, and use that to migrate to Photos or, if you prefer, to Adobe Photoshop Lightroom.

To migrate to Photos, you'll need to have been using iPhoto 9.6.1, as earlier versions are less successful in the migration process. Work with a copy of the iPhoto library, and keep the original in a safe archive. You'll also find it better to migrate a locally-stored library, rather than one held on your NAS. Once you're happy that each library has been converted fully and works properly, you should be able to move them back onto the NAS again.

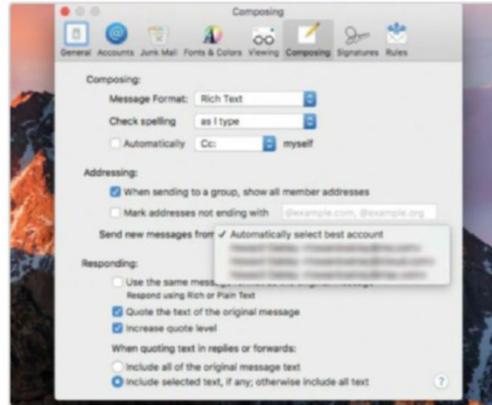
Keeping clear of Gmail

Q I set up a Gmail account ages ago, and haven't really used it, although I still have it set up in Mail. Whenever I send a message from Mail to someone with a Gmail address, the app defaults to sending it from that Gmail account. How can I stop that, and prevent incoming invitations defaulting to my Gmail calendar in the Calendar app?

by DUNCAN BRACK

A Mail lets you change the default mail account for new outgoing messages, which may help. Open Mail's Preferences, and select the Composing tool. Under Addressing, where it says 'Send new messages from:' select the default account from which you wish all new messages to be sent. There's currently no setting which makes all outgoing messages, including replies, come from the same default account, though.

Invitations coming in as email to an



Mail lets you set the default account from which to send new messages, but has no accessible control over replies.

account other than an iCloud mail account have behaviours which are controlled in the General section of Mail's preferences. The only choice is between adding them automatically to Calendar, or to not add them at all. The Calendar app doesn't offer any control; it tries to place invitations as smartly as possible.

How to remove Office 2011 after upgrading to 365?

> You don't have to remove the old version, as it will co-exist if you can cope with updates to both. Drag the Microsoft Office 2011 folder from Applications to the Trash and empty. This leaves debris in Library folders, such as old preference files, but frees up the great majority of the storage space which it occupies.

How can I check and repair a Photos library?

> Ensure it's backed up properly. Open a new window in the Finder, navigate to Applications, and locate the Photos app. Holding down the \square and \mathbb{A} keys, double-click the app icon and it will open, offering to repair the current default library. To change library, first double-click with the \square key held, select the new default library, quit, then repair that.



How can I report a problem with Safari?

> Apple only gives registered developers access to its Radar bug reporting system. If you encounter a problem which could be a bug, contacting Apple Support is the only way.

Importing JSON to Excel

Q What's the best way to convert data I've obtained from websites in JSON format, into a format that I can import into Microsoft Excel?

by RICH DANIELS

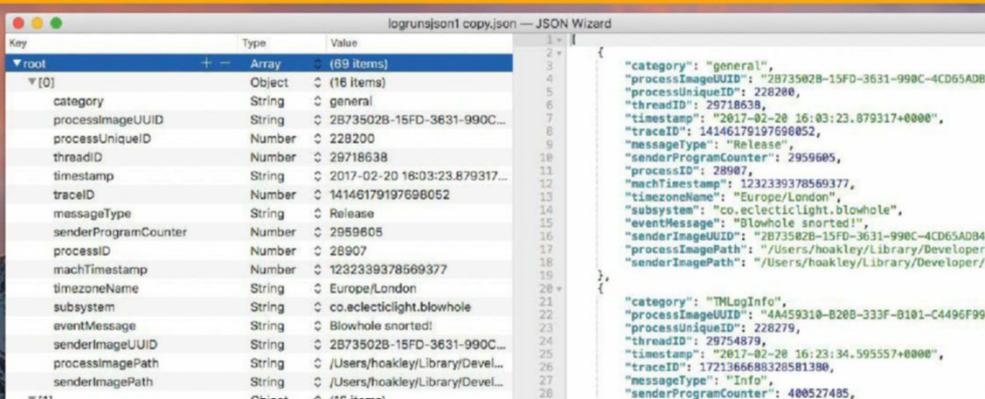
A JavaScript Object Notation (JSON) is an increasingly popular format for data obtained by querying online sources such as Twitter. As its name suggests, it's primarily intended for use with JavaScript, and there are many free online services which will convert small amounts for you with ease.

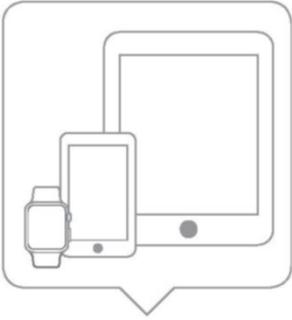
Spreadsheets such as Excel and Numbers are traditional in the formats they import, working best with plain text separated by tabs or commas (CSV). Transforming JSON's paired

attributes and values into lines of tab- or comma-delimited text isn't easy. The free statistical language R has a jsonlite package to import from JSON data, and an xlsx package to export to native Excel format. Even that isn't simple though, as it tends to flatten the data into just two rows of the spreadsheet. If possible, look to using JavaScript to write CSV text direct, or obtain the data in a different format which you could readily convert into tab- or comma-delimited lines of text.

There are also two free JSON databases, Apache CouchDB and MongoDB, which may provide suitable intermediates to help store and convert data, and the format home page at json.org has a huge list of other support packages too.

JSON editors like JSON Wizard reveal the structure of JSON data in the form of paired attributes and values, in a list.





iOS Software >

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

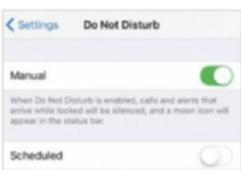
iOS software quick-fire questions >

Why are my phone number and region incompatible?

> iCloud and iMessage match these. If you have problems, correct your Apple ID settings according to support.apple.com/en-ae/HT201389. Check your Time Zone is set to match your Region, and the country code of your phone number matches. If you still see warnings, contact Apple Support to check your account.

How can I stop unwanted calls?

> Get your number put on the 'do not call' registry. Then in Settings, switch on Do Not Disturb to only let through specified callers and block notifications. Also, consider a call blocker app like Truecaller or Hiya (see our tutorial in last month's issue).



Sudden photo sharing

Q My wife and I have separate Apple IDs and different mail addresses, and have never used Apple's family sharing feature. Suddenly, all the photos taken by my wife and stored in her Photos library have appeared in my Photos library on my iPhone. How can I remove them?

by MICHAEL SCOTT

A This is almost certainly because your wife has turned iCloud Photo Sharing on, and you have somehow inadvertently subscribed to that share, either through Messages or in an email you would have received. Reversing that is straightforward, and should remove all shared photos from your library immediately.

If she can locate the shared album, she can go to its People tab, select you as a subscriber, then select Remove Subscriber. She can also turn off iCloud Photo Sharing in two different places within Settings: either tap on iCloud,

Shared photos should only appear in your library if you've accepted an invitation to share

then Photos, and disable it there, or tap on Photos & Camera to see it with other controls.

Once those photos have gone from your Photos, your wife can turn iCloud Photo Sharing on again when she wishes; for them to reappear on your iPhone, you'd have to accept an invitation to share with her again.

If disabling sharing does not remove them, and you're sure that they're not being shared from a Mac or elsewhere, you can try signing out of your respective iCloud accounts at



It's quick and simple to disable iCloud Photo Sharing in the Photos & Camera item in Settings.

the same time, then signing back in and ensuring that your account details are entered correctly.

If there has been some confusion in your accounts, you'd need to contact Apple's iCloud support to check and, if necessary, fix that.



The home of technology

techradar.com

BACK ISSUES Collect them all

Missed an issue?

Complete your collection of the UK's No.1 magazine for Apple fans

> IN PRINT



> ON iPad & iPhone



ISSUE 311 APRIL 2017

- > New Apple gear for 2017!
- > Do more with Apple's built-in apps
- > Smart sensors to secure your home
- > Turn an iPad into a Touch Bar for Mac

ISSUE 310 MARCH 2017

- > Become a Mac Genius
- > Multi-monitor setups made easy
- > Get smart: automate your home
- > Use an old Mac as a Time Capsule

ISSUE 309 FEBRUARY 2017

- > Get more from Apple Music
- > Make your MacBook last longer
- > Discover the full power of 3D Touch
- > Create your own typeface

To order back issues of the print magazine, go to bit.ly/macformat_back or phone **+44 (0)844 848 2852** and we'll post them out to you.

Download back issues onto your iOS device at any time and keep them forever in your personal library.
bit.ly/macformatipad

GET 3 ISSUES FOR £5! SUBSCRIBE TODAY!

IN PRINT & ON iOS

- > Our print and digital bundle gets you the real magazine and our brand-new digital edition for iPad and iPhone.
myfavouritemagazines.co.uk/macformat

ON YOUR MAC

- > Read on the big screen, too! If you prefer to read MacFormat magazine on a Mac, then subscribe with Zinio at zinio.com/macformat



What's inside

78-80

ROLLING BACK THE YEARS

- > Do OS upgrades really slow your Mac down?

80

MEASURE YOUR PERFORMANCE

- > Using GeekBench to measure a Mac's performance



Contact us

- > Email your queries and your questions to lovemac@macformat.com

- > Keep up to date by following us on Twitter @[macformat](https://twitter.com/macformat)

- > Join the conversation at facebook.com/macformat

- > Get the latest subscription offers at macformat.com

LOVE YOUR MAC



EDITED BY **LUIS VILLAZON** >

REUSE OLD KIT

Inspiring ideas for revamping your old Apple devices

The fastest OS X

Last month, I shaved a few minutes off the startup time of my Mac mini with some aggressive de-cluttering. This month, I'm going to try speeding up my wife's MacBook. Alison is making do with an 11-inch, Late 2010 MacBook Air. She almost exclusively uses it for FaceBook, email, shopping and Skype, so it doesn't need blistering performance. And since it has an SSD, it already boots up acceptably fast. But lately, Alison has complained that it feels more sluggish, and she blames the incremental

bloat that comes with each OS upgrade. She's currently running OS X 10.10.6 El Capitan and refuses to risk any more slowdown by upgrading to Sierra. Now, I generally believe the latest version is always the best, but rather than argue from an ideological standpoint, I'm going to approach this empirically. Let's reinstall a few previous versions of OS X and see if it improves performance. And if it does, which version offers the best compromise between speed and features? Was there ever a perfect version, or is this just nostalgia?

Is an old MacBook Air getting sluggish because of OS upgrades?



CLASSIC APPLE KIT FROM 1999!

>The 1999 Power Mac G4, codenamed Yikes!, was the first of the pro-level Macs introduced after Steve Jobs returned to Apple. It was so powerful that it was also the first Mac to be classed as munitions, under US export regulations. According to the government definition at the time, it was classed as a supercomputer! The Yikes! blue and white motherboard isn't perfect though. It doesn't support AirPort and it can't boot from USB drives. It will run versions of OS X up as far as 10.4 Tiger.



Hardware quick-fire questions >



How do I roll back to Lion or earlier?

> Apple still sells Lion and Snow Leopard on their website. Both cost £19.99. Snow Leopard comes on installation DVDs but Lion is only sold as a download code. If you need physical media, you can buy USB sticks with the Lion installer on them from Amazon for around £15.

How big does the external install disk need to be?

> The OS X installer will fit into 8GB, so you can use a thumb drive if you want.



I entered the Terminal command but my keyboard stopped working!

> The sudo command needs your password but Terminal won't display the admin password on the screen, so it looks like the keyboard isn't working. Just type it in blind and hit return.

Rolling back the years >

Did your Mac run faster on previous OS X?



1

Processor

> 1.4GHz Intel Core 2 Duo. The Late 2010 MacBook Air runs about a quarter the speed of a MacBook with an i7 chip.

2

2GB RAM

> This is the base model. The RAM is soldered to the motherboard, so you couldn't upgrade after you purchased.

3

11.6-inch screen

> The smaller screen size was a new option for the Late 2010 model. The screen resolution is 1366 x 768.

4

SSD

> All MacBook Airs from 2010 onward use solid-state drives exclusively. This one has 128GB of storage.

5

Ports

> The slim design leaves room for just one USB 2 port on each side, plus a MagSafe and Mini DisplayPort.

6

OS X

> This Mac was originally sold with 10.7 Lion. It supports all versions from 10.6 Snow Leopard to 10.11 Sierra.



Let's start by benchmarking the MacBook running El Capitan. For the kind of light duties my wife Alison demands of her laptop, a full benchmarking suite feels like overkill. But if I don't measure the performance, I can't compare it. I eventually decided to use Geekbench 4 (geekbench.com) because it claims to use tests that model real-world applications. It also has a free trial version. With no other apps running, the MacBook scores 992 using just one of the CPU cores and 1661 in multi-core tests. Next I made a bootable backup of the entire drive, using Super Duper! (shirt-pocket.com). It was a condition of the deal I made with Alison that she would have her MacBook returned to her in its original condition. In view of this, I also uploaded her entire home folder to cloud storage as well, just to be sure.

Now to downgrade the OS. Although the App Store lists all the previous versions of OS X you have installed, under the Purchased tab, you can't just re-download an old version. OS X will refuse to run the installer for an older version than you already have. Instead I used a spare USB hard drive, and formatted it as OS X Extended (Journaled) and partitioned using GUID. Then in Terminal, I typed:

```
sudo /Applications/Install\ OS\ X\ Yosemite.app/Contents/Resources/
```

```
createinstallmedia --volume /Volumes/Untitled --applicationpath /Applications/Install\ OS\ X\ Yosemite.app --nointeraction
```

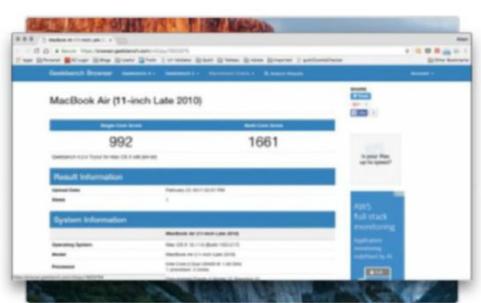
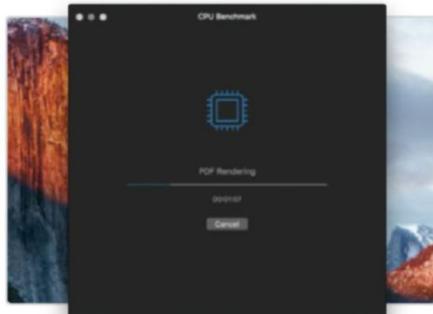
This runs the createinstallmedia utility built into the installer for Yosemite, and tells it to install to the external drive instead of the MacBook's own drive. It took about 20 minutes. Next, I restarted the MacBook with the Option key held down and picked 'Install OS X Yosemite' from the list of bootable drives. Once the menu bar appeared for the OS X Installer, I clicked Utilities > Disk Utility and erased the main hard drive. After I had

The extensions running in the menu bar affect the speed of this Mac a lot more than the particular version of OS X.

It's vital to format the external disk so that you can boot from it before you wipe the internal drive.



HOW TO Measure your performance >



1 Install GeekBench

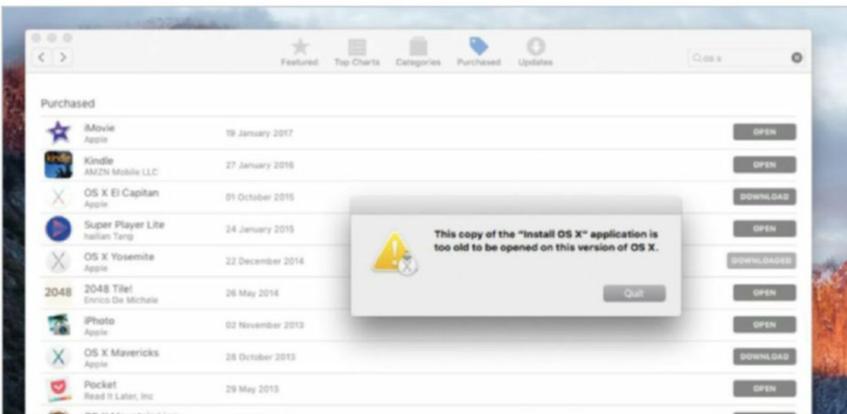
Geekbench 4 (free trial version, as long as you're connected to the internet, or £7.99, primatelabs.com). Earlier versions required you to upgrade in order to run 64-bit tests but these are available in the trial version now. The main screen just shows the same basic info that is available from the About This Mac menu.

2 Run the test

Select CPU and click Run CPU Benchmark. This runs a series of tests simulating the tasks the processor normally performs when running apps. Tests are calibrated against an Intel Core i7, which should score 4000. The score is proportional to the speed, so a score of 2000 means your CPU is half as fast.

3 Single vs multi-core

The two headline scores relate to the system speeds running single-threaded/multi-threaded tasks. Multi-threaded tasks are able to take advantage of all cores on your processor. This requires programming from the developer though. OS X itself is written to take advantage of multiple cores, but not all apps are.



Apple doesn't believe older versions are better, either.

wiped both the drive, and the anxious sweat from my brow, I quit Disk Utility and returned to the installer to put a clean copy of Yosemite on the now empty drive.

Disappointing numbers

Now that Yosemite was up and running, I reinstalled GeekBench and took another sounding. The results were... underwhelming. Scores of 994 and 1666 were about a quarter of a percent faster than El Capitan. And this was a completely clean install. By the time I restored Alison's apps and extensions, it would probably be slower than before. Time to roll back the clock again. I downloaded Mavericks, installed it to the external disk, wiped the MacBook's internal drive and ran the installer. A hour later I ran GeekBench again. Mavericks

scored 1013 and 1699 - about 2% faster than El Capitan. That's slightly better but at this point, I figured that I might as well do one more, so I went through the whole rigmarole one more time to downgrade another step to OS X 10.8 Mountain Lion. This time I saw a performance jump of just under 5% compared with Mavericks, or 7% overall.

So after a long afternoon of installing and reinstalling, what did I have to show for it? 7% performance difference isn't something you can actually notice. These are synthetic benchmark scores testing intensive number-crunching and graphics processing tasks. When I tried opening apps and loading webpages, it all felt about the same. And this performance isn't free either - it comes at the expense of the Maps and iBooks apps, cloud syncing in Notes, window snapping to put two apps side-by-side - to name just a few of the features I've definitely seen my wife use. Last month's tactic of simply clearing out the junk I don't need and never use had a bigger effect on performance on my Mac than dropping back three versions of OS X on Alison's. It's easy to get nostalgic about previous versions, much like we do about previous decades but I am now more convinced than ever that nostalgia is an illusion brought on by the longing for lost youth. And as soon as I have restored Alison's MacBook to El Capitan, I'll start nagging her to upgrade to Sierra.

Next Issue!

> Luis makes another attempt to get Lode Runner installed on his 1987 Mac SE, using some ancient software and an almost prehistoric Mac to PC file-transfer cable.

LIVE IN
THE UK?

Turn to
page 46



Buy overseas **SUBSCRIBE**

Mac
FORMAT

Subscribe
wherever
you live...

- > Never miss an issue again
- > Every issue delivered to your door at a fraction of the price
- > Get instant access to the magazine on your iOS devices
- > Huge savings and the best value for money

Subscribe from as little as

€29/\$42

and get MacFormat wherever you are!

It's easy to subscribe... visit

myfavouritemagazines.co.uk/MACsubs

How Apple accidentally changed the world



Alex Blake looks into five ways in which Apple has transformed the tech industry

There's no doubt that Apple is a game changer. Most times, the innovative tech giant has set out with a vision of what it wants to change and how, but sometimes things can take an unexpected turn - and Apple ends up changing an entire industry without even meaning to.

Touchscreens, app stores, music downloads - even the modern concept of a smartphone - in all of these cases, Apple has innovated, and nearly every one of its competitors has scrambled to play catch up.

Where Apple goes, others follow. In this article, we look at five occasions the Cupertino giant has accidentally changed the world.





1. Smartphones

Apple knew it had something special when it launched the original iPhone 10 years ago.

On stage at Macworld 2007, Steve Jobs recounted the times Apple had revolutionised the tech industry with the Macintosh and the iPod, and announced that Apple was about to do it again. Similarly, the company's press release for the iPhone was titled 'Apple Reinvents the Phone with iPhone', and went on to quote Jobs as saying: "iPhone is a revolutionary and magical product that is literally five years ahead of any other mobile phone." Big talk, indeed.

But aside from its revolutionary physical features, it changed the world in a different way - it reconfigured the relationship between mobile networks, phone manufacturers and customers. In the US, the situation before the iPhone was skewed in favour of the network companies, who would use access to their networks as a means to exert

influence on how phones were to be designed and how much they'd cost.

As *Wired* magazine put it not long after the launch of the iPhone, "Handsets were viewed largely as cheap, disposable lures, massively subsidised to snare subscribers and lock them into using the carriers' proprietary services."

High-end handsets

What the iPhone did was prove that phones needn't be cheap, disposable afterthoughts. It proved that expensive phones - even those costing \$599 as the top-end iPhone did at launch - could sell well. Indeed, market analysts UBS Research predicted the iPhone would sell over 3 million units by the end of 2007,

After 2007, manufacturers strove to create something consumers wanted

making it the world's fastest-selling smartphone at the time.

This flipped the status quo on its head. Smartphone manufacturers strove to create something consumers wanted, rather than something the networks wanted. This was apparent almost immediately - "The iPhone is already changing the way carriers and manufacturers behave," remarked Michael Olson, a securities analyst at Piper Jaffray, less than a year after the iPhone came out.

Similarly, Apple shook up the relationship between manufacturers and networks in Japan. There, networks also had undue influence on what made it into finished phones, tinkering and adding features until they were bloated and complicated.

They added TV receivers and e-wallets - features that the networks thought were indispensable.

Then, in July 2008, came the iPhone. As in the



The original iPhone might look a bit retro these days, but at its launch in 2007 it was revolutionary, and transformed the market.

US, Steve Jobs had managed to get the iPhone on sale in Japan with no modifications from the networks. This was highly unusual - even in 2013, Japanese mobile phone expert Nobuyuki Hayashi commented that "iPhone still is about the only phone in Japan which is sold unmodified" - but it was a successful approach.

Without the bloatware and resulting confusion and battery drain, the iPhone was able to soar to success - so much so that less than two years later it had captured 72% of the Japanese smartphone market. Runner-up HTC secured a paltry 11%.

The end result is that the iPhone changed perceptions of what a smartphone could be. It needn't be a cheap, throwaway item; it could be premium and luxurious. It needn't be bloated with unnecessary features; it could be simple and refined. The whole smartphone paradigm shifted when Steve Jobs walked onto the Macworld stage in January 2007.

Five of the best **APPLE INNOVATIONS**

2. App economy

The App Store - launched alongside the iPhone 3G in July 2008 - barely got a mention in its initial press release, which focused almost exclusively on the iPhone. In fact, Walter Isaacson's biography of Steve Jobs suggests Jobs was against the entire idea of an App Store. But it was such an explosive concept that getting apps any other way seems unimaginable today, be that with an iPhone or Android phone.

Here are our favourite stats that illustrate the success of the App Store - and how it's changed the mobile industry.



90 billion

> Total number of app downloads on iOS and Android in 2016, demonstrating what a phenomenal success app stores have become.

\$5.4 billion

> The total revenue generated by Apple's App Store in Q4 2016. Google's Play Store generated \$3.3 billion in the same period despite having more apps, as a greater proportion of them are free or cheap.



2.2 million

> Number of available apps in the Apple App Store as of January 2017. It launched on the iPhone with 500 apps.



3 million

> Projected number of apps in the Apple App Store by 2020.



2.7 million

> Google's rival app store, the Play Store, has even more apps, with 2.7 million in total.

140 billion

> Total number of apps downloaded from Apple's App Store by September 2016.

While Apple set out to create a safe, simple way for iPhone users to get new apps, it ended up sparking an idea that the whole smartphone industry went on to copy, to great success.

3. Touchscreens

Before the debut of the iPhone, the smartphone world was dominated by Palm and BlackBerry handsets with small screens and plastic keyboards. They were phones for business people, not everyday users, replete with styluses and focused on email.

Just before he unveiled the iPhone, Steve Jobs blasted these phones on-stage as hard to use and lacking in functionality. You were stuck with a large plastic keyboard whether you needed it or not. And if the manufacturers came up with a new function or idea after the product had launched? Too bad, you were stuck with that form factor.

Apple sought to remedy all of that with one simple solution - a touchscreen.

Superior screen

The iPhone launched with a mediocre 2MP camera, no third-party apps and only 2G. It couldn't record video, and you couldn't search your emails. But all that was made irrelevant by the capacitive touchscreen.

The lack of a physical keyboard made reading on the iPhone a far superior experience, with more screen space devoted to the subject matter. Touch functions could change depending on use, with play/pause buttons when listening to music or a keyboard in Messages, all of which would disappear when not in use.

MacFormat editor Graham Barlow remembers being amazed when he first saw the touchscreen. "My abiding memory of the iPhone launch is of Steve Jobs zooming into

a web page in Safari with an unpinch gesture. There were audible gasps from the audience - we'd never seen anything like it before," he says.

Having such a large display area made it ideal for viewing things in landscape orientation as well as portrait - so Apple built in an accelerometer for this purpose. In fact, it was so good that Google completely shelved its own smartphone plans and started over again when its executives saw the iPhone launch. Google was originally going after Microsoft with a phone that had a physical keyboard and no touchscreen. But after seeing Jobs unveil Apple's revolutionary phone, Google knew its own product simply wouldn't be good enough.

"As a consumer I was blown away. I wanted one immediately," remembers Google engineer Chris De Salvo. "What we had suddenly looked just so... '90s."

The touchscreen transformed phones from communication devices into immersive media viewers. Instagram, YouTube, Twitter - it's a good bet that none of these would have taken off in the way that they did if the touchscreen hadn't have been introduced. Apple didn't mean for that to happen - at least not directly - but it all came about as a result of that design decision.

4. Digital music downloads

Back in 2003, the music industry was terrified of piracy. Four years after the first release of Napster, the online world must have seemed like a scary place to record executives.

Then along came the iTunes Music Store. In one fell swoop, Apple introduced a safe, legitimate online music store that satisfied consumers and reassured record labels (although they still had reservations about the price structure).

Digging digital

The store allowed users to download songs instantly at 79p a pop when it launched in the UK in 2004. Compared to heading out to a record store, hoping

The iTunes Music Store paved the way for streaming services like Netflix and Apple Music.



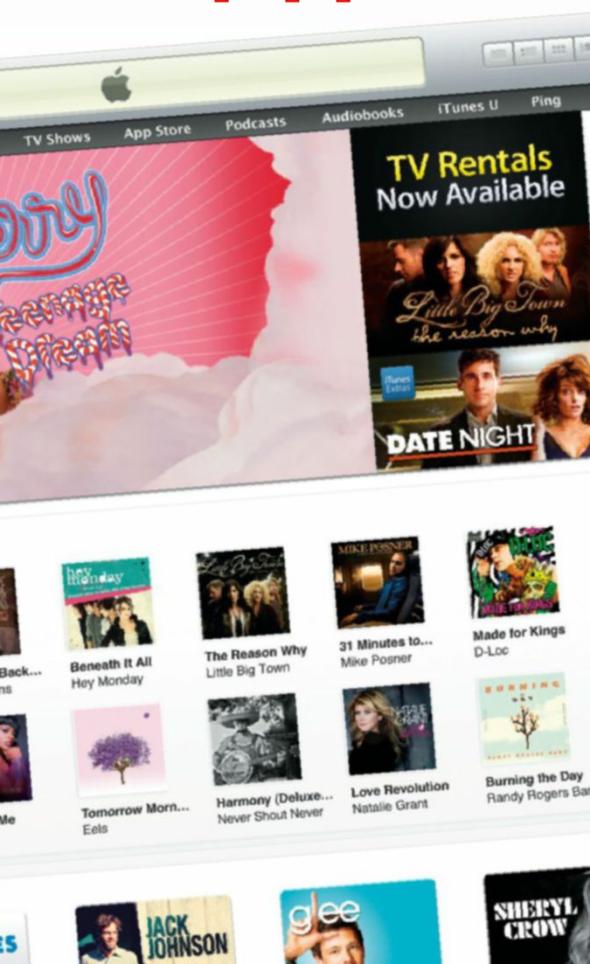
they had the CD in stock and paying more for it anyway, this was a far better experience.

It took off in such a big way that from 2000 to 2007, CD sales in the US fell from 943 million to 500 million. At the same time, digital music downloads went from almost zero to 819 million. The impact on CD sales was so profound that CNN proclaimed in 2013 that "iTunes singles killed the music industry".

The iTunes Music Store expanded into other areas too, like TV shows, movies, games and more. Although it wasn't a streaming service, it readied the ground for platforms like Netflix and Apple Music alike by giving people a way to quickly access their favourite media, online and direct from their devices.

Jobs wasn't aiming for universal industry change, but the iTunes Music Store proved to be so popular that that's what he got.

The iTunes Music Store allowed users to download songs at 79p a pop



Like a lot of Apple moves, the removal of the headphone jack was controversial, but there are already plenty of wireless earbuds on the market...

5. Dropping standards

Apple's position as a market leader and reputation for innovation has given it a lot of leeway when it comes to adopting new hardware standards. It knows it can drop a popular port in favour of what it thinks is the hardware of the future and people will still buy its products in droves - albeit at the expense of a bit of grumbling.

What's interesting is that everyone else usually follows suit, resulting in major hardware industry shifts. We've already seen that with touchscreens, but it applies to the more modest ports and cables too.

Moving on

In hindsight, much of the fuss surrounding these decisions seems like a storm in a teacup. For example, when Apple dropped the 3.5-inch floppy drive in the iMac in 1998, Bloomberg quoted one angry Mac fan as saying the lack of the then-standard drive would "kill this machine". But the follow-up from the rest of the industry was so complete

that floppy drives had been completely abandoned within a few years - and soon, manufacturing of the drives had ceased completely.

From VGA on Macs to the 30-pin port on the iPhone, Apple is ruthless when it comes to dropping standards that it perceives as archaic, and is very willing to adopt new, replacement standards that end up driving the industry forward. Ditching the floppy paved the way for the mainstream adoption of USB and CD drives, after all, with obvious storage and speed benefits.

The abandonment of the headphone jack in the iPhone 7 is part of the same story. Apple forecasts a wireless future, and doesn't mind making the first move.

Its revenues and popularity are such that it knows it can weather the resulting storm. How long will it be until the 3.5mm jack is viewed the same way as FireWire? Apple can't tell other companies what to do, but in many cases, when Apple drops something, everyone else follows.

iPad User Magazine



Essential guides and reviews!

Personalise your iPad

Make your iPad look and work the way you want!

EACH ISSUE JUST £2.99 / \$4.99, SUBSCRIPTIONS FROM £1.99 / \$2.99

bit.ly/iTunes_iPadUser JOIN US ON TWITTER: @iPadUserMag



What's inside

90-94 **MAC HARDWARE**

> Cameras, drives, storage and gaming

95 **HEAD-TO-HEAD**

> Two outdoor cams on the lookout for top spot

96-99 **GROUP TEST**

> We pitch 5 wireless in-ear headphones against each other

100-101 **MAC SOFTWARE**

> Window snapping, easy email, photo editing and more

102-103 **IOS SOFTWARE**

> Photography, weather reports and design



Contact us

> Email your queries and your questions to letters@macformat.com

> Keep up to date by following us on Twitter @macformat

> Join the conversation at [facebook.com/macformat](https://www.facebook.com/macformat)

> Get the latest subscription offers at macformat.com

APPLE CHOICE

EDITED BY **ALEX BLAKE** >



BUYING ADVICE

Our authoritative reviews help you make more informed choices



**BILLION
BiPAC
ROUTER**
p92

> 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 noted for affordability.



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

Nikon D5600

Modest updates to a great SLR

Reviewed by PHIL HALL

> £727 > FROM Nikon, nikon.co.uk > FEATURES 24.2 megapixels, 3.2-inch touchscreen, SnapBridge, ISO 100-25,600, 1080p video at 60fps

The D5600 is designed for those looking for a few more features and greater creative control than

Nikon's more entry-level cameras. Its resolution is a decent 24.2MP, with a native sensitivity range running from ISO100 to 25,600, so it's quite comfortable shooting in a range of lighting conditions.

The optical viewfinder provides coverage of 95% of the frame, so for some key shots you may want to double-check the composition on the rear display to ensure that nothing unwanted has crept into the very edges of the frame. Speaking of the display, there's the same 3.2-inch vari-angle touchscreen display with a 1,037,000-dot resolution, although its operation has been improved. It now offers the frame-advance bar to speed up toggling through images, as well as a crop function for use during playback.

Another addition to the D5600 is Nikon's timelapse movie function. This allows for timelapse movies to be captured and put

together entirely in-camera, with an exposure smoothing function evening out variations in lighting as your sequence is captured. Other manufacturers are starting to offer 4K video capture as standard but Nikon



Alex says...

> It's a shame that Nikon decided to completely forego the ability to record 4K video on the D5600. Still, if you prefer fluid framerates to high resolutions, its 1080p 60fps output will be smoother than the 4K 30fps video on offer from some of its rivals.



We were impressed with the resolution and detail in shots captured by the Nikon D5600.



The included 18-55mm kit lens sometimes struggles to focus in low light, but is otherwise a good starter lens.

has, a little disappointingly, decided to stick with 1080p capture here, with a choice of 60p, 50p, 30p, 25p and 24p frame rates.

The D5600 sticks with Nikon's proven 39-point Multi-CAM 4800DX autofocus (AF) system. It may be starting to show its age against mirrorless rivals offering ever-more AF points, but it's still a solid and accurate system when shooting with the viewfinder. Both single and continuous AF modes are fast and accurate, locking on with ease to static subjects, while the AF tracking modes work well for moving subjects, although you don't get the more advanced custom settings found higher up the Nikon range. We did find that the bundled 18-55mm kit lens struggled a little when light levels dropped, though.

Performance

The D5600's Matrix metering system copes well with a range of lighting situations, although you might need to dial in some negative exposure compensation in high-contrast scenes to retain highlight detail,



and recover shadow detail in post-processing if necessary. Alternatively, the Active D-Lighting system can be useful here, retaining more detail in both the highlights and shadows when shooting JPEG files.

The auto white balance system did well in a range of lighting conditions, rendering natural-looking results, although under some artificial lighting images can look yellowish; the dedicated white balance presets can help.

The burst shooting speed remains at 5fps; some mirrorless cameras of comparable price and spec are offering considerably more speed in this area. What a mirrorless camera will struggle to keep up with, however, is the D5600's battery life. Good for 820 shots, it towers over most mirrorless options.

Image quality

The results from the 24.2MP chip didn't throw up any nasty surprises. As you'd expect, with all of those pixels packed onto the sensor, resolution is very good, with the absence of a low-pass filter allowing for intricate details to be recorded, while there's plenty of scope for decent enlargements too.

Images captured at lower sensitivities appear to be very clean, with little or no noise present, and it's only at ISO6400 and above

ALTERNATIVE CHOICES



Panasonic Lumix G80M (body only) **£629**

SPECIFICATIONS

- > FROM panasonic.com
- > 16 megapixels
- > Live MOS sensor
- > ISO 100-25,600
- > 4K video at 30fps



Canon EOS 750D (body only) **£549**

SPECIFICATIONS

- > FROM canon.co.uk
- > 24.2 megapixels
- > CMOS sensor
- > ISO 100-25,600
- > 1080p video at 30fps



The large touchscreen on the back of the camera can be moved through different angles for ease of use.

that the D5600's processing starts to really encroach on image quality.

Finally, dynamic range is impressive, with the potential to recover plenty of shadow detail in raw images shot at lower ISOs. This latitude does decrease as you ramp up the camera's sensitivity, with ISO1600 about the limit at which you can expect recovered shadows to stand up to close scrutiny.

The D5600 is a very capable mid-range DSLR that delivers great images and is complemented by sound autofocus and solid controls. That said, unless you're desperate for a camera with timelapse movie capture, the cheaper Nikon D5500 would be our pick until the price drops on the D5600.

Mac FORMAT VERDICT

> A very capable mid-price DSLR, which delivers great quality images and polished handling.



- ⊕ Great image quality
- ⊕ Decent AF system
- Only 1080p video
- Relatively expensive

LaCie d2 Thunderbolt 3

Fast performance, generous storage

➤ £575 ➤ FROM LaCie, lacie.com
➤ FEATURES 2x Thunderbolt 3 ports, 1x USB 3.1 (Type-C)



Though this d2 has new ports, LaCie has reused its existing case design.

Mac FORMAT VERDICT

➤ Sound performance, attractive design, and plenty of space at a reasonable per-gigabyte price.



- ⊕ Connection choices
- You'll need to consider a back-up strategy

This drive has two features that are attractive if you deal with very large media files or have a high-end display setup. It sports a gigantic 10TB capacity and two Thunderbolt 3 ports.

Such a fast connection to your Mac might seem wasted on a traditional disk, which won't saturate the 40Gbps bandwidth. The point of it, though, lies in the second Thunderbolt 3 port, which enables you to daisy chain

another device – great news if you're running short of places to plug things in to your Mac. That device can even be a 5K display.

This model also has a Type-C USB 3.1 port, and a Type-A-to-C is included for older Macs. Beyond that, this d2 looks just like other recent models; the friction afforded by the rubber-backed base is a particularly welcome touch for keeping the drive steady.

LaCie quotes speeds of up to 240MB/sec. As ever with

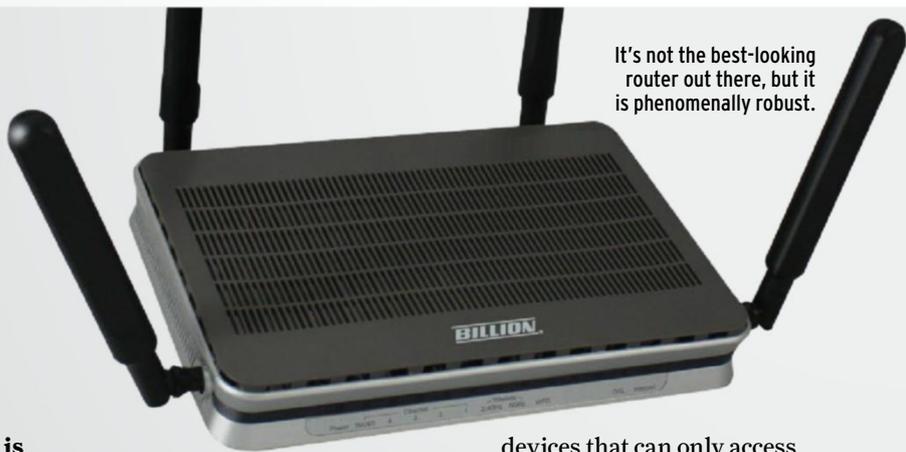
storage, mean averages are lower – 220.7 and 211.5MB/sec sequential read and write speeds, respectively, and 108.2MB/sec and 95.1MB/sec when reading and writing randomly around the disk; the latter is likely to be a rare occurrence at this capacity and when using the drive for very large files that occupy contiguous areas of the disk.

Bear in mind that at this kind of capacity, a means of backing up gets costly. **ALAN STONEBRIDGE**

Billion BiPAC 8900AX-2400

A fibre-friendly gigabit router

➤ £250 ➤ FROM Billion, billion.com ➤ NEEDS Dual-band 802.11ac Wi-Fi, backup 3G/4G connection via USB



It's not the best-looking router out there, but it is phenomenally robust.

Mac FORMAT VERDICT

➤ A supremely flexible all-in-one networking box.



- ⊕ Backup connectivity
- Not the most attractive design

This router is intended for a situation where you simply can't afford to be without the internet.

If your broadband falls over, there's the option to failover seamlessly to a 3G/4G data connection via a USB cellular modem. Your Mac won't know the difference.

The Billion supports all phone line broadband, including fibre. If you have a router and separate fibre

broadband modem, the Billion can replace both – we used it to replace a BT Smart Hub (connected to BT Infinity fibre). If you have a cable connection, you can use this as an action point, but should probably look for a more standard router without ADSL2+ and VDSL (fibre) support. It supports both newer devices on 5GHz 802.11ac, as well as legacy

devices that can only access 2.4Ghz 802.11ac.

You can have multiple individual networks across both bands and schedule times – so you could give tenants, kids or co-workers access between certain hours. (Be aware that the Billion isn't designed for telephony.) The best thing, though, is its reliability – we had no issues, with a robust Wi-Fi signal across all devices. **DAN GRABHAM**

Drobo 5C

USB-C storage that can grow to suit your needs and budget

Reviewed by **ALAN STONEBRIDGE**

> £363 (enclosure only) > **FROM** Drobo, drobo.com
> **FEATURES** 1x USB-C port, five bays for between 2 and 5 disks

You can remove one disk and install a new one of a larger capacity without a problem

The major appeal of Drobo's storage drives is the ability to start with two disks installed and add more later to boost capacity whenever suits you.

The distinguishing feature of this model is its USB-C port; a USB-A-to-C cable is included, but if your Mac has the newer kind of port, you'll need to provide your own adaptor or replace the cable. Disappointingly, there's just one USB port onboard, whereas some RAID drives we've tested before have included extras and worked as a hub.

Access to the disk bays requires no tools; the front panel is magnetically attached and easy to detach. The downside is there's no way to lock the panel in place. A sticker on its back tells you about the statuses the lights on the front-right of the drive may take – credit to Drobo for putting it in a sensible place.

Drobo's online guide walks you through inserting 3.5-inch SATA disks into the bays, installing the Drobo Dashboard on your Mac, and using the app to configure the drive. Some prebuilt RAID drives only accept disks from their own manufacturer; Drobo doesn't make disks, and it shows no favouritism.

Getting set up took us about 10 minutes to complete, and then a good while longer for the two disks we inserted to be initialised. After that, you can add more disks at will; detection takes roughly 10 seconds.

Some of the total capacity of your disks is set aside as an overhead to protect against a disk going bad. With the default settings, one can fail without enduring any data loss. Protection against two disk failures is an option, if you're willing to sacrifice additional space for files. Replace a failed disk with one of the same or a greater capacity and the array is rebuilt automatically for you.



The 5c is an affordable - and expandable - storage solution, with protection against hard drive failure.

Additionally, the dynamic nature of Drobo's BeyondRAID tech enables you to expand on the capacity of whatever disks you choose to install in the first place; you can remove one disk and install a new one of a larger capacity without problem. Again, the drive deals with this automatically, saving you some worry.

Room to grow

Drobo's capacity calculator (bit.ly/2lWT9eE) is helpful for checking how your particular combination of disks and choice of single- or dual-disk redundancy will affect the space that's actually available for your files, ahead of you buying new disks.

Dashboard shows array and disk status info clearly, and is complemented by a menu bar icon that informs you of problems – a nice touch if you'll put the drive somewhere that results in the status lights on its front being out of sight. As for Time Machine support, Dashboard provides an option to limit the space it can use by setting aside capacity on a separate volume to your other files.

The Drobo 5C is a great way to consolidate and grow your Mac's storage over time. Its port is limited to USB 3.0 speeds, though; the more costly 5D has two Thunderbolt ports, enabling daisy chaining and providing more bandwidth, plus it has an mSATA bay to further boost performance with an SSD. However, the 5C's price, set-up process, and supporting software make it an affordable and flexible pick for protecting files at home.

Mac
FORMAT

VERDICT

> The 5C offers the usual Drobo benefits, but there's room for a second-gen model to improve on it.



- ⊕ Flexible for future storage expansion
- ⊕ Excellent software
- ⊕ Port is limited to USB 3.0 transfer rates
- ⊖ No USB hub feature

Gamevice for iPhone

The iPhone's Nintendo Switch



There's no battery, so Gamevice draws power from your iPhone.

> £79.95 > FROM Gamevice, gamevice.com
> FEATURES Lightning connector and passthrough port, 3.5mm headphone jack

Mac FORMAT VERDICT

> Far better than playing your iOS games with clumsy on-screen controls.



- ⊕ Light and comfortable
- Quite expensive

Let's be honest: playing games on iOS can be a faff.

It's rare to find a game where your thumb doesn't end up obscuring the action. Add in clumsy controls and you have a recipe for frustration. Gamevice circumvents this issue completely – it's a controller housing for your iPhone with physical buttons and joysticks. At the time of writing it was compatible with 940 App Store games,

including big names like Assassin's Creed and Call of Duty, and the manufacturers promise to add more.

And it works very well. There's no noticeable latency and it feels firm and sturdy. It transforms gaming on iOS into an experience not unlike the Nintendo Switch. You can adjust the fit for your phone, and there's also a Lightning passthrough port and a headphone jack too. The Lightning adaptor is a

two-sided coin.

If you buy an Android phone (or Apple changes the connection in the future), you may find the Gamevice no longer fits. But the other option (Bluetooth) may have had its own set of issues, such as signal interference in busy areas, or high latency.

Gamevice is also a sizeable investment for a bit of fun, so you have to be sure it's worth it for you before you shell out. **ALEX BLAKE**

Satechi Aluminum USB 3.0 Hub & Card Reader

More ports for your Mac



You get three USB 3.0 ports, but one more wouldn't hurt.

> £33.99 > FROM Satechi, satechi.net
> FEATURES 3 x USB 3.0 ports, 2-slot card reader, plug-and-play

Mac FORMAT VERDICT

> An excellent, useful USB hub. It's fast, looks good, and is a great price.



- ⊕ Fast connectivity
- microSD reader

Having ports on the back of your Mac desktop makes it look good, but it's not the most convenient thing.

This hub borrows the styling of Apple's Magic Trackpad and Keyboard (although, slightly awkwardly, the last generation of these devices, rather than the current style), and gives you three USB 3.0 ports, an SD card reader, and a microSD card reader, with a single USB Type-A cable

that connects to your Mac. The idea is to save you having to fumble behind your Mac to plug things in.

Mostly, it works great. With two drives connected through it, data rates were almost exactly the same as with the drives connected to the Mac directly. It also pushes through enough power to charge an iPad.

However, if you connect too many of your devices at once, you may overload its power capabilities – our two drives stopped transferring once we connected the iPad! (Your Mac will warn you if this is the case.)

We'd have liked a fourth USB slot over the microSD reader ourselves, but it's still great. **MATT BOLTON**



Security cameras

Security cameras come with many extras, such as a floodlight or a speaker. Here, we put two top cameras to the test...



Netatmo Presence

Nest Cam Outdoor

Reviewed by **DAN GRABHAM**

> £249 > **FROM** Netatmo netatmo.com > **FEATURES** 100-degree FOV, 1080p HD video, weatherproof, light, infrared

> £179 > **FROM** Nest nest.com/uk > **FEATURES** 130-degree FOV, 1080p HD video, speaker, weatherproof, infrared

Features ★★★★★

The Netatmo Presence detects in real time whether someone's in front of your house. An integrated smart floodlight switches on when needed as an added deterrent.

Features ★★★★★

With a wider degree of view than the Presence, the Nest Cam Outdoor also includes a speaker – so, you can use Nest's iOS app to talk to someone outside. There is, however, no way to store video footage locally, or a light.

Design ★★★★★

Constructed from aluminium, the Presence is a tough looking piece of kit. The major design drawback is that most people will need a professional to fit it, as it will either replace an existing external light or need to be cabled up as a new one – there's no mains plug or USB.

Design ★★★★★

The Nest Cam Outdoor has a nifty appearance, but it comes with a standard three-pin UK plug. You can either plug it into a socket inside and get the flat cable through the wall, place it beside a door, or plug it into a weatherproof outdoor socket.

Ease of use ★★★★★

There's consistent upload of full HD video to a 16GB microSD card (or to Dropbox or FTP should you wish). You can set specific zones for alerts. The app (iOS 9 or later) can distinguish between people, cars and animals, and you can customise notifications accordingly.

Ease of use ★★★★★

Nest is owned by Google and the app (iOS 8 or later) is simple; you can zoom, enhance, get person alerts, create clips and timelapses, and share live streams.

Price ★★★★★

This camera is expensive but, as mentioned, the tech is housed in substantial material. As well as the sturdy (and weighty at 1kg) casing, there's also a mount kit and wall bracket. You also get an included microSD card.

Price ★★★☆☆

The camera price is good, but to access your video history you'll need to subscribe to Nest Aware. This costs from £8 per month or £80 per year (you get a free month's trial). Watching live video is free, and you can also view snapshots from the last three hours.

> An impressive outside security camera – providing you can get it fitted; the camera itself is solid and the app can be customised.



**Mac
FORMAT
VERDICT**

> Lovely design, but you'll need access to a socket. The app has a lot to offer including live video, but you'll have to pay to store video.



APPLE AIRPODS RIVALS TESTED

We test five Bluetooth in-ear headphones that offer the freedom of wireless listening

Reviewed by **TIM HARDWICK**

You may have heard that Apple's latest iPhones don't have a headphone jack. The decision to remove it wasn't exactly widely applauded, but we've seen Apple do this before – drag its customers, not to mention the entire technology industry, kicking and screaming into the future. Events usually proceed in the following sequence: 1) Apple kills a universal standard; 2) Cue collective outrage; 3) The long-term benefits gradually sink in; 4) The industry follows suit and the majority of users wonder what all the fuss was about.

Granted, we're not quite there yet with the jack, mainly due to its abiding presence on a wide range of home audio equipment, plus

Audio accessory companies are embracing wireless tech to cater for smartphone users

Apple hasn't quite mustered the 'courage' to remove it from its notebooks (yet). But that hasn't slowed the embracing of wireless technology among audio accessory companies eager to cater for smartphone users. Concerns about Bluetooth's ability to deliver decent sound quality still get bandied around, but the truth is that given the choice, many mobile users favour the convenience of wireless headsets over wired ones, knowing that they can always enjoy their music without compromise using their hi-fi and a wired connection at home.

Jack-free judgement

Over the next few pages, we'll be comparing some of the most promising cord-free solutions in the headphone market and highlighting their unique features, relative merits, as well as any drawbacks. Notably, we'll also be seeing how the rival brands stack up against AirPods, Apple's own 'truly wireless' offering. So join us as we step into a jack-free future. Let's get listening.

WIRELESS BUDS

- › Apple AirPods **£159**
- › Bose SoundSport Pulse **£149**
- › Bragi The Headphone **£145**
- › KEF Motion One **£220**
- › Jabra Elite Sport **£229**

How we tested

Each headset was tested in various typical usage scenarios, such as wearing while walking or jogging, and listening on a noisy commute. We also tested for everyday wear and tear, taking into consideration weather conditions. An iPhone 7 or a 2015 MacBook Pro was the connected audio source for the vast majority of cases.

Things to consider...

Everything you need to know before getting started

- 1 **Audio quality**
Do the earphones provide decent sonic reproduction in the lows, mids, and highs? Is the bass overpowering or well balanced? Do certain genres sound muddy or vibrantly clear?
- 2 **Earbud fit**
Are the earbuds comfortable to wear? Don't forget, the real test comes with prolonged use. Also, do they isolate you from the commotion of the outside world, or let in a pile of sound pollution?
- 3 **Bluetooth connection**
Some wireless devices cause all sorts of connectivity issues. Regular drop-outs are particularly frustrating if they happen when you're listening to an album or a podcast. Solid Bluetooth pairing is a must.
- 4 **Battery life**
How long do the earphones last on a single charge? Do they take an age to recharge from empty? Also, is there any kind of battery backup if you're away from a power outlet?
- 5 **Water resistance**
A headset's ability to withstand rain and moisture is a crucial feature for outdoor use. Also, ears tend to get sweaty during exercise, so decent water resistance is important.
- 6 **Wearing style**
How conspicuous (or inconspicuous) are the earpieces during use? Do they look weird sticking out of your ears, or would onlookers even know you were wearing any? If fashion is a big factor in your get-up, it's something to consider.



Higher...

> **Bose QuietControl 30 wireless headphones** A wire connects the two ear buds, but you can set your own level of noise cancellation. **£260**



...or lower?

> **Syllable D900 Mini** This pair of 'virtually wireless' buds has a selection of silicone tips and a charging case that can hold between four and six charges. **£40**

Test 1 Design

How do they look and feel in-ear?



> The one-size-fits-all AirPods are very comfy. The open-air design is feather-light; the balancing stem means they 'hang' in your ear, but don't fall out, even when exercising. The magnetic case design is great, too. The magnetised KEF buds feel good in-ear, but the corded

'neckband' looks weird and bounces around when running. It doesn't fit in a pocket either.

The Jabra have a solid, discreet look, and the wings mean they sit securely in the ear, but pressing the buttons can push the buds further into your eugs, which isn't nice. The Bragi buds suffer the same issue, and though they look similar to the Jabra, they don't feel quite as robust. The Bose buds are well built and the connecting cord feels strong, but the winged earpieces, while comfy, do stick out of your ears a bit.

TEST RESULTS

Apple AirPods	★★★★★	KEF Motion One	★★★★★
Bose SoundSport Pulse	★★★★★	Jabra Elite Sport	★★★★★
Bragi The Headphone	★★★★★		

Test 3 Sound

Audio quality versus noise pollution



> Tonally, the AirPods sound very clear and well balanced for open-air earphones; the drawback is they do virtually nothing to isolate external noise. The story's the reverse with the Bragi: their passive noise cancellation is impressive, but the audio quality is less so - instrumental music sounds

particularly muddy and the bass can be overpowering. The Jabra on the other hand hit the audio quality/noise-cancelling sweet spot; music and spoken word sounds decent across the board, with clearer lows thanks to the buds' isolating seal. The Bose buds are too 'open' to provide any real isolation and the volume level feels capped, but the buds offer decent sound in the low and mid range, albeit with a touch of harshness in the treble. Generally, the KEF sound excellent, especially for earbuds - and keep external noise at bay pretty well too.

TEST RESULTS

Apple AirPods	★★★★★	KEF Motion One	★★★★★
Bose SoundSport Pulse	★★★★★	Jabra Elite Sport	★★★★★
Bragi The Headphone	★★★★★		

Test 2 Accessories

Included tips, cables and cases



> The AirPods case is small but holds 24 hours' charge for topping up the pods, which receive two hours of extra juice after 15 minutes inside. A Lightning cable is included to charge the case. Jabra includes an on-the-go charging case with six hours' backup power and a USB charging cable, as

well as six pairs of eartips and three pairs of earwings.

The Bragi come with three eartip sizes and a carry case, but it must be connected to a power source via the supplied USB cable to charge the buds. The Bose earphones come with two spare pairs of winged tips and a soft case, while a micro-USB charging cable attaches directly to one bud. KEF supplies two spare tip sizes, an airport adaptor, a soft leather pouch for the earbuds and a hard case for the neckband, a micro-USB charging cable, and a spare lead for optional wired listening.

TEST RESULTS

Apple AirPods	★★★★★	KEF Motion One	★★★★★
Bose SoundSport Pulse	★★★★★	Jabra Elite Sport	★★★★★
Bragi The Headphone	★★★★★		

Test 4 Controls

Interacting with your buds



> The AirPods auto-connect to an iPhone when you open the case, and eschew buttons in favour of touch-sensitive taps - a double tap invokes Siri (to change volume or track, for example) but the same gesture can be configured to pause/play. The Bragi on-bud buttons can also be

used to control Audio Transparency to allow in ambient sound. They also pause music when removed and resume playback when re-inserted. Apart from onboard playback/volume buttons, the Jabra buds also include heart-rate tracking and real-time voice coaching, with an app to manage your training. The Bose buds have inline volume and playback controls on the connecting cable; the KEF set has them integrated into the neckband which is not a convenient solution, and you lose the controls when you detach the cable for wired listening.

TEST RESULTS

Apple AirPods	★★★★★	KEF Motion One	★★★★★
Bose SoundSport Pulse	★★★★★	Jabra Elite Sport	★★★★★
Bragi The Headphone	★★★★★		



They don't isolate much, but the AirPods are a fine example of considered Apple design.



Graham says...

> Apple kicked up a huge fuss when it unveiled its wireless AirPods, with claims flying around that they were ugly and easy to lose. But it looks like they're the real deal here, with a winning combination of great sound quality and classic Apple ease of use. We love them.



THE WINNER APPLE AIRPODS

On-the-go charging with great sound and comfort

The Bose SoundSport are an all-round decent pair of buds, but the sound quality isn't quite what it should be at this price, while the Bragi The Headphone buds lack flair both materially and in terms

of audio. The KEF sound fantastic, but they're just too awkward and expensive to recommend. In the end, it comes down to Apple and Jabra, the only two waterproof sets with on-the-go charging cases.

If you're looking for fine-sounding isolating buds for use during workouts, the Jabra Elite Sport headphones have all the practical benefits. But with instant pairing, balanced sound, and great comfort, the AirPods embody Apple at its best.

It comes down to the two waterproof sets with on-the-go charging cases

> How do they compare?



>THE SPECS	> Apple AirPods	> Bose SoundSport	> Bragi The Headphone	> KEF Motion One	> Jabra Elite Sport
Website	apple.com	bose.co.uk	bragi.com	uk.kef.com	jabra.co.uk
Price	£159	£149	£145	£220	£229
On-the-go charging	Yes (24 hr capacity)	No	No	No	Yes (6 hr capacity)
Battery Life	Up to 5 hours	Up to 6 hours	Up to 6 hours	Up to 10 hours	Up to 3 hours
Earbud type	Open ear	Open ear	Isolating in-ear	Pivoted open ear	Isolating in-ear
Accessories	Charging case, Lightning cable	2x spare winged tips, soft case, USB cable	Charging case, 3x spare tips, USB cable	2x spare tips, airport adaptor, earbud pouch, neckband case and charging cable	Charging case, 3x spare tips, 3x earwings
Waterproofing	Waterproof (unofficial)	Sweat resistant	Sweat resistant	Water-resistant; IPX5	Water resistant; IP67
> DESIGN & COMFORT	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
> ACCESSORIES	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
> SOUND & ISOLATION	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
> FEATURES & CONTROLS	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
> FINAL VERDICT	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Note: The final verdict scores reflect the overall opinion of a product and are not necessarily an average of the criteria listed in the table.

Spark

Making email fun again

> Free > FROM Readdle, sparkmailapp.com
> NEEDS OS X 10.11 or later

Mac FORMAT VERDICT

> Spark puts the fun into function; it's very capable and an absolute joy to use.

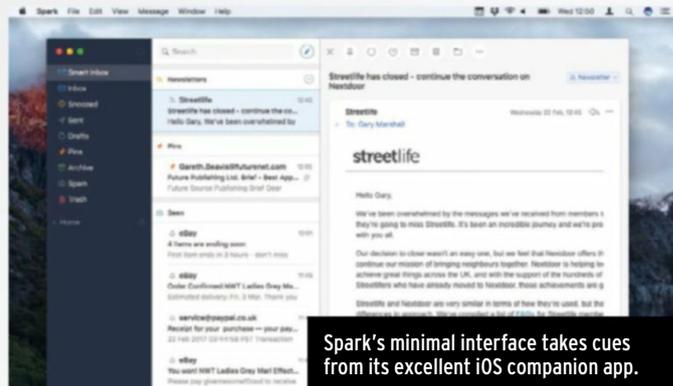


- ⊕ Excellent email search
- Inflexible interface

We're always on the lookout for the perfect email

app. Our wish list includes support for Gmail aliases, smart inboxes, the ability to snooze messages for set periods and easy, automated responses to things we don't have time for. Several email apps offer those features, but few do it with Spark's style.

Spark's good-looking design supports the new MacBook Pro's Touch Bar, so you can easily sort or snooze messages with a tap, and you can use Swipe gestures on your trackpad to switch



Spark's minimal interface takes cues from its excellent iOS companion app.

signatures before you send.

New emails are classified as personal, notifications or newsletters, and you can pin important messages so they don't disappear until you're done with them. The Smart Inbox shows only important, unread messages and pinned ones, and you can use the Snooze option to hide emails for a specified period of time. There's an excellent natural language search engine, too.

Our only real complaint is that you can't do much about the user interface, like changing text sizes. You can customise everything else, however, including what appears in the Smart Inbox, how long the Snooze feature holds your emails for, and what Quick Replies contain.

Spark fits our wish list almost perfectly – it really takes much of the pain out of email. **GARY MARSHALL**

Magnet 2

Wonderful window-snapping

> £4.99 > FROM CrowdCafé, magnet.crowdcafe.com
> NEEDS OS X 10.9 or later

Mac FORMAT VERDICT

> Despite more powerful options, this is a natural-feeling macOS enhancement.



- ⊕ Simple and intuitive
- Mission Control clash

One thing Windows still does better than macOS is shortcuts that quickly snap windows to preset areas of the desktop.

Magnet adds a similar kind of feature to your Mac, so you can make a window fill a half or a quarter of the screen by dragging it to a screen edge or corner. This version lets you snap your windows to columnar thirds, too.

A grey overlay indicates the area a window should fill when you let go of it. If it needs more space, an overlay, like macOS's one for volume



Magnet displays a grey box to show where your window will snap.

changes, tells you why. Minimum widths required by some apps can make snapping to a third of the screen's width more useful on large desktops than on a MacBook, where these apps may not fit in the allocated space. Unfortunately, there's no way to divide the screen into a finer grid, as rival apps Divvy and Moom can.

Helpfully though, Magnet memorises the previous

dimensions of a window and restores them when you drag a window away from its snapped position.

One thing we'd like to be refined is the ability to fill the desktop by dragging toward the screen's top edge; there are only a few rows of pixels between triggering that or macOS's shortcut into Mission Control, which can be a tad frustrating. **ALAN STONEBRIDGE**

Photolemur

The machines are coming
(to edit your photos)

Reviewed by **ANGELA NICHOLSON**

> £28.99 > **FROM** Photolemur, photolemur.com
> **NEEDS** OS X 10.10.5 or later



It works especially well with dark images, bringing them to life

Photolemur is a photo editor with a difference; it uses subject recognition and applies adjustments automatically. Rather than applying specific filters or fixes, it identifies features such as faces, trees, skies, and landscapes to make enhancements that are specific to the subject and image. What's more, it learns as it goes, so it should get better the more it's used.

Photolemur looks at image colours, exposure, contrast and white balance, and analyses an image on a pixel-by-pixel basis before making adjustments to enhance each shot individually. If you save an image, it's added to the 'success' list, but if you don't it's added to the 'blacklist', thus helping the app learn what you like to see.

Automagic adjustments

Photolemur couldn't be easier to use. Click Load Photo to upload an image or a selection of images, or drag a collection of files to the



Photolemur is particularly effective with dark photos, where its changes help bring out details and colour.

main screen. It then starts processing the images before revealing the first image, with a line dividing it into before and after views.

You can drag the line left or right to reveal more or less of the adjusted version. A sliding control under the preview lets you alter the adjustment on a scale from Realistic to Vivid. In most cases we found that the default effect was fine, but it's nice to be able to make the occasional tweak to your image.

Varying effects

The only other control is a crop/rotate tool accessed via the scissors icon. This can be used as a click-and-drag tool, but you can also enter a specific angle of rotation if you like. It's also possible to set an aspect ratio for the crop, which is useful if you have a specific output in mind (such as Facebook or Twitter).

If you upload more than one image in the app, all of the unopened images are visible in the collapsible browser bar underneath the central preview screen. Simply click any of the images to see the adjusted version.

Photolemur is extremely easy to use and works very well. We applied a variety of adjustments – all to varying degrees – to a selection of different images, and it handled them well in each case. Sometimes the automatic adjustment can be very subtle, whereas other images may have a more dramatic edit applied. It works especially well with dull or dark images, bringing them to life by brightening them selectively, boosting the local contrast to bring out details, and also increasing the colour saturation.

For an app that works almost entirely automatically, Photolemur's results are impressive. It's a worthy investment.

Mac FORMAT VERDICT

> Photolemur's effects are often subtle and work well in a variety of situations.



- ⊕ Easy to use
- ⊕ Automatic adjustments
- ⊕ Effective results
- Limited control

Weather Line

Graphs make everything better!

- > £3.99 > FROM Off Coast, weatherlineapp.com
- > NEEDS iOS 10 or later



Mac FORMAT VERDICT

> Both functionally and aesthetically pleasing, this is a brilliantly designed app.



- + Clear information
- + Weekly charts

You may wonder why you'd need a third-party weather app in the first place. As it turns out, there are lots of reasons: maybe you do a lot of work on your iPad – and the default Apple Weather app isn't available for the iPad; maybe you want something that shows a lot of information in a small space. Whatever the reason, this app has a lot to offer.

The app is really easy to use; its sleek interface can be read at a glance. Weather Line shows information on a plain white background for



Weather watchers can pore over monthly and yearly information.

optimum visibility, and the simple, infographic-style presentation of data gives you everything you need to know front and centre.

You'll be able to see the weather throughout your day, as well as the projection for the week, and there's a smart feature that allows you to see averages for specific months of the year. Worried about precipitation? Check out what sort of rainfall-

related weather you'll be in for over the next hour, from clear skies to heavy rain and everything else in between.

Weather Line is a great improvement over Apple's Weather app, especially for those who like to plan their events according to weather projections. Not won over by rival apps like Dark Sky? Weather Line is a worthy alternative, and deserves high praise. **AMBER NEELY**

Darkr

Relive the days of analogue photos

- > Free (£2.99 IAP for Pro version) > FROM Marcus Carlsson, miliam.net/support
- > NEEDS iOS 8.1 or later

Mac FORMAT VERDICT

> Daunting at first, Darkr quickly teaches you how to take better photographs.



- + Learn photo skills
- Hard without tutorials

Darkr is a photo app designed to emulate the feeling of working in a real darkroom. It hopes this will help you take better pictures as you learn the darkroom process. The app only shoots images in black and white, but the results are so striking that we don't mind.

Getting to know Darkr is a bit intense. There are a few different camera options to try out, each offering varying amounts of control. These allow you to manually control focus and exposure, as well as set the contrast in the



darkroom. The idea is that if you have to slow down the process, you'll be more mindful of the photographs you're taking, and thus take better photo. We're inclined to agree, were very pleased with the results from the virtual lab.

We suggest you take the time to read the tutorials. While they may seem a little excessive at first, you will get a far better result than if you



Darkr details how the app functions as it works, including an explanation of analogue tech.

were to go in completely blind. If you forget how to use a feature or create a particular effect, Darkr allows you to go back and view the tutorials again.

If you're looking to improve your photography, Darkr will help you create stunning results while also teaching you how to properly compose photographs. Who says darkroom photos are dead? **AMBER NEELY**

Astropad Studio

Draw on your Mac with an iPad Pro

Reviewed by **RICHARD HILL**

> £7.49/month, £60.99/year > **FROM** Astropad, astropad.com
> **NEEDS** OS X 10.10 or later, iPad Pro, Apple Pencil



With Astropad, sketches with your Apple Pencil on your iPad Pro appear on your Mac.

It's aimed at working artists and designers who expect to be drawing for hours every day

Astropad is an app that links your iPad and Mac together: the iPad displays the app you're running on your Mac, and whatever you draw with a stylus on your iPad appears on your Mac. Last year's Astropad Standard app enabled you to do this with a variety of iPad models and any stylus you owned. Studio, however, works only with iPad Pro and the Apple Pencil. Another important difference is that Standard costs a one-off payment of £28.99, but Studio is only available through a monthly or annual subscription, managed through an online account. It's clear that Studio is a professional solution, aimed at working artists and designers who expect to be drawing for hours every day.

Perfect partners

Setting everything up is a chore, simply because of the number of components you're working with. First, create your Astropad Studio account and set up your subscription. Next, download and install the Astropad app on your Mac and the Astropad Studio app on

your iPad Pro. Now run both apps: as long as your Mac and your tablet are on the same network, they'll recognise each other and your Mac screen will be reproduced on your iPad Pro. Of course, all this only needs to be done once, but it's still not exactly fun.

The combination of iPad Pro and Mac works well in practice. If you link your iPad and Mac with your iPad charging cable, the connection between the two screens feels instantaneous. If you decouple the iPad and link through Wi-Fi instead, you might notice a lag between the Mac screen changing and the iPad screen updating, depending on the speed of your wireless network. But we were never excessively bothered by the time lag.

The exclusive use of iPad Pro and Apple Pencil means that Astropad Studio has several extra features compared with Standard. For example, Studio's Magic Gestures feature enables you to combine finger tap and Pencil gestures to trigger responses, including simulating a **⌘**-click or switching between tools. You'll have to consider if that's worth the subscription.

Mac FORMAT VERDICT

> State of the art, but you might prefer the Standard edition's pricing if you're a more casual sketcher.



- ⊕ Reliable to use
- ⊕ Fluid gestures
- ⊖ This version only works with iPad Pro
- ⊖ Subscription-only



You can combine finger touches with Pencil movement to trigger shortcuts such as simulating a **⌘**-click.



For the best experience, connect your iPad Pro directly to your Mac rather than over Wi-Fi.

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 highlighted the model of each product that's ideally suited to your needs, whether you're a recent

convert or a seasoned Apple user. So be sure to 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, helping you 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.

	> 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

> Inside your buying guide...

MacBook Pro.....104	Monitor.....109	Portable speaker.....110
MacBook.....105	Ultra HD monitor.....109	On-ear headphones.....110
MacBook Air.....105	External SSD.....109	In-ear headphones.....110
Mac Pro.....105	Network storage.....109	Portable battery.....110
Mac mini.....105	Wireless router.....109	Action camera.....110
iMac.....106	Thunderbolt dock.....109	Bluetooth tracker.....110
iPhone.....108	Printer.....109	Microphone.....110
iPad.....108	IP camera.....109	Fitness smartwatch.....110
iPad Pro.....108	MacBook bag.....109	
Apple Watch.....108	Wireless speaker.....110	

R = Retina display

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 R
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 R
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 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
APR 2016
EXPECTED
TBC



MacBook Air

> Apple's MacBook Air has felt a bit neglected, with its place as the light, portable laptop for use on the go having been usurped by the 12-inch MacBook.

Still, it has the longest-lasting battery of all of Apple's MacBooks, going strong for 12 hours of wireless web browsing. It's also the most affordable MacBook, starting at £949. It has 8GB of memory, and flash storage includes 128GB, 256GB and 512GB options. There's a 1.6GHz processor, configurable to 2.2GHz.

That said, it's difficult to recommend. While it *is* the cheapest MacBook, we think it's likely this will only be the case until prices drop for the MacBook and MacBook Pro, at which point Apple will probably phase out the Air range.

It also lacks a Retina display, and feels a bit stuck between Apple's other laptops. This is one MacBook whose time is severely limited.

> Choose a MacBook Air

	> MODEL	> KEY SPECIFICATIONS	> PRICE
ENTRY LEVEL	13-inch 1.6GHz dual-core Intel Core i5	MEMORY 8GB of 1600MHz LPDDR3 GPU Intel HD Graphics 6000 STORAGE 128GB SSD	£949
UPGRADER	13-inch 1.6GHz dual-core Intel Core i5	MEMORY 8GB of 1600MHz LPDDR3 GPU Intel HD Graphics 6000 STORAGE 512GB SSD	£1,279
HIGH END	13-inch 2.2GHz quad-core Intel Core i5	MEMORY 8GB of 1600MHz LPDDR3 GPU Intel HD Graphics 6000 STORAGE 512GB SSD	£1,409

UPDATED
DEC 2013
EXPECTED
2017



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. But with a high cost, last being updated in 2013, and Thunderbolt 3 in the new MacBook Pro, it's worth waiting for the next version, which could finally come out in 2017.

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 comes with some interesting talking points: the entry-level model has a 1.4GHz dual-core Intel Core i5 CPU and 4GB of memory, making it one of the lowest-spec Macs around, 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 at the moment.

UPDATED
OCT 2015
EXPECTED
2017

IN FOCUS:

iMac

Apple's flagship desktop computer is a potent mix of beauty and power

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.

With the Mac Pro conspicuous by its absence in recent Apple keynotes, the iMac is the desktop of choice if you're in the market for a powerful, capable desktop computer.

And it's not just a great computer on the inside - the iMac looks absolutely stunning too. With an amazingly thin frame and sleek, minimalist touches,

it's vintage Apple design that masks its raw power.

Apple last updated the iMac range in October 2015, so we're hopeful of seeing some newer models making a splash in 2017. With better graphics cards and faster processors (likely from Intel's Kaby Lake range) in the offing, this iMac update could represent a significant boost.

5K phenomenon

As with the original iMac, Apple is again pushing boundaries with its desktop beauty, blessing all of its 27-inch models with the one of the best displays on the market, with 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 a formidable i7 running at 4.0GHz), 16GB 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. Be sure to check out our preferred configurations on the left to find the iMac best suited to your needs.

If you want something that's kinder on the wallet, you won't miss out on a beautiful display - the smaller 21.5-inch iMacs are available with a brilliant 4K display.



	> 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 16GB 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	£1,629
HIGH END	27-inch 4.0GHz quad-core Intel Core i7	MEMORY 16GB of 1867MHz DDR3 GRAPHICS AMD Radeon R9 M395 STORAGE 2TB Fusion Drive DISPLAY Retina 5K (IPS, P3 gamut) ALSO Magic Mouse 2, Magic Keyboard	£2,654

Four things to consider >

1 Display resolution

> These days iMacs come in 1080p, 4K and 5K flavours, with each resolution being a significant step up from the one before it. If you do a lot of photo or video editing work, the additional screen space afforded by the higher resolution will be a real boon.



Graham says...

> I know it's expensive, but opting for flash storage can make a world of difference. It's just so much faster than a hard drive. Installing one is the best way to speed up a old Mac, so going for one in a new iMac is absolutely worth it if you can stomach the premium Apple tax.

2
Processor power
 > Every iMac comes with an Intel i5 CPU by default, configurable to an i7 in the 4K and most of the 5K models. In short, an i7 will perform better in tasks such as video encoding and, at 4.0GHz, it also has a faster clock speed than the i5 processors.

3
Do you need a discrete GPU?
 > All 5K iMacs have a dedicated graphics card, whereas all other models rely on the processor to handle graphics. Discrete GPUs help with the higher resolution, but are also better if you want to dabble in a bit of gaming.

4
Storage situation
 > Apple offers a baffling array of storage options with its iMacs. The default is a hard drive - large but fairly slow. At the other end is flash storage, which is lightning fast but more expensive. Fusion Drives are a blend of the two, and a good mid-range choice.



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 these if the iPhone 7 is too expensive.

And let's not forget the iPhone SE. Updated with 32GB and 128GB storage options, it packs in an A9 chip and M9 motion coprocessor, and has a bright, crisp and compact 4-inch screen.

> Choose an iPhone

	> MODEL	> KEY SPECIFICATIONS	> PRICE
ENTRY LEVEL	iPhone SE (4-inch display)	CAPACITY: 128GB PROCESSOR: A9 3D TOUCH No CAMERA 12MP photos, 4K video recording	£479 
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 shifted the iPad range around in March 2017, replacing the iPad Air 2 with a 9.7-inch model simply called 'iPad'. The entire Air range has been phased out, but the iPad mini 4 is still available.

The 9.7-inch iPad features an A9 CPU and M9 motion coprocessor, and comes in 32GB and 128GB storage flavours. The Retina display has been made brighter compared to the Air 2, but the new iPad is slightly thicker and heavier. It's also got an 8MP rear camera and a 1.2MP front-facing camera.

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. There's also Split View, which lets you work on two apps side by side.

> Choose an iPad

	> MODEL	> KEY SPECIFICATIONS	> PRICE
ENTRY LEVEL	7.9-inch iPad mini 4	CAPACITY 128GB PROCESSOR A8 CONNECTIVITY Wi-Fi CAMERA 8MP TOUCH ID Yes	£419 
UPGRADER	9.7-inch iPad	CAPACITY 128GB PROCESSOR A9 CONNECTIVITY Wi-Fi CAMERA 8MP TOUCH ID Yes	£429 
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.

> **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.

> **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.

> **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.

> **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.

> **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.

> **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.

NEW! > **IP CAMERA**

Netatmo Presence

£250

netatmo.com



> The Netatmo Presence is an impressive outdoor security camera. Set in a sturdy housing, it's built to defy the elements. It has a built-in floodlight to

deter intruders, and a 100° field of view recorded in 1080p. There's also an SD card included, making it easy to store and access your footage.

> **MACBOOK BAG**

Knomo Hanson

£90

knombags.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.

NEW! > **IN-EAR HEADPHONES**

Apple AirPods
£159
apple.com/uk



> Apple's answer to dropping the 3.5mm jack is the AirPods; we tested them against four rivals this issue (see p96) and they cleared the pack.

With instant iPhone pairing, balanced sound and a comfortable fit (even when exercising), the AirPods are classic Apple. They're even reasonably priced.

> **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.

> **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 Hero5 Black
£349
gopro.com



> We looked at GoPro's new flagship action cam this issue, and it coloured us impressed. GoPro has finally improved its cam's usability, and it's a cinch to

get started with the Hero5 Black. Add in superb 4K video quality plus a great range of shooting options and you've got a hugely powerful camera on your hands.

> **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.

Get the UK's best-selling Linux magazine



DELIVERED DIRECT TO YOUR DOOR

Order online at www.myfavouritemagazines.co.uk

or find us in your nearest supermarket, newsagent or bookstore!

NEXT ISSUE Back up on

BACK UP ONLINE

YOUR COMPLETE GUIDE TO BACKING UP YOUR MAC AND USING iCloud TO THE FULL

ALSO INSIDE...

- > Get organised with Wunderlist
- > Get better performance on old Macs
- > Record FaceTime audio
- > The best photo editing apps
- > Master the features of Night Shift for Mac
- > Discover the new abilities of iOS 10.3

ISSUE 313
ON SALE
9 MAY
2017

DON'T MISS IT - SUBSCRIBE TODAY!

IN PRINT & ON YOUR iPad

> Our print and digital bundle gets you the paper magazine as well as our iPad edition myfavouritemagazines.co.uk/macformat

ON YOUR MAC

> Read digitally on your Mac: subscribe with Zinio at zinio.com/macformat

Zinio subscriptions do not include a print copy of the magazine.

Mac FORMAT

MacFormat, Future,
Quay House, The Ambury
Bath, BA1 1UA
Tel +44 (0)1225 442 244
> www.futureplc.com
> facebook.com/macformat
> twitter.com/macformat

EDITORIAL

Editor-in-Chief **GRAHAM BARLOW**
graham@macformat.com
Art Editor **PAUL BLACHFORD**
paul@macformat.com
Operations Editor **JO MEMBERY**
jo@macformat.com
Commissioning Editor **ALEX BLAKE**
alex@macformat.com

ADVERTISING

Commercial Sales Director **CLARE DOVE**
Senior Advertising Manager **LARA JAGGON**
Director of Agency Sales **MATT DOWNS**
Advertising Director **JOHN BURKE**
Head of Strategic Partnerships **CLARE JONIK**
Advertising Manager **MICHAEL PYATT**
michael.pyatt@futurenet.com
Account Sales Manager **ANDREW TILBURY**
andrew.tilbury@futurenet.com

PRINT & PRODUCTION

Production Controller **FRANCES TWENTYMAN**
frances.twentyman@futurenet.com
Head of Production UK & US **MARK CONSTANCE**
mark.constance@futurenet.com

MANAGEMENT

Managing Director - Magazines **JOE McEVROY**
Group Editor-In-Chief **PAUL NEWMAN**
Group Art Director **GRAHAM DALZELL**

LICENSING

Senior Licensing & Syndication Manager **MATT ELLIS**
matt.ellis@futurenet.com Tel +44 (0)1225 442244

PRINT SUBSCRIPTIONS

Tel 0844 848 2852 Web myfavouritemagazines.co.uk
Email macformat@myfavouritemagazines.co.uk

Printed in the UK by William Gibbons
Distributed in the UK by Marketforce (UK), 2nd Floor,
5 Churchill Place, Canary Wharf, London, E14 5HU

CONTRIBUTORS

EDITORIAL: Matt Bolton, Nate Drake, Dan Grabham,
Craig Grannell, Phil Hall, Tim Hardwick, Richard Hill, Cliff Joseph,
Gary Marshall, Amber Neely, Angela Nicholson, Howard Oakley,
Nick Peers, Alan Stonebridge, Luis Villazon

ART: Apple, Future Photo Studio (Niel Godwin)



23,021

PRINT 13,634 DIGITAL 9,387

Jan-Dec 2016

A member of the Audited Bureau of Circulations



Future is an award-winning international media group and leading digital business. We reach more than 57 million international consumers a month and create world-class content and advertising solutions for passionate consumers online, on tablet & smartphone and in print.

Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR). www.futureplc.com

Chief executive Zillah Byng-Thorne
Non-executive chairman Peter Allen
Chief financial officer Penny Ladkin-Brand
Tel +44 (0)1225 442 244

© Future Publishing Limited 2017. All rights reserved. No part of this magazine may be used or reproduced without the written permission of the publisher. Future Publishing Limited (company number 2008885) is registered in England and Wales. The registered office of Future Publishing Limited is at Quay House, The Ambury, Bath, BA1 1UA. All information contained in this magazine is for information only and is, as far as we are aware, correct at the time of going to press. Future cannot accept any responsibility for errors or inaccuracies in such information. Readers are advised to contact manufacturers and retailers directly with regard to the price of products/services referred to in this magazine. If you submit unsolicited material to us, you automatically grant Future a licence to publish your submission in whole or in part in all editions of the magazine, including licensed editions worldwide and in any physical or digital format throughout the world. Any material you submit is sent at your risk and, although every care is taken, neither Future nor its employees, agents or subcontractors shall be liable for loss or damage.



When you have finished with this magazine please recycle it.

We are committed to only using magazine paper which is derived from well managed, certified forestry and chlorine-free manufacture. Future Publishing and its paper suppliers have been independently certified in accordance with the rules of the FSC (Forest Stewardship Council).

PHOTO STREAM

GET ON INSTAGRAM

› 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).

Covet that cover!

BY [gel_ous](#)

MAC MEMORIES

MacFormat's Apple G4 Cube cover, Sept 2000

Thanks so much to [gel_ous](#) for having a bit of a clearout, and stumbling across a vintage issue of Britain's best-selling Apple magazine!

This G4 Cube cover dates back to September 2000 - the millennial year when Apple released its "coolest computer ever". A year later? Ahem, Apple decided to put the cool computer "on ice"...

Share your pics with us using the hashtag #MacFormat on Instagram. In each issue we'll pick our favourites to feature on this page.

WHAT TO DO!

- › **1** Open an Instagram account.
- › **2** Follow @MacFormatUK (of course).
- › **3** Take a picture of, or with, your 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.



The history of OS X

We roll back the years on classic Apple tech



Mac OS X was, arguably, the product that got Steve Jobs back into Apple. Apple acquired NeXT Computer in 1997, bringing Steve back on board, to get its Unix-based NeXTSTEP operating system which evolved into Mac OS X and replaced the aging Mac OS 9.

Aqua user interface

> Mac OS X's most recognisable feature, and most radical departure from Mac OS 9, was the Aqua interface, which contained soft, water-like elements. After the initial splash (sorry) at the launch of Mac OS X, Aqua got toned down and by 2014's OS X Yosemite started a new trend towards a flatter '2D' interface that went hand-in-hand with the latest iOS look and feel.



Mac OS X launched with a splash, thanks to Aqua.

August 2002

> Jaguar saw great performance increases, and the introduction of iChat and Address Book.

April 2005

> Tiger had more new features than most Mac OS X releases, including Spotlight, Dashboard and Smart Folders.

August 2009

> Snow Leopard was the first Intel-only edition of Mac OS X to be released.

July 2011

> Lion saw the arrival of Launchpad and even more use of multitouch gestures.

October 2013

> Mavericks was Apple's first free OS upgrade, adding Maps and iBooks.

September 2016

> In 2016 Apple dropped the OS X name altogether with the release of today's macOS 10.12 Sierra.

2001

March 2001

> Mac OS X 10.0 Cheetah launches, succeeding the 'Classic' Mac OS introduced in 1984.

2002

September 2001

> Hot on the paws of the buggy Cheetah came Puma, with improved stability.

2003

October 2003

> Panther ushered in the era of brush metal interfaces and added Mac staples like Safari, Exposé and Font Book.

2004

2005

October 2007

> Leopard added even more new features than Tiger, including Time Machine, Spaces and support for 64-bit applications.

2006

2007



July 2012

> Mountain Lion changed the naming convention of OS X, and was the final big cat version to be released. The OS featured more iCloud integration.

2009

2011

October 2014

> Yosemite matched the iOS 7 flat design and introduced Handoff.

2012

2016

June 2015

> El Capitan was a smaller update with few visible changes.

2017

Big cats

> The first public beta of Mac OS X had the codename Kodiak, but the first official release of Mac OS X 10.0 was called Cheetah, starting a trend for a range of big cat names, cumulating in OS X 10.8 Mountain Lion in 2012, after which Apple switched to using Californian landmarks.

The Intel transition

> Unknown to most Mac users, Mac OS X was living a double life from its inception, running on both PowerPC and Intel processors, but it wasn't until 2005 that it was revealed that Mac OS X worked on both systems and Intel Macs were released in 2006. It was the final change that Apple needed to spur on widespread Mac adoption.



2006's MacBook Pro and iMac were both Intel Macs.



NEXT ISSUE ON SALE >
Tuesday 9 May 2017





AKVIS Watercolor

Photo to Art! Watercolor Painting Effect!



akvis.com

Stormfront

beats by dr. dre.

Designed for Sound. Tuned for Emotion.

Beats Solo³ Wireless headphones immerse you in rich, award-winning sound, everywhere you want to go. Buy now from your local Stormfront store.



Visit Stormfront, your local Apple experts.
Find us at: www.stormfront.co.uk/contact

TM and © 2017 Apple Inc. All rights reserved.

9012

9000