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JIM
MARTIN



Windows 8: Microsoft's biggest mistake

Having forced the Modern UI on users entrenched in the old ways of the Windows desktop, does Windows 8.1 offer too little, too late?

This time last year Microsoft released Windows 8 to the world. PC World and Currys even opened their doors at midnight on 26 October ready for the hordes to rush in and buy their new PC.

Trouble is, apart from a few enthusiasts, no-one was in a rush to upgrade. Microsoft's biggest mistake was to force the new interface on users entrenched in the old ways of the Windows desktop. All they saw in PC adverts was the new Start screen with its brightly coloured tiles.

Radical was the over-used adjective for what became known as the Modern UI, but the real problem was not the learning curve: it was that Microsoft did nothing to explain that underneath the Start screen was the familiar Windows desktop and all the features people were looking for.

It remains a source of confusion. If you want you can use Windows 8 just like you did Windows 7 - you just have to adjust to the fact that the old Start menu has been replaced by the new-look Start screen (or you can install Pokki to bring back something that looks like the old Start menu).

With declining PC sales (which have slumped considerably further since October last year), you can see why Microsoft redesigned Windows. Tablet- and smartphone sales were rising rapidly, and it needed an operating system that would work properly on a touchscreen (one of the primary reasons the old slate PCs failed so badly).

However, without a touchscreen, the Modern UI didn't make sense and the options in Windows 8.1 (see our review on page 56) to boot directly to the desktop are arguably too little, too late. The fact that the 'new' Start button merely launches the Start screen is considered by many as an insult.

Had Microsoft hidden away the new Start screen and interface and forced it only on those buying a Windows 8 tablet, things might be different now. The idea - clearly - was for everyone to start using apps and forget about their desktop programs (that's certainly what you have to do with a Surface running Windows RT, which runs only Office on its 'fake' desktop). Unfortunately, not only were the native apps weak, but developers didn't queue up to release their apps in the Windows Store. Even now the selection on offer is pretty embarrassing.

The truth is that, even on a traditional PC, Windows 8 is a great operating system. It's faster, more secure and more stable than Windows 7. You can get things done quicker because it takes less time to boot and files transfer faster.

If you were put off buying a new PC or upgrading from a previous version of Windows because of the Modern UI, then read our review of Windows 8.1 and you might just change your mind. ☒



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Reader comments



Whether it's with useful tips, pithy observations, or a good old moan, we're always happy to hear from PC Advisor readers. For your chance to appear here, keep in touch via email, our forums, comments on our news stories, and via Facebook, Google+, Twitter and YouTube

letters@pcadvisor.co.uk

Lend a finger

I love the latest iPhone's implementation of a fingerprint scanner, but it's been irritating me that every time one of the kids wants to play a game they need my fingerprint to unlock it. (They aren't having the code.) Then a friend told me how you could scan in up to five fingers, and there's no reason why these must be your own fingers. Why didn't I think of this before! So that's one for me, one for the wife, two for the kids, and a spare just in case we, erm, lose one. **Robin Maidstone**

A life of grime

I've been too busy to read the latest issue of *PC Advisor*... too busy cleaning my phone, tablet, laptop, PC and any other gadget I find. After reading your advice (Dec issue, page 90), I am suitably disgusted. Who would have thought that a phone screen would be dirtier than a toilet seat. Yuck! **Lisa Blanden**

pcadvisor.co.uk

Programming with Fuze

On page 43 you'll find our review of the Fuze powered by Raspberry Pi, which makes it easier for novice users to program in Basic. But should you bother? "Just like in the 80s, you'll be able to write three lines of code and watch a little square move 1mm across the screen. The kids of the 80s got bored doing this; the kids of today will not even bother to write those three lines of code. Everything has to be immediate for today's generation, regrettably they have no patience for this sort of thing," wrote **steve**.

Windows 8.1 well received

Despite some discontent, plenty of readers are still sticking up for Windows 8, and now Windows 8.1, too. **jon** wrote: "I find Windows 8 much easier to use and I picked it up very quickly. It's a great improvement over Vista and Windows 7, and 8.1 is even better. I enjoy combining the apps with the desktop on the same screen - it's great fun and really easy to do. If you prefer the Windows 7 way of doing things then simply boot to the desktop and download a Start button add-on. Nothing is being foisted on you. You choose whether you want to use the new features."



Who needs a microSD slot?

You may have noticed a new contender at the top of our smartphones chart: the LG G2 (reviewed on page 47) ticks all our boxes except one - it lacks a microSD slot. But **mountainloafer** argues that one isn't necessary. "As much as I would like all phones to provide microSD storage for convenience, I often wonder why people feel the need to lug around their entire music collection or more than one or two HD movies at a time. At any given time, I have a couple of gigs of my current favourite albums on my device, while I dump all my photos on Dropbox. I never have the time to watch an entire movie on such a small device - I go home where there are larger screens and hard drives on which to access content."

Flagged: Star letter

Enough speed

Your article *Enough speed* in the December issue (page 16) caught my eye. I always think my current device is fast enough... until I buy a new one. Then the old device feels positively geriatric, and using it for even the occasional task feels like a hassle.

More than that, I realise there are so many new things that the increased power enables me to do, whether that's watching online video with less buffering or being able to even attempt to play the latest games.

Plus it's all part of the fun of owning shiny new tech. Perhaps more than I should, I genuinely enjoy those first few weeks of

owning the latest phone or tablet when I can gloat to my (geeky) friends that my device is faster than theirs. It's usually a matter of only days or weeks before a newer, faster device is released, so you have to make the most of it while it lasts.

So, please, give me better battery life and displays, but don't stop piling on the performance! **Gary Sharp**

Marie Brewis, managing editor, replies: Thanks for your letter, Gary. Since you're clearly a fan of speed, this Crucial SSD should help you eke out a little more performance from your PC.



Our Star letter writer wins a 120GB Crucial M500 SSD, worth £90. For your chance to win, tell us your thoughts on any tech issue:

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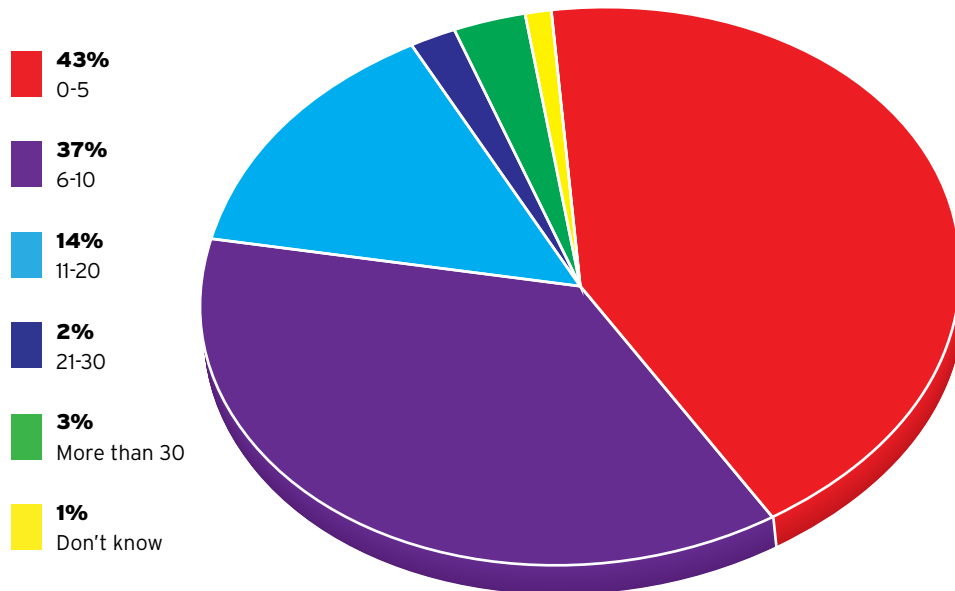
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3D printing

Not so long ago the thought of printing out physical objects was an extraordinary idea. Today, even supermarkets such as Asda are getting in on the act, pointed out [Dragon_Heart](#).

"Shoppers will soon be able to have 3D versions of any object, up to the size of a family car, printed at Walmart and Asda stores. However, the object will be scaled down to an 8in figure," he quoted.

Join the discussion in Speakers Corner at tinyurl.com/m7e4L4s.

[chub_tor](#) Finally, I can return from Asda, open my hands, and say: "Look, honey, I shrunk the kids!"

[Jock1e](#) They will also shrink your wallet (and not just with the 3D printing).

[Aitchbee](#) I've got some rather nice hand-painted plastic figurines of wrens, goldcrests, robins and so on, which may lend themselves to 3D printing, but would I be infringing on copyright laws if I were to do so?...

[...bumpkin](#) Probably. Stick to simple things such as the plastic £20 notes coming soon.

Read more about 3D printing in our guide at tinyurl.com/au9gr56.



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Windows 8.1 released

The long-awaited update to Microsoft's Windows 8 operating system became available as a free download as we went to press, but was it the answer to disconcerted readers' prayers?

"The upgrade took ages, with a few false starts, but have to say I like it. It's what Windows 8 should have been from the start. Much faster and you are able to boot straight to the desktop. I had been using a start bar app, but I don't think I'll bother anymore," wrote [Alan McClean](#).

"Windows 8.1 seems slower at startup, and the Start button isn't the Start button you might expect from Windows XP, Vista or 7," added [Neil Ross](#).

"I had Windows 8 on my laptop for three months. I tried to like it, but I just couldn't. I grew out of comic books with pretty pictures when I left junior school. I finally bit the bullet and did a complete hard drive wipe and installed Windows 7. Nothing could convince me to ever reinstall Windows 8, no matter how much Microsoft tries to turn the pig's ear into a silk purse," wrote [Brett Nocturnus Caporato](#).

Nexus 5 leaks no accident

We're expecting the launch of Google's Nexus 5 smartphone any day now, although the eventual handset will offer few surprises. The latest - and arguably most unbelievable - in a series of 'leaks' from Google saw the Nexus 5 pop up on the US Google Play store for a short while.

"I don't think these 'leaks' happen by accident. It is a good marketing thing - it costs nothing, and the internet does the work for them," wrote [Antony D'Andrea](#).

Surface 2 doomed to fail

On page 18 you'll find our analysis of why the second-generation Microsoft Surface is a total non-starter, but we were interested in what you thought of its chances.

"I really like the original Surface, and the new one is even better - I love the concept. But the reason it has not done very well, I think, is its price. Even though the Surface tablet has the power of a laptop, people won't see it like that - they see it only as an iPad competitor. Microsoft needs to re-address the way it is marketed," wrote [Antony D'Andrea](#).

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PC SALES DECLINE CONTINUES FOR SIXTH QUARTER IN A ROW

It's sad news for the desktop PC, but other markets could make up for the downturn in sales

The PC market moved into its sixth straight quarter of declining sales, analysts reported in October, although the dip was less pronounced than one firm expected.

Market research firm Gartner reported that July-to-September PC sales dipped by 8.6 percent to 80.3 million units. IDC reported slightly lower figures of a 7.6 percent drop to 81.6 million units, although it had previously projected a worldwide decline of 9.5 percent.

The third quarter traditionally marks the beginning of the upswing for the PC market, as students and educators invest in new hardware. But sales failed to materialise, which may be an indication that students are instead turning to tablets or simply sticking with their existing machines.

Other markets reap the benefits

On the other hand, IDC reported that emerging product categories and a greater assortment of Windows 8-based models pushed up sales volumes, as did the migration from Windows XP to Windows 7.

"Consumer shift from PCs to tablets for daily content consumption continued to decrease the installed base of PCs both in mature- and emerging markets," said Mikako Kitagawa, principal analyst at Gartner. "A greater availability of

inexpensive Android tablets attracted first-time consumers in emerging markets and in mature markets were favoured as supplementary devices."

"Whether constrained by a weak economy or being selective in their tech investments, buyers continue to evaluate their options and delay PC replacements," added Loren Loverde, an IDC analyst. "Despite being a little ahead of forecast, and the work that's being done on new designs and integration of features such as touch, the third-quarter results suggest that there's still a high probability we will see a decline in worldwide shipments in 2014."

Lenovo edged out rival HP for a second straight quarter, with it showing a 2.8 percent increase in unit sales to 14.1 million worldwide. HP and Dell also demonstrated 1.5 percent and 1.0 growth, respectively. But Acer's sales plunged 22.6 percent, followed closely by Asus, with a 22.5 percent decline in shipments. However, both have shifted their focus towards the tablet market, Gartner said.

Lenovo's market share is 17.6 percent, followed closely by HP, at 17.1 percent. Dell, Acer and Asus make up 11.6-, 8.3- and 6.1 percent, respectively.

IDC and Gartner typically release tablet sales figures in a separate report, which will

provide more insight into how the overall market will fare.

Despite these estimates, Microsoft is anticipated to announce better-than-expected Windows revenue for its third quarter. This is partly due to businesses migrating from XP, since it will no longer be supported by Microsoft.

"Continuing upgrades from XP boosted shipments, particularly in the commercial desktop segment, while retail acceptance of new and emerging product categories, such as Chromebooks and Ultrabooks, helped the portables segment," said Rajani Singh, senior research analyst at IDC.

Microsoft will be hoping that the release of Windows 8.1, along with the updated Surface 2 and Surface 2 Pro tablets, will inject some life into the market. However, Windows tablets have strong competition from Apple's iPad (see opposite page) and an increasing number of budget Android alternatives.

The firm is also under threat from Google and its Chrome OS. Chromebook laptops are being sold by Microsoft's long-term partners, including HP and Acer. "Chromebooks were much stronger than anticipated," said Singh, pegging the number of Chromebooks shipped globally at 640,000 (0.8 percent of the total).

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APPLE LAUNCHES iPad AIR & iPad MINI WITH RETINA DISPLAY

The big iPad gets smaller, thinner and faster; the mini iPad gets more pixels and a 128GB option

Apple has unveiled a brand-new iPad model, the iPad Air, and added to the iPad mini a Retina screen and an A7 processor.

The iPad Air is significantly thinner than its already-skinny predecessor, plus it receives a bit of a speed bump.

The new model is 20 percent thinner than the fourth-generation model, and 183g lighter (weighing just 469g). While it has the same 9.7in Retina display as its predecessor, the bezel around that screen is 43 percent thinner.

Inside that slimmed-down chassis rests the 64-bit A7 chip and M7 co-processor. Apple says these processors provide twice the CPU- and graphics performance of the previous model, while retaining a 10-hour battery life. Other new features include faster 802.11n Wi-Fi with MIMO, expanded LTE networks, improved FaceTime and iSight cameras, and dual-mics.

Both Wi-Fi and LTE models of the iPad Air will start shipping on 1 November in silver/white and space grey/black colour choices. In the UK they'll cost the same as the iPad models they replace: the iPad Air starts at £399 for 16GB Wi-Fi and £499 for

16GB Wi-Fi plus 3G/4G, with storage options up to 128GB. The iPad 2 remains on sale at £329 for a 16GB Wi-Fi-only version.

iPad mini with Retina display

Apple also introduced a new generation of the iPad mini. Its marquee feature: a high-resolution Retina Display.



The iPad mini ups its screen resolution from 1024x768 pixels to 2048x1536 pixels, while keeping the same 7.9in (diagonal) screen size. That ups the mini's pixel density from 163ppi to 326ppi.

The mini gets some upgrades on the inside, too, including Apple's 64-bit A7 processor. Apple claims this processor makes the Retina iPad mini up to four times as fast as its predecessor for processor-intensive tasks, and up to eight times faster for graphics-intensive ones. The mini also features Apple's M7 motion co-processor, and it gains the same upgraded Wi-Fi connectivity and camera improvements as the iPad Air.

The iPad mini with Retina Display will be available in silver/white or space grey/black in late November. The Wi-Fi versions will cost £50 more than their predecessors, at £319 with 16GB of storage, £399 for 32GB, £479 for 64GB and £559 for 128GB – a first in that capacity for the iPad mini. Cellular versions add £100 to the mini's price.

Apple will continue to sell the original iPad mini at £249 for the 16GB Wi-Fi-only model and £349 for the cellular version.

Windows Phone 8 updates brings full-HD, quad-core support

Long-awaited update could help Microsoft catch up with its Android and iOS smartphone rivals



Microsoft's next Windows Phone update opens the door for 1080p screens and more powerful processors. It will be delivered to existing phones over the coming months (see page 114 for a guide to upgrading).

"It's been a busy, but exciting year for Windows Phone. Our market share in Europe has grown to nearly 10 percent. We're seeing things really start to accelerate. We believe this is because we continue to advance the platform at a rapid pace. Our hardware partners, meanwhile, have taken advantage of this innovation by releasing amazing new Windows Phone devices," said Microsoft.

The addition of 1080p screens and support for Qualcomm's Snapdragon 800 quad-core processor should help close the hardware gap with Windows Phone's rivals.

A new generation of Windows Phone devices will have 5- and 6in touchscreens,

according to Microsoft. They will compete with products such as the Samsung Galaxy Note 3 (see page 46) and the HTC One Max.

The higher resolution will make room for up to six tiles across the Start screen (up from four). Other updates include an improved internet sharing feature, the ability to use customised ringtones for instant messages, emails, voicemails and reminders, and a new rotation lock option to keep the screen fixed in one place. A proper notification centre is still missing.

Consumers will also be able to close apps from the App switcher and use Driving Mode while on the road, which lets them send automatic replies to calls or texts.

Microsoft also announced the Windows Phone Preview for Developers, which will let them verify their apps work as expected before the code is released to consumers.



BBC unveils next-generation iPlayer

The next generation of BBC iPlayer will arrive in early 2014. Tweaks and new features will include 'pop-up channels' for special events, online channels such as Radio 1 TV, the ability to create a schedule of viewing, and pause and resume on another screen. The window in which you can watch programmes will increase from seven- to 30 days, too.

MORE: tinyurl.com/nkj4j96

John Lewis offers two-year guarantee on all electricals

John Lewis has announced it now offers a minimum two-year guarantee on all electrical products. The retailer is the first to offer its customers such a lengthy guarantee, which it provides at no extra cost.

MORE: tinyurl.com/non2oy3



Argos announces £99 Android tablet

Argos has announced its own-brand tablet, called the MyTablet, to rival Tesco's £119 Hudl. The 7in device features 8GB of storage and runs Google's Android Jelly Bean 4.2.2 OS. It also comes preloaded with 19 free games and apps. Read our comparison of the two at tinyurl.com/qdwl96p.

MORE: tinyurl.com/o3x58o4

TALKTALK LAUNCHES £2.50 BROADBAND DEAL

TalkTalk offers super-budget deals on unlimited broadband, TV and mobile

TalkTalk has launched two entertainment packages including broadband from just £2.50 per month.

SimplyBroadband offers customers unlimited broadband for £2.50 per month. That's a saving of £250 when compared to BT's Unlimited Broadband.

The £7.50 Essentials TV package is based on SimplyBroadband, but has been designed to entice more customers to YouView. The deal also includes free evening and weekend calls.

This means TalkTalk customers can access YouView for just £5 per month, but they will be given a downgraded version of the YouView box. This is worth £149 rather than £299, and doesn't have a built-in hard drive for recording programs.

YouView is aimed at Freeview customers who want the extra functionality of on-demand services, but don't want to pay through the nose.

Dido Harding, CEO of TalkTalk said: "This is TalkTalk doing what it does best, giving consumers access to exciting new products at unbeatable prices, and the launch of Essentials TV underpins our role as Britain's fastest growing TV service. Each week thousands more homes are signing up to YouView from TalkTalk because of our great-value offering. TalkTalk is at an exciting stage of its growth and momentum is only increasing."

TalkTalk also confirmed that it will be rolling out an update to the TalkTalk Player service to offer on-demand Sky Movies and Sky Sports content.



The ISP said that this will be offered at no extra charge for those who subscribe to the Sky Movies and Sky Sports Boosts.

Furthermore, the ISP has launched what it calls Britain's best price SIM-only mobile plan for just £3.50 per month. The bundle includes 100 minutes, 250 texts and 100MB of data, which works out at less than 1p per minute, text or MB. Customers are offered double the amount of data when they purchase a SIM-only plan online.

eBay strikes click-and-collect deal with Argos

Scheme allows customers to buy goods from eBay and collect them from Argos

eBay has announced a deal that will allow customers to collect items purchased via the site from a local Argos high-street store.

The auction site has partnered with high-street retailer Argos to offer customers a click-and-collect service. The pilot scheme will see shoppers able to buy goods from eBay and then pick them up from one of 150 participating Argos stores.

Initially 50 sellers will participate in the scheme. eBay said the service will be fast, free and local. It will combat missed deliveries and the need to collect items from the Post Office or reschedule delivery.

"This new way to shop - with different online merchants and collection at convenient locations - could create immense opportunities for sellers," said Devin Wenig, president of eBay Marketplaces. The UK rollout will be mirrored around the world.

Argos' managing director John Walden said: "Click & Collect is growing quickly, and it may eventually surpass delivery."



eBay Now is also coming to Europe, a service that allows you to buy an item on eBay and get a local store to deliver to you within an hour.

There is a risk that the service may eat into some of Argos' own collection-service sales, which is why Click & Collect requires trialling. ☒

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The rise of twitter

Twitter has announced it is to be floated on the stock exchange. Martyn Casserly looks at why the micro-blogging site is important, and how shareholders might change its ideals

Micro-blogging behemoth Twitter has recently announced that it is to be floated on the stock exchange. Initial figures have investors valuing the company at over \$10bn - this might be only a 10th of the valuation Facebook has achieved, but it's an impressive feat for a service that has a basic website, is free to use, and limits posts to just 140 characters.

In the lead up to the Initial Public Offering (IPO), Twitter has been shoring up its brand

by restricting the use of its API (which third-party clients need to refresh the Twitter feeds for their users) and recently spent \$350m acquiring mobile ad company MoPub. These moves will help to promote the use of Twitter's official app and open up revenue streams to appease investors. This makes sense, since a company needs to make money to survive and prosper, but it also suggests changes are coming to one of the simplest and most powerful online services.



Since its launch in July 2006 Twitter has become one of the most important social networks in the world. Alongside the inevitable tweets about food and cats, the site has also been responsible for breaking major news stories and enabling political protests, and is now frequently used on live television shows for audiences to share their comments. Facebook might appear to be the dominant entity in the social space, with more than twice as many users as Twitter, but somehow those 140-character messages have claimed a higher visibility in society.

Perhaps one reason for the huge interest in Twitter is its unusually high number of famous users, many of whom tweet on a

regular basis. In an age in which celebrity culture has reached new extremes, Twitter offers fans a personal insight into the lives of the famous, plus the chance that they might even interact with the stars themselves.

Stephen Fry (@stephenfry) is a long-term and particularly avid Twitter user who brought the site to a wider audience in 2009 after he found himself stuck in a lift. He tweeted about it from inside of the elevator and received replies from his thousands (now millions) of followers. Fry posted a photo of himself and his fellow captives, which was circulated by the major press outlets and helped publicise Twitter to the mainstream.

Today the site has become the social site of choice for professional athletes, writers, actors, musicians, politicians and leading figures in the tech industry: Bill Gates (@billgates) regularly uses his account to promote the work of the Bill and Melinda Gates Foundation; Apple CEO Tim Cook (@tim_cook) began tweeting on the day the iPhone 5s launched; his holiness Pope Francis (@pontifex) recently took to Twitter to bring spiritual wisdom to a platform overrun with the thoughts of Premiership football players and Miley Cyrus (@miley Cyrus). Of course, if you prefer words from the heavens to have a scientific edge, you could always follow Curiosity, NASA's Mars Rover (@marscuriosity) - it shares details of the Martian landscape that it now calls home.

To think of Twitter as nothing more than a celebrity fan site would be missing the real strength of the medium, however. First and foremost the service is about communication: ideas, causes, jokes, disputes, and how did that person manage to survive another week on the X Factor when the other contestant was evidently better?

The real genius behind it all is the restricted length of each post. On Facebook or Google+ you are free to wax lyrical about whatever is on your mind, quoting sources of inspiration and even inserting the odd photograph or 20. On Twitter you need to cut to the chase. This makes it very different, and allows users the freedom to quickly share something and move on. There's little chance of being caught in the notorious time-hogging fashion that the larger social-media sites offer; here you dip in and out, quipping here, discussing there, always moving at speed.


In 2007, while trying to organise a conference via Twitter, Chris Messina stumbled across a single character that would dramatically affect the way people would go on to use the service. In an attempt to group together tweets related to the conference he suggested the prefix #

(hashtag), which had traditionally been used in IRC chat clients. The idea quickly spread and turned an ever-changing group of unrelated tweets into single-subject streams, unleashing the true potential of Twitter as a news service. In subsequent years the hashtag #egypt would bring the struggle of the country's people against a repressive government to international attention, while #japan collected tweets about the tragic Japanese Earthquake. Marketing companies have also used hashtags to run online campaigns, television shows enable audience participation in the same way, while activists such as the Occupy Movement have brought their causes to the fore by the simple addition of the # symbol.


Recently Twitter announced a deal to show in-game highlights (accompanied by sponsored ads) for the NFL, which mirrors earlier agreements with the NBA and ESPN. These form part of Twitter's Amplify strategy, which targets the collective viewing behaviour of its users. Given that 95 percent of online conversations during live events occur on Twitter (according to a recent study by Bluefin), this is no surprise. How these deals are implemented without disrupting the flow of a news feed remains to be seen.

There's also the issue of trolling and aggressive threats, particularly toward women, that have grabbed the headlines in the past few months. Politician Stella Creasy (@stellacreasy) and feminist campaigner Caroline Criado-Perez (account now deleted) received rape- and death threats for their entirely reasonable view that a woman should appear on a UK bank note. Arrests have been made, but such incidents can make shareholders twitchy: their investment might be publicly attached to high-profile scandal. Whether this would trigger calls for censorship by those who would want to protect their stock value is questionable, but the possibility exists and would be a worrying road to start down.

In the short space of seven years Twitter has gone from "a short burst of inconsequential information", as described by co-founder Jack Dorsey, to a rich source

of news, opinion and global shared experiences. It has proved that sometimes less really is more. What Twitter will be a decade from now is anyone's guess, so we'll just have to keep our fingers crossed and hope that money doesn't make a total mess of one of the best things in technology right now. 



make a total mess of one of the best things in technology right now. 

Microsoft Surface 2 is bound to fail

Matt Egan wants to like the Surface 2, but he can think of five reasons why it just won't work

Microsoft, and Microsoft alone, is persisting with Windows RT. As other hardware manufacturers have dumped Microsoft's ARM-based OS - making their excuses about it 'being them and not it' - Microsoft refuses to give up on RT. Pride can be an expensive thing.

An ARM-based version of full Windows would be a truly game-changing innovation for reasons of battery life alone, but Windows RT is not that. We're stuck with Intel for now, and Intel is making such strides on battery life that it is soon to become a moot point.

Meanwhile, Windows 8 is stable and fast, and offers additional features and functions that can simply be ignored by those who want plain old Windows. And the Surface Pro is the most portable power PC you will ever own. You can't compute with it on your lap, but surfaces for the Surface are not in short supply.

But hobbled with the less-useful half of an OS the Surface RT is not useful. And the Surface 2 will not solve this issue, nor its lack of popularity, despite comprising some impressive hardware.

The biggest upgrade on the Surface 2 tablet is its new 1080p display. With a resolution of 1920x1080, it's a significant upgrade over the original Surface RT's 1366x768 screen. Not that the Surface RT's screen was ever the problem.

Microsoft says the panel itself is optically bonded to the surface of the screen, aiming to improve sunlight legibility outdoors. The 10.6in, 1080p screen should also mean a significant improvement in displaying crisp and clear text, a major criticism of the original Surface - but not a problem for me.

Microsoft has also improved the kickstand, a hardware design almost Apple-like in its simplicity and elegant usefulness. That should be a good thing but, again, it won't stop the Surface 2 from failing. Here's why.

It's not Windows, but you might think it is

Windows RT is not Windows. It looks like Windows, and has some of Windows' capabilities, but it's not what your average punter would expect from Windows. And that is a problem.

Unlike many, I have no problem with the Modern UI and Windows apps. But that's because they are an additional skin to the Windows OS on which I run all the software I need.

Something that looks like Windows, but on which I can run exactly none of my Windows software is next to useless. Actually, it's worse than that, because many people will consider RT devices without realising the full implications.

No-one will write software for- or sell media on it

Of course you get a 'full' version of Microsoft Office 2013 RT. But that is not entirely a full version of Office, and it is about the only useful software you can find. As for hardware accessories the Touch and Type covers are amazing, but they are expensive and you won't find the price coming down any time soon.

Unfortunately, they are all there is. Third-party hard- and software makers are just not interested in a niche that is getting more nichey by the day.

The Windows Store remains resolutely bereft of great apps and games, and it's not the best place from which a UK consumer can source music and movies.

Without third-party support, or the ability to run traditional x86 software, Windows RT is just a pretty environment within which to web browse and send emails. Nothing more.

It's not even Windows Phone...

So you have a slab on which you can do, well, not a lot. The least you would expect would be that it could connect you to the web all the time so you can get on with your hobbled web browsing and emailing. Unfortunately, that's not the case. The Surface 2 will lack cellular connectivity. It requires Wi-Fi to get online.

“

Microsoft, and Microsoft alone, is persisting with Windows RT... Pride can be an expensive thing

”



Windows Phone may not have great third-party support, but it does portable connectivity well. RT can't even help you check your email on your commute.

It should be cheaper

Kudos to Microsoft for recognising in its pricing that Surface 2 will not be a challenger to the best Android and iPad tablets with their rich app- and media support, or the best Windows tablets with their access to proper software. But even at this price it's not cheap enough.

The Surface 2 starts at £359. That puts it in the mid-rank of tablets. It's too expensive because the hardware is no better than, say, a Nexus or Tesco Hudl tablet, and it doesn't offer access to either Google Play or iTunes and the App Store.

It's not the Surface Pro 2

The Surface Pro 2 will set you back at least £719 inc VAT, but in my view is worth looking at. It has all the benefits of Surface 2 and those of a full Windows PC. Indeed, if the performance has improved

from the original Surface Pro it will be the best portable power PC you'll ever own.

A device on which you can run any Windows program with performance that you would expect from a £700 PC or laptop. With a keyboard and display it could easily be your home- and/or office PC. And presuming that the battery life is up to snuff, it could also be your daily travelling companion.

At half the price the Surface 2 will have almost none of the usefulness, and that makes it worth next to nothing. ☒



Japan's 2020 Olympics will showcase

The awarding of the 2020 Olympic Games to Tokyo is great news for tech, says Martyn Williams

Pushed by a desire to showcase their expertise to the world, some of the country's biggest companies are now targeting 2020 for the deployment of new technologies that could revolutionise mobile telecommunications, consumer electronics, automobiles and even the way people watch the Olympic Games on television.

At the Ceatec 2013 electronics expo in Japan companies outlined their plans for smartphones that transmit data 100 times faster than today, TV pictures with 16 times as much detail as current HD, and cars that drive themselves.

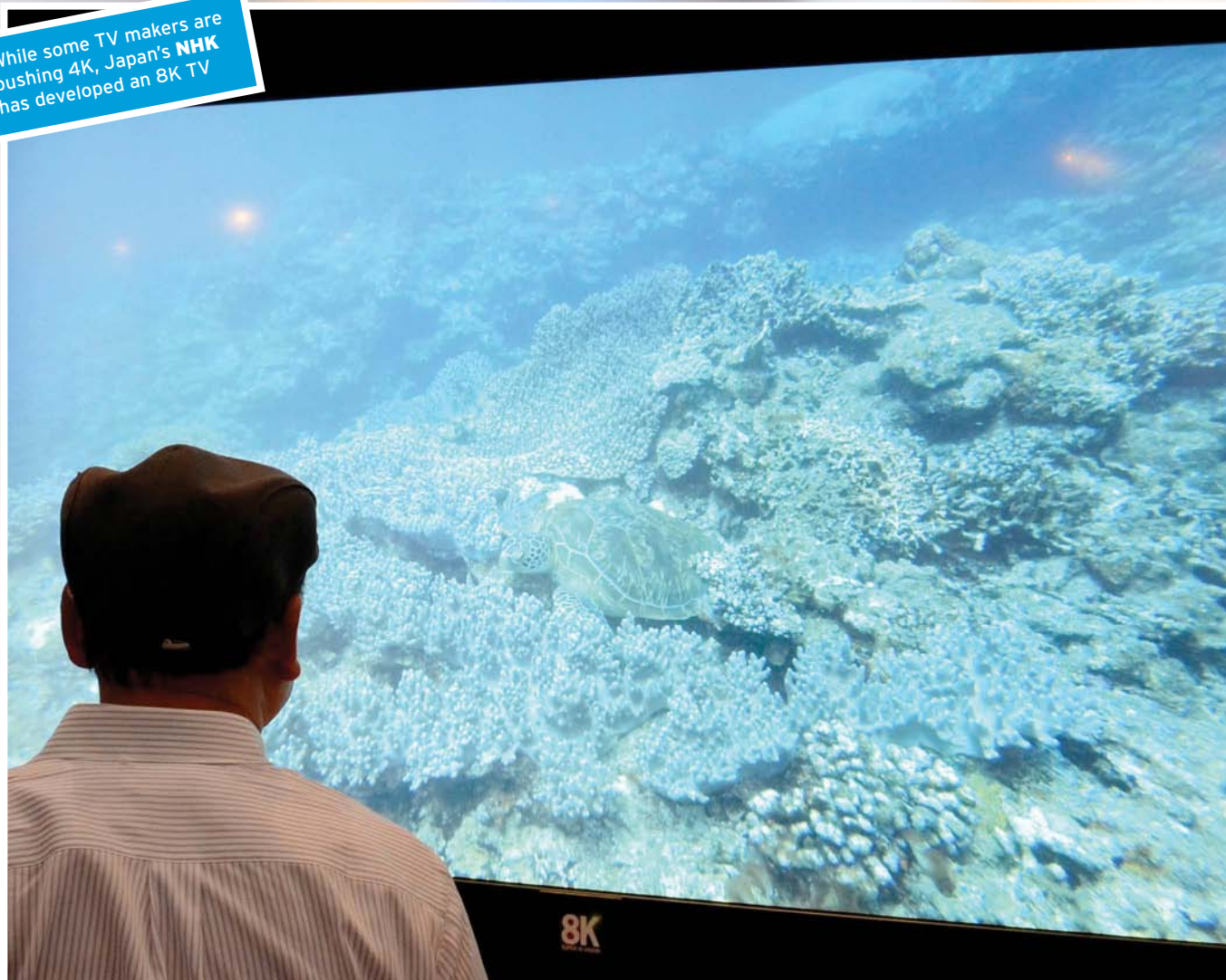
These might sound like fanciful dreams, but consider what happened last time Japan hosted the Olympic Games: in 1964, the country undertook a massive infrastructure program that included building the famous Shinkansen bullet train, numerous subway lines in Tokyo, an expressway system through the city and hotels and facilities for visitors. Back then, technology wasn't nearly as pervasive as it is today, but the 1964 games were the first to be broadcast overseas via satellite and in colour.

In 2020, the Olympic Games might again serve to push forward TV tech.

While TV makers are currently promoting 4K or Ultra HD sets, which offer four times the level of detail of current HDTVs, Japan's national public broadcaster NHK is close to beginning trial service of a system with 16 times the level of detail. Super Hi-Vision or 8K technology has been under development for years, with test transmissions due to begin in 2016.

By 2020, NHK hopes it will be able to cover the Olympic Games using this system. 8K received a limited trial at last year's London Olympics, where NHK and the BBC produced several hours of

While some TV makers are pushing 4K, Japan's **NHK** has developed an 8K TV



groundbreaking new technology

programming per day and beamed it to public viewing sites in each country, so chances are good it will meet this target.

TDK also showed off a HDD-based recording system developed with Seagate that adds a laser to the traditional magnetic recording head. The result is that more data can be crammed on to a disk. It said 40TB drives could be possible by 2020 – the amount of space TDK envisages will be needed to record all Olympic competition transmitted in 8K.

NTT DoCoMo, Japan's biggest mobile telecom network operator, is targeting

2020 for the introduction of a 5G cellular phone service. Designed to work in outdoor, urban areas such as Tokyo, the system will boast data rates of between 1- and 10Gbps, but DoCoMo admits there are several hurdles it needs to overcome to realise the technology. At present it exists solely as a computer simulation.

And if Nissan has its way, the streets of Tokyo won't just be transformed by Olympic spectators in 2020. The company is working on an autonomous driving technology for cars that will allow vehicles to drive themselves.

The cars, equipped with five cameras, five laser sensors and an electronic map, are already working on test tracks and were demonstrated at Ceatec. Production vehicles could be on the road by 2020.

At a news conference in Buenos Aires shortly before the Olympic committee voted on the 2020 host city, Japanese Olympian Yuki Ota, a double silver medalist in Fencing, demonstrated a small humanoid robot called Mirata. Mirata is the same type of robot as Kirobo, developed by Toyota and recently sent to the International Space Station. ☒



NISSAN's prototype autonomous car



A prototype **SEAGATE HAMR** HDD, modified with a window to see the drive head

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Why you should stick with iOS 7

Not everyone likes iOS 7's redesigned interface, but David Price says you should stick with it

Praise be to iOS 7, one of the great gambles of the smartphone era, and the first 'bet the company' moment of Apple under Tim Cook.

Apple didn't need to reimagine its immensely popular OS for iPhone and iPad; switchover stats show that Android users are far more likely to move to iOS than vice versa, thanks to the Cupertino offerings of user-friendliness and tight integration with the hardware. But even though it wasn't broken, Apple nonetheless decided to fix it.

Leaving aside the substantive changes in iOS 7 – the handy inclusion of Control Centre, the NFC-only-not-horribly-insecure niche convenience of AirDrop, optional background app updates and a plethora of security enhancements, iOS 7 looks utterly different to iOS 6. And not everyone likes change.

Disgruntled iOS 7 users have besieged search engines trying to work out how to go back to iOS 6, and reviewers have complained about its vibrant colour palette.

We thought the same at first, but our advice is to stick with it: the new look quickly becomes familiar, and soon you'll look back on pictures of iOS 6 and wonder how you ever thought it looked good.

iOS 7 will become familiar

The thing with interfaces is that they depend on familiarity. Inefficient interfaces acquire inertia, because it's an effort to switch to something else: hence the tale of the qwerty keyboard layout, designed to slow down the clashing metal arms of typewriters but then surviving unsuitably into the digital age.

To get the most out of iOS 7 you need to get used to it. Play with it. Work out its foibles, the little elements of its menus that have moved since iOS 6. And that applies too, albeit less obviously, to its visual style.

iOS 6 will get more and more dated

Whatever else you think of iOS 7's looks, it's a lot more contemporary than iOS 6 and its reality-imitating skeuomorphism. Talk to people who've updated to iOS 7, and most will mention that looking back on iOS 6 is like digging out family photos from the 1980s: happy memories but, oh, the hairstyles!

iOS 7's looks serve a practical purpose

Jony Ive's team didn't just trim down the screen furniture out of a sense of minimalistic puritanism. They felt that these elements were no longer needed, and were obscuring rather than aiding clarity.

Apple cleared out the unnecessary distractions from the screen and focused on clear typography and white space. Ultimately, that should make it easier to use your iDevice.

Apple will tweak iOS to enhance usability

The first beta version of iOS 7 was pretty close to the final edition, but Apple did respond to some criticisms, tweaking visual elements to make it as user-friendly as possible. Beta 4, to give an example, featured slightly thicker fonts, after testers reported that they couldn't read text easily.

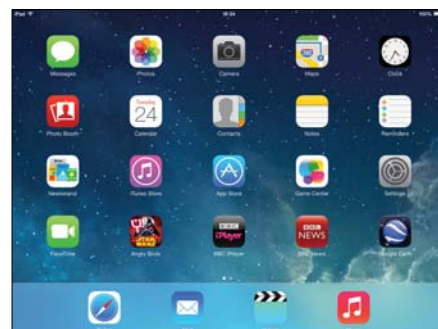
Apple releases regular updates to iOS, mostly for bug patches, but it's not out of the question that it could choose to tweak the layout of a menu in an update before iOS 8.

Apps will adapt to match iOS 7's looks

Part of the reason iOS 6 is going to disappear further and further into the archive of tech nostalgia is because the rest of the iOS ecosystem is going to evolve around it. Many devs have already updated their apps to match the clean lines and light typography of iOS 7.

iOS 8 will look more like iOS 7 than iOS 6

Apple isn't going to give up and bring back the green felt and fake wood. iOS 8 is very unlikely to see any major visual changes – most likely it will offer a range of tweaks to iOS 7 and a small number of new features. ☒



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The future of television: what

New technology is shaping your future viewing. Michael Burns explains

Every year, the IBC (International Broadcast Conference) in Amsterdam brings together tech makers, broadcasters, TV programme and filmmakers, and offers a different view of the future of TV and film than a consumer-focused show such as CES or IFA.

Those exhibitions let you know what TV set and set-top-box manufacturers want to sell to you in the future, but IBC shows what the broadcasters and programme/filmmakers are buying into. And that's probably a more accurate view of the future - without readily available content, hyped formats such as 4K offer nothing more than tech demos of beautiful landscapes.

4K is real

Fortunately for those 4K TV makers, UltraHD television (UHD TV) is becoming a reality. IBC 2013 witnessed the first time a full multicamera production of a sports event was captured in 4K UHD TV and transmitted live internationally via satellite and fibre-based cable (like that offered to homes by Virgin and BT).



BT captured the Saracens versus Gloucester Aviva League rugby match in London using three 4K UHD TV Sony cameras and mixers...

To make the transmission possible, BT captured the Saracens versus Gloucester Aviva League rugby match in London using three 4K UHD TV Sony cameras and mixers.

Encoders and receivers from Ericsson encoded and decoded the four feeds in real time.

Sony is throwing its full weight behind UHD TV. It showed an array of 4K-compatible cameras, displays - both consumer TVs and professional monitors - and back-end hardware for broadcasters, as well as 4K footage from this summer's FIFA Confederations Cup in Brazil in all its eye-popping colour and glory.

The company also announced at IBC that, in partnership with HBS and FIFA, it would record the World Cup Final 2014 in 4K.

The move by FIFA is a big first step for UltraHD, said Katsunori Yamanouchi, VP of Sony's broadcast arm,

Sony Professional Solutions Europe. "It will help broadcasters understand the product and, when audiences see it - perhaps at public venues - it will begin to generate demand," he said.

4K makes HDTV viewing better

4K capture is already being used by sports broadcasters to provide new viewing experiences within HD broadcasts. For example, broadcast tech developer EVS was touting its 4K zoom system for replays. This allows operators to zoom in on part of the action quicker while maintaining quality. So, if a goal is scored out of nowhere, the operator can go back to a wide shot and zoom in on what happens for the replay without it becoming blurry.

The drive to 4K and above stood out for documentary film editor and director Andrew Chastney. "You simply can't get away from how stunning these images can be, on the right screen and with the right subject matter of course," he said. "I think there will be some careful thinking about film craft, too. You might get the wrong audience reaction if you use too many big close-ups."

Outside the 4K bubble, advancements were also demonstrated in the field of high-dynamic range (HDR) video.

Similar in premise to HDR photography - and capable of the same beauty when used subtly and garishness when pushed too far - HDR video records multiple versions of



...Encoders and receivers from Ericsson encoded and decoded the four feeds in real time

broadcasters are working on

Fraunhofer extends the dynamic range of a scene using an array of 16 cameras with different neutral density filters, then stitching together the images



the same shot at different exposures, which are then combined to create a shot with a much deeper depth of contrast than standard footage.

We saw two separate methods of extending the dynamic range of a scene from researchers Fraunhofer (a wide-ranging research group best known for its work on the MP3 encoding format). One was based on a single camera by sampling pixels in various ways to get differently exposed results. The other used an array of 16 individual cameras with different neutral density filters in front of the lens, with the signal stitched together by an algorithm into a single HDR image.

Fraunhofer also created a buzz by demonstrating the same 4x4 array of cameras being used to capture footage that you could decide where to focus later – in essence a video version of the Lytro still camera we were hyped about but ultimately disappointed by over the summer.

This implementation estimates a depth value for every pixel recorded by the cameras; after the recording is made, the filmmaker is able to virtually 'drive' around a person or an object, to retrospectively

re-adjust sharpness and to change the camera angles and depth of field.

Fraunhofer was also showing its Dialogue Enhancement technology to allow you to individually adjust the volume of dialogue, music or sound effects within a single broadcast program. It uses an encoder that provides information to your television set or set-top box about the different components of the audio, such as a commentator's voice and the atmosphere of a sports stadium.

On a suitably equipped device, the user is then able to independently adjust the volume of the dialogue from the overall volume. Devices that are not capable of decoding the additional information will play back the mixed audio signal. If you are put off by grunts and squeals of Women's Tennis championships, as the IBC demo was showing, this may be just the thing for you.

Another quirky technology on show at the conference was INCA, an Android-powered image-processing system built into mini cameras that can measure acceleration, temperature and atmospheric pressure in real time. Demonstrated at IBC in the form of a mounted camera on

an eagle for a nature film, the INCA system might be used in sports broadcasts to allow you to lay into the curves with a motorcyclist, jump over rises with a mountain biker or 'run' past other competitors in athletics.

A fix for rubbish HD

High-resolution HDR content is wonderful, but it might seem a ridiculous thing to discuss if you're currently tolerating some of the highly compressed streams currently being passed off as HD by some broadcasters and web-based TV/film services.

We went in search of better solutions for this, and found it in the arcane, acronym-strewn world of codec development.

Some developers were showing solutions using the accurately named High-Efficiency Video Coding (HEVC), which is also known as H.265 as it offers half the bitrate of the H.264 standard used by the likes of YouTube and Apple. In simple terms, this means you can download twice as many pixels on the same bandwidth, resulting in much better quality – or, at least, nowhere near as rubbish as what you might have now. ☒

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Apple iMac

All-in-one PC

Apple's new iMac looks the same as the previous model, but there are several upgrades under the bonnet. Both 21.5- and 27in models run Intel Haswell processors and Iris Pro graphics as standard. They also boast next-generation 802.11ac Wi-Fi and 50 percent faster PCIe flash storage.

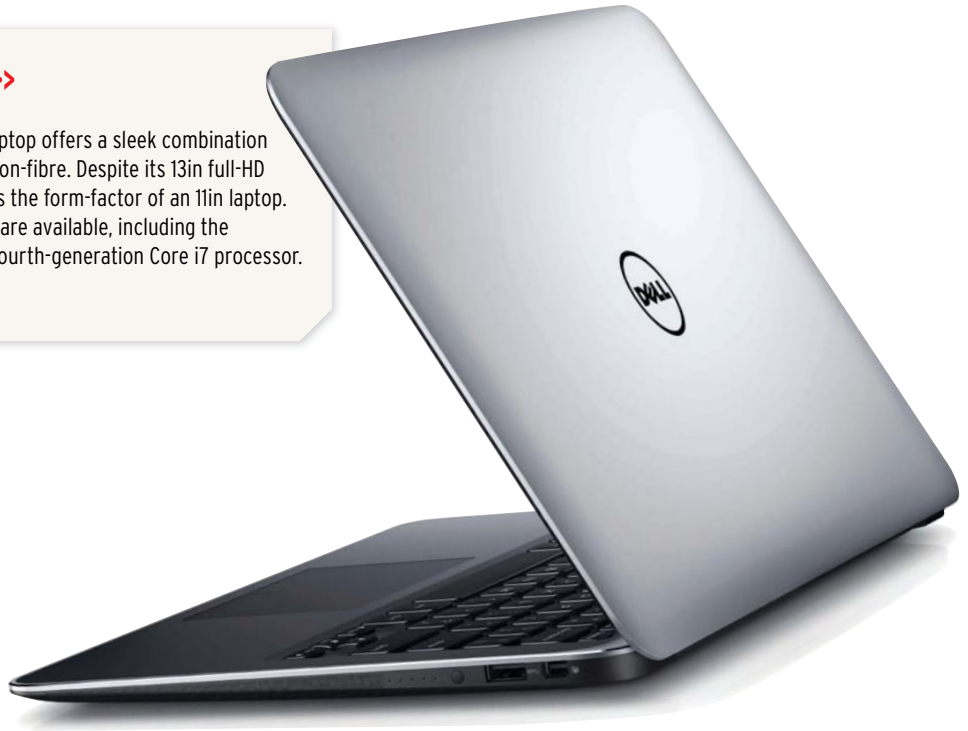
From £1,149 inc VAT
apple.com/uk

Dell XPS 13 >>**Ultrabook**

Dell's revised XPS 13 laptop offers a sleek combination of aluminium and carbon-fibre. Despite its 13in full-HD IPS screen, the Dell has the form-factor of an 11in laptop. Various specifications are available, including the possibility of an Intel fourth-generation Core i7 processor.

Price TBC

dell.co.uk

**Tesco Hudl** >**Tablet**

Tablets have become so popular that now even supermarkets are making their own. Tesco's tablet is known as the Hudl and comes with a reasonable specification, given its tiny price. Highlights include a 1440x900 7in IPS screen and a microSD slot. Clubcard vouchers are worth double their value when used to purchase the Hudl. See our reviews section for more (page 32).

£119 inc VAT
tesco.com



>> **Sonos Play:1**

Wireless speaker

Wireless hi-fi equipment tends to be rather pricey, but the Play:1 is Sonos' cheapest speaker to date - and the smallest, too. Sound is provided by a forward-facing tweeter and a mid-range driver, each with a Class-D amplifier. Buy two to create a stereo pair and for a limited time Sonos will bundle a free Bridge.

£169 inc VAT
sonos.com



HP Chromebook 11 <<

Laptop

New to the Chrome OS laptop family is HP's Chromebook 11. The laptop weighs just over 1kg and charges via a standard USB charger. Specs include an 11.6in (1366x768) screen and a dual-core Exynos processor.

£229 inc VAT
hp.com/uk



>> **HTC One Max**

Phablet

The HTC One has been super-sized: meet the new HTC One Max. This smartphone has a huge 5.9in screen to rival the Galaxy Note 3 (see reviews, page 32) and, in common with the iPhone 5s, a fingerprint scanner. The One Max comes preloaded with HTC's Sense 5.5 UI.

£589 inc VAT
htc.com/uk



Roku 3 <<

Media streamer

Making its way to the UK following its US launch is the Roku 3 media streamer, compatible with services such as Netflix. The latest model has a new design, faster processor and a headphone jack on the remote for private listening.

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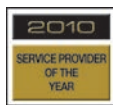
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<< Samsung Galaxy Ace 3

Smartphone

Now in its third generation, the Galaxy Ace 3 is Samsung's more affordable smartphone. It has similar styling to the flagship S range, but a lower specification. The Ace 3 offers a 4in screen, 5Mp rear camera and 4G LTE support.

Around £250 inc VAT
samsung.com/uk



<< Gioteck RC-5

Gaming chair

The RC-5 gaming chair for Gioteck works with Xbox 360, PS3 and PC. A 2.1 stereo sound system combined with built-in rumble feedback provides an immersive experience. The RC-5 folds up for easier storage and transportation.

£149 inc VAT
gioteck.com

>> Octa Monkey Kit

Tablet stand

The Octa TabletTail's suction pad allows it to adhere to almost any tablet or e-reader. A bendable arm, aka the Monkey Kit, is coated in soft but grippy silicone. This can be shaped into whatever form you like, giving more flexibility than a regular tablet stand.

£49 inc VAT
octa.com



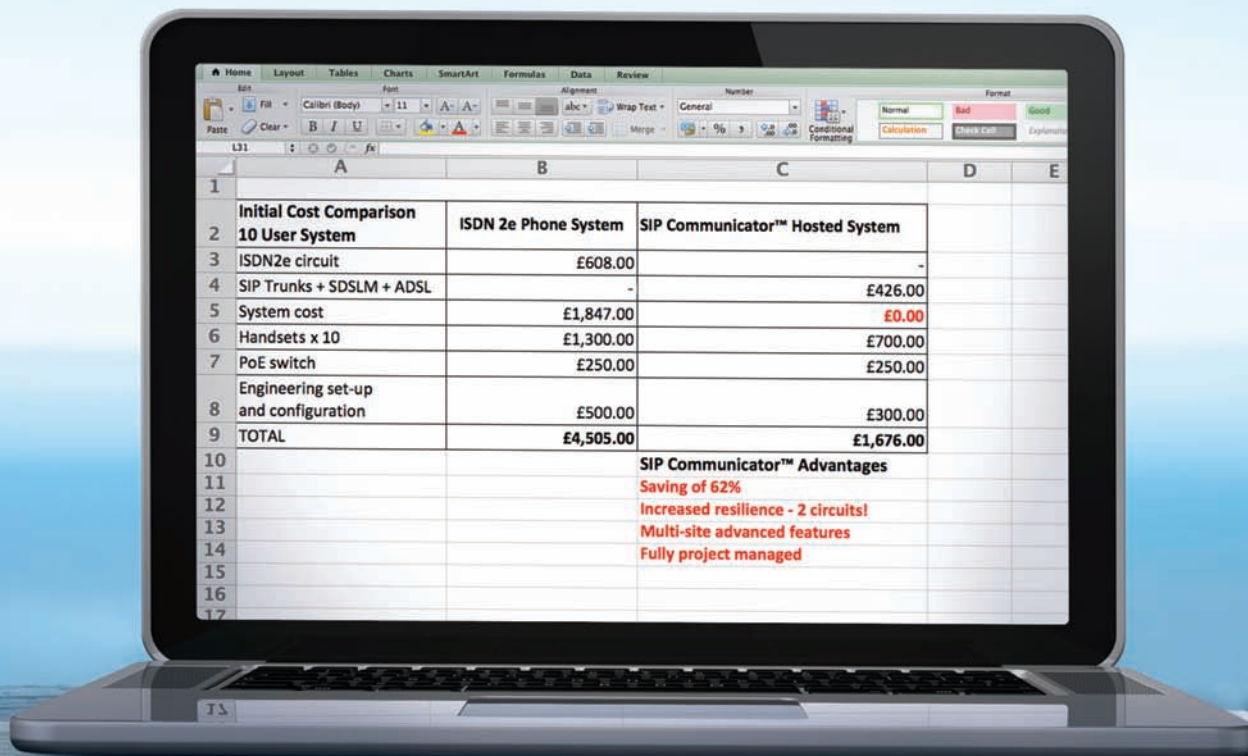
>> Philips Fidelio M1BT

Headphones

If you want music without wires then check out the Fidelio M1BT headphones from Philips. These cans are among the first to use Bluetooth 4.0 along with aptX, SBC and ACC codecs for high-quality streaming. The headphones have 40mm drivers and playback controls.

£249 inc VAT
philips.co.uk ☒





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Sony Xperia Z1

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The impossible dream

It was just over a year ago that we first got excited about the prospect of gigabit-speed wireless networking. And then had our high hopes quickly dashed after finding the familiar marketing baloney that overstates wireless speeds.

To recap, router makers print the sync-rate - rather than the data-transfer speed on the box. There are other technical reasons, but some would suggest that any company which promises 300Mb/s throughput via 802.11n 2.4GHz is seriously overdue a visit from the Trading Standards officer. I couldn't possibly comment.

As we see in so many other aspects of the PC industry - over promise, under deliver - the latest 802.11ac protocol is also victim to the same false advertising. Understand this, and the second generation of 802.11ac routers we test this issue don't look so bad.

Some companies have perhaps wisely stopped making ludicrous claims for 'gigabit wireless' and instead reverted to 'three times faster than 802.11n', which is about right. And let's just accept that around 450Mb/s real-world speed is nice to have - especially when that kind of speed can be maintained at a distance where 802.11n would have us waltzing around the room looking for signal.

Yet client devices - all our laptops, mobile phones and tablets, with the exception of the HTC One and Apple MacBooks - are still resolutely stuck at 802.11n, more than a year after the first 802.11ac wireless routers appeared on the high street.



Is this because the protocol remains in draft form? Unlikely. After all, that didn't stop 802.11n, which spent its first five years in draft form, achieving widespread use.

The slow rollout of 802.11ac is also because, for most people, the current wireless standard is good enough. In the same way that people won't upgrade ageing PCs that still mostly do what they're told, there's less compulsion to jump to the next wireless bandwagon.

Read more about what's possible with today's best wireless routers in our group test on page 66.

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£1,149 inc VAT

Contact

■ dell.co.uk

Read more

■ tinyurl.com/qbawklc

Specification

1.8GHz i7-4500U (3GHz Turbo Boost); Windows 8 (64-bit); 8GB DDR3L-RS RAM; 256GB SSD; 12.5in (1920x1080) glossy TN touchscreen display; Intel HD Graphics 4400; 802.11b/g/n; Bluetooth 4.0; WiDi 3.0; 1x Mini DisplayPort; 2x USB 3.0; 1.3Mp webcam with built-in mic; headphone socket; 47Wh, non-removable lithium-ion battery; 317x215x20mm; 1.52kg

**PC ADVISOR
BEST BUY**

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



LAPTOP

Dell XPS 12 (late 2013)

Dell's XPS 12 was one of the more successful attempts to create a convertible laptop/tablet device for Windows 8, and this latest version provides improved performance and battery life, courtesy of its new Haswell processor.

Rather than trying to be all things to all men, the XPS 12 is first and foremost an attractive and powerful laptop. The 12.5in device measures 20mm thick and weighs 1.52kg, so it's as light and portable as many Ultrabooks, while its Intel Core i7 offers the processor power of a desktop replacement system.

Unlike some hybrid Windows devices, the XPS 12 doesn't allow you to separate the keyboard and screen panels, which means you can't use the display on its own as a self-contained tablet. It does, however, offer a kind of pseudo-tablet mode in which you flip the screen over so that it covers the keyboard while still facing up towards you.

It's bigger and heavier than a conventional tablet when used in this way, so it's uncomfortable to hold in one hand while tapping the screen with the other. But you can at least rest it on your lap while you put your feet up and browse the web or watch streaming video.

It'll earn its keep in either mode, though. The moulded keys on the keyboard are comfortable and responsive, and the 'soft touch' black paint that surrounds the keyboard and trackpad has a

pleasant, tactile quality to it. The screen is also a delight – bright and colourful with a crisp, sharp 1920x1080-pixel resolution and excellent viewing angles.

The stereo speakers are a little tinny, but loud enough for listening to music or streaming video. In fact our only complaint about the design is that the XPS 12 doesn't include an ethernet interface or card slot along with its Wi-Fi, two USB 3.0 ports and Mini DisplayPort video output.

This Haswell version of the XPS 12 is currently only available in a single configuration, priced at £1,149 with a Core i7 running at 1.8GHz, 8GB RAM and 256GB solid-state storage. That's expensive, but not excessive for an Ultrabook. In contrast, a 13in MacBook Air

with 256GB SSD starts at £1,129 without either a touch-sensitive or full-HD screen.

The Haswell processor continues to impress, even though its clock speed is slightly reduced from the 1.9GHz of the original Ivy Bridge version of the XPS 12. Performance when running the PCMark 7 benchtest rises from 4854 to 5205 points, and this laptop is more than powerful enough to handle Microsoft Office, PowerPoint presentations or even video-editing.

The integrated HD Graphics 4400 can't cope with Windows gaming at full 1920x1080 resolution, but if you drop to 1280x720 and Medium graphics quality, you can get a playable 27fps from games such as Stalker: Call of Pripjat.

The biggest improvement, though, lies in battery life. The Ivy Bridge version of the XPS 12 provided five hours of streaming video, but that figure rose to a six hours and 45 minutes when we tested this Haswell model.

Verdict

If you're looking for a lightweight tablet, then look elsewhere. Dell's XPS 12 is primarily intended as a powerful working laptop, and its fourth-generation Haswell processor provides performance and battery life that could justify the high price. Tablet mode isn't entirely successful, but it's a nice bonus that you can use to relax when you finish work at the end of the day. **Cliff Joseph**



£1,037 inc VAT**Contact**■ sony.co.uk**Read more**■ tinyurl.com/myvt4g**Specification**

2GHz i7-3537U (3.1GHz TurboBoost); Windows 8 (64-bit); 8GB DDR3 memory; 1TB HDD (5400rpm), 8GB SSD; 15.5in, touch-sensitive LED display with 1920x1080 resolution; Intel HD 4000 graphics/nVidia GeForce GT 735M (2GB); Gigabit Ethernet; 802.11b/g/n; Bluetooth 4.0; NFC; 1x HDMI; 2x USB 3.0, 1x USB 2.0; 720p webcam with built-in mic; headphone socket; 41Wh, non-removable lithium-ion battery; 375x250x25mm; 2.3kg

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**LAPTOP****Sony Vaio Fit 15**

We were impressed by the low-cost Vaio Fit 15E laptop we reviewed recently (tinyurl.com/lhnykg6), but it also makes a more expensive version called the 'Vaio Fit 15'. This provides greater performance, as well as additional features such as a touch-sensitive screen with full HD resolution, but doesn't seem to be such good value for money.

Prices start at £559 for a model with a 14in screen and a modest i3 processor, but we reviewed the top-of-the-range £1,037 option that comes with a 15in touch-sensitive screen, an Ivy Bridge i7 processor running at 2GHz, 8GB of memory and 1TB hard disk. The hard drive is a basic 5400rpm model, but is backed up by an 8GB solid-state module to improve performance. Our review unit also included a DVD writer and an nVidia GeForce GT 735M for dedicated graphics - although you can save £40 by omitting the GeForce card, which will bring the price down to just under £1,000.

It's a neatly designed laptop, with brushed aluminium panels that look very smart, but are also sturdy enough to provide good protection when you're out and about. The 1920x1080 screen provides a bright, attractive image that works well for viewing video, web browsing or working with high-resolution photos.



But while the vertical viewing angle is good, the horizontal viewing angle is more limited and we found ourselves having to nudge the screen a number of times during our tests in order to improve visibility.

The speakers are reasonably loud, but the sound is harsh and tinny, which was a disappointment after the impressive speakers of the less expensive Fit 15E. These are only minor complaints, but they're not what you'd expect from a laptop costing over £1,000.

Still, the keyboard and trackpad are spacious and comfortable to work with, and the trackpad is similar to that used on Apple's MacBook range, with the entire surface of the trackpad acting as a single large button. This means you can almost forget about the

traditional mouse buttons and perform most tasks - apart, of course, from a right-click - without lifting your hand away from the surface of the trackpad. In fact, we prefer this to the touchscreen controls on this model - which can also be omitted for a saving of a further £80.


Performance is good for a laptop with a 5400rpm drive - that solid-state module clearly does its job, boosting the Vaio Fit 15 to a score of 4573 when running the PCMark 7 benchmark. That's more than adequate to handle a wide range of computing tasks, including photo and video editing - which will also benefit from the 8GB of memory and large hard disk.

It can handle some decent gaming action, too, cruising to 61fps when running *Stalker: Call Of Pripyat* at 1280x720 with medium graphics settings. And it maintained a respectable 34fps when we increased the resolution to 1920x1080.

The one real disappointment in terms of performance is battery life. Sony only quotes a maximum of 4.5 hours, and even when we switched to the less power-hungry Intel HD 4000 integrated graphics, the Vaio Fit 15 still fell just short of four hours (235 minutes) when streaming video on the BBC iPlayer. That's not very impressive for a laptop that costs this much - especially with similarly-priced Haswell laptops that can run all day long with ease.

The Vaio Fit 15 isn't particularly portable either. To be fair, the 2.3kg weight and 25mm thickness aren't bad for a 15in laptop with a built-in DVD drive, but it's still quite a weight to carry around in a briefcase, so the Sony will probably spend most of its time at home.

Verdict

The Vaio Fit 15 is a powerful and versatile 15in laptop, but small details such as the limited battery life and viewing angles on the screen mean that it doesn't reach the standard you'd expect for a laptop in this price range.  **Cliff Joseph**



£1,515 inc VAT

Contact

■ mysn.co.uk

Read more

■ tinyurl.com/l5yxxva

Specification

2.4GHz Intel Core i7-4700MQ (3.4GHz Turbo); Windows 8 (64-bit); 8GB DDR3 SDRAM; 750GB HDD (7200rpm); 256GB SSD; 15.6in matt-finish LED (1920x1080) display; Intel HD 4600/Radeon HD 8970M (4GB); 802.11b/g/n; Bluetooth 4.0; Blu-ray drive; HDMI/Mini DisplayPort; mini-FireWire; Gigabit Ethernet; 3x USB 3.0, 1x USB 2.0; SD/SDHC/SDXC/MMC/MS Pro card reader; 2Mp webcam with built-in mic; headphone socket, line-in, SP/DIF; 77Wh lithium-ion battery; 375x268x50mm; 3.4kg

Build: ★★★★★☆

Features: ★★★★★★

Performance: ★★★★★★

Value: ★★★★★☆

★★★★★

LAPTOP

Schenker XMG P503

Schenker's range of XMG gaming laptops generally provide good performance and value for money, but not even their mother would accuse them of being good-looking. Rivals such as Alienware adorn their gaming machines with all sorts of flashing lights and go-faster stripes, while Schenker tends to opt for generic black-box designs that look rather dull.

However, the P503 suggests that Schenker is finally starting to pay a little more attention to that sort of detail. The chunky matt-black chassis isn't exactly elegant - it measures 50mm thick and weighs in at 3.4kg, which is a lot even for a 15.6in model with a built-in optical drive. But turn it on and the keyboard backlight smoulders gently, while the trackpad lights up and displays a dramatically spread set of 'tribal wings'. There's also a utility that allows you to select a variety of different colour schemes, as well as settings such as 'dance' or 'wave' that make the lights strobe across the keyboard and trackpad at different speeds. It's utterly pointless, of course, but it's the sort of thing that everyone expects from an expensive gaming rig.

And the P503 is certainly expensive. Prices start at around £1,100 for a model with a Haswell i5 processor, 4GB of memory and 320GB hard disk. However, we reviewed a top-of-the-range model that comes in at £1,516 with a quad-core Haswell i7 chip running at 2.4GHz (3.4GHz with Turboboost), 8GB of memory, and



both a 750GB hard drive and 256GB solid-state drive. It also includes a Radeon HD 8970M with 4GB VRAM and a Blu-ray drive, although you can customise most of these components and easily save £200-£300 by ditching the Blu-ray drive and opting for a smaller SSD.

Most of these components are well chosen and will earn their keep. The 15.6in screen isn't touch-sensitive, but few gamers will worry about that. They'll prefer the matt finish that helps to reduce glare and provide maximum visibility during gaming sessions. The screen is bright and colourful, with 1920x1080 resolution and a horizontal viewing angle close to a full 180 degrees. Oddly, though, the vertical viewing angle is more limited - closer to 120 degrees - although we didn't find this a real problem during our tests.

The Onkyo speakers are good, too - a little harsh on higher frequencies, but the built-in subwoofer adds welcome depth to the sound and will work well with games and film soundtracks.


Big hitter

Performance is impressive, too. The inclusion of the secondary solid-state drive helps the P503 hit a score of 6205 when running the general-purpose PCMark 7 benchtest. That's one of the highest scores we've seen so far, so the P503 can certainly handle everything from web browsing to video-editing or audio-recording with ease. We were a little concerned about the two large cooling vents on the back of the unit, but while the fans fire up noisily when you first turn it on, the P503 still ran cool and quiet during all our tests.

We started our gaming tests by running *Stalker: Call of Pripjat* with medium graphics at 1280x720 resolution, and saw the P503 breeze to 176fps with no trouble at all. Stepping up to 1920x1080 only reduced that to 129fps, so we fired up *Batman: Arkham City* next and still managed to get 57fps at 1920x1080 with all the DX11 trimmings. That sort of performance should satisfy even hardcore gamers, and you can also experiment with Intel's Extreme Tuning utility, which is included to help you squeeze every last frame out of your games.

The only real disappointment is the battery life. Even with the Haswell processor and switching to the integrated HD 4600 graphics, the P503 could barely manage two and a half hours (160 minutes) of streaming video. You'd expect much better from a laptop in this price range - especially with a Haswell processor. Even so, that's unlikely to be a dealbreaker for most gamers, as the size and weight of the Schenker means that it's not likely to get outdoors very often.

Verdict

It's baby steps as far as the move towards a more stylish design is concerned, and there's certainly room for improvement when it comes to the battery life. However, the P503 provides all the performance you'd expect from a high-end gaming laptop. Schenker's website also provides plenty of build-to-order options, so you can probably trim the price down a bit without compromising performance too much.  **Cliff Joseph**



£649 inc VAT**Contact**■ toshiba.co.uk**Read more**■ tinyurl.com/mohaef**Specification**

1.6GHz i5-4200U (2.6GHz TurboBoost); Windows 8 (64-bit); 8GB DDR3 memory; 1TB hard drive (5400rpm); 15.6in LED touchscreen (1366x768) display; Intel HD 4400 graphics; 802.11b/g/n; Bluetooth 4.0; HDMI/VGA; 2x USB 3.0, 1x USB 2.0; 720p webcam with built-in mic; headphone and mic sockets; SD card reader (SD/SDHC/SDXC/MMC); 43Wh, non-removable lithium-ion battery; 377.5x244x28.8mm; 2.5kg

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**LAPTOP****Toshiba Satellite L50T-A-130**

Toshiba has been a bit slow off the mark to produce laptops with Haswell processors, and even the Satellite L50T-A-130 is a modest effort that's unlikely to grab any headlines.

It has the same unassuming design as many other models in the Satellite range, with a silver-grey plastic case that looks smart but not particularly exciting. It'll probably be equally deskbound, too, as the 15in screen and built-in DVD drive mean that it measures 29mm thick and weighs in at a 2.5kg.

The build quality is perfectly good, though, with a sturdy panel to protect the screen, and a keyboard and trackpad that are both roomy and comfortable to use. The one stand-out feature is the large speaker grille that runs almost the entire width of the keyboard panel.

Designed by Onkyo, the stereo speaker system produces a decent amount of raw volume, while the bundled DTS Sound software includes a 10-band equalizer, as well as options for quickly adjusting bass, treble and vocals on music. A few quick tweaks here allowed us to produce a better sound than most laptop speakers – and we even had to turn it down on occasion as they were too loud in our office.

That's the one real highlight, though, and other aspects of the L50T's design are much more mundane. The 15.6in screen is bright



and clear, and perfectly adequate for browsing the web or watching some streaming video. However, the entry-level 1366x768 resolution is disappointing in a mid-range laptop that costs almost £650 – especially as Toshiba is specifically positioning it as a multimedia machine.

Points of view

There's also some room for improvement in the viewing angles, which were only around 120 degrees both horizontally and vertically. Even so, that's still perfectly adequate for general use and didn't cause us any real problems during testing. It's also worth pointing out that the screen is touch-sensitive, which adds to the overall value for money – although we suspect that many people would gladly swap the touch controls for a higher quality screen.

Performance is a similarly mixed bag. There are less expensive models in the L50T range that use Ivy Bridge and even AMD processors, but the L50T-A-130 comes in at around £650 with a Haswell i5 running at 1.6GHz, along with a healthy 8GB of memory and 1TB hard drive.


We know that the Haswell processor is capable of strong performance even at relatively modest clock

speeds, but Toshiba does itself no favours by pairing the state-of-the-art processor with an aging 5400rpm hard drive. The end result is a score of just 2850 when running the PCMark 7 benchmarks. That's perfectly adequate for running Microsoft Office, web browsing or a spot of photo-editing but, again, is still the sort of performance we'd associate with entry-level laptops costing closer to £500.

Thankfully, the improved performance of the Haswell processor's HD 4400 integrated graphics means that the L50T can just about handle some casual gaming action, reaching 26.5fps when running Stalker: Call Of Prip'yat at 1280x720 resolution with medium graphics settings.

Haswell also comes to the rescue on battery life, providing a five hours and 15 minutes of streaming video via its onboard Wi-Fi. That's not going to break any records, but it's above average for a model with a 15in screen and ensures that you will be able to get plenty of work done – as long as you have the strength to carry it around with you.

Verdict

Looking back over this review, we do seem to have used the word 'adequate' rather a lot. That pretty much sums up the L50T-A-130, as it's adequate in most respects but – apart from the beefy speakers – really doesn't stand out in any particular way. Cut the price by £100 and it'd be a good budget offering, but at £649 it may struggle to compete with its many mid-range rivals.  **Mike Jennings**



£599 inc VAT

Contact

■ samsung.com/uk

Read more

■ tinyurl.com/nthzv59

Specification

1.4GHz AMD A6-1450 (quad-core); AMD Radeon 8250 graphics; 13.3in (1366x768) TN display; Windows 8 64-bit; 128GB SATA SSD; 4GB DDR3 1600MHz RAM; ethernet via supplied dongle; mini-VGA, Micro HDMI; 802.11b/g/n (1x1); Bluetooth 4.0; 0.9Mp webcam; stereo speakers, 1.5W amp; built-in mic, 3.5mm line-in; 3.5mm line-out (combined with line-in); 1x USB 2.0, 1x USB 3.0; Slim Security Slot; SD card slot; Samsung SideSync, HomeSync Lite software; 40W mains adaptor; 32Wh lithium-ion, non-removable battery; 315x226x15.5-16.9mm; 1532g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



LAPTOP

Samsung Ativ Book 9 Lite

The Ativ Book 9 Lite is Samsung's first laptop since it rebranded the confusing Series 3, 5, 7 and 9 ranges. This affordable ultraportable aims to balance premium features with a low price.

Samsung says it shares the same 'design identity' as the flagship Ativ Book 9 Plus (reviewed opposite). It certainly looks similar, which is no bad thing since the Plus is a sleek and attractive laptop.

Although the name 'Lite' might suggest that this is lightweight, it's pretty thick and unavoidably heavy. Not by a huge amount, though. It's 18mm thick and weighs 1.5 kg, which puts it at the chunkier end of slim ultrabooks. It also has a plasticky build, though, it still feels well-made, and is available in Marble White or Mineral Ash Black (pictured).

Its keyboard feels very plastic to the touch, but offers a comfortable and tactile experience. The trackpad is more impressive, with a large area to work with and the kind of responsiveness not regularly associated with cheaper laptops.

Although the Ativ 9 Book Lite might superficially resemble the Plus, it's been downgraded internally to reach that sub-£600 price.

Samsung is vague about exactly what processor is inside the laptop, stating only that it's a quad-core chip running up to 1.4GHz. We did a little digging, though, and discovered that it's an AMD A6-1450 auxiliary processing unit (APU) with a Radeon



HD 8250 graphics core. What Samsung is less ashamed about is the 4GB of memory and 128GB SSD.

The Lite produced adequate results of 2142 points in PCMark 7, but only 15fps in Stalker: Call of Pripyat at our lowest standard 720p/Medium-detail test. The graphics framerate especially shows that gameplay will be limited even more than with Intel integrated graphics.

Battery power

Battery life, according to Samsung, is up to 8.5 hours from the built-in 32Wh battery. In our tests, however, the Ativ Book 9 Lite streamed a looped movie on BBC iPlayer over Wi-Fi for 6.5 hours.

Our review sample came with a 13.3in touchscreen, but a non-

touchscreen version is also available if you don't think you'll need Windows 8 or its gestures - it will save you £100.

The screen looks reasonably good, but its 1366x768 resolution is a long way from the Plus, which offers 3200x1800 pixels and IPS technology.

Viewing angles from this budget TN panel are narrow, too.


The Lite's hinge allows you to push the screen back so that it's flat to the desk, in case you find a use for this other than playing a two-player air hockey game.

There's no room for an ethernet port, but Samsung includes an adaptor dongle in the box. The proprietary connector looks like Micro-USB, but don't try to force one of these cables in. Other options include a USB 3.0 port, a USB 2.0 socket, Micro HDMI, mini-VGA and an SD card reader hidden away under a flap.

As with most laptops these days, a 720p webcam allows you to make video calls.

Pre-loaded software normally falls into the 'bloatware' category, but Samsung adds some useful apps - SideSync and HomeSync Lite. The latter lets you create a personal cloud to share media between devices, while SideSync allows you to control your phone with a keyboard and mouse, mirroring the display on the laptop's screen. This only works with Samsung Galaxy Android devices, though.

Verdict

Samsung's Ativ Book 9 Lite is around half the price of the Plus. This means a plastic chassis and a cheap screen and processor have been used, though, it has an impressively thin and light form factor. Component downgrades also mean that this laptop is no powerhouse, but it does the job well and few laptops at this price point are so thin and light.  Chris Martin



£1,300 inc VAT**Contact**■ samsung.com/uk**Read more**■ tinyurl.com/pv6qwyb**Specification**

1.6GHz Intel Core i5-4200U (dual-core, 2.6GHz Turbo); Intel HD Graphics 4400; 13.3in (3200 x 1800, 275 ppi) PLS LED; Windows 8 64-bit; 128GB SSD, SATA; 4GB DDR3 1600MHz; ethernet via proprietary dongle; mini-VGA via proprietary dongle, Micro HDMI; 802.11a/b/g/n; Bluetooth 4.0; 0.9Mp; stereo speakers 2x 2W; Built-in mic, 3.5mm line-in; 3.5 mm line-out (combined with line-in); 2x USB 3.0; Slim Security Slot; SDXC card slot; Samsung SideSync, HomeSync Lite software; 55.5Wh lithium-ion, non-removable; 320x223x13.5-14.5mm; 1409g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**LAPTOP****Samsung Ativ Book 9 Plus**

The Samsung Ativ Book 9 Plus is an Ultrabook that's been designed to rival Apple's MacBook Air and Pro. It also looks very similar to the old Series 9 laptop it replaces, which is no bad thing. The thin aluminium unibody looks sleek and attractive in its blue tinted 'Ash Black' colour, with arcing lines and cleanly finished silver edges. The Plus has a classy, premium feel with excellent build quality. There's no scrimping here as even the underneath of the laptop is metal, matching the MacBook Air.

It's a 13in laptop, measuring 13.5mm at its thinnest point and only a millimetre more at its thickest, and weighs 1.4kg. That's as portable as a MacBook Air, but Samsung has included specifications that rival the MacBook Pro.

We like the backlit typing experience, even if it is the same plastic keyboard found on the Ativ Book 9 Lite (opposite). The trackpad is outstanding with a smooth feel and responsive nature that only requires the lightest of touches.

The star of the show here is the touchscreen, which has a resolution of 3200x1800 pixels and a high pixel density of 275ppi, the highest we've ever seen on a laptop. Windows isn't equipped for this, though. You'll need to change the display settings to 200 percent zoom to make the desktop a usable size. And even then, many Windows applications aren't compatible with this scaling, so you'll be peering at the tiniest of small print when using these.

Aside from the high resolution, the display has good contrast, rich colours and great viewing angles



with Samsung's IPS-like PLS panel. All are slightly tainted by the highly reflective glossy sheet of glass, though. If you should want to, it folds flat and the hinge cleverly stiffens at around 105 degrees. This means you can easily open the laptop, and the screen isn't pushed back when you use touch input.

The Plus is powered by an Intel Haswell (4th-gen) processor and built-in HD 4400 graphics. In this case, it's a 1.6GHz dual-core Core i5-4200U that's backed up with 4GB of memory and a 128GB SSD.

Samsung says it can boot up from cold in under six seconds, and although our review sample couldn't achieve this, it managed a still impressive eight seconds. Note that this isn't a cold boot, but Windows 8's restore from hibernation mode.

The Plus fared well in benchmark tests, too, achieving an impressive 4648 points in PCMark 7, but only outpacing the MacBook Air by 50 points, or one percent.

Graphic performance is capable at low quality settings but the laptop is no gaming rig. In Stalker: Call of Pripyat at our lowest standard test of 720p/Medium-detail, the Ativ Book 9 Plus managed a playable 31fps. Increasing the resolution to 1080p halved the framerate to 16fps, while cranking it to the screen's full 3200x1800-pixel resolution made the game plummet to 7fps.

Samsung claims a battery life of up to 11 hours from the 55.5Wh non-removable battery. In reality, the Plus was found to last for a

considerably


shorter time. Our usual video rundown test comprises looping an MPEG-4 HD video, streamed over Wi-Fi, with screen brightness set to 120cd/m². It lasted just five hours and one minute.

Connectivity is good, even if there isn't room for full-size ports other than USB. The Plus has two USB 3.0 ports, Micro HDMI, mini VGA, mini ethernet, combined headset jack and an SDXC card reader is hidden behind a flap on the underside. To use the VGA or ethernet options, though, you'll need to carry around Samsung's proprietary dongles.

A 720p webcam for video calls and a decent pair of stereo speakers also make an appearance. There's no 11ac wireless, though, meaning the Plus is behind the curve here, which is a shame.

Like the Ativ Book 9 Lite, Samsung pre-loads some software in the form of SideSync and HomeSync Lite. These only work with certain Samsung Galaxy devices, though, and respectively allow you to take control of the smartphone or tablet and share content between devices.

Verdict

The Samsung Ativ Book 9 Plus is one of the nicer Windows ultrabooks around, with stylish design and impressive specifications. But it comes at a high price and has disappointing battery life. Unless you specifically want Windows 8 and that super high-res display, the equivalent MacBook Air has better overall performance and is cheaper.  **Chris Martin**



£1,679 inc VAT**Contact**■ uk.msi.com**Read more**■ tinyurl.com/poragxu**Specification**

2.4GHz Intel Core i7-4700HQ processor; 17in (1920x1080) matt TN display; nVidia GeForce GT 765M graphic with 2GB GDDR5 RAM; 8GB DDR3 RAM; 2x 128GB mSATA SSD in RAID 0; 750GB hard disk; dual-band 802.11n Wi-Fi; gigabit ethernet; 4x USB 3; HDMI; VGA, 2x Mini DisplayPort; SDHC card slot; Windows 8 64-bit; 419x287x22mm; 2.6kg

Build: ★★★★★
 Features: ★★★★★
 Performance: ★★★★★
 Value: ★★★★★

**LAPTOP****MSI GS70 Stealth**

Desktop-replacement laptops are traditionally heavy and bulky units, but MSI aims to banish convention with its GS70. It might have a 17in full-HD screen, a quad-core Intel processor and a discrete nVidia graphics processor, but it's all contained in a chassis that's 22mm thick.

It's a stunning headline figure, bolstered by a relatively impressive weight of 2.6kg. Other gaming laptops just can't compare to the svelte MSI: the Alienware 17 weighs 4kg and is 50mm thick.

The GS70 doesn't just impress with its vital statistics - it's also one of the best-looking gaming laptops we've seen. It's largely made from brushed aluminium, and the gunmetal grey finish is paired with smooth, curved corners and restrained details throughout. Build quality is also excellent.

The lid houses an MSI logo and an illuminated red badge, while the base is strangely devoid of the typical tacky Windows, Intel and nVidia stickers that disturb the design of many high-end machines.

Instead there's a modest SteelSeries logo below the keyboard and a small power button above. The speaker grille is milled from the metal, and there's a discreet row of status LEDs along the front edge.

There's only one concession to the sort of ostentatious design that prevails in many gaming notebooks: the backlit keyboard. Its lights are divided into three sections, and each can be lit with a different colour - or made to pulse. If you prefer, they can be turned off entirely.

The keyboard itself is excellent. The base is rock-solid, and the entire keyboard is slightly sunken, which allows the keys enough travel to provide consistent feedback and a comfortable typing action. The keys are light, which helped us quickly get up to speed, and the wide touchpad below is responsive and accurate.

The 17in screen impressed, too. Its measured maximum brightness is a high 318cd/m², and the panel delivers punchy, vibrant images. The measured 1096:1 contrast ratio is superb - it indicates the wide span from searing whites to inky blacks.

It has an anti-glare matt finish, and despite being the cheaper TN



type has good viewing angles that help games leap from the screen. The main issue is colour accuracy - a Delta E figure of 7.6 is average.

The GS70 is a stunner under the bonnet, too. Windows 8 64-bit motors along thanks to a Core i7-4700HQ. It's one of Intel's most potent mobile parts: four 22nm cores, a stock speed of 2.4GHz, a top Turbo pace of 3.4GHz, and 6MB of L3 cache.

The storage is just as notable: two 128GB SSDs are combined in RAID 0 for 237GB of capacity and we measured the array's sequential read speed at 826MB/s - stupendous speed, and approaching twice as fast as the best standalone SSDs.

Performance

It's understandable, then, that the MSI returned one of the best PCMark 7 scores we've ever recorded from any Windows PC, let alone a laptop: 6060 points.

The nVidia GeForce GTX 765M is one of the firm's most powerful mobile GPUs - it's based on the architecture from the desktop GTX 660 card - and in this incarnation it has 768 stream processors clocked at 850MHz and 2GB of GDDR5 RAM. It's one of the best chips currently to be found inside laptops.

It's only fitting that this machine recorded stellar games results. Our standard Stalker benchmark runs at 1280x720 and Medium quality settings, and the MSI brushed this aside with an average framerate of 85.7fps - a superb score, although it didn't match the Alienware's 130fps. We loaded Stalker's top graphics settings, added anti-aliasing and anisotropic filtering, and upped

the resolution to screen-native 1920x1080. The GS70 still didn't balk, averaging 37.3fps. It handled more demanding titles without breaking a sweat, too, and averaged 42fps in Bioshock Infinite at the game's top settings and 1920x1080.

It's a tribute to Haswell's efficiency that the GS70 lasted for three hours and 31 minutes in our battery test - a reasonable result that's not far behind the Alienware.

The rest of the specification is suitably high-end: a 750GB hard disk, Killer DoubleShot networking and 8GB of memory in our review model, which MSI has subsequently doubled for the GS70's retail release.

There are four USB 3.0 ports, two Mini DisplayPort connections, HDMI and VGA ports, plus an SD card slot.

The speakers are good, too: the bass is punchy, and the high-end is filled with snappy, clear sounds. The mid-range is fine, although it tends to be slightly drowned out by the rest of the mix.

It's not all good news, though: high-end components crammed inside such a slim chassis creates heat and noise. The processor and graphics card hit top temperatures of 82°C and 87°C - high, if not dangerous. The pair of fans inside churned out a high-pitched whine when the machine was stressed, although some noise might be drowned out by the speakers.

Verdict

The MSI GS70 Stealth impresses in almost every department, with class-leading benchmark results, a superb screen and a slimline build. You'll have to pay for the privilege, though.

✉ **Mike Jennings**

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■ quietpc.co.uk

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Specification

1.1GHz Intel Celeron 847 dual-core processor; Ubuntu Linux 13.04; 8GB RAM (16GB max); 120GB mSATA 6Gb/s SSD; 3x USB 2.0; 2x HDMI; gigabit ethernet; (Wi-Fi with Bluetooth card option); external PSU; 112x117x39mm; 520g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



SMALL FORM-FACTOR PC

Quiet PC UltraNUC

The UltraNUC from Quiet PC is one of the smallest PCs we've ever seen. Although thicker than a modern laptop, it's much smaller in the other two dimensions, and weighs well under half any notebook, too.

It's based on a bare-bones platform from Intel that system builders can configure by adding a processor, memory, solid-state drive and operating system. Quiet PC allows you to configure the platform by selecting your options for each of these.

We looked at the entry model, with the only customisation being 8GB of memory rather than 4GB, which adds £47 to the base price.

As supplied, the UltraNUC didn't include a monitor, keyboard or mouse. While adding the cheapest keyboard and mouse can only cost £10, unless you have a spare HDMI monitor, you'd need to budget from around £100 for a display. Thanks to a supplied mounting kit, the UltraNUC can be screwed to the rear of a monitor, thereby turning it into something like an all-in-one PC.

While the styling is acceptable, it's not particularly exciting as you might hope for a small PC that's designed to be largely unnoticed.

Unlike many desktop systems, where opening up the case is discouraged by warnings of warranty invalidation, Quiet PC's two-year



collect-and-return warranty states that the company has an "open case" policy. As such, we took the opportunity to take a look inside, facilitated by the removal of four screws. Construction appears solid and, except for a couple of leads for connection to an optional Wi-Fi adaptor, it's free of the plethora of wires that tend to be found in most desktop PCs.

On turning the UltraNUC on, the first thing we noticed was that it's totally silent. A fan kicks in if necessary, although this was rare during testing. Our review unit came with Ubuntu Linux pre-installed and it booted to a clean build with no bloatware or nag screens to buy full versions of pre-installed trial software.

The LibreOffice suite is installed as part of Ubuntu, its three components of Writer, Calc and Impress being the equivalent of Word, Excel and PowerPoint, and with the ability to import and export these Microsoft formats.

We didn't measure its speed since our usual benchmarks don't run in Linux. However, we found that the combination of a dual-core 1.1GHz Intel Celeron 847 processor and no additional graphics hardware were perfectly adequate for normal office productivity use. High-powered graphics or games are out of the question, though.

You can specify better components: 1.8GHz Intel Core i3-3217U or 1.8GHz Intel Core i5-3217U from last year's Ivy Bridge range, which add £82 and £210 respectively to the price. Also available are larger mSATA SSDs, up to 240GB for an extra £124.

Verdict

The UltraNUC looks underpowered compared to other desktop PCs, and it quickly becomes expensive when you opt for a higher specification. However, what's on offer even with the base unit is an unusually small PC which itself attracts a price premium. Mike Bedford

TABLET

Tesco Hudl

PC ADVISOR
RECOMMENDED

£119 inc VAT

Contact

■ tesco.com

Read more

■ tinyurl.com/mxhxvuk

Specification

Android 4.2.2 Jelly Bean; 1.5GHz quad-core A9 processor; 16GB storage; 1GB RAM; 7in (1440x900) IPS display; Bluetooth 4.0; 193x129x9.9mm; 370g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



Tesco has launched the Hudl, which is aimed at anyone who doesn't yet own a tablet. That's one of the reasons it's priced at £119, undercutting Google's Nexus 7 (tinyurl.com/m9hnr8q) by £30. Clubcard Boost allows Tesco Clubcard vouchers to be used for double value, so you can get the tablet even cheaper than its already budget price tag.

The Hudl feels nice in the hand and its soft touch plastic casing comes in four colours: black, blue, red and purple. It's a little chunkier and heavier than the Nexus 7 at 9.9mm and 370g, but isn't unwieldy. It's also well built for a cheap tablet, with a solid construction.

Despite the budget price, the Hudl has a reasonable specification. The 7in screen matches that of the Nexus 7 and Kindle Fire, but has been designed to be used in landscape mode - you can still use portrait if you wish. The resolution is also decent for a low-cost tablet, and at 1440x900 is higher than the original iPad mini. Viewing angles are good, too. The display is, however, occasionally unresponsive and in general we needed to set brightness to the maximum setting.

The Hudl comes with 16GB RAM, however, a microSD card lets you add up to 32GB more, which is another plus point when compared to Google's and Amazon's devices.

The 1.5GHz quad-core A9 processor copes well with its job. Navigation around the operating system is nippy if not lightning fast, while web browsing and gaming is reasonable but nothing more.

The Hudl scores 1583 in Geekbench 2, which is a little more than the original Nexus 7. It's only one frame off the considerably more expensive Galaxy Note 8 (tinyurl.com/nn5yrds) in GLBenchmark 2.5 - it managed 17fps. In SunSpider 1.0, the Hudl scores a middling 1397ms.

Android 4.2.2 Jelly Bean is almost vanilla, but Tesco has added a few of its own applications. Preloaded widgets give first time users a helping hand and other

£179 inc VAT**Contact**■ fuze.co.uk**Read more**■ tinyurl.com/oo94a4**Specification**

Raspberry Pi Model B (single board computer with 700MHz ARM 11 CPU core, Broadcom VideoCore IV GPU core, 256MB RAM, SD card slot, 2x USB ports, HDMI port, 10/100 ethernet port, audio port); 4GB SD card (including FUZE BASIC and PDF-based project cards); case with keyboard; wireless mouse; breadboard; electronics kit; power supply

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**EDUCATIONAL COMPUTER****FUZE powered by Raspberry Pi**

Back in the 1980s, the UK led the world in home-computer ownership. Since those early systems had little in the way of ready-written software, enthusiasts learned to program, and a generation of computer programmers was born.

Today's PC and tablet owners rarely write their own programs and experts are concerned at the effect this is having on the UK computer industry. In an attempt to resolve this, the Raspberry Pi was launched in 2012 as an educational computer to get people programming again.

It's small and cheap, and it's doing a lot to encourage schools to teach programming. And FUZE believes it can build on this success. The company's 'FUZE powered by Raspberry Pi' takes the Raspberry Pi credit card-sized computer, houses it in a case with a keyboard, and pre-configures it with the BASIC programming language.

In addition, so that people can learn to drive electronic circuits using software, it also has a patch board on which you can create a circuit and wire it to the Raspberry Pi's inputs and outputs. The kit we looked at also includes a box of electronic components, although you can buy it without.

The FUZE has a decidedly retro look about it. While this isn't a problem in schools, it would look

rather out of place in the home. And while a patched up electronic circuit will never be a work of art, a cover for the breadboard would have helped.

The system boots into a Debian flavour of the Linux operating system, although initially that won't concern you as you'll only be using FUZE BASIC. A few project cards are provided as PDF files to get you started although, as yet, you're not going to learn to program from these alone. So far there are three that appear to be the start of a FUZE BASIC programming course, and one that guides you in wiring up a simple circuit and driving it using a BASIC program.

Extra project cards will be made available on the website, but in the meantime, you'd either have to buy a book on learning BASIC (although this won't be specific to the FUZE version), or work your way through the Programmer's Reference Guide which will be hard work for a beginner. In a school setting, though, this won't be an issue with teachers at hand.

In use everything worked without a glitch, and we were up and running




in next
to no
time thanks
to the Easy

Setup Guide. We tried one of the project cards - the one that involved patching up a circuit - and that too worked perfectly.

The system is sluggish, and this could be an issue if you wanted to do other things in Debian, but for its prime purpose of learning BASIC this isn't a problem.

Verdict

The FUZE system goes a long way to making the Raspberry Pi easier for the novice to use and providing the resources necessary to learn to program in BASIC. To be more accurate, though, we ought to say that it should do when it's all finished. The combination of a proprietary version of BASIC and an unfinished programming course means that getting up to speed will be tough going for beginners who are working alone.  **Mike Bedford**

things such as Clubcard status at a glance. These can, of course be removed if they are of no use to you.

Alongside the regular navigation buttons, there's a T button, which is a shortcut to Tesco services including Blinkbox and Clubcard TV. They are both streaming services, but Blinkbox offers up-to-date content to buy or rent, while Clubcard TV allows free but fewer and older content.



To go with these is a Micro HDMI port to get those films and TV shows on to your TV. Importantly, there's full access to Google Play Store, so the Hudl has one up on Amazon's Kindle Fire range of budget tablets.

With Jelly Bean onboard, users can create multiple accounts, meaning the Hudl will suit families who want to share the tablet.

Tesco says the Hudl can provide up to nine hours of video playback, depending on the settings. During testing, we set the brightness to maximum and streamed a 30-minute BBC iPlayer programme over Wi-Fi. This used just under 10 percent of the battery, so it will last around five hours if you only watch video.

General battery life will depend on how often you use the device. If you pick it up occasionally to check your Facebook account, then it will give you a few days' worth of use. We'd like some kind of power management, though, so that Wi-Fi could be automatically switched off with the screen.

Verdict

The Tesco Hudl is a budget tablet with a nice design and good build quality. Key specifications are better than the price suggests, and the microSD card slot and Micro HDMI port are two reasons to opt for it over Google's and Amazon's alternatives.  **Chris Martin**

£1,299 inc VAT

Contact

■ braebo.com

Read more

■ tinyurl.com/m6nnsty

Specification

4.7GHz AMD FX-9590
8-core (overclocked to 5.09GHz); Asus Sabertooth 990FX R2.0 motherboard; 16GB DDR3 RAM; Windows 8 (64-bit); 2TB Hitachi Deskstar 7K3000 HDD (7200rpm); 250GB Samsung 840 Evo SSD; Cooler Master Silencio RC-650 case; 600W Corsair CX600M PSU; Corsair Hydro H55 liquid CPU cooler; Sapphire AMD Radeon HD 7950 with 3GB RAM; 6x USB 3.0; 10x USB 2.0; 2x eSATA; DVI; DisplayPort; 16x LG Blu-ray BD-RE optical drive; 2-year return-to-base warranty

PC ADVISOR

BEST BUY

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



GAMING PC

Braebo Annihilator

Braebo strikes out for something a little different with the Annihilator, arming its system with the latest FX9590 processor from AMD. This ambitious eight-core CPU has a base speed of 4.7GHz, and can exceed 5GHz in use – Braebo cagily rates it as 5GHz+, and we measured it at 5.09GHz at its very fastest.

Such a clock speed looks quite astonishing, but the PC isn't fast enough to allow AMD to bridge the gap to its competition from Intel. PCMark 7 rated the whole system at 5501 points, which makes it a pretty nippy chip, but certainly no match for the likes of an Intel Core i7-4770K. In fact we have laptops that measure faster by this metric.

Under the bonnet

The CPU is not without a stellar treatment from Braebo, and it's given support by 16GB of 1600MHz Crucial RAM. The storage drives are recent-spec, too, combining the capacious storage of a 2TB Hitachi Deskstar disk with a speedy 250GB Samsung 840 EVO SSD.

The AMD isn't a cheap processor, and this left Braebo having to settle for a AMD Radeon 7950 graphics card where a 7970 would be more fitting for gaming. Nonetheless,

this Sapphire version still makes a nice addition, and its 3GB of RAM gives it memory to drive more than one high-resolution screen.

Figures of 112 and 64fps (720p/1080p) in Aliens vs Predator are testament to the extra lick of speed that the Braebo extracts from this card, while Sniper Elite V2 generated similarly sharp scores of 104 and 27fps (720p/1080p). However, there are better gaming machines available for this £1,300 PC-only price tag.

The Cooler Master Silencio RC-650 is a large imposing case that proves a smart choice. The top panel slides away to reveal matching pairs of USB 2.0 and USB 3.0 ports, and some cunning switches that give you the possible option of booting from two drives, or turning down the fans for a quieter life. The case is strong on internal space, too, and the neat arrangement means that all components can be accessed with ease.

A Corsair Hydro H55 unit allows for great liquid cooling, and doesn't hog space like many a cooler option we've seen. The 600W Corsair CX600M isn't the largest power supply we've seen packaged with a PC of this type, but it does the job.



An array of ports and connectors at the back includes eight USB 2.0, four USB 3.0, and a brace of eSATA connectors. It consumed around 84 watt when idling, and topped over 300 watt at its most intensive, so it's not especially economical in power consumption. It's perhaps to be expected given the AMD CPU and performance components.

Our system came with a 12x Lite-On Blu-ray writer (BD-RE/DVD±RW), although we're told the PC will sell with a 16x LG optical drive. Either way, you're getting useful Blu-ray playback and recording facilities. The onboard sound is more than adequate, and the price includes delivery.

All systems will have three games included, from a choice that includes Far Cry 3 and Hitman Absolution.

Verdict

The Braebo Annihilator is a smartly attired gaming PC that's let down in performance and economy by the AMD processor. The FX9590 isn't without ambition, but it doesn't pack the raw processing power of today's Intel PC. Consequently, even a nice selection of components from Braebo isn't enough to qualify this machine as one of the top deals on the market. **Robin Morris**



£847 inc VAT**Contact**■ intel.com

Read more

■ tinyurl.com/lc8oj4w**Specification**

3.6GHz stock speed,
4GHz Turbo; Ivy Bridge-E
22nm architecture; six
cores, Hyper-Threading;
32KB L1 cache per core,
256KB L2 cache per core,
15MB L3 cache; quad-
channel 1866MHz DDR3
memory controller;
LGA 2011 socket

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★★

Value: ★★★★★☆

**PROCESSOR****Intel Ivy Bridge-E Core i7-4960X**

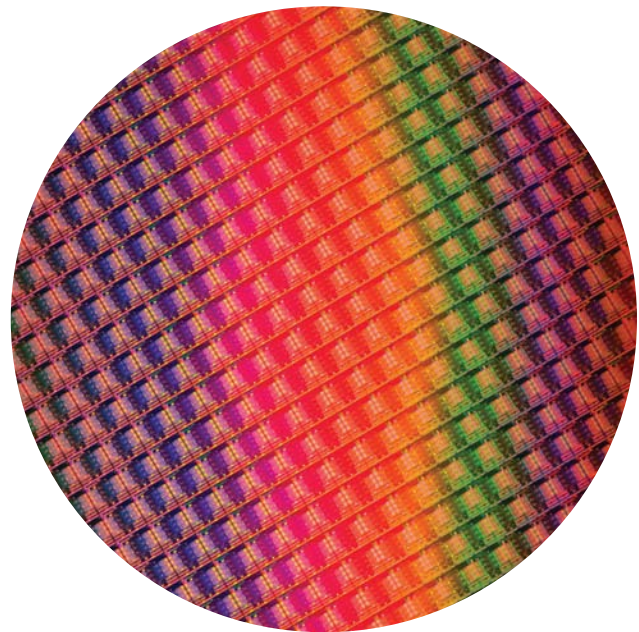
Intel reserves Extreme branding for its fastest chips, but its Ivy Bridge-E range has been a long time coming – Sandy Bridge-E emerged in 2011 and, four months ago, Intel released Haswell. The three new chips use 2012's Ivy Bridge architecture rather than Haswell. That's because they're based on workstation Xeon parts, which are released behind the curve of Intel's consumer chips for reasons of longevity and reliability.

The new chips use a 22nm manufacturing process. This an improvement on Sandy Bridge-E's 28nm, and makes for a die that's smaller, cooler and more efficient. The flagship Core i7-4960X has a fearsome specification: six Hyper-Threaded cores clocked to 3.6GHz, a top Turbo Boost speed of 4GHz, and 15MB of L3 cache.

Ivy Bridge improves on its Sandy Bridge predecessor with better branch prediction, improved out-of-order execution and more cache bandwidth. And the Extreme-edition of these chips have their own enhancements too: support for 40 PCI-Express 3.0 lanes and quad-channel 1866MHz DDR3 memory both improve over Sandy Bridge-E.

The Core i7-4960X isn't the only Ivy Bridge-E chip. The i7-4930K also has six cores, but they're clocked to 3.4GHz with a Turbo speed of 3.9GHz, and it's got 12MB of cache. The i7-4820K is a quad-core 3.7GHz chip that maxes out at 3.9GHz and has a 10MB cache.

The LGA 2011 socket and X79 chipset remain from Sandy Bridge-E, so you won't need to buy a new motherboard. Old heatsinks will work, and so will the vast majority of motherboards – although most need a BIOS update.



The older chipset has its down sides, especially if you're building a fresh machine. There's no native USB 3.0 support, and support for only two SATA 6Gb/s sockets. Both of these are rectified by third-party chips on motherboards, but these increase the price and the potential for instability.

The Core i7-4960X returned great benchmark results, but don't expect this chip, made from an older architecture, to always outpace Haswell. Its overall PCMark 7 score of 6099 points beats the 5246 points scored by the Sandy Bridge-E based i7-3960X, but it's a little slower than the Haswell-based i7-4770K. That's disappointing, but not surprising – Haswell is newer, and PCMark 7 doesn't necessarily make the best use of the i7-4960X's six cores.

Other tests show off the i7-4960X's multithreaded advantage. The i7-4960X's score of 11.85 points in the Cinebench video rendering benchmark is excellent: the Core i7-4770K managed just 8.12 in the same test, and the Sandy Bridge-E based i7-3960X scored 11.01.


We were easily able to overclock the i7-4960X to a stable 4.4GHz. In PCMark 7, the tweaked chip returned a lower overall score of 5851 points, but that was caused by just one test: in the Productivity benchmark – which measures basic system tasks – the i7-4960X's score nearly halved from a superb 5648 to a still quick 2733.

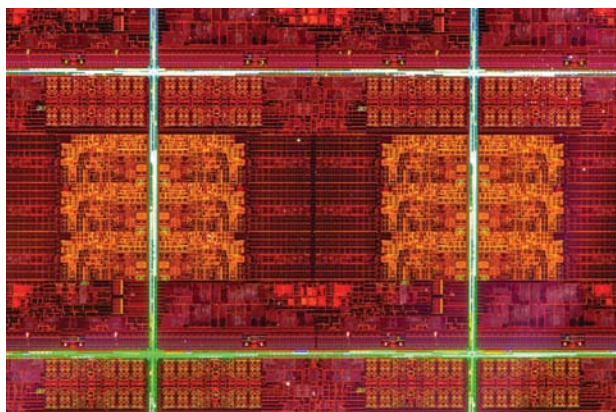
In every other PCMark 7 test, the overclocked chip improved: its Entertainment score rose from 4915 to 5109 points, the Creativity test leaped from 7811 to 8042, and the i7-4960X's Computation result jumped from 8879 to 9604. The overclocked i7-4960X also scored 13.3 points in the Cinebench test – a stunning result that demonstrates the part's multicore abilities.

Our final test, wPrime, calculates prime numbers using every available thread to evaluate multicore performance. The i7-4960X finished the 1024MB test in 132 seconds – the i7-3960X needed 151 seconds.

Intel has upped its Extreme-edition chip's multithreaded performance levels without compromising on heat or power draw. The i7-4960X's top temperature of 63°C is fine, and the peak power draw of 247W during the Cinebench test is only 4W more than Sandy Bridge-E managed, while providing a hefty performance leap.

Verdict

Benchmarks show that the i7-4960X is the most powerful processor around in multithreaded tasks and when running intensive apps because of its six cores, but it's marginally slower than Haswell in less demanding single-threaded tasks. Its mixed performance, ageing ancillary hardware and stratospheric price means this is only worth buying if you need the extra power its six cores provide.  **Mike Jennings**



£1,299 inc VAT

Contact

■ samsung.com/uk

Read more

■ tinyurl.com/qakolzzy

Specification

5.7in FHD sAMOLED 16M colour depth, 1920x1080 display GSM 3G/HSPA+/LTE, GSM/GPRS/EDGE, LTE, HSPA+; 802.11a/b/g/n/ac; Bluetooth 4.0; NFC; USB 2.0, USB 3.0; 3.5mm stereo earjack; MicroSD external memory slot (up to 64GB); Micro SIM; Android 4.3 Jelly Bean; 32/64GB RAM; 151.2x79.2x8.3mm; 168g; 3200mAh standard battery; S Pen; CMOS, 13Mp BSI sensor, auto focus, smart stabilisation, LED flash (High CRI), and zero shutter lag; CMOS, 2Mp BSI sensor with smart stabilisation, full HD recording at 30fps

PC ADVISOR
RECOMMENDED

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



PHABLET

Samsung Galaxy Note 3

The Galaxy Note 3 offers stunning performance, and an amazing and huge screen. Furthermore, it feels like a premium device, and it's slim and light enough for the massive screen to seem like a bonus rather than a hindrance.

The Note 3 has staggering specifications and performance to match. It pairs a new Qualcomm Snapdragon Quad-core 2.3GHz Krait 400 processor with a whopping 3GB RAM. And it shows. Synthetic benchmarks shouldn't be relied upon when making a purchasing decision, but if they were the Note 3 would be a must buy. It smashed our record for the Geekbench 2 real-world performance test, turning in a record average score of 4057.

Graphics are handled by an Adreno 330 graphic processing unit, and benchmark results are similarly impressive. Running the GFXBench 2.7.2 Egypt HD test onscreen, we got an excellent - record - result of 54fps. Again, none of this would mean much if the real-world performance was poor, but we found games and video footage worked well, with no lag at all.

Storage wise the options are 32GB and 64GB, and there's an SD card expansion slot for up to another 64GB of storage.

The graphics performance to which we refer above is put to good use on the Galaxy Note 3's exquisite screen. This is an FHD sAMOLED display with 16M colours and a 24-bit colour depth. That's a lot of colour and it shows. If a vibrant and deep hue is something you like in your display, you need look no further.

And the colour is just the start. This is a huge 5.7in screen with an HD resolution of 1920x1080. That gives it a world class pixel density of 386ppi. We're used to smaller smartphones boasting retina-busting displays, but such sharpness on a screen of this size is truly a thing to behold. Movie content looks amazing, games stunning. But the Note 3 comes into its own watching sport on TV. Held naturally a couple of feet from your face, it offers a better visual experience than a big TV on the other side of the room.

The touchscreen is snappy and sensitive, too, although prone to picking up finger smears.

The Note 3 is big, yes, but it feels slim. It also differs from previous Samsung offerings in a few small but significant ways. For one, the thin plastic back that provides access to the battery on Galaxy phones has a textured finish, and there's a grooved metal rim around the edges of the Note 3 that makes it feel well put together and sturdy. And although the width of 8.3mm is considered thick when compared to the iPhone 5s' 7.6mm (tinyurl.com/mz8jhlf), it's thinner than the excellent Xperia Z1's (opposite) 8.6mm.

At the bottom there's the S Pen, docked into the grooved metal rim. The stylus is topped in metal so it fits in neatly, although it can be difficult to extract if you are holding the Note 3 in your right hand. Also down here at the bottom is a Micro-USB 3.0 connector.

Micro-USB 3.0

It's worth pointing out that any Micro-USB cable will connect the Galaxy Note 3 to a computer or the mains. But Micro-USB 3.0 adds faster data transfers via the supplied connector. The first we've seen on a live product.

On the rim of the phone is a 3.5mm audio jack. On the left toward the top is a volume rocker, and on the right side is the on/off button.

The Note 3 is a little bit lighter than its predecessor, weighing in at 168g compared to the 183g of the Note 2 (tinyurl.com/k78ghze). For a device with such a big display that's a very respectable weight.

The Galaxy Note 3 has two cameras, a front-facing 2Mp camera for selfies and video calling, and a 13Mp rear-facing snapper for more serious photography and video capture. The latter is a serious piece of compact camera kit, offering such features as auto focus, image stabilisation, LED flash and zero shutter lag.

Taking advantage of the larger chassis used to house a large display, Samsung has used a huge



3200mAh lithium-ion battery rated at 12.16Wh. And the Qualcomm Snapdragon Quad-core 2.3GHz Krait 400 processor should be lighter on the battery than the Note 2's is.

Samsung claims up to 13 hours of internet usage and up to 21 hours of talk time. You can take those figures with a pinch of salt, but in our tests of using the Galaxy Note 3 for a few days we'd say battery life is a strong point. Using it for email and web browsing, listening to music on the commute, a little social media and some video watching, we could easily get through 24 hours on a single charge. More importantly there was enough juice left over the next day to get us through the commute into the office.

The Galaxy Note 3 comes with Android 4.3 'Jelly Bean' installed, as well as Samsung's own TouchWiz interface. Jelly Bean is the best Android yet, offering a slick consumer experience and access to all the media and apps that Google Play can offer.

You can also install and purchase apps and media from Samsung's own store, which is in some ways confusing but does at least offer you the opportunity to compare and choose based on price.

Verdict

The Galaxy Note 3 is a high-quality portable device, offering excellent performance, a stunning screen and nice build quality. **Matt Egan**

£399 inc VAT**Contact**■ lg.com/uk**Read more**■ tinyurl.com/pafk4sz**Specification**

Android 4.2.2 Jelly Bean OS; 5.2in IPS display (1920x1080), 424ppi; 2.26GHz Quad-Core Qualcomm Snapdragon 800 CPU; 2GB RAM; 16/32GB internal storage; 802.11a/b/g/n; Bluetooth 4.0 LE; NFC; A-GPS; 4G LTE (Cat 4); Micro-SIM; 11.1Wh (3000mAh) battery; 71x139x9.4mm; 143g

PC ADVISOR**GOLD**

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**SMARTPHONE****LG G2**

After successfully teaming up with Google for the Nexus 4, LG is back with the G2. The front of the device looks similar to the Samsung Galaxy S4 (tinyurl.com/ca5p7lf), although it has no physical or touch-sensitive buttons below the screen. However, flip it over and the handset looks quite unique. We like the fibreglass-style finish, but more notable is the fact that buttons are located on the rear below the camera. It's a strange concept, but something we soon became accustomed to.

LG has impressed us in the same way Samsung did with the S4, by squeezing a large screen into a small chassis. The G2 is smaller than the Xperia Z1 and only marginally bigger than the S4, but has a larger screen than both at 5.2in.

The handset is equipped with Qualcomm's latest smartphone chip, the 2.26GHz quad-core Snapdragon 800. This is accompanied by an Adreno 330 GPU and a healthy 2GB of RAM. The phone comes in either 16GB or 32GB of internal storage,

and you might be best off opting for the latter as there's no microSD card slot for expansion.

LG has managed to pack in a 5.2in IPS display. Matching other top Android handsets, it's got a Full HD 1920x1080 resolution, and although the size means the pixel density is a little lower, 424ppi, the difference isn't noticeable.


The impressive specs continues with the G2's cameras. The 13Mp rear-facing snapper takes high-quality photos and videos nevertheless, and while it may not be the best around, it's up there with the best. The 2Mp front-facing camera also offers great quality imagery, with up to 1080p video at 30fps.

Smartphone manufacturers tend to go one of two ways with their Android interfaces; vanilla as Google intended or all-out customisation with their own skin or overlay. LG has gone down the latter path, and its Practical UX has popping colours and cluttered areas, namely the notification bar which LG has



cramped everything imaginable into. Luckily it's not enough of a mess to put us off the phone.

Verdict

LG has trumped the competition with the G2. It offers a combination of value for money with high-end features we haven't seen from rival flagship devices.  **Chris Martin**

£599 inc VAT**Contact**■ sony.co.uk**Read more**■ tinyurl.com/njpm4de**Specification**

Android 4.2.2 Jelly Bean; 5in (1080x1920) display; 2.2GHz Quad-Core Qualcomm Snapdragon 800 CPU; Adreno 330 GPU; 2GB RAM; 16GB internal storage; microSD slot (up to 64GB); 20.7Mp rear camera AF with LED Flash; 2Mp front camera; Bluetooth 4.0; 74x144x8.7mm; 170g

PC ADVISOR**RECOMMENDED**

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**SMARTPHONE****Sony Xperia Z1**

Sony topped our smartphone chart with its flagship Xperia Z (tinyurl.com/cxdr829) smartphone and now it's back with a new model. The Z1 looks very much like its predecessor, but there are some noteworthy changes. The phone is still glass clad on the front and rear, though, the rim is now aluminium instead of a rubbery plastic. Sony has also made the edges more rounded.

We're a bit miffed as to why the Z1 is bigger than the original. It's 8.7mm thick compared to 7.9mm, and it's both a few millimetres taller and wider, yet it has the same size screen. The phone is heavier, too, a gain of 25g to 170g isn't ideal.

The reason for this increase may be due to some hardware upgrades. The phone still has 2GB of RAM, and there's a new Qualcomm Snapdragon 800 processor. It's a quad-core with an impressive clock speed of 2.2GHz, the highest we've seen on a smartphone to date.

The Full HD 5in screen has a resolution of 1920x1080 with a pixel

density of 441ppi, meaning it's still up there with the best.

Storage remains at 16GB and there's still a microSD card slot, this time support for 64 GB off the bat.

Sony prides itself on its photography and the Xperia Z1 has had an upgrade here. Its resolution has jumped from 13Mp to 20.7Mp making it the highest resolution on an Android smartphone, according to Sony. The results are high quality as you would expect. The resolution of the front camera has dropped slightly to 2Mp, but can still capture excellent quality 1080p video.


Sony has done some spring cleaning with its Android users interface. The overlay looks similar but is cleaner and more stylish in parts. At the time of review, the Z1 was running Android 4.2.2.

As usual, Sony includes some good-looking and handy widgets. There are also small apps that float around the screen including notes, calculator and a timer.



We were wondering, whether the specs would affect battery life, but in our tests, it comfortably lasted a day of regular use.

Verdict

Sony has upgraded its fantastic Xperia Z. The Z1 is easily one of the best Android handsets around but the high price tag taints this slightly.  **Chris Martin**

£330 inc VAT

Contact

■ lg.com/uk
Read more
 ■ tinyurl.com/k8wbr7r

Specification

23in monitor; 1920x1080 resolution; 16:9 aspect ratio; IPS panel technology; tilt-adjusting stand (-5 to 25 degrees); white LED backlight; 10-point multitouch input; non-glare coating; rated brightness 250cd/m²; rated contrast ratio (dynamic) 10,000,000:1; 178/178-degree (H/V) viewing angles; 5ms response time; 16.7 million colours; 1x VGA; 2x HDMI; headphone output; 554x208x399mm; 6.4kg

Build: ★★★★★☆
 Features: ★★★★★☆
 Performance: ★★★★★☆
 Value: ★★★★★☆



23in MONITOR

LG 23ET83

LG's 23ET83 offers an easy way to add touch input to your existing Windows PC or laptop.

Without the need for any special drivers, this LG monitor works as a simple plug-and-play upgrade. This 23in touchscreen monitor will automatically be recognised by Windows and give you 10-point multitouch control out of the box.

Moments after plugging it in, we were swiping and tapping away at Windows 8 apps, the whole system accurate, responsive and trouble-free. The display also works well with Windows 7 and even Android x86, which also automatically detected the display.

Touchscreen displays can look a little unconventional, often adding extra thickness and, out of necessity, bucking the current trend for super-thin bezels and sleek slimline panels.

The LG 23ET83 is no exception in this respect, yet its striking white exterior and edge-to-edge glass give it a stylish, if chunky, look. The wider frame around the display facilitates Windows 8 gestures, which require you to sweep inward from beyond the edge of the desktop.

Its 23in panel is attached to a hinged stand, offering only a basic tilt function. It doesn't tilt backward close to the horizontal, which can offer a more comfortable position for prolonged use.

At the rear of the display is a VGA port, a pair of HDMI inputs and a connector for an external power supply. A USB port allows the touch functions to be relayed to your PC. A headphone socket is provided, but the LG lacks built-in speakers.

The 23ET83 features an IPS panel, which ought to be able to deliver very good image quality. While its wide viewing angles are as good as we would expect from the technology, the touch-sensitive surface implementation has adversely affected picture quality.

When compared to LG's other IPS displays, the 23ET83 produces noticeably less vivid colour and a disappointing contrast ratio.

We measured 97 percent coverage of sRGB, but a low contrast ratio of 420:1, which leaves the image looking washed out compared to other similar-price IPS displays.

Although rated at a maximum brightness of 250cd/m², the 23ET83 measured only 19cd/m² in our tests. This is a comfortable brightness level for general desktop use, but brighter monitors are more clearly visible in a well-lit room.

Colour and brightness uniformity are excellent, as is overall colour




accuracy, but the touchscreen layer imparts a feeling of separation from the picture, as if you are viewing the screen through a window.

A comprehensive selection of setup options are available via row of touch-sensitive controls. You'll find advanced control options, such as six-way colour adjustments and multiple gamma selections, although these and the many other complex menus will most likely serve to confuse rather than assist all but the most experienced customers.

Perhaps more useful are the energy-saving options, which will update you on the number of trees you've saved by using them.

Verdict

The LG offers a simple and effective way of adding touch input to a Windows 8 PC. Picture quality is a step up from TN displays, but style and picture quality are compromised.  **Paul Monckton**

£453 inc VAT

Contact

■ philips.co.uk
Read more
 ■ tinyurl.com/qxx22qc

Specification

2560x1440; 16:9; PLS panel; matt coating; 16.7M million colours; white LED backlight; height/pivot/swivel/tilt; 300cd/m²; 639x580x242mm; 8.5kg

Build: ★★★★★☆
 Features: ★★★★★☆
 Performance: ★★★★★☆
 Value: ★★★★★☆



27in MONITOR

Philips 272P4

Aimed at professional users, this 27in 'Quad-HD' display from Philips also incorporates many features that will appeal to home users interested in graphical arts or photography.

Featuring a high-quality PLS display panel with a 2560x1440-pixel resolution, the 272P4 offers consistent colour with wide viewing angles and nearly 78 percent more pixels than a standard HD monitor.

The 272P4 includes a fully height-adjustable stand, which also pivots 90 degrees. It incorporates a three-port USB 3.0 hub, a raft of inputs, including a pair of HDMI connectors, DVI Dual-Link and DisplayPort. You can also connect more than one port at a time for

picture-in-picture and side-by-side multi-input display.

The screen has a matt anti-glare coating, which we found easier to work with than glossy displays that can cause distracting reflections.

Above the screen sits a 2Mp webcam with an integral microphone and, for the paranoid, an LED indicator noting when it's recording.

At the bottom of the screen a 'people sensor' detects when you are present and dims the display as you move away from your desk. The bezel also incorporates a pair of stereo speakers for multimedia use.

The monitor comes with Philips' SmartControl Premium software, which enables you to configure

and calibrate the display from your Windows desktop, without having to use the fiddly onscreen menus. (These can also be accessed via a row of invisible touch-sensitive controls.) A power switch is located behind the right side of the monitor.

The PLS technology used in the 272P4 is Samsung's take on IPS, which features in most of the high-quality displays currently available. It provides wide 178-degree viewing angles and consistent colour. The latter was borne out in our tests.

We recorded 99 percent coverage of sRGB and a maximum checkerboard contrast ratio of 530:1. Screen uniformity is also very good in terms of both colour and

£190 inc VAT**Contact**■ samsung.co.uk**Read more**■ tinyurl.com/Lu88py7**Specification**

23.6in monitor;
1920x1080-pixel
resolution; 93ppi pixel
density; 16:9 aspect ratio;
1x DisplayPort; 1x HDMI;
1x VGA; 2-port passive
USB 2.0 hub; stereo
speakers with 1W amp;
555x357-487x224mm;
555x331x55mm (w/o
stand); 5.45kg; 3-year
warranty

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**23.6in MONITOR****Samsung S24C650PL**

It's a matter of taste, but we often find that desktop monitors bearing the business label are more classically attractive than consumer displays. Samsung's 24in Series 6 monitor, otherwise known as the S24C650PL, is no exception - it offers a simple widescreen frame with a thin matt-black bezel and an unfussy supporting column.

Such office-oriented monitors are also typically provided with a stand that allows height adjustment - an essential feature for a monitor if you're to avoid neck strain or other aches. Indeed, the Samsung has a fully adjustable stand that also allows for 90 degrees of rotation to put the screen into portrait mode - popular with gamers who may set up a three-way triptych to extend the PC desktop space. That's certainly helped here by the 9mm-thin bezel. At its fullest extent, you can raise the landscaped monitor up to 490mm from desk to screen top.

Like most business monitors, this Samsung adopts a widescreen 16:9 aspect ratio. That shape's nothing to do with business, of course, unless your trade is in video production. Sadly, the consumerisation of professional hardware means it's very difficult to find 16:10 panels today, let alone the 4:3 frame that suits office documents so well.

This monitor takes advantage of IPS-like technology to ensure good colour accuracy and wide viewing angles. In this case, it's plane-to-line switching, or PLS, that gives a similar effect to in-plane switching, but at a lower price.

In our tests the Samsung covered 99 percent of the sRGB gamut, and gave a high 82 percent figure for the more demanding AdobeRGB range, too.

Despite the rich colours found on IPS panels, real-world contrast-ratio figures aren't always the most impressive. The Samsung managed a good 760:1 in our checkerboard test. Colour uniformity across the panel was consistent, while overall DeltaE averaged just 1.70, suggesting precise colours.

Connection options run to one DisplayPort, one HDMI, one VGA, and a two-port USB 2.0 hub, albeit passive only, which should be enough to feed a wired keyboard and mouse on your desk.

Sound quality through the built-in speakers is of the alert-sound-only variety, thin and caustic sounding, but enough for the most basic of audio monitoring.

We found the onscreen menus relatively easy to use, with the



help of real click buttons on the monitor itself. Options here include response-time adjustment from Standard to Fast and Faster. RGB adjustments are present as well as five Color Tone settings, namely Cool 1/2, Normal, Warm 1/2, plus a Custom setting. These were found to dial in blue-to-yellow casts, although the Custom option didn't lead us to any more adjustments.

Power consumption at full brightness was just 27W.

Verdict

The Samsung S24C650PL is a basic, but high-performance PC monitor that's suited to the office or the home. It has notably good image quality and a simple unadorned aesthetic that should ensure it doesn't date or draw unnecessary attention from its principal task.

✉ **Andrew Harrison**



brightness, with an even response measured across the surface of the screen. A small amount of black-light bleed was visible at the very bottom of the screen, but only when displaying a black image in a relatively dimly lit room. Overall

colour accuracy is very good, with most results in the 48-colour swatch test measuring well below 1DeltaE.

This is a bright display, which we tested at up to 264cd/m² - just a little shy of its rated 300cd/m² brightness. Nevertheless, power consumption remained relatively low at 37W, reducing to 25W with the brightness set to 120cd/m². This was recorded without any of the LG's power-saving features enabled, which should reduce the power consumption further still.

Overall, we are impressed with the Philips 272P4. While it's not exactly the best-looking display for home use, it's aimed more at professional applications and its

feature set reflects this. We have no complaints about picture quality, and its ergonomic features are first-class. There are less-expensive 27in displays available with a similar level of image quality and pixel resolution, but much of the price of this display goes toward its extra features and adjustable stand.

Verdict

The 272P4 is a premium-quality display with great performance. It's possible to pay much less for a decent 27in display, but you'll miss out on many of its advanced features, such as a height-adjustable stand with pivot and built-in USB 3.0 connectivity. ✉ **Paul Monckton**

£119 inc VAT

Contact

■ avm.de/en

Read more

■ tinyurl.com/mfaLed5

Specification

Dual-band wireless modem router; 802.11b/g/n; 2.4- & 5GHz simultaneous; 3 external antennae; 3.3 MIMO; 3x gigabit ethernet LAN; 2x USB 2.0; external PSU; 226x159x47mm

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



WIRELESS ROUTER

AVM FritzBox 3390

Hopes were high for AVM's 3390 wireless router. It looked to be the router that would establish AVM's presence in the mid-range market.

It isn't just the odd name or the unique silver-and-red plastic casing that helps AVM's router line to stand apart from other networking equipment. There's also the Fritz OS interface, which is better designed and more advanced than most. It's chockfull of settings to adjust your connection or troubleshoot problems.

The 3390 has three internal antennae, a requisite of 450Mb/s theoretical wireless speeds, and a built-in ADSL modem. As well as ADSL2+ this supports VDSL connections, making the 3390 one of few routers that can work as a single-box device for use with a BT Infinity fibre-optic line.

Support for faster 802.11ac wireless networking isn't on the 3390's list of features, though. Its omission is justifiable at this point in time - 802.11ac is still a 'white-hot' technology, built into only the most expensive routers (see our group test on page 66) and very few new laptops. The majority of today's potential users are likely to be using only 802.11n devices.

On the back are four gigabit ethernet ports, a pair of USB 2.0 ports and a connector for your phoneline. There's no separate WAN

port for cable use, but you can sacrifice one of the four ethernet LAN connections for a cable modem.

In Standard mode the 3390 creates a single wireless SSID, allowing connection from devices on either 2.4- or 5GHz frequencies. Switch to Advanced mode and you can create individual SSIDs for the two frequencies.

We were pleased to see most aspects of AVM's Fritz OS software in place in the 3390. The Online Monitor shows how your connection is being used at a router level, offering an easy way to check for bandwidth-hogging programs running on the network.

You can finetune interference compensation on a DSL connection, which may improve speed or stability. There's also a visual browser to check for congestion from other networks within range. Once online yet more configuration options appear, including QoS settings, port forwarding and built-in VPN support.

We tested the 3390's performance at short-, medium- and long range (1-, 5- and 10m respectively), with an outer stone wall sitting between the router and our test laptop at the longest range.




To measure transfer rates we used a laptop to upload and download a file to a locally connected FTP server, using both 2.4- and 5GHz frequencies.

The results weren't spectacular. At close range on 2.4GHz we recorded 91Mb/s downstream and 73Mb/s upstream.

At 5m on the 2.4GHz frequency we recorded 88Mb/s downstream and 36.8Mb/s upstream; and 77Mb/s down and 16Mb/s up at 10m.

Switching to 5GHz, we recorded 127Mb/s downstream at 1m range, which is less than half the speed we've seen from the fastest routers. At medium range we saw 114Mb/s, and just 38Mb/s at long range.

Verdict

The middling wireless performance is our only real criticism of the FritzBox 3390, with AVM having bundled all the functionality you need into a relatively affordable product. The Fritz OS software is still the best graphical interface we've seen in a router. If you demand ultimate performance, look to 802.11ac.  **Orestis Bastounis**

POWERLINE ADAPTOR

Netgear Powerline 500 WiFi Access Point

£90 inc VAT

Contact

■ netgear.co.uk

Read more

■ tinyurl.com/nxzsgon

Specification

Two units: XWN5001 (remote end) and XAV5201 (router end); HomePlug AV IEEE 1901; 500Mb/s rating, 10/100 ethernet; 2.4GHz 802.11n; 2-year warranty

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



The Netgear XWN5201 is a powerline adaptor kit rated for 500Mb/s operation. The two adaptors - one is used near your router, and the other in a remote room - are small when compared to units from Devolo and TP-Link, which means there's no power space for a passthrough socket. Each unit therefore removes an available mains power socket from use.

The unit itself is a neutral white colour. Combined with its small size, the Netgear will be barely noticeable in most rooms. The adaptors feel well built, solid and functional.

Many adaptors on the market follow the HomePlug AV500 standard, and none is even close

to offering 500Mb/s. You can realistically expect 40- to 100Mb/s.

We tested both the Netgear's powerline-to-ethernet and powerline-to-Wi-Fi options to get a good grasp on its performance.

First we tested the powerline adaptor using an ethernet connection. The first and most challenging setup involved testing the bandwidth of the unit when connected across the building's wiring between two rooms on the same floor, with a 4m extension cable used in each room.

The Netgear achieved 42Mb/s throughput. We tried again with only one extension cable, which resulted in a speed of 50Mb/s.

The third test was performed between two adjacent rooms with no extension cables. Under these conditions the unit achieved a transfer speed of 47Mb/s.

These speeds are the slowest we have recorded from a powerline adaptor rated at 500Mb/s, if only around 10Mb/s below the similarly slow competition. In terms of raw speed, the Netgear does not deliver the best performance on the market.

Netgear is clearly aware that the speed of HomePlugAV powerline networking will never approach 500Mb/s, given that it has installed only 10/100 ethernet ports. Even if powerline technology was as quick as is promised, it would be

£60 inc VAT**Contact**■ tp-link.com**Read more**■ tinyurl.com/khplNv**Specification**

Powerline network kit;
1x gigabit ethernet port;
mains power
passthrough; AES-128
encryption; 126x64x42mm

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**POWERLINE ADAPTOR****TP-Link AV500+ Gigabit Powerline Adaptor Starter Kit**

Wi-Fi has been widely adopted for home networking, but ethernet connections still offer better range, reliability and security. Powerline adaptors offer a slightly different approach, allowing you to use your building's electrical wiring as a circuit for carrying a network signal. You plug powerline boxes into different rooms in the house, allowing you to extend the range of your home network.

TP-Link rates its twin powerline adaptors for speeds up to 500Mb/s. The ethernet ports on each unit are gigabit ethernet, which means any data bottleneck you'll experience will be from the powerline standard itself or your electrical wiring.

A welcome feature that was missing from early Powerline units is a passthrough mains socket. This allows you to plug the adaptor into a power socket, and continue to use that plug for other electrical equipment. If you have a limited number of sockets in your home this will be useful.

The TP-Link units feature a power-saving mode that the company claims can reduce consumption by up to 85 percent.

In appearance the adaptors are smart and unobtrusive. Their white face helps them to blend into the room, while three LEDs provide status information.

What distinguishes these Powerline adaptors from their rivals is their ease of setup or, more accurately, lack of setup. Simply plug the units into power sockets, connect the ethernet cables and you're done. The devices quickly take care of managing the connection over the power lines and so to the router and computer they believe they are directly connected via ethernet.

In our first performance test we placed one adaptor next to the router, connected via ethernet. A 4m extension cable was added between it and the wall socket. The second adaptor was placed in another room and connected via another 4m extension cable.

In this setup the TP-Link kit recorded a transfer speed of 63Mb/s. This is faster than the Devolo DLAN 500A powerline kit (reviewed at tinyurl.com/kc2r6j2), which recorded 40Mb/s under the same conditions.

We then discarded the extension cable and plugged the second unit



directly into the mains. This setup saw a data rate of 75Mb/s, matching the Devolo on performance.

In our final test we plugged in each of the units in adjacent rooms with no extension cords. This resulted in a transfer speed of 85Mb/s, meaning its best performance was just 17 percent of that advertised.

Verdict

This TP-Link kit can be found for a relatively low price of £60, and its setup is purely plug and play. It's a little faster than the Devolo DLAN 500AV under identical conditions, if still only a fraction of what TP-Link advertises for the product.

✉ **John Taylor**



impossible to get a transfer speed higher than 100Mb/s over the Netgear's ethernet connection. But, in its favour, this Netgear unit is priced considerably lower than many of its rivals.

To test the Wi-Fi speed of the unit we connected the Netgear directly to a router and measured the data throughput to a laptop placed in three different locations.

In the first test the laptop was 1m from the router. Here it produced a data throughput of 93Mb/s. This is relatively good compared to many 2.4GHz 802.11n connections.

Next the laptop was placed at 5m distance in line of sight from the adaptor. We recorded a data throughput of 56Mb/s. This is by no means fast, but it is an acceptable figure for 2.4GHz.

Finally the laptop was placed 10m away in an occluded position around a corner where a concrete

wall blocks the signal. In this setup the Netgear's bandwidth fell to a miserable 19Mb/s. However, this is on par with other mid-range 2.4GHz Wi-Fi routers we've tested in the same location.

Verdict

The Netgear Powerline 500 WiFi Access Point is one of the slowest 500Mb/s-rated powerline adaptors we have tested. Note that its ethernet ports are rated 10/100 and not gigabit. But don't count it out just yet: this underachieving pair comprises a complete two-part kit with a Wi-Fi access point for just £90, which is much cheaper than rival products. ✉ **John Taylor**



298X4QJAB

Double the screen, double the excitement

The UltraWide 21:9 display with Multiview

Take your viewing experience to the limit with the UltraWide 298X4QJAB display with Multiview. Connect and view two different sources at same time in picture-by-picture or picture-in-picture mode. Follow the game while checking email or watch a movie while chatting on social media – you can access nearly any device with the HDMI, DVI and DisplayPort connections. The sleek Ultra Narrow Bezel maximizes your viewing area with a touch of style. No matter what you're doing, you'll be impressed by the ultra-high 2560 x 1080 resolution and IPS panel that delivers true-to-life colors and unbelievable 178-degree viewing angles.



PHILIPS

Philips Displays are available from the following Distributor partners:



Business Direct

SCAN
computers

MISCO.co.uk

Insight



5 best security apps for tablets & smartphones

Chris Martin compiles the most effective apps to safeguard your hardware

Having a smartphone or a tablet is like carrying around a portable computer and, as such, they are at risk from security threats. With millions of users around the world, it's no wonder these always-connected device are being targeted. Here are some great apps that can keep your device free of malware by preventing you from downloading dodgy apps or browsing malicious sites. Some can even help out if you lose your precious gadget.



Lookout Security & Antivirus

Price: Free

Available on: Android, iOS

Lookout covers your back in a number of ways. For starters, it offers protection against viruses, malware, adware and spyware, with continuous app scanning to help it detect suspicious behaviour. In case you lose your precious device it also has a find my phone facility, which will sound an alarm, save the location if the device's battery is low, and email you a photo of the culprit and location data should someone enter an incorrect passcode five times. Last but not least, it lets you back up and download your contacts.



AppLock

Price: Free

Available on: Android

AppLock offers a different take on the traditional passcode lock, letting you lock down only the apps to which you want to

avoid prying eyes - friends or otherwise. You simply install the free Android app, set up a passcode, then toggle on or off the sliders in the list of installed apps. AppLock can also prevent others from installing or uninstalling apps, force-stopping the app and answering incoming calls. A premium version of AppLock (59p/month or £1.95/year) includes extra features such as the ability to lock apps in a given location or at a certain time, set up profiles and more.



AVG

Price: Free - £9.49

Available on: Android

If you want a security app from a respected provider that has been making trusted security software for years, AVG is a solid bet. The free app for smartphones and tablets is packed with features. It offers real-time scanning of apps, settings, files and media, and it can also attempt to locate a lost device on Google Maps and lock or wipe its contents. AVG has a handy task killer and a battery monitor to help improve performance. It will also scan websites for threats when you're browsing the web on your mobile device. More features are available in the paid-for Pro version.

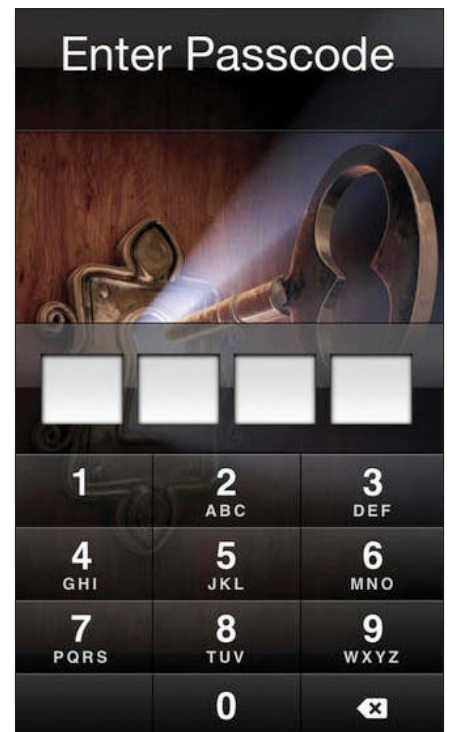


1Password

Price: £12

Available on: iOS

If you struggle to remember different passwords and end up using the same one for all your online accounts, 1Password



will be a great help. You create a master password and the app remembers the rest. Not only will it generate strong and unique passwords for any site, it will remember credit-card details, bank account logins, notes and passports. Furthermore, it has a built-in web browser and sensitive information is blanked out to stop anyone seeing it. It will also synchronise details between devices. Just make sure you keep that master password to yourself.




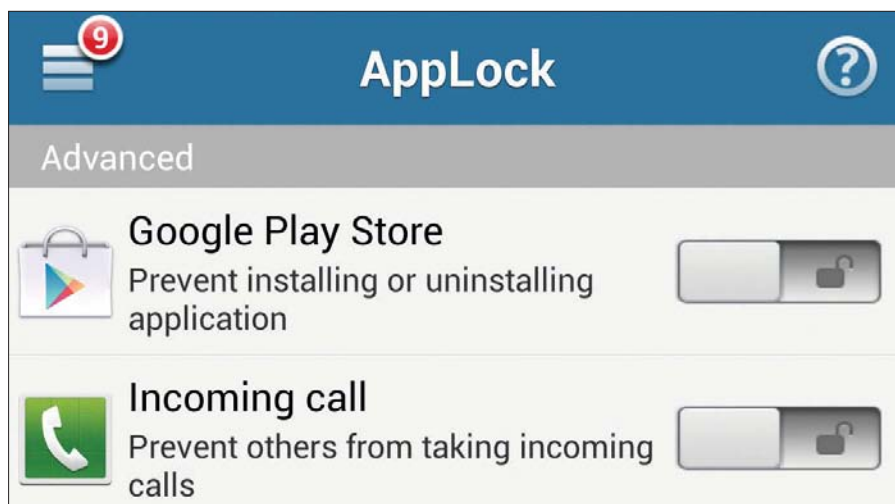
Private Photo Vault

Price: Free - £1.99

Available on: iOS

If you want to safeguard the precious snaps stored on your smartphone or tablet, look no further than Private Photo Vault (pictured above). The app demands passcode entry in order to authorise access to content captured by your camera. A Pro version adds features such as a decoy password, pattern lock and break-in report. You'll also need to get the Pro version to add support for video content.

Check out PC Advisor's website for more useful apps. Head to: tinyurl.com/kznxcrx 



ENTERTAINMENT APP

Blinkbox

Free

Contact

■ blinkbox.com

Read more

■ tinyurl.com/oaexdt

System requirements

iPad with iOS 5.0 or later; 32.1MB storage
Android 4.0 or later
(selected tablets);
7.6MB storage



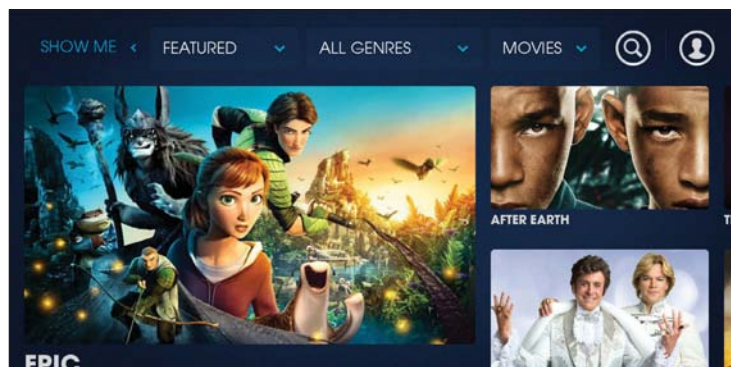
Owned by Tesco, Blinkbox is a film- and TV streaming service with a difference. Instead of charging a monthly fee and letting you stream whatever you like, you pay only for what you watch. You can buy content to watch as many times as you like or rent it instead.

The app is limited to the iPad and selected Android tablets, but you can also watch on other devices such as games consoles, Smart TVs and set-top boxes.

Blinkbox is very nicely designed and has an easy-to-use interface for exploring the available content.

Since you're buying the content to keep or rent, the pricing is critical. Much of the content is standard-price for rental: £3.49 for a film and £1.89 for a TV episode. It is worth shopping around, though, as rivals such as Google Play will often offer a better deal.

Buying an entire TV series will cost you close to £20 in standard-definition, and £25 in HD. It's worth noting that every pound spent on



Blinkbox will collect Tesco customers one Clubcard point.

The selection is good and you'll find new releases here before they arrive on Netflix and LoveFilm. You'll need a Wi-Fi connection to stream, but you can browse content using mobile data.

You can't download content for offline viewing, which is a big omission for purchased content, but the app does support video output to a larger display.

We find it strange that the app doesn't give the option to purchase HD versions of a TV series or film. However, if you purchase via a console or PC the HD content will show up in your library in the app.

The iPad app also doesn't allow you to purchase content. It is in essence a video player and only able to show and play your library.

Verdict

If it's available for your device, Blinkbox is a good-looking and easy-to-use app that's well worth the download. However, you can buy only standard-definition content, the iPad app shows only previously purchased content, and you can't download films and TV programmes for offline viewing. The ability to buy or rent content on a pay-as-you-go basis makes it much easier to shop around for the best prices.

✉ **Chris Martin**

GAME

Toca Builders

**£1.99 (iOS),
99p (Android)**

Contact

■ tocaboca.com

Read more

■ tinyurl.com/kjoobmw

System requirements

iOS 5.0 or later; 28.7MB
storage; Android 4.0.3 or
later; 20MB storage



Toca Builders is aimed at five- to 11-year-olds, and is in essence a simpler version of the popular adult game Minecraft. It's based on children's coloured blocks, of which you have a limitless supply and can place them anywhere you like – even in mid-air.

The app is available for iPhone and iPad, Android and Amazon devices. Although it works with both phones and tablets, we found the latter's larger screen less fiddly.

The included level gives you some inspiration for creating your own design from a blank canvas.

You can place blocks on the grid, change their colour and paint the ground. There's also a crane that can move blocks from one place to another, and some of the builders will automatically smash blocks in their path – something our five-year-old tester Annabel found particularly satisfying.

That's pretty much all there is to it but, as with all Toca Boca games, Toca Builders is easy for kids to



pick up without needing an adult to show them how. Since there are few limitations, most kids will be occupied for a good while before they get bored of the app and start looking for something else to do.

Happily there are no third-party advertising or in-app purchases within the game.

Verdict

Available at a reasonable price, Toca Builders offers kids the chance to have some fun and get creative within a charming and colourful world. It might be rather basic, but this simple and addictive game for kids is a no-brainer for the price.

✉ **Jim Martin**

GAME

Infinity Blade III

£4.99**Contact**■ infinityblade.com**Read more**■ tinyurl.com/k9jy8hq**System requirements**

iPhone/iPad/iPod touch;

iOS 7; optimised for

iPhone 5



Infinity Blade III, the latest in the mega-popular action roleplaying game series for iPad and iPhone, delivers the most sumptuous graphical experience yet. But while it expands the options in lots of interesting ways, the (slickly executed) gameplay remains in essence the same for the third game in a row.

But like one of its own characters, the Infinity Blade series seems to have been repeating itself for a bit too long. Because while this third instalment is more graphically polished than ever, and dutifully adds a number of peripheral elements to the gameplay, it seems critically short of big new ideas.

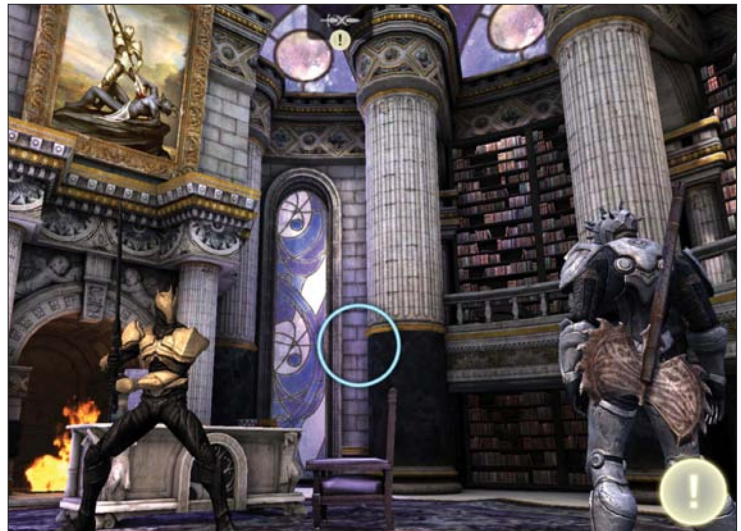
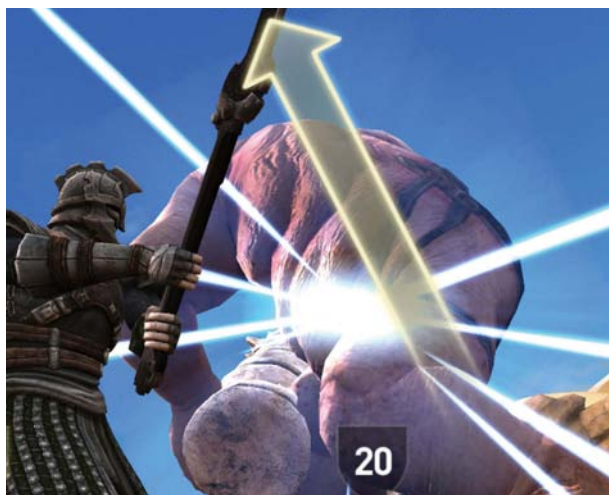
Combat in the Infinity Blade series is simple; it feels as though you master this after about an hour.

The combat mechanics are slickly executed, admittedly. As in Infinity Blade II, there are multiple weapon styles: sword and shield, double-handed weapon, and dual weapons.

To be fair, combat is different when you fight the dragon, a new enemy who periodically shows up later in the game, which is nice, although it affects only a very small percentage of the fights.

New features

So we've got the dragon. But what other new features are there in Infinity Blade III? The most obvious is the ability to play as a second character, a willowy brunette who nevertheless plays almost identically to her musclebound jarhead colleague. It makes for a little more variety, though.



For us, a more pleasing addition is the blacksmith. He reforges mastered weapons for you, pretty much reversing the frustrating 'find a cool weapon, master the cool weapon, have to dump the cool weapon to keep the experience points coming in' routine.

Similarly, Infinity Blade III lets you combine gems and brew potions, but the latter in particular is a bit of a bore, mainly adding an extra type of thing - ingredients - for you to pick up off the floor. There's a small number of ingredient types you can combine, but veterans of more conventional RPGs such as Skyrim will find the whole thing desperately limited, and the in-built waiting requirement feels like a bid for in-app payments - you can cash in chips to speed the process.

To return to levelling, that side of things has been tweaked, too: as you add points to your attack, magic or other statistics, new skills are unlocked - the ability to remove gems from weapons, charge up super attacks and so on. This makes levelling up far more exciting.

One further tweak affects exploration. Infinity Blade III has a hub location (called the hideout), and a map interface that you use to travel to various smaller locations. This makes the game feel like a series of levels rather than a map you can explore.

Graphics and sound

And what of that Infinity Blade trademark, the graphics? The game's backdrops are stunning, as beautifully drawn as in the previous game, but more creatively designed and varied. The characters themselves look nice, too. One


slight issue, however, is the way the game still refuses to modify its use of scripted victory animations. A surprisingly large number of these animations, along with many enemy character models, have been imported wholesale from the previous game.

And one other down side is that the voice acting is shockingly cheesy. The male character in particular is prone to outbursts mid-fight that are impossible to take seriously.

For such a big, bold blockbuster of a game, Infinity Blade III is surprisingly deft at the atmospheric use of silence. Indeed, the alternating rhythms of staccato violence and serene calm are a big part of its charm.

We tested Infinity Blade III on an iPhone 5s and an older iPad 3. It generally ran fine on both, but we did notice some glitches; and oddly enough the newer device seemed to struggle more, with frequent shutdowns. This has been blamed on early issues working with 64bit, and should hopefully be fixed in future updates. The iPad 3 just tended to get stuck on one part of the title sequence every now and then, which was easily resolved by restarting the app, and didn't disrupt gameplay.

Verdict

Infinity Blade III looks brilliant, plays well and adds lots of new features; but none of them alters the fundamental gameplay mechanics, which are starting to get a bit tired. If you're new to the series, then this is the best Infinity Blade yet, but veterans might want to keep their £4.99 for something a bit more original.  **David Price**

OPERATING SYSTEM

Windows 8.1

Free (upgrade)
£99 inc VAT

Contact

■ microsoft.com/uk

Read more

■ tinyurl.com/pb274ep

System requirements

1GHz or faster processor, with support for PAE, NX and SSE2; 1GB (32-bit) or 2GB RAM (64-bit); 16GB (32-bit) or 20GB drive space (64-bit); Microsoft DirectX 9 graphics device with WDDM driver



It's been nine months since Windows 8 was launched, but the radical redesign remains a source of frustration for many. Fundamentally, nothing has changed in 8.1 – there's still the desktop and separate Modern UI, and two versions of Internet Explorer. It's best to think of the update as a series of refinements, rather than any major changes, backtracks or retreats.

One feature that will be seen as a U-turn is the return of the Start button, though, it's just a shortcut to the modern Start screen. Here you can click on a shortcut to an application and it will launch on the desktop. You could, of course, do this in Windows 8, but now the experience can be made less jarring by setting your desktop wallpaper to be the background on the modern Start screen.

There are a couple of subtle changes to the Start screen, too. One is a downward-pointing arrow which, when you swipe down or click on it, displays all your apps. It's also easier to customise groups of icons on the Start screen, and there are two new icon sizes: large and small.

Right-click the Start button and you'll get the 'power user' menu that was present in Windows 8. However, a new entry is Shut down, which lets you use the old-style menu options to power down, restart or put the computer in to sleep mode.

Although it was previously possible to have two apps onscreen at once, one had to occupy a thin strip at the side. Microsoft now allows two apps to have half of the screen each, though, you can drag the divider line to, say, give one app three quarters of the screen.

Search has changed, too. Where previously the system-wide search facility defaulted to searching for Apps (and you had to click on other categories such as Files or Settings if you weren't searching for an app), it now sensibly searches everywhere, including the internet.

The results you see will be dependent on what you search for, but searching for Madonna would produce a Wikipedia link, a list of tracks to preview, videos, photos, news stories, and more. A search for PC Advisor, meanwhile, results in a list of Word and Excel documents



On the **START SCREEN**, clicking a desktop program's shortcut opens it

which contain this phrase, plus web links and a map.

Clicking particular results will launch the relevant Modern UI app, desktop app or web browser. As the results are provided by Microsoft Bing, it could provide a much-needed boost for that search engine.

The original Photos app was one of Microsoft's better creations, but it lacked one key ingredient: editing. That's remedied with a new editor that lets you apply quick fixes, remove red-eye, crop, rotate and even more advanced adjustments such as colour correction. You can undo your changes step by step, and choose whether to save a copy or overwrite the original photo.

We've never been tempted to use the built-in Mail app. It looked clean and fresh, but had extremely basic features. Windows 8.1 has a bunch of features that should give it a power boost. In the left-hand pane are shortcuts to your inbox, a VIP-style inbox containing emails from your favourite contacts, flagged messages and other inbox folders.

You'll be able to manage email from multiple accounts and Microsoft is working to get information from Google Calendar as well. Other new features include options to keep only the most recent version of a newsletter you regularly receive, and deleting all messages from a particular sender.

Windows Store has been given a small facelift, and is all the better for it. Navigation has been improved by putting the list of categories in the app bar (visible when you right-click) instead of forcing you to scroll endlessly through them all.

More settings have found their way into the Modern UI settings 'app', and there are now fewer

reasons to go to the old Control Panel. However, these are still pared down and you'll probably find that the Control Panel is still necessary for advanced settings.

One addition under the Network heading is Workplace. When you bring your Windows 8 device to work, this will let you join a corporate network without the need for a separate user account that's joined to the company 'domain'. Combined with another new feature, Work Folders, you can sync work documents to your laptop or tablet.

Windows 8.1 also provides more scope for customisation. You can choose from a variety of hues for the Start screen and select a photo slideshow on your Lock screen. More importantly, there's a new tab called Navigation when you right-click on the desktop Taskbar and choose Properties. This contains options that address some of the biggest complaints about Windows 8.

One is the new ability to boot straight to the desktop, bypassing the Start screen. Another lets you force the Start screen to show on your main display when you have more than one monitor. Before, the Start screen would appear seemingly on any screen. The final option is to show desktop apps before Modern UI apps on the Apps list when sorted by category. It sounds like a minor feature, but it makes a considerable difference if you predominantly use the desktop.

Verdict

Windows 8.1 is a fast, stable OS that can be used just like Windows 7 on a PC or laptop. It takes a bit of adjustment living without the old Start menu, but little has changed in most other respects. **Jim Martin**

PHOTO-EDITING SOFTWARE

Adobe Photoshop Elements 12

£78 inc VAT
£63 inc VAT (upgrade)

Contact

■ adobe.com/uk

Read more

■ tinyurl.com/oo34lbd

System requirements

Windows XP with Service pack 3/Vista with Service Pack 2/7/8; Mac OS X 10.7 or 10.8; 2GB RAM; 4GB drive space; 1024x768 screen resolution; DVD drive; internet connection



Following on from the release of its Creative Cloud suite of applications, Adobe has updated Photoshop Elements. Version 12 introduces new effects, frames and filters, as well as the Content-Aware Move tool previously seen in Photoshop CC.

As in previous iterations, the main photo-editing interface provides access to tools such as levels, exposure, colour, cropping tools and red-eye removal.

When it comes to its new effects, textures and photo frames, these appear to have been inspired by the Instagram generation. To access these, you'll need to have an image open in Quick Edit mode and click the appropriate tab in the bottom-right corner. There are 10 effects to choose from, including black and white, and vintage. If after applying one you have a change of heart, press Reset Image to remove it or use the undo button. These effects can be combined with 10 different textures and frames. Unfortunately, we didn't always find an effect to suit our photos, and we feel the frames are gimmicky. If, however, you're looking to make some fun, quirky images they may be fine.

If you're new to Photoshop Elements, you'll appreciate Guided mode - you follow the steps shown and use the provided tools to create the desired effect. Among the Guided Edits is Restore Old Photo, which takes you through the whole process of retouching a photo, including cropping, healing, removing dust and improving the contrast and sharpness.

One tool that Adobe has added to Elements, but not the Creative Cloud version of Photoshop, is the Auto Smart Tone enhance option. By going to the Enhance tab, you can now select Auto Smart Tone, which Adobe says intelligently learns your preferences over time to adapt the results it provides.

When you select Auto Smart Tone, a window will pop up with your original photo in the middle and four tone options around it - move the circle in the middle of the window towards the one you prefer. While intuitive and easy to use, the results aren't great. During testing, many of our photos were either



AUTO SMART TONE offers four tone options and learns your preferences

too dark or too light, and we had problems getting a realistic tone. We did, however, notice that as we frequently chose a lighter tone, the four tone options became lighter over time - learning our preferences.

Pets corner

Another new tool is Pet-Eye Correction. If you take a photo of your treasured pet, you'll find that its eyes are often yellow when shot with a flash, so the Red-Eye removal tool doesn't work. Adobe's Pet-Eye tool operates in the same way, but eradicates the yellow instead of red. It worked well in our tests, and animal owners will appreciate it.

Within Expert mode, you'll find the new Content-Aware Move tool, which borrows some technology from Photoshop CC. We found that it provided impressive results when we tried moving a boat further down a river. Patches that didn't look great were easy to touch up using the clone stamp tool.

For more serious photographers, there's a new Open in Camera Raw feature. If you have a Raw file or a TIFF, JPEG or PSD that you want to edit, go to File, Open in Camera Raw, and edit your image here before continuing.

As for the Organizer, many of the changes focus on making the software mobile. Users can access and share their photos using the new Adobe Revel-powered Elements Mobile Albums. The Revel iOS app, Adobe's cloud server storage service, is free from tinyurl.com/p9qe9tk, but if you want to upload more than 50 photos per month,

you'll need to upgrade to Revel Premium, which costs £39 per year. Adobe Revel works in a similar way to Apple's iCloud. You'll be able to view stored photos through a web browser by logging in to your Revel account, as well as Elements 12's Organizer and in the Revel app.


Adobe provides one month of unlimited Revel usage to begin with. If you're not planning on subscribing to Revel Premium when your first month is up, we'd advise you not to turn on auto syncing in the app. If you do, any picture you take with your iOS device automatically syncs with the Organizer, some of which you may not want to sync as part of your allowance of 50 photos.

When it comes to sharing, Adobe has added the ability to share images (one at a time) on Twitter in both the Revel app and Photoshop Elements itself.

The Organizer also has some new tags. You can now see Places and Event tags in the Tags/Info panel. We like the ability to go to Places view, choose a location from the map and see only the pictures taken there.

Unfortunately, the user interface isn't the most intuitive we've used, and it took us some time to get used to. If you've used previous versions of the software on a regular basis, this won't be a problem, but new users may find it tricky to get the hang of to begin with.

Verdict

While the user interface could use some tweaking, Photoshop Elements 12 has many useful photo-editing tools.  **Ashleigh Allsopp**

MULTIMEDIA SUITE

Nero 2014 Platinum

£80 inc VAT (1 PC)

Contact

■ nero.com
 Read more
 ■ tinyurl.com/pse9m7r

System requirements

Windows XP/Vista/7/8;
 32- and 64-bit

Usability: ★★★★★☆

Features: ★★★★★☆

Value: ★★★★★☆

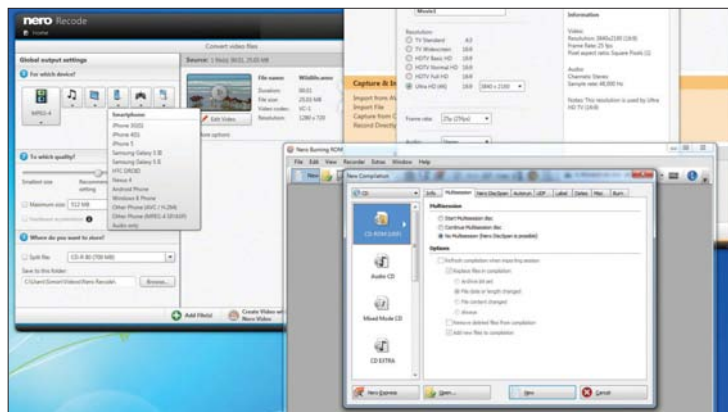


The venerable set of multimedia utilities, Nero, has seen a relatively minor revamp for the 2014 edition. Like many mature and comprehensive suites, it's hard to see what can usefully be added, but Nero has highlighted four key areas: TV streaming, disc to device conversion, Ultra HD editing support and improved mobile device support.

The most obvious cosmetic revision is a new, full-screen, Windows 8-style panel that shows all available applications. It slides out of the way once you select one and has to be relaunched if you want to fire up another.

The main programs are divided into four categories: Manage & Play, Edit & Convert, Rip & Burn and Backup & Rescue. The first of these includes the media organiser MediaHome, which automatically scans and categorises videos, photos and music, and can now stream video and slideshows direct to a smart TV. Media Browser does much the same in a more compact format, and Blu-ray Player includes all the necessary codecs and decrypters for commercial movie playback.

During testing, Blu-ray Player was held up by a message, stating: "d3dx9_43.dll was missing". Although it was missing, our test PC was running DirectX 11, so the program shouldn't have needed a dll



You can now see all the available applications in **NERO 2014 PLATINUM**

from DirectX 9. We had to download a DirectX archive and extract and copy the required dll to the System32 folder to get the player to run. After that, playback was fine.

The Edit & Convert category includes Nero Video, which can now cope with Ultra HD and Nero Recode, designed specifically to convert from one video format to another. While it's good to see Nero staying ahead of the pack with Ultra HD support, it's currently playing to something of a niche audience; those who can record and playback at video resolutions at or above 3840x2160.

Nero Recode enables single-click conversion of video from SD and HD sources to a variety of portable gear, with presets for iPhones, the best known Android devices, and games consoles. If you copy TV shows, for

example, to watch on the train to work, this simplifies things.

Nero Burning ROM and Nero Express make up the Rip & Burn category, and while there's little new here they still combine to offer one of the best disc-creation packages available. Backup & Rescue offers Nero BackItUp, though, for some reason it has to be downloaded separately from the rest of the suite. A generous 5GB of Cloud storage is provided, too.

Verdict

This is the most comprehensive CD, DVD and Blu-ray write, play and edit suite available. Nero is trying to remain relevant, in an era of streamed video and movie viewing on small phone screens. It does this successfully; all it needs is a bit of a tidy up. **Simon Williams**

UNINSTALLER AND UTILITIES

Revo Uninstaller Pro 3

£25 inc VAT (1 PC)

£37 inc VAT (3 PCs)

Contact

■ revouninstaller.com
 Read more
 ■ tinyurl.com/nmed4ae

System requirements

Windows XP/Vista/7/8;
 32- and 64-bit

Usability: ★★★★★☆

Features: ★★★★★☆

Value: ★★★★★☆



Most modern Windows programs include their own uninstallation applet, which removes them from your system. Why then would you want to pay for a third-party application, which aims to do the same thing? Revo Uninstaller Pro 3 uninstalls things, but does so a lot more thoroughly.

The interface is straightforward, with icons for all the software on your system in the main panel and function buttons for the operations that can be carried out on them, sitting above. Uninstalling a program involves selecting the icon and then hitting Uninstall.

There's also a 'hunter' mode that puts a crosshair cursor on

the desktop, which can be dragged over an application icon to remove the associated software.

Revo uses a program's own uninstaller, if that's available. In most cases, it's reasonable to expect that the creator of an application best understands what's needed to remove their own code from a system. What's surprising, though, is the amount of code detritus typically left after an uninstallation. Revo conducts a scan of the Registry and of the file folders once an application has been removed, and spots any entries and files that still need sweeping up.

In our tests, there were often over 200 Registry entries and half

a dozen files left behind after a third-party uninstall. While these won't directly damage your system by their presence, they do bulk out the Registry, which in turn can slow down your PC.

The speed at which applications are uninstalled depends on the third-party uninstaller, but Revo's post-uninstall scan is fast, taking between 15 and 30 seconds on the test applications we tried. You're then presented with a list of the items it has found, all selected for deletion by default.

Although you can unselect items individually, we didn't encounter any problems after block deleting everything Revo suggested. It's

STICKY NOTES SOFTWARE

Zhorn Stickies 7.1e

Free (donationware)**Contact**■ zhornsoftware.co.uk**Read more**■ tinyurl.com/mkwulrc**System requirements**

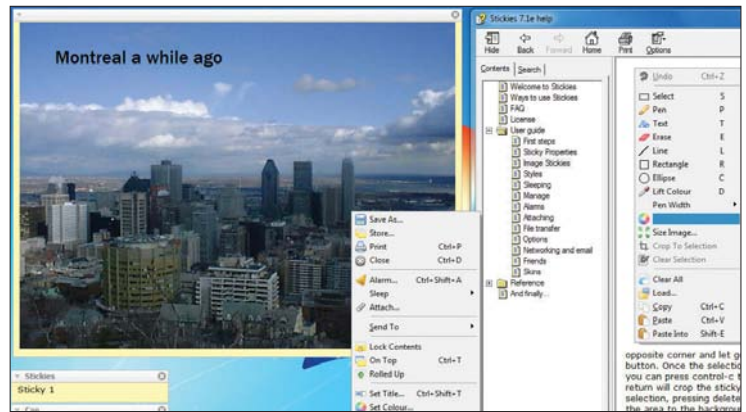
Windows XP/Vista/7/8

There are many different programs designed to give you the equivalent of sticky notes, but on your desktop. Microsoft, for example, provides one with Windows, though, it's a basic app. Stickies takes the concept a lot further than a place to write notes and stick them to your screen.

Not that Stickies can't do that. Once it's installed, a click on the sticky note icon in the taskbar calls up a blank note. This can be typed on directly and expands in length as you type, and in width when you drag the edges. They can be sat freely on the desktop or attached to a specific application or document, so they only appear when that item is onscreen.

Text can be formatted by adapting font, size, case, style and highlight, and you can justify paragraphs and add bullets and numbers. Each note can be given a title and its background colour changed, too. If you have groups of notes, they auto-align when you bring them close onscreen.

Stickies don't have to be text. They can hold images, by dragging a picture to an empty note. Whatever the format of the original, they're handled internally as PNG files. Images and text can be combined within the same note, but only by using the text tool from the graphics editing menu.

**ZHORN STICKIES 7.1e** lets you set up alarms to appear at specific times

The other graphics tools, which include selector, simple shapes, crop, pen and colour dropper, give the opportunity for simple editing, at roughly the Windows Paint level.

Stickies can be assigned alarms, making them pop up at predefined times, play sounds and jiggle to draw attention. Alarms can be single use or recurring. Notes of all types can be saved, removed from the screen and called back later, and the whole program is very clean, making no entries in the Registry.

There's another twist, though, which makes it an essential for home and small business networks - notes can be passed around between PCs. Turn on the program's networking and you can set up Friends, other named computers, which are then available as destinations for the Send To command on each note.

To establish friends, you'll need the IP addresses of the respective machines, so it's best to give them fixed addresses. If DNS assigns new ones, you could be sending notes to the wrong recipient. It would be better if the system worked with computer names alone.

Stickies comes with well-written and thorough help. The three different right-click menus can be a bit confusing to start with: one on each note, one on each note's title bar and one on the Stickies icon in the task bar. The options are logically arranged, though, so most of the time they're intuitive.

Verdict

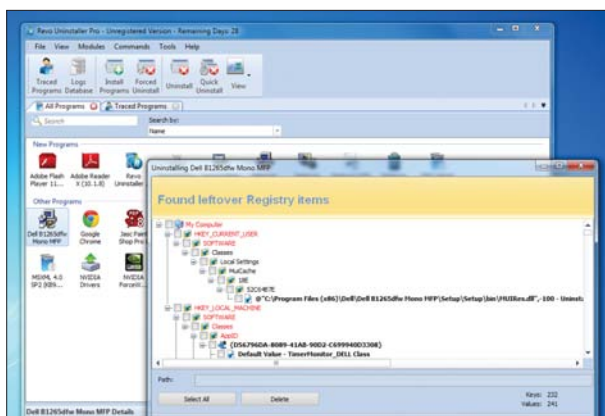
We've not seen a better sticky note app than Stickies. It's a professional piece of software that can be very useful. **Simon Williams**

**PC ADVISOR
RECOMMENDED**

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



Once a program has been removed **REVO UNINSTALLER PRO** 3 scans the Registry

intelligent enough not to remove items such as DLLs, that are shared with programs that remain installed.

Revo does a pretty good job of uninstalling software from cold, but works better if it's available when you install a new application -

Trace mode detects what's installed and what changes are made to your system, and can be used when you want to remove a traced program. Revo also automatically creates a restore point before uninstalling an application, so if you need to reverse the process you can do so without reinstalling from scratch.

Uninstalling isn't the only thing Revo does. Its Tools menu includes nine other options, which will help you clean up different areas of your PC. They include an Autorun Manager that handles startup applications, and a Junk Files Cleaner, which looks for fragments and temporary files that the system should have deleted. On our test

machine, it found 3.2GB of junk files, a worthwhile reclamation.

There's also a useful option called Windows tools, which groups together all the housekeeping tools provided by Microsoft.

Verdict

Looking at Revo Uninstaller Pro 3 as just a more thorough uninstallation tool is missing the point. It's more like a clean-up tool with special abilities in uninstallation. It's easy to use and from our tests removes a lot more than the uninstallers of individual applications do. The other tools are all just as useful and the overall suite should help keep your PC tidy. **Simon Williams**

GAME

Amnesia: A Machine for Pigs

£34 inc VAT

Contact

■ aamfp.com

Read more

■ tinyurl.com/p6pgs8o

System requirements

Windows Vista; Intel Core i3, AMD A6 CPU or equivalent; 2GB RAM; Mid-range nVidia GeForce 200/AMD Radeon HD 5000; 5GB drive space

PC ADVISOR

RECOMMENDED



GENUINELY

SINISTER, this is full of psychological and corporeal frights

Monsters, ghostly laughter, doors that open and close themselves, fleeting apparitions, bloodstains – Amnesia: A Machine For Pigs doesn't shy away from the tropes of horror. Impressively, it makes them effective rather than exhausted.

While nominally a sequel to 2011's menacing first-person horror-adventure Amnesia, A Machine For Pigs has few overt ties to its predecessor. It's entirely standalone narratively, although it reuses some of the mythology and monsters.

In essence, it's more of the same, which means period-set frights in both psychological and corporeal flavours as you creep through dark, primarily indoor environments peppered with physics-based interactions (such as pulling back on the mouse to open a draw or door) in search of explanations.

Where A Machine For Pigs differs most from the first Amnesia is that it's more of a ghost train than an interactive adventure. There's not much you need to do beyond make your way forwards, experiencing and/or running from what it throws at you – either real or imagined – and mentally piecing together the slow burn of clues and revelations.

A certain amount of lateral thinking is required in order to ascertain what a hint in a note or letter relates to (the secret switch that opens a hidden passage is a regular one), and there's some scope to get lost in the maze-like corridors filled with blood, hideous paintings and Aztec imagery, but for the most part you're a tourist in a nightmare.



Prepare to explore spooky corridors in **AMNESIA: A MACHINE FOR PIGS**

On paper that perhaps raises the question: 'Why not watch a film instead?' But that's to undersell the effectiveness of being in that place, in those situations, yourself, where moving into the light, answering an unexpectedly ringing telephone or attempting to evade that awful creature that's hunting you is a decision you make, and you must deal with the consequences.

The loss of more hands-on action, and of the 'sanity' metre that affected just how many risks you could take, in the first Amnesia has caused plenty of grumbling among the faithful, but on the other hand, the cutting away of anything that isn't pure, raw atmosphere and exploration to some degree ups the horror. Your mind is preoccupied by what's going on and how you feel about it, rather than how to master particular skills or mechanics.

A Machine For Pigs was created by the UK developer behind last

year's similarly minimal though far more abstract Dear Esther (tinyurl.com/mf38trs), so it's not entirely unexpected that they'd tread similar, if a little more player-liberating, ground here. They also muster a sharper, more discomfiting story than the first Amnesia, whose increasingly monstrous revelations should be experienced yourself rather than spoiled here.

All that's safe to say is that you play a wealthy industrialist who awakes in his seemingly empty mansion with no memory of the past few months. His children are missing, there are awful noises, there are references to a machine, and to pigs, and sometimes the phone rings. The rest, you'll find out.

It's genuinely sinister, even when it does rely on horror stereotypes, and even though the Amnesia engine is rickety. The lack of much in the way of human faces and the constant near-darkness means it's up to the job, though, on both a technical level and a trouser-browning level it's unlikely this engine and formula could stand up to a third tour. For now, though, close the curtains, turn out the lights and make sure you haven't eaten any pork products recently.

Verdict

Amnesia: A Machine For Pigs risks being over-familiar, both in terms of horror movie staples and similarity to the last Amnesia game, but deft use of leftfield scares and sharp, atmospheric writing and sound means it accomplishes what it sets out to do. Which is to destroy your peace of mind. **Alec Meer**



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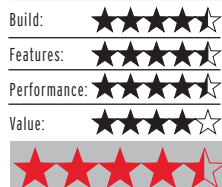
Contact

■ synology.com
Read more
■ tinyurl.com/pwo4m6j

Specification

8-bay network-attached storage unit; DSM 4.3 OS; 2.13GHz Intel Atom D2700 dual-core processor; 2GB DDR3 RAM, upgradeable to 4GB; 8x drive bays for 2.5in or 3.5in SATA Revision 3 HDD; 2x eSATA, 2x USB 3.0, 4x USB 2.0; 4x gigabit ethernet; internal PSU; 2x 115mm fans; passively cooled CPU; 175x340x233mm; 5.2kg; 3-year warranty

PC ADVISOR RECOMMENDED



EIGHT-BAY NAS DRIVE

Synology DS1813+

Two's company and three's a crowd, but in NAS circles, the real magic starts when you have four drive bays to play with. That's when the circles of 'data security' and 'performance' coincide, by striping data across several disks in RAID 5 for added performance and disk redundancy.

An eight-bay NAS will be overkill for all but the most data-hoarding households. And many businesses, too, given that today's hard-disk technology means you could install eight 4TB disks for an incredible 32TB total of unformatted capacity.

You can look at eight drive bays as a way to future-proof your storage needs. Alternatively, there's the DS1513+, which has the same specification as the DS1813+ but offers five drive bays. It will set you back around £150 less.

Features

The DS1813+ is an impressive synthesis of hardware and software. In its black plastic case, it doesn't perhaps give the impression of enterprise-class, over-engineered build quality; however, construction is solid and its well-damped materials serve to remove the metallic ring and clatter of some NAS boxes.

Two large 115mm diameter fans run slower and quieter than smaller fast-revving types. There isn't an extra fan over the processor and motherboard either, just passive heatsinks that are ventilated by the main rear-mounted disk fans. The result is a cool and quiet drive.

The hard disk mounting system has been revised for this model, no longer relying on four screws to hold in each disk, but a long snap-on plastic strip on each side. The rails click into place easily, feel reasonably robust and save having to fiddle with small screws that some people find so off-putting when first setting up a NAS box.

Locking the disks in place is possible with a supplied hex-sided plastic key that's like an Allen key, only proprietary to Synology with its extra spline in one corner. It wouldn't stop a determined disk thief, but it will help prevent you inadvertently popping out disks, which could destroy a RAID 5 setup if two drives were pulled out at once, for example.



There's a useful range of some of the latest data ports around the DS1813+ to help connectivity and expansion. For example, two eSATA ports are designed primarily to allow Synology's own add-on drive boxes – a pair of DX513 five-bay unpowered NAS boxes allow expansion by up to another 20TB (10TB capacity, at £390 empty each).

Two USB 3.0 and four USB 2.0 sockets are sited at the back, giving a cleaner front panel. Four gigabit ethernet ports are included, and are configurable for failover redundancy or port aggregation. Synology specifies a high 212MB/s write and 352MB/s read performance available when set up thus.

To power the DS1813+, there's a dual-core 2.13GHz Intel Atom – the D2700 version with 1MB of L2 cache and Hyper Threading. This 32nm Saltwell/Cedarview chip is well-suited to high-performance and low consumption NAS applications, lacking only the hardware-accelerated AES encryption that's due to appear in Intel's Silvermont update in the coming months.

Performance

We set up the Synology DS1813+ with eight 4TB WD Se hard disks, optimised for NAS use. Using a single gigabit ethernet link, we saw up to 112MB/s read and 80MB/s write speeds using QuickBench in OS X.

Sustained data delivery was impressive, keeping a steady 109MB/s read and write, according to the video professional benchmark Blackmagic Disk Speed Test. The disks are clearly not being held back by the NAS electronics or the software, although you'll need to use multiple LAN connections to get the best this server can deliver.

Power consumption is inevitably higher than slower or smaller units. We measured a peak of 90W fully loaded, and a typical average of 82W.

This fell to 26W for the NAS system alone after the disks had hibernated.

DSM software

Synology's Disk Station Manager (DSM) software remains the jewel in the company's hardware crown. As standard, it can serve to Windows, Macintosh and Unix or Linux client PCs, and Windows shops are well served with domain-joining, while other enterprise-friendly assets include SNMP for network management, WebDAV and Directory Service.

Home users may be interested in other app packages that can be downloaded and installed from within DSM's Package Center. Media Server, for example, is a popular way of hosting music and video on a Synology drive, and there are more specialised packages such as iTunes Server and Plex Media Server.

Off-drive backup is possible, and HFS+ volumes are now recognised over USB, although we note that Synology's implementation of rsync within the Backup and Restore module is still broken. Even with all Photo Station and similar packages uninstalled or disabled, a backup of a DS1813+ volume to an external drive will result in thousands of @eaDir metadata files and folders littering your destination drive.

It may sound trivial, but this coding error is a major inconvenience that makes us hesitate in using a Synology NAS with direct backups to external storage.

Verdict

The Synology DS1813+ is a smart and sophisticated NAS drive. It's superbly constructed and has a well-judged selection of ports. As an overall package, it can't escape our test lab without a recommendation.

✉ **Andrew Harrison**

£985 ex VAT
£1,182 inc VAT

Contact

■ wdc.com/en
Read more
■ tinyurl.com/mp3geg4

Specification

Four-bay NAS; Windows Storage Server R2 Essentials; 1.8GHz Intel Atom D525 dual-core processor; 4GB DDR3 RAM; 4x 2TB WD HDDs; 2x USB 3.0; 1x USB 2.0; gigabit ethernet; CIFS/SMB, AFP, NFS, HTTP, HTTPS, FTP, WebDAV, Bonjour

Build: ★★★★★
Features: ★★★★★
Performance: ★★★★★
Value: ★★★★★

FOUR-BAY NAS DRIVE

WD Sentinel RX4100

Western Digital's Sentinel RX4100 is a fast rack-mount, network-attached storage device that runs Windows Storage Server R2 Essentials.

It's a four-bay, 1U (unit) drive, which means it takes up one standard 2in vertical rack space. It houses four quick-change drive caddies and a double-locking bezel to discourage theft. The RX4100 can be ordered with dual, redundant power supplies, though, our test unit had only one.

A dual-core Intel Atom D525 CPU powers the RX4100, supported by 4GB of DDR3/800 memory in the motherboard's single SODIMM slot.

One area that's a let-down is the meagre number – and odd arrangement – of peripheral ports. Two USB 3.0 sockets are sited on the back of the RX4100, and there's one USB 2.0 port on the front, securely hidden under the security bezel, though, that's a slow way to move a transfer of data. WD should have provided two USB 2.0 ports on the rear, to support a mouse



and keyboard. There isn't an eSATA port either, so you can forget about backing up to – or expanding the available storage of – an eSATA rack-mount drive array.


The configuration reviewed here includes four 2TB, enterprise-class Western Digital WD2009FYPX hard drives in a RAID 5 array (5TB usable of the 8TB capacity). Our benchmark results identify it as the fastest NAS we've tested on two counts, and the second-fastest NAS overall. Our tests use a 10GB mix of files and folders, and we recorded read and write speeds of 53.7MB/s and 41.8MB/s respectively – the former being the fastest we've seen. We also tested the drive with a single large 10GB file. Here we saw 96.5MB/s read and 96.4MB/s write speeds – the latter setting another record.

The RX4100 natively supports bare-metal backup for 25 PCs on the network. Western Digital also offers

an online backup service (KeepVault, keepvault.com/wdc) for storing those backups in a remote location. This costs extra, though.

The unit runs Windows Storage Server 2008 Essentials. Being a subset of Microsoft's full server operating system, Essentials has a spartan feature set. It does, however, support Active Directory, which lets the RX4100 seamlessly integrate into your network; and includes Remote Web Access, so you can remotely manage the device. You also don't require a CD to set it up – just go to the unit's IP address (add\setup) to get started.

Verdict

The Sentinel RX4100 is an affordable and fast entry-level rack-mount NAS. Aside from its port array, its faults are minor. It's more than suitable for SMB file sharing, and it's particularly good for backups.  **Jon L Jacobi**

£116 ex VAT
£140 inc VAT

Contact

■ brother.co.uk
Read more
■ tinyurl.com/p2p27ta

Specification

Print resolution 2400x600dpi; quoted print speed B=18ppm C=18ppm; actual print speed B=15.9ppm C=8.6ppm; USB 2.0, 802.11b/g/n Wi-Fi; Cloud, Mobile and Smartphone connectivity; 250-sheet input tray + 1 sheet manual feed; 64MB memory; 410x465x240mm; 17.4kg; 1-year warranty

Build: ★★★★★
Features: ★★★★★
Performance: ★★★★★
Value: ★★★★★

COLOUR LED PRINTER

Brother HL-3140CW

The HL-3140CW represents a tidy combination of many of the features and figures that rate highly in the world of sub-£150 colour lasers, and teams well-sized dimensions with an inoffensive colour scheme. The control panel is standard laser-fare, with a simple text LCD and four-button navigation.

Sub-£150 models are often hampered by poor paper handling, however, the HL-3140CW's 105gsm 250-sheet input tray is substantial and long-lasting, ensuring you can get the full benefit of the laser technology. Or, to be precise, LED technology, as the Brother uses LEDs rather than lasers to construct the image. This works just like a laser, but allows Brother to reduce costs slightly.

Its 64MB of memory isn't vast, although it's not inadequate, and the Brother will be able to handle decent-sized office loads. One potential hitch is the lack of wired ethernet – many offices use ethernet as the main network, so

a number of otherwise interested companies may be deterred by this faintly surprising omission. Not that you're without networking – 802.11b/g/n Wi-Fi is fully supported. Indeed, connectivity is otherwise very good, with cloud support offered through the wireless networking, and additional features letting you hook up to smartphones and mobile technology – our Android connection worked beautifully.


The Brother got very close to its stated speed of 18ppm, turning out 15.9ppm – 0.1ppm faster than the Oki C110 (tinyurl.com/konvjgv) that's been such a chart-stalwart. However, the HL-3140CW is much better equipped to handle high volume colour, putting out 8.6ppm.

Colour reproduction is also very good. The printer's output is invigorating and faithful to the subject matter. Faint banding slightly mars the effect, but overall we were impressed with the quality.



There isn't a high yield version of the black toner, but this doesn't prevent the HL-3140CW from offering a very reasonable 2.3p a page for mono text. Unfortunately, colour is another matter. Even with high yield toner, the costs come to 11.1p per page. This makes it one of the more expensive colour models we've seen in the past 12 months.

Verdict

The HL-3140CW is almost an exceptional machine. Colour is well-produced and fast, but it's pricey in terms of running costs. For the user whose needs are compatible with the Brother's strengths, this is a fantastic buy.  **Robin Morris**

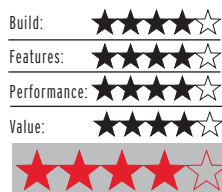
£547 ex VAT
£657 inc VAT

Contact

■ xerox.co.uk
Read more
■ tinyurl.com/o29892e

Specification

Mono multifunction laser printer; 1GB standard memory; 1200x1200dpi max printing resolution; processor speed 525MHz; 45ppm specified speed; 700-sheet standard input capacity; 2350-sheet maximum input capacity; recommended duty cycle up to 110,000 images/month; ethernet, optional Wi-Fi, USB 2.0; 495x492x549mm; 21.5kg



MONO MULTIFUNCTION LASER PRINTER

Xerox WorkCentre 3615

The Xerox WorkCentre 3615 was released at the same time as its younger brother, the Phaser 3610 (we review the 3610DN below). It's intended to be an upscale version that produces many of the same results with a few extra features.

The 3615 is a mono laser printer for small to medium-size businesses, but it also includes full multifunction capabilities that add the ability to fax, scan and copy documents.

The unit feels strong, weighing in at 21.5kg and occupying a roughly square space of 495x492mm. Styled in Xerox's trademark two-tone blue and cream, there are plenty of options for expanding your input volume to suit company demands. There is one flimsy part of the machine, though; the front panel has to be tugged quite smartly to reveal the toner cartridge.

A 60-sheet Auto Document Feeder sits on the top, a drop-down multipurpose tray that holds a further 150 sheets is built into the front, and the main input tray in the

base contains 550 sheets. As with the Phaser 3610DN, this can be expanded with a further three trays to make 2,350 sheets in total.

Auto duplex operation comes as standard with both normal printing and via the ADF. Print functions are handled by the bright and clear-to-follow colour touchscreen, and connectivity can be established via USB 2.0, ethernet or (optional) Wi-Fi.

The WorkCentre 3615 has a similar speed ratio to the Phaser 3610DN, averaging 45ppm for single sheets and 24ppm for duplex, which are some of the fastest rates in this class. Graphics and images manage to avoid the exaggeratedly dark tones that bedevil many MFPs of this type and scanned images - which are saved as JPEGs, TIFFs and PDFs to PC folders, network files or USB memory sticks - retain their vibrancy.

The ink quality on black text documents is deep and distinct, and depending on your required print volumes, toner cartridges



come in three versions: Standard (5900 pages at 2.47p per page), High (14,100 pages at 1.77p per page) and Extra High (25,300 pages at 1.32p per page).

Verdict

The WorkCentre 3615 is a full-featured, lightning fast mono laser printer that's well worth considering. [✉ Martyn Clayden](#)

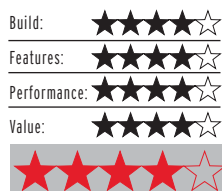
£380 ex VAT
£457 inc VAT

Contact

■ xerox.co.uk
Read more
■ tinyurl.com/pb5cju

Specification

Mono laser printer; 512MB standard memory; 1200x1200dpi max printing resolution; 45ppm specified speed; 700-sheet standard input capacity; 2350-sheet maximum input capacity; recommended duty cycle up to 110,000 images/month; auto-duplex; ethernet, USB 2.0, optional Wi-Fi; 393x426x315mm; 13kg



MONO LASER PRINTER

Xerox Phaser 3610DN

Two words neatly sum up the appeal of the Xerox Phaser 3610DN - volume and speed. Created for small- to medium-sized offices, this is a solid and efficient workhorse.

It comes in the traditional Xerox dark blue and cream, weighs a chunky 13kg and occupies a broadly square footprint that measures 393x426x315mm. It feels strong, sturdy and reliable.

Paper capacity consists of a base input tray that holds 550 sheets of A4 and a drop-down multipurpose tray at the front that adds a further 150 sheets. An additional three optional trays (at £205.20 each) can be attached to make a whopping total of 2,350 sheets - more than sufficient for most daily office demands.

In keeping with the simplicity of design and function, the 3610DN has a stripped-down control panel that's built in to the left side of the cover. It uses a brightly back-lit two-line text display alongside a control wheel and four buttons for power, menu,

return and control. It's easy to use, but as it involves a fair amount of scrolling, we recommend printing out the menu guide first.

If automatic two-sided printing is a priority, you'll appreciate the fact that this comes as standard on the 3610DN. Wi-Fi is, however, optional and you'll need to purchase an extra attachment for around £111 - this will also allow you to perform mobile printing with Apple AirPrint and Xerox PrintBack. Ethernet connectivity, however, is offered as well as single PC link via USB.

The 3610DN's outstanding virtue is its speed - averaging 40ppm with standard A4 documents. The ink quality is also impressive - we saw no signs of feathering or blurring, just clean solid blacks. We particularly liked the good contrast and definition on pictures and graphics up to 1200x1200dpi resolution.

Depending on the size of your output needs, the black toner cartridges come in three capacities:



Standard (5900 pages at 2.47p per page), High (14,100 pages at 1.77p per page) and Extra High (25,300 pages at 1.32p per page). The latter is especially attractive if you're going to make use of all the extra input trays.

Verdict

If your business has a workteam of up to 10 users who value speed, volume and good quality mono printing, then the Phaser 3610DN is one to consider. [✉ Martyn Clayden](#)

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802.11ac wireless routers

Orestis Bastounis tests six routers that support the latest wireless protocol, 802.11ac, for improved range, reliability and performance

Behind its bland engineering designation, 802.11ac wireless networking has the potential for a revolution in computing technology. Dubbed gigabit Wi-Fi by some marketing departments, it promises a substantial leap forward in just about every aspect of wireless data transfers, providing better reliability, range and faster speeds. Consequently, it should allow more bandwidth-heavy tasks to be simultaneously carried out at distance, without having to resort to old-fashioned ethernet cables.

Once fully ratified the 802.11ac specification should deliver a major boost to key aspects of the previous 802.11n standard. It will do this with a variety of new techniques, such as an increase in channel bandwidth from 20- or 40MHz to 80MHz, modulation (QAM) from 64 to 256, and an increase in the maximum number of spatial streams from 802.11n's three to eight.

It works only on the 5GHz frequency band, which is currently less troubled by interference from other routers and electronic devices that use the traditional 2.4GHz band. Optional features of 802.11n, such as beamforming, will become standard and should work more effectively than before, with clients able to direct wireless streams from the router.

The result can be a mathematical maximum sync rate of 1.3Gb/s. Real data-transfer speeds will be lower, as best-case coding rate will be 5/6 of that figure.

But this technology is in the early stages. The 802.11ac specification is still in draft form, with ratification expected in early 2014. Until then there is no certainty of full compatibility between devices. And that's one reason why only a handful of laptops, smartphones and tablets currently support the standard, despite 802.11ac wireless routers appearing over a year ago.

If you want to get a glimpse of 802.11ac's potential today, you'll need to find a compatible wireless router, and one of the few mobile devices that support it, such as the Apple MacBook Air or HTC One.

Or you could try a wireless USB dongle, although these will limit performance – either by limitations with USB 2.0, or even with USB 3.0 thanks to their single aerial. To get even halfway close to the 'gigabit' speed requires a three-antennae setup.

We've tested the routers using Apple kit for the simple reason that there are precious few Windows PCs with built-in 802.11ac.

As with other transitions in 802.11 wireless standards, 802.11ac routers should be backward-compatible with older wireless devices using 802.11n. This is hugely important: there are billions of mobile devices that rely on the 802.11n wireless protocol.

While you can pick up a perfectly functional 802.11n router for less than £100, even the cheapest 802.11ac models cost more. In time, every mobile device will likely incorporate this technology.

We've taken six 802.11ac routers sold with a pre-ratification specification and tested their real-world data-transfer rates, using both 802.11ac and 802.11n at short- and long range.

Bear in mind that none of these routers here have built-in ADSL modems, so they are best suited to those with cable broadband. Otherwise, you'll need to buy a separate ADSL modem that plugs into the router's WAN port.





Photography by Dominik Tomaszewski



PC ADVISOR
BEST BUY

Build	★★★★★
Features	★★★★☆
Performance	★★★★★
Value	★★★★★
Overall	★★★★★

APPLE AIRPORT EXTREME

£169 inc VAT • apple.com/uk • tinyurl.com/mfdLLsc

The AirPort Extreme has one of the most striking designs we've seen in networking kit. Its footprint is identical to that of the Apple TV, just 98mm square and with the same rounded corners, but it's taller at 168mm high. It's encased in a smooth, glossy white plastic, resulting in an attractive object that successfully hides its mundane purpose.

The internal PSU is a welcome improvement, too, with only a small figure-8 cable required to power it up.

The AirPort Extreme has six internal antennae, three for 2.4GHz and three for 5GHz, offering simultaneous dual-band wireless networks with support for all wireless bands. There's a limited set of connectors at the rear, though – a single USB 2.0 port, which can be used to share printers or add storage, and three gigabit ethernet LAN ports. Another ethernet port is for a WAN connection.

The router has been designed with ease of setup in mind, either via a Mac or an iPhone or iPad. Instead of the usual web-browser-based administration interface, a dedicated software application, AirPort Utility, is built into OS X and available as a download for Windows. Linux and Android users are left out in the cold.

When running on a Mac, this software makes it simple to set up and configure the AirPort Extreme. It automatically detects the router, and all the configuration screens load quicker than on a browser-based interface. Annoyingly, though, changing some settings still requires a full reboot of the router.

There's IPv6, WPA and WPA2 encryption, port forwarding and support for dynamic DNS services, but it lacks certain features such as MAC address cloning, QoS and VPN support.

Performance on both 802.11n and 802.11ac wireless bands is extremely good. It recorded one of the fastest peak 802.11ac speeds we've seen, breaking all records at 706Mb/s, before settling down for a still-impressive average of 578Mb/s at short range, and 540Mb/s at the longer 10m distance. We recorded reasonable transfer speeds on 802.11n, too, with an average 105Mb/s at long range.

VERDICT: The AirPort Extreme is one of the more expensive routers here, although we can swallow Apple's £169 price, given that 802.11ac routers are typically more expensive than 802.11n models. The AirPort Extreme offers the best experience in many ways, although the lack of some advanced features might put off power users.



PC ADVISOR
RECOMMENDED

Build	★★★★☆
Features	★★★★☆
Performance	★★★★★
Value	★★★★★
Overall	★★★★★

ASUS WIRELESS-AC1900

£189 inc VAT • uk.asus.com • tinyurl.com/k4zatkv

The Wireless-AC1900 (aka RT-AC68U) is the new flagship router from Asus. Its previous offerings have delivered good performance, so we expected nothing less than excellence from this 802.11ac model.

An attractive black-and-grey chequered design covers the front of the chassis, sprucing up what would otherwise be a monolithic black plastic box. It's sturdy, but hardly low-profile, with a 160mm-high case and three giant protruding antennae.

The 10 bright blue LEDs at the front can be distracting; fortunately there's a button to turn these off. Two more buttons are found at the side: one to shut off the wireless and another to connect via WPS. At the back are four gigabit ethernet ports, a WAN port and two USB connections, one of which is USB 3.0.

The software is particularly good. A network map shows an incredible amount of information, superbly laid out with neat icons that indicate whether features are on or off. You can quickly see the status of each wireless SSD, the USB ports, WAN IP and so on.

A clearly labelled menu running down the side leads to different pages with more settings for each router function. Asus has done an impressive job of reducing the chances of you getting lost in obscurely named menus to find a specific setting.

A technology Asus calls TurboQAM means the router is able to handle 600Mb/s via 802.11n. TurboQAM is a performance-boosting feature from Broadcom, the maker of most wireless chipsets. It kicks in only when a certain other Broadcom device connects to it, so isn't available to all wireless clients.

And we're not sure it made a difference during our testing, since the Asus' 802.11n speeds over 2.4GHz fell at the lower end of the results in this group – just 98Mb/s at short range and 69Mb/s at 10m.

However, performance via 802.11ac over 5GHz is outstanding. The Asus' 610Mb/s figure eclipsed every other router we tested.

Asus also offers its AiCloud suite of online tools, including a mobile configuration app and Smart Sync.

VERDICT: With record-breaking 802.11ac results and advanced setup options, Asus deserves recommendation for power users. Although we wouldn't buy an Asus router just for the AiCloud feature, it's far from useless, and another string to the bow of the Wireless-AC1900, an excellent networking product.



BUFFALO AIRSTATION EXTREME AC 1750

£91 inc VAT • buffalo-technology.com • tinyurl.com/mb3nctx

Routers are little more than boring plastic boxes containing chips and antennae, so manufacturers try all sorts of tricks to make their product appear more appealing. With the AirStation Extreme AC 1750 (aka WZR-1750 DHP), Buffalo has selected the same simple, unfussy design as we saw on the world's first 802.11ac router, the Buffalo AirStation 1750 (reviewed at tinyurl.com/9kqub54).

Its smooth, rubbery finish contrasts with a lighter shade of metallic grey that runs around the router's edge, giving a lovely two-tone appearance. Switch on the router and the Buffalo logo glows a bright shade of red, then white once it's ready.

The power supply is external, but instead of a single unit that plugs into the wall it's a cable and a separate brick.

Software design is easy to get wrong, but Buffalo is on the right side of the line with most of its interface decisions. The home screen, also decked in two-tone grey, provides buttons linking to most of the important settings, with a single screen for Advanced settings.

One unusual feature is a built-in BitTorrent client. Connect a USB drive and you can add torrent files for the router to manage, so you don't have to leave your PC on. This is useful if you use tracker sites that require you to continue uploading to maintain a ratio.

But for all that this router does right, we found performance disappointing. While short-range 802.11n performance was a not-terrible 111Mb/s, at longer range in our 10m setup the AirStation Extreme dropped to 65Mb/s.

Using 802.11ac over 5GHz we saw erratic results. We measured 500Mb/s on our first test, but this quickly dropped to 350Mb/s and then continued to provide odd results. The final average was 390Mb/s, which is far from the best speed we've seen.

At 10m range, 802.11ac throughput dropped to just 85Mb/s. We spoke to a Buffalo engineer who explained that beamforming is not yet implemented. However, we were assured that it would show up in a future firmware update.

VERDICT: We were disappointed with the performance of the AirStation Extreme in its current form, since it's otherwise a great router, with some excellent software tools not found on many other products. Buffalo has promised future fixes and firmware updates, so we hope performance will improve soon.



D-LINK DIR-868L

£104 inc VAT • dlink.com • tinyurl.com/ksdsq89

Upon seeing D-Link's DIR-868L's cylindrical design, our photographer joked that Apple had sent us an early version of the new Mac Pro. It's a fitting comparison: we can't think of many other tech products shaped like a tube, aside from some of D-Link's other routers.

It's certainly an unusual design, but it has a practical use, too, reducing the footprint of the router and disguising its purpose. According to D-Link, this shape also allows the router to more effectively output a signal in all directions.

D-Link also hopes to improve performance with a technology called Smartbeam. It's a type of beamforming, which is a standard part of the 802.11ac specification, a technology designed to work out where is a wireless receiver and focus the signal in that direction. The difference is that here it works on 802.11n/g/b as well.

On the front are just two status lights: one indicating internet connectivity; the other showing the status of the internet connection. At the back is the usual array of connectors - four gigabit ethernet, a WAN port and a single USB 3.0 port. A tiny reset button sits at the bottom of the device. There are no ethernet activity lights, which may be annoying since they can offer useful information about the router and computers hardwired to it.

D-Link's familiar orange colour scheme greeted us in the admin interface, a style the company has used for as long as we can remember. It may not be as attractive as the rich graphical interfaces found on other routers, but it's fully functional, chock full of settings and with handy contextual help running down the side.

It's also easy to get lost in these settings. There's an Advanced menu, and an Advanced Wireless menu, for example, and it's not always obvious which one to click on for a specific setting.

The DIR-868L performed relatively well on 802.11n, achieving 137Mb/s at close range and 91Mb/s at distance. However, its 802.11ac results were disappointing, managing just 276Mb/s at 1m and 243Mb/s at 10m. We couldn't find a way to improve performance.

VERDICT: The D-Link's poor 802.11ac test results are disappointing because the DIR-868L is otherwise a solid wireless router. We are very keen on the cylindrical design, even ignoring its practical uses, and the router's performance over 802.11n was one of the best recorded in this group.



TP-LINK ARCHER C7

£105 inc VAT • tp-link.com • tinyurl.com/kkjmpce

The Archer C7 is slightly different from the networking products we usually see from TP-Link – a company that, until now, has been known for selling no-frills but well-performing hardware.

The first change is to the router's name. We're not sure why tech companies love to brand their products with seemingly random arrays of letters and numbers, such as TPW8961ND. Archer C7 is a much better, more memorable choice.

Then there's the router's appearance. Gone is the cheap-looking, boring white plastic rectangular shell from TP-Link routers of the past, a style that already looked dated in 2002; in its place is a black glossy finish with three gigantic antennae.

Admittedly, nearly every router looks like this now, and the Archer C7 still isn't the most attractive technology product we've seen, but it is a step forward for TP-Link. Glossy plastic has a tendency to show fingerprints, though, and these covered the C7 minutes into testing.

Despite the additions, TP-Link is still very aggressive on cost. And the company hasn't skimped on the features.

The most important addition to the Archer C7 is support for 802.11ac. Three external antennae provide coverage for 2.4GHz 802.11n and 5GHz wireless bands. At the back are four gigabit ethernet ports, one WAN port, plus two USB 2.0 ports.

The software interface is perhaps bland compared with the more graphical pages of some other routers, with just a simple green header and two columns of menus, but no important features are left out. It's chock full of settings, and we can't criticise too much, given the price. That said, the plethora of entries in the menu could overwhelm some less experienced users – perhaps the very price-conscious folk TP-Link is targeting.

But, as we've found with other TP-Link routers we've reviewed, the wireless performance of the Archer C7 is as good, or better, than some of its pricier rivals. Using 802.11ac, it managed 505Mb/s at short range and 486Mb/s from 10m.

Its 802.11n performance over 2.4GHz wasn't as good, but still reasonable with 110Mb/s at short range and 89Mb/s at distance.

VERDICT: Respectable wireless performance and a full list of features makes the Archer C7 a truly worthy purchase, especially if you don't want to spend too much to try out 802.11ac.



ZYXEL NBG6716

£153 inc VAT • zyxel.com • tinyurl.com/ohmo3td

The NBG6716 may be yet another router enclosed in a black plastic rectangular box, yet Taiwanese firm ZyXel has spruced up its appearance with swirling grooved plastic that covers three quarters of the front. The remaining area is for the status LEDs and company logo, providing a rather striking effect.

ZyXel's onboard software is simple but effective, yet it doesn't work as well as that offered with some of the company's NAS drives. When you log in you'll see the aptly named Simple mode, which provides three switches for enabling power-saving mode, the firewall and the content filter, plus a pair of links to the internet and wireless settings. These settings aren't ones we imagine changing that often, so you'll spend more time in the less-well-designed Expert screen.

Four tiny, poorly drawn and unlabelled icons lead to different areas of the software. It's far from obvious to what each one refers, leading to blindly clicking on each section to find a specific option. Although you'll eventually find what you need, navigating the interface is undoubtedly frustrating, and not helped by a short but noticeable delay when clicking anything.

The NBG6716 hardware has four gigabit ethernet ports, a WAN port and two USB 2.0 ports. A button can switch off the array of LEDs, making the NBG6716 less distracting in a dark room. There's another button to switch off Wi-Fi, and more to eject USB devices.

The 3x3 MIMO internal antenna configuration didn't provide especially good performance. Over 802.11n we measured an average short-range transfer speed of 79Mb/s; on the same band at long range we recorded a mere 58Mb/s.

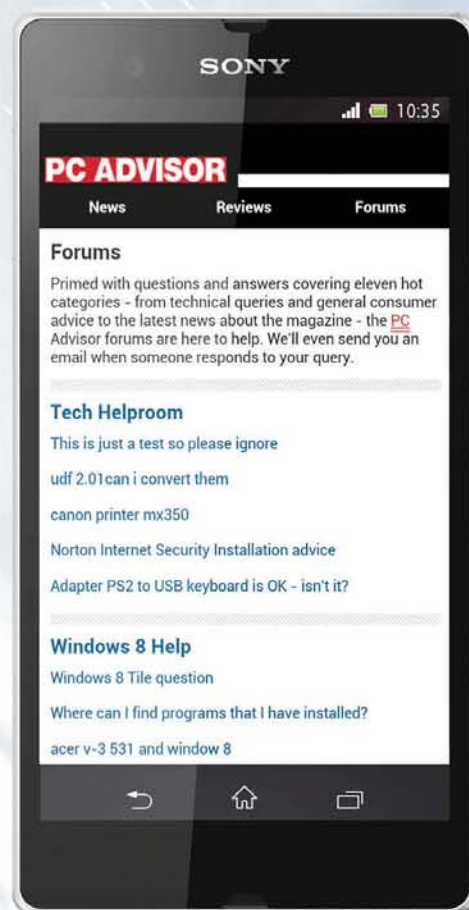
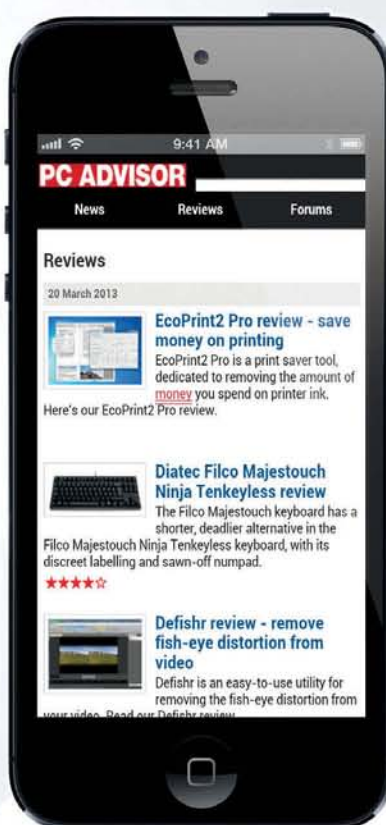
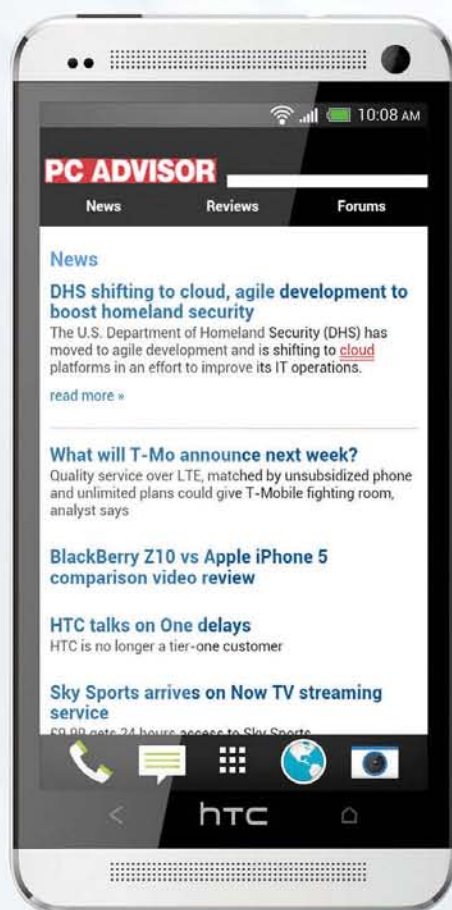
The ZyXel's 802.11ac performance was slightly better. The NBG6716 managed good performance at short range, averaging 498Mb/s. At longer range performance dropped off slightly, with the ZyXel hitting 413Mb/s. While these results are faster than any 802.11n transfer rate we've seen, some of the competition in this group test can exceed 600Mb/s.

VERDICT: A relatively high price and only fair-to-middling transfer rates make it difficult to recommend the NBG6716. ZyXel could make improvements, especially in its interface design. Additionally, given the price, we'd expect USB 3.0, and its omission is odd considering older, less expensive ZyXel products have it as standard.

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How we test

We test wireless routers through a combination of performance tests and evaluation of their features, stability, design and build, and their ease of use.

To test 802.11n wireless speed, we used an Apple MacBook Pro laptop equipped with a best-specification Broadcom 3x3:3 transmit/receive front end. The 802.11n protocol allows for either one, two or three spatial streams, providing nominal maximum speeds of 150-, 300- and 450Mb/s.

For measuring real-world throughput we used the zPerf bandwidth tool running on OS X, with an iMac as the server, ethernet-

wired to the router under test, and the MacBook as the client. Tests were performed at close- (1m) and long range (10m), using channels untrafficked by other networks.

Several runs were made, from which we derived an average speed.

For 802.11ac testing the server/client units were reversed in order that we could use the 2013 Apple iMac's 802.11ac wireless chipset.

Subjective testing included appraising the build quality, materials used, and the style and design.

Ease of use was judged in the initial setup procedure and the advanced options.

	APPLE £169 inc VAT ★★★★★ PC ADVISOR BEST BUY	ASUS £189 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	BUFFALO £91 inc VAT ★★★★★	
Model name	AirPort Extreme (6th gen)	Wireless-AC1900	AirStation Extreme AC 1750	
Product code	ME818B/A	RT-AC68U	WZR-1750 DHP	
Wireless protocols	802.11b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	
Radio bands	2.4- & 5GHz, simultaneous	2.4- & 5GHz, simultaneous	2.4- & 5GHz, simultaneous	
Antennae	6x internal	3x external	3x internal	
Stream support	3x3 MIMO	3x3 MIMO	3x3 MIMO	
Processor	ARM Cortex A9 dual-core	Broadcom BCM4708	Broadcom BCM4708	
Chipset	2x Broadcom BCM4360KLMG	BCM 4360B0	Broadcom BCM4331 & BCM4360	
WAN port	1x gigabit	1x gigabit	1x gigabit	
LAN port	3x gigabit	4x gigabit	4x gigabit	
USB	1x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0	
Other	Internal power supply, cooling fan	TurboQAM, iCloud	Norton Connect Firewall, Torrent client	
Dimensions	98x168x98mm	160x220x83.3mm	183x34x212mm	
PERFORMANCE				
802.11n, 2.4GHz, 1m	124Mb/s	98Mb/s	111Mb/s	
802.11n, 2.4GHz, 10m	105Mb/s	69Mb/s	65Mb/s	
802.11ac, 5GHz, 1m	578Mb/s	610Mb/s	390Mb/s	
802.11ac, 5GHz, 10m	540Mb/s	570Mb/s	85Mb/s	
Power consumption	6W	9W	5W	

Prices correct at press time

Conclusion

802.11ac performance comes nowhere near to the claims of networking companies. Gigabit Wi-Fi is a misnomer; much less the claim of 1300Mb/s. You can expect no more than half that in use.

Many networking companies are all too eager to splash these theoretical speeds over product packaging. Some will even add together the 802.11n and 802.11ac speeds and claim their routers can offer 1750Mb/s. This is nonsense.

On the other hand, 802.11ac real-world speeds are substantially faster than what can be achieved with 802.11n, and the drop-off in performance at range is significantly reduced.

Some routers in our test delivered inconsistent performance, which may be a consequence of the specification remaining in draft form, with some aspects not yet fully implemented. We're hopeful that future 802.11ac routers will deliver more reliable performance.

It's important to note that while a router's 802.11ac performance is interesting, it is 802.11n that will be in use for some time.

Three models stood out in our round-up: Apple's AirPort Extreme, Asus' Wireless AC-1900 and TP-Link's Archer C7. While Zyxel's

NBG6716 wasn't bad, we became frustrated with its interface.

Buffalo's AirStation Extreme and D-Link's DIR-868L fell short of the mark with some odd test results, although the DIR-868L did provide the best overall 802.11n performance.

Choosing which 802.11ac router to buy today depends on some key factors. The TP-Link offers great value, but its interface might put off anyone who isn't especially technical.

For Mac users, the AirPort Extreme is a worthy addition to your home network. It's powerful, and incredibly easy to administer. The advanced features it lacks may put off certain buyers, but we suspect not too many people will need to change their MAC address that regularly, for instance. We did find that the AirPort Utility software, like iTunes, is not as good on Windows as it is on OS X.

The 802.11ac performance champion is the Asus Wireless-AC1900. We loved its powerful interface and full range of features. Its only caveat is lower 802.11n performance than we expected, although Asus has assured us that a forthcoming firmware update will specifically address this area. ☒

D-LINK £104 inc VAT ★★★★☆		TP-LINK £105 inc VAT ★★★★☆ PC ADVISOR RECOMMENDED		ZYXEL £153 inc VAT ★★★★☆
DIR-868L		Archer C7		NBG6716
DIR-868L		Archer C7		NBG6716
802.11a/b/g/n/ac		802.11a/b/g/n/ac		802.11a/b/g/n/ac
2.4- & 5GHz, simultaneous		2.4- & 5GHz, simultaneous		2.4- & 5GHz, simultaneous
6x internal		3x external		3x internal
3x3 MIMO		3x3 MIMO		3x3 MIMO
Broadcom BCM4708		Qualcomm Atheros QCA9558		MIPS 74K 700MHz
Broadcom BCM 4708 & BCM 4360		Qualcomm Atheros QCA9558 & QCA9880		Qualcomm Atheros AR9558
1x gigabit		1x gigabit		1x gigabit
4x gigabit		4x gigabit		4x gigabit
1x USB 3.0		2x USB 2.0		2x USB 2.0
N/A		N/A		Qualcomm Steamboost
102.3x123.3x217mm		32.5x243x160mm		165x214x74mm
137Mb/s		110Mb/s		79Mb/s
91Mb/s		89Mb/s		58Mb/s
276Mb/s		505Mb/s		498Mb/s
243Mb/s		468Mb/s		413Mb/s
8W		5W		5W

INTERNET SECURITY SUITES

There are dozens of security products out there, so which do you choose? Simon Williams cherrypicks the six best-performing products to reveal the ultimate malware protection for your Windows PC in 2014

It may not be the most exciting of subjects, but internet security software is essential for keeping your PC secure from online threats.

We use results from German testing house AV-Test.org in our security software reviews. The lab has just released its latest batch of results from 26 antivirus vendors, including AhnLab, Avast, AVG (both free and paid-for versions), Avira, Bitdefender, BullGuard, Check Point, Comodo, Eset, F-Secure, G Data, K7TotalSecurity, Kaspersky, Kingsoft, McAfee, Microsoft, Microworld, Norman, Panda, Qihoo, Symantec, Tencent, ThreatTrack, Trend Micro and Webroot. Turn to page 78 to see how well each suite performed in AV-Test's lab.

But it isn't just about the numbers. We've taken the six highest-rated products and assessed their feature sets, usability and system impact to come up with our own ratings, looking to find the best overall package for keeping your PC safe.

Security vendors typically offer three levels of protection for Windows PCs. There is often a basic antivirus, perhaps with a firewall thrown in, usually available for free. Then there's the internet security package, which typically adds anti-spam and parental control. Top of the range will be an all-

embracing suite, with extras such as online backup, PC tune-up and identity protection.

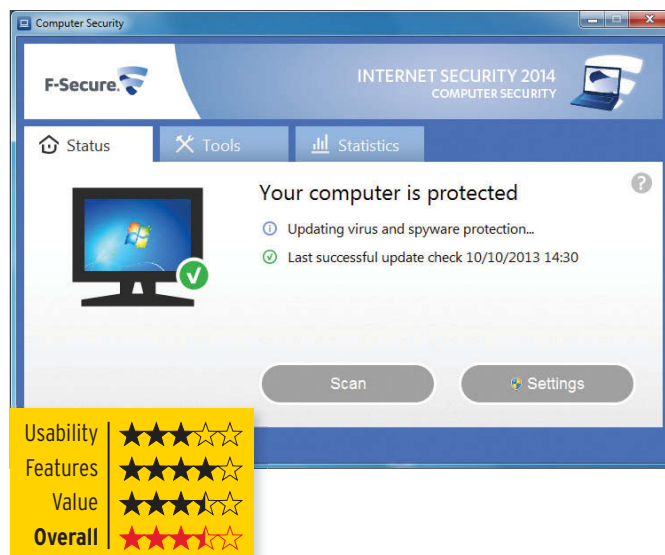
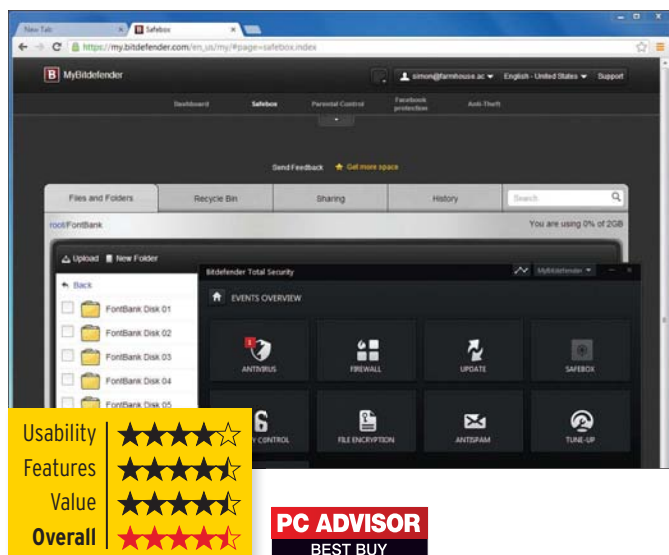
Running in parallel with this three-tier approach is support for devices other than PCs, including Android devices. (Apple's strict app policy means iOS devices are significantly less likely to be targeted by malware.) The mobile apps are often available for free. Some suites might add Mac antivirus software, too.

It's likely that we'll continue to see the extension of internet security products into areas such as online backup. Pairing malware protection and data backup is sensible, given that an infection can cause you to lose important files.

As more and more people own multiple computers, three- and five-device licences are becoming commonplace. All the prices we've given here cover three-PC licences, with the exception of Qihoo's free suite, which offers unlimited licences.

It's handy to be able to buy or renew your security cover in a single transaction. Symantec has extended this idea within its Norton products, so you can manage your licences online and transfer remaining cover from one device to another. This is useful if you upgrade one of your devices and sell on the old one.





BITDEFENDER TOTAL SECURITY 2014

£55 inc VAT (3 PCs) • bitdefender.co.uk • tinyurl.com/L9knk29

Bitdefender Total Security 2014 has more modules and facets than most suites and combines these with a strong core antivirus engine.

As well as antivirus, malware and spam filtering, the Bitdefender suite includes a two-way firewall, parental control, a secure browser, online storage, PC tune-up, anti-theft, identity protection, file encryption and data shredding.

All these elements are controlled from a rather busy control screen, with 11 individual panels; each offers configuration options or ways to start scans and updates. Bitdefender's AutoPilot sets sensible defaults, so you only need to tweak things.

There's also a screen widget, which shows when the program is scanning or updating, and highlights any outstanding alerts. Files and folders can be dragged on to the widget for quick scans.

The secure browser opens when the program detects you've moved to an online banking site and can be used in place of your regular browser, along with a virtual keyboard to foil keyloggers. Your day-to-day passwords can be stored in Bitdefender's Wallet, too, which is an encrypted safebox.

Online backup takes the form of 2GB of storage on Bitdefender's servers. Rather than offering a conventional scheduled backup, the suite uses a sync regime to mirror selected files and folders and keep them up to date in its cloud. 2GB is not a generous allowance these days - although it isn't bettered by any of the competition here, free services such as Google Drive offer two or three times as much.

The Anti-Theft provision comes into play if a Windows laptop or tablet is stolen. You can locate the machine via Bitdefender's website, provided it is within wireless range, then lock it down and, if necessary, erase its hard drive. The only thing missing is the ability to take a picture of the thief.

Bitdefender Total Security 2014 scanned virtually every file in our bundle on its first scan. It looked at 1,390,387 files in our 50GB basket, and took 2 hours 19 minutes - a good rate of 166 files/sec.

A repeat scan checked just 10,172 files, in seven seconds, so it's intelligent enough not to repeat-scan unchanged files.

We saw a 17 percent increase in the copy time of 2GB of files when there was a scan running, so the scanner doesn't produce too heavy a resource load. It was exemplary under AV-Test's regime, too, scoring 17.5 out of 18 points overall.

F-SECURE SAFE 2014

£60 inc VAT (3 devices) • f-secure.com • tinyurl.com/kzm386n

Although F-Secure Safe 2014 costs £60 for a year's cover, this licence covers three devices rather than three PCs. F-Secure produces internet security software for Windows, Mac and Android.

When you fire up F-Secure four small icons appear at the bottom of the screen, labelled Computer Security, Online Safety, Safe Profile and F-Secure. Each of these leads to one or more control screens, which are well laid out and generally easy to navigate.

The suite contains antivirus, anti-malware and anti-spam modules, as well as a firewall and parental control, but there's no tune-up or backup provision. It's more of an antivirus product than a full suite.

As some compensation, F-Secure offers extra protection for laptop owners. Its Android app, Mobile Security, has a module for remotely protecting data on a stolen laptop and reporting the laptop's location when it's within reach of a wireless connection.

It can provide similar parental control to the PC application, and use the anti-theft technology to keep an eye on your kids' location, provided they have the F-Secure app on their phones or tablets.

The 2012 and 2013 versions of F-Secure Safe had trouble scanning our file collection. An initial scan of our 50GB basket of files showed over 10 hours to complete. We contacted F-Secure and provided our files for the company to analyse and sort out the problem. Some weeks later, it let us know it had fixed the issue.

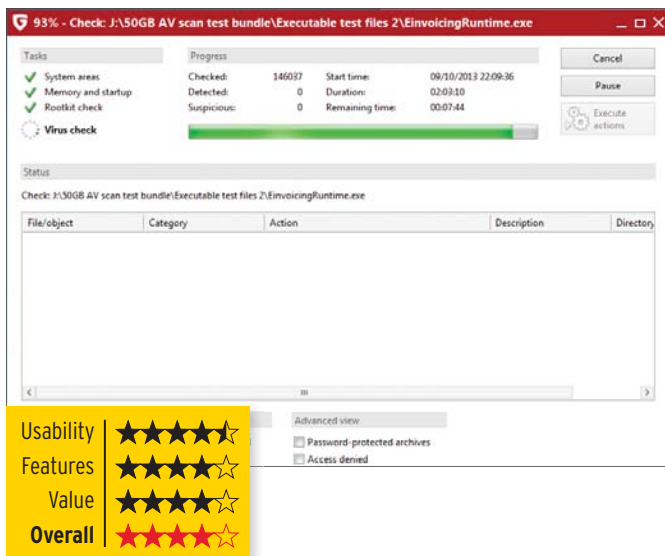
Unfortunately, it still seems to be there in the 2014 product. We abandoned a scan more than six hours in, when it was still showing only 60 percent complete and with just over 21,000 files examined.

Our files are a mixture of executables, data files and zip archives; the archives are where the F-Secure engine seems to have the problem. The other internet security applications in this group test experienced no difficulties with the same file set.

It appears that AV-Test didn't experience the same problems, as it awarded F-Secure 16 out of a possible 18 points overall. The three measurement categories, Protection, Performance and Usability, came in at 6, 4.5 and 5.5 out of 6, respectively.

Protection looks at recent and zero-day threats, so this is the best place to have a perfect score, with 100 percent in all parts of the test.

The Usability score of 5.5 reflects a low total of five false positives. The 4.5 figure for Performance shows a noticeable resource hit while running regular computing tasks.



G DATA TOTALPROTECTION 2014

£50 inc VAT (3 PCs) • gdatasoftware.com • tinyurl.com/Lzbqkem

German company G Data offers one of the highest-rated packages in the latest AV-Test survey. TotalProtection sits above AntiVirus and InternetSecurity at the top of G Data's range and includes antivirus, anti-spam, firewall, parental control and browser protection.

G Data also offers a startup manager, a secure data store and backup, including FTP, although no online storage is included. The three-PC licence is at the lower end of prices in this round-up.

The interface has been revamped, with good effect. There's been a trend in the past couple of years to limit the number of icons on the main screens of internet security packages in the hope of keeping things simple. This is fine when you're using the main functions, but it can make finding subsidiary functions more difficult.

G Data has bucked that trend with a conventional layout, putting nine icons along the top of the panel; each acts as a tab to a corresponding control area. Individual panels are also well organised, with the checkboxes and switches clear and organised.

The suite uses two separate antivirus engines for additional protection. Its performance in AV-Test's lab results isn't noticeably better as a result, however.

Browser protection includes a feature called BankGuard, which sits in the browser to defend against installed Trojans after SSL-encrypted data from your bank has been unencrypted for display. G Data claims it's effective against 99 percent of such attacks.

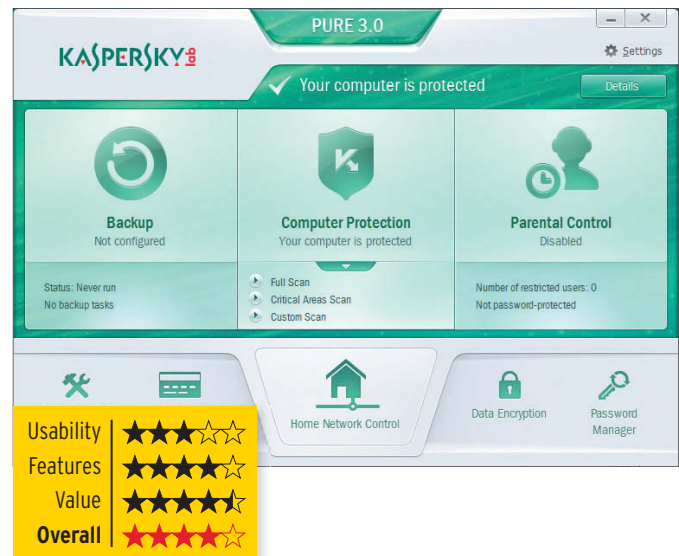
The suite provides good backup, offering easy selection of file- and drive backups and a reasonable scheduler.

The tune-up facilities mostly comprises disk defragmentation and deleting unneeded logs; most are automatic.

A test scan of our 50GB file basket took 31 minutes 44 seconds and examined 8,801 files, giving a scan rate of just 4.6 files/sec. This is very low, but the software fingerprints files well, so a second run scanned the same number of files in just 54 secs.

We also measured very little resource hit when we compared file copy times with and without a full scan running in the background. It took just 3 percent longer with the additional workload.

AV-Test noted rather more impact on PC performance, and the package scored 4.5 out of 6 points in this category. In the Usability category it dropped just half a point, and it scored a perfect 6 in Protection, resulting in a very good 16 out of 18 points overall.



KASPERSKY PURE 3.0 TOTAL SECURITY

£60 inc VAT (3 PCs) • kaspersky.co.uk/pure • tinyurl.com/n4er2x2

Pure 3.0 Total Security includes much more than simple antivirus technology. You also get Safe Money, which opens a secure browser when you're banking online, plus data backup, identity protection, PC clean-up, parental control and data encryption.

The main interface is geared more toward looks than function. Three panels for Backup, Computer Protection and Parental Control take up most of the space and change colour depending on status.

Combining backup with anti-malware provision is a sensible move. The adage that you never back up your data until you've lost something important still seems to hold, so a one-time setup of both security measures is encouraging.

Pure's backup provision offers categories such as documents, photos and audio, as well as individual selection of files and folders. These are all on radio buttons, though, so it's not possible to combine, say, documents and videos in one backup job.

The software can back up to local drives (internal or external), network drives or an online target. The Cloud option connects to Dropbox, so you'll need an account with sufficient space to hold the backup. Kaspersky's software automatically creates its own folder to contain the copied files. The backup module contains a basic scheduler, which can run backups on a daily, weekly or monthly basis.

Pure's initial antivirus scan was not particularly quick, and it took 1 hour 21 minutes to check 334,086 files – 68.7 files/sec. A second scan suggested a good level of fingerprinting, reducing the number of scans to just 8,805 files. This required only seven seconds.

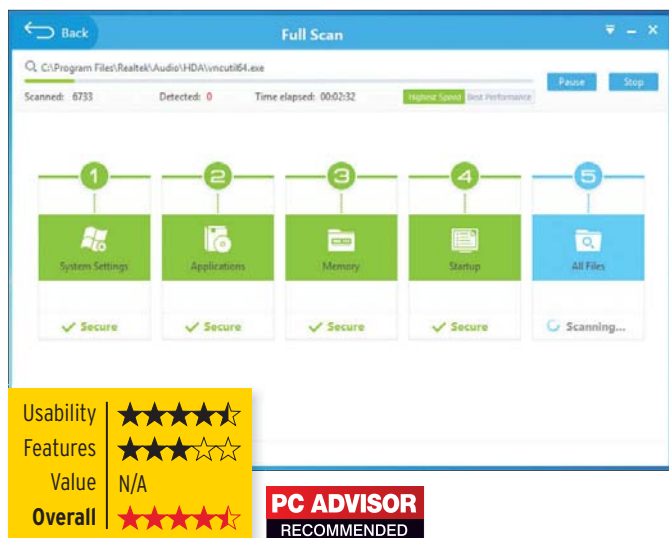
The resource hit was higher than with some of its competitors, with a 61 percent increase in file-copy time with a scan in progress.

AV-Test awarded Kaspersky 17 out of a possible 18 points, with only Bitdefender beating it overall.

It scored 5.5 points for Protection, with 100 percent detection of four-week-old malware and 97.5 percent for zero-day threats.

Pure also scored 5.5 points for Repair, which looks at the removal of malware and readjustment of the system after an attack. Kaspersky offers a special tool called Post-Infection Microsoft Windows Troubleshooting, hidden away under Additional Tools.

And in Usability Kaspersky scored a perfect 6/6. It caused a below-average system slowdown under AV-Test's evaluation, and produced only a couple of false positives during testing.



QIHOO 360 INTERNET SECURITY 4.3

FREE • 360safe.com • tinyurl.com/Ly557m7

Qihoo 360 Internet Security 4.3 is notable for its appearance in AV-Test's top six as the only security suite that is free to use.

The suite is clean and modern. Although it doesn't sport the feature set of some of its rivals here, it uses three antivirus engines. These comprise Qihoo's own 'checksum-based' engine in the cloud, a machine-learning QVM engine, and a Bitdefender local engine.

As well as antivirus protection, the program offers support against malware by checking for suspicious use of PC resources, and web protection by using a database of known troublesome sites and issuing anti-phishing alerts. There's a sandbox, too, in which you can load untested programs to check they're no threat, plus a trace cleaner, which removes browsing history and media remnants.

Qihoo could be particularly useful for laptops, as it claims to prevent unauthorised webcam access. Recent revelations about the NSA and GCHQ suggest we should be more concerned about unwanted images of us being captured.

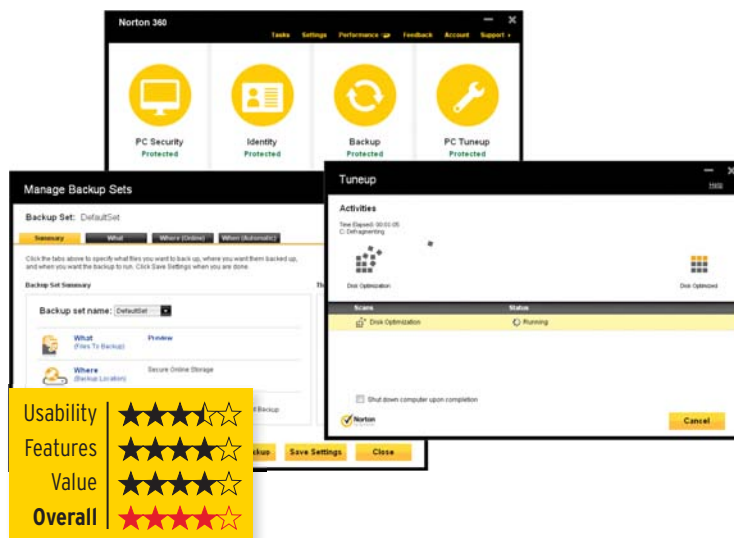
What Qihoo doesn't have is specific modules aimed at spam or providing parental control, and there's no firewall, backup or PC tune-up offering. This software is pretty much an antivirus product, despite its internet security label.

Our 50GB scan test completed in just under 39 minutes and examined 68,146 files. This gave a scan rate of 29.2 files/sec - it's at the lower end of the performance scale, but still acceptable. A repeat scan finished in 31 minutes, while testing exactly the same number of files. We're not sure where it made up the eight minutes.

The 1GB copy test took 45 secs without a scan running and 55 secs with one, showing a resource hit of just 22 percent in this particular task. That was with the scanner set to the default fastest scan, not the setting for the least performance hit.

AV-Test awarded the Qihoo engine an extra point over the better-known free offerings from AVG and Avast, with a total of 15.5 out of a possible 18. This is a very good score for a free antivirus product, breaking down to 5 points for Protection, 4.5 for Performance and 6 for Usability.

Although the Performance score, which shows the resource hit, is a bit low, this wasn't reflected in our own, admittedly simpler, test. The Protection result was pretty good on recent threats, although it dropped down to around 90 percent on zero-day attacks.



SYMANTEC NORTON 360 2014

£60 inc VAT (3 PCs) • norton.com/uk • tinyurl.com/Lez8ahc

The best-known of all internet security brands, Norton has several iterations in its range, from Anti-Virus through Internet Security, 360 and 360 Multi-Device. 360 includes core modules to cover antivirus, anti-spyware, anti-spam, a two-way firewall and browser protection, but also provides parental control, online storage, online backup, PC tune-up and identity protection.

The suite is controlled from a single window showing four yellow panels on a white background. These are labelled Security, Identity, Backup and Tuneup, with Security covering scans, update and the program's firewall.

Identity deals with online protection and the Identity Safe, Backup offers to create and manage backup sets and to buy more storage, and Tuneup leads to disk optimisation, file cleanup, a diagnostic report and a startup manager.

A separate Tasks panel makes it easy to drill down and perform individual tasks, although one of the highlights of 360 is that much of its protection is automatic. Once set up, it can be largely left to itself and rarely interrupts with messages or alerts.

Several extras incorporated into the product and some others can be downloaded as needed. Safe Web provides guidance on potentially hazardous websites before you reach them, making use of the collective experience of its millions of customers.

Online backup is another useful extension to the core features, although a new backup job isn't particularly intuitive to set up and 2GB of storage between the three devices covered by the licence isn't generous. Symantec isn't the only provider with this limit, mind.

Given Symantec's past as a purveyor of the geeky Norton Utilities, the Tuneup module is basic. There's the usual file and Registry cleanup, the ability to limit startup applications and a disk optimiser.

In our tests, Norton 360 2014 scanned 175,985 files in our 50GB basket in 19 minutes, 53 seconds, giving a scan rate of 148 files/sec. This is fast and the program does a good degree of fingerprinting, as a repeat test looked at just 20,800 files.

We measured a 60 percent increase in file-copy time, however, when a scan was running in the background.

AV-Test awarded Norton code 17 points out of 18. It achieved 5.5 points in both Protection and Usability, and a full 6 points in Performance, even if this wasn't reflected in our own tests.

How we test

Antivirus software is first and foremost about preventing malware infection on your Windows PC. It should also be adept at remedying existing problems, cleanly removing viruses, Trojans and rootkits that are already installed.

But it cannot be too trigger-happy and stop legitimate programs running, nor annoy you unnecessarily with false alarms. And all the while it's operating in the background it should not cause noticeable slowdown of the computer.

To help us evaluate these aspects of the software, we based our group test of six products on lab-test results from AV-Test.org, which indicate the antivirus software that may be the most effective at detecting and preventing Windows infections.

Over the months of July and August 2013, AV-Test evaluated 26 consumer antivirus products, from which we've selected the best six as judged by the lab's overall scoring system in three categories of protection, performance and usability. All software detailed in these pages scored at least 15.5 out of 18 points. Familiar names that were tested but did not make the grade include Avast, AVG, Avira, BullGuard, Eset, McAfee, Microsoft, Panda, Trend Micro and Webroot.

AV-Test used a computer running Windows 7 SPI 64-bit to record how well security software defended the PC against existing malware through signature matching, and new malware using behavioural analysis. It also examined how well the software cleaned infections after malware has infected Windows.

Blocking of real-world attacks: AV-Test pits each software package against live malware samples, and determines whether the software can fully or even partially block each malware example.

This test is an indicator of how capable a security suite will be at blocking brand-new malware that hasn't yet been formally logged. This is also known as zero-day malware – not to be confused with zero-day exploits, used by government agencies and cybercriminals to remotely access people's computers through design flaws in popular operating systems and software.

The most dangerous and increasingly widespread type of malware is zero-day. This is tried-and-tested malware whose code has just been subtly tweaked by its developer to avoid the traditional signature-based detection.

Malware zoo: Each product faces a collection of thousands of malware samples from the past four months. This test is an indicator of how well a security product will be able to block known malware.

False positives: AV-Test checks to see whether a security software product mistakenly flags any of 250,000 known safe files as being potentially dangerous.

System disinfection/remediation: This test determines how well antivirus software can detect, disable and fully purge active malware infections on a test PC.

Remember that the results garnered from evaluating the efficacy of all antivirus software is really just a snapshot in time,

Conclusion

As always, when choosing a piece of software to install on your PC, you shouldn't go just by the performance figures. What appears on paper to be the best buy can be less than ideal when you come to use the program in the real world.

By starting with these six players in the internet security field, judged the best on test in September 2013 by evaluation lab AV-Test, we know that the numbers were good on all these candidates.

The Recommended winner is perhaps an unusual choice, but Qihoo 360 Internet Security 4.3 has a huge amount going for it



indicating how it performed only at the time of testing – in this case over a few weeks in summer 2013. As the various antivirus vendors continually update definitions, so their products will return different results in the same tests, while the test lab's sample database is also in continual flux.

Speed tests

System performance impact: Some products can seriously hamper system performance. AV-Test runs each suite through a series of tests to discover how much it slows common PC tasks, such as starting up and shutting down the machine, copying and downloading files, opening files, installing software and opening web pages.

Scan-speed tests: The scan-speed tests show how quickly a suite can check 4.5GB of data for malware. AV-Test checks the performance of both the 'on-demand' scanner (which runs when you manually initiate a scan) and the 'on-access' scanner that is always running in the background, checking every file you open or save.


Design and usability

Once AV-Test has finished its assessment, we install each product to find out how easy it is to use. We take into account each product's interface, evaluating ease of set up and use through its main control panel and settings screens.

In addition to AV-Test's performance test, we also measure the impact of installed antivirus software on the PC, by copying the same 50GB directory of assorted files on our test PC. We then note the difference in time between an active scan (on-demand) running; background (on-access) scanning; and with no antivirus installed.

All other aspects of internet security suite software are not independently tested. This includes the efficacy of firewalls, parental control filters, 'anti-theft' protection, spam filtering, backup and encryption features.

if you want malware protection and aren't too bothered about the extras. It's pretty quick, thorough and has a delightfully clear and simple interface. It's also free, of course, and bettered both its main free rivals, AVG and Avast, in AV-Test's benchmarks.

But if you want the best in security protection you still need to pay for your software. Bitdefender dropped only one point under test, contains all the key protection modules, including online storage, tune-up and online banking protection, and does it all without endless interruption. A worthy winner of our Best Buy. 

	AHNLAB	AVAST	AVG (FREE)	AVG (PAID)	AVIRA	BIT-DEFENDER	BULL-GUARD	CHECK POINT	COMODO	ESET	F-SECURE	G DATA	
Protection score (/6)	1.5	5.5	4.5	5	3.5	6	6	2	6	5	6	6	
Performance score (/6)	3.5	3	4.5	4.5	3.5	5.5	3.5	3	5	2	4.5	4.5	
Usability score (/6)	5	6	5.5	5.5	5	6	5.5	6	4	6	5.5	5.5	
Total score (/18)	10	14.5	14.5	15	12	17.5	15	11	15	13	16	16	
AV-Test certification	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

	BITDEFENDER £55 inc VAT  PC ADVISOR BEST BUY	F-SECURE £60 inc VAT 	G DATA £50 inc VAT 	
Package name	Total Security 2014	Safe 2014	TotalProtection 2014	
No of devices	3	3	3	
Antivirus	✓	✓	✓	
Anti-malware	✓	✓	✓	
Anti-spam	✓	✓	✓	
Browser protection	✓ (including Wallet)	✓ (including banking)	✓ (including BankGuard)	
Firewall	✓	✓	✓	
Parental control	✓	x	✓	
Online storage	2GB	Not included	Not included	
PC tune-up	✓	x	✓	
Non-Windows support	Android, Mac (available separately)	Android, Mac (included)	Android (included)	
Extras	Photon technology, laptop anti-theft, security report	Anti-theft (data protection, device location), SMS blocker, Facebook privacy protection	Startup manager, backup manager	
50GB AV scan time	2 hrs 19 mins 57 secs	N/A	31 mins 44 secs	
No of files scanned	1,390,387	N/A	8,801	
Scan rate (files/sec)	165.58	N/A	4.62	
Second AV scan time	7 secs	N/A	39 secs	
No of files scanned	10,172	N/A	8,801	
1GB file copy scan time (no AV running)	41 secs	42 secs	52 secs	
1GB file copy scan time (AV running)	48 secs	1 min 36 secs	54 secs	
Increase in copy time	17%	128%	3%	

Prices correct at press time

	K7TOTAL-SECURITY	KAS-PERSKY	KINGSOFT	MCAFFEE	MICRO-SOFT	MICRO-WORLD	NORMAN	PANDA SECURITY	QIHOO	SYMAN-TEC	TENCENT	THREAT-TRACK	TREND MICRO	WEB-ROOT
	2	5.5	2.5	5	0.5	5.5	3.5	5	5	5.5	3	3.5	5.5	2.5
	3.5	5.5	2.5	3	5	3.5	2	3.5	4.5	6	5	3	5	6
	5	6	6	6	4	5.5	4.5	5.5	6	5.5	6	5.5	4	4
	10.5	17	11	14	9.5	14.5	10	14	15.5	17	14	12	14.5	12.5
	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓

	KASPERSKY £60 inc VAT 	QIHOO FREE  <div> PC ADVISOR RECOMMENDED </div>	SYMANTEC £60 inc VAT 
	Pure 3.0 Total Security	360 Internet Security 4.3	Norton 360 2014
	3	Unlimited	3
	✓	✓	✓
	✓	✓	✓
	✓	x	✓
	✓ (including Safe Money)	✓ (including anti-phishing)	✓ (including Safe Web)
	✓	x	✓
	✓	x	✓
	2GB	Not included	2GB
	✓	x	✓
	Android, Mac (available separately)	Android (free, available separately)	Android, Mac (available separately)
	Home network control, password manager, file encryption, virtual keyboard	Sandbox, trace cleaner, triple-AV engines including Bitdefender, anti-keylogger, webcam protection	Identity Safe, Safe Web for Facebook, file shredder
	1 hr 21 mins	38 mins 51 secs	19 mins 53 secs
	334,086	68,146	175,985
	68.74	29.23	147.51
	7 secs	31 mins 38 secs	1 min 57 secs
	8,805	68,146	20,800
	44 secs	45 secs	43 secs
	1 min 11 secs	55 secs	1 min 9 secs
	61%	22%	60%



What happens to data when you die?

Mike Bedford investigates the fate of online assets after their owner passes away



<< With expert legal advice from Ian Bond, a partner at Higgs & Sons

It might be something that many of us prefer to keep at the back of our minds, but there are times when we need to give some thought to what happens after we die. Even when we do consider our mortality, though, the fate of our online property is something that often gets overlooked.

Much of this property has sentimental value – for example, emails, photographs and documents stored in the cloud, plus our presence on social-media sites – but it can also have financial value. Either way, you probably don't want it simply to evaporate.

Succession law is somewhat vague about some types of online property. Unless you've shared your passwords, your relatives or the beneficiaries of your will may be unable to access your online assets.

Here we look at what the law says, how the big companies that administer our online assets interpret that law, and what you can do to ensure that your wishes are met.

The law

To understand the legal situation we spoke to solicitor Ian Bond (@IanBondTEP), a partner at Higgs & Sons and member of the Law Society's Wills & Equity Committee. According to English and Welsh law, Bond said: "It is the duty of a personal representative to collect the real and personal estate of the deceased and administer it according to law. If the deceased had digital assets, the personal representatives have a duty to protect those assets and collect them for the beneficiaries."

Later in this article we'll see how this applies to online assets that have financial value but, to start, we'll look at online property that is primarily of sentimental value. Here, things are rarely as simple as Bond's initial statement might suggest.

"Digital assets are mostly stored on shared servers; the service providers may be based in a different country to their users, and they may store data on servers in many countries, making it unclear which country's laws would apply," said Bond.

To clarify, he gave an example: "Just because a user with a Facebook or Twitter account dies in London, it doesn't mean that English law will apply in dealing with those digital assets. In the absence of clarity on which country's laws apply, how a digital service provider deals with an asset following the death of the user becomes a matter for the provider's terms of use.

"No uniformity exists so, in reality, each digital service provider sits in final judgment when it comes to deciding the fate of the digital assets," added Bond.

In view of this ambiguous situation, we approached some of the most likely companies that you'll have entrusted with your online assets.

Facebook

We asked Facebook what happens to an online presence when the account holder dies and were told two options are available: the account can either be deleted or memorialised. Facebook describes the latter option as such: "In the memorialised state, sensitive information such as status updates and contact information is removed from the profile, while privacy settings on the account are changed so that only confirmed, existing friends can see the profile or locate it in Facebook's internal search engine. The wall remains so friends and family – who are already friends with the profile – can leave posts in remembrance. When memorialised, no-one can log into the profile."

Deletion or memorialisation of a Facebook account requires proof of death. This action may be requested only by someone who can prove that they have the authority to act on behalf of the deceased.

Facebook maintains an archive of every account, which contains a copy of everything that has been uploaded to it. The account holder is able to download this archive, but a relative or someone holding a grant of probate would be denied access since this would breach Facebook's privacy policy.

While Facebook allows verified relatives to memorialise the account, they can see only the information that the deceased chose to share with them. Facebook said it would not be appropriate for them to download that person's private messages because no permission had been given. The company would not tell us whether they would respect someone's wishes had they bequeathed their online assets in their will.

Facebook takes the privacy of deceased account holders very seriously. In a recent high-profile case, the parents of a 15-year-old boy who had committed suicide hoped that by accessing his Facebook account they would be able to better understand why he had taken his life. Facebook fought all attempts to gain access, even after the parents had obtained a court order.

Twitter

In the event of the death of a Twitter user, the social-media firm will work with a person authorised to act on behalf of the estate, or a verified family member of the deceased, to have an account deactivated.

However, Twitter's policy on providing access to an account following the death of the holder is similar to that of Facebook. "For privacy reasons we are not able to provide access to a deceased user's account, regardless of a person's relationship to the deceased," it said.

The company was not forthcoming when we asked whether it would permit access in the event that provision for someone to

inherit online assets was made in a will. Of course, unlike other such services, much of the information published on Twitter is public and visible to anyone.

Google

Google offers a plethora of online services, including Gmail (email), Picasa (photo hosting and sharing), Google+ (social networking) and Google Drive (document hosting). Given that these services are accessed via a single account, a similar policy applies to all.

The bottom line is that there are no hard and fast rules; each case is taken on merit, so there might be scope for an authorised person to gain access to the online assets of a deceased account holder.

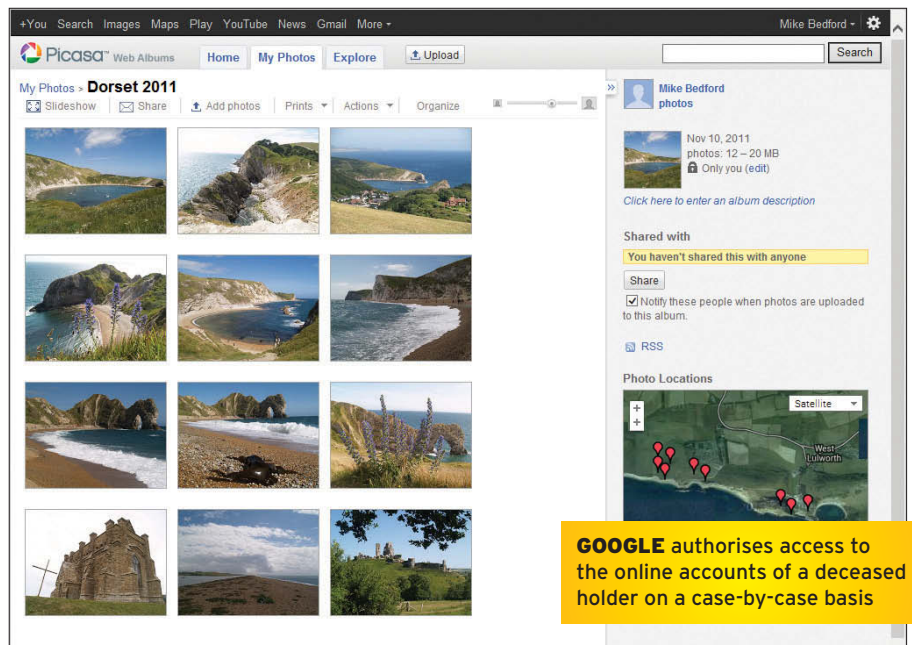
Google would not respond to our requests for clarification. As such, it is not possible to judge whether all online material is considered to be equally confidential or, for example, Google might grant access to photo albums, but not to more sensitive information such as that contained in emails.

It's pertinent to point out that Google offers an Inactive Account Manager service, through which an email notification can be sent to a trusted friend or family member in the event of an account being inactive for a certain amount of time. The mail contains a link to download certain content, as defined by the account holder.

Online assets with financial value

As we turn our attention to online property with financial value, the legal situation is much clearer. "Some assets, for example an online bank account, can be dealt with in the same way as traditionally held assets. Retail websites or gambling sites with an outstanding credit in favour of the deceased are also simple to value and administer in accordance with the law," Bond said.

You might think the same would apply to property you've bought that is stored online. The most obvious examples of such are music tracks and books bought on iTunes or a similar content store. Unfortunately, according to Apple, such property dies with the person who bought it. This is because



in paying for a music track you are simply obtaining a licence to listen to that audio, and this licence is not transferable.

This might sound like a change in policy when compared to music stored on physical media, such as CDs or LPs, but Apple says not. In fact, the same rule applies here, and the only difference is that online distribution provides a means by which the conditions of the licence can be enforced.

While we can't disagree with the legal situation, we'd have to say that the onset of online purchasing does seem to have ushered in a newfound determination to enforce that law. After all, we don't hear a lot about high-profile raids on secondhand record shops and record fairs.

Managing your online property

Any expectation that your online property will become available to your family or other beneficiary after your death would be misplaced unless you take precautions beforehand. An obvious solution is to inform your relatives of your various passwords, but that opens the possibility that your accounts may be accessed while you are still alive.

Another problem with passing on your passwords now is that you may forget to tell them when you change that password, having followed the advice of security experts and doing so on a regular basis.

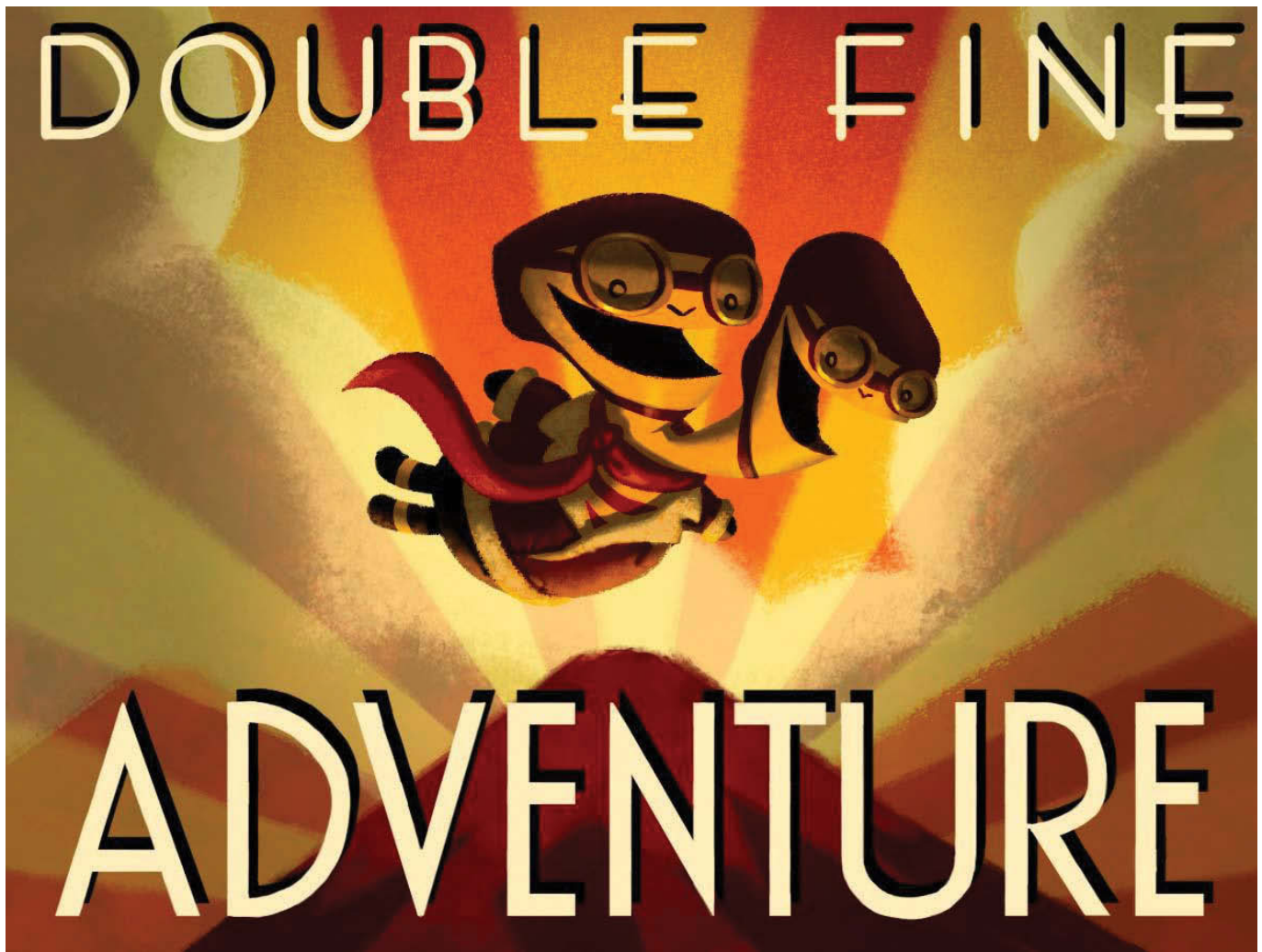
A solution to the problem of multiple passwords is to use a password-management utility such as KeePass or 1Password, which stores all your passwords in an encrypted file on your PC, or to list them in an encrypted Word document, making sure you update the document each time you change a password. Then, depending on whether you're happy for someone to have access to your passwords while you're still alive, you have two options: either you give someone the password for your password utility or Word document, or you provide the information to your solicitor with the instruction to make it available to a named person in the event of your death.

Dealing with a deceased person's estate can be a lengthy process. Bearing in mind that this will also be a period of considerable distress, handling a relative's online property is a job that might not be addressed for some considerable time after their death. A final aspect to consider, therefore, is how long someone can wait before their relative's accounts, and all their associated data, is deleted due to lack of activity.

We reasonably expected that this information would be written into the terms and conditions of each service; this isn't always the case. While Twitter said that accounts may be deleted after six months of inactivity, neither Facebook nor Google would tell us how long a dormant account would remain active.

So, if you're sorting out the affairs of a loved one who has passed away, don't wait too long before attending to their online property. ☹





How Kickstarter is changing the world

Martyn Casserly explains how crowdfunding sites are bringing amazing new products to the marketplace

Crowdfunding is quietly changing the world. Websites such as Kickstarter and IndieGoGo are offering inventors, artists and developers the ability to fund their projects in a way that up until now was almost impossible.

The secret resides in the simple idea of giving creators a chance to pitch to their intended audience rather than to the CEOs of large corporations. Traditionally, if you wanted your product made you needed to raise the capital to build it yourself, usually achieved by securing funds from investors. If you've ever seen 'Dragons' Den' then you'll

know how unfavourable this approach can be, with large percentages of your business being taken by the money men.

The internet is changing this. Kickstarter allows entrepreneurs to go to the general public, outline their project in a video, and then ask those interested to invest anything from £5 to £5,000, depending on how much they support the idea.

But this isn't just a fundraising initiative, as the creators offer various enticements to their potential patrons. Those who just want to support the project with a small donation might receive a public thank you

on the website, while those who invest heavily in a film or novel might have a character named after them in the final version. The best part is that this enables the artists to retain complete ownership of the product, while investors still benefit from their own munificence.

Trust is paramount when it comes to money and the internet, so Kickstarter has instituted a system that protects both the creators and the investors. A project has a set amount of time to raise its funds, usually around 30 days, and must have a specific financial target.

PEBBLE WATCH is one of the most successful products on Kickstarter

If, at the end of the campaign, the goal hasn't been reached, all the money donated is returned to the investors and the project is cancelled. This works well in two ways: first, it requires creators to set realistic goals that cover only the cost of their projects; secondly, it means investors don't have to worry about their money disappearing into a hole when an ambitious idea for a motion picture raises only 10 percent of the £1m target.

In the four years since Kickstarter opened its digital doors more than 45,000 successful projects have been funded by the site's user, with some £460m given in donations. The range of creative endeavours is incredible, with novels, paintings, electronic devices, children's toys, video games and movies all featuring. To give you an idea of the type of products in which you could invest, we've handpicked some of the most successful Kickstarter projects to date. Many of these have already entered full production, but they may never have happened without the support of the Kickstarter community.

So, whose dreams will you help to make a reality today?

Pebble Watch

With wearable computing heavily tipped to be the next big thing in technology, it's perhaps not surprising that a watch that can interact and control aspects of a smartphone has become the most backed project on Kickstarter. The scale of the funds

OUYA is a sub-£100 console that runs indie games on your television



donated is extraordinary. Having initially asked for \$100,000 to develop an iOS and Android version of its moderately successful BlackBerry-compatible Inpulse Smartwatch, the developers were amazed when nearly 69,000 people invested in the project, raising an astonishing \$10,266,845.

The Pebble is now a fully fledged product that allows users to check messages, screen caller IDs, control the music playing on their phone, and install a variety of purpose built apps. The Pebble is waterproof (great for when you're out in the rain and don't want your iPhone to get drenched), features an e-paper display that's perfectly viewable in direct sunlight, and will run for a week on a single charge.

You can preorder the Pebble Watch in one of four colours for the reasonable sum of \$150 (approx £100) from getpebble.com, with delivery expected in 'late Summer 2013'.

Ouya

Microsoft and Sony may be battling it out for the hearts, minds and wallets of the next generation of console gamers but, while they've been confusing potential customers over the fate of secondhand games and always-on connections, a much smaller company has stolen a march in the space. Ouya is a cheap sub-£100 console that runs indie games on your TV.

It might not have the big-name games available on mainstream consoles, but there are a few older titles that have already been ported to the platform, including Final Fantasy 3. iOS and Android developers have also started migrating games to the Ouya, with favourites such as Canabalt HD, Shadowgun and The Bard's Tale available.

Those with more retro tastes will enjoy the various emulators available in the store. So, if you've a hankering for Playstation 1, SNES, Neo Geo or even Commodore 64 games, the Ouya has you covered.

The unit itself is about the size of a Coke can and is powered by an nVidia Tegra 3 CPU with 1GB RAM and 8GB of storage; the latter can be expanded with a USB drive. It comes with a wireless controller, but it's also possible to use your existing PS3 or Xbox 360 ones if you're willing to tinker.

Oculus Rift

Virtual-reality headsets have been around a long time. Some of us might remember back in the 90s donning huge, heavy units and attempting to fly a plane without toppling headfirst on to the arcade floor. They didn't exactly set the world on fire.

The Oculus Rift, however, is another matter entirely. Designed by Palmer Luckey, the Rift is a lightweight virtual-reality headset



that boasts a wide field of vision, 3D stereoscopic rendering and ultra-low-latency head tracking.

Gaming luminaries such as Cliff Bleszinski (Unreal, Gears of War) and John Carmack (Doom, Quake) have declared it an extremely exciting technology, with Carmack saying the Rift is "probably the best VR Demo the world has ever seen".

The Kickstarter campaign made 10 times its \$250,000 goal, and production is now moving into the latter stages with developer units being sent out. Valve has confirmed that Half Life 2 will be compatible with the Rift, and the unit has featured on the cover of games magazine Edge with the title 'Believe the hype... How the Oculus Rift changes everything'. Not bad for an independent product that isn't even on sale. Check it out at oculusvr.com, and read our own impressions at tinyurl.com/m465uqr.

GoldieBlox

While browsing the many clever and innovative creations on Kickstarter or IndieGoGo you can be sure of one thing: most are designed and built by men. That's because around 90 percent of engineers are male. One female engineer decided this situation needed to change.

Debbie Sterling began a campaign for a product called GoldieBlox, aimed solely at teaching young girls how to build things.

Sterling noted that many of the toys targeted at girls are pink products that don't teach them anything other than how to be a good princess or a housekeeper. GoldieBlox instead aims to engage them through books and hardware, still decorated in a pretty fashion, and to gently introduce the ideas of mechanics and systems.

The project hit its funding target within four days, and Sterling was contacted by Toys R Us with a firm offer of distribution. Now GoldieBlox is sold in more than 1,000 toy shops worldwide, and Sterling has given talks at Google, Twitter and Microsoft.

OCULUS RIFT made 10 times its \$250,000 target and is now in the latter stages of production

Broken Age videogame

It isn't just startups that run crowdfunding campaigns. Established studios have also taken advantage of the direct-to-market route they offer.

Tim Schafer is something of a legend in computer-game design, being the surreal brains behind classics such as Grim Fandango, The Secret of Monkey Island, Brutal Legend and Day of the Tentacle. His company, Double Fine, wanted to make another classic point-and-click adventure, but knew no publisher would be interested. This was frustrating for Schafer, as he was convinced a market for such a product existed. So, Double Fine set up a Kickstarter project to allow fans to fund the game.

In typical Schafer-style there was an unusual twist to the pitch. To fund the game he needed \$300,000, but he also wanted to film a documentary about making the game, which would cost an additional \$100,000. The company didn't even have a title for the game, instead referring to it as 'Double Fine Adventure'.

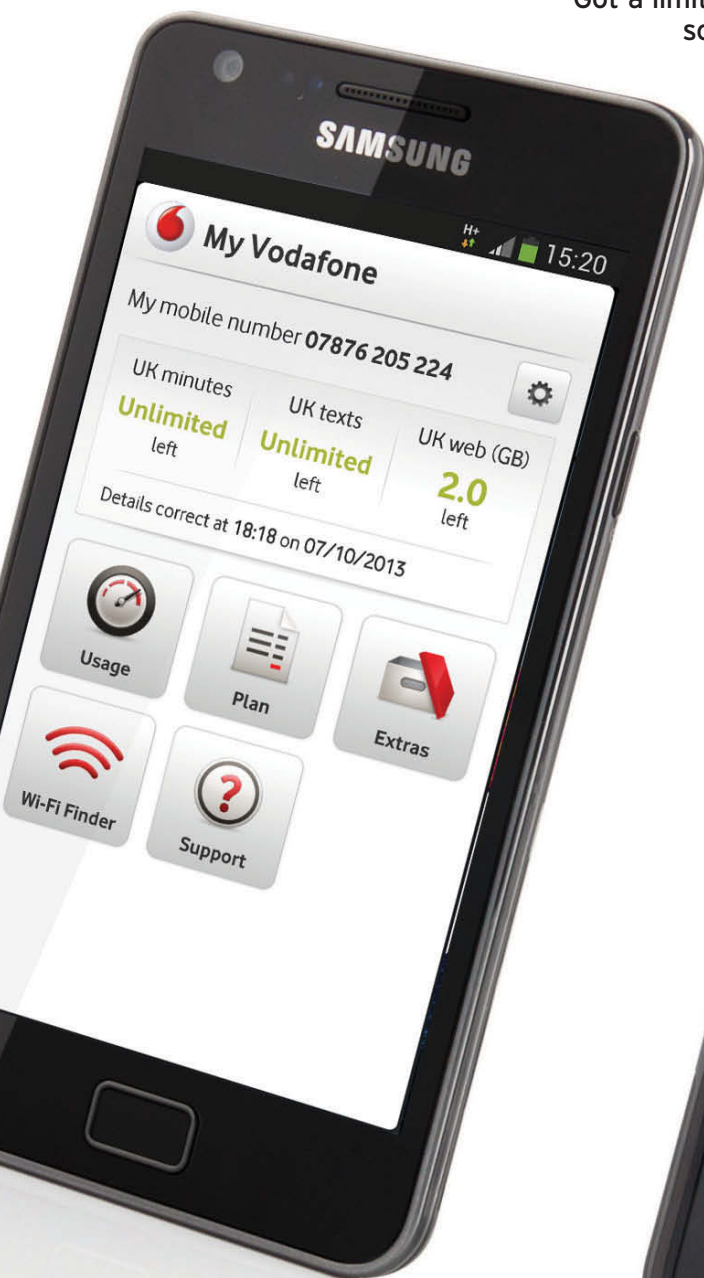
By the end of the campaign donations totalled \$3,336,371: the schaffer's theory was right on the money. The game development is now well underway with the title 'Broken Age'. Double Fine has been so buoyed by the response to the initial project that it launched another Kickstarter campaign for another game called Massive Chalice, which raised over a million dollars. Expect to see many more of these in the future. ☒

GOLDIEBLOX is a unique toy that aims to teach girls more than how to be a good princess



5 ways to keep

Got a limited data plan? No problem. Sarah Jacobsson Purewal offers some simple tricks that can help you cut back on data usage



to your data cap

Bad news, smartphone owners: unlimited data plans are, for the most part, a thing of the past – especially on pay-as-you-go deals. Only Three, Virgin and T-Mobile offer truly unlimited data without any throttling or penalties, but you'll pay a premium for the privilege.

Mobile operators want you to buy bigger data allowances, and they have the leverage to do so: we're using more data than ever thanks to apps, social media, web services and our obsessive email-checking.

So what's a hard-working, socially connected, tech-savvy person such as yourself to do with a limited data plan? Follow these tips to cut back on your data habit, track and monitor your usage, and make sure you stay within your monthly limit.

Monitoring usage

Okay, you're ready to start saving data and money. But first things first: before you can start reducing your data usage, you need to know how much data you use. The only way to do this is to monitor and track your usage so that you learn exactly what your phone is doing, even when you're not using it (thanks, background data).

You have a few ways to track your data usage on an Android or iOS device. The simplest method is to look up the information on your smartphone or tablet. Android users can check their data consumption by digging into the Settings menu: Navigate to Settings, 'Wireless and network' and tap Data usage. Here, you'll find an interactive graph that displays how much data you've used over the past month. You can also check previous months' data usage, and you can view a list of apps that use data and see how much they consume.

The process for iOS 6 users is a bit more complicated, and the results are a lot less useful. Go to Settings, General, Usage and tap Mobile usage at the bottom of the screen. Here, under 'Mobile Network Data', you can see how much you've consumed, but only since the last time you reset the tracker. If you don't reset the tracker at the beginning of each new billing cycle, this statistic is useless. For example, the last time I reset my iPhone's tracker was in June 2010, when I purchased the handset. So my iPhone displays how much data I've used since then, which is a fun bit of trivia that's not terribly helpful for tracking my monthly data usage.

In iOS 7, things are a bit better. Mobile data settings and usage are pulled together under a Mobile heading at the top of the

Settings. Now you can see how much data each app has used and also how much data iOS itself is consuming. The problem, though, is that it still relies on you resetting the counters at the right time of the month. The cumulative totals can highlight which apps are using the most data, and you can then disable mobile data for those apps.

Checking your data usage on your device is convenient, but the function is limited and you should rely on it only in a pinch. It's better to track data through an app from your mobile provider. Three, O2, Virgin, Vodafone and GiffGaff all offer apps that track your data usage. The main benefit of using one of these apps is that you'll have an accurate estimate of how much data your carrier believes you've used.

Do use these in conjunction with your phone's own tracking, since there's always a possibility that the mobile operator's data isn't bang up to date. You wouldn't want to check your usage and think it was okay to stream a TV show from iPlayer, then find you go over your limit and incur charges.

Although we're not focusing on Windows Phone here, it's worth mentioning that Windows Phone 8 takes seriously mobile data usage. It has a clever feature (Data Sense) that compresses web pages to effectively increase your mobile data allowance when browsing the web. Users can also set a data limit (as can Android users) with a warning that you're nearing the limit. The bad news is that Data Sense requires the mobile operator to support the feature, and no UK provider does so right now.

Wi-Fi: it's everywhere!

The easiest way to reduce data usage is to take advantage of Wi-Fi hotspots, which are found in cafes, restaurants, bars, trains stations and most public places. But finding a fast, reliable Wi-Fi hotspot is tough, especially if you're depending on your Android or iOS device's Settings menu. Tapping each Wi-Fi hotspot and hoping that



your phone will be able to connect - and that you won't bump into a password prompt - can be rather tedious.

Instead, use a free Wi-Fi finding app, such as JiWire's Wi-Fi Finder. Available for both Android and iOS, Wi-Fi Finder contains a database of more than 550,000 Wi-Fi hotspots in 144 countries. You can use the app's regularly updated hotspots map in conjunction with your phone's GPS function to find the best Wi-Fi in your area, or you can download JiWire's database so that you can still peruse its map of Wi-Fi hotspots even if you're currently offline. For every hotspot, Wi-Fi Finder lists details that you can't get from your phone's settings menu, such as the provider, the type of location, and whether it's a free or paid-for hotspot.

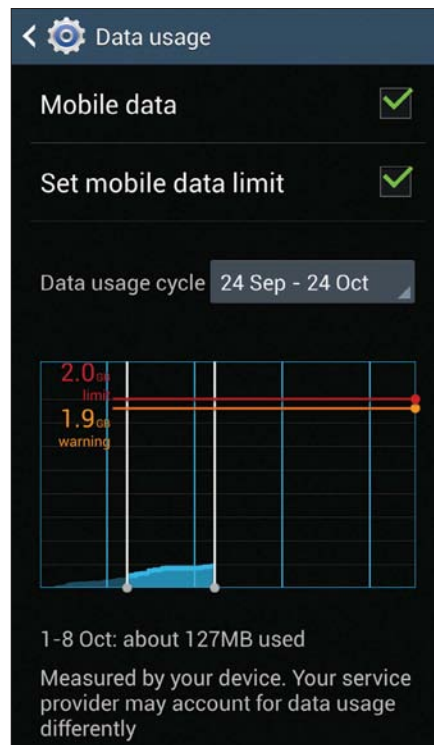
If you're a BT Broadband customer, you've automatically got free, unlimited access to 5 million hotspots in the UK and over 6.5 million abroad. You have to register (free) for the service and it's possible to set it up on your iPhone or iPad, Android device, Windows Phone or BlackBerry. See tinyurl.com/4yqk9mj for more.

You may also find the mobile app provided by your mobile operator includes a Wi-Fi hotspot finder.

If you're concerned about apps potentially leaching data from your mobile data plan - for example, if the Wi-Fi connection is sketchy and your phone slips back into mobile-data mode - be sure to disable mobile data in your smartphone's Settings. In both iOS and Android you can separately toggle mobile data and data roaming, a tactic especially helpful if you're using your device in another country and you don't want to get hit with data-roaming charges.

Cut back on data-heavy apps

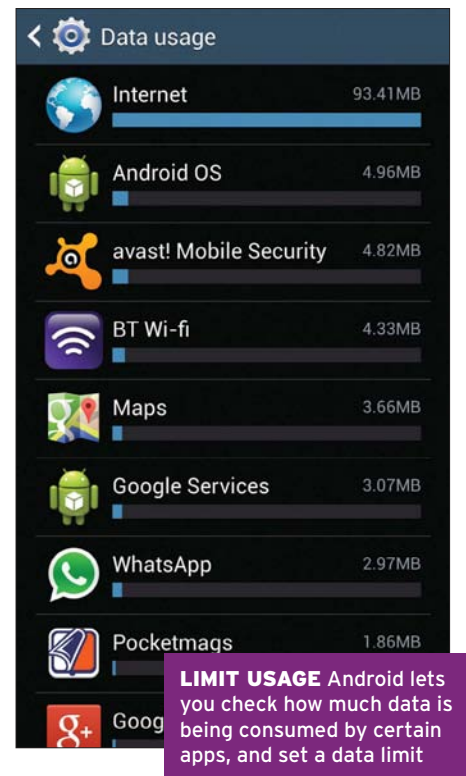
Not all apps are created equal. In fact, some apps, such as streaming music and video players, can eat through your data plan in a week (or faster if you're on 4G). You probably know that it's best to keep YouTube



marathons to a minimum, but it's other data-sucking apps that you need to worry about. Social-networking apps (which are constantly updating in the background), games (which push ads and notifications to you), and cloud-storage apps such as Dropbox (which might frequently download files to keep in sync all your devices) can drain data without your knowledge.

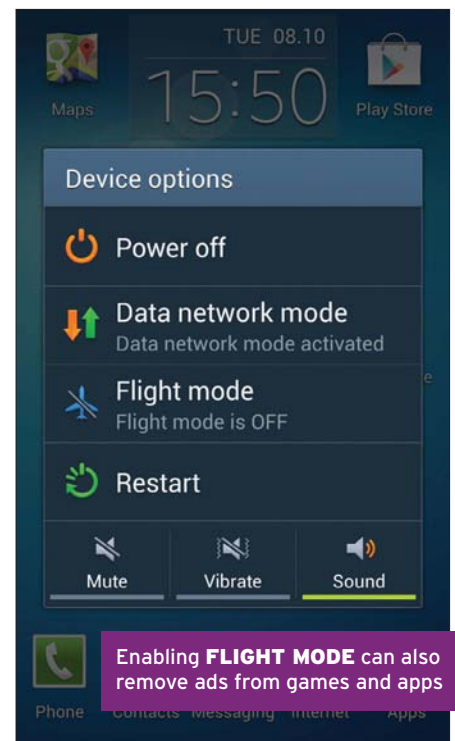
You need an app that reports how much data each app on your phone is using. This information is provided in Android, but we also like Onavo Count, which is free for both Android and iOS. It shows you how much data your apps are using, and you can generate weekly and monthly data-usage reports, plus find out how much data your 20 most frequently used apps are consuming.

Onavo Count also has a 'You vs Everyone' analysis feature, which tells you how much



data each of your apps is using in comparison with the same apps on other people's devices. This function can alert you to excessive data usage; for example, if your Dropbox app is using way more data than are other people's Dropbox apps, you should probably tweak your sync settings and rein in your mobile Dropbox use to reduce data consumption.

Another way to cut back on data-heavy apps is to use 'lightweight' apps for everyday tasks, such as web browsing. For example, Opera Mini (available for Android and iOS)



is a lightweight browser that compresses websites before sending them to your device. If you don't mind text-only browsing, TextOnly (Android) and Text Browser (iOS) are extremely lightweight browsers: they show only the readable text on a web page.

Block ads

Mobile ads aren't just annoying, they're also data hogs. Each ad you see in an app, game or on a web page must download from an external server, which means you're using data. Thankfully, you have a few different ways to banish ads from your mobile device.

The simplest way to eliminate ads from an app or game is to purchase the 'Pro' or full version of said app or game. It allows you to support the app developer, while conserving your data. Another easy way to block ads in apps and games is to use the app or game in Airplane or Flight mode (if possible). Your phone can't reach the servers to download ads in the background without a connection.

If you'd rather block ads the traditional way, you'll have to get a little hands-on. Google no longer allows ad-blocking apps in the Google Play store, and Apple has never allowed ad-blocking apps on iOS. But if you're willing to root your Android device, an app such as AdAway can block ads on both apps and websites. Likewise, if you don't mind jailbreaking your iPhone, AdBlocker stops ads on websites and in games and apps.

Ban background data

This may come as a surprise, but your phone is constantly eating through data, even when it's just sitting in your pocket. That's because many apps, including email, social media and cloud-storage apps, are always 'checking in' with a remote server to see whether any email messages, updates or new files are ready for downloading (via your data plan). Thus, you can conserve data usage by limiting the transfer of background data - the data that powers notifications.

You have a few different ways to reduce background data usage on your Android or iOS device. Both Android and iOS users should avoid downloading too many apps that require constant updating, such as stock tickers, weather apps and news updates. Android users can limit background data from the Google Play store by restricting how the store updates apps. Open the Google Play store and open Settings, Auto-update apps, then enable either 'Do not auto-update apps' or 'Auto-update apps over Wi-Fi only'. Before iOS 7, users didn't need to worry about auto-updating apps, but it's now an option; be sure to disable the 'Use Mobile Data' setting in Settings, 'iTunes & App Store'.

Yet another iOS 7 feature that could push you over your data limit is Background App Refresh. This can be toggled on a global level,



or you can choose to prevent certain apps updating their content in the background. It's also worth checking the apps themselves for settings that restrict data to Wi-Fi only. Dropbox is just one example that lets you choose to sync files only a Wi-Fi connection is available (and you can also prevent uploads in the background).

Android users can also restrict background data for individual apps: go to

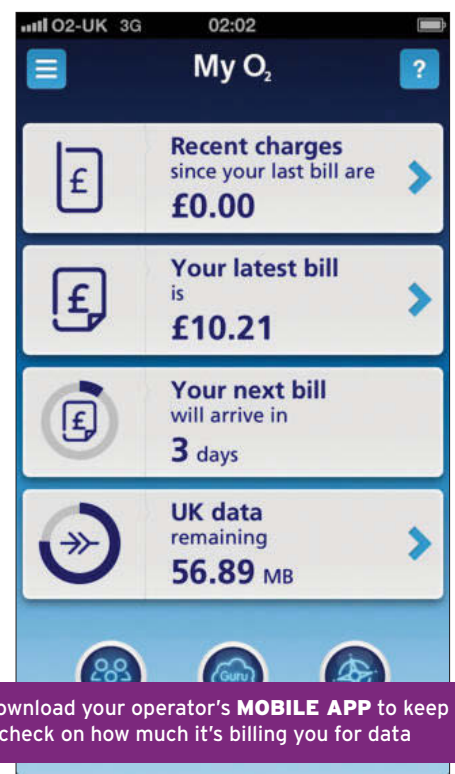
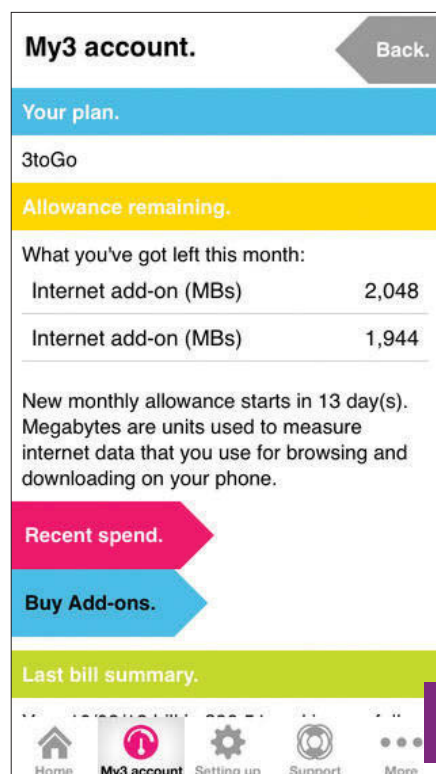
Settings, Wireless and network, Data usage and tap the settings button to toggle Auto sync data on and off.

Another way to limit background data usage is to restrict background data for connected accounts on services such as Dropbox, Facebook, Google, LinkedIn and Twitter. To do so, go to Settings, Accounts and tap the account you want to limit. On this screen you'll be able to choose what to sync (or not to sync) and how often; for example, you can elect to sync your Facebook calendar, contacts or pictures at different intervals.

iOS users can combat background data usage by turning off push mail and push notifications. To turn off push mail, or to ensure that your mail app isn't constantly checking for new messages, go to Settings, Mail, Contacts, Calendars and tap 'Fetch New Data'. Toggle off the Push switch, and set the Fetch schedule to Manually. This way, apps that do not support push notifications will fetch updates only when you open them.

Yes, you really can make a 500MB data plan work. You will have to sacrifice some convenience to stay within your data plan's limits, but it's definitely worth the effort. Plus, do you really need to see every 'Like' your latest Instagram post gets as soon as it happens? We didn't think so.

Just remember to disable all the stealthy data hogs described above, and download everything you can - whether it's an app, an email message, or a website - over Wi-Fi. If you can do that, stretching your data plan will be a cinch. ☒







Reclaim your online privacy

Thinking you're being watched is no longer a simple case of you being paranoid. David Bayon shows you how to reclaim your online privacy

The documents leaked by NSA whistleblower Edward Snowden illustrated the startling reach of the world's largest intelligence agencies. We learned that the agencies collaborated with technology companies to make it easier to spy on the public.

It's no longer safe to assume anything about the security of your data - except that you're not the only one who has access to it. Whether or not you're on their radar, your activity may be indiscriminately sucked up by intelligence services, who have made it their right to know what you know.

One consequence is that average users are increasingly turning to open-source privacy tools. Much more transparent and often independently audited, they can't be subverted as easily as a proprietary tool, making them the best means of retaining privacy in your online activities.

Encryption

We know the NSA and GCHQ have collaborated with technology companies to install backdoors into security products, so it's reasonably safe to assume proprietary encryption solutions are compromised.

That means no more BitLocker, even though it's highly convenient as it comes with some versions of Windows. Instead, we recommend you use the open-source TrueCrypt to encrypt your data.

It's a powerful tool, offering volume-, partition- and drive encryption, plus the ability to set up hidden volumes or an entire OS. If you're compelled to reveal your main encryption password for whatever reason, a hidden volume will remain safely encrypted and undetectable inside the visible volume. Think of it as a saferoom within a saferoom.

Download TrueCrypt from truecrypt.org and install it on your PC. To set up an encrypted area in which to store your most important files, first launch TrueCrypt, then click Create Volume and choose 'Create an encrypted file container'.

You'll be offered the option of making a hidden volume, but these must be created inside an existing volume, so choose Standard.

Click Select File and choose a location and a file name for your TrueCrypt container (don't use an existing file name or it will be overwritten by the container). Choose your encryption and hash algorithm - novices can safely stick to the defaults - then choose the size of your container and a strong password. When prompted, randomly move your mouse around the TrueCrypt window for at least 30 seconds - the longer you move, the stronger the encryption.

To access your container, open TrueCrypt, choose any spare drive letter, select your container file from the Volume drop-down menu, then click Mount. Enter your password and the volume will appear in Windows Explorer. Drag a file on to this and it will be automatically encrypted and added to the container; open an encrypted file and it will temporarily be decrypted in your PC's RAM. When you're done with your container, just click Dismount and it will disappear.

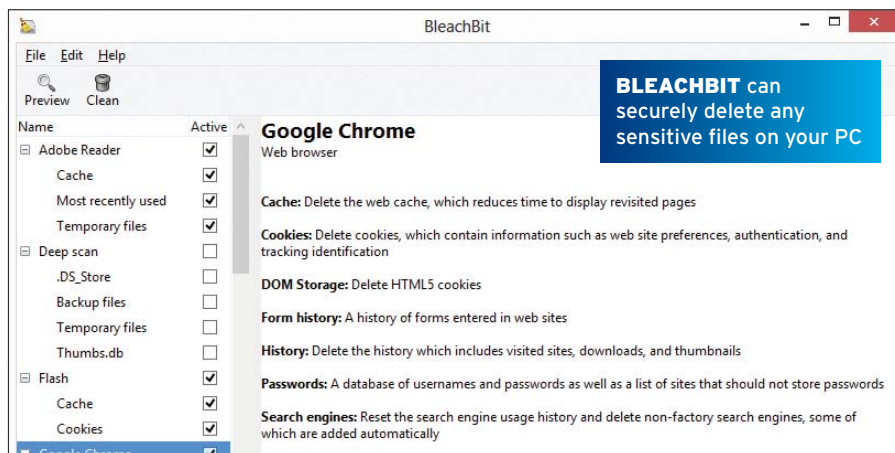
There's lots more you can do from there. You could create a hidden volume inside your standard volume, and you can encrypt a partition or OS using similar steps to creating a container. It's all well documented both in the software and on the TrueCrypt website.

Web browsing

Tor is a free and open virtual network that bounces communications around the world to prevent sites from learning your physical location. It forms the basis of a range of security applications, the most common of which is the increasingly popular Tor browser. It's based on a modified Firefox release, and if you follow some simple precautions it will grant you a level of anonymity online.

To set it up, go to torproject.org and download the Tor Browser Bundle. Run the downloaded file, choose an extraction location, then open the folder and click 'Start Tor Browser'. The Vidalia Control Panel will automatically handle the randomised network setup and, when Tor is ready, the browser will open; close it to disconnect from the network.

It won't be browsing as usual, as the Tor browser is necessarily stripped of many of Firefox's modern trimmings. Plug-ins, such as



Flash and QuickTime, are by default blocked as they can reveal your non-Tor IP address, as can opening any downloaded document that's handled by an external application such as Word. The makers strongly advise against using BitTorrent over Tor, too.

Don't go switching to Chrome, though: Tor is not protecting your PC's internet traffic, only the traffic that goes via the Tor Browser, so it's no good just having Tor running in the background.

Because of these restrictions, not to mention the reduced speed of browsing as data flies around the world en route to your PC, it's not practical to use Tor for everything online. It's fine to keep using your current browser for everyday online activities – if you want things a bit more private, search with DuckDuckGo.com rather than Google – but try to at least get into the habit of switching to Tor when it's time to do your banking, shopping or any other sensitive tasks.

Messaging

Public key cryptography is no longer only for IT experts, as more and more people are using tools such as OpenPGP to keep their communications private.

In very simple terms, with PGP you generate two unique keys. Your public key is what you give to others, and they can use it to encrypt any messages meant for your attention. Your private key is what you keep secret and safe, as it works in conjunction with your public key to unlock those messages when they arrive. The public key alone can never decrypt a message, which means you're safe to hand it out even to people you've never met.

The most popular implementation of OpenPGP is the free GnuPG (gnupg.org). Unless you're skilled with the command line, scroll down to the Binaries section on the Downloads page to find the special setup files for each OS. Note that both sender and recipient need the software installed.

For Windows that's Gpg4win, a suite that contains GnuPG plus a few other useful tools and extensions, as well as a PDF of the

excellent 'Gpg4win Compendium'. The 'For Novices' chapter is a great place to start learning about PGP.

Gpg4win includes everything you need: there are plug-ins for Outlook 2003 and 2007, and a standalone email client called Claws Mail that works with the keys you generate in Kleopatra.

To generate your own pair of keys, run Kleopatra (it's installed with Gpg4win), then click File, New Certificate. Choose the first option that pops up, enter your name and email address, then click Create Key. Your chosen passphrase is important, as it determines the strength of your encryption; try to use a phrase at least four- or five-words long, but be sure you'll remember it. Back up your newly created key pair, then Export the certificate to your PC. Opening that file will give you your public key in text form.

That's the very basic setup, but there's an awful lot more to it. The Gpg4win Compendium document has walkthroughs for everything, so the best thing you can do is work through the examples until you're confident enough to start using OpenPGP with your friends, relatives and colleagues.

One area of messaging that Gpg4win doesn't cover is instant messaging. Skype uses industry-standard encryption to keep private your conversations. However, if you don't want to put your trust in a mainstream app, you might like to try Off-the-record (otr.cypherpunks.ca). This encryption toolkit works with the Pidgin IM client (pidgin.im).

Disk cleaning

The final tool in your privacy arsenal is a vital one: a good disk cleaner. BleachBit is a simple piece of software that can shred files to prevent recovery, and overwrite free disk space to hide traces of old files. It also automatically hunts down and deletes

unnecessary files on your hard disk, from caches and cookies to the temporary folders of thousands of applications.

Head to bleachbit.sourceforge.net to download and install the software. The interface will show you any supported applications installed on your PC on the left, along with information on what will be deleted for each on the right. Just tick what you want to clean, leave anything you're unsure of, and click Preview to see how much room you'll free up. Then tap Clean.

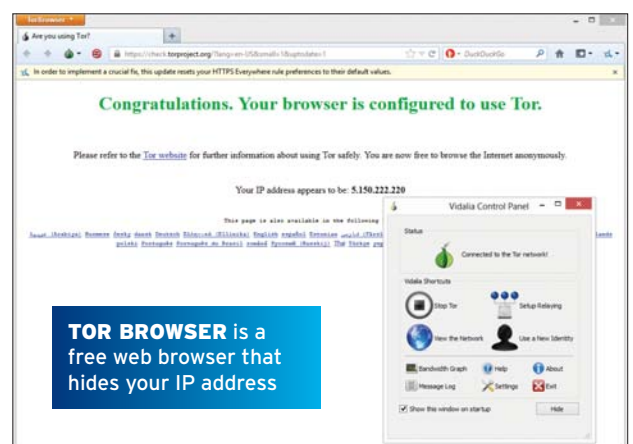
The extra privacy tools are all in the File menu. Shred Files and Shred Folders will delete and overwrite your selected data. Wipe Free Space will go through a drive or partition and overwrite files previously deleted by any software, so they can't be easily recovered. After doing this, BleachBit will also attempt to wipe metadata about those files by filling Windows' Master File Table.

Tails

If you want a bit of everything we've covered in one package, try Tails. It's a live Debian-based OS that you can run on any PC from a DVD or USB drive. As it uses only the host system's RAM, it leaves no trace when you switch off and disconnect. You can rock up at an internet café or use the PC in your hotel lobby without worrying about viruses and spyware on the host OS, and you can also use Tails to circumvent regional locks and censorship. Bear in mind, though, that you must boot it from a disc or external drive.

Download the Tails ISO image from tails.boum.org and follow the instructions to verify the image. To install it on a USB drive, first go to pendrivelinux.com to download and run the Universal USB Installer. Choose Tails from its drop-down list and click Browse to select your downloaded ISO image, then select the drive letter of your USB stick. Finally, click Create to build a bootable Tails OS drive.

Tails includes a range of tools, all of which are preconfigured to connect to the internet through the Tor network – it blocks any attempts by applications to directly access the internet. ☒





i2369Vm

New milestone in IPS display technology

This 58.4 cm (23") Full HD model sets a new milestone in IPS display technology. It boasts a great design and offers extensive connectivity options, such as D-Sub, two HDMI connectors and a DisplayPort. Its practical MHL interface even allows you to directly hook up your Android mobile devices to the monitor. IPS is known for vivid colours as well as high viewing angle stability. Until recently mainly used by professionals and enthusiasts, the competitively priced i2369Vm proves that this technology and high standard has become affordable to all. The display comes with a 250 cd/m² brightness, a typical contrast of 1000:1 (dynamic contrast: 50,000,000:1) and a 6 milliseconds GTG response time for your ultimate viewing experience.



Multiple inputs for enhanced multimedia capabilities



Ultra-slim profile

PRODUCT DETAILS

- D-Sub, 2x HDMI, Display port
- 6 ms GTG
- 1920 x 1080 @ 60 Hz
- MHL, -3°~+21° Tilt, VESA Wallmount
- 250 cd/m²



3 year warranty

DO YOU NEED A 64-BIT SMARTPHONE?

Apple has raised the bar with the latest iPhone - a 64-bit device. But do you need 64-bit processing, and is a 64-bit smartphone better than a 32-bit device?

Roland Waddilove investigates

One of the headline features of Apple's iPhone 5s is its 64-bit A7 chip, but should we care? Does it make it noticeably better than the 32-bit iPhone 5? Is the 5s twice as good?

It's easiest to think of the processor as the heart of a smartphone, or the engine that powers it, and there's no doubt that one day you'll need a 64-bit handset, but that day hasn't come. You might therefore ask why Apple decided to include the A7. The truth is that it's more than marketing puff. Apple used a 64-bit processor to improve performance and to prepare for the future. Although there's still life left in 32-bit processors, the writing is on the wall.

Memory matters

These days PCs and Macs, Windows and OS X are all 64-bit. The reason for this is that there are limits to the amount of memory a processor can access. A 64-bit chip can access 2^{64} memory locations - that's two multiplied by itself 64 times. A 32-bit device can use a maximum of 4GB of memory, which is one reason why computers and their OSes are all 64-bit.

A few years ago, it wasn't possible to get 8GB of RAM in a PC or Mac. Now if you have less than 4GB of RAM, you'll find that your computer is sometimes slow and unresponsive. This is because it's running short of memory; these days we are running more and more applications simultaneously and like to have scores of tabs open in our web browsers. They all require memory space, and there isn't always enough to go around.

Smartphones and tablets aren't yet struggling for memory in the same way. Android phones and tablets typically have 1GB or 2GB of memory, and the Samsung Galaxy Tab 3 (for details see tinyurl.com/m4pvz7d) is one of the few devices with 3GB. Apple's iOS is more memory efficient, and even though the iPhone's memory has doubled from 512MB in the 4 and 4s to 1GB in the 5 and 5s, it's well below the 4GB limit imposed by 32-bit processors. There's plenty of room for apps and operating systems to grow, and right now a 32-bit chip can address all the memory it needs. However, as apps and mobile operating systems grow, there'll come a day when 4GB of memory isn't enough

Performance gains

Breaking the 4GB memory barrier isn't the only reason for using a 64-bit processor, though. It can also access and manipulate data in 64-bit chunks, which is twice as much as a 32-bit chip. If it needs to access a lot of data or make calculations with big numbers, it can do so more efficiently. This means that apps will run faster, though - they'll have to be designed for 64-bit processors.

As far as performance goes, there'll be losses as well as gains. Some 32-bit apps may be faster, but others might be no different or possibly slower on a 64-bit processor because it's working in sub-optimal 32-bit mode. Overall, though, the benefits outweigh the drawbacks. The main advantage of the A7 chip in the 5s is that it's fast. Even in 32-bit mode running existing 32-bit apps, it's quick.

64-bit apps

Currently, every iOS app in the App Store will run on a 32-bit device, but Apple is asking developers to create new apps or rewrite old

ones for 64-bit operation. A 32-bit processor can't, however, run 64-bit apps, which means there could be software that works only on the iPhone 5s (and any other new 64-bit iOS devices Apple launches). Fortunately, that situation is unlikely to have a major impact in the near future given the number of 32-bit iPhones and iPads out there. In fact, unless there's an advantage to running in 64-bit mode, a developer may stick with 32-bit apps since they run on every iOS device.

64-bit Android phones

Will Samsung and other phone manufacturers follow Apple's lead? Yes, but whereas Apple has complete control over the design of the processor and operating system, Samsung and others must wait until Google gets around to making a 64-bit version of Android. The best guess is that this will be Android 5.0 in 2014. The odd thing is that Android needs 64-bit more than does iOS, and devices such as the Samsung Galaxy Note 3 at 3GB are already close to the 4GB limit. ☒



Photography by Dominik Tomaszewski

Versatile and Powerful NAS



DS1513+



DS1813+



Superior Performance

Read and write speeds of 350 MB / sec and 202 MB / sec respectively. With dual core CPU and upgradable RAM, the DS1513 + / DS1813 + is ideal for the implementation of essential business functions and the most intensive applications, such as data encryption and video transcoding.

Advanced Business Applications

Complete integration with Windows® ADS and LDAP environments. Backups via iSCSI LUN helps make the best use of the storage space and offers the highest performance during backups.

High Reliability

Passive cooling for processor to prevent from fan failure. Redundant system fans provide continuous availability. Other fail-proof designs include multiple LAN ports and hot-swappable hard drives.

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DS1813+ award



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Sync iWork documents between iOS & Windows



Cliff Joseph explains how to read and edit Pages, Numbers and Keynote documents on a Windows PC

The iWork suite of apps, which comprises Pages, Numbers and Keynote, is available as a free download for any iOS device running iOS 7 bought and activated on or after 1 September 2013. That includes the new iPhone 5s and 5c, as well as any iPad, iPad mini or fifth-gen iPod touch bought after that date.

The iOS version of Microsoft Office Mobile didn't get rave reviews when it was released, especially as it's available only to those who have an existing subscription to Office 365. And we have a sneaking suspicion that this might have been one reason behind Apple's

decision to give away its iWork apps for free with all new iOS devices.

The iWork suite consists of three productivity apps: the Pages word processor, Numbers spreadsheet, and Keynote for business presentations. The suite was originally developed for the Mac to provide a low-cost alternative to Microsoft Office, and iOS versions of the apps were later released costing £6.99 each.

The iWork apps for iOS are typically slick Apple products, but in the past they've primarily been of interest to Mac users who also owned the Mac version of iWork and

wanted to transfer documents between their Mac and iOS devices.

However, giving away the iWork suite for free means many people who have a Windows PC will now have these apps running on their iPhones and iPads, too.

If you don't want to subscribe to Office 365, or to purchase rival office suites such as QuickOffice for iOS, then the iWork apps could provide a useful option for sharing documents between your PC and iOS devices. The benefit for Apple, of course, is that this is yet another way of luring Windows users into the Apple ecosystem.

Pages, Numbers and Keynote

The three iWork apps are typical Apple products, with attractive interfaces that are very easy to use. In fact, Apple - with typical humility - once described Numbers as "the most beautiful spreadsheet ever".

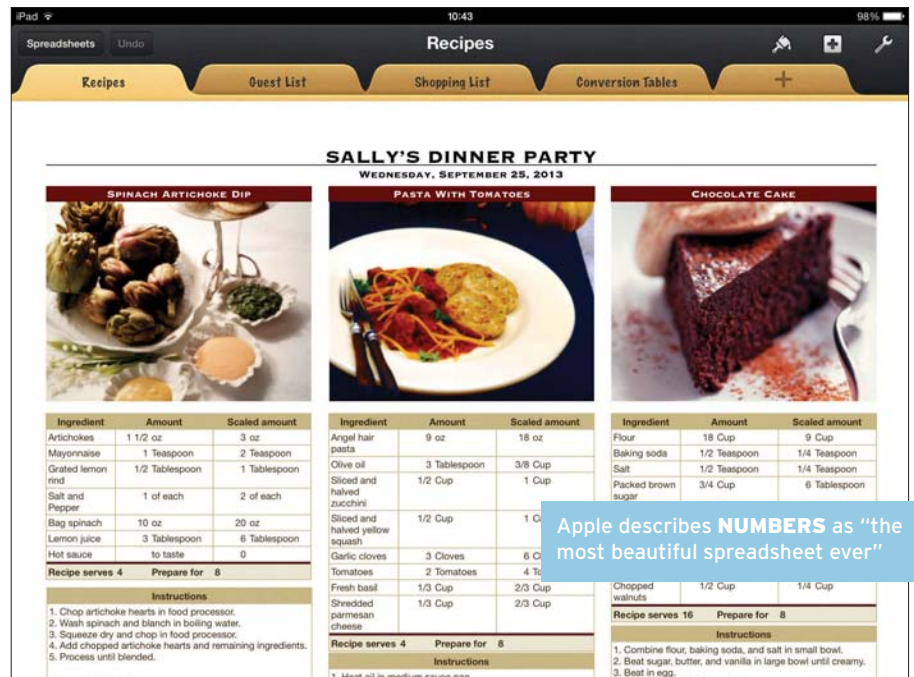
More important than the graphical eye-candy is the fact that the apps can also import and export Microsoft Office file formats, such as .doc, .xls and .ppt, providing a degree of compatibility with Microsoft Office on your PC.

The iWork apps for iOS have been around a while now, and we've reviewed them in detail online at (tinyurl.com/o94cgo7, tinyurl.com/pp8w93q and tinyurl.com/ppv2o3z). They're not the most powerful productivity apps available (if you're planning to do clever things with pivot tables in a spreadsheet then you might want to look elsewhere), but they're versatile enough for most home users and students, and also for many business users, too.

Keynote, in particular, will be useful for many people as the PowerPoint component in Office Mobile is primarily designed only for viewing existing presentations. In contrast, Keynote allows you to create simple but effective presentations using a variety of transitions and graphical effects using your iPhone or iPad.

But while the apps themselves are very easy to use, the process of transferring documents between your mobile devices and a desktop PC or laptop has always been a bit of a mess. The problem here is that neither the iPhone nor iPad has a handy USB port that would allow you to quickly transfer files to or from a Mac or PC.

Apple's original idea was to use a clumsy file-sharing feature built into the Mac and Windows versions of iTunes, which required you to physically connect your iOS device to your Mac or PC with a charging cable and to then individually select and transfer each file. That option still exists as a last resort when no Wi-Fi network or internet connection is



available, but as cloud computing has become more popular over recent years Apple has started to move the iWork suite into the cloud - or, to be precise, to its own iCloud service.

iWork For iCloud

The Mac side of things is a piece of cake. If you've got a Mac with the iWork suite installed on it then the iCloud software that is built into both iOS and the Mac OS will automatically sync your iWork documents between your Mac and iOS mobile devices.

You can write a letter using Pages on a Mac, then edit it on an iPhone or iPad, and the most up-to-date version of that letter will automatically be available when you open Pages on your Mac.

Unfortunately, the Windows side of things isn't so straightforward. There are no Windows versions of Pages, Numbers or Keynote, so you can't simply sync documents between the iOS apps and their counterparts on Windows. Instead, you have

to use a browser-based service that Apple calls 'iWork For iCloud'.

To use this service you'll first need to install the Windows version of Apple's iCloud software onto your PC. Head to icloud.com and you'll be prompted to download iCloud for Windows, then to enter your Apple ID (which you would have created when you activated your iOS device).

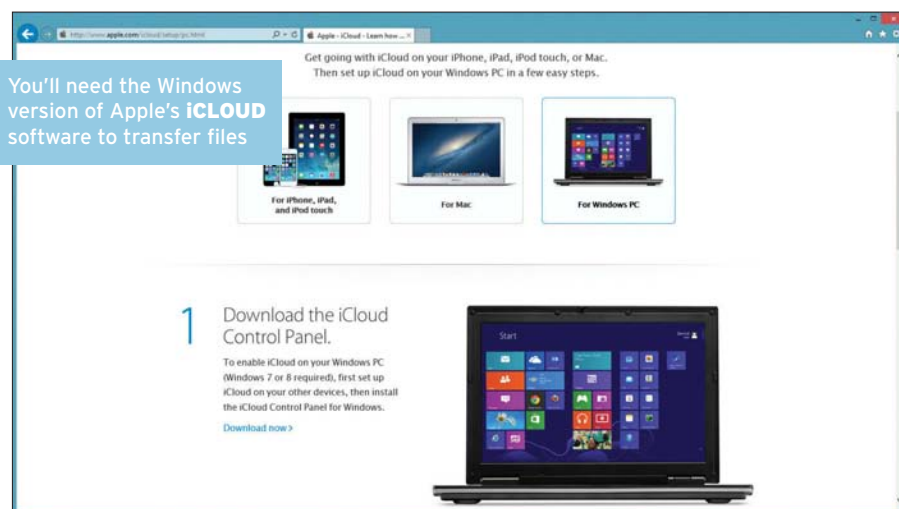
You might need to activate iCloud in the Settings of your iPhone or iPad if you declined to do so when setting up your device, and also make sure you've selected the 'Documents and Data' option in the iCloud preferences panel. This ensures that any iWork documents you create on your iOS devices are automatically uploaded to the iCloud website.

When you log into icloud.com from your PC, you'll see the iCloud home page with icons for Pages, Numbers and Keynote, alongside other options such as Apple's me.com email service or the Find My iPhone service for lost or stolen phones.

You'll notice that these icons carry a beta label; this refers to the online versions of these apps, which represent Apple's attempt to produce a suite of online apps such as Google Docs or Microsoft's Web Apps. They allow you to create a new document in your web browser - something that wasn't possible before.

For now, click the icon for any of these three apps and you'll see the Document Manager window, which displays any documents that have been created using Pages, Numbers or Keynote on your iPhone or iPad.

At this point you will also be prompted to download the iCloud plug-in for Internet Explorer (support for other browsers is still





The iCloud website includes **ONLINE VERSIONS** of iWork apps

in development). This isn't essential, but it does make converting and transferring files between iWork and Microsoft Office more straightforward, so you might as well install it when prompted.

From iOS to PC

Double-click on any document listed in the Document Manager and it will open in the online version of the relevant app, allowing you to edit it online. Again, bear in mind that the online apps are still in beta.

Right-click on a document and you'll see a pop-up menu that allows you to download the file to your PC, delete the file altogether, or email it to a friend or colleague.

When you download a file, iCloud also gives you the option of converting it into a PDF file or into a suitable Microsoft Office format, such as .doc, .xls or .ppt. This allows you to open your iWork files using Microsoft Office on your PC and carry on working as you would normally do so.

It's a similar process when you need to transfer files the other way - from your PC to your iOS device. Log into the iCloud website, then click on Pages, Numbers or Keynote to upload word processor documents, spreadsheets or PowerPoint presentations.

There are two options here: you can use the Upload menu within your web browser to select the files you want; or, if you've installed the aforementioned iCloud for Internet Explorer plug-in, you can simply drag and drop files from the Windows desktop on to your Internet Explorer browser window to upload them.

Once your files have been uploaded they will appear within the Document Manager window, and will also be automatically downloaded on to your iPhone or iPad ready to use within Pages, Numbers or Keynote.

This isn't the ideal way of doing things - having to log into the iCloud website every time you want to transfer a file to or from your PC is clumsy compared to the automatic syncing that takes place on the Mac. One possibility that immediately comes to mind is that you could use other cloud services, such as Dropbox or SkyDrive, to automatically transfer files from your PC to your iPhone or iPad. But, if you edited those files on your iOS device, you'd still need to log into the iCloud website to download the latest versions back to your Windows PC.

The ideal solution would be for Apple to release a Windows version of iWork that could sync all your documents for you. That's not likely to happen, though. If you already subscribe to Office 365 then it makes sense to continue using Office Mobile on your iOS devices. But if you're still happily using an older version of Office then the ability to edit your documents on your iPad or iPhone with Pages, Numbers or Keynote will be a very welcome bonus. ☒

iPhoto & iMovie

As well as the main iWork suite, Apple is also making freely available its iPhoto and iMovie apps, which provide basic photo- and video-editing features. The iCloud software for Windows includes a feature called Photo Stream that uses a Wi-Fi connection to automatically transfer photos taken on an iOS device to the Pictures library on your PC.

If you edit a photo in iPhoto you can save the edited version and add that to your Photo Stream, too. However, Photo Stream doesn't work with videos files: Apple provides no easy way to transfer original or edited videos to your PC.

As an alternative, iMovie provides options for uploading individual files to Facebook, YouTube and other sites. You can also transfer multiple iMovie video projects on to your PC by plugging in your iOS device via USB and then using the Windows Autoplay option to import the files.



YOUR QUESTIONS ANSWERED

Expert computing advice

We tackle readers' hardware and software conundrums

REMOVE THE START BUTTON

Q After the furore surrounding its removal in Windows 8 and reinstatement in Windows 8.1, someone had to ask: "How can I remove the Start button from Windows 8.1?"

Windows 8.1 sees the return of the Windows logo to the bottom-left corner of our screens, but rather than bringing up a Windows 7-style Start menu, its function duplicates that of pressing the Windows key on your keyboard, bringing up the new Windows Start screen.

If you would rather use this space for something else, download StartIsGone for Windows 8.1 from winaero.com. There's not much to see, except for a StartIsGone icon in the taskbar. Right-click this and select 'Run at startup' to ensure that the Start button is gone each time you boot up. To restore it, exit the program.

STOP TILES DISPLAYING DATA

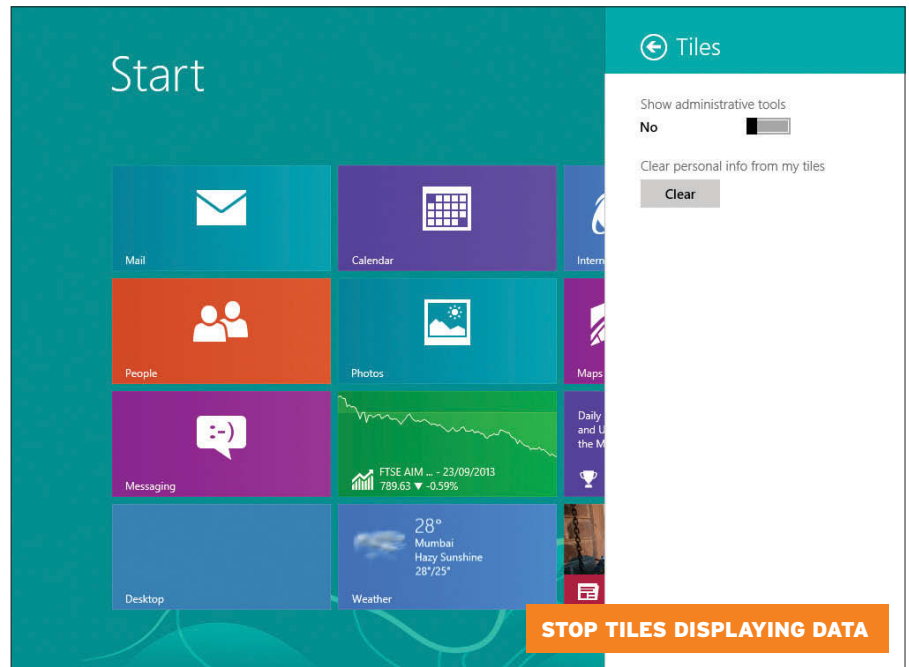
Q I like the live tiles feature on the Windows 8 Start screen, but I'm concerned about all the personal data displayed in them. How can I clear out all this information so that no-one can see my personal alerts and messages?

This is easy to do, although the option isn't simple to find as you'll need to be at the Windows Start screen for the option to show up - you can't go in via the Control Panel.

First, go to the Start screen and press Win+I to bring up the settings menu. Click on 'Tiles'. Now click the button marked 'Clear' to remove personal details from the tiles.

LAPTOP BATTERY

Q When I switched on my laptop yesterday a notice appeared at the bottom of the screen showing my battery with an 'x' next to it



and a message telling me: "Consider replacing your battery."

Until I manage to get one, I thought I could use the mains adaptor, but the available percentage is slowly going down. Yesterday it was 92 percent and today it's dropped to 90 percent. Will it slowly decrease to 0 percent, so I won't be able to use the laptop?

Starting with version 7, Windows has been able to request performance information directly from the battery in your laptop. Your battery will gradually deteriorate over time and its ability to hold charge will decrease. When it's able to hold only 40 percent of its original capacity, Windows warns you with the message: "Consider replacing your battery."

Although you can still continue to use the laptop, battery life will be considerably

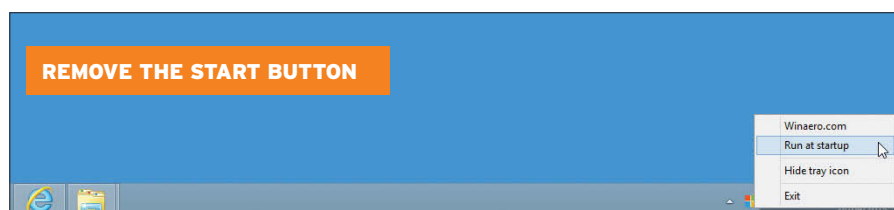
reduced. Furthermore, Microsoft also states that the percent remaining indicator will become less accurate as the battery's performance diminishes. This means it may fail unexpectedly, causing your laptop to shut down or switch off - you can't count on it slowly reducing to 0 percent. At this point, some laptops fail to work even when plugged into the mains. Removing the battery and running off mains power will often allow you to use the laptop normally until you can fit a replacement battery.

If you use your notebook on mains power most of the time, it can be a good idea to remove the battery as keeping it installed in the laptop will cause it to deteriorate faster.

PC SPEAKERS

Q I want to troubleshoot my laptop, which isn't producing any sound. I have a speaker set handy - a 2.1 kit with a subwoofer. I know that it works with my desktop PC, but I just wanted to check before trying it with my notebook computer.

I remember reading somewhere that hooking up mismatched speakers can damage a hi-fi system (or vice versa). Does this also apply to computers?





LAPTOP BATTERY

If your speakers have come from your desktop PC, then they are almost certainly multimedia speakers designed for use on any computer and should work fine on your laptop. They usually come with a built-in amplifier and use a standard audio input, which is similar to most PCs and laptops.

Hi-fi speakers are a different case, because they are often driven by an external amplifier. These can vary a great deal in

output power and therefore need to be carefully matched to the speakers to ensure that they aren't overloaded.

TRANSFER PHOTOS

Q My brother wants to buy a tablet and be able to load photos from his camera to this via a cable. He wants an 8in device for under £200, and it must be able to pinch to zoom.

That's about all it will get used for. I assume there are apps that will enable him to edit his photos easily once they

are on the tablet. His camera is a Canon PowerShot SX280 HS.

Given your price constraints, you'll be looking at an Android tablet to fulfil your requirements. In order to plug the camera directly into the device, you'll need to use a USB cable (usually provided with the camera) and a tablet with a USB host port (plus an On-The-Go USB adaptor cable).

You'll then be able to shoot using the camera as normal and then connect it to the tablet to transfer the images via the cable.

Alternatively, you may find it easier to buy a microSD card (with a full-size SD card adaptor), which you can use in your camera, and then remove and insert into your tablet's corresponding slot. Using a file manager app such as ES File Explorer (free, tinyurl.com/cd4u27q), the images can be copied on to the tablet.

Another way to avoid using cables is to opt for a Wi-Fi-enabled SD card for your camera, such as any of the Eye-Fi range. With one of these in your camera, you can transmit your photos to your tablet automatically as you take them, without the need to stop shooting, hook up any cables, or remove any cards.

Those lucky enough to own a compatible DSLR can take advantage of apps such as Helicon Remote (free, tinyurl.com/qz5jyvk). This lets you control your camera entirely from your Android tablet, checking the viewfinder image onscreen and controlling the autofocus via the tablet's touchscreen.

You requested an 8in tablet and one option is the Archos 80 Titanium (read our

Continues >>

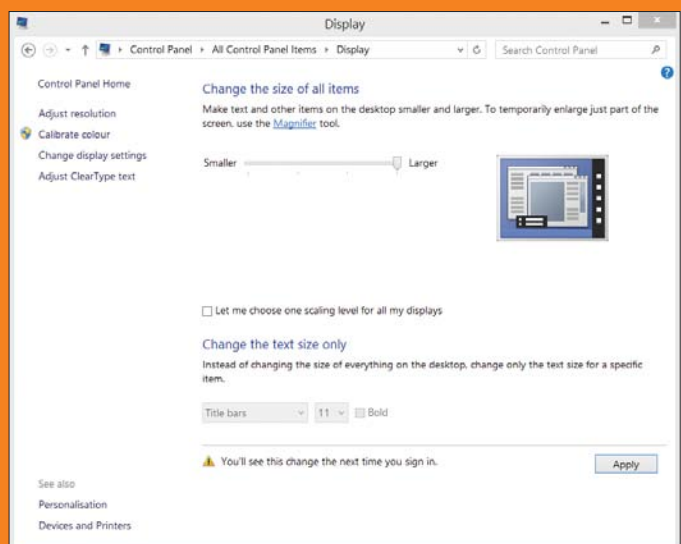
SCALING OPTIONS ON MULTIPLE MONITORS

Windows lets you scale desktop items such as text, cursors and icons to match the pixel resolution and physical size of your monitor. In versions of Windows prior to 8.1, you could select only one scaling option, which then applied equally to all connected monitors.

Now with Windows 8.1, you can elect to have it automatically scale desktop items individually to suit each attached display. To set it up correctly, go to the desktop and right-click on it. Select Screen Resolution and click on the link marked 'Make text and other items larger or smaller'.

Make sure that the box next to 'Let me choose one scaling level for all my displays' is not ticked. Ticking this will cause Windows 8.1 to revert to the old method of using one scaling factor across all attached monitors.

Now you can move the slider at the top anywhere between the 'Smaller' and 'Larger' options, and Windows 8.1 will attempt to match the size of screen items on all displays. Click on Apply to fix the settings. You may have to sign out of Windows and back in to see the effects.



review at tinyurl.com/d8btue6), which has a microSD slot. However, the newer Tesco Hudl (for details go to tinyurl.com/mxhxvuk) is cheaper and has a higher-resolution screen. Its 7in screen is smaller, but it's a better deal.

As there's a £200 budget, we believe that the new 7in Google Nexus 7 (see our review at tinyurl.com/qyudy5c) might be a better option. It has a 1920x1200-pixel display, which will be better for photography than the lower-resolution displays found on most 8in tablets – although which you prefer will depend largely on your eyesight.

If you choose a tablet that doesn't support USB OTG mode or external storage, you can use the Nexus Media Importer app (£2.62, tinyurl.com/8kwajr5) to get around this restriction and import your images.

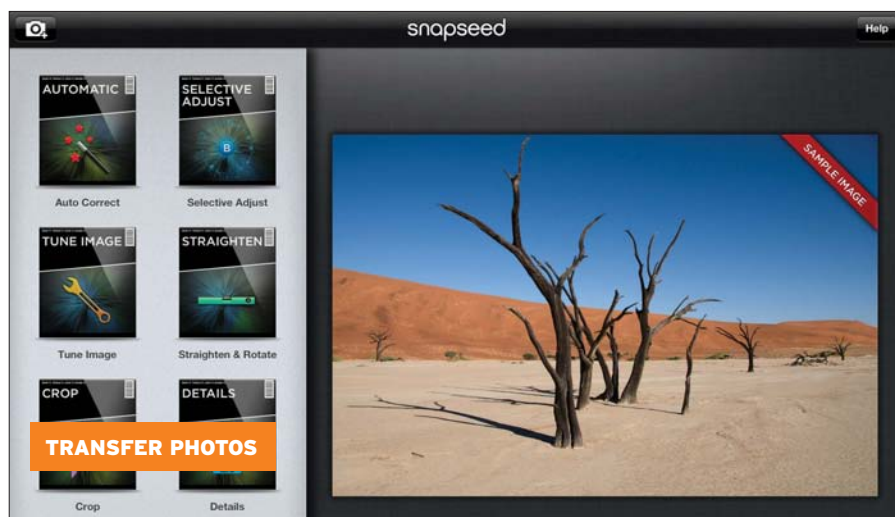
You can spend less than £200 on a tablet, but we would recommend buying one with a reasonable amount of power if you want to use it mainly for editing large JPEGs straight from a camera.

The Google Play store has a wide array of free image-editing apps. Take a look at Snapseed (tinyurl.com/akq5rt8) and Adobe Photoshop Express (tinyurl.com/6wzmm99) if you want something flexible.

RENAME JPEGS

Q When I scan documents using my Epson Stylus SX235W multifunction printer, they are automatically placed into the Epson pictures folder. Once scanned, I like to rename them so they are easier for me to find later.

This evening I needed to scan and email a document. After scanning, I wanted to rename the file from img183.jpg to something more memorable, so I right-clicked the file and selected



Rename. However, I got the message: "If you change a file name extension, the file might become unusable. Are you sure you want to change it?"

Now, if I rename a file, I can't open it. Instead, I'm asked which program I'd like to open it with. This didn't happen before, and whenever I try to rename any other JPEG files, I get the same message. I think I must have messed around with a setting somewhere. How can I rectify this?

The solution to this lies in the use of file extensions. In the case of your scanned file, img183.jpg, the '.jpg' part is the file extension. Windows uses this to determine what type of file it is and how to open it. Any installed photo viewer or editor could be configured to open .jpg files. If you haven't installed anything, it's likely to be the built-in Windows Photo Viewer that's used.

The part of the file before the dot, in this case 'img183', is designed to be descriptive so you can tell your various .jpg files apart.

By default, Windows hides the .jpg extension, so that when you rename a file you're only changing the 'descriptive' part of the name. The extension won't get changed.

Windows can alternatively be configured to show the full filename, including the .jpg extension. Now if you rename a file, you will need to ensure that you type '.jpg' at the end or you will in effect be removing the file extension and Windows will no longer know how to open it.

This is why Windows is warning you that you're about to change the file extension when you simply type in a new filename without the trailing '.jpg'.

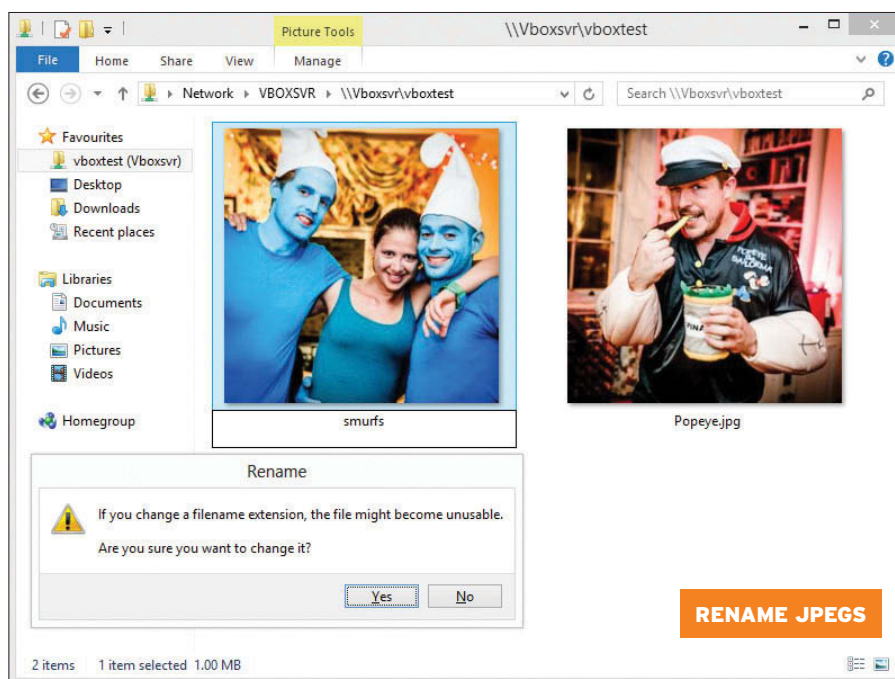
To solve your issue, you can either make sure you type '.jpg' every time you rename a JPEG file or you can reconfigure Windows Explorer to hide the file extensions and manage them for you.

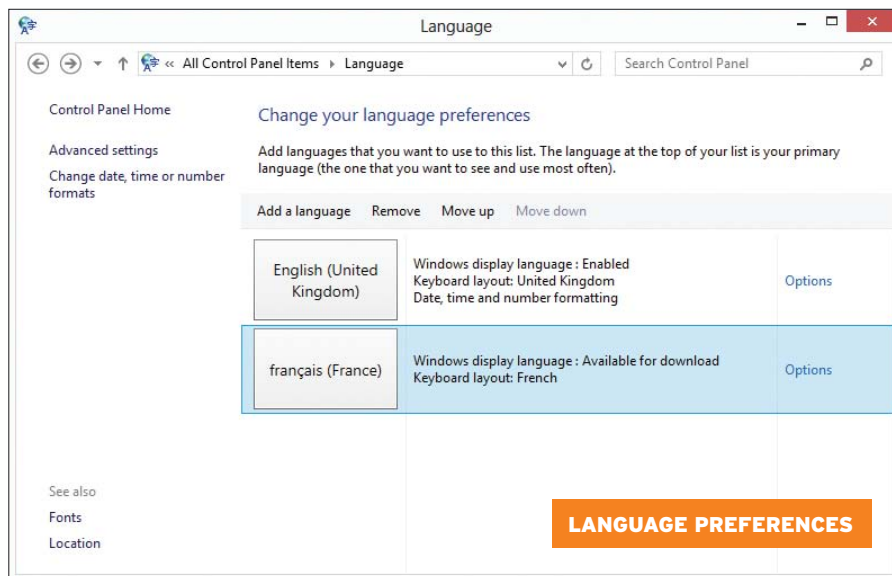
To do this in Windows 8, open up an explorer window containing some image files. Now click View from the menu along the top and then the Options icon on the right-hand-side. A Folder Options dialog will appear. Select the View tab and then tick the box marked 'Hide extensions for known file types' in the Advanced settings below. Finally, click OK and you should be able to rename your files as before.

LANGUAGE PREFERENCES

Q I want to buy a French HP Pavilion 500-27ef desktop PC with Windows 8 installed. Would I be able to change the operating system over to English (I live in France)?

This used to be difficult with previous versions of the operating system, but with Windows 8 using and installing language packs is straightforward. Open up the Control Panel and click on Language.





Under 'Change your language preferences', you'll find a list of currently installed languages and input methods.

Click 'Add a language', select English and then pick your preferred regional variant of English from the list. Now if you double-click your new language in the list, you'll be given the option to download and install the relevant language pack. Make sure you're connected to the internet and Windows will perform the necessary steps for you.

You'll need to restart Windows once the pack has been installed. Return to the Language options in the Control Panel. Click on the word 'options' next to your selected language to customise the settings. Click 'Add an input method' to select a keyboard that matches the physical keyboard layout of your PC.

Your French PC will probably come with a French Azerty keyboard, so you can either select this as your input method or purchase an English Qwerty keyboard for more convenient use in English.

Once you've installed your languages, you'll be able to switch between input methods by holding down the Windows key and pressing the Spacebar to toggle between languages. Take particular care to ensure that you have the correct keyboard input method configured or you may run into problems when typing your password to sign in.

Now you can change the order of the installed languages by using the 'Move up' and 'Move down' options. The language at the top of the list will be the system language used the next time you sign in.

If you set up more than one user on your PC, each user can have their own language settings, which are applied automatically when they sign in.

DELETE THUMBS.DB FILES

Q Since I upgraded from Windows 7 Professional to Windows 8 Pro, I've encountered problems deleting folders. Whenever I try to remove a folder, I get the message: "Cannot delete thumbs.db as it is open in another program." I haven't any applications open that could be accessing the folder, so how can I delete folders containing this file?

The thumbs.db file contains behind-the-scenes data used by Windows to maintain thumbnails of your icons and should never really be seen by the user. However, this file can often be held open by the operating system, making it impossible to delete or move folders containing a thumbs.db file. It's probably not one of your own applications that has the file open, but Windows itself. This is especially prone to happening on shared network folders.

To fix the issue, you can use the Group Policy Editor to disable the use of thumbs.db files. The policy path you need to change is 'User Configuration\Administrative Templates\Windows Components\File Explorer'. Set the policy 'Turn off the caching of thumbnails in hidden thumbs.db files' to Enabled.

To do this, press the Win+C to bring up the Windows 8 charms and then click on search. Type **group policy** into the search box and click on 'Edit group policy'. This

Continues >>

TECH JARGON BUSTER

BIOMETRIC AUTHENTICATION: This is the identification of a person based on their individual characteristics - usually physical ones, rather than relying on a person to possess a key or remember a password. Common methods include DNA matching, facial recognition and fingerprint scanning, as featured in Apple's iPhone 5s handset.

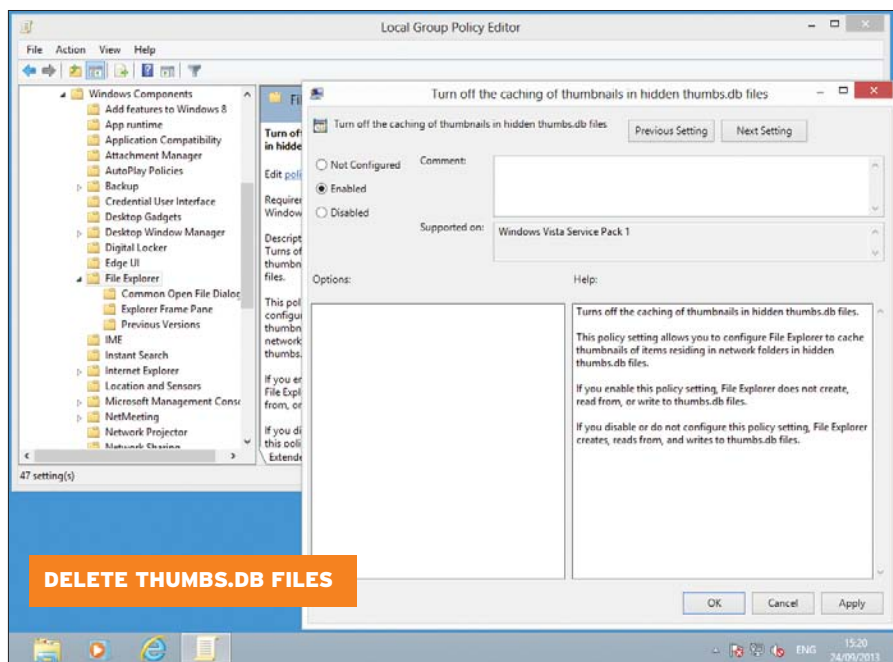
PHISHING Criminals use this technique to trick their victims into revealing information, usually passwords and account details, by posing as a legitimate request for such data. Common phishing scams include emails, supposedly from the victim's bank, asking them to click on an embedded link and verify their password, which is then sent directly to the thieves.

NET NEUTRALITY Net Neutrality is the principle that all legal traffic on the internet should be treated as equal, regardless of its content or which sites are accessed. Proponents say that this prevents ISPs from discriminating for or against certain traffic in order to gain commercial or political advantage. Some opponents say that some degree of traffic prioritisation is beneficial and can allow ISPs to fund faster connections and greater coverage.

4K VIDEO This ultra-high definition digital video standard features roughly four times the number of pixels as full HD video. The name comes from the width of the video frame, which is approximately 4,000 pixels.

sRGB Put simply, the sRGB colour space is a standard for describing colour as used in digital devices. By adhering to the sRGB standard, devices and applications can ensure that colours displayed on one device are a reasonably close match for those shown on another. However, the range of displayable colours is somewhat restricted compared to what's achievable by high-end monitors and printers.

ADOBE RGB A standard for describing colour, Adobe RGB colour space is primarily used by professionals. It encompasses a greater range of colours than sRGB and is capable of describing more of the colours achievable by printers, but can only be displayed by specialist 'wide-gamut' monitors.



will launch the Local Group Policy Editor. Navigate to the above policy entry and double-click it.

Set it to Enabled and click OK. Windows will stop using thumbs.db files to cache thumbnail data. Thumbnails will, however, still cache correctly, as the thumbs.db method is there to retain compatibility with some old programs which needed it. If you encounter any problems, you can re-enable the thumbs.db files by reversing the process above.

If disabling the thumbs.db files causes incompatibilities for you, then enter the Folder Options from the Appearance and Personalization section of the Control Panel. In here, select the View tab and turn off the option marked 'Display file icon on thumbnails'. Click OK and this should enable you to delete the folder and any thumbs.db file within.

SYNCING MOVIES

Q How can I transfer videos from my iPhone to my Windows laptop? Photo Stream only syncs photos.

If you use iCloud to back up your iPhone or iPad, videos will be backed up. However, there's no way to access those videos directly - they are merely restored if you ever need to call on the backup.

Photo Stream contains photos, but not videos. You can either connect your iPhone to your computer with a USB cable, then use Windows Explorer to browse through the DCIM folder, copying all the videos manually.

However, you can automate the process with the Dropbox iOS app (free, tinyurl.com/cel9cre) to upload photos and videos to your Dropbox account. These will then be synced to your laptop, assuming you've installed Dropbox on that too. Sign up for a free 2GB account at dropbox.com. ☒

For more PC help go to:
pcadvisor.co.uk/helproom



SEARCH THE
PC ADVISOR FREE
ONLINE HELPROOM

The PC Advisor online Helproom contains an indispensable database of answers to common questions regarding all aspects of PC problems. This ranges from general Windows issues to problems with specific apps, and covers all types of PC hardware and software, including system components and peripherals.

Alternatively, you can ask for help from the experts on our online forums. Sign up to be a registered user - which is free - and then browse to one of the discussion forums. In the Helproom your first stop should be the searchable database of frequently asked and previously answered queries. With more than 1.5 million forum posts, you'll almost certainly find your answer in this archive of queries - just enter a few keywords.

If our online database can't solve your problem, try posting a question in the Helproom forum, where more than 200 queries are answered every day. The forum is manned by our team of Helproom Angels, who are ready and willing to lend a hand with anything from system crashes to virus alerts.

helproom@pcadvisor.co.uk
pcadvisor.co.uk/helproom

CONTACT US



Email your Helproom questions to helproom@pcadvisor.co.uk. Please use 'Helproom' as the subject header and give your full name, the operating system you're using and other product details. We will let you know by email if your query has been selected for inclusion in these pages. If your query is urgent, you may find it useful to visit our forum at pcadvisor.co.uk/helproom.

Helproom aims to give you the best assistance possible. But, given the

limitations of this type of advice, we can't guarantee what we say will work and we can't accept responsibility for any damage arising as a result.

Always back up your system before you make any changes, including software installations.

Please note that we are unable to respond to letters or telephone requests, but we will endeavour to answer queries submitted by email or via our Helproom forum.

Call premium-rate numbers free from a mobile



Avoid incurring expensive call charges with Chris Martin's handy guide to dialling premium-rate numbers from your iPhone or Android smartphone

You might have a smartphone call plan with unlimited minutes, but that's unlikely to include premium-rate numbers. And if you think the charges for calling these numbers from your landline are bad enough, don't even try it with a mobile.

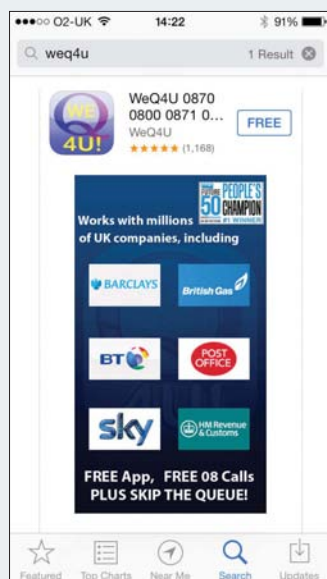
Mobile networks tend to charge excessive amounts for calling these numbers, although Giffgaff (giffgaff.com) at least allows you to call 0800, 0808 and 0500 number for free. That typically costs 30p per minute, so a half-hour call to Ikea's customer service will set you back £9.

Fortunately, there is a way to call otherwise chargeable numbers without it costing you a penny. Here's how it works.



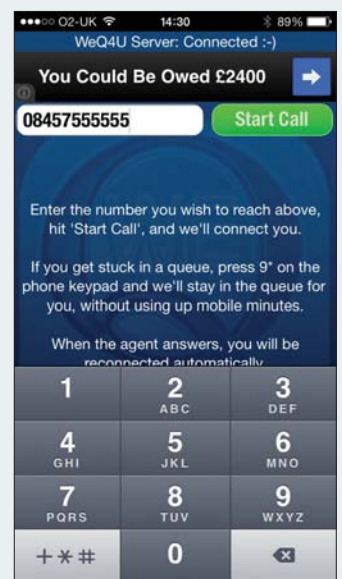
START

If you have an Android smartphone or iPhone, head to Google Play or the App Store and search for WeQ4U. This ad-supported app is free to download. WeQ4U can offer you free calls to 0870, 0800, 0808 and 0500 numbers by routing the call through an 03 number, which is covered by the free minutes in your tariff. Other 08 numbers, including 0845, are re-dialled using an alternative number sourced from a database such as that found at saynoto0870.com.



2

When you dial a number beginning 08 an Android phone will automatically pre-dial an 03 access number. This means you don't even have to open the WeQ4U app. However, iPhone users will have to open the app to dial the number, then tap the Start Call button.



3

The app will start the call and you'll hear a message from WeQ4U about queuing. Your phone's dialling screen will be visible, so you can still key in responses to automated systems. If you do find you're stuck waiting in a queue to talk to someone, simply tap 9* on the onscreen keypad and the app will notify you when an operator has picked up your call.



4

If you're not an Android or iPhone user you can still use the service. Just dial 03335 432 111 (better still, add the number as a contact in your address book), followed by the premium-rate number you need to call. ☒



Send group messages

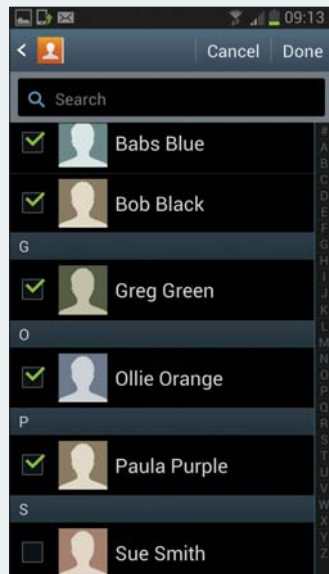


Sending group texts not only saves time, but ensures that everyone is kept in the loop. Sandra Vogel explains how to do this on an Android and iOS smartphone

SMS is a great way to keep in touch. It's fast, efficient and personal. A lot of the time, we send texts to just one person, but there are occasions when it's quicker to message a group of contacts. You can tell your whole book club about the next read, for example, or make plans to meet up with friends. Groups members can chat with each other, too, so that any changes to arrangements are shared with everyone.

You can, of course, use third-party apps such as WhatsApp to send group messages, but some smartphones can handle texts without any help. Here we explain how to send group texts on a Samsung Galaxy S III running Android and an iPhone with iOS 7.

4 To add people to the group, select them from your contacts list. On a Samsung Galaxy S III, tap the group, then the Add Contact button and choose members from your full contact list.



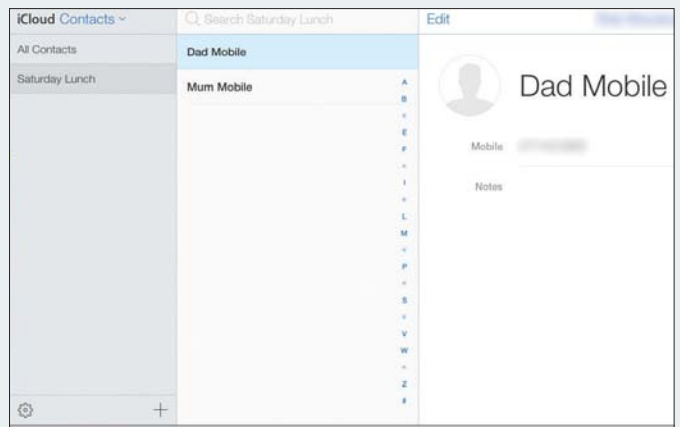
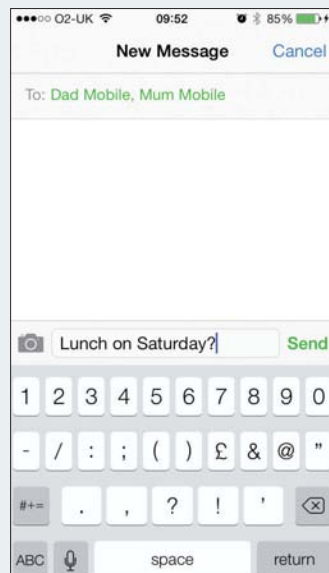
START In Android, a good way to manage group texts is to set up a contacts group. First, tap Contacts on the home screen.



5 Next, go to the messaging app, tap the Contacts icon, pick your group and then either Select All or make specific choices for a subset. When you're finished, tap Done. You'll return to the messaging app where you can add more recipients, or type and send your message.

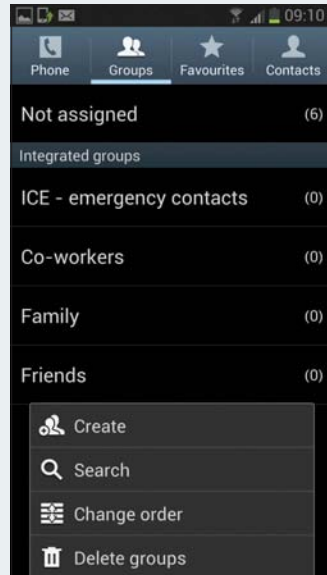


8 Type out your text and then send the message when you're ready. Each group member will see it and be able to chat with each other.

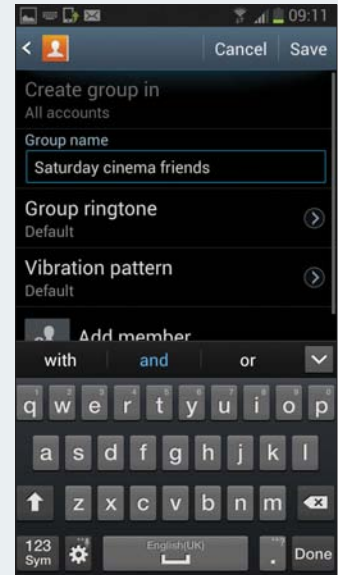


9 To make things easier, you can create a group of contacts. To do this you'll need to go to your iCloud account. Log in, then in iCloud Contacts, click the '+' button on the bottom-left of the screen and select New Group. Give it a name and hit Return. Next, click All Contacts and drag one or more of these to your group.

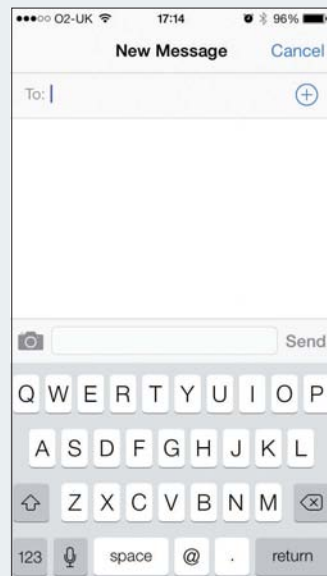
2 Next, tap Groups. Depending on the version of Android you are running, and which phone you own, you'll either have an Add Groups option or you'll need to tap the Menu to call up a Create Groups option.



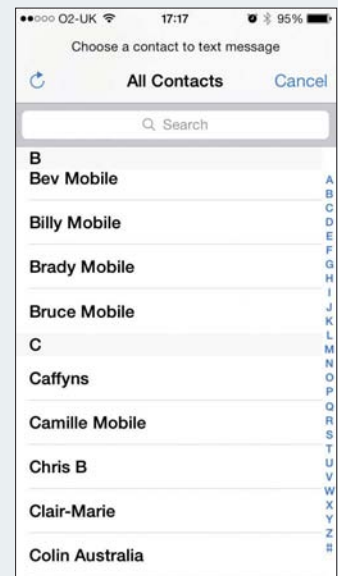
3 Your group needs a meaningful name, such as PCA Softball team. Once you've added this, tap Save.



6 On the iPhone, there's no option to group contacts (even in iOS 7), so you'll need to create groups in the Messages app. To get started, open this.



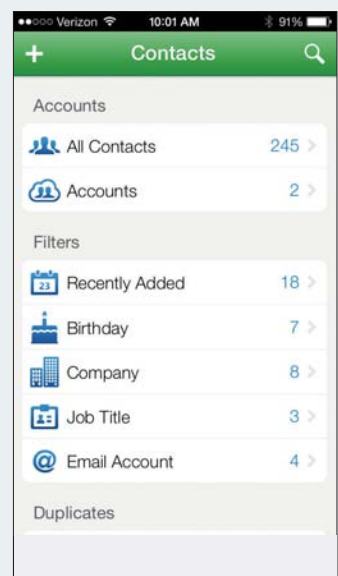
7 Tap the small '+' icon to the right of the To field and you'll be taken to all your contacts. To add one to a group, tap their name. If you've got lots of contacts, use the Search box to find who you are looking for.



10 This will sync to your iPhone, but you'll need to ensure iCloud is enabled (go to Settings, iCloud to check). Create a new message and press '+'. Click Groups and then select one. Press Done and you'll be shown a list of contacts within that group. Unfortunately, there's no Select All option. Click one and then the '+' icon. You'll be taken back to your group. Tap the next contact in the list and continue until each group member has been added. Finally, type your message and press Send.



11 Third-party apps such as Text 2 Group (69p, tinyurl.com/q4dvqf5) and Easy Group (free, tinyurl.com/nhecop5) are the only way to get around iOS' limitations, and allow you to create groups on your iPhone, as well as send texts to groups with minimal hassle. ☒



Turn on Windows Defender in Windows 7 and 8



It's more important than ever you ensure your PC is protected. Jim Martin explains how to ensure Microsoft's antispware and antimalware tool is working

Microsoft acknowledged the growing threat of spyware with the launch of Windows Defender a few years ago. It's available for Windows XP through to Windows 7. In Windows 8, which is the most secure version of the operating system so far, Microsoft provided an enhanced version of Defender, which also protects against malware – effectively rolling Security Essentials (Microsoft's free antivirus program) and Defender into one.

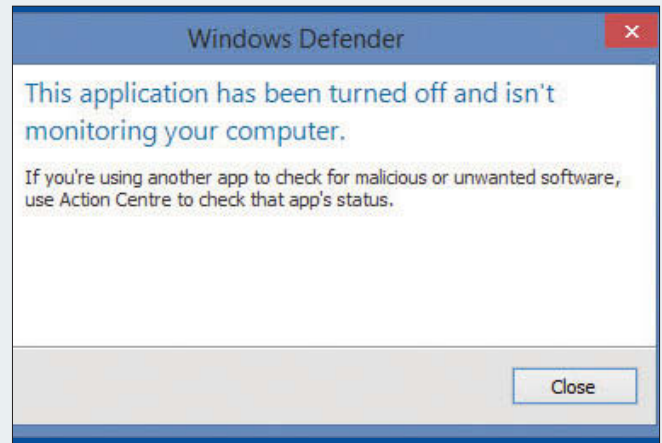
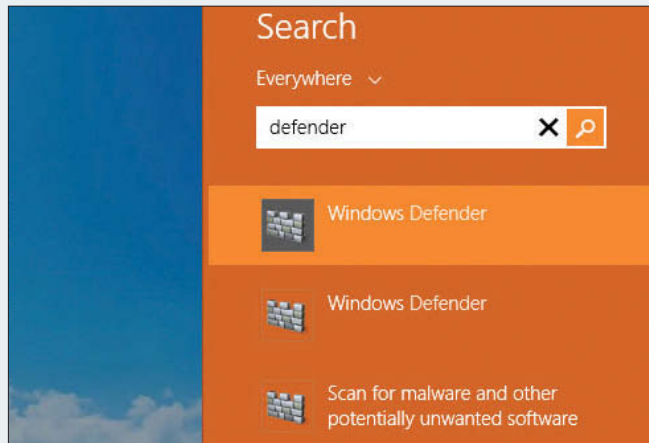
This rubbed all the security software companies up the wrong way, so Microsoft provided an option to turn off Defender when a trial version of a security suite was installed on a new PC or laptop – it's bad practice to run more than one antimalware

engine at the same time. They will probably conflict with each other, which can cause severe performance problems.

However, should you decide not to activate that McAfee or Norton trial, Defender won't automatically re-enable itself again, so you're left unprotected from the viruses, Trojans and other nasties that could play havoc with your system, and even leave you out of pocket.

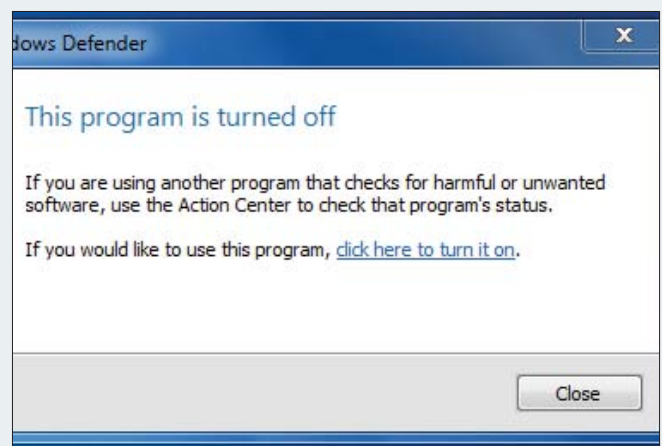
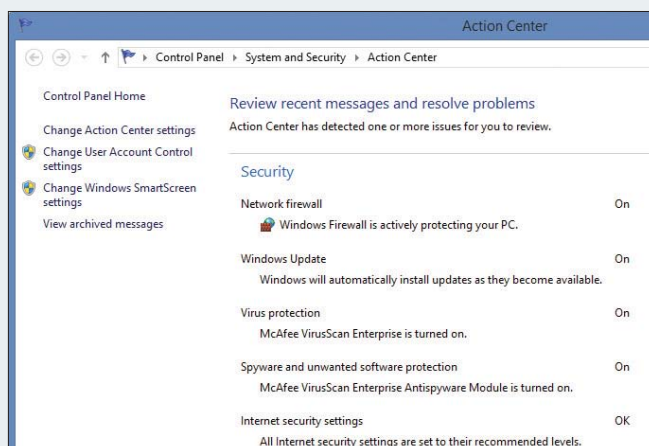
It's easy enough to check whether Defender is running: look for its icon in the Notification area (the space to the left of the clock to the right of the Taskbar). It might be in the list of hidden icons, so click the little upward-pointing arrow and look for a castle icon.

Don't worry if you can't find it – it may still be running, or your computer might already be running other security software that's doing a similar job. However, if you're still not sure, or you know your computer definitely doesn't have an antivirus program or security suite, here's how to enable Windows Defender.



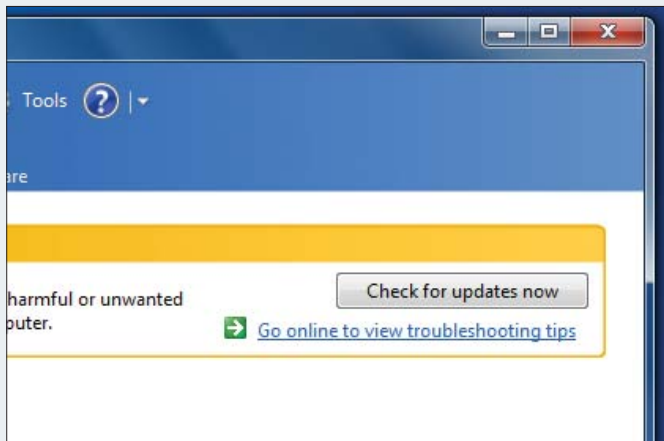
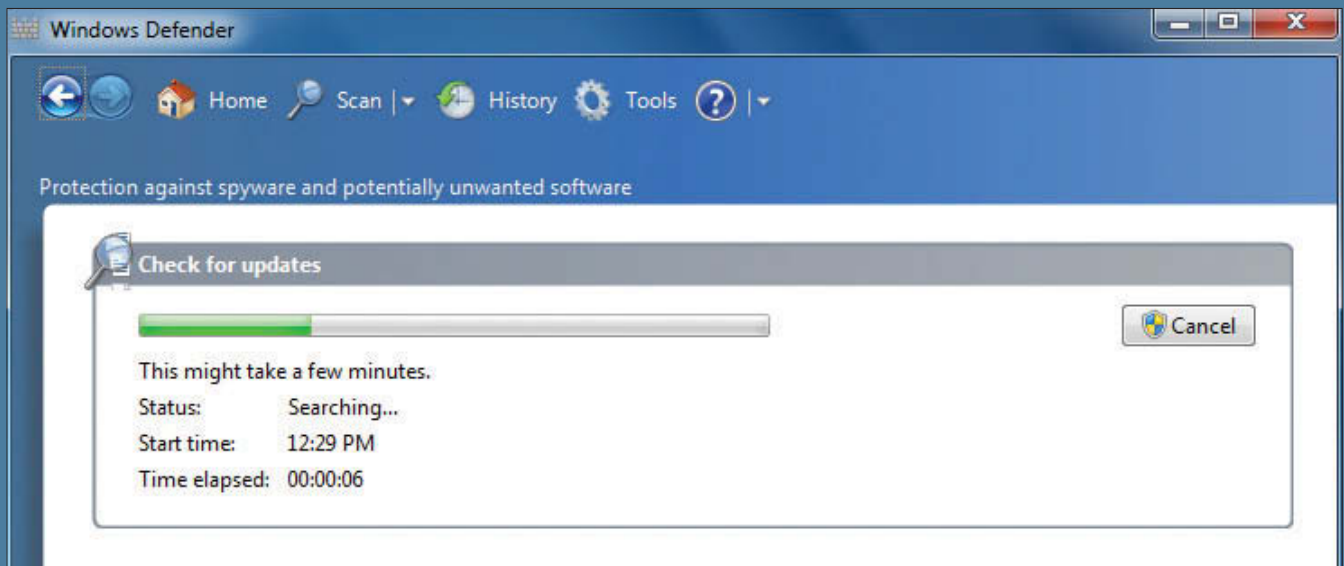
1 In the Start menu (or on Windows 8's start screen), type Defender. Windows Defender should appear in the list. Click on it to launch the program. If it's already running and you see the main window, skip to Step 5.

2 You might see a message like the one above, showing that Defender is turned off and isn't protecting your computer. If so, search for Action Center in the Start menu (or screen if you are using Windows 8) and run that.

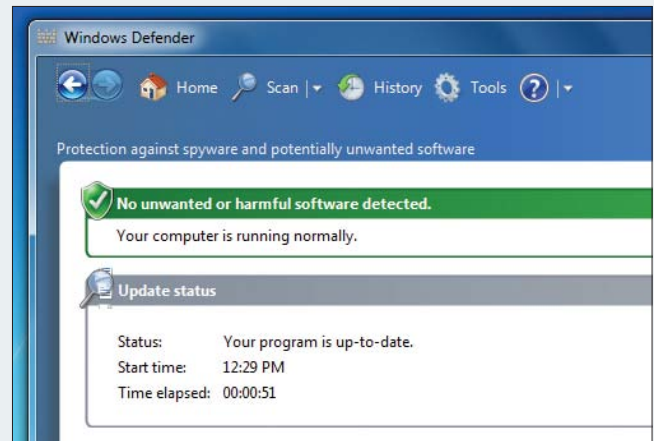


3 In Action Center, click the Security tab to check which program is handling spyware and unwanted software protection. To enable Defender in place of another suite such as McAfee, use the Control Panel to uninstall that first.

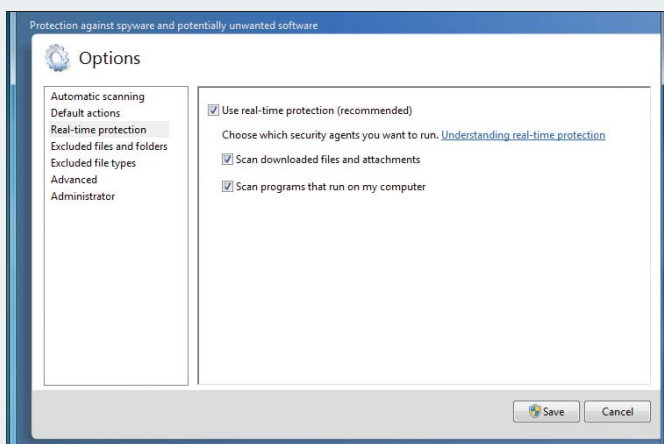
4 Once the program has uninstalled, you'll need to type Defender again in the Start menu and, if it's turned off, the above message will appear along with a link to turn it on. Click this to switch on Windows Defender.



5 Assuming your computer isn't protected, the Windows Defender main window will open on the desktop. Chances are, the spyware definitions will be out of date, so now's the time to update them. Click the Check for updates now button.



6 When that's done, you should see a nice green bar showing that Defender is up to date and protecting your computer.



7 Click the Tools link at the top, and then on Real-time protection in the left pane. Check that it's enabled and then choose options for scanning downloads, attachments and programs that run on the computer. We advise enabling all the options here.



8 As mentioned at the beginning, in versions of Windows prior to 8, Windows Defender does not scan for viruses, so ensure that your computer has some antivirus software installed. Check our antivirus reviews at pcadvisor.co.uk for recommendations. ☒

Format a hard drive



If your PC has been unlucky enough to contract a virus, you might want to reformat it. Jim Martin explains how to wipe your disk clean in Windows

There are many reasons why you might want to format a hard drive, including a clean installation of Windows to get rid of a virus or malware, because you're giving the drive to someone else, or throwing it away.

Here, we'll explain everything you need to know to get the job done properly. What you'll need to format the hard drive depends on a few things, such as whether it's your only hard disk and if you have a spare PC or not.

You can't, for example, format the hard drive on which Windows is running. In order to format the disk and reinstall Windows (or another operating system), you'll need to boot your computer from a Windows installation disc, a USB flash drive or another bootable disc.

Formatting is the process of deleting all the data on the hard drive, but beware of 'Quick Format', which leaves all your data in place and makes the drive appear to be empty. A quick format is okay if you have a brand new hard drive, or you want to reinstall Windows, but not if you're disposing of the disk.

A word of warning: make sure you have successfully backed up any photos, videos, music and other documents from your drive before you format it. Although files can be recovered in some situations, prevention is always better than cure.



Partitions

It's important to understand about partitions before you start. A hard drive's storage can be divided up into smaller sections, called partitions. It's possible to format one partition while leaving the others untouched. While that's useful in certain situations, if you want to format the entire hard drive and use the entire capacity in one block, you'll also need to delete the partition information.

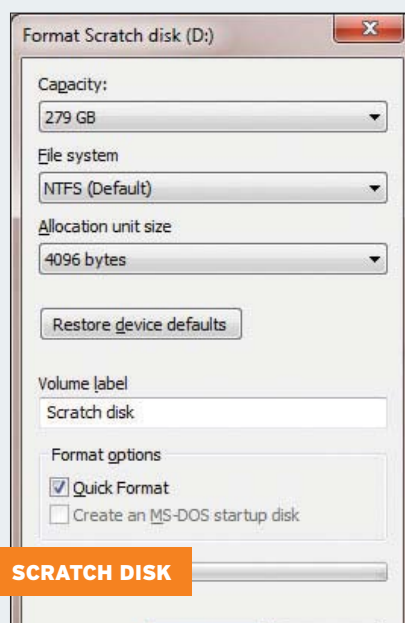


Quick format

Windows Vista, 7 and 8 have a built-in Disk Management tool (see far top-right), but the fastest way to format a hard drive is to click the Start button, then Computer and right-click on the hard drive you want to wipe (you can't format the drive on which Windows is running for obvious reasons). Choose Format... from the menu and a new window will appear with a few formatting options.

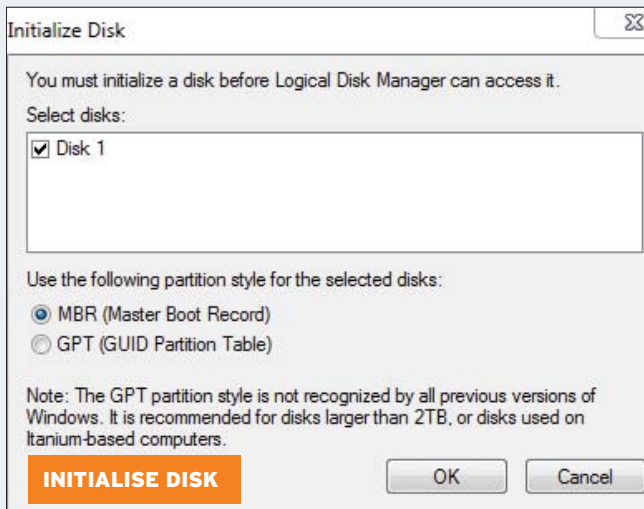
By default Quick Format is checked, and you can choose the file system and allocation unit size, as well as changing the volume

label (the drive's name). Typically, you can leave all settings unchanged and click the Start button. In under a minute your hard drive will be formatted. You should choose NTFS as the file system if it isn't already selected for Windows Vista, 7 or 8.



Windows' Disk Management

Type **diskmgmt.msc** into the search box in Vista or Windows 7 and then click on the only result that appears in the menu above, with the same

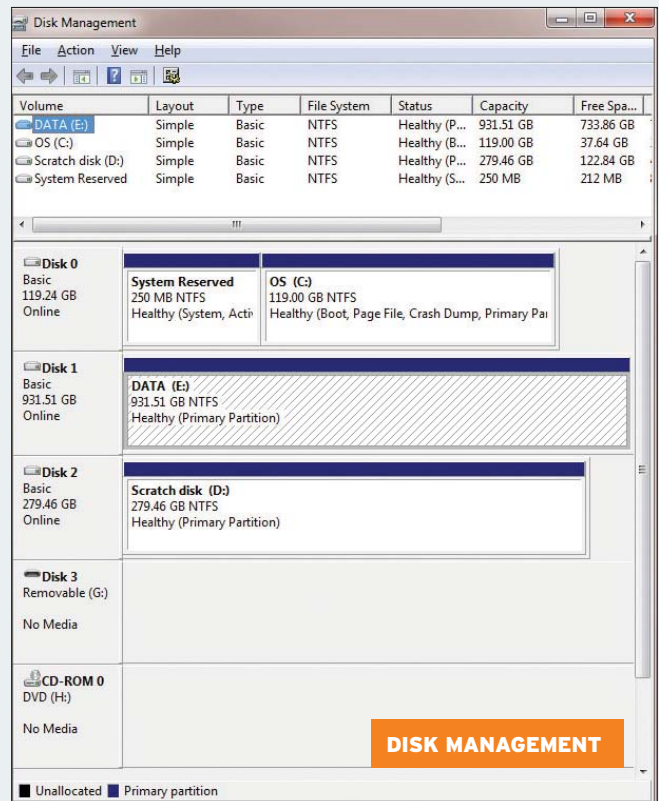


name. This is the easiest way to launch Disk Management, but you'll also find it in the Control Panel if you search for 'disk' or look under the Administrative tools section, where it's called 'Create and format hard disk partitions'.

Disk Management isn't as powerful as a standalone partition management tool, but it's still useful. When you install a new (additional) hard drive in your PC, you might wonder why it doesn't appear in Windows Explorer. The reason is because it needs to be initialised and formatted - you can do this in Disk Management.

When the tool loads, it will analyse all your computer's drives and will prompt you to initialise a new disk that it finds. If your disk is larger than 2TB, you should opt for GPT (GUID Partition Table). This setting also lets you create more than four partitions.

If you don't see a prompt, look in the list of drives and you should see one that says 'Not Initialized'. Right-click on it and choose Initialize Disk. Once that's done, right-click in the hatched Unallocated space and select New Simple Volume. Follow the instructions, choosing how big you want the partition to be (in MB - 1024MB = 1GB), and which drive letter you want (one will be chosen, but you can opt to change it if you wish).



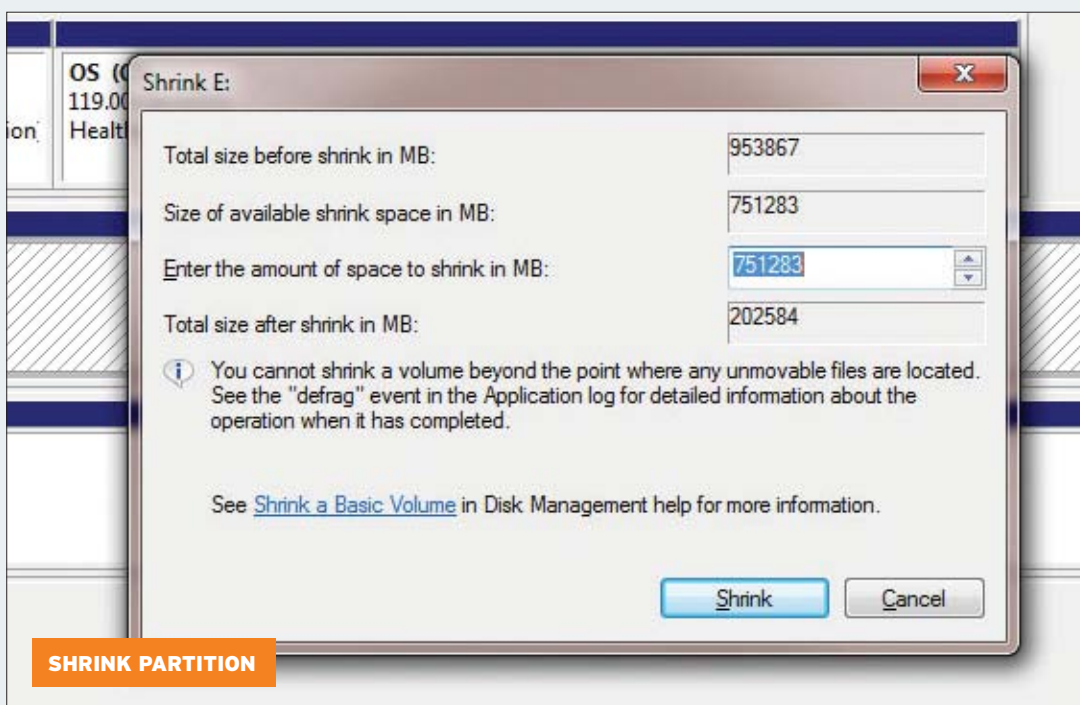
When you come to format the partition, our advice is the same as in the Quick Format section. If you select a size for the partition that's smaller than the total capacity of the drive, say 500GB on a 1TB drive, you'll end up with some unallocated space on the drive that you can format by repeating the process you've just completed.

Changing a partition's size

You can use Disk Management to expand or shrink a partition. Right-click on one and choose the appropriate option from the menu that appears. If shrinking, the partition will be checked to find

out how much empty space it contains.

It's a little confusing as the numbers are displayed in MB rather than GB, but you can adjust the amount of space to shrink and the 'Total size after shrink' will be updated. You can't shrink a partition beyond the point where files are located - you may be able to free up space by defragmenting the drive first. Conversely, you can only expand a partition if there's unused space on the drive. If not, the option will be greyed out. ☒



Windows Phone updates



Chris Martin explains how to check if a software update is available for your Windows Phone 7 or 8 handset, and how to automatically download and install it

As with other mobile operating systems, Microsoft releases Windows Phone software updates to bring new features, improve performance and fix bugs. You'll want to download and install this to get the most benefit from your handset.

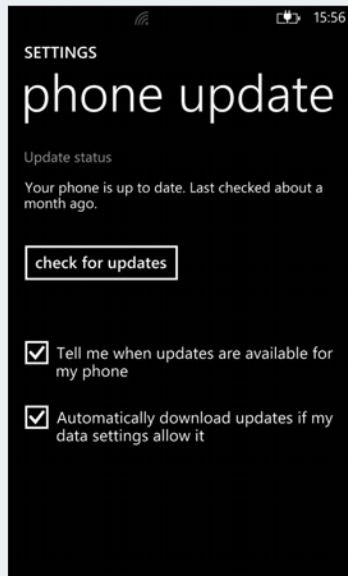
It's possible to download updates automatically, check for updates manually, and then install them. Here's how to download Windows Phone updates automatically. We'll use a Windows Phone 8 here, but the process is similar for WP7.

START

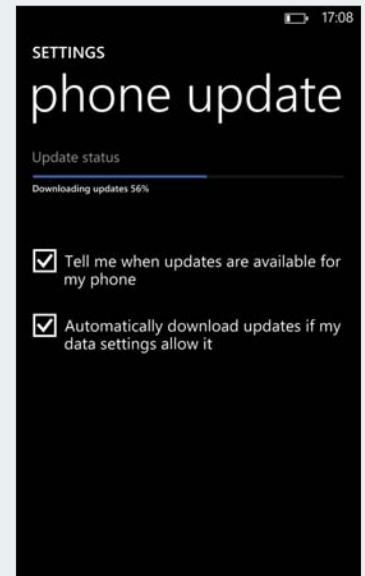
Head to the App list (a swipe away from the Start screen) and tap Settings. Now tap Phone update.



2 Tap the 'Automatically download updates if my data settings allow it' tick box. Updates won't be downloaded if Data Sense or Battery Saver apply limits on how your phone uses data.



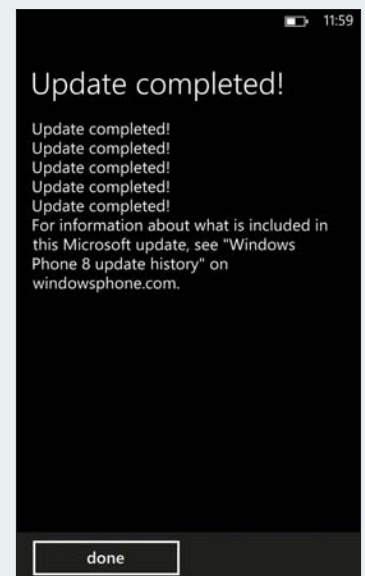
3 To check manually if an update is available, tap the Check for updates button. This can take several minutes, and if you've ticked automatically download updates, the process will start if a new version is found. Bear in mind that, even if you think an update should be available, it may be that it isn't yet for your specific phone, mobile provider or country.



4 Whether you've downloaded an update automatically or found one manually, it's the same process to install it. First, if there isn't enough battery power, connect your charger. Once there's enough power - and free storage space - the update will ask if you want to Install or Postpone.



5 Your Windows Phone will restart, and then install the update. If there are several updates, your phone may restart several times, and be unusable for five to 10 minutes. Tap Done when it's finished; your handset may restart one last time before it's ready to use. ☑



Webcam self-portraits



Take photos using your laptop or desktop PC's built-in webcam. Jim Martin explains how to capture and share fun pictures for free

Most smartphones, tablets and laptops come with a built-in webcam, but these aren't useful only for conducting video chats over Skype or other VoIP services. You can also use a webcam to take a quick snap - perhaps a self-portrait to update your Facebook, Twitter or Google+ avatar.

Your laptop might have been preinstalled with software that is able to use the webcam as a stills camera (search the Start menu for camera, webcam or the manufacturer's name to find an appropriate utility), but you can also use a handy online service. In the following workshop we'll show you how to use webcamtoy.com to take self-portraits from your webcam.



START

We're using Google Chrome here, but you can use any web browser to access Webcam Toy. In your browser of choice head to webcamtoy.com and click the pink 'Ready? Smile' button to get started.

Please press the button to access your camera:

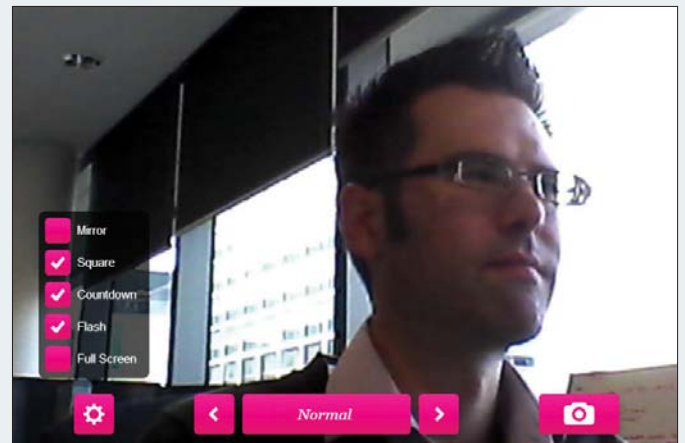


Use my camera!

Webcam Toy respects your [privacy](#).
Photos are **not** stored online unless you choose to share them.

2

Click the 'Use my camera' button to grant permission for the site to access your camera. No photos are saved or stored online unless you choose to share them. You might see another button asking for permission in your browser's top or bottom bar.



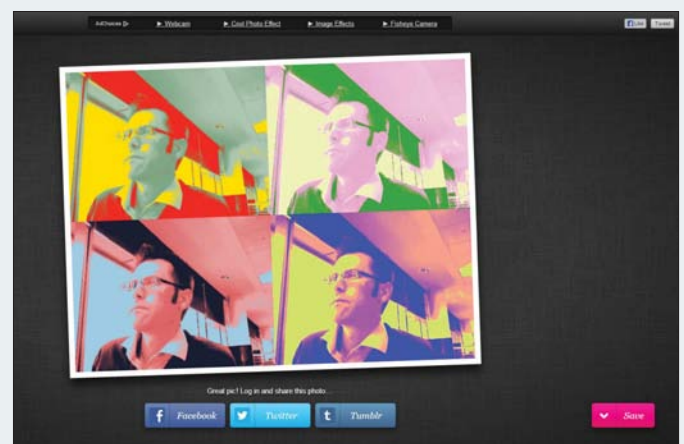
3

You'll see a live preview from your webcam. Click the cog to choose options. By default there's a countdown timer after you click the shutter button.



4

Using the arrows in the middle you can scroll through the available effects, including the obligatory set of Instagram-style filters, distortion and mirror effects.



5

Click the camera button to take the photo and, if you like the shot, click the Save button to immediately download it to your PC. Alternatively click any of the social buttons to share the photo.

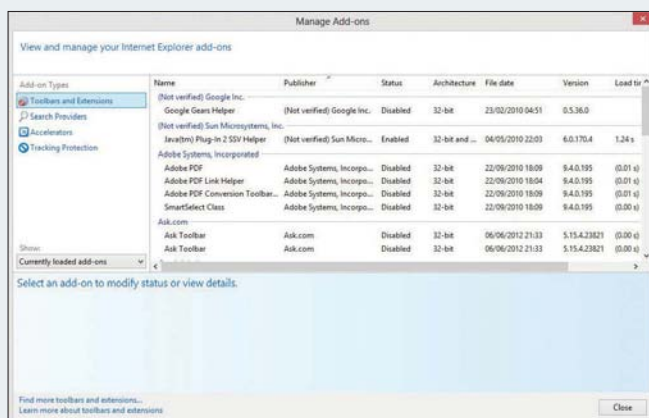
Remove annoying web browser toolbars



Web-browser toolbars are all too easily installed on the back of other apps. Some are useful; others infuriating. Matt Egan explains how to get rid of them

Browser toolbars can often be useful, and there are occasions when you might purposefully install one. However, it's far more likely that a browser toolbar will have piggybacked its way on to your machine on the back of another app installation. And now it pops up every time you go online. It's incredibly annoying.

Here we show you how to banish Babylon Search and other such pesky add-ons. The good news is they are as easy to remove as they are to accidentally install.



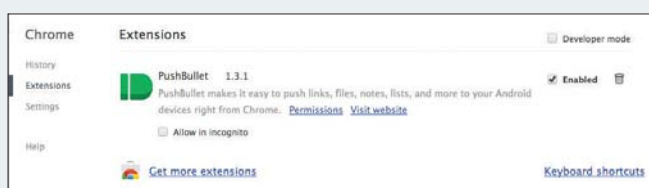
Internet Explorer

Open Internet Explorer. Click the cog wheel at the top-right and select Manage add-ons. By default the Toolbars and Extensions tab is displayed; locate the unwanted toolbar and click the trash icon.



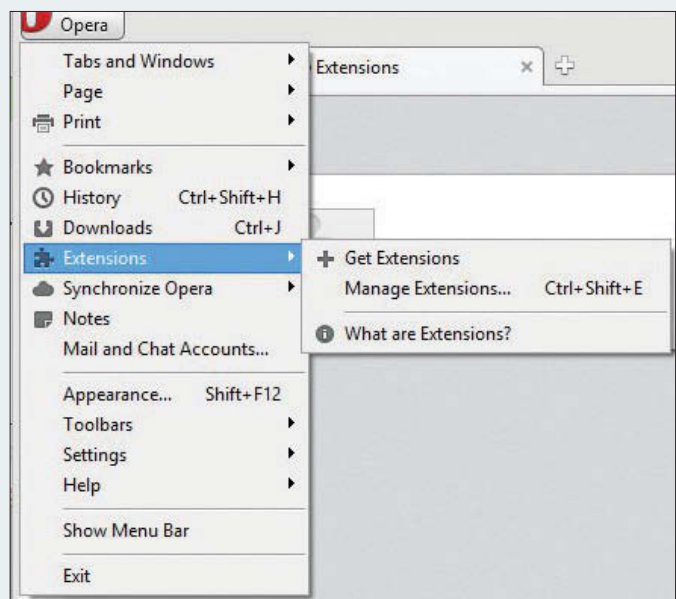
Mozilla Firefox

Open Mozilla Firefox. From the menu bar select Add-ons. Browse the Extensions and Plugin lists for any unwanted toolbars, then simply click Disable or Remove to prevent them popping up and bothering you.



Google Chrome

Open Chrome. Click the icon in the top-right corner of the window that looks either like a spanner or three horizontal lines. Select Settings, Extensions, then disable or delete the unwanted toolbars. You can also find this option via Tools, Extensions.



Opera

Open Opera. Click the Opera icon in the top-left corner, then select Extensions, Manage Extensions. Find and delete any toolbars you don't want to use. Be sure to restart the browser for the changes to take effect.

Worst offender: Babylon Search

Babylon Search is a toolbar that is installed with your permission, but which then takes control of your web browser and makes it act in a way to which you are not familiar. It probably changed your home page to Babylon's own, and made your default search engine the Babylon search engine. And you'll find a new search toolbar installed in your web-browsing software.

Let's be honest about Babylon Search's toolbar: it does things you don't like with your browser, and you didn't expect to install it. We'll show you how to rid your PC of Babylon Search, but first let's examine how you ended up with Babylon Search on your machine to help prevent reinfection.

Why is it on my PC?

Babylon Search may be legitimate software by the book, but it acts like malware. There are a few ways via which Babylon Search insinuates itself on to your PC or laptop, and the chances are you didn't consciously ask for any of them.



Babylon makes lots of legitimate translation-software programs, including Babylon 9, as well as language-learning programs. There's nothing wrong with these programs, but unless you overtly select not to install the Babylon Search toolbar it will install itself.

That's easy to avoid, but Babylon doesn't stop there. In fact Babylon's chief distribution mechanism is via free third-party software installs. Whenever you install any software, particularly free software, closely check the permissions. You may be giving Babylon or another search provider such as Delta the opportunity to bury itself deep into your PC or laptop. They do this for the advertising revenue generated via search: Google is the world's biggest seller of advertising, and other software makers want a slice.

How do I get rid of it?

There are several steps to removing Babylon Search, because it insinuates itself so deeply into Windows. In essence you need to uninstall the program itself, then remove the plug-in from every browser you have installed. Finally, you need to change your browser settings to remove any changes Babylon Search has made, and then remove all cookies so that it doesn't come back. It will take a while.

We'll try to cover all browsers and provide general Windows advice, but you may find some minor differences in your install. No matter, you should be okay if you follow the basic procedure outlined above: uninstall the software, remove from browsers, change browser settings, delete cookies.

Uninstall the toolbar

The first thing to do is to uninstall Babylon from Control Panel's 'Uninstall a program' dialog. In older versions of Windows this is found under 'Uninstall or change a program'.

In Windows 8 hit Windows, Q to bring up the Search bar, then type 'Control Panel'. Select Control Panel from the resulting list and choose 'Uninstall a program'. In Windows 7 you'll find Control Panel in the Start Menu. Select 'Uninstall or change a program'.

Select and uninstall any items you find in the list that contains the word 'Babylon' in either the program name or publisher name.

Remove any add-ons

Now you need to access each web browser's preferences to remove Babylon's add-ons and extensions. You need to do this for any browsers you have installed (follow our browser-specific step-by-step guides on the previous page).

Restore your home page

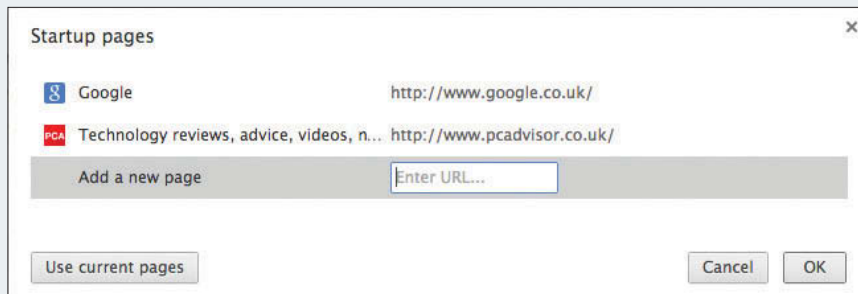
In each web browser you need to change the default home page from Babylon Search to that of your preference.

In Internet Explorer go to Tools, Internet Options, then type in the URL you want to be your home page. In Firefox go to Tools, Options. In Chrome go to Settings, On Startup. Delete any Babylon pages and type in your own desired home page. In Opera click the Opera icon and choose Settings, General, Home Page.

Change the default search engine

Now you need to remove Babylon from being your default search engine. This is a little more involved so we've written separate guides:

- Change the default search engine in Internet Explorer: tinyurl.com/k8hezqt
- Change the default search engine in Firefox: tinyurl.com/d3zo9az
- Change the default search engine in Google Chrome: tinyurl.com/m4L4nmw



Clear out your cookies

Next you need to clear your browser's cookies to stop Babylon creeping back in. You'll find this option under the security settings of each browser.

Run a virus scan

We'd also suggest running your antivirus software at this stage, perhaps even installing MalwareBytes AntiMalware to run a secondary scan (it's free and works well with other security software).

Restart your PC

Finally, restart your PC. If, on restart, you find that Babylon Search re-emerges, go through all the steps above and then delete and reinstall the browsers. ☒



Stream live TV on iPhone, iPad and Android



You don't need a television to watch live TV. Chris Martin explains how to stream TV on your iPhone, iPad or Android smartphone or tablet

Watching live TV on your smartphone or tablet is easy: all you need to do is download and install an app. BBC iPlayer and Sky Go are two such apps that support live streaming of certain content, while TVCatchup is an old favourite of ours that offers around 50 free-to-air channels. There are several alternative apps you can use to catch up on programmes, too.

Here we show you the best services for streaming live television content to your mobile device, and explain how to get that content back on to the big screen if required. We also examine some of the pitfalls of streaming live video, discuss some of the hidden costs and explain whether you need a TV Licence.



Get a live TV stream

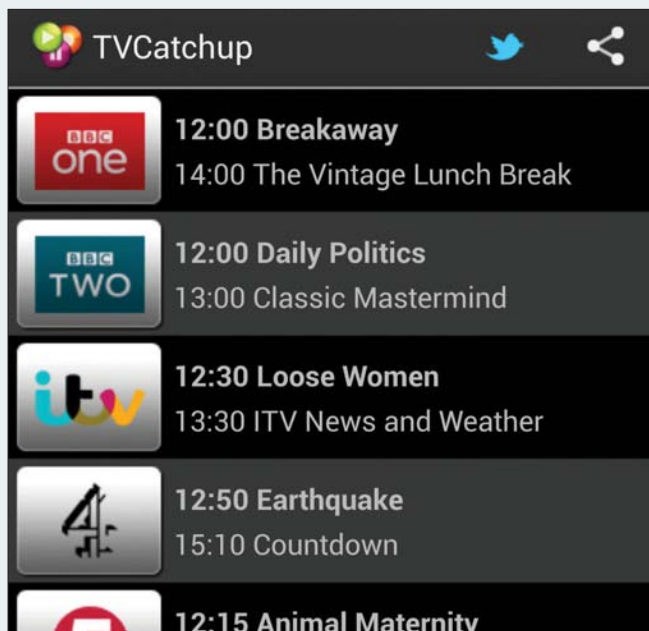
To get started streaming live television to your phone or tablet, simply visit the Google Play store or Apple's App Store. Search for and download TVCatchup (free).

In essence, TVCatchup is a free online streaming service that brings live free-to-air television content from more than 50 channels to any web-connected device.

Upon launching the app you'll see a list of the supported channels with details of the programmes showing now and next. Simply tap on a programme, skip the ad and the content will immediately begin streaming.

As has been reported in recent news, TVCatchup has been forced to remove several channels from its line-up, including ITV2, -3 and -4, E4, More4, 4 Seven, Five Star, Film Four, Four Music and CITV. You can still access a live stream of ITV1, Channel 4 and Channel 5 through the app, but only when using a Wi-Fi rather than cellular connection.

BBC iPlayer also offers live streaming of certain content. If the app isn't already installed on your device, head to Google Play or the App Store to download and install iPlayer (free).



The first time iPlayer is used on an Android device running Ice Cream Sandwich or Jelly Bean (version 4.0 or later) you will also be prompted to install BBC Media Player (also free). Tap Install to download and install the app.

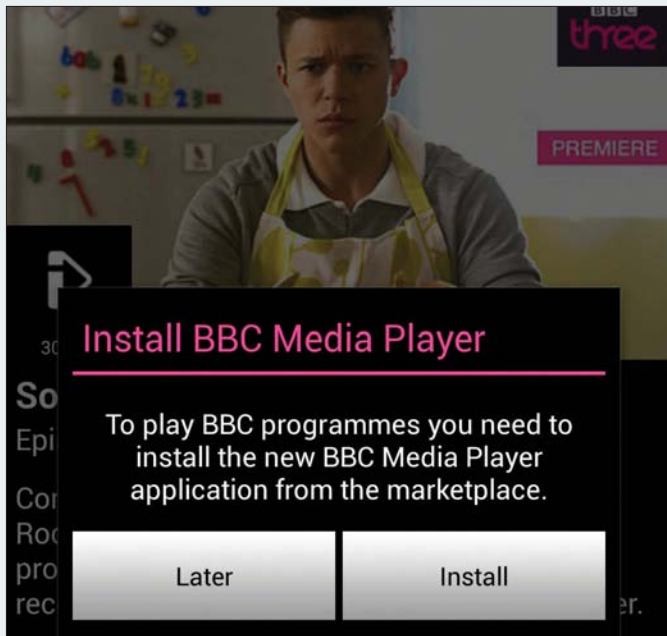
You can now use iPlayer either to stream or download catch-up content from the past seven days, or to view live programming. Open the Channels tab and select a BBC channel. You will be presented with a programme guide for up to seven days previous and two days in the future. At the top of the Today tab is what is currently being broadcasted by the BBC, denoted with a 'Live' banner. To start streaming live TV, simply tap this programme and choose Watch Now.

To start streaming live TV from Sky Go you will either need to be an existing Sky subscriber, or sign up for a Monthly Ticket, with prices starting at £15 per month for the basic Entertainment bundle and rising to £40 to also include Sky Movies and Sky Sports.

The Sky Go app is compatible with iPhones, iPads and several Android devices (you'll find a full list at tinyurl.com/qhrtggy). Download the app from Google Play or the App Store, then start streaming live content from up to 38 channels.

What's the catch?

TVCatchup, BBC iPlayer and their ilk are free to use, while Sky Go is free if you are an existing Sky customer. However, what you will pay for is the data: video streaming will quickly eat through your data allowance, and you could incur extra charges in your phone bill. Unless you have an unlimited data plan, we strongly recommend you stream live TV over Wi-Fi - this will no doubt offer a faster connection, too, unless you can access 4G connectivity.



Do I need a TV Licence?

It's important to note that a TV Licence is required for streaming live content. Watching live TV without a valid licence is a criminal offence, which can lead to prosecution, a court appearance and a fine of up to £1,000 plus legal costs.

In other words, while you don't need a licence to catch up on BBC shows broadcast earlier in the week via iPlayer, if you are using any of its live streaming services you must be covered with a TV Licence. A TV Licence is also required for TVCatchup and Sky Go.

Catch-up and on-demand services

As well as watching exactly what's on TV at any one moment, plenty of apps and services let you catch up with recently broadcast programmes on-demand.

If you've missed a show or forgotten to record it, there's a good chance you can watch it via a catch-up service. The main ones are BBC iPlayer, ITV Player, 4oD and Demand 5. Some of these, and others such as Sky Go, offer on-demand content that includes entire seasons of TV shows.

Paid-for services include Netflix, LoveFilm, Blinkbox and Sky Now TV. These either offer unlimited streaming of a huge catalogue of TV shows and films in return for a monthly fee, or the ability to rent or purchase only the content you want.

All the apps we've mentioned are available on iOS and Android and, in some cases, other mobile operating systems, too.

If you own an Amazon Kindle Fire tablet, you'll find your choice is considerably more restricted, especially when it comes to on-demand TV. LoveFilm Instant is an Amazon service, so that's no problem, and you'll find Netflix in the App Store alongside BBC iPlayer. However, there's still no app for ITV Player, nor 4oD or Demand 5.

Device compatibility

An ongoing problem with many of the streaming apps is device compatibility. Sky Go is a prime example: only a handful of Android devices are supported and the process of adding more is very slow.

On iPhone and iPad things are much simpler as these devices are prioritised by app developers (one reason it's worth paying the Apple premium). If there's no specific iPad version of an app, for example Sky Sports Mobile TV, you can always install the iPhone version and use it zoomed in to fill the screen.

When browsing the Google Play store from a PC or laptop's web browser you will be informed with which of your Android devices an app is compatible. If you're browsing the store on the device itself, incompatible apps simply won't show up in the search results.

Connecting to a larger display

Streaming live TV on a small screen wherever you are is pretty great, but sometimes you'll want to watch TV on a bigger screen. There are different ways of doing this, plus some pitfalls to be aware of.

Wired

The simplest way to connect your device to your TV or monitor is with a cable. Some Android tablets have a video output, typically micro-HDMI, although a cable is rarely included.

If there isn't an HDMI port you might be able to buy an adaptor. Many Android devices support HDMI output with a MHL adaptor. These don't cost much, but note that the connection is not universal - make sure the adaptor is compatible with your device.

In a similar way, Apple sells HDMI and VGA adaptors for the iPhone and iPad in both Lightning and older 30-pin varieties. You'll need a separate HDMI or VGA cable and the appropriate connection on your TV or monitor.

Wireless

If wires aren't your thing, you might be able to go wireless. For example, a second- or third-generation Apple TV can perform the same display-mirroring trick with an iPhone or iPad without requiring an adaptor and an HDMI cable. Apple calls this AirPlay.

On Android things are a bit more complicated. With Jelly Bean (4.2) Google introduced screen sharing via a standard known as Miracast. You'll know if your device supports this protocol by checking Settings, Display for a screen-sharing option. Look for Miracast, Wireless Display or similar.

Your TV will need to be connected to the same network as your Android device and support Miracast. Either check your manual, ask the manufacturer or search for compatible devices in the settings menu of your smartphone or tablet. If your TV doesn't have support for Wireless Display then you can buy a dongle to do the job - you'll just need a spare HDMI input.

Restrictions

Even after you've decided on a way to get the video to your TV, projector or other screen, there are some restrictions to be aware of before you shell out on expensive adaptors and accessories.

Not all streaming services and apps support video output. Sky Go, for example, blocks both types of connection to a larger display - Sky wants you to pay extra to stream to multiple screens.

It's best to check whether the apps you want to use support video output before spending any money on dedicated hardware. ☒



LETITIA
AUSTIN



ONLINE
REGISTRATION
REQUIRED

Ashampoo Movie Studio

FULL PROGRAM

Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 222\Ashampoo Movie Studio 2014 and open the file

Online registration

required: follow the links during installation before 5 Jan 2014

System requirements

Windows XP/Vista/7

Ashampoo Movie Studio includes everything you need to edit and produce home movies from start to finish in a step-by-step fashion.

- Cut, trim and convert videos
- Add background music
- Apply transition effects and text overlays
- Export to file or burn to disc
- Everything out of the box

Ashampoo Movie Studio comes with all the features you need to edit and produce your home videos.

Cut and trim your movies down to size

Shorten scenes or cut them out and get rid of unwanted commercials

Blend scenes seamlessly together with transitions

Provide a seamless movie experience with smooth transitions between scenes and add cinematic depth to your movies.

State your point with text overlays

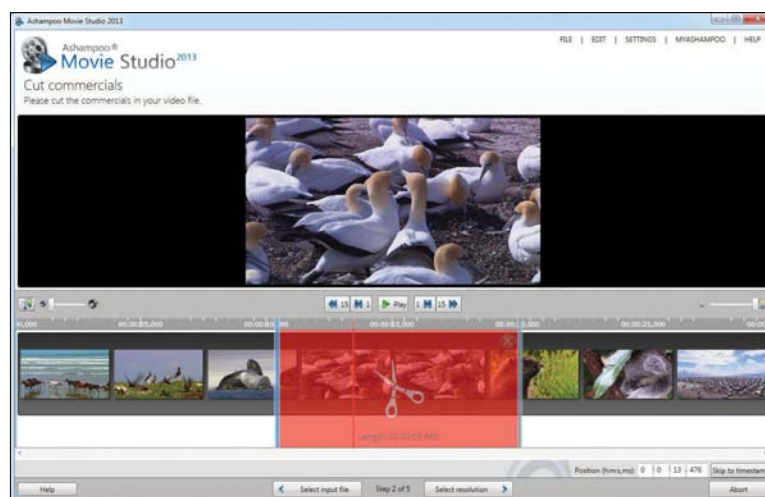
Make sure your viewers don't miss the message with scrolling- and animated texts.

Play with lights and sounds

Use fine-tuned controls to adjust brightness, contrast and saturation. Add background music and adjust volumes and playback speeds. Apply subtle effects such as Sepia to add more depth.

Produce and publish your own masterpiece

When you're done editing, create your own movie disc from within Movie Studio and share it with your friends and loved ones. ☒



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ONLINE
REGISTRATION
REQUIRED

Panda Antivirus Pro 2014

FULL PROGRAM (SIX-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 222\Panda Antivirus Pro 2014 and open the file

Online registration required: follow the links during installation before 5 Jan 2014

System requirements

300MHz processor
Windows XP/Vista/7/8;
128MB RAM (1GB recommended); 265MB drive space; Internet Explorer 6.0 or later

Essential protection, but more than a simple antivirus! Panda Antivirus Pro 2014 offers the easiest-to-use and most intuitive protection for your computer. Just install it and forget about viruses, spyware, rootkits, hackers and online fraud.

- Protection against all kinds of known and unknown threats
- Protect your communications against online fraud
- Protect your networks against hackers and intruders

Chat, share photos and videos, bank and buy online, read your favourite blogs or surf the web with total peace of mind and without interruptions.

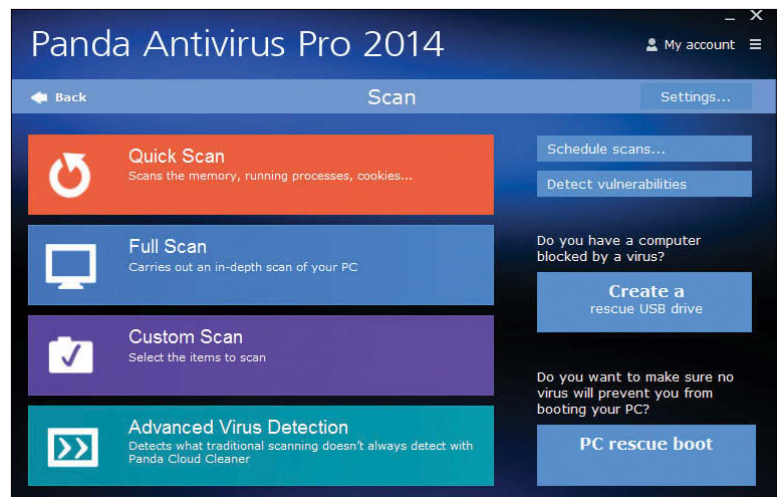
Start your computer in Safe mode and disinfect it in emergency or critical situations. Share it with anybody you want and help them clean their computers.

Panda Antivirus Pro 2014 protects thanks to a bidirectional firewall, including protecting your wireless network from intrusion or unwanted connections.

Panda Antivirus Pro 2014 also protects you against online fraud, phishing and other type of crime used by cybercriminals.

Enjoy a new, more modern and intuitive user experience in line with that of the latest operating systems.

You don't have to be an expert to use it, Panda Antivirus Pro 2014 does everything for you: install it and forget about viruses and spyware. ☒



Steganos Privacy Suite 14

FULL PROGRAM AVAILABLE ONLY ON THE DISC+

ONLINE
REGISTRATION
REQUIRED

Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 222\Steganos Privacy Suite 14 and open the file

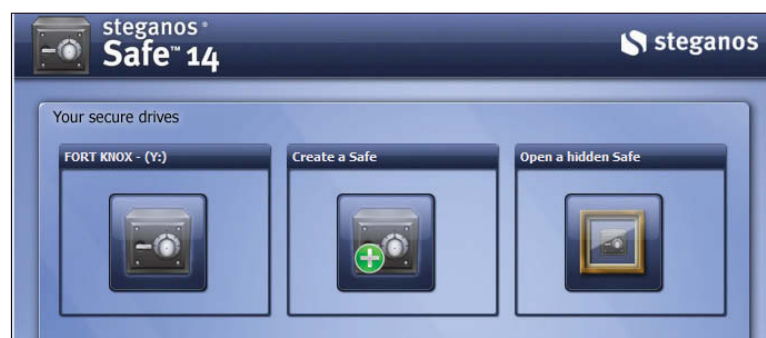
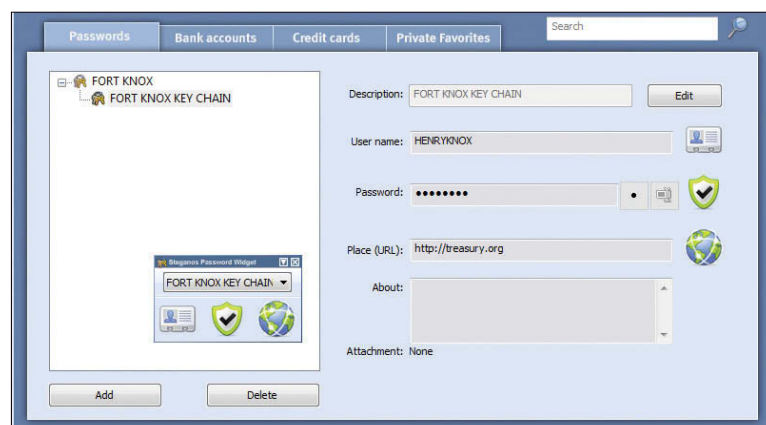
Online registration required: head to tinyurl.com/Ley3d3d before 5 Jan 2014

System requirements

Intel Pentium processor or equivalent; Windows XP/Vista/7/8; 256MB RAM; 100MB drive space; internet connection for updates

Designed for individuals who demand comprehensive privacy protection for their data and online activities, on their PCs, smartphones and USB sticks. The software's user-friendly interface and privacy tools featuring 256-bit AES encryption make it the ideal one-stop privacy solution.

- **Steganos Password Manager** safely stores all your account information and PIN codes, and helps you create secure passwords
- **Steganos Traceless Drives** lets you run any program on a temporary drive, which disappears when you turn off your PC, leaving no traces of your activity
- **Steganos Safe** enables you to create secure storage spaces up to 1TB in size for sensitive files. The safes can be hidden from view for extra protection
- **Steganos Trace Destructor** lets you customise which traces you want deleted from your browser
- **Steganos Email Encryption** enables you to send password-protected emails that only your target recipient can open and read
- **Steganos Shredder** uses military-standard techniques to eliminate all traces of data from your hard drive



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	Apple MacBook Air 13in	Apple MacBook Pro 13in Retina	Apple MacBook Air 11in	Sony Vaio Pro	Samsung Series 7 Ultra
Price	£949 inc VAT	£1,449 inc VAT	£849 inc VAT	£1,039 inc VAT	£1,000 inc VAT
Website	Apple.com/uk	Apple.com/uk	Apple.com/uk	Sony.co.uk	Samsung.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★☆	★★★★★
Features rating	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	1.3GHz Intel Core i5-4250U	2.6GHz Intel Core i5-3230M	1.3GHz Intel Core i3-5250U	1.8GHz Intel Core i7-4500U	1.8GHz Intel i5-3337U
RAM	4GB DDR3L	8GB DDR3L	4GB LPDDR3	4GB DDR3	6GB DDR3
Storage	128GB SSD	256GB SSD	128GB SSD	128GB SSD	128GB SSD
Screen size	13.3in glossy (anti-glare)	13.3in glossy (anti-glare)	11.6in glossy (anti-glare)	13.3in glossy touchscreen	13.3in glossy touch
Screen resolution	1440x900	2560x1600	1366x768	1920x1080	1920x1080
Graphics	Intel HD Graphics 5000	Intel HD Graphics 4000	Intel HD Graphics 5000	Intel HD Graphics 4400	AMD Radeon HD 8750M
Video memory	N/A	N/A	N/A	N/A	1GB
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n/ac	802.11b/g/n	802.11a/b/g/n
Ethernet	Optional	Gigabit with adaptor	Optional	None	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	2x USB 3.0	1x USB 3.0, 2x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	✓	✓ (2)	✓	x	x
DisplayPort	✓	✓	✓	x	x
HDMI	x	✓	x	✓	✓
DVI	x	x	x	x	x
VGA	x	x	x	✓	x
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam, multitouch trackpad, backlit keyboard	HD webcam, multitouch trackpad, backlit keyboard	HD webcam, multitouch trackpad, backlit keyboard	None	HD webcam
Operating system	Mac OS X 10.8 Mountain Lion	Mac OS X 10.8 Mountain Lion	Mac OS X 10.8 Mountain Lion	Windows 8 64-bit	Windows 8 64-bit
Bundled software	iLife 11	iLife 11	iLife 11	None	None
Fear (Max detail)	Not tested	29fps	Not tested	Not tested	Not tested
Battery	54Wh lithium-polymer	74Wh lithium-ion	38Wh lithium-polymer	Not specified	57Wh lithium-ion
Battery life	12 hrs 57 mins	8 hrs 44 mins	8 hrs 56 mins	6 hrs 20 mins	5 hrs
PC Mark 7 score	4602	4596	4080	4575	4889
Dimensions	325x227x4-17.5mm	313x219x19mm	300x192x17mm	322x216x17.2mm	324x224x19mm
Weight	1.35kg	1.64kg	1.08kg	1.06kg	1.65kg
Warranty	1-year return-to-base	1-year return-to-base	1-year return-to-base	2-year return-to-base	2-year return-to-base
Verdict	<ul style="list-style-type: none"> Haswell processor 802.11ac Wi-Fi support Stunning battery life Unsurpassed build Good performance 	<ul style="list-style-type: none"> Big price cut and slightly more speed Strong performance Fantastic battery life Limited future expansion 	<ul style="list-style-type: none"> Elegant lightweight design Good performance Strong on games 11.6in screen rather small Very decent battery life 	<ul style="list-style-type: none"> Strong Haswell processor Significantly lighter than the MacBook Air Wi-Fi dongle turns it into a five-device hotspot 	<ul style="list-style-type: none"> Attractive design Twin-GPUs deliver impeccable performance Battery life poor compared to latest Macs
FULL REVIEW	TINYURL.COM/KNXWZW3	TINYURL.COM/BQBSHC	TINYURL.COM/K64ZPKB	TINYURL.COM/ORTTEBA	TINYURL.COM/NV6TOOD

>> Buying advice



Ultraportable laptops

Apple's MacBook Air sets the standard for thin-and-light laptops, which are usually referred to as Ultrabooks or ultraportable laptops.

Most run fast and silent SSDs for storage, which can partly explain their higher retail price, but some manufacturers are now fitting slim 7mm hard disks.

All Ultrabooks run Intel CPUs (AMD variants are known as Slekbooks), often a low-power version identifiable by its U suffix. The 1.7GHz Intel Core i5-3317U is a popular example.






Beware of cheap glossy panels with poor contrast and colour gamut and, if possible, judge in person the screen quality and viewing angles before you buy.

Ports are limited due to space constraints, but look for built-in ethernet or dongles that allow full-size ports to be connected.

A smaller chassis means a smaller, often non-removable battery. Expect six-plus hours of life.

There's no room for an optical drive, but you can always connect an external USB version.

READ MORE: TINYURL.COM/CEAHEZK

Sub-£500 laptops					
	 1	 2	 3	 4	 5
	Dell Inspiron 14z	Lenovo Z580	HP Pavilion 14	Compaq CQ58-300sa	Acer Aspire V3-571
Price	£459 inc VAT	£490 inc VAT	£350 inc VAT	£250 inc VAT	£465 inc VAT
Website	Dell.co.uk	Saveonlaptops.co.uk	Saveonlaptops.co.uk	Saveonlaptops.co.uk	Acer.co.uk
Build rating	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆
Features rating	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆
Performance rating	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆
Value rating	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆
Overall rating	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆	★★★★★☆☆
Processor	1.9GHz Intel Core i3-3227U	2.6GHz Intel Core i5-3230M	1.8GHz Intel Core i3-3217U	1.4GHz AMD E1-1200	2.5GHz Intel Core i5-3210M
RAM	4GB DDR3	8GB DDR3	4GB DDR3	2GB DDR3	8GB DDR3
Storage	500GB HDD + 8GB SSD	1TB HDD	320GB HDD + 32GB SSD	320GB HDD	750GB HDD
Screen size	14in glossy	15.6in glossy	14in glossy	15.6in glossy	15.6in glossy
Screen resolution	1366x768	1366x768	1366x768	1366x768	1366x768
Graphics	Intel HD Graphics 4000	Intel HD 4000/GT 635M	Intel HD Graphics 4000	AMD Radeon HD 7310	Intel HD Graphics 3000
Video memory	N/A	2GB	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11a/b/g/n
Ethernet	10/100	10/100	10/100	10/100	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0, 1x USB 2.0	3x USB 3.0	1x USB 3.0, 2x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	x	x	x	x	x
HDMI	✓	✓	✓	✓	✓
DVI	x	x	x	x	x
VGA	x	✓	x	✓	✓
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	8x DVD ±RW	8x DVD ±RW	N/A	8x DVD ±RW	8x DVD ±RW
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 7 Home Prem 64-bit
Bundled software	None	None	None	None	Microsoft Office Starter
Stalker (720p)	22fps	56fps	23fps	9fps	Not tested
Battery	44Wh lithium-ion	48Wh lithium-ion	37Wh lithium-ion	47Wh lithium-ion	48Wh lithium-ion
Battery life	5 hrs 10 mins	4 hrs 45 mins	4 hrs	4 hrs 45 mins	5 hrs 18 mins
PCMark 7 score	3486	2765	2547	1094	123 WorldBench 6 points
Dimensions	347x240x21mm	376x250x33mm	347x238x21mm	376x247x33mm	380x253x33mm
Weight	1.9kg	2.65kg	1.8kg	2.3kg	2.6kg
Warranty	1-year return-to-base	1-year return-to-base	1-year return-to-base	1-year return-to-base	1-year collect-and-return
Verdict	<ul style="list-style-type: none"> • Clear 14in screen • Portable, despite DVD drive • Solid build, firm keyboard • Trackpad a little small • Good battery life 	<ul style="list-style-type: none"> • Attractive design, and good choice of colours • Comfortable keyboard • Good performance • Screen could be brighter 	<ul style="list-style-type: none"> • Good performance • 32GB SSD • Modest gaming capabilities • Sharp 14in screen • Decent speakers 	<ul style="list-style-type: none"> • Extremely low price • Modest performance • Poor for gaming • Keyboard firm, but rattles • Respectable battery life 	<ul style="list-style-type: none"> • Strong general performance • Excellent trackpad, keyboard • Reflective screen • Decent battery life • Supplies starting to dwindle
FULL REVIEW	TINYURL.COM/LV5BLHU	TINYURL.COM/MAYG5MS	TINYURL.COM/L4TSYE7	TINYURL.COM/MT67W8X	TINYURL.COM/CQKL4PD

» Buying advice



Sub-£500 laptops

Budget laptops are quick enough for most people, but economies are often made in build quality.

At the top end of the category you should find a highly capable Intel Core i-series processor. This will probably be a second-gen Sandy Bridge chip (ix-2xxx part number), but look out for a newer Ivy Bridge model (ix-3xxx).

Windows 7 and 8 run on 2GB of RAM, but 4GB or more is useful.

Hard disks are the norm at this price, with 250GB enough for most people. If you're a video hoarder look for 500GB or more.

Wi-Fi is standard, but Bluetooth is not a given at the price.

The bodywork and display are the main areas in which costs are cut. Expect creaky plastic bodies,

bendy frames and faux-metal paint jobs. Keyboards and trackpads are also likely to feel cheap and erratic.

Gloss screens hide inferior image quality. Colours are vivid, but the contrast may be poor. Check the visibility at an angle.

Some laptop manufacturers scrimp on the battery. Look for a rating of 48Wh or more.

READ MORE: TINYURL.COM/CA9EXZ6

£501-£1,000 laptops		1	2	3	4	5
		Chillblast Genesis Mini	MSI CX61	Scan 3XS LG155	PC Specialist Optimus V	Lenovo IdeaPad Z500 Touch
Price		£699 inc VAT	£675 inc VAT	£909 inc VAT	£879 inc VAT	£800 inc VAT
Website		Chillblast.com	Saveonlaptops.co.uk	3xs.scan.co.uk	Pcspecialist.co.uk	Lenovo.com/uk
Build rating		★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating		★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating		★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating		★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating		★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor		2.6GHz Intel Core i5-3230M	2.2GHz Intel Core i7-4702MQ	2.4GHz Intel Core i7-4700MQ	2.4GHz Intel Core i7-4700MQ	2.2GHz Intel Core i7-3632QM
RAM		8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage		1TB hybrid HDD	1TB HDD	1TB HDD hybrid	1TB hard drive + 120GB SSD	1TB HDD
Screen size		11.6in matt	15.6in matt	15.6in	17.3in	15.6in glossy touchscreen
Screen resolution		1366x768	1920x1080	1920x1080	1920x1080	1366x768
Graphics		GT 650M/Intel HD 4000	GT 740M/Intel HD 4600	GTX 765M/Intel HD 4600	GTX 765M/Intel HD 4600	Intel HD 4000/GT 740M
Video memory		2GB	2GB	2GB	2GB	2GB
Wireless		802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet		Gigabit	Gigabit	Gigabit	Gigabit	10/100
Bluetooth		✓	✓	✓	✓	✓
USB		2x USB 3.0, 1x USB 2.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0, 2x USB 2.0	3x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0
FireWire		x	x	x	x	x
Thunderbolt		x	x	x	x	x
DisplayPort		x	x	x	x	x
HDMI		✓	✓	✓	✓	✓
DVI		x	x	x	x	x
VGA		✓	✓	✓	✓	✓
eSATA		x	x	✓	✓	x
Media card slot		✓	✓	✓	✓	✓
Audio		Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive		N/A	BD-ROM	8x DVD ± RW	4x BD-ROM	8x DVD ± RW
Extras		Webcam	Webcam	Webcam	Webcam	Webcam
Operating system		Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit
Bundled software		None	None	None	None	None
Stalker scores		Not tested	58/39fps	68/62fps	Not tested	Not tested
Battery		48Wh lithium-ion	49Wh lithium-ion	77Wh lithium-ion	76.9Wh lithium-ion	48Wh lithium-ion
Battery life		4 hrs 45 mins	3 hrs 5 mins	4 hrs	3 hrs 29 mins	4 hrs
PCMark 7 score		4557	3241	4700	6099	3011
Dimensions		287x207x37mm	383x249x38mm	374x250x43mm	413x278x44mm	370x255x30mm
Weight		1.8kg	2.4kg	2.7kg	3.2kg	2.7kg
Warranty		2-year collect-and-return	1-year return-to-base	2-year return-to-base	3-year return-to-base	1-year return-to-base
Verdict		<ul style="list-style-type: none"> • Not quite an Ultrabook • Small but good-quality screen • Decent gaming speed • Hybrid HDD/SSD • No optical drive 	<ul style="list-style-type: none"> • Haswell processor • Low price • 15.6in matt screen is particularly good • Blu-ray drive 	<ul style="list-style-type: none"> • Strong gaming performance • Good all-round speed • Comfortable keyboard • Decent battery life • A little hefty and inelegant 	<ul style="list-style-type: none"> • Decent spec for the price • Fast • Proficient at gaming • Not the most portable • Battery life lacking 	<ul style="list-style-type: none"> • Ordinary overall speed • Decent gaming potential • Touchscreen • Display not full-HD • Not the lightest 15in laptop
FULL REVIEW		TINYURL.COM/C8E6MTK	TINYURL.COM/NXLB4E7	TINYURL.COM/KYSYQ GK	TINYURL.COM/Q5QRFJ2	TINYURL.COM/NXRQ02Q

>> Buying advice



£501-£1,000 laptops

If you're prepared to pay more than £500, you can get a laptop with a better selection of internal components, a higher-quality build, and faster performance.

Most laptops at this price have 15.6in widescreen displays, but beware of budget panels with a coarse resolution - 1366x768 pixels is wide, but creates fuzzy text and

images. Look for anti-glare matt panels rather than glossy screens.




Intel introduced its third-gen Core chips in 2012, aka Ivy Bridge, which offer integrated GPUs capable of half-decent gameplay. You'll also find 2011's Sandy Bridge chips, identifiable by a leading 2 rather than 3 on the part number.

Battery life can stretch to six hours, but don't take it as a given.

Expect at least one USB 3.0 port, which allows for faster data transfer with compatible peripherals. Gigabit ethernet is now standard, and you may find even faster ports such as eSATA or Thunderbolt at this price.

Look for 8GB of RAM, and an SSD if you don't mind offloading media files to external storage.

READ MORE: [TINYURL.COM/BUHSEAR](http://tinyurl.com/BUHSEAR)

<div> <div>£1,001+ laptops</div> <div> <div>1</div>  <div>PC ADVISOR GOLD</div> </div> <div> <div>2</div>  </div> <div> <div>3</div>  <div>PC ADVISOR RECOMMENDED</div> </div> <div> <div>4</div>  </div> <div> <div>5</div>  </div> </div>					
	Apple MacBook Pro Retina	Chillblast Messiah 17 GTX780M	Dell Precision M4700	Chillblast Genesis 8970	Samsung Series 7 Chronos
Price	£1,799 inc VAT	£1,799 inc VAT	£3,542 inc VAT	£1,259 inc VAT	£1,050 inc VAT
Website	Apple.com/uk	Chillblast.com	Dell.co.uk	Chillblast.com	Samsung.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.4GHz Intel Core i7-3630QM	2.7GHz Intel Core i7-4800MQ	2.9GHz Intel Core i7-3920XM	2.7GHz Intel Core i7-4800QM	2.4GHz Intel Core i7-3635QM
RAM	8GB DDR3L	16GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage	256GB SSD	1TB + 250GB SSD	512GB SSD	Hybrid 1TB HDD/8GB SSD	1TB HDD
Screen size	15.4in gloss	17.3in matt	15.6in matt	15.6in gloss	15.6in glossy touchscreen
Screen resolution	2880x1800	1920x1080	1920x1080	1920x1080	1920x1080
Graphics	nVidia 650M, Intel HD 4000	nVidia GeForce GTX 780M	AMD FirePro M4000	AMD Radeon HD 8970M	AMD Radeon HD 8870M
Video memory	1GB	4GB	1GB	2GB	2GB
Wireless	802.11a/b/g/n	802.11b/g/n, WiDi	802.11a/b/g/n	802.11b/g/n	802.11a/b/g/n
Ethernet	Via adaptor only	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✗	✓	✓
USB	2x USB 3.0	3x USB 3.0, 1x USB 2.0	2x USB 3.0, 2x USB 2.0	3x USB 3.0, 1x USB 2.0	2x USB 3.0, 2x USB 2.0
FireWire	✗	✗	✓	✗	✗
Thunderbolt	✓ (2)	✗	✗	✗	✗
DisplayPort	✓	✓	✗	✓	✗
HDMI	✓	✓	✓	✓	✓
DVI	✗	✗	✗	✓	✗
VGA	✗	✗	✗	✗	✓
eSATA	✗	✓	✓	✓	✗
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, Toslink out	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	BD-RE	N/A	6x BD-ROM/DVD±RW	N/A
Extras	HD webcam, multitouch trackpad, backlit keyboard	2.1Mp webcam	HD webcam	Webcam	Webcam
Operating system	Mac OS X 10.7.4 Lion	Windows 8 64-bit	Windows 7 Ultimate 64-bit	Windows 7 Home Prem 64-bit	Windows 8 64-bit
Bundled software	iLife 11	None	None	None	None
Stalker scores	Not tested	64.3/63.8fps	93.4fps/not tested	Not tested	71/59fps
Battery	99Wh lithium-polymer	77Wh lithium-ion	97Wh lithium-ion	76.9Wh lithium-ion	91Wh lithium-ion
Battery life	Not tested	4 hrs 15 mins	6 hours	Not tested	7 hrs 10 mins
PCMark7 score	Not tested	6316	5300	Not tested	4742
Dimensions	359x247x18mm	412x276x55mm	376x256x36.5mm	376x256x43mm	376x250x23mm
Weight	2kg	3.9kg	2.87kg	3.3kg	2.5kg
Warranty	1-year return-to-base	2-year collect-and-return	3-year NBD	2-year collect-and-return	1-year return-to-base
Verdict	<ul style="list-style-type: none"> • Gorgeous super-resolution Retina display • Outstanding build quality • Wonderfully light and slim • Effortless to use 	<ul style="list-style-type: none"> • Stunning gaming and general performance • Capacious RAM, storage • Not too heavy for its size • Blu-ray writer is included 	<ul style="list-style-type: none"> • Incredibly powerful • Heavy-duty graphics • Stunning performance • Expensive • Large and heavy 	<ul style="list-style-type: none"> • Slightly higher price covers upgrade to Haswell processor, 8970M graphics, and a 1TB hard drive • Strong overall performance 	<ul style="list-style-type: none"> • New range, but old CPU • Decent overall performance, and good for games • Good battery life • No optical drive
FULL REVIEW	TINYURL.COM/7YGC3KJ	TINYURL.COM/PCJP94Q	TINYURL.COM/KC4UNLQ	TINYURL.COM/9WTG6MP	TINYURL.COM/KL2HENN

>> Buying advice



£1,001+ laptops

Invest £1,000 or more in a laptop, and you can be reasonably sure of getting a high-quality PC.

Sometimes that money will be spent on getting a thin-and-light laptop, with good performance to boot. Alternatively, you may prefer a rugged laptop that's able to withstand wear and tear on the road, or a performance-first

high-powered workstation.

Whatever your need, accept no compromises in build quality.

The best laptops should offer very good screens. Beware of glossy shiny panels that allow distracting reflections in certain lighting conditions.

Ultraportables may have 256GB or more of solid-state storage, but won't have an optical drive or GPU.



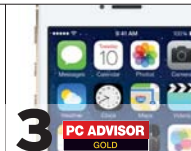


Workstation laptops will have faster – often quad-core – CPUs and a mobile graphics processor.

Rugged laptops are engineered for strength, at the expense of light weight and sleek design. Look out for milspec standard ratings, such as MIL-STD-810G.

You'll find a wide range of ports, high-grade components and extras.

READ MORE: TINYURL.COM/CC3KBMM

Tablets	1	2	3	4	5
					
	Apple iPad 4	Google Nexus 7 (2013)	Apple iPad mini	Amazon Kindle Fire HD	Google Nexus 10 by Samsung
Price	£399 inc VAT	£199 inc VAT	£269 inc VAT	£119 inc VAT	£319 inc VAT
Website	Apple.com/uk	Play.google.com	Apple.com/uk	Amazon.co.uk	Play.google.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Apple iOS 7	Android 4.3 Jelly Bean	Apple iOS 7	Amazon (based on Android 4.0)	Android 4.2 Jelly Bean
Screen size/resolution	9.7in/2048x1536	7in/1280x800	7.9in/1024x768	7in/1280x800	10.1in/2560x1600
Storage/media card slot	16GB/none	16GB/none	16GB/none	16GB/none	16GB/none
Connectivity	802.11a/b/g/n, Bluetooth 4	802.11b/g/n, Bluetooth 4	802.11b/g/n, Bluetooth 4	802.11b/g/n, Bluetooth 4	802.11b/g/n, Bluetooth 4, NFC
Processor	1.39GHz Apple A6X	1.5GHz Snapdragon S4 Pro	1GHz Apple A5	1.2GHz TI OMAP 4460	1.7GHz Cortex A-15
RAM	1GB	2GB	512MB	752MB	2GB
Claimed battery life	10 hrs	9 hrs	10 hrs	8 hrs	9 hrs
Cameras (front/rear)	1.2/5Mp	1.2/5Mp	1.2/5Mp	1.3Mp/none	1.9/5Mp
Dimensions	241x186x9.4mm	114x200x8.7mm	135x200x7.2mm	137x193x10.3mm	264x178x8.9mm
Weight	652g	299g	308g	395g	603g
Warranty	1 year	1 year	1 year	1 year	1 year
Verdict	<ul style="list-style-type: none"> • Twice as fast as iPad 3 • Superb graphics • Breathtaking display • Supports 4G where available 	<ul style="list-style-type: none"> • Pricier than original • Best screen of any 7in tablet • Slimmer and lighter • Fast and slick 	<ul style="list-style-type: none"> • 7.9in screen large for a mini • Vibrant but not Retina screen • Decent performance • Very good cameras 	<ul style="list-style-type: none"> • Slick, intuitive OS • Vast content available • Exceptional value at £119 • 8.9in version costs £229 	<ul style="list-style-type: none"> • Fastest tablet overall • Highest screen resolution • Excellent value • Can't match iPad on build
FULL REVIEW	TINYURL.COM/CRSTDSK	TINYURL.COM/QYUDY5C	TINYURL.COM/CLJWUVS	TINYURL.COM/CH6CLNZ	TINYURL.COM/ARL2KDG

Smartphones	1	2	3	4	5
					
	LG G2	Sony Xperia Z1	Apple iPhone 5s	HTC One	Samsung Galaxy Note 3
Price	£399 inc VAT	£599 inc VAT	£549 inc VAT	£490 inc VAT	£550 inc VAT
Website	Lg.com/uk	Sonymobile.com	Apple.com/uk	Htc.com/uk	Samsung.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Android 4.2 Jelly Bean	Android 4.2 Jelly Bean	Apple iOS 7	Android 4.2 Jelly Bean	Android 4.3 Jelly Bean
Processor	2.26GHz Snapdragon 800	2.26GHz Snapdragon 800	1.3GHz Apple A7	1.7GHz Snapdragon 600	2.3GHz Snapdragon
Storage/media card	16GB/none	16GB/microSDXC	16GB/none	32GB/none	32GB/microSDXC
Screen size/resolution	5.2in/1920x1080	5in/1920x1080	4in/640x1136	4.7in/1920x1080	5.7in/1920x1080
Input method	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch
Connectivity	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi
Battery life (talk/standby)	Not specified	14 hrs/880 hrs	10 hrs/250 hrs	Not specified	21 hrs/420 hrs
Camera	13Mp, 1080p video	20.7Mp, 1080p video	8Mp, 1080p video	4Mp, 1080p video	13Mp, 1080p video
GPS	A-GPS	A-GPS	A-GPS, Glonass	GPS, Glonass	A-GPS, Glonass
Dimensions, Weight	71x139x9.4mm, 143g	144x74x8.5mm, 169g	59x124x7.6mm, 112g	68x9.3x137mm, 143g	151x79x8.3mm, 168g
Warranty	1 year	1 year	1 year	2 years	1 year
Verdict	<ul style="list-style-type: none"> • Excellent value • High-end specification • Impressive design • No microSD slot 	<ul style="list-style-type: none"> • Powerful specification • Larger and heavier than original Xperia Z • Expensive 	<ul style="list-style-type: none"> • Very fast performance • Superb 4in screen • Beautifully balanced weight • Fingerprint reader 	<ul style="list-style-type: none"> • Fastest smartphone yet • 468ppi full-HD screen • UltraPixel camera • Great sound quality 	<ul style="list-style-type: none"> • Lots of extra features • S Pen stylus • Very good 5.7in screen • Excellent performance
FULL REVIEW	TINYURL.COM/PAFK4SZ	TINYURL.COM/NJPM4DE	TINYURL.COM/MZ8JHLF	TINYURL.COM/CE76X3T	TINYURL.COM/QAKOLZY

>> Buying advice



Tablets

Tablet PCs combine the mobility and connectivity of a smartphone with a larger screen and more powerful processor. Rather than struggle with Windows, they run a lightweight, touch-focused OS.

You have two main choices: a tablet running iOS or Android. iOS is slick, supremely easy to use, and has a library of hundreds of

thousands of apps. But the iPad is expensive, it doesn't support memory cards, and the whole system is locked down.

Android tablets are available at lower prices. Many have ports for adding storage and connecting devices, and plenty of apps are available via Google Play - although Google doesn't vet them.

Look for a dual-core processor for smooth operation and good multi-tasking. Opt for a capacitive rather than resistive touchscreen if possible, and consider a smaller screen to minimise weight.

3G tablets are available on subsidised tariffs, but it's usually cheaper to buy them outright.

[READ MORE: TINYURL.COM/7YGV8Q6](http://TINYURL.COM/7YGV8Q6)

Gaming PCs	1	2	3	4	5
	PC ADVISOR BEST BUY	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED		
	Chillblast Fusion Uzi	Wired2Fire Diablo Predator	PC Specialist Vanquish GT1	Computer Planet ND 3000	Mesh Elite Gamer PCA
Price	£1,249 inc VAT	£1,699 inc VAT	£1,279 inc VAT	£1,100 inc VAT	£1,499 inc VAT
Website	Chillblast.com	Wired2fire.co.uk	Pcspecialist.co.uk	Computerplanet.co.uk	Meshcomputers.com
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.4GHz Intel Core i5-4670K (OC 4.4GHz)	3.4GHz Intel Core i5-4670K (OC 4.4GHz)	3.4GHz Intel Core i5-4670K (OC 4.2GHz)	3.4GHz Intel Core i5-4670K	3.5GHz Intel Core i7-4770K (OC 4.6GHz)
CPU cooler	Corsair H55 Liquid Cooler	Corsair H100 Liquid Cooler	Corsair H60 Liquid Cooler	Corsair H60 Liquid Cooler	Corsair H60 Liquid Cooler
Memory	16GB DDR3	16GB DDR3	16GB DDR3	8GB DDR3	16GB DDR3
Storage	120GB SSD + 2TB HDD	240GB SSD + 1TB HDD	120GB SSD + 2TB HDD	120GB SSD + 1TB HDD	250GB SSD + 2TB HDD
Power supply	750W Corsair	650W Corsair	650W Corsair	650W Corsair	850W X-Viper
Motherboard	Gigabyte GA-Z87N-Wi-Fi	Gigabyte GA-Z87-D3HP	Asus Z87-K	Gigabyte GA-B85M-D3H	MSI GA-Z87-GD65 Gaming
Operating system	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit
Screen	23.6in Iiyama X2377HDS	24in AOC G2460PQU	23.6in AOC i2369vm IPS	23in AOC	24in Iiyama ProLite E2473HS
Graphics	MSI nVidia GeForce GTX 770, 2GB VRAM	nVidia GeForce GTX 780, 3GB VRAM	Palit nVidia GeForce GTX 770, 2GB VRAM	Gainward nVidia GeForce GTX 770, 2GB VRAM	MSI nVidia GeForce GTX 770 Ti, 2GB VRAM
Sound	Onboard	Onboard	Asus Xonar DG	Onboard	Onboard
Connectivity	2x Gigabit ethernet, 802.11n Wi-Fi	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Killer Ethernet 2200
Ports	6x USB 3.0, 2x USB 2.0, S/PDIF	8x USB 3.0, 2x USB 2.0, 2x DVI, HDMI, DisplayPort	3x USB 3.0, 6x USB 2.0	3x USB 3.0, 5x USB 2.0	4x USB 3.0, 2x USB 2.0, card reader
Optical drive	Pioneer BD-ROM/DVD±RW	DVD±RW	Lite-On DVD±RW	Samsung 24x DVD±RW	Pioneer BD-RE/DVD±RW
Case	BitFenix Prodigy Blue	Corsair C70 Black	InWin GT1	Cooler Master K-350	Fractal Design Define R4 Black
Keyboard	Gigabyte M6800	Gigabyte K3	Roccat Isku	Logitech MK260	MS Bluetrack Desktop 3000
Mouse	Force K3	Gigabyte M6980X	Roccat Kova	As above	As above
Other	Optional family pack	Extra fans	None	Splinter Cell: Blacklist	None
PC Mark 7	7045	6974	6763	6550	6899
Alien vs Predator	118/64	165/87	120/65	122/66	121/65
Final Fantasy XIV	70 (1080p)	209/96	117/73	186/68	162/69
Sniper Elite V2	300/143/37	315/180/44	307/145/37	284/146/37	291/140/38
Power consumption	52W/310W	60W/403W	70W/315W	46W/250W	73W/325W
Warranty	2-year collect-and-return	3-year return-to-base (2-year parts, 3-year labour)	3-year collect-and-return	1-year collect-and-return	3-year 'Gold' (2-year parts, 3-year labour)
Verdict	<ul style="list-style-type: none"> Stunning performance in general use Also pretty strong on games Small-form-factor PC great for portability Cool in running Slightly bouncy case 	<ul style="list-style-type: none"> Sizzling performance Best for gaming power Reasonably expensive Smooth flat-panel No Blu-ray drive 	<ul style="list-style-type: none"> Good all-round performance Nicely priced Strong drive options Dedicated sound card Keyboard and mouse ideal for gamers 	<ul style="list-style-type: none"> Solid performance None of the components are overlocked Low power output Motherboard a little cheap Only a one-year warranty 	<ul style="list-style-type: none"> Quite expensive Best processor in the chart Gaming scores not as dominant as we'd like for the price Keyboard and mouse not best suited to games
FULL REVIEW	TINYURL.COM/P58MMM	TINYURL.COM/NDUHD3L	TINYURL.COM/PL5EUPW	TINYURL.COM/MNBXXHF	TINYURL.COM/LTLBZB9

All gaming scores given in fps. Alien vs Predator 720p, Max/1080p, Max. Final Fantasy 720p, Med/1080p, Max. Sniper Med/Ultra

>> Buying advice



Gaming PCs

Gaming PCs put performance and upgradability before subtlety and quiet operation. Many run overclocked CPUs to eke out every bit of available speed.

Intel's Core i5-3570K is a popular choice of CPU, but will require a decent cooler and beefy PSU. The HyperThreaded i7-3770K is slightly faster, but dearer.

Cooling is essential for stability. Liquid-cooling systems, dust filters, fan-speed controls and good cable-management can aid airflow.

Most important of all is the graphics card; vendors will often skimp on storage, networking and other features and throw all their budget at the graphics card.

nVidia's GTX 680 delivers unparalleled performance - but at

a price. Cheaper solutions include the GeForce GTX 660 and 670.

Look for wired peripherals and a headset. Good warranty terms are crucial for overclocked PCs.

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

[READ MORE: TINYURL.COM/CZXH443](http://TINYURL.COM/CZXH443)

All-in-one PCs	1  PC ADVISOR BEST BUY	2  PC ADVISOR RECOMMENDED	3  PC ADVISOR RECOMMENDED	4 	5 
	Dell XPS 2720	Apple iMac 27in	Medion Akoya P2002	Chillblast Fusion AIO Ultima	MSI Wind Top AE2712G
Price	£1,749 inc VAT	£1,599 inc VAT	£449 inc VAT	£1,199 inc VAT	£1199 inc VAT
Website	Dell.co.uk	Apple.com/uk	Medion.com/gb	Chillblast.com	Uk.msi.com
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.1GHz Intel Core i7-4770S	3.2GHz Intel Core i5	3.3GHz Intel Core i3-3220	3.1GHz Intel Core i7-3770S	2.9GHz Intel Core i5-3470S
RAM	16GB DDR3	8GB DDR3	4GB DDR3	16GB DDR3	4GB DDR3
Storage capacity	2TB HDD + 32GB SSD	1TB HDD	1TB HDD	1TB HDD + 120GB SSD	1TB HDD
Screen	27in IPS touchscreen	27in IPS	23.6in TN	21.5in IPS touchscreen	27in TN touchscreen
Screen resolution	2560x1440	2560x1440	1920x1080	1920x1080	1920x1080
Graphics card	nVidia GeForce GT 750M	nVidia GeForce GTX 755M	Intel HD Graphics 2500	Intel HD Graphics 4000	nVidia GeForce GT 630M
Video memory	2GB	1GB	N/A	N/A	2GB
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	✓	✓	✓	✓	✓
Bluetooth	✓	✓	✗	✓	✓
USB	6x USB 3.0	4x USB 3.0	2x USB 3.0, 4x USB 2.0	4x USB 3.0, 2x USB 2.0	2x USB 3.0, 4x USB 2.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✓	✓ (x2)	✗	✗	✗
HDMI	✓	✗	✓	✓	✓
Media card slot	✓	✓	✓	✓	✓
Max disc speeds	BD-ROM/DVD±RW	None	DVD±R	BD-ROM/DVD±RW	BD-ROM/DVD±RW
Extras	2.1Mp webcam, wireless keyboard and mouse	1.3Mp webcam, wireless keyboard and mouse	Wireless keyboard and mouse, CyberLink software	Webcam, Microsoft Wireless Desktop 3000	2Mp webcam, DVB-T TV tuner, Wireless keyboard and mouse
Operating system	Windows 8	Mac OS X 10.8 Mountain Lion	Windows 8	Windows 8	Windows 8
Power consumption	54W (idle), 220W (load)	53W (idle), 243W (load)	34W (idle), 92W (load)	32W (idle), 119W (load)	44W (idle), 110W (load)
Sniper 2 Elite (High)	6fps	12fps	5fps	5fps	5fps
Sniper 2 Elite (Low)	94fps	197fps	16fps	28fps	17fps
PCMark 7 score	6091	4141	3298	5195	3138
Dimensions	492x664x72mm	650x203x516mm	580x196x430-460mm	338x541x61mm	672x483x66mm
Weight	16kg	9.5kg	10.3kg	9kg	13kg
Warranty	1-year next-day in-home	1-year return-to-base	1-year return-to-base	2-year collect-and-return	2-year collect-and-return
Verdict	<ul style="list-style-type: none"> Screen offers stunning array of colours Great general performance Solid, but not amazing gaming framerates Quite heavy Next-day in-home support 	<ul style="list-style-type: none"> Still svelte and cool-looking Decent performance Class-leading gaming Stunning display No touchscreen 	<ul style="list-style-type: none"> Low price Decent performance for the money Built-in TV tuner Lacks SSD and Blu-ray No touchscreen 	<ul style="list-style-type: none"> Good-looking and well built Blistering Windows performance Disappointing gaming IPS panel offers inferior colour fidelity to iMac and Dell Many of the ports are difficult to reach 	<ul style="list-style-type: none"> Low price for a 27in all-in-one PC Fully featured all-in-one with TV tuner and Blu-ray Lacklustre gaming Disappointing performance
FULL REVIEW	TINYURL.COM/KWZ4KLL	TINYURL.COM/A95Q9VY	TINYURL.COM/MEVSJ9D	TINYURL.COM/LQ4U8FW	TINYURL.COM/MUGFK07

>> Buying advice



All-in-one PCs

All-in-one PCs build into a large (21- to 27in) monitor all the components they require to run, making them an excellent and stylish solution for saving space.

However, with limited internal space for cooling, all-in-one machines tend to include less powerful components than traditional desktops. Expect to

find integrated or laptop graphics processors and mobile CPUs inside.

All-in-ones aren't usually easy to upgrade, but many are pre-packed with Wi-Fi, Bluetooth, speakers and even Blu-ray players.

Touchscreen displays are likely to become more desirable once Windows 8 is released. If you buy one now, ensure the image quality hasn't been compromised and that

it's sufficiently responsive to touch.

The quality of the supplied keyboard and mouse (usually wireless) is critical. TV tuners and HDMI ports are welcome additions.

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

READ MORE: [TINYURL.COM/87VW5KJ](http://tinyurl.com/87VW5KJ)

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Razer Deathstalker Keyboard & Mouse
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PC ADVISOR
BEST BUY



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* Chillblast won more awards in the leading IT press publications PC Pro, PC Advisor and Computer Shopper combined than any other retailer 2010-2012

** World's fastest PC as tested by PC Pro Magazine - <http://www.pcpro.co.uk/reviews/desktops/371152/chillblast-fusion-photo-oc-iv>

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Business PCs					
	1 PC ADVISOR RECOMMENDED	2	3	4	5
	Aria Gladiator N200-3220M	Chillblast Fusion Opal	Wired2Fire Business Accelerate	Dino PC Synergy 4430	Eclipse Precision A856F85
Price	£509 inc VAT	£549 inc VAT	£689 inc VAT	£569 inc VAT	£519 inc VAT
Website	Aria.co.uk	Chillblast.com	Wired2fire.co.uk	Dinopc.com	Eclipsecomputers.com
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.3GHz Intel Core i3-3220	3.2GHz Intel Core i5-4570	3.4GHz Intel Core i5-4670	3GHz Intel Core i5-4430	3.6GHz AMD Trinity A8-5600K
RAM	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage capacity	500GB HDD + 80GB SSD	1TB HDD	120GB SSD	1TB HDD	1TB HDD
Motherboard	Gigabyte GA-B75M-D3H	Asus B85M-G	ASRock B85M-HDS	Gigabyte GA-H87M-HD3	Asus F2A85-M LE
CPU cooler	Arctic Cooling Alpine 11 Quiet	Standard Intel cooler	Standard Intel cooler	Standard Intel cooler	Standard AMD cooler
Power supply	Corsair 430W	CiT 500W	Xigmatek 400W	CiT 500W	Alpine 600W
Screen	21.5in AOC E2260SWDA	23.6in Iiyama X2377	2x 21.5in AOC E2260SWDA	23in Iiyama XB2380HS-B1	23in AOC i2369Vm
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Graphics	Intel HD Graphics 2500	Intel HD Graphics 4600	Intel HD Graphics 4600	Intel HD Graphics 4600	Integrated
Video memory	N/A	N/A	N/A	N/A	N/A
USB	2x USB 3.0, 4x USB 2.0	3x USB 3.0, 6x USB 2.0	2x USB 3.0, 8x USB 2.0	4x USB 3.0, 4x USB 2.0	4x USB 3.0, 4x USB 2.0
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Speakers	Not specified	Not specified	Not specified	Not specified	Not specified
Case	Cooler Master N200	CiT Fortress	In-Win Em040	CiT Templar	K2 Gamer
Keyboard	Microsoft Desktop 400 keyboard and mouse (wired)	Cherry J82-16001 keyboard, M-5450 mouse (wired)	Gigabyte K6800 keyboard, M6800 mouse (wired)	Logitech K120 keyboard, B110 mouse (wired)	Microsoft Optical Desktop 800 (wired)
Optical drive	24x DVD±RW	24x DVD±RW	DVD±RW	Samsung DVD±RW	Samsung DVD±RW
Operating system	Windows 7 Home Prem 64-bit	Windows 8 Professional	Windows 7 Pro 64-bit	Windows 7 Home Prem 64-bit	Windows 8 Professional
Bundled software	None	None	None	None	None
PCMark7 overall score	3524	4257	5667	3458	2349
Power consumption	27/69W	47/124W	37/135W	37/115W	34/145W
Warranty	1-year return-to-base, phone support	2-year collect-and-return, phone support	2-year return-to-base, phone support	3-year return-to-base (2-year parts), phone support	1-year return-to-base, phone support
Verdict	<ul style="list-style-type: none"> • Exceptional value for money • Sticks with older Ivy Bridge processor technology • Not the best performance • SSD, Wi-Fi connectivity and memory card included • Only a one-year return-to-base warranty 	<ul style="list-style-type: none"> • Haswell processor • Impressive Iiyama IPS flat-panel • No SSD • No cable management under the lid • Warranty is collect-and-return rather than return-to-base 	<ul style="list-style-type: none"> • Expensive Haswell processor technology, but the fastest PC here • 120GB SSD • Logitech keyboard flamboyant for office use, but comfortable • Two flat-panels included for improved productivity - could save money by specifying just one 	<ul style="list-style-type: none"> • Not the fastest system here • No SSD, but hard drive has a generous 1TB capacity • High-quality Iiyama IPS flat-panel • Detailed warranty • Windows 7 ideal for business use • No cable management under the lid 	<ul style="list-style-type: none"> • Sluggish performance • 1TB hard drive, but no SSD • Pleasing AOC monitor with excellent IPS technology • Gamer case inappropriate for office environments • Warranty just one year
FULL REVIEW	TINYURL.COM/OSW55A8	TINYURL.COM/KGGE98T	TINYURL.COM/PCSKWVS	TINYURL.COM/PF8LUXD	TINYURL.COM/MQFWJ3R

» Buying advice



Business PCs






Provided you have sufficient RAM (at least 2GB, preferably 4GB), any modern CPU will provide enough power for low-level admin tasks. Intel's Core i3 provides ample performance for general use and come with integrated graphics, saving you the cost of buying an additional card. In a typical networked business environment

there will be storage available on the LAN, so you're unlikely to need a large hard drive. A 500GB drive should be ample.

Wireless keyboards and mice can cause issues in the workplace due to interference between adjacent workstations. A decent wired kit is ideal, while quiet-typing keyboards can be less distracting. For small businesses with just

one or two PCs, Windows 7 Home Premium is cheaper but can't connect to servers. The Pro edition is a better option for businesses, especially if you need compatibility with older software.

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

Family PCs	 1 PC ADVISOR BEST BUY	 2 PC ADVISOR RECOMMENDED	 3	 4	 5
	Chillblast Fusion Commando	Quiet PC Serenity Home Value	Dino PC Raging Lizard	CyberPower Ultra Scylla SE III	Computer Planet F2000 Family
Price	£799 inc VAT	£696 inc VAT	£899 inc VAT	£699 inc VAT	£930 inc VAT
Website	Chillblast.com	Quietpc.com	Dinopc.com	Cyberpowersystem.co.uk	Computerplanet.co.uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.2GHz Intel Core i5-4570	2.9GHz Intel Core i5-3475S	3.2GHz Intel Core i5-4570	4.2GHz AMD FX 4350	3.4GHz Intel Core i5-3570
RAM	16GB DDR3	16GB DDR3	16GB DDR3	8GB DDR3	8GB DDR3
Storage capacity	1TB HDD + 120GB SSD	500GB HDD hybrid	1TB HDD + 128GB SSD	2TB HDD	2TB HDD + 120GB SSD
Motherboard	Asus B85M-G	Gigabyte GA-H61M-USB3V	Gigabyte GA-Z87M-HD3	Asus M5A78L-M/USB3	Gigabyte B75M-D3H
CPU cooler	Arctic Cooling Freezer 7 Pro	Standard Intel cooler	Standard Intel cooler	Standard AMD cooler	Arctic Cooling Freezer 7 Pro
Power supply	CIT 600W	Zalman ZM450-GS 450W	Corsair VS450 450W	Cooler Master 500W	Cooler Master 600W
Screen	23in Iiyama X2377	Not supplied	23in AOC i2369Vm	24in BenQ GL2450E	23.6in Iiyama X2377
Screen resolution	1920x1080	N/A	1920x1080	1920x1080	1920x1080
Graphics card	Zotac nVidia GeForce GTX 650 Ti	Intel HD Graphics 4000	Gigabyte nVidia GeForce GTX 650 Ti	MSI AMD Radeon HD 7770	Gainward nVidia GeForce GTX 660
Wireless	802.11b/g/n, gigabit ethernet	802.11b/g/n, gigabit ethernet	802.11b/g/n, gigabit ethernet	802.11b/g/n, gigabit ethernet	802.11b/g/n, gigabit ethernet
USB	3x USB 3.0, 6x USB 2.0	2x USB 3.0, 6x USB 2.0	6x USB 3.0, 2x USB 2.0	2x USB 3.0, 6x USB 2.0	2x USB 3.0, 7x USB 2.0
Media card slot	x	x	✓	✓	✓
Sound card	Onboard	Onboard	Onboard	Onboard	Onboard
Speakers	2x Logitech LS220	None	None	None	None
Case	Cooler Master Force 500	Zalman ZM-T1	Xigmatek Asgard 382	Cooler Master Elite 430	Cooler Master Elite 335U
Keyboard	Logitech MK260 wireless combo	Gigabyte GK-KM7580 wireless combo	Logitech MK260 wireless combo	Logitech MK330 wireless combo	Logitech MK260 wireless combo
Optical drive	LG BD-ROM/DVD ±RW	Sony DVD ±RW	Lite-On BD-ROM, Samsung DVD ±RW	Lite-On BD-ROM/DVD ±RW	TSSTcorp 24x DVD ±RW
Operating system	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit
Bundled software	None	None	None	None	None
Sniper (Low/Med/Ultra)	147, 59, 14fps	26, 7, 5fps	154, 62, 14fps	130, 43, 9fps	205, 59, 15fps
Alien vs Predator (720p/1080p)	52, 27fps	8, 5fps	53, 27fps	47, 24fps	77, 41fps
PCMark 7	6177	4464	6282	2957	6134
Warranty	2-year collect-and-return	2-year collect-and-return	3-year return-to-base	3-year return-to-base	2-year return-to-base
Verdict	<ul style="list-style-type: none"> • Strong performance • Good GTX 650 graphics • Great 23.6in Iiyama IPS screen • Wi-Fi only through USB adaptor • Temperature and noise kept low 	<ul style="list-style-type: none"> • Near-silent operation • Good power for the money • Strong RAM complement • Limited gaming power • Hard drive capacity a little stingy 	<ul style="list-style-type: none"> • Best performance here in our benchmarks • Good gaming potential • Stylish AOC IPS monitor • Strong components • Not cheap 	<ul style="list-style-type: none"> • Pedestrian performance in our benchmarks • Solid gaming scores • No SSD • Large screen lacks colour fidelity and decent viewing angles • High-quality Logitech MK330 keyboard and mouse combo 	<ul style="list-style-type: none"> • Most expensive of the systems here • Powerful performance • GTX 660 the best card here • Strong storage options • No Blu-ray drive
FULL REVIEW	TINYURL.COM/KF6G3T7	TINYURL.COM/KPE3BAD	TINYURL.COM/RAGLIZ	TINYURL.COM/QHT5X2H	TINYURL.COM/NEWWQ4U

» Buying advice



Family PCs

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

A family PC needs to offer decent performance in every area, able to cater for the needs of each individual - but there are some areas where you can cut costs.

If you're not itching to play the latest games, opt for integrated rather than dedicated graphics. AMD processors are more adept in this regard, while Intel CPUs offer faster application performance.






Intel's Core i5-3570K will form the core of a powerful home PC, although the older Core i5-2500K may be offered at lower cost and supports easy overclocking.

Consider 4GB of RAM and a 500GB hard drive as the minimum; both are easy to upgrade later.

Screen quality is crucial, with the best displays using IPS tech. A Blu-ray drive will help make the most of a 23.6in full-HD monitor.

For Skype, watching films and listening to music, decent speakers and a webcam are essential.

READ MORE: [TINYURL.COM/BL4UREB](http://tinyurl.com/bl4ureb)

Mini PCs	 1 PC ADVISOR BEST BUY	 2 PC ADVISOR RECOMMENDED	 3 PC ADVISOR RECOMMENDED	 4	 5
	Zotac Nano XS AD13 Plus	Apple Mac mini	Sapphire Edge VS8	Chillblast Fusion NUC	Tinygreen PC Intense PC Pro
Price	£300 inc VAT	£959 inc VAT	£277 inc VAT	£549 inc VAT	£791 inc VAT
Website	Zotac.com	Apple.com/uk	Sapphiretech.com	Chillblast.com	Tinygreenpc.com
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★★
Value rating	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	1.7GHz AMD E2-1800	2.6GHz Intel Core i7-3270QM	1.6GHz AMD A8-4555M	1.8GHz Intel Core i3-3217U	1.7GHz Intel Core i7-3517UE
CPU cooler	Custom heatsink and fan	Custom fan	Custom heatsink and fan	Custom Intel semi-active	Passive heatsink
RAM	2GB DDR3	4GB 1600MHz DDR3	4GB 1333MHz DDR3	8GB 1333MHz DDR3	8GB 1600MHz DDR3
Storage capacity	64GB mSATA SSD	1TB HDD + 128GB SSD	500GB 5400rpm HDD	128GB Intel 525 Series SSD	500GB 5400rpm HDD
Power supply	External	Internal	External	External	External
Motherboard	AMD Hudson-1, AMD K14	Custom Intel HM77	AMD Hudson-3, AMD K15.1	Intel QS77 Express chipset	Intel QM77 chipset
Operating system	None	OS X 10.8 Mountain Lion	None	Windows 8 64-bit	Windows 7 Professional
Graphics	AMD Radeon HD 7340	Intel HD Graphics 4000	AMD Radeon HD 7600G	Intel HD Graphics 4000	Intel HD Graphics 4000
Sound	Onboard	Onboard, built-in speakers	Onboard	Onboard	Onboard
Connectivity	802.11b/g/n USB adaptor, gigabit ethernet	802.11a/b/g/n, gigabit ethernet, Bluetooth	802.11b/g/n, gigabit ethernet, Bluetooth	802.11b/g/n, Bluetooth	802.11b/g/n, 2x gigabit ethernet, Bluetooth
Ports	2x USB 3.0, 2x USB 2.0, eSATA/USB 2.0, HDMI, S/PDIF, mic	4x USB 3.0, HDMI, Thunderbolt, FireWire 800, line-in/out	2x USB 3.0, 4x USB 2.0, HDMI, Mini DisplayPort, S/PDIF, line-in/out	3x USB 2.0, HDMI, Thunderbolt	2x USB 3.0, 4x USB 2.0, 2x eSATA, HDMI, DisplayPort, S/PDIF, ultra-mini RS232
Card reader	SD	SDXC	SD	None	None
Other	Remote control, Vesa mount	Apple iLife, HDMI-to-DVI adaptor, IR	HDMI, S/PDIF cables, HDMI-to-DVI adaptor, Vesa mount	Chillblast Free Software pack, Vesa mount	None
Dimensions	106x106x37mm	197x197x26mm	183x198x32mm	117x112x39mm	190x160x40mm
Weight	Not specified	1.3kg	660g	1kg	750g
PC Mark Overall	1985	3286	1150	3993	2628
Aliens vs Predator (fps) ¹	5/5	8/5	11/6	7/5	7/5
Power consumption ²	7.5W/23.5W	12.5W (6W in OS X)/75W	13W/33.3W	9W/19.5W	12W/35W
Warranty	2-year return-to-base	1-year return-to-base	2-year return-to-base	2-year collect-and-return	2-year return-to-base
Verdict	<ul style="list-style-type: none"> • Tiny size • Good performance for the dimensions • Generous number of ports and connectors • Only 64GB of storage 	<ul style="list-style-type: none"> • Superlative build and quality • Strong speed • Plenty of storage • Fairly power hungry 	<ul style="list-style-type: none"> • Low price • Sluggish general performance, but very fast at games • No operating system preinstalled 	<ul style="list-style-type: none"> • 128GB SSD drive is blisteringly fast, but low in capacity • Stunning overall speed • No USB 3.0, ethernet or card reader 	<ul style="list-style-type: none"> • Fanless design means quiet operation • Good performance • Interchangeable expansion modules • Not cheap
FULL REVIEW	TINYURL.COM/CQ7N7S8	TINYURL.COM/C62LTOH	TINYURL.COM/BO8JSXJ	TINYURL.COM/CRD3BQR	TINYURL.COM/CM3U8GS

¹ Alien Vs Predator tested at 720p and 1080p, High Quality respectively ²Measured when idle and under load respectively

>> Buying advice



Mini PCs

Mini PCs look good, fit into the smallest of spaces, and usually offer cooler, quieter operation and lower power consumption than their desktop counterparts.

However, there are a few down sides. For example, a mini PC doesn't have enough internal space for a discrete graphics card or a desktop (3.5in) hard drive. All

other upgrades and expansion will usually be achieved externally.

With this in mind, pay particular attention to the connectivity options. If you want to hook up external storage, look for USB 3.0 ports. For connecting the PC to a standard LCD monitor you can use HDMI. If you have an external music system with digital inputs you may also want an S/PDIF






connector on your mini PC.

Mini PCs typically ship without a keyboard or mouse, and often come without an OS. Remember to factor in the cost of these items.

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

READ MORE: TINYURL.COM/D29Y0NN

Blu-ray drives	 1	 2	 3 PC ADVISOR RECOMMENDED	 4	 5
	Pioneer BDR-208EBK Retail	Pioneer BDR-208DBK OEM	LG BH16NS40	LG BP40NS20	Lite-On IHES112-115
Price	£66 inc VAT	£64 inc VAT	£74 inc VAT	£90 inc VAT	£54 inc VAT
Website	Pioneer.eu/uk	Pioneer.eu/uk	Uk.lge.com	Uk.lge.com	Liteonit.eu
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Blu-ray speeds	15x -R, 14x -R DL, 2x -RE, 12x -ROM	15x -R, 14x -R DL, 2x -RE, 12x -ROM	16x -R, 12x -R DL, 12x -RE, 12x -ROM	6x -R, 6x -R DL, 2x -RE, 6x -ROM	12x -ROM
DVD speeds	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 16x -ROM	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 16x -ROM	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 12x -RAM, 16x -ROM	8x ±R, 6x ±R DL, 6x -RW, 8x +RW, 5x -RAM, 8x -ROM	8x ±R, 8x ±R DL, 6x -RW, 8x +RW, 8x -ROM
Max storage	128GB	50GB	50GB	100GB	8.5GB
Interface type	SATA (internal)	SATA (internal)	SATA (internal)	USB 2.0 (external)	SATA (internal)
Label technology	None	None	LightScribe	None	None
Software	ArcSoft TotalMedia Extreme	None	CyberLink Blu-ray Suite	PowerDVD, PowerProducer	None
Dimensions	148x180x42mm	148x180x42mm	146x170x41mm	160x153x22mm	158x145x22mm
Weight	740g	740g	749g	380g	700g
Warranty	1 year	1 year	1 year	1 year	2 years
Verdict	<ul style="list-style-type: none"> • Retail pack includes software • Supports 128GB BD-XL media • Very well priced • Matches 208DBK on speed 	<ul style="list-style-type: none"> • OEM only - no software • Great performance on BD-R • Doesn't support BD-XL • 208EBK offers better value 	<ul style="list-style-type: none"> • Pioneer offers faster BD-R • Good RE speed • Doesn't support BD-XL • Comes with software 	<ul style="list-style-type: none"> • Attractive external model • Maxes out at 6x BD-R (most media is only 6x) • Supports triple-layer BD-R 	<ul style="list-style-type: none"> • Playback only • No software included with many bundles • Pioneers offer better value
FULL REVIEW	TINYURL.COM/LD47X7K	TINYURL.COM/LD47X7K	TINYURL.COM/8YTUJEF	TINYURL.COM/BS8UAFF	TINYURL.COM/8SYECMW

Antivirus software	 PC ADVISOR BEST BUY	 PC ADVISOR RECOMMENDED	 PC ADVISOR RECOMMENDED	 PC ADVISOR RECOMMENDED	
	Norton AntiVirus	Bitdefender Antivirus Pro	G Data AntiVirus	Kaspersky Anti-Virus	Trend Micro Titanium AV+
Annual price	£39 inc VAT	£24 inc VAT	£34 inc VAT	£39 inc VAT	£39 inc VAT
Licence terms	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year
Website	Norton.com	Bitdefender.co.uk	Gdatasoftware.com	Kaspersky.co.uk	Uk.trendmicro.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Signature-based detection	98.7%	97.5%	99.4%	95.7%	98.4%
Malware blocking (full)	96%	68%	84%	88%	88%
Malware blocking (partial)	0%	20%	4%	4%	8%
Clean-up of active malware	80%	80%	80%	80%	80%
On-demand scan speed	121 secs	126 secs	111 secs	103 secs	187 secs
On-access scan speed	272 secs	327 secs	336 secs	310 secs	249 secs
Interface design	Very good	Very good	Very good	Very good	Very good
Verdict	<ul style="list-style-type: none"> • Smooth user interface • Large 'Fix Now' button • Moderate impact on system performance 	<ul style="list-style-type: none"> • Very good performance for malware removal • Average scan speeds • Three interface tiers 	<ul style="list-style-type: none"> • Strong malware detection, blocking and removal • Good user interface, but poorly translated 	<ul style="list-style-type: none"> • Well-designed interface • Easy to use • On-demand single-file scans • Impacts PC performance 	<ul style="list-style-type: none"> • Set-it-and-forget-it security • Cloud-based protection • Requires web connection • Good performance
FULL REVIEW	TINYURL.COM/4P5YCX	TINYURL.COM/66SK77U	TINYURL.COM/6BFXWCS	TINYURL.COM/6HQAZWB	TINYURL.COM/4HUORV3

>> Buying advice



Blu-ray drives

A single Blu-ray Disc holds the equivalent of 35 CDs or five DVDs. It might look like a DVD, but its shorter wavelength and narrow blue laser beam allow it to hold greater capacity. It's the storage method of choice for HD and 3D video content.

External drives are easier to install, portable, and can be shared

between PCs, but they will cost you considerably more than internal models, and may not be as quick.


If you opt for an internal drive, ensure you have enough space inside your PC. Most internal drives use the SATA interface, so check you've got a compatible port.

Look for a drive that also supports several DVD formats, but don't obsess about write speeds.

You should be able to get 16-speed DVD writing, but it's not worth paying more to save seconds.

You may find that the Blu-ray media currently on the market isn't fast enough to enjoy your chosen drive's maximum write speeds. Six-/eight-speed BD-R capabilities are standard, but even six-speed BD-R media is still rare.

READ MORE: TINYURL.COM/70EPYL6

Sub-£150 printers					
	1 PC ADVISOR GOLD	2 PC ADVISOR BEST BUY	3 PC ADVISOR	4 PC ADVISOR RECOMMENDED	5 PC ADVISOR
	Samsung ML-2955DW	Oki C110	Pantum P2050	HP Photosmart 7520	Canon Pixma MX525
Price	£108 inc VAT	£126 inc VAT	£49 inc VAT	£129 inc VAT	£80 inc VAT
Website	Samsung.com/uk	Oki.co.uk	Pantum.com	Hp.com/uk	Canon.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Mono laser	Colour laser	Mono laser	Colour inkjet	Colour inkjet
Max print resolution	1200x1200	1200x600	1200x600	9600x2400	4800x1200
Actual print speed	B=22.2ppm	B=15.8ppm C=2.5ppm	B=15.8ppm	B=17.6ppm C=7.9ppm	B=11ppm C=5.5ppm
Scan/fax facilities	None	None	None	1200x2400 scans	1200x2400 scans, fax
Supported interfaces	USB 2.0, 802.11b/g/n, ethernet	USB 2.0	USB 2.0	USB 2.0, 802.11b/g/n, HP ePrint	USB 2.0, 802.11b/g/n, ethernet
Cost per page	B=2.7p	B=3.6p C=5p	B=2.4p	B=2.4p C=4.8p	B=3.5p C=5.5p
Media card/auto duplex	✓✓	✗✗	✗✗	✓✓	✓✓
Input capacity	251 sheets	100 sheets	150 sheets + manual	125 sheets + 20 tray + 25 ADF	100 sheets + 30 ADF
Dimensions	348x338x197mm	396x380x275mm	380x260x236mm	454x551x220mm	458x385x200mm
Weight	7.2kg	14.4kg	6.1kg	8.6kg	8.7kg
Warranty	1 year	3 years	1 year	1 year	1 year
Verdict	<ul style="list-style-type: none"> • Speedy for the price • Slim but well-defined text • Reasonable running costs • Wi-Fi/wired network support 	<ul style="list-style-type: none"> • Good-value colour laser • Performs better than an equivalent inkjet • No duplex mode 	<ul style="list-style-type: none"> • Now available for just £49 • Decent design • No fancy features • Solid running costs 	<ul style="list-style-type: none"> • Nice 4.3in touchscreen • Separate photo/ADF trays • Good speed for an Inkjet • Competitive running costs 	<ul style="list-style-type: none"> • Above-average photo quality • Decent running costs • Includes fax, ethernet, Wi-Fi • Stylish looks
FULL REVIEW	TINYURL.COM/CCLSZDM	TINYURL.COM/YLNO5RV	TINYURL.COM/C764SZ2	TINYURL.COM/98G9XTE	TINYURL.COM/ON28THH

£151+ printers					
	1 PC ADVISOR BEST BUY	2 PC ADVISOR GOLD	3 PC ADVISOR RECOMMENDED	4 PC ADVISOR RECOMMENDED	5 PC ADVISOR
	Kyocera Mita FS-1320D	HP OfficeJet Pro X551dw	Canon i-Sensys LBP7780Cx	Lomond EvoJet 2 Office	Xerox ColorQube 8700
Price	£170 inc VAT	£460 inc VAT	£440 inc VAT	£50-£150 per month	£1,650 inc VAT
Website	Kyoceramita.co.uk	Hp.com/uk	Canon.co.uk	Lomond.com	Xerox.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Mono laser	Colour inkjet	Colour laser	Colour laser	Colour laser
Max print resolution	1200x1200	2400x2400	9600x600	1600x1600	600x600
Actual print speed	B=26.1ppm	B=42.9ppm C=15.8ppm	B=23.2pp C=16.7ppm	B=41.4ppm C=23.1ppm	B=30ppm C=30ppm
Scan/fax facilities	None	None	None	None	600dpi scans
Supported interfaces	USB 2.0	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet	USB 2.0, ethernet	USB 2.0, gigabit ethernet
Cost per page	B=1.4p	B=1p C=4.3p	B=1.3p C=7.5p	Variable	B=1.4p C=8p
Media card/auto duplex	✓✓	✗✓	✗✓	✗✗	✗✓
Input capacity	250 sheets	500 + 50 sheet	500 + 100 sheets	250 + 20 sheets	525 + 100 sheets
Dimensions	375x393x250mm	517x399x414mm	517x530x401mm	542x455x265mm	605x595x615mm
Weight	12kg	17.1kg	31kg	12.8kg	46.5kg
Warranty	2 years	1 year	1 year	1 year	1 year
Verdict	<ul style="list-style-type: none"> • No frills business laser • Lacks Wi-Fi and ethernet • Modest running costs • Auto-duplex support 	<ul style="list-style-type: none"> • Capable of immense speed • Potential 1050 sheets input • Very cheap running costs • Text not the darkest 	<ul style="list-style-type: none"> • Immense 1100-sheet capacity • Auto-duplex at 19.9ppm • Excellent colour depth • Secure Print 	<ul style="list-style-type: none"> • Monthly payment plans rather than outright purchase • Stunning speed • No auto-duplex 	<ul style="list-style-type: none"> • High price tag • Good running costs • Extensive paper handling • Large model weighs 46.5kg
FULL REVIEW	TINYURL.COM/6GG9UKV	TINYURL.COM/CZ05P65	TINYURL.COM/CCAPAJF	TINYURL.COM/CLQAQ5V	TINYURL.COM/ARCLM4J

GLOSSARY: • B: mono • C: colour • ppm: pages per minute

» Buying advice



Printers

Most printers are inkjet or laser models, and there are colour and mono flavours of each. Lasers tend to be more expensive to buy, but provide better-quality output, particularly where text is involved.

The price you pay in-store is only the beginning; also consider the cost of replenishing the ink and paper. Duplexing lets you print to

both sides of a sheet, saving paper but slowing output.

Multifunction printers can save you money if you also require scanning facilities; some models include copy and fax functions, too.

A USB port lets you connect a printer to a single PC, but built-in wireless networking allows it to join a home or office network.

A memory card slot will let you bypass a PC for printing.

Never trust a manufacturer's claimed print speeds; we run our own tests to properly assess each printer's performance.

High-capacity paper trays and auto document feeders are also worth looking for.

READ MORE: TINYURL.COM/BUX9QM0

External hard drives	    				
	1	2	3	4	5
	Axtremex Micro SSD	WD My Passport Edge for Mac	G-Technology G-Drive Pro	G-Tech G-Raid Thunderbolt	Toshiba Stor.E Basics
Price	£130 inc VAT	£70 inc VAT	£250 inc VAT	£599 inc VAT	£100 inc VAT
Website	Axtremex.com	Wdc.com/en	G-technology.com	G-technology.com	Toshiba.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Capacity tested	32GB	500GB	4TB	8TB	2TB
Capacity range	32GB to 256GB	500GB	2TB to 4TB	4TB to 8TB	320GB to 2TB
Disk size	2.5in	2.5in	3.5in	3.5in	2.5in
Spin speed	N/A	5400rpm	7200rpm	7200rpm	5400rpm
Transfer speed	400GB/s	94MB/s (USB 3.0)	N/A	329MB/s	94MB/s (USB 3.0)
Encryption	None	Password protection	None	None	None
Other interfaces	None	None	FireWire 800	None	none
Software	Axtremex utilities	WD utilities	None	None	None
Dimensions	73x38x10mm	112x83x11mm	235x130x46mm	235x130x85mm	119x79x21mm
Weight	58g	164g	1.35kg	2.3kg	215g
Warranty	1 year	3 years	3 years	3 years	1 year
Verdict	<ul style="list-style-type: none"> • Stunning performance • Requires USAP-enabled USB 3.0 ports for the best performance 	<ul style="list-style-type: none"> • Not just for Macs • Password protection • Faultless build quality • Great value 	<ul style="list-style-type: none"> • 120Mb/s average real-world performance • Clearly audible • Suits both PCs and Macs 	<ul style="list-style-type: none"> • Fast Thunderbolt interface • Real-world speed can exceed 200MB/s • Pricey, but huge capacity 	<ul style="list-style-type: none"> • Good value for money • Unashamedly simple • No backup or encryption • Slow speed
FULL REVIEW	TINYURL.COM/KTRDXUH	TINYURL.COM/BMG7SW9	TINYURL.COM/NV7F32F	TINYURL.COM/CXEF6MH	TINYURL.COM/LBHC8EL

NAS drives	    				
	1	2	3	4	5
	Synology DS413j	Synology DS413	Synology DS412+	Qnap TS-1079 Pro	Zyxel NSA325
Price	£265 inc VAT (diskless)	£415 inc VAT (diskless)	£455 inc VAT (diskless)	£2,265 inc VAT (diskless)	£85 inc VAT (diskless)
Website	Synology.com	Synology.com	Synology.com	Qnap.com	Zyxel.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Drive bays	4	4	4	10	2
Processor	1.6GHz Marvell mv6282	1067MHz Freescale P1022 dc	2.13GHz Intel Atom D2700	3.3GHz Intel Core i3-2120	1.6GHz processor
Memory	512MB DDR3	1GB DDR3	1GB DDR3	2GB DDR3	512MB DDR2
Remote access	✓	✓	✓	✓	✓
eSATA	x	✓	✓	✓	x
USB port	2x USB 2.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0, 4x USB 2.0	2x USB 2.0
Raid options	0/1/5/6/10/JBOD	0/1/5/5+s/6/10/JBOD	0/1/5/5+s/6/10/JBOD	0/1/5/5+hs/6/6+hs/10/10+hs/JBOD	0/1/JBOD
Software	DSM 4.1	DSM 4.1	DSM 4.1	Qnap QBack, MyCloudNAS	zPilot
Dimensions	184x168x230mm	165x203x233mm	165x203x233mm	218x327x321mm	108x205x147mm
Weight	2kg	2kg	2kg	9.8kg	1.8kg
Warranty	2 years	2 years	2 years	2 years	1 year
Verdict	<ul style="list-style-type: none"> • Much cheaper than DS413 • Aimed at small-office and home users • No USB 3.0 or eSATA 	<ul style="list-style-type: none"> • More powerful than DS413j, but less so than DS412+ • Versatile, friendly interface • Cloud Station indispensable 	<ul style="list-style-type: none"> • Brilliant read/write performance eclipses the DS413 models • Attractive and intuitive 	<ul style="list-style-type: none"> • Up to 10 bays • Very powerful processor • Fast performance • Strong specifications 	<ul style="list-style-type: none"> • Cheapest drive here • Decent performance and features for the money • Complex interface
FULL REVIEW	TINYURL.COM/PL8XM8S	TINYURL.COM/B562XW3	TINYURL.COM/6UUL4DE	TINYURL.COM/PAAYD4Y	TINYURL.COM/7B9EPW8

» Buying advice



NAS drives

NAS drives are ideal for businesses or home users who require large amounts of dependable and secure storage, accessible to anyone logged into the local wired or wireless network.

Instead of connecting a hard disk directly to one PC, the NAS is connected to a network via a router. Many NAS drives are






typically supplied without disks, letting you add your own selection.

Most NAS drives allow virtual partitions, letting you keep data such as PC backups separate from media files. Home-oriented NAS drives also include media servers to allow easy streaming of content.






To augment data integrity, access speed, capacity, or all

three, individual hard disks can be combined in a number of Raid configurations. Raid 0 'stripes' data across multiple drives to increase access speeds. Raid 1 mirrors the contents of one drive on to another, providing a cloned backup. Raid 5 is available with three-plus drives and combines both advantages.

READ MORE: [TINYURL.COM/7H3HCNR](http://tinyurl.com/7H3HCNR)

Projectors	    				
	1	2	3 <small>PC ADVISOR RECOMMENDED</small>	4	5
	Epson EB-1945W	BenQ W1070	ViewSonic PJD7820HD	Vivitek Qumi Q2	Dell M900HD
Price	£1,310 inc VAT	£650 inc VAT	£670 inc VAT	£350 inc VAT	£754 inc VAT
Website	Epson.co.uk	Benq.co.uk	Viewsoniceurope.com/uk	Vivitek.co.uk	Dell.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Projection technology	3LCD	DLP	DLP	DLP	DLP
Resolution (pixels)	1280x800	1920x1080	1920x1080	1280x800	1280x800
Brightness ¹ , Contrast	4200, 3000:1	2000, 10000:1	3000, 15000:1	300, 2500:1	900, 700:1
Image size	280in	235in	300in	30-90in	80in
Supported aspect ratios	16:10, 16:9, 4:3	16:9	16:9, 4:3	16:10, 16:9, 4:3	16:10, 16:9, 4:3
Noise levels (dB)	37 (29 eco)	33 (30 eco)	35 (29 eco)	32 (28 eco)	38 (34 eco)
Connections	VGA, HDMI, DP, CM, USB, ET	VGA, HDMI, CM, USB	VGA, HDMI, CM, USB	VGA, HDMI, USB	HDMI, USB, WiDi
Lamp/lamp life	Not supplied/2500 hrs	240W/6000 hrs	Not supplied/5000 hrs	LED/30000 hrs	LED/30000 hrs
Dimensions	377x271x108mm	312x244x109mm	268x221x84mm	162x102x32mm	232x164x43mm
Weight	3.9kg	2.65kg	2.1kg	635g	1.59kg
Warranty	5 years	2 years	3 years	3 years	1 year
Verdict	<ul style="list-style-type: none"> • Incredibly easy to find optimum image quality • Strong spec and quality • Not particularly portable 	<ul style="list-style-type: none"> • Good home cinema output • Short-throw lens creates big picture • Very good SmartEco option 	<ul style="list-style-type: none"> • 3000 ANSI lumens • Short-throw lens • Good colour depth • 3D option 	<ul style="list-style-type: none"> • Now fantastic value • Lightest model here • DLP-Link enables 3D display • Exceptional lamp life rating 	<ul style="list-style-type: none"> • Wonderfully petite, portable • WiDi and Miracast for wireless/portable devices • Will struggle in light offices
FULL REVIEW	TINYURL.COM/CP95P7G	TINYURL.COM/LXADR7Q	TINYURL.COM/D2H04CV	TINYURL.COM/3TXMWPK	TINYURL.COM/MAXQRG3

¹Ansi lumens GLOSSARY: • CM: component • CP: composite • ET: ethernet • SV: S-Video

Solid-state drives	    				
	1 <small>PC ADVISOR GOLD</small>	2 <small>PC ADVISOR RECOMMENDED</small>	3 <small>PC ADVISOR RECOMMENDED</small>	4 <small>PC ADVISOR RECOMMENDED</small>	5 <small>PC ADVISOR RECOMMENDED</small>
	Samsung 840 EVO	Plextor M5 Pro	Crucial M500	Samsung 840 Pro	Corsair Neutron GTX
Price	£380 inc VAT	£174 inc VAT	£275 inc VAT	£367 inc VAT	£190 inc VAT
Website	samsung.com/uk	Plextor.com	Crucial.com/uk	Samsung.com/uk	Corsair.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Capacity tested	750GB	256GB	480GB	512GB	240GB
Price per GB	51p	68p	57p	72p	79p
Memory cache	1GB LPDDR2	512MB DDR3	512MB DDR3	512MB LPDDR2	256MB DDR2
Controller	Samsung MEX (3-core ARM)	Marvell 88SS9187	Marvell 88SS9187	Samsung MDX (3-core ARM)	Link_A_Media LM87800
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	AES 256-bit	None
Flash	Samsung 19nm Toggle NAND	Toshiba Toggle NAND	Micron 20nm MLC NAND	Samsung 21nm Toggle NAND	Samsung/Tosh Toggle NAND
Firmware updated via	SSD Magician for Windows	ISO boot disc	ISO boot disc	SSD Magician for Windows	SSD Toolbox for Windows
ATTO peak sequential	R: 554MB/s; W: 537MB/s	R: 547MB/s; W: 457MB/s	R: 539MB/s; W: 433MB/s	R: 562MB/s; W: 519MB/s	R: 557MB/s; W: 511MB/s
CDM peak IOPS	104k (read)	103.3k (read)	89.8k (read)	103.8k (read)	92.8k (read)
AS SSD (points)	1141	1124	1038	1094	1057
Warranty	5 years	5 years	3 years	5 years	5 years
Verdict	<ul style="list-style-type: none"> • Lightning performance • 840 Pro is slightly faster • Great value for money • Good longevity 	<ul style="list-style-type: none"> • High performance figures • Nowhere near the value per gigabyte of the EVO • Very durable 	<ul style="list-style-type: none"> • Best value of all SSDs here • Good security • Decent speed • Multiple OS support 	<ul style="list-style-type: none"> • Impressive speed • Three-core ARM processor • Limited platform support • Bluetooth issues on test 	<ul style="list-style-type: none"> • Strong write performance • Nice weight and warranty • Choice of models available • Unusual choice of controller
FULL REVIEW	TINYURL.COM/L5EDQOY	TINYURL.COM/PTYGG27	TINYURL.COM/M2NCSMJ	TINYURL.COM/OU4LEJG	TINYURL.COM/KV954FC

» Buying advice



Projectors

Projectors designed for home use don't tend to be as bright as office models - anything offering fewer than 1000 ANSI lumens will be usable only in a dark room. And don't forget that the brightness drops as the image size increases.

The cheapest home-cinema models offer a 720p resolution, but you'll notice the extra detail

of 1080p when watching Blu-ray films on a large screen.

If you can't place the projector square-on to the screen, look for a model with lens shift. Keystone correction is a cheaper alternative, altering the image digitally, but degrading quality in the process.

A zoom function offers more flexibility over how far from the

screen you can site the projector.

If it's to go in a small room, get a short-throw model that produces a large image over a short distance.

DLP projectors offer better contrast and punchier colours than LCD models, but can suffer from the distracting and sometimes nauseating 'rainbow effect'.

READ MORE: TINYURL.COM/6MTMWJX

Sub-£150 graphics cards	1	2	3	4	5
	MSI GTX 650 Ti OC Boost	Sapphire HD 7770	HIS HD 7790	MSI GeForce GTX 650	Sapphire Radeon HD 7750
Price	£140 inc VAT	£90 inc VAT	£105 inc VAT	£85 inc VAT	£80 inc VAT
Website	Uk.msi.com	Sapphiretech.com	Hisdigital.com	Uk.msi.com	Sapphiretech.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	nVidia GTX 650 Ti Boost	AMD Radeon HD 7770	AMD Radeon HD 7790	nVidia GeForce GTX 650	AMD Radeon HD 7750
Installed RAM	2GB GDDR5	1GB GDDR5	1GB GDDR5	1GB GDDR5	1GB GDDR5
Memory interface	192-bit	128-bit	128-bit	128-bit	128-bit
Core/memory clock	1033MHz/1502MHz	1GHz/1125MHz	1075GHz/1.6GHz	1071MHz/1250MHz	800MHz/1125MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	768	640	896	384	512
Power connectors	1x 6-pin	1x 6-pin	1x 6-pin	1x 6-pin	None
Interface	PCI Express	PCI Express	PCI Express	PCI Express	PCI Express
DirectX	11	11.1	11	11	11
Digital interface	2x DVI, HDMI, DisplayPort	DVI, HDMI, Mini DisplayPort	2x DVI, HDMI, DisplayPort	2x DVI, Mini HDMI	DVI, HDMI, DisplayPort
Warranty	3 years	3 years	3 years	3 years	2 years
Verdict	<ul style="list-style-type: none"> Fantastic performance 192-bit memory interface Boost clock to 1098MHz Fairly quiet for the power 	<ul style="list-style-type: none"> Faster than 650 and 7750 Decent value for money Plenty of stream processors Low sound levels 	<ul style="list-style-type: none"> 650 Ti Boost much faster Becoming better value Only 128-bit memory Low noise 	<ul style="list-style-type: none"> Marginally slower than 7770 Superb overclocking Very different to 650 Ti MSI version has second fan 	<ul style="list-style-type: none"> Cheapest card in the chart Low specs include 800MHz core clock Lacks power in some games
FULL REVIEW	TINYURL.COM/DYE3OW8	TINYURL.COM/BWJ7BL9	TINYURL.COM/BPRUYS5	TINYURL.COM/AKT2XOM	TINYURL.COM/7ZB5OE3

£151+ graphics cards	1	2	3	4	5
	MSI GeForce GTX 760 OC	MSI GTX 660 Ti	Asus GeForce GTX 770 2GB	XFX 7970 3GB GDDR5	Asus GeForce GTX 780 3GB
Price	£200 inc VAT	£175 inc VAT	£340 inc VAT	£270 inc VAT	£570 inc VAT
Website	Uk.msi.com	Uk.msi.com	Uk.asus.com	Xfxforce.com	Uk.asus.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	nVidia GeForce GTX 760	nVidia GeForce GTX 660 Ti	nVidia GeForce GTX 770	AMD Radeon HD 7970	nVidia GeForce GTX 780
Installed RAM	2GB GDDR5	2GB GDDR5	2GB GDDR5	3GB GDDR5	3GB GDDR5
Memory interface	256-bit	192-bit	256-bit	284-bit	384-bit
Core/memory clock	1006MHz/1502MHz	941MHz/6008MHz	1058MHz/1752MHz	925MHz/1375MHz	863MHz/1502MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	1152	1344	1536	2048	2304
Power connectors	1x 6-pin, 1x 8-pin	2x 6-pin	1x 6-pin, 1x 8-pin	1x 6-pin, 1x 8-pin	1x 6-pin, 1x 8-pin
Interface	PCI Express	PCI Express	PCI Express	PCI Express	PCI Express
DirectX	11	11	11	11.1	11
Digital interface	2x DVI, HDMI, DisplayPort	2x DVI, HDMI, DisplayPort	2x DVI, HDMI, DisplayPort	DVI, HDMI, 2x Mini DisplayPort	2x DVI, HDMI, DisplayPort
Warranty	2 years	2 years	3 years	2 years	3 years
Verdict	<ul style="list-style-type: none"> Performance in a different league to sub-£250 cards Not many stream processors or texture units 	<ul style="list-style-type: none"> Sub-£175 price pushes it back into the competition Can't compete with 760, but quieter and uses less power 	<ul style="list-style-type: none"> 660 Ti and 760 offer better value for money Good price/performance Vast 22GB/s memory 	<ul style="list-style-type: none"> Performance barely superior to cheaper 760 3GB of RAM Look out for price drops 	<ul style="list-style-type: none"> Removes the Titan's Compute capabilities Very expensive Best choice for gaming
FULL REVIEW	TINYURL.COM/OPSNB5K	TINYURL.COM/D5BV2NG	TINYURL.COM/OAG6277	TINYURL.COM/6UZRVXC	TINYURL.COM/PN43VTL

>> Buying advice



Graphics cards

The key feature of a graphics card is its GPU. Produced by AMD or nVidia, this determines the quality of images displayed and their refresh speed. The more powerful the GPU the better, but you can get away with a lesser card by turning down a game's detail levels.

Even those on a budget should be able to get at least 1GB of DDR

video memory. Look for GDDR5 rather than GDDR3 RAM. This in effect quadruples the clock speed (GDDR3 merely doubles it).






The memory interface (or bus) governs how much data can be sent at once, so a 256-bit interface lets through twice as much data as a 128-bit interface. Graphics cards with the best combination of memory interface size and






clock speed should produce the best performance.

DirectX 11.x support is required for advanced, modern games; cheaper cards lack the firepower to do such titles justice, however.

Check that a card will fit inside your PC and you have sufficient connections from the power supply unit before you buy.

READ MORE: [TINYURL.COM/7BPUHQE](http://tinyurl.com/7BPUHQE)

Sub-£200 flat-panels	    				
	1	2	3	4	5
	Dell S2440L	ViewSonic VP2365-LED	BenQ GW2750HM	Hanns-G HL249DPB	ViewSonic VX2460H-LED
Price	£198 inc VAT	£172 inc VAT	£200 inc VAT	£116 inc VAT	£157 inc VAT
Website	Dell.co.uk	Viewsoniceurope.com/uk	Benq.co.uk	Hannsg.com	Viewsoniceurope.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	24in	23in	27in	23.6in	23.6in
Panel type	Vertical alignment	In-plane switching	Vertical alignment	Twisted nematic	Twisted nematic
Native resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Pixel pitch	0.28mm	0.27mm	0.31mm	0.27mm	0.27mm
Brightness	239cd/m²	238cd/m²	313cd/m²	247cd/m²	250cd/m²
Static contrast ratio	1200:1	681:1	1530:1	740:1	710:1
Response time	6ms	6ms	6ms	5ms	5ms
Ports	HDMI, VGA	DVI	HDMI, DVI, VGA	DVI	2x HDMI
Dimensions	568x191x418mm	548x433x250mm	654x489x191mm	563x211x403mm	581x447x194mm
Weight	3.6kg	5.4kg	5.6kg	3.8kg	3.5kg
Warranty	3 years	3 years	3 years	3 years	3 years
Verdict	<ul style="list-style-type: none"> Recent price drop Premium build quality Very good VA panel Calibrate for best results 	<ul style="list-style-type: none"> Can't match Dell's quality Still strong value Good viewing angles DVI port only 	<ul style="list-style-type: none"> Price up as supplies fall Massive 27in screen VA panel is excellent Colour accuracy not perfect 	<ul style="list-style-type: none"> Low price Pleasing image quality Low power consumption Only a TN panel 	<ul style="list-style-type: none"> Slim and stylish looks Good range of inputs One of the better examples of TN technology
FULL REVIEW	TINYURL.COM/CXWJJLM	TINYURL.COM/5WMJLR9	TINYURL.COM/BQKT65S	TINYURL.COM/C95859A	TINYURL.COM/CSQ2H7P

£200+ flat-panels	    				
	1	2	3	4	5
	BenQ GW2760HS	LG 29EA93	Asus PA248Q	ViewSonic VP2765-LED	AOC I2757Fm
Price	£220 inc VAT	£370 inc VAT	£315 inc VAT	£273 inc VAT	£230 inc VAT
Website	Benq.co.uk	Uk.lge.com	Asus.com/uk	Viewsoniceurope.com/uk	Aoc.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	27in	29in	24in	27in	27in
Panel type	A-MCA	In-plane switching	In-plane switching	Advanced MVA	In-plane switching
Native resolution	1920x1080	2560x1080	1920x1200	1920x1080	1920x1080
Pixel pitch	0.31mm	0.26mm	0.27mm	0.31mm	0.31mm
Brightness	300cd/m²	300cd/m²	201cd/m²	1,200cd/m²	237cd/m²
Static contrast ratio	950:1	560:1	630:1	378:1	660:1
Response time	4ms	5ms	6ms	25ms	5ms
Ports	HDMI, DVI, VGA	3x USB 3.0, 2x HDMI, DVI, DP	4x USB, HDMI, DVI, DP, VGA	DVI, DP	2x HDMI, VGA
Dimensions	472x191x623mm	700x209x387mm	557x416x235mm	642x365x474-608mm	622x449x130mm
Weight	4.5kg	5.2kg	6.4kg	8.5kg	5.7kg
Warranty	2 years	2 years	3 years	3 years	3 years
Verdict	<ul style="list-style-type: none"> Stunning value for a 27in screen this good Almost true 1,000:1 contrast Just becoming available 	<ul style="list-style-type: none"> 21:9 ultra widescreen Very accurate colours Hardware calibration support Three-port USB 3.0 hub 	<ul style="list-style-type: none"> For graphics professionals Good control over image Very accurate colour 16:10 display ratio 	<ul style="list-style-type: none"> Now at a great price Large 27in display Low resolution for size Slow response for games 	<ul style="list-style-type: none"> Nice 27in IPS panel Versatile viewing angles MHL Android hook-up Last few remaining
FULL REVIEW	TINYURL.COM/NF3WVFY	TINYURL.COM/CTR7AAW	TINYURL.COM/CPYX7MQ	TINYURL.COM/86T3PFM	TINYURL.COM/C53K8KP

>> Buying advice



Flat-panel displays

You'll spend most of your working day staring at the screen, so it makes sense to choose one that's comfortable to view.

The panel size will largely depend on your budget and amount of desk space, but those measuring 22in and above tend to offer a full-HD resolution. All bar the cheapest models also have at

least one digital interface (DVI, HDMI or DisplayPort). VGA (or D-Sub) is an analogue interface, and won't provide as clean a signal.

The panel technology is important. Twisted nematic (TN) is the budget option, offering fast response times but limited viewing angles. Multiple vertical alignment (MVA) and patterned vertical alignment (PVA) screens offer

better viewing angles and higher contrast ratios than TN, but slower response times. Advanced MVA screens are more responsive.

In-plane switching (IPS) panels offer excellent viewing angles, contrast and colour accuracy, but they can be rather pricey.

Get a matt rather than gloss coating for fewer reflections.

READ MORE: TINYURL.COM/6RMBVR6

MATT EGAN



Hudl proves the Apple premium is not worth paying

We review products based on performance, design and build, then consider value before offering an objective verdict and star rating. That doesn't stop readers accusing us of bias. Such is life in the post-web world. One particular gripe is a perceived bias toward Apple.

Where other PC makers use the components available to build products that give users what they want, Apple conceives of products it thinks people will love. It never uses focus groups, seeking to intuitively provide the public with things they never knew they wanted. As Henry Ford said: "If I had asked people what they wanted, they would have said faster horses." Apple doesn't do faster horses.

This adds a premium to Apple prices. The company makes a consistent profit on every product, based on the cost of components and a healthy margin. It's fair, if a little steep. But when considering, say, the Macbook Air against every other Ultrabook, it makes sense to plump for Apple. The same is no longer true in the mobile world. The iPhone and the iPad were for a long time ahead of all smartphones and tablets. Android was a mess, with hardware only ever on a par with Apple, costing more. That's just not the case these days.

A look at our smartphone chart (page 132) shows that handsets from Sony, LG and Samsung are all capable of duking it out with the iPhone 5s, and all cost less. (And that's before the Nexus 5 launches.) Yes, the iPhone 5s remains unsurpassed in terms of the responsiveness of the touchscreen and the beauty of the build, but with Android you have a choice of music and movie stores, and most high-end Androids are sufficiently sturdy as to not require a case.

You don't have to choose an inferior product to avoid paying the Apple premium. And that is even more the case in the world of tablets. While basic Android tablets from no-name makers tend to be poor value, manufacturers such as Google, Amazon and Barnes & Noble subsidise their products to sell them cheaper than competing Apple iPads, for a variety of reasons. And now Tesco has entered the fray. The Tesco Hudl (see reviews, page 32) is a well-designed and -built tablet that offers full access to Google Play. And it costs less than half the iPad mini.

Tesco knows it can shift a load of these tablets this Christmas, and it has included Tesco shopping and Club Card apps to encourage further purchases. It uses the Hudl to promote other services such as Blinkbox, but like the Nexus and Nook devices you aren't locked to the manufacturer's own services.

For the first time in a long time the choice in the tablet- and smartphone space is not pay Apple's premium or get an inferior product.



Next issue

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GRAPHICS: AMD 7870 Tahiti 2048MB GDDR5



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GRAPHICS: NVIDIA GTX650Ti Boost 2048MB GDDR5



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MEMORY: 8GB 1600MHz DDR3 (32GB Max)
STORAGE: 120GB SSD / 1TB SATA Hard Drive
GRAPHICS: GeForce GTX760 OC 2048MB GDDR5

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CPU: Intel i5 Haswell 3.40GHz (Overclocked to 4.2)
MEMORY: 8GB 1600MHz DDR3 (32GB Max)
STORAGE: 250GB SSD / 2TB SATA Hard Drive
GRAPHICS: NVIDIA GTX770 2048MB GDDR5



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