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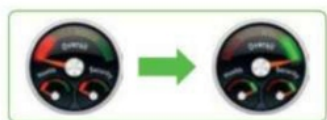

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What do you think of this issue of PC Advisor? We welcome feedback – email Matt Egan at matt_egan@pcadvisor.co.uk and include the issue number in the subject heading

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Why you should take care not to share

You can't take back what you say online – which is worrying, given Google's latest privacy changes

What did we do before the web? It's our source of entertainment and news, and one of our most important means of keeping in touch. The results of our annual Home Broadband Survey are in (see page 90) and, as usual, it's given us pause for thought on how well web access is delivered and how much we've come to rely on it.

Time was when the broadsheets decried couch-potato Brits for spending too much time in front of the TV. Now we're tweeting, chatting via IM, downloading and gossiping on our smartphones and tablets. We're not just 'getting online', as this issue's Star letter writer points out (page 8), we're using our web access in the way it was intended: as a means to do all the things connectedness engenders. We're also sharing a lot of information online.

> **"We're not just 'getting online', we're using the web in the way it was intended"**

Twitter, Facebook and, to a greater extent, Google have made sure the web is absolutely personal. Our every tweet, comment and thumbs-up about a particular story or product is duly noted. In the headline-hungry online world, the pressure's on to pass comment, break a story or add a witticism on Twitter that others will pick up and relay. Not-so-subtle ads appear next to stories in our Facebook pages and email conversations. We're constantly urged to 'like' items recommended by our friends. And competition entries and discount deals depend on our willingness to endorse a brand with a click of a button.

This trend can be traced back to Google, and some people took an instant dislike to its Gmail webmail service with its contextual ads. Since its free ad-supported email service began seven years ago, Google has added many more services, all accessible via a central login. This setup came in for criticism when Google+ came along and curiously knew an awful lot about people who had only just signed up to use it.

Now Google is taking steps to clarify what information is stored and how it's shared across its many services. Suffice to say, it's got plenty of marketable information on us all. It's keen to capitalise on both its acquisitions and its many millions-strong user base by directing ads at users of YouTube, Gmail, Google+, Picasa, Blogger and other services you may not explicitly think of as being Google Search-related. Surf the web while logged into a Google service, and you can expect to get pitched on those very topics when next you use a Google-owned service.

In February, Google stated that it intended to create "a beautifully simple and intuitive interface". Conscious of the potential outcry concerning the way it shares information across its portfolio, existing users were delivered explicit instructions to review Google's privacy policy when next they logged in. But many of us have come to depend on Google's various services, and will simply accept what's being imposed at the expense of yet more erosion of our privacy.

If they object to targeted adverts, and Google knowing all about them, Google Android tablet and smartphone users should consider anonymiser software. ☒

INBOX

Reader letters

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

facebook.com/pcadvisor

Cover star

To celebrate our 200th issue, we recently asked our Facebook fans to pick their favourite cover design and tell us why. **Tracey A Belcher** picked issue 11. "The missing jigsaw piece actually became a joke in our house – I was struggling with newfound computer technology and my kids teased me that there were a lot more pieces missing from the jigsaw in my brain!" she wrote.

Log out before leaving

When Labour MP Tom Watson left his PC unattended with the browser open on his Twitter page, a young intern took advantage. She realised her mistake when the post was re-tweeted, but it was too late to retract it. "The easy answer is to log out of Twitter/Facebook and lock your computer before leaving the office," suggested **Paul Clements**.

pcadvisor.co.uk/news

Best mobile ever

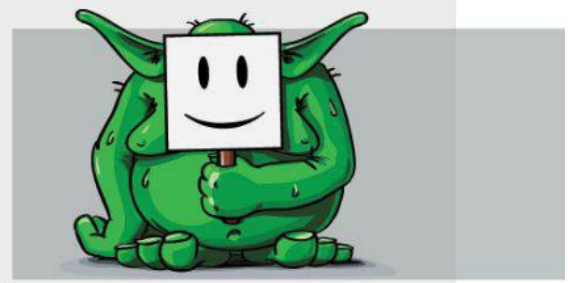
The smartphone you use is a very personal choice, so it follows that our Top 5 chart attracts rather a lot of heated debate (tinyurl.com/7gdps2h). *Steve* thinks all those getting hot under the collar would do well to take things into perspective. "Hey, I don't know why you lot are moaning. I bought an NEC 9a, with a five-year contract, and it cost me £1,750. The calls were £2 per minute. And I loved it! 1985: those were the days," he wrote. How much?!!!

Captcha caught out

We reported that security researchers had discovered a malware engine that's able to get around the Captcha codes requested by some websites to prove you're human (tinyurl.com/7bzgyov). "I could do with using that myself because I can never get them right," joked *Dave S.*

Tripped up

TripAdvisor has been slammed by the ASA for not checking the veracity of its reviews (tinyurl.com/73j2427). "I was amazed to find that one very good Yorkshire B&B I know closed down for a year and yet several people apparently managed to stay there and were very critical of the service and quality. There are so many trolls out there who seem to regard their comments as important, especially when they are anonymous," wrote *Dennis Martin.*



Cameras vs smartphones

As Nikon announced a refresh of its Coolpix compact camera line-up, *Johnyboy* wondered whether it was time for camera manufacturers to bow to the smartphone industry (tinyurl.com/7umdu7v). "Recent analysis has suggested camera sales are suffering with competition from smartphones. It would be a smarter move for camera makers to squeeze their compacts into smartphones," he wrote.

Flagged: Star letter

Browsing terminology

I see from *Inbox* in your March 2012 issue that you are in receipt of a certain amount of flak from lady readers of a certain age. I couldn't really see the problem, until I read *Nine in 10 silver surfers go online every day* (page 14). While the term 'silver surfer' is in itself patronising, the sin here surely lies in the way you still describe the use of a mainstream enabling technology as 'going online' or 'surfing the web'.

In the days when the World Wide Web was a novelty, such terms may have had some validity in describing an amusing pastime. Nowadays, with the advent of broadband, the internet has become the mainstream source of information on anything and everything, not simply a way of keeping oneself amused (irrespective of age).

If I need to unearth a telephone number or settle an invoice, it would no more occur to me to 'go online' or 'surf the web' than it would to 'read the telephone directory' or 'drop by the bank': I simply pick up my iPad, in the same way as my granddaughter picks up her mother's iPhone to help with her homework. I'm pretty certain she doesn't think of herself as 'surfing the web', let alone a 'junior surfer'! *David Farman*

BoysStuff.co.uk serious fun

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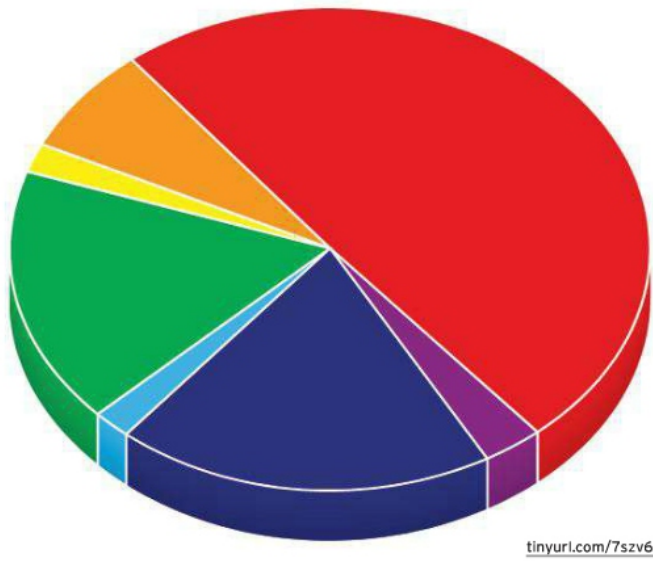
In future, the most important mobile platform will be:

- **49%** Google Android
- **3%** BlackBerry
- **19%** Apple iOS
- **2%** Symbian
- **17%** Windows
- **2%** Other
- **7%** Don't know



tinyurl.com/7szv68a

letters@pcadvisor.co.uk

Bring back the sub-£500 PCs!

Who in their wisdom decided to drop the *Top 5 Sub-£500 PCs*? Are they being paid that much that they think this is not of any value? For those of us who are scraping a living, and can't afford the latest and the best, this is a very valuable piece of content. Please, please bring it back. I have been saving my fivers for the past two years and have just reached the £500 mark and need to know how to spend it wisely! *Steve Greer*

Matt Egan, editor, replies: Thanks for your comments, Steve, which we certainly will take on board. It was feedback from both PC makers and readers that spurred the change. Unfortunately, when price alone was the delineating factor, computer makers tended to produce very similar specifications, in a desperate scramble to get in just under the price limit. Other vendors simply passed on the opportunity of taking part, as their products didn't fit into the price categories we asked for, and they felt that they would be punished for this.

The new way we structure the Top 5 charts still uses value, plus performance, features and build quality, as a deciding factor. And in each category we aim to publish products at a range of prices.

If you prefer to search for desktop computer reviews by price, you can still do this on our website (pcadvisor.co.uk/reviews).

The majority of feedback we've received has been positive, but it's possible we need to make some minor adjustments – and we will.

Inverse-Square Law

There is no point in experts warning people about possible risks, if they do not also advise them how to minimise them. Have the authors of scare stories about phone masts and Wi-Fi radiation never heard of Sir Isaac Newton, and the Inverse-Square Law?

For example, if you place a laptop on a desk it might be up to 1m from your reproductive organs. Transfer it to your lap, and it may then be a 10th of that distance from them. According to Inverse-Square Law, your organs will not ingest 10 times the strength of radiation, but 100 (10x10).

I have no idea as to how real the risks are, but I do know that by increasing the distance a little you vastly reduce the strength of radiation. Why is someone not making this clear? *Harry Leeming* ☒

Join 317,006 members: pcadvisor.co.uk/forums

Mobile platforms

We asked visitors to PCAdvisor.co.uk what they thought would be the most important mobile platform in the future; you can see the results in our pie chart (left). Although the overwhelming majority said Android would eventually dominate, we were intrigued by some of the answers given in our Speakers Corner forum (tinyurl.com/7hy96ag). That said, we're not sure everybody understood the question...

AitchBEE: "Telepathy!"

Bingalau: "I haven't a clue what half those things are. However, I was going to suggest a skateboard."

caccy: "Don't know, but I suspect it will be legs and feet."

Kevscar: "Nuclear-powered personal flyer."

Mr Mistoffelees: "I know it won't be my old steam-powered phone. Really must replace it..."

ams4127: "Android, closely followed by Windows 8 Mobile. Apple iOS has a niche market and will never dominate (but I love my iPad!)."

dms_05: "Apple will be the most profitable, but Android will dominate worldwide. An iPhone data plan in some parts of India or China is a complete year's salary. Android, however, is already available in almost affordable packages in India, which has a market the same size as the US and EU combined."

wee eddie: "It depends on one's definition of mobile. The tablet will become more powerful, enabling it to embrace business software. But phone OSes are still in their infancy, and no company would roll out one platform to their entire workforce."

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MICROSOFT REVEALS MORE DETAILS ABOUT WINDOWS ON ARM

OS for ARM devices will support Office 15 programs

Microsoft has revealed more details regarding its Windows operating system for ARM-powered devices.

Windows on ARM (WOA) is based on the company's Windows 8 code (itself still in development), and replicates familiar Windows design features, such as its desktop interface. In other ways, WOA is uniquely crafted; for example, it will require devices running it to use a system-on-a-chip design.

"WOA enables creativity in PC design that, in combination with newly architected features of the OS, will bring to customers no-compromise experiences," said Steven Sinofsky, president of Microsoft's Windows and Windows Live division.

"We created WOA to enable a class of PC with unique capabilities and form-factors, supported by a new set of partners, that expands the ecosystem of which Windows is part," he continued.

WOA: What to expect

Microsoft expects WOA PCs, based on hardware platforms from ARM-licensees nVidia, Qualcomm and Texas Instruments (TI), to ship at the same time as Intel and AMD x86/64-powered Windows 8 systems. However, it has yet to reveal when the final version of the desktop OS will be made available; the firm has previously suggested it will be ready some time this year.

The nVidia, Qualcomm and TI platforms will share what Sinofsky calls a "common WOA foundation", running the same Windows OS binaries. PC makers have been encouraged to build tablets and other WOA devices that are lightweight, thin and offer long battery life.

Like Windows 8 PCs based on x86/64 processors, WOA devices will be able to run Metro apps that were created using the WinRT application programming interface. However, they will not be able to run, emulate or port programs coded for an x86/64 environment.

> **"WOA enables creativity in design that will bring to customers no-compromise experiences"**

WOA will support hardware-accelerated HTML5 with Internet Explorer 10.0, and include a version of Microsoft's forthcoming productivity suite, Office 15 (see next page). Importantly, the Office suite preinstalled on WOA devices will be compatible with the full desktop program. The company has built each WOA application to suit touch-based interfaces, and expects them to consume minimal amounts of power.

"Some have suggested that we might remove the desktop from WOA in an effort to be pure, to break from the past, or to be more simplistic or expeditious in our approach. To us, giving up something useful that has little cost to customers was a compromise we didn't want to see in the evolution of PCs," said Sinofsky.

Rather, the main difference between traditional desktop machines running Windows 8, and mobile devices running WOA, is the replacement of Windows' hibernate and sleep options with a 'Connected Standby' power mode. When the screen is on, the device operates at full power; when the screen is dark, it enters a very-low-power mode. System-on-a-chip devices based on x86/64 processors will also feature Connected Standby.

WOA PCs will be preinstalled with the OS, drivers and necessary software. The OS will not be available for purchase as a standalone component. Fixes and applications will come via the OS, Microsoft Update and the Windows Store.

Microsoft has yet to reveal the exact launch date for Windows 8, which has been described as a "reimagining of Windows from the chipset to the experience". Microsoft was expected to release the public beta as we went to press, with a Windows 8 Consumer Preview event slated for 29 February.

See Outbox on page 146 for opinion >>

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64BIT ARM CPUs TO BE USED IN SMARTPHONES

Devices will support larger memory banks and offer better performance with demanding applications

ARM will unveil its first 64bit processors for servers and high-end smartphones later this year.

Warren East, CEO, said the 64bit processors, which currently answer to the codenames Atlas and Apollo, will be licensed to device makers and based on the ARMv8 architecture.

Don't expect to see these processors available in consumer devices any time soon, though. The chips will be in volume production by 2014, and will then reach devices, said East.

This time gap between the introduction of a processor and its implementation in consumer devices is a long-standing trend. Unveiled in 2007, ARM's Cortex-A9 processor didn't reach

smartphones and tablets until 2011. And we're not expecting to see the fruits of its Cortex-A15 CPU until later this year.

Smartphones running 64bit CPUs will deliver better performance than devices fitted with 32bit chips. The new CPUs will also be able to support a wider range of applications in Windows and Linux.

It'll prove a timely upgrade for mobile devices, as manufacturers begin fitting larger memory banks and smartphones and tablets are increasingly called on to run demanding applications.

Nathan Brookwood, principal analyst at Insight 64, said the move is also inevitable: many of today's mobile devices are packed with 2GB of RAM, and current 32bit CPUs support only up to 4GB. This doesn't leave much room for improvement.

For servers, a 64bit CPU is a no-brainer: the applications and requirements are already there, said Brookwood. Servers require large memory blocks and 64bit programs already exist.

Apple iPad 3 tablet PC rumoured to launch in March

Internet rumours suggest the tablet will be powered by the previously unseen Apple A6 processor

The Apple iPad 3, which could be powered by a quad-core processor known as the A6, looks set to launch this month.

According to the Boy Genius Report website, which published a selection of photos from a source who claimed to have a prototype of the tablet, the processor carries the codename S5L8945X.

The A4 processor used in the original iPad and the iPhone 4 featured the codename S5L8930X; the A5, which powers the iPad 2 and the iPhone 4S, goes by the name S5L8940X. The website therefore assumes that the new code signifies an upgraded processor, aka the A6.

The news comes as All Things D reported that the iPad 3 will launch in the first week of March. The website went so far as to say it would be unveiled at the Yerna Nuena Center for Arts in San Francisco.

All Things D said the tablet will include a 2048x1536 Retina display and a "much faster chip, sporting an improved GPU".

Apple is not committing.

Microsoft Office 15 beta coming this summer

A version of the office suite will be compatible with Windows on ARM devices

The beta version of Office 15, the next instalment of Microsoft's office productivity suite, will be released this summer.

Office 15 is the codename for the successor to Microsoft Office 2010, which was released in June 2010.

Very few details have been released about the suite, although Microsoft has confirmed that a version of the software will be compatible with WOA devices (see previous page).

"Office 15 is the most ambitious undertaking yet for the Office division. For the first time ever, we will simultaneously update our cloud services, servers, and mobile and PC clients for Office, Office 365, Exchange, SharePoint, Lync, Project and Visio," said PJ Hough, CVP of development in the Microsoft Office division.

"Office 15 will help people work, collaborate and communicate smarter and faster than ever before."

A Technical Preview was released in January, for which a select group of Microsoft customers were asked to take part.

"These customers play a key role in our development process by testing early builds and providing feedback," said Hough.

2 in 5 children have seen adult content on a mobile phone

More than two in five (21 percent) of the UK's 8- to 15-year-olds have accessed inappropriate content from their mobile phone, said The Carphone Warehouse. Research by the retailer revealed this behaviour hasn't always been intentional: some children go looking for adult content, but others stumble across it. Around 2.8 million children in the UK own a smartphone, but only 13 percent have the appropriate security settings configured.

MORE: tinyurl.com/7sf7ekh

UK's over-55s shop hard online

Over-55s are the UK's biggest online shoppers. Basekit.com has found that 86 percent of this age group regularly purchase goods on the web, while 36 percent do most of their shopping online and 6 percent predict all their future purchases will be made in this manner. Meanwhile, 13 percent of 25- to 34-year-olds never buy goods online.

MORE: tinyurl.com/85awazp

4G LTE Cornwall trial extended

A trial of 4G LTE broadband in Cornwall, conducted by Everything Everywhere and BT, has been extended until June. Ofcom has agreed to extend the licence for the test, which utilises 10MHz of the 800MHz spectrum currently used for terrestrial TV broadcasts to bring wireless internet access to 180 residents.

MORE: tinyurl.com/6m244as

AVERAGE UK BROADBAND SPEED IS 7.6Mbps

Broadband connection speed is 22 percent faster than it was in May 2011

The UK's average broadband speed is 7.6 megabits per second (Mbps), according to Ofcom.

This figure was revealed in the regulator's *UK Broadband Speeds* report, which was compiled with reference to the tests conducted in partnership with SamKnows.

The average broadband speed is 22 percent faster than it was when Ofcom last published this report, in May 2011. Then, the average broadband connection was pegged at 6.8Mbps.

The regulator also revealed that in November last year more than half (58 percent) of UK residential broadband connections had an advertised achievable speed of 10Mbps or above.

Ofcom said this is a result of more consumers upgrading to high-speed packages, but highlighted that 42 percent of Brits would be able to achieve 10Mbps at little or no extra cost simply by switching their ISP.

"It is encouraging that speeds are increasing and consumers have a real choice of broadband service. There is an opportunity for consumers to look at the deals in their area to receive the best value, speeds and performance," said Ofcom's CEO Ed Richards.

In September 2011 the Committees of Advertising Practice (CAP) issued new guidelines that were designed to clamp down on the use of phrases such as 'unlimited' and 'up to' in broadband advertising.

Under the guidelines, which are due to come into force in March, any maximum speed claims used in broadband advertising must be based on actual experience of users, and ISPs must be able to demonstrate that these speeds can be achieved by at least 10 percent of its customers.

Based on recent research, Ofcom suggests that these guidelines will see 8Mbps packages reduced to 6Mbps, and up to 20- or 24Mbps services brought down to around 14Mbps.

SKY TO LAUNCH FIBRE-OPTIC BROADBAND SERVICE

Sky Broadband is to launch a fibre-optic service in March, offering download speeds of up to 40Mbps.

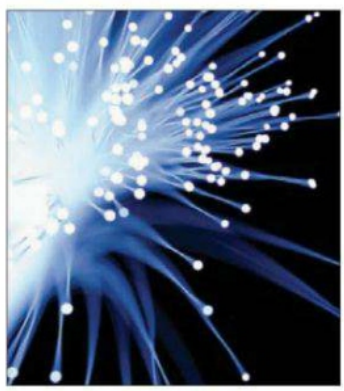
The service will include an unlimited bandwidth allowance that's not subject to a fair-usage policy, but will be available only to Sky TV customers.

Sky will charge a monthly premium of £20 for its fibre-optic broadband service, from £20 for the TV package, plus £12.25 for line rental. A £50 one-off installation fee is also applicable.

Sky Broadband said its fibre-optic broadband service will be available to around 30 percent of UK homes at launch time. This coverage will increase as BT continues to roll out its fibre-optic service across the country.

Furthermore, Sky Broadband revealed it will soon launch a public Wi-Fi service. This will allow Sky Broadband Unlimited customers to log into – and use more than 10,000 wireless hotspots across the UK. The Wi-Fi service is powered by The Cloud, which was purchased by Sky in January 2011. It will be available at high-street chains, including the likes of Pizza Express and Wagamama.

Virgin Media 100Mbps available to 10 million UK homes



Fibre-optic rollout expected to complete this spring

Virgin Media is ahead of schedule on the rollout of its up to 100Mbps broadband service.

The ISP said the super-fast broadband package, which launched in October 2010, is now available to 10 million UK homes. Virgin Media initially expected 12.7 million UK homes to be able to access the service by mid-2012, but now believes the rollout will complete as early as spring.

"Soon, half the country will be able to get super-fast 100Mbps broadband from us. Reaching this milestone puts us ahead of schedule as we help propel the UK up the global broadband rankings," said Jon James, executive director of broadband at Virgin Media.

"Broadband is coming of age as more people give up on slow DSL in favour of super-fast fibre-optic speeds," James added.

>> PC ADVISOR HOME BROADBAND SURVEY, PAGE 90

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What cybercriminals do

We all know that we have to protect our personal data, but what happens when it is compromised? Meridith Levinson investigates

When online clothes shop Zappos notified its customers that their names, email addresses, billing and shipping addresses, phone numbers and the last four digits of their credit-card numbers may have been exposed during a data breach in January, it emphasised that "critical credit-card and other payment data was NOT affected or accessed".

That's a relief for the 24 million customers whose information may have been compromised in the breach. They don't have to be concerned about finding mysterious charges on their credit-card statements at the end of the month. Yet.

So what do they have to worry about? According to experts, the most likely security risks for consumers range from the annoying (more spam in their inboxes) to potentially much more dangerous targeted phishing emails. Here, the sender disguises themself as a trusted individual or organisation to trick the recipient into clicking a link that will download malware on to their computer or giving the sender confidential information such as a password, credit-card or National Insurance number.

The hackers who infiltrated Zappos' databases accessed a bundle of information. Other breaches, such as some of the web server attacks perpetrated by hacktivists, expose only names and email addresses. Whether large or small, these breaches raise a number of questions.

Why is data valuable?

Personal information is the currency of the underground economy. It's literally what cybercriminals trade in. Hackers who obtain this data can sell it to a variety of buyers, including identity thieves, organised crime rings, spammers and botnet operators, who use the data to make even more money.

Spammers, for example, might get a fresh list of email addresses to which they can send Viagra offers and the like. They make money (say 50p per click) from response rates or website/pop-up ad impressions. Meanwhile, identity thieves could use the email addresses to create a phishing scheme designed to trick people into giving up their bank-account or credit-card numbers.

Rod Rasmussen, president and CTO of Internet Identity, a US internet security company, said cybercriminals trade this information among each other to create a more complete picture of an individual. "You put together more information on people so you can do more damage. You get their name, credit-card number, PIN, email address and phone number from different sources to get their full information."

What is the monetary value?

A name or email address is worth anywhere from fractions of a penny to £1 per record, depending on the quality and freshness of the data, according to security experts.

"There's so much data flowing around, you have to have lots of it to get paid in the underground," said Rasmussen. "Even credit-card numbers are going for under $1."

> **"You put together more information on people so you can do more damage"**

That may not sound like a windfall, but multiply it by millions of records and it quickly adds up. Take the Zappos breach as an example: if hackers sold 5 million of the 24 million customers' email addresses at 5p each, they'd make £250,000.

Botnet operators make even more money. Say you own a botnet that consists of 100,000 computers. You may rent it out to spammers for £500 to £1,000 per hour, said Stu Sjouwerman, founder and CEO of KnowB4, a provider of internet security awareness training. If you rent or buy the 24 million records from Zappos' so that you can then send malware to those email addresses, even if only 20 percent of recipients get infected and your malware takes control of their computers, you've still grown your botnet by about 5 million computers with very little work.

"You can then charge $5,000 an hour instead of $1,000 per hour for 5 million bots that start sending spam," said Sjouwerman. "These guys make money hand over fist." Of course, their illegal activity also means criminal charges, jail time and financial restitution.

What do cybercriminals want?

All cybercriminals require to start making money is an email address. They can then inundate a victim's inbox with spam.

To steal people's identities or commit credit-card fraud, cybercriminals need a password, credit-card or National Insurance number. If they have people's email addresses, they can sometimes obtain sensitive data by sending phishing emails or distributing malware via email. Some malware installs keylogging software that records usernames and passwords when they log into their various online accounts. If one of those accounts is a bank account, cybercriminals can quickly empty it.

If cybercriminals get only the last four digits of your credit- or debit-card number, they may be able to use it to reset your password on an e-commerce site, said Rasmussen. They'll then be able to start making purchases using your account. But more likely, he added, "They'll sell that information to someone else who will do some other attack."

How long before something happens?

The period of time between a criminal getting their hands on your data and unauthorised charges appearing on your statement depends on the criminal and the data they obtained, said Rasmussen. If credit-card numbers are involved, fraudsters will start using that information immediately.

Cybercriminals who use emails for phishing schemes may also act quickly. To trick more people into downloading malware on to their computers or giving out sensitive information, cybercriminals may send a fake breach disclosure notification asking victims to reset their passwords on a website that looks real but is, in fact, fake, before the company that was hacked sends out a disclosure notice, said Sjouwerman.

That's why it's critical for organisations whose customer information has been compromised in a breach send out a

with your personal data

notification as soon as they know what happened and who was affected. Rasmussen added that the EU is considering a law that would require companies to notify customers of breaches within 24 hours.

What are the risks?

If your email address was compromised in a security breach, you can expect more spam, phishing emails and malware in your inbox. The malware could allow cybercriminals to take control of your PC so that it becomes part of a botnet. It could allow them to activate the webcam or microphone on your PC so that they can spy on you. It could also download keylogging software so that the criminals can record your passwords.

If hackers obtain more information than just your name and email address – perhaps your phone number, address and the last four digits of your credit-card number - they can create more convincing and effective phishing schemes that can ultimately lead to identity theft and credit-card fraud.

What are the odds?

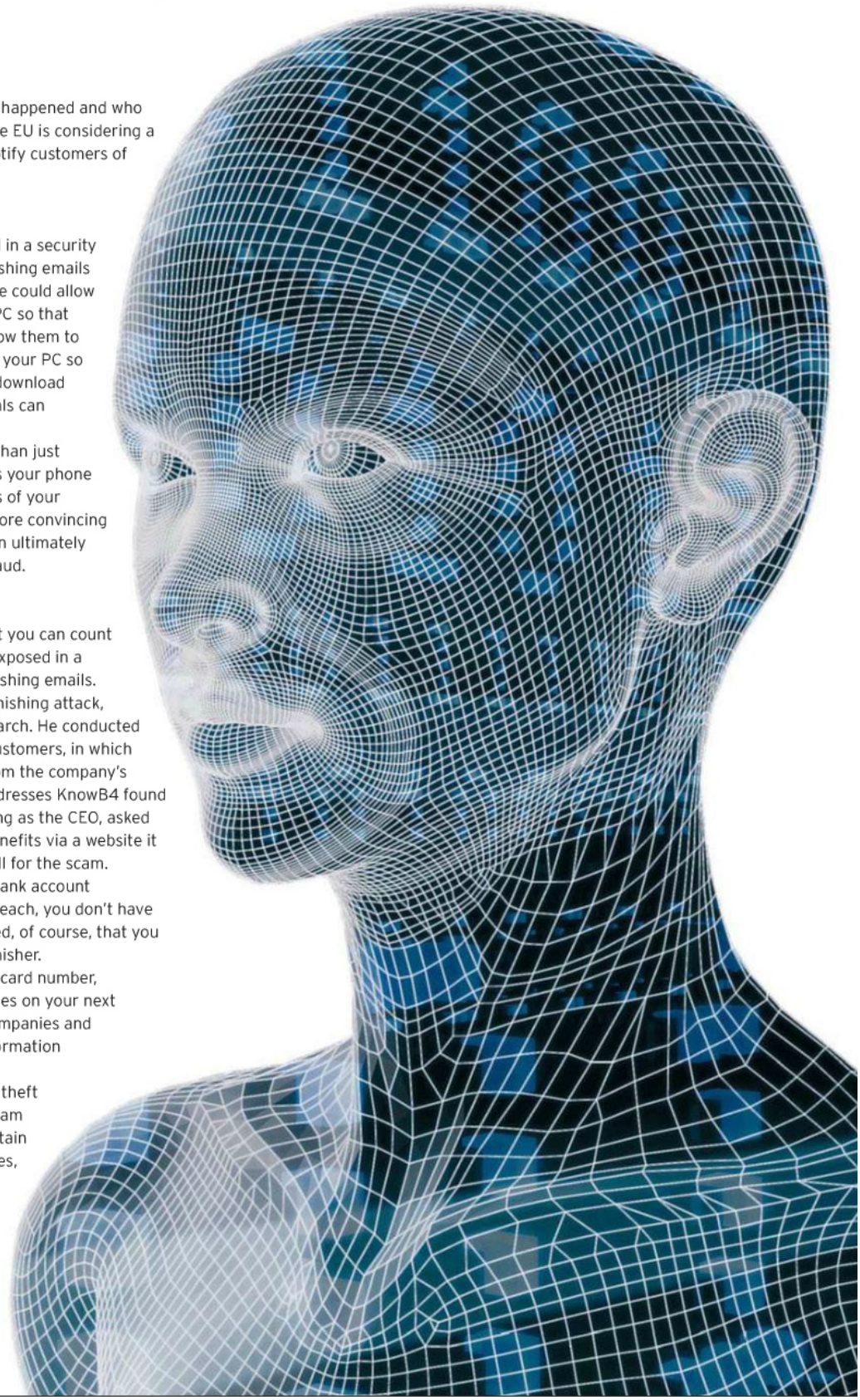
Rasmussen and Sjouwerman agree that you can count on getting more spam if your email is exposed in a breach. You also need to be wary of phishing emails.

Four in 10 individuals will fall for a phishing attack, based on Sjouwerman's anecdotal research. He conducted an experiment with one of KnowB4's customers, in which KnowB4 sent a fake email, allegedly from the company's CEO, to 100 employees whose email addresses KnowB4 found on the web. In the email, KnowB4, posing as the CEO, asked employees to make changes to their benefits via a website it spoofed. Forty percent of employees fell for the scam.

Unless your credit-card number or bank account information was compromised in the breach, you don't have to worry about financial fraud – provided, of course, that you don't later give that information to a phisher.

If hackers make off with your credit-card number, you can expect to find fraudulent charges on your next bill, and you should alert credit-card companies and credit-reporting agencies that your information may have been compromised.

Not all breaches will lead to identity theft and credit-card fraud – or even extra spam and phishing emails. Even if hackers obtain only people's names and email addresses, what troubles people the most, said Rasmussen, "is the feeling of being victimised: somebody, without your permission, has published something about you". ☒



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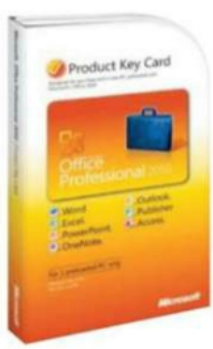

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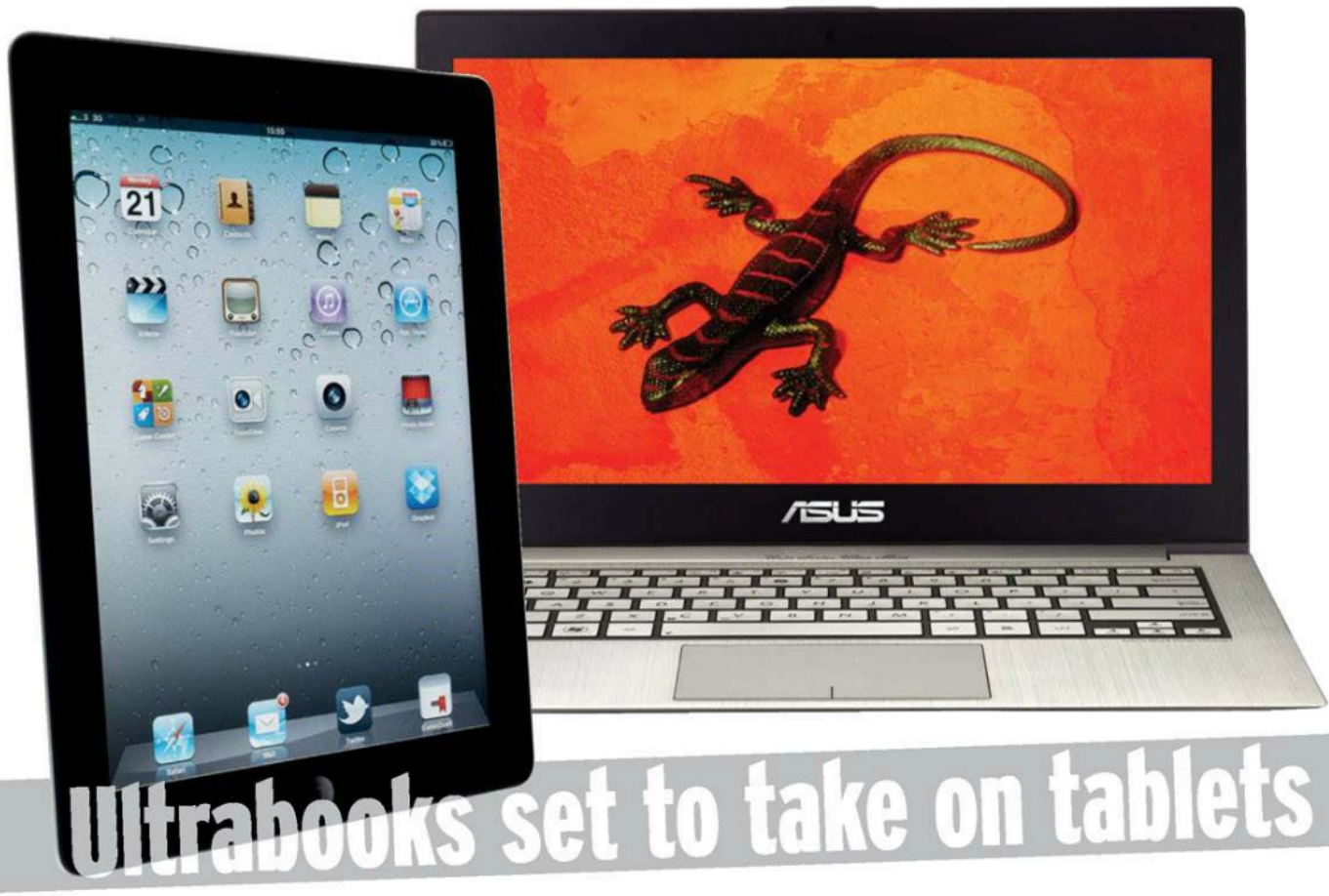


Ultrabooks set to take on tablets

Tony Bradley assesses the impact Ultrabooks will have on the growth in sales of tablets

A report from analyst firm Juniper Research forecasts that shipments of Ultrabooks will grow three times the rate of tablets over the next five years.

The initial reception and anticipation of the Ultrabooks category announced late last year is impressive. But if we look closer at the stats, the tablet really isn't in any danger of being relegated to irrelevance by the new class of laptops any time soon.

For starters, Juniper Research caveats the statement comparing the growth rates of Ultrabooks and tablets by pointing out that tablets are still expected to ship in higher volumes than Ultrabooks. Juniper Research predicts that there will be 253 million tablets shipped in 2016, compared with a mere 178 million Ultrabooks.

Define 'Ultrabook'

We don't doubt that Ultrabooks will be a huge success. But we do have some reservations about calling the Ultrabook a new type of laptop. It's simply the natural evolution of netbooks and laptops.

Ultrabooks may be different to existing laptops and netbooks in several ways, but they're still just laptops. The real issue is whether or not the umbrella category of 'laptop' remains relevant, or if its role as a mobile-computing device has been permanently usurped by the increasing popularity of tablet PCs.

Perspective on growth

The assertion that the growth of Ultrabooks will be triple that of tablets over the next five years is as misleading as it is true. Yes, the growth of Ultrabooks may indeed be three times greater, but tablets are a more mature market, while Ultrabooks are a freshly minted product category.

We're just making these numbers up to illustrate, but going from 100 to 200 is technically 100 percent growth, but hardly as impressive as the 10 percent growth of going from 100 million to 110 million.

Windows 8: friend or foe?

Windows 8 will play a pivotal role in driving Ultrabook adoption. Features such as extended battery life, always-on, always-connected and other functionalities expected with Microsoft's forthcoming OS will help generate interest in the Ultrabook segment.

Of course, Windows 8 may also ignite a surge in tablet sales. There are many users waiting with great anticipation to see what Windows 8 tablets have to offer. If the OS can deliver solid performance and features in a tablet-form-factor at the right price, it has the potential to slow Ultrabook sales as much as or more than it creates them.

Balancing act

Daniel Ashdown, author of the Juniper Research report, explains: "While Intel's control of the brand ensures that Ultrabooks stand out from traditional notebooks, vendors face a balancing act in terms of product strategy. Meeting Intel's specification secures brand status and funding, but the step-change from notebooks means many of today's Ultrabooks are too expensive for consumers."

Ultrabooks require a steeper investment than the selection of bargain laptops one might find at their local supermarket. For those with the extra pocket change, though, they combine the power and capabilities of a Windows laptop with the features and benefits of a tablet to create a hybrid device that is superior to both the traditional laptop and the tablet PC.

The challenge for Ultrabook vendors will be to find the sweet spot where price meets performance, at a place that the masses can actually stomach. They must also avoid simply cannibalising sales of traditional desktop or laptop PCs.

The final version of Windows 8, the next iteration of Microsoft's operating system, is due to go onsale this year. There's been plenty of news about what features to expect, but few details about the hardware required to run Windows 8 have been forthcoming – specifically in regard to tablets. And that's odd, since Microsoft demoed the OS on a Samsung tablet PC at its Build conference in September.

We expected January's CES tradeshow to be littered with Windows 8 tablets; it, too, was surprisingly quiet on this front.

The same three companies that showed off Windows 8 running on ARM processors at Build were in the mix once more at CES. nVidia demoed Windows 8 running smoothly on a reference platform, the Qualcomm tablet already seen at Build made an appearance, and Texas Instruments also displayed a Windows 8 reference platform.

A few Chinese manufacturers demonstrated generic tablets running Windows 7, but only one spoke specifically about its Windows 8 plans: Kupa ran the Windows 8 Developer Preview on its X11, a tablet that's currently available running Windows 7 on an Intel Atom Z670 processor. It said the X11 was Windows 8-ready, thanks to its 1366x768-pixel, 16:9 display (which matches Microsoft's optimised target for Windows 8), and a specification in line with the Samsung Series 7 tablet demoed by Microsoft at Build.

As well as this 1366x768-pixel resolution, Microsoft has stated that a tablet PC will require a minimum of 1GB available memory, a 720p camera and Direct3D 10 support.

Furthermore, all Windows 8 tablets and tablet-laptop hybrids must have at least five hardware buttons, for power, rotation lock, volume up, volume down and a Windows key. Tablets must support five touch points at a time, and include an ambient light sensor (most likely for auto brightness adjustments), a magnetometer (for compass applications), an accelerometer and a gyroscope (for motion controls).

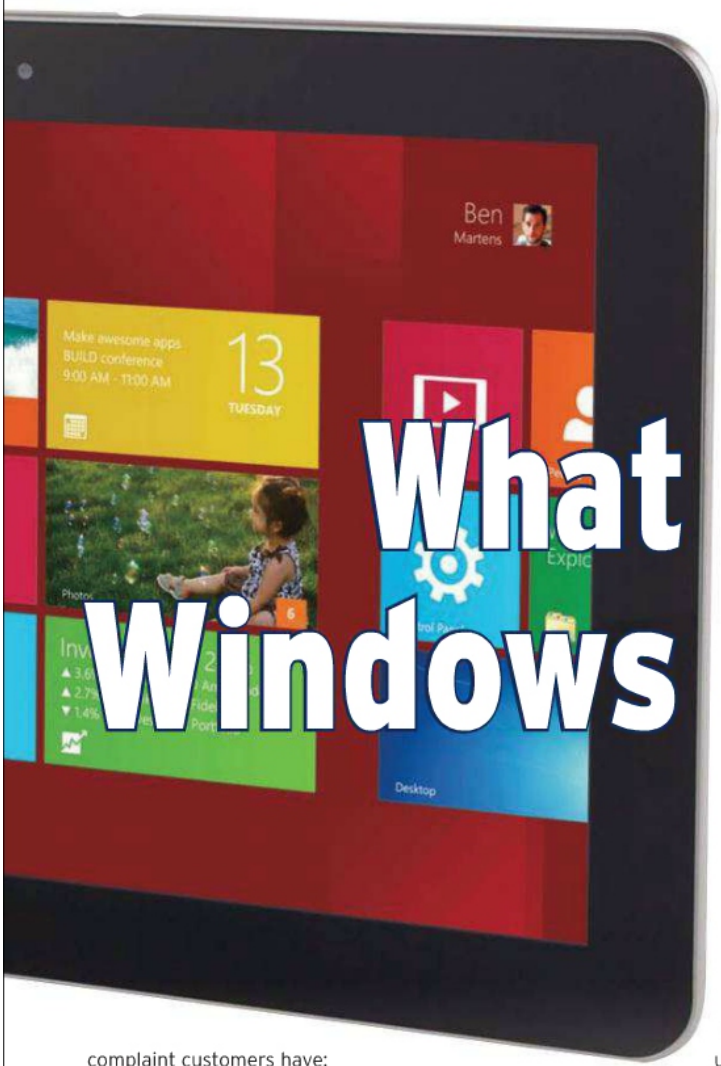
Microsoft has not stated minimum processor and system memory requirements, but has said that all Windows 7 machines will be able to run Windows 8. The Windows 8 Developer Preview listed requirements of a 1GHz processor, plus either 1GB or 2GB of RAM for 32- and 64bit systems respectively.

Not ready to talk

Beyond the few demonstrations we've mentioned, few tablet makers were ready to talk about their Windows 8 plans, nor even to discuss what we might expect to see in that form-factor. Even Samsung had nothing to add to the information we already have.

Paul Moore, senior director of product development at Fujitsu, hinted that Microsoft is encouraging a clean look on tablets that will run the new OS. But it's "been a bit vague so far", he admitted.

Fujitsu's Stylistic Q550 tablet runs Windows 7 on an Intel Atom CPU, but the company plans to roll out some updates to its specification by mid-2012. It hopes to boost performance for better video playback. "That seems to be the biggest challenge on Atom," Moore said. "And that's the noticeable



What to expect: Windows 8 tablets

Little has been heard or seen of Windows 8 tablets, as yet. Jared Newman and Melissa Perenson find out where they are and what's to come in the future

complaint customers have: the video is a little choppy."

The CPU question

It remains unclear as to whether Microsoft will hold any advantages in the tablet market when Windows 8 goes onsale. That's in part because Microsoft hasn't yet clarified if and how existing Windows apps will work on ARM processors. ARM tablets will have a distinct weight, power and potentially price advantage over tablets running x86 processors, which makes the ARM tablet space an intriguing one to watch.

Expecting an onslaught of ARM-based tablets, Intel is readying a dual-pronged defence. Its single-core 'Medfield' platform built for Android is expected in the second quarter of this year; while 'Clover Trail', designed specifically for Windows 8, will come later in 2012. Clover Trail will replace the Atom chips used in most Windows 7 tablets available today – only Samsung, with its Core i5-based Series 7, has released a Windows tablet that uses the beefier CPU common to laptops.

Always-on operation

Qualcomm demoed the second public Windows 8 build of its reference system at CES, this time showing it with the connected standby feature enabled. Connected standby, a state in which the system powers down but can be immediately resumed, will enable Windows 8 tablets to save power and extend battery life.

"Microsoft has discussed this new [to its OS] concept of always-on, always-connected. We see this as a marriage of smartphone functionality and computing," said Steve Horton, director of software and product management at Qualcomm.

While tablet makers remained tight-lipped when asked how ARM platforms will influence their tablet designs, the use of ARM processors will no doubt keep things interesting. In a previous conversation at Build, Horton noted that there's no restriction on ARM tablet designs beyond a 16:9 display. This aspect ratio allows the display to match the optimal screen size for Windows 8's Metro interface.

When asked about Windows 8 tablets running on ARM processors, senior designer Junghwan Hong and principal designer Sangwon Yoon, who were involved in creating the lightweight Samsung Series 9 laptop, shied away from the specifics. They did admit that the prospect of ARM processors presents a new design opportunity and challenge, however.

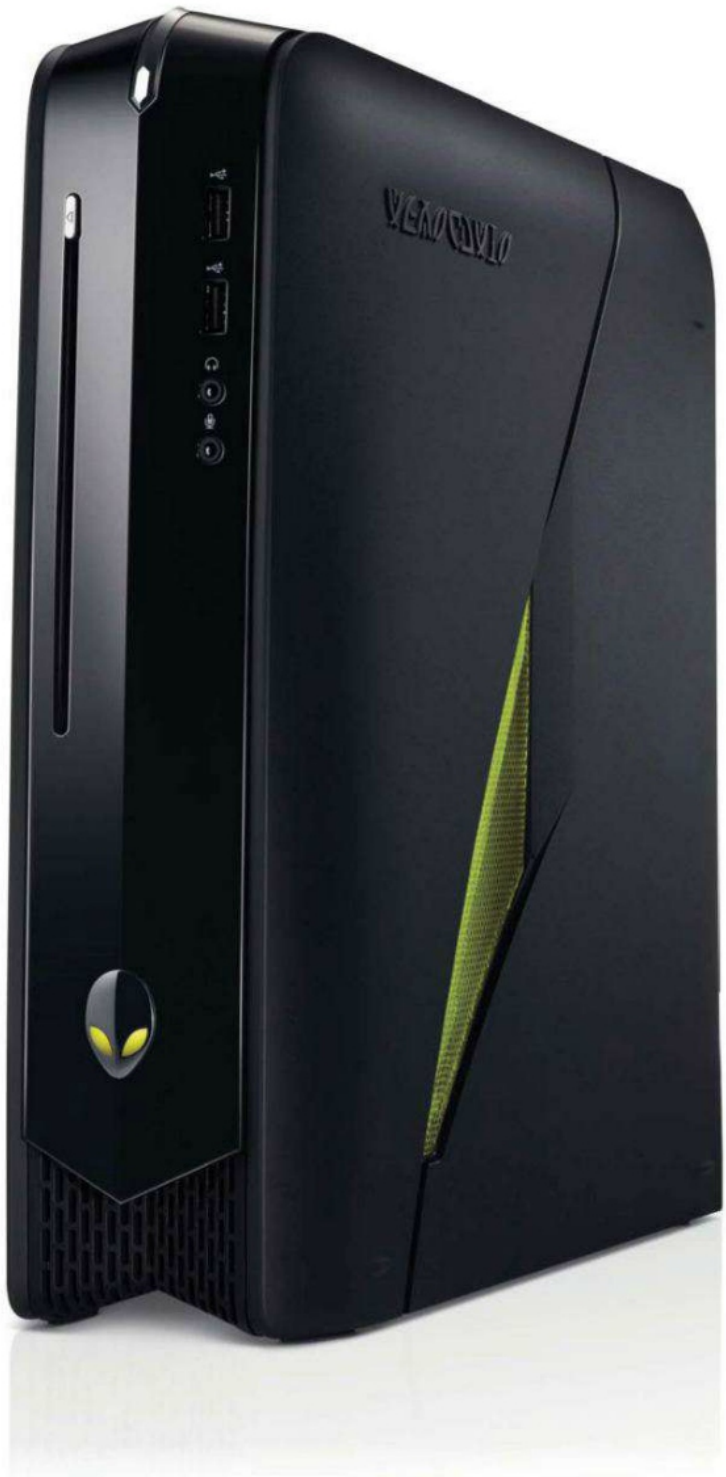
"As designers, we are studying ARM," said Yoon. "We have a lot of different form-factors for ARM devices. ARM has no [cooling] fans, so that's a good feature."

Yoon explained one logistical challenge designers are facing: the probable low price of ARM tablets restricts the use of "fancy" materials, yet still the tablet must look good.

Without any solid teasers to cling to at CES, 2012 promises to shape into an interesting year for tablets running Microsoft's next operating system. ☒

NEWPRODUCTS

Rosemary Hattersley and Carrie-Ann Skinner showcase the most eye-catching new slices of electronic cleverness



<< Dell Alienware X51

Desktop PC

Alienware gaming machines have never been subtle in design. The X51 isn't either. It offers a nod in the direction of the games consoles with which it directly competes. Intel Core i5 and i7 versions are offered, while the slot-loading DVD drive can be swapped for a Blu-ray version. Gamers will be more interested in the nVidia GeForce GTX 545 or 555 graphics card options and 8GB of video RAM. A 1TB hard drive is also included. Read our review at tinyurl.com/7vwgaq2

From £699 inc VAT

dell.co.uk

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Olympus OM-D

Micro Four Thirds camera

The OM-D is a mirrorless Micro Four Thirds camera, but it differs from Olympus' PEN line-up with an updated Live MOS. Olympus claims its autofocus is faster than that of any interchangeable lens camera. Specifications include a 3in touchscreen, 1080i video recording, a 4.2fps burst mode, five-axis sensor-shift image stabilisation and a detachable flash. The OM-D will be able to make use of lens built for PEN cameras.

£995 inc VAT (body only)

olympus.co.uk

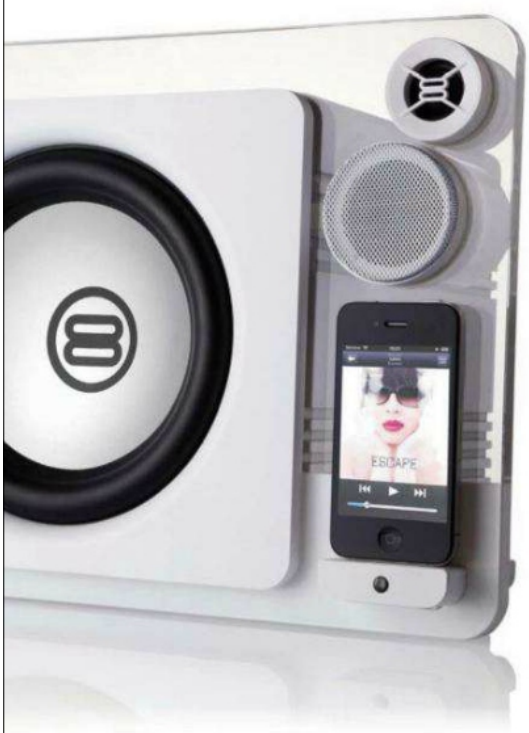
Toshiba AT200

Tablet PC

Toshiba's AT200 – aka the Excite – runs Google Android 3.2 and is billed as the world's thinnest 10.1in-screen tablet. A mere 7.7mm thick, it comes with 16GB or 32GB of storage and has Wi-Fi and Bluetooth built in. The AT200's 1.2GHz TI OMAP 4430 processor is twinned with 1GB of DDR2 RAM. A pair of 1.5W speakers, and 5Mp and 2Mp cameras are embedded in the 535g tablet's 256x176x7.7mm chassis.

£399 inc VAT (16GB)

toshiba.co.uk



Bayan Audio 7

iPod dock

Bayan's sleek Audio 7 can hold and charge a pair of iPods simultaneously. Inside, an 8in subwoofer and twin amplifiers create 120W audio output. The speaker dock has 1in tweeters and a wide audio spectrum. The subwoofer is housed in a solid wood case, resulting in distortion-free, natural-sounding playback.

£299 inc VAT

bayanaudio.com

Pentax K-01

Digital camera

The Pentax K-01 is a 16.28Mp interchangeable-lens camera with a 6fps burst mode and a remarkably high ISO range that stretches to 25,600. Pentax says the lens, which is just 40mm deep, is the thinnest swappable lens currently available. The camera uses an APS-C CMOS, has a 3in LCD and can capture full-HD video at 30fps (or 720p at 60fps).

£629 inc VAT (body only)

pentax.co.uk

Samsung Galaxy S Advance

Smartphone

Powered by a 1GHz dual-core processor, Samsung's Galaxy S Advance Google Android 2.3 handset features a 4in SuperAmoLED touchscreen and offers Wi-Fi and HSPA connectivity. There's a 5Mp camera with LED flash on the rear, plus a 1.3Mp front camera for video chat. The 123x63x10mm Advance weighs 120g and comes with 8GB or 16GB of storage.

Price TBC

samsung.co.uk

Kidz Gear Wired Headphones

Sound-limiting headphones

Parents will want to protect their child's sensitive hearing, which can be damaged by loud noise, so Kidz Gear has unveiled a pair of sound-limiting headphones. A volume rocker attached to the cable enables parents to ensure their requests for the volume to be turned down don't fall on deaf ears.

£19 inc VAT

gearforkidz.com

PowerFreakz Evolution 3000

Solar charger

The PowerFreakz Evolution 3000 solar charger has a 3,000mAh lithium-ion battery, which provides a 500mAh charge. The device comes with a selection of tips that connect it to a range of phones, MP3 players, digital cameras and portable games consoles. The Evolution can be plugged in to a mains power supply or be placed on a sunny ledge to soak up solar energy.

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powerfreakz.com

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Canon Selphy CP810

Photo printer

Canon's Selphy CP810 claims to print 6x4in photos in under a minute, and it can also produce credit card-sized snaps. It comes with preloaded layout software for creating business and photo ID cards, while a 6.7in colour LCD makes it easy to preview and adjust photos before printing. An optional battery pack means you can take the Selphy on the road; 10GB of online storage for your photos may also come in handy here.

£99 inc VAT

canon.co.uk

Optoma HD23

Projector

Optoma's HD23 home-cinema projector supports full-HD video at 24fps and can produce a 5m image. Brightness is rated at 2,500 Ansi lumens, while a contrast ratio of 5,000:1 means you won't need a fully blacked-out room to view the action. Whisper-quiet operation is promised, while the Optoma consumes less than 1W in standby mode.

Price TBC

optoma.co.uk

Fujifilm X-S1

Digital camera

Fujifilm's X-S1 is a 12Mp bridge camera with a 26x optical zoom lens. Images can be previewed on its electronic viewfinder and reviewed on the tiltable 3in LCD. A daylight mode attempts to compensate for glare.

A 10fps burst mode is available at 6Mp, and 7fps at 12Mp. The camera has a shutter lag of just 0.001 seconds. Despite firing off shots in such quick succession, the camera has a CIPA-rated battery life of 500 shots per charge.

£699 inc VAT

fujifilm.co.uk

Magellan eXplorist 110

GPS device

Magellan has announced an entry-level model in its eXplorist range of outdoor GPS receivers. The device has a 3in colour touchscreen, is accurate to 3m, and can store hundreds of waypoints on its internal memory. Rugged and waterproof, it's well-equipped for outdoor use. A 3.2Mp camera and voice recorder also feature.

£99 inc VAT

magellan.com

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ANDREW HARRISON

Replicants like any other machine

Everyone likes a bargain, and we hate to pay over the odds for a product or service that's available cheaper elsewhere.

There are brands that have a reputation for premium quality (and prices), and there are those that put themselves forward as the people's champion, supplying decent products at everyday prices.

Samsung is a perfect example. The technology giant puts sophisticated consumer goods into our hands at affordable prices. South Korea's super-brand has huge economies of scale to tap into, driving prices down. With the help of its mass-production of microwaves, washing machines, televisions, cameras, phones and computers, boxes of modern conveniences have filled the needy corners of our houses and our lives.

Copycat technology

Innovation isn't the company's strong point. Instead, Samsung majors in surveying the market to see what's popular, what works, what sells, and then making its own version. In established areas of tech, such as washing machines and vacuum cleaners, there are few wheels to reinvent, so it can go along with other appliance-churners.

But when Samsung sets its eye on cutting-edge computing and smartphone technology, the competition can take exception at what it sees as copying its original ideas. Few people will have missed the on-going soap opera that is Apple and Samsung winning frequent-flyer seats in international high courts. The stakes are high, as much in brand reputation as in the financial reward from awarded damages or by removing the infringing product from sale.

On one side is Samsung, with its popular Galaxy phone and tablet tributes; on the other is Apple trying to protect its ideas and designs from being diluted by lookalike products, and looking like a sulking spoilsport for its troubles.

Can it be coincidence that Samsung's most popular smartphone and tablet PC, the Galaxy S II and Galaxy Tab 10.1, bear a close resemblance to the iPhone and iPad?

One gets the idea that Apple would really rather retaliate against Google for emulating its mobile OS in the first place, more than just Samsung for selling Android on hardware that tries so hard to copy its product. But this war is by proxy so far, with Samsung in the firing line.

And the fact remains that people like a bargain. While the Galaxy Tab ultimately failed to make much of a dent in iPad 2 sales, Samsung's Galaxy S II has picked up numerous awards as a winning smartphone – it's even won our own award for Best Smartphone of the Year (see page 84). That's as much for the value it seems to offer: all the touchscreen goodness of the iPhone, available in your pocket for less.

Google smartphones like the Galaxy fill an important place for people who don't mind if their smartphone's only almost as good as the original. They're good enough for those who can overlook minor shortcomings, such as flaky browsers and frictional interfaces.

And Google phones are compelling for anyone who likes to tinker or install apps outside of a single point of delivery. The semi-open-source nature of Android appeals to hackers and hot-rodders.

But Android's huge market share mostly comprises people who just want what they see as a bargain, a phone that can surf the net and play games and give them their Facebook updates. A phone they think or have been told is every bit as good as an iPhone, but is cheaper to buy on a monthly subscription plan.

Premium Google phones are nipping at the heels of the iPhone, and the Galaxy Nexus is the latest Samsung-Google co-production to define the state of the Android art. Turn to page 32 to see how the Nexus 3 squares up as the everyman alternative.

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GRAPHICS CARD

HIS 7970 3GB

£480 inc VAT

Contact
■ hisdigital.com
Read more
■ tinyurl.com/6uzrvxc

Specification
AMD Radeon HD 7970; 3GB GDDR5 RAM; 925MHz core clock; 1,375MHz memory clock (5.5GHz DDR effective); 400MHz Ramdac; 384bit memory interface; 2,048 stream processors; 128 texture units; 32 ROP units; PCI Express; 1x 6-pin and 1x 8-pin power connectors; DirectX 11.1; DVI; HDMI; 2x Mini-DisplayPort

Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★☆
Value: ★★★½☆
★★★½☆

The Radeon HD 7970 is the new top-end graphics chip in AMD's 'Southern Islands' series. It's the first chance we've had to see AMD's Graphics Core Next architecture. Created using a 28-nanometre (nm) manufacturing process, the HD 7970 has some fantastic specifications.

The most powerful card in the previous range was the 6990, comprised of two GPUs, so it makes sense to compare the 7970 with the single-GPU 6970. Whereas that card came with 2GB memory, the 7970 packs 3GB of GDDR5, in effect quadrupling the 1,375MHz memory clock to a staggering 5.5GHz.

The default memory clock is the same as the 6970's, but the 7970 steps up the memory interface from 256bit to a beautifully wide 384bit. This boosts memory bandwidth from the 6870's 176 gigabytes per second (GBps) to 220GBps.

Throw in a core clock speed of 925MHz and 32bit raster operation pipelines (ROPs) that work with considerably more zip, and the 7970 promises to be a very speedy card. The new design also allows for a potential 2,048 stream processors – a 33 percent increase on the 1,536 of the HD 6970.

The Radeon HD 7970 is the first card to support DirectX 11.1. This introduces enhancements to 3D audio and video, along with some tweaks to game visuals. Target Independent Rasterization is the most notable of the latter, and should improve anti-aliasing.

Partially Resident Textures is a better way of using textures, turning them into smaller pieces so a game can ignore unseen bits of the texture and save on valuable resources. Game developers must implement the technology, however.

The Radeon HD 7970 also supports PCI Express 3.0, given a suitably equipped motherboard. Performance is said to be improved by up to 10 percent, although we didn't have a compatible motherboard with which to test it.

Our HIS sample follows AMD's standard specification, offering a DVI port, HDMI and two Mini DisplayPorts. Its power needs are typical for a high-end card, requiring a 6-pin and an 8-pin connector from your power supply unit (PSU).

The card has a thermal design power of around 225W, which isn't especially high, given the performance, but HIS recommends a 500W-plus PSU. The card is reasonably loud when under load – we measured 45dB against the typical 43dB of a standard GTX 580.

In BattleForge, the HD 7970 recorded 68.2- and 47.4fps at 1920x1200 and 2560x1600 respectively. This places it some distance behind the GTX 590 (102.3- and 60.9fps), but ahead of the 6970 (51.9- and 37fps).

In Crysis 2 at the same resolutions the card logged 39.7- and 25.9fps respectively. The GTX 590 took the lead with 47.9- and 28.5fps, while the 6970 gave barely playable framerates of 24.3- and 15.6fps.

In Stalker: Call of Pripyat, the 7970's figures of 78.8- and 57.1fps were beaten comfortably by the GTX 590 (92.7- and 63.2fps).

Verdict

At £480, the 7970 is expensive. The new architecture marks a change for AMD, although this card falls short of ground-breaking performance. Wait to see nVidia's riposte before buying the 7970. ☒ **Robin Morris**

LAPTOP

Acer Aspire 5560G

£680 inc VAT

Contact
■ acer.co.uk
Read more
■ tinyurl.com/7q4m2on

Specification
1.5GHz AMD A8-3500M; Windows 7 HP 64bit; 8GB DDR3 RAM; 750GB HDD; 15.6in (1366x768) display; AMD Radeon HD 6740G2; 382x253x33mm; 2.6kg

Build: ★★★½☆
Features: ★★★☆☆
Performance: ★★★☆☆
Value: ★★★½☆
★★★½☆

The Acer Aspire 5560G uses AMD's quad-core A8-3500M processor. Each core runs at 1.5GHz, but is capable of up to 2.4GHz when the going gets tough. When compared to Intel's quad-core i7 processor family, however, there's no contest: the AMD chips just can't match Intel's performance.

A WorldBench 6 speed score of 85 points suggests that the A8-3500M can't compete even with some members of Intel's dual-core i3 and i5 processor families on performance. Nevertheless, four cores are generally better than two if you want to run several programs at the same time – the generous 8GB of RAM will help here, too.

The Acer Aspire 5560G's poor general application performance was turned around by its ability to handle fast-paced gaming. Our standard Fear test (Maximum detail settings) saw the laptop race through the first-person shooter at 53fps – a decent framerate.

The strong graphics performance is down to the AMD Radeon HD 6740G2 graphics setup, which uses CrossFireX technology to combine a dedicated Radeon HD 6650M processor with 1GB of video memory and an integrated Radeon HD 6620G chip. Each manages alternate frames, which boosts performance but is less power efficient than a standalone solution.

The display is very reflective, but offers good colours and a wide viewing angle. We'd prefer to see a sharper image than the 1366x768 resolution of this 15.6in panel allows.

The sound provided by the Acer's Dolby-licensed speakers is impressive. The laptop also does a good job of playing films, even if it doesn't have a Blu-ray drive.

You can expect this laptop to last around 5 hours on the road – we recorded 4 hours 45 minutes in MobileMark 2007. Of course, at 2.6kg, although it's no brick, the Acer may not be your first choice for portable computing.

The 5560G isn't the sturdiest model we've seen, with the bottom

See page 145 for our graphics card charts

DISPLAY CALIBRATOR

Datacolor Spyder4Elite

£180 inc VAT

Contact
- spyder.datacolor.com

Read more
- tinyurl.com/89cyqw4

System requirements
Display calibraion colorimeter; 7 coated colour filter/detectors; initial calibration time: 5 mins; recalibration time: 2.5 mins; ambient light detector; tripod mount/ desktop docking base; front projector support; USB 2.0; 89x38x102mm

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

★★★★☆

The Spyder4Elite offers a solution to a perennial problem. No two displays reproduce colour in the same way. Your images will therefore look different depending on which screen you display them.

This small three-pointed USB sensor is bundled with some sophisticated control software. By displaying and measuring the full range of colours and brightness levels, the Spyder4Elite is able to characterise the way your display reproduces colour.

When combined with software that supports colour management, such as Adobe Photoshop, you can be sure that your monitor will reproduce colours as they were intended to the best of its ability. And if you have more than one display, you can match one to the other with the Spyder4Elite.

Because display performance is reduced over time, Datacolor's Spyder4Elite will regularly remind you to recalibrate the screen. It will also keep you abreast of how well your display is performing.

If you're using an old monitor, you may be in for a shock: the amount of colour shift experienced over several years can be dramatic. Our Dell 3007WFP has suffered a noticeable yellowing over its six years of service, but the Spyder4Elite was able to return its performance to something much closer to its original colour output.

Built-in analysis tools allow you to keep track of the performance of all the displays in your organisation and determine those that should be retired from colour-critical work.

This fourth-generation device adds several new features, and is better able to accurately calibrate screens that use recent technology such as LED backlighting.

As with its predecessor, the Spyder4Elite incorporates seven discrete colour sensors, but these are now double-coated to prevent deterioration. According to Datacolor, accuracy has also been improved by around 26 percent. And the Spyder4Elite offers improved sensitivity to darker shades, too, improving shadow-tone reproduction on today's high-contrast displays.

Unique to the Spyder4Elite is the ability to calibrate iPhones, iPads and iPods using a dedicated app.

A supplied tripod mount lets you calibrate front projection systems, although we found this somewhat less convenient to use than the swivelling design of rival X-Rite's i1 Display Pro product.

The bundled software requests permission to gather anonymous calibration information, which should help Datacolor improve future releases. The application automatically checks for updates.

You can save £30 with the Spyder4Pro, which lacks projector support and some of the more esoteric colour-matching options. A Spyder4Express is also available, which simplifies the interface at the expense of several configuration options, and is unable to calibrate multiple connected displays.

Verdict

The Spyder4Elite offers a significant improvement over its predecessor. It incorporates useful new features such as iPad calibration, while providing increased accuracy and better support for recent technologies. ☒ **Paul Monckton**

in particular feeling rather fragile. The textured lid makes it easy to grip when carried without a case.

The Acer has a decent keyboard, with lilypad-style keys that look as though they're floating above the chassis. The effect is good to look at, but impractical: crumbs and other debris can rather easily find their way in between the keys. A numeric keypad lies to the right, which is useful for data entry.

The touchpad does a decent job. Its smooth surface helps you to differentiate it from the rest of the textured chassis, letting your fingers find it while your eyes remain fixed on the screen.

Connectivity options are basic. There is a choice of VGA or HDMI for connecting the Acer to a TV or monitor, but none of the three USB ports support the latest standard (3.0). All the usual Wi-Fi options are covered, and Bluetooth connectivity is also included.

Storage is taken care of by a large 750GB hard drive, which should be enough for most users.

Verdict

As a gaming laptop the Acer Aspire 5560G is a decent bet, but we were disappointed by its general application performance in our benchmark. Although the average user wouldn't notice this lack of speed in most day-to-day applications, we'd prefer an Intel Core-series processor for running more demanding software programs. The Acer's price isn't especially competitive either, and you can get more for your money elsewhere. ☒ **Ben Camm-Jones**

See page 135 for our laptop charts ▶ See page 54 for our monitor round-up ▶

SMARTPHONE

Samsung Galaxy Nexus

£500 inc VAT

Contact
- samsung.com/uk

Read more
- tinyurl.com/7jrsech

System requirements
1.2GHz TI OMAP 4460 ARM Cortex A9 dual-core processor; 307MHz PowerVR SDX540 graphics; 4.65in SuperOled PenTile display (720x1280 pixels); Google Android 4.0.3 Ice Cream Sandwich; 16GB Nand flash storage; 1GB RAM; 5Mp/1.2Mp cameras; 1920x1080 video; LED flash; A-GPS; gyroscope; proximity/light sensors; barometer; NFC; 802.11a/b/g/n; Bluetooth 3.0; MicroUSB 2.0; 6.48Wh removable lithium-ion battery; 135.5x68x7.2-11.7mm; 139g

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★½☆
Value: ★★★½☆
★★★½☆

Google Android phones can be less expensive mass-market alternatives to the premium iPhone, but that hasn't stopped Google from trying to make a handset experience to match that of Apple's smartphone.

It does so with Nexus, the name awarded to its flagship Android smartphones. These aim to cram in as many bleeding-edge features from the platform as possible – a shining beacon for the best that Android has to offer.

Google is said to have worked closely with Samsung to create a virgin Android installation that comes without the bloat network operators and hardware makers routinely pack into their handsets.

Samsung is now the favoured and best-selling Android partner. The handset's name is a clear nod to its Galaxy line-up, and in particular to the Galaxy S II.

In the same way that Google elected to use the Nexus S as a launchpad for Android 2.3 Gingerbread, it's using the Galaxy Nexus to out Android 4.0 Ice Cream Sandwich.

As the showcase Android 4.0 handset, it's pitched in the market against the iPhone 4S and cannot escape direct comparisons with it.

Handset

There's no denying the Galaxy Nexus is a huge handset. It dwarfs the iPhone 4S and its 3.5in screen, and is even larger than the Galaxy S II.

Its 4.65in screen has richly saturated colours, similar to those of the S II, but this 720x1280-pixel touchscreen has stepped back from SuperAmoLED Plus to SuperOled.

These Oled screens are impressive to look at, with incredible contrast ratios that make for punchy images. Colours are rich to the point of cloying, with reds in particular looking surreal. When viewing photographs on the Galaxy Nexus, skintones err toward the sunburned.

With an HD resolution of 1280x720 across that 4.65in screen, the pixel density equals 316ppi. That's lower than the iPhone's 326ppi, but enough to not betray individual pixels to the eye.

A large screen is always welcome to navigate the interface and watch video. But it also makes day-to-day use more tiresome, since you're unable to control the phone using just one hand.

Most smartphones feature hardware buttons on the front; the Galaxy Nexus has only soft keys. As we've come to expect from Android phones, the Home key is still in the middle, with Back to the left. To the right is an overlapped square icon, which brings up an overview of open apps. It's a handy aid to multitasking.

Build

The Galaxy Nexus' construction follows Samsung's penchant for creaky plastics. There's no MicroSD slot, so you're limited to 16GB of onboard memory. A 32GB version is not officially sold in the UK – unlike the 4S, which is also available with 64GB of storage.

A clip-on backplate offers easy access to the battery and SIM, which is important for a phone that struggles to last a full day of moderate use. Our tests clocked its 6.48Wh battery at 25 hours, which included 8 hrs in standby mode. Compare this to the iPhone's 48 hrs.

Much of that power was sapped by the screen. The option in Android to set brightness automatically was flawed, as it set the display too dark to read easily in normal light.

At 139g, the Galaxy Nexus weighs about the same as an iPhone 4S (140g). It's considerably larger, standing 135mm tall and 68mm wide. There's a slight curvature toward the bottom, with even the screen curling in around the mouthpiece end. The thickness varies across its length, from 7.2mm at the top to 11.7mm at its maximum. In the middle it's 9.4mm, coincidentally the same thickness as the iPhone 4S.

Processor

In common with current high-end smartphones, the Galaxy Nexus uses an ARM Cortex-A9 dual-core processor – in this case a 1.2GHz Texas Instruments OMAP 4460. This is backed with a PowerVR SGX540 graphics engine, as seen in the two-year-old Galaxy S.

By way of comparison, Apple's iPad 2 and iPhone 4S take dual-core PowerVR SGX543MP2 graphics. Independent benchmark tests from AnandTech have shown the older processor has just one-third the performance of the latter.

In real use, the interface was even stickier than that of the Galaxy S II, with pinch-to-zoom gestures juddering along. This is as likely to be an issue with Android 4.0 as it is the graphics system.

Connectivity

Early reported problems with Android 4.0 have centred around defective audio and dropped calls. Our sample was delivered running 4.0.2, which we updated to 4.0.3. We didn't experience any such problems, but did note second-rate cellular reception. In one test, we found the phone unable to keep a data connection at an underground train station, where an iPhone 4S clings on using the same SIM.

Overseas versions of the Galaxy Nexus include an LTE modem; that's patently wasted in territories years

away from rolling out 4G mobile broadband. For us Britons, the HSDPA modem gives reasonable speed, if well short of the leaders.

In a test over the 3 network, we recorded average speeds by logging serial tests through Speedtest.net. A reference iPhone 4S averaged 2.5 megabits per second (Mbps) upload and 8.9Mbps download. The Galaxy Nexus in the same location and timeframe averaged 2.4Mbps upload and 5.9Mbps download, in line with the Galaxy S II. The 4S is thus 50 percent faster for 3G.

In our real-world tests, we averaged a 16-second load time for the full PCAdvisor.co.uk site, and 5 secs for the mobile version. An iPhone 4S loaded these pages in 7 and 2 secs respectively.

For local transfers, the Galaxy Nexus works only with Windows.

Camera

A 5Mp rear-facing camera has an LED flash, while a 1.2Mp cam faces forward for video calling. The main camera is specified for 1920x1080p video. Don't be put off by this lowly megapixel count when other phones have 8Mp or more – the key is in the quality of the optics and sensor.

Our test shots found usable low-light performance. But there was plenty of noise in images shot indoors, and detail was obscured by obvious noise-reduction processing. The shot-to-shot time was brisk.

More troubling was the colour balance. Even when viewed on a monitor, our pictures revealed artificial colouring. The iPhone 4S takes visibly superior photographs, with more background detail and better depth perspective.

Interface

Adobe has dropped its development of Flash for mobile, but the tech remains marketable since it's not available to iOS. No lip-sync failures were apparent in the brief time that Flash was seen working on the Galaxy Nexus, but Flash consistently crashed the browser when watching YouTube video – there is a free YouTube app, of course.

As with the S II, near-field communication is included. This continues to have little practical use. You could try Google Wallet if you're going abroad, but fundamental security flaws mean your PIN will be exposed.

Verdict

The Galaxy Nexus is today's flagship Android handset, a standard-bearer for Ice Cream Sandwich and a must-have smartphone for aficionados of the platform. Yet the Nexus is little better than the S II, and actually fares worse in the screen and camera departments. Its huge screen is initially impressive, but makes the phone more like a tablet to handle and stunts battery life. If tangible aspects such as battery life, build quality, stability or performance count, look instead to the iPhone 4S. ☒ **Andrew Harrison**

SMARTPHONE

Verzo Kinzo

Developed by Czech newcomer Verzo, the Kinzo smartphone runs old Android 2.2 Froyo on outdated hardware. It poses no threat to the smartphone market leaders.

Verzo sells the Kinzo direct from its website for 309 (around £259), with free shipping worldwide. At this price you get Sygic satnav software for Europe and Russia, but can pay extra for a GPS kit that includes a windscreen mount. We didn't test Sygic, set up as it was in Czech.

Verzo wants Kinzo users to guide the development of its interface.

A TellMe app lets you offer your own suggestions, but at the time of writing only two people had done so. In its current form, the Home screens are notably bare, and the Apps menu is devoid of any media or social-networking apps.

We loaded up some free games, and found smooth framerates in Dragon, Fly; a well implemented accelerometer in Air Penguin; and good touchscreen calibration and a large viewing area in Angry Birds.

The 1GHz single-core TI processor is clocked faster than those found in budget smartphones, and paired with 512MB of memory. A 4.3in capacitive multitouch TFT screen is capable of 800x480 pixels, and usefully wide for viewing web pages in landscape mode. It's not very bright, though, and its colours are dull. It's also fairly reflective.

The Kinzo's wireless connectivity stretches only to 802.11b/g, while a lowly 5Mp camera produces overexposed shots. Perhaps in recognition of its poor quality, there's no dedicated button to invoke the camera. You also get a VGA-res cam for video chat.

Worse, though, is the overall design. This is surprising, given its outsourcing to a design studio. Housed in lightweight plastic, the Kinzo feels durable, yet toy-like. Its angular, diamond-inspired design is attractive, but it's far too big. We found comfortable one-handed use impossible – this smartphone is chunky in every dimension.

The 5.66Wh battery took a long time to charge over USB. In line with other large-screen handsets, you can expect the battery to last only one day. Verzo cites 16 hours life.

Verdict

We admire Verzo's encouragement of user-led development. Its product packaging and pricing are also very good, so it's a shame we couldn't get more excited about the phone itself. The Kinzo is merely a budget Android smartphone that we neither love nor hate. ☒ **Marie Brewis**

309 (£259)

Contact
- verzo.com

Read more
- tinyurl.com/7matvmj

Specification
Android 2.2 smartphone; 850/900/1,800/1,900MHz GSM; 850/1900/2100MHz 3G; 1GHz TI OMAP 3630 with IFX XMM 6160 graphics; 512MB Nand flash; 4.3in (800x480) capacitive TFT display; 802.11b/g; Bluetooth; Sygic navigation; Verzo TellMe; 0.3/5Mp cameras; 8GB MicroSD; carry case; earbuds; MicroUSB port; 5.66Wh battery (16 hours); 132x72x12mm; 155g

Build: ★★★☆☆
Features: ★★★½☆
Performance: ★★★½☆
Value: ★★★★☆

★★★½☆

See page 143 for our smartphones chart

GAMING PC

Arbico i5 2544 OCX

£799 inc VAT

Contact
- arbico.co.uk

Read more
- tinyurl.com/85c3m55

Specification
3.3GHz (4.4GHz) Intel Core i5-2500K; Xigmatek Gaia CPU cooler; Windows 7 Home Premium 64bit; 8GB DDR3 RAM; 1TB SATA; 580W Xilence PSU; Asus P8Z68 V-LX motherboard; MSI GeForce GTX 560 Ti OC, 1GB VRAM; Revoltec RT 67 case; 22x DVD ± RW drive; 2x USB 3.0; 6x USB 2.0; gigabit ethernet; Bluetooth; 92W (idle); 2-year RTB warranty

WorldBench 6 score: 190

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

★★★☆☆

At £799, Arbico's i5 2544 OCX is significantly less expensive than the gaming PCs in our round-up (see page 62). However, it's supplied without a monitor and any peripherals, such as a keyboard and mouse, so you'll need to consider the cost of these when working out your available budget.

Arbico has overclocked the Intel Core i5-2500K processor to 4.4GHz, which is a massive step up from the chip's factory default of 3.3GHz. This allowed the system to achieve a very fast score of 190 points in our WorldBench 6 real-world speed test; more importantly, it means it can keep up with systems costing hundreds of pounds more when it comes to playing the latest games.

The Arbico's graphics are powered by an MSI-branded nVidia GeForce 560 Ti graphics card. This has also been overclocked, from a reference core clock speed of 732MHz to 880MHz. The memory clock has been bolstered from 950MHz to 1,050MHz, too.

This graphics card is still no match for AMD's Radeon HD 7970, which is found in the most expensive gaming PCs, but it certainly has the edge over a stock GTX 560 Ti.

The black Revoltec RT 67 system case has rather unassuming looks for a gaming machine, but Arbico has installed five bright red cooling fans. One of these is mounted at the rear, with an additional pair visible through the meshed top of the case. The remaining two sandwich a Xigmatek Gaia processor cooler in a push-pull configuration to ensure adequate cooling for the overclock. An additional fan is mounted on the left-hand side panel, also meshed.

A lot of cabling is visible inside, but it's all been pulled out of the way using cable ties.

An Asus P8Z68 V-LX motherboard forms the heart of the system. It's a powerful motherboard with an advanced chipset, but it lacks the multi-GPU options of the more expensive non-LX version.

The Arbico also lacks an SSD, which some would consider essential in a modern high-performance PC.

Verdict

For those on a budget, the Arbico i5 2544 OCX offers good system performance and competitive gaming framerates. It lacks enthusiast features such as an SSD, and we were disappointed not to find a Blu-ray drive. Peripherals must be purchased separately.

Paul Monckton

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Product shown Epson WP-4525 DNF

*1Comparison made against the top 10 A4 colour laser printers and MFPs sold in EMEA in Q1 2011 as tracked by IDC. Print speed comparison based on average (Colour/Mono) (Simplex/Duplex) FSOT according to ISO/IEC 24734 test procedure. See www.epson.eu/testing for details and supporting facts. *2Comparison made against the top 10 A4 colour laser printers and MFPs sold in France, Germany, Italy, Spain and the UK in Q4 2010 as tracked by IDC. Cost per page is calculated from manufacturers' official list prices for toner cartridges and published yields in France, Germany, Italy, Spain and the UK as of December 2010. *3Comparison made against the top 10 A4 colour laser printers and MFPs sold in France, Germany, Italy, Spain and the UK in Q1 2011 as tracked by IDC; power consumption calculated using manufacturers' published data for Print/Average Mode as of July 2011.

NETTOP

Foxconn nT-A3500

£170 inc VAT

Contact
- foxconn.com

Read more
- tinyurl.com/8aaav34

Specification
1.6GHz AMD E-350 processor; AMD Radeon HD 6310 graphics; 2x USB 3.0; 4x USB 2.0; gigabit ethernet; DVI; HDMI; analogue audio output; digital audio output; microphone input; SD/MS card slot; vertical stand; Vesa monitor mount; external power supply; 185x134x25mm

WorldBench 6 score: 55

Build: ★★★★½☆
Features: ★★★★½☆
Performance: ★★★☆☆
Value: ★★★★★½
★★★★½☆

Foxconn is a Taiwanese-owned OEM for many well-known brands. It also sells some products under its own name, such as the nT-A3500. This low-profile barebones computer combines respectable performance with a svelte design.

Foxconn's nT-A3500 is sold with a motherboard, CPU and case, but no memory or storage. It's spectacularly thin – just 25mm in height – and smaller than the average wireless router.

Although its glossy chassis attracts fingerprints, there's nothing ugly about this device. There are both DVI and HDMI video outputs, four USB 2.0 and two USB 3.0 ports, audio connectors, a card reader, an ethernet port and a disk activity LED. A single antenna attaches to the back for 802.11n wireless, and there are power and sleep buttons.

A single memory slot accepts a DDR3 SODIMM, and there's space for fitting a 2.5in hard drive – you could instead use an SSD for the fastest performance.

We installed a 2GB Kingston RAM card and a 200GB 5,400rpm hard drive – but not without difficulty. We had some trouble in opening the nT-A3500. After removing four screws, the case had to be prised open. It was so tight, we were worried about snapping the cover.

The Foxconn is an ideal PC for media playback. Its fan is almost silent, yet the nT-A3500 remains cool during operation.

Even under load it remains unobtrusive. It sipped only 14W of power when idle, which rose to 23W when playing a video.

That modest power draw is in part thanks to the 1.6GHz AMD E-350, which builds the GPU on to the same die as the CPU. It's a more efficient combination than Intel's Atom with nVidia's Ion chipset.

The WorldBench 6 score of 55 points might not sound impressive, but it's not bad for a PC of this size.

The Foxconn's gaming capability can't match a discrete GPU,

however. It managed 35fps in Fear at Maximum detail. When decoding full-HD video, though, this GPU can take some of the load off the CPU.

This worked well when using the XBMC media software, which has an option to force the GPU into hardware-accelerated decoding.

Verdict

We like the budget nT-A3500 at £170, although you'll need to add in the cost of an OS, memory and storage, plus a keyboard or a remote control for media-centre use. **Orestis Bastounis**

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- 5 000 000:1 ACR
- DVI-D, VGA (D-Sub), HDMI

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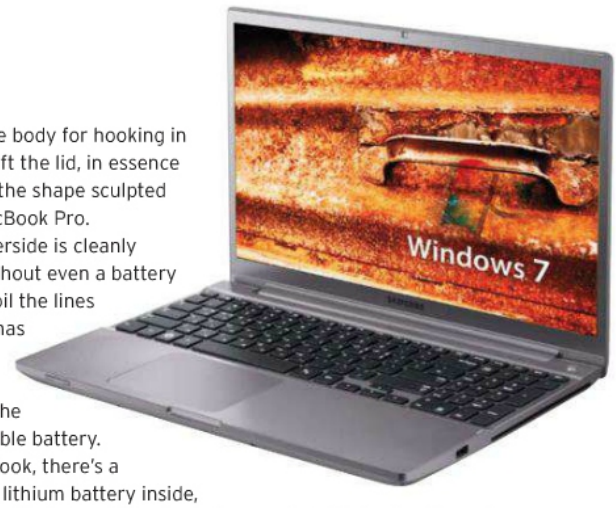
LAPTOP

Samsung Series 7 Chronos



£900 inc VAT

Contact
- samsung.com/uk

Read more
- tinyurl.com/7wL99pd

System requirements
2.2GHz Intel Core i7-2675QM; 8GB DDR3 RAM; 750GB 2.5in 7,200rpm SATA with 8GB ExpressCache; 15.6in (1600x900) matt LED-backlit screen; AMD Radeon HD 6750M with 1GB DDR5 VRAM; HDMI; 802.11b/g/n; gigabit ethernet; 2x USB 3.0; 1x USB 2.0; slot-load DVD ± RW DL drive; 1.3Mp webcam; mic; stereo speakers; 80Wh non-removable battery; 362x239x24mm; 2.38kg

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★★☆

★★★★☆

Samsung's Chronos 7 is a high-spec 15in laptop wrapped in a dark-grey chassis. It's gunning for the premium laptop market, and likely hoping to find the Windows devotee who is teetering on the point of acquiring an Apple MacBook Pro.

Samsung has done a good job of porting some of the quality of Apple's components, along with several of its original technology ideas. And at a much lower price.

The Chronos is powered by the same 2.2GHz Intel Core i7 quad-core processor as the entry-level 15in MacBook Pro, and runs identical AMD Radeon HD 6750M graphics – although here with twice the video memory, at 1GB. The system memory and storage are similarly raised, to 8GB and 750GB respectively.

That disk storage carries a trick we've not seen on a laptop before, with an extra 8GB of flash memory on the motherboard helping to accelerate performance. Akin to Intel's Smart Response Technology (SRT), this ExpressCache feature is licensed from Diskeeper and combines fast Nand flash with a capacious hard disk. It brings together huge capacity and quicker data transfers, giving SSD-like performance at lower cost.

In our tests, with a clean Windows installation and no bloatware, the Chronos booted up in 30 seconds.

The construction is very tidy, with less of the clutter and flaps that adorn other Windows laptops. The back of the display is smart brushed aluminium, but below this lid the corpus of the machine is entirely painted plastic.

The Series 7 has the same magnetic catchless lid first seen on the white MacBook, with a curious cutout in the body for hooking in a finger to lift the lid, in essence identical to the shape sculpted into the MacBook Pro.

The underside is cleanly finished, without even a battery hatch to spoil the lines – Samsung has indeed copied the concept of the non-removable battery. Like a MacBook, there's a long-lasting lithium battery inside, so you're less likely to get frustrated at being unable to swap over to a spare when you run out of juice.

This 80Wh power pack enabled the Samsung to endure more than 8 hours (492 mins) of MobileMark, which is appreciably longer than the 311 mins recorded by Apple's high-end Pro, which has a slightly faster processor, at 2.4GHz. It's not a fair test, of course, since the graphics-switching technology used to toggle between dedicated and integrated solutions and thereby prolong battery life isn't available to the MacBook under Windows. As a rough guide, Apple lists 7 hrs 'wireless web' runtime running OS X.

Performance

Our application-performance tests showed the Samsung to also be the faster of the two laptops. It scored 138 to the Apple's 132 points in WorldBench 6. And remember, that's a 2.2GHz versus a 2.4GHz Core i7, suggesting that the ExpressCache was nudging up system speed.

Connectivity options are well catered for. Most ports are ranged along the left side, leaving space for a slot-load DVD drive on the right, à la Apple. Two USB 3.0, HDMI, a mini-VGA port (that interfaces with a supplied dongle) and a 3.5mm headset jack populate the edge.

Samsung wasn't so successful at squeezing in ethernet to the plastic chassis, with this connection found under a weakly hinged flap. On the front edge of the laptop is an SD/SDXC card slot.

In the all-important areas of human interface, Samsung has laid something of a curate's egg. The keyboard has well-spaced Scrabble-tile-style buttons that offer a reassuring action and enable comfortable typing. These keys are also backlit, with a more distinctive edge-light effect than the glowing characters pioneered by Apple.

The large trackpad is another Apple carryover, buttonless and with some basic multitouch capability, if clunky in Windows when compared with its slick operation in OS X. But it's the screen that caught our eye.

The Samsung has a glare-free matt panel, with a reasonably high resolution at 1600x900 pixels. That pixel count gives away the aspect ratio: a film-friendly 16:9 that's almost inescapable on new laptops.

The colour fidelity is a little poor, and viewing angles worse, but it's unfeasibly bright when required.

Set within a thin aluminium bezel, the screen is one area where the Samsung trumps Apple's laptops, most of which have glass-fronted displays that are too reflective for easy viewing.

With the help of the AMD graphics, the Samsung was capable of respectable gameplay performance. We measured an average framerate of 55fps in Fear at Maximum detail settings.

Verdict

With the Series 7 Chronos, Samsung has turned its talents to making a commoditised version of the Apple MacBook Pro. It has much of the same technology inside, and borrows heavily in certain design cues, but using cheaper materials to allow a lower price. Whereas the entry-level 15in MacBook Pro costs a handsome £1,549, the Samsung can be had for £900. The screen is better than that of the Pro in its standard configuration, although build quality and ease of use trail behind. ☒ **Andrew Harrison**

See page 135 for our laptop charts

PRINTER

HP Photosmart 5510

£80 inc VAT

Contact
- hp.com/uk

Read more
- tinyurl.com/7dacu7t

Specification
Printer/scanner/copier; 1200x600dpi print resolution; quoted print speed: B=11ppm, C=7.5ppm; actual print speed: B=7.6ppm, C=4.1ppm; 1200dpi scanner resolution; USB 2.0; 802.11b/g/n; MS Duo/SD slot; 80-sheet input tray; toner costs: B=£19, C=£14 x 3; print yield (pages): B=550, C=550 x 3; 436x325x146mm; 5.1kg

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

HP's user-friendly 5510 ought to blend nicely into any home office.

A 2.4in colour touchscreen is neither as large, nor as fun to use, as those on HP's more expensive models. However, it gives you access to HP's Web Apps, from puzzles and calendars to forms and templates. Apple AirPrint lets devices on your Wi-Fi network connect to the 5510, including phones and tablets.

This sleek black printer isn't very tall, but it'll take up more room on your desk than some inkjets. So it's disappointing not to find robust paper feeding. Up to 80 sheets can be loaded into the bottom input tray, while the output feeder is rated at no more than 15.

This is the sort of model that'll be good for odd prints rather than sizeable jobs, so the slightly flimsy facilities are unlikely to be a significant issue.

Besides USB 2.0 and wireless connectivity, the HP also has a slot for Sony Memory Stick Duo and SD cards. Auto duplex isn't included.

This being a multifunction printer, the HP also offers a scanning component. We found the quality of scans to be faithful, with colour well reproduced.

Print speeds didn't match HP's claimed figures in our tests. The 5510 notched up 7.6 pages per minute (ppm) in the fastest mode (rated at 11ppm), falling to 4.1ppm (rated 7.5ppm) at higher quality.

Inkjets aren't notable for their text quality, although the HP's output is reasonably dark and sharp. It offers great results in graphics work, offering palettes that fizz with colour and handle dithering well to give smooth colour gradients. And the speeds, starting at 4.2ppm and falling to just under half of that, are acceptable for an inkjet.

Running costs are fair. HP has altered the page yields on its high-capacity cartridges, so don't be fooled by claims of 800 sheets for the black, for instance.

Even with the new yields, 3.5p for a page of mono text is not unusual for a sub-£100 inkjet. Photo printers such as the Epson Stylus SX525WD offer considerably better value, though. Colour is more competitive with the HP, at around 7.6p a page.

Verdict

The HP Photosmart 5510 is well priced, user-friendly, and offers good print quality. It's a little slow and expensive for text printing, and is hampered by an insubstantial paper feed mechanism. However, it's designed for those who want to print out individual colour photos with ease. If you're such a person, you'll find it cheap to run and its prints highly colourful. ☒ **Robin Morris**

DIGITAL CAMERA

Nikon 1 J1

£400 inc VAT

Contact
- nikon.co.uk

Read more
- tinyurl.com/7zc25fy

Specification
10.1Mp mirrorless compact; 13.2x8.8mm lens; 10fps continuous shooting; ISO auto to 3,200; Smart Photo Selector; video: 720p @30fps, 1080i @30fps/60fps, 640x240 @400fps, 240x120 @1,200fps; stereo mic; pop-up flash; 10-30mm lens, PASM modes; white-balance; 106x61x30mm; 274g

Build: ★★★★☆
Features: ★★★½☆
Performance: ★★★½☆
Value: ★★★☆☆
★★★½☆

The Nikon 1 J1 is a weighty 10.1Mp semi-compact, which follows Olympus, Leica and Fujifilm's lead into the retro-style camera market.

Although the J1 is a mirrorless camera in the same vein as compacts based on Micro Four Thirds and even larger APS-C sensors, the magnesium-alloy Nikon introduces its own 13.2x8.8mm sensor that's even smaller.

Rather than offering up nostalgic grainy film, pop art, pinhole and sepia settings, as Olympus does with its PEN cameras, Nikon promotes video as the J1's main selling point.

A red button on the camera's top is dedicated to this function. As well as 720p recording at 30fps, there's 1080i at 60fps, 640x240 at 400fps and 320x120 at 1,200fps. These enable slow-motion video playback that can stretch seconds into minutes of footage.

The fuzziness of its low-res settings is all too apparent, but acceptable for viewing on a small screen or embedding in a web page.

More importantly, the action is smooth, with light artefacts well compensated and colours faithfully reproduced. Footage was far more acceptable in the 720p and 1080i HD modes, but the sound was curiously absent.

The camera has two main settings: a white camera icon denotes Smart Photo Selector (similar to Nikon's Best Shot Selector), while thumbing the scrollwheel to the green icon dedicates the camera to still photos.

In either mode, face-recognition software will automatically frame whoever's in shot. Program, shutter priority, aperture priority and manual modes can be selected only in the still photo mode.

Once the camera is switched on, it quickly focuses on a subject and snaps them. And we were largely happy with the results.

Our shots of wood grain, animal fur and individual leaves displayed deep colours and good detail, but they were slightly over-saturated.

When required, the built-in flash is called up by sliding a notched button to the top left of the J1's 3in LCD. The pop-up flash light perches atop a plastic arm.

We didn't rate the hard vertical rocker used for zooming – it's too small to zoom accurately. The only lenses currently available for the J1 is its standard 10-30mm lens and a 10mm fixed pancake lens.

Verdict

With solid construction and attractive styling, plus an appealing range of video-shooting modes, the Nikon 1 J1 brings something new to the mirrorless compact camp. ☒ **Rosemary Hattersley**

See page 140 for our printer charts ▶ See page 144 for our camera charts ▶

AOC

ULTRA-THIN BEAUTY

The stylish 58.4 cm/23" Full HD flatscreen i2353Fh with its super-slim 9.6 mm profile fascinates business and home users alike. But it is more than just a design-statement: The innovative IPS panel and a high dynamic contrast ratio (50,000,000:1) ensure a realistic colour reproduction and crisp images with finest details. Two HDMI ports offer a multitude of options for connecting high-definition sources. Enjoy this pretty package full of great inner values!

Ultra-slimpr ofile

Discreet touch controls

Inputs in the stand avoid cables hanging from the display

IPS In Plane Switching

www.aoc-europe.com

ebuyer.com MISCO.co.uk OVERCLOCKERS UK SCAN

Music apps

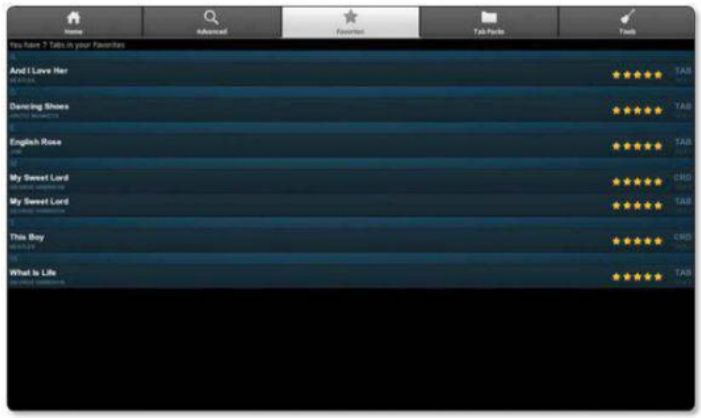
Ultimate Guitar Tabs for Android

£1.95 inc VAT

Contact
- app.ultimate-guitar.com

Read more
- tinyurl.com/6r7myfe

System requirements
Google Android 1.6 or later; 4.3MB available storage



Ultimate Guitar Tabs feeds the delusions of amateur guitarists who still think they're going to sell out stadia and enjoy a UK tour.

The app is a spin-off from ultimate-guitar.com, where members upload the chords used to play particular songs for others to learn. This can take a conventional chord format, or a tabbed form that simplifies the way in which music is written and read. Once uploaded to the site, other members can score the data on its accuracy.

With more than a decade under its belt, the Ultimate Guitar database has accurate tabs for pretty much any song you can imagine. This £1.95 app offers access to that database, in a structure better suited to your Android device. Importantly, it lets you save your favourite tabs for later access offline.

Both app and website offer a great feature that lets you click on an unfamiliar chord and get a visual of where to place your fingers on the guitar in order to play it.

Ultimate Guitar Tabs also has a helpful autoscroll feature, for which you set the pace. This is invaluable, enabling you to play a song all the way through, without having to stop and scroll down the page to see the next set of chords.

The Ultimate Guitar Tabs Android app includes 'Tab packs', which are automatically downloaded to your device. These are various selections of categorised tabs that can give you some often much-needed inspiration for what song you'd like to learn next. The categories are split by genre and/or difficulty, and Ultimate Guitar Tabs is able to offer something to all users.

Verdict

Much of the Ultimate Guitar Tabs Android app's functionality is available for free online, but its huge database and the option to save tabs for offline viewing are welcome features. It's worth £1.95 of any guitarist's money. ☒ **David Court**

GarageBand for iOS

£2.99 inc VAT

Contact
- apple.com/uk

Read more
- tinyurl.com/7b9acvc

System requirements
iPad/iPhone 3GS/4/4S/ iPod touch (3rd/4th generation); iOS 4.3 or later; 501MB available storage

GarageBand is a long-standing favourite with Mac users and was used by Steve Jobs to highlight the iPad 2's processing power at its launch. Now there's a version for iPhone and iPod touch, too, although it supports only a single octave in comparison with the iPad's three.

GarageBand allows you to produce tracks featuring a variety of instruments, both sampled and recorded live. You don't just get one virtual drum kit and a simple choice of acoustic or electric guitar, either. There are six drum kit choices, spanning live rock, studio and several drum machines.

You can record, loop and sample tracks, then splice them together. Instruments appear as icons next to associated tracks, and loops on a timeline that shows where each kicks in. Up to eight instruments can be used in a track, and you can delete them with a single click.

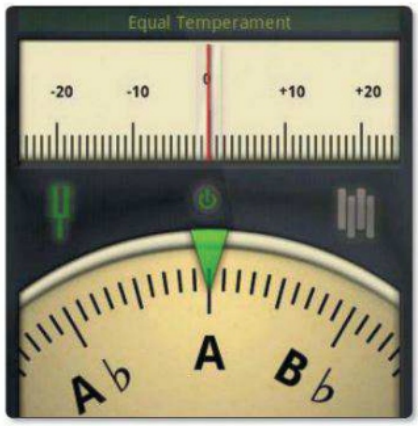
You can import audio by clicking the instrument icon at the top of the screen. GarageBand supports AIFF, WAV, CAF, Apple Loops, AAC and MP3 files, as well as anything you've created in the desktop version of the software.

GarageBand seems simple enough to casually mess around with, but offers a lot of functionality. There's no right or wrong way to get started: you can use parts of demo tracks, bash away at a sound you like, and save it or apply effects.

Instrument support is lacking in the iPod/iPhone version, although an electric guitar can be plugged in.

Verdict

Neither the iPhone nor the iPod touch's screen is ideal for gently tinkering the ivories. But if a tune pops into your head and you've got to record it before you forget it, GarageBand is ideal. ☒ **Christopher Breen and Rosemary Hattersley**



ClearTune – Chromatic Tuner

ClearTune – Chromatic Tuner works with both iOS and Android devices, and we tried both the tablet and smartphone versions. It provides a convenient method of tuning whatever instrument you use.

The chromatic tuner works by getting the microphone built into your tablet or smartphone to listen to a note you play. Alternatively, you can tune your instrument to the note it plays on cue.

The needle shows you how far off key the instrument is and gives you instructions on how to correct it. ClearTune can help you tune almost any instrument, and to any octave or key. The doesn't try to teach you anything or prompt you over poor technique, but its developer, Bitcount, says any instrument that can sustain a note can be tuned using ClearTune.

You have control over the notation and temperament for your instrument. You can also specify the waveform and the amount of needle damping. Everything is clearly labelled, and it's as easy to tune an acoustic guitar as it is to find the note you need your violin to hit. There's also the option to add presets, in effect creating a custom tuner for your own needs.

Verdict

If you're forever losing your electronic guitar tuner or finding that its run out of juice, being able to quickly call up a tuner app on your tablet or smartphone is a boon. ☒ Rosemary Hattersley

£2.39 inc VAT (Android) **£2.49** inc VAT (iOS)

■ bitcount.com ■ **Read more** tinyurl.com/87gdprs

System requirements
Android 1.5/iOS 3.1 or later; 2.9MB storage

Jools Holland's Music Makers Saxophone for iOS

We were excited to find a Jools Holland music-tuition app for saxophone. This app is one of a series put out by Music Makers and the Hootenanny musical maestro. Holland cheerfully introduces the tuition videos for bass guitar, keyboards, saxophone and drums, each of which are presented by respected musicians in their field.

Here, we get a 92-minute-long beginners' introduction from Pete Thomas, a British saxophonist with rock and pop credentials. He carefully outlines how to assemble your sax, blow and breathe properly, and how to produce your first notes. The video is stored on your device, so you can launch it whether or not you have internet access.

The gentle start and thorough explanations can give a beginner the confidence to start playing sax in a way that books and CDs aren't able.

If you've already got basic notes and technique under your belt, this app may still be worth the £9.99 outlay. Thomas also outlines composition and legato note combination techniques that can quickly find you playing what sounds good, rather than repeating endless exercises.

This app makes a good alternative to more formal music tuition, and includes advice on habits and posture.

Verdict

This video gets sax players up and running, while encouraging exploration as you learn at your own pace. ☒ Rosemary Hattersley

£9.99 inc VAT

■ andrewsuk.com ■ **Read more** tinyurl.com/82y6qwh

System requirements
iOS 3.1.3 or later; 382MB storage

Gibson Learn & Master Guitar for Android

Gibson is synonymous with guitars, so we had high hopes for the Android app that bears its name. Actually, it's a bit of a mishmash of the other types of apps we review here, but it certainly has its uses.

There are plenty of dedicated guitar tuners and apps that show you which strings to strum and hold for each chord. Gibson does both these things, with a vertical list of open and barre chords that you click on to view the fingering. On our tablet the images were rather fuzzy, denoting an app that was made for smaller screens.

The tuner couldn't be simpler: choose between single notes and chromatic tuning and the sort of tuning you need, then press the green start button to see how well your guitar strings are tuned. A needle shows you in which direction to turn the pegs.

The metronome was a frequent port of call in our testing. It has a list of standard time signatures and a beats per minute dial, and it lets you choose your own tempo.

The lessons – links to lengthy YouTube videos – seem like a bolt-on. You'll need a web connection to stream them, and we found them less focused and rather verbose in comparison to the Jools Holland app series' approach.

Verdict

Gibson Learn & Master Guitar is brimming with features, but it's less polished than Music Makers and its individual elements don't knit together well. ☒ Rosemary Hattersley

Free

■ learnandmaster.com ■ **Read more** tinyurl.com/72oe5sc

System requirements
Android 1.6 or later; 5.5MB storage

INTERNET SECURITY SUITE

PC Tools Internet Security 2012

£49 inc VAT (3 PCs)

Contact
■ pctools.com
Read more
■ tinyurl.com/79u6sjh

System requirements
1GHz processor; Windows XP/Vista/7; 1GB RAM (2GB for 64bit Windows); 500MB hard-disk space

Usability: ★★★½☆
Features: ★★★★☆
Value: ★★★½☆
★★★½☆

PC Tools' 2012 internet security suite installs easily enough and doesn't complain about other installed security software.

The Home screen is well laid out, but the main functions are allocated to four somewhat crowded tabs. From here you can see the status of IntelliGuard, AntiSpam and Firewall protection, as well as the number of scans performed and their results.

The IntelliGuard tab breaks down the protection offered into sub-categories, such as browser, cookie, email and rootkit guards. Each can be toggled on and off independently.

The Settings tab offers more configuration options, divided into 10 categories. This is where you might set up scheduled scans and blacklists, for example.

Support Tools offers a threat-removal app, an ISO CD burner, a Registry editor and a malware-detection tool.

Finally, Start Scan Now offers three different scans: full system, IntelliScan (which checks particular danger spots) and a custom scan.

The only snag came when we tried to scan a specific folder. The custom scan function should do this, but became bogged down with a list of 13 scan types, including KSP, DNS and Kernel Threat scans.

PC TOOLS offers improved performance and plenty of configuration options

We set off the program on a file scan, before aiming it at our 50GB test basket. It took 59 minutes to check 125,866 files, at a rate of 35.6 files per second. This places it in the middle of the 2012 security products we've tested for scan speed.

With PC Tools installed but not actively scanning, a 1GB file copy took 41 secs. This is a very good result, but still almost three times longer than a scan without antivirus software installed (16 secs).

With a full file scan also running, this dropped to 2 mins 38 secs, which is slow.

AV-Test has tested both the 2011 and 2012 PC Tools engines, and it seems the control interface has noticeably improved. The 2011 product scored 10.5/18, while the 2012 suite achieved 12.5/18. These points are spread evenly between the Protection, Repair and Usability categories, whereas the 2011 product managed only 2/6 for Usability.

There were, however, a higher than average number of false positives, and we saw 'Low Virtual Memory' alerts in Windows XP.

Verdict

PC Tools Internet Security 2012 sets out to be straightforward and effective, and to a large extent it succeeds. Its many, many configuration options can clog up the interface, however, and separate beginner/advanced modes would be welcome. ☒ **Simon Williams**

ANTIVIRUS SOFTWARE

Sophos Endpoint Anti-Virus 10.0

£228 inc VAT (5 PCs)

Contact
■ sophos.com
Read more
■ tinyurl.com/7q3zedd

System requirements
1GHz processor; Windows XP/Vista/7/Server 2003/Server 2008; 512MB RAM; 500MB hard-disk space

Usability: ★★★½☆
Features: ★★★☆☆
Value: ★★☆☆☆
★★★☆☆

Sophos is probably best known as the company that employs Graham Cluley. Cluley is the pet malware expert called on for comment by many UK media sources, whenever there's a new Windows virus or hacking scare.

At least one reason they choose him is that Sophos is a UK-based provider of enterprise-level malware protection, but it also has an Endpoint product, which it sells to small business customers.

Endpoint can be used as protection for a single Windows PC and comprises antivirus software and a firewall. Extra modules, such as web security, mobile protection and data encryption can be added. It's available as a download and is quick and painless to install.

The main control screen is business-like and easy to navigate. You can easily instigate scans and set up schedules to run them automatically. You can also configure the firewall and specify blacklists and whitelists of applications and processes.

Running Endpoint

The program is discreet in use, although the firewall pops up alerts each time an application tries to access the local network or the internet by default. One might expect security software to do this, until it learns which applications you consider safe.

As with those of other products, Sophos' requests can be meaningless to the average user. How do you deal with an alert reporting, for example, 'The system is attempting to communicate via IGMP protocol'?

You could run a search query on 'IGMP' and learn that it's a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships, but that may not help you decide whether it should be allowed to go about its business.

This pop-up may be reasonable for network customers with an IT department to call on, but if you're running a small business or home office then the temptation is simply to accept everything, if only so you can get on with your work. And that sort of behaviour can be dangerous where there's malware about.

MAINTENANCE UTILITY

Uniblue PowerSuite 2012

£79 inc VAT

Contact
- uniblue.com

Read more
- tinyurl.com/84972dy

System requirements
Windows XP/Vista/7; 512MB RAM; 750MB hard-disk space; web connection

Usability: ★★★½☆
Features: ★★★½☆
Value: ★★½☆☆
★★★½☆

Uniblue PowerSuite 2012 comprises Registry Booster, SpeedUpMyPC and DriverScanner. Together, these applications are designed to improve the responsiveness and computation speed of your PC by removing redundant files and Registry entries and updating hardware drivers.

The three applications are pulled together via a single status panel, which shows the results of the most recent scans and allows scheduling and settings adjustments.

RegistryBooster scans the Windows Registry for system, user and third-party errors. The damage level of each is rated from low to high, but it's worth correcting them all for optimum performance.

Before fixing Registry errors, RegistryBooster sensibly creates a restore point. It makes the fixes automatically, and creates a log file for your inspection.

SpeedUpMyPC offers checklists of configuration options under the headings System Tweaks, Speed Tools and Junk Files. Running each lets you improve such things as startup and browsing speeds. These fixes are also made automatically, but you can deselect any options that aren't required.

DriverScanner, which can be found on this issue's cover DVD, searches for outdated hardware drivers on your machine, then downloads and installs the latest versions from its database. It's clever enough to recognise drivers for hardware that's no longer installed, but it's unable to postpone any reboots required by new driver installations until after its completed the entire process.

POWERSUITE offers a small but measurable performance improvement

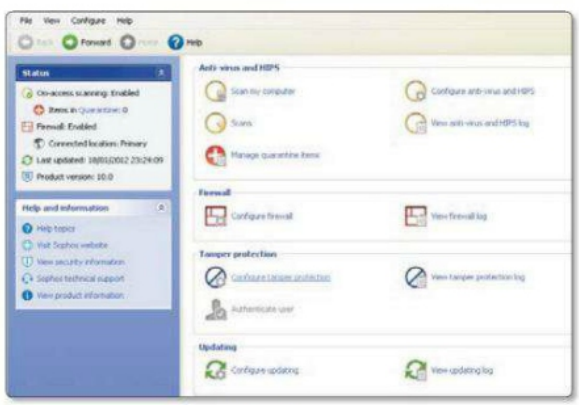
We might quibble about the severity of some of the errors flagged. Many of the more than 1,000 issues found on our test PC – on which Windows is regularly reinstalled – were defined as critical, but these weren't problems that might stop a PC working.

We recorded the PC's startup time before and after running PowerSuite. It reported 640 Registry errors, 1,758 speed issues and eight outdated drivers. After fixing these, the startup time was reduced by 12 percent – not a huge difference.

Of course, there are other harder-to-quantify benefits that can be achieved by the removal of unnecessary files, and by the installation of the latest drivers.

Verdict

Uniblue's PowerSuite can improve the overall running of a Windows PC. We found a small but measurable difference to startup time, although some changes are comparable to Sheldon Cooper arranging cereal boxes in increasing order of fibre content. ☒ **Simon Williams**



SOPHOS ENDPOINT is easy-to-use antivirus for small businesses

Performance

AV-Test scored the Sophos 9.7 engine 11/18 – not a particularly high score, although it was certified. The software scored 4.5/6.0 on usability, but protection against malware warranted only 3.5/6.0 and repair of an infected system dipped to 3.0/6.0, with only 49 percent of modifications made by the malware sample successfully corrected. We reviewed version 10.0, which has yet to be tested by AV-Test.

Our own tests showed Endpoint to be quick to complete a standard scan. It examined 8,973 files in our test basket in 15 minutes 16 seconds. Although this gives a low scan rate of 9.8 files per second, Sophos performs an automatic memory and rootkit check during all file scans.

It's background processes don't put much burden on a system, with our 1GB file copy taking 35 seconds; this is the best time we've seen out of all the security products we've reviewed this year. However, that's still twice as long as it would take with no antivirus software installed on our test machine. With a scan running, the copy took 1 min 42 secs, marking a greater performance slowdown than all the 2012 suites but Webroot and AVG.

Verdict

Although Sophos products are designed primarily as network-administered, system-wide protection tools for enterprise, Sophos Endpoint Anti-Virus 2012 is suitable for smaller, localised systems. The most recent version tested by AV-Test was not a strong contender, but version 10.0 may improve on this. It's not a cheap or particularly well-featured option, however. ☒ **Simon Williams**

>> *See page 70 for more internet security suite reviews*

VIDEO EDITOR

Sony Vegas Pro 11.0

£369 inc VAT

Contact
- sonycreativesoftware.com

Read more
- tinyurl.com/6pqe939

System requirements
2GHz CPU (multi-core recommended for HD/3D); Windows Vista/7; 2GB RAM; 500MB hard-disk space; OHCI-compatible IEEE-1394DV card; USB 2.0; sound card; DVD-ROM drive; .Net Framework 3.5; QuickTime 7.1.6 or later; nVidia/AMD card for GPU-acceleration

Usability: ★★★½☆
Features: ★★★★☆
Value: ★★★½☆

★★★½☆

If there's one thing that stifles creative energy with deadly effectiveness, it's having to wait. The GPU-accelerated features added to Vegas Pro 11.0 are more welcome than any other alteration Sony could have made to its video editor.

Speed me up

Vegas Pro 11.0 can use your system's graphics card in place of its CPU to accelerate certain playback and rendering functions. Whereas its predecessor accelerated only a single function in this way, 36 video effects, 10 transitions and output rendering are supported by Pro 11.0.

Sony claims that Vegas' GPU acceleration can speed up output rendering by a factor of four, depending on the type of project involved, the effects and transitions you use, and your system and graphics card.

Your graphics card must support Open Computer Language (OpenCL), as well as a driver that's compatible with the standard. This led to an odd glitch in our testing: despite our graphics driver having been updated only a few weeks previously, Vegas refused to offer GPU acceleration. We had to dig around on nVidia's site to find a newer driver, which fixed the problem.

We set up a 15-minute timeline with several HD video clips, then added a large number of Vegas' GPU-accelerated effects and transitions. With acceleration disabled, our three-year-old dual-Xeon workstation, with 8GB of RAM and an nVidia Quadro FX4800 graphics card, rendered the 1080i project to .MXF format in 2 hours 20 minutes. With GPU acceleration switched on, Vegas showed a performance improvement of 21 percent, finishing in 1 hr 50 mins.

We then ran a smaller project, using some test files provided by Sony, and saw speed improvements of between 19 and 54 percent, depending on the output format.

Although none of our results approached the four-fold speed improvement claimed by Sony, the gains were substantial and noticeable, and different projects might produce better results. In our experience, Adobe Premiere Pro's GPU acceleration is more effective.

VEGAS PRO 11.0 adds some very welcome GPU-accelerated features

Enabling GPU acceleration has some lesser but still useful additional benefits, including the ability to preview HD clips at higher resolutions and to scrub the timeline more smoothly.

Your title here

Other improvements to Vegas Pro 11.0 are relatively minor, but some new effects and a titler mechanism are worth noting. Sony has added a NewBlueFX starter pack of five transitions and eight video effects. It may not sound like much, but these tools offer a wider range of customisability and can produce some very complicated effects.

The effects come with multiple presets; for example, the NewBlue ST Video Tuneup effect has Dull, Moody, Pastels, Psychedelic and five more presets. Once a preset has been selected, you can tweak it and save it for later use.

Vegas Pro adds a per-parameter keyframing capability for many more video effects, which means you can add keyframes (to specify when an effect begins, how much effect it applies, and when it ends) for different elements of an effect.

You can independently keyframe the size, intensity, perspective and tint. This gives you much more creative control; you may be at risk of losing track of time while playing with the many controls.

The NewBlue Titler Pro lets you manipulate text in four dimensions - X, Y and Z axes, plus time. You can independently adjust the position of text, and scale or rotate it around the three axes.

Also new is a video-stabilisation plug-in that's supposed to analyse motion on all three axes to make clips look less shaky. It has the usual presets - light, medium and heavy - and it works adequately, provided that you don't mind some cropping.

The more stabilisation you implement, the more cropping you have to contend with; but crop too much, especially when working with a standard-definition clip, and the result may look rather fuzzy.

Furthermore, you can't simply drag-and-drop effects on to a clip in the timeline; instead, you must select the clip, then use a Media FX menu command, and then select it from a list in a different window.

Sony insists on this method of using the plug-in so that the new portion of any clips extended by trimming will also be stabilised. Like the NewBlue features, the Stabilize plug-in isn't GPU-accelerated.

As is possible with almost any modern-day consumer video editor, Vegas Pro lets you upload edited footage directly to YouTube. We were slightly surprised to see this feature in a professional-level product, but pleased to find it works even with 3D compositions.

We also like the new Sync Link feature, which lets you associate two or more elements in the timeline and control whether they move together or separately.

Verdict

Vegas 11.0's GPU acceleration isn't as well implemented as that of Adobe Premiere Pro CS5.5, but it's nevertheless an appealing function and a very good reason to upgrade from earlier versions. Those using AMD rather than nVidia graphics cards will welcome Sony's performance improvements even more. **Alan Stafford**

GAME

Call of Cthulhu: The Wasted Land

£2.99 inc VAT

Contact
- tinyurl.com/6eod5nc

Read more
- tinyurl.com/7y3axqd

System requirements
iPhone/iPod touch/iPad; iOS 4.2 or later

PC ADVISOR RECOMMENDED

OVERALL

★★★★½

Its wry tone, knowingly silly concept and instant results save Call of Cthulhu from disappearing into a black hole of diehard-pleasing nostalgia. This turn-based strategy-role-playing hybrid is a reassuringly natural fit for the iPhone and iPad.

Based on the original game, it's set during WWI; but the tale of stiff-upper-lipped Blighty soldiers taking on dastardly Germans swiftly gives way to a desperate defence against Lovecraftian horrors.

It's not lost to bewildering statistics, though. For the most part, it's about using your squad of half a dozen soldiers and magic-wielding mystics to methodically take out invading hordes of zombies, cultists and nameless inter-dimensional horrors, with a healthy selection of guns and spells.

Scan the battlefield, work out what you can shoot before it munches your chaps' faces, and do your level best to manage and refresh their sanity in the face of this dark insanity.

CALL OF CTHULHU is a turn-based strategy game for the iPhone and iPad

Come level's end, you can upgrade soldiers and their gear. If you want a team of magic-wielding psychics, turn your squad into brainiacs. If you want shotgun-toting Stallones, go for it. Or, more sensibly, you can pick your specialists and carefully spend points to build a balanced team.

You'll end up playing a markedly different game to anyone else who ventures into the Wasted Land. That said, it's a shame that levels are so unflinchingly linear. The mechanics are fleshed-out and smart, but the presentation is barebones and dated.

The Wasted Land can be frustratingly unresponsive, and lacks the slickness we associate with the big iOS smash hits.

Verdict

Call of Cthulhu: The Wasted Land is a joyously thoughtful, yet equally silly old-school tactical role-playing game, brought sensitively to the iOS gaming platform. ☒ **Alec Meer**

Small, but can do it all

Shuttle XPC has only 1/3 size of a traditional tower PC. It maybe small on the outside, but inside Shuttle XPC accompany the latest and fastest components. Like, for instance, the highest performance AMD and INTEL processors, latest DRAM-DDR3, high-end graphics cards (PCI-Express and dual-slots for CrossFire/SLI), and 80 Plus certified PSU, which provide XPC the environment to run demanding applications such as 3D games, media design and multi-tasking.

Shuttle XPC Barebone SG41J4

BASIS FOR A RELIABLE MINI-PC FOR DAILY APPLICATIONS IN THE CLASSROOM

- Supports Socket 775 Intel Core 2 Quad & Duo processors
- Supports up to 8GB DDR3 RAM
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- Supports dual-slot graphics cards for extra performance
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- Room for two hard disks plus optical drive

Shuttle XS35 Series

RESPITE FOR YOUR EARS - THE FIRST FANLESS 1-LITRE PC WITH ION2 GRAPHICS (GT VERSION)

- Virtually noiseless and maintenance free
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- Built-in wireless (XS35V2, XS35GT V2)

Shuttle XH61

COST-OPTIMIZED SOLUTION

- Intel 65W LGA 1155 CPU
- 2 x 240 pin DDR3 DIMM slots,8GB per DIMM (Max 16GB)
- D-sub + HDMI dual display
- Low Power consumption less than 90W
- Front-mounted audio jacks & 2 USB 2 ports
- Expansion with 1x 2.5" HDD / SSD bay, and 1 x Slim ODD bay

icubes

visit **www.icubes.co.uk** or call **01753 552222**

UCS

VIRTUALISATION SOFTWARE

VMware Fusion 4.1

PC ADVISOR RECOMMENDED

£30 inc VAT

Contact
- vmware.com/uk

Read more
- tinyurl.com/7p42j5u

System requirements
64bit-capable Intel Mac; Mac OS X 10.6.7 or later (10.7 recommended); 2GB RAM (4GB or more recommended); 750MB hard-disk space, plus 5GB for each virtual machine

Usability: ★★★★☆
Features: ★★★★☆
Value: ★★★★½
★★★★☆

Until recently, VMware and Parallels had an almost identical feature set, and even seemed to sync releases. Parallels has now taken the title as the go-to virtualisation software for the Mac, but Fusion 4.1 has some important distinctions that will make it more attractive to some users.

The core functionality of Fusion remains unchanged in version 4.1. It lets you run virtualised images of x86 and x64 operating systems within OS X. As with Parallels, the focus is very much on Windows, although Linux and Unix systems can also be installed.

But unlike Parallels, VMware doesn't provide Linux OpenGL graphics acceleration. This is a shame, since new user-interface effects – such as Ubuntu's Unity – cannot be viewed or utilised.

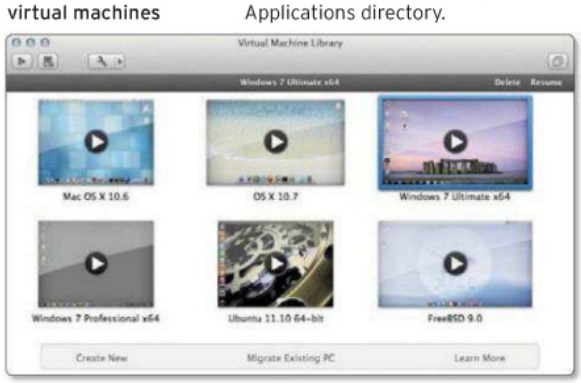
And whereas Parallels allows you to divert up to 1GB of memory to the graphics adaptor, Fusion fixes this allotment at 256MB in Windows 7.

VMware claims that Fusion 4.1 is 2.5 times faster than its predecessor for 3D graphics. Running Fear at Max detail on a 2.4GHz MacBook Pro, we recorded 22fps. In comparison, Fusion 3.0 recorded 16fps in Windows XP.

There is some love for OSes other than Windows in the form of ready-made Linux/Unix virtual machine (VM) images, downloadable from VMware.

New features

VMware's first change is found in Fusion 4.1's installation process. Unlike earlier versions, which required an install process with admin privileges that then scattered files across your system, Fusion 4.1 simply asks that you drag the app from its disk image to your Applications directory.



The new **VIRTUAL MACHINE LIBRARY** gives a graphical overview of available virtual machines

VMWARE FUSION 4.1 adds OS X as a guest VM inside OS X Lion

The Virtual Machine Library window is now laid out in a grid rather than a vertical list, and serves as a central launch centre for installed VMs.

A panel that's reminiscent of OS X's own System Preferences is used for changing each VM's settings. This gives a great overview of the settings available, including one we've been waiting to see for some time: USB device global preferences.

By default, every time you plugged in a new USB device, earlier versions of Fusion would ask if you wanted to connect it to the host or VM computer. With multiple VMs running in the background or on different desktop spaces, this process could quickly become tiresome. It required you to click through VMware's splashscreen for every new thumb drive you plugged in. Now, under USB & Bluetooth/ Advanced USB Options, you can elect to have any new USB device always connect to the Mac or VM.

The Menu Bar that appears in full-screen mode has been redesigned. This small black tab can appear on the left, right, top or bottom of the screen, offering handy shortcuts to Settings and other options. We set it to Automatically Hide and Show, out of the way on the screen's left edge.

Full-screen mode is supported in the new Lion fashion, and accessed via a diagonal arrow in the top-right corner of a VM window. With dual monitors, the VM expands into the same desktop space it started in, rather than create a whole new desktop. We found this more convenient to work, letting you continue working on the adjacent screen of the second monitor.

Lion on Lion

Perhaps the biggest new asset in VMware Fusion 4.1 is the ability to create and run virtualised versions of OS X itself. The main hindrance to this in the past has been Apple's OS licence agreement, which forbade the virtualisation of its client OSes. Those terms changed with Lion, paving the way for first Parallels, and now Fusion, to support the setup.

But just like Parallels 7.0, graphics acceleration isn't supported. This leaves the virtualised OS feeling somewhat slow and juddery (much of the Mac interface is normally accelerated by Quartz Extreme, which offloads screen rendering to the GPU). QuickTime and Flash video are also off the menu.

Also lacking are most of the gesture controls available through a trackpad. You can use two-finger scrolling, though, which is an improvement on Parallels' support.

A feature that has matured nicely is Snapshots. This combines the best of Apple's Time Machine with Microsoft's System Restore to return a PC to an earlier state.

Verdict

Fusion 4.1's virtualised Linux and OS X experience is neutered by incomplete graphics support, but it's otherwise a robust and dependable virtualisation package for the Mac. Now at half the price of Parallels Desktop 7.0 for Mac, Fusion is a useful upgrade. ☒ **Andrew Harrison**

Dell recommends Windows® 7.

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20IN MONITOR

NEC EX201W

£180 inc VAT

Contact
- nec-display-solutions.co.uk

Read more
- tinyurl.com/7y6gzdv

System requirements
20in monitor; 1600x900; 16:9; TN panel technology; tilt/height/swivel/pivot adjustments; white LED backlight; 250cd/m² brightness; 1,000:1 contrast; 176/170-degree viewing angles; 5ms response time; 16.7 million colours; DisplayPort; DVI-I; Vesa 100 mount; external power supply; USB 2.0; 475x381-491x215mm; 3.5kg (with stand), 2.2kg (without stand)

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

NEC's compact, super-slim and ultra-minimalist EX201W has a fully adjustable ergonomic stand and extremely low power consumption.

The EX201W can be adjusted up to 110mm vertically, while a portrait pivot mode joins the NEC's tilt and swivel options.

This lightweight display is also portable. A quick-release mechanism lets you remove the screen from the stand, pack up the external power adaptor, and take the panel with you. Its 20in display makes a good compromise between size and convenience. A portable stand and carrying case is optional.

Given the smaller screen size, the NEC has only a 1600x900-pixel resolution, and a 16:9 aspect ratio. Note that it doesn't include HDMI or VGA inputs, so you'll need adaptors to use its DVI-I or DisplayPort connections. A top-mounted USB port is well placed for a webcam.

The display is very easy to set up via touch-sensitive controls on the bottom right of its bezel. Each button press displays an adjacent onscreen menu. Where values can be tweaked up or down, you simply slide a finger along the touch-sensitive scroll area.

NEC boosts the EX201W's budget twisted-nematic (TN) panel technology with XtraView, which enables wider-than-usual viewing angles. It lists 176 degrees horizontally and 170 vertically.

The NEC's viewing angles are good for a TN panel, based on our subjective tests, but don't expect to see the rock-solid uniform look of an in-plane switching display. We still saw shifts in brightness, if fewer than usual. In portrait mode they become even more apparent.

The EX201W consumes a surprisingly small amount of power, and boasts a raft of power-saving facilities to reduce its footprint still further. It consumed just 10W at 120cd/m², and 14W at the display's maximum 306cd/m².

An ambient light sensor adjusts the backlight in response to how much light is available, conserving power and reducing eye-strain. Step away from your desk, and a motion sensor will dim the screen or put it into power-saving mode.

If you'd appreciate a regular pat on the back for all this ecological consideration, you can check the onscreen menu for an estimate of your carbon savings.

Our testing revealed better performance than most TN panels. The NEC's colours are vivid and bright, but not entirely accurate. The display was able to reproduce 96 percent of the sRGB gamut.

The measured black level was less impressive – a black screen was rendered visibly grey, with some backlight bleed visible from the right edge. This results in less-than-brilliant contrast performance, and a minor lack of uniformity across the screen. The NEC's contrast ratio was measured at 650:1.

Verdict

The £180 NEC EX201W is a 20in TN display that's ergonomic, portable, flexible and incredibly energy-efficient. Its image quality is more than adequate for office tasks, if not suited to graphics professionals. **Paul Monckton**

WIRELESS ROUTER

DrayTek Vigor 3200n

PC ADVISOR RECOMMENDED

£375 inc VAT

Contact
- draytek.co.uk

Read more
- tinyurl.com/7z4xtd5

Specification
Multi-WAN router; 4x WAN; LAN; DMZ; USB 2.0; optional 802.11b/g/n; 40Mbps VPN support; firewall with IP, content filter; 30x160x245mm

Build: ★★★★½
Features: ★★★★½
Performance: ★★★★½
Value: ★★★½☆
★★★★½

A working internet link is critical to most businesses, so it's sensible to have access to multiple redundant connections. In the event of the main DSL wide area network (WAN) going down, a fallback link will keep the business online.

Consumer routers don't include – nor need – this level of sophistication, and some enterprise hardware can seriously dent a company's IT budget. Setting up and configuring such a high-end device also requires well-trained staff, which further increases costs.

For a medium-sized business, a router such as the Vigor 3200n offers advanced features. It's also reasonably easy to set up.

At the front are six gigabit ethernet ports, with four dedicated to separate incoming WAN connections. A single port feeds a LAN connection for the rest of your network. The final LAN port is for a demilitarised zone (DMZ). This configuration is good for security, as you can keep web and ftp servers separate from your network. In the event of an intrusion via your website, the hacker won't be able to gain access to the company LAN.

Different types of traffic can be routed to a specific connection. With clever subnet allocation, you can ensure all the computers used by a certain department have access to your firm's leased line, while a department with lower bandwidth demands is restricted to ADSL.

This feature may also be useful for those in rural areas, where internet speeds are often slower and less reliable. Using more than one ISP allows you to switch to another network if one goes down, but your business will still be interrupted while you make the switch. DrayTek's Vigor 3200n automatically manages this switching.

A USB 2.0 port can be used for attaching printers, sharing storage, and even adding a 3G modem to gain a fifth WAN. The latter option is a useful plan B if something truly catastrophic happens that breaks all fixed-line connections.

DISK SCRUBBER

Wiebetech Drive eRazer Ultra

£230 inc VAT

Contact
- wiebetech.com

Read more
- tinyurl.com/7qbxr6f

Specification
Drive scrubber for 2.5in and 3.5in SATA and 3.5in IDE/PATA hard drives; requires Windows XP/Vista/7/Mac OS X/Linux; USB 2.0; 2-year warranty; 81x56x24mm

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★½☆
★★★★☆

The Drive eRazer Ultra is a small device that lets you securely erase the contents of a hard drive. It can destroy confidential data such as credit-card details, passwords, photos and web histories.

The Drive eRazer can wipe your entire disk, including the hidden, protected data that most free software-based utilities miss.

You can also hook up the eRazer to a PC to view the drive contents before erasing; or afterwards, to make sure the drive is clean.

The eRazer is about twice the size of a deck of cards. It includes ports and data cables for 2.5in and 3.5in SATA and 3.5in IDE/PATA drives, along with a power port and cables to spin up drives.

The unit has a circular four-button control, a two-line backlit LCD, and status lights for power on/off and activity status.

There's also a nine-pin serial port for connecting the eRazer to a printer and outputting a verification tracking label. This contains the drive model/serial number, erase method used, and blank fields for sign-off and release signatures.

If you want to re-use the drive, you can use a non-destructive method that writes over every data block one or more times. Overwriting the data once with zeros is generally considered sufficient, but some government and industry standards specify several passes.

An included metal plate can temporarily protect the drive's electronics and help dissipate heat. The package includes screws for connecting the metal plate to the drive.

You select the erase mode by toggling through the menu on the display. Twelve erase modes include Quick Erase, Custom Erase, Secure Erase N, Secure Erase E, plus eight additional modes that reflect data sanitisation standards from the UK, as well as the US, Canada and Australia.

The eRazer asks for a confirmation before proceeding. It will indicate the size of drive, and then display and update the percentage of the drive erased and roughly how many minutes remain.

In our tests, which included 40GB PATA drives and a 200GB SATA drive, a single-pass scrub took about 45 minutes. In general, scrubbing new SATA drives should take around 7GB per minute for a single pass – a 1TB drive would take around 2 to 2.5 hours to scrub.

After scrubbing, the Drive eRazer Ultra performs a verification operation. You can choose minimal, 0.1 percent or 1 percent sample sizes; any more than this would take much longer than the sanitisation process – to verify 100 percent on a 1TB drive could take days, even weeks.

We checked several erased drives by running Stellar Phoenix Windows Data Recovery. We found no data remaining. As far as we could tell, Drive eRazer Ultra did sanitise to the point where data could not be recovered via software.

Verdict

The Drive eRazer Ultra is affordable, portable and fairly simple to use. But if you're going to want to scrub only a few drives per year, several free utilities are available. **Daniel Dern**

The 3200n resembles a prosumer router, with three antennae and 802.11n 2.4GHz networking. Its performance in our tests was excellent: it achieved 110 megabits per second at short range (1m) and 40Mbps at longer range (10m).

The user interface is well-suited to the management of a large network. In the Online Status page, each WAN connection is listed in a table, along with details of its external IP and gateway, with TX/RX traffic measured in packets and bytes per second. You can easily see whether a connection has gone down and how much traffic is being routed via remaining connections.

Another attraction is its excellent virtual private network (VPN) specifications. The router offers up to 40Mbps to clients. There's also an option for one-time passwords on mobile phones.

The 3200n can connect multiple LANs together, too, which will come in useful if several offices want to share a single network.

A comprehensive firewall aims to block IP and DoS-based attacks, with an object-based system for creating rules based on subnet (or a department in your organisation).

A subscription-based filter allows unwanted web content to be blocked from the network.

Verdict

The DrayTek Vigor 3200n's pricing and feature set places it in between the prosumer and professional markets. Multi-WAN management is its trump card. It's a powerful router with excellent performance and VPN support. **Orestis Bastounis**

DOCUMENT SCANNER

Fujitsu fi-6130Z

£850 inc VAT

Contact
- fujitsu.com

Read more
- tinyurl.com/7dwtqcl

Specification
Desktop sheet-fed scanner; 600dpi; 24bit colour; colour duplex; 50-sheet feeder capacity; USB 2.0; 4,000-sheet daily duty scan; Twain/Isis-compliant; 301x160x158mm; 4.2kg

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★½☆
Value: ★★★½☆
★★★½☆

Fujitsu's fi-6130Z is a sheet-fed document scanner that takes aim at the same ground as the Canon DR-M160 (tinyurl.com/82oqLha). Neither accepts a huge number of documents: the fi-6130Z accommodates just 50 sheets, against the Canon's 60.

The Fujitsu is said to be suitable for up to 4,000 sheets a day, while the Canon can handle 7,000. And unlike its rival, which has a long document mode, the Fujitsu accepts material only up to A4 size.

The straightforward control panel lets you alter the job number and choose where to send scans.

When paper jams, Fujitsu's software intelligently pauses the job so you can remove the offending sheet, it then resumes from the same point. A rear-mounted release button opens up the device, making blockages easy to clear.

A number of useful tools are provided. ScandAll Pro 2.0 offers a colourful front end that's reasonably easy to use, allowing you to quickly load finished scans into Microsoft Office programs. You can change the default settings with a few clicks, then use the fi-6130Z's Scan button to create quick results. The ability to take a single document and turn it into a number of different files could also be useful.

Kofax VRS Professional offers a competent array of tools for enhancing the quality of scans. And OCR comes courtesy of ABBYY FineReader ScanSnap 4.1. Its accuracy levels are strong, and it can create searchable PDFs.

The Fujitsu is marginally slower than the DR-M160. At a resolution of 200dpi, it converted our 20-page test job into a searchable PDF at a rate of 33.9 pages per minute (ppm); the Canon managed 32.5. Using image files, 49.4ppm is possible.

Neither is this scanner as strong in image or text quality. Even at the higher detail levels, flesh tones are handled better by the Canon.

The Fujitsu's OCR facilities work well, and we experienced few errors with standard text. It isn't a perfectionist in recreating columns and tables, but this might be fixed with up-to-date OCR software.

An output tray folds up for easy storage, and the input feeder is removable for transportation.

Verdict

The Fujitsu is a reliable scanner, and the ScandAll Pro front end simplifies the scanning process. We prefer the Canon DR-M160, though, which is more compact and robust, and fares better in speed and quality, too.

Robin Morris

PRINTER

Samsung ML-2545

£85 inc VAT

Contact
- samsung.com/uk

Read more
- tinyurl.com/7rxfs4r

Specification
Mono laser printer; 1200x1200dpi print resolution; quoted print speed: 24ppm; actual print speed: 19.4ppm; USB 2.0; 250-sheet input tray + single sheet; 8MB memory; toner costs £60; print yield (pages): 2,500; 358x389x197mm; 7.2kg

Build: ★★★★☆
Features: ★★★½☆
Performance: ★★★½☆
Value: ★★★★☆
★★★★☆

The ML-2545's crisp cream exterior and delicate curves might make this mono laser look more expensive than it is, but closer inspection reveals some shortcomings.

The 250-sheet input tray is well built and easy to load, but the 80-sheet output tray lacks depth. You'll need to keep an eye on sizeable print jobs to ensure pages don't drop to the floor. The output tray doubles up as a dust cover.

An additional single-page paper feed is provided, which allows you to print to a different paper size without changing the settings.

The control panel is clean and simple. Two status lights are accompanied by buttons for activating the power and cancelling jobs. A third control lends access to the Screen Print function, which lets you quickly print whatever's displayed onscreen.

Unsurprisingly, given the £85 price tag, the Samsung isn't well endowed with features. Auto duplexing is conspicuous by its absence, and means saving paper by printing on both sides won't be so straightforward a task.

Connectivity amounts to a solitary USB 2.0 port. The software bundle is pleasing, though, and includes Samsung's Easy Printer Manager and an AnyWeb Print package for Windows and Mac – this allows you to store snippets from web pages in one central place.

We were very impressed with the ML-2545 when it came to the all-important function of printing. Text was pumped out at a relatively brisk 19.4 pages per minute (ppm). The output is dark and cleanly defined and, even at small font sizes, we found it relatively clear and precise.

Mono lasers aren't designed to print graphics, but the ML-2545 makes a reasonable job of photos. Its range runs slightly thin at the darker end of the spectrum, but it'll prove more than adequate for hard copies of presentations.

The Samsung has very low running costs for a mono laser at this price point. While more expensive models may offer better value than the ML-2545's 2.4p a page, it's a competitive figure for a sub-£100 budget model.

Verdict

The Samsung ML-2545 is an attractive but reliable page-churner. The running costs are reasonable, and we found the text output to be of a high quality. Although this mono laser printer doesn't have an abundance of features, it's an excellent choice for anyone seeking good-quality text for a low initial outlay.

Robin Morris

TEXT EDITOR

Emurasoft EmEditor Professional

£34 inc VAT

Contact
- emeditor.com

Read more
- tinyurl.com/7hecksq

Specification
Windows XP/Vista/7/ Server 2003; 30MB hard-disk space

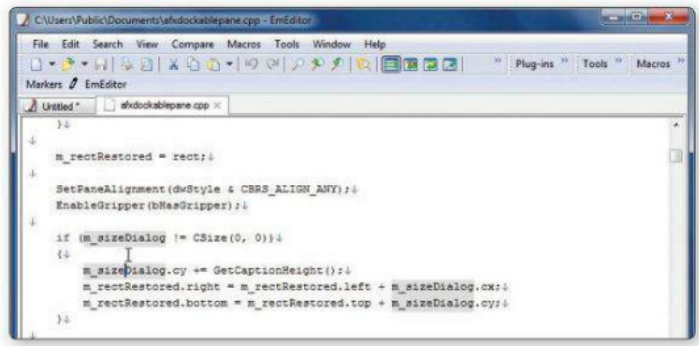
Usability: ★★★½☆
Features: ★★★★☆
Value: ★★★★☆
★★★★☆

EmEditor Professional is a powerful text editor that includes features suitable for programmers, web designers, system administrators and anyone else who regularly works with unformatted text.

A variety of panels can be on display at once, with a central tabbed editing area. Confusingly, some panels are controlled by the View menu and others by Plug-ins. This is a common theme throughout EmEditor, and it's often difficult to work out how to use a given aspect of the program.

The documentation could also be better. It's sparse and peppered with questionable English, but it gets the job done. It also responds to keyword searches.

We like EmEditor's parsing of delimited files, including the ability to specify delimiters. It can read large files without overflowing memory. You can also customise options for various file types, and use powerful outlining, both in-document and in a side panel.



Other useful features include a macro-record feature, along with the ability to write complex macros using eVBScript or JavaScript.

Beyond that, EmEditor has many of the features expected of a professional text editor. It doesn't have a very sophisticated hook into common development tools such as Visual Studio, however; you can set it up as an 'external tool', but there's no automated integration.

We found EmEditor responsive and easy to use. The wealth of configuration options and the ability to quickly change them on a file-by-file basis makes it useful if you regularly edit different file types.

EmEditor is under constant development, and EmuraSoft is quick to fix bugs and add features.

Verdict

If you're in the market for a text editor and don't have a particular preference as to which one, EmEditor Professional is well worth a look. It offers an exceptional mix of features and tools at a low price.

Ian Harac

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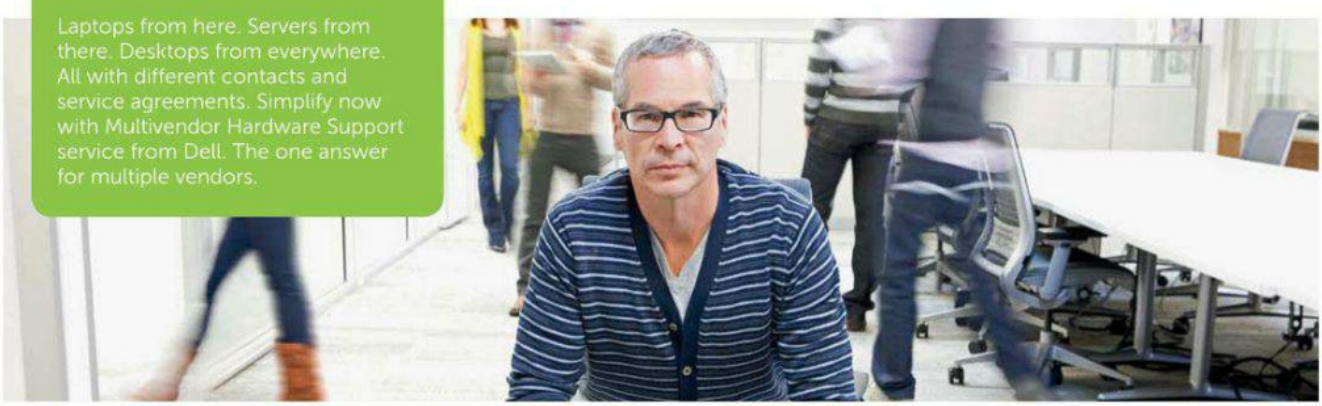

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Flat-panel displays

Panel technology is an important factor in the quality of the display you spend all day looking at. Jim Martin explains why, with his assessment of six sumptuous screens

The screen is one of the most important elements of a PC. You'll be spending most of your working day staring at it, so it makes sense to choose one that's comfortable to view. It's also likely to be with you a long time – the average monitor is replaced less frequently than the PC that powers it. So it's crucial that you buy the correct type of panel for your needs.

Choosing a monitor isn't as simple as comparing the specifications of one against another, then plumping for the display that sounds superior. Indeed, some specifications are far more important than others.

Screen size and resolution

First, decide on the panel size you want, which will most likely depend on your budget. In general, 26in and larger screens will cost upwards of £250. Unless you have a limited amount of desk space, there's really no reason to choose anything smaller than a 22in display. Most such displays will have the same full-HD (1920x100 pixels) resolution as larger 23in and 24in screens.

Panel type

It's rare to find a monitor that offers poor image quality these days, but that doesn't mean all modern displays are identical. Even if you already know and understand the differences between twisted-nematic (TN), multi-vertical alignment (MVA), patterned vertical alignment (PVA) and in-plane switching (IPS) screens, it's unwise to base your purchasing decision purely on the panel technology a monitor uses.

Twisted-nematic

TN panels are generally used in budget monitors and tend to have limited viewing angles. This means colours will shift as you increase the angle at which you view the screen relative to the perpendicular. However, TN monitors also offer fast response times and acceptable colours, making them a good buy for most users.

Multi-vertical alignment

MVA and PVA screens offer better viewing angles and contrast ratios than TN panels, but their often slow response times can lead to blurred frames in video and games. If fast response times are important, look to an advanced MVA (AMVA) monitor.

In-plane switching

IPS is widely regarded as the best monitor technology. It offers excellent viewing angles, contrast and colour accuracy. It also tends to be the most expensive, but there are exceptions and bargains can now be had.

Matt or gloss?

A screen's finish is worth considering. The vast majority of monitors have a matt coating, which all but eliminates reflections. Glossy screens, which are more commonly found on laptops these days, can be overly reflective but offer more vibrant colours.

Extra features

Most monitors costing less than £200 have basic stands that allow only tilt adjustment. Spend more and you may be able to find a height-adjustable stand, which can prevent you craning your neck. The top of your monitor should be roughly at eye level. With height adjustment often comes pivot, which lets you rotate the screen to a tall portrait orientation.

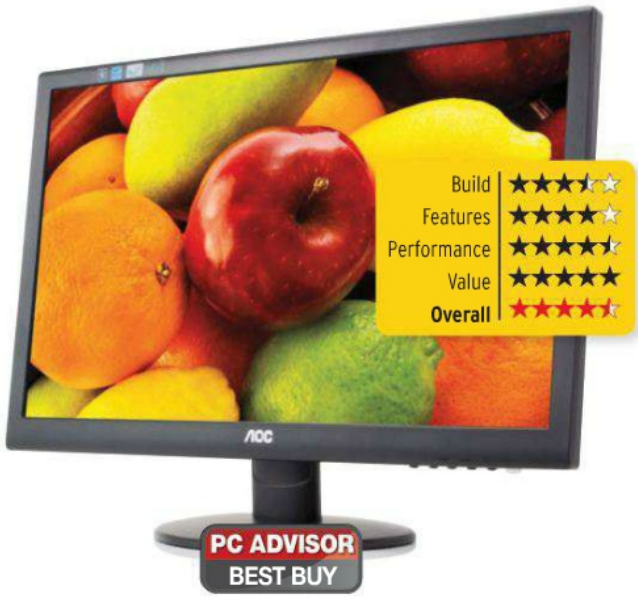
Speakers are built into some models, but are generally of a poor quality and suitable only for email notifications and the like. A headphone output can be handy, but not if it's hidden at the rear of a display where you can't get to it.

USB ports may come in useful for plugging in peripherals and hard drives.

Don't overlook the warranty. Monitors tend to come with two- or three-year guarantees, but some companies ask you to send the screen to them at your expense (return to base), while others will send you a replacement and collect the faulty unit at the same time (onsite).

Buy a monitor for its image quality, not its extra features. These should be viewed only as a bonus.

Photography by Dominik Tomaszewski



AOC i2352Vh

£139 inc VAT • aoc.com/uk • tinyurl.com/7hxtpvv

The 23in AOC i2352Vh is a 1920x1080-pixel IPS monitor that's within reach of those on a tight budget. To achieve the £139 price tag, AOC has omitted frills such as a height-adjustable stand and a USB hub.

Fortunately, connectivity hasn't been overlooked, with the AOC offering a trio of VGA, DVI and HDMI inputs. These are rear-facing, allowing for the quick and easy connection of cables.

The built-in speakers are handy for email notifications and the odd YouTube clip, but for anything else you'll want to plug in a pair of headphones to the AOC's 3.5mm jack.

AOC's i2352Vh won't win any style awards, with its plain black finish and matt screen. We prefer its hardware buttons running along the bottom edge of the bezel to the touch-sensitive alternatives seen elsewhere, but the power button is situated too closely to the menu button. Usefully, the display's power supply is integrated.

Plenty of options can be tweaked, but we'd rather see specific figures for colour temperature and gamma than the meaningless 'Warm', 'Cool', 'Gamma1', 'Gamma2' and 'Gamma3' settings. AOC bundles a Windows-only utility for configuration.

Despite its low price, AOC has managed to squeeze in an IPS panel to the specification. This screen produces an excellent image that puts TN technology to shame. A small amount of calibration was required out of the box, but colours were reasonably good. We measured 77 percent of the NTSC gamut and 85 percent of sRGB.

As expected from IPS tech, viewing angles are also good – AOC states 178 degrees, both vertical and horizontal.

AOC claims a staggering dynamic contrast ratio of 20,000,000:1, yet the actual measurement is lower than many more expensive displays; in our tests, 737:1. Nevertheless, a fast response time of 5ms makes this screen well suited to gamers and video enthusiasts.

At maximum brightness, we recorded 35W power consumption. This fell to 21W when we lowered the brightness setting to 120cd/m².

VERDICT: The i2352Vh is a dream monitor for anyone who still needs great image quality for tasks that demand accurate colours, such as photo editing. Better-featured IPS panels are available, but none can beat the AOC for value. It also has the best subjective image quality.

BENQ RL2240H

£130 inc VAT • benq.co.uk • tinyurl.com/833t7py

BenQ says it's tweaked every aspect of the 22in RL2240H for the enjoyment of real-time strategy (RTS) games. To this end, there's an RTS picture mode alongside the usual Movie, Photo, sRGB and Eco presets. This optimises colour and contrast to help you spot enemies. Our tests bore out the claim.

The BenQ is more expensive than many 22in TN panels we've seen, but offers some reasonable specifications in return. A fast response time is necessary for gaming, and the BenQ's 2ms is the joint-fastest in this group test. We were disappointed to find that enabling the advanced motion accelerator did nothing to reduce blur when objects moved quickly across the screen, however.

The RL2240H also supports plenty of configuration options, with a likable onscreen menu system that's reminiscent of Mac OS X's Finder. Bizarrely, you can even scale the display settings to match those of a 17in or 19in 4:3 monitor.

Our tests revealed washed out colours in comparison to those of IPS panels, something that tweaking the settings did little to remedy. The BenQ can display 94 percent of the sRGB gamut, but just 70 percent of NTSC colours. Contrast also looked weak in the face of BenQ's rivals. Blacks were rather grey, and poor viewing angles served only to exacerbate the problem. We measured 723:1.

The LED backlight is reasonably even, but the recorded brightness is still 10cd/m² lower than that of the similarly priced AOC.

Given its intended market, BenQ's decision to use a glossy white bezel is an odd one. Attractive, yes, but it'll clash with most gaming keyboards and mice. A tilt-only stand is supplied.

Input options include VGA, HDMI and DVI, but only a VGA cable is provided. No speakers are built in; instead you get a 3.5mm jack.

We recorded 21W power consumption at max brightness and 14W at 120cd/m². Forget what you've heard about power-hungry gaming rigs – that makes the BenQ the most power-efficient display here.

VERDICT: If you're on a tight budget, BenQ's RL2240H would appear to offer good value. Its TN technology can't match the quality of IPS, however, and you'll find better colour accuracy and viewing angles if you instead plump for the £9 more expensive AOC.

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NEC MULTISYNC EX231WP

£270 inc VAT • nec-display-solutions.co.uk • tinyurl.com/7vpslvt

The first thing you'll notice about the MultiSync is its slim 15mm bezel. It makes the screen appear larger than 23in, and the NEC will be more economical in terms of desk space if you plan to run multiple displays side by side. This alone isn't enough to justify the high price, but the NEC offers other advantages over budget 23in displays, too.

One is the flexible metal stand, which can raise or lower the screen by 110mm, and rotate the panel into portrait mode. This lets you view entire pages of a document without scrolling.

A USB port at the top of the monitor allows a webcam to be attached. Inputs are limited to DVI and DisplayPort, but you can connect a device with an HDMI or VGA output using a simple adaptor.

To save power, NEC has added proximity and ambient light sensors. These turn off the screen when you move away from the desk, and ensure the panel isn't unnecessarily bright as darkness falls. The onscreen menu also measures your carbon savings, and calculates the amount of electricity and money saved in Eco mode.

With the MultiSync set to maximum brightness, we recorded 23W power consumption; this fell to 13W at 120cd/m^2.

An obvious difference between the EX231Wp and a budget display is its PVA panel. This looks identical to any other matt panel when switched off, but offers better contrast and viewing angles than TN technology. Like every monitor in our round-up, it sports a full-HD native resolution (1920x1080 pixels).

The colours are impressive with minimal calibration, both accurate and natural-looking at their default settings. We measured 95 percent of the sRGB gamut, and 72 percent of NTSC. The even LED backlighting helps here, and is surprisingly bright at 293cd/m^2.

NEC claims a slightly less preposterous dynamic contrast ratio than some manufacturers at 25,000:1; our own tests recorded 2,190:1.

Gamers won't like the NEC's 25ms response time: it doesn't affect video playback too much, but noticeable blur is observed when objects move across the screen.

VERDICT: With its thin bezel, flexible stand and great image quality, the EX231Wp can almost justify its high price. However, an exceptionally slow response time makes it unsuited to gaming.

PC ADVISOR RECOMMENDED

PHILIPS BRILLIANCE 241P4QPYES

£220 inc VAT • philips.co.uk • tinyurl.com/6vvodap

The Brilliance 241P4QPYES is designed for an office environment, but that's no reason to discount it for home use. It's a 24in display with a full-HD native resolution, a rotate- and height-adjustable stand, a four-port USB hub and a slew of power-saving features.

The stand incorporates a slot for routing cables to its VGA, DVI and DisplayPort inputs. The latter could be useful if your graphics card demands a DisplayPort interface for running a third monitor. It's still possible to connect HDMI devices using an HDMI-to-DVI cable.

The Brilliance isn't as beautiful to behold as some of the competition, but the silver bezel and black base are made from 65 percent recycled plastic, making it more eco-friendly than most.

Regard for the environment was clearly high on Philips' list of priorities in designing the 241P4QPYES, which has an infrared sensor that's able to detect when you're not sitting at the screen and put it into standby mode. You can adjust the sensitivity of this feature and, of course, there's a proper on/off switch, too. We recorded 30W power consumption at maximum brightness, and 18W at 120cd/m^2.

We're not keen on the touch-sensitive controls, which can be difficult to locate with no tactile guidance, but Philips includes a Windows-only configuration utility in the box.

The Philips' LED-backlit AMVA panel offers excellent contrast – 1,691:1 in our tests – with deep blacks and bright whites. This helps the display to retain the detail in both shadows and bright objects. We measured a maximum brightness of 299cd/m^2.

The Philips proved able to display 93 percent of the sRGB gamut, and 81 percent of NTSC.

Viewing angles are also very good – 178 degrees both horizontal and vertical, according to Philips. This means the colours and contrast won't shift as you move your head from side to side.

The 12ms response time isn't the fastest here, but should be fine for playing games; we didn't spot any blurring or lag.

VERDICT: It isn't the cheapest in our group, but the office-friendly 241P4QPYES is a superb display. Its flexible stand allows you to position the screen to suit, and image quality is excellent. It also has useful extras, including a USB hub and power-saving features.

SAMSUNG SYNCMASTER S23A550H

£210 inc VAT • samsung.com/uk • tinyurl.com/7jrpsjf

Samsung's PC monitors are easily identified by their red stripe and transparent outer bezel that extends from a glossy black surround. It's a design the company has used for several years, but it still looks good. This 23in, 1920x1080-pixel panel has a thin 20mm profile and a stylish black plastic base with a transparent centre. At the rear is a two-piece cover to hide cables.

Power comes from an external brick, and there are no Vesa holes for mounting this screen to a wall. More problematic for many users will be the absence of a DVI input, however, with the Samsung offering only VGA and HDMI. You can buy a DVI-to-HDMI cable if your PC doesn't have an HDMI output, but we'd expect two digital inputs at £210. There are neither built-in speakers nor a headphone output.

To retain the display's smooth styling, Samsung has employed touch-sensitive controls. We prefer to use hardware buttons, but the onscreen menu system clearly displays each button's function directly above it to simplify the game of hide-and-seek.

Adjustments include brightness, contrast and sharpness. There are individual sliders for red, green and blue channels. Magic Angle is an unusual inclusion, claiming to optimise brightness and contrast for whether you're standing up, sitting or lying down behind the screen.

Colours were reasonably accurate out of the box, and required minimal calibration. We measured 79 percent of the NTSC gamut and 91 percent of sRGB. The screen was also brighter than expected, at 274cd/m^2, although contrast was a let down at 697:1. As with other TN panels, blacks lacked the inky appearance of those of IPS screens. The LED backlighting was relatively even.

Viewing angles are typical for a TN panel, at a claimed 170/160 degrees from a vertical and horizontal viewpoint respectively. The Samsung's matt finish did an effective job minimising reflections.

Power consumption in our tests was around the middle of the pack, requiring 26W at maximum brightness and 18W at 120cd/m^2.

VERDICT: It's sleek and stylish, but the Samsung is expensive for a TN monitor – and comes with no extra features to justify the expense. Image quality is reasonable, and certainly good enough for games, but you can do much better for your money.

VIEWSONIC VP2765-LED

£350 inc VAT • viewsoniceurope.com/uk • tinyurl.com/86t3pfm

ViewSonic's 27in VP2765-LED is a professional-grade monitor, yet it's available at a significantly lower price than most such displays. It looms over the sub-24in competition, but offers the same 1920x1080 resolution. We'd want 2560x1440 pixels on a display this size, even at this price.

The screen is well built, with a huge forked stand keeping things steady. The panel can be raised or lowered with one hand, and rotated into a portrait fashion.

ViewSonic includes VGA, DVI and DisplayPort inputs, while HDMI devices can be attached using an HDMI-to-DVI cable. No speakers or audio outputs are built in, although there are four USB ports.

We were pleased to find hardware rather than touch-sensitive menu buttons, even if their black labels are almost invisible against the display's black bezel. But we found it all too easy to mistake the power button for one of the ViewSonic's configuration options.

Options here are rather basic: colour settings are limited to sRGB, four colour temperature presets and individual colour sliders. Unusually, there are no image presets, so you can't quickly switch between different modes depending on the task at hand.

We were dazzled by the AMVA panel's amazing brightness, measured at 378cd/m^2. The black level of 0.31cd/m^2 is reasonable, and resulted in a contrast ratio of 1,200:1 – slightly down on the Philips AMVA monitor.

Neither were the ViewSonic's viewing angles as good as we'd hoped. They're by no means awful, but colours shift towards the corners of the screen as you focus on its centre. They are reasonably accurate, however. We measured 90 percent of the sRGB gamut, but just 61 percent of NTSC.

Gamers beware: a very slow response time of 25ms makes this display unsuitable for fast-paced action titles.

Power consumption is comparatively high, at 39W maximum brightness and 21W 120cd/m^2.

VERDICT: If you're after a big screen, there are better models. Image quality isn't bad, but the smaller AOC is almost as good at £100 less. Hazro's HZ27WA is still the best-value 27in monitor around.

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£210 inc VAT • samsung.com/uk • tinyurl.com/7jrpsjf

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How we tested

We allowed each monitor to warm up for 30 minutes before we began our tests. We set the colour temperature to 6,500 Kelvins where possible; the red, green and blue sliders were otherwise pushed to their maximum values. Dynamic contrast and other enhancements were disabled.

Each monitor was connected to our PC via DVI or HDMI. We then ran Datacolor's Spyder4Elite calibration software. Combined with the Spyder4 colorimeter, this accurately measures gamut, contrast, brightness and colour accuracy.

We ran each panel through a selection of tests comprising HD video clips and games to observe image quality and response time.

Where speakers are available, a YouTube video was used to help us assess how well they can cope with music and film soundtracks. The speakers built into monitors are usually fit only for an operating system's audible notifications, however.

We examine each monitor's stand for adjustability and cable-management systems. We also assess the usability of the menu system, and experiment with each option offered to judge its effectiveness.

	PHILIPS £220 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	SAMSUNG £210 inc VAT ★★★★★	VIEWSONIC £350 inc VAT ★★★★½
	Brilliance 241P4QPYES	SyncMaster S23A550H	VP2765-LED
	AMVA	TN	AMVA
	24in	23in	27in
	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
	LED	LED	LED
	0.277mm	not specified	not specified
	12ms	2ms	25ms
	20,000,000:1	5,000,000:1	20,000,000:1
	1,691:1	697:1	1,200:1
	299	274	378
	0.19	0.38	0.31
	81 percent	79 percent	61 percent
	93 percent	91 percent	90 percent
	16.7 million	16.7 million	16.7 million
	178/178	170/160	178/178
	✓✓×	×××	✓✓×
	stereo speakers, headphone jack	n/a	n/a
	4x USB 2.0	×	4x USB 2.0
	✓	×	✓
	×	✓	×
	✓	×	✓
	✓	✓	✓
	30W, 18W	26W, 18W	39W, 21W
	565x220x395-516mm	564x235x438mm	642x365x474-608mm
	5.9kg	3.4kg	8.5kg
	3 years onsite	2 years collect-and-return	3 years onsite

GROUP TEST

Photography by Dominik Tomaszewski

GAMING PCs

Paul Monckton tests six overclocked systems with enough graphics firepower for a gripping gaming experience

Gaming PCs aren't about following rules; we want power, excitement and flat-out speed. This is our only desktop PC category in which we allow overclocking.

Despite most systems here using the Intel Core i5-2500K chip we routinely see in our PC reviews, in each case the vendor has eked out even more power from the chip. This CPU also offers better value than the i7-2600K.

Cooling is essential if an overclocked CPU is not to overheat. You won't see stock coolers fitted in any of these PCs. Instead, expect large heat sinks, often with multiple fans. Liquid-cooling systems can also offer reduced noise and greater cooling capacity than airflow alone.

The dust filters attached to a PC's fans are also important, and can help prevent debris from clogging up your machine and causing it to overheat.

Any self-respecting gamer will demand a system case that looks the part, but it also needs to be practical. Internal cable management aids airflow, while fan controllers let you tweak their speeds to reduce noise or boost cooling as necessary.

The graphics card is the single most important component in a gaming PC. It may even be worth trimming your budget in areas such as storage capacity and connectivity, then splashing out on the graphics subsystem instead.

AMD's Radeon HD 7970 is currently the king of graphics cards. This single-GPU solution delivers unparalleled performance, but a PC that includes one will cost well over £1,000.

nVidia's GeForce GTX 560 Ti is a cheaper card that still offers very good performance. You may need to drop the display options to maintain the fastest framerates in some games, however.

Look for a monitor that's large, clear, and offers a fast response time; getting the best colour quality is of less importance. Don't waste money on a pricey in-plane switching panel, for example, unless you also intend to use the PC for tasks such as image and video editing. If you're a console gamer, you may want a display that has multiple inputs.

If you're playing competitively, the keyboard and mouse you use can make a huge difference to your performance. An enthusiast system will come with peripherals designed specifically for gaming.

You'll benefit from wired rather than wireless devices, which tend to be more responsive. Look for high-resolution mice and keyboards with programmable keys and backlighting. Some draw attention to the W, A, S, D keys with a different style of labelling or texture. Also consider a gaming headset with a built-in mic.

Warranty terms are more important in this category than anywhere else. The longer the warranty the better, but also look for a collect-and-return rather than return-to-base option.

CHILLBLAST FUSION TALISMAN

£1,299 inc VAT • chillblast.com • tinyurl.com/88qe2zq

Combining an AMD Radeon HD 7970 graphics card with the most extreme overclock of the group, the Fusion Talisman from Chillblast has a huge head start over the competition on performance.

With its Intel Core i5-2500K processor overclocked from 3.3GHz to 4.9GHz, our expectations were very high. Yet the Talisman's WorldBench 6 score of 203 points is some way behind the leader. We believe this is due to Chillblast fitting 'only' 8GB of RAM.

Gaming performance is excellent. We recorded an average framerate of 59fps in Crysis, with the quality settings pushed as high as they would go. If you're hungry for even more gaming firepower, the Asus P8Z68-V motherboard offers full support for adding a second graphics card through CrossFireX (it also supports scalable link interface – SLI – the nVidia alternative). The 700W OCZ PSU offers ample power for such a configuration.

Chillblast has made use of the Z68 Express chipset's ability to use a low-capacity SSD to boost hard-disk performance, and supplements a 1TB hard drive here with a 30GB OCZ Vertex SSD. The latter operates transparently to the user, so you won't fill up its capacity.

The Cooler Master Elite is a rather standard-looking system case, devoid of garish go-faster decals or illumination. Neither do the internals show any sign of being souped up, save for a large Thermolab Trinity CPU cooler and fan. Given the extreme overclock of the CPU, we expected more in the way of cooling. We experienced one BSoD (blue screen) during testing, but no further problems.

A high-quality 24in Asus VS247H monitor is supplied, along with a high-resolution five-button mouse and a Trust GXT 18 gaming keyboard. Its game-control keys are bright orange and made from rubber. A Blu-ray combo drive also features.

VERDICT: The Chillblast is overclocked to the max, threatening to deliver the ultimate in performance. However, it lacks an enthusiast system case and a heavy-duty cooling system, and comes with 8GB of RAM where its competitors have 16GB. Nonetheless, at this price, nothing can touch this system for gaming performance.

CYBERPOWER COBRA

£1,999 inc VAT • cyberpowersystem.co.uk • tinyurl.com/827qey2

Switch on CyberPower's Cobra and the first thing you'll notice is a small blue LED-illuminated window on its Cooler Master 690 II case. Inside is an industrial-strength watercooling system, with thick transparent pipes. This feeds a radiator, which takes up two thirds of the roof of the case. The interior is otherwise rather spacious.

There's no water block for the AMD Radeon HD 7970 graphics card, which relies on its own internal fan and the pair fitted to the front and rear of the case for cooling. Although it's not silent, the watercooling system and sound-damping material applied to the interior of the case keep the PC reasonably quiet.

The Asus P8Z68-V motherboard is paired with the only Core i7 processor – and the only deviation from the Core i5-2500K – in our round-up. This 3.4GHz i7-2600K has been overclocked to 4.6GHz, and its HyperThreading offers superior multitasking to the i5 chip.

The Cobra achieved the joint-highest score in WorldBench 6, with a blistering 217 points. Its efforts in our benchmark were aided by 16GB of RAM and a 128GB Crucial M4 SSD, the latter set as the boot drive for the Windows operating system.

It was the third-fastest in our gaming tests, but if the excellent performance of the Cobra's HD 7970 graphics card isn't enough for you then the motherboard offers support for a second card.

A 24in full-HD LED-backlit monitor is included in the form of AOC's E2436VWA. We don't rate this as highly as the Asus or BenQ models from Chillblast and Eclipse, but it has a handy USB port.

CyberPower throws in a Blu-ray drive, a gaming headset and the Razer Lycosa and Death Adder keyboard and mouse. The keyboard features backlit, programmable keys and a non-slip rubber finish.

VERDICT: With a keyboard and mouse worth around £125 alone, the most advanced processor and a full watercooling setup, the £1,999 price tag starts to make sense. The Cobra delivers uncompromising performance, high-quality peripherals and quiet operation.

ECLIPSE SNIPER i525n560/OC

£1,019 inc VAT • eclipse-computers.com • tinyurl.com/75fxt7t

Eclipse's Sniper promises a compelling gaming experience for just over £1,000. The package includes a monitor, a keyboard and a mouse.

Eclipse has overclocked the ever-popular Intel Core i5-2500K processor to a relatively modest 4.5GHz. It's also fitted an nVidia GeForce GTX 560 Ti graphics card into an Asus P8Z68-V LX motherboard. This costs a little less than the board selected by Chillblast and CyberPower, but omits support for SLI – a problem only if you think you might like to add a second graphics card later.

The imposing EZCool HA-900B system case is an impressive sight, with a matt black finish and meshed front. A row of four USB ports at the front are illuminated by blue LEDs. Inside the case is extremely tidy, with wires neatly tucked away via holes specifically designed for cable management. It's a good job, too, because there's no rear fan to assist airflow through the Arctic Cooling CPU cooler.

General application performance of the Sniper is very good, with its 210-point WorldBench 6 score placing it ahead of many systems with faster overclocks. This is due to a 64GB SSD and 16GB of RAM.

Gaming performance was rather less impressive in our tests. While the GeForce 560 Ti is able to turn in a solid 67fps in Crysis (1080p, High, no AA), pushing up the quality settings resulted in speeds much closer to 30fps. The Eclipse also turned in the joint-slowest framerates in Stalker: Call of Pripyat.

A Gigabyte KM7580 keyboard and mouse combo is bundled with the system. This wireless set is ideal for general use, but not especially inspired for gamers. It won't offer the responsiveness or programmable keys of dedicated wired alternatives.

An excellent 24in BenQ G2420HDBL display and a Blu-ray/DVD combo drive complete Eclipse's package.

VERDICT: The Sniper performs well, but the lack of case fans may be an issue if you're considering future upgrades or fail to regularly clean out the dust. The 64GB SSD will quickly fill up without careful file management, and the peripherals aren't ideal for gaming.

PC SPECIALIST ENFORCER-X

£1,379 inc VAT • pcspecialist.co.uk • tinyurl.com/84q7vyf

The Enforcer-X falls in the middle of the range price-wise, but delivers excellent application performance to match CyberPower's £1,999 Cobra. PC Specialist has pushed the Intel Core i5-2500K from 3.3GHz to 4.6GHz, and fitted it into a premium Asus P8Z68-V motherboard.

A score of 217 points in WorldBench 6 makes the Enforcer-X the joint-fastest system for general performance in our round-up. Given its middle-of-the-road overclock, this is largely due to the 16GB of 1,600MHz RAM and 80GB Intel 320 Series SSD.

Gaming performance isn't up to the standard of those systems fitted with an AMD Radeon HD 7970, but the PC Specialist's nVidia GeForce GTX 570 offers a noticeable improvement of around 7- to 10fps over the GTX 560 Ti. The P8Z68-V motherboard also supports SLI, so you could add a second GTX 570 later.

The system is housed in a tidy Cooler Master Storm Enforcer case. It features a windowed side panel, and access to the front drive bays and DVD writer is via a large, curved hinged door. A large Titan Fenrir CPU cooler is complemented by modest case fans, and we were pleased to see dust filters in place to help maintain optimum airflow.

Iiyama's 24in LED-backlit full-HD display includes VGA, DVI and a pair of HDMI inputs. You might consider hooking up an external Blu-ray player, given that PC Specialist hasn't included one.

PC Specialist has gone to town with the gaming peripherals, throwing in a Razer Arctosa keyboard and Death Adder ReSpawn mouse. Both are specifically designed for gaming and offer improved responsiveness and programmability over standard models. These are complemented by a Logitech H350 USB headset.

VERDICT: PC Specialist's Enforcer-X offers excellent application performance and a step-up in gaming framerates from those machines equipped with the GeForce GTX 560 Ti graphics card. It lacks Blu-ray support, but comes with a decent set of gamer-friendly peripherals and a premium motherboard.

QUIET PC SERENITY Z68 GAMER XTREME

£1,550 inc VAT • quietpc.com • tinyurl.com/7pdj52L

PC ADVISOR RECOMMENDED

Quiet PC's Serenity Z68 Gamer Xtreme certainly isn't a visual representation of peace and quiet. Its hulking frame towers over its rivals here, while its bright orange detailing seems to warn of the dangerous materials within. Venture inside and a world of flaming orange hits you in the face like a huge weaponised Jaffa Cake.

This is the effect of the fearsome AeroCool X-Predator Evil system case. Well, if you're going to pay out for a top-end AMD Radeon HD 7970 graphics card and overclock your Core i5-2500K to 4.7GHz, you may as well have a case that's equally intimidating.

The case is also rather practical. Its extra capacity allows for excellent airflow, and the many rubberised cable ports keep all wires tucked out of sight. There's heaps of room for expansion, too.

The processor is cooled by a Zalman liquid-cooler that's fitted to a quiet fan and radiator at the rear. There's a huge 230mm fan in the roof of the case, and another at the front. Two-speed fan controls are provided, letting you balance cooling with noise.

The PC performs very well, and scored 203 points in WorldBench. We'd expect considerably more with double the RAM allocation.

Gaming performance is superb, and the 7970 helped the PC trounce most of the competition. You can add another graphics card, too.

A 1TB hard drive is paired with a 60GB SSD, configured as a discrete boot drive. This boosts performance, but may fill up rather quickly. No monitor, keyboard, mouse or Blu-ray drive are provided.

VERDICT: This is a truly impressive gaming PC. It's fast, well-built and quiet. You'll need to pay extra for peripherals, but the Quiet PC Serenity's specification still offers strong value.

	CHILLBLAST £1,299 inc VAT ★★★★½ PC ADVISOR BEST BUY	CYBERPOWER £1,999 inc VAT ★★★★★	ECLIPSE £1,019 inc VAT ★★★½★
Model name	Fusion Talisman	Cobra	Sniper i525n560/OC
Processor (overclocked)	3.3GHz (4.9GHz) Intel Core i5-2500K	3.4GHz (4.6GHz) Intel Core i7-2600K	3.3GHz (4.5GHz) Intel Core i5-2500K
CPU cooler	Thermolab Trinity	Advanced water cooling	Arctic Cooling Freezer 13 Pro
Memory	8GB DDR3 RAM	16GB DDR3 RAM	16GB DDR3 RAM
Storage	1TB HDD + 30GB SSD	1TB HDD + 128GB SSD	1TB HDD + 64GB SSD
Power supply	700W OCZ StealthXtreme	not specified	650W Corsair GX
Motherboard	Asus P8Z68-V	Asus P8Z68-V	Asus P8Z68-V LX
USB ports	2x USB 3.0, 8x USB 2.0	2x USB 3.0, 8x USB 2.0	2x USB 3.0, 6x USB 3.0
Screen	24in Asus VS247H (1920x1080)	24in AOC E2436VWA (1920x1080)	24in BenQ G2420HDBL (1920x1080)
Graphics	Asus Radeon HD 7970, 3GB VRAM	Powercolor Radeon HD 7970, 3GB VRAM	nVidia GeForce GTX 560 Ti, 1GB VRAM
Sound	onboard	onboard	onboard
Connectivity	Gigabit ethernet	Gigabit ethernet, Bluetooth	Gigabit ethernet
VGA/DVI/HDMI/DisplayPort	×✓✓✓	××✓×	×✓✓×
FireWire/eSATA	×✓	×✓	××
Case	Cooler Master Elite 430	Cooler Master 690 II	EZCool HA-900B
Keyboard & mouse	Trust GXT 18 keyboard, Chillblast mouse	Razer Lycosa, Razer Death Adder	Gigabyte KM7580 Desktop Set
Optical drive	BD-ROM/DVD±RW	BD-R/DVD±RW	BD-ROM/DVD±RW
Operating system	Windows 7 Home Premium 32-/64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
Extras	none	MS Office 2010 Starter, soundproofing	none
WorldBench 6 score	203	217	210
Gaming performance (fps)[1]	107/65/59/112	105/65/58/100	67/39/30/66
MediaEspresso time	4 mins 27 secs	5 mins 34 secs	5 mins 8 secs
Power consumption[2]	96W/290W	125W/330W	79W/233W
Warranty	2 years collect-and-return	3 years return-to-base (1 year parts)	1 year return-to-base

[1]Tested in Crysis at 1080p, High (no AA)/V High (no AA)/V High (16x AA) and Stalker: Call of Pripyat at 1080p, Ultra settings respectively [2]Tested when idle and in Crysis

YOYOTECH WARBIRD DARK IRON CS

£979 inc VAT • yoyotech.co.uk • tinyurl.com/7aztos8

Designed as a quiet and compact gaming PC, YoYotech's Warbird Dark Iron CS delivers strong performance and balanced features.

An Intel Core i5-2500K processor has been overclocked to 4.6GHz, providing plenty of power for even the most demanding tasks. We recorded 199 points in WorldBench 6.

YoYotech has selected an nVidia GeForce GTX 560 Ti graphics card, which offers a very good price/performance ratio. Its performance in our tests was identical to that of the Eclipse, which is also fitted with this graphics card.

YoYotech has trimmed its costs with a 500GB rather than 1TB hard drive, augmented with a 60GB SSD that's configured as a discrete boot volume. Neither does the DVD writer support Blu-ray.

The Fractal Design Arc system case has a brushed-aluminium finish, with a mesh covering at the front and top to assist ventilation. The three white cooling fans and dust filters match the removable drive bays and card blanking plates, while the processor is cooled by a large Enermax heatpipe cooler.

The Asus P8Z68M-Pro motherboard is a micro-ATX variant of the P8Z68. Its smaller size has resulted in the loss of the PCI Express 2.0 x1 slots, but the addition of a pair of SATA 6Gbps ports.

Build	★★★☆☆
Features	★★★☆☆
Performance	★★★☆☆
Value	★★★★☆
Overall	★★★½☆

A high-quality 24in ViewSonic LED monitor is included, but it doesn't include an HDMI port. Meanwhile, keyboard and mouse duties are fulfilled by a Microsoft Wireless Desktop 800 combo – great for general use, not so much for gaming.

VERDICT: The YoYotech Warbird Dark Iron CS delivers a lot for £979. However, it lacks gaming peripherals, its hard-drive capacity and RAM allocation are on the small side, and there's no support for Blu-ray.

	PC SPECIALIST £1,379 inc VAT ★★★★★	QUIET PC £1,550 inc VAT ★★★★½ PC ADVISOR RECOMMENDED	YOYOTECH £979 inc VAT ★★★½☆
	Enforcer-X	Serenity Z68 Gamer Xtreme	Warbird Dark Iron CS
	3.3GHz (4.6GHz) Intel Core i5-2500K	3.3GHz (4.7GHz) Intel Core i5-2500K	3.3GHz (4.6GHz) Intel Core i5-2500K
	Titan Fenrir	Zalman CNPS20LQ	Enermax ETS-T40 Cooler
	16GB DDR3 RAM	8GB DDR3 RAM	8GB DDR3 RAM
	1TB HDD + 80GB SSD	1TB HDD + 60GB SSD	500GB HDD + 60GB SSD
	650W Corsair TX650	630W Nexus	500W
	Asus P8Z68-V/GEN3	Gigabyte GA-Z68X-UD3H-B3	Asus P8Z68-M Pro
	4x USB 3.0, 8x USB 2.0	3x USB 3.0, 7x USB 2.0	2x USB 3.0, 14x USB 2.0
	24in Iiyama E2473HDS (1920x1080)	not supplied	24in ViewSonic VA2448-LED (1920x1080)
	Palit GeForce GTX 570, 1.25GB VRAM	Sapphire Radeon HD 7970, 3GB VRAM	Asus GeForce GTX 560 Ti, 1GB VRAM
	onboard	onboard	onboard
	Gigabit ethernet, Bluetooth	Gigabit ethernet	Gigabit ethernet
	✓✓✓×	✓✓✓✓	✓✓××
	✓×	✓✓	×✓
	CM Storm Enforcer	AeroCool X-Predator Evil Black/Orange	Fractal Design Arc
	Razer Arctosa, Razer Death Adder ReSpawn	not supplied	Microsoft Wireless Desktop 800
	DVD±RW	DVD±RW	DVD±RW
	Windows 7 Home Premium 32-/64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
	Nero 9.0 Essentials, Logitech H350 USB Headset	fan-speed control, choice of four case colours	BullGuard Internet Security
	217	203	199
	78/47/37/78	103/65/59/110	67/39/30/66
	4 mins	4 mins 47 secs	4 mins 5 secs
	119W/310W	60W/257W	100W/256W
	3 years return-to-base	2 years collect-and-return (open case policy)	3 years return-to-base, 30 days collect-and-return

>> How we test and our conclusion

Conclusion

Our tests prove that getting the ultimate in gaming performance depends largely on whether or not you can afford an AMD Radeon HD 7970 graphics card. Stepping down to the cheaper nVidia offerings results in significantly slower framerates.

With this in mind, the least expensive PC here is Chillblast's £1,299 Fusion Talisman. Chillblast has cut costs in its RAM allocation and motherboard, but you still get a Blu-ray drive, and a good monitor and peripherals. Its processor has been tweaked more than any other, so regular dust management will be required to keep a lid on the heat generated. Crucially, the Chillblast is the fastest at gaming in our tests.

Other systems fitted with the HD 7970 cost considerably more, but come with other appealing features. Quiet PC's Serenity, for example, has a vastly superior case and much better system cooling and cable management. This is an excellent PC with a huge amount of room for expansion, and it will provide stable performance over time.

Of course, a Radeon HD 7970 isn't necessary to play the majority of games. An nVidia GTX 560 Ti or GTX 570 will do just fine, provided that you turn down the quality settings a notch. (Alternatively, keep them turned up if you're happy to play with framerates below 60fps.)

Eclipse and PC Specialist offer great PCs with very good overall performance, even if they are running nVidia graphics. The PC Specialist also lets you add a second graphics card to boost gaming framerates.

How we test

Application performance

Core system performance is measured using WorldBench 6. This customised test suite runs several desktop Windows applications with real-world workloads, mimicking how PCs are used on a daily basis.

These workloads include tasks such as editing documents and images, compressing files, browsing the web and encoding video. Some tasks are then run simultaneously to form an additional test of the PC's multitasking capabilities.

Results from 10 individual tests are combined and weighted to produce a numerical score relative to a baseline PC.

Our baseline configuration runs a 2.4GHz Core 2 Duo E6600 processor, 2GB of DDR2 RAM, an nVidia GeForce 7900 GS graphics card, twin Western Digital Caviar WD3200KS hard drives in a striped Raid array, and Windows Vista Home Premium 32bit. This PC scored 100 points in WorldBench 6.

Transcoding performance

Because you'll often be working with more than one video file format, we set each PC the task of converting a batch of 1080p Mpeg4 video clips for use on the iPad 2 and recorded how long it took to complete. We used CyberLink's MediaEspresso software.

This software is able to make use of hardware-accelerated decoding and encoding built into graphic cards and CPUs with integrated graphics-processing capabilities. These techniques can often shorten conversion times by a factor of 10. Multiple CPU threads are also fully exploited, allowing quad-core CPUs to shine when compared to dual-core versions.

Gaming performance

We use two games to evaluate performance. Stalker: Call of Pripyat was chosen for its DirectX 11.0 requirement and simple-to-use benchmarking tool, while the older game Crysis remains sufficiently intensive to stretch modern graphics cards to their limit.

We crank up the quality levels much higher than in our other PC categories, sticking to a 1080p resolution at all times. Framerates are then recorded in Crysis at High, V High and V High (16x AA) settings, and Ultra in Stalker.

Overclocking

Because gamers demand the best performance from their hardware, we allow vendors to overclock PCs in this category. We require that any tweaked component is designed for overclocking, and that the PC vendor offers a comprehensive warranty.

Power consumption

Overclocking and high-end graphics cards can place considerable demands on power. We measure the power consumption of the base PC unit and keyboard, excluding the monitors and speakers.

We set the PC to 'High Performance' mode in Windows, ensuring that its hard drive won't power down. We then measure the power consumption of the PC sitting idle, since it's important that graphics subsystems don't consume unnecessary power when they're not driving games.

Next, we measure power consumption while the PC is running our Crysis test at its High quality setting.

Subjective assessment

We pay close attention to the physical characteristics of each PC, its noise output and its build quality, delving inside the case and taking note of the quality of components used, cabling and airflow.

Good-quality peripherals are also important, and where they are supplied we note the ergonomics of the keyboard and mouse. Ordinary wireless keyboard and mouse combos are frowned upon, whereas fast, responsive peripherals will impress.

Support

Differences in warranty terms can impact our scoring. Long warranties are sought after, 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. Ensure the vendor offers full software support and preferably a home installation for more complex systems. ☒

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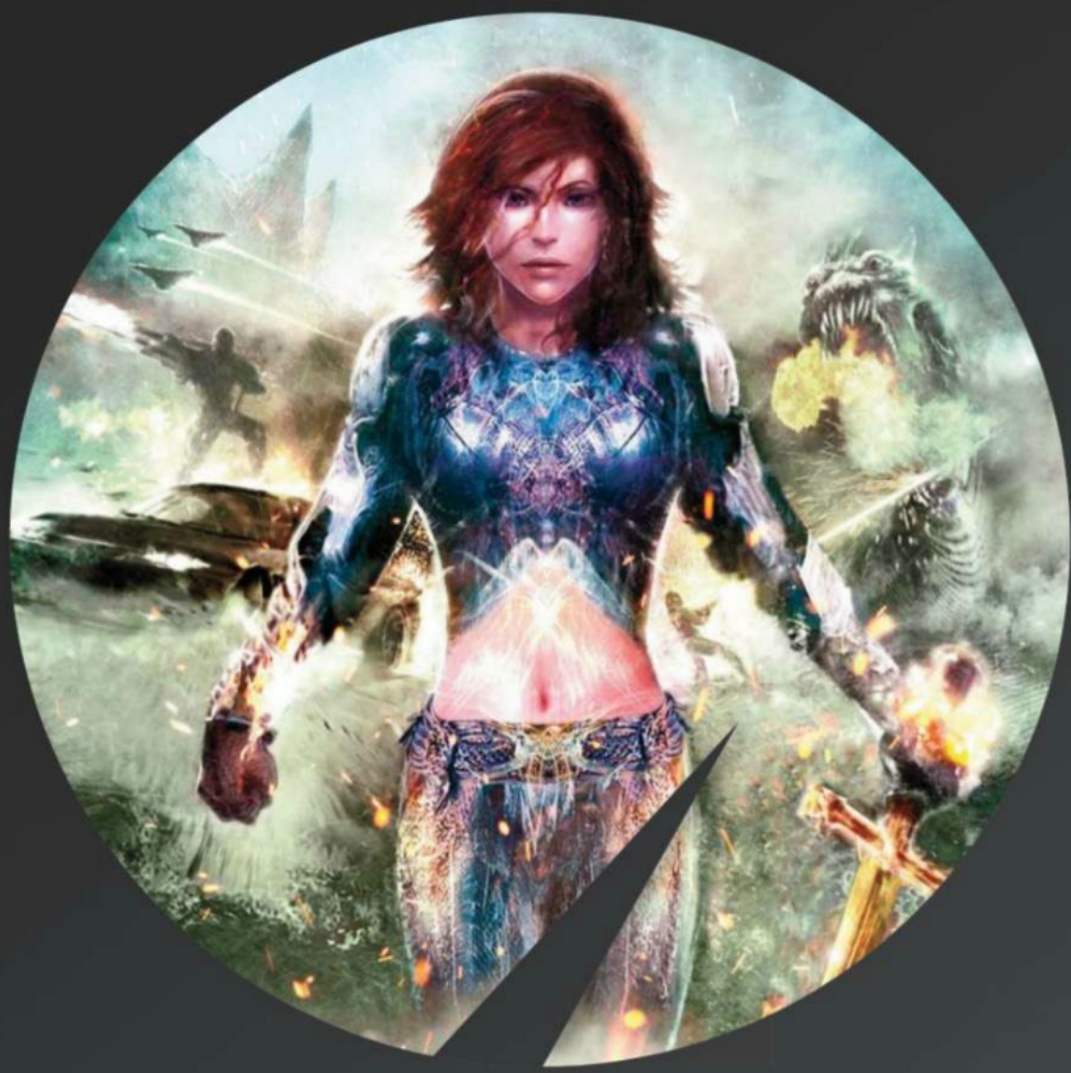

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FEATURE

Internet security suites

These all-in-one PC protection suites can block baddies, tackle Trojans and drop-kick drive-by downloads. Nick Mediati and AV-Test review the latest big-name security products

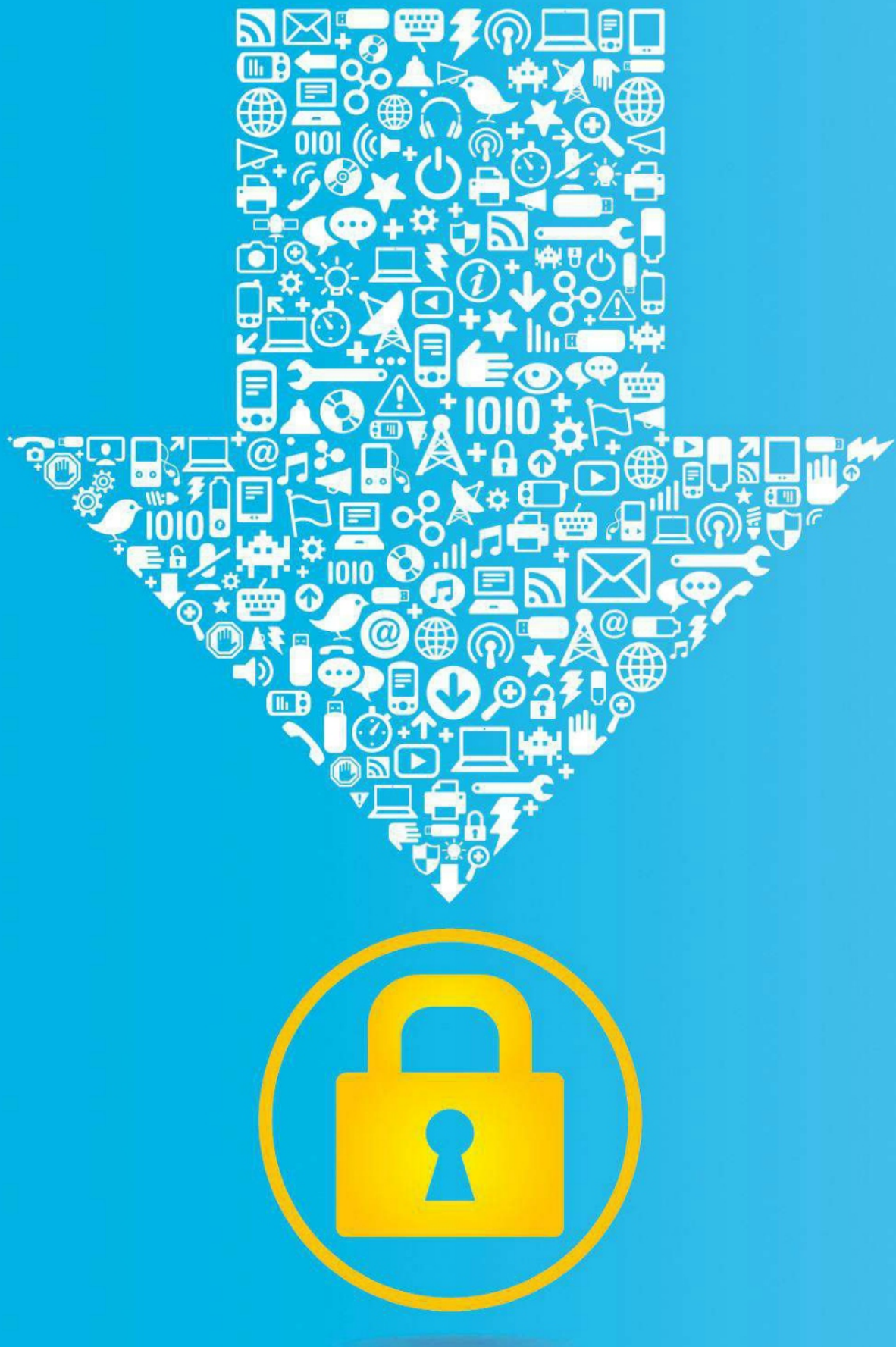
Have security suites reached the point where they all work? At first glance, it seems that way. Every product attempts to protect you from viruses, spyware, Trojan horses and other malware. And for the most part, each of the suites we tested for this round-up did a good job of detection. However, other factors are important, too. Some suites are easier to work with than others, and some make more efficient use of your PC's resources. We put 14 suites to the test to see which one you should consider using to protect your data and your PC in 2012. The best 10 are reviewed here.

The latest internet security suites are lightweight and fast; most are also user-friendly, with intelligible interfaces. Bitdefender and Eset have revamped their packages to make them easier to use, for example.

Security vendors are also shifting toward using cloud computing to help detect new malware. Such efforts may be paying off: the suites did notably better in our real-world detection tests this year versus last year (see page 75).

Once again, we partnered with AV-Test, a trusted security software-testing lab based in Germany. AV-Test puts security products through a veritable torture test to determine not only which package is the best at detecting threats, but also which one cleans up the mess most effectively. On top of that, AV-Test performs a battery of speed tests to discover whether a suite will slow a PC to a crawl.

This year's round-up was perhaps our most competitive to date. All the suites listed here did an excellent all-around job on malware detection, and even the remaining suites (Avira Internet Security Suite 2012, Panda Internet Security 2012, Webroot SecureAnywhere Essentials and McAfee Internet Security 2012) performed well. As a result, we put more weight than before on usability and their effect on resources.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Avast Internet Security 6.0

- **avast.com**
- **£39 inc VAT (1 PC, 1 year)**

A solid choice for keeping you safe, Avast Internet Security 6.0 blocked 96.2 percent of malware in our real-world tests, and managed to stop 99.75 percent of known malware samples. It also achieved a perfect score in our false-positives test. Regrettably, although it proved adept at identifying and neutralising all infections on our test PC, it left more malware remnants behind than many of its competitors.

System slowdowns shouldn't be a serious issue with Avast, although it finds itself in the middle of the pack in that respect. Its scan speeds are faster than the average of the products we tested: it completed our on-demand scan test in 1 minute 21 seconds – one of the fastest performances we've seen. Avast finished our on-access scan in 4 mins 1 sec, a slightly better time than average.

In our hands-on testing of Avast, we found it generally easy to use and navigate. It isn't the most feature-rich suite we tested (it lacks some common functions, such as parental controls), but what it does provide should suffice for most users.

AVAST is speedy when scanning on-demand, and it's a capable choice for keeping a PC safe

AVG Internet Security 2012

- **avg.com**
- **£40 inc VAT (1 PC, 1 year)**

Yet another solid performer, AVG Internet Security 2012 fully blocked 92.3 percent of attacks in our real-world test and partially blocked a further 3.8 percent. These results aren't bad, although many of its rivals offer better performance here. AVG's 99.11 percent detection rate of known malware samples is slightly lower than the average.

Although AVG was successful in detecting and disabling all active infections on our test PC, it removed all traces of malware only 40 percent of the time, tying for the worst showing in completely purging malware. And its six false positives amounted to the third-highest total.

AVG had a relatively light impact on PC performance, but it added nearly 10 secs to our test PC's startup time. Its scanning component was good in the on-demand test (1 min 31 secs), but not so great in the on-access test (5 mins 5 secs).

The interface is good on the whole, but it needs some improvement. We found the main screens straightforward and easy to use, but AVG Internet Security's settings options are downright intimidating.

Overall, AVG's suite feels like a product designed for advanced users.

AVG has very good detection rates, but its settings screens can be intimidating

Bitdefender Internet Security 2012

- **bitdefender.co.uk**
- **£29 inc VAT (1 PC, 1 year)**

Bitdefender Internet Security 2012 bagged third place in our group test and a Recommended award. It won the highest rating in our malware-detection, -blocking and -removal tests. It found and blocked 96 percent of samples in our real-world malware tests, and spotted 99.96 percent of known malware samples.

False positives were almost non-existent: Bitdefender identified only one safe file as being malicious. And the Bitdefender software was the best of the group at cleanups, too. It detected and disabled all sample infections, and removed every last trace of malware 90 percent of the time.

Bitdefender's interface is our favourite. Its new design should be easy for beginners to understand, but it still maintains plenty of flexibility for advanced users. Screens are laid out nicely, and at no point did we feel overwhelmed by the settings options.

The program's new Auto Pilot mode puts protection levels at their recommended settings; you can toggle it on/off with a switch located on the main control panel.

BITDEFENDER offers top-tier antimalware capabilities, wrapped in an easy-to-use, overhauled interface

ZONEALARM is a good security suite, but can't keep up with the competition

ESET makes commonly used settings more accessible in its revised interface

Bitdefender could do with reducing its impact on overall PC performance, however. While its scan speeds (1 min 56 secs on-demand and 4 mins 25 secs on-access) are respectable, it slowed startup times more than any other suite here. It also slowed down our PC significantly when we copied files over a network, completing that test in 5 mins 37 secs. By comparison, our test machine finished the copying operation in 60 secs without antivirus software installed.

Check Point ZoneAlarm Extreme Security 2012

- **zonealarm.com**
- **£59 inc VAT (3 PCs, 1 year)**

Rounding out our top 10 is ZoneAlarm Extreme Security 2012. The suite isn't bad, but it's merely very good while the top performers are great.

ZoneAlarm fully blocked 92.3 percent of live attacks in our real-world tests. It also detected 99.17 percent of known malware samples. Although such results would have been strong as recently as a year ago, in 2012 they're simply average.

This suite isn't especially good at cleaning up either. Despite detecting all infections on our test PC, it disabled only 90 percent of them. It removed all malware components just 40 percent of the time, tying for last place in this test. Fortunately, it reported no false positives.

Although ZoneAlarm had a moderate impact on system performance on the whole, it added a staggering 24 secs to our PC's shut down time. And its scan speeds were mixed: ZoneAlarm required 2 mins 53 secs to complete our on-demand test, which is the second-slowest result here; its on-access scan time of 3 mins 45 secs, meanwhile, is the third-best result we've seen.

Check Point did a reasonably good job on ZoneAlarm's interface. The main screen gives you at-a-glance information about whether your PC is protected, and each section is neatly arranged and easy to use.

Eset Smart Security 5.0

- **eset.co.uk**
- **£39 inc VAT (1 PC, 1 year)**

Smart Security 5.0 offers a significant update to Eset's suite, and is a welcome step up from last year's offering. In detection of real-world threats, it blocked 88.5 percent of malware attacks, and partially blocked another 3.8 percent. Eset also stopped 98.02 percent of known malware.

The Eset package detected all active infections on our machine and disabled 90 percent of them. It also removed all traces of malware 60 percent of the time, which is a good but not first-rate result. To its credit, Smart Security 5.0 was one of only three suites that didn't mistakenly identify any safe file as malicious.

Smart Security had a moderate impact on our test computer's performance. Its scan speeds were middling: it ran our on-demand scan test in 1 min 44 secs (ranking eighth among 14 suites), and Eset finished the on-access scan in 4 mins 12 secs (fifth place).

In the past we've criticised Smart Security's interface for having a frustrating design, especially in its advanced settings. In this version, Eset has made most panes and windows easier to navigate, and the basic settings are more accessible. The advanced settings are still too complex for most people, but Eset has done a better job of surfacing what the majority of users will want to access, while retaining expert-level controls for advanced users.

F-SECURE will do a good job of protecting your PC, provided that you can deal with its advanced settings

F-Secure Internet Security 2012

- f-secure.co.uk
- **£39 inc VAT (1 PC, 1 year)**

If you can deal with a few shortcomings, F-Secure 2012 offers strong protection for your PC. With a 96.2 percent block rate in our real-world tests, it's on a par with the competition; its 99.91 percent detection rate for known malware is also very good.

F-Secure's suite found and removed all test infections on our system, and it cleaned all malware traces 60 percent of the time (around average). It reported four false positives; that's a tiny percentage given our sample size, but several of its rivals had one or zero false positives.

F-Secure's impact on PC performance was low for the most part, but it added 15 secs to system shut down and the most time to our file-download test. Its scan speeds were pedestrian: the suite took 2 mins 43 secs to complete our on-demand scan test, the second-worst result; in our on-access scan it required 4 mins 21 secs, landing at the middle of the pack.

We like F-Secure's easy-to-use interface, but were less keen on the program's Launch Pad, the small window for accessing internet security and PC security settings. It merely added another screen we had to pass through to get where we were going.

G Data InternetSecurity 2012

- gdatasoftware.co.uk
- **£34 inc VAT (1 PC, 1 year)**

Our Best Buy product, barely edging out Norton's suite, is G Data InternetSecurity. It blocked all samples in our real-world tests (which assess how well security software can stop previously unknown threats). It also spotted all but five samples in our 'zoo' of 108,869 samples of known malware.

G Data had a low false-positive rate, labelling one good file out of more than 250,000 as possibly dangerous. It rendered all infections inert, removing all traces of malware 60 percent of the time.

G Data's impact on PC performance was minimal, but its scan speeds were mixed. It finished our on-demand test, which measures how quickly a suite can scan files when the user tells it to do so, in an above-average 1 min 49 secs. Its on-access scanner, which kicks in when you open or save files, processed 4.5GB of data in a very slow 6 mins 41 secs, however.

G DATA leads the field, thanks to superb detection and cleanup, although its layout can be confusing

The interface isn't impressive. Reaching some commonly used features via the main control panel is difficult. Unless you're an expert, the settings can also be confusing.

Kaspersky Internet Security 2012

- kaspersky.co.uk
- **£39 inc VAT (1 PC, 1 year)**

Our fourth-place finisher, Kaspersky Internet Security 2012, fully blocked all real-world malware samples that it encountered, and it detected 99.34 percent of known malware samples. False positives are largely a non-issue: Kaspersky misidentified only one safe file as dangerous. And it was effective at disinfection, detecting and disabling all sample infections. It removed all traces of malware 60 percent of the time, and was slightly above average in that regard.

In general, the suite had a low impact on our test PC's performance, but it was comparatively slow when we copied files over a network. Kaspersky was faster than average at scanning, running our on-demand scan in 1 min 11 secs (the third-best time here). It also wrapped up on-access scanning in 4 mins 40 secs, which is around 8 secs faster than average.

We navigated Kaspersky's menu and settings screens relatively easily, but some parts could use a redesign. For example, a few panels open in the main window, while others spawn new windows.

KASPERSKY has a low impact on PC performance, but some parts of its interface need a redesign

Security in the cloud

The latest trend in fighting malware is to use cloud computing, whereby your PC's security suite enlists the power of the software maker's massive online systems to help detect threats. This method has two advantages. First, it allows security companies to respond to new malware more quickly by effectively updating everyone at once. Second, when done well, offloading the heavy lifting of malware detection to an online system can reduce the impact that a suite has on your PC's performance.

Some antimalware packages use cloud computing to supplement other detection technology. But newer antivirus utilities, including Webroot SecureAnywhere and the Trend Micro Titanium line-up, rely almost exclusively on it. We don't have a specific test for cloud-based protection, but our real-world malware test gives us a good idea as to whether these newer antivirus tools can do a better job of keeping you safe. This test pits security suites against malicious sites to learn how well the software can stop unknown malware. On average, 2012's suites fully blocked 95 percent of these attacks, a notable improvement over last year's 85 percent.

Every malware-detection technology has its pros and cons, and it's still early days for cloud-based protection. If the strength of this year's class of security suites is any indication, however, these new, advanced technologies are doing their part to keep your system even more secure.

TEST	2011	2012
Real-world testing: fully blocked malware attacks	85.2%	95.0%
Signature-based malware detection	96.7%	99.4%
Disinfection of active malware components	74.6%	91.4%

Percentages shown are averages across the suites we tested

Norton Internet Security 2012

- **uk.norton.com**
- **£49 inc VAT (1 PC, 1 year)**

An all-around solid defender and efficient performer, Norton Internet Security 2012 has a slick, user-friendly interface.

Norton's suite blocked all attacks in our real-world tests, along with 99.94 percent of known malware samples. It detected and deactivated all active infections in our cleanup tests, and removed all remnants of malware half the time. However, Norton flagged nine known safe files as potentially dangerous; it's a low false-positive rate percentage-wise, but higher than average for the suites we tested.

Norton completed our on-demand and on-access scans quickly, logging times of 1 min 8 secs and 2 mins 34 secs, respectively. That makes it one of the top performers in scan speeds. The software's overall impact on system performance is slight, too.

We like Norton's interface; it's clean and well designed, and it shouldn't be intimidating to most users.

Trend Micro Titanium Internet Security 2012

- **uk.trendmicro.com**
- **£39 inc VAT (3 PCs, 1 year)**

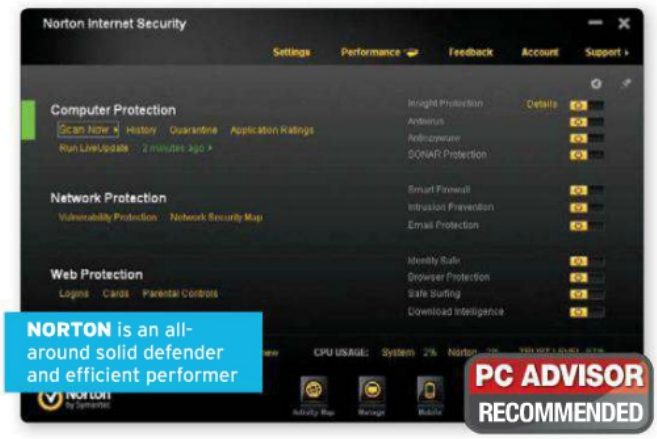
If you need a set-it-and-forget-it suite that will keep your PC reasonably safe, Trend Micro Titanium may be the right choice.

It fully blocked 92.3 percent of malware in our real-world test, and it partially blocked an additional 3.8 percent, which is around average for the products we tested. It detected 97.49 percent of known malware samples, lagging behind rivals. As for false positives, it identified four safe files as potentially malicious; most other suites managed a lower number.

Trend Micro's suite is effective at cleanup. It detected and disabled all infections on our test PC, and fully disinfected 70 percent of our test samples – an above-average result.

Our tests showed that the Trend Micro suite's impact on system performance was generally low. Unfortunately, its scan speeds were uneven: it finished our on-demand scan in a better-than-average 1 min 33 secs, but it took longer to complete our on-access scan (5 mins 14 secs) than many of its competitors in this group test.

The basic interface, although well designed, doesn't offer a lot of settings or options for expert-level users. If you like Trend Micro but want more features, check out Titanium Maximum Security, the company's top-of-the-line package.



NORTON is an all-around solid defender and efficient performer

TREND MICRO provides effective, basic PC protection, with few extra features

	Signature-based malware detection	Malware blocking		Successful clean-up of active malware	Successful clean-up of active & inactive malware	Scan speed		Interface design
		Fully blocked	Partially blocked			On-demand	On-access	
AVG Internet Security 2012 avg.com	99.1%	92.3%	3.8%	100%	40%	1 min 31 secs	4 mins 5 secs	Good
Avast Internet Security 6.0 avast.com	99.8%	96.2%	0%	100%	40%	1 min 21 secs	4 mins 1 sec	Very Good
PC Advisor Recommended **Bitdefender Internet Security 2012** bitdefender.co.uk	100%	96.2%	0%	100%	90%	1 min 56 secs	4 mins 25 secs	Superior
Check Point ZoneAlarm Extreme Security 2012 zonealarm.com	99.2%	92.3%	0%	90%	40%	2 mins 53 secs	3 mins 45 secs	Very Good
Eset Smart Security 5.0 eset.co.uk	98%	88.5%	3.8%	90%	60%	1 min 44 secs	4 mins 12 secs	Very Good
F-Secure Internet Security 2012 f-secure.co.uk	99.9%	96.2%	0%	100%	60%	2 mins 43 secs	4 mins 21 secs	Very Good
PC Advisor Best Buy **G Data InternetSecurity 2012** gdatasoftware.co.uk	100%	100%	0%	100%	60%	1 min 49 secs	6 mins 41 secs	Good
Kaspersky Internet Security 2012 kaspersky.co.uk	99.3%	100%	0%	100%	60%	1 min 11 secs	4 mins 40 secs	Very Good
PC Advisor Recommended **Norton Internet Security 2012** uk.norton.com	99.9%	100%	0%	100%	50%	1 min 8 secs	2 mins 34 secs	Very Good
Trend Micro Titanium Internet Security 2012 uk.trendmicro.com	97.5%	92.3%	3.8%	100%	70%	1 min 33 secs	5 mins 14 secs	Very Good

How we test

We work closely with experts in the security-testing field, who put each product through a veritable torture test. Here's a quick rundown of how we review and rank security products, and how we weight each aspect.

Detection, blocking, removal (60%)

To ensure that we have the most accurate and relevant malware detection, blocking and removal test results, *PC Advisor* teams up with AV-Test, a world-renowned security software testing lab based in Germany.

AV-Test examines how well security software defends a PC against new and existing malware, using signature-matching and behavioural analysis respectively. It also examines how well the software cleans infections should malware make it on to the PC. AV-Test evaluates security software through the following tests.

Blocking of real-world attacks: AV-Test pits each software package against actual, live malware samples, and determines whether the software can fully or partially block each malware attack. This test is a good indicator of how capable a security suite will be at blocking brand-new malware.

Malware zoo: Each product faces a collection of thousands of malware samples from the past four months. This test is a good indicator of how well a security product will be able to block known malware.

False positives: AV-Test checks to see whether a security software product mistakenly flags any of 250,000 known safe files as being potentially dangerous.

System disinfection/remediation: This test determines how well antivirus software can detect, disable and fully purge active malware infections on a test PC.

Speed tests (20%)

System performance impact: Some products can seriously hamper system performance. AV-Test runs each suite through a battery of tests to discover whether it significantly slows common PC tasks, such as starting up and shutting down the machine, copying and downloading files, opening files, installing software and opening web pages.

Scan-speed tests: The scan-speed tests show how quickly a suite can check 4.5GB of data for malware. AV-Test checks the performance of both the 'on-demand' scanner (which runs when you manually initiate a scan) and the 'on-access' scanner (which runs whenever you open or save files to disk). In general, the on-access scan performance is more important, since it kicks in every time you open or save a file on your PC.

Design and usability (15%)

Once AV-Test has finished its assessment, we install each product to find out how easy it is to use. We base our testing on trial versions or evaluation copies provided by the vendor.

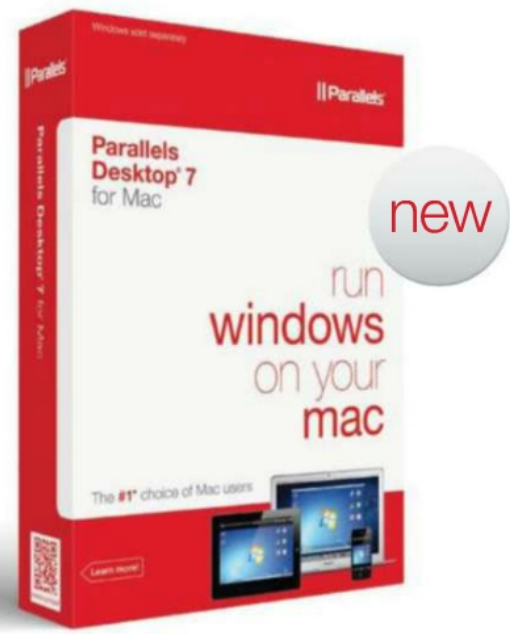
We take into account each product's installation/uninstallation process, its main control panel and settings screens, and more.

Specs (5%)

Finally, we look at each product's specifications to determine whether it has all the features we'd expect from an all-in-one security suite.

Parallels

run windows applications like they were made for your mac



Parallels Desktop® 7 for Mac is the simplest and smartest way to run Windows programs on your Mac. No rebooting necessary.

From business software to Windows Internet Explorer, PC games, and thousands more, Windows couldn't feel more natural on the computer you love.

Do more. Work in Mac OS X and Windows side-by-side, without rebooting. Use Mac OS X keyboard shortcuts and your iSight or FaceTime HD camera with both platforms.

Get more. Enjoy brilliant graphics, blazing performance, 7.1 Surround Sound and support for Mac OS X Lion's amazing features—like Launchpad, Mission Control and gestures—even in Windows.

Connect. Link back to your computer's Windows applications with the Parallels Mobile App for iPhone and iPad.

Go ahead. Bring Windows to your Mac. Get your hands on the #1 choice[1] of Mac users worldwide. Learn more at http://www.unlimited.com/parallelsoffers

TESTED, TRUSTED AND TALKED ABOUT[2]

PC ADVISOR RECOMMENDED

© 2011 Parallels Holdings Ltd. All rights reserved. [1]No. 1 claim based on NPD Techworld Reports for the period 8/1/06-5/31/11. [2]Reviews and awards cited may be for previous versions of Parallels Desktop for Mac.

OCZ Technology
ocztechnology.com

FOR THE REAL ADRENALINE JUNKIE!

The ultimate high for your computer, take the leap and transform your PC or laptop with OCZ SSDs. No more waiting for lagging boot-ups, prepare to blaze through multimedia projects and dive into the latest games at breakneck speeds. There's no going back once you've experienced the cutting-edge performance of OCZ's award winning drives…you've been warned.

High Performance SATA III (6Gbps)

• Read up to 550MB/s • Write up to 520MB/s • Up to 60,000 IOPS (4k random write aligned)

HEXUS PERFORMANCE · MUST HAVE · Top Pick

SandForce DRIVEN

The SandForce Driven™ Logo is a trademark of SandForce, Inc.

Passion for Performance.

VERTEX 3
2.5" solid state drive

Available at: overclockers.co.uk · ebuyer.com · dabs.com · scan.co.uk

PC ADVISOR AWARDS 2012

We present our roll call of honour for the best of the past year's technology, and our guide to the brands you can trust

The arguments are over, the battles won and lost, and an almost impossible task is completed. Our team of experts has taken into account the 1,500 or so products we've reviewed over the past 12 months and created a list of only the very best in key product areas. The *PC Advisor* Awards winners for 2012 await you over the next few pages.

Our annual roll call of honour considers every piece of hardware and software that has passed through our Test Centre over the past year. We looked for innovation and excellence, outstanding performance and value for money, then created the shortlist that was published in the previous issue.

Only excellent products make the *PC Advisor* Awards shortlist, and we congratulate all the manufacturers represented on the list. If a product still looks great from the view point of up to a year after its first review, the chances are that it is great.

That does, however, mean that the *PC Advisor* Awards winners list is not necessarily a buyer's guide – for that you should read our group tests and Top 5 charts. Some of the products here may no longer be available, and in some categories they may have been superseded. But rest assured that each is the standout product in its own area, for reasons we will explain.

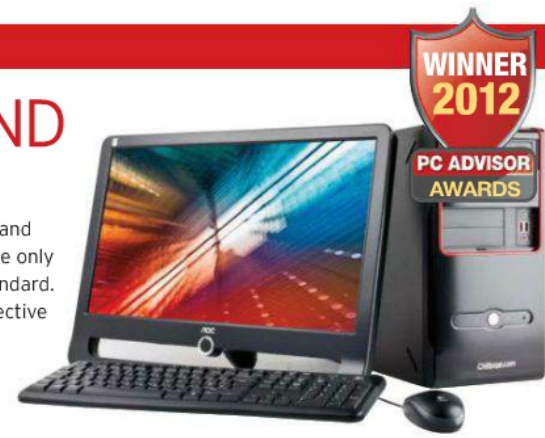
Whittling down the shortlist to pick out individual winners isn't easy. In all cases arguments could be (and were) made for products other than the eventual winners. But winners there must be, and in each case we've explained our reasoning and why that particular product is best.

We also list the hardware makers and online retailers you voted worthy winners of Reader Awards from page 86.

Best desktop PC brand 80
Best monitor 80
Best budget laptop 80
Best high-end laptop 81
Best compact camera 81
Best digital camera 81
Best printer 82
Best wireless networking product 82
Best portable entertainment device 82
Best storage device 83
Best portable storage device 83
Best graphics card 83
Best smartphone 84
Best audio product 84
Best digital home device 84
Best tablet 85
Best app 85
Best photo or video software 85
Best security software 86
Best game 86
Best specialist online IT retailer 86
Best online retailer 87
Best desktop PC brand 87
Best laptop PC brand 87
Best gadget of the year 88

Hardware

BEST DESKTOP PC BRAND



Chillblast

One company has stood out once again this year for its class-leading service and commitment to assembling some of the most competitive PCs. Chillblast is the only brand we regularly test to offer a two-year collect-and-return warranty as standard.

And the PCs we've tested from Chillblast are among the best in their respective categories, in performance and features. Over 2012, Chillblast has garnered enough Recommended and Best Buys to make it the deserved winner.

• tinyurl.com/7cstvpx

THE RUNNERS-UP

- **Arbico** • tinyurl.com/7qhp34z
- **CyberPower** • tinyurl.com/75w7j7n
- **Dino PC** • tinyurl.com/835ncLs
- **Eclipse** • tinyurl.com/76bcprc

BEST MONITOR

LG IPS236V

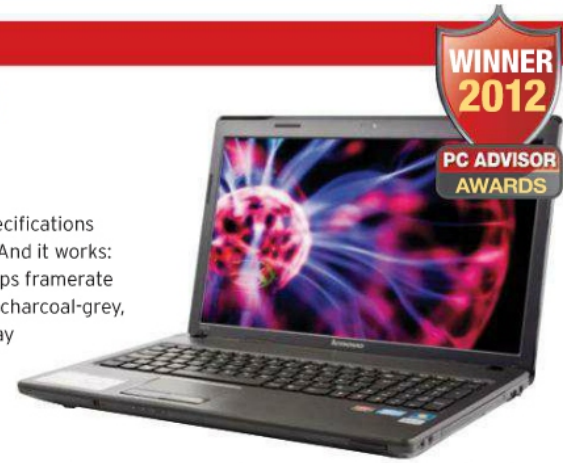
Remarkably good image quality, stylish design and delightful ergonomics make LG's IPS236V an excellent choice for anyone who edits photos or video – or just wants everything to look really, really good. The headline act is its in-plane switching panel, which delivers wider viewing angles and considerably better colours and image quality than the more common twisted-nematic panels found in budget monitors. The LG is a superb 23in monitor, particularly given its £150 asking price.

• tinyurl.com/cwmp7m8

THE RUNNERS-UP

- **Iiyama XB2472HD** • tinyurl.com/3dyx75z
- **NEC MultiSync EX231W** • tinyurl.com/6wL7jhu
- **Philips 273E3LH** • tinyurl.com/4y76xLs
- **ViewSonic VP2365-LED** • tinyurl.com/5wmjLr9

BEST BUDGET LAPTOP



Lenovo IdeaPad G570

Priced under £600, the Lenovo IdeaPad G570 has an impressive set of specifications that includes an Intel Sandy Bridge processor and discrete AMD graphics. And it works: the G570 achieved a WorldBench 6 score of 121 points, and delivered a 34fps framerate in Fear. It isn't all about brute force, however, and the stylish Lenovo has a charcoal-grey, brushed-metal finish on the inside and a glossy back. You even get a Blu-ray drive. It's an excellent all-rounder that comes at a very competitive price.

• tinyurl.com/3mfuxm5

THE RUNNERS-UP

- **HP Pavilion dv6-6103sa** • tinyurl.com/6Lcdpux
- **Kogan Agora Pro** • tinyurl.com/43mn2ob
- **Lenovo ThinkPad Edge 11** • tinyurl.com/667qbjf
- **Packard Bell TS11HR039** • tinyurl.com/6k2pwm4

BEST HIGH-END LAPTOP

WINNER 2012 PC ADVISOR AWARDS

Apple MacBook Air 11in (Mid 2011)

The latest MacBook Air is a powerful tool for daily computing jobs, and weighs just 1.07kg in its tough aluminium shell. It has a second-generation Intel Core processor, running at 1.6GHz. Turbo Boost picks up the revs on demand, to 2.3GHz, while Hyper Threading makes the dual-core CPU look more like a quad-core to many apps. The Air scored 112 points in WorldBench 6, making this a powerful, stylish, carry-anywhere laptop, with decent battery life to boot.

• tinyurl.com/ccpoanm

THE RUNNERS-UP

HP EliteBook 8540w
• tinyurl.com/7rbsjdr

Rock X 685-I5-2540M
• tinyurl.com/7t53hbs

Samsung NP900X3A
• tinyurl.com/3gtq42m

Toshiba R830-143
• tinyurl.com/6xwtk99

BEST COMPACT CAMERA

WINNER 2012 PC ADVISOR AWARDS

Nikon Coolpix S9100

The Nikon Coolpix S9100 is a solidly built camera with a huge 18x zoom lens, and it can produce very good images. Styled like an enthusiasts' compact, complete with a pop-up flash and stereo microphones, the S9100 is an accessible point-and-shoot. We saw pin-sharp results at extreme telephoto, while the subtle corner softening at maximum wide-angle is forgivable. Add a best-in-class focal range, and the Nikon is a winner in our book.

• tinyurl.com/6e457py

THE RUNNERS-UP

Canon Ixus HS 230
• tinyurl.com/6bk7myc

Fujifilm FinePix HS20
• tinyurl.com/3b7wpte

Panasonic DMC-TZ20
• tinyurl.com/6xnrwuo

Sony DSC-HX9V
• tinyurl.com/6cLaw3d

BEST DIGITAL CAMERA

WINNER 2012 PC ADVISOR AWARDS

Canon EOS 600D

The Canon EOS 600D is an entry-level digital SLR camera sporting an 18Mp sensor, an amateur-friendly control interface and menu, and a 3in articulating LCD screen. It's an excellent choice for shooting in automatic mode, and the photos and video it produces are impressive. And it's those video-capture chops that make the EOS 600 stand out from a strong crowd: the EOS 600D is not only a great stills camera, but it's a genuine option for high-quality filming, too.

• tinyurl.com/72ste88

THE RUNNERS-UP

Nikon D5100
• tinyurl.com/6ute9kk

Olympus PEN E-P3
• tinyurl.com/7gpgzzw

Panasonic DMC-G3
• tinyurl.com/7jcxjcr

Sony Alpha A55
• tinyurl.com/87ydqjq

Hardware

BEST PRINTER

WINNER 2012 PC ADVISOR AWARDS

Kodak Hero 7.1

An all-in-one that's aimed at photographers, the Kodak Hero 7.1 is a credible and well-rounded package. All models in the Hero range benefit from built-in Wi-Fi and extremely low running costs, but we think the 7.1 is the best option for home photo printing. It's better than many dedicated photo printers we've tried, and will save you space and money to boot. If photographs are important to you, this all-in-one is the printer you need to pick, and it won't cost you a fortune to run.

• tinyurl.com/73txus3

THE RUNNERS-UP

- Brother HL-2130 • tinyurl.com/3zsw3zr
- Canon LBP7750Cdn • tinyurl.com/5tejm7q
- Epson WP-4535DWF • tinyurl.com/c82fy6k
- Kyocera Mita FS-1320D • tinyurl.com/5unkmm7

BEST WIRELESS NETWORKING PRODUCT

WINNER 2012 PC ADVISOR AWARDS

Cisco Linksys E4200

The Cisco Linksys E4200 dual-band wireless gigabit router is a good-looking device that promises speeds of up to 450Mbps – and, unusually, it all but delivers. A wireless router that requires a separate ADSL or cable modem, it connects to the modem through one gigabit WAN network port, and offers four more gigabit ethernet ports. But it's the E4200's wireless capabilities that stand out from the crowd. This is the fastest wireless-n router we've come across.

• tinyurl.com/6z7bdkm

THE RUNNERS-UP

- AVM FritzBox 7390 • tinyurl.com/7p3oLxk
- D-Link W307AV • tinyurl.com/3may93j
- Netgear N600 • tinyurl.com/3bzz7yh
- TP-Link TL-WR1043ND • tinyurl.com/3gy3m5h
- Zyxel NBG4615 • tinyurl.com/6hacknn

BEST PORTABLE ENTERTAINMENT DEVICE

WINNER 2012 PC ADVISOR AWARDS

Apple iPod touch

The latest iPod touch is slim, at 7.2mm, and now comes with iOS 5 and supports iCloud – a neat way of accessing music and photos from anywhere via the web. iMessage lets you send secure messages over Wi-Fi, too. Additions such as Photostream and editable playlists enhance the player's usability, while iCloud addresses some of the 'tied to iTunes' concerns. An iPhone without the phone, the iPod touch offers music, movies, games and web browsing.

• tinyurl.com/7mLqq5L

THE RUNNERS-UP

- £89 Amazon Kindle • tinyurl.com/6grzq2g
- Kodak PlaySport Zx5 • tinyurl.com/3u3y2ca
- Pure Move DAB 2500 • tinyurl.com/3bvsf7o
- Sony Ericsson Xperia Play • tinyurl.com/6ka99mb

BEST STORAGE DEVICE

WINNER 2012 PC ADVISOR AWARDS

Corsair Performance Pro 256GB

Corsair's latest high-performance SSD range, the Performance Pro series, differs markedly from its other top-spec SSD products. It may not have the highest read/write speeds with which to market itself but, make no mistake, the 256GB Corsair Performance Pro is the fastest SSD in real terms we've ever tested. With circa-half terabyte per second sequential transfer speeds in either direction, and in honest benchmark tests too – and IOPS figures also exceeding 60,000 IOPS both ways – this is a startlingly quick device.

• tinyurl.com/braynsc

THE RUNNERS-UP

- **Crucial M4 256GB** • tinyurl.com/763mrpa
- **Promise Pegasus R6** • tinyurl.com/83yd93b
- **Qnap TS-419P+** • tinyurl.com/3zk5Ljq
- **Synology DS211** • tinyurl.com/877uhq5

BEST PORTABLE STORAGE DEVICE

WINNER 2012 PC ADVISOR AWARDS

Seagate FreeAgent GoFlex Ultra-portable

The Seagate FreeAgent GoFlex Ultra-portable is more than just a portable hard drive – it's the basis of a versatile storage system that offers huge capacity and many user-changeable connection standards, including USB 3.0, eSATA and FireWire 800. In tests, the 1.5TB Seagate had incredibly quick performance, nigh-on 100MBps with USB 3.0, and it was one of the fastest FireWire 800 drives we've tested. It can be easily connected to any PC via any port. Simple, yet incredibly effective.

• tinyurl.com/7oq2m9a

THE RUNNERS-UP

- **Apricorn Aegis Pro SSD** • tinyurl.com/6d2bfsr
- **Buffalo MiniStation Extreme** • tinyurl.com/ce4z9ym
- **Hitachi Touro Mobile Pro** • tinyurl.com/7LwmzbL
- **WD My Passport Studio 1TB** • tinyurl.com/6fawbne

BEST GRAPHICS CARD

WINNER 2012 PC ADVISOR AWARDS

PNY GeForce GTX 570

If you don't want to spend a fortune, but still want a GPU upgrade that's going to make mincemeat out of any game you may throw at it for a few years, PNY's £250 GeForce GTX 570 Performance Edition is a relatively affordable upgrade that doesn't compromise on performance. The GTX 570 is slightly faster than the Radeon HD 6970, and doesn't require you to shell out for a dual-GPU card such as the Radeon HD 6990 or GTX 580. It's an absolute bargain and a worthy winner.

• tinyurl.com/3ub8u3g

THE RUNNERS-UP

- **Asus GTX 560 Ti** • tinyurl.com/3d6wzef
- **HIS ATI Radeon HD 6950** • tinyurl.com/7axm6rs
- **HIS Radeon 6970 IceQ 2GB** • tinyurl.com/3f7yv48
- **Sapphire Radeon HD 6770** • tinyurl.com/6feq6ap

Hardware

BEST SMARTPHONE

Samsung Galaxy S II

The Samsung Galaxy S II is the smash-hit successor to Samsung's incredibly popular Galaxy S Android smartphone, and has been such a success that it narrowly edges out the iPhone to our Best Smartphone award. There are several reasons for the Samsung Galaxy S II's enduring popularity: it has superb design and build qualities, and high-end specifications. As well as being one of the very first Gingerbread Android 2.3 smartphones, the S II has a great AmoLED screen made of toughened Gorilla Glass, excellent build quality and slick performance. We love it.

• tinyurl.com/76wnp2h

THE RUNNERS-UP

- **Apple iPhone 4S** • tinyurl.com/62teb9g
- **BlackBerry Bold 9900** • tinyurl.com/86soe3h
- **HTC Sensation** • tinyurl.com/5w5kc7d
- **Samsung Omnia 7** • tinyurl.com/73nopLt

BEST AUDIO PRODUCT

Orbitsound T12v3

Orbitsound's T12v3 soundbar distinguishes itself in several areas, with a top docking station that lets you easily drop in an iPod or iPhone. It majors on conjuring up a spacey sound cloud with no stereo soundstage positioning – a great, low-distortion sound, that can easily fill a room. An extra bass speaker blends superbly with the main bar, to give a full-range sound ripe with firm, tight low notes. With a versatile set of inputs for iPod, analogue and digital, it serves as a complete speaker solution for the digital home.

• tinyurl.com/75ksc6m

THE RUNNERS-UP

- **ADL GT40** • tinyurl.com/3cne5b2
- **Arcam rCube** • tinyurl.com/7aqvbey
- **Etymotic Research hf3** • tinyurl.com/6aLo9v2
- **Naim Audio UnitiQute** • tinyurl.com/7Lfdm3j

BEST DIGITAL HOME DEVICE

Elgato Netstream DTT

Watching TV on a PC is easy. But now that homes often have several PCs or laptops, how about trying the Elgato Netstream digital tuner, which can plug into a wireless network and stream live TV around your home? The advantage that this network-attached system offers over a direct-connected adaptor is profound. The streaming of live TV, in unadulterated Mpeg2 broadcast quality, to a PC of any type in the house is a fantastic asset, with two TV tuners to help allay domestic programming conflicts.

• tinyurl.com/7hs8u28

THE RUNNERS-UP

- **Apple TV** • tinyurl.com/3ws98jw
- **Cryo PC Alto** • tinyurl.com/3ophwhd
- **InFocus SP8600** • tinyurl.com/3hqanpv
- **WD My Book Live** • tinyurl.com/87wq4q7

Software

BEST TABLET

Apple iPad 2

Deservedly, Apple owns the tablet market right now, and it knows it. The price drop is the icing on the competition-killing cake, leaving iPad 2 as statement of the tablet art today. If we had to name a second-place contender, the only device nearing the slickness of operation and natural hardware/software integration is – last year's iPad. Anyone wishing to explore effortless computing is advised to try Apple's iPad 2. A worthy winner.

• tinyurl.com/6cxnez6

THE RUNNERS-UP

- **Acer Iconia Tab A100** • tinyurl.com/3t2bjqL
- **Asus Eee Pad TF101** • tinyurl.com/43ow5nx
- **Samsung Galaxy Tab 10.1** • tinyurl.com/3Lh239c
- **Sony Tablet S** • tinyurl.com/3tsqkp4

BEST APP

Camera+

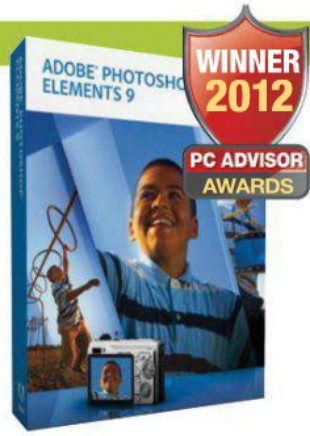
Camera+ is a must-have photography app for all iPhone camera users, and it has a good shot at making poor snaps into great photographs that will wow your friends. Camera+ uses the iPhone's camera, but seriously improves the phone's built-in software features. With its range of compositional features, picture enhancers, special effects and retro options, it makes the iPhone's built-in camera app look like a pinhole. At 69p, this app offers tremendous value and breathes new life into not just the iPhone but consumer digital photography itself. All iPhone users should have it.

• tinyurl.com/7kvwutf

THE RUNNERS-UP

- **ESPN Goals**
- **Facebook for iPad**
- **Napster**
- **Sky Go**
- **Skype 3**
- **Spotify for iPhone**
- **The Guardian for iPad**
- **TripAdvisor**
- **WhatsApp**

BEST PHOTO/VIDEO SOFTWARE



Adobe Photoshop Elements 9.0

More than just a cut-down or limited version of Adobe's flagship Photoshop CS5 software, Photoshop Elements 9.0 delivers cutting-edge features in a package designed to make managing and editing your photos easier and more fun. Like its bigger and far more expensive brother, Photoshop Elements appears slick and professional. From start to finish, everything is made as simple as possible. It offers significantly more functionality than any other free or low-cost consumer photo-editing software.

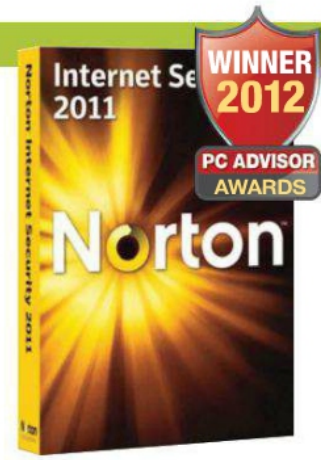
• tinyurl.com/692s5ua

THE RUNNERS-UP

- **Adobe Premiere Elements 10.0** • tinyurl.com/83w9th2
- **Corel Painter 12.0** • tinyurl.com/6q7k66v
- **Sony Vegas Movie Studio HD Platinum 10.0** • tinyurl.com/3kv5za7
- **Xara Photo & Graphic Designer 6.0** • tinyurl.com/6zhcuzL

Software

BEST SECURITY SOFTWARE



Symantec Norton Internet Security

Norton Internet Security is in internet security suite that safeguards your PC lightly and efficiently. Norton is probably the best known of all internet security products, and Symantec has stood the test of time by constantly improving its product with useful extras, both in its core engine and in the way it reports what it's been up to. The latest version is commendably light on resources and does what it sets out to quickly and efficiently. And that's enough for it to take the Best Security Software award in a very strong field.

• tinyurl.com/78tb7gm

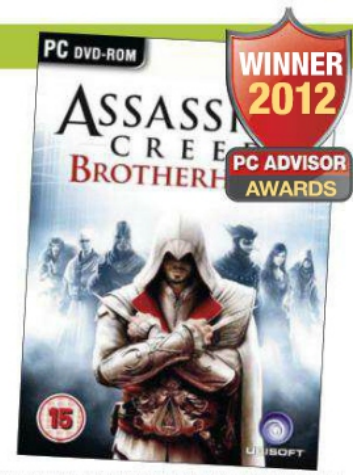
THE RUNNERS-UP

Bitdefender Internet Security
• tinyurl.com/7oj4muq

Kaspersky Small Office Security
• tinyurl.com/3cn9k8s

Panda Internet Security
• tinyurl.com/63sbhfn

BEST GAME



Assassin's Creed: Brotherhood

Assassin's Creed: Brotherhood is proof positive that rapid fire sequels needn't be a bad thing. Brotherhood's setting is the most compelling of the series so far, with every corner revealing a new landmark, and every mission weaving another historical figure or event into the Assassin's Creed mythology. The fluid, parkour-inspired movement mechanics, and incredible breadth and depth of things to do make this game as brilliant to play as it is to behold. In short, Assassin's Creed: Brotherhood is a masterpiece.

• tinyurl.com/72qf7mv

THE RUNNERS-UP

Dead Space 2
• tinyurl.com/773aj9d

DiRT 3
• tinyurl.com/795daxo

Need for Speed Hot Pursuit
• tinyurl.com/88y4oe9

Super Street Fighter IV 3D
• tinyurl.com/7zza8bs

BEST SPECIALIST ONLINE IT RETAILER

eBuyer

There wasn't much to choose between the top six in the specialist online IT retailer category, but eBuyer squeezed ahead. And it's not difficult to see why: with a wide variety of more than 19,000 products ranging all the way through laptops, desktop PCs, netbooks, tablet PCs and LCD televisions. Each is arranged in an intuitive, user-friendly way, and eBuyer offers next-day delivery on orders up to 11pm. More importantly in a contest that requires shoppers to vote: eBuyer has a lot of happy customers, which says something for its level of service.

• ebuyer.com

THE RUNNERS-UP

Dabs
• dabs.com

Maplin
• maplin.co.uk

More Computers
• morecomputers.com

PC World
• pcworld.co.uk

Scan
• scan.co.uk

Reader Awards

BEST ONLINE RETAILER

Amazon

The unrivalled king of the online retail space, Amazon takes our award thanks to its unparalleled array of products, at competitive prices. And the margin of victory was staggering: Amazon garnered around 80 percent of the vote in this category. Amazon is the market-leader in e-commerce, showing the way to other sites and services in terms of convincing consumers to buy. But our Reader Awards poll show that it is not merely successful at making money. Amazon is hugely popular with *PC Advisor* readers, and a worthy winner of our Best Online Retailer award.

• amazon.co.uk

THE RUNNERS-UP

Argos
• argos.co.uk

Currys
• currys.co.uk

John Lewis
• johnlewis.com

Play
• play.com

BEST DESKTOP PC BRAND

Chillblast

On this issue, *PC Advisor* readers and editors are in total agreement: Chillblast has had a great 12 months of making quality PCs. No PC maker has received more Best Buy and Recommended awards than Chillblast over the past year and, as a consequence, no PC maker has generated more support from readers. It is particularly impressive that an independent PC vendor such as Chillblast has managed to hold off opposition from some of the biggest names in computing, including Apple, Dell and HP.

• tinyurl.com/7cstvpx

THE RUNNERS-UP

Apple
• tinyurl.com/7ursfzv

Acer
• tinyurl.com/6wa23qd

Alienware
• tinyurl.com/8a37xgg

Dell
• tinyurl.com/74vddny

HP
• tinyurl.com/7yyown4

BEST LAPTOP BRAND

Apple

Again, *PC Advisor* readers and editors are in accord: Apple makes excellent laptops. Not only has the Mac maker walked away with our Best High-end Laptop award, but our readers have chosen Apple as their favourite laptop brand of the year. In a world where some lower-end laptops are rapidly taking on the guise of characterless commodities, Apple's systems remain distinct. With unparalleled build quality and top-tier performance, Apple's laptops are today excellent computers for all users.

• tinyurl.com/7ursfzv

THE RUNNERS-UP

Acer
• tinyurl.com/6wa23qd

Dell
• tinyurl.com/74vddny

HP
• tinyurl.com/7yyown4

Samsung
• tinyurl.com/6qru2yw

Sony
• tinyurl.com/7qf9rog

Reader Awards

SPONSORED BY CHILLBLAST.COM

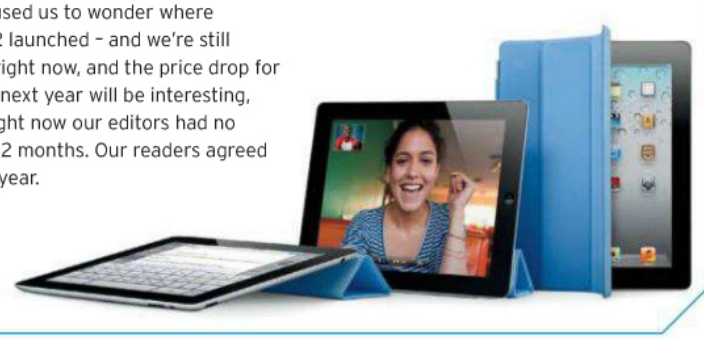
BEST GADGET OF THE YEAR

WINNER 2012 PC ADVISOR AWARDS

Apple iPad 2

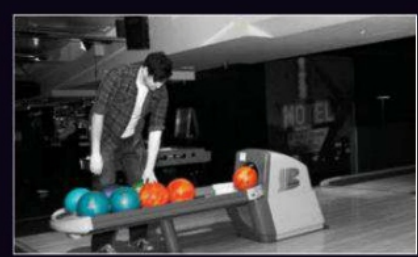
The Apple iPad 2 is appreciably faster, thinner and lighter than the original iPad, and boasts a pair of video cameras. Asking how Apple managed this caused us to wonder where shortcuts had been made in its construction when the iPad 2 launched – and we're still looking for them a year later. Apple owns the tablet market right now, and the price drop for the iPad 2 was the icing on the competition-killing cake. The next year will be interesting, as Android 4.0 and Windows 8 take the fight to Apple, but right now our editors had no choice but to name the iPad 2 as the best tablet of the past 12 months. Our readers agreed but went further, saying the iPad 2 is the best gadget of the year.

• tinyurl.com/6cxnez6



Congratulations to Mr Barry Schneider, who won our Reader Awards competition and scooped himself £250 in Amazon vouchers!

The *PC Advisor* Awards 2012 ceremony will take place in London in March. Here's a sneak peek at last year's bash



BE BROADBAND

3 Months Free
+ free connection

DOUBLE YOUR BROADBAND SPEED

Fancy having one of the UK's fastest broadband connections, but can't get access to fibre?

BE's Line Bonding service can give you **download speeds** of up to **44 meg** and **upload speeds** of up to **5 meg**, all based on a standard telephone connection.

By using **two lines**, instead of one, Line Bonding combines the bandwidth and our smart router joins the data together so all you notice is **much faster upload** and **download speeds**, typically double what you receive through a normal (ADSL) connection on a single line.

As with all our broadband packages, in addition to being **truly unlimited**, we'll never artificially reduce your speed to cram more people on a line (like some ISPs do...), and we **won't throttle** your access when you download certain types of files (you know the ones...) or when using the internet at peak times.

For more information go to **www.bethere.co.uk/linebonding** or order by calling **0808 101 3424**

Use code: **LINEBONDING3** for 3 months free plus free connection

PC ADVISOR BROADBAND SURVEY 2012

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Local loop unbundling 94
Survey results overview 94

We all want better broadband, but knowing whether we're paying the right amount to the right provider isn't easy to ascertain. Armed with the results of our annual Home Broadband Survey, though, we've got a pretty good idea. Rosemary Hattersley reports on our findings

Broadband isn't a luxury; it's a right. At least it ought to be. Without access to the web, vast swathes of information are inaccessible. Public services use the internet to keep us informed about travel issues, school closures, and the introduction of amenities, as well as offering web-based advice, distance learning and the like. If you can't get online, you'll find yourself left out.

Other online services are less critical, but it's hard to ignore the impact of social media and news sites as means of breaking and contributing to news and world events. The past year has borne witness to this to an unprecedented extent. Outside the realm of news, video streaming, catch-up TV and download services are transforming the way we consume entertainment. Most people shop online, and use the web to access critical services.

Of course, it's not just a PC or laptop screen that's used for all these things. Smartphones and tablets are an ever present window on the web. Internet access – and the broadband infrastructure behind it – really has become critical to our everyday lives.

Home broadband assessed

Every year, *PC Advisor* runs a web-based survey that asks readers to assess their home-broadband experience. The results enable us to report on broadband on a personal level – the connection speeds and service reliability customers receive, rather than the headline speeds the ISPs boast.

This is the seventh such survey we've run, and our thanks go out to everyone who took part. As with previous years, around 6,000 people took the time to tell us about their broadband connection, what does and doesn't work with the service, what their ISP is doing right, and what needs improvement.

While we offer modest incentives to encourage participation, we appreciate that filling in surveys isn't the most fun use of your time. But it's certainly worth your while, and allows us to share the cumulative feedback about the UK's best-known ISPs and provide reports based on customers' experiences.

Broadband trends

Connection speed and reliability remain key issues for most customers but, on the whole, UK consumers are satisfied with their broadband services. Of the nearly 6,000 responses we had to our survey, 77.6 percent said they were sufficiently happy with their broadband ISP to recommend it to a friend.

This wasn't a big surprise: for all our gripes and grumbles about web access, most of us tend to stick with the same provider for a significant period of time. The 12- or 18-month contract initially binds us to an ISP, but more than a third of those we surveyed have been with the same provider for more than five years; another 31 percent have stayed loyal to their ISP for three-to-five years.

While 24 percent said they wouldn't consider changing their ISP, just as many reported that they would switch to a provider that doesn't tie them into a long-term contract. More than 60 percent would switch to an internet service provider that was able to supply a faster connection or offered better value, either in the form of a cheaper subscription or uncapped downloads.

Ofcom says that four in 10 households could enjoy significantly faster broadband at little or no cost by switching package or provider.

Of course, it's easier to stick with what you know than go through the hassle of switching your service provider or internet package. The home-broadband market has a notoriously bad reputation for the difficulties involved in changing your ISP. Although it's an easier and faster process than it was only a couple of years ago, those who have tried and been burned by migration attempts may well be shying away from trying it again.

Going mobile

Only one in 200 survey respondents thought that 3G mobile broadband would make an acceptable alternative to fixed-line broadband, yet a third of readers regularly use 3G connectivity on their smartphone or tablet. In addition, 56 percent log on at Wi-Fi hotspots and access points when out and about; however, only 5.5 percent pay for such access. A further 12 percent make use of 3G dongles or SIMs on their laptops to sate their need for mobile web access.

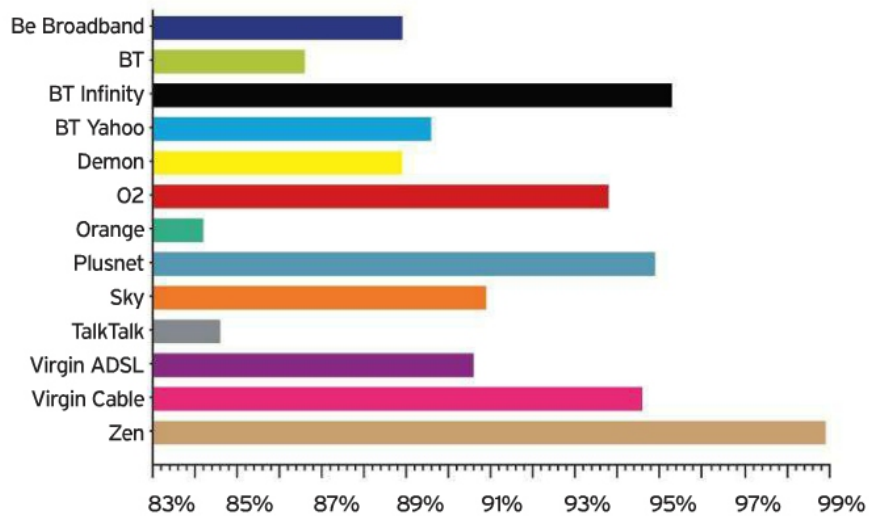
At the end of 2011, Ofcom reported that smartphone ownership in the UK had passed the 50 percent penetration mark; a further 9 percent of us own tablets. Not all tablets offer 3G connectivity, so additional services that allow access to national Wi-Fi networks are popular inclusions in broadband deals.

Speed issues

In February, Ofcom announced a 22 percent jump in average UK broadband speeds year on year. Its research found that 7.6 megabits per second (Mbps) is now the mean connection rate. The main factor behind this improvement is the availability of faster broadband services and consumers moving to faster packages with the same provider.

Our results showed a far greater instance of people whose connections approach the speeds intimated by their ISPs. Some 71 percent said they enjoy connection speeds close to or usually in line with those promised, but this still leaves 29 percent of customers frustrated by slower internet access. Overall, we found a 81.6 percent satisfaction rate for download speeds.

Percentage of customers satisfied with the reliability of their connection



Enhanced regulations governing how service providers are allowed to describe achievable connection speeds come into force in April. These should ensure potential customers have a better idea of the actual speeds they will achieve with a given ISP. Two years ago, the introduction of a voluntary code of practice to which almost every UK broadband provider signed up saw some improvements in such transparency.

Hitting the switch

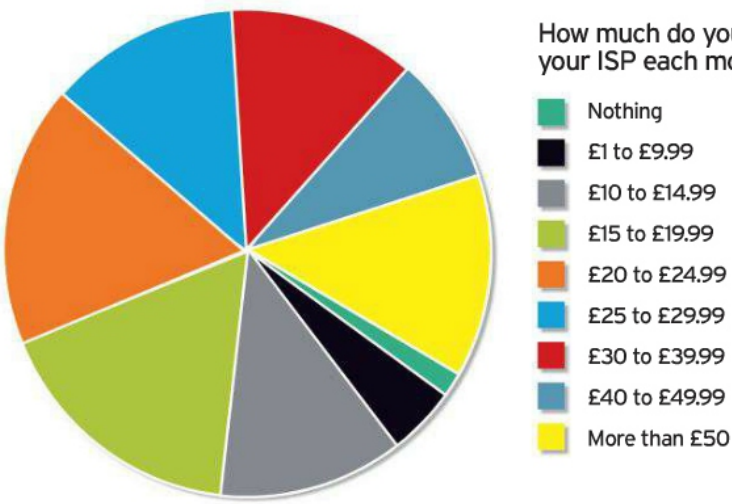
Broadband providers are only too aware that overstating their ability to deliver fast broadband speeds has made consumers disinclined to believe industry marketing hype. The ISPs haven't helped themselves, often seeming more interested in out-boasting each other and picking holes in rivals' claims than in providing a clear and transparent outline of what they can offer customers. Many were hauled over the coals by industry regulators, the press and pressure groups for their shortcomings. The fact that it was also difficult for customers to extricate themselves from a service that wasn't living up to its billing didn't help.

Migrations are getting easier, though. ISPs must now give a prospective customer an estimated line speed that their particular connection will be able to achieve; should the service fall well below these expectations, the customer is entitled to make an early exit from the service, rather than being tied into it for a minimum contract period.

Ofcom is also calling for changes to how migrations between providers are managed, so that the 'winning' ISP controls the changeover process and makes it smoother. Currently, the customer has to request a migration authorisation code (MAC) to pass on to the new ISP. Since it's losing business, the out-of-favour ISP has little incentive to provide the necessary code quickly.

Michael Phillips, product director at Broadbandchoices.co.uk, said "annual bills can be cut by over £350 through switching", but the reticence of some 'losing' ISPs to provide MACs may be penalising customers.

Ofcom estimates that one in five consumers switching their broadband lose

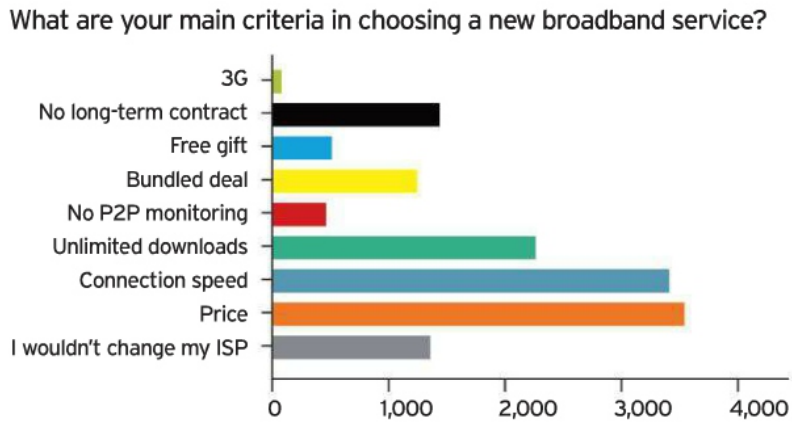


their service for about a week. Ed Richards, CEO, said: "Smooth switching processes are essential to ensure that consumers can change providers with confidence.

"There's no excuse for leaving customers without a broadband connection for days during the switching process."

A MAC is valid for only 30 days, which can cause switchover complications.

Nonetheless, with improvements to the changeover process, better enforcement from regulatory bodies, plus the continuing rollout of faster services across all types of broadband, there are definite benefits to switching to the right provider.



Geographic differences

The digital divide in Britain has long been a bone of contention. Certain areas get 100Mbps, while others get no more than 2Mbps on a good day.

Geographic differences and population distribution are often the issues here. Installing fibre-optic connections is expensive, and most such services are clustered in the more densely populated areas.

Rural residents are also likely to be paying the same amount or more for a slower service than people in a local loop unbundled (LLU) area, where a choice of ISPs is vying for their business. No wonder there's poor broadband uptake in semi-rural areas – £15 a month for an at-best 2Mbps connection is a lot to pay.

Ofcom paints a gloomy picture of broadband access in Scotland and Cumbria, in particular. Its map of broadband services across the UK shows almost all of Scotland rated poorly for provision. (The map is above right, but you can get a better look at tinyurl.com/6yynoyr.)

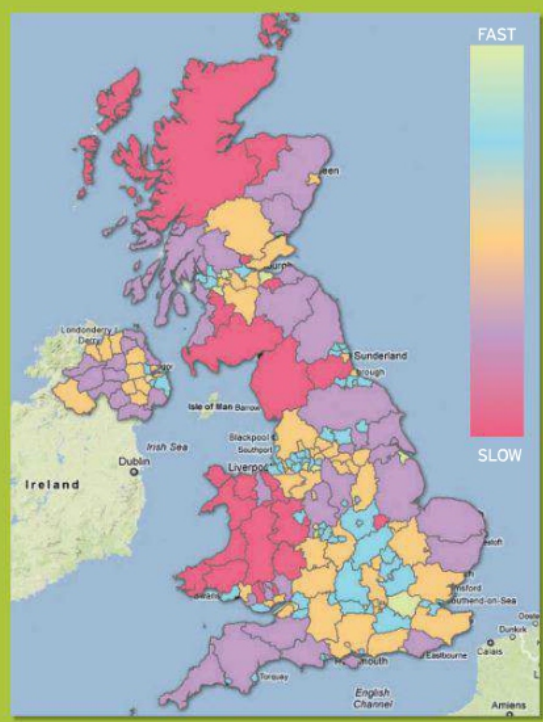
In the Highlands, there's a 66 percent broadband take-up rate, with an average connection rate of 7.3Mbps. Although this isn't far off the national average, 17.2 percent of residents get less than 2Mbps – the figure selected by the UK government in its Digital Economy Bill as the acceptable minimum.

The Isle of Wight has similar statistics, while Wales is almost universally ranked poorly for overall provision and has no super-fast broadband outside Cardiff.

A loop in the formerly excluded south-west has recently been added to Sky's broadband network, but there's still much work to do to close the digital divide.

What comes as a surprise is how low broadband uptake is in the UK, according to Ofcom. In Kingston-Upon-Hull, which has its own telecoms network, connection speeds are a smidgen below the national average at 7.3Mbps, but broadband take-up is just 50 percent. The 96.7 percent of those who do have a broadband subscription enjoy a reasonable connection rate, despite Kingston Communications not offering any super-fast tariffs.

On the other hand, Stoke-on-Trent has theoretically good broadband provision, with 78 percent super-fast broadband availability, but a low 58 percent broadband take-up. Staffordshire has slower speeds and far less access to faster broadband, yet a better take-up of services. Cost can't be the only issue at play here.



Thankfully, there has been some progress for the Final Third (the part of the UK that gets less than 2Mbps broadband or none at all). The government last year made an in principle agreement with Fujitsu, and a partnership of Cisco, TalkTalk and Virgin Media, to build a new network for these customers. This direct-to-the-home fibre-optic network will be delivered by a range of ISPs, How much it will cost to build, and how much customers will be charged, are still unknown quantities, but it's a welcome development and one that's long overdue.

Local loop unbundling

Even in areas of relatively good broadband provision, a lack of competition in exchanges that haven't been unbundled continues to be an issue. Ofcom has told BT it must lower the fees it charges ISPs for wholesale line rentals and the right to install their own hardware in BT exchanges (known as local loop unbundling or LLU).

Half a million exchanges were unbundled in late 2011, according to ThinkBroadband, bringing the current total to a little more than 8 million lines.

If your exchange has only one LLU operator plus BT, you'll be paying top whack. If there are at least three major providers (classified as Market 3), you're getting good value.

You can find out your situation, plus whether your exchange is due an upgrade any time soon, by consulting the exchange checker at tinyurl.com/35o5l ku.

Satellite broadband

Satellite TV broadcaster and terrestrial broadband service provider Sky is unbundling exchanges and upgrading old BT infrastructure to ADSL2+ broadband at a cracking pace. At the end of January, it was providing broadband internet to 17 percent of UK households, with an estimated user base of 3.6 million. Not surprisingly, its 10 million-strong existing customer base of satellite TV customers are proving a fertile market for its ISP business.

Jon Blumberg, commercial director for Sky Broadband and Talk, told us that 60 percent of new customers take its triple-play services, meaning broadband, TV and phoneline.

Sky isn't the only satellite company in town. For the first time, we received feedback from more than a couple of readers who rely on a satellite connection to get them online. Avanti and Tooway are the two best-known names here.

Satellite broadband is still very much a 'fill in' technology, and an expensive option for those who can't get online by other means. As with other types of broadband, the more people sign up for a service or who express an interest in taking it, the more cost effective it becomes.

Survey results

By far the largest number of responses we received were from Virgin Media cable-broadband customers. More than 22 percent of our survey respondents are Virgin Media customers, with a further 3 percent using Virgin Media's ADSL service.

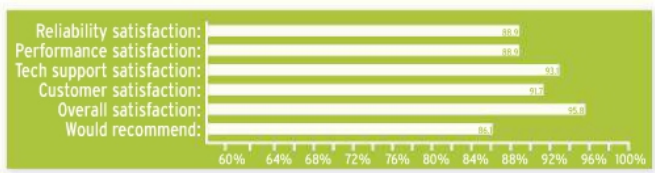
BT, TalkTalk and Sky Broadband were the next most popular broadband service providers, which reflects the size and availability of each of these major ISPs in the UK.

For our reporting purposes, we split BT's connection services into ADSL broadband and fibre-optic (Infinity). However, BT Yahoo still exists as a separate entity, with 4.1 percent of survey respondents identifying it as their broadband provider. Combined, the three BT products represented 20.1 percent of the total results, five percent behind Virgin Media's 25.3 percent overall share (ADSL and cable).

At the other end of the scale, we had single-figure responses from readers who depend on Eircom, UTV, Manx Telecom and Wight Cable to get online. We were unable to draw firm conclusions about the service provided due to the small number of responses for each entity.

Readers shared their experiences of a total of 70 UK ISPs. We had sufficient data on 13 of them to share here.

BE BROADBAND



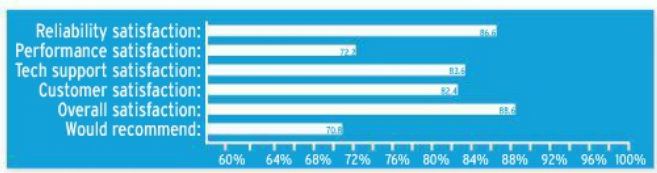
Be Broadband is an ADSL2+ ISP that appeals to customers who want a fast web connection and don't require a landline or any other service from the same company. This scenario is true for 85 percent of the Be Broadband customers who took part in our survey.

The price paid per month is between £15 and £20 for unlimited broadband. Most Be Broadband customers should be enjoying services promising between 15- and 30Mbps download speeds, but 30 percent said the actual speed was some way off.

This didn't stop Be from being highly regarded - almost 96 percent of customers declared themselves happy with the service. Solid customer service and tech support show that speed isn't the be all and end all.

Be is also popular with Mac users: 18.5 percent of customers described themselves as Mac-only users, with a further 15 percent using both Mac and Windows PCs at home. Between two and four PCs share the connection in the average household of a Be Broadband customer.

BT BROADBAND



BT Broadband customers pay between £15 and £25 a month for their web connection, with two thirds combining this with a landline telephone service. VoIP phone calls are enjoyed by 8.4 percent - something that's promoted as a cost-saving service by BT.

Connection speeds are steady, with 5- to 8Mbps being the most common service chosen. BT offers faster speeds via its Infinity fibre-optic technology. For the longer-established BT Home Broadband, reliability doesn't get a great write-up.

BT has managed to keep its customers on average for more than five years – almost 50 percent are long-standing customers of at least four years. Connection speed was the most popular reason for considering migrating to a new provider, however.

Many of BT's customers live in rural locations where ADSL connections are limited to around 2Mbps. With little or no choice of ISP, BT is seen as both expensive and poor value compared to the speed urban dwellers are able to achieve.

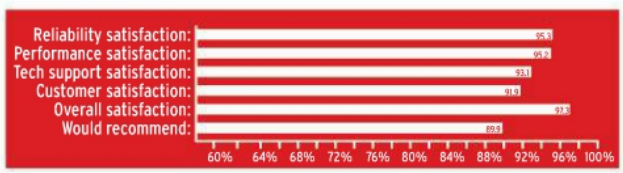
Sweeteners for those customers able to access them are BT Openzone WiFi hotspots and BT Openzone.

BT customers tend to spend a below-average amount of their leisure time using the web: around 10 to 20 hours per week is typical, though almost as many said they are online for longer. By contrast, 48 percent of Virgin Media users spend at least 20 leisure hours online, and 44 percent between 10 and 20 hours per week.

General web use and email were the most popular activities, with BBC iPlayer, other streaming and downloading tasks and social networking are under-represented by BT Broadband customers. Online shopping is enjoyed by 83.5 percent, and online banking was cited by 73.7 percent of BT customers.

Based on our results, and with the exception of Plusnet, Mac users are more likely to choose a package from BT than any other ISP.

BT INFINITY



Infinity is the fibre-optic product offered by BT. A replacement for limited-speed copper ADSL connectivity, it's been rolled out to UK homes and businesses over the past two years.

Prices start at £18 a month for a 40Mbps connection with a 40GB download limit and 2Mbps uploads. A BT phoneline is also required, adding £11.50 to the bill. Hardware installation is also involved, attracting a £25 activation fee.

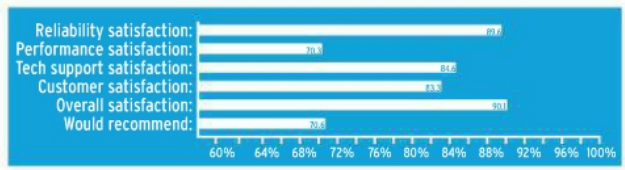
The 2.6 percent of survey respondents who use BT Infinity judged it to be a pretty good deal. Most said they were paying £25 to £40 a month. Rather unfairly, those who aren't in an Infinity-enabled area instead have to stump up £16 a month (plus phone costs) for a connection speed varying from 3Mbps to 20Mbps, and then get only a 10GB monthly download limit. Thankfully, BT's Infinity service continues to be rolled out across the UK.

More than a third of BT Infinity customers were already with BT (and had been for at least five years) and had switched from ADSL to fibre-optic broadband when it was offered in their area.

Most customers chose the fastest connection speed they could: 40Mbps in most locations, but a few places enjoy up to 100Mbps broadband. Speed-reliability figures were exceptionally high at 89 percent, while connection reliability was a solid 95.3 percent. As a result, 89.9 percent would recommend the service, and 30 percent wouldn't consider changing to another ISP.

A typical comment: "BT Infinity is so much faster than anything else available in my area. With an integrated phone contract with free calls it's a very good deal". One complaint that came up several times, however, was that new customers seem to get preferential deals.

BT YAHOO

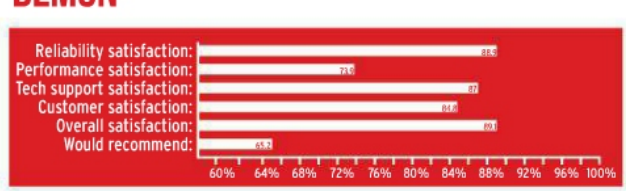


BT Yahoo customers are casting an envious eye over other BT customers who are enjoying far faster connection speeds. The average BT Yahoo user has been with the same provider for at least five years, so let's hope their loyalty pays off and fibre-optic broadband comes their way soon. A staggering 43 percent say they can't get anything like the promised speeds, and most are on an up to 8Mbps package. Another sizable tranche are on the promise of up to 20Mbps connectivity and are paying up to £25 a month for this luxury; downloads are generally unlimited.

A cautious lot, BT Yahoo customers make grateful use of the McAfee software that comes as part of the broadband subscription and make plenty of use of wireless connections. As with BT itself, some of the speed issues with BT Yahoo are likely to be down to the ISP offering a service in an area that others don't. Overall, 70.6 percent would recommend BT Yahoo for broadband.

There's a fair number of Mac users (16 percent) among the BT Yahoo customer base. In most cases, there are two or three laptops or PCs vying for the same home broadband connection and poised for online shopping. Email and general web surfing are popular but, given the reported poor connection speeds, it's perhaps no surprise that more bandwidth-intensive activities such as downloads, video streaming and social networking are under-represented.

DEMON



Demon all-but disappeared for a couple of years, but re-emerged in 2010 with a determination to get stuck into fibre-optic broadband provision. As with other mid-sized broadband service providers, it's been frustrated by BT's dominance of this market. Nevertheless, it continues to make in-roads in the home-broadband market.

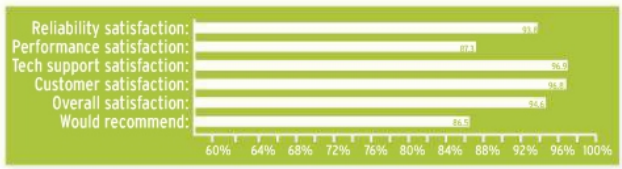
Almost all of Demon's customers are on a £20 or £25 monthly tariff for broadband only. A few receive a faster connection and pay

£35 a month. We had a number of complaints stating that Demon is poor at passing on improved deals to existing customers, and that its service is more expensive than others. Customer service issues were also highlighted by survey respondents.

Web use is split evenly between light users who go online for less than 10 hours a week and those who use it an awful lot more. Connections are of the familiar up to 8Mbps and up to 20Mbps ADSL variety. Actual connection speeds fall below those promised, however, as our poor recommendation and download performance figures show.

Demon customers are sufficiently confident of their broadband connection to use it to run websites and make use of remote-access services, as well pure social activities. Streaming music, internet radio and video appeals to just under 50 percent of Demon customers, but entrepreneurial web use is just as big a pull. Almost half those who responded to our survey have access to an Apple computer at home.

O2



Last year, O2 was the overall winner of our Home Broadband Survey and walked away with our Best ISP Award. This year, the broadband service provider has slipped down the ranks a little, but O2 still gives a very good account of itself.

A healthy 5.6 percent of our survey respondents are O2 broadband customers. O2 has a great offer that sees its mobile customers shave £5 off their monthly broadband bill – a very popular incentive, that's taken up by just over half of its customers. As a result, our survey results show that 60 percent of O2 customers are paying between £10 and £20 per month for their broadband, and getting up to 8Mbps or up to 20Mbps connections in return. Monthly limits of 20GB or 40GB are imposed, although off-peak downloads are excluded.

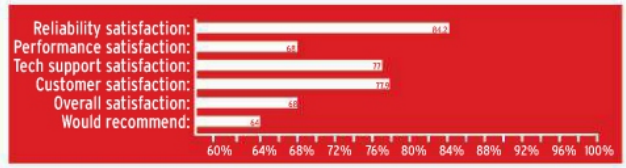
Both Wi-Fi and 3G connectivity are extensively used by O2 customers, which makes sense given the aforementioned mobile and broadband contract many take out. The O2 dongle for 3G access on a laptop is also popular, with 15.6 percent of customers using one.

Broadband speeds don't come up to scratch, though, warn a quarter of O2 customers. Some 12 percent specifically marked down the ISP for this factor. Connection reliability is better, and an impressive 93.8 percent were satisfied in this department.

Overall, O2 gets another great report from its customers, although the 'would recommend to a friend' figure has dipped to 86.5 percent.

A demanding bunch, O2 customers would potentially jump ship if they could get an even better deal that's also uncapped. However, they may find themselves missing the superlative customer support that current customers report: O2 got one of the best write-ups for this aspect of all the ISPs reviewed here.

ORANGE



The story for Orange and O2 is in essence the same: customers who also take out or have an existing mobile phone contract can get discounted fixed-line broadband by bundling the two services. Like O2, Orange offers loyalty incentives in the form of free cinema tickets, meal vouchers and so on.

The mobile tie-in is less popular here, though, with just over a quarter (27.1 percent) saying they bundle their broadband with a mobile contract. Landline phone bundling is more common at 30.7 percent, while VoIP also gets a look-in at 8.9 percent.

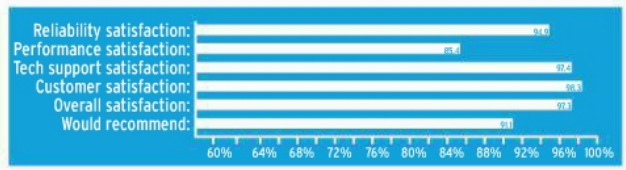
Price-wise, the sweet spot for Orange broadband customers is £15, with most other customers paying up to £30 a month.

Most Orange broadband customers share their connection with only one other laptop or PC. Even so, 38 percent said they don't believe they're getting the connection speed they pay for; most are on an up to 8Mbps connection with unlimited off-peak use.

Only 68 percent of Orange customers state that they are content with the connection speeds they enjoy, while poor customer service and technical support continue to be an issue. These customers have yet to do much about their concerns: 21.8 percent have doggedly stuck with an ISP that clearly could do better for at least three years, while 45.2 percent remain loyal to it after more than five years.

Orange may not offer fibre-optic broadband, but most of its customers are engaged in online tasks that aren't especially bandwidth-intensive. Email, shopping and general web surfing are fairly standard browsing activities; YouTube, Spotify and iPlayer take a back seat, with well under half of its customers saying they use such services. In contrast, online phone calls are cited by 24 percent of Orange customers as one of their important uses of the web.

PLUSNET



Plusnet trades on its good-value, no-nonsense broadband service. Average subscription costs are between £10 and £25 a month among the 5.3 percent of survey respondents who depend on Plusnet for broadband access. For 40 percent of Plusnet users, broadband and a landline phone are provided as a bundle with a single bill, but 60 percent told us they take only their broadband service from the ISP.

The most common connection speed is the up to 8Mbps service, with a further 18 percent on the up to 20Mbps tariff. Plusnet offers fibre-optic broadband too, but too few respondents reported that they are using this service for us to meaningfully analyse their experiences.

Around 30 percent of Plusnet customers told us they aren't getting the speeds they were expecting. Nonetheless, most felt they were getting a good service and connection for the amount they pay. This was borne out with an incredible overall satisfaction rate of 97.3 percent, and download satisfaction of 85 percent.

Download caps are popular, with most customers appreciating the option to download as much as they like during off-peak hours from midnight until 8am. Whereas other ISPs offer similar deals, Plusnet allows customers to decide on a fairly limited cap of 10GB and schedule heavy downloads during the night.

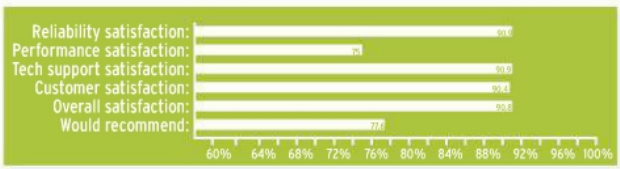
In fact, it's hats off to Plusnet for keeping its customers happy on most levels. Transparency of information relating to poorer-than-expected connection speeds, diligence over resolving customer issues, and the use of UK-based call centres all get a huge thumbs-up.

Of the many compliments from its customers, this summarised things best: "The customer support I receive is absolutely top-notch. If I have a problem, which is actually very rare, I get a very prompt and helpful response. Plusnet's technical support is one of the main reasons I have stayed with it for seven years."

As with most ISPs here, the internet accounts for an increasing portion of Plusnet customers' leisure hours. Just under 57 percent said they spent at least 15 hours of their free time online each week.

Popular activities include online shopping, surfing, downloading and email, but gaming, social networking and BBC iPlayer and other streaming services were less common than with other ISPs. Plusnet has its own dedicated gaming broadband service that offers access to low-latency servers with high ping rates.

SKY BROADBAND



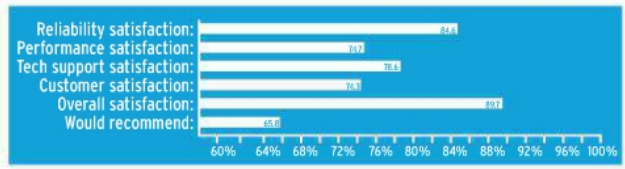
Sky offers satellite broadband, pay-TV, phonelines and video-on-demand and streaming services. Monthly payments to Sky are therefore high: 54 percent of its mainly PC-owning broadband customers pay more than £40 a month to the company. For this, connection speeds of between 15 and 20Mbps are the most prevalent, while email, web surfing, online shopping and some social networking are the favoured online activities. Unfortunately, nearly half of our survey respondents told us they are getting nothing like the web speeds the service promises. This was borne out by the Speedtest.net results customers provided, with some lowly figures.

On the other hand, 85 percent said they can surf to their heart's content as their service allows them unlimited broadband. It's customers also report slightly more than average leisure use (42.4 percent above 20 hours per week).

As one of the youngest ISPs in our survey, Sky has a cross-section of customers who have been subscribers from anything from a few months to three or four years. Peer recommendation levels are almost on a par with more established players, and almost as many current customers said they wouldn't change their provider as said they'd prefer not to be tied in to a lengthy contract.

With expensive TV services and hundreds of channels to choose from, it's perhaps no surprise to find less leisure time spent online and only a couple of PCs in a Sky Broadband household. And while web speeds have disappointed a quarter of customers, good connection reliability and technical support suggest Sky's doing a good job.

TALKTALK



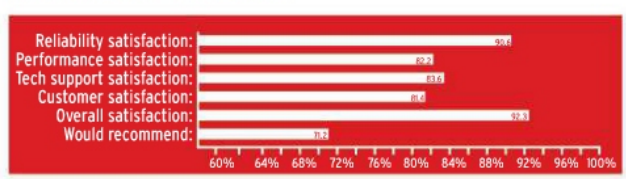
TalkTalk customers like to bundle their home phoneline and broadband subscription and pay between £20 and £30 a month for the two. Most have been with the ISP for between two and five years.

Satisfaction figures for this ISP aren't stellar, with many customers stating they'd rather choose an ISP that doesn't tie them into a contract. Better value and connection speed were also cited as areas in which TalkTalk could improve its service. Nonetheless, 35.6 percent stated that a bundled broadband deal that gave them a 'free' laptop or phone would be worth moving for – the very tie-in deals that many customers appear to be ruing.

Connection drop-outs and lengthy spells waiting for issues to be fixed were mentioned many times in our comments and complaints section, but customers gave TalkTalk a good account. Connection reliability of 84.6 isn't great, but 89.7 percent professed that they were generally happy with their broadband provision.

TalkTalk users are extensive users of the web, spending at least 20 leisure hours online in 34 percent of cases, with just under 20 percent approaching that level. Usage patterns follow the typical email, web surfing and shopping model of most ADSL providers. Most TalkTalk customers are on an up to 8Mbps or slower service with a 40GB monthly download limit and use a Windows PC to get online.

VIRGIN MEDIA ADSL



A little over a quarter of Virgin ADSL customers have a £20-per-month broadband connection, while the remaining two thirds pay £26 a month. There's an almost equal split between those taking

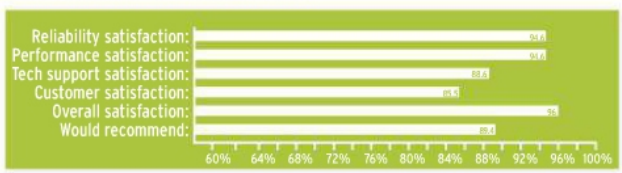
the broadband-only service and those with a landline bundle. Unlike Virgin's cable customers, ADSL users get the choice. However, they can't get the high connection speeds of their cable counterparts: up to 8Mbps or up to 12Mbps are standard here. Unlimited broadband in the form of the XL package is the most commonly chosen, although a sizable chunk prefer the 40GB per month deal.

Unlike most ISPs, Virgin doesn't offer a headline speed for its ADSL broadband packages and then let you down gently when it comes to the results of the line and availability checker: you enter your locale details and get an estimate in return. Even so, a worrying 28 percent of customers in our survey said Virgin Media ADSL isn't providing the speeds anticipated. Virgin Media customers are more vocal about this than customers of most of the ISPs here: they gave only an 82.2 percent satisfaction rating for connection speed, while a modest 71.2 percent said they would recommend their ISP.

Many users said the tariff was expensive – in comparison with the cable version of Virgin's broadband offering, it certainly looks that way. Customer service also got many mentions, and not in a good way.

The 20 percent of our survey respondents subscribed to Virgin Media's ADSL service have a Mac at home (often in addition to a PC), and most customers are avid users of Wi-Fi, 3G and tablets.

VIRGIN MEDIA CABLE



More survey respondents (23 percent) told us they use Virgin Media's cable-broadband service than that of any other provider.

As a quad-play operator offering a combination of broadband, home phone, mobile phone and digital TV services, it was little surprise to find significant sums being paid to Virgin Media each month. Almost 35 percent of customers are spending more than £50 each month to Virgin for their combined services, with as many again paying between £30 and £49 a month.

Most Virgin Media cable-broadband customers also get their phoneline from the company (70 percent explicitly said this was the case). In fact, taking a Virgin Media landline service is often a prerequisite. Discounted connections for Virgin Mobile customers were another a popular combination – just under 21 percent said they took advantage of this deal.

Despite its recent marketing, most customers are long-standing users, with more than half having been with the cable provider for at least five years and most other customers approaching that.

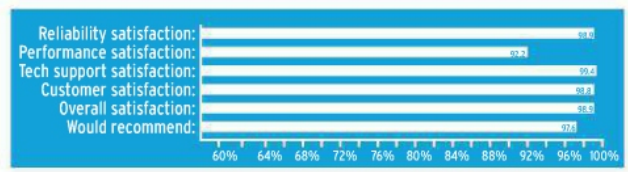
Far faster connection speeds are offered by cable than ADSL providers can supply, with Virgin Media forging ahead with up to 60Mbps connections for customers already on its 20Mbps service. More than 43 percent of Virgin Media customers who completed our survey said they have the 20Mbps or faster services; as a non-contended connection, most people said they usually get the advertised speed. A modest 9.4 percent said their connection speed was much slower than expected. The overall satisfaction figures of 96 percent were largely down to the impressive connection speeds that were acknowledged by 94.6 percent of customers.

However, late 2011 and early 2012 saw many reports of customers experiencing frequent connection issues. Consequently, it wasn't much surprise to find comments along the lines of "I had frequent unexplained dropouts that took ages to be resolved." On the whole, feedback on the reliability of Virgin Media's cable service was very good, but many readers felt improvements were needed to the call-centre service. Lengthy waiting times and a lack of technical knowledge were common complaints. Customer service thus got a poor report, with an 85.5 percent satisfaction rating.

Virgin Media is highly praised for its unbeaten connection speeds and, in areas where it's available, the cable service is clearly the best choice for heavy downloaders and frequent web users. There's room for improvement in customer services, though.

Just under 80 percent of Virgin cable customers answering our survey said they were Windows and Linux users, with 12 percent using a Mac, and 10 percent describing their home setup as being a mixed PC and Mac environment. Two or three PCs and laptops are the norm.

ZEN



Zen isn't the cheapest ADSL broadband provider, but it has always polled well in our broadband survey for customer satisfaction and good technical support. As you'll see from the Best ISP shield adorning this write-up, Zen continues to impress.

Most Zen users take the broadband-only package with unlimited downloads (although several survey respondents were unaware of the limit). Zen also offers a fibre-optic broadband product, but we've received feedback from very few customers so far. Depending on the package chosen, you can subscribe to a rolling monthly contract, rather than tie yourself in for a minimum term. Most customers pay around £20 a month for a broadband-only service, and a higher proportion of Mac users than average list Zen as their ISP.

Customers have typically been with Zen for at least three years (32.7 percent have used Zen for between three and five years), with another 32 percent having at least a five-year relationship with it.

The feedback figures for Zen are nothing short of admirable. A little under 60 percent of customers said they wouldn't consider trading their ISP for another, no matter what.

UK call centres and approachable technical support teams make the difference, it seems. "Brilliant ISP. Worth paying a little extra for the reliable, trouble-free service and friendly technical support" summarised how customers feel about our ISP of the year. ☒

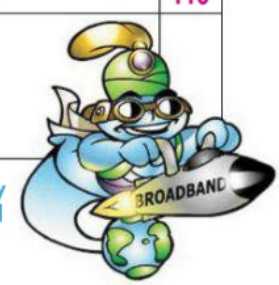
Broadband prices & packages

Not sure about which package to choose? Call our Ofcom-accredited switching helpline on **0800 090 1348** Prices checked 15th Feb. See latest prices at broadbandgenie.co.uk/pcadvisorbroadband

For full package details go to www.broadbandgenie.co.uk/offercode/[3-digit offer code]

Offer code

	Price	Contract	Speed (up to)	Downloads/mth	Offer code
1 TalkTalkEssentials ☞ *£3.25 broadband* TalkTalk £25 Argos voucher	£6.50/month **£3.25 for 12 months**	12 months	24Mb	40GB	101
	Offer1 EXCLUSIVE (online only) – ENDS 14th MARCH: FREE £25 voucher to spend at Argos, Boots, HMV and many other major retailers **Offer2** 12 months HALF PRICE broadband (price after first 12 months £6.50) plus FREE connection **Phone** Free calls to UK landlines evening and weekends (+ £13.80/mth line rental, or £9.50/mth if you pay 1 year in advance)				
2 Sky Broadband Unlimited ☞ Half-price broadband sky	£10/month **£5 for 12 months**	12 months	20Mb	UNLIMITED	102
	Offer1 12 months HALF PRICE broadband (price after first 12 months £10) **Offer2** Existing Sky TV customers can upgrade to Unlimited Broadband for only £3.75/mth for 12 months **Phone** Inclusive evening (7pm-7am) & weekend UK landline calls (+ £12.25/mth line rental)				
3 BT Infinity BT ISP Awards 2012 PC Advisor ☞ *PC Advisor super fast award*	£25/month **£20 for 3 months**	18 months	40Mb	UNLIMITED FUP*	103
	Offer No connection fee if you need a new line. **Phone** Free evening and weekend to UK landlines at any time (including 0845 & 0870 numbers) (+ £14.60/mth line rental or £10/mth if you pay 1 year in advance)				
4 Virgin L Broadband Virgin media ☞ *3 months FREE*	£20/month **3 months FREE**	18 months	10Mb	UNLIMITED FUP*	104
	Offer FREE installation **Phone** Unlimited weekend calls to UK landlines and Virgin mobiles (+ £13.90/mth line rental) **TV** M+ TV package with 75 channels and catch up TV				
5 BT Broadband and Anytime Calls BT ☞ *4 months FREE* £50 Sainsburys voucher	£16/month **4 months FREE**	18 months	20Mb	10GB	105
	Offer FREE £50 Sainsburys gift card **Phone** Unlimited calls to UK landlines at any time plus free 0845 & 0870 any time (+ £14.60/mth line rental, or £10/mth if you pay 1 year in advance)				
6 Plusnet Value ISP Awards 2012 PC Advisor plusnet ☞ *PC Advisor Budget broadband award*	£6.49/month **£3.24 for 12 months**	12 months	20Mb	10GB	106
	Offer ENDS 8th MARCH: 12 months HALF PRICE broadband (normal price £6.49) **Phone** Free evening/weekend UK calls (including 0870 / 0845 calls) (+ £12.99/mth line rental, or £9.49/mth if you pay 1 year in advance)				
7 TalkTalkPlus TalkTalk ☞ *HALF PRICE broadband* £25 Argos voucher	£14.50/month **£7.25 for 9 months**	12 months	24Mb	UNLIMITED FUP*	107
	Offer1 EXCLUSIVE (online only) – ENDS 14th MARCH: FREE £25 voucher to spend at Argos, Boots, HMV and many other major retailers **Offer2** ENDS 14th MARCH: 9 months HALF PRICE broadband plus FREE connection **Phone** Unlimited anytime calls to UK landlines (+ £13.80/mth line rental, or £9.50/mth if you pay 1 year in advance)				
8 Sky Sports in HD: Everyday Lite broadband plus Sky Sports and Sky+ HD ☞ Sky Sports HD	£50.25/month	12 months	20Mb	2GB	108
	Phone Sky Talk with inclusive evening (7pm-7am) & weekend UK landline calls (+ £12.25 line rental) **TV** Over 40 entertainment channels, 17 in HD and five dedicated sports channels; Sky Anytime + (TV on demand), pause, record and rewind live TV; Sky Go (live TV on your laptop)				
9 Virgin XL Broadband & Phone Virgin media ☞ *£5 for 3 months* FREE Spotify	£18.50/month **£5 for 3 months**	18 months	30Mb	UNLIMITED FUP*	109
	Offer1 FREE installation when you order online **Offer2** FREE Spotify Premium for 6 months **Phone** Unlimited weekend calls to UK landlines and Virgin mobiles (+ £13.90/mth line rental)				
10 BT Broadband & Evening/Weekend Calls BT ☞ *£3.50 for 6 months* £50 Sainsburys voucher	£13/month **£3.50 for 6 months**	18 months	20Mb	10GB	110
	Offer FREE £50 Sainsburys gift card **Phone** Free weekend and evening calls to UK landlines (including 0845 & 0870 numbers) (+ £14.60/mth line rental, or £10/mth if you pay 1 year in advance)				



www.broadbandgenie.co.uk/offercode/[3-digit offer code]

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For full package details type in www.broadbandgenie.co.uk/offercode/ followed by the offer number from the right-hand column
e.g. www.broadbandgenie.co.uk/offercode/101

* Fair usage policy applies

All prices in the comparison table above were checked on 15th February. For a complete list of today's prices and packages please visit www.broadbandgenie.co.uk/pcadvisorbroadband or call our Ofcom-accredited switching helpline on 0800 090 1348.

ECO
INNOVATION

MULTISYNC EX231Wp
23" WIDE HIGH QUALITY FULL HD PVA PANEL LED BACKLIGHT TECHNOLOGY
JAPANESE DESIGNER SLIM-SLIM PROFILE COMPREHENSIVE ERGONOMICS
HUMAN SENSOR AND LOWER POWER USE

The **Smart Display** that works, only when you do.

MULTISYNC EX SERIES DISPLAYS
MINIMALISM AND ECO-PERFORMANCE

The EX231Wp combines a 'precision image' PVA panel with LED Backlight Technology and the EX Series' elegant and minimalist 'design house' looks, to create the ideal mix of image performance and eco features in a cabinet that is the perfect complement to ultra-modern office environments.

Also featuring a unique 'human sensor', that powers the screen on and off depending on the viewer's presence and the smallest fully ergonomic stand we ever made, the NEC EX Series sets new trends for displays of the future.

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Empowered by Innovation NEC

ROSEMARY HATTERSLEY

Tech Help

The Chrome effect

If you want to get ahead of your business rivals, create an app for Google Chrome that will appear whenever the browser is launched. It'll give your customers a convenient means of diving straight into your site and starting to shop.

Tesco quickly saw an opportunity to promote its online shopping and recruit new members to its loyalty scheme by creating a Chrome app, and several high-profile newspaper titles have followed suit. We show you how to add your brand to the growing list of Chrome Web Apps on page 114.

Google Chrome adds customisation and interactivity to an otherwise static entity. This is something we look at in more detail with our *How to: Windows* workshop on web-based whiteboarding. See page 110.

Troubleshooter (page 102) offers cunning tricks to boost your web experience in another sense: by tweaking how you connect, you can enjoy a faster connection.

And if it's a richer media experience you crave, great-sounding lossless audio is just a few clicks away – see *How to: Audio* on page 118.

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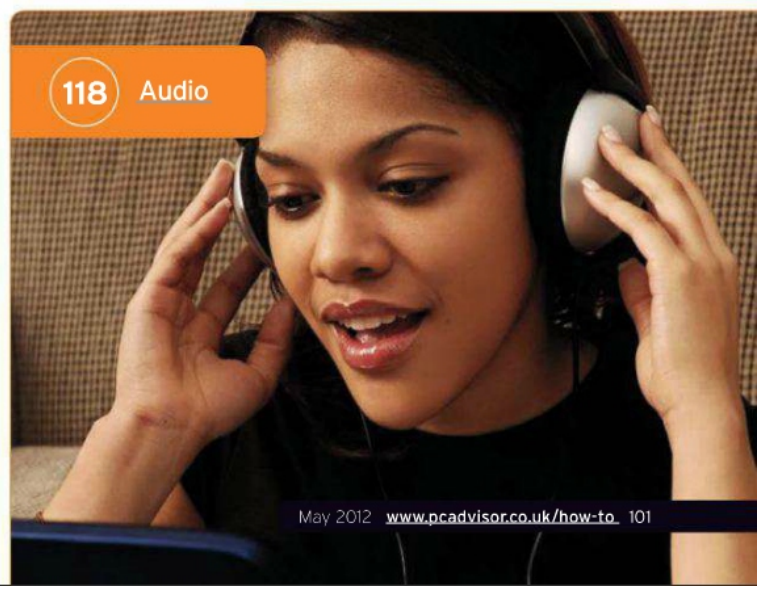


Boost browsing speeds with a faster DNS

Marco Chiapetta explains how the right DNS server can enhance your web connection

Most people assume that their internet connection's peak bandwidth determines its overall performance. That's not true. Many factors are in play, including the speed of the servers you're trying to connect to, the type of network connection (wired or wireless), router and network bandwidth, and latency. One of the least-understood factors is the Domain Name System (DNS) server.

The DNS translates easily remembered domain names into numeric IP addresses. You might type pcadvisor.co.uk into a browser, for example, but it requires the site's 192.168.1.64 IP address to take you there. If this address isn't cached in its DNS resolver, the system will request it from a DNS server – and then from another if it receives no response.

Your ISP probably assigns DNS servers for your connection. But depending on your ISP and location, you may find that this system is underperforming or unreliable. As a result, some sites take too long to load (if they load at all), and email can be flaky.

Find fast DNS servers

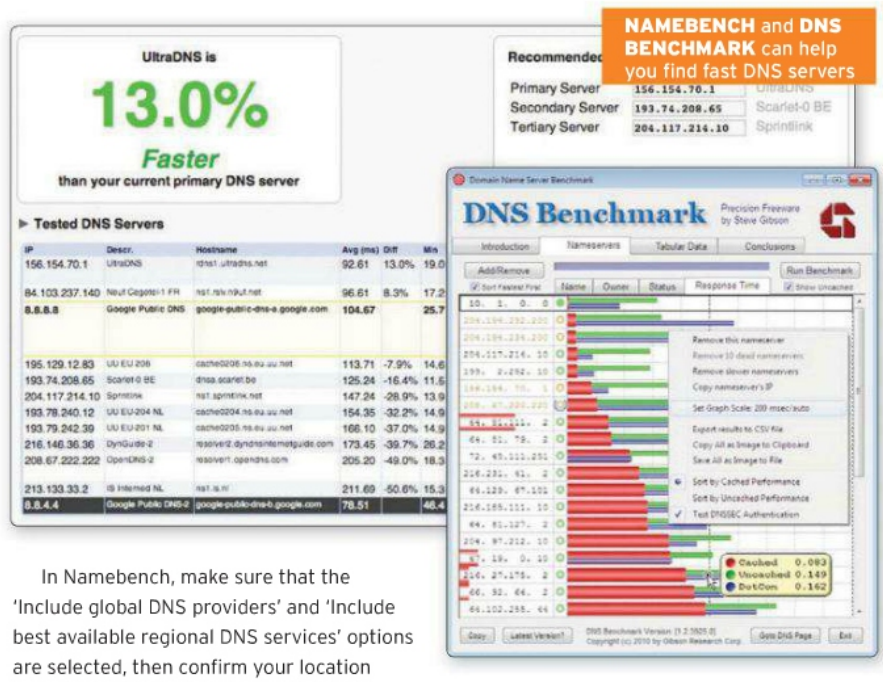
Instead, you can use public DNS servers. Download and run both the open-source Namebench (tinyurl.com/yLr8m63) and GRC's DNS Benchmark (tinyurl.com/mtxLzo) to see whether they yield consistent results.

Fix your web browser

A common malware trick is to modify your browser's home page or settings so it can reinfect your PC, display ads and prevent browsing.

First, check your browser's home page settings. In Internet Explorer, click Start, Control Panel, Internet Options. Find the Home Page settings, and verify that it's the right site.

Next, select the Connections tab and click the LAN settings button. You'll probably also want to select 'Automatically detect settings', unless your work's IT policy or ISP requires a proxy.



In Namebench, make sure that the 'Include global DNS providers' and 'Include best available regional DNS services' options are selected, then confirm your location and click Start Benchmark. The tool will run a few tests on your system.

In DNS Benchmark, click the Nameservers tab, then Add/Remove. Click 'Build Nameserver Custom List' in the 'Edit DNS Server IPs' window. Then, in the window that pops up, click 'Build Custom List'. You'll need to wait around 40 minutes for the process to complete, and should then click Run Benchmark on the Nameservers tab.

The servers with the fastest response times should offer the best performance. Make a note of the top three IP addresses.

Configure your PC

To set Windows 7 to use your preferred DNS servers, click the Start button, type **Network Connections** in the Search box, and press Enter. You must configure the DNS settings on all the system's active network connections (each active network adaptor will have the network name listed below its name and won't have a red X in its icon). Right-click each active adaptor and select Properties. On the Networking tab, highlight 'Internet Protocol Version 4 (TCP/IPv4)', then click the Properties button.

Select the General tab in the following window, then click 'Use the following DNS server addresses'. Enter the IP address of the fastest DNS in the Preferred field; and the second-fastest DNS in the Alternate field. Click Ok in that window, and Ok again in the Network Properties window. Close the network connections list and restart the PC.

Configure your router

To make all your networked systems (regardless of operating system) use the same servers, you must change your wireless router's settings. Here are the basics; see your manual for specific instructions.

Enter 192.168.0.1 or 192.168.1.1 in your web browser's address bar. If neither works, select Control Panel, 'Network and Sharing Center', 'Change adapter settings'. Double-click the active network connection, click Details, and find the address under 'IPv4 Default Gateway'. Take that address, add http:// in front, and paste it into your browser's address bar.

Log into the wireless router's web interface. Click Basic Setup or Network Setup, then look for a section named 'Network Address Server Settings (DHCP)' or similar. Enter the IP addresses for the fastest DNS servers in your area. Save the changes, then restart the router.

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YOUR QUESTIONS ANSWERED

Expert computing advice

Paul Monckton tackles readers' hardware and software conundrums

RECYCLE BIN CORRUPTION

Q The Recycle Bin on my Windows 7 PC no longer retains deleted files. When I delete a file I now get a warning that it will be permanently deleted.

I've already checked my settings: the capacity of the Recycle Bin is set to 16,375MB; the option 'Don't move files to the Recycle Bin, remove files immediately when deleted' is disabled; and the option 'Display delete confirmation' is enabled.

The problem appeared after I downloaded a set of Windows updates, but rolling back the PC to before they were applied doesn't solve the issue. Please advise me on what to try next. *Vincenzo Boccardi*

The steps you've already taken should have fixed the problem, so we suspect that your Recycle Bin has become corrupted. Note, however, that files stored on a networked or removable drive will always bypass the Recycle Bin, as will very large files. Be sure to test its operation using a small local file that you don't mind losing.

Other readers experiencing the same problem should follow the steps described by Vincenzo: right-click the Recycle Bin and select Properties. Ensure that Custom size is selected, 'Don't move files to the Recycle Bin...' is disabled, and 'Display delete confirmation dialog' is enabled.

If this doesn't solve the problem, deleting the Recycle Bin and forcing Windows to create a new one may do the job. Windows has a Recycle Bin for each drive letter, but you'll need to enable the viewing of hidden files to see this in Windows Explorer. The easiest way to find and delete it, without permanently changing your settings, is to use the command prompt.

Click the Start button and type **cmd** in the Search field. Look for cmd.exe in the search results, then right-click it and select 'Run as Administrator'.

On the assumption that C is your primary drive, type **rd /s /q C:\$Recycle.bin** and press Enter. This will delete the Recycle Bin from drive C; repeat the procedure and/or substitute the C for other drive letters if necessary. The 'rd' command removes folders, while the /s switch instructs it to also delete any subfolders. The /q, for quiet mode, disables any status messages.

RECYCLE BIN CORRUPTION

Finally, type **exit** and press Enter. Windows will close the command prompt and carry out your request. We hope this will solve your problem – please let us know how you get on.

MORE RECYCLE BIN WOES

Q The application of an automatic update to my Windows 7 PC appears to have corrupted the Recycle Bin. System Restore hasn't helped, and I haven't been able to delete the Recycle Bin via a command prompt.

Although the Recycle Bin appears to be empty, inside is a 7.8MB hidden folder called 'S-1-5-21-1287572835-11547434736-1001'. This contains five more folders, each with a name beginning '$R...'. I cannot delete these.

I managed to rename the Recycle Bin 'Oldrecycle.bin', and a new Recycle Bin appeared. This has stopped the constant 'nag' about having a corrupt Recycle Bin, but I still can't delete the original. Please help. *Wallace McLarty*

It sounds as though you've already tried the advice we gave in reply to the previous question. You say that you can't delete the Recycle Bin, but don't describe the error message itself. This is always helpful in responding to reader queries. Knowing which Windows update was applied prior to the problem appearing can also be helpful.

You'll need to ensure that you're using an elevated command prompt with administrator privileges – click the Start button, type **cmd**, right-click cmd.exe in the search results and choose 'Run as Administrator'. If a file is owned by another user, being an administrator isn't enough to allow you to delete it. As the administrator, however, you do have the power to take ownership of the file, and then delete it.

Right-click your oldrecycle.bin file and select Properties. Open the Security tab, then click Advanced. Open the Owner tab and click Edit. Select Administrators in the 'Change owner to:' box, then press Ok.

Close any open windows. Right-click your file, then select Properties, Security. This time, choose Edit and select Administrators in the top pane. Ensure Full control is enabled in the bottom pane, then click Ok. You should now be able to delete the file when logged in as an administrator.

CYKEY ON A TABLET?

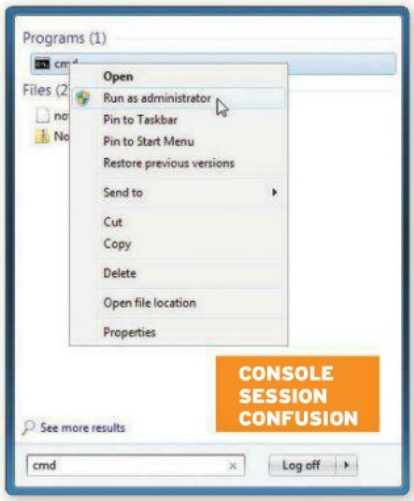
Q I would like to buy a tablet PC. The iPad is appealing, but it doesn't have a USB port. This is important, since I need to be able to use it with a CyKey one-handed keyboard, which uses a USB receiver. *Frank Duffin*

Given that it has no USB port, there is no simple method for using your CyKey with an iPad. Some tablets do have a USB connector, but CyKey tells us that the device is compatible only with Windows, Mac and Linux – sadly, not Android. A Bluetooth version is in development, however, which a tablet or smartphone is more likely to support than USB 2.0.

Production is slated for the second quarter of 2012, but you'll need to check with CyKey for updates. It's too early for us to say how well it will work with tablets, but remember that most people will interact with the iPad using only one hand.

CYKEY ON A TABLET?

Tech Help



CONSOLE SESSION CONFUSION

Q My Windows 7 PC demands that I use a console session to run the SFC utility. I don't know what this is. Any ideas, please? *Ian Clements*

In recent versions of Windows, logging into the administrator account isn't enough to grant you administrator-level privileges when performing system operations. This is to protect you from accidentally performing dangerous operations, and also to prevent malware from masquerading as you and making system changes.

To perform such tasks, you must elevate your session to administrator level. The 'console session' referred to here is simply a command prompt with administrator privileges enabled. Click the Start button, type **cmd** in the Search field, right-click cmd.exe in the results and then choose 'Run as Administrator'. You should now be able to run the SFC utility.

TROUBLE WITH ADMIN ACCOUNT

Q My XP PC doesn't recognise the command sfc/scannow. I figured that this was because I wasn't logged into an administrator account and tried to switch from my standard user account using the command line; it wouldn't let me enter the password. Hitting buttons on the keyboard does nothing. Any suggestions, please? *peaches10001*

An occasional bug can occur in XP that prevents you from typing in your password at the Welcome screen. Microsoft recommends using the Classic login screen to sign in. You say that your keyboard isn't working at this point, but this still might be worth a try: simultaneously press Ctrl, Alt, Del twice at the login prompt.

This should bring up the Classic login window, where you'll need to type in your username and the password. You can read more details about this workaround on the Windows support site (tinyurl.com/7bfh8qo).

However, you don't need to be logged into an administrator account to run SFC on a Windows XP machine. We suspect that the command prompt simply can't find the file. Direct it to SFC.exe by first typing **cd C:\windows\system32** and then entering your request (substitute C: for the drive on which Windows is installed if necessary).

MOTHERBOARD LED ACTIVITY

Q My Asus M4A88T-M motherboard has a Realtek LAN adaptor. Following a recent update, I noticed that its activity LED light remains lit regardless of whether the cable is attached. This is not the case when plugged into another PC.

Network Diagnostics stated that 'Windows did not detect a properly installed adapter. If you have a network adapter, you will need to re-install the driver'. I reinstalled the driver, then got the message: 'The Realtek network controller was not found. If Deep sleep mode is enabled, plug in the cable'.

I have not enabled deep sleep mode, nor do I know how to. I've tried starting up the computer without the LAN cable plugged in, and again with it attached. Neither solved the problem.

My online research found several others who have had the same problem, but their suggested remedies – removing the memory cards and battery, and clearing the CMOS – have not helped. *Wallace McLarty*

The network adaptor problem is indeed a tricky one, and all sorts of different tricks have been employed to resolve this issue with varying levels of success. That this occurred immediately after an update suggests that it's a software or driver problem rather than there being something physically wrong with your network adaptor. Any re-setting of the motherboard will only be able to fix things if it can trick Windows into reloading any problem drivers.

First, try booting a live version of Linux, such as Ubuntu, which is free. You can download and burn a CD and boot into that. There's every chance that your onboard network adaptor will work fine under Ubuntu. If it does, we'll know that it's a Windows configuration problem and the problem you're having is caused by drivers that aren't right for your network hardware.

If this is the case, you'll need to download and install the latest drivers for your motherboard. These can be obtained from Realtek's website, at tinyurl.com/La9ey. Be sure to grab the right version – for your motherboard you'll need RTL8111E.

PANDA PURCHASE PROBLEM

Q ***PC Advisor*'s review of Panda Internet Security 2012 doesn't say where to buy it. I tried to buy it at PCWorld.co.uk, but couldn't find it there. Where can I buy the software?** ***John***

Panda Internet Security is available from many online merchants, Panda Security's own website, and even at our site (see pcadvisor.co.uk/special-offers). Before you rush out and buy it, though, check out the other available internet security suites reviewed from page 70.

GWBASIC ON 64BIT WINDOWS

Q **Thanks for the recent workshops you ran on SmallBasic programming. I am more at home with GWBasic. Is it possible to run this on a Windows 7 64bit system?** ***Paul Woffindin***

GWBasic was written using 16bit code. It can't be used on a 64bit version of Windows without using emulation software.

If you're running the Professional Edition of Windows 7, download and install Windows XP Mode (tinyurl.com/c8274e). This will let you run GWBasic in a virtual Windows XP environment. (You won't need to buy a Windows XP licence to use this software.)

If you're using the Home Premium version of Microsoft's OS, download and install Virtual PC (tinyurl.com/cphL2q). Note that you'll have to provide your own 32bit operating system to install on the virtual machine, however.

Oracle Virtualbox is another good alternative (from tinyurl.com/7qbuLjq).

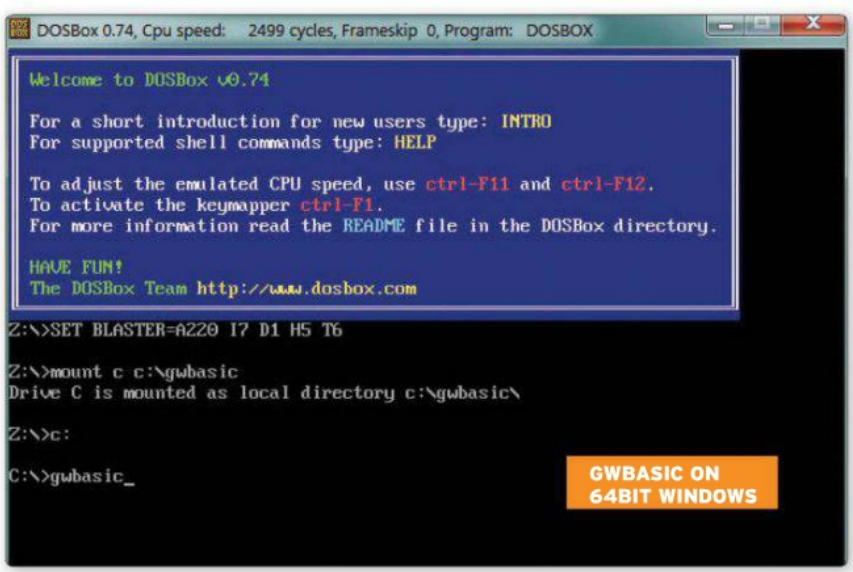
You can set up a virtual PC with Virtualbox, then install a 32bit operating system and run GWBasic on that.

A quicker solution would be to download a DOS emulator such as DOSBox (get it from tinyurl.com/73k8co2). Using this, you won't have to install a second copy of Windows.

Install and run the application, and you'll be presented with a DOS prompt. You can now map a virtual drive within DOSbox to a real folder on your hard drive using the mount command.

Let's say your GWBasic files are stored in a folder called C:\GWBasic on your Windows PC. Open DOSBox and type **mount C: C:\GWBasic**. Press Enter.

Your DOSBox now has a virtual C drive, which is in fact your GWBasic folder from Windows. In DOSBox, type **C:** and press Enter to access the C drive. Next, type **GWBasic** to run GWBasic.



Any other DOS programs you place in your Windows C:\GWBasic folder can be accessed within DOSBox in this way.

DECOMPRESSION TRAUMA

Q **I'm using Windows 7 64bit and need a reliable utility that will allow me to extract documents that were compressed into SIT files by a Mac. I've already tried 7-Zip, WinZip and StuffitExpander.** ***Martina Jessop***

Stuffit files can be extracted on a Windows PC by using a utility such as ExtractNow (extractnow.com) or Universal Extractor (tinyurl.com/23asLa). Either of these will cope with SIT files created on a Mac just as easily as Zip files created on a PC.

FREE SCREENCASTER

Q **Please suggest some free software that can capture your actions onscreen and save it to a video file. This is to be used for educational purposes.** ***Martin Higgins***

Perhaps the easiest way to record a video clip directly from your screen is to use a website such as screencastle.com. The site uses a Java plug-in that allows you to select an area of your screen to record and optionally enable your PC's microphone. To use it, simply click the big red button and grant any requests for permission to run.

Once recorded, your video clip can be previewed and optionally uploaded to the ScreenCastle server. A link is then provided for you to embed it to a web page or send to others via email.

One caveat with this site is that it's impossible to delete your video files when no longer needed. That said, uploaded files are not associated with individual user profiles, and the very long video ID codes used make it unlikely that someone who is not the intended viewer would find them.

If you don't fancy uploading your recordings to an internet server, there are plenty of free applications that can perform the task you require. We've listed a few of the most popular below.

CamStudio (camstudio.org) is a powerful screen-recording application that's free for both personal and commercial use, but the software lacks editing features.

You might also like to take a look at Webinaria (webinaria.com) and Wink (debugmode.com/wink). Both are free tools that afford you some degree of editing with the videos you create.

Alternatively, Jing (jingproject.com) is available in both free and paid-for versions. It has the added advantage of working on both Windows and Mac platforms.

In a similar vein and extremely useful, although it's not strictly a screen-capture program, is Microsoft's Problem Steps Recorder. This is built into Windows 7.

Problem Steps Recorder is designed to help users accurately describe to tech support the problems they are experiencing – and that's a big hint as to why we've mentioned it. The utility makes a recording of your actions in Windows, which you can send to a helpdesk or a tech-savvy friend.

Problem Steps Recorder doesn't record video, but the person helping you will be able to view screenshots of the steps you have taken, and the results of your actions. These include error messages and other pertinent system information, including the version numbers of any software you're using. You can also add comments to the recording, which is saved to a single Minimal HTML file for emailing.

Download a short demo video of Problem Steps Recorder at tinyurl.com/6ocn3hb.

For any Windows 7 users who have a PC problem they'd like our help in solving, please consider including a Problem Steps Recorder file with your query. This can aid us in providing you with a timely and correct solution. Users of other operating systems should also feel free to send us screenshots captured in other formats.

USING LEGACY FILE FORMATS

Q I want to be able to open and edit documents in old file formats – Lotus 1-2-3, Ami Pro and so on. Until my recent retirement, I was able to use a computer at work to achieve this. I'm now dependent on newer versions of Microsoft Office and WordPerfect, which don't seem to support these file types. I'm currently using Windows XP, but would like to replace my laptop with an Apple MacBook. ***Dick Harris***

The best solution for keeping these legacy file formats alive is to use virtualisation software. It's a similar situation to the one detailed on the previous page, where access to GWBasic is required in Windows 7 64bit.

You can continue to run old programs on a new PC by setting up a virtual machine. This allows you to run older applications within a virtual environment. Think of it as running one of the old office PCs on your home computer in virtual form.

To make this work, however, you would need to transfer the original programs over to the virtual PC. This may be tricky if legacy media such as floppy disks are to be used, and even more difficult if you don't have access to the original software.

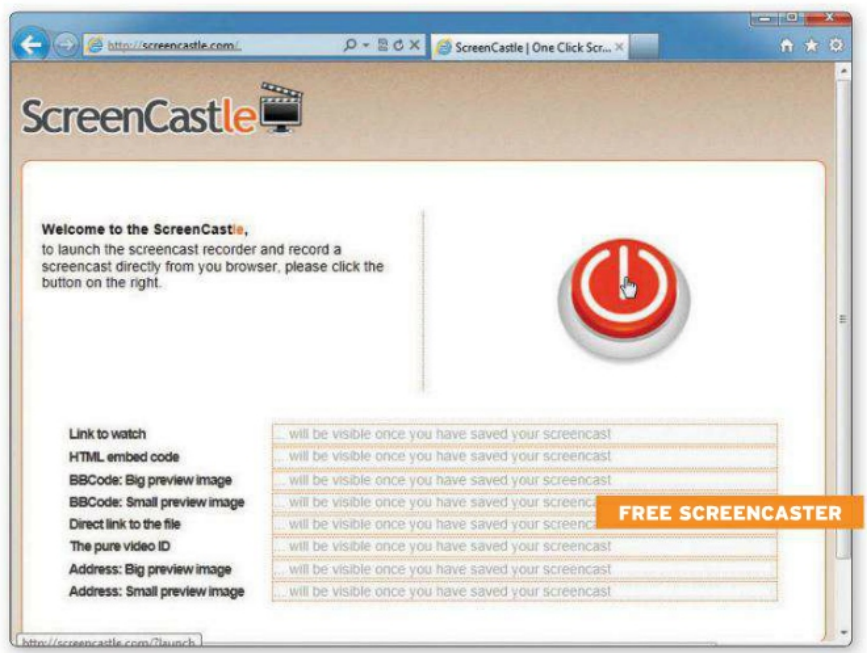
A better long-term solution may be to convert the files into a newer format. This may be the most time-consuming option, since you'll need to find a converter for each type of file you wish to use. Of course, once you've converted the files you won't need to repeat the task.

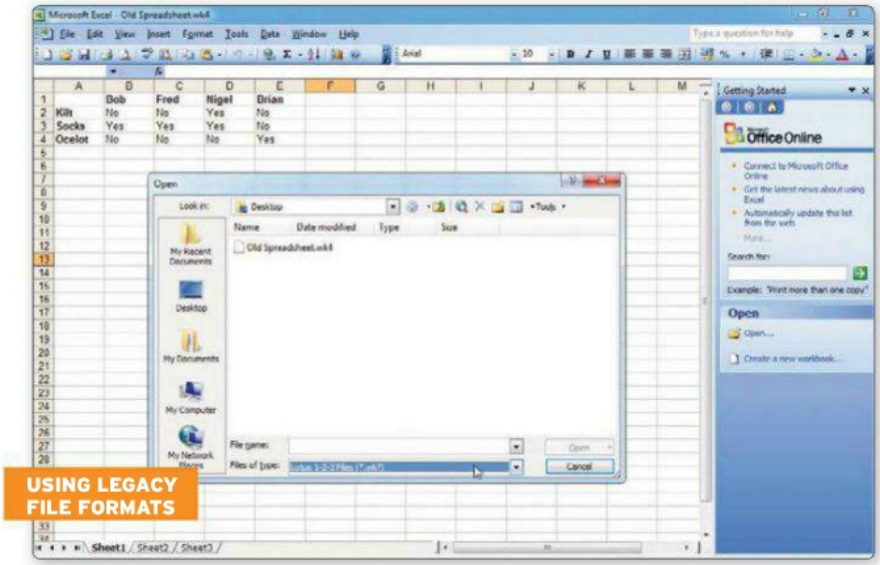
As time goes on, converters that are compatible with the latest versions of modern applications become more difficult to find. For example, the Ami Pro converter that Microsoft provided for use with Word 2000 is no longer available for newer versions of Word.

And whereas older versions of Microsoft Excel supported the use of Lotus 1-2-3 .WK4 files, newer versions of Office do not. You may find you have to seek out versions of software that bridge the gap between your two chosen file formats.

In the case of Lotus 1-2-3, you will need a copy of Excel between version 7.0 and Excel 2003 to convert the .WK4 files to a format that can then be loaded into a modern version of Excel.

Alternatively, look for a copy of the latest version of Lotus SmartSuite. SmartSuite and Office 2003 can still be purchased from Amazon (see tinyurl.com/732pean and tinyurl.com/6qy43mm).





USING LEGACY FILE FORMATS

According to IBM's support site, Lotus SmartSuite will run on Windows 7, even though it was designed to be compatible only with Windows versions up to XP.

If alternative versions of these programs aren't available, conversion packages such as ABC Amber Lotus Converter (head to tinyurl.com/bnL3n) can convert Lotus 1-2-3 files to an Excel-friendly format without either application needing to be installed on your computer. A demo version is available, but you must pay to unlock the software's full functionality.

Graham Mayor, a member of Microsoft's Most Valuable Professional team, runs a site containing free file converters for older formats. See tinyurl.com/dga3d.

An Ami Pro converter for Word is listed among those found on this site, including a version for Windows 7 64bit.

The move to Mac may mean that any Windows software will need to be run under emulation utilities such as Parallels Desktop, or you'll need to dual-boot Windows using Boot Camp. In either case, you'll need to buy a Windows licence. However, the number of conversion options available to you may actually increase, since you'll also be able to run Mac software that's incompatible with Windows operating systems.

Unfortunately, whichever method you choose, such file conversions are often rather irksome. Although you may get lucky in finding free converters for many file types, you may also find that certain features of the original format aren't supported. You will need to check that any documents you convert continue to function correctly. Finding a copy of the original software is the best way to ensure this.

CONTACT US

Email your Helproom questions to helproom@pcadvisor.co.uk. Please use 'Helproom' as the subject header and give your full name, the operating system you're using and other product details. We will let you know by email if your query has been selected for inclusion in these pages. If your query is urgent, you may find it useful to visit our forum at pcadvisor.co.uk/helproom.

Helproom aims to give you the best assistance possible. But, given the limitations of this type of advice, we can't guarantee what we say will work and we can't accept responsibility for any damage arising as a result.

Always back up your system before you make any changes, including software installations.

Please note that we are unable to respond to letters or telephone requests, but we will endeavour to answer queries submitted by email or via our Helproom forum.

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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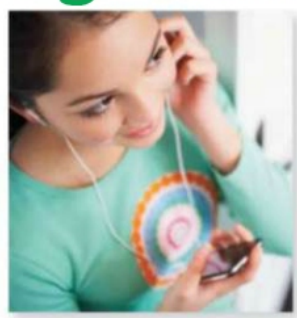

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Collaborative whiteboarding

Physical distance between you and a colleague needn't be a barrier to idea-generation. Sandra Vogel explains the benefits of whiteboarding

There are many instances when the ability to remotely collaborate on a project with a colleague is a real boon. The same is true outside of paid work, too. But people don't always need to be a long distance apart for web-based collaborative working to be useful. Many voluntary and community projects and activities involve people who can't always meet up to discuss and share their ideas, even when they live very close to each other.

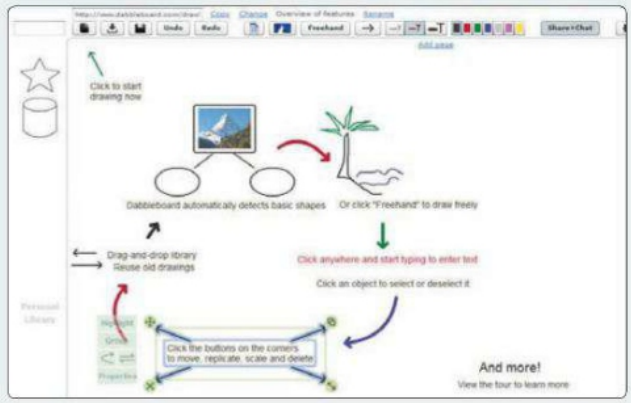
Students working on projects may find it's often more convenient to get together using a computer than to meet in a physical space, for example. And family members sharing the workload of putting together a family tree or organising a reunion can find the web offers a useful way to share ideas.

The ability to access an online repository of collective ideas can be more reliable than expecting one individual in the group to capture, organise and share information on behalf of everybody, too.

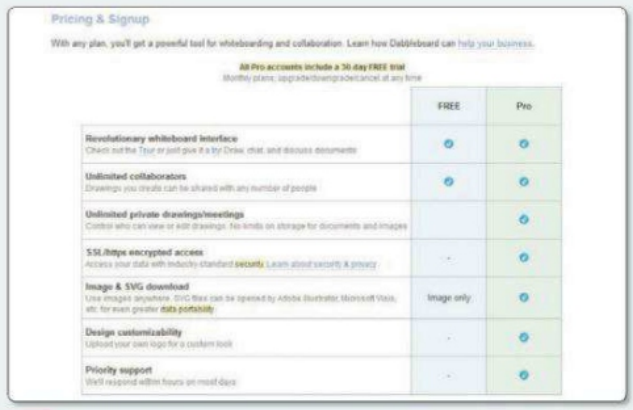
When we think of 'collaborative working', we tend to imagine document-sharing systems such as Google Docs. But what about idea-generation- and brainstorming-type activities? That's where whiteboarding comes into its own. Such online services allow for the capture of freeform ideas and aid the generation of new projects by bringing together a group of people's thoughts, all in one place.

Over the following few pages, we look at two online whiteboarding services, each with a slightly different approach. Dabbleboard, the subject of our first workshop, is a freeform system that lets you create and capture ideas visually; Writeboard, meanwhile, concentrates on shared text creation. Both services have a place in the arsenal of any group wanting to share creative processes.

VISUAL BRAINSTORMING WITH DABBLEBOARD



START If you want to do more than just write text documents that you can share with others, dabbleboard.com offers some graphically rich collaboration methods. Click Get Started, then look for the Start icon at the top left of the following screen. Click this, then choose New drawing to begin.



4 You'll need to sign up if you want take advantage of all of Dabbleboard's features. These include multiuser groups that let you share access to an unlimited number of whiteboard projects. With the free account you can still share drawings with other people and download SVG image files of your drawing.

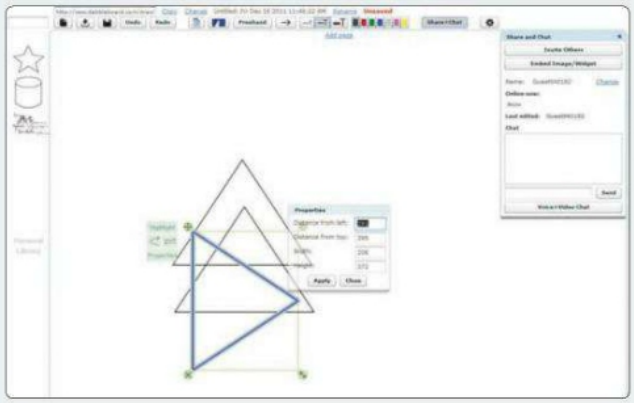
OTHER WHITEBOARDING SERVICES

Several online whiteboarding services are available, where they are aimed at the gamut of users from professional to casual, with each offering different features.

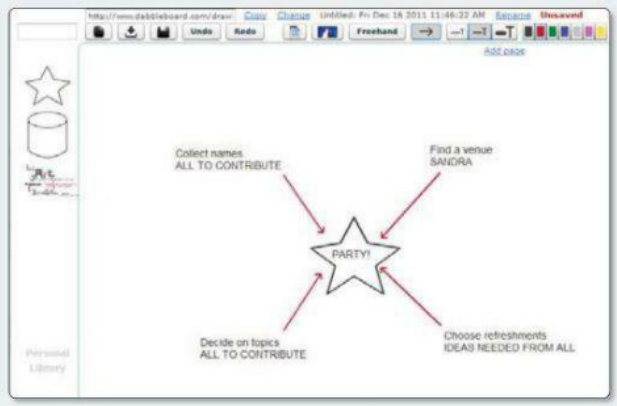
We like Groupboard.com (right), which can be embedded to a website or runs on your own web server.

Twiddla.com is another good option; as with Dabbleboard and

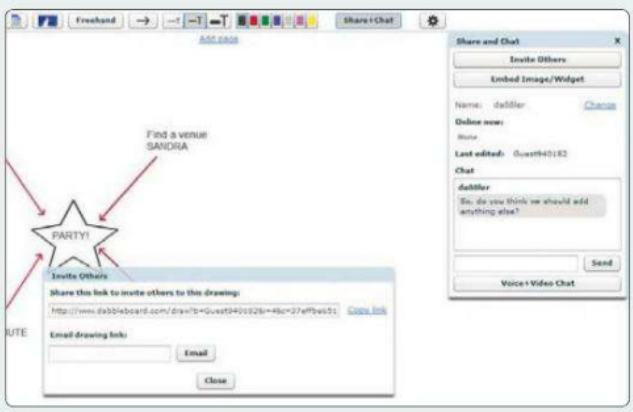
Tech Help



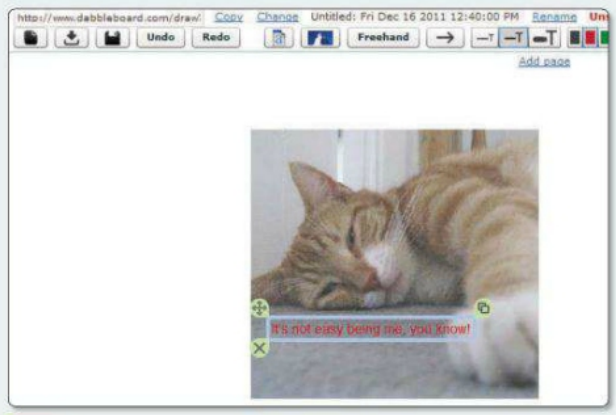
2 Use the mouse to draw shapes onscreen. Dabbleboard does its best to recognise your doodles and turn them into regular squares and triangles. Click a shape and drag its four corner icons to resize it, copy it and move it around the screen. A pop-up toolbox also lets you rotate the shape.



3 Click anywhere to bring up a text box that you can simply start typing into. You can copy, move and delete text, and you can add symbols and apply basic formatting by clicking to select a text box. You can also put text into boxes, or connect text boxes with arrows.



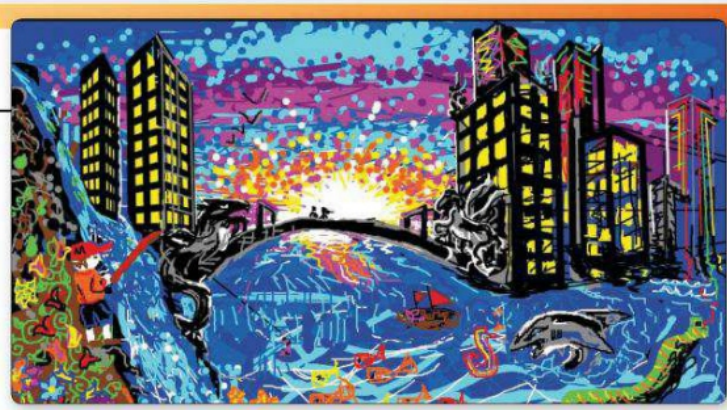
5 Even without signing up you can chat with other people about a drawing by inviting them to join a chat session by email. This allows you a measure of collaborative working if you simply want to test the system before signing up for an account. Click the Invite Others box to the right of the screen.



6 Other tricks you can try using the free account include importing documents and photos. These appear on the whiteboard as images that can be drawn over – we've added an editable caption box. To do the same, find and click the appropriate icon on the toolbar at the top of the screen. ☒

Writeboard, it works through a browser. A 'sandbox' lets you try out the service before signing up, and its graphically rich user interface makes Twiddla easy to explore and experiment with.

If you want something a little more art-based, FlockDraw.com (right) could be ideal. This free service is designed specifically for painting and drawing. 'Lobby' areas, which you simply join and begin drawing, mean FlockDraw has the potential to be as useful for children separated by miles as it is for art students.

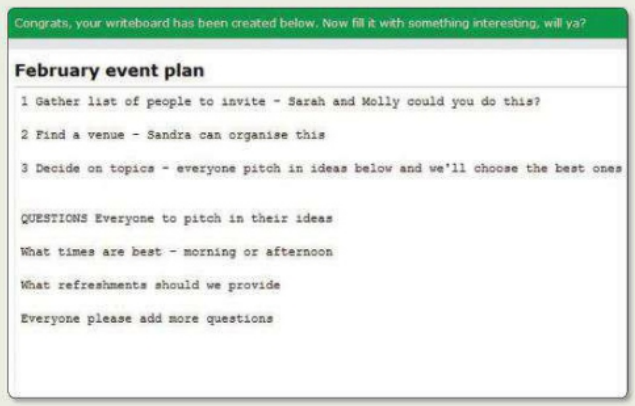


SeanSwift14

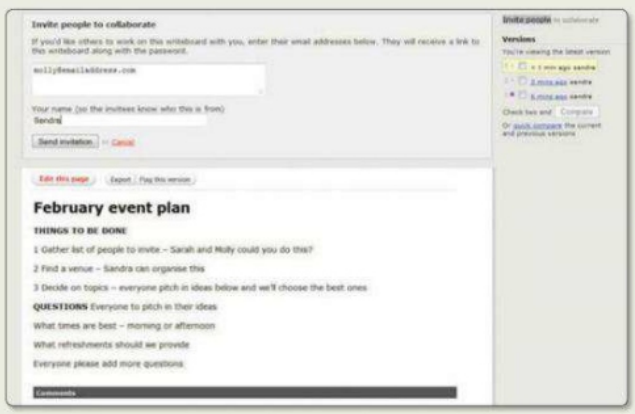
SHARING DOCUMENTS WITH WRITEBOARD

START

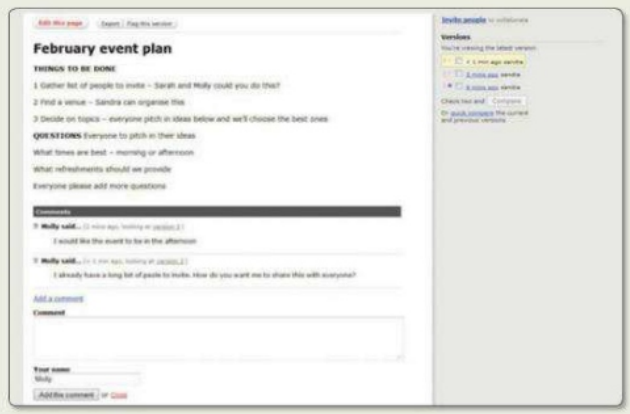
Writeboard is ideal for collaborating on text documents. Head to writeboard.com and create a document. Fill in the three fields on the home page with a name for your writeboard, a password to access it and your email address. Click to agree to the terms, then 'Create the Writeboard'.



2 Now you can get started with creating your document. Writeboard is based around text, and you simply type into the large white box shown onscreen. You might want to start by outlining a document, adding in specific questions for other people, or you could take another approach that suits you.



5 You can now invite other people to collaborate with you on the document. Click Invite people at the top right of the screen, then fill in the form with their email address and your name. Click Send invitation. The recipient will get an email containing a link to the writeboard and a password with which to access it.

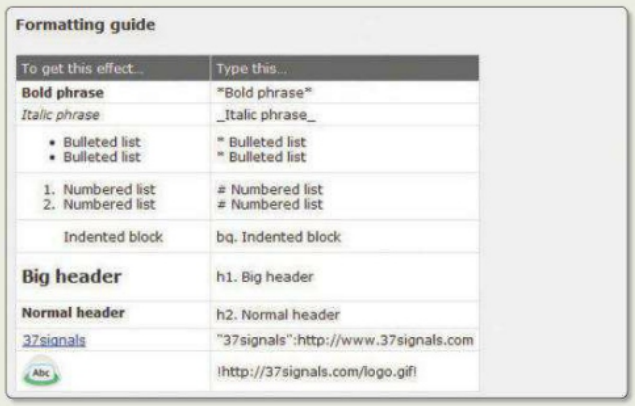


6 Others can add comments to the end of a document that are readable by anyone with access to it. They can also click 'Edit this page' at the top of the screen and add their comments to the main body of the document. They must remember to click 'Save as the newest version' when they have finished.

THE BENEFITS OF ONLINE WHITEBOARDING

You might be wondering why you would need to bother with online whiteboarding services when you can quite easily use Google Docs, but we think they offer a few advantages. For example, you get immediate group access to graphics-rich environments, which are ideal for brainstorming and fleshing out ideas; built-in chat features add to their flexibility in this respect.

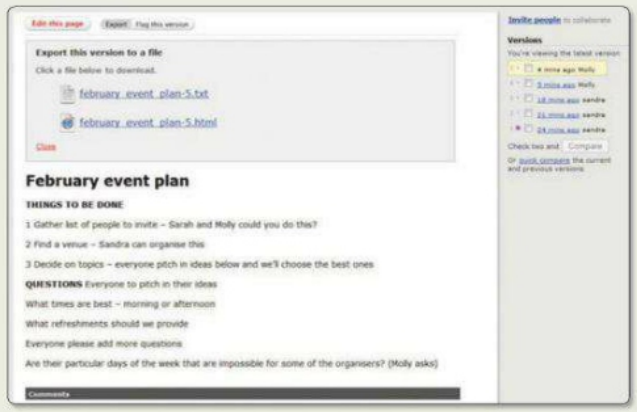
A user-friendly interface means you need no prior experience to get started on a project, and inviting others to join you is as quick and easy as firing off an email. Collaborations can be on a one-off basis, with each new version of a document automatically saved for easy backtracking. Importantly, once a project is finished, you can download it for use offline.



3 Writeboard offers a few basic formatting features, which you can apply by inserting special codes into the text. To make a chunk of text bold, for example, bookend it with * characters. The formatting will be visible after you click Save. Click the formatting guide link to the right of the screen to see other codes you can use.

4 Enter your name below the document so other people will know who was the last person to add to or amend the document. Don't forget to save the writeboard – click 'Save this writeboard' below the document. When you make subsequent edits, you'll instead need to choose 'Save as the newest version'.

7 The revision history of a document is visible in the right panel. Click on any version of the document to view it. If you decide to stick with an older one, simply click 'Revert to this version'. You can compare two versions by selecting them and clicking 'Compare'. Any changes are highlighted onscreen.



8 If you want to export a document created in Writeboard so that you can then edit it in a word processor or add it to a website, click the Export button at the top of the screen. Writeboard offers you two versions of the file to download: a text version and an HTML document. Simply click your preferred version. ☒

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Get to grips with Chrome Web Apps

Tom Norton ransacks Google Chrome's Web Store for the third-party themes, extensions and games most worthy of your attention

Back in 2008, a pricey and far-reaching ad campaign, which extended to magazines, TV and even London's Tube stops, ensured that Google's Chrome browser was thrown well and truly into the public consciousness. So prevalent was the coverage, at one point it felt as though the billboards were following me to work.

But say what you will about Google's overbearing ad tactics, its Chrome browser is speedy, efficient, and came with just the right amount of frills. By October 2011, Chrome was used by more than 200 million people.

Determined to keep things fresh, Google released the Chrome Web Store, complete with extensions, themes and games, a little over a year ago.

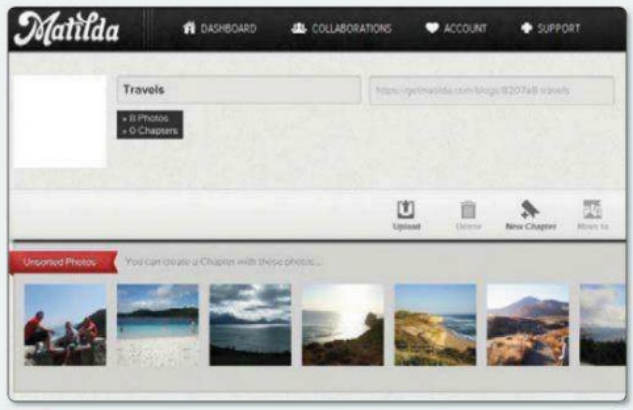
The Web Store has since amassed a huge range of third-party add-ons. You'll need to be running version 8.0 or later of the browser and be logged into a Google account to access it.

On the store's home page is a selection of featured apps and extensions – all are rated 3.5 stars or more, and the most popular are tagged with '100,000+ users'. These extend from irreverent – albeit addictive – games, to education and finance apps, and some impressive weather and news widgets. The sports section has a US focus, but you can expect this to change rather rapidly – Chelsea FC has already waded into the Chrome Web Store.

Over the following pages we'll explain how to reap the benefits of Chrome's Web Store. You need only install the browser and log into your Google account to begin. Our first workshop introduces the Matilda app, with which you can create online albums; the second explains how to browse Tesco's online store as a web app. We also look at the free extensions, themes and games worthy of your attention.

CREATE ONLINE ALBUMS WITH MATILDA

START Of the wealth of photo apps available in Chrome's Web Store, we were most impressed by Matilda. This simple but brilliant app can be found in the 'Social and Communication' section, and specialises in simplifying the organising, synchronising, collaborating and sharing of your photos online.



4 Sharing albums with your friends is simplified with Matilda. To allow others to contribute images to one of your existing albums, click the Collaborate button. Matilda offers a URL that you can include in an email. The recipient doesn't even need a Matilda account to add their images to your album.

GOOGLE CHROME EXTENSIONS

One of the most compelling aspects of the Chrome Web Store is its useful and easy-to-install extensions. Similar in concept to the Extensions offered by Mozilla Firefox, these can make subtle but important changes to your web-browsing experience.

Annoyed by the barrage of adverts appearing every time you watch a YouTube video? Download the YouTube extension and ads become a thing of the past.

Job agency Monster's nifty Chrome extension automatically checks for vacancies posted on its own website, and takes into account all the other sites you visit. So if you're fond of wasting time

Tech Help

2 Install the app and you'll be greeted by Matilda's home page. You can scroll down to learn more about the various features the app offers, or cut to the chase and click the 'Sign Up Now' button to register your account. This is straightforward, and requires only an email address and a password.

3 Create an album on the app's Dashboard. You can store up to 200 photos per album, and each album can be divided into various chapters. As well as offering an Upload function for adding photos from your hard drive, Matilda also supports drag-and-drop from Windows Explorer.

5 With your photo album complete, Matilda offers to publish your creative efforts to a blog. This process is largely automated, provided that your album is sorted into chapters. Matilda builds the blog on your behalf, although you can add your own text and themes. You can then send it by email to family and friends.

6 Matilda is also able to sync with an iPhone. Take a picture on your phone and it'll automatically upload it to the web app. This automatic synching also works in the opposite direction. Matilda does a good job of dealing with conflicts when changes are made on the phone and in the app simultaneously. ☒

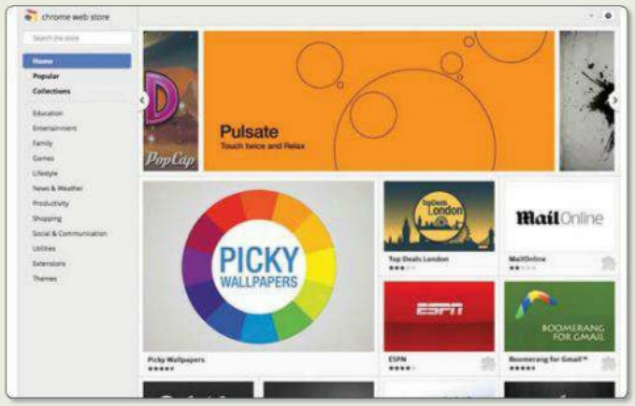
on BBC Sport, you may soon find yourself being apprised of the Beeb's vacancies while listening to the cricket.

Those with a thirst for current affairs will find newspaper extensions ranging from *The Telegraph* and *The Guardian* to the *Wall Street Journal*. *The Independent* gets our vote, thanks to an option to filter the headlines that enter our news feed.

The 'Social and Communication' section features many extensions that each professes to do the same thing better than the last. Among the most useful are Spellcheck, Screenshot and Disconnect Web Anonymiser tools. Without even needing to sign into your Google

account, these extensions can be installed with a few clicks of the mouse. Extensions then sit unobtrusively in the top righthand corner of your now highly sophisticated browser.

BROWSE ONLINE STORES AS GOOGLE WEB APPS

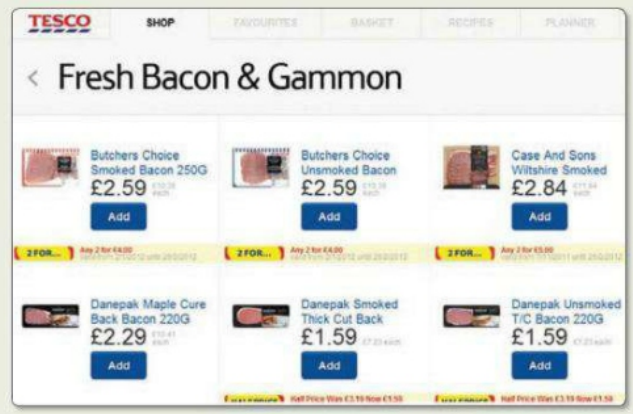


START

Getting started with Chrome's Web Apps is sublimely simple. First ensure you're using Google Chrome 8.0 or 9.0; update your web browser if required. Create or log into your Google account and head to tinyurl.com/6yeeoe6. Click on any of the categories to start exploring the apps and extensions.

2 If you do everything online from the weekly shop to buying birthday presents, the Shopping section will be useful. Here, you'll find apps for eBay and Amazon, plus others specially tailored around deals of the week. Since everyone's got to eat, we'll focus on Tesco's well-structured grocery shopping app.

5 At Tesco.com, simply add your email, postcode and, if you have one, Clubcard number. This will allow you to collect points through the app. If you don't have Tesco Clubcard, it's not enough simply to tick the 'No Clubcard?' box when registering; you'll be promoted to sign up online one at the next stage.

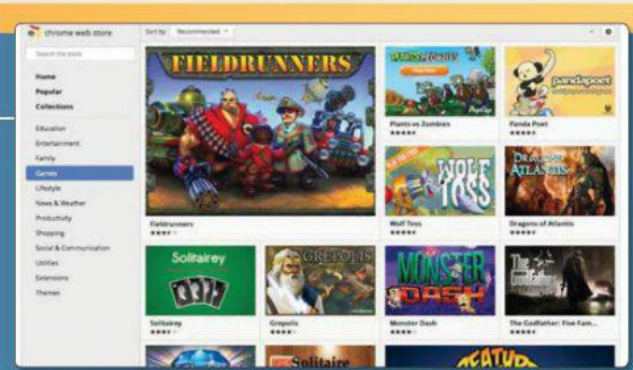


6 You can now start shopping using the app. Navigation is straightforward, with all goods categorised; once you've found the produce you need, simply decide which of the numerous varieties tickles your pallet. Assisted by pictures and clear prices, you can even browse the Offers and Favourites at the top right.

GOOGLE CHROME GAMES

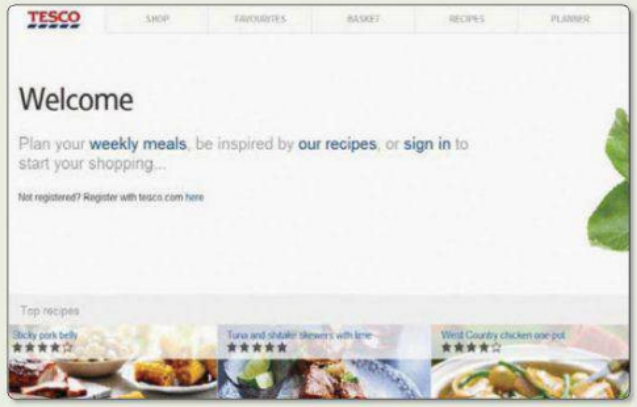
Most of us enjoy whiling away a few spare minutes with one addictive game or another. For fear of losing a few days of our lives playing Angry Birds, we made a point of perusing the Web Store's less well known titles to see whether they could keep us engaged. The Web Store houses a plethora of casual games, from Bouncy Mouse to Bubble Shooter. Once you've tried these fun, but rather limited, games, we recommend learning games such as Hangman and Panda Poet.

Sports aficionados will find the WGT golf game nicely polished, and it offers decent online play. The more tactically minded will find The Godfather: Five Families strategy game a great distraction. And while Striker Manager won't have legions of

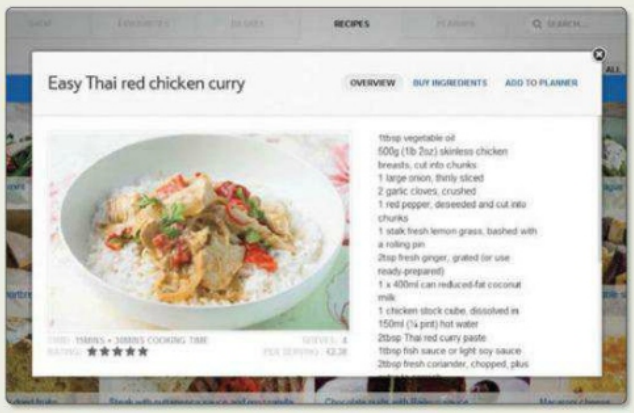


Football Manager fans converting, there are more than enough games available in the Web Store to make that lunchbreak pass by a little quicker. Right, back to Angry Birds.

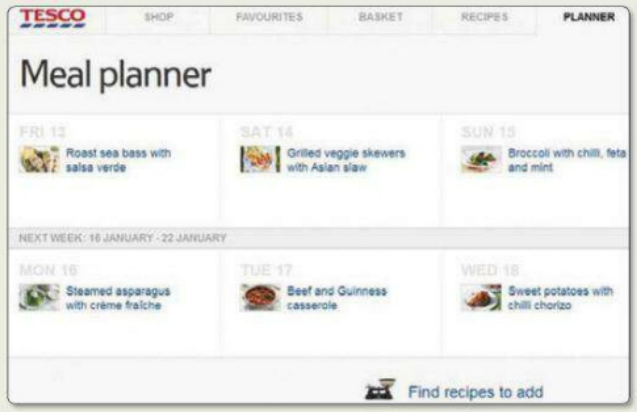
3 Click on an app to access an overview of its features, its rating and the number of people who have already downloaded it. You can also browse the reviews section for other people's thoughts on an app. Screenshots of the app scroll along the bottom of the overview section to give you a visual idea of what to expect.



4 Once you've taken the plunge and decided to add Tesco to your existing arsenal of apps, the Welcome page instructs you on the quickest way to proceed. Existing customers need only sign in; everyone else will need to register at Tesco's website. Simply click on the link provided to redirect your browser here.



7 The standout feature of Tesco's app is its recipe suggestions. With over 1,000 starters, salads and more to browse, you can filter recipes by course or cuisine. Click one you fancy, and it lists each ingredient with a direct link to buy the product. The only thing it doesn't provide is step-by-step cooking instructions.



8 The app also boasts a Meal Planner. Simply browse through the recipes until you find one you like, then click 'Add to Planner'. Should you find you can't wait until the specified day to sample those lamb shanks or roast sea bass, simply drag-and-drop your meals around to create a more preferable eating plan. ☒

GOOGLE CHROME THEMES

Themes are the canvas in which Google's creative side comes alive. The Web Store offers a huge collection of skins for the browser.

Divided into those produced by artists and Google's own creations, there's more choice here than you're ever likely to need.

Google's themes are simplistic, labelled Late Night, Floral Blue and the like, but ideal for those who want a simple background that's more aesthetically pleasing than Chrome's default.

Third-party themes have a more diverse nature, from the downright gaudy to the decidedly glamorous. Catering for almost every taste imaginable, designs range from Japanese illustration and stunning photography, to pictures of your favourite celebrity. Fashionistas will enjoy the stylish contributions from the likes of

DKNY and Marc Ecko, while film buffs can plump for the awesome Matrix-inspired design, among others.

Each theme is added as easily as an extension or game. And when you get bored with a theme, it's replaced just as painlessly.

Enjoy better-quality music on your PC

Uncompressed or lossless audio offers much higher quality than regular MP3. Mike Bedford shows you how to enjoy a better listening experience

The most popular digital audio file formats, which include MP3 and AAC, employ lossy compression. Here, audio is split into frequency bands for each time interval. According to a model of the human auditory system, bands deemed inaudible due to the presence of louder frequencies are discarded or encoded using fewer bits.

Lossy compression results in much smaller files sizes, but reduced quality. Many of us won't notice the difference when listening to our music on a portable player through a tiny earpiece, possibly with traffic noise in the background, but it's most definitely present – especially at the higher compression ratios these codecs support.

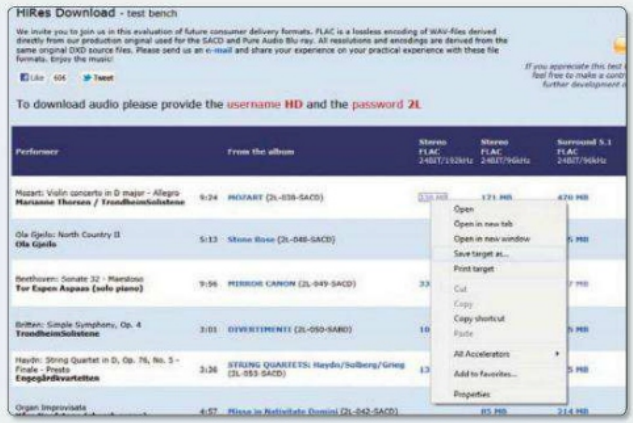
When MP3 was developed more than 20 years ago, storage was expensive and PCs were lucky to have a 540MB hard drive – roughly 2,000 times lower in capacity than what's popular today. Given that MP3 files are typically only 11 times smaller than uncompressed files, we can now afford to store more uncompressed audio. We also have audio formats at our disposal that use lossless compression, which slightly reduces the file size without affecting quality.

It might be easy to stick with the MP3 format when ripping tracks from CD, but all it takes to switch to uncompressed audio is to change a single setting. The ripping process should then take less time to complete, since less compression work is involved, although you won't be able to store quite as many files in the same amount of space.

If you choose to adopt lossless compression for your portable media player, you'll still be able to store around 600 tracks on an 8GB device.

Here, we delve into the practicalities of recording and playing music tracks with small amounts of compression or even none at all.

RIP AUDIO FILES TO A LOSSLESS FORMAT



START Although file-format compatibility depends on the playback software you use, your audio hardware might limit the sampling rate (see *Audio formats revealed*, below). Find out if your hardware is capable of 24bit audio at 96kHz and 192kHz by downloading the relevant test files from tinyurl.com/bn734k.

4 Note that Flac files still won't show up in WMP's library. To correct this, install the upgrade from tinyurl.com/7qLgb6t. Reports suggest that this works differently on some PCs; if Flac files still don't appear in the library, delete all the library entries (but not the files themselves) and allow WMP to rebuild its directory.

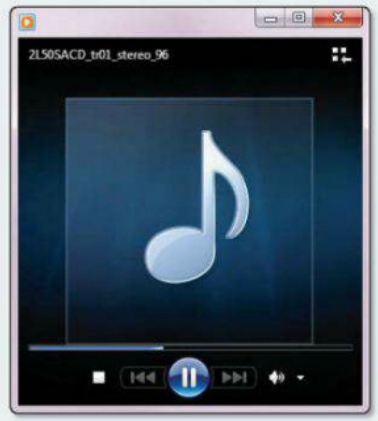
AUDIO FORMATS REVEALED

The most common format for uncompressed audio is Waveform Audio, which is usually referred to simply as WAV. Assuming a decent bit-depth and sample frequency, its quality is unsurpassed, since no information is discarded. Alternative formats can outdo it only by achieving the same quality and reducing the file size.

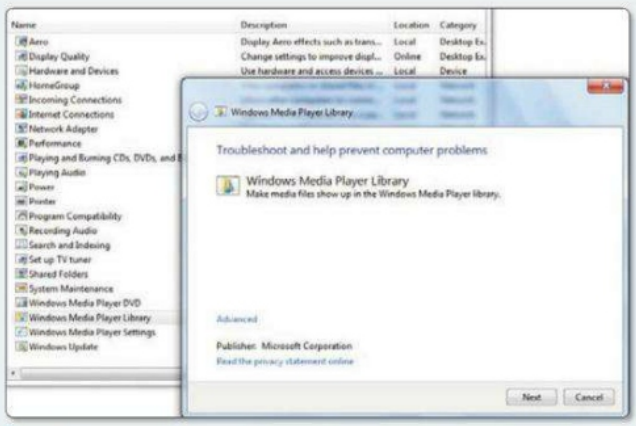
The most common format for compressed audio is MP3. This has various data-rate options, from 8 kilobits per second (kbps) to 320kbps. CD's sampling rate of 44.1kHz and 16bit depth, for example, represents a reduction in file size of between four and 176 times. As a lossy form of compression, though, the quality isn't as good

Tech Help

2 These test files are in Flac format, which isn't supported by Windows Media Player (WMP). Instead, download and install VLC Media Player (videolan.org/vlc). Try listening to the test files; if one or both won't play then you'll either have to stick with lower sampling rates (you can still use lossless compression) or upgrade.



3 You can now play Flac files, but only in VLC. If you prefer to stick with WMP, download and install the Direct Show filters (xiph.org/dshow). Launch WMP and open the sample files. You'll find that you can now listen to Flac files in WMP and various other audio formats will also have become available.



5 If WMP still refuses to include your new files in the library, it's possible that the library has become corrupted. This can be resolved using the appropriate troubleshooter. Type **Troubleshooting** into the Start menu Search box and select 'Troubleshooting'. Select View All, then 'Windows Media Player Library'. Follow the steps given.

6 By now, you should be able to listen to Flac files in WMP or VLC. Chances are, however, the only Flac files you have are the two test samples. Your favourite MP3 download store might offer Flac, but other sites specialise in lossless, high-bitrate audio. Take a look at hdtracks.com and 7digital.com.

as it is with uncompressed audio, particularly at the lower bitrates.

AAC is a similar lossy format, although it's estimated that the file sizes are about two-thirds that of MP3 for the same quality.

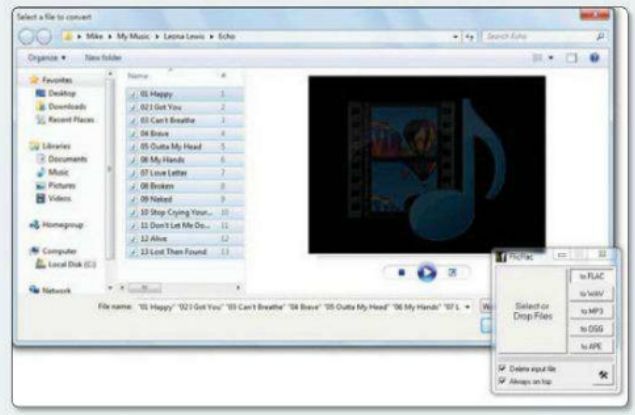
The two most common formats that use lossless compression (and sound as good as WAV) are Free Lossless Audio Codec (Flac) and Apple Lossless, often referred to as Apple Lossless Audio Codec (Alac).

Also important to the audio quality are the sampling rate and bit-depth. These are measures of how many times per second the audio was sampled during recording and how many bits were stored per sample. Files ripped from CD are fixed at 44.1kHz and 16bit, but in selecting music for download you should look out for higher quality sampling (such as 48-, 96- or 192kHz at 20- or 24bit). WAV, Flac and Apple Lossless all extend support beyond 44.1kHz/16bit.

7 Flac downloads are still a rarity, but you can rip CDs using the format. You'll be limited by the CD's 16bit, 44.1kHz sampling rate; even so, by using Flac instead of MP3 you'll preserve a CD's audio quality. In WMP, select Tools, Options. Select WAV (lossless) under Format on the Rip Music tab.

8 Rip tracks from CD in the same way as you would if you were storing them in Windows Media Audio (WMA) format. If you're making new, higher-quality rips of tracks that you've previously ripped in another format, things will get less confusing if you rip them to a different folder.

11 Flac files are typically around 50 percent the size of WAV files of the same sampling rate, but sound just as good. If you want to save disk space, convert your WAV files to Flac. Download and unzip FlicFlac (tinyurl.com/79khzev). There's no need to install the program; simply double-click FlicFlac to launch it.



12 In FlicFlac, ensure the 'to Flac' button is depressed and 'Delete input file' selected. Click within the area labelled 'Select or Drop Files'. When the 'Select a file to convert' window opens, select the file(s) you want to convert. We recommend you convert multiple files simultaneously, one album at a time.

HIGH-QUALITY HARDWARE

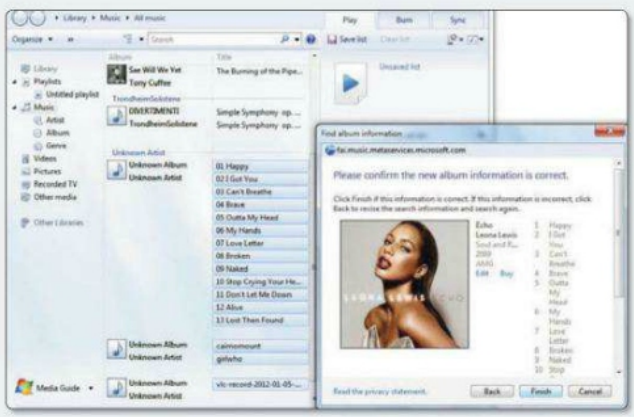
For many years, hi-fi purists insisted that the earlier a component is in the playback chain the more important it is. The implication of this is that the CD player (or optical drive) is more important than the amplifier (or sound card) which, in turn, is more important than the speakers.

Working on this basis, if you want to improve the audio quality of music playback on a PC, the first line of attack should be to move from a lossy to a lossless format. While we wouldn't disagree that this is vitally important, it would also be wrong to suggest that the hardware is unimportant. In fact, it could well be that you won't notice the improvement provided by better-quality audio until you upgrade from the cheap audio hardware bundled with most PCs.

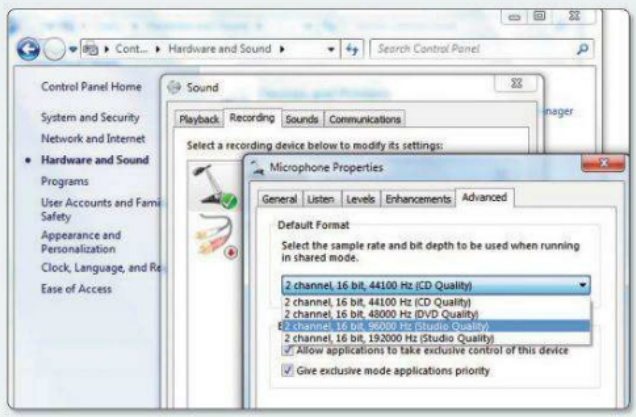
The best approach for listening to high-quality audio is to route the audio from your PC to a decent hi-fi system, taking the output from as early as possible in the playback chain.

9 Your WAV files can now be played in WMP in just the same way as MP3 or WMA – hopefully you'll notice an improvement in audio quality. If you struggle to notice a difference, however, it may be that your audio hardware isn't up to scratch. See *High quality hardware* for tips on upgrading.

10 Before continuing, take a look at your WAV files in Windows Explorer. You'll find they're huge. While MP3 files are typically 2MB to 4MB, depending on the length and bitrate, WAV tracks will often be around 40MB. If you're happy with storing such large files, skip to Step 14 for advice on recording your own lossless audio.



13 Having converted WAV to Flac, it's likely that your files will be missing the artist information and album artwork. If this happens, right-click the album in WMP's library and select 'Find album info'. If it doesn't find it automatically, enter the name of the album when the Search box appears and select it from the results.



14 Windows' Sound Recorder lets you record high-quality audio from a microphone. Click Start, Control Panel, 'Hardware and Sound', 'Manage audio devices'. Select the microphone and choose Properties on the Recording tab, then select a sampling rate on the Advanced tab. After recording, convert the WAV file to Flac. ☒

If you really do want to listen to music on your computer, though, the easiest and cheapest upgrade would be to get a better-quality speaker set (find reviews at tinyurl.com/7jLskj2). Don't ignore your sound card (or chipset) and its associated amplifier; consider upgrading this to an external sound adaptor.

Consider a hardware upgrade to make the most of uncompressed or lossless audio

Software editor:
Letitia Austin
dvd@pcadvisor.co.uk

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Uniblue DriverScanner 2012

FULL PROGRAM

ONLINE REGISTRATION REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 202\ Uniblue DriveScanner 2012 and open the install file

Online registration required: follow the links during installation

System requirements

500MHz processor; Windows XP/Vista/7; 256MB RAM; 200MB hard-disk space; 800x600, 16bit colour screen; web connection; Internet Explorer 6.0 or later

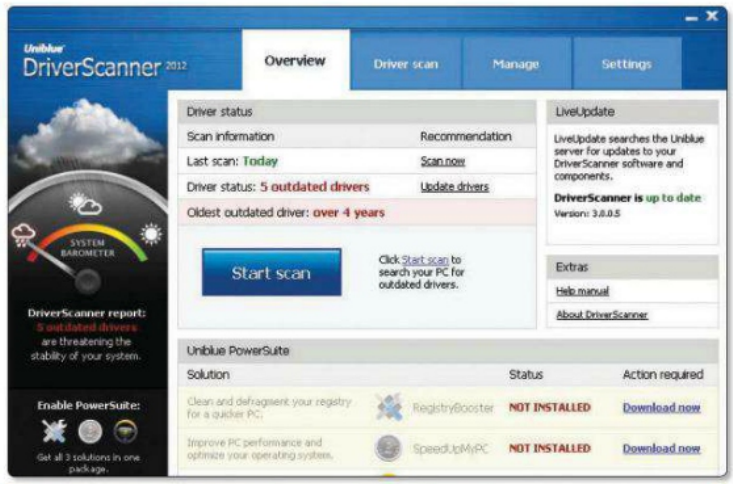
Updating drivers is not just an important part of PC maintenance, but the first port of call when PC hardware acts up. It's a reliable way of increasing your computer's stability and performance.

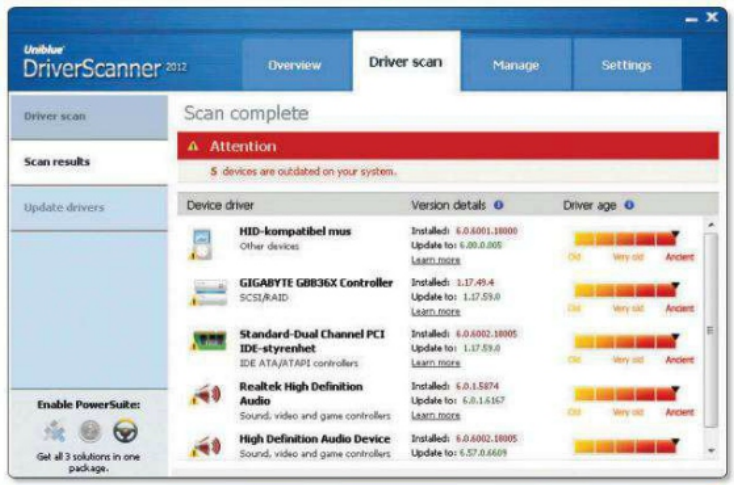
Produced by device manufacturers, drivers are essential for Windows to be able to communicate with your PC. First-generation drivers can be riddled with problems, and updates can remove the bugs and improve the way a device functions. The more recent the driver, the better your device will run and your computer perform.

Features

Updating drivers ensures that your hardware runs at its best. Although the benefits depend on the specific driver you choose to update, you can expect to see one or several of the following:

- Better hardware compatibility and reduced system conflicts
- Refined device performance
- Fewer bugs and device errors
- New device capabilities or unlocked features
- Better computer performance and stability ☒





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iolo System

FULL PROGRAM (

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ONLINE REGISTRATION REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 202\ iolo System Mechanic 10 and open the install file

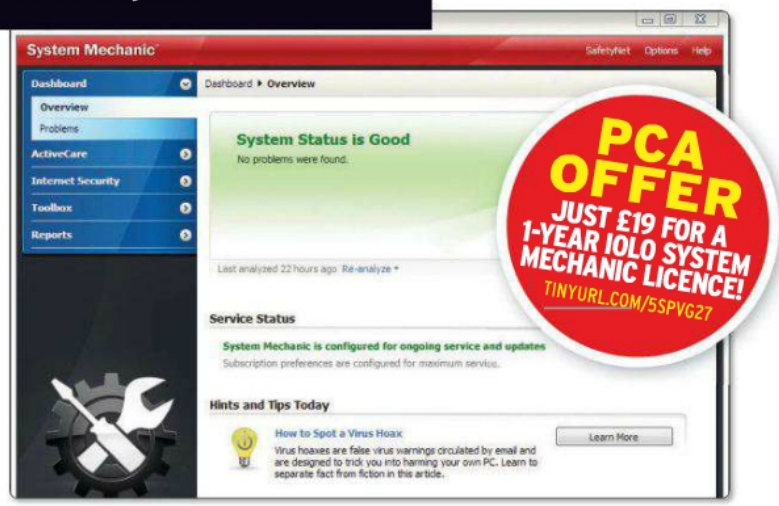
Online registration required: head to tinyurl.com/7fpeftr

System requirements
400MHz CPU; Windows XP/Vista/7; 256MB RAM; 30MB hard-disk space

While a
their once-fast computers slow down over time, few understand the reasons for mysterious crashes, system errors and long boot times. With a quick tune-up, your PC could work like new again.

iolo Labs' research indicates that 98 percent of all slowdowns are caused by Windows becoming clogged with faulty settings, system clutter, and data fragmentation that results from everyday use.

System Mechanic is engineered to breathe new life into old computers by releasing misused CPU cycles, sweeping away clutter and recovering wasted memory. ☒



Trend Micro Titanium Maximum Security 2012

FULL PROGRAM (THREE-MONTH LICENCE)

ONLINE REGISTRATION REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 202\ Trend Micro Titanium Maximum Security 2012 and open the install file

Online registration required: follow the links during installation

System requirements
1GHz processor; Windows XP/Vista/7; 1GB RAM; 500MB hard-disk space

Trend Micro Titanium Maximum Security provides maximum protection for everything you do online. This all-in-one security solution protects you, your devices and your data.

Titanium uses cloud technology to proactively stop viruses and spyware before they reach your computer. It's light on resources and won't slow you down. Real-time updates keep your computer safe from the latest online threats.

Designed for ease of use, this product won't pester you with irritating pop-ups.

Keep your children safe with parental controls. Plus, get alerts to malicious links on social networks. ☒

DISC INSTRUCTIONS

Place DVD in drive. Open the file 'Click here to begin.pdf' for extra information.

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Incomedia WebSite X5 Smart 9.0

FULL PROGRAM (THREE-MONTH LICENCE)

ONLINE REGISTRATION REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 202\ Incomedia WebSite X5 Evolution 9 and open the install file

Online registration required: head to tinyurl.com/774zLc7. Expires 31 May 2012

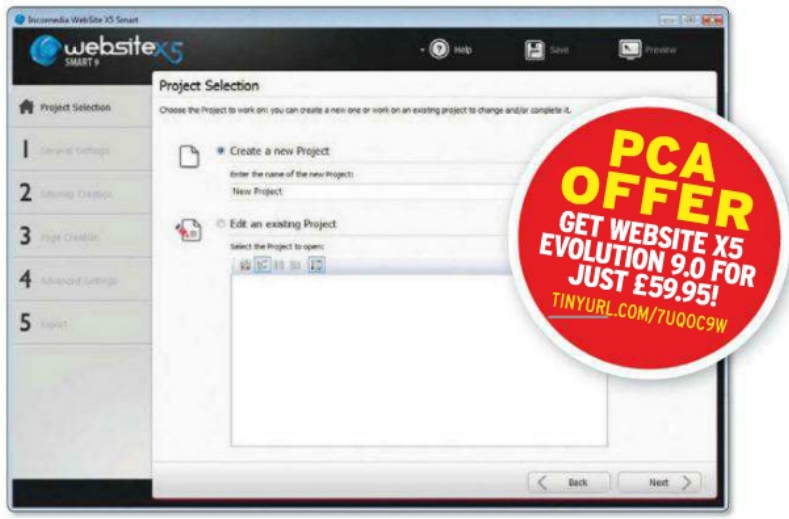
System requirements
Windows XP/Vista/7; 512MB RAM; 1024x768 screen resolution; web connection

WebSite X5 lets you create a good-looking website in five simple steps, with no programming knowledge required. Its intuitive graphical user interface lets you check your work as you go, with previews always available and updated in real time.

WebSite X5 gives you tips and advice every step of the way. It guarantees simplicity of use, flexibility and maximum customisation of your work.

Features

- 250 templates
- Custom template editor
- Menu generator
- Embed video/sound
- Embed Flash animations
- Built-in FTP engine for easy uploads to the internet



Serif PagePlus 10.0

FULL PROGRAM

ONLINE REGISTRATION REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 202\ Serif PagePlus 10 and open the install file

Online registration required: follow the links during installation

System requirements
Windows XP/Vista/7; 64MB RAM; 100MB hard-disk space; SVGA display

Whether you're a professional designer or desktop-publishing novice, Serif PagePlus is the ideal tool for all your publishing needs. From the creation of marketing materials, business cards and newsletters to posters, greetings cards and invitations, PagePlus has everything you need to create print documents and PDFs more quickly and easily than ever.

Create sophisticated designs: Design documents and combine text and graphics elegantly, with simple drag-and-drop functionality.

Impressive text handling: Includes powerful features for managing, editing and laying out text.

Work with data: Import data from spreadsheets, insert/format tables, and perform mail/photo merges.

One-click object and text effects: Tools for adding patterns and textures, 3D objects, and warping.

Press-ready PDF output: Export your document in a format that can be opened and printed on any PC.

Web-compatible: Create a website by saving your documents as HTML.

Split-Second Accuracy!

1 Second

Don't let life pass you by. Utilising a 14.4 MP CMOS sensor that captures every detail, the GE G100 and the E1410SW give you some great features including:

- High speed continuous shooting at a rate of 10 frames per second at full resolution.
- Multi-Exposure - shoot up to 6 images on one frame; great for analysing the action.
- Object Tracking - follow a moving subject ensuring pin sharp pictures.
- High Dynamic Range + blends 3 images to give you that perfectly exposed shot.
- Pan-Capture Panorama - create impressive panoramic photographs.

G100
15X Zoom
14.4 MP CMOS Sensor
28mm - 420mm
Full HD - 1080p Video
3" Hi-Res LCD

CMOS sensor
high performance

E1410SW
10X Zoom
14.4 MP CMOS Sensor
28mm - 280mm
Full HD - 1080p Video
3" LCD

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Letter from the Editor

PC Advisor hit the news stand in 1995. Not every family had a PC, and if they did it was a noisy beige box used for spreadsheets, newsletters and the occasional game. Surfing the net mostly meant using dialup: snarling up the phoneline to find atrocious-looking websites. Such days are gone.

> "There's no better way to get expert advice"

In the past 16 years, we've covered the inexorable rise of the internet, an exponential increase in computing performance, and the birth of the mobile- and cloud-computing eras.

Along the way we've seen false starts and spats, technology successes and failures, and malware that refused to die. We've watched as Microsoft slowly got to grips with PC security, Google swallowed the world whole, and Apple defied those who believe that substance always beats style (it doesn't).

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Each month we review hundreds of computer products, cover thousands of news stories, and write yet more features and expert guides. And to the latest issue of the magazine we bring only the most interesting and important of each.

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Matt Egan, Editor, PC Advisor
matt_egan@pcadvisor.co.uk

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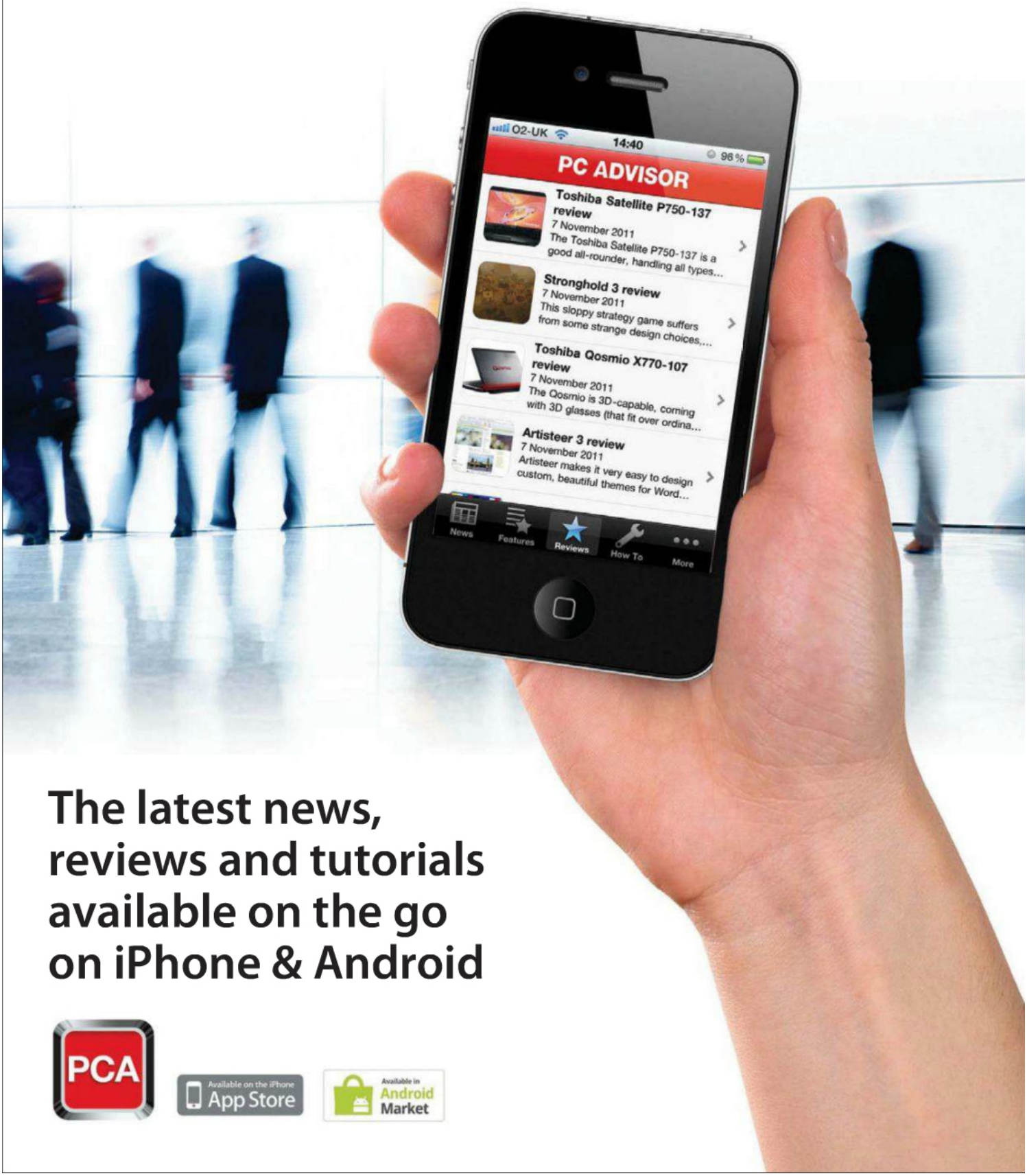

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PC Advisor's charts rank and rate the best products every month. If you're looking for the latest Best Buys and Recommended kit, look no further than our 100-plus reviews

Top-ranking chart entrants are eligible for either Best Buy or Recommended awards. A Best Buy takes the top spot, thanks to a winning combination of features, performance and value for money, while Recommended products are excellent alternatives. Almost as good, they offer great value, quality and performance. Chart placings are based on a calculation of features and performance compared to price, so the highest-scoring products usually also represent the best value for money.

BLU-RAY DRIVES

Blu-ray writers and blank recordable discs are coming down in price, making them a more viable medium for long-term data storage and backup. We rank five of the best internal and external Blu-ray drives money can buy – see page 141.

PC ADVISOR BEST BUY

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All-in-one PCs

Family PCs

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Netbooks

Laptops

Security software

Tablets

Projectors

Printers

Blu-ray drives

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Digital camcorders

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Graphics cards

Prices

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Laptops up to £600
£601 to £1,000
£1,001 and over

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Printers under £150
£151 and over

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£151 and over

Flat-panels
Flat-panels under £200
£201 and over

Prices listed are those quoted by the distributor or manufacturer and include VAT. They are intended only as a guide and you may see products on sale for less or more than our quoted price.

If you're interested in purchasing one of the products reviewed here then please contact the manufacturer or supplier directly, mentioning both *PC Advisor* and the issue in which you saw the product. If it won't supply the product as reviewed, contact us at letters@pcadvisor.co.uk.

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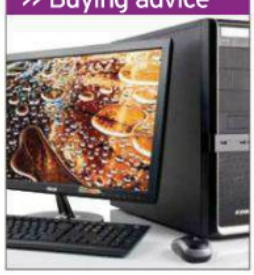
Top 5 All-in-one PCs

	Apple iMac 21.5in	Sony Vaio VPC-L22Z1e	Asus ET2400XVT	HP Touchsmart Pro 610	Sony Vaio VPC-J21L8E
Price	£999 inc VAT	£1,600 inc VAT	£1,277 inc VAT	£1,200 inc VAT	£850 inc VAT
Website	apple.com/uk	sony.co.uk	uk.asus.com	hp.com/uk	sony.co.uk
Build rating	★★★★★	★★★★½	★★★★☆	★★★★☆	★★★★★
Features rating	★★★★½	★★★★☆	★★★★☆	★★★½☆	★★★★☆
Performance rating	★★★★½	n/a	n/a	★★★★☆	★★★☆☆
Value rating	★★★½☆	★★½☆☆	★★★☆☆	★★★½☆	★★½☆☆
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★½☆	★★★½☆
Processor	2.5GHz Intel Core i5-2500	2.2GHz Intel Core i7-2670QM	1.73GHz Intel Core i7-740QM	3.2GHz Intel Core i5-650	2.3GHz Intel Core i5-2410M
RAM	4GB DDR3	8GB DDR3	6GB DDR3	6GB DDR3	4GB DDR3
Storage capacity	500GB hard drive	1TB hard drive	1TB hard drive	1.5TB hard drive	1TB hard drive
Screen	21.5in IPS glossy LED-backlit	24in glossy 3D touchscreen	23.6in glossy 3D touchscreen	23in glossy touchscreen	21.5in glossy touchscreen
Screen resolution	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Graphics card	AMD Radeon HD 6750M	nVidia GeForce GT540M	nVidia GeForce GT460M	AMD Radeon HD 5570M	Intel HD Graphics 3000
Video memory	512MB	1GB	1.5GB	1GB	n/a
Wireless	802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	gigabit	gigabit	gigabit	gigabit	gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	4x USB 2.0	2x USB 3.0, 3x USB 2.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 2x USB 2.0
FireWire	✓	×	×	×	×
Thunderbolt	✓	×	×	×	×
HDMI	×	✓	×	✓	✓
Media card slot	SD/SDHC/SDXC	SD/SDHC/SDXC/MS Duo	SD/SDHC/SDXC	SD/SDHC/MS/MS Pro/xD	SD/SDHC/SDXC/MS Duo
Max disc speeds	8x DVD±R, 4x DVD±R DL, 8x DVD-ROM	6x BD-ROM, 4x BD-R, 8x DVD±R, 6x DVD±R DL, 8x DVD-ROM	4x BD-ROM, 8x DVD±R, 6x DVD±R DL, 8x DVD-ROM	4x BD-ROM, 8x DVD±R, 6x DVD±R DL, 8x DVD-ROM	8x DVD±R, 4x DVD±R DL, 8x DVD-ROM
Extras	FaceTime HD webcam, Magic Mouse, wireless keyboard	webcam, wireless keyboard	webcam, wireless keyboard, 3D glasses	webcam, wireless keyboard, TV tuner, Beats Audio, remote	webcam, wireless keyboard
Operating system	Mac OS X 10.7 Lion	Windows 7 Home Premium 64bit	Windows 7 Home Premium 32bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
Power consumption	not tested	87W (idle), 135W (under load)	40W (idle), 78W (under load)	67W (idle), 112W (under load)	41W (idle), 72W (under load)
Fear (Max detail)	100fps	116fps	40fps	72fps	17fps
Stalker (Medium/Ultra)	48fps/not tested	215/125fps	45/26fps	36/22fps	18/9fps
WorldBench 6 score	139	not tested	not tested	122	84
Dimensions	528x189x451mm	608x168x429mm	582x50x495mm	584x103x450mm	525x185x398mm
Weight	9.3kg	12kg	13kg	11.8kg	9.8kg
Warranty	1 year return-to-base	2 years return-to-base	1 year return-to-base	1 year return-to-base	2 years return-to-base
Verdict	• Excellent overall performance score • Superb image quality, but has a smaller, non-touchscreen display • Slick Mac interface • Lacks Blu-ray drive • Thunderbolt port, but no HDMI input • Great graphics	• Extremely impressive performer • 8GB DDR3 RAM onboard • Blu-ray writer & 3D support • Best games performance • 3D 24in touchscreen • Two USB 3.0 ports • Expensive	• Impressive 23.6in touchscreen • Generous 6GB RAM • 1.5GB nVidia graphics • Blu-ray/3D playback (3D glasses included) • Surprisingly poor gaming framerates • Two USB 3.0 ports • 32bit OS	• Solid performer • Generous 23in screen • Nice Beats Audio sub-system • Blu-ray playback • TV tuner • Two USB 3.0 ports • Bulky design	• Attractive styling; most compact PC here • Specs promise more than this PC delivers • Multitouch screen is over-sensitive • No Blu-ray drive • HDMI and two USB 3.0 ports • Onboard graphics mean it's a poor choice for gamers
Full review	tinyurl.com/6276q4s	tinyurl.com/3r9ppq6	tinyurl.com/6Lxtsn4	tinyurl.com/69tvukz	tinyurl.com/42ykrru

>> Buying advice



Family PCs

Desktop PC prices were correct at press time for issue 201 and include delivery. Vendors often honour the price of PCs longer than our onsale date. However, changes in exchange rates and component supply issues mean that not all the PCs listed will be available as specified. These charts are intended only as a guide.

Processor: Intel's Core i5-2500K is a popular CPU, offering excellent performance at a good price. Its 'K' suffix means the chip can be easily overclocked in the EFI, provided that you're also using a motherboard with a Z68 chipset. It also includes integrated graphics, which are adequate for most users. AMD also sells CPUs with graphics built-in – its Fusion chips are faster for gaming than their Intel counterparts, but the trade-off is slower application performance. We like the A8-3850, a quad-core CPU running at 2.9GHz.

Graphics: If you later find integrated graphics aren't fast enough for your needs, it's possible to boost your setup. An AMD Radeon HD 6870 or nVidia GeForce GTX 560

Top 5 Family PCs

	Chillblast Fusion Hotrod	Braebo Ares	Arbico eXcel i5256 VX	Eclipse Solar i525n560Ti	CyberPower Ultra Silent Edition
Price	£799 inc VAT	£611 inc VAT	£699 inc VAT	£849 inc VAT	£999 inc VAT
Website	chillblast.com	braebo.com	arbico.co.uk	eclipse-computers.com	cyberpowersystem.co.uk
Build rating	★★★½☆	★★★½☆	★★★☆☆	★★★☆☆	★★★★☆
Features rating	★★★½☆	★★★½☆	★★½☆☆	★★★½☆	★★★★☆
Performance rating	★★★★½	★★★½☆	★★★★☆	★★★★½	★★★☆☆
Value rating	★★★½☆	★★★★☆	★★★½☆	★★★½☆	★★★☆☆
Overall rating	★★★★☆	★★★★☆	★★★½☆	★★★½☆	★★★½☆
Processor	3.3GHz Intel Core i5-2500K	2.9GHz AMD Fusion A8-3850	3.3GHz Intel Core i5-2500K	3.3GHz Intel Core i5-2500K	2.8GHz AMD Phenom II X6 1055T
RAM	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage capacity	1TB SATA 3Gbps	1TB SATA 3Gbps	1TB SATA 6Gbps	1TB SATA 6Gbps	2TB SATA 3Gbps
Motherboard	Asus P8Z68-V LE	ASRock A75M-HVS	Asus P8Z68-V LX RTL	Asus P8Z68-V LE	Asus M5A97
CPU cooler	standard Intel cooler	standard AMD cooler	standard Intel cooler	standard Intel cooler	Asetek Watercooling
Power supply	650W	500W	500W	650W	500W
Screen	23.6in Asus VS247H	21.5in AOC F22+	23.6in AOC 2436Vwa	23.6in HKC 2412	23.6in HKC 2412
Screen resolution	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Graphics card	Sapphire Radeon HD 6870	AMD Radeon HD 6550D	Intel HD Graphics 3000	nVidia GeForce GTX 560 Ti	Powercolor Radeon HD 6870
Video memory	1GB	n/a	n/a	1GB	1GB
Wireless	none	none	802.11b/g/n	none	802.11b/g/n
USB	2x USB 3.0, 7x USB 2.0	4x USB 3.0, 2x USB 2.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 6x USB 2.0	2x USB 3.0, 4x USB 2.0
Media card slot	×	×	✓	×	✓
Sound card	onboard	onboard	onboard	onboard	onboard
Speakers	Sweex 2.0	Logitech S220 2.1	2x Logitech S120 2.0	Logitech LS21 2.1	Logitech S220 2.1
Case	EZCool A200D Rev 2	Inwin Dragon Slayer	Gigabyte GZ-X6 Black	Cooler Master Elite RC-430	Cooler Master Silent RC-551-KKN1
Keyboard	Logitech Cordless MK260	Microsoft Wireless Desktop 3000	Sumvision USB Wired	unbranded USB Wired	Logitech Wireless Keyboard & Mouse MK320
Max disc speeds	12x BD-ROM, 16x DVD±R, 8x DVD±R DL, 16x DVD-ROM, 12x DVD-RAM	12x BD-ROM, 16x DVD±R, 8x DVD±R DL, 16x DVD-ROM, 12x DVD-RAM	22x DVD±R, 12x DVD+R DL, 16x DVD-R DL, 22x DVD-ROM, 12x DVD-RAM	10x BD-ROM, 12x DVD±R, 8x DVD±R DL, 16x DVD-ROM, 12x DVD-RAM	12x BD-ROM, 16x DVD±R, 8x DVD±R DL, 16x DVD-ROM, 12x DVD-RAM
Operating system	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
Bundled software	CyberLink PowerDVD	Microsoft Office 2010 Starter	BullGuard Internet Security	none	Microsoft Office 2010 Starter
Crysis (Low/Medium)	161/100fps	62/36fps	46/21fps	162/110fps	96/58fps
WorldBench 6 score	172	115	172	169	123
Warranty	2 years collect-and-return	1 year return-to-base	2 years return-to-base	1 year return-to-base	3 years return-to-base
Verdict	• Exceptional WorldBench performance • Great graphics score • 8GB DDR3 RAM • Blu-ray playback and built-in speakers • 23.6in full-HD 1080p display • Great family PC • Power-hungry	• Generous 8GB DDR3 RAM allocation • Great overall performance • Four USB 3.0 ports • Integrated graphics • Blu-ray playback • Limited warranty • Rather bulky design	• Joint-fastest performance in this chart • 8GB DDR3 RAM • 23.6in full-HD screen • No Blu-ray drive • Poor graphics provision • Struggles with more demanding games • Poor keyboard and mouse	• 23.6in full-HD screen • Great performance • Expensive • No Wi-Fi provision • nVidia graphics pick of the gaming crop; best graphics test result here • Quality Logitech speakers • Keyboard and mouse are sub-par	• Most expensive PC here • Superbly built computer • 2TB SATA hard drive offers vast storage capacity • 2.8GHz processor trails the competition • Blu-ray playback • 1GB AMD Radeon graphics
Full review	tinyurl.com/7q3p93n	tinyurl.com/6wm2drq	tinyurl.com/7ssrknr	tinyurl.com/d6qodth	tinyurl.com/88799nw

Ti graphics card can provide ample performance without breaking the bank.

Memory and storage: Consider 4GB of memory and a 500GB hard drive as the minimum required. If you plan to upgrade the storage later, keep in mind that recent flooding in Taiwan has pushed up prices. Things should settle down within a few months, however.

Display: Screen quality is crucial. Look out for in-plane switching (IPS) panels where available, which offer better colour fidelity than budget twisted-nematic (TN) monitors.

Consider a full-HD 24in monitor rather than a get-you-by 21.5in model, especially if you'll be using the PC to watch video.

Multimedia: If you want a computer for watching films and video, listening to music and chatting with friends, a set of speakers is essential. For larger rooms or simply a bigger sound, a 2.1 stereo set that incorporates a separate bass speaker or subwoofer will perform better than a cheap 5.1 setup.

A Blu-ray Disc drive is becoming a more affordable option, but watching films isn't helped by a noisy PC. Quiet, sound-dampened cases can reduce noise. Good-quality CPU coolers can also help.

Software: Beginners may find the automated setup process of systems from larger manufacturers useful, but a lot of unwanted preinstalled software can slow down your PC.

Top 5 Business PCs

	Chillblast Fusion Palomino	Dino PC Plutosaur 2400	Arbico Value 210 MX	Braebo Athena	CyberPower Ultra Triton SE
Price	£499 inc VAT	£499 inc VAT	£399 inc VAT	£383 inc VAT	£499 inc VAT
Website	chillblast.com	dinopc.com	arbico.co.uk	braebo.com	cyberpowersystem.co.uk
Build rating	★★★½☆	★★½☆☆	★★★☆☆	★★½☆☆	★★★½☆
Features rating	★★★★☆	★★★★☆	★★½☆☆	★★★☆☆	★★★★☆
Performance rating	★★★★½	★★★★½	★★★☆☆	★★☆☆☆	★★½☆☆
Value rating	★★★★☆	★★★½☆	★★★★☆	★★★★★	★★★½☆
Overall rating	★★★½☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Processor	3.3GHz Intel Core i5-2500K	3.1GHz Intel Core i5-2400	3.1GHz Intel Core i3-2100	3GHz AMD Athlon X4 640	2.9GHz AMD FM1 A8-3850
RAM	8GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3	8GB DDR3
Storage capacity	500GB SATA 3Gbps	500GB SATA 3Gbps	500GB SATA 6Gbps	500GB SATA 3Gbps	500GB SATA 3Gbps
Motherboard	Asus P8H61-M LE/USB3	Gigabyte GA-H61M-S2P	Asus P8H61-M LE/USB3	ASRock N68C-S UCC	Gigabyte GA-A75-D2H
CPU cooler	standard Intel cooler	standard Intel cooler	Xigmatek Apache	standard AMD cooler	Cooler Master cooler
Power supply	500W EZCool	not specified	500W Ace	500W	450W WinPower
Screen	21.5in AOC F22+	22in Asus VE228T	not supplied	18.5in AOC 931Swl	21.5in AOC F22+
Screen resolution	1920x1080 pixels	1920x1080 pixels	n/a	1366x768 pixels	1920x1080 pixels
Graphics	Intel HD Graphics 3000	Intel HD Graphics 3000	Intel HD Graphics 3000	nVidia GeForce 7025	AMD Radeon HD 6550D
Video memory	n/a	n/a	n/a	256MB	1GB
Wireless/Bluetooth	××	××	××	××	××
USB	2x USB 3.0, 6x USB 2.0	6x USB 2.0	2x USB 3.0, 4x USB 2.0	4x USB 2.0	2x USB 3.0, 4x USB 2.0
Media card slot	×	×	✓	×	×
Sound	onboard	onboard	onboard	onboard	onboard
Speakers	not supplied; add £4	not supplied	not supplied	not supplied	not supplied
Case	Inwin Z637 Micro ATX	EZCool N750D	Gigabyte GZ-M1	Braebo Fides Case	Cooler Master Elite 430
Keyboard	Logitech MK120	Logitech MK120	Sumvision (wired)	Braebo Black USB Keyboard	Logitech MK120
Optical drive	24x DVD±RW	22x DVD±RW	22x DVD±RW DL, LightScribe	24x DVD±RW	24x DVD±RW
Operating system	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit
Bundled software	free utilities	none	none	free utilities	none
WorldBench 6 score	164	150	135	100	119
Power consumption	32W	30W	43W	49W	44W
Warranty	2 years collect-and-return	3 years return-to-base	2 years return-to-base	1 year return-to-base	3 years return-to-base
Verdict	• Performance outstrips the competition • Intel Core i5 processor • 8GB DDR3 RAM • 21.6in display better than others here • Two USB 3.0 ports • Designed for easy upgrades • Over-specified for office use	• Great overall performance • 22in screen is best here • Intel Core i5 processor • Good-looking system • Poor-quality case • Rather noisy • Only 4GB DDR3 RAM • No USB 3.0 ports	• 4GB DDR3 RAM • Intel Core i3 rather than Core i5 processor • Solid overall performance • Two USB 3.0 ports • Media card slot included • Flat-panel display not included • Not ideal for future upgrades	• 4GB DDR3 RAM • AMD processor falls short • Small 18.5in flat-panel with 1366x768-pixel resolution • 256MB nVidia graphics • No USB 3.0 ports • Cheap • Relatively slow	• 8GB DDR3 RAM • 1GB graphics best of group • Middling overall performance • Two USB 3.0 ports • Solidly built • Noisy in operation
Full review	tinyurl.com/bm9q39x	tinyurl.com/ccdrsf5	tinyurl.com/ccckogg	tinyurl.com/huosf5v	tinyurl.com/cf2cqz5

>> Buying advice

Business PCs

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Processor: Provided you have sufficient RAM, any modern CPU will provide enough power for low-level administrative tasks. Intel's dual-core Core i3 chips should provide ample performance for general use and come with integrated graphics, saving you the cost of buying an additional card.

AMD's Llano series of processors, such as the A8-3850, offer value for money, but with performance shifted towards graphics processing rather than general-purpose computing. Our business performance benchmark scores are therefore considerably lower for AMD PCs than Intel systems at any given price.

Processor cooler: We would normally expect a standard processor cooler to be installed,

Top 5 Media PCs

	Chillblast Fusion Avatar	Apple Mac mini	Quiet PC Zeno NT-H67	Cryo PC Alto	Arbico Zippy X35 HD
Price	£799 inc VAT	£896 inc VAT	£1,444 inc VAT	£1,038 inc VAT	£549 inc VAT
Website	chillblast.com	apple.com/uk	quietpc.com	cryopc.co.uk	arbico.co.uk
Build rating	★★★½☆	★★★★★	★★★★★	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★½☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★★	★★★★☆	★★★★☆	★★★☆☆	★★☆☆☆
Value rating	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★☆☆
Processor	3.4GHz Intel Core i5-2500K	2.53GHz Intel Core i5-2520M	3.3GHz Intel Core i3-2125	2.5GHz Intel Core i3-2100T	1.6GHz AMD E-350
RAM	8GB DDR3	4GB DDR3	8GB DDR3	4GB DDR3	4GB DDR3
Storage capacity	60GB SSD + 2TB 3.5in HDD	500GB 2.5in HDD	1TB 2.5in HDD	60GB SSD + 2TB 3.5in HDD	1TB 3.5in HDD
Motherboard	Asus P8H67-M Pro	Apple Mac mini board	Gigabyte GA-H67N-USB3-B3	Gigabyte GA-Z8MA-D2H-B3	Asus E35M1-I Deluxe
CPU cooler	AC Freezer 7 LP cooler	custom active cooler	Zeno heatpipe cooling	passive cooler	integrated fanless cooler
Power supply	BeQuiet	85W Delta Electronics	1000W Zeno	460W Seasonic fanless	150W integrated
Graphics	HIS AMD Radeon HD 6570 with 1GB video memory	AMD Radeon HD 6630M with 256MB video memory	Intel HD Graphics 3000	Zotac nVidia GeForce GT 430 passive-cooled	AMD Radeon HD 6310
TV tuner	Peak Dual Tuner Freeview	none	Black Gold BGT3600	Black Gold BGT3595	Compro E750
Wireless	802.11n	dual-band 802.11n	×	×	×
Ethernet	gigabit	gigabit	gigabit	gigabit	gigabit
Bluetooth	×	✓	×	×	×
USB	2x USB 3.0, 6x USB 2.0	4x USB 2.0	2x USB 3.0, 4x USB 2.0	4x USB 3.0, 6x USB 2.0	2x USB 3.0, 6x USB 2.0
Ports	S/PDIF, HDMI, DVI, VGA	S/PDIF, HDMI, FW800, TB	S/PDIF, HDMI, VGA	S/PDIF, HDMI, DVI, eSATA	S/PDIF, HDMI, DVI
Case	Silverstone SST-ML03B Milo	Apple Mac mini unibody	Zeno NT-TX2000	Zalman HD503	Arbico Zippy Black Case
Keyboard and mouse	Logitech MK260	Bluetooth Keyboard, Magic Trackpad	Microsoft Wireless Desktop 3000	not supplied	Logitech K400
Remote control	✓	✓	✓	×	×
LCD screen	×	×	×	✓	×
Optical drive	BD-ROM/DVD±RW	SuperDrive DVD±RW	BD-ROM/DVD±RW	BD-ROM/DVD±RW	BD-ROM/DVD±RW
Sound	onboard	onboard	onboard	onboard	onboard
Media card slot	✓	×	×	×	×
Operating system	Windows 7 Home Prem 64bit	Mac OS X 10.7 Lion	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit
Media software	WMC, CyberLink PowerDVD	none	WMC, ArcSoft TotalMedia	WMC, ArcSoft TotalMedia	WMC
Crysis (Low/Medium)	118/62fps	77/48fps	45/20fps	not tested	24/12fps
MediaEspresso time	7 mins 43 secs	8 mins 33 secs	3 mins 14 secs	not tested	37 mins 7 secs
WorldBench 6 score	172	123	141	120	57
Power consumption	39W	10W	36W	50W	27W
Warranty	2 years collect-and-return	1 year collect-and-return	2 years collect-and-return	3 years return-to-base	2 years labour only
Verdict	• Great value • TV tuner • 8GB DDR3 RAM • Incredible performance in WorldBench 6 • Excellent graphics handling • Can be overclocked • A little noisy • Limited remote control features	• Beautifully compact • Great for graphics • Mediocre performance • No DVD drive • Very low power consumption • Quiet and elegant • Peripherals sold separately	• Blu-ray drive included • Silent, fanless operation • Best multimedia playback of group • Dual digital TV tuners • Stylish Zalman case • Expensive	• Proper media-centre controls • Passively cooled, fanless design • Dual digital TV tuners • 2GB storage • Upgradable • Doubles as hi-fi when PC power off	• Low-cost media centre with Blu-ray drive • Compro dual digital TV tuner • Tower design not very living room-friendly • Fans are noisy • Low power consumption • Useful remote control • Wireless keyboard
Full review	tinyurl.com/8843u87	tinyurl.com/88guq5h	tinyurl.com/7s2zwxd	tinyurl.com/3ophwhd	tinyurl.com/82xd4fq

GLOSSARY: FW800: FireWire 800 TB: Thunderbolt WMC: Windows Media Center

but third-party cooling fans can help to keep down noise levels.

Memory: A 4GB memory setup should be fine – even 2GB should be okay.

Storage: In a typical networked business environment there will be storage available on the LAN, so you're unlikely to need a large hard drive – especially at their currently inflated prices. A 500GB drive should be ample unless your business involves storing a lot of video or other large media.

Motherboard: The motherboard won't need the latest and greatest features, although some spare memory slots may prove useful so that extra RAM can be added later. Power-management and fan-speed control can also help to save you money and create a more peaceful working environment.

Graphics: Integrated GPU solutions provide enough graphics power for business applications, so you're unlikely to need to add a graphics card to your specification.

Peripherals: 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 to others.

OS: 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 designed for Windows XP.

Top 5 Netbooks

	HP Mini 210-3002sa	Samsung NC110	Kogan Agora Pro	Samsung NS310	Dell Latitude 2120 Advanced
Price	£269 inc VAT	£270 inc VAT	£280 inc VAT	£300 inc VAT	£598 inc VAT
Website	hp.com/uk	samsung.com/uk	kogan.co.uk	samsung.com/uk	dell.co.uk
Build rating	★★★★½	★★★½☆	★★★½☆	★★★½☆	★★★½☆
Features rating	★★★½☆	★★★☆☆	★★★½☆	★★★½☆	★★★★☆
Performance rating	★★½☆☆	★★½☆☆	★★½☆☆	★★½☆☆	★★½☆☆
Value rating	★★★★☆	★★★½☆	★★★★☆	★★★☆☆	★★☆☆☆
Overall rating	★★★★☆	★★★½☆	★★★★☆	★★★☆☆	★★★☆☆
Processor	1.66GHz Intel Atom N570	1.5GHz Intel Atom N550	1.3GHz Intel Pentium SU2700	1.5GHz Intel Atom N550	1.5GHz Intel Atom N550
RAM	1GB DDR3	1GB DDR2	2GB DDR2	1GB DDR3	2GB DDR3
Storage	250GB hard drive	250GB hard drive	500GB hard drive	250GB hard drive	320GB hard drive
Screen size	10.1in	10.1in	11.6in	10.1in	10.1in
Screen resolution	1024x600 pixels	1024x600 pixels	1366x768 pixels	1024x600 pixels	1366x768 pixels
Graphics	Intel GMA 3150	Intel GMA 3150	Intel GS40	Intel GMA 3150	Intel GMA 3150
Video memory	n/a	n/a	n/a	n/a	n/a
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	10/100Mbps	10/100Mbps	10/100Mbps	10/100Mbps	gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 2.0	3x USB 2.0	3x USB 2.0	3x USB 2.0	3x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	×	×	×
DisplayPort	×	×	×	×	×
HDMI	×	×	✓	×	×
DVI	×	×	×	×	×
VGA	✓	✓	✓	✓	✓
eSATA	×	×	×	×	×
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	webcam, Beats Audio	webcam	webcam	webcam	webcam
Operating system	Windows 7 Starter 32bit	Windows 7 Starter 32bit	Ubuntu Linux 11.04	Windows 7 Starter 32bit	Windows 7 Pro 32bit
Bundled software	Norton Internet Security	none	none	none	Microsoft Office Starter 2010
Fear (Max detail)	not tested	not tested	not tested	not tested	not tested
Battery	55Wh lithium-ion	48Wh lithium-ion	31Wh lithium-ion	three-cell lithium-ion	56Wh lithium-ion
Battery life	7 hrs 54 mins	7 hrs 52 mins	2 hrs 22 mins	3 hrs 41 mins	6 hrs 24 mins
WorldBench 6 score	38	36	n/a[1]	37	33
Dimensions	268x191x32mm	259x180x28mm	290x195x26mm	275x188x31mm	265x187x23mm
Weight	1.4kg	1.2kg	1.3kg	1.1kg	1.3kg
Warranty	1 year collect-and-return	1 year return-to-base	1 year collect-and-return	1 year return-to-base	1 year collect-and-return
Verdict	• Nearly 8-hour battery life • Available in bright pink • Glossy 10in screen • Quality build • Usable keyboard	• Attractive styling • Excellent battery life • Only DDR2 RAM • Non-reflective 10in screen	• Above average screen size • 2GB RAM • Runs Ubuntu not Windows • Battery life very poor • Hi-res matt screen	• 1GB DDR3 RAM • Only 250GB hard drive • Glossy screen • Low battery life • Expensive for the spec	• Business netbook • 2GB DDR3 RAM • Average performance • Windows 7 Professional • Solid battery life
Full review	tinyurl.com/4vfd5ho	tinyurl.com/7qzapkm	tinyurl.com/43mn2ob	tinyurl.com/444sktx	tinyurl.com/7wnff7t

[1]Not tested. Note: WorldBench 6 works only in Windows

>> Buying advice

Netbooks

A light, compact chassis is a mini laptop's main asset. Portability, lengthy battery life and a low price tag are these modest machines' main selling points.

Processor: Intel's Atom is a popular processor. It consumes little power and gets the job done. Just don't expect massive processing muscle.

Storage: Netbooks usually come with 160GB or 250GB hard-disk drives. Some have solid-state drives instead. Smaller, less fragile and quieter, these are also expensive and you'll have to settle for far less capacity.

Memory: Most netbooks come with 1GB of RAM, but you can upgrade to 2GB for around £20 (see tinyurl.com/verjwpc). A smaller complement than found in more capable machines, this is just sufficient for single tasks.

Wireless: 802.11b/g was standard on netbooks, sometimes with Bluetooth, but most new models now also support the faster 802.11n standard. As they are designed to be used on the move, the faster wireless technology comes in handy when copying large files.

Top 5 Sub-£600 laptops

	Samsung RV511	Lenovo IdeaPad S205-1038	Lenovo G570	Lenovo ThinkPad X121e 3045	MSI CR650
Price	£520 inc VAT	£340 inc VAT	£480 inc VAT	£500 inc VAT	£450 inc VAT
Website	samsung.com/uk	lenovo.com/uk	lenovo.com/uk	lenovo.com/uk	uk.msi.com
Build rating	★★★½☆	★★★★☆	★★★½☆	★★★★☆	★★★☆☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆
Performance rating	★★★★☆	★★★☆☆	★★★★☆	★★½☆☆	★★★☆☆
Value rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★½☆☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★½☆	★★★☆☆
Processor	2.53GHz Intel Core i3-380M	1.6GHz AMD E350	2.1GHz Intel Core i3-2310M	1.4GHz Intel Core i3-2367M	1.6GHz AMD E350
RAM	6GB DDR3	4GB DDR3	6GB DDR3	4GB DDR3	4GB DDR3
Storage	640GB hard drive	500GB hard drive	640GB hard drive	320GB hard drive	500GB hard drive
Screen size	15.6in	11.6in	15.6in	11.6in	15.6in
Screen resolution	1366x768 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels
Graphics	nVidia GeForce 315M	AMD Radeon HD 6310M	AMD Radeon HD 6370M	Intel HD Graphics 3000	AMD Radeon HD 6310M
Video memory	1GB	n/a	1GB	n/a	n/a
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	gigabit	gigabit	gigabit	gigabit	gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 2.0	3x USB 2.0	4x USB 2.0	1x USB 3.0, 2x USB 2.0	3x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	×	×	×
DisplayPort	×	×	×	×	×
HDMI	✓	✓	✓	✓	✓
DVI	×	×	×	×	×
VGA	✓	✓	✓	✓	✓
eSATA	×	×	×	×	×
Media card slot	✓	✓	✓	✓	✓
Audio	headphone jack, mic	headphone jack, mic	headphone jack, mic	headphone jack, mic	headphone jack, mic
Optical drive	8x DVD±R, 4x DVD±RW, 8x DVD-ROM	n/a	2x BD-ROM, 8x DVD±R, 4x DVD±RW, 8x DVD-ROM	n/a	8x DVD±R, 4x DVD±RW, 8x DVD-ROM
Extras	webcam	webcam	webcam	webcam	webcam
Operating system	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Pro 64bit	Windows 7 Home Prem 64bit
Bundled software	none	none	none	none	none
Fear (Max detail)	33fps	18fps	32fps	13fps	19fps
Battery	48Wh lithium-ion	48Wh lithium-ion	48Wh lithium-ion	54Wh lithium-ion	48Wh lithium-ion
Battery life	5 hrs 15 mins	5 hrs 38 mins	5 hrs 1 min	6 hrs 15 mins	5 hrs 42 mins
WorldBench 6 score	105	53	96	72	54
Dimensions	382x256x34mm	290x168x29mm	377x250x35mm	289x208x24mm	383x250x38mm
Weight	2.4kg	1.5kg	2.6kg	1.57kg	2.3kg
Warranty	1 year return-to-base	1 year return-to-base	1 year return-to-base	1 year return-to-base	1 year return-to-base
Verdict	• Good performance in WorldBench 6 • Large hard disk • Light gaming potential • Reflective screen	• Extremely portable • More powerful than a netbook • Glossy screen • Rather slow	• Blu-ray drive • Adequate performance • Can play some games • Capacious hard drive • Heavy	• Business portable • Excellent matt screen • No optical drive • Relatively lightweight • Good battery life	• Good sound quality • Comfortable keyboard • Not great for games • Weak processor • Expensive
Full review	tinyurl.com/5tvt8ae	tinyurl.com/6g5ekqk	tinyurl.com/6fzz4xe	tinyurl.com/7r5woar	tinyurl.com/5trk7f4

All the models currently in our chart support 802.11n.

Operating system: Windows 7 Starter Edition is now standard, with slightly reduced performance compared to Windows XP. Some earlier netbooks instead ship with a Linux operating system. All those we've tested have struggled with Vista, but Windows 7 will run on an Atom processor.

Display: Netbooks' small screens and lowly resolutions, plus the lack of dedicated graphics, mean they don't lend themselves to video playback or gameplay. However, most netbook screens are adequate for sending emails, web browsing and word processing.

Keyboard: Cramped keyboards go with the territory, and it's useful to try out typing on a netbook before you buy it. The keyboards on netbooks with smaller than 9in screens will make touch typing impossible. Watch out for non-standard layouts; mini laptops often sacrifice dedicated function keys.

Extras: To keep down cost and weight, mini-laptop manufacturers tend to compromise heavily on extra features – don't expect to get a CD/DVD drive, a FireWire port or an ExpressCard slot, for example. You'll usually find three USB ports, but they may be crammed together tightly, which can make plugging in two devices side by side tricky unless you use a USB hub or an extension cable.

Top 5 £601-£1,000 laptops

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	Toshiba Satellite P750	Asus U46SV-WX044X	Apple MacBook Air 11in	Asus UX21e Zenbook	Acer TravelMate 8481T
Price	£999 inc VAT	£699 inc VAT	£999 inc VAT	£850 inc VAT	£795 inc VAT
Website	toshiba.co.uk	uk.asus.com	apple.com/uk	uk.asus.com	acer.co.uk
Build rating	★★★★½	★★★★☆	★★★★★	★★★★½	★★★★☆
Features rating	★★★★☆	★★★½☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★☆☆
Value rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★★☆
Processor	2.2GHz Intel Core i7-2670QM	2.3GHz Intel Core i5-2410M	1.6GHz Intel Core i5-2467M	1.6GHz Intel Core i5-2467M	1.6GHz Intel Core i5-2467M
RAM	8GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3	3GB DDR3
Storage	750GB hard drive	640GB hard drive	128GB SSD	128GB SSD	320GB hard drive
Screen size	15.6in	14.1in	11.6in	11.6in	14in
Screen resolution	1366x768 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels
Graphics	nVidia GeForce GT 540M	nVidia GeForce GT 540M	Intel HD Graphics 3000	Intel HD Graphics 3000	Intel HD Graphics 3000
Video memory	2GB	1GB	n/a	n/a	n/a
Wireless	802.11b/g/n	802.11b/g/n	802.11a/b/g/n	none	802.11b/g/n
Ethernet	gigabit	gigabit	100Mbps with USB adaptor	gigabit	gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 3x USB 2.0	1x USB 3.0, 2x USB 2.0	2x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	✓	×	×
DisplayPort	×	×	✓	✓	×
HDMI	✓	✓	×	✓	✓
DVI	×	×	×	×	×
VGA	✓	×	×	✓	✓
eSATA	×	✓	×	×	✓
Media card slot	✓	✓	✓	✓	✓
Audio	headphone jack, mic	headphone jack, mic	headphone jack, mic	headphone jack, mic	headphone jack, mic
Optical drive	6x BD-ROM, 8x DVD±R, 6x DVD-RW, 8x DVD+RW	8x DVD±4, 4x DVD±RW, 5x DVD-RAM, 8x DVD-ROM	n/a	n/a	n/a
Extras	webcam	webcam	HD webcam, multitouch trackpad, backlit keyboard	webcam	webcam
Operating system	Windows 7 Home Prem 64bit	Windows 7 Pro 64bit	Mac OS X 10.7 Lion	Windows 7 Home Prem 64bit	Windows 7 Pro 64bit
Bundled software	none	none	iLife 11	none	none
Fear (Max detail)	54fps	78fps	17fps	17fps	6fps
Battery	48Wh lithium-ion	88Wh lithium-ion	35Wh lithium-ion	35Wh lithium-ion	86.5Wh lithium-ion
Battery life	3 hrs 23 mins	10 hrs 1 min	5 hrs 51 mins	5 hrs 47 mins	11 hrs 1 min
WorldBench 6 score	131	114	112	116	100
Dimensions	381x254x36mm	333x245x27mm	300x192x3-17mm	299x197x3.5-17mm	329x240x22mm
Weight	2.6kg	2.1kg	1.07kg	1.16kg	1.78kg
Warranty	1 year carry-in	2 years return-to-base	1 year return-to-base	1 year return-to-base	1 year return-to-base
Verdict	• Fastest laptop here • 2GB nVidia graphics • Blu-ray playback • Glossy screen • Poor battery life	• Solid business laptop • 10-hour battery life • Sharp, vibrant 14in screen • Great graphics handling	• Template for all Ultrabooks • Very light and compact • Strong performance for size • Great hi-res low-glare screen	• Best Ultrabook to date • Beautiful construction • Solid overall performance • Multitouch gesture support • 128GB SSD storage	• Lightweight business laptop • Comfortable for typing • 11-hour battery life • No optical drive • Very poor for gaming
Full review	tinyurl.com/buhw64s	tinyurl.com/c845t5y	tinyurl.com/ccpoanm	tinyurl.com/7g36ge2	tinyurl.com/7Lbn8nn

>> Buying advice

Laptops

Processor: Intel processors remain the dominant force in our laptop charts. The best options are the Core i3, i5 and i7 processors, although budget laptops use slower Intel Celeron-branded chips. The Core i-series are very efficient, allowing speedy performance and good battery life. Some Core i7 chips are also available as quad-core processors – look for a 'Q' after their part number.

Processors in Intel's Core i3, i5 and i7 families include performance features such as Turbo Boost, for short-term overclocking, and Hyper Threading, which enables dual-core CPUs to function like quad-core processors.

Memory: The minimum offering if you're paying more than £600 should be 2GB of memory. Most laptops offer more. The more memory you have, the smoother your laptop will run.

Top 5 £1,001+ laptops

	Apple MacBook Air 13.3in	Rock Xtreme X685-i5-2540M	Toshiba Qosmio X770-107	Apple MacBook Pro 15in	Dell XPS 15z
Price	£1,349 inc VAT	£1,229 inc VAT	£1,399 inc VAT	£1,849 inc VAT	£1,199 inc VAT
Website	apple.com/uk	rockdirect.com	toshiba.co.uk	apple.com/uk	dell.co.uk
Build rating	★★★★★	★★★★☆	★★★★☆	★★★★★	★★★½☆
Features rating	★★★★☆	★★★★☆	★★★★½	★★★★½	★★★★☆
Performance rating	★★★★☆	★★★★½	★★★★½	★★★★½	★★★★☆
Value rating	★★★½☆	★★★½☆	★★★½☆	★★★★☆	★★★½☆
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★½	★★★½☆
Processor	1.7GHz Intel Core i5-2557M	2.6GHz Intel Core i5-2540M	2GHz Intel Core i7-2630QM	2.4GHz Intel Core i7-2760QM	2.7GHz Intel Core i7-2620M
RAM	4GB DDR3	6GB DDR3	8GB DDR3	4GB DDR3	8GB DDR3
Storage	256GB SSD	500GB hard drive	2x 500GB hard drives	750GB hard drive	750GB hard drive
Screen size	13.3in	15.6in	17.3in	15.4in	15.6in
Screen resolution	1440x900 pixels	1920x1080 pixels	1920x1080 pixels	1440x900 pixels	1920x1080 pixels
Graphics	Intel HD Graphics 3000	AMD Radeon HD 6990	nVidia GeForce GT 560M	AMD Radeon HD 6770M	nVidia GeForce GT 525M
Video memory	n/a	2GB	1.5GB	1GB	2GB
Wireless	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n	802.11a/b/g/n	802.11b/g/n
Ethernet	100Mbps with USB adaptor	gigabit	gigabit	gigabit	gigabit
Bluetooth	✓	✓	✓	✓	×
USB	2x USB 2.0	2x USB 3.0, 2x USB 2.0	1x USB 3.0, 3x USB 2.0	2x USB 2.0	2x USB 3.0, 1x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	✓	×	×	✓	×
DisplayPort	✓	×	×	✓	✓
HDMI	×	✓	✓	×	✓
DVI	×	✓	×	×	×
VGA	×	×	✓	×	×
eSATA	×	✓	×	×	✓
Media card slot	✓	✓	✓	✓	✓
Audio	headset jack, mic	headphone jack, mic	headphone jack, mic	headphone jack, mic	headphone jack, mic
Optical drive	n/a	6x BD-ROM, 8x DVD±R, 2.4x DVD-RW, 4x DVD+RW	6x BD-ROM, 4x BD-R, 2x BD-RE, 8x DVD±R	8x DVD±R, 2.4x DVD-RW, 4x DVD+RW, 8x DVD-ROM	8x BD-ROM, 8x DVD±R, 2.4x DVD-RW, 4x DVD+RW
Extras	HD webcam, multitouch trackpad, backlit keyboard	webcam, fingerprint reader	webcam, 3D glasses	HD webcam, multitouch trackpad, backlit keyboard	webcam
Operating system	Mac OS X 10.7 Lion	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Mac OS X 10.7 Lion	Windows 7 Home Prem 64bit
Bundled software	iLife 11	none	none	iLife 11	none
Fear (Max detail)	17fps	275fps	166fps	98fps	51fps
Battery	50Wh lithium-ion	76Wh lithium-ion	48Wh lithium-ion	77.5Wh lithium-ion	64Wh lithium-ion
Battery life	6 hrs 35 mins	2 hrs 30 mins	2 hrs 4 mins	5 hrs 11 mins	6 hrs 49 mins
WorldBench 6 score	122	124	132	133	135
Dimensions	325x227x17mm	376x256x43mm	412x270x58mm	364x249x24mm	385x260x25mm
Weight	1.3kg	3.1kg	3.4kg	2.6kg	2.6kg
Warranty	1 year return-to-base	3 years onsite	1 year carry-in	1 year return-to-base	1 year return-to-base
Verdict	• Thunderbolt, DisplayPort • Solid overall performance • 256GB SSD • Exceptional build quality • Lengthy battery life	• Great performance • 2GB AMD Radeon graphics • Incredible gaming machine • Very poor battery life • Wonderful glare-free screen	• 3D gaming laptop • Whopping 8GB RAM • Huge 17in screen • Superb games performance • 2x 500GB hard drives	• Multitouch trackpad • Good battery life • Thunderbolt connectivity • Solid unibody chassis • Quad-core power	• Best performance score • 8GB DDR3 RAM • 2GB nVidia graphics • Awkward touchpad • Glare-prone screen
Full review	tinyurl.com/3gy2Lae	tinyurl.com/btzsq97	tinyurl.com/cLq5e99	tinyurl.com/6Lrtacr	tinyurl.com/5wtq6wp

Hard drive: It can be difficult to upgrade a laptop's hard drive, so get as much storage space as you can. For the best performance and increased reliability, look out for a solid-state drive. Expect lower capacity than with a hard drive, however.

Screen: If you're after a desktop-replacement machine, go for a model with at least a 15in screen. For film playback, 17in widescreen models are even better. For ultraportables, 13in or smaller is best.

Graphics card: If you need a laptop as a design workstation or for playing games, you'll need a dedicated graphics processor. AMD and nVidia make more efficient chips for the task, such as the AMD Radeon HD 6700 series and nVidia GeForce 500 series, both ending with an 'M' suffix.

The integrated graphics in Intel Core i-series processors are now usable with some games, too. Older Intel GMA 4500M graphics are sufficient only for games played at low resolutions.

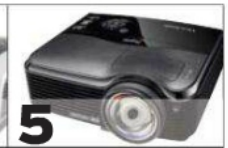
Some laptops feature switchable graphics, using the integrated graphics processor to maintain battery life and the discrete card for maximum performance.

Top 5 Tablet PCs

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	Apple iPad 2	**Samsung Galaxy Tab 10.1**	**Sony Tablet S**	**Asus Eee Pad Slider SL101**	**Acer Iconia Tab A100**
Price	**£399 inc VAT**	**£399 inc VAT**	**£369 inc VAT**	**£400 inc VAT**	**£280 inc VAT**
Website	apple.com/uk	samsung.com/uk	sony.co.uk	uk.asus.com	acer.co.uk
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★½☆	★★★½☆
Platform	Apple iOS 5.0	Google Android 3.1 Honeycomb	Google Android 3.2 Honeycomb	Google Android 3.2 Honeycomb	Google Android 3.0 Honeycomb
Screen size/resolution	9.7in/1024x768	10.1in/1280x800	9.4in/1280x800	10.1in/1280x800	7in/1024x600
Storage/media card slot	16GB/none	16GB/none	16GB/SD	16GB/MicroSD	8GB/MicroSD
Connectivity	802.11a/b/g/n, Bluetooth[1]	802.11b/g/n, Bluetooth[1]	802.11b/g/n, Bluetooth[1]	802.11b/g/n, Bluetooth	802.11b/g/n, Bluetooth
Processor	1GHz Apple A5	1GHz nVidia Tegra T20	1GHz nVidia Tegra 2	1GHz nVidia Tegra 2	1GHz nVidia Tegra 2
RAM	512MB	1GB	1GB	1GB	1GB
Claimed battery life	10 hrs	9 hrs	8 hrs	8 hrs	5-8 hrs
Cameras (front/rear)	0.3/0.7Mp	3/2Mp	0.3/5Mp	1.2/5Mp	2/5Mp
Dimensions	241x186x9mm	257x173x9mm	241x174x20-7.6mm	273x180x17mm	241x186x9mm
Weight	597g	559g	588g	960g	612g
Warranty	1 year	1 year	2 years	1 year	1 year
Verdict	• Exceptional touchscreen • Beautiful design and build • Best selection of apps • 10-hour battery life	• 1GHz processor • Impressive 10in touchscreen • Plasticky construction • 3Mp main camera	• Lightweight design • Scratch-prone chassis • Android Honeycomb 3.2.1 • 16GB memory plus SD card	• 10in IPS touchscreen • Slide-out qwerty keyboard • MyCloud auto backups • Great hybrid tablet/laptop	• Compact design • Surprisingly heavy • Poor viewing angles • Accurate touchscreen input
Full review	tinyurl.com/4xv7g4k	tinyurl.com/3Lh239c	tinyurl.com/3tsqkp4	tinyurl.com/7ckrscq	tinyurl.com/3t2bjqL

[1]3G available at additional cost

Top 5 Projectors

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
					
	InFocus ScreenPlay SP8600	**Vivitek Qumi Q2**	**NEC NP43**	**BenQ W1000+**	**ViewSonic PJD7383i**
Price	**£700 inc VAT**	**£520 inc VAT**	**£610 inc VAT**	**£880 inc VAT**	**£1,129 inc VAT**
Website	infocus.com	vivitek.co.uk	nec-display-solutions.co.uk	benq.co.uk	viewsoniceurope.com/uk
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★½☆
Projection technology	DLP	DLP	DLP	DLP	DLP
Resolution (pixels)	1920x1080	1280x800	1024x768	1920x1080	1024x768
Brightness[1], Contrast	1,800, 5,000:1	300, 2,500:1	2,300, 1,600:1	2,000, 3,500:1	3,000, 3,000:1
Image size	300in	30-90in	300in	80in+	30-300in
Supported aspect ratios	16:10, 16:9, 4:3	16:10, 16:9, 4:3	16:9, 4:3	16:10, 16:9, 4:3	4:3
Noise levels (dB)	30 (26 eco)	32 (28 eco)	37 (32 eco)	28 (26 eco)	32 (27 eco)
Connections	VGA, HDMI, CM, CP, SV, USB	VGA, HDMI, USB	VGA, SV, USB	VGA, HDMI, CM, CP, SV, USB	VGA, CP, SV, USB
Lamp/lamp life	230W/4,000 hrs	LED/30,000 hrs	200W/1,000 hrs	180W/4,000 hrs	210W/4,000 hrs
Dimensions	326x254x104mm	162x102x32mm	246x72x177mm	325x254x95mm	290x126x254mm
Weight	3.4kg	635g	1.7kg	3.4kg	3.5kg
Warranty	5 years	3 years	2 years	1 year	3 years
Verdict	• Smooth video playback • Full-HD resolution • Great contrast levels • Bright, colourful image	• Great value portable model • Lightest model here • DLP-Link enables 3D display • Exceptional lamp life rating	• Portable business model • Strong Auto Focus • Customisable settings • Decent image quality	• Good for home-cinema use • Excellent connectivity • Up to 80in display • Pleasing colour palette	• Ultra-short throw • Gets very warm in operation • Lacks HDMI and DVI • Creston RoomView software
Full review	tinyurl.com/3hqanpv	tinyurl.com/3txmwpk	tinyurl.com/62w3796	tinyurl.com/6kfuemf	tinyurl.com/3bw7zzw

[1]Ansi lumens GLOSSARY: • CM: component • CP: composite • SV: S-Video

>> Buying advice

Tablet PCs

Tablet PCs bridge the gap between the capabilities of a PC and a smartphone. They couple the mobility and connectivity of a smartphone with elements of a laptop, offering larger screens and more powerful processors. A tablet PC is a thin slab, dominated by its screen. Instead of struggling to run Windows, they run a lightweight, touchscreen-focused mobile platform.

The most developed and optimised is Apple iOS 5.0, with Google Android and OSes from HP and RIM following. Some tablets offer 3G connectivity, and are available on subsidised data contracts.

Tablets are ideal for web browsing, email, reading e-books, playing games and watching video. However, you won't be tempted to write long essays or reports on a tablet's onscreen keyboard.

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Top 5 Sub-£150 printers

	Oki C110	Brother HL-2130	Kodak Hero 5.1	Epson Stylus SX525WD	Canon i-Sensys LBP-7010C
Price	£135 inc VAT	£65 inc VAT	£80 inc VAT	£74 inc VAT	£115 inc VAT
Website	oki.co.uk	brother.co.uk	kodak.co.uk	epson.co.uk	canon.co.uk
Overall rating	★★★★☆	★★★★½	★★★★½	★★★★☆	★★★½☆
Technology	Colour laser	Mono laser	Colour inkjet	Colour inkjet	Colour laser
Max print resolution	1200x600dpi	2400x600dpi	9600dpi	5760x1440dpi	5760x1440dpi
Actual print speed	B=15.8ppm/C=2.5ppm	B=20ppm	B=12.2ppm/C=6.8ppm	B=15ppm/C=4ppm	B=13ppm/C=3.3ppm
Scan/fax facilities	none	none	1200dpi scans	2400x2400dpi scans	none
Supported interfaces	USB 2.0	USB 2.0	USB 2.0, 802.11b/g/n, cloud	USB 2.0, 802.11b/g/n	USB 2.0
Cost per page	B=3.6p/C=5p	B=3p	B=1.8p/C=3.3p	B=2.4p/C=8.2p	B=3.8p/C=13.8p
Media card/auto duplex	××	××	✓✓	✓✓	××
Input capacity	100 sheets	250 sheets	100 sheets	150 sheets	150 sheets
Dimensions	396x380x275mm	368x360x183mm	422x399x183mm	455x359x164mm	400x398x223mm
Weight	14.4kg	6.7kg	6.3kg	6.2kg	12.3kg
Warranty	3 years	1 year	1 year	1 year	2 years
Verdict	• Attractive pricing • Performs better than an equivalent inkjet • No duplex mode	• 20ppm mono laser printer • Crisp text output • 3p per page • Cheap for a laser printer	• Printer/scanner/copier • Lowest cost per print • Built-in Wi-Fi • Could be faster	• Good value & performance • Mediocre photo prints • 2400dpi scanning • Built-in Wi-Fi	• Great value colour laser • High-quality colour prints • Slow colour performance • Expensive replacement inks
Full review	tinyurl.com/yLno5rv	tinyurl.com/4yrrdjm	tinyurl.com/6s5bw3h	tinyurl.com/3scrzpc	tinyurl.com/7tLxchk

Top 5 £151+ printers

	Kyocera Mita FS-1320D	Samsung ML-3710ND	Brother MFC-J6910DW	Epson Stylus Office BX925FWD	Brother HL-5380DN
Price	£160 inc VAT	£200 inc VAT	£335 inc VAT	£210 inc VAT	£282 inc VAT
Website	kyoceramita.co.uk	samsung.com/uk	brother.co.uk	epson.co.uk	brother.co.uk
Overall rating	★★★★½	★★★★½	★★★½☆	★★★★☆	★★★½☆
Technology	Mono laser	Mono laser	A3 colour inkjet	Colour inkjet	Mono laser
Max print resolution	1200x1200dpi	1200x1200dpi	19200x19200dpi	5760x1440dpi	1200x1200dpi
Actual print speed	B=26.1ppm	B=28.6ppm	B=13.3ppm/C=3.6ppm	B=17.6ppm/C=14.2ppm	B=23.1ppm
Scan/fax facilities	none	none	1200x2400dpi scans, fax	2400x2400dpi scans, fax	none
Supported interfaces	USB 2.0	USB 2.0, ethernet	USB 2.0, 802.11b/g/n, ethernet	USB 2.0, 802.11b/g/n, ethernet	USB 2.0, ethernet
Cost per page	B=1.4p	B=1.4p	B=1.5p/C=5p	B=2.4p/C=5.4p	B=1.2p
Media card/auto duplex	✓✓	×✓	✓×	✓✓	×✓
Input capacity	250 sheets	250 + 50 sheets	2x 250 sheets	2x 250 sheets	250 + 50 sheets
Dimensions	375x393x250mm	366x368x253mm	540x489x331mm	446x368x300mm	393x384x259mm
Weight	12kg	10kg	18.5kg	9.8kg	9.5kg
Warranty	2 years	1 year	1 year	1 year	1 year
Verdict	• No frills business laser • Lacks Wi-Fi and ethernet • Modest running costs • Auto-duplex support	• Fast mono page churn • Modest running costs • Ethernet and USB ports • Generous paper trays	• Initially expensive • Good value A3 printer • Economical prints • Wi-Fi, ethernet, USB ports	• Very fast colour printing • High-quality scans • Excellent connectivity • Expensive colour prints	• Economical text printer • Good print speeds • PIN security • Prints are rather faint
Full review	tinyurl.com/6qq9ukv	tinyurl.com/75rb5nz	tinyurl.com/4q8has5	tinyurl.com/6bw3gu4	tinyurl.com/73ukx62

GLOSSARY: • B: mono • C: colour • ppm: pages per minute

>> Buying advice

Printers

These days, many printers are multifunctional, offering printing, faxing, copying and scanning functions. The trade-off can be slower performance and a more limited resolution.

For some people it will make more sense to buy an efficient, single-function printer for producing documents, then use a copy shop or a separate photo printer for your best shots.

If you want to produce photos at up to A4 size and need a printer that can produce a combination of photos and documents, a colour inkjet or multifunction printer will be the best choice.

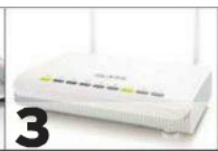
Long-term costs: On top of the initial outlay, consider the cost of consumables (ink/toner, paper and printheads), time and maintenance.

Speed concerns: Be wary of claimed print speeds, too: some printer manufacturers craftily quote print speeds based on Draft mode output.

Top 5 Blu-ray drives

	LG BE12LU38	LG BH10LS38	Asus SBW-06C1S-U Slim	Lite-On iHBS212	Buffalo BR3D-12U3
Price	£120 inc VAT	£65 inc VAT	£130 inc VAT	£100 inc VAT	£199 inc VAT
Website	uk.lge.com	uk.lge.com	uk.asus.com	liteonit.eu	buffalotech.com
Overall rating	★★★★★	★★★★½	★★★★½	★★★★☆	★★★★½
Blu-ray speeds	12x -R, 12x -R DL, 2x -RE, 12x -ROM	10x -R, 8x -R DL, 2x -RE, 10x -ROM	6x -R, 4x -R DL, 2x -RE, 6x -ROM	12x -R, 8x -R DL, 2x -RE, 8x -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	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	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 5x -RAM, 8x -ROM
Max storage	50GB	50GB	50GB	50GB	50GB
Interface type	USB 2.0, eSATA (external)	SATA (internal)	USB 2.0 (external)	SATA (internal)	USB 3.0 (external)
Label technology	LightScribe	LightScribe	none	LightScribe	none
Software	PowerDVD, PowerProducer	(OEM – add £5 for software)	PowerDVD, PowerProducer	CyberLink Blu-ray Suite	PowerDVD, PowerProducer
Dimensions	163x260x50mm	146x170x41mm	157x142x21mm	146x170x41mm	160x220x50mm
Weight	1.38kg	749g	364g	650g	1.1kg
Warranty	1 year	1 year	2 years	2 years	2 years
Verdict	• 12-speed external writer • Side-mountable • Supports eSATA, USB 2.0 • Not portable	• 10-speed internal writer • Attractive front panel • Reliable performance • Very good value	• Super-slim six-speed drive • No power supply required • Portable • Slow but reliable	• 12-speed internal writer • Issues during testing • Noisy during operation • Limited to available media	• 12-speed external writer • Power supply required • Bulky design • Expensive
Full review	tinyurl.com/8yvfLfp	tinyurl.com/8ytujef	tinyurl.com/7s3wpv6	tinyurl.com/65pxhuj	tinyurl.com/453bx7L

Top 5 Wireless routers



	Cisco Linksys E4200	AVM FritzBox Fon 7390	Zyxel NBG4615	Edimax BR-6475nD	Tenda W307R
Price	£130 inc VAT	£210 inc VAT	£60 inc VAT	£65 inc VAT	£22 inc VAT
Website	linksysbycisco.com	fritzbox.eu	zyxel.co.uk	edimax.co.uk	tenda.cn
Overall rating	★★★★½	★★★★½	★★★★½	★★★½☆	★★★★☆
Standards supported	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n	802.11a/b/g/n	802.11b/g/n
Frequency modes	2.4GHz/5GHz (dual mode)	2.4GHz/5GHz (dual mode)	2.4GHz	2.4GHz/5GHz (dual mode)	2.4GHz
WEP/WPA/WPA2	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
USB port/Network port	✓✓	✓✓	✓✓	×✓	×✓
Firewall	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI
Eco mode	×	✓	✓	×	×
Average power use	not tested	not tested	not tested	not tested	not tested
Throughput (near/far)	226/92Mbps	92/38Mbps	94/32Mbps	97/41Mbps	78/35Mbps
Dimensions	225x160x25mm	226x160x48mm	162x106x28mm	134x110x26mm	172x110x31mm
Weight	335g	not specified	237g	200g	900g
Warranty	1 year	5 years	1 year	2 years	3 years
Verdict	• ADSL modem required • Excellent performance • Dual-band Wi-Fi • Guest login feature	• Supports landline and internet telephony • Dual-band Wi-Fi • USB port	• Good-value router • Strong Wi-Fi performance • Single-band Wi-Fi • Compact design	• Dual-band Wi-Fi • Poor web interface • Strong performance • Good value	• Very cheap • Cable router • Poor web interface • No UK support
Full review	tinyurl.com/6z7hdkm	tinyurl.com/3qujzbx	tinyurl.com/6hacknn	tinyurl.com/6xda648	tinyurl.com/d6tab8j

>> Buying advice

Blu-ray drives

DVD formats: To handle the bewildering array of DVD recording and playback formats, we recommend buying an optical drive that supports as many as possible. Look for labels such as LG and NEC's SuperMulti or Lite-On's Super All Write.

Blu-ray Disc: Six-/eight-speed BD-R (Blu-ray Disc writable) capabilities are standard, but bear in mind that even six-speed BD-R blank media is still rare.

Speed: Don't obsess about speeds. You should be able to get 16-speed DVD writing, but it's not worth paying more to save seconds.

Internal or external? External drives are easier to install and can be shared between computers, but will cost you considerably more than internal models. Most internal drives now use a SATA interface, so check you've got a compatible port. Older PCs may not be compatible.

Top 5 External hard drives

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	Seagate FreeAgent GoFlex	WD My Passport Studio	Buffalo MiniStation Extreme	Iomega Prestige	Freecom Mobile Drive Sq
Price	£190 inc VAT	£110 inc VAT	£130 inc VAT	£100 inc VAT	£105 inc VAT
Website	seagate.com	wdc.com/en	buffalotech.com	iomega.co.uk	freecom.com
Overall rating	★★★★☆	★★★★½	★★★★½	★★★★☆	★★★½☆
Capacity tested	3TB	1TB	1TB	1TB	500GB
Capacity range	1TB to 3TB	500GB to 1TB	500GB to 1TB	1TB to 2TB	500GB to 1TB
Disk size	3.5in	2.5in	2.5in	3.5in	2.5in
Spin speed	7,200rpm	5,400rpm	5,400rpm	5,400rpm	5,400rpm
Transfer speed	94Mbps (USB 3.0)	76Mbps (FireWire 800)	94Mbps (USB 3.0)	94Mbps (USB 3.0)	94Mbps (USB 3.0)
Encryption	192bit	256bit	256bit	256bit	none
Other interfaces	optional FireWire 800	FireWire 800, USB 2.0	none	none	none
Software	Memo Backup	WD utilities	Backup, RAMdisk	Iomega Protection Suite	Nero BackItUp & Burn
Dimensions	158x124x44mm	126x84x22mm	128x89x18mm	188x124x31mm	120x120x11mm
Weight	1kg	334g	230g	1kg	195g
Warranty	2 years	3 years	2 years	3 years	2 years
Verdict	• Fastest write speed • Great value for capacity • Separate storage drive and USB 3.0 dock	• Superbly built • FireWire 800 and USB 2.0 interfaces • AES encryption	• Military-grade rugged design • Lightweight 2.5in drive • Solid 256bit encryption	• Good-value USB 3.0 drive • 256bit encryption • Metal case	• Ultra-compact USB 3.0 drive • No security software or encryption provided • Power-saving mode
Full review	tinyurl.com/bn2z92f	tinyurl.com/6fawbne	tinyurl.com/ce4z9ym	tinyurl.com/d4kaLcw	tinyurl.com/bmvzw3r

Top 5 NAS drives

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	Netgear ReadyNAS Duo v2	Synology DiskStation DS211	Qnap TS-419P+	Qnap TS-659 Pro II	Zyxel NSA310
Price	£150 inc VAT (diskless)	£190 inc VAT (diskless)	£430 inc VAT (diskless)	£990 inc VAT	£125 inc VAT
Website	netgear.co.uk	synology.com	qnap.com	qnap.com	zyxel.co.uk
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Capacity range	up to 2TB preinstalled	up to 6TB	up to 12TB	up to 18TB	up to 2TB preinstalled
Internal drives	2	2	4	6	1
UPnP	✓	✓	✓	✓	✓
DLNA	✓	✓	✓	✓	✓
Remote access	✓	✓	✓	✓	✓
USB port	✓	✓	✓	✓	✓
Raid options	0/1/JBOD	0/1	0/1/5/6/10	0/1/5/6/10	n/a
Software	ReadyNAS	DiskStation Manager 3.0	TurboNAS 3.5	TurboNAS 3.5	zPilot
Dimensions	88x218x161mm	142x101x220mm	180x235x177mm	175x257x235mm	58x196x130mm
Weight	1kg	2.07kg	3kg	5.2kg	662g
Warranty	3 years	2 years	2 years	2 years	3 years
Verdict	• Suitable for small-business or home-media use • Remote access support • Low power consumption	• iTunes, uPnP, DLNA options • Takes up to 6TB total storage • Excellent security	• High-performance NAS • Strong Raid support • Versatile	• Max 18TB (6x 3TB) storage • Great Raid support • Expensive • Fast performance	• Good value, compact media-sharing drive • Limited to 2TB storage • Sluggish performance
Full review	tinyurl.com/hmsdr74	tinyurl.com/65s4v4u	tinyurl.com/3zk5Ljq	tinyurl.com/7mx6oz7	tinyurl.com/3voqrxx

>> 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 typically connected to a network 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 or more drives and combines both advantages.

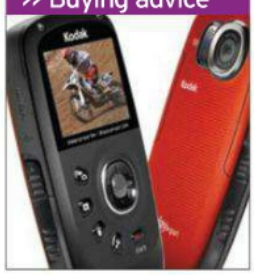
Top 5 Smartphones

	Apple iPhone 4S	Samsung Galaxy S II	HTC Sensation	RIM BlackBerry Bold 9780	Motorola Defy+
Price	£499 inc VAT	£406 inc VAT	£499 inc VAT	£331 inc VAT	£246 inc VAT
Website	apple.com/uk	samsung.com/uk	htc.com/europe	uk.blackberry.com	motorola.co.uk
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Platform	Apple iOS 5.0	Android 2.3 Gingerbread	Android 2.3 Gingerbread	BlackBerry OS 6.0	Android 2.3 Gingerbread
Processor	1GHz ARM Cortex A9	1.2GHz ARM Cortex A9	1.2GHz Qualcomm SnapDragon	624MHz	1GHz TI Omap 3620
Storage/media card	16GB/none	16GB/MicroSD	1GB + 8GB MicroSD	512MB + 2GB MicroSD	1GB/MicroSD
Screen size/resolution	3.5in/960x640	4.3in/800x480	4.3in/960x540	2.4in/480x360	3.7in/854x480
Input method	capacitive multitouch	capacitive touchscreen	capacitive touchscreen	SureType keyboard	capacitive touchscreen
Connectivity	HSDPA, 3G, Bluetooth, Wi-Fi	HSDPA, 3G, Bluetooth, Wi-Fi	HSDPA, 3G, Bluetooth, Wi-Fi	HSDPA, 3G, Bluetooth, Wi-Fi	HSDPA, 3G, Bluetooth, Wi-Fi
Battery life (talk/standby)	8 hrs/200 hrs	not specified	8 hrs/285 hrs	6 hrs/408 hrs	6.8 hrs/237 hrs
Camera	8Mp stills, 1080p video	8Mp, 1080p video	8Mp, 1080p video	5Mp, 720p video	5Mp, video not supported
GPS	✓	✓	✓	✓	✓
Dimensions, Weight	59x10x115mm, 140g	66x125x8mm, 116g	68x126x5mm, 148g	109x60x14mm, 122g	107x59x13mm, 118g
Warranty	1 year	2 years	2 years	1 year	1 year
Verdict	• Superb retina display • Excellent web browser • Responsive touchscreen • Siri voice-recognition	• Huge 4.3in AmoLED screen • 16GB memory (expandable) • Shorter battery life • TouchWiz 'Hubs' interface	• Media-centric smartphone • High-resolution screen • Slick HTC Sense interface • HTC Watch	• Qwerty keyboard input • Media player/manager • Secure email platform • Small 2.4in screen	• Ruggedised smartphone • Supports DLNA • Car Dock satnav mode • Pedestrian look and feel
Full review	tinyurl.com/33hoyex	tinyurl.com/3hf6qod	tinyurl.com/5w5kc7d	tinyurl.com/3kj33gs	tinyurl.com/77uLwsj

Top 5 Digital camcorders

	Kodak PlaySport Zx5	JVC Everio GZ-HM650	Sony Bloggie Touch MHS-TS20	Canon Legria HF R106	Kodak Playfull ZE1
Price	£98 inc VAT	£247 inc VAT	£160 inc VAT	£169 inc VAT	£106 inc VAT
Website	kodak.co.uk	jvc.co.uk	sony.co.uk	canon.co.uk	kodak.co.uk
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★☆☆
Maximum resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Aspect ratio	16:9	4:3, 16:9	16:9	16:9	16:9
Display	2in	2.7in	3in	2.7in	1.5in
CCD sensor	1/3.2in	1/4.1in	1/2.5in	1/5.5in	1/3.2in
Zoom	4x digital	200x digital, 40x optical	4x digital	80x digital, 20x optical	4x digital
Supported formats	Mpeg4, Jpeg	Mpeg4, Jpeg	Mpeg4, Jpeg	AVCHD, Jpeg	Mpeg4, Jpeg
Storage (media card)	128MB (SD/SDHC)	8GB (SD/SDHC/SDXC)	8GB (SD/MS)	none (SD/SDHC)	128MB (SD/SDHC)
Connections	Micro-HDMI, MicroUSB	HDMI, USB 2.0	HDMI, USB 2.0	HDMI, USB 2.0	Micro-HDMI, MicroUSB
Dimensions	58x112x18mm	51x55x111mm	47x9x106mm	60x64x124mm	42x100x16mm
Weight	125g	195g	125g	319g	95g
Warranty	1 year	1 year	1 year	1 year	1 year
Verdict	• Ruggedised design • Comfortable to hold • 2in screen rather small • Takes AAA batteries	• Lightweight, easy to use • Excellent 40x optical zoom • 6.5-hour recording memory • Supports 32GB SDXC cards	• Useful 8GB memory • Awkward to hold • Ideal for video; stills less so • No built-in flash	• Excellent-value HD model • 2.7in flip-out LCD • Smooth 20x optical zoom • Great colour balance	• Simplicity itself to use • One-touch record and share • Tiny LCD • Rather toy-like
Full review	tinyurl.com/3u3y2ca	tinyurl.com/453u838	tinyurl.com/332uogj	tinyurl.com/2vfvLqx	tinyurl.com/79hcqjc

>> Buying advice



Digital camcorders

Camcorder manufacturers have moved from devices based on tapes and hard disks to gadgets with flash memory.

A 'proper' pistol-grip camcorder with a flip-out LCD screen will help you follow the action more easily.

HD video can be of a higher visual quality than broadcast TV or DVD – it captures video footage at either a 1280x720- (720p) or 1920x1080-pixel resolution. Beware that '1080' can refer to either 1080i or 1080p, and the latter progressive scan is preferable.

Video is usually compressed with Mpeg4, and often wrapped in its Blu-ray-friendly variant AVCHD. However, you'll need to watch out for compatibility issues with your video-editing software.

Shooting in HD can produce crystal-clear footage, but you inevitably end up with huge files. Consider investing in an external hard drive (see our pick on page 142).

Top 5 Compact digital cameras

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	Sony Cyber-Shot DSC-HX9V	Nikon Coolpix S9100	Panasonic Lumix DMC-TZ20	Samsung MV800	Canon PowerShot G12
Price	£250 inc VAT	£200 inc VAT	£215 inc VAT	£190 inc VAT	£400 inc VAT
Website	sony.co.uk	nikon.co.uk	panasonic.co.uk	samsung.com/uk	canon.co.uk
Overall rating	★★★★☆	★★★★½	★★★★½	★★★½☆	★★★½☆
Megapixel rating	16.2Mp	12.1Mp	14.1Mp	16.2Mp	10Mp
Maximum resolution	4608x3456 pixels	4000x3000 pixels	4320x3240 pixels	4608x3456 pixels	3648x2736 pixels
Optical zoom	16x	18x	16x	5x	5x
Maximum aperture	f3.3-f5.9	f3.5-f5.9	f3.3-f5.9	f3.3-f5.9	f2.8-f4.5
LCD size	3in	3in	2.8in	3in	2.8in
Media card	SD/SDHC	SD/SDHC	SD/SDHC	MicroSD	SD/SDHC
Battery/life	1x lithium-ion/410 shots	1x lithium-ion/270 shots	1x lithium-ion/260 shots	1x lithium-ion/not specified	1x lithium-ion/370 shots
ISO range	100 to 3200	160 to 3200	100 to 1600	125 to 3200	80 to 3200
Dimensions	105x34x59mm	106x35x62mm	105x33x58mm	92x18x56mm	112x48x76mm
Weight	215g	214g	219g	124g	401g
Warranty	2 years	2 years	1 year	2 years	1 year
Verdict	• Superior stills and video • Great 16x optical zoom • GPS photo tagging • Doesn't support RAW	• Excellent photo quality • Longest zoom range here • 1920x1080-pixel video • Incredible 240fps slow-mo	• Comprehensive menu • Warm, natural colour range • GPS geotagging support • AVCHD or Mpeg video	• Flip-up touchscreen LCD • Limited 5x optical zoom • Better for video than photos • Great panorama mode	• Comprehensive feature set • High dynamic range setting • Ideal step-up from compacts • Easy to use
Full review	tinyurl.com/6cLaw3d	tinyurl.com/6e457pv	tinyurl.com/6xnrwuo	tinyurl.com/83ssnqx	tinyurl.com/4qhaf66

Top 5 Interchangeable-lens cameras

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	Nikon D5100 (18-55mm)	Panasonic DMC-G3 (14-42mm)	Sony Alpha NEX-5 (18-55mm)	Canon EOS 600D (18-55mm)	Olympus E-PM1 (14-42mm)
Price	£599 inc VAT	£450 inc VAT	£400 inc VAT	£550 inc VAT	£390 inc VAT
Website	nikon.co.uk	panasonic.co.uk	sony.co.uk	canon.co.uk	olympus.co.uk
Overall rating	★★★★☆	★★★★½	★★★★½	★★★★☆	★★★★☆
Megapixel rating	16.2Mp	16Mp	14.6Mp	18Mp	12.3Mp
Maximum resolution	4923x3264 pixels	4592x3448 pixels	4592x3056 pixels	5184x3456 pixels	4032x3024 pixels
Optical zoom	3x	3x	3.1x	3x	3x
Maximum aperture	f3.5-f5.6	f3.5-f5.6	f3.5-f5.6	f3.5-f5.6	f3.5-f5.6
LCD size	3in	3in	3in	3in	3in
Media card	SD/SDHC/SDXC	SD/SDHC/SDXC	MS/SD/SDHC	SD/SDHC/SDXC	SD/SDHC/SDXC
Battery/life	1x lithium-ion/660 shots	1x lithium-ion/270 shots	1x lithium-ion/not specified	1x lithium-ion/440 shots	1x lithium-ion/330 shots
ISO range	100 to 6400	100 to 6400	200 to 12800	100 to 6400	200 to 12800
Dimensions	124x97x79mm	115x84x47mm	111x59x38mm	133x100x80mm	110x64x34mm
Weight	510g	336g	229g	570g	217g
Warranty	3 years	3 years	1 year	1 year	2 years
Verdict	• Excellent stills and video • Suitable for novice and intermediate photographers • Plenty of lenses available	• Great dSLR alternative • Rotating touchscreen • Strong video-capture mode • Very fast autofocus	• Compact • Great performance • Great colour fidelity • Takes clean, sharp shots	• Top-notch photo results • Fully auto/manual modes • Articulated LCD screen • Strong video capture	• Compact camera • Likable art filter modes • High ISO suffers noise • No built-in flash or EVF
Full review	tinyurl.com/6ute9kk	tinyurl.com/7jcxjcr	tinyurl.com/37xozx5	tinyurl.com/72ste88	tinyurl.com/bl_mymjw

>> Buying advice

Digital cameras

Excellent-value 10Mp-plus cameras may be available for £100 or so. However, sensor size may be a better indicator of quality than megapixels – read the full review online for detailed specs.

LCD screen: A large 3in LCD screen is useful for previewing images on a compact, but a viewfinder is also useful on any model for use in bright sunlight. Consider a 260k-dot screen as the minimum.

Image stabilisation: This is standard on compact digital cameras, but less common on interchangeable-lens models. If you're to get crisp shots using a lengthy zoom, you'll want some form of anti-shake mechanism and a small tripod. Almost every camera has a tripod mount underneath.

Zoom: Look for a large optical rather than digital zoom. Digital zoom crops an image, losing detail.

Storage: SDXC removable memory cards can store up to 64GB of photos and video (note that not all cameras support it), but a high-speed SD Card is far better for capturing video.

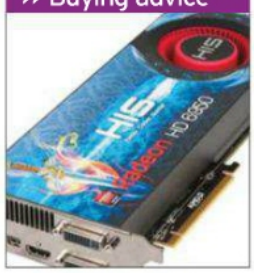
Top 5 Sub-£150 graphics cards

	Sapphire Radeon HD 6850	Sapphire Radeon HD 6790	HIS Radeon HD 6770	Sapphire Radeon HD 6570	Asus Radeon HD 6670
Price	£125 inc VAT	£100 inc VAT	£99 inc VAT	£65 inc VAT	£65 inc VAT
Website	sapphiretech.com	sapphiretech.com	hisdigital.com	sapphiretech.com	uk.asus.com
Overall rating	★★★★½	★★★★☆	★★★½☆	★★★½☆	★★★☆☆
Graphics processor	AMD Radeon HD 6850	AMD Radeon HD 6790	AMD Radeon HD 6770	AMD Radeon HD 6570	AMD Radeon HD 6670
Installed RAM	1GB GDDR5	1GB GDDR5	1GB GDDR5	1GB GDDR3	1GB GDDR3
Memory interface	256bit	256bit	128bit	128bit	128bit
Core/memory clock	775MHz/1GHz	840MHz/1,050MHz	850MHz/1.2GHz	650MHz/900MHz	800MHz/900MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	960	800	800	480	480
Power connectors	1x 6-pin	2x 6-pin	1x 6-pin	none	none
Interface	PCI Express	PCI Express	PCI Express	PCI Express	PCI Express
DirectX	11.0	11.0	11.0	11.0	11.0
Digital interface	DVI, HDMI, DisplayPort	2x DVI, HDMI, DisplayPort	DVI, HDMI, DisplayPort	DVI, HDMI	DVI, HDMI
Warranty	2 years	2 years	2 years	2 years	3 years
Verdict	• Powerful card for the price • Good memory bandwidth • Faster cards cost little more • Single DVI slot	• Playable framerates • Strong memory bandwidth • 6800-series cards faster • 256bit memory interface	• 1GB DDR5 video card • Supports Blu-ray playback • Not very power-hungry • 6790 card is better value	• Smooth video playback • Great value • GDDR3 memory • Half-height model	• Great-value video card • 800MHz core clock memory • 128bit memory limits appeal • 6570 card is a better deal
Full review	tinyurl.com/3xruqw5	tinyurl.com/6p9b7kz	tinyurl.com/6feq6ap	tinyurl.com/3h62ti3	tinyurl.com/3Lm8hqe

Top 5 £151+ graphics cards

	HIS Radeon HD 6950	MSI GeForce GTX 560 Ti 448	Zotac GeForce GTX 570	Asus GeForce GTX 560 Ti	PNY XLR8 GTX 580 LC
Price	£216 inc VAT	£240 inc VAT	£265 inc VAT	£170 inc VAT	£452 inc VAT
Website	hisdigital.com	uk.msi.com	zotac.com	uk.asus.com	pnyeurope.com
Overall rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★★☆
Graphics processor	AMD Radeon HD 6950	nVidia GeForce GTX 560 Ti 448	nVidia GeForce GTX 570	nVidia GeForce GTX 560 Ti	nVidia GeForce GTX 580
Installed RAM	2GB GDDR5	1,280MB GDDR5	1,280MB GDDR5	1GB GDDR5	1.5GB GDDR5
Memory interface	256bit	320bit	320bit	256bit	384bit
Core/memory clock	800MHz/1,250MHz	750MHz/975MHz	732MHz/950MHz	830MHz/1GHz	857MHz/1,053MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	1,408	448	480	384	512
Power connectors	2x 6-pin	2x 6-pin	2x 6-pin	2x 6-pin	1x 6-pin, 1x 8-pin
Interface	PCI Express	PCI Express	PCI Express	PCI Express	PCI Express
DirectX	11.0	11.0	11.0	11.0	11.0
Digital interface	DVI, HDMI, DisplayPort	2x DVI, Mini-HDMI	2x DVI, Mini-HDMI	2x DVI, HDMI	2x DVI, Mini-HDMI
Warranty	2 years	2 years	2 years	3 years	5 years
Verdict	• 2GB graphics memory • 5GHz memory clock speed • Best overall value here • GTX 750 chip is faster	• Similar performance to GTX 570 but costs much less • Limited availability • Quieter cards are available	• Impressive detail rendering • Outstrips Radeon HD 6970 at lower resolutions • 320bit memory interface	• Affordable gaming graphics • Slightly overclocked • 384 stream processors • Smooth framerates	• Liquid-cooled • Excellent performance • Noisier than most cards • Most expensive in chart
Full review	tinyurl.com/6qqs8xc	tinyurl.com/cm2mk8q	tinyurl.com/3ub8u3q	tinyurl.com/43uxnp8	tinyurl.com/7jsqkwa

>> Buying advice



Graphics cards

Graphics processor: The GPU determines the quality and refresh speed of images. The GTX 570 is the highest-performing card here, while the 460 and Radeon HD 6850 represent excellent value. Gamers may have to switch off some detail settings with a cheaper card. Substituting one brand of card for another with the same graphics chip and memory allocation won't affect performance.

RAM: Even those on a budget should be able to get a minimum of 1GB of DDR memory. For high-end cards, look for 1,280MB or even more.

Features: DirectX 11.0 support is required only for the most advanced games; cheaper cards are likely to lack the firepower to do justice to DirectX 11.0 games. Demand a DVI or HDMI connection.

Dual-display support: This useful feature adds a second HDMI port to your PC setup.

MATT EGAN

Windows 8 is ARMed and ready for Apple

Windows 8 may be something of a point upgrade for existing Windows PC users, but it could herald the birth of PCs in all shapes and sizes.

After all, Windows 8 runs on the same hardware as its predecessor, and should be a relatively straightforward upgrade. The Metro interface is its only radical change, and it is optional.

But Microsoft is releasing a whole new operating system alongside Windows 8, which has the potential to radically change Windows computing forever. It's also called Windows, but its full title is WOA: Windows On ARM.

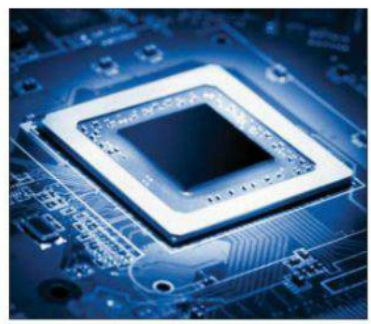
ARM processors have just about taken over the mobile world, and are now found in the majority of tablets and smartphones. And these product categories are growing rapidly as desktop PC sales decline.

> **WOA has the potential to change computing forever**

Windows 8 is designed to be used on desktop and laptop PCs, and on mobile devices. WOA represents Microsoft's ambition to fill the gap between laptops and smartphones with a wide variety of new types of personal computer – thin and light systems with lengthy battery life.

WOA uses the Windows 8 code base and will replicate many familiar Windows design features, such as its desktop interface. In other ways, WOA will be uniquely crafted. It will, for instance, require that devices running it use a system-on-a-chip design.

Any type of device that runs on ARM processors, from the tiniest smartphone to smart-fridges and -TVs, will be able to run Windows. And plenty will, given the popularity of Windows with the majority of the world's computer users. We know Microsoft has been working with tablet makers on ARM-based Windows devices, for instance; expect a lot of those.



But device makers are limited by more than just their imagination. Microsoft has locked down the hardware specification of WOA devices, which extends to such things as the number and type of connectivity ports they support.

This seems like a strange decision on Microsoft's part if it wishes to promote diversity: locking down the hardware specification of netbooks went some way to killing that breed of device (and Windows XP, which was Microsoft's intention).

But there's a bigger prize at stake here. Microsoft has for a long time watched from the sidelines as Apples' App Store has gone from strength to strength. As the Android Market also develops, one thing becomes clear: if you want to sell lots of hardware, you need a viable software ecosystem. And if you want the software, you need to sell lots of compatible hardware.

It's a tough nut to crack, but Microsoft starts from an unrivalled position: it is the dominant player in the consumer and business PC world. It also has pots of cash with which to entice hardware and software makers to commit to Windows. And it has Office – the productivity tool used by most of the world's enterprises, and bundled in with WOA.

WOA is a statement of intent: Microsoft wants to be part of a multi-device world in which Google and Apple don't have things all their own way. That's good news if you like using Windows.

>> Next issue

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TEST CENTRE Ultrabooks
The Ultrabook is Intel's big idea for how Windows laptops can take on the light but power-packed MacBook Air. *PC Advisor* offers buying advice and in-depth reviews of the main contenders.

TEST CENTRE Multifunction printers
We find out how the latest inkjet and laser printers deliver in terms of speed, running costs and invaluable extras, including scanning and copying capabilities.

Video-on-demand
Amazon, Apple, LoveFilm, Sky, Netflix and, er, Tesco, all hope to win over punters willing to fork out for films they can watch on any device, at any time. We break out the popcorn.

Smartphone hacks and upgrades
Troubleshooter looks at how easy it is to jailbreak an iPhone or root an Android handset and highlights the dangers of leaving your gadgetry unsecured.

How to: Windows
Backup tools can do more than just store your files; some can also be used to recreate a Windows installation if your hard drive fails.

How to: Photo
Online photobook services now offer templates so you can create recipe books that show off your culinary prowess. We put on our chef's whites and grab a camera. Ready, steady, bake!

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Vigor 2710Vn	ADSL2+			■	
Vigor 2710VDn	ADSL2+	■		■	■
Vigor 2750Vn	VDSL		■	■	■

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