

PC ADVISOR

29 BUDGET LAPTOPS

TESTED

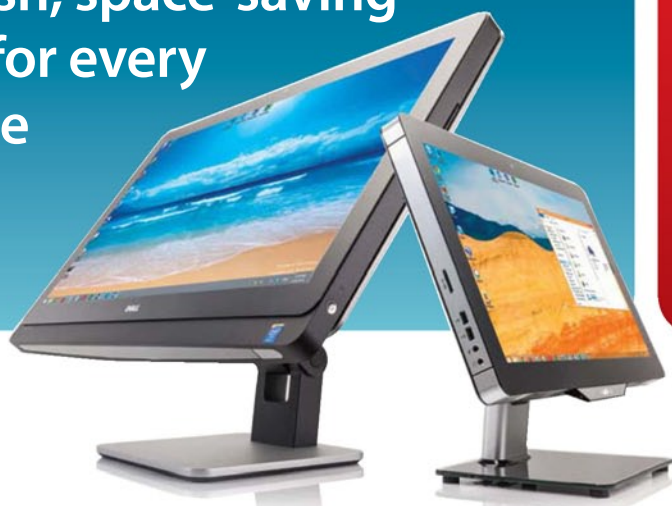
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The PC is not dead

People may be buying fewer laptops and desktops than ever before, but the humble PC certainly isn't being ousted by the upstart tablet

Computer sales are set for massive decline, ousted by the growing popularity of laptops, tablets and smartphones... if you believe the headlines. Look past the hype and it's plain to see the PC's demise is nonsense. So why aren't people buying desktops so frequently?

For one thing, PCs last longer. Whereas once there was a constant need for more processing power - hence you regularly bought a new machine - that's rarely an issue now. Even the budget laptops we review from page 66 are more than fast enough for most people's needs. And that's probably also the case with the PC you bought four years ago: you just don't need a new one yet.

'Customers want mobility, not a bulky PC' is an argument often cited by analysts, yet portability isn't a factor for everyone. Tablets have their place but, if we're brutally honest, they're still gadgets, non-essential toys if you like, and cannot compete with a PC in terms of productivity.

Who in their right mind would give up their large, high-resolution screen and mouse and choose to edit photos or home videos on their tablet or smartphone? It's eminently possible to do so, but far from preferable.

Take the brilliant all-in-ones from Dell and Apple in our group test on page 58, for example. Their 27in screens are ideal for seeing the details in photos and video, while keeping the editing tools in view. These stylish, space-saving PCs are underrated, in our view.

Another credible reason for the slump in PC buying is that people are choosing a laptop instead of a desktop. Trading screen size for the benefit of a full-blown Windows experience that you can use on the sofa or even when travelling is a compromise worth making for many.

However, it's possible that manufacturers are pandering too much to the concept of a laptop that can convert into a tablet, thereby becoming all things to all men. These hybrid or 'convertible' devices with rotating, twisting touchscreens are perhaps too confusing (or aren't being properly demonstrated in-store) and put off prospective buyers.

You could even blame Windows 8, with its radical Start screen and associated learning curve, but the fact remains that people still turn to Windows PCs for productivity. A recent survey carried out on behalf of Intel by IDC in June showed that 83 percent of respondents were more productive on a PC than on a tablet or smartphone.

This highlights where PC makers could be going wrong. People want to buy inexpensive laptops and PCs that are simply good at getting things done, without them trying to be an oversized tablet as well. ☒



58 ALL-IN-ONE PCs



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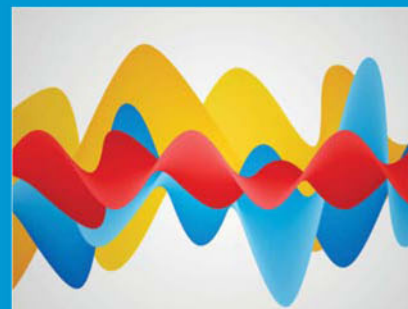
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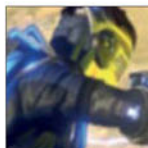
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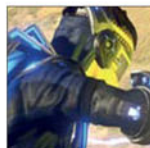
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Pretty pictures

I wanted to thank you for your excellent and somewhat revealing article in the latest issue of the magazine (*Sell music online*, October issue, page 98). I was pleasantly surprised to see the full-spread picture of a lovely young lady who certainly made my day. I was so taken by her obvious and visual delight that it took me a while to start reading your article. Sorry about that!

I'm of the opinion that more pleasant pictures such as this, where printing space allows, would certainly help toward the sales of the magazine. I hope you agree!

Ray Cutts

Driverless cars

I love the idea of driverless cars (October issue, page 20), but I can't help worrying that we're asking for trouble. What happens when LIDAR crashes at 120mph, ahem, 70mph on the motorway? I wouldn't like to think. **J Simpson**

Free antivirus: any good?

We rounded up our pick of the best free antivirus suites with which to protect your PC from malware at tinyurl.com/p64usnk. But how do they fare against paid-for utilities?

"Working in IT I would say that free antivirus products offer some protection, and using one is better than using nothing at all. Anyone who does not use any form of protection is taking a huge risk.

"However, I would rather pay for security software with the knowledge that the company is willing to invest in its product. I'm very happy with my current solution, and I can't remember the last time I was struck down by a virus," wrote Jay.

O2 announces 4G data plans

O2 has finally got in on EE's 4G act by announcing its own 4G data plans, offering 1-, 5- or 8GB of data (see tinyurl.com/k2b7eg2). But is even 8GB enough?

"I still don't get the point of a 4G plan with a data cap. All that's going to happen is that using 4G I'll go over my limit 10 times quicker and start racking up charges. Unless I can get an unlimited data plan I'm not interested," wrote SiPA.



Windows 8.1: a great upgrade

"I've been using the preview since it was released. I love Windows 8 anyway, but the changes are a vast improvement. Just little things, such as newly installed programs not cluttering the Start screen with numerous icons for the same program, having the desktop wallpaper duplicated on the Start screen, and more customisation options for the live tiles make it a joy to use. I can't wait for the official release," wrote Wayne Storton.

PlayStation 4 vs Xbox One

With two exciting new games consoles due for release, we compared the PS4 and Xbox One (see tinyurl.com/L2mgajm). But we like Rory Pino's idea: "I'm just buying both. Problem solved," he wrote.

Flagged: Star letter

Cameron's internet censorship plan vs freedom of speech

The PM can be commended for his proposal to make the internet safer and friendlier for family usage. But censorship in any form can be a double-edged sword: once a law or new technology have come in to being, they can be used by any body for any purpose.

Heavy-handed censorship of pornography could inadvertently or deliberately restrict access to other material, including that which might be embarrassing to a government.

A particular issue is how censorship will be applied to unmoderated and anonymous areas of the web, which are crucial in allowing free speech and exposing corruption.

I ask Cameron to fully consult internet users before making any drastic changes. While some find pornography offensive, many more take offence at losing their freedom of speech. **AR Wainwright**

Matt Egan, editor-in-chief, replies: In general I agree with your sentiment, Mr Wainwright. But the PM is proposing an opt-in to a web filter that prevents certain sites from being viewed locally. It is not strictly censorship because nothing is being taken down or universally blocked, and individuals can choose to opt out.



Our Star letter writer wins a 120GB Crucial MX500 SSD, worth £90. For your chance to win, tell us your thoughts on any tech issue:

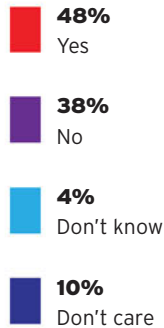
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Do you agree with the government's plan for opt-out internet porn filtering?



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Internet porn filtering

PM David Cameron recently announced plans to force UK consumers to opt-in via their ISP if they want to look at pornography on the internet. For more details see tinyurl.com/ndj92oe.

morddwyd After 20-plus years of trying, the government has succeeded in censorship of the internet. Stand by for 20 years of it trying to work out how to tax it. Pornography is not my scene, and corrupting children should mean life [in prison], but this is a bad day for freedom of expression.

lotvic Sounds good to me, I won't have to worry so much about the grandchildren surfing the internet when they come to visit.

canarieslover I can't agree to government intervention to achieve what every sensible parent should be doing to protect their children anyway. As for adults, they are old enough to make up their own minds.

rdave13 I can choose what my children or grandchildren 'see' when they use the internet in my house. I am the censor who does this; I don't want another Big Brother to stifle my freedom even more. If I wanted internet censorship I'd live in China.

fourm member You can't stop truly evil people exchanging their child-abuse material unless you find a way to control Tor, and Cameron knows he can't easily do that. Plus, it will not prevent children from finding pornography if they go looking for it, and it is those who need the guidance.

HondaMan This is simply adding to the 'nanny state' governing everything we do. We are already one of the most watched nations in the world and yet we claim to have freedom. What rubbish. ☒

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Waterproof phones

We posted a video review of the Samsung Galaxy S4 Active, the waterproof version of the company's flagship S4. *Keith Pmsl* was pleased to learn that the smartphone maker was taking steps to avoid water damage.

"The main reason companies are waterproofing phones is the high volume of claims for water damage. This is understandable, but it will benefit both parties: people who drop their phones in puddles or toilets will not have to go through the rigmarole of making a claim and potentially losing whatever data was on their phone. This is a great idea where everyone wins," he wrote.

Windows 8.1 release confirmed

Microsoft has announced that the Windows 8.1 update will be available on 17 October. The update will be delivered free via the Windows Store.

"No! I moved from Vista to Windows 8 only a week ago - I can't cope with the stress of it all!" wrote *Annie Daniel*.

Allan Greagsbey was more optimistic, and wrote: "I'll be updating to Windows 8.1 when it comes out."

BlackBerry: for sale

With the news that BlackBerry had in essence put itself up for sale, we wondered where it all went wrong for the once successful mobile giant (see page 22).

Matthew Russell wrote: "It's no surprise. BlackBerry had its chance, but it was too late to market with new mobiles when other manufacturers were releasing phones with decent hardware and software. Plus, BlackBerry World contains barely any apps."

iPhone 5C

Rumours are hotting up that Apple will soon launch a budget iPhone. *Ndumiso Dominic Mncwango* already has an iPhone, but he can't wait for the '5C'. "I want to jailbreak it, I don't want to jailbreak my iPhone 5," he wrote.

Opt-out porn plans

It's a hot topic this month, and you guys have also been debating Cameron's anti-porn plans on our Facebook page.

"I think it should be about increasing the knowledge of adults so they know how to protect their children. Plus, there's more out there than porn that you wouldn't want your children getting to," wrote *Jake Hancke*.



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WINDOWS RT STRUGGLES ON

Microsoft's hardware partners pull out after slow sales for Windows RT, but Surface RT 2 is inbound

A number of big-name device makers have dropped Windows RT, signalling the beginning of the end for the cut-down OS.

Asus is one of those to bow out of the RT game following weak sales. CEO Jerry Shen said: "It's not only our opinion. The industry sentiment is also that Windows RT has not been successful."

Shen said that Asus took a write-down on its Windows RT tablets during the second quarter and will now focus on Windows 8 devices running Intel chips.

Lenovo has discontinued its Yoga 11, HTC has cancelled its plans for an RT tablet and Samsung is rumoured to be stopping its Windows RT production. Toshiba and HP will also be making only x86 devices.

Toshiba said: "For the time being, Toshiba will focus on bringing Windows 8 products to market. We will continue to look into the possibility of Windows RT products, while monitoring market conditions."

HP said: "The robust and established ecosystem of x86 applications provides the best customer experience at this time."

Who's left?

Well, there's Dell. And Acer hasn't dropped RT just yet, but it has publicly stated that it won't be "so influential anymore". It's unsure about launching an RT tablet.

What went wrong?

Chip maker nVidia has put a large amount of the blame on the Windows RT operating system for its poor performance in the second quarter of 2013.

nVidia CEO Jen-Hsun Huang said: "Coming into the year we had pretty high expectations on one particular platform. It was a very important platform from which a lot of design wins were derived."

"And because this particular platform just didn't do as well as we or anybody in the industry had hoped, we don't expect as much return from our investment."

Although Windows RT wasn't specifically mentioned, it's not difficult to work out to which 'platform' Huang was referring. The Surface RT, Asus VivoTab RT and other RT tablets run on nVida Tegra 3 chips.

A second chance

With almost all Microsoft's partners opting out of the Windows RT world, things don't look great for the mobile operating system.

With its latest financial earnings report, Microsoft announced that it has taken a whopping \$900m (£577m) hit.

During July and August, both the Surface RT and Surface Pro received price cuts to boost sales. The former went from £399 to £279, a 30 percent reduction.

However, a leaked slide and the price cuts to the current tablets suggest that a new generation of Surface is on its way. A Surface RT 2 will give Windows RT a second chance, and could well arrive with Windows 8.1 in October. Nokia is also rumoured to launch a Windows RT tablet in September.

Although there's time for Windows RT to turn around its fortunes after a seriously bad start, it seems unlikely: a new version of Google's popular Nexus 7 is already on the market, while an update to the iPad and iPad mini is expected before Christmas.

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MICROSOFT CONFIRMS WINDOWS 8.1 RELEASE ON 17 OCTOBER

Free update to arrive in the Windows Store a year after Windows 8's launch

Microsoft has confirmed the release date for the update to its Windows 8 operating system. Windows 8.1 will launch on 17 October.

The firm said on the Windows blog that the Windows 8.1 update will go live at 12am on 18 October in New Zealand, which translates to midday on 17 October here in the UK. It will be available as a free download from the Windows Store.

Microsoft said on the Windows blog: "It's very exciting to be delivering Windows 8.1 to consumers just before Windows 8 celebrates its one-year anniversary.

"Windows 8.1 continues the vision we began with Windows 8 and it is an example of our commitment to continuous innovation and improvement for our customers."

Windows 8.1 adds a number of improvements and features to the operating system. Most noticeable is the refreshed Start screen, which can now include larger tiles and offers many more colour schemes and background wallpapers.

The update has also seen the return of the Start button, although its functionality is reduced. This button simply makes it easier to switch from the traditional desktop to the Start screen, and does not bring back the Start menu.



Microsoft has also said Windows 8.1 will include Internet Explorer 11, Bing-powered search, a better Windows Store and additional SkyDrive functionality.

If you can't wait until October then you can try the Windows 8.1 Preview version for free, but you should only do so with the understanding that the software is still in development and may contain bugs. Head to tinyurl.com/windows81prev.

New iPhones 'on their way', including a budget model

Apple's latest iPhone could be about to be announced, alongside a cheaper plastic companion



It's that time of year when a slew of new smartphones and tablets begin appearing on shop shelves ready for the Christmas sales period. Among the shiny new gadgets expected to arrive is, not one, but two new iPhones from Apple.

While Android has been rapidly growing in popularity, with a number of big launches from Samsung, Sony and HTC, it's been a quiet year for Apple. All eyes will be on the Cupertino company for its big reveal.

The iPhone launch event was expected on 10 September, just after this issue of *PC Advisor* went to press. Check out our website for announcements (pcadvisor.co.uk/news).

Based on previous iPhone launches, we expect Apple to launch the iPhone 5S rather than the rumoured iPhone 6. The device will be a faster, all-singing and all-dancing update to the company's iPhone 5.

Apple has already confirmed that iOS 7, the latest version of its mobile operating system, will launch in the autumn; it's almost a given that the iPhone 5S will be the launch device for the updated platform.

It is thought that the iPhone 5S will have the same 4in screen size as the previous model, but with a higher resolution that brings it into line with full-HD competitors.

The iPhone 5S may also be the first Apple smartphone to include NFC, with a fingerprint scanner embedded into the home button to allay Apple's NFC-related security fears. This scanner will be the first fruit of Apple's acquisition of security firm AuthenTec.

Apple is also expected to unveil a budget iPhone, thought to be called the 5C. It will be made from plastic rather than aluminium, and multiple leaked photos have shown the iPhone 5C in a range of colours.



BT Sport service launches in the UK

BT Sport has switched on its first channels in the UK, BT Sport 1 and 2. The service includes ESPN and is free to BT Broadband customers; other users will pay £12 per month. BT Sport will show 38 Premier League matches, plus rugby and tennis coverage. Read our BT Sport app review on page 46.

MORE: tinyurl.com/n83oo8e

Amazon adds digital downloads for software & games

Online retail giant Amazon has taken the plunge in the digital software and games market, allowing customers to download titles to PC or Mac. Consumers can also buy redeemable codes for sites such as Origin, Xbox Live and Microsoft's Office.com. Content can be re-downloaded any time from the Games and Software Library.

MORE: tinyurl.com/mg5g3wa



TalkTalk hauls 160,000 YouView customers

TalkTalk's YouView TV service has netted 160,000 subscribers over a three-month period. This is largely down to its partnership with Sky Sports and other on-demand content.

MORE: tinyurl.com/obsr4z

O2-, VODAFONE 4G SERVICES GO LIVE

EE finally has some competition, resulting in better choice for consumers

UK mobile operators O2 and Vodafone have at last launched their 4G LTE networks, offering consumers a 4G alternative to EE's service.

O2 and Vodafone have joined their resources and created a shared grid to speed up the rollout. This went live on 29 August.

At launch O2's network went live in London, Leeds and Bradford, reaching 5 million users. The mobile operator said 13 UK cities, including Birmingham, Newcastle, Glasgow, Liverpool, Nottingham, Leicester, Coventry, Sheffield, Manchester and Edinburgh, will be able to access 4G by the end of the year.

O2 CEO Ronan Dunne said: "Digital connectivity will be made ubiquitous by 4G and become the oxygen of modern life. It is our intention to use 4G to inspire the nation through the possibilities of technology, encouraging people to live more, do more and be more with O2."

Meanwhile, Vodafone's 4G network was switched on only in London, with a promise to cover 12 more UK cities by the end of the year.

Neither O2 nor Vodafone is offering an unlimited data plan; for those who already have



a 4G-capable smartphone, pricing starts at £26 per month for a SIM-only deal with 1GB of data. The maximum amount of data available is 8GB.

Extras are being thrown into the deal to entice customers. O2 is including a 12-month subscription to O2 Tracks, plus exclusive multiplayer online gaming, while Vodafone is offering up to two-year subscriptions for Spotify or Sky Sports Mobile TV.

Sky extends Now TV streaming service's reach

Sky Sports and Movies offered through more non-subscription platforms

Sky has partnered with LG to push its Now TV internet-streaming service.

Existing owners of LG Smart TVs will get exclusive access to Now TV via an app, while new purchases of TVs or home-entertainment gear will come with a three-month subscription to Now TV movies and three 24-hour passes for Sky Sports.

Craig West, head of marketing at LG UK, said: "The LG/Now TV joint multimillion pound investment to develop, launch and market the service demonstrates LG's continued commitment to bringing the best in home entertainment. LG is proud to be the first and only TV brand to offer consumers the benefits of the Now TV service"

Now TV offers non-Sky customers a simple way to access Sky Sports and Sky Movies. Consumers can opt to pay £8.99 per month for Sky Movies, or tune into Sky Sports for 24 hours for £9.99. Those new to Now TV can take advantage of a 30-day free trial.

Although only LG Smart TVs will come with the Now TV service, owners of other-branded sets can order a Sky Now TV Box for just £9.99,

including postage and packaging (see page 26).

The pint-sized media streamer is a rebranded Roku LT and brings smart features to almost any TV, including BBC iPlayer and Demand 5 content.

"Despite the explosion in connected devices such as Sky set-top boxes, games consoles and connected TVs, there are still up to tens of millions of regular TVs in the UK that cannot currently connect to the internet.

The Now TV box provides an affordable and simple way for any broadband-connected home to join the online TV revolution," said Sky. ☒



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The Quantified Self

Apps that monitor everything from your daily calorie intake to how well you sleep can help you to learn a great deal about yourself, plus ways to improve your lifestyle. Martyn Casserly explains

Statistics are a much maligned type of information. This could be due to the way they are often manipulated to bolster the arguments of less honest individuals, or the rather cold, impersonal nature of the medium itself. Of course, none of this distracts from the truth that stats are an incredibly useful way to analyse data. To many of us, though, the idea of reading through tables of figures is about as enticing as a camping trip in the Antarctic. But what if the data was all about you?

The increasingly digital nature of our lives means that it is now easy to track our behaviour in a variety of ways, using simple apps and a mobile phone or a computer. Everything from sleeping patterns to reading habits can be logged, stored and even publicly shared with a minimum of effort. There is a movement that promotes this kind of self awareness, dubbed 'The Quantified Self'. The term was coined by Gary Wolf and Kevin Kelly in 2007, after the two *Wired* writers saw the potential for tech to impact the way we live and look after our bodies.

"It's the idea that we can take something you care about," explains Kevin Kelly, "and use numbers to capture it, to sense it, to see it in a way we can't normally, and then to respond to that."

For many years people have recorded information about themselves in an effort to control ailments or help them maintain healthy diets. Diabetics constantly monitor their blood sugar levels, while anyone who joins a Weight Watchers programme seems to quickly become an instant expert on the calorific content of meals. The Quantified Self takes these principles and applies them, with the assistance of technology, to other areas in your life, allowing you to build up a picture of how productive, healthy and even happy you are.

Say, for example, you are struggling with sleeping. Downloading an app such as Sleep Cycle can turn your iPhone into a device that monitors your sleep patterns and then gives you a report of how long and deeply you've managed to slumber. If you also use a food diary app, possibly MyFitnessPal, then you might be able to spot patterns of certain

foods that could be keeping you awake. Incorporating an additional fitness app or pedometer would also show how exercise contributed to a good night's rest.

The collaborative nature of these data-collection apps can also give us insights into our psychological behaviour. Using a personal-finance app such as Mint can be a helpful way of seeing how and where you spend your money. Pairing it with the information from a health-related app such as Runkeeper could reveal that in the months you exercise less you spend more on comfort food or alcohol. Subconsciously we might already be aware of these facts, but seeing it in black and white can be a wake up call.

Data collection

Typically, the collection of this data occurs in two ways: passively and manually. Passive is when your phone gathers data without you needing to be directly involved. This is the approach favoured by apps such as Google Now or the Nike Fuelband, which monitor your movements and build up a picture of where you've been and the activities you've completed. The advantage to this is that, once configured, you can forget about it until you want to view the results.

Manual apps are more likely to involve a greater level of detailed data, which requires direct input by the user. The most common form is the calorie-counting apps such as MyFitnessPal and location services such as Foursquare.

Once you've amassed this information about yourself, you can then choose either to act upon it solo (adjusting the relevant behaviours and practices) or harness the power of positive peer pressure by heading to your social network of choice. Many fitness and nutrition apps have the option to post your progress to the web in an effort to motivate you. It is a principle that organisations such as Weight Watchers have used for years, whereby you weigh in at the start of a meeting so that everyone can see your progress. It might sound brutal but, provided that your friends are encouraging, it can be an excellent tool that helps you work toward a goal.

The current trend of gamification is another tool that many apps incorporate. Instead of a dry list of stats, users are instead set a series of challenges that are rewarded with badges, points or bragging rights with friends. These can range from streaks that are achieved by consistently hitting daily goals to animated celebrations when you reach a target. It might sound silly, but friends or even your smartphone telling you that you are making progress can have a positive effect on your outlook.

Privacy concerns


For some the idea of The Quantified Self is nothing more than intense digital navel gazing, and a number of privacy advocates are concerned by the amount of detailed data that users are already collecting during their day-to-day lives. This is certainly more of a thorny subject in light of the recent NSA/GCHQ spying scandal brought to the world's attention by Edward Snowden (see tinyurl.com/L88hhyx).

But the potential benefits to health, lifestyle and even social interaction makes The Quantified Self an endeavour that many exponents judge worthy of the risk. In fact, across the world there are now Quantified Self community groups that meet up to share their stories about self-tracking and how it has positively affected their lives.

"We're entering a new era of data," says community organiser Ernesto Ramirez, "not just about the things we're doing but who we are as people... and being able to make decisions based on that. Being able to experiment, to possibly make your life better than it is now."

Of course, people are more than a just series of statistics on a page. This is something that The Quantified Self movement understands, but it also sees the power that accurate data gives people to gain more control over their lives.

Wolf has a simple mantra that he uses to help people understand what, at its heart, the movement is all about and how it is relevant to everyone.

"What did you do?" he asks. "How did you do it? And what did you learn?" 

High PC prices hindering industry recovery

Customers are not willing to pay for high-priced Ultrabooks with Windows, says Agam Shah



As Samsung launches its Ativ Book 9 Plus laptop with Intel's latest Haswell chip, which costs \$1,400 in the US (the UK price is yet to be confirmed), analysts fear that sustained high prices for laptops and Ultrabooks could hinder the recovery of the PC market.

PC shipments are in a steady decline with the growing adoption of tablets, and buyers are not yet willing to pay a premium for machines running Windows 8. Most of the new laptops powered by Haswell chips, including Toshiba's latest Satellite laptops, are priced above £800, and buyers at this point are willing to pay a premium only for Apple products.

"The thought that you can sell a \$1,400 notebook is ridiculous. The mess is partly credited to Windows 8," said Roger Kay, president and principal analyst at Endpoint Technologies Associates.

Most of the Haswell laptops are still priced at £800 or more, with a few exceptions, such as Dell's Inspiron 15R, which is priced at £499 after a £70 discount. Intel has said it hopes to bring the Ultrabook prices to under £600 by the end of this year, although the processor type in those laptops has not been specified. It is likely that sub-£600 Ultrabooks will have the older Intel Core processors codenamed Ivy Bridge, as has happened in the past when other older CPUs were used in less-expensive Ultrabooks.

Laptop prices have stabilised and may even go up slightly because PC vendors are trying to position laptops as a premium product compared to tablets, said Mikako Kitagawa, a research analyst at Gartner.

"In general, many vendors stay away from the low-priced market and secure better margins on the mid- to high-end laptops," Kitagawa said.

The back-to-school season usually results in a price drop for laptops, and some reasonable deals are available on laptops from companies such as Acer, Dell and Asus. But those have low-end processors from Intel or AMD and, while those laptops are good for basic productivity and internet activities, they are competing with cheaper tablets increasingly capable of handling those tasks, Kay said.

The premium Ultrabooks such as Samsung's Ativ 9 Book Plus have high-resolution screens, solid-state drives and other high-end features, which are more expensive. Because such components can be expensive, companies try to upsell products for a higher market, Kay said.

But in a slumping PC market, the rollout of expensive Windows 8 laptops defies logic.

"In their bones they don't get it," Kay said. "They refuse to deal with the reality of what's going on."

At this point the margin pressure on PC makers is too high, and some of them don't want to break their necks on pricing, said Charles King, principal analyst at Pund-IT.

"Intel has been working both internally and with other component makers to bring unit price to the point where OEMs can build and make a profit on PCs," King said.

Until Haswell chips start shipping in volume, there may not be a break in laptop pricing, King said. ☒

SAMSUNG's Ativ Book 9 Plus Ultrabook costs a staggering \$1,400



The rise of open-source PCs

Open-source PCs such as the Raspberry Pi are finding interesting uses, says Agam Shah

Single-board or open-source PCs have become a hot market, with the Raspberry Pi selling in the millions and competitors getting in on the act, including Intel's recently announced MinnowBoard. These PCs have open designs that can be replicated by other hardware companies, are inexpensive to manufacture as components get smaller, and can run Android, Ubuntu and other flavours of Linux.

Our prices come from amazon.co.uk and uk.mouser.com.

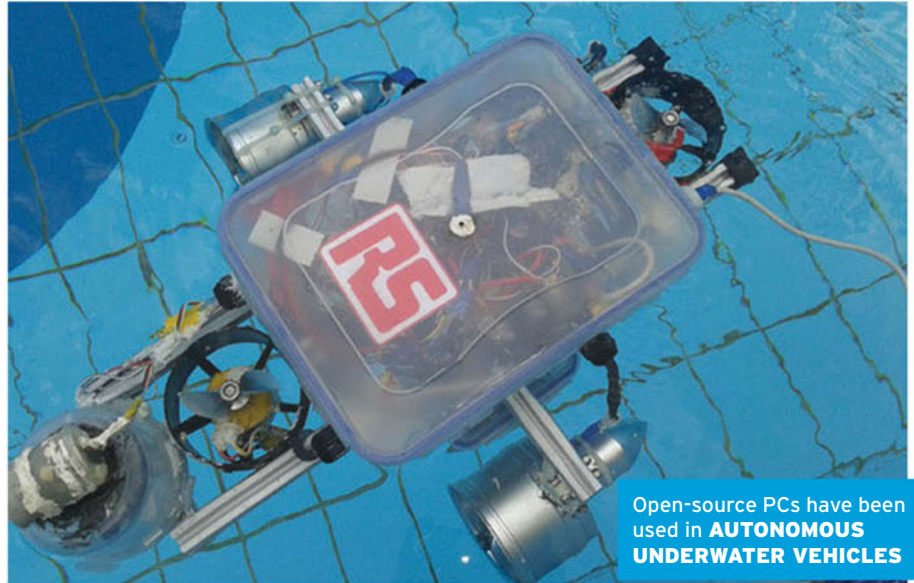
Raspberry Pi

The Raspberry Pi has caught the imagination of hackers, programmers and 13-year-old Henry Budden, who wrote a tutorial on how to take advantage of the open-source PC. It has been widely used as a web server and a media server with the XBMC program, which serves multimedia files to TVs. The Pi is compatible with Android, and has been used by programmers to write and test phone and tablet applications. Other interesting projects involve jukeboxes, an autonomous underwater vehicle and a coffee machine.

The Raspberry Pi comes in two models, the Model A for £26 and the Model B for £33. The base hardware includes a Broadcom chip with a 700MHz CPU based on an old ARM11 processor design. The video processor is able to handle 1080p multimedia and, combined with an HDMI port, the tiny PC makes for a popular media server. Both boards come with SD and MMC slots. The Model A has 256MB of memory and one USB port, while the Model B has 512MB of memory, an ethernet port and two USB ports.



The **RASPBERRY PI** has been used in applications such as coffee machines



Open-source PCs have been used in **AUTONOMOUS UNDERWATER VEHICLES**

BeagleBoard

BeagleBoard offers a range of boards starting at around £30. The hardware is more advanced than that of the Pi. In addition to Android, the BeagleBoard and BeagleBone boards run the Linux variants Ubuntu, ArchMobile, Gentoo and Angstrom.

BeagleBoards are being used for interesting projects such as a Wi-Fi radio alarm clock, a solar-powered car controller, an in-car computer and a retro game computer.

BeagleBoard's BeagleBone Black has a Texas Instruments ARM Cortex-A8 processor, a 3D graphics accelerator and a USB port. Other hardware includes 512MB of DDR3 memory and 2GB of storage, plus HDMI and ethernet ports.

The top-of-the-range BeagleBoard-XM packs in more power with its 1GHz Cortex-A8 processor, four USB ports, an ethernet port and a SD/MMC slot.

PandaBoard

The fastest open-source PC on the market could be the PandaBoard ES, which runs on Texas Instrument's dual-core OMAP4460 chip with a 1.2GHz ARM Cortex-A9 CPU. At £131, the board costs more than other open-source PCs, but it provides a variety of features not found on other boards.

An outstanding feature is Imagination Technologies' PowerVR SGX540 graphics processor, which until recently was used in phones and tablets to render 1080p graphics. It also has wireless connectivity with Wi-Fi and Bluetooth. Other features include

1GB of DDR2 DRAM, camera attachment components, and SD, USB and HDMI ports.

The standard PandaBoard (£129) has similar features and supports the Android, Chrome and Ubuntu OSes. The lighter PC runs on the OMAP4430 1GHz processor, which is also based on the Cortex-A9 design.

MinnowBoard

MinnowBoard is the first open-source PC with Intel's x86 processor. At £142, it is expensive compared to ARM-based boards.

The x86 board was developed jointly by CircuitCo and Intel. The target audience for the board is developers writing embedded applications for products such as home-automation systems, set-top boxes, robots and in-car entertainment systems.

Intel also hopes to expand the x86 development platform, said Scott Garman, a MinnowBoard evangelist at Intel.

Garman also pointed out that boards such as Raspberry Pi are subsidised and that \$200 (£129) is the actual development price of the MinnowBoard. Open-source PC makers will be unable to replicate the Pi for £26, but will be able to make a MinnowBoard within a \$200 budget.

MinnowBoard's 1GHz Intel Atom E640 processor provides more power than ARM processors, Garman claimed. But with a CPU released in 2010 and older DDR2 memory, the hardware is mildly disappointing. MinnowBoard also has a gigabit ethernet port, SATA support and open-source UEFI firmware, plus an HDMI port and microSD. ☒

LG and Motorola struggle to end Samsung's Android dominance

Innovative interfaces may not boost smartphone sales by much, says Mikael Ricknäs

LG and Motorola are betting on updated smartphone user interfaces in a bid to differentiate their latest products, but analysts aren't convinced that it's enough to break Apple and Samsung's dominance.

As smartphone design and hardware specs grow more similar, vendors are increasingly turning to the user interface as they try to differentiate their products and get people to upgrade in a saturated market.

The two latest examples are Motorola's Moto X and the G2 from LG. The latter has been equipped with buttons on the back, which can be used to control the volume and turn on the phone as well as access some apps. Motorola is betting big on voice control, and users can also turn on the camera with two quick twists of the wrist.

"What LG is doing with buttons on the back typifies the challenge most manufacturers are facing when it comes to differentiation. It is becoming harder and harder now, and it's difficult to see how the buttons will make much of a difference," said Geoff Blaber, an analyst at CCS Insight.

Motorola is going much further in trying to fundamentally change the way users interact with their phone, with voice and gestures, but Blaber still thinks Motorola will struggle to turn the Moto X into a success.

Blaber isn't alone in doubting that these additions will make much of a difference to consumers looking at crowded store shelves.

"I just don't think it's enough. We have reached a point where a major change is needed to boost sales. All the vendors, including Samsung and Apple, have lower forecasts going forward," said Bengt

Nordström, CEO at market research company Northstream.

Neil Mawston, executive director at Strategy Analytics, agreed: "Our view is that the primary input mechanism for mobile phones is the fingers, and this wave of secondary input mechanisms that is emerging is likely to remain a niche for the foreseeable future," he said. Changing the way users interact with their phones doesn't come without risks.

For example, when Apple introduced voice-powered Siri, expectations were too high.

The subsequent criticism of Siri took a bit of polish off Apple's brand, and the same can happen to other vendors if their innovations don't work well, according to Mawston.


If a feature doesn't immediately hit consumer expectations, which Siri didn't, it can be difficult to get consumers to give it another go, added Blaber.

"I think the key is bringing on these new technologies softly, softly, and almost always in tandem with another means of access. That is what Motorola has done with the Moto X," Blaber said.

Still this trend isn't going away, and the analysts agree that consumers can expect more features that use eyes, voice and gestures to control their devices.

This is happening partly because one-handed operation is becoming more cumbersome as phones are getting bigger.

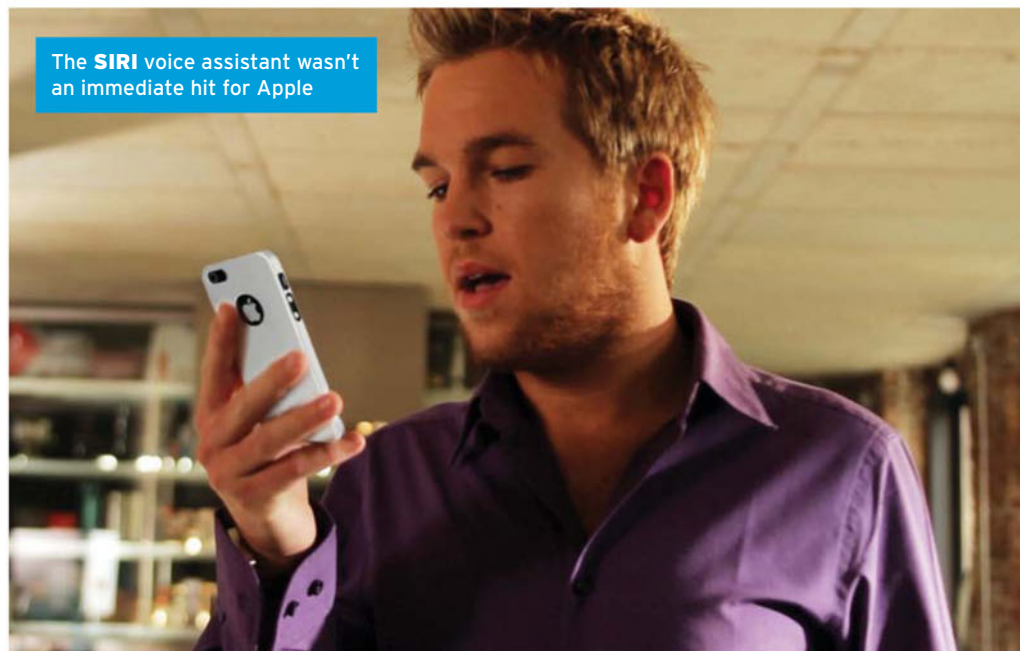
Ultimately, success depends on whether a user interface change truly improves the user experience or if users just see it as a gimmick, according to Nordström.

LG has been the most successful in its turnaround efforts and shipped 12.3 million smartphones during the second quarter of this year, while Motorola managed only 2.3 million. Meanwhile, Samsung shipped over 73 million Android-based smartphones, according to estimates from IDC. 



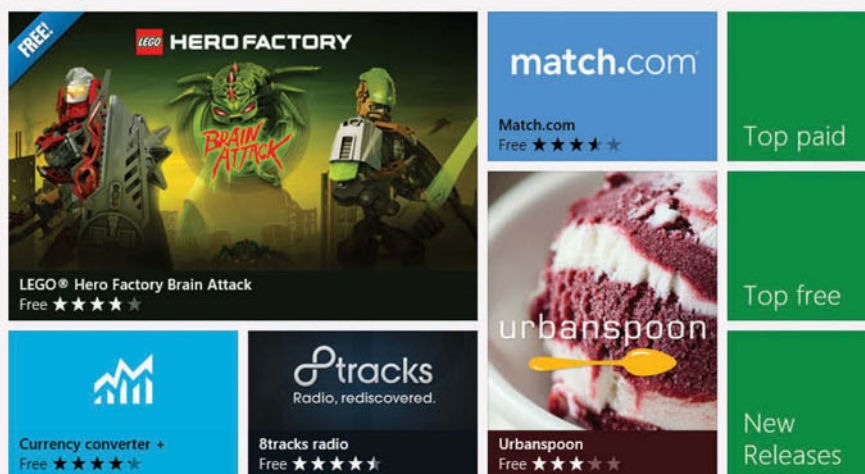
Motorola hopes its **MOTO X** will help it take on Samsung and Apple

The **SIRI** voice assistant wasn't an immediate hit for Apple

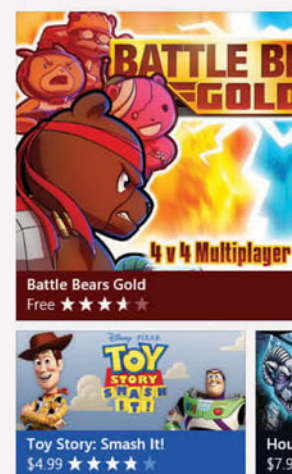


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Only 54 top-100 apps are on Windows

Microsoft's reputation for failing to deliver on apps could stick for some time, writes Gregg Keizer

Microsoft's Windows 8 app ecosystem is in need of a jolt to make it competitive with iOS and Android on tablets, but it doesn't look as though that will happen anytime soon.

"Most of the top apps are still not supported by Windows 8," said Patrick Moorhead, principal analyst with Moor Insights & Strategy. "Not only is that a major issue on its own, but Windows 8 now has a reputation for not having the right apps."

That reputation will stick long after the developers of the must-have apps have created something for Windows 8. "Even when Microsoft rounds out the catalogue, Windows 8 will have a lingering perception issue with consumers," Moorhead contended.

Nick Landry, a Microsoft MVP and product manager at Infragistics, came up with a must-have list based on the top 100 iOS apps. The Windows Store had just 54 of these.

"I don't know about you, but for a new platform that is less than a year old, having 100,000 apps, including 54 percent of the top 100 apps, is not bad at all," he argued.

But Moorhead begged to differ, and pointed out that Windows 8 in fact debuted in September 2011. "The numbers reinforce the challenge that Windows 8 still has in apps," he said.

"It still doesn't support the number-one social app, Facebook, the number-one paid-

content app, HBO GO, or the number-one sports app, Watch ESPN."

Although Facebook has yet to appear on Windows 8 and Windows RT, in June Microsoft said that the social network had committed to developing an app.

No chance to catch up

Landry cited other examples of AWOL apps, saying that many were also missing from the Windows Phone Store and concluded that their omissions from the Windows Store were for similar reasons, including, he said, "Because some of these developers (reportedly) love sticking it to Microsoft, or they don't feel the platform is important."

To Moorhead, Microsoft has run out of excuses and, at this point, if it wants to play with the Android and iOS big boys, it simply has to have comparable app coverage.

"If there's a viable alternative to Windows, and there is, and you're a consumer, you're going to try to mitigate your risk," said Moorhead. "It's more than a numbers game. What if your bank isn't supported?"

Until Microsoft can overcome not only the app shortage, it won't overcome both the perception that it fields a sub-standard ecosystem and the reality that it can't deliver the most sought-after software.

"Look at the history of Android," said Moorhead. "Even though it's been moving up

in app coverage for two years, it still has a reputation that it doesn't have enough apps." And that's despite 95 of Landry's top 100 apps being available from Google Play.

So what's Microsoft to do? Persevere, obviously, as the company has promised.

"With consumers, you get one shot... unless you relaunch," said Moorhead. "But you need a reason to relaunch. Windows 8.1 would have been that relaunch."

Now he's not sure Windows 8.1 will be impressive enough, and that enough of the missing apps will be in the Windows Store this year, to convince consumers that it is a new day for Microsoft and tablets.

So far, Microsoft's Windows tablet strategy has failed to produce big returns. But it has gained ground. In the second quarter of 2013, IDC estimated two million Windows-powered tablets were shipped by Microsoft and its OEM partners, an increase of 11 percent over the previous quarter. Windows share also increased, from 3.7 percent in the first quarter to 4.5 percent in the second.

Until Microsoft closes the app gap it's going to be a tough climb out of the single-digit cellar. "Microsoft is going to have to go through a period where the perception of inadequacy remains. It should educate consumers about when it's going to add apps," said Moorhead. ☒

BlackBerry: where it went wrong

Now that BlackBerry is up for sale, Chris Martin asks what caused a once-great company to fall so far?

BlackBerry has announced that it has in essence put itself up for sale. So where did it all go wrong for the Canadian firm that was once a leader in the mobile industry?

BlackBerry has said: "The Company's Board of Directors has formed a Special Committee to explore strategic alternatives to enhance value and increase scale in order to accelerate BlackBerry 10 deployment. These alternatives could include, among others, possible joint ventures, strategic partnerships or alliances, a sale of the company or other possible transactions."

It's not the end for BlackBerry, but things aren't looking rosy. Here are five reasons why we think it all went wrong for BlackBerry.

BlackBerry 10 delay

RIM changed its name to BlackBerry with the launch of the BlackBerry 10 operating system, but this did little to distract from the fact it had been consistently delayed time and time again. The delay lasted many months and didn't fill customers with hope.

During the time the OS was delayed, BlackBerry cut thousands of jobs and pleaded with users to hold on for what it rested its faith in. It's unsurprising that BlackBerry users jumped ship and boarded the far more buoyant vessels HMS Apple and HMS Android.

Apps

When BlackBerry 10 did finally arrive earlier this year, we were impressed with the software itself. Gesture navigation and the all-in-one Hub were great features. However, a distinct lack of apps was a major problem. BlackBerry made promises at the launch event that things would improve quickly, but seven months down the line BlackBerry World still looks barren.

Apple and Android were, and still are, so far ahead in a world where content is king that BlackBerry had an almost impossible task to catch up.

Hardware

BlackBerry 10 obviously needed some new hardware on which to run and display its prowess. So the firm introduced the Q10 and Z10 smartphones- one with the iconic Qwerty keyboard and the other with a full touchscreen. Although the hardware was reasonable, it couldn't stand up to some

fierce rivals on the market and has been overshadowed ever since.

Sales of these devices have been disappointing, and BlackBerry failed to regain traction in market share. This year, BlackBerry was outsold by Nokia's Lumia smartphones running Windows Phone 8.

PlayBook

One of BlackBerry's biggest failings was its attempt to crack the tablet market. It launched the PlayBook with good hardware and arguably a good operating system at its core, but the device had a ridiculously high price tag and didn't even come with a built-in email client. A poor reception led to massive price cuts and a huge loss for BlackBerry.

BlackBerry promised an update to the BlackBerry 10 OS for PlayBook users, but this was cancelled last month with CEO Thorsten Heins saying he was "not satisfied with the level of performance and user experience".

Enterprise

There was a time when BlackBerry ruled the enterprise world. Countless businesses handed out BlackBerries to their workers, lapping up the platform's simple and secure email capabilities. Then along came the iPhone, which added desirability, better web surfing and apps.

Businesses didn't like the iPhone, but their employees did. The game was forever changed. From being a byword for innovation, BlackBerry became a staid, boring, functional thing.

Once the iPhone rolled into town, followed by Android devices, BlackBerry was struggling to compete, and simply didn't innovate quick enough to retain its loyal following. ☒



IBM partners with Google to get back into the PC game

Agam Shah says Google and IBM are part of the OpenPower Consortium, dedicated to pushing the chip design to new products

IBM will license designs of its Power microprocessor architecture to companies such as Google in an effort to expand use of the architecture and reverse declines in its hardware business.

Intellectual property of the chip design is being opened up as part of a development alliance known as OpenPower Consortium. Members of the consortium will be able to make Power chips based on architecture designs, and component companies will be able to make hardware that can be integrated, or attached, to the processor.

Other OpenPower partners besides Google include graphics chip maker nVidia, server maker Tyan, and Mellanox, which makes networking and storage equipment. The first products from alliance partners could be based on IBM's forthcoming Power8 design, said Brad McCredie, vice president and chief technology officer at IBM's Systems and Technology Group (STG).

Power architecture could be a viable option for applications running within Google's data centres. Google designs its own servers, and it could also design its own integrated chip based on the Power architecture, said Dean McCarron, principal analyst at Mercury Research.

That development is tied to one of IBM's goals: to push Power-based chips into more servers, which could prop up the company's software, hardware and services businesses.

Why now?

IBM is opening its architecture at a time when the business has been struggling. Its Power division reported a 25 percent decline in revenue last quarter, while STG saw a 12 percent drop.

Against that backdrop, IBM made some of its employees take a mandatory leave of absence at the end of August. The employees received an equivalent of one-third pay, while executives were not paid for that week. It declined to say how many were affected.

What to expect

Tyan will be the first to release a server based on Power architecture, and said that the system was projected as an alternative to

x86 servers. IBM has also included a feature in Power8 for component makers to easily attach their intellectual property to the chip. More companies will join the alliance in the coming months, McCredie said.

Third parties could release new system-on-chips based on Power in a few years. The Power IP is also being opened up to manufacturers, and IBM will continue to make chips for third parties.

OpenPower will be beneficial to IBM and its partners as it will breed collaboration and innovation, and help IBM enter new markets.

Cloud computing

One of those markets is cloud computing, which is dominated by x86 chips from Intel and AMD. IBM's Power chips are mostly used in mainframes and high-performance servers, but the company has been taking steps to move the chips into medium-range and low-end servers. IBM in the past year has lowered the price of some Flex Systems and preconfigured PureSystems servers, and has also configured servers for cloud and virtualisation deployments.

Mega data centres established by Google, Facebook and Amazon mostly use servers with x86 chips, but there is a growing interest in low-power ARM processors. Many believe that ARM servers will be faster


and more power-efficient in handling quick-moving cloud transactions, such as search requests and social-network posts.

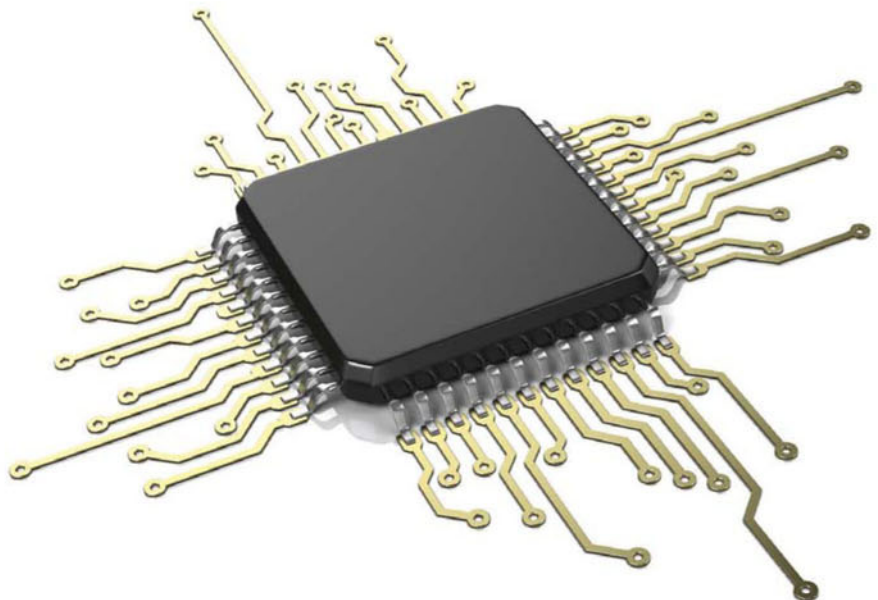
Meanwhile, IBM's Power architecture brings more reliability, processing power and longevity to servers in cloud deployments.

The move could be viewed as a desperate attempt to keep Power alive, but there is an opportunity for chips based on the architecture in data centres with varying workloads and performance requirements, said Jim McGregor, principal analyst at Tirias Research.

Plus, more features are being etched on to smaller and smaller chips, and IBM's move to open up Power could be tied to that trend. Rather than put multiple chips in a system, companies may prefer to build a single chip with all the features integrated.

One of the more interesting aspects of OpenPower is IBM and Google partnering with nVidia, which is tuning its CUDA parallel programming toolkit for Power processors. Both could help resolve the issue around the software and make Power another good alternative, McGregor said.

"If you could combine the big iron performance of Power with the efficiency of ARM and the parallelism of a GPU, you could develop some really interesting and diverse solutions," McGregor said. 





Google Nexus 7 (2013)

Tablet

The new version of the Nexus 7 is once again made by Asus, but a lot has changed. The tablet is thinner, lighter and easier to hold. It's got a whopping screen resolution of 1200x1920 pixels, has a speedy Qualcomm Snapdragon S4 Pro processor and now has a 5Mp rear-facing camera. The price has gone up, though.

£199 inc VAT

play.google.com

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LG G2 >>**Smartphone**

LG is aiming to take on the big guns of the smartphone market with its G2. In its armoury are an edge-to-edge display, 'best-in-class' power capacity, optical image stabilisation and studio quality hi-fi sound. The only physical buttons, collectively called the 'Rear Key', are placed on the back of the device.

Around £500 inc VAT

lg.com/uk

**Plantronics RIG <<****Headset**

The first in a new range of gaming headsets from Plantronics is the RIG. Unlike others, this headset works across PC, consoles and mobile. A USB-powered mixer allows you to blend in-game sounds and chat with your mobile audio, apps and alerts. The innovative design means the boom mic is detachable for when you head out of the house.

£109 inc VAT

plantronics.com/uk



Nokia Lumia 625 <<

Smartphone

Nokia's largest smartphone is the Lumia 625 with its 4.7in display. Like others in the Lumia range, the 625 comes with five colourful interchangeable covers. The handset runs Windows Phone 8 and a microSD card slot onboard.

Around £200-£250 inc VAT, £179 PAYG

nokia.com/gb-en

>> Sky Now TV Box

Internet media streamer

In essence a rebranded Roku player, the Now TV Box offers easy access to Sky Sports and Sky Movies and will plug into almost any TV. You still have to pay to access the content, but it's subscription-free - plus it offers access to BBC iPlayer and Demand 5.

£9.99 inc VAT

nowtv.com



Orbitsound SB60 airSound Base <<

Soundbar

Unlike most soundbars, the airSound Base from Orbitsound has an integrated 5in subwoofer. It connects to any TV with an optical cable, while the sound is provided by two front- and two side-facing 2in speakers. Included in the box are black and silver interchangeable grilles.

£299 inc VAT

orbitsound.com

>> Panasonic GX7

Camera

Panasonic's latest in the interchangeable-lens camera market is the retro-looking GX7. More importantly, there's an adjustable touchscreen and an electronic viewfinder. Panasonic also packs in a 16Mp Live MOS sensor and a new processing engine.

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panasonic.co.uk



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HTC Desire 500 <<

Smartphone

Keeping the HTC's Desire range ticking along is the Desire 500, which is aimed at those who can't afford the company's flagship HTC One. This smartphone offers a lot for the £229 asking price, with a 1.2GHz quad-core processor, 1GB of memory, a 4.3in screen and an 8Mp rear-facing camera.

£229 inc VAT
htc.com/uk



>> Google Chromecast

HDMI dongle

Chromecast is a new home-entertainment gadget from Google. It's a low-cost HDMI dongle for your TV, which lets you stream Netflix, YouTube, photos and the web from your smartphone, tablet, laptop or PC. Built-in Wi-Fi lets you wirelessly stream content.

\$35 (£22)
play.google.com

Sphero 2.0 >>

Robotic ball

Sphero is back with the second-generation of its smartphone- or tablet-controlled robotic ball. This bundle of fun is two times faster, three times brighter and can go off-road, thanks to a silicone 'hubby cover'. Ramps are included in the box.

£99 inc VAT
gosphero.com



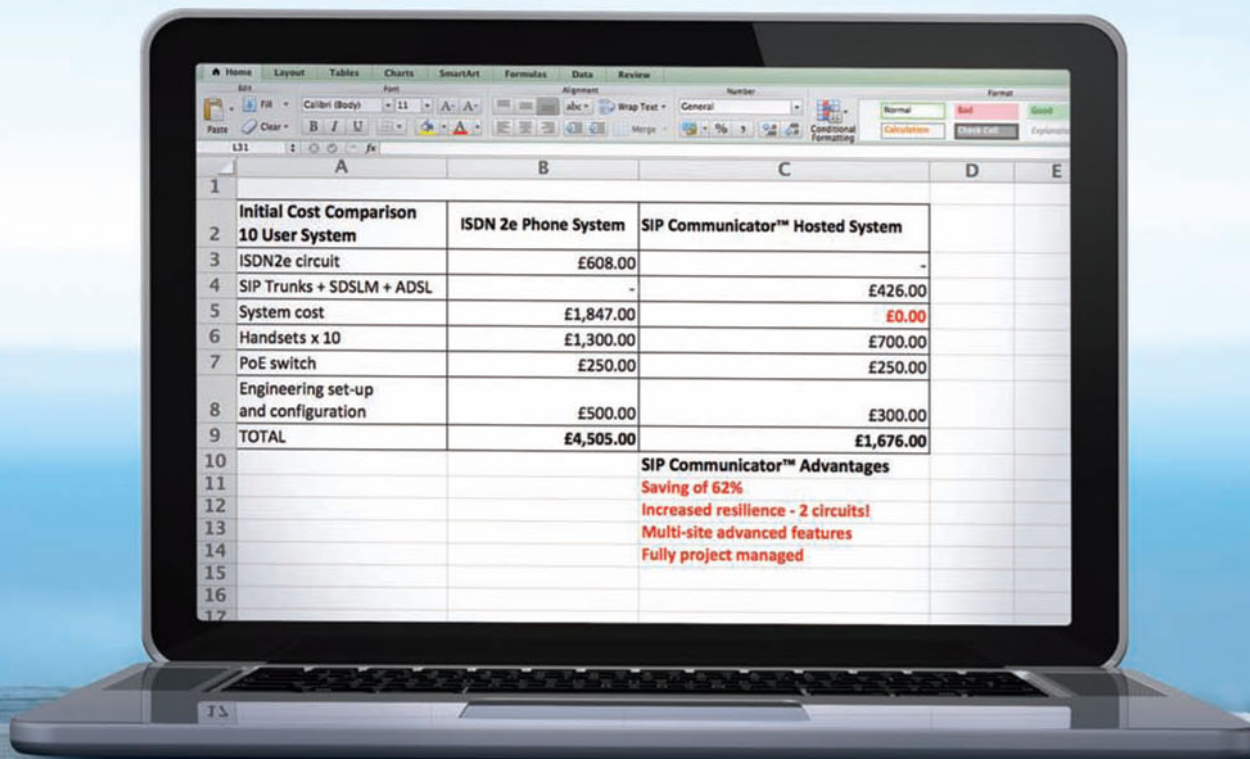
>> Leapfrog LeapPad Ultra

Kids tablet

The LeapPad Ultra is a rough-and-ready tablet designed for children aged between four and nine. The colourful device features a child-safe LeapSearch web browser and a Learning Library of approved games, apps, e-books, videos and music. The LeapPad Ultra has a 7in touchscreen and 8GB of internal storage.

£119 inc VAT
leapfrog.com/en_gb ☒





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Elgato Game Capture HD **40**



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ANDREW
HARRISON

Hungry man needs TLC

Storage technology, for most people at least, is not especially sexy. But the results when storage technology works well can really make a difference to our day, and indeed our lives.

It's become apparent to me only in the past few years how our computers were being held back - not because Intel was slow to fulfil its side of the Moore's Law contract, but because storage technology was, compared to 21st-century CPU developments, from the iron age.

Add the glacially slow pipes used to transport the data, and our personal data in PCs and external drives was routed in the bronze age.

Solid-state drives fitted inside desktops and laptops can now at last fast-forward the same PC into the future. Well, the 2010s at least.

But where the storage industry failed for so long to deliver genuinely nimble performance, it more than made headway in shovelling on sheer capacity. So while the spinning iron-oxide platter of a hard disk may not be delivering its bytes significantly faster than it did 10 or even 20 years ago, it can at least hold orders of magnitude more data in the same old 3.5- or 2.5in package.


The problem for ravenous 2010s man is that we're now used to wallowing in hundreds of gigabytes of personal data. We're all hooked on buckets of space and we can't afford to trade up from big and cheap hard disks to equally big but expensive and zippy SSDs.

That situation has been easing in the past three or four years; SSDs are getting bigger and cheaper. Not so long ago at £2/GB, current prices are more like 60p/GB. Crucial was the first to go big



with its roomy 960GB SSD at around £450. But we're still spoiled by cheap hard disks at one-tenth of that price.

So new breakthroughs such as Samsung's grooming of a cheaper flash memory technology is welcome, even if its terabyte-sized SSD is currently no cheaper than Crucial's. Prices will drop again, though, within months of this release.

And external flash drives are finally getting quicker, too, as we found not only from LaCie's reasonably speedy XtremKey thumb drive (page 37), but new contender Axtremex's Micro SSD drive. Turn to page 41 to see how it brings SATA-like speed to USB 3.0. 

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£849 inc VAT (128GB)

Contact

■ apple.com/uk
 Read more
 ■ tinyurl.com/k64zpkb

Specification

1.3GHz Intel Core i3-5250U (2.6GHz TurboBoost); 11.6in (1366x768) glossy LCD; Mac OS X 10.8.4; 4GB LPDDR3 RAM; 128GB flash storage; Intel HD Graphics 5000; 802.11a/b/g/n; Bluetooth 4.0; 2x USB 3.0; 1x Thunderbolt; stereo speakers; 1.3Mp webcam with dual microphones; 38Wh lithium-polymer battery; 300x192x17mm; 1.08kg

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



LAPTOP

Apple MacBook Air 11in (Mid-2013)

It can't match the outstanding battery performance of its 13in counterpart, but the updated 11in version of the MacBook Air still provides an improvement in both battery life and performance, which bodes well for the forthcoming generation of Haswell-based laptops.

The design and build quality are impeccable, thanks to the elegant-yet-sturdy 'unibody' aluminium casing. And with a maximum thickness of 17mm and a weight of just 1.08kg, the 11in MacBook Air remains one of the lightest and most portable laptops currently available.

The 11.6in display may be a little too small for some people, but – speaking as a satisfied owner of the 2011 edition – it's the weight that really clinches the argument for me. Having said that, we can't help thinking the 2mm border around the edge of the screen – thicker than the MacBook Air itself – is starting to look more than a little dated.

But, of course, the focus for this release is the introduction of the fourth-generation Intel Core Series processor, codename Haswell. The price for the 11in model remains the same at £849, again with 4GB of memory, although the 64GB of flash storage provided with last year's model has been doubled to 128GB.

What Apple isn't so eager to bring to your attention is the fact

that the new Haswell i5-4250U runs at just 1.3GHz, whereas last year's model had an Ivy Bridge Core i5 running at 1.7GHz. Even so, the Haswell Core i5 performs surprisingly well.

Installing Windows 7 and running the PCMark 7 benchtest produced a score of 4080 points, which is very respectable, and suggests that the Air can handle more than just web browsing and word processing.

Using the OS X version of Geekbench 2 produced a score of 6023 points, which is four percent higher than last year's model.

We were also pleasantly surprised by the gaming performance provided by the Haswell's new integrated HD Graphics 5000. Running Stalker: Call of Pripyat in Windows at 1280x720-pixel resolution, with DirectX 11 and Medium detail graphics, produced a playable score of 33fps.

Just to prove that there are some decent Mac games available, too, we also ran the native OS X version of Batman: Arkham City, which managed a similar 32fps when set at the MacBook Air's native 1366x768 resolution, albeit on low graphics settings. Those scores won't have nVidia quaking in its boots, but they



do suggest that Haswell's integrated graphics can finally handle some decent gaming action, even at quite modest clock speeds.

Battery life is improved, too, although not to the same extent as that of the 13in MacBook Air. We got exactly seven hours of streaming video in our tests – using 802.11ac Wi-Fi – compared to five hours for last year's model. In the MobileMark 2007 Productivity test, running in Windows 7, it lasted for just four minutes short of eight hours (476 mins).

Verdict

We were worried about the 1.3GHz clock speed at first, but the Haswell chip is more than a match for its Ivy Bridge predecessor, while achieving nearly a day's battery life. Combine that performance with the MacBook Air's lightweight, elegant design and you've got an ultraportable that still sets the standard for its Windows rivals to copy. Cliff Joseph

TABLET

Panasonic ToughPad FZ-G1

£1,800 inc VAT

Contact

■ panasonic.co.uk
 Read more
 ■ tinyurl.com/k2vhw9p

Specification

1.9GHz Intel Core i5-3437U; 10.1in (1920x1080) IPS touchscreen, anti-glare; Windows 8 64-bit; 4GB DDR3L RAM; 128GB SSD; 802.11a/b/g/n; 270x188x19mm; 1.1kg

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



Panasonic made headlines recently when it showed off a prototype 20in tablet with Ultra HD 4k resolution. The ToughPad FZ-G1 is a bit more down to earth, but will probably be of more practical use for its target audience – people who work outdoors in construction, maintenance or engineering.

This Windows 8 device has a 10.1in screen, but measures 19mm thick and weighs 1.1kg – almost twice the size and weight of a 10in iPad. That's because the screen is surrounded by a 0.75in bevel of sturdy plastic and further reinforced by a layer of tough rubber that runs right around the edges. There are added protective covers for the

ethernet, USB 3.0 and other ports around the edges of the device.

Panasonic states that the FZ-G1 is certified water- and dust-resistant to IP-X5 standard, and that it can survive being dropped from a height of up to 1.2m. We certainly wouldn't want to argue with any of those claims, as it feels sturdy enough.

Inside that armour is a fairly conventional Windows 8 tablet. The FZ-G1 is currently only available in a single configuration with a third-generation (Ivy Bridge) dual-core Intel Core i5. This runs at 1.9GHz, and is joined by 4GB memory and a 128GB solid-state drive.

You can't buy it direct from Panasonic, but it can be found for

around £1,800 through various online retailers, with the only variation being a 3G option that adds another £100 to the price.

The FZ-G1 managed a respectable score of 4622 points when running the PCMark 7 benchtest, so it's more than capable of handling data input in Excel or other apps. A cold boot took 20 seconds, and the device woke from sleep in just three seconds, so there's little time wasted when you need to get to work.

It responds quickly to the touchscreen controls and – safely tucked into a slot on the back of the unit – there's a stylus to help you control the more fiddly elements of the classic Windows desktop.

£3,542 inc VAT**Contact**■ dell.co.uk**Read more**■ tinyurl.com/kc4unlq**Specification**

2.9GHz Intel i7-3920XM (quad-core with 3.8GHz TurboBoost); 15.6in (1920x1080) matt anti-glare TN display; Windows 7 Ultimate (64bit); 8GB DDR3 memory; 512GB solid-state storage; AMD FirePro M4000 (1GB video memory); 802.11a/b/g/n; gigabit ethernet; 1x HDMI; 2x USB 2.0, 2x USB 3.0, 1x USB 2.0/eSATA; SDXC card reader; 1Mp webcam with built-in mic; headphone, microphone sockets; 97Wh removable lithium-ion battery; 376x256x36.5mm; 2.87kg

**PC ADVISOR
RECOMMENDED**

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**LAPTOP****Dell Precision M4700**

Dell describes its Precision M4700 as “the world’s most powerful mobile workstation”, and we can’t argue with that. It may not look particularly attractive, but if you need a mobile machine that can provide true workstation performance both indoors and out, then the this fits the bill.

It’s safe to say that the M4700 has no pretensions of ultrabookishness. This dark grey slab of a laptop measures 40mm thick and weighs 2.87kg, which is big and heavy even for models with a 15.6in screen and optical drive.

Even so, its sub-3kg landed weight is still light enough to qualify as mobile when you need to travel between sites, protected by a rigid magnesium and aluminium casing that’s sturdy enough to cope with some real-world use.

The screen has a welcome anti-glare matt finish, which will also help when you’re outdoors in bright sunshine. The 1920x1080-pixel resolution produced a bright, sharp image with a good horizontal viewing angle. Built-in speakers are loud enough to be heard outdoors too. However, the vertical viewing angle is more limited, so you’ll need to tilt the screen back and forth now and then for best visibility.

The keyboard feels firm, but the trackpad is too small – just

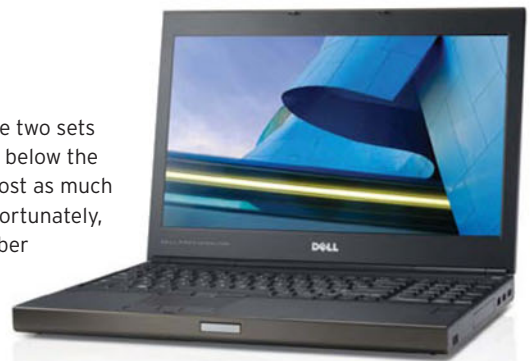
80x45mm. In fact, the two sets of buttons above and below the trackpad take up almost as much space on their own. Fortunately, the M4700 has a rubber track-stick located on the keyboard as an alternative.

The M4700 has a range of connectivity options, including HDMI, DisplayPort and VGA video connectors, while the AMD graphics card supports up to five separate displays. It has gigabit ethernet and a USB/eSATA combo port along with two standard USB 2.0 and two USB 3.0 sockets. There’s a proprietary Dell dock connector on the base of the unit, and even a mini-FireWire port.

Prices start at £1,138 for a model with an Intel Core i5 dual-core processor running at 2.7GHz, 4GB memory, 500GB hard drive and discrete AMD FirePro M4000 graphics processor. That model also sports a low-resolution display.

However, our review unit was decked out with quite a few added extras, including a quad-core Intel Core i7-3920XM running at 2.9GHz, along with 8GB memory, a 500GB solid-state drive, and a Blu-ray writer.

The Extreme Edition processor upgrade alone adds a hefty £1,104 to the price of the M4700. The other options included in our review unit




brought the total to a hefty final price of £3,542.

That’s expensive by consumer standards, but a PCMark 7 score of 5300 points helps demonstrate that the M4700 can handle even demanding CAD and engineering software. Its frame rate of 93.4fps when running Stalker: Call of Pripyat at 1280x720 pixels and Medium details illustrates how its graphics performance outguns all but the most expensive gaming laptops.

Battery life is pretty good, too, thanks to the optional chunky 9-cell 97Wh lithium-ion battery. This lasted for spot on six hours when we were streaming video over Wi-Fi. The battery pack is removable, so you can carry a spare if needed.

Verdict

It’s big, heavy and expensive, but the Dell Precision M4700 provides workstation levels of performance, along with a rugged design that can cope with a wide range of outdoor environments.  **Cliff Joseph**



Graphics performance is largely irrelevant on a specialised device such as this, and the integrated HD 4000 graphics could barely reach 10fps when we tried our graphics benchmark test, Stalker at 1280x720 and Medium detail, so any lunchtime

gaming will be restricted to Angry Birds and other 2D fare.

Visibility is important for an outdoor device such as this, so Panasonic has opted for an IPS panel with anti-glare coating. It’s a high resolution for the 10.1in size too, at 1920x1080 pixels. The display produces a very bright, sharp image, with good all-round viewing angles, so you can hold it up and show it to colleagues with no difficulty.


The FZ-G1 also has front (1.3Mp) and rear (3Mp) cameras, so you can take pictures or video chat if you have a decent internet connection.

Battery life is good, too. Our test unit managed 6.5 hours of streaming video using the built-

in Wi-Fi, so light web browsing or data entry that doesn’t require web access should let you get close to Panasonic’s claimed eight hours.

Our only minor concern is the sizable air vents on the base and the top edge of the unit. These emit a loud whirring sound on initial startup and the fans continue to make a steady, low humming noise even when the device is idle.

Verdict

The ToughPad FZ-G1 is well suited to outdoor use. You are paying quite a premium for that rugged design, but it’ll earn its keep in environments that would be too harsh for a conventional tablet.  **Cliff Joseph**

LAPTOP

Samsung Series 3 Chromebook

Since its introduction in summer 2011, the Chromebook has remained a difficult sell for Google and its partners. Previous models have lacked features and quality, with little to offer over a low-end laptop or a tablet. Samsung's latest attempt has an attractive design, a lower price and, importantly, an ARM CPU.

Everything is constantly updated and backed up to Google. Documents never need to be saved. Working in this fashion requires you to put your confidence in

Google; do so, though, and computing becomes a whole lot more



convenient. You could pick up a new Chromebook, log into your Google account, and pick up where you left off. You also get 100GB of free online storage via Google Drive for two years (\$59 per year thereafter).

A 16GB SSD holds the OS and some offline documents and apps, and allows instant wake from sleep.

The Series 3 resembles the 11in MacBook Air, but it's nowhere near as polished. The silver casing is all plastic, which is acceptable at £229, but the form is spoiled by a bulbous screen hinge.

Samsung makes the 1.7GHz Exynos 5, a dual-core ARM chip that's cheaper than an Intel equivalent, with lower consumption and heat output. The unit stays cool without a fan, with a reasonable runtime of 6 hours in our tests.

The 11.6in screen has a 1366x768 resolution, and a matt finish lends it a frosted look. Colours can be bland, although the display itself is bright.

An SD slot and a headphone jack are found on the left; at the rear are two USB (one USB 3.0), a useless SIM slot and HDMI. This output had quirks in YouTube, forcing a reboot before we saw images on the TV.

The keyboard is responsive, comfortable and roomy. The trackpad is good, with sufficient intelligence to ignore stray touch input. It accepts two-finger scrolling and right-clicking. A left-click button is found underneath.

For general tasks - writing, YouTube, social media, basic games - the Chromebook performed fine. For the most part things were efficient and speedy, with a few stutters when many tabs were open.

Verdict

Google pitches the Chromebook as an inexpensive tablet-like device for people who want a cheap laptop. For perusing Facebook, shopping and writing emails it's a fine choice. If you live in Google's ecosystem it's a great machine. **Martyn Casserly**

£229 inc VAT

Contact

■ samsung.com/uk

Read more

■ tinyurl.com/dxwr5gw

Specification

1.7GHz Samsung Exynos 5 Dual (ARM Cortex-A15); Google Chrome OS; 2GB RAM; 16GB SSD; 11.6in (1366x768) matt TN display; dual-band 802.11a/b/g/n; 1x USB 3.0; 1x USB 2.0; HDMI; SD slot; 0.3Mp webcam; 3.5mm headphone jack; one-button, multitouch trackpad; Bluetooth 3.0; 290x209x17.5mm; 1.1kg



SMARTPHONE

Samsung Galaxy S4 Mini

As is the custom in the many markets, mini models offer a cheaper but downgraded version of a flagship product. Samsung's latest is the Galaxy S4 Mini. This looks like its bigger brother but fits better in the hand, so it's easier to reach all four corners of the screen and the touch-sensitive buttons.

The downside of its similarities with the full-size Galaxy S4 is that it has Samsung's typical plastic build quality. A thin removable rear cover does give you access to the battery, but the phone just doesn't feel very premium or special.

With a 1.7GHz dual-core processor and 1.5GB of memory, the S4 Mini shows good performance, but the hardware isn't very inspiring.

The 4.3in screen is a good size, but a 540x960-pixel resolution and a pixel density of 256ppi isn't anything special.

Moving on to storage, things don't look good with just 8GB of initial capacity - 5GB of which is available to use. A microSDXC card slot is here

to save the day, though. This will accept cards with capacities up to 64GB, and we've been able to move some, but not all, of our downloaded apps over to the removable storage.

Connectivity is a strong point, with 4G LTE support, dual-band 11n Wi-Fi, Bluetooth 4.0 and NFC. Furthermore, Samsung has included an infrared transmitter, so you can control devices in your home.

Some top smartphones now provide 13Mp cameras, but the 8Mp offering on the S4 Mini is about what we'd expect from a decent mid-range device. It's a respectable camera and takes high-quality images in general, but indoor shots tend to look a little hazy. The 1.9Mp front-facing camera is fine for 'selfies', and video footage is acceptable at 1280x720 pixels.

Android 4.2.2 (Jelly Bean) and TouchWiz is the current software combination from Samsung. The firm has improved its user interface overlay over the years, but it's still not quite as good as HTC Sense.



With a 7.2Wh removable battery, we expected long life from the S4 Mini. Unfortunately, while it was good, it wasn't enough to get through two complete working days.

Verdict

The Galaxy S4 Mini is a great mid-range option, with the same styling as its counterpart. The cameras are good, but the screen and storage are under par. **Chris Martin**

£380 inc VAT

Contact

■ samsung.com/uk

Read more

■ tinyurl.com/mx3f9da

Specification

1.7GHz Qualcomm Snapdragon 400; Android 4.2.2 Jelly Bean; 4.3in SuperAMOLED screen (540x960, 256ppi); 1.5GB RAM; 8GB internal storage; Adreno 305; microSDXC; 8Mp rear/1.9Mp front cameras; dual-band 802.11a/b/g/n; Bluetooth 4.0; NFC; A-GPS; Micro-USB; GSM/HSDPA/4G LTE; Mini-SIM; 7.2Wh removable battery; 61x125x8.9mm; 107g



£199 inc VAT**Contact**■ huawei.com/en**Read more**■ tinyurl.com/le7frum**Specification**

1GHz Qualcomm Snapdragon; 4in screen (480x800) LCD; Google Android 4.1.1 (Jelly Bean); 512MB RAM; 4GB internal storage; 5Mp rear camera with LED flash; 0.3Mp front camera; 802.11b/g/n; Bluetooth 2.1; A-GPS; Micro-USB; 6.4Wh removable battery; 64x125x11.4mm; T34g

**PC ADVISOR
RECOMMENDED**

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**SMARTPHONE****Huawei Ascend Y300**

Huawei's latest entry to the budget end of the smartphone market is the Ascend Y300, and if you're looking for a cheap-and-cheerful option, then this certainly delivers.

There's little to say about the design because the device is so plain looking. It's not ugly, but Huawei's definitely taking a no-frills approach.

The Y300 is the first budget smartphone we've reviewed to include Google's Android 4.1 (Jelly Bean) operating system, and a dual-core processor – a 1GHz Qualcomm Snapdragon. Although performance isn't super slick, it doesn't have the kind of lag that's normally a problem with budget Android smartphones.

We recorded a result of 485 points in GeekBench 2, which isn't bad considering there's only 512MB of memory. A framerate of just 9fps in GLBenchmark shows it's not cut out for games, and a time of 2496ms in SunSpider is slow but average for a cheap Android device.

The Y300 has a 4in screen with a 480x800-pixel resolution. A pixel

density of 233ppi is a good for a budget phone, but viewing angles aren't great.

Storage is very limited: there's 4GB inside, but only half actually available for use. Although it has a microSDHC card slot for adding up to 32GB, Google won't let you store your apps there.

There's nothing to get excited about in terms of cameras. The 5Mp rear camera with an LED flash is better than you might expect considering the basement price, but is slow and won't take decent shots unless you're shooting in good light. The front-facing 0.3Mp camera provides an acceptable image, though, the refresh rate is poor.

Huawei has done a good job in the software department. On top of Android 4.1 is Huawei's Emotion UI. The first thing of note is the absence of any app menu – apps are placed on the homescreen panels. Other tweaks are of a more orthodox nature, such as adding quick settings in the notifications bar.

Budget phones don't tend to offer good battery life. However, this was a strong point of the Y300. After more than 24 hours of (fairly light) use we'd only used a third of the 6.4Wh battery. This was without using a power-saving mode that switches off Wi-Fi and Bluetooth, screen animations, background data and haptic feedback.

Verdict

The Ascend Y300 is a no-frills smartphone that does the basics well, with Android 4.1 and usable battery life at a low price. ☒

Chris Martin

**£315** inc VAT**Contact**■ uk.blackberry.com**Read more**■ tinyurl.com/kuludbb**Specification**

1.2GHz Qualcomm Snapdragon S4; 3.1in IPS LCD touchscreen (720x720); BlackBerry 10.1; Qwerty keypad; 2GB RAM; 8GB internal storage; microSDHC card slot; 5Mp rear camera with LED flash (1080p video); 2Mp front camera (720p video); Wi-Fi 802.11b/g/n; Bluetooth 4.0 LE; MicroUSB; 8Wh removable battery; 66x120x10.8mm; 120g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**SMARTPHONE****BlackBerry Q5**

If you're after a smartphone with the BlackBerry 10 operating system and a keyboard, and you're on a budget, then the Q5 is your best option.

The design is distinctly plain in black finish, perhaps less so for the silver and red models. Its mid-range price tag doesn't entirely match the plastic and the cheap feel that the Q5 imparts to the touch. Build quality is satisfactory, but not great considering its price, though.

A 1.2GHz dual-core processor is quite typical for a mid-range smartphone, while 2GB of memory is double the amount we expected. Interface performance is generally excellent, with the Q5 showing little sign of lag. Our usual benchmark tests aren't available for the OS but as we say, from a user perspective, the phone performed well. We were able to run the SunSpider 1.0 test on the built-in browser and the Q5 did very well with a JavaScript completion time of 1079ms.

The Q5 has a 3.1in touchscreen with a respectable resolution of

720x720 pixels. The fact that it's an IPS LCD display compared to SuperAMOLED isn't a problem.

Built-in flash storage is limited with only 8GB available. BlackBerry does provide a microSDHC card slot, though, for up to 32GB more.

Some of the Q5's hardware may punch above its weight, but the cameras are distinctly average. The 5Mp rear-facing camera's photos aren't anything special, though, the front-facing 2Mp camera is fine for BBM video chats and the like.

We like BlackBerry 10, though, there's a but; and it's a big one. BlackBerry World is severely lacking in app selection. Of course there are some big names like Facebook, Twitter and BBC iPlayer, but the list of missing apps is far bigger: Netflix, LoveFilm, BT Sport, Starbucks, eBay and Spotify, to name just a few.

The Q5 easily got us through a day of normal, regular use. We had plenty of juice left at the end of the day – around two thirds – so we were confident about a full second



day, too. However, the 8Wh non-removable battery lost a fair amount of power while on standby overnight which is unusual. We just about got to lunchtime on the second day, with light usage, before the battery died.

Verdict

It's a mixed bag when it comes to the Q5. The build quality isn't inspiring and while BlackBerry 10 is smooth, a shortage of apps is a problem. ☒ Chris Martin

£64 inc VAT

Contact

■ pioneer.eu/uk

Read more

■ tinyurl.com/Ld47x7k

Specification

Internal BD-RE/DVD±RW optical drive; SATA; 4MB buffer; max Blu-ray write speeds 15x/14x (BD-R/-R DL); 2x/12x (BD-RE/-ROM); max DVD speeds 16x/8x (DVD±R/±R DL); 6x/8x/16x (DVD-RW/+RW/-RAM/-ROM); max CD speeds 40x/24x/40x (CD-R/-RW/-ROM)

PC ADVISOR
GOLD

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



BLU-RAY DRIVE

Pioneer BDR-208DBK

The BDR-208DBK, Pioneer's latest 25GB Single and 50GB Double-Layer drive is the fastest specified drive yet – theoretically capable of reaching BD-R write speeds of 15x and 14x with BD-R DL.

The blank discs are only rated as high as 6x, and while the actual write speed will often be higher, consistent 15x performance remains a long way off. Current discs have been stuck at 6x for a while now.

We conducted our main tests by using ImgBurn to write 22GB of data to BD-R media. We started by using discs from TDK. With these, the drive needed 10 minutes 49 seconds to copy the 22GB, rather than the 11 minutes 19 required by an older drive, the 12-speed Lite-on iHBS212.

With an extra 30 seconds shaved, this may look like a good performance, but five per cent improvement is not perhaps a remarkable one. We then tried the drives with Sony media.

Like the TDK discs, the Sony blanks reached a maximum of

no more than 11.8x when used with the iHBS212. However, paired with the Pioneer, this flew up to

a full 15x at times, according to ImgBurn. The average speed was actually down at 10.8x, but this was considerably faster than the 8-8.1x tallied using TDK media. The total time taken collapsed to eight minutes and 12 seconds.

No software is provided with this drive, so you'll need to find some yourself. A Blu-ray film player would certainly be desirable, since the Pioneer should enable smooth movie playback. The QuickPlay feature means it takes even less time than before to load up discs.

Read speeds aren't as high as maximum write speeds, but 12x BD-ROM performance is still good. Pioneer claims the drive offers low noise levels. We couldn't detect any difference between this and the iHBS212, for instance. The drive is



fairly quiet, although no more so than some rivals.

Also available is the 208EBK. This is in essence the same drive as the 208DBK, and took just three seconds longer during the 22GB BD-R tests. However, it can also handle BD XL media – Triple Layer (100GB) and Quad Layer (128GB). We tested the drive with 100GB media, and found that it could burn 88GB of data in 49 minutes 8 seconds.

The problem with XL media is that it's still rather limited. The price of media is also high, with 100GB discs costing around £30-£40.

Verdict

The Pioneer is the best Blu-ray drive we've seen, and it can be bought for just £64. **Robin Morris**

£415 inc VAT (750GB)

Contact

■ samsung.com/uk

Read more

■ tinyurl.com/L5edqoy

Specification

750GB solid-state drive; 2.4in 7mm form factor; SATA 6Gb/s; also available in 120, 250, 500GB and 1TB capacities; 9GB Turbo Write technology; 1GB LPDDR2 cache; Samsung Magician software with RAPID mode; 52g

PC ADVISOR
GOLD

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



SOLID-STATE DRIVE

Samsung 840 EVO 750GB

The Samsung 840 EVO is a second-generation solid-state drive that uses Three-layer cell (TLC) flash chips. These manage the neat trick of boosting capacity while reducing the price. They also offer a surprise when it comes to performance.

TLC NAND flash can be a useful compromise to increase storage capacities and lower costs. But the 3-bit version of multi-layer cell (MLC) flash has an intrinsically slower write speed and shorter overall lifespan.

For better performance and longevity, there's still Samsung's 840 Pro Series, with its MLC technology. But we found that in performance terms, the 840 EVO can hold its head up high against the 840 Pro; and with it, all current leading SATA 6Gb/s solid-state drives.

Samsung has developed a nifty way to compensate for 3-bit MLC's inherently slow write performance. The new addition in the EVO here is what Samsung's dubbed TurboWrite Technology. This overcomes the poorer write latency of TLC by

treating a specially reserved write cache area of flash like single-layer cell (SLC) flash.

SLC flash was the first and fastest of its breed, and Samsung tells us it's found a way to emulate its performance using the same stock of TLC NAND – SLC and 3-bit MLC have the same physical structure, we were assured.

Incoming data is written to the TurboWrite buffer first at high speed, then rewritten to the main drive as and when convenient later. The buffer size is relatively large, so with most daily operations it shouldn't be readily depleted, but if it is, it puts write operations back to regular TLC speeds. For reference, the original 840 Series with its unaided TLC flash had sequential write speeds of around 250MB/s.

And since this dedicated part of the drive only works in SLC mode, Samsung assures us it will have



better endurance than short-lived TLC – around 100 times longer life.

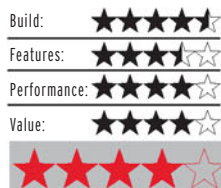
In our lab tests, we recorded 516/498MB/s for the latter, and now 510/490MB/s for the new 804 EVO. That was using CrystalDiskMark in Windows 7. Looking at the other extreme, of very small files, we found that 4kB random reads had just about doubled in number, from 22- to 41MB/s with the 840 EVO.

Verdict

The Samsung 840 EVO is a triumph in solid-state technology, combining for the first time vast capacity by flash standards with lightning performance, and at an approachable price. **Andrew Harrison**

£115 inc VAT**Contact**■ lacie.com/uk**Read more**■ tinyurl.com/Lt82Lrs**Specification**

64GB USB flash drive;
 USB 3.0; Mazak chassis;
 Windows/OS X utilities;
 75x16.6x22mm; 60g
 (28g USB drive section)

**USB DRIVE****LaCie XtremKey 64GB**

Undersea depths of 200 metres and pressures from 10-ton vehicles are shrugged off by the XtremKey. Those are just some of the claims made by LaCie for its latest dongle, a USB 3.0 thumb drive available with either 32- or 64GB of flash storage.

As if its resilience wasn't enough, the use of fast USB 3.0 and better-than-average flash memory means the XtremKey can boast a read speed up to 230MB/s.

The XtremKey is certainly one tough little objet d'art, a truncated cone standing 75x17x22mm. It's made from Mazak, a white-metal alloy of zinc, aluminium, magnesium and copper that has good strength and corrosion-resistance properties.

Unfortunately, form comes before function to a great extent. The business end of the flash storage and its electronics are shrouded by the long metal sleeve, which screws into place at the broadest end. But if you're tempted to stand the drive upright on its fattest end, be aware that it carries a domed radius that makes it wobble, threatening to fall over any moment.

The fact that it can stay upright is testament to the extra weight at this end. But, with the flash stick within removed, it's also the opposite end to the USB connection. So most of the mass is on the opposite end to the USB connector. Good for keeping XtremKey upright; not so good for

putting unnecessary strain on your laptop or desktop PC's USB port.

Getting the device unscrewed is needlessly difficult. When assembled there's almost no discernible join between innards and outer sleeve. And no palpable grip provided to let you unscrew the smooth metal - or conversely to tighten it fast, in order to ensure the rubber O ring inside is making a watertight seal.

A small lanyard hole is provided on the narrow end of the outer sleeve. But that's not where it's needed - for security, the fastening strap needs to be attached to the valuable part, the USB stick with all your data. No lanyard cord is provided in the box although there's a metal ring to help you construct a keyring out of the unit.

LaCie offers one-year's free subscription to its Wuala online backup service, which afterwards currently costs €109 per year for 100GB storage. Also available for download is LaCie's suite of software for Windows and OS X, including backup and encryption utilities.


For large sequential file transfers, we found the XtremKey largely met with LaCie's listed performance. QuickBench in OS X showed a maximum read speed of around 210MB/s, for all files above 1MB in size. Write performance was slower at around 140MB/s. Small files also took longer to transfer,



random writes suffering especially, and averaged just 6.7MB/s for files between 4kB and 1MB in size.

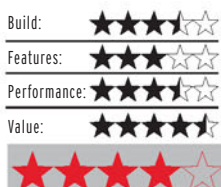
Measured performance in Windows with CrystalDiskMark was about the same - 218MB/s sequential read and 143MB/s write. Multi-threaded stacked data revealed low overall IOPS, around just 1400 IOPS. That's to be expected for a USB drive, though, which doesn't benefit from the powerful multistream controller of a SATA SSD.

Verdict

Style overrides practicalities in some areas, but the XtremKey is a stylish and very tough thumbdrive. Its new USB 3.0 feature means it can operate at scorching speeds, while the build quality should ensure it survives almost anything you could do to abuse it.  **Andrew Harrison**

£100 inc VAT**Contact**■ toshiba.co.uk**Read more**■ tinyurl.com/Lbh8eL**Specification**

2TB portable hard drive;
 2.5in Toshiba hard disk;
 Micro-USB 3.0 port;
 USB 3.0 cable;
 119x79x21mm; 215g

**PORTABLE HARD DRIVE****Toshiba Stor.E Basics 2TB**

No frills in features or looks is hardly surprising for a product dubbed Basics. Toshiba's Stor.E Basics is an unashamedly simple product that's been trimmed to keep down price. And it looks good value, too, at just £100 for 2TB.

Current competition includes the WD My Passport for around £120 and Buffalo Ministation at £150.

The Toshiba Stor.E Basics is also available in 320GB, 500GB, 750GB, 1TB, and 1.5TB capacities.

Not that you need much from a portable hard disk other than a durable box to keep lots of data. Toshiba doesn't even bother with the usual backup or encryption

software that every drive maker tends to bundle, and almost no-one bothers using.


The case is matt black plastic, and feels quite tough. On one end is a Micro-USB 3.0 port - and that's about it.

We tested the Stor.E first with Black Magic Speed Test, where it could sustain write speeds of around 61MB/s and read speeds of 95MB/s. QuickBench showed both sequential read and writes could peak at around 110MB/s. Small file random reads and writes, averaged from files 4kB to 1024kB, were well down at just 15- and 4.5MB/s respectively. Those snail-like random read/write



speeds won't be an issue for most people's need for an external drive, though, to offload and back up music and video files.

Verdict

Toshiba's Stor.E Basics 2TB is a simple little black box that can take care of portable bulk storage for not a lot of cash.  **Andrew Harrison**

£340 inc VAT

Contact

■ nvidia.co.uk

Read more

■ tinyurl.com/oag6277

Specification

nVidia GeForce GTX 770; 2GB GDDR5 RAM; 1006MHz core clock (1058MHz Boost); 1.75GHz memory clock (7010MHz DDR effective); 400MHz RAMDAC; 256bit memory interface; 1537 stream processors; 128 texture units; 32 ROP units; PCI Express interface; DirectX 11; 2x DVI, 1x HDMI; 1x DisplayPort; 1x 6-pin, 1x 8-pin PSU connector needed; 3-year warranty

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



GRAPHICS CARD

nVidia GeForce GTX 770

Deciding what's a fair price for a graphics card is never an easy task. To many users, £150 would seem a high price to pay just to play a few games. Serious gamers, though, wouldn't even consider a card that cost less than twice that figure.

If you're in this latter category, you're likely to be strongly drawn to the GTX 770, a card that retails for around £340 and which offers some serious firepower. It may not be quite as stunning as the GTX 780, but then that card will set you back almost twice as much.

Going on the name, you'd be forgiven for thinking that the GTX 770 was the natural successor to the GTX 670. As ever with graphics card naming systems, though, this would have you drawing the wrong conclusions. The 670 was a cut-down GTX 680, with both cards using the same GK104 processor. The 670, though, was partly disabled. In the GTX 770, the same GK104 processor has all its units turned on.

That means you get exactly the same 1536 stream processors and 128 texture units, for example, as on the GTX 680. The relevant figures in the case of the 670 were 1344 stream processors and 112 texture units - in both cases, an eighth less than those the 680/770. The 770 also shares the 680's 256-bit memory interface - the 670, in contrast, was 192-bit.

In essence, the GTX 770 follows in the footsteps of the 680. Where it offers something new is with the clock rates. Whereas the 680 had a core clock of 1006MHz with a boost of 1058MHz, the 770 stretches these figures to 1046MHz and 1085MHz respectively. These differences of 40MHz and 27MHz seem fairly substantial.

The really radical move on the GTX 770 comes with the memory clock. A figure here of 1.75GHz amounts to an effective in effect on GDDR5 (the RAM effectively quadruples the memory clock figure), whereas the 680 was only using 1502MHz (6GHz DDR effective). It's worth drawing attention to this, as nVidia has pushed the GDDR5 memory to its limits.

The 256-bit memory interface combines with the 7GHz figure to give a memory bandwidth of 224GB/s, rather higher than the 192.3GB/s of the 680's, and way ahead of the 670's 144.2GB/s.

When we reviewed the 680 in our July 2012 issue, we commented that 2GB of memory might seem a little inadequate in the future. Well, we're over a year on now, and our version of the 770 also came with 2GB. Will 770 users lose out by having only 2GB? In today's gaming world, you can get by very happily with



2GB. However, that situation could change 12- to 18 months from now.

In terms of benchmark figures, the GTX 770 isn't as fast as the 780, but it is noticeably faster than the 680. In *Stalker: Call of Pripyat*, the gap between the 770 (102 and 74fps) and the 680 (86/62fps) became a rather large 12- to 16fps. The 780 (114/82fps) picked up an 8- to 12fps lead over the 770.

The graphics chips of the previous year have tended to be fairly good at saving power. The GTX 70, though, takes a rather different tack. Given that it uses essentially the same technology as many previous GPUs, but makes its main advances through higher clock speeds, it's perhaps unsurprising that this card will use a lot of power.

Verdict

The nVidia GTX 770 might not have the showmanship of the GTX 780, but it's better value for money. It offers strong gaming performance without being extortionately priced.

✉ Robin Morris

GRAPHICS CARD

MSI GeForce GTX 760 OC

£216 inc VAT

Contact

■ uk.msi.com

Read more

■ tinyurl.com/opsnb5k

Specification

nVidia GeForce GTX 760; 2GB GDDR5 RAM; 1006MHz core clock (1072MHz Boost)

PC ADVISOR
GOLD

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



As if it wasn't already convoluted enough, nVidia has chosen to add yet another new chip to the soupy broth that is the graphics cards market. Following hot on the heels of the GTX 780 and 770 (above) comes this cheaper-still 760. It's another card based on the GK104 chip.

The standard GK104 has a potential eight streaming multiprocessors (or SMXes). Each single SMX handles 192 stream processors and 16 texture units - these are the parts that handle shading and texturing of graphics.

In the case of the GTX 770, all eight SMXes are turned on, giving it access to 1536 stream processors and 128 texture units. The older

670 and 660 Ti chips also seem pretty well specified, with seven of their eight SMXes turned on - resulting in 1344 stream processors and 112 texture units in both cases. The new GTX 760 has just six of the eight SMXes enabled, giving it a relatively humble 1152 stream processors and 96 texture units.

Before we rush to proclaim it to be the weakest of the four GK104 configurations here, it's worth pointing out that the 760's 256-bit memory interface is significantly superior to the 192-bit version on the 660 Ti - and matches that of the 770 and the 670. Also, the 660 Ti has only 24 raster operators (ROPs), whereas the 760 comes with 32.

We're reviewing an enhanced MSI version, which has a clock speed of 1006MHz and 1072MHz). Not that this necessarily helps the 760 compensate for the lower texture units. While the 670 and 660 Ti both notch up a texture fill-rate of 109.8GT/s, even the faster MSI version of the 760 can only muster 102.9GT/s - and the standard 760 tallies a mere 99.2GT/s.

The 760 fares better when it comes to memory performance. The 760, 670 and 660 Ti all come with 2GB of GDDR5 memory, and they also have the same 1.5GHz memory clock speed - which increases to an effective 6GHz when the quadrupling capabilities

£5,999 inc VAT**Contact**■ sony.co.uk■ [Read more](#)■ tinyurl.com/k77qhk7**Specification**

65in LCD TV; 3840x2160 pixels; stereo speakers with 12.5W amp and 20W amp for woofers; Freeview HD, Satellite DVB-S2 tuners; seven-day EPG; inputs: 4x HDMI, 1x SCART, 1x Component, phono stereo; outputs: digital audio coaxial, headphone jack; 10/100 ethernet; 802.11n; 3x USB 2.0; CI slot; average power consumption 193W; 1682x875x58mm; 45kg

PC ADVISOR
RECOMMENDED

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



65in 4K TV

Sony KD-65X9005A

There's a revolution in resolutions happening in the world of television. The now ubiquitous full-HD standard of 1920x1080 pixels, once the cutting edge of clarity, is being superseded by what's been termed 4K or Ultra HD, which is able to deliver four times the detail.

Sony is first out of the gate, with its X9 models. The 55in KD-55X9005A is available for £3,999 and the KD-65X9005A, reviewed here, costs £5,999.

When it comes to design, this is a knock-out. Sony's decision to include forward-facing high-grade speakers makes a massive difference to the set's audio performance, but the way the slimline magnetic fluid drivers have been sculpted directly into the fascia is beautiful.

Connections comprise four HDMI, SCART, component/composite video, three USBs and ethernet. Wi-Fi is built in, too. Two remote controls are bundled – a standard Sony remote and a simplified Bluetooth option with integrated NFC chip. This facilitates a quick sharing link with the TV, and has been optimised for use with the brand's Xperia Android phones.

The user interface is exactly the same as that found elsewhere in the Sony range – the brand's engineers sadly haven't utilised the extra resolution to create a

bespoke UHD UI. Still as an interface, it's easy to use.

The internet TV provision is reasonably solid. Catch-up services include BBC iPlayer, Demand 5, Netflix, Lovefilm, YouTube, and others. Multimedia file playback compatibility is broad across a LAN and from USB drives.

To help evaluate this screen, we were supplied with a 4K media player featuring well-chosen movie clips and promotional footage in UHD. Predictably, the results were spectacular. The ultra-fine 3840x2160 resolution of the panel compels you to watch closely, yet you're never aware of any pixel structure. Indeed, while you need a large screen to appreciate the extra resolution, the idea is to sit near rather than far away.


The catch, of course, is that no native 4K video is currently available. So for the time being that throws the challenge squarely over to the set's upscaler. Thankfully it doesn't disappoint. Here 4K processing is handled by two chips. The first scales incoming content to full-HD dimensions, leaving the second to handle the conversion up to 3840 pixels across.



To do this, the chip incorporates a powerful image database. Algorithms decide what type of image manipulation to apply, and the result is beautifully rendered, cinematically smooth images.

The impact of the 4K treatment on full-HD content is subtle yet beneficial. HD from the set's Freeview HD tuner takes on an unusual solidity, while Blu-ray discs exhibit pronounced depth. If a disc is mastered from a 4K source, residual high-frequency information left in the image can be exploited by Sony's processing. The results look remarkably good.

Verdict

Even without native 4K content to play with, it's difficult not to become a little infatuated by the KD-65X9005A. Indeed, it may well be the best the brand has ever made. From design to usability, audio to video, it's a real treat to use.  **Steve May**



of the GDDR5 memory is taken into account. However, the 660 Ti is saddled with that 192-bit memory interface, whereas the others luxuriate at 256-bit. As a result, the 760's memory bandwidth of 192.3GB/s matches that of the 670, and comfortably destroys the 660 Ti's figure of 144.2GB/s.

The 770 is in a class of its own here, using its amazing 7GHz

memory clock to produce a stunning bandwidth of 224GB/s. All the same, the 760's 192.3GB/s looks pretty good, given its low price tag – it outstrips the only other card within striking distance of it on price.

The truth, as is often the case, isn't fully revealed until we get to real-world gaming scores. And here the news is rather good for the 760. In most cases it manages to keep to within a couple of frames of the vastly more expensive 670.


In Stalker: Call of Pripyat, it was a similar story, with the GeForce GTX 760's scores of 78/56fps once more only marginally behind the 670's 79/57fps, while the GTX 660 Ti and Radeon 7950

were substantially behind on 73/50fps and 70/46fps.

The 770 was notable for pushing up power requirements, reversing the recent trend in graphics cards of tumbling TDPs. The 760, though, at least matches the 670's 170W TDP, the reduction in SMXes compensating for the higher speeds.

Nonetheless, the 760 is noticeably faster than the 660 Ti, and gets very close indeed to the 670 on gaming figures.

Verdict

We didn't expect too much from this, but nVidia seems to have found the perfect value-for-money card in the £200-plus bracket.  **Robin Morris**

£140 inc VAT

Contact

■ elgato.com/uk
Read more
 ■ tinyurl.com/Lfkcd4j

Specification

Powered by USB 2.0 interface; 420p, 576p, 720p and 1080p recording resolutions; HDMI passthrough; HDMI input; analogue component (PS3) input; Mac- and Windows-compatible; 73x109x24mm

**PC ADVISOR
RECOMMENDED**

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



VIDEO-CAPTURE TOOL

Elgato Game Recorder HD

For years, PC gamers have enjoyed the ability to record footage of their efforts, thanks to a nifty application called Fraps. But capturing a stream from a console is more difficult.

Elgato's Game Recorder HD provides console gamers with a straightforward way to record videos of their performances. It can rip a stream from pretty much any unencrypted device - which includes most consoles, computers, and Apple iOS and Android devices - into a video that can be shared on YouTube, or streamed live to sites such as Twitch.

The device connects to your TV via HDMI, and can accept either a digital or analogue video input. The feed is passed to your set without lag, so you can continue playing the game while footage is captured via a USB connection to a PC or Mac, which also powers the device.

To our eyes, the video quality was almost as good as direct recordings of PC games made using Fraps. The colour was slightly less vibrant than that of rival product, Hauppauge's HD PVR 2 (below), though. As long as the host computer's CPU isn't burdened by other tasks, the audio remained synchronised. The Game Capture HD supports either 720p or 1080p video recording at 30fps, while the feed is passed to the television at 60fps.

The image on the computer's screen is slightly delayed, so you can't use the Game Recorder HD to play consoles using a laptop or computer as the main display. But it's not limited to modern consoles with HDMI output. Even relatively ancient systems are listed as compatible, with an appropriate adaptor, such as the Sega Mega Drive or Nintendo SNES. Elgato makes no promises that every older console will work.

The bundled software is our favourite aspect, as it has a simple layout that offers many advanced features. Depending on whether you have Capture or Edit mode selected, the left-hand side of the screen either views the feed from your source, or is used to navigate through recorded video. On the right are various controls: a big record button, game volume, audio commentary and a section for the capture quality settings, with a selection of presets, depending on the device you're using.

The picture's contrast, hue, brightness and saturation can be adjusted, with a selection of presets for the device you're using. There's a live-recording mode, where the Game Recorder HD offers a rewind function up to one hour, capturing



video even if you forget to press the record button, similar to how Sky+ lets you pause live TV.

The edit controls are relatively simple, with a timeline that previews the recorded video and an option to upload your content to a social-networking site.

Be careful with the settings you choose, though. The host computer can become bogged down compressing the video into the correct format, or your internet connection saturated. The default 1080p settings can result in massive file sizes, so we recommend a few test runs and adjustments before you upload anything. In our tests, a seven-minute 1080p recording at the best possible quality and a bitrate of 28Mb/s came out at 1.8GB.

Verdict

The Elgato Game Recorder HD packs a lot of recording functions into a small package. Despite the gaming focus, it's suitable for practically any recording task. **✉ Orestis Bastounis**

VIDEO-CAPTURE TOOL

Hauppauge HD PVR 2 Game Edition Plus

£145 inc VAT

Contact

■ hauppauge.co.uk
Read more
 ■ tinyurl.com/mhzmmbo

Specification

Video capture device; 420p, 576p, 720p and 1080p recording resolutions; HDMI passthrough; HDMI input; analogue component (PS3) input; S/PDIF audio

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



The first Hauppauge HD PVR was highly popular among gamers who needed an external video-capture device to record footage from games consoles. With a full set of analogue video connectors, including component, composite and S-Video inputs, it was a great way to record the analogue display output from almost any device.

Its only glaring omission was support for HDMI video, to allow for bit-perfect recording of all these digital sources. Not for long, though, since Hauppauge has now released a second version of its flagship recording device - the HD PVR 2 Gaming Edition Plus - with the ability to record HDMI

video, and a strong focus on the fast-growing interest in capturing and sharing game content across social media channels.

As with its predecessor, the HD PVR 2 is an external box-shaped device, although it's considerably slimmer than before. There are now fewer connectors on the gadget itself: HDMI input and output, an A/V port for component video using a supplied cable, and an S/PDIF optical audio connector for Dolby Digital surround sound. And, of course, a USB 2.0 port for connecting a computer to the HD PVR 2 to record the stream. Unfortunately, Hauppauge's device can't be powered via this USB

connection, so you'll need to use the supplied mains adaptor.

The HDMI output works as a lag-free passthrough, so you can continue to play games on your TV while the HD PVR 2 captures the video stream. An LED inside lights the device up when it's used, and there's a button at the top so you can start or stop recording without having to delve into software.

The Hauppauge HD PVR 2 supports recording to both Windows and Mac PCs, using the supplied Hauppauge Capture software. There are some differences though. For Windows users, a copy of ArcSoft ShowBiz is provided, for which there is no Mac version.

£130 inc VAT (32GB)**Contact**■ axtremex.com**Read more**■ tinyurl.com/ktrdxuh**Specification**

256GB portable solid-state flash drive; Micro-USB 3.0 port; 256GB Toshiba THNSNF256GMCS mSATA; also available in 32/64/128/256GB; supplied with 120mm flat ribbon Micro-USB 3.0 cable; 73x38x9.5mm; 58g (plus 14g cable)

**PC ADVISOR
RECOMMENDED**

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**PORTABLE FLASH DRIVE****Axtremex Micro SSD**

USB 3.0 promises super-speed data transfers, but external storage – even flash drives – never comes close. The Axtremex Micro SSD aims to make amends by delivering high speed in a tiny device.

Outwardly, it's 58g of satin-finish metal with a chamfered top, rounded corners, and a single Micro-USB 3.0 port on one end.

Inside, the drive is built around a Toshiba mSATA SSD, and available in capacities of 32, 64, 128 and 256GB. The enclosure is barely larger than the small mSATA circuit board itself.

Pricing is not fully confirmed yet, but we understand the smallest 32GB will be around £130, with the following capacities at around £150, £180; and the largest 256GB model we tested may be about £300.

That mSATA SSD is effectively the mini version of the Toshiba THNSNH512GCST we tested previously in full-size form; a high-performance 2.5in SATA 6Gb/s SSD with excellent sequential and IOPS ratings. In charge of SATA-to-USB conversion is an ASMedia ASM1053 chip. It's with the help of this second-generation single-chip USB 3.0 solution that the Axtremex Micro SSD can use the important UASP technology to allow USB 3.0 to perform more successfully.

The USB Attached SCSI Protocol allows PCs to talk to flash storage

over a high-speed serial protocol, based on the venerable but versatile SCSI system.

Without a dedicated channel like UASP, even the best flash silicon is held back by '5Gb/s' USB 3.0. In our initial tests using standard USB drivers, we saw transfer speeds of around 215MB/s reads, and 235MB/s writes in Windows. In OS X, the best read/write speed was better but still underwhelming at around 250MB/s.

We found that getting UASP to engage in Windows wasn't easy. Matters were initially complicated by a choice between two distinct Micro SSD models available from Axtremex. We were expecting a UASP-compliant drive; but the initial sample featured Windows To Go (WTG) functionality. You should note that WTG and UASP are mutually incompatible.


In Windows, you'll also need an Intel Z77 chipset or better on the PC motherboard, and install a new driver from the motherboard vendor. You'll also have to make sure you connect the device to the correct type of USB 3.0 port. On this Asus motherboard, the right-hand set of two are run by an Intel chipset. The left-hand pair run through an ASMedia chipset. To



get UASP operation, we had to use the ASMedia-controlled ports since UASP is not support by Intel's USB 3.0 ports. At least not in Windows 7.

We also tested the Axtremex Micro SSD with Mac OS X on an Apple MacBook Pro (mid-2012) running OS X 10.8.3. Here the required kernel extension (USBAttached SCSI.kext) loaded automatically when the Mac sensed a suitable USB 3.0 was plugged in. In other words, truly plug and play, and no faffing with different ports, extra system drivers and somewhat unintuitive vendor software to make the drive work correctly.

Verdict

The Micro SSD is a tiny, flash-based drive that can approach the kind of performance promised by the USB 3.0 standard, high speed that's been waiting to be released from modern flash memory.  **Andrew Harrison**



You can stream a live feed from the HD PVR 2 to Ustream or Twitch servers, upload recordings to YouTube, and there's an editing function. The Capture tab provides a live preview of the video stream from the HD PVR.

But on the Mac, despite offering many of the same features, instead of a straightforward appearance, the application is chock full of settings, relying on the standard OS X user


interface elements rather than custom graphics, and less concise labels that make the Windows version look the better option.

However on either platform, the recorded video is of superb quality. You can choose the bitrate, up to 14Mbit/s, and add audio commentary on-the-fly. The colours look sharp and vibrant, and we're sure that if you want a device for capturing video, you won't be disappointed with the results.

We found the Hauppauge software wasn't generally as good as that provided with Elgato's Game Recorder HD (above). The Windows versions could do with some tweaks, while the OS X version needs a

lot of work. Windows users should weigh up the pros and cons of each, but for now we'd recommend Mac users choose Elgato's device until Hauppauge's software has improved.

Verdict

The HD PVR 2 is a powerful video-capture device, with far more utility than simply recording games. It's a great way to record output from a PC without an application such as Fraps hogging system resources, and can be used with many other gadgets, too. We're not keen on the Mac software, though. It works fine, but lacks the polish and attention that has gone into the Windows software.  **Orestis Bastounis**

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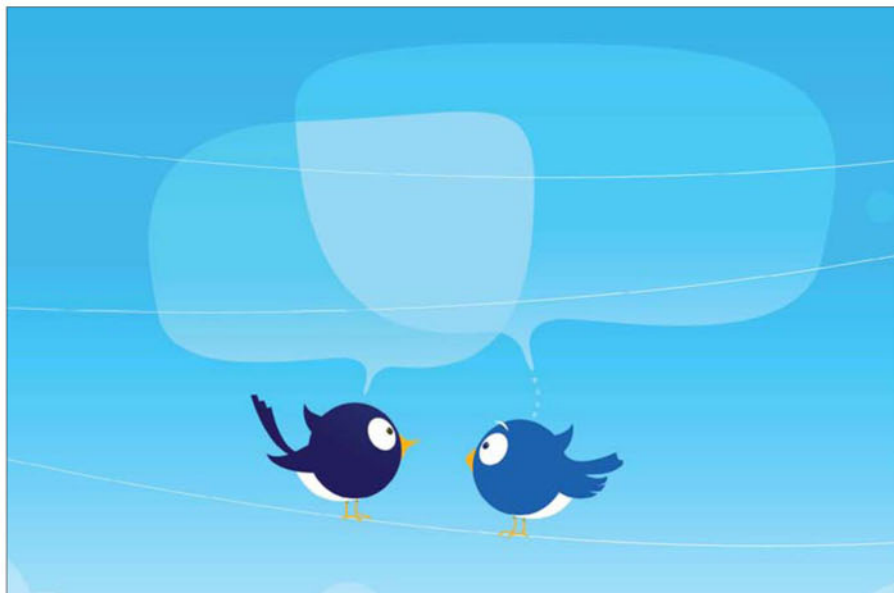
5 of the best instant-messaging apps

Keep in touch with your friends and family with these messaging apps, compiled by Chris Martin

Instant messaging is quickly becoming a popular alternative to the SMS text message. To ensure you'll always be able to keep in touch with friends and family, we've rounded up five of the best mobile apps. Although most mobile tariffs come with unlimited text messages, instant messaging is a great alternative – particularly if you are abroad and want to avoid roaming costs. Many of these apps also offer video calling, but we'll be focusing on the text-based side of things here.

Skype
Free
Available on: Android, iOS, Windows Phone, BlackBerry, Windows 8
Now owned by Microsoft, Skype is so well-known for video messaging that it has verb status. However, the app can also be used for sending and receiving text messages. Skype has two major advantages: it's free (for instant messaging) and it's available on every major mobile platform. It uses Wi-Fi and a mobile data connection, and is also supported on PC, Mac, some home phones and even TVs. As well as messages, you can also send files. Skype really is the messaging app to beat.

Viber
Free
Available on: Android, iOS, Bada, Windows Phone, BlackBerry, Symbian
Viber supports even more mobile platforms than Skype including Symbian and Bada, although there's no Modern UI app for Windows 8. It's free and there are no ads, which is a bonus. You can share photos, videos and locations, and even paint a



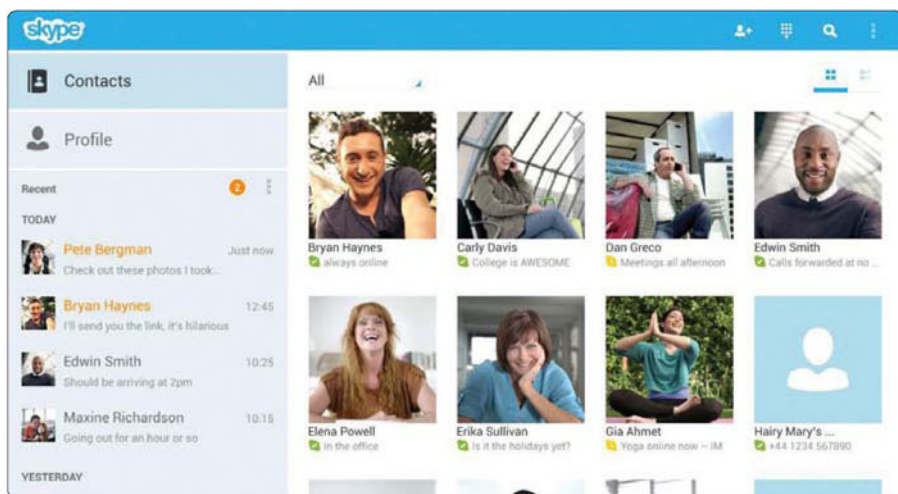
doodle or draw over a photo before sending it. Groups of up to 40 people can have a conversation, and there are emoticons and stickers. The app also syncs with your contact list, detecting which have Viber.

WhatsApp Messenger
Free
Available on: Android, iOS, Windows Phone, BlackBerry, Nokia S40, Symbian
Like the others, WhatsApp Messenger is free to download but has in-app purchases. You can use it for free for the first year, but from then on you'll have to pay 65p per year. This isn't much, but it does make it less attractive than its fully free rivals. Like Viber, WhatsApp uses your phone contacts and displays the ones that have the app

installed. However, it does use the phone number associated with your SIM, so you can't use it on multiple devices. This does mean that you don't have to log in, though, and the app will save messages offline.

BBM
Free
Available on: Android, iOS, BlackBerry
One of BlackBerry's main selling points for its phones has been BlackBerry Messenger (BBM). At the time of writing BBM is still limited to BlackBerry handsets, but will soon be launched on Android and iOS. This move warrants it a place in this round-up as it will be the first time the popular service is cross-platform. As well as text messaging, you can send photos, voice notes and videos files. You can even share your screen or the view from your camera if you wish to do so.

Facebook Messenger
Free
Available on: Android, iOS
If you use Facebook, you probably reply on it to keep in touch with friends. Although messaging is available in the regular app, Facebook Messenger gives you a dedicated space for having those private chats. Any messages you send will appear on the recipient's Facebook page, so they don't even need the app. One handy feature is Chat Heads. These appear at the top of your phone's screen, and let you keep track of conversations and continue messaging while using other apps. Like its rivals, you can send photos and your location. ☒





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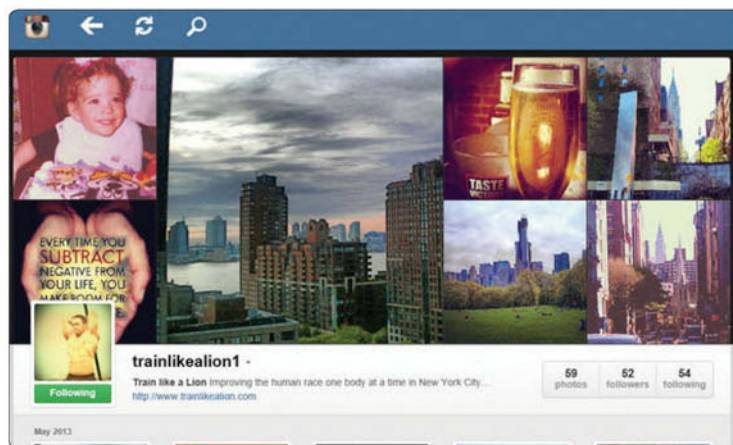
System requirements

Windows 8; 590kB storage

You may think an Instagram app that doesn't let you take pictures would be pointless, but Instagram Explorer, a Windows 8 app for the Modern user interface, has plenty of potential. Using it is like browsing through the Instagram.com site, but the app brings that experience to Windows 8's alternative view.

Instagram Explorer's default view displays your live feed, and it's a nice change to view some of the gorgeous photos you can find on Instagram on a bigger screen. It's also easier to comment on images when you're using the spacious real estate of a Windows 8 desktop.

The profile view is superior to the square tiles displaying identically-sized recent photos on your phone. Instead, the app shows pictures in a variety of sizes, which sometimes change while you're viewing them. Overall, the effect is more visually appealing than the mobile view and brings more life to Instagram. It works well with Windows 8 Snap View and the Live Tile gives you a



small snapshot of what's going on in the world of Instagram.

The app suggests 'famous' users you might want to make your favourites, but we found this feature unnecessary. It suggested some people we'd heard of (David Beckham) and some we hadn't (Cody Simpson). Clicking any of these lets you visit their profile to check them out, though, the app was a bit slow to make the transition at times.

If you're constantly snapping photos and sharing them with your Instagram followers, you may find the app limiting. And if you're not

relying on Windows 8's Modern UI, you have no need for this app: Instagram.com offers an almost identical feature set. But if you're looking for an easy way to sit back and browse photos on Instagram while using Microsoft's latest OS, this free app is for you.

Verdict

Instagram Explorer for Windows 8 offers a free, easy and visually pleasing way to browse Instagram when you're using Windows 8. It's also easier to interact compared to the mobile app. **✗ Liane Cassavoy**



ENTERTAINMENT APP

BT Sport

Free with BT Broadband
£12/month without

Contact

■ bt.com

Read more

■ tinyurl.com/Lk8rvch

System requirements

iOS 5.0 or later, 19.9MB storage; Android 4.0.3 or later, 5.3MB storage

At the beginning of August, BT launched its own sports channels, unsurprisingly called BT Sport. One way to make sure you don't miss any of the action is via the free Android and iOS apps.

If you're already a BT Broadband customer, then access to the content is free - log in with your BT email address and password. Although it's free, you'll have to order the service via your account before you can log in to the app.

The main use for the app is to live stream the channels available from BT Sport - BT Sport 1, BT Sport 2 and ESPN. These are accessed via the Watch button, which displays what's on each channel for the day, and the next seven days.

One small caveat is that you can't swipe between channel listings on the phone version's menu - you have to click on their logos. Plus, you can only swipe out of the side menu - you can't access it with a swipe.

A good selection of content is on offer, and while it doesn't



match that provided by Sky Sports, we can't complain since it's free. BT Sport has 38 Premier League matches, as well as Aviva Premiership rugby, WTA tennis, and more. You can watch it over a Wi-Fi connection, or with 3G or 4G.

Although the app is primarily for streaming the three BT Sport channels, it has other content on offer. There's sports news, polls and a selection of on-demand video content. There are also sections for individual sports, which are accessed from the side menu. These are split into news,

fixtures, results, tables and video. We're reviewing the app before the start of the Premier League season, but BT says it will work as a second screen if you're watching BT Sport on your TV, providing stats, commentary, and more.

Verdict

Aside from minor navigation issues, we can't find any faults with this app. It makes it easy to access to all of BT's sports channels, with a few additions, too. All this for free if you're a BT Broadband customer is a great proposition. **✗ Chris Martin**

**PC ADVISOR
RECOMMENDED**



SPORTS APP

FTBpro

Free

Contact

■ ftbpro.com

Read more

■ tinyurl.com/Lm4mjmq

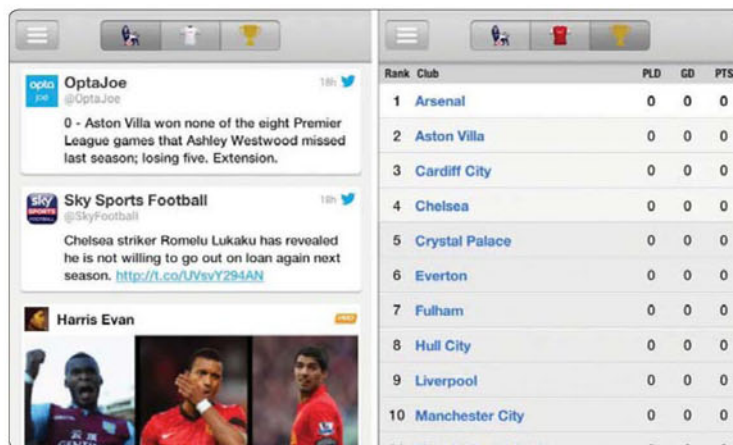
System requirements

iOS 6.0 or later, 5.8MB storage; Android 2.2 or later, 1.9MB storage

I don't know about you, but even as a life-long footie fan I don't really have a need for more football news in my life. It's not as if you have to search to find it. And I could live with fewer apps that are in essence shells for RSS feeds from websites. Fortunately, FTBpro adds something different on both scores.

In terms of content, the major difference here is that FTBpro is written by fans for fans. It sounds like a nightmare. Indeed, anyone who's ever listened to 5Live or TalkSport will know that the opinions of other fans are like cold calls: unwanted and irritating. But fair's fair, a lot of the content on FTBpro is interesting, in particular when it's a fan of your team who is opining.

It's probably best to think of FTBpro as the offspring of the rich tradition of fanzines such as The Onion Bag. Not exclusively, mind you, there is a smattering of flame. And reading about my team Leeds United (I really am sorry), it struck me that some of the pieces are



simply fans getting their hurt off their chest. Same as it ever was.


But the content is strangely compelling, and I found myself reading piece after piece. The app showcases the content of regular contributors who are able to gain 'pro' writer status by consistently submitting high quality content.

The other difference between FTBpro and other sports news apps is that once you set a team, your personalised feed is full of a variety of types of content. There's real-time news from professional sources, articles, twitter updates and video to

enjoy, as well as live match updates. And you can get the hard data you want with up-to-date scores, league standings, fixtures and stats.

The app is simple in design with decent fonts. It's easy to share your favourite content and, of course, if you sign up you can always write your own articles, though the novelty of writing wears off. Trust me.

Verdict

For the footie fan who wants something different to the average sports news feed FTBpro is worth a look. And it's free.  **Matt Egan**



NAVIGATION APP

Garmin StreetPilot (UK & Ireland)

£45 inc VAT

Contact

■ garmin.com/en-GB

Read more

■ tinyurl.com/mmgqk9L

System requirements

iOS 5.1 or later;
263MB storage

Persuading iPhone and iPad users to part with £45 for a satnav app is tough. Not only are there capable free offerings from the likes of Google and NavFree, but Apple's own Maps app provides turn-by-turn guidance for the iPhone 4S and 5.

Garmin has a long history in satellite navigation, so we had high hopes for StreetPilot. Needing to add extra features to tempt users away from free offerings, Garmin has decided to go down the social-media route and integrated Wikipedia, Foursquare and Glypse.

Using the various online services, drivers can discover points of interest around them and 'check in' to locations using Foursquare. Glypse allows you to share your position and destination with others - they don't need a Glypse account to track your progress.

The main interface is clear, with instructions at the top, and some key shortcuts to volume, cancel route and traffic information on the right. At the bottom you get

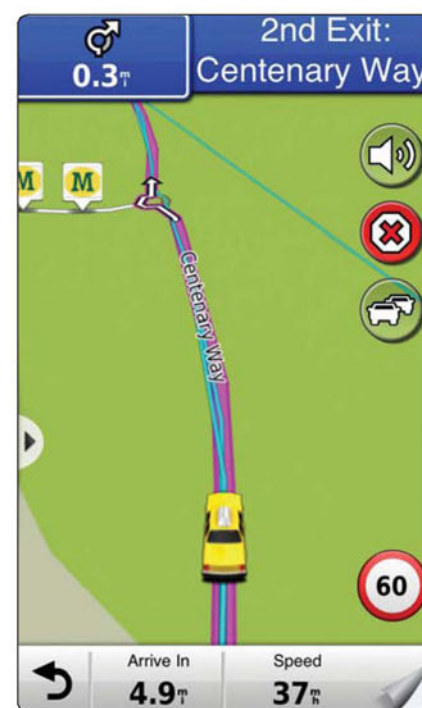
one configurable field, plus the ETA and current speed. A pop-out panel lets you calculate a detour, find out where you are, see the trip computer, send a Glypse or find services on your route.

Before you set off you must download the 360MB UK map and 64MB of extra files, including PhotoReal Junction View, 3D landmarks and Wikipedia POIs.


No traffic info is included (this adds £15) and, despite the ability to add their locations, in 600 miles of driving we didn't get a single speed-camera warning.

Our main gripe concerns the small turn icon and font in the information bar. Unless you can mount your phone close by, you might struggle to see the details.

Routing was beyond criticism and the route was always clearly marked onscreen, along with clear spoken instructions.



Verdict

StreetPilot offers some features you won't find in a free satnav app, but none make it worth £45. If you need offline maps, NavFree is almost as good.  **Jim Martin**



ONLINE BACKUP SOFTWARE

Malwarebytes Secure Backup

\$30 (£20) 50GB/yr

Contact

■ malwarebytes.org

Read more

■ tinyurl.com/mpcu2bw

System requirements

800MHz processor;
Windows XP/Vista/7/8;
512MB RAM; 30GB drive
space; high-speed
internet connection

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



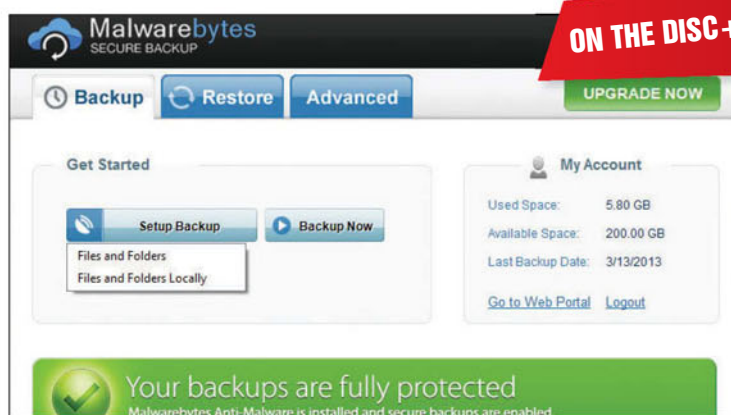
Plenty of backup applications are available, many of which back up data to the cloud. Malwarebytes Secure Backup claims to differ in that it checks files for malware before uploading them.

Available in three versions, differing only in the amount of storage they offer, Secure Backup costs range from £20 per year for 50GB to £80 for 200GB. Compared to Mozy, which offers 125GB for £88, this appears to be good value.

Secure Backup offers a simple wizard-based interface, which automatically scans your PC and suggests what data you should back up. This selection can be edited, so you can add or remove files and folders. You can also choose a backup frequency, from hourly to monthly, and a schedule for when it should begin. There's no control over the type of backup, however, and every version of a file is maintained. Malwarebytes also claims to archive files you delete from Secure Backup.

The oddest thing about this program is that the file cleaning works only if you also download the Anti-Malware program. Although this is a free download, we expected it to be installed with Secure Backup.

Anti-Malware runs alongside regular antivirus software to scan files on demand and remove the toughest malware. The free product



SECURE BACKUP claims to back up only "files that you know are clean"

still doesn't have a real-time scanner, so it's a manual run each time.

By its own admission Malwarebytes doesn't detect or remove threats such as file infectors, so it's difficult to see how it can claim to back up only "files that you know are clean".

According to Malwarebytes, three levels of encryption are applied to the files before, during and after backup. A first layer of AES encryption is applied before files are sent, a second is added via a Secure Sockets Layer (SSL) connection during the transfer, and a third is used at the data centre.

If you opt for the UltraSafe feature at registration, your files can't be decrypted by Malwarebytes. This means that even in the case of a court order your data will remain encrypted.

You can back up data from multiple machines, within your storage allowance, and each backup is kept separate. Secure Backup also supports Android and iOS.

Our 20GB test backup took more than 12 hours to complete over a 5Mb/s upload connection. This is slow, but subsequent backups are incremental and therefore faster.

Verdict

Malwarebytes Secure Backup is a competent online backup application and its storage costs are more than competitive. It's a perfectly reasonable choice if you want to store data securely in Malwarebytes' cloud. Don't be fooled by the attraction of malware scans before backup, though, as you still need to install separate antivirus software. **Simon Williams**

SECURITY SUITE

Kaspersky PURE 3.0 Total Security

£50 inc VAT (3 PCs)

Contact

■ kaspersky.co.uk

Read more

■ tinyurl.com/n4er2x2

System requirements

800MHz processor;
Windows XP/Vista/7/8;
2GB RAM; 700MB storage

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



In the same way that Norton 360 is Norton Internet Security with lots of extras, PURE 3.0 Total Security is Kaspersky's top-of-the-range internet security product, with a lot more than AV to show for itself.

It offers protection from malware, Safe Money data backup (which runs a separate secure browser when banking online), identity protection, PC cleanup, parental control and data encryption.

The main interface is more geared to looks than function. Three large panels for Backup, Computer Protection and Parental Control take up most of the space, and change colour from green to amber and red, depending on their status.

Each panel includes options such as running a scan or setting up a backup task or the number of restricted users. Further features are located below these panels, including data encryption and home network control.

Combining backup with Windows anti-malware provision is a sensible move. The adage that you never back up until you've lost important data still seems to hold, so a one-time setup of both security measures might get a few more people taking both precautions.

The software's backup provision offers categories, such as documents, photos and audio, as well as individual selection of files

and folders. These are all on a bullet-point selector, though, so it's not possible to combine, say, documents and videos as 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 your data. 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.

The initial AV scan isn't quick, and took one hour 21 minutes to check 334,086 files - a scan rate of 68.7

SECURITY SUITE

Bitdefender Total Security 2014

£50 inc VAT (3 PCs)**Contact**■ bitdefender.co.uk**Read more**■ tinyurl.com/L9knk29**System requirements**

800MHz processor;
Windows XP/Vista/7/8;
1GB RAM; 1.8GB
drive space

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



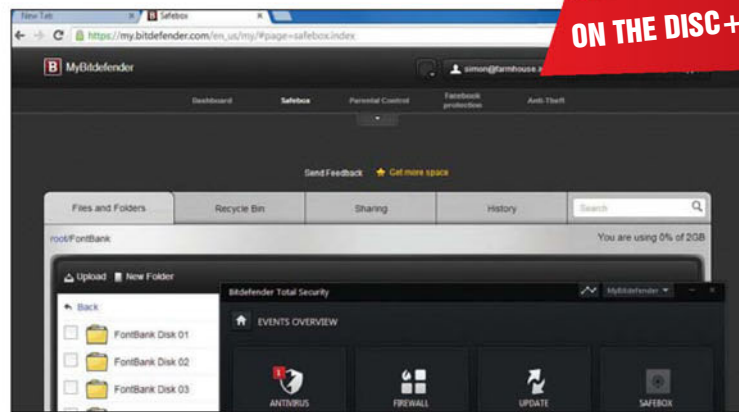
The Total Security label is normally given to top-of-the-range security products and that's the case with Bitdefender Total Security 2014.

As well as AV, malware and spam filtering, Bitdefender's suite includes a two-way firewall, parental control, a separate 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 single window with a total of 11 panels scrolling through it. Each panel offers configuration options or ways to start scans and updates. It takes a bit of practice to work round them, but Bitdefender's AutoPilot sets sensible defaults, so you only need to tweak things if you want.

Those with Windows 7 also get a screen gadget that shows when the program is scanning or updating, and highlights any outstanding alerts. (Editor's note: Microsoft no longer endorses the use of third-party gadgets, because they present a Windows security risk.) Files and folders can also be dragged there for quick, contextual scans.

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



BITDEFENDER TOTAL SECURITY offers 2GB of storage on its servers

mirror selected files and folders, and keep them up to date in the cloud. 2GB is quite a small allowance these days, though, when competitors offer up to 25GB.


The Anti-Theft provision is for customers with Windows tablets or laptops, and comes into play if the device is stolen. Then from a remote PC, any that has access to the Bitdefender site, you might locate the machine when it's within wireless range, lock it down and if necessary erase its hard drive.

Our usage tests show that Bitdefender Total Security 2014 scans virtually every file in a bundle the first time it's used. It looked at 1,390,387 files in our 50GB basket, which took two hours 20 minutes, giving a good scan rate of 166 files per second. A repeat scan checked just 10,172, 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. AV-Test also scored it highly, at 16.5/18, and it won the best Repair award for home use in 2012, using the 2013 version of the engine. The 2014 product is too new to have been tested. The three sub categories in AV-Test evaluation gave a perfect 6/6 for Performance, 5.5/6 for Repair and 5/6 for Usability.

Verdict

Technically one of the best IS suites you can buy, Bitdefender Total Security 2014 also offers a swathe of extras that all help to protect some aspects of your Windows life online.  **Simon Williams**



The colour of **PURE 3.0 TOTAL SECURITY's** panels changes, depending on their status

files/s. Repeating the scan showed a good level of fingerprinting, to reduce the number of unnecessary scans, and it examined 8805 files in just seven seconds.

The resource hit is a bit higher than with some of its competitors, registering a 61 percent increase in

file copy time when a background scan was in progress.


The German site AV-Test scored the suite at 16/18, with only Bitdefender (above) beating it, overall. This is a very good result and well balanced between the categories of test the site uses. It scored 5.5/6 for Protection, with 100 percent detection of established malware and 99.5 percent and 98 percent for recent and zero-day threats, respectively.

PURE 3.0 also scored 5.5/6 for Repair, which looks at the removal of malware and readjustment of the system after an attack. Kaspersky provides a special tool called Post-Infection Microsoft

Windows troubleshooting for this, though, it's a hidden away under Additional Tools.

Finally, the Usability score was 5/6, also high. It caused an 'average' system slowdown under AV-Test's evaluation, although our tests put it a little higher than average.

Verdict

The price of PURE 3.0 makes it a competitive product for a full IS suite with all the trimmings, and its AV-Test results put it in a strong position. It's good to see anti-malware and backup apps combined, though, the interface would benefit from a more equitable distribution of its function links.  **Simon Williams**

PHOTOSHOP PLUG-IN

Adobe Photoshop Lightroom 5

£103 inc VAT

Contact

■ adobe.com/uk

Read more

■ tinyurl.com/mfn6ap3

System requirements

Intel Pentium 4 or AMD Athlon 64 processor; Windows 7/OS X 10.7 or later; 2GB RAM; 2GB drive space; 1024x768 screen; DirectX 10-capable graphics card



As well as cataloguing and sorting images in the Library, you can apply **PRESET EFFECTS** to them

With Adobe's Creative Cloud rolling out across the digital landscape, it's no surprise that Lightroom is part of it. Fortunately, you don't have to sign up for CC to get it - you can just pay for a download or a box copy, and keep it. If you do have a Creative Cloud subscription, you'll be able to use Lightroom 5.

Everything starts with the Library tab, and its interface makes it clear where you are at all times. There are three main methods of looking for images: Folders shows you where images are; Catalogs displays any collections you've made and recent imports; while Collections lets you start searches based on specific criteria, such as a modified image.

In some ways all of this is overkill if you are just trying to load a folder of photos and select the best ones. It can do that, but where it really pays off is if you have thousands of images and numerous folders, and you want to be put them into different categories. The size of the thumbnails you're looking at can quickly be increased, too, so you can do a preliminary check.

Images can be rotated, but the most powerful functions are revealed when you right-click on a photo. Pictures can be zoomed into by selecting Open in Loupe. Flags, rating and colours can be applied, and a photo can be added or removed from collections, rotated or exported immediately.

The Navigator option in the top-left corner lets you switch between different levels of zoom either manually or by using the cursor. Clicking and releasing on a photo zooms in to 3:1, and switches to a hand tool so you can move around the image. Clicking and holding



LIGHTROOM 5's Adjustment Brush paints on the area you want to adjust

zooms in to where the cursor is, and when you release Lightroom zooms back out.

The main photo controls are located in panels along the right, while on the left are a set of Presets that use them. These cover black and white, toning, colour, effects, general editing and video. You can also create your own presets using the settings on the right - save them and they will appear under User Presets.

Mechanics

The actual mechanics cover the whole range of functions from temperature and tint, exposure, contrast, highlights, shadows, whites and blacks, clarity, vibrance and saturation. Those are just the basics, and Lightroom also has tone curves, eight channels of colour, saturation, luminance and black-and-white control, as well as options for split-toning, sharpening, reducing noise, camera calibration and lens correction. Finally, you can add vignettes and grain.

On their own, these would be an impressive raft of adjustments, but general ones, which is where Lightroom's tools come in. These

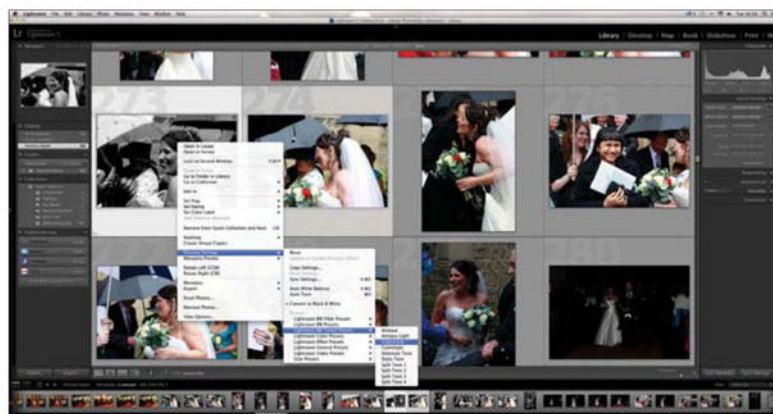
include Crop, Spot Removal, Red-Eye Fix, Radial Filter and an Adjustment Brush. There's also a handy white balance tool and a fringe colour selector. The white balance tool requires you to click on a neutral tone, or in practice, a white one. This is then adjusted to

pure white tone and everything else is shifted accordingly. Another useful option is the Map tab, which lets you tag where photos were taken. It's handy for landscape photographers or those who like to return to places. Images with geotags can be placed automatically, but the first time you drop a photo without geotagging onto the map, there's a request to send data back and forth between Lightroom and Google Maps, so that the image can be retroactively tagged. Moving the cursor over an image in the strip at the bottom will start a flag jumping up and down if it's been located on the map. This is handy for those images that are geotagged and you can't remember where it was.

Lightroom also has updated the Book feature. This now offers a range of sizes, finishes, paper types and formats, and updates the prices on screen as you go. Thankfully these are both UK-priced and sourced with Blurb, the online printer, and are competitively priced. You might want to use your own specific printing company, in which case you can output the book design as a PDF, but for most people there are some nice options here. There's a selection of presets that Auto Layout can fill in for you, though, at the time of writing these presets didn't work. They were there, but Auto Layout defaulted to filling them using the wrong preset. Photos in the cells can be moved and resized, and you can add text, but until this is fixed it's all a little moot.

Verdict

Photoshop Lightroom 5 has some excellent tools and useful presets, making this a great app for photographers. **✉ Derrick Story**



WINDOWS UTILITY

Start Menu Reviver

Free

Contact

■ reviversoft.com

Read more

■ tinyurl.com/Lkrr3sa

System requirements

Intel or AMD processor;
Windows 8

Usability: ★★★★★

Features: ★★★★★



Windows 8's unpopularity can be traced in part to the removal of the touchstone for every Windows user, the Start menu. This has fuelled a growth bolt-on replacements, like this attempt at revival.

How much you'll like Start Menu Reviver largely depends on what you want out of a Windows 8 Start Menu. If you want something that mimics the Windows 7 Start Menu exactly, you're better off with Stardock's Start8 or IObit's Start Menu 8.

If you want something that's more of a melding of Windows 8's Metro tiles and a start menu, Start Menu Reviver is for you.

When first installed, it defaults to a large size, which is handy for touchscreens, but on a monitor or laptop screen looks like an Ease of Access feature for those with impaired vision. You can select a size that's in keeping with the scaling employed throughout the desktop.

Start Menu Reviver sits on the taskbar. As with other Start Menus for Windows 8, you can change



START MENU REVIVER is located in Windows 8's taskbar

the icon to suit your taste. A list of common Windows programs (desktop and modern UI) such as Task Manager (modern UI version), Network (desktop), Run (desktop), and the user name (which takes you to User Account Control) are located in a column on the left.


To the right are My Computer, Internet Explorer (desktop), a link for the modern UI, and a bunch of

other tiles representing both legacy and modern UI apps. You can freely arrange – and even resize – the tiles, just as with the Modern UI.

Start Menu Reviver has the usual search box at the bottom. However, this is where we first noticed that there's no tabbing between fields or sections as there is in a normal Start Menu. It can be considerably faster navigating when you can use both the mouse and the keyboard. Not everyone is touch-oriented.

Start Menu Reviver lacks the fine control over switching between the desktop and modern UI that the competition offers. You can have the Windows Key invoke Reviver rather than the modern UI, but that's about it. Start8 and Start Menu 8 both allow you to take the modern UI out of the mix entirely.

Verdict

Start Menu Reviver is free, and it's nice that Windows 8 users put back the Start Menu that Microsoft removed.  **Jon Jacobi**

FILE UTILITY

PeaZip

Free

Contact

■ peazip.sourceforge.net

Read more

■ tinyurl.com/mkk2ccg

System requirements

Windows XP/Vista/7/8

Usability: ★★★★★

Features: ★★★★★

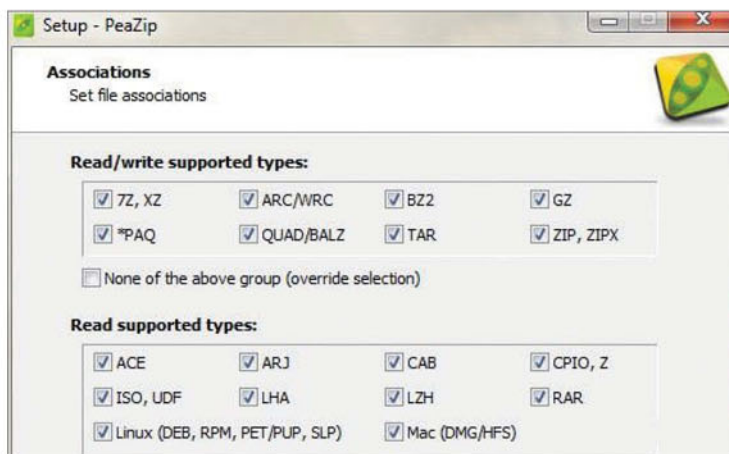


PeaZip is one of the most versatile file compression and archiving utilities out there, and it's free. It's easy to use and offers contextual menu integration, passwords and command line control.

The program supports every compressed archive format we can think of: 7Zip, ARC, GZ, TAR, ACE, and RAR. There's also support for both ISO and UDF disc images and Linux package formats such as DEB, RPM and SLP.

Version 5 of PeaZip seems more stable than previous releases, but it still has a tendency to not close and launch 100 percent smoothly when you're dealing with multiple instances. The progress bar is still inaccurate, claiming far less progress than is true. Several times, it was only 25 percent across when the task completed.

It depends on a lot on open-source and free libraries to handle the various archive types, and some of these are faster than others. That's a minor complaint: PeaZip




We can't think of an archive format that **PEAZIP** doesn't support

is fast enough on any modern PC. We like the interface, which is clean with lots of nice touches. It ignores unpopulated higher-level folders when you open archives. So if you have a batch of zipped pictures in say 'Picture\Holiday 2013\ Grandma', it takes you directly to the Grandma folder rather than forcing you to tunnel down three levels.

Also, it keeps the files that you've already viewed open till the archive

is closed. This is handy when you're using the Windows image preview and want to scroll through the pictures you've selected to view from within the archive without permanently extracting them.

Verdict

You won't find a more capable archive utility than PeaZip, though, performance could be better on some file types.  **Jon Jacobi**

GAME

Sid Meier's Civilization 5: Brave New World

£19 inc VAT

Contact

■ civilization5.com

Read more

■ tinyurl.com/kh2ozwn

System requirements

1.8GHz Intel Core 2 Duo or 2GHz AMD Athlon X2 64; Windows XP/Vista/7; 2GB RAM; 8GB drive space; AMD HD2600 XT or nVidia 7900 GS with 256MB VRAM or Core i3 integrated graphics; DirectX 9

PC ADVISOR
RECOMMENDED



The **CULTURAL VICTORY** option expands the ways you can play and win Civilization 5

For the longest time, received wisdom has held that 2005's Civilization IV remained the superior of 2010's Civilization V. A slow trickle of updates, little and large, to the more recent turn-based, history-spanning strategy sequel has seen that gradually change, and with the Brave New World major expansion Civ V's blossomed into something especially elaborate and nuanced.

The expansion's no good if you don't own the parent game, although you can skip previous add-on Gods and Kings if you must - in fact, Brave New World contains most of that expansion's features, but not the new playable factions and leaders.

Brave New World is filled with small changes, as well as the inevitable raft of new playable Civs (including Brazil, Poland and the Zulus); but it has three major areas of focus. The first of these is a new Cultural Victory, significantly expanding the range of ways to play and win the game, as well as improving the range of options if you prefer to be the leader of a pacifist nation.

The idea is that, through the generation of Great People, who in turn perform Great Works, you increase the tourism appeal of your Civilization, striving to become the most admired faction, rather than the most feared or the most hi-tech.

It's a difficult way to play, as you need to devote almost everything your collection of cities and citizens does to generating culture and building World Wonders if you're to have a hope of making enough Great People to out-tourist rival



CIVILIZATION 5 lets you establish trade routes with neighbouring Civs

factions. This makes it hard to leave anything spare to build armies and defences, so while you might have the world's finest collection of paintings and symphonies, it might be ripe for a warlike neighbour to stride in and destroy it all.

It must be said that the presentation of tourism and cultural artefacts perhaps isn't what it could be, feeling rather like the new information and statistics have been shoved into any available screen space rather than made front and centre, but then a raft of initially overwhelming numbers has long been the Civilization way.

Also tackled is the long-standing problem of the late game tending to be a baggy war of attrition, where the strongest Civs slowly chip away at each other. A new World Congress system enables Civs to propose, endorse and seek to block measures with wide-ranging effects - for instance, agreeing to impose sanctions on aggressive Civs, enacting world-wide boosts to

culture or cheekily seeking to boost generation of a resource you're short on.

If other Civs consider your motions to be their own benefit, they'll vote for them and be extra-chummy to you. So if you play your cards right, you'll have your enemies handicapped and

other rivals busy making nice with you. Like the Cultural Victory, it's highly elaborate stuff, tying into the espionage and diplomacy system established in the last expansion, Gods and Kings, and once again significantly refreshing the game for anyone who feels they've seen all Civ has to offer. For that reason, it will feel like overload if you're new to Civilization V.

More comprehensible is a new trading system that enables the establishment of temporary trade routes, either with neighbouring Civs or your own remote cities very early in the game. Build a few caravans, set them running back and forth with a target, and you'll experience either a steady stream of gold and science (if you're trading with another Civ), or having one of your own more populous cities funnelling food to a struggling offshoot.

However, the recipient of a trade route will benefit, too, so you run the risk of later consequences for shovelling small amounts of gold and science into your erstwhile rivals, as well as seeing a potentially disastrous exchange of religion between two linked cities. While trading is ostensibly a friendly act, it's also a means of applying silent pressure to an enemy.

Verdict

This major add-on for Civ V is almost incomprehensible for non-fans, and frankly it's nowhere near as smart as it could be about explaining its new stuff. But for those who have already sacrificed dozens of hours to this strategy giant, Brave New World is absolutely essential. Alec Meer





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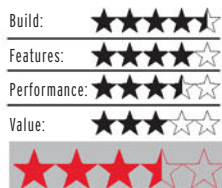
£408 ex VAT
£490 inc VAT

Contact

■ readynas.com
Read more
■ tinyurl.com/motv53m

Specification

2.1GHz Intel Atom
(dual-core); 2GB RAM;
4x drive bays, 3.5/2.5in
SATA 3Gb/s; 16TB
maximum capacity
(current HDD max);
1x eSATA; 1x USB 2.0;
2x USB 3.0; 1x HDMI;
2x gigabit ethernet;
223x134x205mm



NAS DRIVE

Netgear ReadyNAS 314

Network-attached storage (NAS) is becoming increasingly useful to home- and business users as a means to create a private data cloud. For small-business use, Netgear is becoming a potential adversary to Synology and Qnap.

The ReadyNAS 314 is from Netgear's business range. A 2.1GHz dual-core processor is coupled with 2GB of memory. That's a respectable amount of processing power and memory for a four-bay NAS.

There are three USB ports, two of them USB 3.0, plus HDMI, eSATA and two gigabit ethernet ports.

Netgear includes its new OS6 software with the ReadyNAS 314. A nice addition are Paragon drivers for NTFS and HFS+. This allows Mac and Windows PCs to read and write to each other's formatted drives, and at hugely improved speeds.

The system doesn't require any command-line terminal work or hacks - we plugged in an HFS+ drive and it was automatically detected, mapped to a shared drive and available to any Windows PC on the network in a matter of seconds.

OS6 software includes some improvements to cloud functionality. For example, the cross-platform ReadyNAS Remote connects to the NAS unit from any internet connection and populates the PC's network places with the shared

areas on the NAS. On a Mac, both SMB and AFP connections are listed as separate network nodes, making it easier to choose between them.

Windows users should note that these drives are automatically populated via the NAS' remote IP address, even when on the LAN, which is slower than using the local IP address.

Our initial speed tests, when mounting the populated shared folders, left something to be desired. But when we manually entered the local IP address for the NAS, our benchmarks yielded much more LAN-appropriate speeds.

Cloud services extend from remote mounting of drives using AFP and SMB to killer features such as remote Time Machine backup.

We used the CrystalDiskMark Windows benchmark to test read and write performance. The ReadyNAS' average sequential read speed of 53MB/s was much lower than we expected.

However, the sequential write speed was 83MB/s is very high in comparison to competing units, which average around 50- to 60MB/s write speed.

We suspect Netgear may have paid more attention to the higher



I/O demands of the business user: random 4k writes were measured at 17MB/s, while the 4k read rate was 32MB/s (queue depth 32). These are decent transfer rates for small-file random access.

Verdict

The ReadyNAS 314 is a very capable unit. In our tests its read and write performance during random access was strong, but peak sequential read speed was disappointing. Enterprise features will please business customers, such as the ability to take unlimited snapshots for improved data protection. John Taylor

WIRELESS ROUTER

Billion BiPac 7800DXL

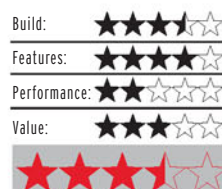
£116 ex VAT
£140 inc VAT

Contact

■ billion.uk.com
Read more
■ tinyurl.com/L4rhL77

Specification

Concurrent 2.4/5GHz
radio; 802.11a/b/g/n; WPA2,
WPS; ADSL2+ modem;
4x gigabit ethernet LAN;
230x155x43mm



Billion's 7800DXL modem router is targeted at small businesses or home users looking for flexibility.

To help you get online there's a WAN port for a separate cable or ADSL modem, a DSL port to make use of the internal ADSL2+ modem, and a USB port. Note that the WAN port comes at the expense of one of the four gigabit ethernet LAN ports.

The USB connection allows you to plug in a compatible mobile broadband dongle, or you can use it to connect a shared printer or hard drive to the network.

On first inspection the router feels cheap. It uses thin plastics with plenty of vents through which the circuits inside are clearly visible.

However, the case is built in such a way to provide a high level of cooling. The only solid surface is found at the front, where you also find a series of status LEDs.

As with most modern routers, setup is remarkably simple. And although the settings for customising the Billion's use are more detailed than most, they are straightforward in their layout.

For example, you can select certain ports (applications such as web browsers or FTP software) and decide how much bandwidth they are allowed on the network. This will be particularly useful for the home user, since BitTorrent filesharing can be capped at the

program level and VoIP services such as Skype prioritised.

This will also be of use to small businesses, where critical traffic can be ringfenced and others limited. Small businesses will also benefit from the router's ability to filter internet sites by URL, reducing the requirement for a proxy server.

To assess the unit's wireless performance we devised a number of tests on both the 2.4- and 5GHz bands. These tests varied the range and number of obstructions between the router and our test laptop.

The laptop includes a 3x3 MIMO antennae arrangement for best 802.11n performance, although the Billion wireless router itself

£228 ex VAT
£274 inc VAT

Contact

■ canon.co.uk
Read more
■ tinyurl.com/mfxr6u4

Specification

Colour laser engine;
max print resolution:
1200x1200dpi; quoted
print speed: B=14ppm,
C=14ppm; actual print
speed: B=10.2ppm,
C=6.7ppm; 600x600dpi
scanner; 24-bit colour;
33.6kb/s fax; USB 2.0;
10/100 ethernet;
802.11b/g/n; iPad, iPhone
and Android support;
151-sheet input; 50-sheet
ADF; 256MB memory;
toner cost: B=£58,
C=£53 x 3; print life
(pages): B=2400,
C=1500 x 3;
430x484x429mm; 26kg

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



PRINTER

Canon i-Sensys MF8280Cw

If we judged printers on their heft, the MF8280Cw would exceed all our expectations. It looks rather large, and feels larger still, packing a 26kg weight that comes as something of a surprise for a sub-£300 model. It certainly isn't a featherlight model that you'll be whisking from one side of the office to the other.

Of course, lasers aren't usually selected for their slim physique, and the Canon makes up with its comprehensive feature set.

Not just a printer, the MF8280Cw also delivers scanning, copying and even Super G3 faxing. The 600dpi optical resolution (which can be stretched to 9600dpi) of the scanner makes for some quality image capture, and the Canon can create 600dpi A4-size output in a mere 18 seconds. Photos take just 12 secs at the same resolution, and a mere 6 secs at 300dpi. The results are very pleasing, with good attention to colour.

Files can be seamlessly distributed across the network or converted to a choice of formats that includes Compact PDF. The faxing is simple, but effective, and a 50-sheet ADF is welcome.

Connectivity is pretty good. Ethernet doesn't stretch to gigabit, although you do get 802.11b/g/n Wi-Fi to compensate. Full cloud support is built in, with the Canon

able to talk to iPad, iPhone and Android devices. USB sticks can be inserted, too.

Not all the specifications are so generous, though. Despite the Canon's heavyweight looks, some of the specs fell below our expectations. For example, the Canon's main paper tray holds only 150 sheets (with an additional single-sheet manual slot), which seems a poor use of the huge casing.

The control panel has simple enough navigation, employing a pair of select keys and a back button, and is paired with a pleasing 3.5in colour TFT display. There are too many other buttons, though, many of which don't have particularly descriptive titles.

The Canon MFC8280Cw can stretch its standard 600dpi resolution to a more sizeable 1200x1200dpi. Prints are of acceptable quality, with nicely defined text and vibrant but not exaggerated colours.


Performance is lacking, though, with the Canon turning out mono and colour prints at 10.2- and 6.7 pages per minute (ppm) respectively in our tests. This mono speed is eclipsed even by the £45 Pantum P2050 (see page 140), while some inkjets can match its colour printing speed at decent quality levels.



Part of this was down to the sluggish startup time, and the printer frequently took 20 seconds to turn out the first page. Large jobs should see the figures coming down, although the small paper tray will impose some limits.

Running costs are higher than we'd like, and even mono costs more than 2p a page. Colour pages work out at five times that.

Verdict

Canon has produced some excellent models of late, but this multifunction laser printer isn't one of its best. The i-Sensys MF8280Cw is slow, has a skimpy paper tray, and it's relatively expensive. It also remains a mystery as to why it's so heavyweight in build.  **Robin Morris**



is behind the curve with a two-antennae configuration.

The first test was conducted with the laptop 1m from the router, the second from 7m, but within the line of sight, and the third at 10m with concrete walls in between.

On the 2.4GHz channel, we recorded 104-, 75- and 17Mb/s respectively. These speeds are in line with many mid-range routers in the 802.11n class.


We then tested the Billion BiPac router's performance over the 5GHz band, and the results were as follows: 203Mb/s at 1m, 100Mb/s at 7m, and 16Mb/s at 10m.

The 1m performance was unusually good. This reviewer has tested a range of routers and none has managed to transmit or receive data at faster than 180Mb/s over 802.11n 5GHz.

Editor's note: real-world transfer speeds up to 300Mb/s are possible with three-stream 802.11n 5GHz

routers, for example the similarly priced Buffalo AirStation 1750 (tinyurl.com/9kqub54).

Verdict

The Billion BiPac 7800DXL is a decent modem router that provides plenty of flexibility in getting online, whether you do so via a separate ADSL modem, the one built into the box, or mobile broadband. It offers solid wireless performance over both the 2.4- and 5GHz frequencies, and houses a good range of network management options. This, combined with the ability to plug in a shared printer or hard drive, makes it a good choice if you can afford the high price.  **John Taylor**

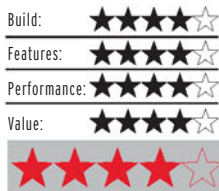
£559 ex VAT
£671 inc VAT

Contact

■ benq.co.uk
Read more
■ tinyurl.com/Lxadr7q

Specification

DLP projector; 1920x1080; 16:9; 2000 ANSI lumens; 10,000:1 specified contrast ratio; 5% vertical horizontal offset; 33dB/30dB (eco); 2x HDMI; VGA; USB; composite; display size: 40-235in; 2m gives 79in; throw ratio: 1.15-1.5; 3500 hours (normal), 6000 hours (SmartEco) lamp life; 240W lamp; 10W speakers; 312x244x109mm; 2.65kg



PROJECTOR

BenQ W1070

A relatively low-priced model capable of 1080p HD film playback, BenQ's W1070 may prove a useful living-room addition. It cuts a dapper figure in its polished white casing, although it's not especially light.

Its high 2000 ANSI lumens brightness rating might seem to make it a good choice for offices, but there are a few issues in such an environment. The remote control is too small to easily operate, for example, and the W1070 lacks the backlighting crucial for use in darkened meeting rooms.

It's also tricky to set up. The zoom is underspecified and the controls are rather cumbersome. The vertical projection offset is accessible only via a screw. Of course, such a feature isn't a given at this price.

If you're prepared to spend some time setting it up, the results can be very good. The menu options are impressive, even if some of the colour options are excluded when connected via HDMI.

Speakers are included, although you'll almost certainly want to replace these with external speakers for anything serious.

The short-throw lens means you can create a big image in a relatively modest space – a 79in picture is available at a distance of just 2m.

In addition to the standard eco mode is a SmartEco option, which adjusts the settings to suit the amount of light in the room. In practice, this often produced better quality than the full mode, generating a rich and varied colour palette that succeeded even in fiendishly dark film sequences.

The image isn't the slickest, and fast sequences can be jerky. However, given the budget price, movie rendering is superb. A fast-spinning colour wheel means it's also largely untouched by the rainbow effect. The ample 2000 ANSI lumens brightness rating means that images look good even



in daylight, although you'll need to close the curtains for best results.

3D is built in, but you will have to buy your own glasses – look around for a cheaper option than BenQ's circa-£100 offering. The Triple Flash feature helps create a clean image. 3D mode is rather dim, but we were generally pleased with the quality.

It's not the quietest projector, hitting 30dB even in full eco mode.

Verdict

With images better suited to home cinema than PC output, the BenQ is a well-priced model that looks great and works well. You'll need to spend some time grappling with its controls, and we'd recommend using SmartEco on a regular basis.

✉ Robin Morris

PROJECTOR

Dell M900HD

Wonderfully petite and finely polished, this mini projector from Dell will slip easily on to any boardroom desk, and can be fired up and ready to go within seconds. It's a great projector whether you're on the move or simply transporting it between conference rooms.

Despite this portability, the Dell has a range of connection options. HDMI and USB are included, plus there's an SDHC slot that allows you to display images directly from a memory card. The Dell also has 2GB of built-in flash storage.

Wireless connectivity is extensive. Laptops and Android devices compatible with WiDi and Miracast can be wirelessly hooked up to the M900HD, while iPhones and iPads will need to use the third-party WiFi-Doc app or an HDMI adaptor to transmit images.

Inevitably, given the size, the Dell's hardware specifications aren't as impressive as those of a full-size projector, and this will limit its performance. The brightness is rated

at only 900 ANSI lumens, for example. Although you can just about project in daylight, the M900HD needs a darkened room to shine.

The native resolution stretches to 1280x800, but the images are good for the size. It lacks the decent contrast of the BenQ W1070 reviewed above. With our test video colours could be a little rosy, and it struggled to bring out much detail from very dark scenes.

We should stress, though, the quality is good for a projector of this size – if it's home cinema you want, you won't be buying this model. It's more than capable for displaying presentations or photographs, however, and will make a bold impression in boardrooms, provided you can shut out the daylight.

The Dell M900HD is rather loud and, even in its eco mode, noise levels top an all-too-audible 38dB. In an office setting the noise may be less an issue than for enjoying



a film. Built-in speakers produce decent volume from their 3W amp.

We weren't impressed by the amount of excess heat generated. This projector felt extremely hot after an hour's use. It promises to be long-lived, though, with the LED light specified for an impressive 30,000 hours.

Useful protection is provided by a padded carry case.

Verdict

The Dell is incredibly portable, and very convenient if you have a suitably equipped laptop, phone or tablet. It does get hot, and a few more ANSI lumens would increase its versatility. Nonetheless, it will prove a great option as a projector that can service several rooms.

✉ Robin Morris

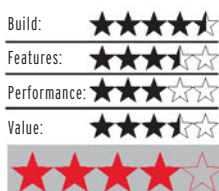
£619 ex VAT
£743 inc VAT

Contact

■ dell.co.uk
Read more
■ tinyurl.com/maxqrg3

Specification

DLP projector; 1280x800; 16:10; 900 ANSI lumens; 700:1 specified contrast ratio; 38dB (34dB eco); HDMI 1.3; USB; stereo mini jack; WiDi and Miracast support; SDHC; 2GB storage; display size: 30-80in; distance 0.91-2.4m; 2m gives 68in screen; throw ratio: 1.4; 30,000 hours lamp life; speakers with 3W amp; 232x164x43mm; 1.59kg



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All-in-one PCs

All-in-one PCs have once again been brought to the fore with the release of Microsoft's touch-centric Windows 8. Paul Monckton reviews six stylish machines

The all-in-one PC is enjoying greater exposure after the appearance of Windows 8. In fact, in the Windows world, it's about the only way to get a large-format PC with a decent touchscreen.

They also offer great space-saving advantages and have a much bigger screen than you'd find on a laptop. Some also double as entertainment centres capable of playing films, music and, to some extent, games. Lenovo's IdeaCentre Horizon in particular is aimed at family fun, with educational and unique touch-enabled gameplay brought to the fore.

In choosing an all-in-one, you should take into account more than its performance. Sometimes used as family multimedia systems, they will be subject to the same aesthetic considerations as any other home-entertainment system. The same goes for their reliability and freedom from technical maintenance.

Many systems incorporate Blu-ray drives and Freeview TV tuners, and are supplied with a remote to control them from across the room. Most of the PCs reviewed here incorporate a touchscreen interface, freeing you from the keyboard and mouse in some activities.

Other all-in-ones, most notably Apple's iMac, don't offer touch control - favouring traditional input methods instead. Although Apple's use of multi-gesture control on its mice and trackpads is anything but traditional.

If you're considering making use of touchscreen input, look for a system

that tilts a long way towards the horizontal, to enable comfortable prolonged use. Holding your arms out to control a PC will otherwise soon prove tiring.

The move to Windows 8 has increased the demands made on touchscreens. Microsoft requests its hardware makers create flush, frameless screens with 10 touch points



Photography by Dominik Tomaszewski



for a satisfactory experience. All the touchscreens here meet this requirement.

When selecting an all-in-one, it's a good idea to start by considering the screen size. Some systems have an HDMI input for plugging in a set-top box or games console, for which you might want a large display. HDMI outputs let you add another screen or a projector. You might also want a Blu-ray drive to get the best movie experience.

With all their components crammed into a thin housing, an all-in-one must compromise between performance and noisy cooling. Some use mobile or low-power processors to reduce heat and power consumption - the U and S suffixes that denote low-power chips. These PCs are generally quieter in use, while third- and fourth-gen Intel processors pack more than enough power for the vast majority of users.

Due to space and cooling constraints, all-in-one systems rarely offer strong gaming performance. Haswell and Ivy Bridge processors provide enough built-in graphics power for HD video playback and low-level gaming, so for many people there's no need to pay for discrete graphics. However, some of the systems here incorporate a laptop-tuned nVidia processor to boost the graphics. If you really want to enjoy games to the full, the 27in iMac offers by far the quickest graphics of the group - at a price, and with a much reduced choice of titles, unless you install Windows alongside Mac OS X.

Most of the PCs we look at here have flexible configuration options and can be tweaked to fit your requirements and budget. If one is too expensive, consider cutting back on some of the options. Faster versions of the less-expensive systems are often available by selecting a quicker processor at the time of purchase.

However, we wouldn't advise trying to save money in Windows 8 by opting for processors slower than the ones reviewed here: Microsoft's operating system needs a certain performance of chip to process its touch control.

APPLE iMAC 27in (LATE 2012)

£1,699 inc VAT • apple.com/uk • tinyurl.com/a95q9vy

It's the granddaddy of the concept, yet the Apple iMac remains the most svelte and cool-looking all-in-one you can buy. It's a design masterpiece, with build quality second to none and looks that will impress in any location.

The display is superb. Used by the most demanding professional photographers and designers, its 2560x1440 IPS panel delivers outstanding image quality with great contrast, accurate colour and huge amounts of brightness. Colour reproduction is excellent, offering a slightly wider range of colours to ensure that the full range of sRGB colours is covered, with a little in reserve to ensure that this 100 percent coverage is maintained as the monitor ages.

Our review model incorporated a high-level specification, but steered clear of the very high-end options found in the built-to-order version we tested last time. For £1,699, you get a 3.2GHz Intel Core i5-3470 quad-core processor, 8GB of memory and 1TB hard drive. Graphics are provided by an nVidia GeForce GTX 675MX chip with 1GB of VRAM. Core system performance is very good. Its PCMark 7 score of 4141 points was ahead of most of the competition, but both Chillblast and Dell manage significantly higher scores thanks to their use of solid-state drives and faster processors.

However, the iMac's class-leading graphics performance is useful not only for gaming, but for enhancing the kind of applications many Mac users love – such as Adobe Photoshop and Lightroom, both of which use the graphics processor to speed up operations.

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

**PC ADVISOR
RECOMMENDED**



If funds won't stretch, you can cut back on the CPU and GPU, and still have a 27in iMac for £1,499. The iMac is no longer fitted with an internal optical drive, so you may need to find an external USB drive.

VERDICT: The 27in iMac is still an obvious choice for any creative designer. It's immensely powerful and delivers outstanding image quality. It also offers peerless design and impeccable build quality. This model is by far the quickest for running games, although there's no touchscreen for finger navigation in Windows 8.

CHILLBLAST FUSION AIO ULTIMA

£1,199 inc VAT • chillblast.com • tinyurl.com/Lq4u8fw

It may be constructed from off-the-shelf components, but the Fusion AIO Ultima is a huge step forward from Chillblast's previous forays into the all-in-one world. It's considerably better-looking and more solidly-constructed than any of the company's previous offerings.

Some self-assembly is required – the stand must be fixed to the base with four small bolts and then manually attached to the screen with yet another bolt. Once assembled, it does feel a little more industrial than a custom-designed system, but it's not bad at all.

One disadvantage is that most of the connecting ports (including HDMI and USB 3.0) are rather hard to reach, pointing downwards from the rear of the device and partially blocked by the stand. Thankfully, the card reader and audio jacks are placed more conveniently on the left-hand side, along with a pair of USB 2.0 ports. On the right, there's a Blu-ray combo drive and a pair of brightness control buttons along with the power switch.

Inside, Chillblast has fitted some powerful components, including a 3.1GHz Intel Core i7-3770S power-saving processor, a 120GB mSATA solid-state drive, a 1TB Seagate Momentus hybrid drive and 16GB of memory. This combination allows the Fusion AIO Ultima to race ahead of the iMac in Windows benchmarks, achieving a blistering PCMark 7 score of 5195. Graphics performance is, however, considerably less impressive as the system relies on the Core i7's integrated HD Graphics 4000 processor. This delivers only around one-eighth of the iMac's speed when attempting to play games.

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



The 21.5in display is rather more compact than the competition, but still supports 10-point multitouch and has a full-HD 1920x1080-pixel resolution. Its IPS panel delivers far better viewing angles and image quality than Medion's budget system, but can't match the colour fidelity of models like Apple's iMac or the Dell XPS 2720.

VERDICT: This model delivers excellent application performance, but lacks a discrete graphics chip for gaming. It requires some self-assembly, but offers good features and value for money.

DELL XPS 2720**£1,749** inc VAT • dell.co.uk • tinyurl.com/kwz4kLL

Dell's stunning XPS 2720 is immensely powerful, feature rich and a serious contender to the iMac in its performance and feature list.

It's a hefty beast, thanks mainly to the 27in articulated 10-point touchscreen. This offers height adjustment and also tilts back to allow comfortable fingertip operation. The display features the same size ultra-high 2560x1440-pixel resolution of the 27in iMac, but also has stunning Adobe RGB colour. When booting up Windows 8, the Start screen is filled with outrageous colours that are entirely impossible to display so luridly on the vast majority of PC monitors.

This is both a blessing and a curse – being able to display such a wide range of colours is great for those creating output destined for print or eye-catching product packaging, but for most it increases the chances of getting their display colours wrong. Careful colour management is a must, but in the right hands this display is superb.

Behind the display, we find the most powerful processor of any in this group. The 3.1GHz Core i7-4770S is one of the latest low-power Haswell versions and this helped the Dell achieve an impressive 6091 points in PCMark 7, assisted by 16GB of memory and a 32GB mSATA solid-state drive that boosts the performance of the main 2TB hard disk through Intel's Smart Response Technology.

A powerful nVidia GeForce GT 750M graphics chip that delivers playable frame rates for gamers is included – around four times the speed of most of the competition. However, it still achieves only around half the graphics performance of the iMac.

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

PC ADVISOR
BEST BUY

Dell's all-in-one is also packed with features including a 2.1Mp webcam, six USB 3.0 ports, Thunderbolt and a Blu-ray drive. The warranty also includes a year of next-day in-home service, so you won't have to ship your PC off if any repairs are required.

VERDICT: The Dell XPS 2720 is undeniably expensive, but delivers incredible performance, excellent features and offers an impressive touchscreen display. Next-day in-home support from Dell will make a huge difference to those relying on their PC for business.

LENOVO IDEACENTRE HORIZON**£1,599** inc VAT • lenovo.com/uk • tinyurl.com/Ltr8vnt

Marketed as a 'table PC', the 27in IdeaCentre Horizon is part desktop PC, part tablet. A small stand allows it to sit on a desk, but folding this way enables it to function like a massively oversized tablet.

Loaded with Windows 8, it's the bundled software that transforms this into a device that's designed to be used horizontally on a table top. Lenovo's 'Aura' interface, provides a simple touch-enabled environment that's designed to be used from any angle, so multiple people can use it while sitting around the device.

A selection of games are included, with a strong multi-user bias, turning the IdeaCentre into a sort of high-tech compendium of family board games. Just like board games, some of these make use of physical objects that interact with the 'board'. These include four handheld 'strikers' for a game of virtual air hockey, mini joysticks and a Bluetooth-enabled die for onscreen Monopoly japes.

Connectivity options are somewhat restricted. There are only two USB ports, which really isn't enough – especially as one of these is taken up by an RF receiver for the supplied wireless keyboard and mouse. You get an HDMI input, so you can hook up a Blu-ray player or games console, but no HDMI output to power an external screen or projector. There's also a handy media card reader built in.

The display is a glossy IPS touchscreen, with a standard HD resolution of 1920x1080 pixels. It's great for watching videos and delivers excellent contrast, but can't match the pro-level clarity or colour reproduction of the Apple iMac or Dell XPS systems.

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



Our review system came with a 2GHz Intel Core i7-3537U dual-core processor, which was let down by the sluggish performance of a 5400rpm laptop hard disk. This system is crying out for a solid-state drive. A version is available with an 8GB solid-state cache, but our review sample lacked this potential speed-boosting feature.

VERDICT: Part all-in-one, part tablet, the IdeaCentre Horizon can be used as a family entertainment system. Build quality is high, but connectivity is poor and our sample lacked performance.

MEDION AKOYA P2002

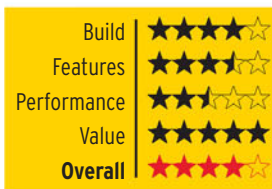
£449 inc VAT • www.medion.com/gb • tinyurl.com/mevsj9d

At just £449, the Medion costs well under half the price of the other all-in-ones in this group test. Fortunately, you don't have to put up with only half the performance or quality as the Akoya P2002 is a surprisingly solid piece of kit that looks good, too.

Behind the 23in, 1920x1080-pixel screen lies a 3.3GHz Intel Core i3-3220 dual-core processor backed by 4GB of memory and a 1TB hard drive. This is a relatively small amount of RAM nowadays, and obviously at this price you're not getting a solid-state drive either, yet the Akoya P2002 achieved a creditable PCMark 7 score of 3298. Graphics performance is, however, rather less impressive, relying on the Intel HD Graphics 2500 built into the CPU.

A pair of USB 3.0 ports is included, along with four USB 2.0 sockets. You also get a built-in Freeview TV tuner. HDMI in and out ports allow for hooking up an external monitor. Most of the ports are located inconveniently on the underside, but a pair of USB 2.0 connections, audio and a card reader are placed along the sides. The power switch is sited at the back of the screen right underneath the display controls. This results in accidentally shutting down the PC when you really just want to switch inputs.

The most obvious omission is the lack of a touchscreen. Windows 8 can be easier to fathom using one, but it isn't a necessity and



PC ADVISOR
RECOMMENDED



getting rid of touch support keeps the costs down. Medion has also used a less-than-great display panel, with limited viewing angles and noticeably worse colour reproduction than the other all-in-ones here.

VERDICT: This is a basic, no-frills all-in-one with adequate performance, no Blu-ray drive and no touchscreen. However, at this low price, it represents excellent value for money if you don't need those features.

	APPLE £1,699 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	CHILLBLAST £1,199 inc VAT ★★★★★	DELL £1,749 inc VAT ★★★★★ PC ADVISOR BEST BUY	
Model name	iMac 27in (late 2012)	Fusion AIO Ultima	XPS 2720	
Processor	3.2GHz Intel Core i5-3470	3.1GHz Intel Core i7-3770S	3.1GHz Intel Core i7-4770S	
Installed memory	8GB DDR3	16GB DDR3	16GB DDR3	
Storage	1TB 7200rpm HDD	1TB Seagate Momentus XT HDD/SDD hybrid, 120GB Intel 525 mSATA SSD	2TB HDD, with 32GB mSATA SSD	
Motherboard	Custom board, Intel Z77 chipset	Gigabyte GA-H77TN, Intel H77 chipset	Custom board, Intel H87 chipset	
External USB ports	4x USB 3.0	4x USB 3.0, 2x USB 2.0	6x USB 3.0	
Display	27in (2560x1440) IPS, tilt-adjustable	21.5in (1920x1080), IPS, tilt- and height-adjustable, VESA-mountable	27in (2560x1440), IPS, tilt- and height-adjustable	
Graphics	nVidia GeForce GTX 675MX, 1GB VRAM	Intel HD graphics 4000	nVidia GeForce GT 750M, 2GB VRAM	
Sound	Stereo speakers, onboard processor	2x 5W speakers, onboard HD audio	Stereo speakers, onboard HD audio	
Networking	802.11n, gigabit ethernet, Bluetooth 4.0	802.11n, gigabit ethernet, Bluetooth	802.11n, gigabit ethernet, Bluetooth 4.0	
Other ports	2x Thunderbolt, optical digital audio, headphone, dual mics	HDMI (in/out), DisplayPort, line in/out, headphone	HDMI (in/out), Thunderbolt, headphone, mic input	
Keyboard and mouse	Apple Wireless Keyboard, Magic Mouse	Microsoft Wireless Desktop 3000	Wireless keyboard and mouse	
Optical drive	None	Blu-ray combo drive	Blu-ray combo drive	
Operating system	OS X 10.8 Mountain Lion	Windows 8	Windows 8	
Extra items	SDXC card reader, 1.3Mp webcam	Webcam	Card reader, 2.1Mp webcam with dual digital microphone array for Skype, McAfee Live Safe (12-month subscription)	
System weight	9.54kg	9kg	16kg	
Dimensions (W x D x H)	650x203x516mm	338x541x61mm	492x664x72mm	
Warranty	1-year return-to-base	2-year collect-and-return	1-year next day in-home service	
PCMark 7 score	4141	5195	6091	
Sniper Elite V2	12/54/197fps	5/7/28fps	6/25/94fps	
Power	53/84/243W	32/40/119W	54/84/220W	

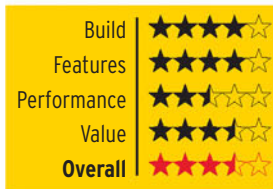
MSI WIND TOP AE2712G**£1,199** inc VAT • uk.msi.com • tinyurl.com/mugfkq7

MSI's 27in Wind Top AE2712G is a touchscreen all-in-one, with a Blu-ray combo drive and built-in Freeview TV tuner. The system has a 2.9GHz Intel Core i5-3470S low-power quad-core processor, with 4GB of memory and a 1TB hard drive. Performance in this configuration was adequate, if a little lacklustre. PCMark 7 recorded a score of 3138 points, and it's worth noting that Medion's considerably less expensive Akoya P2002 scored higher.

It comes with an nVidia GeForce GT 630M graphics processor, but even with 2GB of video memory it provides little advantage over Intel's integrated graphics when it comes to games.

There are plenty of connectivity options, mostly situated at the rear but aligned parallel to the ground and close to the left side of the display. This makes them more accessible than on some other systems where they point directly downwards.

HDMI in and out ports are included and, unusually, the input can be configured with a full onscreen display. This allows for all the adjustments you would usually get on a standalone monitor, such as colour tweaks and selecting aspect ratios. Unfortunately, the display controls are perilously close to the power switch. The screen has a 1920x1080-pixel resolution and performed well in our tests, producing accurate colour and good contrast. It falls far short



of the sharpness delivered by the 2560x1440 screens of the Apple iMac and Dell XPS 2720, though.

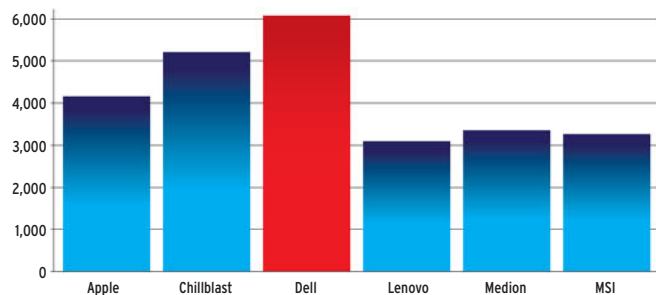
VERDICT: The Wind Top is the least expensive 27in model of the bunch and offers a correspondingly lower specification with lacklustre performance. The nVidia graphics are particularly disappointing. You do, however, get a Blu-ray player and a built-in TV tuner.

LENOVO £1,599 inc VAT ★★★★★	MEDION £449 inc VAT ★★★★★ <div>PC ADVISOR RECOMMENDED</div>	MSI £1,199 inc VAT ★★★★★
IdeaCentre Horizon	Akoya P2002	Wind Top AE2712G
2GHz Intel Core i7-3537U	3.3GHz Intel Core i3-3220	2.9GHz Intel Core i5-3470S
8GB DDR3	4GB DDR3	4GB DDR3
1TB 5400rpm HDD	1TB HDD	1TB 7200rpm HDD
Custom board, Intel HM76 chipset	Medion G24, Intel H61 chipset	MSI AF11i, Intel H61 chipset
2x USB 3.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 4x USB 2.0
27in (1920x1080), IPS, tilt-adjustable: table or PC mode from 0- to 90 degrees	23.6in (1920x1080), TN, tilt-adjustable	27in (1920x1080), tilt-adjustable
nVidia GeForce GT 620M, 2GB VRAM	Integrated Intel HD graphics 2500	nVidia GeForce GT 630M, 2GB
Stereo speakers with Dolby Home Theater v4, onboard HD audio	Stereo speakers, onboard HD audio	Stereo speakers, onboard HD audio
802.11n, Bluetooth 4.0	802.11n, gigabit ethernet	802.11n, gigabit ethernet, Bluetooth
Integrated 6-in-1 memory card reader (SDXC, MMC, MS, MS-Pro)	HDMI (in/out), headphone	HDMI (in/out), headphone
Wireless keyboard and mouse	Wireless keyboard and mouse	Wireless keyboard and mouse
None	DVD combo drive	Blu-ray combo drive
Windows 8	Windows 8	Windows 8
e-Dice, Strikers, joysticks, 8-cell lithium-polymer battery, 720p HD webcam, microphone	Windows Essentials 2012, CyberLink Power2Go, CyberLink PowerDVD, CyberLink YouCam, HD webcam software, Kaspersky Internet Security 201	Card reader, 2Mp webcam, Office 2010 Starter Edition, PowerDVD, Fresh Paint, Norton Internet Security (60-day trial), DVB-T TV tuner
8.6kg	10.3kg	13kg
690.5x430.5x29.8mm	580x196x430-460mm	672x483x66mm
1-year return-to-base	1-year return-to-base	2-year collect-and-return
3060	3298	3138
5/9/35fps	5/5/16fps	5/6/17fps
35/45/92W	34/42/92W	44/53/110W

>> How we test and our conclusion

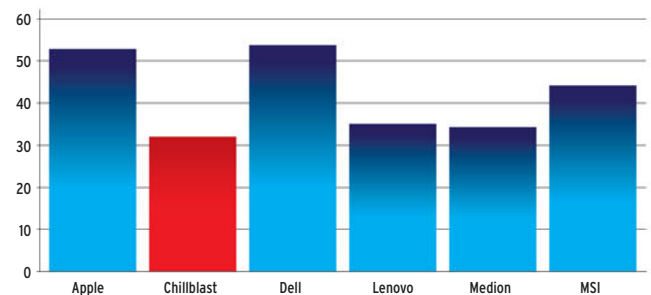
OVERALL SYSTEM PERFORMANCE

PCMark 7 score (points)



POWER EFFICIENCY

Idle power consumption (watts)



Conclusion

For those with limited funds, the Medion Akoya P2002 is an obvious choice. Its performance is adequate and the build quality is higher than you'd expect for the £449 price, which is well under half that of any other all-in-one in this group test. Although its screen is smaller than most and comes without touch input or Blu-ray, it does have a Freeview TV tuner. It therefore earns a Recommended award for value for money.

All-in-ones are often bought as family entertainment centres, but if you want to get everyone involved, you may want to consider Lenovo's IdeaCentre Horizon table PC. It folds flat to allow multiple simultaneous players to gather around it, and comes with educational and entertainment software.

For serious work, you won't go wrong with the 27in Apple iMac. With build quality and design second to none, this will look good in any home or office environment. It'll also deliver excellent performance and, perhaps surprisingly, the best gaming graphics of the group. It's designed to run Mac OS X, but you can use Boot Camp to easily install Windows 8 within a partition of the drive should you have to, or run Microsoft's operating system virtualised without even rebooting - perhaps to gain access to some Windows-only games. Despite the lack of touch input, the fantastic 2560x1440 IPS display places it near the top of the list for any serious artist or photographer, and is an obvious choice for a Recommended award.

Dell's XPS 2720 may be the most expensive all-in-one on test, but it's excellent throughout. The 27in display trumps even the iMac by supporting the full Adobe RGB colour space and adding touch support to its 2560x1440 pixels. Its quad-core Haswell processor, combined with a solid-state cache for the main disk helped it achieve almost 50 percent more performance points than the iMac when running PCMark 7. It'll also have a decent stab at playing games, although here the roles are reversed, with the iMac delivering around double the speed. A full selection of features, including Blu-ray, Thunderbolt and six USB 3.0 ports along with Dell's excellent support and in-home service earns it our Best Buy award.

How we test

Application performance

Core system performance is measured using PCMark 7 in Windows, an industry-recognised test suite that uses 25 different workloads to measure areas such as storage, computation, image and video manipulation, web browsing and gaming.

As well as the overall PCMark 7 result, typically a point score between 3000 and 7000 with current hardware, we have also published results garnered from some of the suite's sub-routines. These are designed to gauge performance in, for example, creativity and entertainment scenarios.

Minimal gaming

Most all-in-ones aren't designed for gaming, although some do offer powerful discrete graphics chips. We've run a single game, Alien vs Predator, at 1280x720 and full-HD resolutions with High Quality settings enabled. This is enough to reveal differences in gaming performance. Systems with integrated graphics seldom perform to

a satisfactory level in these tests, but Windows applications and casual games will usually run sufficiently well.

No overclocking

We allow overclocking of the processor only in dedicated gaming computers. All other components are run at their stock speeds, with the exception of factory-overclocked graphics cards, which are designed and sold at boosted speeds.

Power consumption

We measure the power consumption of each PC while it's idling at the desktop and after it has settled down following bootup. We then measure each system's consumption while pushing it to the limit by running Prime95 with the maximum number of available threads, and at the same time running the storage test from PCMark 7. Real-world power consumption will fall somewhere between these two measurements, depending on use.

Display quality

We use a Datacolor Spyder4 calibrator to measure colour gamut and accuracy, contrast and uniformity across the surface of the screen. We also take into account the viewing angles afforded by the display technology used by each panel.

Subjective assessment

It's not all about speed. We also pay close attention to the physical characteristics of each all-in-one PC, its noise output and build quality, and take note of important features such as the quality of components.

Warranty and support

Differences in warranty terms can affect our verdict. Obviously, longer warranties are better, but we also look at the terms and conditions - specifically, whether faulty systems must be returned to the vendor at your own cost, and if both parts and labour are included. In-home support is particularly welcome. ☒



ND 4000 Gaming PC

CPU: Intel i7 4770K (4 x 3.5 GHz) OC @ 4.2 GHZ

RAM: Corsair 16 GB DDR3 1333 MHZ

HDD: 1 TB SATA-III 7200 RPM 64 MB

Graphics Card: NVIDIA GTX 660 2 GB

Motherboard: Gigabyte Z87-HD3

Case & PSU: Corsair R200 & Corsair 650W PSU

Optical Drive: 24x Dual Layer DVD Re-Writer

O/S: Choose from Windows 7 64 BIT or Windows 8 64 BIT.

Ports: USB2, USB3, LAN, 7.1 Audio, DVI & HDMI

FREE - Tom Clancys Spinter Cell Blacklist

FREE - 16 GB USB2.0 Flash Drive

FREE - 3 Year Warranty & Free Next Day Delivery

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ND 1000 Gaming PC

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- ✓ 1 TB (1000 GB) SATA-III
- ✓ NVIDIA GeForce GTX 650 1 GB
- ✓ Gigabyte GA-78LMT/USB3 Motherboard
- ✓ Windows 7 or Windows 8 Included

Included Benefits

- FREE - TOM CLANCY GAME
- FREE - UK DELIVERY
- FREE - 3 YEAR WARRANTY
- FREE - WEBROOT / NERO / POWERDVD



£545
INC. VAT &
DELIVERY



ND 2000 Gaming PC

Amazing Spec - Amazing Price

- ✓ AMD FX 8350 (8 x 4.2 GHZ)
- ✓ 8 GB DDR3 1333 MHZ RAM
- ✓ 1 TB (1000 GB) SATA-III
- ✓ ATI Radeon HD 7770 1 GB
- ✓ Gigabyte GA-78LMT/USB3 Motherboard
- ✓ Windows 7 or Windows 8 Included

Included Benefits

- FREE - BIOSHOCK GAME
- FREE - UK DELIVERY
- FREE - 3 YEAR WARRANTY
- FREE - WEBROOT / NERO / POWERDVD



£599
INC. VAT &
DELIVERY



ND 3000 Gaming PC

EXTREME Performance - LOW Price !!!!

- ✓ i5 4570 (4 x 3.2 GHZ)
- ✓ 8 GB DDR3 1333 MHZ RAM
- ✓ 1 TB (1000 GB) SATA-III
- ✓ NVIDIA GeForce GTX 660 2 GB
- ✓ Gigabyte B85M-HD3 Motherboard
- ✓ Windows 7 or Windows 8 Included

Included Benefits

- FREE - TOM CLANCY GAME
- FREE - UK DELIVERY
- FREE - 3 YEAR WARRANTY
- FREE - WEBROOT / NERO / POWERDVD



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BUDGET LAPTOPS

With the kids about to return to school, Cliff Joseph rounds up a selection of Windows laptops costing less than £500

Buying a budget laptop inevitably means compromising somewhere. Compromises can be the looks, the feel, the attention to detail that makes you want to connect on a more emotional level. Or it could be in the build quality, the choice of internal components or the options for connecting the laptop to all manner of peripherals – and to the world at large through wired or wireless networking.

Unless you go for real bottom-dollar shelf fillers, the one area in which you're less likely to feel the pinch is performance. The slimmed-down Windows 7 and 8 can even run on some 10-year-old PCs without issues.

One of the problems with reviewing cheap laptops is that they are often discounted, end-of-line models or those produced in a never-to-be-repeated batch at a special price. As always, we've done our best to avoid this, but you might find that the precise model we've reviewed isn't available to buy. For this reason, or if you happen to see a particularly tempting deal at the supermarket, here's our advice on buying a good budget laptop.

Design & build

Laptops are much more personal than desktops, and typically owned and used by one person. They cannot avoid becoming as much a statement about you as the clothes you wear.

We can't tell you what fashion to follow, but be aware that cheap

laptops are rarely catwalk models. They may use cheaper, lumpier plastic components, or simply be designed by people with no aesthetic sense.

Design considerations also span into the engineering, so pay attention to the hinges, keyboard and access hatches, and ask yourself whether they look as though they'll survive continued use.

Premium-grade materials often serve a purpose. Take aluminium alloy, chosen for its strength, lustre, resistance to corrosion and malleability. Cheap laptops are nearly universally plastic constructs. Be aware that laptop makers often disguise their use of inferior materials by spraying plastic to look like metal. This will look nasty after some gentle wear removes the faux-metal paint.

Look at how well the chassis has been put together. Check along the seams for air gaps,

and see how well joined is the lid to the deck. Keyboards and trackpads are common cut-back components, leaving you with soggy typing or skittish mice pointers from low-grade capacitive touchpads.

Components

At the budget end, hard disks are now cheap enough that you may see huge capacities offered. Solid-state storage makes life-changing improvements to your computing experience, but don't expect to see any in the budget category – rarely you might find



Photography by Dominik Tomaszewski

a small amount bolted on to the hard drive to speed up booting and program launching. Displays are nearly always gloss-finished. They

can have rich colour and useful contrast ratio, but only in a pitch-black room. Unless they have a pricey anti-reflective optical coating, expect to see distracting reflections.

Performance

Don't be fooled by the processor clock speed. A speed rating such as '2.5GHz'

gives only the most rudimentary guide to performance. A laptop review should include a performance score but, unless you follow the tech, a single number of, say, 3500 points in PCMark 7 is also worthless. See our bar charts on page 73 to draw comparisons.

Graphics performance is never great on cheap laptops, which rely on integrated graphics. Expect little more than to play basic games and watch HD video.

A laptop's battery life is nearly always an afterthought in budget models. Don't expect more than 4 hours unplugged use.

Budget laptops are shackled with basic 802.11n capabilities. The IEEE spec allows for three antennae, but most cheap laptops will have only one.

Connections

Laptops now sport USB 3.0 ports for quickly getting in and out data. But budget laptops may still have a part- or total complement of USB 2.0. HDMI is now ubiquitous, but gigabit ethernet is far from a given.

Software

Windows is no longer a given: Google is edging into the budget space with its Chromebooks (see page 34), and if you look around you may find laptops preinstalled with Ubuntu Linux.

Beware that prices may be subsidised by third-party software. For some this is helpful; for others it is a pain.





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

ASUS VIVOBOK S200E

£430 inc VAT • asus.com/uk • tinyurl.com/m783yp6

The 11in VivoBook S200E certainly doesn't look like a budget laptop – in fact its brushed metal finish and slim, lightweight design could give Apple's far more expensive MacBook Air a run for its money. Admittedly, the Asus is slightly heavier than the 11in version of Apple's laptop, weighing 1.45kg to its rival's 1.1kg. Even so, it's still extremely light and portable, and with a thickness of just 22mm you can slip it into a bag and barely notice the weight.

It's quite solidly constructed, too, with good support for the screen panel and a sturdy keyboard that feels comfortable when typing – although the relatively small keys might be a little tricky for anyone with chunky digits.

The S200E even manages to include a touch-sensitive screen for Windows 8. The display isn't without its flaws, though. It's not spectacularly bright, and while the horizontal viewing angle is quite reasonable we found the vertical viewing angle more limited – something that wasn't helped by the glare on the highly reflective screen coating – and it was often necessary to tilt the screen to just the right angle in order to improve visibility. That's only a minor complaint, though, and worth putting up with in order to benefit from the VivoBook's compact, lightweight design.

The original S200, which we reviewed earlier this year, costs about £350 with a Pentium processor, but this current model includes an Ivy Bridge i3 running at a respectable 1.8GHz along with 4GB of memory and 500GB hard drive. You can't buy it direct from Asus, but online prices are typically around the £430 mark.

Performance is comparable to that of other low-cost laptops using the same processor, with a score of 2100 when running PCMark 7. That should be fine for web browsing or running Microsoft Office, but it will struggle with heavy-duty tasks such as video editing or 3D gaming. Battery life has improved since the last version, managing 4.25 hours when streaming video via the built-in Wi-Fi. You can probably eke that out to over five hours for lighter work, giving you the best part of a day's work when you're out and about.

VERDICT: Our only real complaint is the reflective screen. Performance and battery life are respectable rather than outstanding, but the S200E offers an attractive, lightweight design and build quality that are rarely seen in laptops costing less than £500.



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

COMPAQ CQ58-300SA

£239 inc VAT • saveonlaptops.co.uk • tinyurl.com/mt67w8x

Intel isn't the only game in town when it comes to processors, and there are several manufacturers who produce low-cost AMD-based laptops that they tend to sell through specific high street stores or online retailers such as Saveonlaptops.

At just £239, the Compaq CQ58 is one of the most affordable laptops we've come across. It's not the fastest or most stylish model we've seen, but it's fine for checking email or web browsing.

The black plastic casing has a rather cheap and cheerful feel to it, and the keyboard tends to rattle a bit when you're typing. However, it feels sturdy enough to cope with the occasional bump in a backpack, and the keyboard is firm enough to let you type at speed, even if it does get a bit loud at times. Our one real concern about the build quality is the tray of the internal optical drive, which seems extremely flimsy when it pops out from the side of the machine.

But, for the most part, the CQ58 gets the basics right. The 15.6in display provides 1366x768 resolution, with a bright, clear image. The vertical viewing angle is a little limited, and if you're viewing full-screen video you may need to tilt the screen occasionally in order to improve visibility, but it's not bad enough to be annoying.

The speakers produce a thin, tinny sound when playing music, but they're fine for watching videos on YouTube, and there's a headphone socket so you can connect better speakers. And one advantage of the lightweight plastic casing is that the CQ58 weighs only 2.3kg.

Performance is fairly modest, though. The AMD E1-1200 processor runs at 1.4GHz, and produces a score of 1094 when running the PCMark 7 benchmark. And, with just 2GB of memory and 320GB hard disk, it's safe to assume that the CQ58 is not going to be a good choice for gaming. It feels sluggish when opening multiple applications, but it's adequate for web browsing. There's a 4GB option available that costs just £20 extra if you think you'll need it.

Battery life is also quite respectable, providing 4.75 hours of streaming video, which makes it one of the longer-lasting laptops in this price category.

VERDICT: It may be a bit slow, but the CQ58 will get you online for several hours at a time, and let you run Microsoft Office for less than £250. We'd recommend stepping up to the 4GB model if you can afford it, but the CQ58 definitely represents good value for money.



DELL INSPIRON 14Z

£459 inc VAT • dell.co.uk • tinyurl.com/Lv5bLhu

It's a shame that Dell is probably going to abandon the consumer market in order to focus on big business accounts, as it's produced some very attractive and affordable laptops in recent years. The Inspiron 14z is a good example – slim and light, with good performance and battery life, while still coming in at under £500. Fortunately, Dell tells us that the Inspiron range will still be available as part of its range of business laptops in the future.

There are few obvious signs of cost-cutting compromise in the design of the 14z. Its grey-and-silver chassis looks very smart, without the flimsy plastic feel of some of its low-cost rivals. And despite having a built-in DVD drive, the 14z is just 21mm thick and weighs 1.9kg, so it's certainly portable enough to carry around.

It's solidly built, too, with a firm keyboard that has a comfortable feel to it. The trackpad is quite small, and perhaps not ideal for multi-finger gestures, but that's a minor complaint and the 14z gets it right in all the most important areas. The 14in screen provides 1366x768 resolution, and produces a bright, clear image with good viewing angles both horizontally and vertically, so it'll work well for watching video or giving business presentations.

There are many customisation options for the Inspiron range, including models with an i7 processor costing over £700, but we tested a model with a more affordable Ivy Bridge i3 running at 1.9GHz, 4GB of memory and 500GB hard disk for £459. This option also includes a small 8GB solid-state module that gives the hard drive a bit of a boost and allows the 14z to achieve a very respectable score of 3486 when running PCMark 7. That will allow it to handle a wide range of software and applications, including photo- or video-editing work, as well as simple web browsing and word processing.

Battery life is also good for such a low-cost machine, managing just over five hours when streaming video with its built-in Wi-Fi. The only minor disappointment is its modest gaming performance. Its Intel HD 4000 graphics could only manage 22fps when running Stalker at 1280x720 resolution and medium graphics settings, so you'll be better off sticking to 2D fare such as Angry Birds.

VERDICT: The Inspiron 14z does a good job of cramming a fully-featured laptop into a compact, lightweight design. It's no gaming rig, but its good performance and battery life make it an attractive option.



HP PAVILION 14

£319 inc VAT • saveonlaptops.co.uk • tinyurl.com/L4tsye7

The HP Pavilion 14 is a good low-cost laptop that provides respectable performance for just over £300. The glossy black plastic case gives it a rather nondescript appearance, but it measures just 21mm at its thickest point and weighs 1.8kg, so it's certainly portable enough to stick in a backpack.

The build quality is also fairly good for such an affordable machine, with a rigid top panel to protect the screen and a firm keyboard that feels quite comfortable when typing at speed. Our only complaint here is that the trackpad is rather small, and not very well suited to multi-finger gestures such as two-finger scrolling.

The 1366x768 resolution of the 14in screen produces a sharp, clear image, although it's not as bright as it could be and full-screen video loses clarity quite quickly if you move your head away from the front-on position. Still, the modest weight of this laptop means that it's no trouble just to nudge the screen into position every now and then. The speakers are also fairly respectable – designed by Altec Lansing, they produce quite decent volume, and in our tests did a good job of playing music videos on YouTube.

Crucially, the Pavilion provides good performance for a laptop in this price range. Its i3-3217U processor is found in a number of similarly priced rivals, and its 4GB of memory and modest 320GB hard disk are also fairly standard. However, HP backs up the 5400rpm hard drive with a 32GB solid-state module that adds a little snap to overall performance, and its score of 2547 when running PCMark 7 nudges it ahead of a number of laptops that use the same processor.

It can just about pass muster for some casual gaming, too. Running Stalker at 1280x720 resolution and medium graphics settings only produces a speed of 23fps, but you should be able to get playable 3D performance if you don't mind lowering the graphics detail a little. Battery life is slightly disappointing, though. The Pavilion has one of the smallest batteries we've seen – both in physical size and capacity, at just 37Wh – and could only just manage four hours of streaming video.

VERDICT: The Pavilion 14 provides good performance and value for money, and would be a good choice for anyone who needs a capable laptop, but can't stretch to £400 or £500. Battery life could be better, though, so it's not the best choice if that's your main priority.



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

LENOVO Z580

£499 inc VAT • saveonlaptops.co.uk • tinyurl.com/mayg5ms

It's quite heavy, at 2.65kg, and it pushes our £500 budget to the limit, but Lenovo's Z580 provides as much power as you're likely to get from a laptop in this price range. That weight means it's no Ultrabook, and it's also 33mm thick, so it's a bit of a handful even for a 15in laptop with a built-in DVD drive. If portability is your main priority, then there are lighter alternatives.

The Z580 is attractively designed. Our review unit was clad in 'enamel white' plastic casing with black trim, but it's also available in a variety of other colours, including a rather striking cherry red. It's solidly built, too, and can certainly cope with life on the move. The keyboard has Lenovo's trademark moulded keys, which are extremely comfortable when typing for long periods of time, and the large trackpad is roomy enough for multi-finger gestures.

The speakers have a little bit of a metallic edge on higher frequencies, but they produce a decent volume and are fine for watching video on YouTube. The only minor disappointment is that the 15.6in screen isn't as bright as we might have liked. The viewing angle is relatively limited, so you may need to nudge the display a bit from time to time. This isn't a major weakness, though.

We can't fault its performance, either. Prices start at around £400 for a model with an i3 processor, but our review unit was priced at £499 with an Ivy Bridge i5 running at a healthy 2.6GHz (3.2GHz with TurboBoost), along with 8GB of memory and a 1TB hard disk. And, as well as the integrated HD4000 graphics, this model also includes a separate nVidia GeForce GT 635M graphics processor.

That combination produced a solid score of 2765 when running PCMark 7, which is good going for a laptop with only a 5400rpm hard drive, and the Z580 is fine for basic web browsing and running Microsoft Office, as well as more demanding tasks such as photo-or video-editing. It can even handle some decent gaming action, too, with the GeForce graphics hitting a smooth 55.5fps when running Stalker at 1280 x 720 resolution with medium graphics settings. Alternatively, you can switch to the integrated graphics when you're on the move and get 4.75 hours of battery life.

VERDICT: The size and weight of the Z580 mean it's not particularly portable. However, its strong performance makes it an excellent choice for anyone that needs a desktop replacement system.



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

PC ADVISOR
RECOMMENDED

SONY VAIO FIT 15E

£438 inc VAT • sony.co.uk • tinyurl.com/Lhnykg6

Most low-cost laptops are old models that end up having their price cut when something newer and faster comes along, but Sony's Vaio Fit 15E is a brand new release specifically designed to provide attractive multimedia features at an everyday price.

It's neatly designed, too – at 25mm thick it's relatively svelte for a 15in laptop with a built-in DVD drive. It's a bit hefty at 2.45kg but is still reasonably portable, and the large, comfortable keyboard and trackpad are a cut above average for a laptop in this price range.

The glossy screen has a resolution of 1366 x 768, but that's standard for a laptop in this price range, and image quality is very good – bright and colourful, with good viewing angles both horizontally and vertically. The real standout feature, though, is the quality of the speakers, which produce higher volume and a fuller sound than many laptops we've seen costing twice as much.

The processor is a fairly modest Ivy Bridge i3 running at 1.8GHz (although Sony tells us that this may be upgraded to 1.9GHz quite soon). That's very much an entry-level processor these days, and produces a relatively modest score of 2172 when running the general-purpose PCMark 7 benchmark. However, that's still more than adequate for basic tasks such as web browsing and word processing.

Our review unit included 4GB of memory and a 500GB hard disk for a total price of £438, but Sony also provides a wide range of build-to-order options. The i3 processor may not be great for gaming – its integrated HD 4000 manages just 23fps when running Stalker with medium graphics settings at 1280x720 – but you can add a GeForce GT 740M graphics card for another £50 and still scrape in at just under £500. A Blu-ray player will only cost £40, although the £80 touchscreen option takes the price just past our price limit.

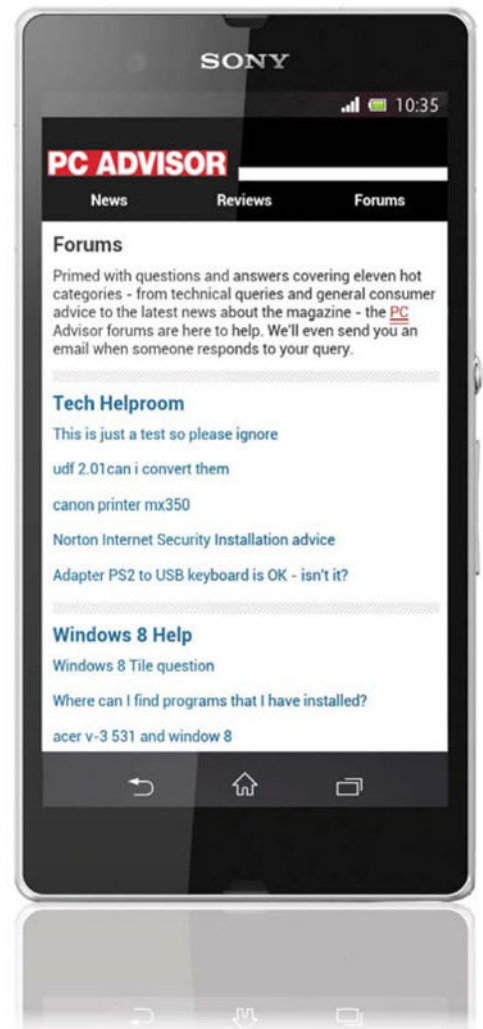
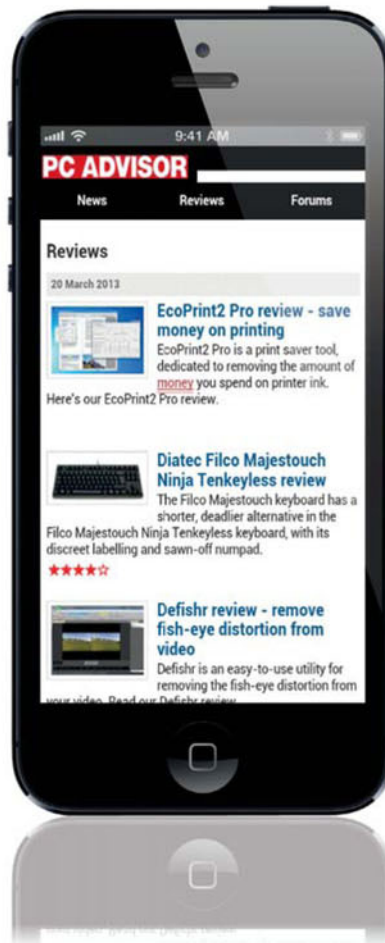
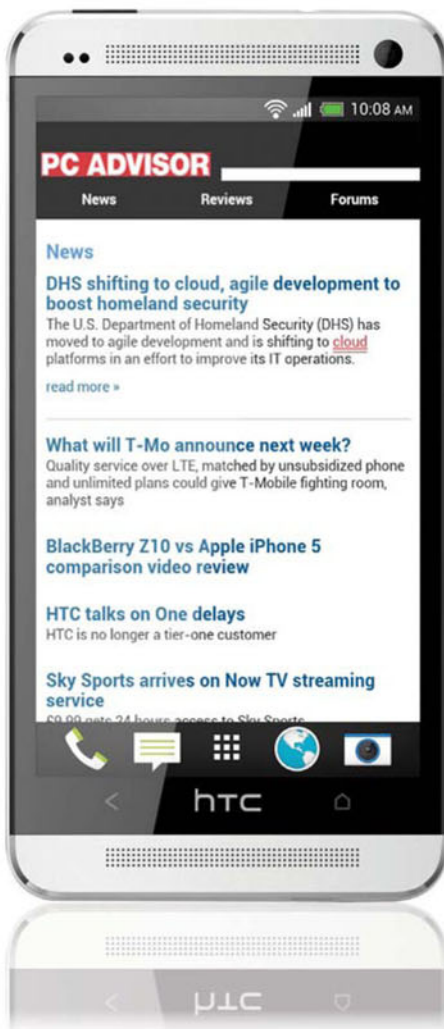
If we have one complaint about the Fit 15E, it's that the battery life isn't what it could be. The 40Wh battery pack is very small and managed just four hours when streaming video off the BBC iPlayer. You could probably stretch that to five hours for more modest tasks, but that's still a little disappointing.

VERDICT: It's nice to see Sony making a real effort to produce a decent budget laptop, and the attractive display and speakers make the Fit 15E a good choice for entertainment. However, its weight and modest battery life make it more suited to life at home than in a backpack.

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Conclusion

If you're on a really tight budget, then the Compaq CQ58 is the obvious choice. You won't be editing high-definition video on it, but it'll get you online for less than £250 – although we recommend spending a little extra to get 4GB of memory if you can afford it.

At the other end of the £500 price range is Lenovo's Z580, which provides good performance and plenty of memory and storage. It also has a discrete graphics card that handles some decent gaming action, making it one of the best all-round performers you'll get for £500.

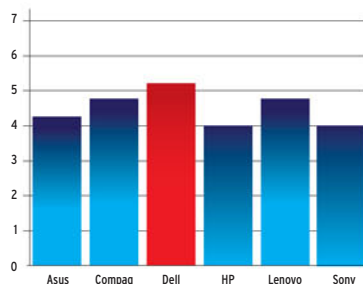
The only drawback with the Z580 is its weight, so if you need something that's a little more backpack-friendly, you'll want to look

at the S200E from Asus. Its i3 processor is no speed demon, but it's fine for basic web browsing and word processing, and its light weight makes it one of the most portable laptops available at any price.

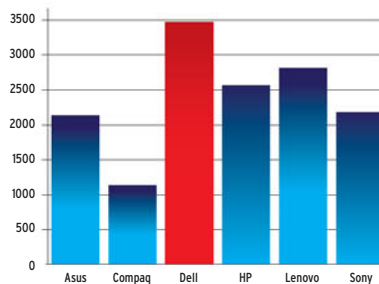
Sony gets major kudos for designing a laptop that actually has decent speakers, and its Vaio Fit 15E is a good choice for music and video. However, the overall winner in the sub-£500 category is Dell's Inspiron 14z. This neatly designed laptop hits the sweet spot, with an attractive and highly portable design that also provides good performance and battery life – so go get it before Dell pulls down the shutters and quits the consumer market for good. ☒

	ASUS £430 inc VAT 	COMPAQ £239 inc VAT 	DELL £459 inc VAT  PC ADVISOR BEST BUY	
Model	VivoBook S200E	CQ58-300sa	Inspiron 14z	
Product code	S200E	DOX08EA	N00I1431	
Processor	1.8GHz Intel Core i3-3217U	1.4GHz AMD E1-1200	1.9GHz Intel Core i3-3227U	
Graphics	Intel HD Graphics 4000	AMD Radeon HD 7310	Intel HD Graphics 4000	
Display	11.6in (1366x768) touchscreen, glossy	15.6in (1366x768) glossy	14in (1366x768) glossy	
Operating system	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	
Storage	500GB 5400rpm HDD	320GB 5400rpm HDD	500GB 5400rpm HDD + 8GB SSD	
Memory	4GB DDR3	2GB DDR3	4GB DDR3	
Ethernet	10/100	10/100	10/100	
Optical drive	N/A	8x DVD ± RW	8x DVD ± RW	
Video out	HDMI, VGA	HDMI, VGA	HDMI	
Wi-Fi	802.11b/g/n	802.11b/g/n	802.11b/g/n	
Bluetooth	Bluetooth 4.0	Bluetooth 2.0	Bluetooth 4.0	
Webcam	720p	720p	720p	
Speakers	Stereo speakers	Stereo speakers	Stereo speakers	
Audio in	Built-in mic	Built-in mic, 3.5mm line-in	Built-in mic	
Audio out	Headphone/mic combo	3.5mm line-out (headphone)	Headphone/mic combo	
USB	1x USB 3.0, 2x USB 2.0	3x USB 2.0	2x USB 3.0	
Card slot	SDXC/MMC	SDHC/MMC	SDHC/MMC	
Trackpad	105x45mm, two-button	95x45mm, two-button	100x50mm, two-button	
Other software	N/A	N/A	N/A	
Power adaptor	33W	65W	Not specified	
Battery	38Wh lithium-polymer, non-removable	47Wh lithium-ion, removable	44Wh lithium-ion, non-removable	
Dimensions	303x200.5x22mm	376x247x33mm	347x240x21mm	
Weight	1.45kg	2.3kg	1.9kg	
Warranty	1-year return-to-base	1-year return-to-base	1-year return-to-base	
PCMark 7 score	2100	1094	3486	
Battery life	4 hrs 15 mins	4 hrs 45 mins	5 hrs 10 mins	
Stalker (720p)	14fps	9fps	22fps	

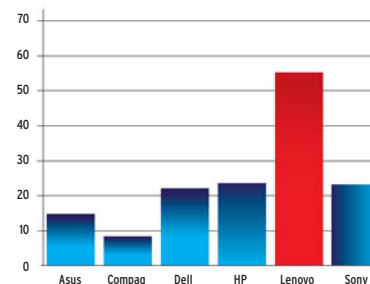
Battery life (hours)



PCMark 7 score (points)



Stalker, 720p (fps)


HP
£319 inc VAT
**Pavilion 14**

14-b003SA

1.8GHz Intel Core i3-3217U

Intel HD Graphics 4000

14in (1366x768) glossy

Windows 8 64-bit

320GB 5400rpm HDD + 32GB SSD

4GB DDR3

10/100

N/A

HDMI

802.11b/g/n

Bluetooth 4.0

720p

Stereo speakers

Built-in mic

3.5mm line-out (headphone)

2x USB 3.0, 1x USB 2.0

SDHC/MMC

90x40mm, two-button

N/A

65W

37Wh lithium-ion removable

347x238x21mm

1.8kg

1-year return-to-base

2547

4 hrs

23fps

LENOVO
£499 inc VAT
**Z580**

M81KLUK

2.6GHz Intel Core i5-3230M (3.2GHz Turbo)

Intel HD 4000/nVidia GeForce GT 635M (2GB)

15.6in (1366x768) glossy

Windows 8 64-bit

1TB 5400rpm HDD

8GB DDR3

10/100

8x DVD±RW

HDMI, VGA

802.11b/g/n

Bluetooth 4.0

720p

Stereo speakers

Built-in mic, 3.5mm line-in

3.5mm line-out (headphone)

2x USB 3.0, 2x USB 2.0

SDHC/MMC/MS

105x60mm, two-button

N/A

90W

48Wh lithium-ion, removable

376x250x33mm

2.65kg

1-year return-to-base

2765

4 hrs 45 mins

56fps

SONY
£438 inc VAT
**Vaio Fit 15E**

SVF1521C5E

1.8GHz Intel Core i3-3217U

Intel HD Graphics 4000

15.5in (1366x768) glossy

Windows 8 64-bit

500GB 5400rpm HDD

4GB DDR3

10/100

8x DVD±RW

HDMI

802.11b/g/n

Bluetooth 4.0

720p

Stereo speakers

Built-in mic, 3.5mm line-in

3.5mm line-out (headphone)

2x USB 3.0, 2x USB 2.0

SDHC/MMC/MS

105x55mm, two-button

N/A

65W

40Wh lithium-ion removable

380x261x25mm

2.45kg

2-year return-to-base

2172

4 hrs

23fps

PC ADVISOR
RECOMMENDED



Laptop bags

Protect your laptop and other gadgets on the move. We round up a selection of laptop-ready rucksack and messenger bags

It's extremely rare for manufacturers to bundle a case or bag with a new laptop; even if they did, chances are you wouldn't want a tell-tale Dell, HP or Lenovo logo advertising the fact you are carting around an expensive bit of kit.

To avoid becoming a target for thieves, and to help keep your delicate electronics safe as you travel, we've rounded up a selection of rucksacks and messenger bags.

What to look for in a laptop bag

Every laptop bag has a dedicated compartment for your computer, and bags usually advertise the largest laptop you can carry by giving a screen size in inches. You might find that a laptop with a 16in screen will fit even if the bag says 'up to 15in', but it could be a tight fit. We tested all the bags here with a 15.6in laptop, and you can find the dimensions below each review.

The amount of protection varies from bag to bag, with some manufacturers providing all-round padding (with double at the bottom), and others just an internal pouch with no top cover. Read our reviews to find out what level of protection each bag offers.

As well as your laptop, you'll need room for the power supply, other accessories and your own gear, whether that's a gym kit, water bottle, documents, keys and other gadgets. Most bags have a nominal capacity, but this is usually given as the total volume, rather than a single space for stuff besides a laptop.

Multiple pockets are useful as they help keep everything organised, while a bag with a large extra compartment is good for bulky items such as shoes. Look for a capacity in litres, but bear in mind that the larger the capacity, the bigger (and usually heavier) is the bag you'll have to carry everywhere.

Some bags have a dedicated pocket for tablets and another for smartphones or media players. The latter sometimes have a hole through which you can route your headphones.

It's useful to have several zipped pockets that can be independently accessed, rather than having to open a main zip to get at internal pockets. That gives would-be thieves a view of what you're carrying and isn't nearly as convenient.

If you're after a rucksack, look for one with well-padded straps and, if you'll be walking long distances, a chest strap to help stabilise the load. Some bags even have a hiking-style waist strap, but that's overkill on a laptop carrier.

Most laptop bags have water-resistant material either on the outside or in the lining. If this is a priority, bear in mind that only bags marked as waterproof (such as those from Overboard) will ensure your kit stays dry. Some bags, such as Be.ez's LE Bag Pro, come with a separate rain cover you can pop over the rucksack in a downpour to keep your kit bone-dry.

Water-resistance doesn't mean the same thing, and it's wise to use additional protection such as a proper rain cover or keep some large freezer bags to seal in your gadgets.

Prices vary widely, and you don't always get what you pay for. Buying a laptop bag from a fashion brand, for example, might be more costly, but doesn't guarantee better-quality zips or fasteners than a cheaper bag.

Read on for our reviews of nine rucksack- and messenger-style laptop bags, and head to tinyurl.com/LapBags for more detail on each.

Photography by Dominik Tomaszewski

RUCKSACKS



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

BE.EZ LE BAG PRO

£90 inc VAT • be-ez.com

The LE bag Pro's centre-situated laptop pocket features double bottom padding for extra protection, but it lacks significant space for anything other than your laptop and its accessories.

Two large mesh pockets behind the laptop pocket are useful for holding the PSU and other accessories, and there are small nylon pockets on the outside for other bits.

A front compartment has yet more pockets – some padded, some meshed – for chargers, power leads, pens, folders and business cards.

The top-mounted zip pouch can be used to stow a smartphone, and there are secret pockets behind the side flaps and at the bottom, the latter housing an elasticated rain cover that protects the bag and its contents in a sudden downpour.

The down side to all these pockets is that there isn't a single large space for your gym kit or packed lunch, for example.

The build quality is particularly impressive, with the LE bag Pro using a water-resistant outer material made from ballistic nylon.

Despite being no larger than the Dicota BacPac Challenge, the bag weighs in at a hefty 1.5kg. You'll appreciate the chunky rear and strap padding, and clips that prevent the strap adjusters flapping.

VERDICT: The LE bag Pro is stylish and comfortable to carry, but it doesn't offer much room for bulky gear other than your laptop. It's also pricey. **David Court**

Laptop space: 267x393x25mm • Outer dimensions: 360x470x200mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

BOOQ BOA SQUEEZE GRAPHITE

£114 inc VAT • booqbags.com

The Booq Boa squeeze is a tough turtleshell-like rucksack for 13- to 15in laptops. It's made from black ballistic nylon with a tough-feeling course weave, lined inside with ripstop polyester in a tasteful light cream colour. The effect is not unlike unbleached cotton, and makes the pack seem less sterile than pure monotonous.

A potentially useful feature is the Terraling tag sewn into the deep-padded foam back. This includes a barcode and unique serial code. Register your details online and, should your bag go missing, the finder should be able to reunite you.

Liberally dispersed around the bag are the usual collection of hidden pockets, all of them potentially invaluable for stowing and organising little gadgets. Zip-down side pockets are handy for carrying small bottles of water, keys and other accessories. All zips are from respected manufacturer YKK.

A top-mounted zip pocket is the perfect size for storing your smartphone.

The main shoulder straps are pre-curved, with harder foam on the top side and soft mesh padding inside. There's no webbing or chest straps, giving a cleaner look.

The laptop compartment is well-padded with dense foam, although there isn't as much protection at the bottom as we'd like. But rigid beading through the edges of the bag should help it battle many a hard knock.

VERDICT: The squeeze is very stylish, and has lots of useful pockets. It is expensive, however. **Andrew Harrison**

Laptop space: 264x393x32mm • Outer dimensions: 300x432x160mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

BOOQ MAMBA DAYPACK

£73 inc VAT • booqbags.com

Booq's natural-fibre backpack has understated looks and a minimalist design. Like a traditional rucksack, there's just one large compartment and a smaller zipped front pocket.

Inside we find a laptop pocket (which has neither a top cover nor a Velcro strap), a couple of smartphone/iPod-size pockets and a pair of pen holders. In front of this is a decent space for your gym kit or packed lunch; you might even get away with using the Mamba as an overnight bag.

The laptop sleeve secured our 15in Sony Vaio with enough room to also slot in a tablet or magazine.

Booq has added padding to the Mamba's rear for comfortable transportation, and we found the soft, breathable, padded mesh rear and straps helped to lighten the load.

The Mamba is made from Jute, a natural fibre that's both lightweight and waterproof (although there's no guarantee that water won't find its way in elsewhere). It also uses premium YKK zippers.

As with the squeeze, the Mamba carries a barcode and unique serial number that could help reunite you with your possessions in the event that your laptop bag goes AWOL.

At £73, the Mamba isn't cheap, and it doesn't have many pockets. But it does offer more room than most for your other gear.

VERDICT: Booq's Mamba daypack is a stylish rucksack that is lightweight, comfortable and offers ample space for a 15in laptop and several other everyday items. **DC**

Laptop space: 274x368x32mm • Outer dimensions: 394x292x165mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

PC ADVISOR
BEST BUY

DICOTA BACPAC CHALLENGE

£45 inc VAT • dicota.com

Dicota's BacPac Challenge stands out not for its looks, but the fact it lets you safely carry all your stuff, while remaining accessible.

The main bag is divided into two zipped compartments, the rear one large enough to hold a 16in-screen laptop. A Velcro strap holds in place the PC, and there's room in front for a tablet. Two meshed pockets are ideal for power supplies and chargers.

The secondary compartment is for your other stuff - a gym kit, lunch box, bike lock or whatever else you want to carry. It isn't huge, but it should be ample for most uses.

Two small zipped pockets are found at the sides, which are great for keys, cables and other small items. A dedicated pouch toward the top is for your smartphone or music player, complete with a headphone outlet.

Yet another zipped compartment on the front conceals a variety of mesh and nylon pockets, which are useful for pens and other small accessories. A final zip on the front flap provides a thin pocket for documents.

Shoulder and waist straps, plus lots of thick, meshed padding, means carrying the Challenge is surprisingly comfortable.

There's a decent amount of padding around the laptop sleeve, and the bag looks and feels well made. We found the waist strap redundant for our purposes, however, and there were too many hanging straps.

VERDICT: The Challenge has lots of pockets for keeping things organised, and it's well padded. You can snap it up online for less than £40, making it great value. **Jim Martin**

Laptop space: 275x390x40mm • Outer dimensions: 350x470x150mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

STM IMPULSE

£75 inc VAT • stmbags.com

STM's brand-new Impulse rucksack is designed for laptops with up to 16in screens: our 15.6in test laptop fitted snugly.

The main zip pocket at the rear houses both a laptop and a tablet, thanks to a second soft-lined pouch. We managed to squeeze in an iPad with its case.

Another zip compartment at the front can be used for accessories, but there isn't a lot of room for your other gear. You'd struggle to fit in a pair of shoes, for instance.

We like the open lefthand pocket, into which you can fit a bottle, and the zipped pocket on the right side for accessories.

The front zip flap opens to reveal an organiser for pens, documents and other small items. Below this is another pocket that is an ideal size for your PSU, but there's no obvious place to keep your smartphone.

The straps are reasonably well padded, and there's a chest strap. Across the middle is a strap through which you can slot the telescopic handle on a wheeled bag, but it pulls too tight when the Impulse is full.

If you don't like black, the Impulse also comes in grey with orange zip pullers. Both feature have top-quality YKK zips and a reflective tab for night-time visibility. The bags' lining is water-resistant polyester, so your laptop should be safe in a brief shower.

VERDICT: It's good that STM has brought the laptop bag up to date with a tablet pocket, but the limited extra storage space and lack of a smartphone pouch makes its £75 price rather steep. **JM**

Laptop space: 249x364x24mm • Outer dimensions: 330x490x140mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

PC ADVISOR
RECOMMENDED

THULE CROSSOVER 25L

£90 inc VAT • web

Thule's Crossover 25L Backpack is very well constructed from dobby nylon, with a high-quality waterproof coating and a soft fine nylon lining.

A small zipped pocket at the top contains a removable rigid box that's designed to hold your sunglasses or other crushable bits.

One main compartment is sealed by a double-end zip, and sectioned off inside with a padded pocket large enough to hold a 17in laptop. The remaining capacity is quite TARDIS-like in the amount it can carry.

The bag's only failing is a paucity of lining at the bottom of the laptop compartment. There's just a single thin layer of foam to separate your precious laptop from the hard ground, which is insufficient to allow a shoulder-height drop of the bag and leave your computer unscathed.

But this is one tough bag, built incredibly strong. In fact, it might be the subject of PCA's longest-running field test, having been pressed into service in November 2010 and used almost every day since.

The shoulder straps are lined with tough EVA material and show none of the crumpling of lesser foam. The main carcass of nylon shows no marks and barely any wear.

Made from stamped metal, the shoulder strap and side compression buckles are nearly impossible to tighten one-handed.

VERDICT: The absence of extra padding below is our only gripe with this super-tough, stylish laptop bag. Its price is reasonable, given the formidable construction quality. **AH**

Laptop space 270x380x35mm • Outer dimensions 480x340x170mm

MESSENGER BAGS



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

CONVERSE REPORTER POLLY

£35 inc VAT • converse.co.uk

It may be made by Converse, but the Reporter Poly isn't particularly stylish. This plain black bag has only a Converse logo printed on the front, and just one of the four zips is brandished with the 'All Star' logo.

The messenger-style bag has an adjustable strap and a large shoulder pad, which makes it comfortable to wear, but the black lining can make it difficult to quickly spot black items such as your charger.

One of the bag's two main compartments fits a 13in-screen laptop with room to spare, even when it's wearing a protective sleeve. This section is surrounded by protective foam, while a Velcro strap holds in place the laptop. The padding isn't as thick as we've seen on other bags, though.

The placing of the laptop compartment at the front of the bag is odd, pulling it away from you somewhat. Instead, you'll get the nobby bits of your accessories in your hip.

Sewn into the back of the main compartment are pockets for three pens and four cards. There is also has a reasonably sized zipped pocket and a smaller section with a Velcro strap.

Two zipped pockets sit at the front, one of which is large enough to hold documents and other flat items.

VERDICT: Converse's Reporter Poly offers everything you need from a laptop bag, but it's plainer-looking than we expected from the company. It is relatively cheap, however, and may appeal to those on a budget. **Chris Martin**

Laptop space: 370x245x25mm • Outer dimensions: 390x300x90mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

**PC ADVISOR
RECOMMENDED**

PAKUMA CHOROKO K3L

£49 inc VAT • pakuma.com

A large and well-designed laptop bag, the Pakuma Choroka K3L certainly cuts a dash with its bright blue water-resistant material (it's also available in black). A light grey lining helps you to pick out individual items when you are fishing around inside.

There are features aplenty, including what Pakuma refers to as the 'Cocoon'. This 380x257x36mm pouch is surrounded by memory foam and designed to protect any device with up to a 15in screen, with a healthy amount of space left over.

When not packed full, this 16-litre bag feels like a smart and slim record bag. And internal space is used well. There are myriad pockets and mesh sleeves, of varying sizes and with varying levels of accessibility from the outside. Most have zips for security. There are specific spaces for cables and smartphones, and a headphone out socket.

There is a minor design flaw, mind. Most of the various nooks and crannies can be accessed only by undoing the main zip, and peeling back the flap to reveal the interior of your bag. This does mean that prying eyes get a regular look at what your packing.

We found carrying around the Choroka comfortable, even when stuffed with a laptop, tablet, gym kit, sandwiches and multiple chargers and cables. Our laptop remained unscathed, and the bag seemed to hold up similarly well.

VERDICT: A well designed, well-built laptop bag. At just £49 online, we have to say we are impressed. **Matt Egan**

Laptop space: 380x257x36mm • Outer dimensions: 410x318x152mm



Build	★★★★★
Features	★★★★★
Value	★★★★★
Overall	★★★★★

STM VELO 2

£65 inc VAT • stmbags.com

For a bag with a 20-litre capacity, the Velo 2 from STM is surprisingly svelte, measuring 500x370x190mm. It's not the lightest bag we've tried, however, weighing in at 1.2kg.

In line with what appears to be the current trend in laptop bags the Velo 2 we tested is blue. Strikingly so. The thin and sparingly used trim is an equally bright yellow. The overall effect is striking, but smart. The Velo 2 is also available in more sombre grey or black.

Inside is mainly light grey with a fair smattering of bright yellow. Darkly coloured chargers and adaptors stand out against such a bright background.

Construction feels solid, consisting mainly of water-resistant polyester. Subjectively, though, it feels less robust than the Pakuma.

This is a comfortable bag to carry and use. It's also spacious and versatile. There are almost too many pockets and sleeves within which to secrete your tech goods.

There are two slots into which to place a laptop. The more traditional sleeve sits at the back of the Velo 2's main cavity. This is small, but we could fit in a 10in tablet.

Around the back is a clever side-loading sleeve. Turn your bag on its left side and you can slide your 15in laptop into a well-padded, zipped up space. It's an unconventional setup that works fantastically well.

VERDICT: A good-looking, practical and well-built laptop bag. At £65 it's not the cheapest bag around, but if you have to carry multiple devices the Velo 2 is a good choice. **ME**

Laptop space: 364x249x24mm • Outer dimensions: 500x370x190mm

BEYOND SILICON: PROCESSORS OF THE FUTURE

What might replace silicon chips when the technology reaches its limits?
Martyn Casserly investigates the options

The world's first microprocessor, the Intel 4004, was launched in 1971. It was a 4-bit design with a clock speed of 740kHz, and contained a single core. Today we have 64-bit chips, clock speeds of 4.4GHz, and up to a dozen cores. This rate of change would be awe-inspiring had we not come to expect constant improvements as the norm in the world of computing.

Some analysts and scientists are suggesting that such complacency might be misguided as the laws of physics could soon step in and bring a halt to further improvements. Fortunately, silicon transistors aren't the only way to make processors, and even the familiar concept of executing instructions sequentially, on digital data, has its alternatives. Here we look at some of these different and, in some cases, bizarre technologies to get a view of what might be driving our computers in a decade or two's time.

Future processors: the non-silicon alternative

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A transistor is an electronic component that either amplifies a signal or allows one signal to control another. They form the basis of nearly all electronic equipment, indeed today's most complicated processors contain no fewer than 2.5 billion transistors. Although the term 'silicon chip' is a familiar one, the element silicon isn't the only substance that can be used to make transistors. Indeed in the early days, germanium was also used.

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Of course, no one is suggesting a return to germanium, but other semi-metallic elements look promising when used in mixtures. Intel has been experimenting with several of these compound semiconductors. Mixing elements allows the various electrical properties to be fine-tuned, whereas using single elements provides no such flexibility, and this has provided improved performance compared to silicon.

Back in 2005, the company announced an InSb (indium and antimony) transistor that was five times faster than its silicon counterpart but consumed a tenth of the power. More recently, Intel has used a combination of indium, gallium and arsenic, and has referred to "very high performing devices".

While these substances might provide a stopgap measure, an alternative with the potential for even higher performance - albeit a potential that's not guaranteed and much further away - is carbon.

For many years, this was known to exist in two forms, namely graphite and diamond. Then, in 1985, buckminsterfullerene was discovered. This form of carbon has molecules with 60 carbon atoms arranged as a sphere, and many more new forms of carbon have been discovered since. Two that are attracting a great deal of interest are graphene, which comprises sheets of carbon atoms; and a group known as carbon nanotubes, in which the atoms are arranged in cylinders of various sizes. Among their many other uses, both these forms of carbon are able to be used as transistors and can operate much more quickly than silicon.

Silicon and other semi-metallic elements have small amounts of impurities added to them - a process known as doping - to give them the semi-conductor properties needed for them to act as transistors. Some of these esoteric forms of carbon, on the other hand, are inherently semiconducting so don't need doping.

More significantly, though, an electrical current travels more quickly through graphene than any other known substance. As a result, IBM has demonstrated a 300GHz graphene transistor and experts believe that both these forms of carbon have the potential to operate at 1THz. As yet, the transistors are more suitable for analogue electronic circuits, such as those used in mobile phones, than digital circuits, but you can bet that researchers will do their utmost to change all that.

Future processors: light beam computing

While non-silicon transistors could provide a performance boost without the difficulties associated with shrinking silicon chips yet further, digital computers don't have to be electronic, and some of the alternatives offer potential performance gains. For this reason, scientists have long investigated computers that don't rely on electrical signals. Whenever non-electronic forms of computing are discussed, the optical alternative invariably comes to the fore but, despite many years of research, progress has been slow.

Optical computers have been built, and while fabricating an electronic switch (a transistor) is simplicity itself, creating a practical version of the optical equivalent has proved fiendishly difficult. Efforts have been hampered mainly by the problems of miniaturisation. Despite this, and not wanting to be drawn on when, a scientist from the ETH Zürich research centre hasn't ruled out the possibility of a fully optical computer some time in the future.

Although all optical computers are proving challenging, other researchers have set their sights on building chips that combine electronics and optics thereby obtaining the best of both worlds. One of the greatest problems with today's processors is not the processing speed but the speed at which data is transmitted around the chip.

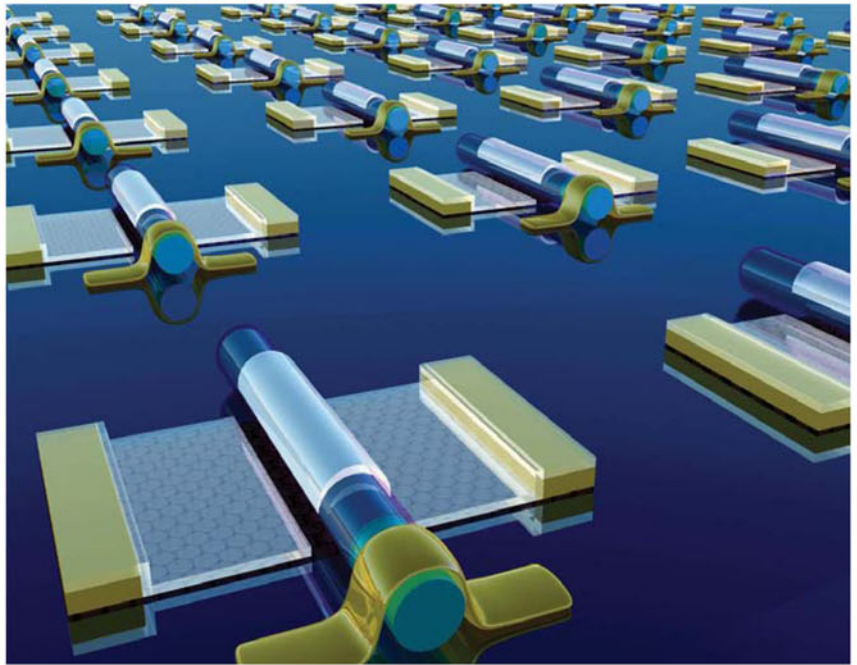


Photo: Stanford University

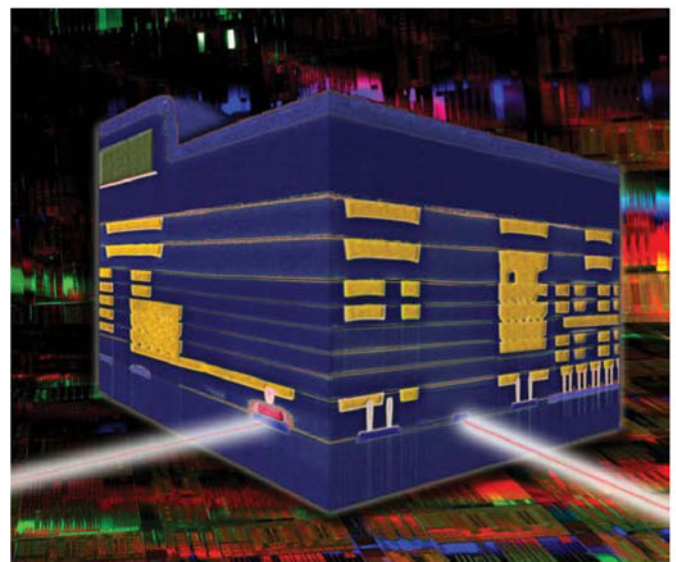
Experts believe transistors made from **CARBON NANOTUBES** could operate at 1THz

The transfer of data back and forth between the processor cores and the cache memories is a notorious bottleneck. Work carried out by IBM has used silicon for the actual processing of the data but optical links for the data pathways. By using wavelength division multiplexing - a technique that involves using different colours of light for different data streams but transmitting them along the same pathways - much higher rates of data transfers are achieved in less space and with a lower power consumption than with electronics.

Future processors: from digital to analogue

Having taken a detour from the world of electronics into that of optics, we'll now return to electronics, but with a difference. In virtually all today's computers, values are stored digitally - in other words a sequence of 0s and 1s. These are represented by different voltage levels, say 0V and 1.5V.

So, for example, because the binary equivalent of the decimal number 13 is 00001101, it could be stored digitally in an 8-bit processor as the voltages 0V, 0V, 0V, 0V, 1.5V, 1.5V, 0V and 1.5V, each in different memory circuits. However, we can also conceive



IBM's **HYBRID PROCESSOR** could combine electronics and optics

Photo: Harvard University

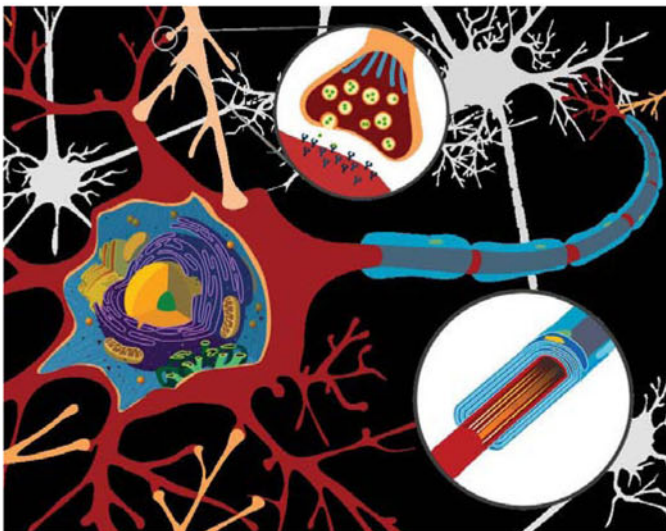


Traditionally, research into optical computers has been hampered mainly by the problems associated with **MINIATURISATION**

of it being stored as a single voltage in a single circuit. Now 13 might be represented by 13V, while 12 would appear as 12V and 3 as 3V. This forms the basis of analogue computing.

Analogue computing is by no means new – it existed alongside digital computing for many years. Typically, analogue computers had circuits for addition, subtraction and integration, and these were wired up using patch leads to create a circuit capable of solving a particular problem. Because wiring up the circuit was a time-consuming job, later analogue computers used digital computers to do that wiring, so that a program could be loaded from disk in a similar way to a digital computer.

One major advantage of analogue computing is that the speed of operation doesn't depend on the complexity of the problem. However, the amount of hardware required increases with the size of the problem and this proved to be their downfall, as digital computers got faster. The other nail in the coffin was that they aren't general purpose – while they're very good at some problems such as simulation, they are incapable of solving others. Interest in analogue computing hasn't totally vanished, though, and while nobody thinks they'll stage a comeback and replace digital computers, the option of digital computers having analogue coprocessors, optimised for specific type of task, might just be an attractive option.



Mimicking the human brain, an **ARTIFICIAL NEURAL NETWORK** could significantly faster than a digital computer for some tasks

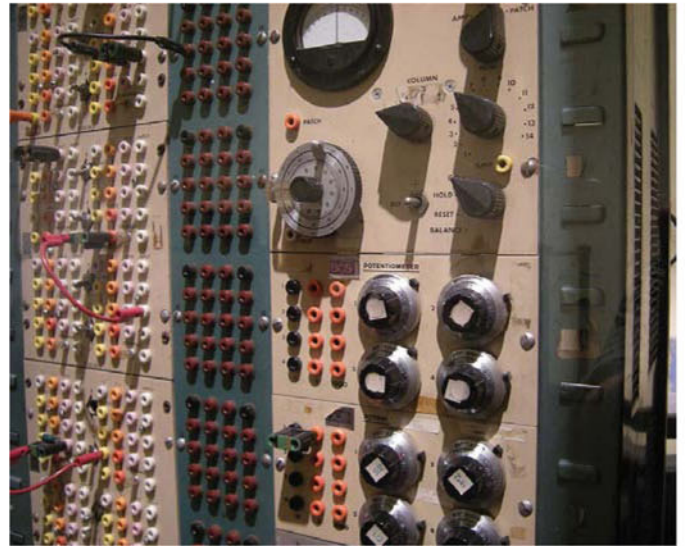


Photo: Joe Mabel

ANALOGUE COMPUTERS might have died out in the 1970s, but it's thought they could make a comeback for certain applications

And then there's the artificial neural network, a very specific type of analogue computer that mimics the operation of the human brain. That means it's good at tasks such as voice recognition; a task that digital computers still struggle with. Progress has been slow after many years and although digital computers can simulate neural networks, and often do so for pattern-recognition tasks, because they do it sequentially they are much slower than true artificial neural networks, which would operate in parallel.

Future processors: biological computing

Talking of neural networks, what about biological computing? This really is the stuff of science fiction.

An artificial neural network is inspired by biology but implemented using analogue electronics. Other researchers, however, have used the actual building blocks of life: DNA.

All living organisms rely on this phenomenally complicated molecule. Comprising a string of so-called bases, the exact sequence of which defines the characteristics of each organism, and their chemical reactions are key to passing on that genetic information during cell division.

Because the sequence of bases can be thought of as 'data', and because DNA's chemical reactions can be thought of as 'processing', there is potential for it to be used as a type of processor.

This was demonstrated several years ago to solve the 'travelling salesman' problem, which aims to find a route starting at one city, ending at another, and visiting a list of other cities only once en route, relying on the availability of transport services between the various cities. It's fairly easy to write a program to solve the problem on a digital computer, but the time taken to solve it increases dramatically with the number of cities. So, if your computer could come up with an answer for 20 cities in a reasonable time, adding just one more city would make the calculation time unreasonable, since it would increase the total time by a factor of 21. Go to 22 cities and the time becomes completely impractical.

DNA computing provides an excellent solution because a test tube full of DNA could contain millions of molecules, thereby allowing millions of possible routes to be tried out in parallel.

Strange as using test tubes full of chemicals might be, even stranger is the use of actual biological material. Again we're not suggesting that they'll replace silicon chips anytime soon, but researchers at the University of Florida have used neurons, extracted from rats, to act as an autopilot for a flight simulator. Science fact truly is stranger than science fiction. ☒



Photography by Robert Cardin

21 fixes for your worst tech habits

A bad habit can ruin your digital life just as easily as it can harm your offline one. Christopher Null outlines the worst offenders, and explains how to overcome them

Nail biting. Keeping a sloppy workspace. Habitually being late. We all have bad habits in real life. Why isn't technology a cure for them?

While tech should be a panacea for our bad habits, all too often it just makes things worse. Rather than offering an easy way for us to correct something we're doing wrong, tech gives us another venue in which to engage in poor behaviour.

Here are 21 of the worst such technology-oriented habits, plus potential fixes for all.



1 Leaving equipment in plain sight.

The typical gadget theft doesn't happen with careful stakeouts and planning. It's conceived and executed in seconds, and probably because you left the item unattended. That cosy window corner at the café is great until you need to run back to the counter for a refill. A thief can pop in, grab your device, and be gone. Gadgetry is also commonly snapped up from airport security conveyers while you're being frisked.

Your locked car isn't safe, either: an eager thief will happily smash your window and grab the laptop bag from the passenger seat, even in broad daylight.

FIX: Don't leave laptops and other gadgets unattended. Yes, that means you must either take them to the toilet or leave them with someone you trust. At a café, it doesn't hurt to ask the staff if you can leave something behind the counter for a minute.

2 Oblivious gadget use.

Opportunist thieves might lurk at the top of the stairs as you emerge from the Underground, or sneak up behind you while you're eating at an outdoor café. Either way, you have no idea they're there, because your nose is buried in your smartphone's Facebook feed. Next thing you know, you've been punched in the face, and the thieves are dashing off to a getaway car. Can you identify the suspects? No. The last thing you saw before it happened was a picture of a puppy.

FIX: Everyone uses their phones everywhere, so it doesn't feel risky to break one out on the train or while walking home in the dark. But electronics remain some of the most easily pinched items on the black market, and it pays to keep your wits about you when using them in an unknown situation. Make it a policy to limit mobile device usage to areas in which you're certain you won't be the victim of a smash-and-grab attack. That also goes for using your phone while you're driving.

3 Using your devices with dirty hands.

Anyone who has ever handed a smartphone to a child knows that the device will come back covered in sticky finger marks, crumbs and snot.

But you aren't much better. Playing Bejeweled while chomping on a Big Mac won't leave your phone looking fresh, and holding your phone against your face to talk may leave behind an oily shadow.

This isn't just unpleasant, but brings health risks, too: the old adage that your keyboard is dirtier than your toilet applies to your phone, as well. One report last year claimed that a Ugandan thief contracted Ebola from a stolen phone.

FIX: Keep some wet wipes or other cleaning products on your desk in plain



view. Clean your phone, tablet and other touchscreen devices daily, and do a quick wipe-down any time you see visible grime.

4 Not cleaning your equipment.

We've dealt with the problem of filthy touchscreens but what about everything else? Literally everything in your high-tech arsenal is vulnerable to damage from dust and dirt. Grime seeps in through any crack and crevice, but machines such as desktops, laptops and even printers, which have air-intake vents for cooling, are the most affected.

Dust generally won't damage the electronics, but it can clog fans, optical-drive mechanisms and other moving parts, which can lead to component failures and overheating if the fans stop working properly. Dust in scanners and printers can affect the quality of your printouts, too.

FIX: Cleaning your equipment isn't difficult, but it's important to do so regularly before the grime builds up. Once or twice a year should do it. Can't remember? Try cleaning out your PC at the same time you get your car serviced. A calendar reminder on your PC can help, too.

5 Sitting with bad posture at the computer.

The posture lessons, cautionary tales and ergonomic gadgets of the past 30 years have taught us nothing. As a result, carpal tunnel syndrome is the most common form of neurological syndrome called entrapment neuropathy, affecting up to six percent of the population. The typical treatment is surgery. And all because you were too lazy to sit up straight.

FIX: Fixing this problem requires a proper work environment. Keep your chair

at a height so that your knees bend at a 90-degree angle; also keep your feet flat on the floor, your monitor directly in front with the top of the screen at eye-level, and your keyboard placed so your wrists are parallel with the floor.

This is easier said than done if your office is now a Starbucks. But Imak Computer Gloves (available from Amazon for around £20) can keep your wrist at the correct typing angle and cushion your hand - an easy solution that you can drop into your bag.

6 Not taking breaks.

Most parents have no trouble limiting their children's screen time, but they find it more difficult to put down their own laptops or smartphones when work demands action.

Breaks are essential to good health. Your joints, muscular system, circulatory system and eyes all benefit from a change of scenery every once in a while. Remaining in a seated position for extended periods of time can cause blood clots (sometimes even fatal ones). And staring at a screen for hours on end can cause eyestrain that may affect your vision afterward and make it dangerous to drive home.

FIX: Fortunately, programs such as Scirocco Take a Break (tinyurl.com/Lw3urvo), mobile apps and web browser plug-ins can remind you to step away from your gadgets, stretch your legs, get a drink of water, or call it a day on your computer time.

Another easy way to remedy the problem is to keep, at all times, a very large glass of water at your desk (the solution to another bad habit: failure to hydrate). Regularly sipping a gulp from that glass of water will force you to take an occasional toilet break.

7 Working with your laptop on your lap.

Yes, they call it a 'laptop', but you weren't supposed to take that literally.

Using your laptop on your lap can lead to a whole host of problems, many caused by the heat that most laptops spew from their undersides. The maladies can range from simple skin dryness and discolouration to reduced sperm count to - the jury's still out on this one - cancer.

Heat isn't the only problem. Placing a heavy object across your thighs for hours on end can cause neurological damage, particularly when coupled with the typical laptop-on-lap posture: hunched over, legs outstretched, neck craned. Arthritis can also develop over time.

FIX: Fixes aren't easy unless you want to move your desk into the living room so you can watch 'Game of Thrones' while you work. Instead, start with something like a Belkin Cushdesk (around £20) that shields your thighs from heat, and follow the break-taking tips in item #6. Periodically shifting your laptop from one leg to the other can help.

Avoid working on your laptop with your legs outstretched on the coffee table, too. Your nervous and muscular systems will be in better alignment if you keep your knees bent and your feet on the floor.

8 Failing to back up data.

Everything is going swimmingly until one day it suddenly isn't. Maybe it's a hard-drive crash, maybe it's a malware infestation, maybe it's a stolen laptop. One way or another, your data has abruptly vanished, and you're left crying that you should have backed up your data.

The excuses for not backing up your data are becoming increasingly thin. Any number

of online backup services will automatically sync your files with a cloud-storage system, whether you use a PC, a tablet or a phone.

Don't be lulled into thinking that you have nothing important on that device. Whether it's a forgotten baby picture or a game save on the verge of hitting completion, you'll feel differently once it's gone.

FIX: With most backup systems, you don't need to do anything other than install an application and set it up. If that's too much effort, well, perhaps it's time to go back to pen and paper.

9 Reusing passwords over and over.

We are all guilty when it comes to this bad habit. How are you supposed to remember your 100th different password for the latest social network you've joined? You take the easy way out and re-use a password that's easy to remember.

Password 'strength' is a bit illusory. All it takes is one website that doesn't securely store passwords and gets hacked, or one old and unencrypted hard drive that's sloppily disposed of, to bring tumbling down the whole house of cards, no matter how many numbers, uppercase letters and special characters you use.

FIX: The solution involves coming up with a system to build a unique password based on each website where you use it. Build from a base phrase and add something unique to it for each site. Take, say, Flurpb&rgl3r as a base and add fb8 to the end for Facebook, or tw7 for Twitter.

In this example, the numerical component of the end tag is the number of characters in the site name. The result is a password that you won't forget, but is virtually impossible to crack.

10 One account, multiple users.

A parent's typical move, when giving a child his or her first computer, is to hand it over and hope for the best. Mum then wonders where her address book went, and her boss wonders why she sent him 20 emails full of gibberish.

FIX: Setting up multiple user accounts on Windows isn't difficult, and it's an incredibly prudent precaution if more than one person is going to use the machine. Never mind the privacy issues - accidents happen, even among grown-ups sharing a PC. Having two people working on different files called curriculum vitae.doc will end in heartache.

For children, security and safety are bigger concerns. Setting up kids with Standard User accounts (rather than Administrator accounts) is wise to keep unwanted software from being installed, and it's the key to letting you configure parental controls on the computer. So next time little Johnny wants to use your PC, be sure to give him his own account.

11 Failing to update.

Software published today is updated on a near-constant schedule. If you have a few dozen apps on your smartphone or tablet, you've probably become accustomed to downloading updates on a daily basis - unless you're one of those people who never updates anything.

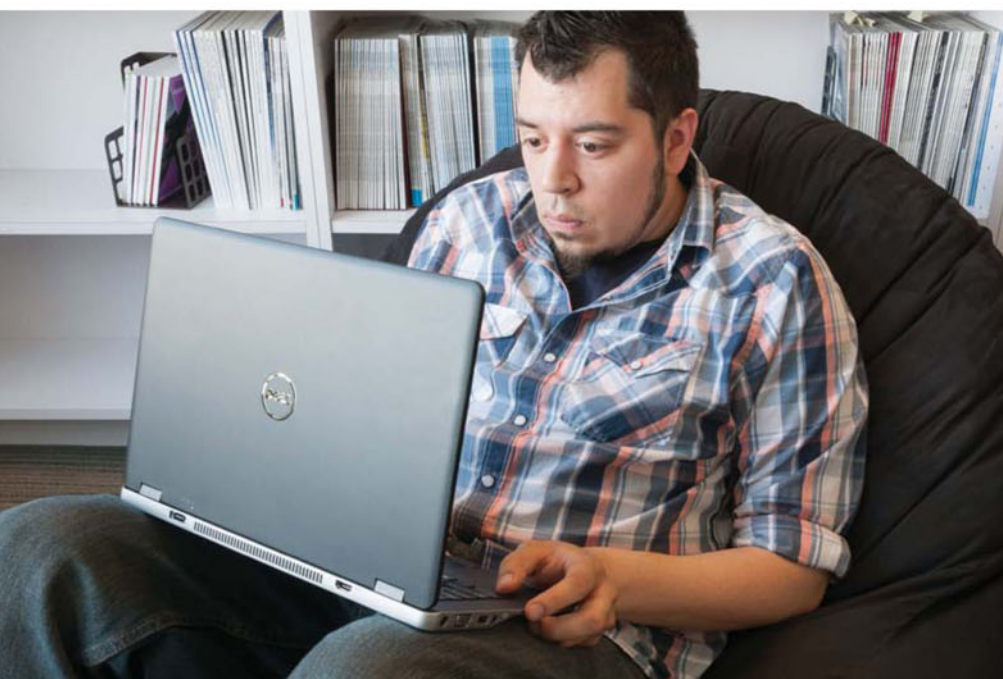
Software updates are released for a variety of reasons. The app's developers add features, fix bugs and plug security holes. Installing updates upon release - particularly operating system updates and security software updates - is essential to keeping your device stable and secure.

FIX: Every application has to be updated, so it's forgivable if you don't want to deal with the constant nagging to install, reboot and repeat every day. Automatic updates take some of the hassle out of this operation, but most software updates still have to be manually installed. There's no easy solution to this. If immediately installing updates when they appear in the system tray or on your handset doesn't fit with your computing habits, make it a weekly event to update everything all at once.

12 Printing anything.

You've seen the request at the bottom of so many email messages: 'Please consider the environment before printing this email.' Is that really necessary in 2013? Who isn't considering the environment? And more importantly, who is still printing out their email?

When a 1TB hard drive costs £50 and there's endless cloud storage, why does anything that starts out in digital format, such as email, ever need to go back to paper? Even utility and bank statements



are archived online (often for years), and are much safer as backups than the ones sitting in filing cabinets in your house.

What legitimately needs to be printed? The only thing we can come up with is labels for products that have to be physically posted somewhere, and maybe the packing slips or receipts that are included with those packages. Also arguably acceptable is the occasional printed photograph that you'd like to frame and put on the wall.

FIX: Unplug your printer and stick it in a cupboard for a week. See if you can't go paperless, cold turkey.

13 Faxing, ever. As bad a habit as printing is, faxing is infinitely worse. Here, you have the opportunity to break the paper cycle, but instead you're continuing it, indeed worsening it by duplicating the paper and possibly racking up long-distance telephone charges in the process.

No disrespect to the fax machine. It was a critical piece of apparatus in business for years, but now it is an outdated relic on a par with the dial-up modem. Yes, technology has improved - you can even send colour faxes now - but quality really has not. Most faxed documents are still difficult to read, still come out askew, and are often incomplete, cut off by a paper jam or a problem with the phoneline. Many people resort to faxes when they need to send a signed document to another party, but in many cases a fax with a signature may not even be legally acceptable.

FIX: Fortunately, for most people, faxing is an easy habit to break. Just staring at the pile of junk faxes that most businesses continue to receive is impetus enough. While your fax machine may be attached to an otherwise useful all-in-one printer, you can simply unplug it from the phoneline, and save a few pounds per month if you're paying for a second line for it. Plenty of free or cheap services can let you send a digital fax, should you really need to do so.

14 Throwing computer equipment in the bin. If you've been a computer user for any length of time, you've probably accumulated old peripherals, outdated or broken laptops, ancient mobile phones and webs of cables. What do you do with that mountain of phone wire that came with every modem you ever bought? What about all those old red-white-and-yellow A/V cables bundled with the VCRs of yesteryear?

Much of this material ends up in landfills. Some, like telephone wire, isn't hazardous, but anything with a battery or a circuit board in it probably is. (Modern electronics typically aren't as toxic as older stuff, but that isn't what you're throwing away, is it?)



FIX: You can easily recycle most of this junk, even broken cables and defunct printers. It's preferable not to dump it at your local tip, unless it will recycle it. If the kit is still working, you might be able to get a bit of cash from CeX, eBay or Gumtree.

If it's not worth anything, consider offering it on a recycling website such as Freecycle.org. That way someone will probably come and collect it, and you'll have to expend precisely no effort.

Don't forget to delete personal data from any hard drive or flash drive you recycle. Use a program such as Eraser 6 to make sure last year's tax returns don't end up in someone else's hands (see tinyurl.com/cuxyLz3).

15 Not reading the FAQs. When trouble arises online, the knee-jerk reaction is to open a support ticket or call the help desk. Then you'll spend half an hour on hold waiting for someone who probably can't do much to help you.

FIX: Make it a habit to remember the FAQs. Companies love to create Frequently Asked Questions pages because they really do answer a lot of common concerns. While some FAQs are more thorough than others, they're always worth a quick spin to see if you can't find a quick answer to what you believe is a unique problem. Use the search feature on your browser to scan a large document for your keywords.

16 Oversharing on social media. It's good news that you finally resolved your bunion problems. We got a kick out of that picture of the syrup puddle on your breakfast pancakes. And the story about the squeaky dog toy you bought was also a gem.

Yes, complaining about banal stories, photos and comments on Facebook and other social-media sites has become a First World Problem of the greatest order. But given how intertwined social media and the business world have become, the person most likely to suffer is the one who does the blathering.

FIX: If you're at all concerned about your appearance in the world, try to keep your comments unique and unexpected. Dutifully copying the latest 'Follow these instructions or else!' post on Facebook is no better than mailing chain letters to your friends. Restrict social-media chatter to a few posts a day. You can post the rest of your conspiracy theories ad nauseam to your blog.

17 Texting at the table. Really? It's that important? We all love our smartphones, but using them in the company of others, particularly at meal times, is just plain rude. (It's also dirty - see bad habit #3.)

What about the phone-in-the-lap trick? Still unacceptable. And that goes for any kind of social situation, whether it's school, work or a simple conversation with someone else.

FIX: If you must deal with another conversation, voice- or text-based, take it to another room or outside. Make the 'no phones at the table' rule apply to everyone in your household, including yourself.

18 Using your phone or tablet without a case. How will it end? Eventually your phone or tablet will die. The battery may explode. The CPU may melt down. Cosmic rays may fry the RAM. Realistically, you will probably drop it. No matter how sure-handed you are, and no matter how carefully you treat your

devices, one day they are going to slip out of a pocket, or simply fall to the ground when someone's elbow bumps against you.

FIX: The only solution is to enshroud your gadgets in cases, preferably sturdy ones that offer decent protection. The flippy Smart Cover for your iPad is useless when a child knocks it on to your tiled floor. Go for a thick rubber or silicone case that covers every corner of the device, such as the Otterbox Defender. A thinner, plastic case may do the job, but replace it when it becomes damaged.

answer a customer survey. You let it go to voicemail, and that little red light blinks all day (if you have a BlackBerry, at least) until you get around to playing the message.

Technology has given us many ways to communicate with one another – virtually all at the expense of the fastest and most expedient, the telephone.

FIX: We're not talking about breaking the rule against texting at the table (see bad habit #17), but a blanket policy against answering the phone may make sense.

20 Failing to silence your phone. These days, just about every public performance begins with an entreaty to the audience to mute or turn off their mobile phones. Thirty minutes later, the unmistakable jingle 'Marimba' makes its presence, and its clueless owner, known.

Smartphones that erupt at the most inappropriate times are a cultural epidemic. Ironically, it's likely because we have heard so many commands to shut off our phones that we simply don't hear them at all.

FIX: While you likely can't fix the behaviour of the person sitting next to you, at least you can ensure you aren't part of the problem. Simply make your default setting ringer off. Turn the ringer on only when you know you're going to need to hear it ring – that is, any time it's not in a pocket and out of arm's reach.

21 Never rebooting. For all their advances in reliability, our gadgets remain incredibly susceptible to minor bugs of all kinds. Memory leaks are still rampant in Windows applications, flooding your RAM to make it unusable. Numerous applications still require reboots after they're installed or updated, and the app will be stuck in limbo until that reboot occurs.

Windows 8 has improved reboot times (and reboot frequency), but every operating system – whether desktop or mobile – benefits from an occasional reboot. Think of it as a good night's sleep for a device: A reboot lets it start fresh, free of digital baggage. And it may improve the battery life.

FIX: Build rebooting into the natural downtime of your day, typically when you go to bed. Reboot your device to give it a refresh. Better yet, turn it off completely and save energy. ☒

19 Failing to pick up the phone. The phone rings. You look at the number and don't recognise it. You don't want to speak to someone about life insurance or your phone contract, nor

Consider how much faster it would be to answer a simple question via voice than to read and respond to a long email message. If it's someone to whom you really don't want to speak, you can always hang up the phone.



BAD EMAIL HABITS

Responding to spam

There's a difference between a mailing list or a promotional newsletter to which you signed up and spam. The first you can unsubscribe from (and you should, liberally), the second you cannot. Use unsubscribe links for the former and invest in a spam filter for the latter. If spam becomes such a problem that you can't manage it, consider the nuclear option: changing your email address.

Keeping a full inbox

Treat your inbox like your desk, with only the essentials you need at that moment. As for everything else, file it, delete it or transfer it to the calendar. Some task management approaches favour 'inbox zero' (making your inbox totally empty), but the 'no-scroll' goal (all inbox contents on a single screen) is more reachable for many.

Answering instantly

It's tempting to write back to an email as quickly as possible so you can get it off your plate, but doing that can create its own problems. Consider setting your email client to delay its send/receive operation by 10 or 15 minutes. This gives you the chance to edit a message, add something to it (so there is no second message), and avoid the 'I accidentally hit the Send button' mistake. More critically, a delay lets the recipient know you took time to put together a reply.

Replying to all

One reason our inboxes are so full: we send so much email. Bob sends an email to a dozen people because he doesn't know who can help him solve a problem – and those dozen people then reply to everyone. Use 'Reply to All' sparingly.

How to print from your iPad

Nik Rawlinson runs through your options when printing from Apple's tablet

The iPad is much more than an entertainment system on which you can play games, browse the internet, and watch TV shows and movies. Pair it with a keyboard and office suite and you've got a fully-fledged laptop replacement. The same is true of the iPhone - particularly now that Office365 subscribers can use it to edit native files in mobile editions of Excel and Word.

The trouble is, without a USB port - and with no way to install any drivers - printing looks like the missing link. It's all very well being able to create and edit documents, but what about those times when you need a hard copy of a vital email, printed directions for a forthcoming journey or a paper-based recipe so you don't have to tap and swipe your screen with pastry chef fingers? Thankfully, as we'll show you here, it's a problem that's easy to work around. We've four different ways to print your documents from an iPad or iPhone.

AirPrint

AirPrint is Apple's officially authorised method of printing from its mobile devices. It was introduced with the iOS 4.2 update, and adds a print function to a wide variety of applications. In Pages, Numbers and Keynote, for example, you'll find Print under Tools, Share and Print. In Mail, tap the reply button and pick Print from the menu. In Safari, tap the shortcut button to the left of the address bar and then tap Print.

But before you start printing, you'll first need to make sure that you have a compatible printer. These were originally only produced by Canon, but now each of

the leading manufacturers sells these. They aren't expensive, either. Shop around and you can pick up an all-in-one device such as the Canon Pixma MG3150 for £40 from Ryman (tinyurl.com/Izn8t7u).

Setting up AirPrint is a two-tap process. The first time you send a document to print, iOS will open the Printer Options dialog. Tap Select Printer and your device will scan your network for compatible printers. When it finds one, tap the printer name to return to the Printer Options dialog and complete the process.

You can now specify how many copies you need (and whether to print double-sided if your printer has a built-in duplexer) and tap the Print button to output your file.

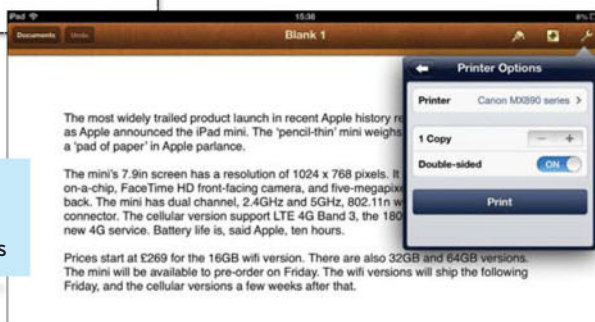
AirPrint with an incompatible printer

Unless your printer is only a couple of years old, it's unlikely it will have AirPrint built in. Even if it's fairly new, there's still no guarantee that it supports the service, as it's not an option on every device. Don't rush out and buy a new printer if yours



AIRPRINT adds native printing features to a wide range of programs, including Pages, Numbers and Keynote

Setting up AirPrint is a **TWO-TAP PROCESS**, after which you'll have access to your printer's built-in features





isn't compatible, though, as there are two workarounds that allow you to add AirPrint features to any regular printer.

The first of these is a hardware add-on. The Lantronix xPrintServer (tinyurl.com/984t5d5) will transform over 4,000 USB and network printers into AirPrint compatible devices, and lets you install up to eight at a time on your iOS device, courtesy of a USB hub. That means you can send word processed letters to a laser printer, photos to a high-quality inkjet, and drafts to a budget device with cheaper ink and a stack of low-grade paper. Lantronix maintains a list of compatible printers at tinyurl.com/86mt4I4.

You can pick up the xPrintServer Network Edition for £134 on Amazon (tinyurl.com/q5cexvg). Setup is easy: connect it to your printer via USB, and use a regular network cable to hook it up to your wireless router. Plug it in and you're ready to go.

You don't need to install any apps or drivers on your iOS device, as from that point on you follow the regular instructions, as above, for printing to an AirPrint device.

Printing via a PC or Mac

There is, however, a cheaper option than buying an AirPrint printer or a hardware add-on for your current printer, but it requires that you leave your desktop PC or laptop running whenever you want to print, since the documents are routed via your computer out to the printer. The process varies slightly depending on whether you have a PC or Mac, but the theory behind it is the same on either platform.

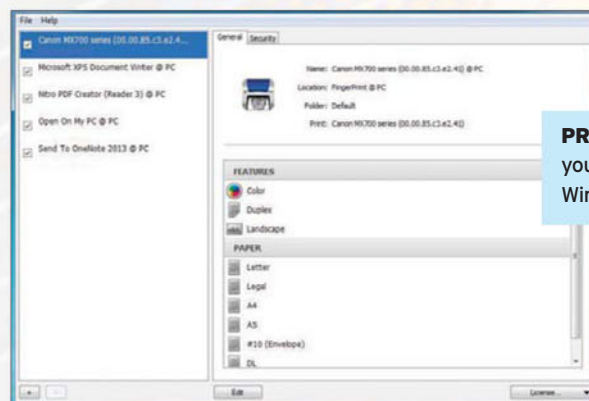
Windows users need to download Presto from collobos.com. There's a free trial, at the end of which you'll need to pay \$20 to register. It requires iOS 4.2 or later on your iOS device, and Windows XP SP3 to Windows 8 on your PC.

Once you install the software, it will list each of the printers on your PC. Make sure that the one you want is checked, and use the options in the main pane to set up features like duplexing and colour management. Your PC takes on the role of an AirPrint device from this point forward, allowing you to print from your iOS device in the usual manner.

If you can't see it on your iPad's print dialogs, you can check the printer is shared on your PC by opening Control Panel, View devices and printers, double-clicking your printer name, followed by Customize your printer. Switch to the Sharing tab and check the box beside Share this printer.

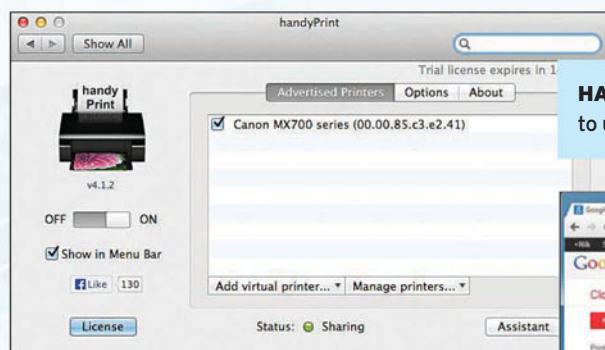
Presto is also available for the Mac, but handyPrint is potentially cheaper as its donationware. It's an OS X app that enables printing via a Mac - download it from tinyurl.com/a6fxwvy. It's compatible with iOS 4.3 or later, and OS X 10.6 (Snow Leopard) or later on a 64-bit Mac. If you're using OS X 10.6, you'll first need to share your printer (this isn't necessary on OS X 10.7 and later). Open System Preferences and click Print & Scan. Select your printer and check the box beside Share this printer on the network.

Installing handyPrint adds a new pane to System Preferences, which is automatically opened at the end of the installation routine. Click the switch in the sidebar to turn it on and it will immediately share all the available printers installed on your Mac, again acting as though it were an AirPrint device. In theory that should be all you need to do, but in our tests we found that it was also necessary to reboot our Mac.



PRESTO shares any printers you have installed on your Windows PC with iOS devices





HANDYPRINT allows iPad owners to use printers installed on a Mac

Selecting the print option from an application on your iPad will then search your wireless network for a compatible AirPrint device, see the handyPrint driver and give you the option to print to your regular USB printer.

Using Google Cloud Print

None of the methods mentioned above will work if you're away from your local network, as your iPad won't be able to see your printer. However, Google Cloud Print lets you print to any network-connected printer anywhere in the world from a variety of applications on Windows, Mac, Android and iOS devices, which means you can print just as easily from home as you can from the bus on your morning commute.

You can find a list of compatible printers at tinyurl.com/q7up367. If your printer isn't listed you needn't replace it right away, as you can set up what Google calls a 'classic' printer to work with the service.

You'll need to install the Google Chrome browser on your PC or Mac if you're not already running it - it's a free download from

tinyurl.com/7ax3dad. Sign in to your Google Account by clicking the link on the Google homepage, then click the configuration button, which you'll find on the right of the address bar. Click Settings, followed by the Show advanced settings... link. Scroll down to Google Cloud Print and click Add printers.

As you're already logged in, Google knows which account you're using, so click the Add printer(s) button to authorise it to add your installed printers to the cloud. That's the end of the setup process. Clicking the link to manage your printers will now let you see each of the installed devices and manage the jobs being sent to each one.

So long as your printer is turned on and connected to the internet, you'll be able to print to it remotely from any PC or Mac,

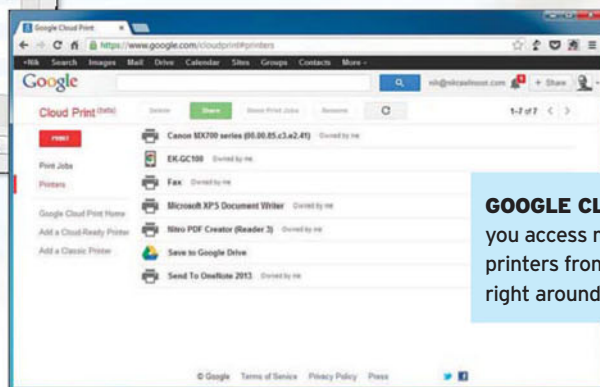
and from selected applications on your Android and iOS device.

On the iPad, you can use it with the latest update to the iOS Chrome browser (free from tinyurl.com/k86yw58). Tap the options button to the right of the address bar, followed by Settings. Select the option to Sign in to Chrome and use the same details as you did when setting up Cloud Print, so that the iPad can see your registered printers. Open the page you want to print, tap the options button again and select Print... Choose Google Cloud Print as the output option and then tap the printer you want to use.

To print from other apps you'll first need to install an intermediary third-party application such as PrintCentral Pro (£5.49 for iPad from tinyurl.com/lpoy72o; £2.99 for iPhone and iPod touch from tinyurl.com/pup6wb7). This lets you print to any wireless printer on your local network and any Google Cloud Print device over the internet, using the native Open With... feature in applications such as Mail and Dropbox, or by sending your work to an external application - in this case PrintCentral Pro - from tools such as Pages, Keynote and Numbers.

After choosing the appropriate option, select PrintCentral Pro from the list of available applications to handle the file. Your iPad will switch apps, and PrintCentral Pro will display its native print dialog. From here you can print to any AirPrint-compatible printer installed on your local network.

To print to a Google Cloud Print device, tap the Choose button on the dialog's Printers line, and then the '+' at the foot of the screen. Tap Google Cloud Printing and enter your Google Account login credentials. PrintCentral Pro logs in and displays a list of your authorised devices. Tapping the one you want returns you to the print dialog, from which you can complete the process of printing the file. ☑

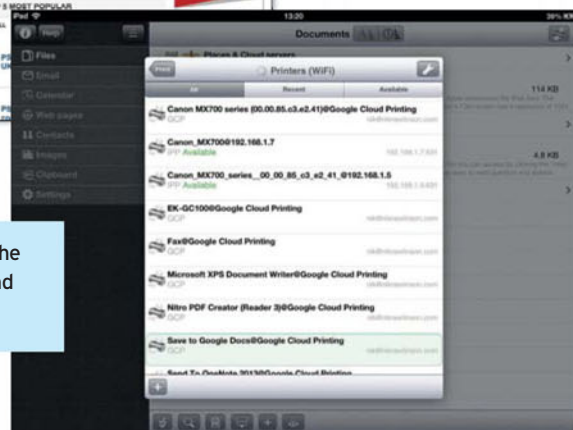


GOOGLE CLOUD PRINT lets you access multiple remote printers from connected devices right around the world



With Google Cloud Print set up, you can print from **CHROME** on an iPad and iPhone without any further configuration

PRINTCENTRAL PRO bridges the gap between regular iOS apps and your Google Cloud Print devices





Find a lost or stolen laptop

Laptops are easily stolen or lost, so you should consider some form of protection. Tracking services can tell you where it is and even who is using it. Roland Waddilove examines the options available to you

Thousands of laptops are lost or stolen each year. People leave them in taxis, trains, hotels and coffee shops, and they're a prime target for thieves as well. Put down your laptop bag for a minute and a thief might snatch it when you aren't looking, and a laptop left on your car seat is a huge temptation for opportunists.

Of course, you stand to lose more than just the hardware. The thief or finder could access personal files and information and even steal your identity.

There is little chance of recovering a lost or stolen laptop unless you take some sensible precautions, such as those outlined here.

It's good practice to make a record of any serial numbers printed on your laptop's case that may help identification. This information can be passed on to the police, lost and found departments at train stations, or wherever you last remember having your laptop. It should also speed up your computer's return, should it be recovered.

Also consider marking your laptop with a UV pen. These cost very little and, should the police recover a laptop, they will check it with a UV lamp. An alternative is to etch your name on to the device, or attach a tough sticky label that will make your laptop difficult for the thief to sell on. Companies such as Selectamark (selectamark.co.uk) specialise in this sort of thing.

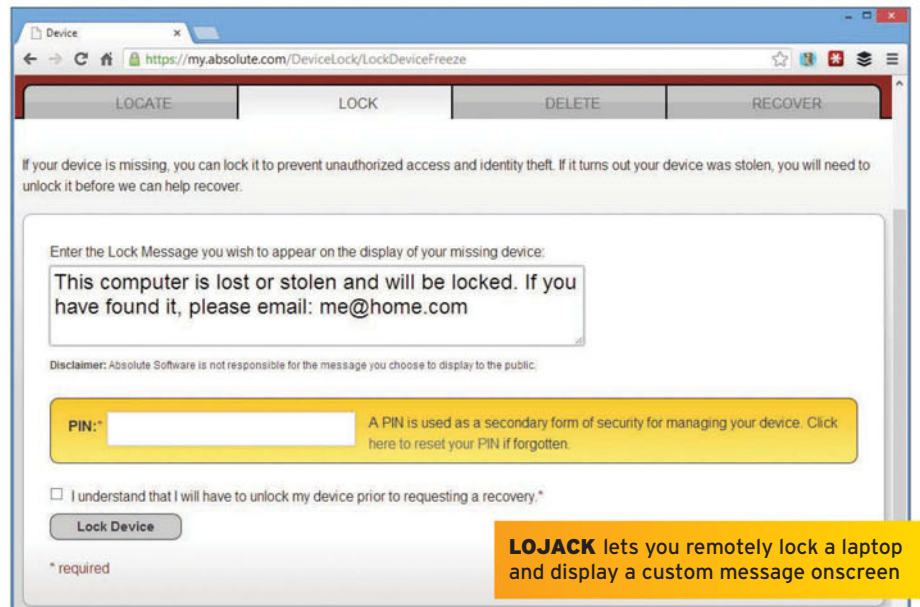
Another step to take is to encrypt your files. Encryption software can be used to hide important files or lock your entire hard drive. TrueCrypt (truecrypt.org) is free and open-source, and there are many commercial encryption tools, too.

Laptop-tracking software is another safeguard, in to which we go some detail here. It should enable you to see on a map the location of your missing device. This is well worth investigating if your regularly take your laptop out of the home or office.

Also known as laptop-recovery software, given an active internet connection it will note the laptop's location several times per day. It may take screenshots of the desktop and photos with the laptop's webcam, in effect catching the thief red-handed.

Tracking software can remotely lock a laptop and erase its contents, and display a message onscreen or sound an alarm.

Here we look at four of the most popular laptop-tracking services to find out which is best suited to your needs.



LoJack For Laptops

lojackforlaptops.com • £33/year



LoJack is available for Windows and Apple laptops, with an Android version promised soon. After registering with the website, which requires you to enter your credit-card details even if you intend to use only the 30-day free trial, a serial number is provided that enables you to install the software. LoJack hides itself on the hard drive, and that's the last you'll see of it. The computer logs in with the company's servers every so often to check for instructions.

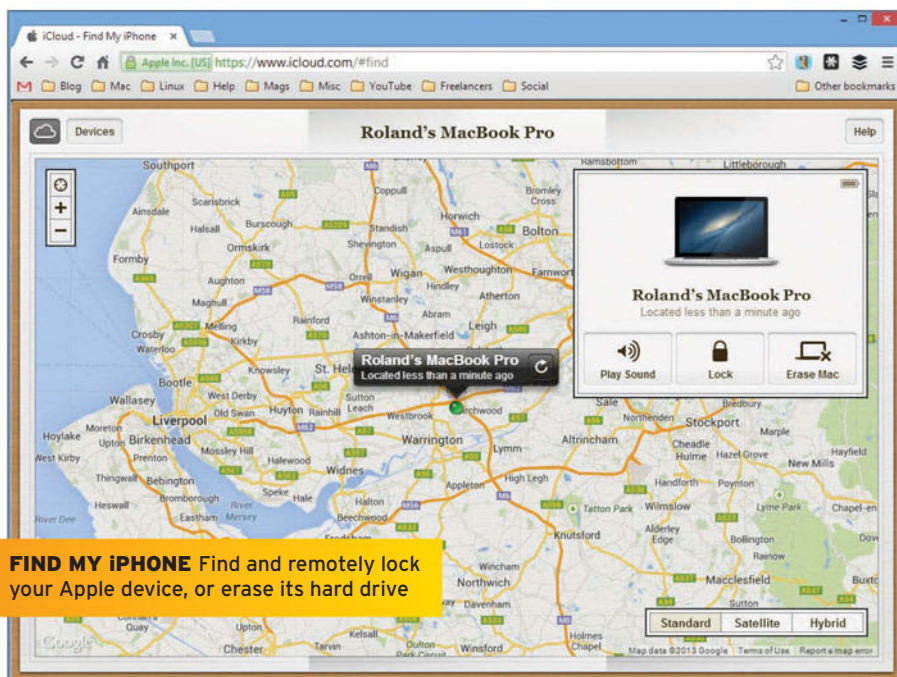
If the laptop is stolen you simply log into the website on another computer and select one of the Locate, Lock, Delete or Recover options. Lock stops the laptop being used and

displays a message onscreen. Rather than an angry rant at the thief, this might be your contact details for returning your laptop.

Delete, as you might expect, allows you to erase all user files and leave only the operating system. Although you'll be doing the thief a favour by making the laptop easier for them to sell, you'll also be ensuring the privacy of your personal data.

Recover lets you report the computer as stolen. You must report it to the police first, though. Parent company Absolute Software then gathers information about the laptop and works with the police to recover it.

LoJack sounds great, but you won't know for sure how well it works until your laptop is stolen - and then it's too late. It requires a leap of faith in trusting that Absolute Software can recover your missing device.



Find My iPhone

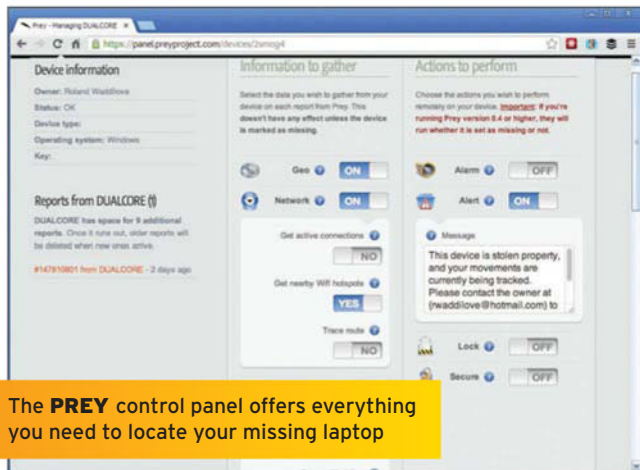
icloud.com • Free



You might assume from the name of this Apple utility that it is able to find only missing iPhones, but it can also help you to recover iPads, iMacs and MacBooks. You can't track laptops running Windows, but you can use the service on a Windows PC to find your missing Apple devices.

To set up Find My iPhone on a MacBook open the Apple menu and select Preferences, iCloud. Turn on 'Find My Mac'. You can then use Find My iPhone on an iPhone or iPad, or head to icloud.com on any computer with an internet connection.

The locations of all your Apple devices are displayed on a map, and you can pinpoint the one that's disappeared. There are options to play a sound (even if the volume is set to mute), and to lock the laptop with a PIN and display a message onscreen.



You can even erase the hard drive. Find My Mac can be turned off just as easily as it is turned on, but there's a good chance the thief won't know to look for the service. You could determine the laptop's location and send a lock command before they even realise what has happened.

Prey
preyproject.com • Free



Prey is free for up to three devices, be they Windows or Apple laptops, Android or iOS phones and tablets. There are Pro plans for companies with up to 500 devices, too. Prey doesn't hide itself, but the Start menu entries can be deleted following installation and the program folder hidden. A password is required to uninstall the software.

You can log into the website, see a list of devices and access the control panel. There is a simple toggle switch to flag a device as missing. This triggers reports, which are collected at regular intervals as short as 10 minutes. Prey attempts to determine the location, IP address, nearest Wi-Fi hotspots, GPS and any other information available.

You can take screenshots in the hope of capturing a Facebook or Twitter page that will identify the user, and a webcam photo. The

Norton Anti-Theft
antitheft.norton.com • £30/year



Norton Anti-Theft costs £30 per year for up to three devices, and there are options for up to 10. These can be Windows and Apple laptops, and Android phones and tablets. It installs a desktop icon and Start menu entries, but you can delete or hide these and the uninstaller won't run without a password.

Signing into your account via a web browser allows you to see the location of the laptop on Google Maps. Updates are every hour, but clicking the Lock Device button if the laptop is stolen increases the frequency.

Locking a laptop displays a custom message onscreen and prevents it from being used until a PIN is entered. Another feature is the ability to take photos using the webcam.

Norton Anti-Theft seems lacking in features compared to Prey, but it works well enough and once the laptop is locked, it can't be used. You can't erase files as you can with Prey and it is up to you to work with the police to retrieve your lost or stolen laptop.

computer can be locked and files can be erased.

Whereas LoJack handles the laptop recovery for you, it's up to you to gather information using Prey and pass it on to the police. Despite being free, Prey is very good and you can easily test all the functions. This gives you confidence that, should the worst happen, you might well be able to track and recover your laptop.

software offers more than its rivals, including file encryption, a file shredder and the ability to scramble the contents of personal files to prevent access.

If your laptop is lost you can log into the website and change the status to missing. The laptop can then be locked and you can enter a message encouraging the finder to return your device. There are functions for deleting files, and you can send commands to the laptop to delete images, documents, web browser files, zip archives, or any file type you like. These facilities are useful but, unlike competing software, miTracker lacks the ability to take a mugshot with your webcam.

Fortunately, it does have a locate facility that finds where the laptop is being used and displays it on a Google map. You could then pass this information on to the police (we don't recommend vigilantism).

You're better off using miTracker than nothing at all, and we like its encryption and



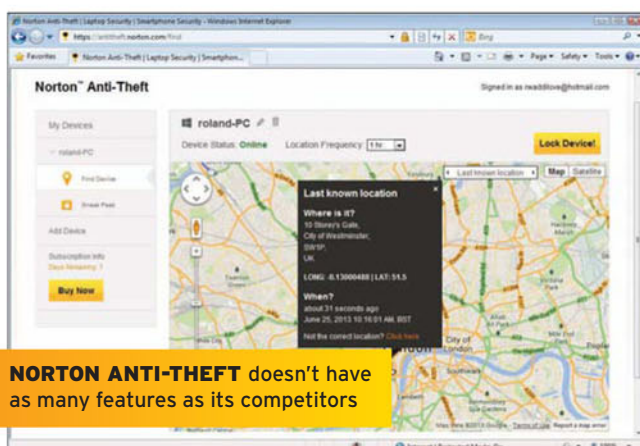
secure file-deletion features, plus its low price, but there are better services out there.

Conclusion

Find My iPhone and miTracker do not take photos with the laptop's webcam and can't show you who is using your PC. They are otherwise useful tools for locking your laptop and erasing files stored on its hard drive. Find My iPhone can be used only with Apple devices, and miTracker only with Windows laptops. The former is free, of course.

Norton takes photos and offers remote locking, but you can't remotely delete your personal files. Some people may worry the thief could find a way around the lock.

For these reasons we recommend either LoJack or Prey. Prey is free for up to three devices and you can easily test all its features, checking the location, grabbing desktop and webcam snapshots and so on; with the £33-per-year LoJack you instead put your faith in the company that it will find your laptop in the event that it is lost or stolen. Nevertheless, LoJack has a good reputation and plenty of happy customers. The choice is up to you. ☒



miTracker
mitracker.com
• £12/year



miTracker is a cheap option if you have only one laptop: three years cover will cost you just £26. It's available only for Windows, but the

Quick cash for your old phones

Selling your old gadgets can help you pay for exciting new toys. Martyn Casserly explains how to sell your old handsets



As your mobile phone contract comes to an end and you start eyeing up that new shiny handset, give a thought to what your trusty old smartphone could be worth. The same goes for other gadgets, of course. Tablets, e-readers, even laptops are regularly upgraded these days.

Perhaps you like to hold on to your old devices as a backup in case the new one goes wrong or hurls itself into a nearby cup of tea. The more munificent among you might pass them on to family members or friends who want a better smartphone, while a large chunk of people will simply put the old unit in a draw and forget about it. But you could be passing up the chance to cash in on a booming secondhand market.

With so many SIM-only deals offering brilliant value by removing the cost of a smartphone, people are regularly buying

used handsets. Selling your old phone or tablet should give you some cash that could help fund the purchase of a newer model or perhaps even a holiday.

You can sell directly on sites such as eBay and Gumtree, or use a 'we-buy-any-phone' service for a quick and easy transaction. Swap sites offer a chance to exchange your gadget for something else, most of the phone operators have now started trade-in deals, or you could donate the handset to charity.

To get the most money for your device, it's important to keep it in good condition. Cracked screens, scratched metalwork or water-damaged innards will reduce the amount anyone will pay for your used tech.

Thankfully, these things are easy to avoid: keep your smartphone in a case and use a screen protector. Sure, you might lose some of the slinky feel and hide the elegant design,

but at the end of your contract you'll be rewarded with more money from the sale than if you didn't look after your stuff.

Bear in mind that the sooner you sell your old handset the better, as the pace of change in technology means that devices quickly devalue. Remember to return your gadget back to its factory settings before you pop it in the post. This will erase any personal data, passwords and so on.

So let's explore the various options for selling tech gadgets, the pros and cons of each, and the prices you might expect to receive for smartphones in particular. We're using an iPhone 4S as an example here: a popular smartphone that's nearly two years old. Apple equipment tends to hold its value very well in the secondhand market, but Android, BlackBerry and Windows phones all fetch respectable sums.



Trade in your smartphone

Before you head off to the various websites listed below, check whether you can get a decent trade-in price. O2, Vodafone, Three and EE will all offer to buy your old unit at prices, so when you're negotiating your next upgrade be sure to ask them how much they would give you for your old phone.

eBay

One of the first places people look when buying secondhand tech is eBay. The auction site has been around since 1995 and has proven to be a great place to securely buy and sell new and used equipment.

Setting up an account is free and easy: head to ebay.co.uk and click Register. Fill in your details, and you can then list items for sale via the Sell menu. You'll need a picture of your device and will have to write a brief description, then specify at what price the auction should start and whether you want to place a reserve on the item, as well as your postage charges.

Be honest about the condition of your device and highlight any scratches or damage, preferably with a picture. It might lose you a few pounds, but many people won't mind a few nicks and scrapes provided they know about them up front. Include the box and accessories if you have them.

One of the ways eBay protects buyers is through its feedback system. For each item sold both seller and buyer are asked to rate the transaction. This results in a self-monitored community in which problem users are immediately flagged with a poor score.

This can be a disadvantage for new members who have no feedback rating. Some people will be reluctant to buy an expensive item from you without this peace of mind. One way to quickly build up your feedback is to buy several very cheap items, or you could simply use a friend's active eBay account to sell your handset.

eBay offers fixed-price and bidding auctions. The former can result in a quicker sale, but you may not make as much money if you undervalue your handset. The bidding



option is a traditional auction in which you set a start price and let people bid on the item until the listing ends (up to 10 days).

A good rule of thumb is to watch a few items similar to yours and see at what price they sell. If you like, you can also invite buyers to make a best offer.

We watched several iPhone 4S 16GB auctions and found most sold at around £210. Remember that eBay takes a 10 percent cut from the final value, and unless you take advantage of its free listing days it will also charge you to list the item. Prices here vary depending on how many pictures you use, your starting price and so on. Also note that if the payment is processed by eBay-owned PayPal, it will also take a small cut.

Make sure you set an appropriate postage cost in your listing, which includes insurance. If the buyer doesn't receive the item, through no fault of your own, you will still have to refund them. You'll need to claim on the insurance to get your money back.

Gumtree

Gumtree (gumtree.com) lets you place free classified ads to sell your items. Simply describe your device, attach a picture, set the price, then wait for an email or phone call from an interested buyer. It's a fast and easy way to trade.

You don't have the assurance of eBay's feedback rating system, so you'll need to

exercise more caution. We recently heard of one seller who was handed counterfeit money for their item, and didn't realise until too late. In such a scenario you can turn only to the police, so ensure that you inspect the money before parting with the goods.

When we checked Gumtree, the average asking price for the iPhone 4S 16GB was around £250. We don't know whether any devices sold at this price. Typically, buyers will haggle with sellers through Gumtree.

Get a guaranteed price

If you'd prefer to avoid directly selling your phone to someone, another option is to use one of the many 'we-buy-any-phone' services that have sprung up over the past few years.

With these you enter the make and model of your handset, the capacity, condition and network status (locked or unlocked), and are then told how much you can get for it. If you like the price and accept the offer, the service will pay out upon receipt of your handset - provided it is as described.

Prices here are lower than what you might receive on eBay or Gumtree, since the profit is shared, but sales are fast and hassle-free.

Examples include CashMyFone (cashmyfone.co.uk), FoneBank (fonebank.com), Mazuma (mazumamobile.com) and even Asda (tradein.asda.com). All these sites offered around £190 for our iPhone 4S 16GB, with slightly higher prices paid if you accepted payment in gift vouchers for sites such as Amazon or Argos.

Swap sites

If you have your eye on a particular gadget or item then you could always try a swap site such as Swapz (swapz.co.uk). Here you list your item with a picture, value and a brief description, but you also add what you would consider a fair swap. So your iPhone could be exchanged for, say, a DSLR camera worth a similar amount.

This can be a great way to be environmentally friendly as, in essence, you're both recycling and possibly getting a great bargain. Of course, it will be pot-luck whether you find a match, but as listings are free, you've nothing to lose.

Charity and Freecycle

Many charities now accept mobile phones, even broken ones, as donations. If you want to help raise money for various causes, organisations such as the British Red Cross (tinyurl.com/pofq57a), Oxfam (tinyurl.com/pczwou3) and Scope (tinyurl.com/ov32ve7) would be grateful for your generosity.

Don't forget, too, that if you're not interested in the money your local Freecycle (freecycle.org) group is a great way to clear your drawers of not just unwanted tech gadgets, but pretty much anything. ☑

Upgrade or buy new?

Mike Bedford helps you decide whether it's worth upgrading an old laptop or PC, or if you're better off buying a new one

If your PC or laptop is running out of steam, you might be better off upgrading it than buying a new one. We help you decide whether it's worth investing in more memory, an SSD or even a new processor, and how to go about the upgrade.



Constant obsolescence is the price we pay for using high-tech equipment. When a mobile phone no longer meets your needs, you simply sell it or give it away and buy another one (see page 94). With a PC or laptop, though, there's the possibility of giving it a new lease of life by upgrading it. What's more, the improved performance might meet your needs every bit as well as a brand-new PC, and you'll have saved plenty of money in the process.

For the most part, upgrading isn't as simple as shelling out for a new computer. First there's the question of which components you should replace. Then there's the issue of warranty, both on what remains of your original PC and on the new kit you're thinking of adding.

You also need to take a view on whether you feel competent to carry out the upgrade and, if so, how to proceed.

Only when you've got your head around these issues can you decide whether the financial saving represents good value. Here we address each of these issues to help you decide which solution is best for you.

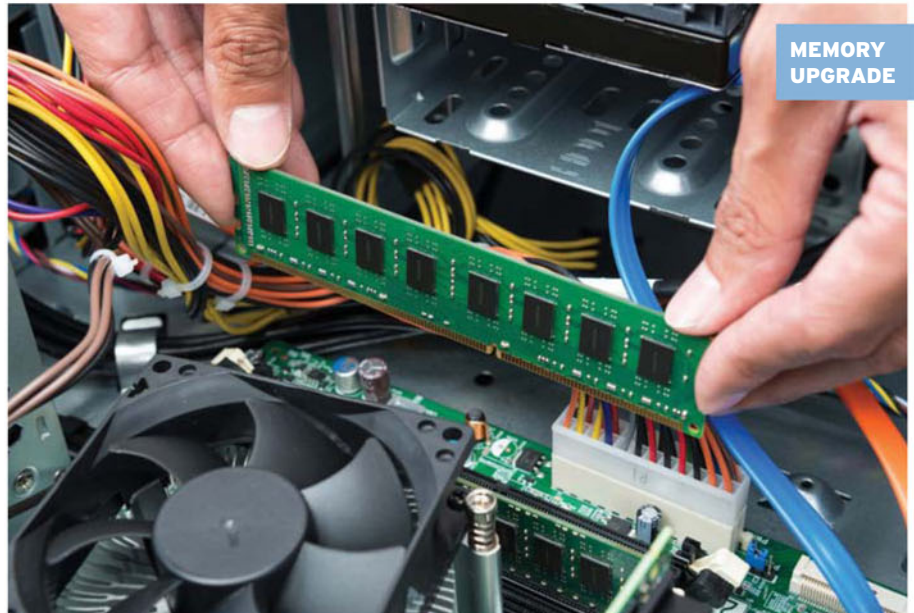
Identifying the weakest link

In a few cases it's perfectly obvious what part of a PC system needs upgrading. If, for example, you've run out of disk space, the solution is to add a second disk or replace the original with a larger-capacity disk. Similarly, if you fancy a larger screen, a better keyboard or a cordless mouse, your decision is already made.

The most common reason for considering an upgrade, though, is that your PC's performance is lacklustre. It might have been okay when you first bought it but, over the years, it has gradually become slower.

If you're using the same software but your PC has slowed down, it may just need a good spring clean. Plenty of tools can help you clean up the clutter, from Windows' built-in utilities such as Disk Defragmenter to third-party offerings such as CCleaner (tinyurl.com/ajxuxc8).

More drastically, you could reinstall Windows. In this case, you can restore



MEMORY UPGRADE

your system to its factory settings (all your files and programs will be removed), and you might not need to upgrade after all.

However, the slow-down might be because you're trying to run more demanding programs, which have a greater appetite for computing resources. In such a scenario you need to decide which component is the weakest link and hence the most likely candidate for an upgrade.

In the case of a general dissatisfaction with performance, the culprit could be the main processor, the graphics processor, the amount of memory, or even the hard disk. Working out which of these components is the bottleneck isn't always easy, but we can give you some pointers.

First, your application might give you a clue. Video- or audio editing and encoding, mathematical or scientific computing, and 3D rendering are all pretty demanding on the processor. If it's in gaming that your PC starts to show its age, and it can't run the latest games smoothly, upgrading the graphics processor may be beneficial. If your PC doesn't have a plug-in graphics card (which means it's using the built-in graphics chip), the obvious answer is to add one.

If you do a lot of multitasking, switching between applications, if you run virtual machines in VMware or VirtualBox, or you are serious about photo- or video editing, it could be insufficient system memory (RAM) letting you down.

Finally, if the pedestrian performance is more general, perhaps related to the time it takes your PC to boot and applications to load, a faster hard disk, perhaps a solid-state drive (SSD), might do the trick. In fact, an SSD is usually the best-value upgrade for both PCs and laptops, since it makes them much more responsive.

Another way of approaching this question is to compare the specification of your system with that of a typical modern PC. A degree of caution is called for here. After all, the chances are that all the components will look outdated, but it's clearly not sensible to upgrade everything. However, perhaps something stands out. For example, very few modern desktops are sold with less than 8GB of memory; if yours has just 2GB, that's quite a shortfall.

The other difficulty with this approach is deciding to which modern PC you should compare your machine. Start with a basic model, since you're unlikely to be able to upgrade an old system to the extent that its performance is on par with a brand-new top-end system.

The exception here is with gaming. You can install the best graphics card, which will make your PC perform as well as a new model, provided the other components are still okay.

Unfortunately, the same isn't true for laptops. In most cases you can upgrade a laptop's hard drive and memory only.

If you're drawn in the direction of a new processor, before going any further you need to consider one important fact: your motherboard might not be compatible with



STORAGE UPGRADE

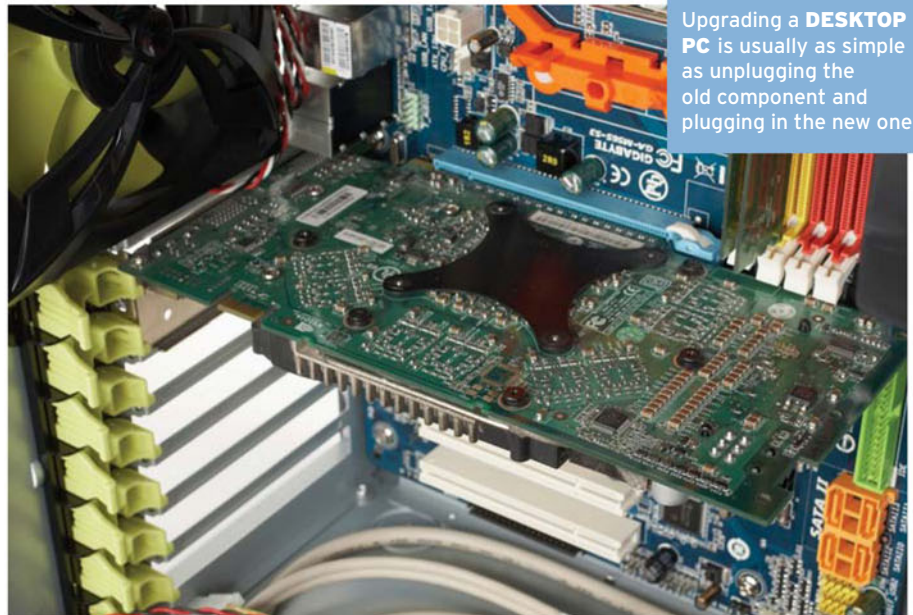
the latest models. It's vitally important, therefore, that you check the motherboard manual that came with your PC and the specification of the new processor, and ensure that the two are compatible. If they aren't, upgrading both the motherboard and the processor is rarely a cost-effective option.

Warranty implications

Upgrading might be cheaper than buying new but, depending on the warranty you get, first appearances can be deceptive. For example, if you're upgrading a two-year-old PC for which the warranty has just expired, it may work out more expensive than buying a new PC should something go wrong.

Even the warranty on your upgraded components might not be as good as you'd expect. A new PC is generally covered for one or two years, but the warranty on components is often less. What's more, some less reputable suppliers might suggest that the premature failure of a component is due to your lack of expertise in its installation.

If, on the other hand, you're thinking of upgrading a PC that is still covered by a warranty, you need to consider whether the act of upgrading the machine will render it void. Companies differ in their policies here: some may continue to offer a limited warranty, others may offer nothing at all. Don't take any chances – check with your PC supplier before deciding to upgrade and,



Upgrading a **DESKTOP PC** is usually as simple as unplugging the old component and plugging in the new one

Practicalities

We will provide some general upgrade guidance and help you to decide whether it is something you feel comfortable tackling yourself, but we're not going to explain step-by-step how to carry out an upgrade. The exact process will differ between models and the specific components you are upgrading. However, you can find our extensive selection of upgrade guides at pcadvisor.co.uk/how-to/pc-components.

inside the system case. You usually need nothing more than a standard Phillips-head screwdriver to carry out the task.

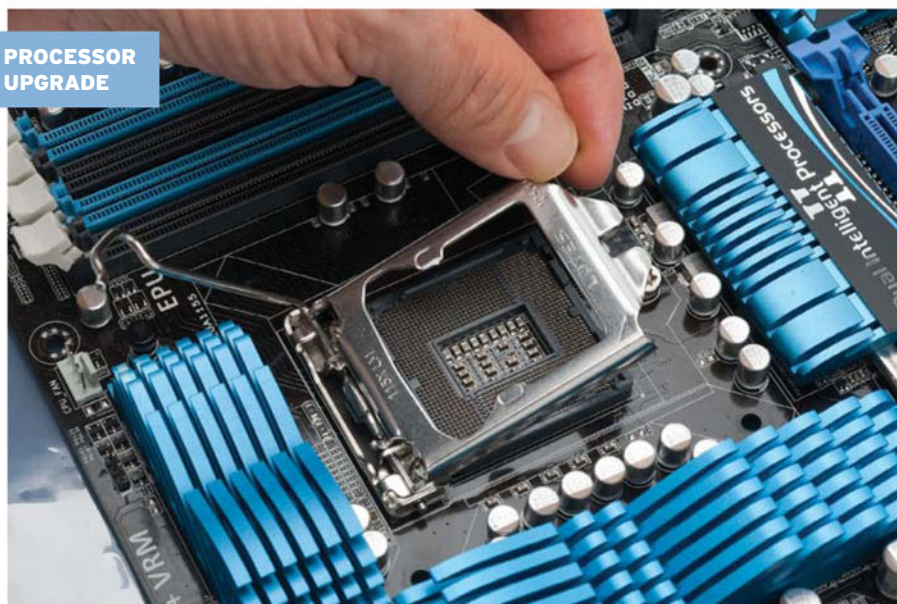
To upgrade a desktop PC you would typically remove the side panel, unplug the component you're upgrading and plug the new one in its place, then replace the case panel. With a laptop, components such as hard disks and memory modules can usually be replaced after removing a small cover, usually on the bottom of the case.

The only thing that could potentially go disastrously wrong is damage caused by static discharge to the components inside your PC or those you're adding.

Electronic components can be damaged by static electricity: our bodies are often charged with static without us knowing it. The solution is simple: never touch the electrical connections, such as the gold-plated contact on a memory module or the metal parts of the socket into which you're going to plug it.

Instead hold memory modules, processors, graphics cards and the like by their edges. As an extra precaution, discharge yourself before you take a component out of its protective anti-static bag by touching the rear metal panel of a desktop PC, while it's still plugged in and therefore earthed. Touching any bare metal plumbing, such as the inlet or outlet of a central heating radiator, will have the same effect.

If you decide that upgrading your system makes sense, but you're reluctant to try your hand at it yourself, you could take your machine to a local PC shop. While the components might not be as cheap as if you had bought them online, these small businesses will often install them for a very reasonable fee. You'd also get the peace of mind of seeing your upgraded PC in full working order before you took it home. ☑



PROCESSOR UPGRADE

in the event that you're told it's okay to go ahead, make sure you get it in writing.

It can be tricky to work out what a warranty on a new computer is worth compared to the upfront savings if you choose to upgrade your existing machine but, by now, you should be in a position to decide which option makes more sense. Don't forget, you can raise some cash by selling your old computer.

Naturally, we're talking about internal upgrades to either a desktop PC or a laptop, since replacing an external component such as a keyboard or mouse involves nothing more than plugging it in and, occasionally, installing a driver.

If you've never upgraded a computer, don't let that put you off. Most upgrades aren't difficult, even though some people are understandably nervous about delving

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JIM
MARTIN**Tech
Help**

Expert advice

These days we're not only taking more photos than ever, but videos too. Although the days of the unedited 90-minute home video are largely over, even the short clips you take on your smartphone are much too large to attach to an email. On page 116 we outline the best ways to share videos with friends and family.

If you have an Android device, Google Keep app is ideal for capturing whatever's on your mind. It's a bit like Evernote: you can write notes, lists and attach photos. There's also a web app for Google Chrome users. Find out how to get started on page 112.

Windows 8 has proven more controversial than just about any previous version. If you've bought a new PC or laptop and just can't get on with it, we show you how to downgrade to Windows 7 on page 108. Similarly, if you've upgraded to Internet Explorer 10, but wished you hadn't, you'll find out how to turn back time in *Helproom* (page 102).

If you need to edit an audio file - perhaps you're recording a podcast or merely trying to improve the sound quality in a home video - Audacity is one of the best free programs. We show you how to use it on page 114.

Finally, on page 110 we explain how to use Toggl. This simple time-tracking tool not only lets you see which tasks consume your time, but it can also create timesheets for invoices.

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QUICK TIP: START WINDOWS 8 IN START MODE

Windows 8 detects when there's a problem and automatically enters a new Recovery Mode. However, if you need to access Safe mode, try these tips:

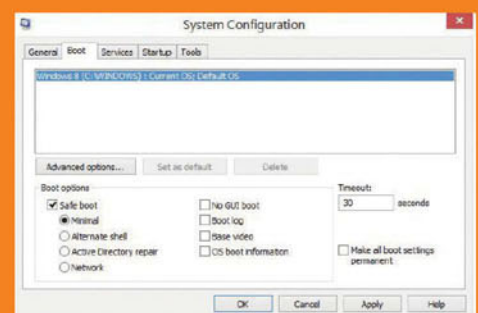
If you're able to boot Windows normally, go to the Start screen and type **msconfig**. Launch System Configuration, then select the Boot tab. Enable Safe boot, then click Ok. Hit Restart.

There is a much easier way, however. From the Windows 8 login screen choose

Restart and hold down the Shift key. You will be presented with various troubleshooting options, from which you can select to boot into Safe mode.

(If you are already logged in, hit Ctrl, Alt, Del to bring up the selection screen, then choose Logout, Restart.)

If you can't boot into Windows normally, your only hope is to use the Recovery Mode... or reinstall Windows and restore your files. ☒





YOUR QUESTIONS ANSWERED

Expert computing advice

We tackle readers' hardware and software conundrums

SPLITTING A PDF FOR FREE

Q I have a large multi-page PDF file from which I would like to email a single page to my friend. Is there a way I can extract just the page I want without having to buy any expensive software?

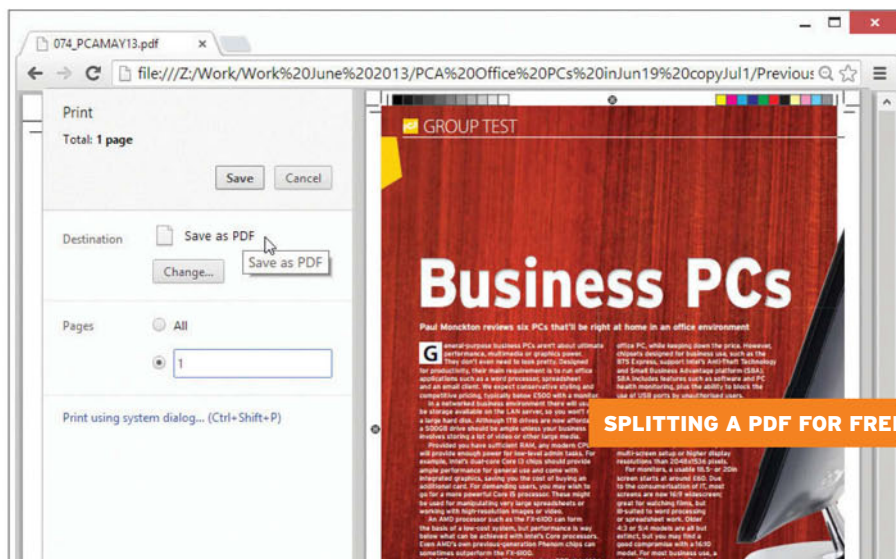
Yes there is. You can do this using Google's free Chrome web browser. If you don't have it already, go to www.google.com/chrome and click the 'Download Chrome' button.

Once installed, launch it and navigate to your PDF file's location in Windows Explorer. Now drag and drop your PDF file's icon onto the Chrome window. The file should open within Google's browser.

Move your cursor to the bottom right of the Chrome window, using your mouse. A row of buttons should then appear. Click the button with the printer icon, as though you're going to print the document.

Here you should see an entry marked 'Destination', probably with your default printer already selected (if you have one). Click the 'Change' button and select 'Save as PDF' from the list of Local Destinations.

Now you can choose which pages you want to save by filling in the box in the 'Pages' section of the Print dialog. You can select individual pages, separated by commas or ranges of pages such as '1-3' to print the first three pages. You can



SPLITTING A PDF FOR FREE

mix individual pages and ranges to make a more complex selection.

Now click the 'Save' button at the top of the page. You'll be presented with a standard Save dialog box in which you can type a filename and choose where to save your file. This will contain only the pages you selected from the original document.

The built-in Chrome PDF Viewer can't deal with some rare kinds of PDF file, though, so this method will work with most, but not all, PDF files. It's also possible to

disable the Chrome PDF Viewer, in which case you will need to re-enable it.

To do this, go to the address bar and type: **chrome://plugins**. This will display a list of installed plug-ins. Scroll down until you find 'Chrome PDF Viewer' and make sure it's enabled. If it is, there'll be a link to disable it. However if it's disabled, a link will be provided to enable it.

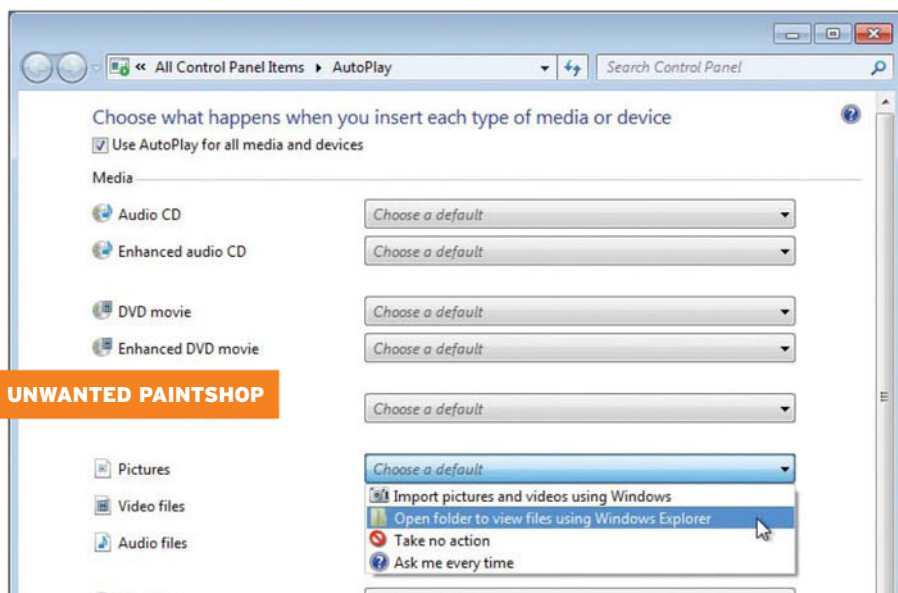
In the next issue, we'll cover editing PDFs in considerably more detail.

UNWANTED PAINTSHOP

Q Every time I insert a flash drive into my laptop, PaintShop Pro launches. How can I stop this from happening? I'm using Windows 7 and have a large number of Jpeg files on the flash drive.

Windows can be configured to take various different actions when devices such as USB flash drives are inserted. When no default action has been set, Windows will ask you how you would like it to handle the contents of your drive, but once a default action has been selected - such as opening PaintShop Pro - it will continue to perform this every time without asking.

To change this behaviour, insert your flash drive and close down PaintShop Pro when it opens. Now go to the Windows Start menu and in the search box type: **AutoPlay**. This should display 'Change default settings



UNWANTED PAINTSHOP



for media or devices' in the search results. Click on it to bring up the AutoPlay options.

Now look for the entry marked 'Pictures', click on the pull-down menu to the right and select an appropriate action to be taken when you insert a drive containing images. If you just want to open the drive to access the files, select 'Open folder to view files using Windows Explorer'. Alternatively, you can select 'Ask me every time', in which case Windows will display a list of appropriate options every time you insert the flash drive.

You can set up different default options for different types of file. By selecting 'Video files', 'Audio files' or any of the other Media options, you can choose what you would like Windows to do when encountering files of each type on any inserted media.

MONITOR SPLITTING PROBLEM

Q I've recently attached a splitter cable to my PC's display output socket and connected up both a monitor and TV to it. My computer has an Intel HD graphics chip with 1760MB of RAM. I now have two problems. First, my display flickers with rapid white 'pulsations' running up and down the

MONITOR SPLITTING PROBLEM



image. Secondly, I have to plug the television into the splitter first, followed by the monitor, otherwise my PC's desktop won't fit the TV screen properly. Could you recommend a way of not having to plug things in separately, and also how to stop the flickering?

Using a monitor splitter cable is far from ideal, although we appreciate that if you have only one display output on your PC, you may have no choice. From your description of your computer's graphics capabilities, it's likely that you're using a

relatively recent Intel processor, such as a Core i5. Such systems often offer more than one monitor connector, although they may not be of the same type.

You may, for example, find a VGA connector and an HDMI connector, or perhaps a DVI port. If this is the case, you should be able to connect one port to your computer and the other to your TV (preferably using the HDMI connector). You can then configure your PC to use different resolutions on each display if you wish, or you can configure it to 'clone' the display onto your TV, thereby displaying the same image on each.

The advantage of doing this is that the computer can configure each connection individually to suit the specifications of the attached display. With a splitter cable, you'll be sending exactly the same video signals to both, despite differing requirements from each. This is why you are having problems with flickering and images not fitting correctly on the screen.

The order in which you connect the screens to your splitter is also important, as your computer is configuring the graphics according to the specifications of the display connected first.

Continues >>

DOWNGRADE TO INTERNET EXPLORER 9 IN WINDOWS 7

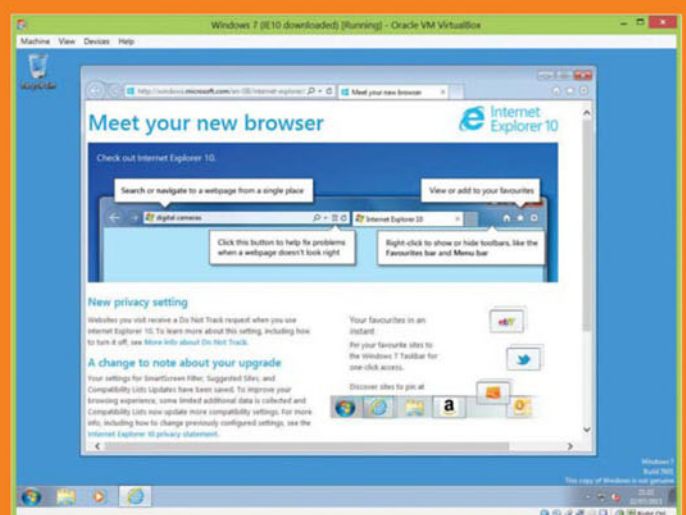
Some users have experienced problems with Internet Explorer 10, but removing it isn't as straightforward as installing it. Since it's installed as an update, you'll need to go to the Start menu and type 'Programs and Features' in the search box. This will then appear in the results. Click on this option and you'll be taken to the relevant section of the Windows control panel.

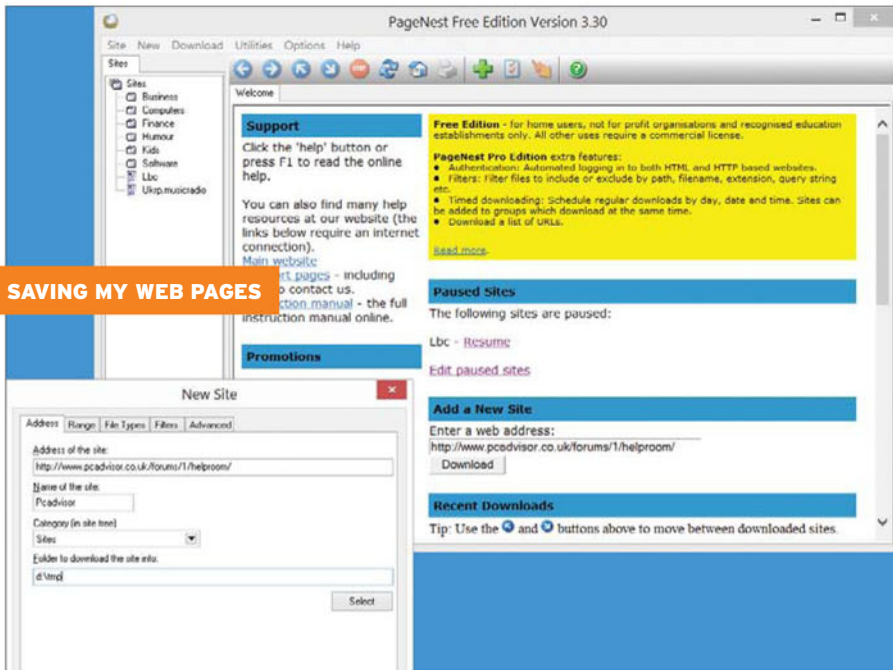
From here, click on 'View installed updates'. IE10 should appear here, though, you may need to scroll to find it. Right-click on 'Windows Internet Explorer 10' and select 'Uninstall'. You'll be prompted to restart your computer - your PC will have reverted to Internet Explorer 9.

If you're comfortable using the Windows command line, you can achieve the same effect by opening up an Administrative command prompt and typing the following command:

wusa /uninstall /kb:2718695 /quiet /forcerestart

This will run the same procedure in the background and then restart the PC automatically. If you don't want your computer to restart, you can use **/norestart** instead.





You don't say whether you're using a desktop PC or a laptop, but if it's the former and you don't have multiple display connections, we recommend buying a low-cost plug-in graphics card with at least two display outputs.

You won't need anything fancy, just a relatively up-to-date entry-level AMD or nVidia card will fit the bill (this should give you plenty of change from £50). Unless you want to upgrade your PC to play the latest games, steer clear of more powerful (and expensive) graphics cards, as these require additional power connectors and often come with cooling fans which will make your PC noisier.

SAVING MY WEB PAGES

Q I have a lot of writing that I typed directly into a website, run by a friend, which is now closing down. What's the best way to preserve my work, preferably to transfer it to somewhere else on the internet and without having to pay?

Most browsers offer a simple way of saving the content of a web page to a copy on your local hard drive. For example, if you're using Internet Explorer, you can press Ctrl-S to bring up a 'Save Webpage' box. From here, you can select a folder on your local hard drive in which to save your page. For safety's sake, we suggest selecting 'Webpage, complete' as the file type.

This will create a file on your local hard drive on which you can click to open it in your browser. It will also produce a folder of associated files, such as images and scripts that may have been part of the page behind the scenes. This folder should be kept

together with your downloaded file. You can do this for each page containing your writing, creating a local backup of your work.

Alternatively, you could use a program such as PageNest from pagenest.com, to save an entire website locally. This could be useful if your work is spread across many pages and you can't easily locate them all.

Finally, you say the website is run by a friend. If so, your friend should have access to all the website data, and may be able to back it up for you and provide you with your content directly.

GOING COMPLETELY WIRELESS

Q My PC is on its last legs, so I need to buy another and want one without all the wires. Is there a reasonably priced model from a well-known brand? What should I look for? What, if any, are the pitfalls? I already have a wireless printer and mouse, but how can I get rid of the rest of the wires, such as the one connecting the monitor and the network?

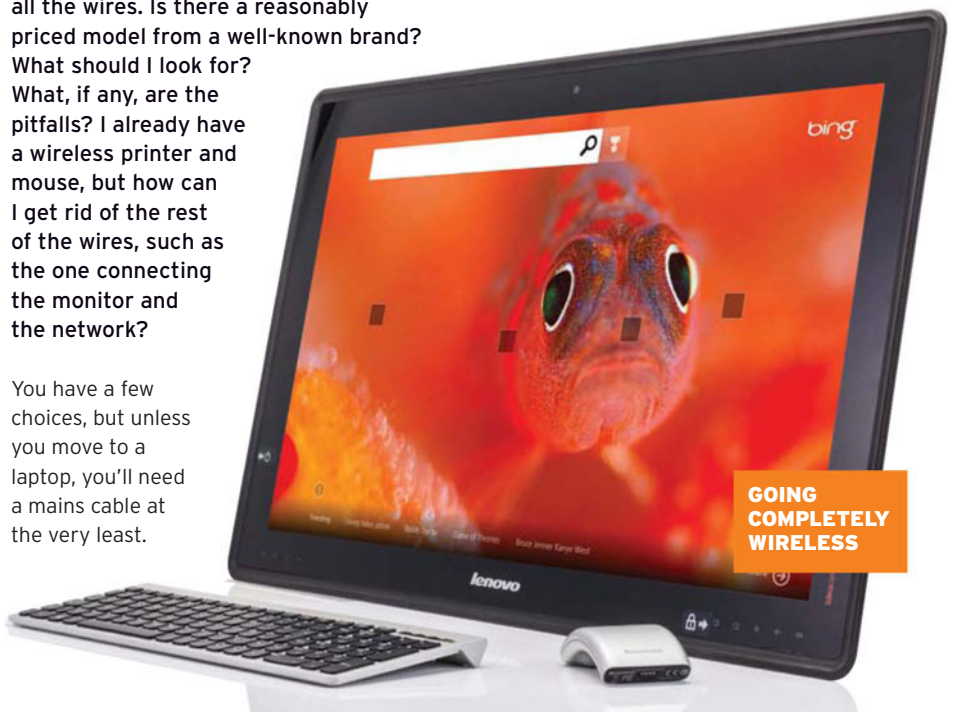
You have a few choices, but unless you move to a laptop, you'll need a mains cable at the very least.

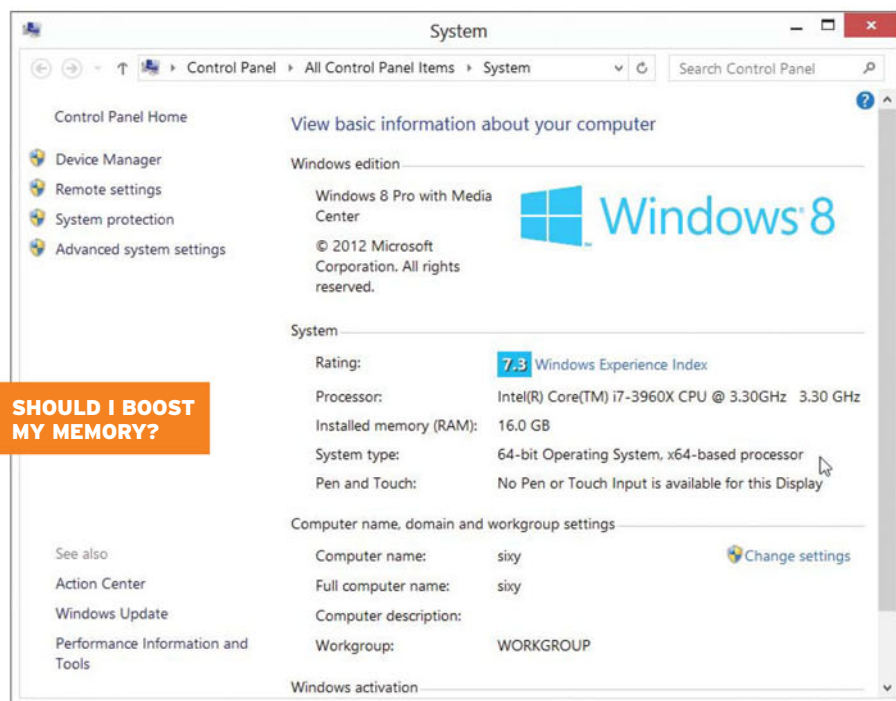
These days many PCs come with built-in wireless networking and can be supplied with a wireless keyboard. You say you have a wireless mouse already, but it may be better to get rid of that and go for a new wireless keyboard and mouse combo, as it will simplify setup and cut down on the number of wireless receivers required on the computer. To make use of wireless networking, you'll need to have a wireless router installed, so you can connect over Wi-Fi. Your wireless printer will most likely already be connected using this router (unless you never set it up and use a USB cable instead). If you don't have a wireless router they are relatively inexpensive.

If you want to keep your monitor, then you're going to have to keep its wires too - both the mains cable and the PC connecting cable will remain, although you should be able to tuck these out of sight.

If you're not too attached to your old monitor, we suggest going for an All-in-One PC, such as a Lenovo IdeaCentre. All-in-Ones fit the computer's internals into the same physical box as the monitor, so no connecting cable is necessary and the whole device can be powered by a single mains cable, which will become the only external 'wire' required by your PC. All-in-Ones also tend to be considerably more stylish than traditional desktop models and take up much less space.

There are, however, some pitfalls to all-in-ones, including being difficult, if not impossible to upgrade, plus the fact that you can't upgrade the monitor separately from the computer. They also tend not to offer video inputs, so you can't use the monitor for your Xbox or DVD player as you can with most PC monitors.





There are a few drawbacks involved with going wireless, too. A wireless network connection, for example, can be less reliable than a wired one, slower and prone to interference from other wireless equipment. Also, wireless peripherals such as keyboards and mice require battery power to operate, and these batteries will eventually have to be recharged or replaced. Make sure you always have a spare set ready.

SHOULD I BOOST MY MEMORY?

Q Would doubling the RAM from 4GB to 8GB on a PC with an Intel G630 processor, H61 motherboard and running

Windows 8 have a material effect on performance and speed up browsing?

Based on the information you've supplied, the short answer is 'maybe'. First, it's important to check which version of Windows 8 you're running. You'll need a 64-bit version to take advantage of more than 4GB of RAM, which is the limit for the 32-bit editions. (In fact, 32-bit Windows is limited to accessing 3.2GB of that 4GB)

Hold down the Windows key, and press the pause key to bring up the System Properties box (or navigate to 'System' via the Control Panel). In the section marked

'System', under 'System type' it will specify either a 32-bit or 64-bit operating system.

If it's 64-bit, then you should be able to increase your system RAM beyond 4GB. Note that, depending on the number of memory slots in your PC and the capacity of any installed chips, you may have to remove and replace your existing memory chips rather than adding to them.

If you're adding extra memory chips, try to buy exactly the same type as the ones already installed to avoid possible issues with timing differences between sticks of RAM. If you're not sure about matching the memory, it's best to replace the existing 4GB - RAM is fairly cheap these days.

Whether the extra memory will make a noticeable difference will depend on how you use your computer and if you have run many applications simultaneously. Adding extra memory will certainly allow your PC to cope much better when multiple browser tabs are open at the same time. At the time of writing we're using a PC running the Google Chrome browser, which is currently using over 3GB of RAM all by itself.

When your computer runs out of available RAM, it starts using the hard drive instead. This is much, much slower than RAM and will cause your PC to slow down. It's likely that heavy use of a web browser will push overall memory requirements beyond your available 4GB, so increasing this to 8GB will prevent such slow-downs.

However, if you're very much a one-tab-at-a-time person, you may notice less of an improvement. You may find that you start to change the way you use your PC after the upgrade as it will be able to cope with much heavier use without starting to struggle.

Continues >>

TECH JARGON BUSTER

3D PRINTING: Put simply, a 3D printer is a device that prints three-dimensional objects rather than flat images onto sheets of paper. The designs for the 3D objects are stored in modelling software on a computer and can be created from scratch or input via a 3D scanner. Various technologies exist, but all currently construct models by printing layers of material, one on top of the other, which are fused together during the process.

VPN: A virtual private network, or VPN, allows you to extend a private network across a public network - usually the internet. To the end user, it will appear as though their device is connected directly to the private network in the remote location. A VPN is often used in

business environments where remote workers require secure access to the corporate network. Because the local device appears to be connected to the remote network, VPN can also be used to circumvent local restrictions such as firewalls and the blocking of certain traffic.

INSTAGRAM: Instagram is an online service for capturing and sharing photos and video. It was acquired by Facebook in 2012 and runs primarily as an app on iOS and Android devices and, as of February 2013, serves over 100 million active users. A variety of simple graphical filters are available to enhance users' photos with various effects, and pictures can be tagged and hashtagged to allow searching by other users. The service

provides integration with other social networking services where its trademark square-format pictures can be shared and users can be 'followed' in a similar style to Twitter.

HASHTAG: A hashtag is a word, phrase or just a collection of letters preceded by a hash (#) symbol. It's a way of creating a label that people can use to refer to the same thing. The # means 'this is a tag' and enables other users to search for content marked with the same label by searching for the same hashtag. Although they've been around for many years, it's their use on Twitter that has pushed them further into mainstream use. They are also used on services such as Instagram and Facebook.



Bear in mind that upgrading your hard disk to an SSD is likely to provide a bigger performance increase. See tinyurl.com/nuaf4nv for a step-by-step guide.

HORRIBLE SCREEN COLOURS

Q I've just bought a very old but serviceable monitor. It works fine except for the colour balance. When I connect it to my computer via the VGA port, whatever appears on the screen has a marked greenish-yellow tinge, which is quite different from that on my primary monitor. How can I improve the colour balance?

It's possible that you have a defective VGA cable, but this problem is more likely to be down to age. As monitors get old, their colour reproduction can shift considerably. Over time 'white' images will gradually become more yellow as you have described.

You may be able to tweak the colours by entering the monitor's control menus and searching for the colour adjustment section. Here, look for a colour mode called 'user' or 'custom'. You should find individual adjustments for the red, green and blue colour channels. Try boosting the blue component a little or, if it's already at maximum, you can try reducing both red and green.

If you have, or can borrow, a hardware monitor calibrator, you can use it to calibrate your old monitor and bring it as close as possible to the correct colours. However, the colour reproduction will never be as good as a new model as there are certain blue-ish colours your monitor is unable to display, regardless of any tweaking. If you're just using it for a bit of word processing, then this may not matter to you, but you'd be better off buying a new monitor if colour accuracy is important to you. ☒

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.

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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.

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Downgrade Windows 8

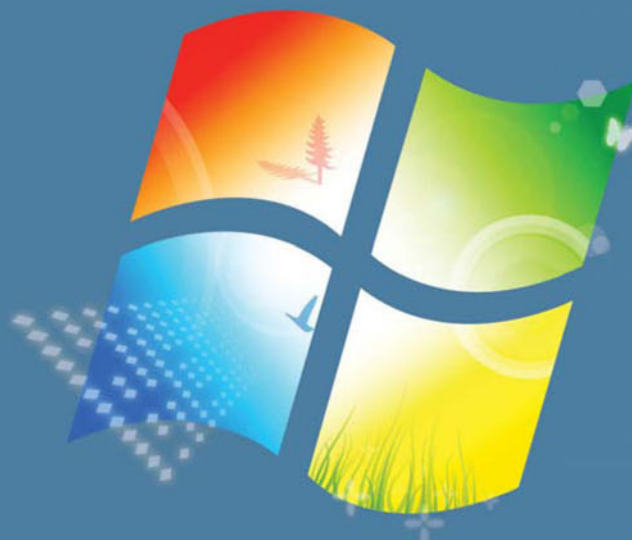


Windows 8 not everything you hoped for? Matt Egan explains how to install Windows 7 on to a PC or laptop that came with Windows 8

It's relatively straightforward to downgrade from Windows 8 Pro to Windows 7, but if you are using plain Windows 8 you'll need to buy and install a Windows 7 key. That's not a cheap option, but Microsoft doesn't offer downgrade rights with the consumer version of Windows 8. It's Windows 8 Pro or bust, in this respect.

Other restrictions include the fact that you can downgrade Windows 8 Pro only to Windows 7 Pro or Windows Vista Business. (In essence Microsoft understands why businesses with a fleet of Windows 7 PCs may wish to downgrade new PCs so that all their systems use the same OS, but it doesn't want to make it easy for consumers to downgrade.)

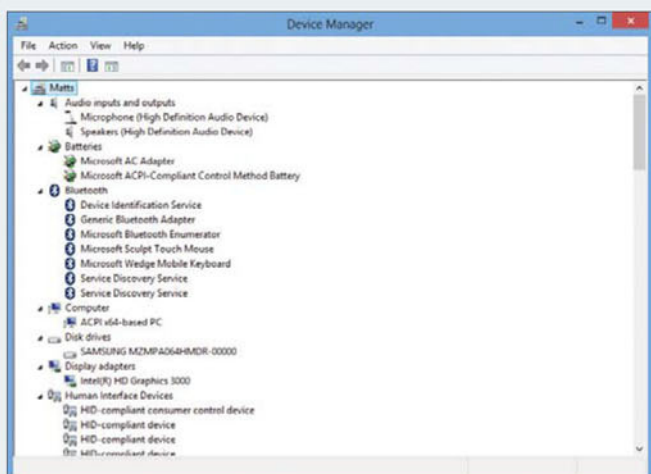
Here we explain how to downgrade from Windows 8 Pro to Windows 7 Professional. To downgrade a consumer Windows 8



PC you must buy a Windows 7 DVD, but otherwise the steps are identical. Of course, if you are a consumer and you buy a Windows 7 DVD you may choose instead to install Windows 7 on a partition and retain Windows 8.

Before you start

You'll need a Windows 7 installation disc. You can buy it, but with downgrade rights you just need a Windows 7 DVD or USB stick and your Windows 8 Pro activation key. If you're moving from Windows 8 Pro to Windows 7 Professional you won't need a new licence key, but you will have to call Microsoft to obtain a single-use activation code after Windows 7 is installed -



attempting to activate Windows 7 online will bring up a local Activation Support phone number.

You also need to make sure you have all the important drivers. In Windows 8 open the Device Manager (hit Windows and X, then choose Device Manager). Now expand each device until there's a list of all the components, then write them down or take screenshots. You need the manufacturer and model numbers for everything, but the three most critical components are display adaptor, network adaptor and pointing device (if you use anything other than an ordinary mouse).

Now you need drivers for every component. Search on the web for the support pages of each component (or visit your PC maker's site) and download them. Store them on a USB drive.

Next you need to back up all the software you have installed on your PC. The chances are that you haven't installed much, given that you wish to downgrade a PC that is, presumably, new. Also remember to back up all your files. The downgrade is destructive - you'll lose everything on your PC.

You want to have all your files stored externally, as well as the discs and codes for all your software. And remember that you won't be able to install Windows 8 apps in Windows 7. You'll also need a Windows 7 disc and an activation key.

The install

Boot your PC from the Windows 7 disc - you will probably have to pop the disc in the drive and hit a key during the boot up process.

That's all the heavy-lifting done. The Windows 7 installer will ask you for details such as your geographical location. Follow the prompts. The system will reboot several times until Windows 7 is installed on your machine.

Now you need to reinstall all the drivers you stored on the USB or CD. Then reinstall the software you set aside, and load up your files. You now have a Windows 7 PC. ☑



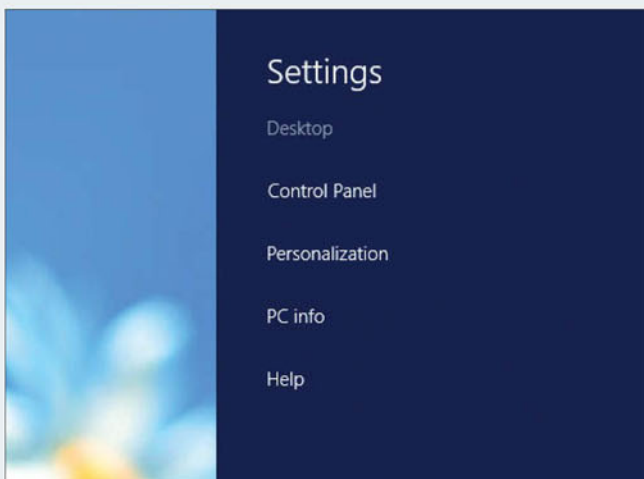
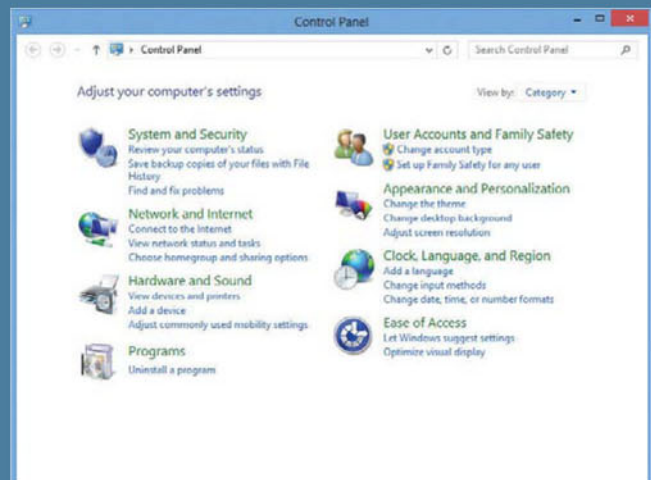
Change your PC settings



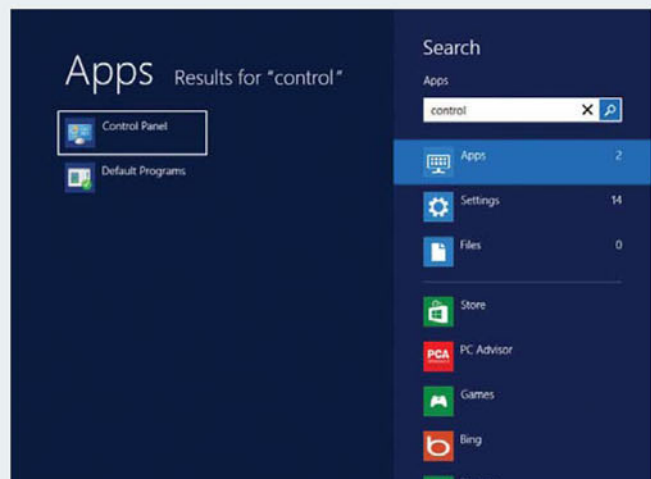
If you're getting a bit lost in Windows 8, Chris Martin explains how to find and open the Control Panel and PC settings on your PC, laptop or tablet

Finding your way around Windows 8 can be confusing for new users. For example, there are a number of ways to find and change your PC settings. Here we explain how to access the Control Panel and new PC Settings.

PC Settings is a new section of Windows 8, in which you can personalise your working environment, set up notifications, control your user account and more. You can also use the traditional Control Panel as with previous versions of Windows.



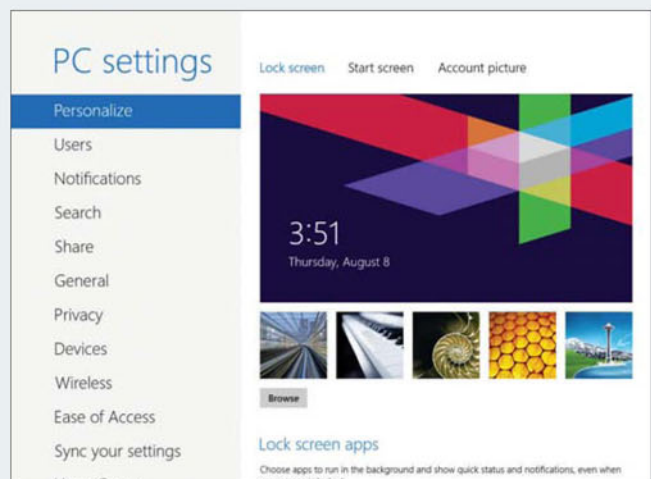
1 From the Start screen choose the Desktop tile to open the traditional Windows environment. Drag in from the right side of the screen or move your mouse into the top right corner to open the Charms bar. Click Settings, then Control Panel.



2 A quicker way to find and open the Control Panel is to search for it: simply start typing Control Panel within the Modern UI, or open the Charms bar and choose Search. You can then select Control Panel from the search results.



3 Windows 8 also includes a new PC Settings menu, which you can access from either the traditional desktop environment or the Modern UI. Open the Charms bar, then choose Settings. Now click 'Change PC Settings'.



4 Various options are available here, including the ability to personalise your lock screen, start screen and account picture, add user accounts, toggle on or off app notifications, and set up sharing and privacy preferences. ☒

Track tasks with Toggl

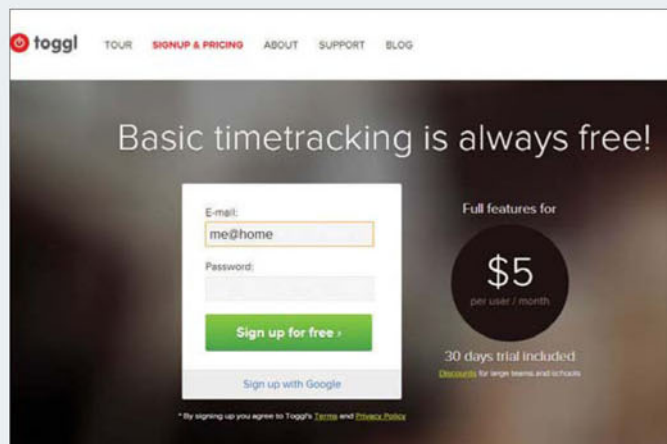


Toggl lets you record how long you spend on tasks and produce reports so you can bill customers. Roland Waddilove shows you how to get started

Do you sometimes wonder where all your time has gone? Do you complete every task? Do some jobs take longer than expected? Toggl can tell you all this information.

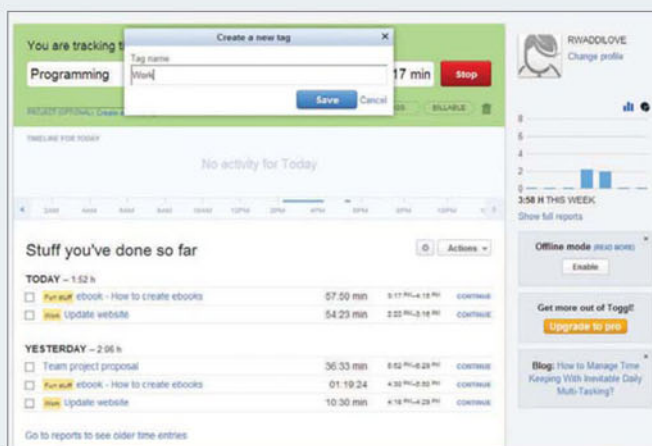
The Toggl website, desktop program and smartphone app can record all the tasks you do. These can be started, stopped and continued later, so every time you check your email, you can record them. Tasks can also be assigned to projects and tags used to label them. Daily, weekly and monthly reports show where your time was spent.

We look at the free plan here, but with the paid-for option you can invoice people for the time spent on jobs, too.

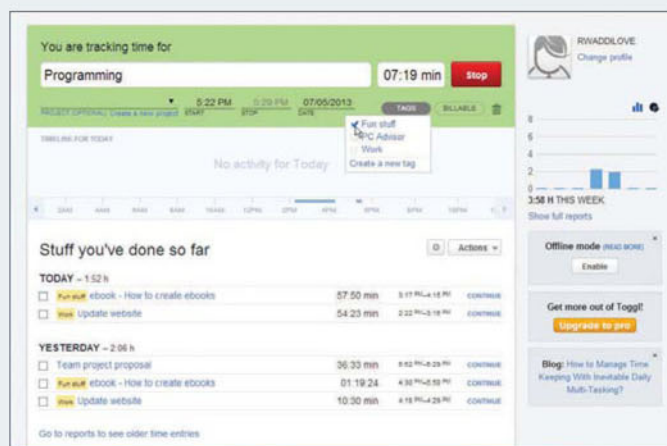


START

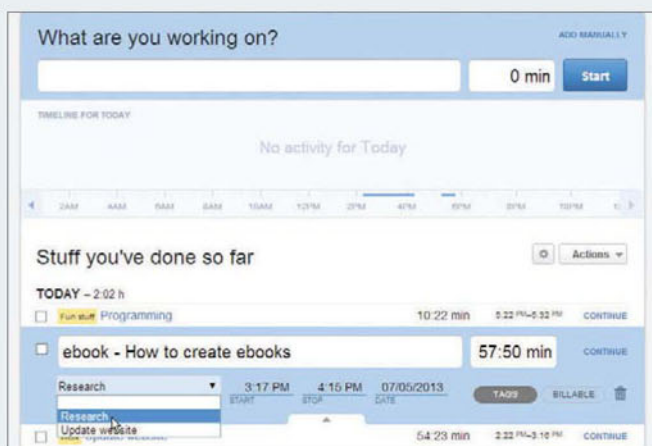
Go to toggl.com and it immediately starts timing you. Ignore this and click the Sign up button on the home page. Use the option to sign up for free. Enter your email address and think of a suitable password. There's no need to pay.



4 A couple of days later, you'll be able to see how Toggl lists the tasks you've worked on, showing today, yesterday, and so on. Click Tags under the task at the top and then 'Create a new tag'. Create tags for work, personal or whatever you need.

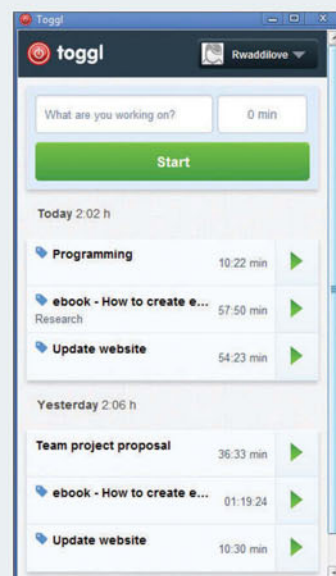


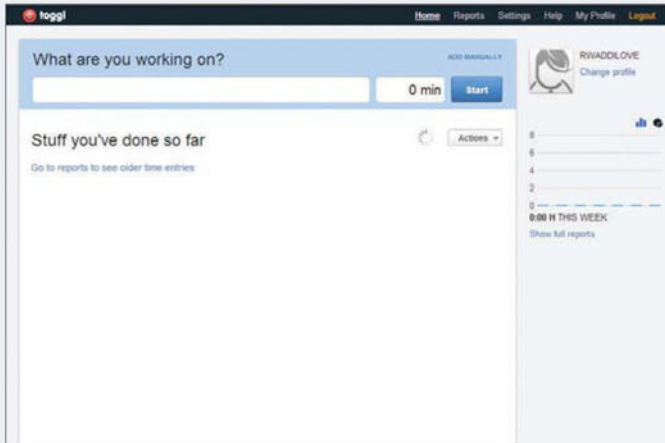
5 Tags are a bit like labels in Google Mail and you can see them in the task list below. They are useful for organising work. There's a Billable button so you can assign tasks to customers or clients, but only in the paid Toggl plan.



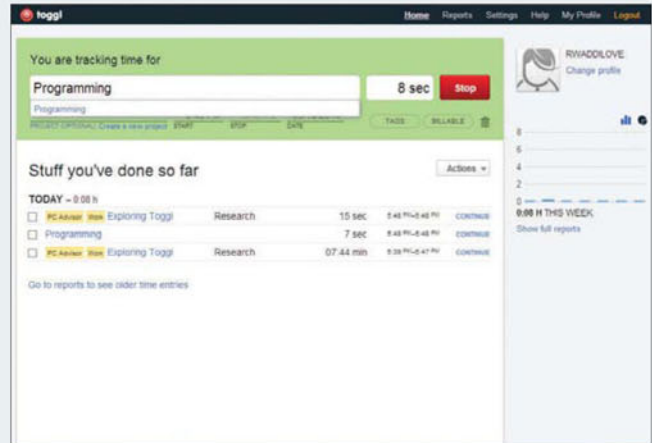
8 Click Home at the top to return to the home screen. Click in a task and it will open up so you can edit it. A task can be assigned to a project that you created earlier. There's a Continue link and a trash can if you want to delete it.

9 The website must be used to access advanced features like reports, but for creating and recording tasks there's a desktop app that can be downloaded and installed on all your computers. It automatically syncs everything with the website.

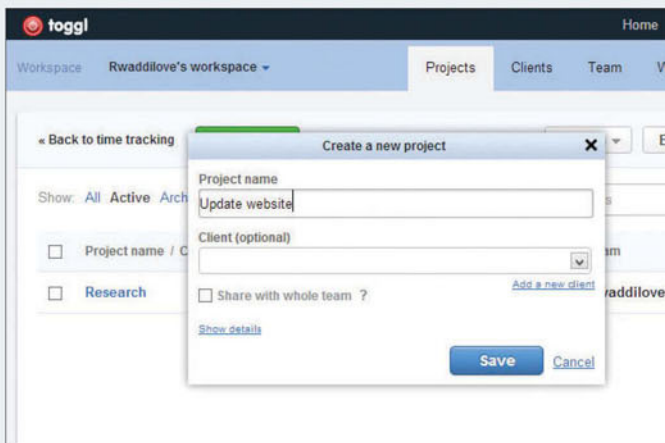




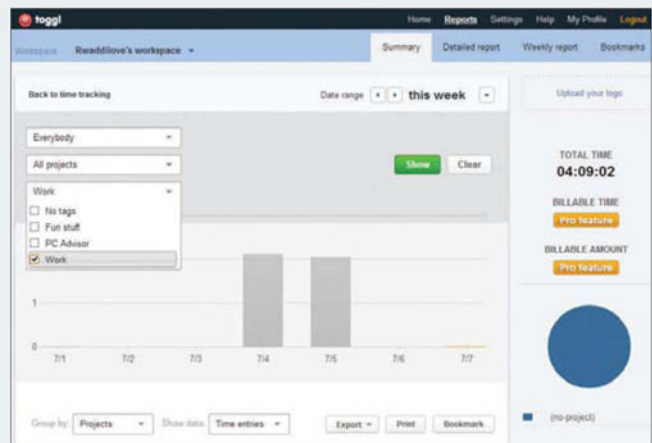
2 The browser looks like this when you first sign up and it's mostly blank. The main part of the screen asks: "What are you working on?" Below this is a large area for 'Stuff you have done so far'. Click in the box and enter your current task.



3 When you add a task and click the Start button, Toggl starts a timer. Clicking the Stop button stops it. Tasks are added to the 'Stuff you've done so far' list, and Continue links enable you to carry on with tasks previously worked on.

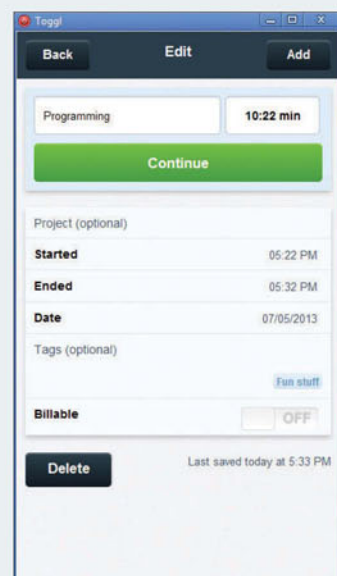


6 In addition to tags, you can also create projects with one or more team members. Click Settings at the top and then select the Projects tab. Click New Project. Most of the features in this section are ones you'll need to pay for, though.

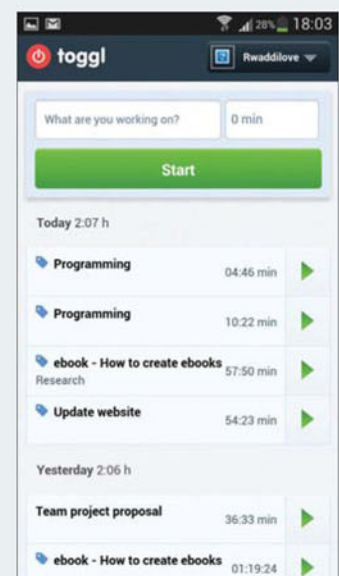


7 Click Reports at the top to go to this screen, which shows you exactly where you've spent all your time. Select the date range at the top right, then the tags to view on the left and the chart will show your activities.

10 You can create a new task or click an existing one to continue it. The timer starts and the time spent on it is added to the total time for that task. Click Tags to add tags and there's a Billable button for Pro users to track costs.



11 A great feature of Toggl is that it runs everywhere and even if you are on the move and have only your smartphone, you can still record tasks. Here's Toggl running on a Samsung Galaxy S4. You can create tasks, start and stop them, and so on. ☑



Stay organised



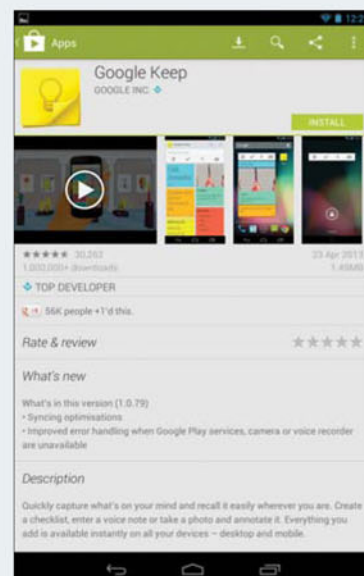
Martyn Casserly looks at how to use Keep, Google's note-taking app, which allows Android users to make notes and sync them to their Google Drive account

Note-taking apps are a handy addition to a mobile phone. We may all be big fans of Moleskine notebooks here at PC Advisor, but it isn't always practical to have one in your pocket. And, even if you do there's no guarantee you'll have a pen with you.

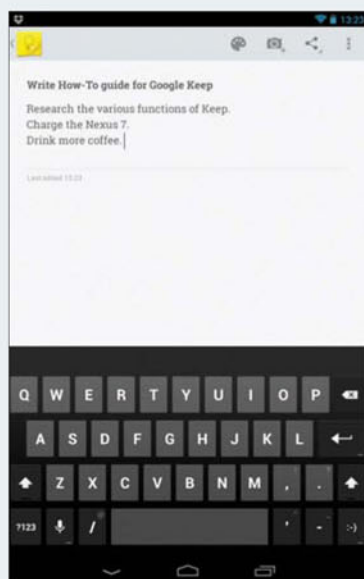
A smartphone, of course, is pretty much always with you, and has the added advantage of audio and photo capabilities with which to record your thoughts. Google's new Keep app is a simple, fast way to create notes of various types, organise them, and sync your creations directly with Google Drive on your desktop. In this guide we'll show you how to get started with Keep, and the different things it has to offer.

START

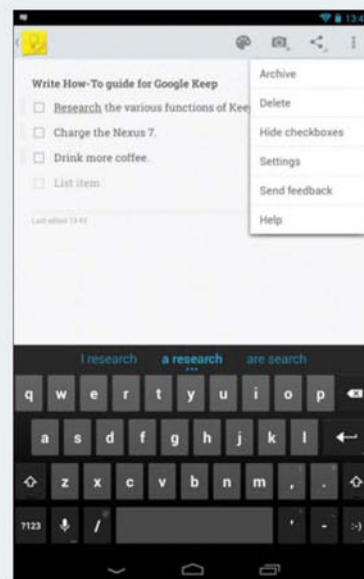
At the moment Google Keep is only available on Android, although we're sure an iOS version will appear in due course. To download it, go to the Google Play Store and search for Keep.



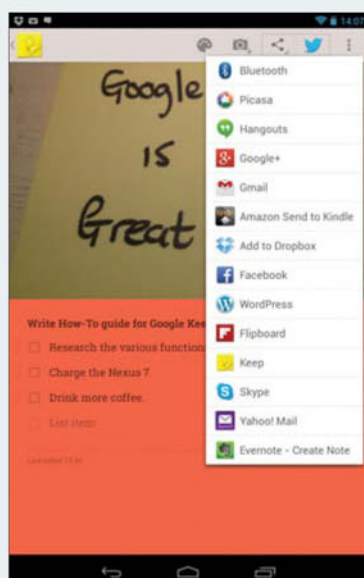
4 Now you have a page with a title and note section. As you'd expect, tapping on either area will allow you to enter the relevant text. Tapping the three dots in the top-right corner will give you further options.



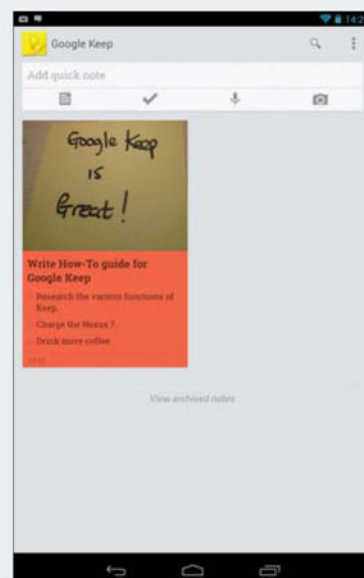
5 The drop-down menu lets you archive or delete notes, but possibly the most useful feature is that of Show Checkboxes. This instantly turns your note into a list with boxes you can tick for completed tasks.



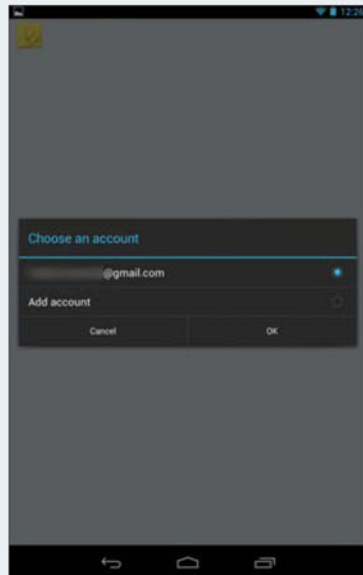
8 Sharing your notes is easy. Tap the three connected dots icon and you are presented with a comprehensive list of potential destinations including Gmail, Picasa, Facebook and Dropbox. Select your favourite and Keep will format the note accordingly.



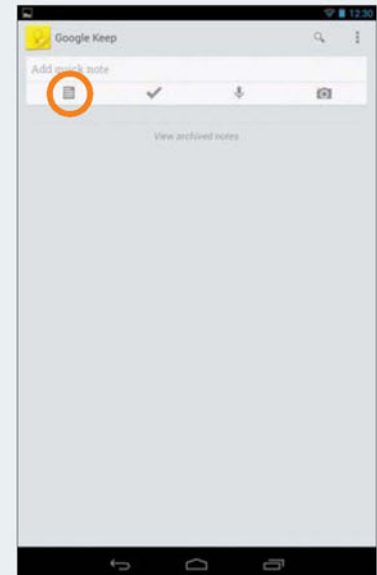
9 Tap the yellow sticky pad icon in the top-left corner to return to the home screen. Here you'll see your newly created note. All your notes will appear here in a continuous stream.



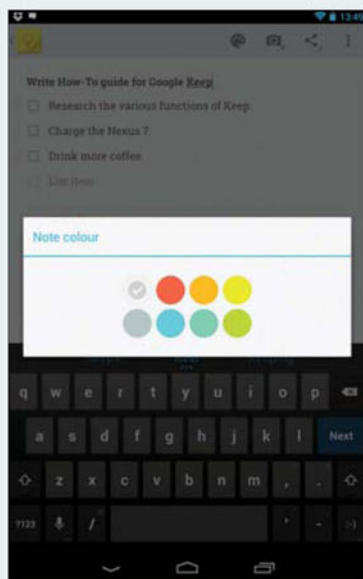
2 Once you've installed Keep, launch it and you'll be asked which email account you wish to use. If for some odd reason you haven't already got a Google account, now would be a good time to set one up.



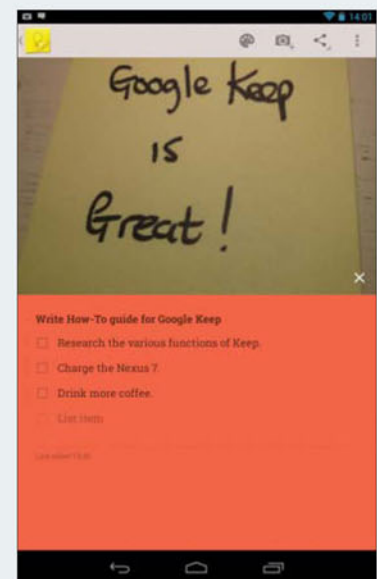
3 Next, you'll arrive at Keep's home screen. In typical Google fashion it's mainly empty. You can change this by adding a note, so tap the note icon on the left-hand side of the bar at the top to begin.



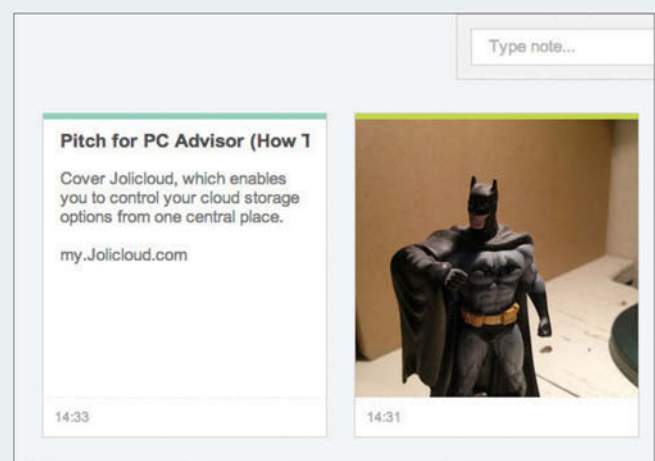
6 Another useful feature is being able to colour the notes. Tapping the artist's palette brings up a choice of pastel tones that you can choose from. This is actually a good way to organise your notes in the absence of folders.



7 If you want to add a photo, tap the camera icon on the menu bar. This will launch your device's camera, enabling you to take a quick snap, which is then added to the top of the note.



10 Follow the same steps to create other types of note. Tap the Tick icon for a list, microphone for audio, and camera for an image. When you're eventually finished with them, drag them to the side of the home screen and they will be archived.



11 The official Chrome app for Google Keep doesn't appear yet when you search on the Google Play store, but you can download it here - tinyurl.com/ooe7fq2. Functions are basic at the moment, but it's an easy way to add new notes. ☒

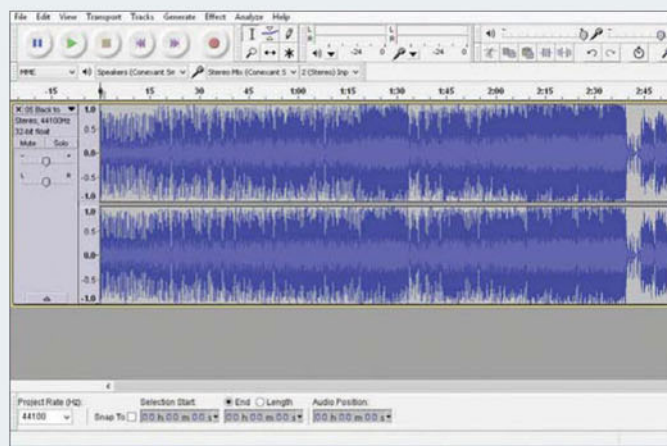
Edit audio files



Jim Martin explains how you can record and edit audio files in Windows, Mac OS and Linux using Audacity, a free audio editing application

Audacity is a useful program that not only lets you record live audio, but can also be used to record and convert old tapes or LPs to MP3 or other digital formats. It's also easy to edit MP3, WAV, AIFF and Ogg Vorbis files: you can cut sections, amplify, remove noise and apply effects, such as fade-ins and fade-outs.

Here we'll show you how to get to grips with Audacity, including downloading extra codecs so you can save your edited audio files in MP3 format. First, download it from audacity.sourceforge.net and install it. We're using Windows 8 here, but you should be able to follow the tutorial if you're using an older version, Mac OS or Linux.



START

Start by opening an existing audio file. The easiest thing to do is to go to your Music folder and open an MP3 file. You'll see the blue waveform (two waveforms if it's a stereo track), a time scale along the top and playback controls.

How do I download and install the LAME MP3 encoder?

Because of software patents, Audacity cannot include MP3 encoding software or distribute such software from its own web sites. Instead, install the free and recommended LAME third-party encoder to export MP3 files with Audacity.

Windows

1. Go to the external LAME download page. **Left-click this link, do not right-click.**
2. Directly underneath "For FFmpeg/LAME on Windows", left-click the link **Lame v3.99.3 for Windows.exe** and save the file anywhere on y
3. Double-click "Lame v3.99.3 for Windows.exe" to launch it (you can safely ignore any warnings that the "publisher could not be verified").
4. Follow the Setup instructions to install LAME for Audacity, making sure not to change the offered installation location of "C:\Program Files\Audacity" on a 64-bit version of Windows).

You should now be able to export MP3s without any further configuration, choosing **File > Export...**, then selecting "MP3 Files" in the File Export

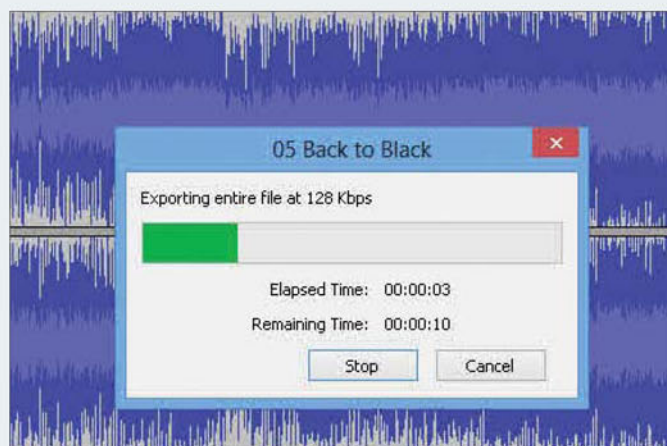
Troubleshooting

Occasionally, there may be a conflict where Audacity still tries to detect the path to an older lame_enc.dll file. To correct this:

1. Ensure there are no older versions of lame_enc.dll in any locations where Audacity detects it, namely:
 - C:\Program Files\LAME for Audacity or C:\Program Files (x86)\LAME for Audacity (this is where the installer puts the new .dll)
 - the Audacity installation folder (usually C:\Program Files\Audacity or C:\Program Files (x86)\Audacity), or in the Plug-ins folder if
2. Exit Audacity and navigate to the audacity.cfg preferences file at:
 - Windows 2000/XP: Documents and Settings\user name\Application Data\Audacity\audacity.cfg
 - Windows Vista/7: Users\user name\AppData\Roaming\Audacity\audacity.cfg
3. Open audacity.cfg in a text editor such as Notepad, and delete the two lines starting with:

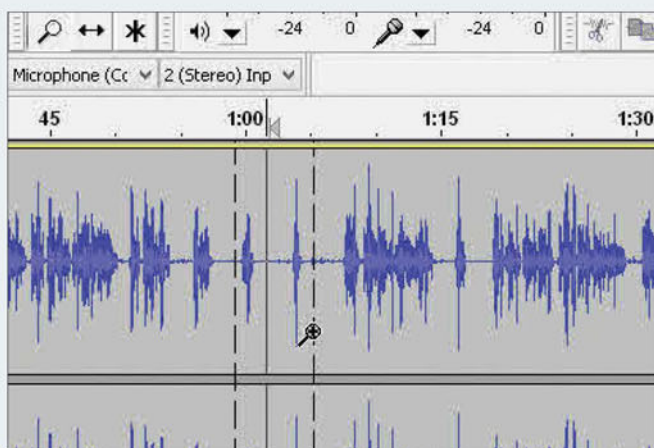

```
[MP3]
MP3LibPath=
```
4. Save the changes to audacity.cfg and restart Audacity

In order to see audacity.cfg, you may need to set the operating system to show hidden files and folders. See instructions for Windows 7 and

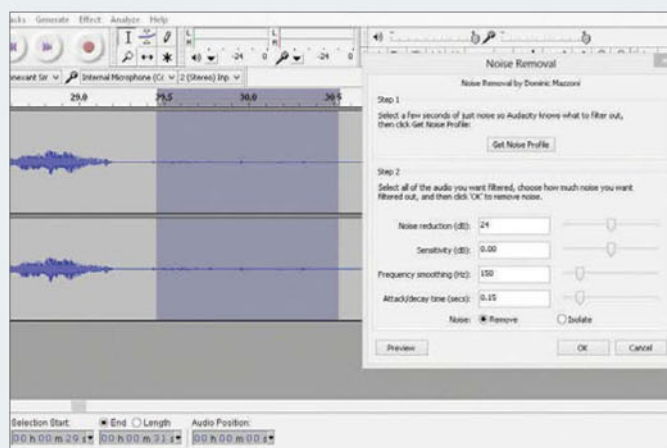


4 Don't enter any information. Instead, click OK and you'll see a message saying Audacity can't locate lame_enc.dll. Click the Download button and your browser should open with instructions on how to download and install the MP3 encoder.

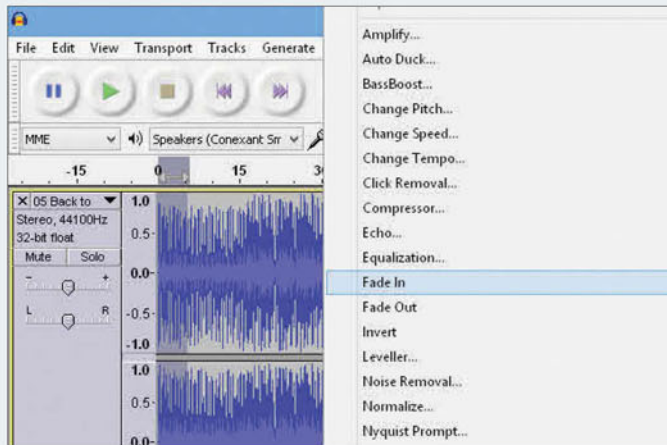
5 Return to Audacity, click the OK button, dismiss the error and repeat Step 3, this time entering or editing the metadata. Now when you click OK, the file will export correctly as Audacity will find the encoder this time.



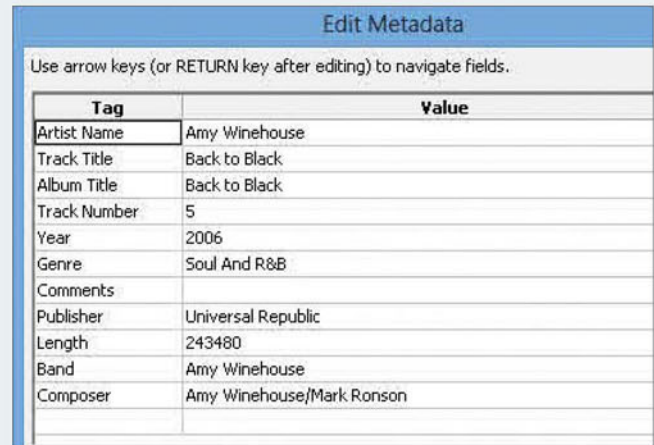
8 Most audio recorded on a microphone will have some background hiss. To remove this, select a silent portion of your recording a few seconds long. It's easier if you zoom in: click the magnifier and select a section. This will then fill the screen.



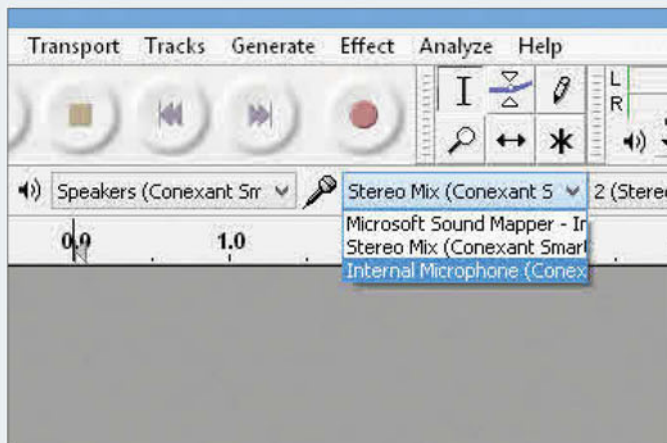
9 Switch back to the selection tool and highlight a couple of seconds of 'silence'. Choose Noise Removal from the Effect menu. In the window that appears, click Get Noise Profile. Launch the Noise Removal tool again and click Preview to listen to the result.



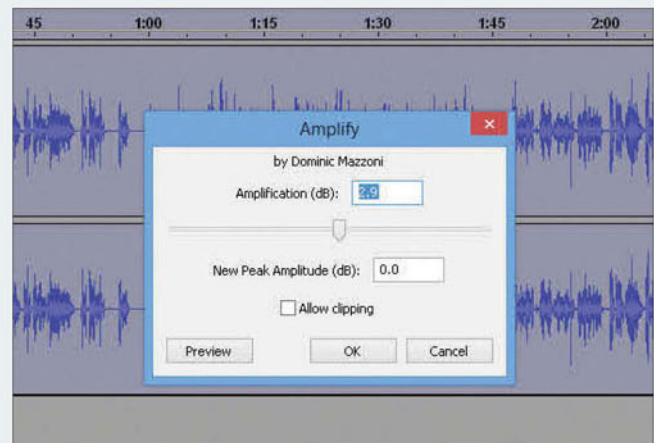
2 Let's fade in this track. The selection tool (the same icon as used in Microsoft Office) is on by default. Click and drag a selection from around the five-second mark back to the start of the track. From the Effect menu, choose Fade In.



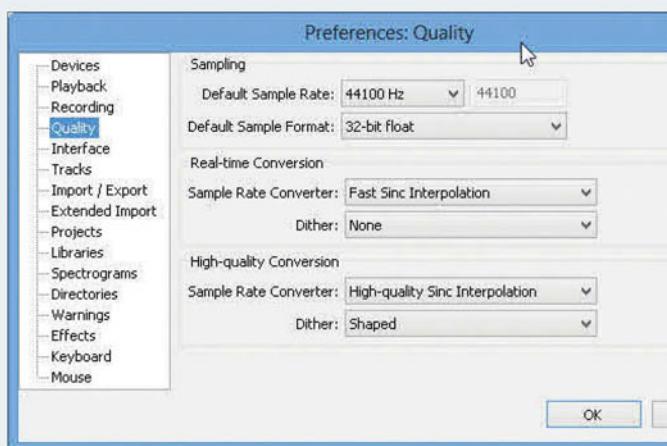
3 To save a track, click File, then Export. Give the file a name in the File name: box. Using the drop-down box, choose MP3 as the format. You'll then see an Edit Metadata window where you can enter or edit the track name, artist, album, year, and so on.



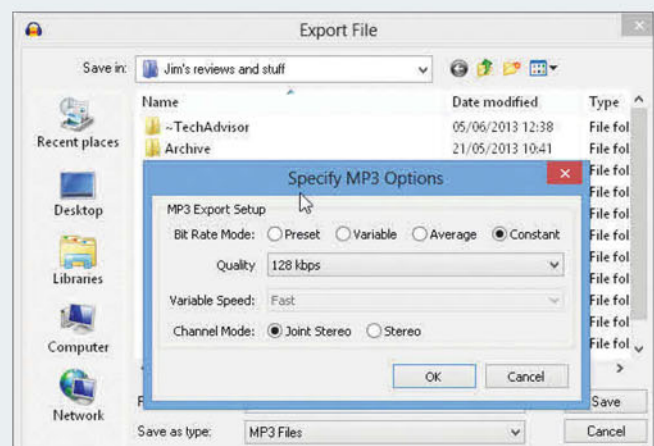
6 If you have a microphone, you can record live audio. First, make sure it's selected using the drop-down menu (you can change whether to record in stereo or mono using the other drop-down to the right). Click File, then New and click the round red record button.



7 If your recorded audio is too quiet, you can amplify it. Press Ctrl-A to select it all, then choose Amplify from the Effect menu. The slider will be set to the maximum value possible without clipping, but you can override this using the checkbox.



10 You might want to change some default settings, so click Edit and then Preferences. Under devices you can choose which playback and recording devices to use. Click Quality and you can select the default sample rate for recordings.



11 To set the default quality when exporting MP3 files, click File, then Export. It's easy to miss the Options... button in the dialog box, but clicking it brings up another box where you can set the bitrate and whether it's constant or variable. ☑

Sending large videos



Matt Egan explains how to share large videos with friends, family and colleagues, without becoming unpopular by breaking their email account

The use of video is exploding. It is so easy for anyone to make great-looking video that virtually everyone has a clip or two of important events or people in their lives, or great destinations to which they have been. But sharing videos can be a problem.

Whereas you can send almost any JPEG image via email or even text message, even the smallest video file is likely to be way too big for email. And you stand to become very unpopular when your huge video attachment breaks people's inboxes.

But in order to get the full benefit of a video clip you need to be able to share your videos. Here we look at how you can share videos with your family, friends and colleagues.

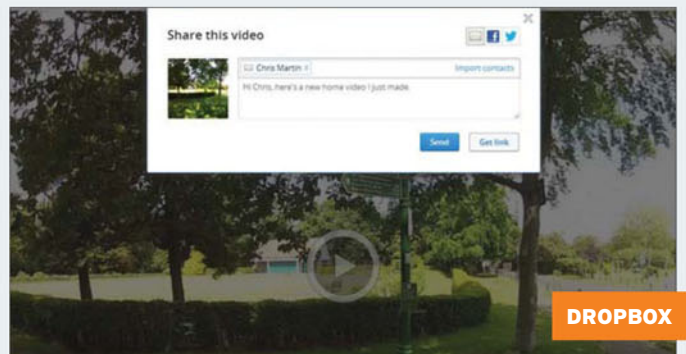


YouTube, Facebook

One very simple way to share a video clip is to post it to YouTube and then email a YouTube link to your friends. YouTube can accept virtually any type of video file, and anyone can set up a YouTube channel – you just need a free Google login. Simple head over to youtube.com to find out how.

Posting to YouTube doesn't mean that your video can be viewed by anyone, either. There are three settings for YouTube videos: Public, Unlisted and Private. The former is viewable by anyone with a web connection; Unlisted means it is viewable to anyone who has the direct URL, but it won't appear in searches or listings; and Private means you have to give permission for anyone to view your video.

Of course, this approach is rather limited. You can send your video in the sense that your friend, colleague or relation can



DROPBOX

view it online, but they don't have the physical file to edit, post or add to their personal collection.

You could also use Facebook to show off a video in a similar manner. But such are the vagaries of Facebook privacy settings it is best to assume that anything you post is visible to anyone who wants to see it. To share a video, just select the Photo/Video box in the Status box on your profile, then browse to the file on your computer.

Dropbox

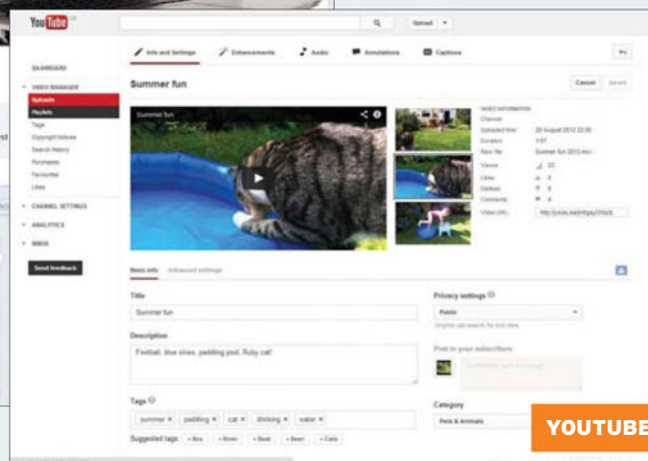
If you are reading this piece you probably want to send a video file rather than simply sharing a view of that video. One of the best ways to do this is to use a cloud service such as Dropbox.

Dropbox is a hugely popular file-sharing and cloud-storage service. You install a small piece of software that creates a virtual Dropbox, then put large files into it from your computers, phones or tablets. It's a great way of backing up files, and it allows you to share with confidence.

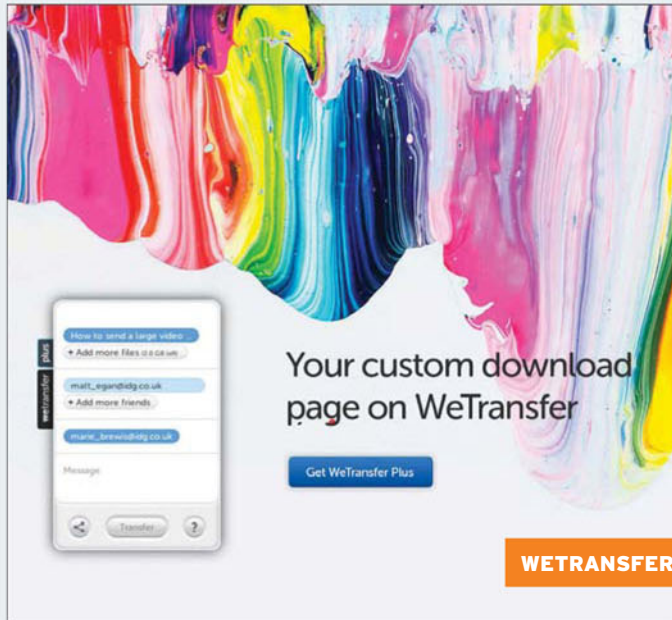
To share a file via the Dropbox website you simply sign into your account, then go to your list of files and folders and select the folder you want by clicking on the empty space to the right of the folder's



FACEBOOK



YOUTUBE

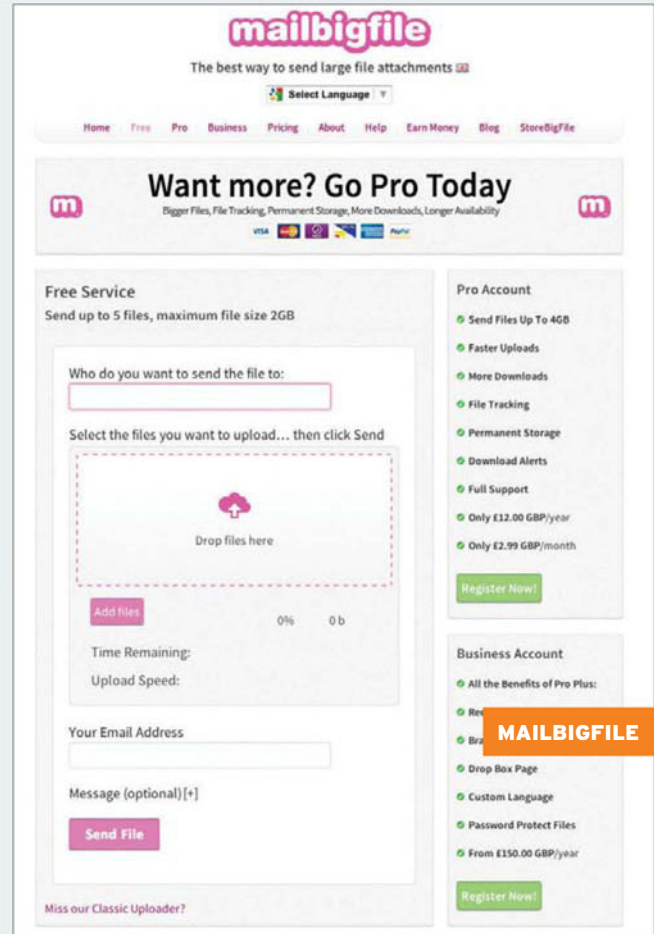


name. Click 'Invite to folder' in the toolbar, and then enter the email addresses of the people you want to invite and click Share folder.

In Windows you can also share a folder from the Dropbox desktop application mentioned above. Just open your Dropbox folder, right-click the folder you want to share, and select Dropbox, 'Share This Folder'.

This will take you to the Sharing page on the Dropbox website. As before you simply enter the email addresses of the people you want to invite, and click Share folder.

Dropbox is free for 2GB of storage, but you can earn an extra 500MB for each friend and family member that signs up. Various tablets and smartphones are also sold with extra Dropbox storage.



Free sending services

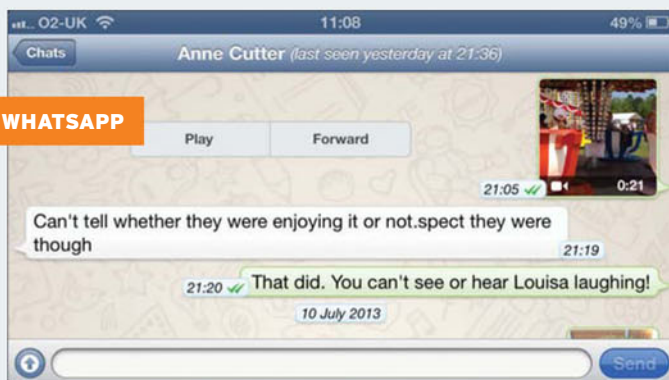
Dropbox is great if you regularly have to share large files. But for a one-off you may not wish to sign up for a service and you certainly won't want to pay for it. In this case you should try one of many, largely free, large-file-sending email services. These include, but are not limited to, YouSendIt, SugarSync, WeTransfer and MailBigFile.

In each case you have to upload your file to the service, and it then sends a link to your friend or colleague to download the file. You will usually receive a notification when they have downloaded the file. Such services can take a while to load up the file depending on your connection, and some will impose limitations to the size of file you can send (WeTransfer allows up to 2GB, for example). They will also probably try to sign you up to premium accounts, and many display adverts. But as a one-off means of sending a large file they are simple and useful.

WhatsApp and iMessage

These days you are more than likely to have recorded your video on a phone or tablet. Thus you may not want, or even be able, to transfer it to a desktop PC or laptop before you share it further. Fortunately, you're not limited to emails or text messages. Better to use services such as WhatsApp or Apple's iMessage. These allow you to send multimedia messages in much the same way as MMS messages, but using internet rather than cellular data.

Thus you can send large video files without killing your phone contract. The good news is that the person to whom you send the file can then save it to their phone or tablet (unless it's Windows Phone), so you have transferred the file. But it will have been compressed in the process, so don't expect amazing quality. ☒



Use Find My iPhone



Find My iPhone can be used to track down a missing or stolen iOS device. Jim Martin explains how to set up and use Apple's free app

If you lose your iOS device, Find My iPhone can show its position on a map, display a 'lost' message on the screen, force it to make a noise to help you find it, and remotely wipe your device. It also lets you remotely lock a device that's not protected by a passcode. However, if incorrectly set up, its location services could be disabled, so here we'll explain how to configure everything and then track down a gadget.

We'll use an iPhone here, but the steps apply to an iPad or iPod touch. Before you start, you'll need to have set up iCloud on your device. If you skipped this when you got your iPhone, go to Settings, then iCloud. Enter your Apple ID, or create one.

START

To begin with, you'll need to enable the Find My iPhone option. You'll find it under the iCloud menu in the Settings app. If you haven't already done so, set a passcode by going to the General section in Settings, and tapping Passcode Lock.

(You'll need iOS 5 or later to use Find My iPhone, while the Lost Mode, which we look in Step 10, requires iOS 6.)



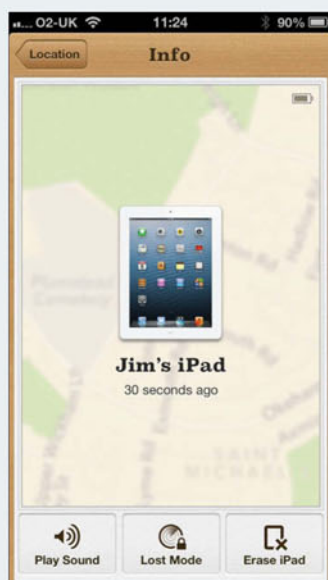
4 Tap the back button (marked Location Services) and scroll back to the top and tap Don't Allow Changes. Tap the back button (marked Restrictions) and you'll see a padlock symbol next to Location Services, indicating that no one (and no new apps) can change the settings without entering the Restrictions passcode.



5 Next, go to the App Store and search for Find My iPhone. Tap the button that says Free, then tap again when it changes to Install app. Enter your password when prompted, and the app will install. You will see a progress bar, and then an Open button.



8 With your device highlighted on the map, tap the blue arrow to show the options to play a sound, enable Lost Mode and erase the iPhone.



9 Tapping Play Sound will do that, and should mean you can track down your iPhone or iPad if it's near. The screen will also show a message: Find My iPhone Alert (or Find My iPad Alert if it's an iPad).

2 Tap on Restrictions (also in the General section) and then Enable Restrictions. You'll have to set another passcode (preferably a different number to the main Passcode Lock) to do this.



3 Scroll down to Location Services, tap it, and scroll down until you see Find My iPhone. Tap it, ensure Find My iPhone is set to ON and that Status Bar Icon is set to OFF. This prevents anyone knowing that you're tracking the phone's location using the Find My iPhone app.



6 Tap Open and Find My iPhone will ask you to log in with your usual Apple ID. The app will attempt to locate any devices that are connected to that Apple ID (which is also your iCloud ID). You'll see a list of these along with when they were last 'seen'. The status might show 'Offline' if the device isn't connected to the internet.



7 Tapping on a device that has a green circle next to it will show its location on a map. A smaller circle means the location is fairly accurate, while a big circle means its position can't be precisely determined.

The location service works for the device you're holding, which is slightly odd. However, it's worth noting that you don't have to use the app to track your device: you can go to www.icloud.com on any computer, log in with your Apple ID and click the Find My iPhone icon to access the same map and settings.



10 Tapping Lost Mode prompts you to enter a phone number, which anyone finding the iPhone or iPad will see displayed on the screen when they press the sleep/wake button.



11 Tapping Erase iPhone will wipe all your content and settings, and prevent you using Find My iPhone to locate or track the device. If your iPhone or iPad has been stolen, it's best to give any location to the police rather than trying to recover it yourself. ☒



LETITIA
AUSTIN



ONLINE
REGISTRATION
REQUIRED

Movavi Screen Capture SE

FULL PROGRAM

Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 220\Movavi Screen Capture SE and open the file

Online registration required: follow the links during installation before 31 Sep 2103

System requirements

1GHz processor;
Windows 2000/XP/
Vista/7/8; 1GB RAM
(512MB Vista); 50MB
drive space for
installation, 1GB for
ongoing operations;
1024x768, 32-bit colour
display; QuickTime

This version does
not support: MPEG-2
encoder/decoder;
MPEG-4 encoder/
decoder; MPEG-4 AAC
codec; AMR; MP3 codec

Whereas most screen-capture software specialises in either creating slick screencasts or in recording games, Movavi's all-purpose recoding program does both - and it captures streaming videos.

Record live videos

We can tap into the knowledge of the web through webinars, interactive guides and videos. Watch events live or at your convenience - use Screen Capture Studio to record content and set it up for later viewing.

Edit recorded video

Whether you're enhancing, applying special effects or overlaying titles and a soundtrack, with the help of Movavi's huge range of editing tools you can turn your recorded video into a first-class user guide.

Create a video tutorial

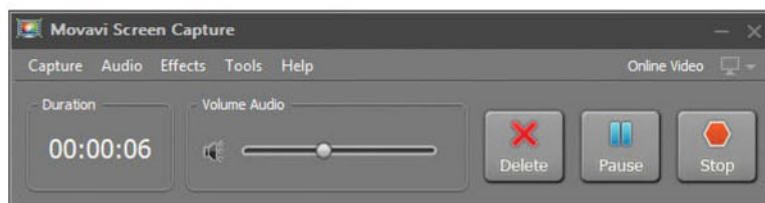
Smooth, professional video output at up to 60fps is within your reach. Use Movavi capturing toolkit as a webcam or video call recorder.

Save stunning gameplay

When every second counts, Movavi Screen Capture makes best use of your PC's resources power to capture gameplay with no system hangs or delays.

Share your recordings

Once recorded, your video tutorial, web event or screencast can be converted to almost any media format, burned to disc or copied to a portable device. ☒



Visit our website for more software special offers: pcadvisor.co.uk/special-offers

ONLINE
REGISTRATION
REQUIRED

Bitdefender Internet Security 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 220\Bitdefender Internet Security 2014 and open the file

Online registration required: follow the links during installation before 31 Sep 2013

System requirements

Windows XP/Vista/7/8;
1.5GB RAM; 800MB
drive space

With a non-intrusive and extremely fast scanning technology, Bitdefender Internet Security 2014 offers enhanced silent security against e-threats.

- Superior security for all your data
- Extremely fast. Non-intrusive
- Guards your online transactions. Protects your digital identity
- Reveals your kids' online activities. Restricts them when necessary
- Protects your internet connection with its firewall

Shop and bank in confidence

Bitdefender Safepay safeguards your payments and automatically fills in your account information.

Bitdefender Safepay

Keeps hackers at bay by automatically opening all your online banking pages in a separate, secure browser, and keeping all necessary credentials safe and within your reach.

Your identity stays private

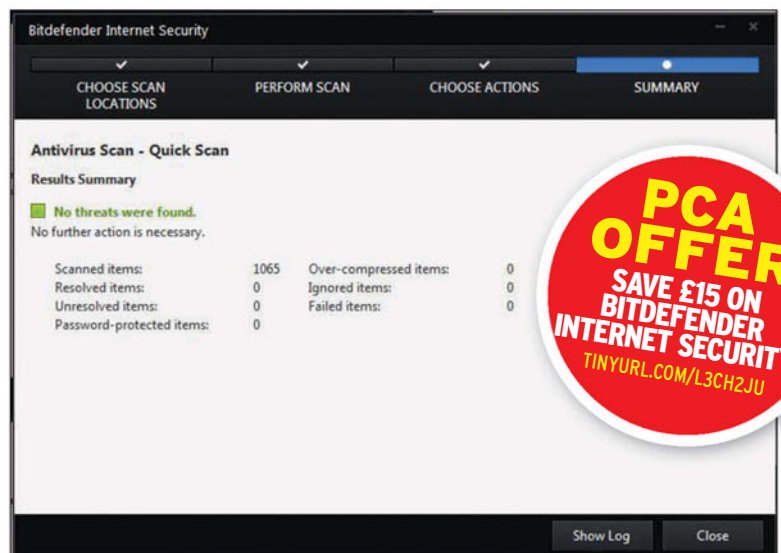
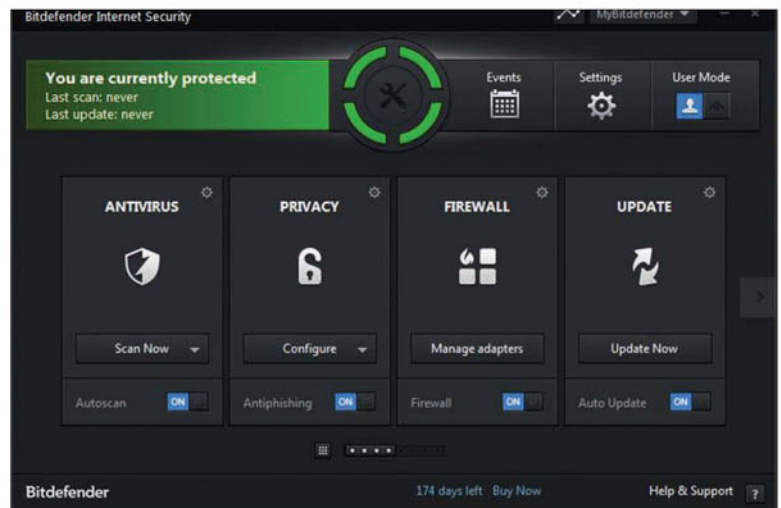
Surf the Internet and socialize without worries. Your private information cannot be seen or stolen by hackers.

Two-way firewall

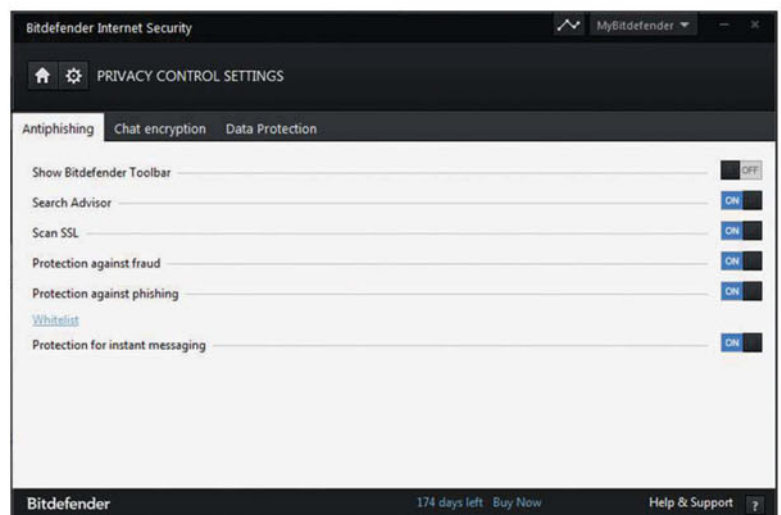
A two-way firewall continuously monitors your Internet connection and prevents unauthorised access, even over a Wi-Fi network.

No interruptions. No pop-ups

Bitdefender Autopilot automatically takes the best security-related decisions for you, offering silent security. ☒



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SAVE £15 ON
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Auslogics File Recovery 3

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 220\Auslogics File Recovery 3 and open the file

Online registration required: follow the links during installation

System requirements

Windows XP/Vista/7;
256MB RAM; 15MB
drive space.

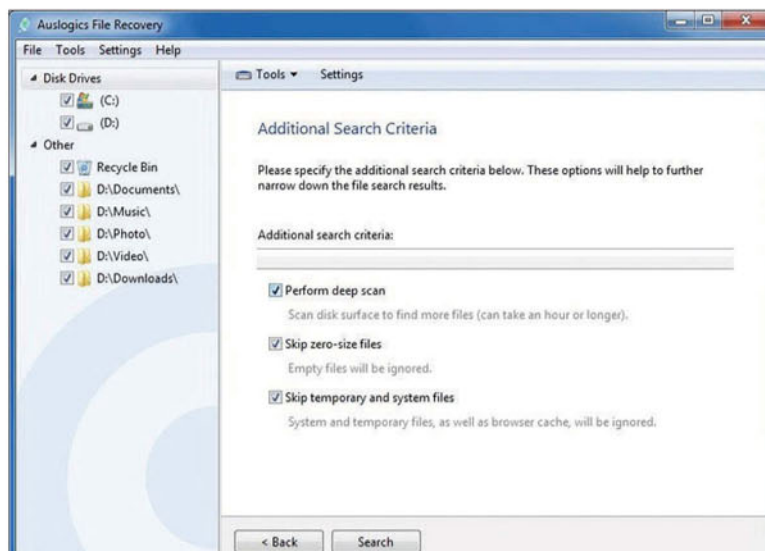
This version is
restricted to 10
100kb files

Auslogics File Recovery can recover maliciously or accidentally deleted data. It can recover any file type from almost any media, including hard drives, flash memory, SD cards and USB sticks, even after they've been formatted. It can also retrieve partitions after they've been reallocated, and offers a range of features beyond simple recovery:

- Filter and preview search results to recover only the files you need
- Permanently delete files, and wipe free space on your hard drive. If your PC ever gets into the wrong hands, you can breathe easy knowing that none of your confidential files will be recovered
- A disk-image tool lets you back up your entire drive with all its contents, including deleted files that may still be recoverable

Since new data written to a drive can overwrite the remnants of your deleted files, the sooner you attempt recovery the more likely it is to be successful. If you have data you can't afford to lose, it makes sense to install recovery software before disaster strikes.

With its privacy protection and backup options, File Recovery may prove useful even when you're not recovering files. ☒



DISC INSTRUCTIONS

Place disc in drive. Open the file 'Click here to begin.pdf' for extra information.

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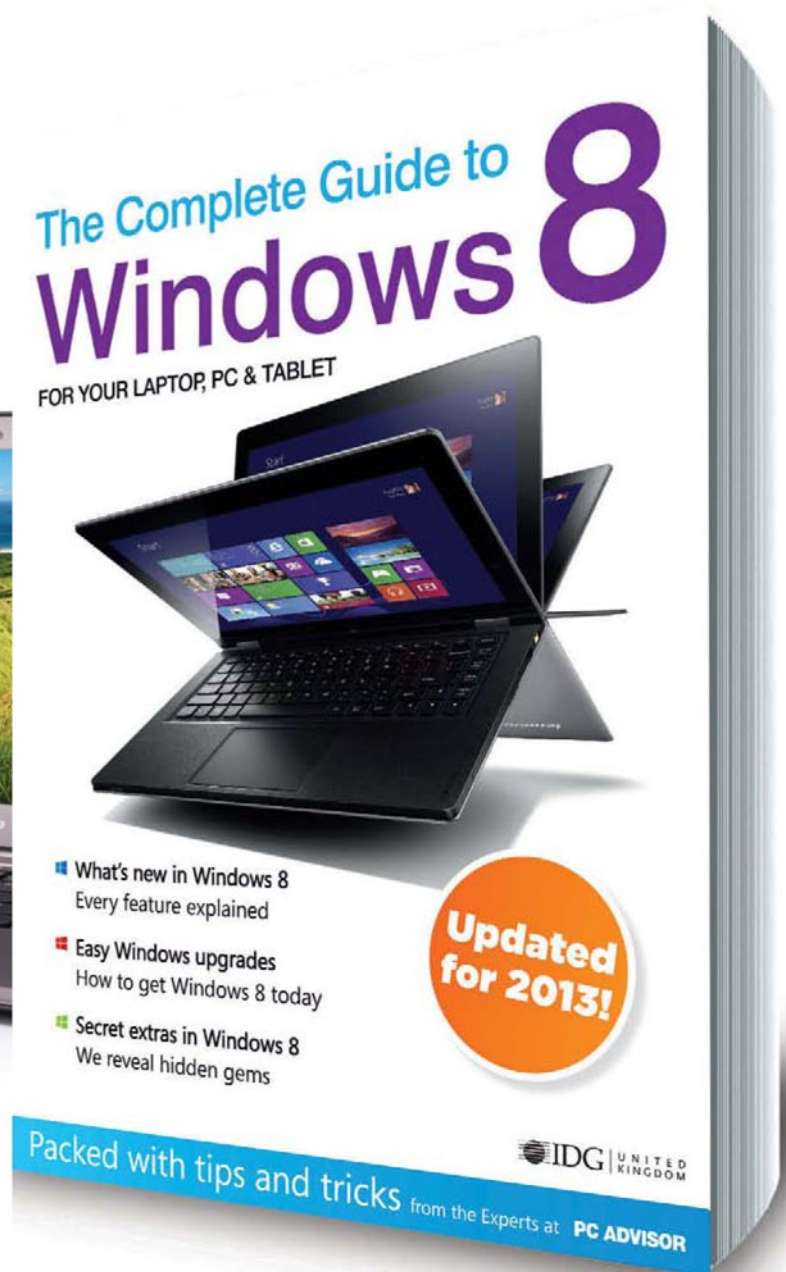
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Flat-panel displays

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Ultraportable laptops	1	2	3	4	5
	Apple MacBook Air 13in	Apple MacBook Pro 13in Retina	Sony Vaio Pro	Lenovo ThinkPad X1 Carbon	Acer Aspire S7-391
Price	£949 inc VAT	£1,449 inc VAT	£1,039 inc VAT	£1,650 inc VAT	£1,219 inc VAT
Website	Apple.com/uk	Apple.com/uk	Sony.co.uk	Lenovo.com/uk	Acer.co.uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	1.3GHz Intel Core i5-4250U	2.6GHz Intel Core i5-3230M	1.8GHz Intel Core i7-4500U	1.8GHz Intel Core i5-3427U	1.9GHz Intel Core i7-3517U
RAM	4GB DDR3L	8GB DDR3L	4GB DDR3	4GB DDR3L	4GB DDR3
Storage	128GB SSD	256GB SSD	128GB SSD	180GB SSD	256GB SSD
Screen size	13.3in glossy (anti-glare)	13.3in glossy (anti-glare)	13.3in glossy touchscreen	14in matt touchscreen	13.3in glossy touchscreen
Screen resolution	1440x900	2560x1600	1920x1080	1600x900	1920x1080
Graphics	Intel HD Graphics 5000	Intel HD Graphics 4000	Intel HD Graphics 4400	Intel HD Graphics 4000	Intel HD Graphics 4000
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11a/b/g/n
Ethernet	Optional	Gigabit with adaptor	None	100Mbps with USB adaptor	N/A
Bluetooth	✓	✓	✓	✓ (optional)	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	1x USB 3.0, 1x USB 2.0	2x USB 3.0
FireWire	x	x	x	x	x
Thunderbolt	✓	✓ (2)	x	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	None	HD webcam, multitouch trackpad, fingerprint reader	HD webcam
Operating system	Mac OS X 10.8 Mountain Lion	Mac OS X 10.8 Mountain Lion	Windows 8 64-bit	Windows 8 Pro	Windows 8 64-bit
Bundled software	iLife 11	iLife 11	None	None	None
Fear (Max detail)	Not tested	29fps	N/A	Not tested	Not tested
Battery	54Wh lithium-polymer	74Wh lithium-ion	Not specified	45Wh lithium-ion	35Wh lithium-ion
Battery life	12 hrs 57 mins	8 hrs 44 mins	6 hrs 20 mins	5 hrs	4 hrs 20 mins
PC Mark 7 score	4602	4596	4575	4783	5038
Dimensions	325x227x4-17.5mm	313x219x19mm	322x216x17.2mm	331x226x22mm	323x224x12.5mm
Weight	1.35kg	1.64kg	1.06kg	1.54kg	1.3kg
Warranty	1-year return-to-base	1-year return-to-base	2-year return-to-base	1-year return-to-base	1-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"> 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"> Stylish casing Good performance Display not the most colourful Rather expensive 	<ul style="list-style-type: none"> Sleek 1.3kg design Well-built and sturdy Responsive touchscreen Reflective screen Ordinary battery life
FULL REVIEW	TINYURL.COM/KNXWZW3	TINYURL.COM/BQBSHCQ	TINYURL.COM/ORTTEBA	TINYURL.COM/CTDUYQO	TINYURL.COM/CNLW3DF

>> 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
	Acer Aspire V3-571	Asus X501A	Lenovo G580	Acer Aspire V5-571	Samsung 535U3C
Price	£450 inc VAT	£320 inc VAT	£450 inc VAT	£420 inc VAT	£500 inc VAT
Website	Acer.co.uk	Uk.asus.com	Saveonlaptops.co.uk	Acer.co.uk	Samsung.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.5GHz Intel Core i5-3210M	1.8GHz Intel Core i3-3217U	2.5GHz Intel Core i3-3120M	2.3GHz Intel Core i3-2365M	1.7GHz AMD E2-1800
RAM	8GB DDR3	4GB DDR3	8GB DDR3	8GB DDR3	6GB DDR3
Storage	750GB HDD	320GB HDD	1TB HDD	750GB HDD	500GB HDD
Screen size	15.6in gloss	15.6in gloss	15.6in gloss	15.6in	13.3in
Screen resolution	1366x768	1366x768	1366x768	1366x768	1366x768
Graphics	Intel HD Graphics 3000	Intel HD Graphics 3000	Intel HD Graphics 4000	Intel HD Graphics 3000	AMD Radeon HD 7500G
Video memory	N/A	N/A	N/A	N/A	n/a
Wireless	802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11a/b/g/n
Ethernet	Gigabit	Gigabit	10/100	x	Gigabit
Bluetooth	✓	x	✓	✓	✓
USB	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 2x USB 2.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x 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	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	N/A	8x DVD±RW	8x DVD±RW	N/A
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Windows 7 Home Prem 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 7 Home Prem 64-bit	Windows 8 64-bit
Bundled software	Microsoft Office Starter	McAfee Security trial	N/A	None	None
Stalker (Low/High)	Not tested	10/17fps	37/24fps	Not tested	Not tested
Battery	48Wh lithium-ion	47Wh lithium-ion	48Wh lithium-ion	37Wh lithium-ion	45Wh lithium-ion
Battery life	5 hrs 18 mins	4 hrs 35 mins	4 hrs	5 hrs 2 mins	3 hrs
PCMark7 score	123 WorldBench 6 points	1389	2614	Not tested	1445
Dimensions	380x253x33mm	380x253x35mm	375x240x36mm	382x253x21-23mm	314x218x19mm
Weight	2.6kg	2.1kg	2.4kg	2.3kg	1.4kg
Warranty	1-year collect-and-return	1-year return-to-base	1-year return-to-base	1-year collect-and-return	1-year return-to-base
Verdict	<ul style="list-style-type: none"> • Strong general performance • Excellent trackpad, keyboard • Reflective screen • Decent battery life • Some stock @ Laptopsdirect 	<ul style="list-style-type: none"> • Low price • Decent build quality • Surprisingly good speakers • Very poor for gaming • No optical drive 	<ul style="list-style-type: none"> • Slightly faster CPU, but large price hike • Screen very glossy • Irritating touchpad • Rather weighty 	<ul style="list-style-type: none"> • Hard drive now 750GB • 8GB of RAM • No ethernet • Onboard graphics • Decent battery life 	<ul style="list-style-type: none"> • Extremely light • Battery life not great • Slow Windows performance • No optical drive • Tinny speakers
FULL REVIEW	TINYURL.COM/CQKL4PD	TINYURL.COM/B7YOHJCJ	TINYURL.COM/A786DEY	TINYURL.COM/CABAX8Z	TINYURL.COM/D8LRCGE

>> 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 LGI55	Lenovo IdeaPad Z500 Touch	PC Specialist Optimus IV
Price	£699 inc VAT	£699 inc VAT	£899 inc VAT	£790 inc VAT	£968 inc VAT
Website	Chillblast.com	Saveonlaptops.co.uk	3xs.scan.co.uk	Lenovo.com/uk	Pcspecialist.co.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	2.2GHz Intel Core i7-3632QM	2.4GHz Intel Core i7-3630QM
RAM	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage	1TB hybrid HDD	1TB HDD	1TB HDD hybrid	1TB HDD	1TB HDD + 120GB SSD
Screen size	11.6in matt	15.6in matt	15.6in	15.6in glossy touchscreen	17.3in matt
Screen resolution	1366x768	1920x1080	1920x1080	1366x768	1920x1080
Graphics	GT 650M/Intel HD 4000	GT 740M/Intel HD 4600	GTX 765M/Intel HD 4600	Intel HD 4000/GT 740M	GTX 660M, Intel HD 4000
Video memory	2GB	2GB	2GB	2GB	2GB (660M)
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	10/100	Gigabit
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	1x USB 3.0, 2x USB 2.0	3x USB 3.0, 1x 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	8x DVD ± RW	4x BD-ROM
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 Standard 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	48Wh lithium-ion	76.9Wh lithium-ion
Battery life	4 hrs 45 mins	3 hrs 5 mins	4 hrs	4 hrs	2 hrs 55 mins
PCMark 7 score	4557	3241	4700	3011	4572
Dimensions	287x207x37mm	383x249x38mm	374x250x43mm	370x255x30mm	405x270x50mm
Weight	1.8kg	2.4kg	2.7kg	2.7kg	3.3kg
Warranty	2-year collect-and-return	1-year return-to-base	2-year return-to-base	1-year return-to-base	3-year RTB (1-year parts)
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"> • Ordinary overall speed • Decent gaming potential • Touchscreen • Display not full-HD • Not the lightest 15in laptop 	<ul style="list-style-type: none"> • Excellent performance despite the price hike • Massive 17.3in screen • Blu-ray drive • Battery life not great
FULL REVIEW	TINYURL.COM/C8E6MTK	TINYURL.COM/NXLB4E7	TINYURL.COM/KYSYQGK	TINYURL.COM/NXRQO2Q	TINYURL.COM/ABQB6QP

» 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 over 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 4GB 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)

£1,001+ laptops		1  PC ADVISOR GOLD	2 	3 	4 	5  PC ADVISOR RECOMMENDED
		Apple MacBook Pro Retina	Chillblast Genesis 7970	Alienware 17	Schenker XMG A523	Alienware M14x
Price		£1,799 inc VAT	£1,199 inc VAT	£2,284 inc VAT	£1,056 inc VAT	£1,450 inc VAT
Website		Apple.com/uk	Chillblast.com	Alienware.co.uk	Mysn.co.uk	Alienware.co.uk
Build rating		★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★★
Features rating		★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★★
Performance rating		★★★★★	★★★★☆	★★★★★	★★★★★	★★★★★
Value rating		★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★★
Overall rating		★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★★
Processor		2.4GHz Intel Core i7-3630QM	2.7GHz Intel Core i7-3740QM	2.7GHz Intel Core i7-4800MQ	2.4GHz Intel Core i7-4700MQ	2.7GHz Intel Core i7-3740QM
RAM		8GB DDR3L	8GB DDR3	16GB DDR3	8GB DDR3	4GB DDR3
Storage		256GB SSD	750GB HDD + 8GB SSD	750GB HDD + 256GB SSD	500GB HDD + 256GB SSD	500GB HDD + 32GB SSD
Screen size		15.4in gloss	15.6in gloss	17.3in matt	15.6in matt	14.1in gloss
Screen resolution		2880x1800	1920x1080	1920x1080	1920x1080	1600x900
Graphics		nVidia 650M, Intel HD 4000	AMD Radeon HD 7970M	GTX 780M/Intel HD 4600	GTX 765M/Intel HD 4600	nVidia GeForce GT 650M
Video memory		1GB	2GB	4GB	2GB	1GB
Wireless		802.11a/b/g/n	802.11b/g/n	802.11b/g/n/ac	802.11b/g/n	802.11b/g/n
Ethernet		Via adaptor only	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth		✓	✓	✓	✓	✓
USB		2x USB 3.0	3x USB 3.0, 1x USB 2.0	4x USB 3.0	3x USB 3.0, 1x USB 2.0	2x USB 3.0, 1x USB 2.0
FireWire		x	x	x	x	x
Thunderbolt		✓ (2)	x	x	x	x
DisplayPort		✓	✓	✓	x	✓
HDMI		✓	✓	✓	✓	✓
DVI		x	✓	x	x	x
VGA		x	x	x	✓	✓
eSATA		x	✓	x	✓	x
Media card slot		✓	✓	✓	✓	✓
Audio		Headphone jack, Toslink out	headphone jack, mic	Headphone jack, dual mics	Headphone jack, S/PDIF	Headphone jack, mic
Optical drive		N/A	6x BD-ROM/DVD ± RW	BD-ROM	8x DVD ± RW	8x DVD ± R, 2.4x DVD-RW, 4x DVD+RW, 8x DVD-ROM
Extras		HD webcam, multitouch trackpad, backlit keyboard	Webcam	HD webcam	HD webcam	Customisable backlit keyboard
Operating system		Mac OS X 10.7.4 Lion	Windows 7 Home Prem 64-bit	Windows 7/8 64-bit	Windows 8 64-bit	Windows 7 Home Prem 64-bit
Bundled software		iLife 11	None	CyberLink Media Essentials	None	None
Stalker scores		Not tested	107/87fps	129/119fps	69/63fps	Not tested
Battery		99Wh lithium-polymer	76.9Wh lithium-ion	86Wh lithium-ion	77Wh lithium-polymer	63Wh lithium-ion
Battery life		Not tested	3 hrs	4 hrs 15 mins	4 hrs 30 mins	5 hrs 7 mins
PCMark7 score		Not tested	4333	6332	6135	168 (WorldBench 6)
Dimensions		359x247x18mm	376x256x43mm	410x295x50mm	374x250x42mm	337x258x38mm
Weight		2kg	3.3kg	4.15kg	2.88kg	2.9kg
Warranty		1-year return-to-base	2-year collect-and-return	1-year return-to-base	2-year return-to-base	1-year in-home support
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"> • Chassis has cheap feel, average keyboard/touchpad • Strong games and Windows performance • Low price for the power 	<ul style="list-style-type: none"> • Mouthwatering specs give astonishing gaming speed • Large 17.3in screen • Expensive • Heavy, but well built 	<ul style="list-style-type: none"> • Many configurations on site • Excellent performance • Well priced • Unimpressive plastic chassis • Heavy 	<ul style="list-style-type: none"> • Limited supplies at Amazon • Only 4GB of RAM • SSD is now only 32GB • Glossy screen can be difficult to read
FULL REVIEW		TINYURL.COM/7YGC3KJ	TINYURL.COM/9WTG6MP	TINYURL.COM/KS5LNFx	TINYURL.COM/PH8AYXJ	TINYURL.COM/CLGSCMV

>> 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.

Ultratables 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 by Asus	Apple iPad mini	Google Nexus 10 by Samsung	Amazon Kindle Fire HD
Price	£399 inc VAT	£159 inc VAT	£269 inc VAT	£319 inc VAT	£159 inc VAT
Website	Apple.com/uk	Play.google.com	Apple.com/uk	Play.google.com	Amazon.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Apple iOS 6.0.1	Google Android 4.1 Jelly Bean	Apple iOS 6.0.1	Google Android 4.2 Jelly Bean	Amazon (based on Android 4.0)
Screen size/resolution	9.7in/2048x1536	7in/1280x800	7.9in/1024x768	10.1in/2560x1600	7in/1280x800
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, NFC	802.11b/g/n, Bluetooth 4
Processor	1.39GHz Apple A6X	1.3GHz nVidia Tegra 3	1GHz Apple A5	1.7GHz Cortex A-15	1.2GHz TI OMAP 4460
RAM	1GB	1GB	512MB	2GB	752MB
Claimed battery life	10 hrs	10 hrs	10 hrs	9 hrs	8 hrs
Cameras (front/rear)	1.2/5Mp	1.2Mp/none	1.2/5Mp	1.9/5Mp	1.3Mp/none
Dimensions	241x186x9.4mm	120x199x11mm	135x200x7.2mm	264x178x8.9mm	137x193x10.3mm
Weight	652g	336g	308g	603g	395g
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"> • Best budget tablet • Strong build quality • Nice screen • Impressive battery life 	<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"> • Fastest tablet overall • Highest screen resolution • Excellent value • Can't match iPad on build 	<ul style="list-style-type: none"> • Slick, intuitive OS • Vast content available • Excellent value • 8.9in version costs £229
FULL REVIEW	TINYURL.COM/CRSTDsk	TINYURL.COM/CGBA439	TINYURL.COM/CLJWUVS	TINYURL.COM/ARL2KDG	TINYURL.COM/CH6CLNZ

Smartphones	1	2	3	4	5
					
	Sony Xperia Z	Apple iPhone 5	HTC One	Samsung Galaxy S4	Google Nexus 4 8GB
Price	£450 inc VAT	£529 inc VAT	£450 inc VAT	£550 inc VAT	£239 inc VAT
Website	Sonymobile.com	Apple.com/uk	Htc.com/uk	Samsung.com/uk	Play.google.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Android 4.1 Jelly Bean	Apple iOS 6.0	Android 4.1 Jelly Bean	Android 4.2 Jelly Bean	Android 4.2 Jelly Bean
Processor	1.5GHz Snapdragon S4 Pro	1GHz Apple A6	1.7GHz Snapdragon 600	1.9GHz Snapdragon 600	1.5GHz Snapdragon S4 Pro
Storage/media card	16GB/microSDHC	16GB/none	32GB/none	16GB/microSDXC	8GB/none
Screen size/resolution	5in/1920x1080	4in/640x1136	4.7in/1920x1080	5in/1920x1080	4.7in/768x1280
Input method	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch
Connectivity	4G, Bluetooth, Wi-Fi	HSPA+, Bluetooth, Wi-Fi	4G, Bluetooth, Wi-Fi	4G, Bluetooth, Wi-Fi	HSPA+, GSM, Bluetooth, Wi-Fi
Battery life (talk/standby)	11 hrs/550 hrs	8 hrs/225 hrs	Not specified	Not specified	Not specified
Camera	13Mp, 1080p video	8Mp, 1080p video	4Mp, 1080p video	13Mp, 1080p video	8Mp, 1080p video
GPS	GPS, Glonass	A-GPS, Glonass	GPS, Glonass	GPS, Glonass	GPS
Dimensions, Weight	71x79x139mm, 146g	59x124x8mm, 115g	68x9.3x137mm, 143g	136.6x69.8x7.9mm, 130g	69x134x9.1mm, 139g
Warranty	2 years	1 year	2 years	2 years	2 years
Verdict	<ul style="list-style-type: none"> • 443ppi full-HD screen • Fast performance • Dust- and waterproof • Very good 13Mp camera 	<ul style="list-style-type: none"> • Very fast performance • Superb 4in screen • Beautifully balanced weight • Siri voice-recognition 	<ul style="list-style-type: none"> • Fastest smartphone yet • 468ppi full-HD screen • UltraPixel camera • Great sound quality 	<ul style="list-style-type: none"> • Performance record holder • Interesting software features • Impressive 441ppi screen • Plastic build quality 	<ul style="list-style-type: none"> • Stunning price tag • Exceptional build quality • Keyboard allows fast typing • Not great storage
FULL REVIEW	TINYURL.COM/CXDR829	TINYURL.COM/CTRJEJD	TINYURL.COM/CE76X3T	TINYURL.COM/CA5P7LF	TINYURL.COM/D7HTPFJ

>> 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)

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-BI	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  Chillblast Fusion Commando	2  Quiet PC Serenity Home Value	3  Dino PC Raging Lizard	4  CyberPower Ultra Scylla SE III	5  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 • 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)

Gaming PCs					
	1 PC ADVISOR BEST BUY	2	3 PC ADVISOR RECOMMENDED	4	5
	Chillblast Fusion Carbine	Chillblast Fusion Panther	Yoyotech Warbird Titanium	Dino PC Angry Lizard 3770K	CyberPower Infinity Fusion GT
Price	£1,199 inc VAT	£2,039 inc VAT	£1,300 inc VAT	£1,649 inc VAT	£1,499 inc VAT
Website	Chillblast.com	Chillblast.com	Yoyotech.co.uk	Dinopc.com	Cyberpowersystem.co.uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.4GHz (OC to 4.6GHz) Intel Core i5-3570K	3.5GHz (OC to 4.8GHz) Intel Core i7-4770K	3.4GHz (OC to 4.8GHz) Intel Core i5-3570K	3.5GHz (OC to 4.6GHz) Intel Core i7-3770K	3.4GHz (OC to 4.6GHz) Intel Core i5-3570K
CPU cooler	Corsair H55 water cooler	Corsair H100i	Corsair H55 water cooler	Xigmatek Dark Knight SD1283 Night Hawk	Corsair H60
Memory	16GB DDR3	16GB DDR3	8GB DDR3	16GB DDR3	8GB DDR3
Storage	120GB SSD + 1TB HDD	256GB SSD + 2TB HDD	120GB SSD + 3TB HDD	256GB SSD + 2TB HDD	2x 128GB SSD + 1TB HDD
Power supply	750W Corsair CX750W	750W Corsair CX750	750W Cooler Master GX750	650W Corsair VS650W	600W Corsair CX600
Motherboard	Asus P8Z77-V LK	Gigabyte GA-Z87-D3HP	Asus P8Z77-V	Gigabyte GA-Z77X-D3H	MSI Z77A-G45
Operating system	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit	Windows 8 64-bit
Screen	23.6in Iiyama X2377HDS (1920x1080, IPS)	27in Asus MX279H (1920x1080, IPS)	Not supplied	24in LG 24EN43VS-B (1920x1080, TN)	23in AOC i2367FH (1920x1080, IPS)
Graphics	2x Palit GeForce GTX 650 Ti Boost, 2GB VRAM	nVidia GeForce GTX 780, 3GB VRAM	2x MSI GeForce GTX 660 Ti, 2GB VRAM	Gigabyte GeForce GTX 680 OC, 2GB VRAM	XFX Radeon HD 7970, 3GB VRAM
Sound	Onboard	Onboard	Onboard	Asus Xonar DGX	Onboard
Connectivity	Gigabit ethernet	None	802.11b/g/n, gigabit ethernet	802.11a/b/g/n, gigabit ethernet, Bluetooth 4.0	Gigabit ethernet
Ports	6x USB 3.0, 2x USB 2.0, 2x HDMI, 4x DVI, 2x DisplayPort	8x USB 3.0, 4x USB 2.0, HDMI, DVI, DisplayPort	4x USB 3.0, 2x USB 2.0, 2x HDMI, 4x DVI, 2x DisplayPort	8x USB 3.0, 2x USB 2.0, HDMI, DVI-I, DVI-D, DisplayPort	4x USB 3.0, 4x USB 2.0, HDMI, 2x DVI, Mini DisplayPort, PS2, S/PDIF
Optical drive	Lite-On BD-ROM/DVD ± RW	LG BD-R/DVD ± RW	Pioneer DVD ± RW	Lite-On BD-ROM/DVD ± RW	Pioneer BD-R/DVD ± RW
Case	Corsair Carbide 300R	Fractal Design Define R4	Corsair Carbide 300R	Fractal Design Arc Midi R2	Corsair Carbide 300R
Keyboard	Gigabyte M6800	Razer Deathstalker	Not supplied	Saitek Cyborg V7	Logitech MK330
Mouse	Force K3	Razer Abyssus	Not supplied	Cyborg Rat 3	As above
Other	Chillblast Family PC Pack	Creative A520 speakers	None	BullGuard, surge protector	Bioshock Infinite, Crysis 3
PC Mark 7	6594	6772	6772	6930	6259
Alien vs Predator	138/74	163/87	163/87	114/61	134/75
Final Fantasy XIV	150/47	190/70	190/70	209/77	152/73
Sniper Elite V2	124/32	175/45	175/45	120/30	131/32
Power consumption	74W/370W	105W/458W	105W/458W	95W/425W	75W/401W
Warranty	2-year collect-and-return	2-year collect-and-return	3-year return-to-base	3-year return-to-base (2-year parts)	3-year return-to-base (1-year parts)
Verdict	<ul style="list-style-type: none"> • Best value of all PCs here • Strong performance • IPS display gives great picture, but slow response rates • Proper gaming peripherals supplied 	<ul style="list-style-type: none"> • Intel Haswell technology gets great results • GTX 780 gets the best gaming scores • Strong 27in IPS flat-panel • Creative A520 speakers • Blu-ray writing 	<ul style="list-style-type: none"> • Fastest overall performer • Formidable dual-card graphics solution • No screen, peripherals or Blu-ray drive • Liquid cooler keeps temperature low 	<ul style="list-style-type: none"> • Steep price tag • Great components offer strong performance • CPU cooler can be noisy under load • Dedicated sound card and gaming peripherals 	<ul style="list-style-type: none"> • A little expensive • Good performance • Blu-ray Writer • Low-cost mouse and keyboard
FULL REVIEW	TINYURL.COM/C4VA62U	TINYURL.COM/MT45R9G	TINYURL.COM/D337KUJ	TINYURL.COM/CS5RRK8	TINYURL.COM/CXSKWFK

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

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/D29YONN

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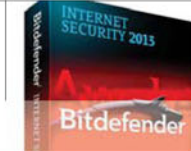


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Internet security suites	    				
	F-Secure IS 2013	Norton IS 2013	Bitdefender IS 2013	Trend Micro Titanium IS 2013	Kaspersky IS 2013
Annual price	£39 inc VAT	£49 inc VAT	£44 inc VAT	£59 inc VAT	£49 inc VAT
Licence terms	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year
Website	F-secure.com	Uk.norton.com	Bitdefender.co.uk	Trendmicro.co.uk	Kaspersky.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Signature-based detection	99%	99.8%	98.8%	100%	98.1%
Malware blocking (full)	100%	100%	100%	100%	94.4%
Malware blocking (partial)	0%	0%	0%	0%	0%
Clean-up of malware	90%	60%	90%	80%	80%
On-demand scan speed	76 secs	79 secs	121 secs	110 secs	70 secs
On-access scan speed	230 secs	175 secs	341 secs	341 secs	368 secs
Interface design	Very good	Superior	Very good	Very good	Very good
Verdict	<ul style="list-style-type: none"> • Good value for money • Great scores in most tests • User-friendly interface • Fast scan speed 	<ul style="list-style-type: none"> • Real-world attack scores bode well for its efficacy • Consumes few resources • Polished, simple interface 	<ul style="list-style-type: none"> • Good value for money • Exceptional in some tests • Can slow startup • MyBitdefender a nice touch 	<ul style="list-style-type: none"> • Brilliant performer • Scan times a little low • More guidance required • Expensive 	<ul style="list-style-type: none"> • Excellent at cleaning up infections; not so hot on detection • Impacts system speed
FULL REVIEW	TINYURL.COM/CKKPBWF	TINYURL.COM/8U7W6OA	TINYURL.COM/CAFEHS7	TINYURL.COM/CRZZ73Z	TINYURL.COM/BRY3CTZ

GLOSSARY: • IS: Internet Security

Antivirus software	    				
	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/4P5YXCP	TINYURL.COM/66SK77U	TINYURL.COM/6BFXWCS	TINYURL.COM/6HQA2WB	TINYURL.COM/4HUORV3

>> Buying advice



Security software

Every connected PC should have at least antivirus, antispyware and a firewall, and it's important that each is kept up to date. Avoid installing more than one real-time scanning component.

We work with world-renowned independent security testing lab AV-Test.org to evaluate the effectiveness of security software.

No security software is foolproof, but some are significantly better than others. And factors such as ease of setup, scan speeds, interface design and ability to deal with new threats set them apart.

The best products will offer parental controls, cloud protection, anti-phishing, anti-rootkit, virtual web browsers and keyboards, link

and file scanners, gaming modes, online backup and more.

The best value is usually offered by a three-user licence, but you can save some cash if your household has only one PC.

There are some good free antivirus products but, as in life, you get what you pay for.

READ MORE: [TINYURL.COM/7NR8FSM](http://tinyurl.com/7NR8FSM)

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	Epson Expression XP-605
Price	£108 inc VAT	£126 inc VAT	£45 inc VAT	£130 inc VAT	£90 inc VAT
Website	Samsung.com/uk	Oki.co.uk	Pantum.com	Hp.com/uk	Epson.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Mono laser	Colour laser	Mono laser	Colour inkjet	Colour inkjet
Max print resolution	1200x1200	1200x600	1200x600	9600x2400	5760x1440
Actual print speed	B=22.2ppm	B=15.8ppm C=2.5ppm	B=15.8ppm	B=17.6ppm C=7.9ppm	B=11ppm C=4ppm
Scan/fax facilities	None	None	None	1200x2400 scans	1200x2400 scans
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
Cost per page	B=2.7p	B=3.6p C=5p	B=2.4p	B=2.4p C=4.8p	B=3p C=6p
Media card/auto duplex	✓✓	✗✗	✗✗	✓✓	✓✓
Input capacity	251 sheets	100 sheets	150 sheets + manual	125 sheets + 20 tray + 25 ADF	120 sheets + 20 photo
Dimensions	348x338x197mm	396x380x275mm	380x260x236mm	454x551x220mm	390x341x138mm
Weight	7.2kg	14.4kg	6.1kg	8.6kg	7.1kg
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 £45 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"> Impressively sharp output Intuitive 2.5in touchscreen Numerous features Auto-duplex a little slow
FULL REVIEW	TINYURL.COM/CCLSZDM	TINYURL.COM/YLNO5RV	TINYURL.COM/C764SZ2	TINYURL.COM/98G9XTE	TINYURL.COM/CZ6TXZS

£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	£175 inc VAT	£450 inc VAT	£440 inc VAT	£50-£150 per month	£2,028 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 instore 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

Blu-ray drives	    				
	LG BH16NS40	Lite-On iHBS212	LG BP40NS20	Lite-On iHES112-115	Buffalo BR3D-12U3
Price	£74 inc VAT	£87 inc VAT	£90 inc VAT	£50 inc VAT	£199 inc VAT
Website	Uk.lge.com	Liteonit.eu	Uk.lge.com	Liteonit.eu	Buffalotech.com
Overall rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★★
Blu-ray speeds	16x -R, 8x -R DL, 2x -RE, 12x -ROM	12x -R, 8x -R DL, 2x -RE, 8x -ROM	6x -R, 6x -R DL, 2x -RE, 6x -ROM	12x -ROM	12x -R, 12x -R DL, 2x -RE, 8x -ROM
DVD speeds	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 12x -RAM, 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	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 5x -RAM, 8x -ROM
Max storage	50GB	50GB	100GB	8.5GB	50GB
Interface type	SATA (internal)	SATA (internal)	USB 2.0 (external)	SATA (internal)	USB 3.0 (external)
Label technology	LightScribe	LightScribe	None	None	None
Software	CyberLink Blu-ray Suite	CyberLink Blu-ray Suite	PowerDVD, PowerProducer	None	PowerDVD, PowerProducer
Dimensions	146x170x41mm	146x170x41mm	160x153x22mm	158x145x22mm	160x220x50mm
Weight	749g	650g	380g	700g	1.1kg
Warranty	1 year	2 years	1 year	2 years	2 years
Verdict	<ul style="list-style-type: none"> • Fast 16x speed • Attractive front panel • Reliable performance • Very good value 	<ul style="list-style-type: none"> • 12x internal writer • Issues during testing • Noisy during operation • Average with 4x media 	<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 • Low price 	<ul style="list-style-type: none"> • 12x external writer • Power supply required • Bulky design • Expensive
FULL REVIEW	TINYURL.COM/8YTUJEF	TINYURL.COM/65PXHUJ	TINYURL.COM/BS8UAFF	TINYURL.COM/8SYECMW	TINYURL.COM/453BX7L

Wireless routers	    				
	Apple AirPort Express	D-Link Cloud Router N600	Cisco Linksys EA6500	Asus RT-AC66U	WD My Net AC1300
Price	£79 inc VAT	£65 inc VAT	£157 inc VAT	£165 inc VAT	£139 inc VAT
Website	Apple.com/uk	Dlink.com	Linksysbycisco.com	Uk.asus.com	Wdc.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Standards supported	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n/ac	802.11b/g/n/ac	802.11a/b/g/n/ac
Frequency modes	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz	2.4GHz/5GHz	2.4GHz/5GHz (concurrent)
128/256bit WEP/WPA2	✓ x ✓	✓ x ✓	✓ x ✓	✓ x ✓	✓ x ✓
ADSL Modem/Guest NW	✓ x	✓ x	✓ x	✓ x	✓ x
Parental cont./mobile app	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ x
Firewall	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI
Ports	10/100 WAN, 10/100 LAN, USB	Gig WAN, 4x gig LAN, USB	Gig WAN, 4x gig LAN, 2x USB	Gig WAN, 4x gig LAN, 2x USB	Gig WAN, 4x gig LAN, 2x USB
Average power use	Not tested	Not tested	10.2W	9W	Not tested
Throughput (near, far, ac)	94Mb/s, n/a, n/a	142Mb/s, 115Mb/s, n/a	266Mb/s, 195Mb/s, 471Mb/s	270Mb/s, 199Mb/s, 457Mb/s	290Mb/s, 220Mb/s, 425Mb/s
Dimensions, weight	98x98x23mm, 240g	111x93x145mm, 330g	256x184x40mm, 500g	207x149x36mm, 450kg	169x36x230mm, 440g
Warranty	1 year	1 year	2 years	2 years	1 year
Verdict	<ul style="list-style-type: none"> • Sleek, flat and square look • Concurrent 2.4/5GHz • Extremely easy setup • Digital audio output 	<ul style="list-style-type: none"> • Cloud features • Parental controls • Interesting looks • Up slightly in price 	<ul style="list-style-type: none"> • Stunning performance • Excellent interface • Strong QoS • 802.11ac isn't cheap 	<ul style="list-style-type: none"> • Decent value • Versatile antennae • Great for file-hosting and media streaming 	<ul style="list-style-type: none"> • Performance holds up well over longer distances • Well designed user interface • Average USB performance
FULL REVIEW	TINYURL.COM/6LH6OOS	TINYURL.COM/9LGFF8Y	TINYURL.COM/AWYOPYX	TINYURL.COM/BU79W64	TINYURL.COM/LZOS9KO

>> 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](http://tinyurl.com/70EPYL6)

External hard drives	    				
	1	2	3	4	5
	WD My Passport Edge for Mac	G-Technology G-Drive Pro	G-Tech G-Raid Thunderbolt	Freemove Mobile Drive MG	iStorage diskAshur 256bit
Price	£70 inc VAT	£250 inc VAT	£599 inc VAT	£180 inc VAT	£172 inc VAT
Website	Wdc.com/en	G-technology.com	G-technology.com	Seagate.com	Istorage-uk.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Capacity tested	500GB	4TB	8TB	1TB	500GB
Capacity range	500GB	2TB to 4TB	4TB to 8TB	1TB to 1.5TB	250GB to 1.5TB
Disk size	2.5in	3.5in	3.5in	2.5in	2.5in
Spin speed	5400rpm	7200rpm	7200rpm	5400rpm	5400rpm
Transfer speed	94MB/s (USB 3.0)	N/A	329MB/s	329MB/s	94MB/s (USB 3.0)
Encryption	Password protection	None	None	None	256-bit
Other interfaces	None	FireWire 800	None	USB 3.0	None
Software	WD utilities	None	None	Freemove utilities	None
Dimensions	112x83x11mm	235x130x46mm	235x130x85mm	120x81x15mm	19x85x120mm
Weight	164g	1.35kg	2.3kg	170g	176g
Warranty	3 years	3 years	3 years	2 years	1 year
Verdict	<ul style="list-style-type: none"> Not just for Macs Password protection Faultless build quality Great value 	<ul style="list-style-type: none"> 120Mbps 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 200MBps Pricey, but huge capacity 	<ul style="list-style-type: none"> Thunderbolt interface Light and compact Doesn't get the full potential performance 	<ul style="list-style-type: none"> 256bit encryption PINs, self-destruct passwords, anti-hacker tools 2.5in disk stifles speed
FULL REVIEW	TINYURL.COM/BMG7SW9	TINYURL.COM/NV7F32F	TINYURL.COM/CXEF6MH	TINYURL.COM/C5SQU20	TINYURL.COM/CX3DNHY

NAS drives	    				
	1	2	3	4	5
	Synology DS413j	Synology DS413	Synology DS412+	Qnap TS-1079 Pro	Zyxel NSA325
Price	£275 inc VAT (diskless)	£400 inc VAT (diskless)	£460 inc VAT (diskless)	£2,077 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	4	5
	Epson EB-1945W	ViewSonic PJD7820HD	Vivitek Qumi Q2	Dell M110	ViewSonic Pro8300
Price	£1,310 inc VAT	£730 inc VAT	£350 inc VAT	£345 inc VAT	£820 inc VAT
Website	Epson.co.uk	Viewsoniceurope.com/uk	Vivitek.co.uk	Dell.co.uk	Viewsoniceurope.com/uk
Overall rating	★★★★★	★★★★★	★★★★☆	★★★★☆	★★★★☆
Projection technology	3LCD	DLP	DLP	DLP	DLP
Resolution (pixels)	1280x800	1920x1080	1280x800	1280x800	1920x1080
Brightness ¹ , Contrast	4200, 3000:1	3000, 15000:1	300, 2500:1	300, 10000:1	3000, 4000:1
Image size	280in	300in	30-90in	80in	300in
Supported aspect ratios	16:10, 16:9, 4:3	16:9, 4:3	16:10, 16:9, 4:3	16:10, 16:9, 4:3	16:9, 4:3
Noise levels (dB)	37 (29 eco)	35 (29 eco)	32 (28 eco)	36 (32 eco)	33 (29 eco)
Connections	VGA, HDMI, DP, CM, USB, ET	VGA, HDMI, CM, USB	VGA, HDMI, USB	VGA, HDMI, CM, CP, USB	VGA, HDMI, SV, USB
Lamp/lamp life	Not supplied/2500 hrs	Not supplied/5000 hrs	LED/30000 hrs	LED/10000 hrs	230W/4000 hrs
Dimensions	377x271x108mm	268x221x84mm	162x102x32mm	105x104x37mm	332x110x264mm
Weight	3.9kg	2.1kg	635g	360g	3.9kg
Warranty	5 years	3 years	3 years	2 years	3 years
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"> 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"> Ultra-small and -light Good colour Long-life LED lamp Remote control costs extra 	<ul style="list-style-type: none"> Good brightness levels Flexible connectivity Lacks colour depth, and cinematic content suffers
FULL REVIEW	TINYURL.COM/CP95P7G	TINYURL.COM/D2H04CV	TINYURL.COM/3TXMWPK	TINYURL.COM/77S8D6D	TINYURL.COM/9PU6XJS

¹Ansi lumens GLOSSARY: • CM: component • CP: composite • ET: ethernet • SV: S-Video

Solid-state drives	    				
	1	2	3	4	5
	Plextor M5 Pro	Crucial M500	Samsung 840 Pro	Corsair Neutron GTX	Toshiba THNSNH512
Price	£174 inc VAT	£299 inc VAT	£370 inc VAT	£190 inc VAT	£380 inc VAT
Website	Plextor.com	Crucial.com/uk	Samsung.com/uk	Corsair.com	Toshiba.co.uk
Overall rating	★★★★★	★★★★★	★★★★☆	★★★★☆	★★★★☆
Capacity tested	256GB	480GB	512GB	240GB	512GB
Price per GB	68p	67p	72p	79p	74p
Memory cache	512MB DDR3	512MB DDR3	512MB LPDDR2	256MB DDR2	Not specified
Controller	Marvell 88SS9187	Marvell 88SS9187	Samsung MDXL (3-core ARM)	Link_A_Media LM87800	Toshiba TC58NC5HA9GST
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	None	None
Flash	Toshiba Toggle NAND	Micron 20nm MLC NAND	Samsung 21nm Toggle NAND	Samsung/Tosh Toggle NAND	Toshiba 19nm MLC NAND
Firmware updated via	ISO boot disc	ISO boot disc	SSD Magician for Windows	SSD Toolbox for Windows	None
ATTO peak sequential	R: 547MB/s; W: 457MB/s	R: 539MB/s; W: 433MB/s	R: 562MB/s; W: 519MB/s	R: 557MB/s; W: 511MB/s	R: 554MB/s; W: 519MB/s
CDM peak IOPS	103.3k (read)	89.8k (read)	103.8k (read)	92.8k (read)	98.5k (read)
AS SSD (points)	1124	1038	1094	1057	954
Warranty	5 years	3 years	5 years	5 years	1 year
Verdict	<ul style="list-style-type: none"> High performance figures Excellent value Very durable Uses custom firmware 	<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 	<ul style="list-style-type: none"> Good read performance Low energy consumption Availability not great Poor warranty
FULL REVIEW	TINYURL.COM/PTYGG27	TINYURL.COM/M2NCSMJ	TINYURL.COM/OU4LEJG	TINYURL.COM/KV954FC	TINYURL.COM/PH6XNK5

>> 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	£147 inc VAT	£96 inc VAT	£120 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	Asus GeForce GTX 770 2GB	MSI GTX 660 Ti	XFX 7970 3GB GDDR5	Asus GeForce GTX 780 3GB
Price	£216 inc VAT	£340 inc VAT	£220 inc VAT	£300 inc VAT	£570 inc VAT
Website	Uk.msi.com	Uk.asus.com	Uk.msi.com	Xfxforce.com	Uk.asus.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	nVidia GeForce GTX 760	nVidia GeForce GTX 770	nVidia GeForce GTX 660 Ti	AMD Radeon HD 7970	nVidia GeForce GTX 780
Installed RAM	2GB GDDR5	2GB GDDR5	2GB GDDR5	3GB GDDR5	3GB GDDR5
Memory interface	256-bit	256-bit	192-bit	284-bit	384-bit
Core/memory clock	1006MHz/1502MHz	1058MHz/1752MHz	1019MHz/6008MHz	925MHz/1375MHz	863MHz/1502MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	1152	1536	1344	2048	2304
Power connectors	1x 6-pin, 1x 8-pin	1x 6-pin, 1x 8-pin	2x 6-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	3 years	2 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"> Good price for the level of performance on offer 760 offers better value Vast 224GB/s memory 	<ul style="list-style-type: none"> Beats older cards, but can't compete with 760 Quieter and consumes less power than 760 	<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/OAG6277	TINYURL.COM/D5BV2NG	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
	ViewSonic VP2365-LED	BenQ GW2750HM	Hanns-G HL249DPB	ViewSonic VX2460H-LED	AOC i2353Fh
Price	£172 inc VAT	£185 inc VAT	£116 inc VAT	£157 inc VAT	£192 inc VAT
Website	Viewsoniceurope.com/uk	Benq.co.uk	Hannsg.com	Viewsoniceurope.com/uk	Aoc.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	23in	27in	23.6in	23.6in	23in
Panel type	In-plane switching	Vertical alignment	Twisted nematic	Twisted nematic	In-plane switching 3D
Native resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Pixel pitch	0.27mm	0.31mm	0.27mm	0.27mm	0.27mm
Brightness	238cd/m²	313cd/m²	247cd/m²	250cd/m²	225cd/m²
Static contrast ratio	681:1	1530:1	740:1	710:1	666:1
Response time	6ms	6ms	5ms	5ms	5ms
Ports	DVI	HDMI, DVI, VGA	DVI	2x HDMI	2x HDMI, VGA
Dimensions	548x433x250mm	654x489x191mm	563x211x403mm	581x447x194mm	550x388x188mm
Weight	5.4kg	5.6kg	3.8kg	3.5kg	5.6kg
Warranty	3 years	3 years	3 years	3 years	3 years
Verdict	<ul style="list-style-type: none"> • Better value than ever • Great quality • Good viewing angles • DVI port only 	<ul style="list-style-type: none"> • Supplies now dwindling • 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 	<ul style="list-style-type: none"> • Big price hike • Wide viewing angles • Attractive, slimline design • No DVI connection
FULL REVIEW	TINYURL.COM/5WMJLR9	TINYURL.COM/BQKT65S	TINYURL.COM/C95859A	TINYURL.COM/CSQ2H7P	TINYURL.COM/7TWLB2A

£200+ flat-panels					
	1	2	3	4	5
	Dell S2440L	LG 29EA93	Asus PA248Q	ViewSonic VP2765-LED	AOC i2757Fm
Price	£201 inc VAT	£400 inc VAT	£315 inc VAT	£273 inc VAT	£230 inc VAT
Website	Dell.co.uk	Uk.lge.com	Asus.com/uk	Viewsoniceurope.com/uk	Aoc.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	24in	29in	24in	27in	27in
Panel type	Vertical alignment	In-plane switching	In-plane switching	Advanced MVA	In-plane switching
Native resolution	1920x1080	2560x1080	1920x1200	1920x1080	1920x1080
Pixel pitch	0.28mm	0.26mm	0.27mm	0.31mm	0.31mm
Brightness	239cd/m²	300cd/m²	201cd/m²	1,200cd/m²	237cd/m²
Static contrast ratio	1200:1	560:1	630:1	378:1	660:1
Response time	6ms	5ms	6ms	25ms	5ms
Ports	HDMI, VGA	3x USB 3.0, 2x HDMI, DVI, DP	4x USB, HDMI, DVI, DP, VGA	DVI, DP	2x HDMI, VGA
Dimensions	568x191x418mm	700x209x387mm	557x416x235mm	642x365x474-608mm	622x449x130mm
Weight	3.6kg	5.2kg	6.4kg	8.5kg	5.7kg
Warranty	3 years	2 years	3 years	3 years	3 years
Verdict	<ul style="list-style-type: none"> • Premium build quality • Very good VA panel • Excellent contrast ratio • Calibrate for best results 	<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/CXWJJLM	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 but 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



More personal tech requires more personal security

We're all used to the idea of 'security' when it comes to computers. But we tend to think only in terms of stopping viruses and other malware. The more sophisticated among us may take further steps to secure our valuable data, but an increasingly important vector attack is often ignored: physical theft.

There are two important factors to consider here. For one, locking down Windows and encrypting all data won't help if your laptop is lying next to an open window. Which makes the second factor even more important: personal computers these days are a lot more personal.



Your old desktop PC was physically secure in the sense that Burglar Bill would have to break in to lift it. But technology is much more portable and desirable these days.

Most of us travel around with some or all of the following: smartphone, tablet, e-reader, laptop, camera. All are valuable, all are vulnerable. And yet we wave them about in plain sight, offering an open invitation for someone to steal our devices, and our data.

It's something that occurred to me when we were testing laptop bags (see page 74). Even the term 'laptop bag' is now a misnomer, as the best are designed to carry all the devices listed above, as well as the usual travelling detritus of packed lunch, gym kit and copy of *PC Advisor*. And it is important that they do so, not only to protect your kit from the slings and arrows of a busy commute, but also to hide your valuables.

The same rules apply as ever they have in PC security. If you are less easy to rob than your neighbour, you won't become a victim. So the best laptop bags use style as a security mechanism. If your valuable tech is secured in what to the untrained eye looks like a rucksack or metrosexual man bag, the chap next to you with a bag marked 'laptop' is at more risk on the wrong side of town. And a laptop bag that requires you to open up two zips to get at your Kindle may be occasionally irritating, but it makes your e-reader a lot more secure.

It's easy to overstate this, of course, but if you do travel with a lot of personal tech, a good bag is a good investment. Which is just as well because, as we found out, a good laptop bag is far from cheap. ☒

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