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 issue number in the subject heading



The future... now

We're already living a future that seemed unthinkable only a few years ago. So, what's next?

We often report on the future gazing of people cleverer even than the combined big brains of Team *PC Advisor*. Hard to believe, I know. And some of the weird and wonderful predictions that have passed down have been just that. But take stock and you'll realise we're living in that future.

We've spent years talking about on-demand- and mobile TV. It always seemed a little far-fetched. Years ago I struggled to see the connection between ISPs and entertainment. Why did NTL try to buy ITV? Or Sky stretch its wings into broadband, and BT make the return journey? One word: foresight.

Taking Sky as an example, a chunk of its customers pay only once for TV, broadband and phonecalls. They watch that TV on smartphones, tablets and laptops, wherever they are, and with Zeebox onboard Sky is going social. Virgin and BT are far down a similar road, with greater mobile broadband connectivity to boot.

The marriage of connectivity and content has happened, and those telcos unable to provide every slice of the pie risk missing out. But, as ever, content is king, and there are myriad ways to enjoy connected entertainment, regardless of who connects you (turn to our apps reviews, on page 43).

Staying in the future brings us to tablets: a form-factor Microsoft has pushed since it introduced Windows for Pen Computing in the 90s. How galling it must be to sit back and watch Apple take the plaudits and the cash with its successful iPad.

HP and Microsoft tried to pre-empt it by announcing the Slate PC just before the iPad launched in 2010. But, unlike Apple, Microsoft didn't have a product to take to market, or a massive cohort of users who had already invested a fortune in music and movies via iTunes. Once again content is king - although, as Amazon is finding out with its under-performing Kindle Fire tablet, it helps if the hardware is good. As we explain in our iPad review (page 32), Apple's latest tablet is that and more.

It's unlikely that the iPad can be overhauled, so great is its dominance, but that hasn't stopped Microsoft wanting to convert its dominance on the desktop into influence in portable computing. Existing, Intel-based Windows tablets are nothing to shout about, and Windows Phone remains niche, but Windows 8 is coming, and it will shake things up. Version 8 is Windows' biggest change since 3.1 gave way to 95. We've spent a few weeks playing with the latest release, and bring you our verdict on page 84. It's a compelling read.

Of course, portable computing doesn't end with tablets and smartphones, any more than the 'PC' in *PC Advisor* refers only to desktop PCs. There's life in the Microsoft/Intel partnership, as the space between desktop and smartphone is filled by an increasing range of devices. Powerful and portable, Ultrabooks offer some of the advantages of tablets, with all the capabilities of laptops. But are they any good? Read our test on page 58 to find out. And as you're doing so, try to forget that the prototype for the Ultrabook is a PC called the Air, made by none other than Apple. ☐

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58 Ultimate Ultrabooks

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76 All-in-one PCs compared

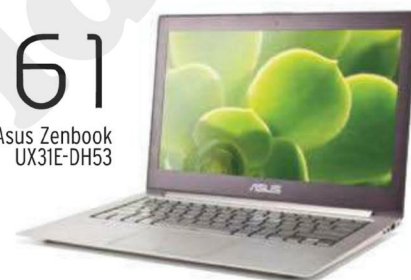
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Microsoft has unleashed the Consumer Preview of its forthcoming Windows 8 operating system. With radical change in the form of a touch-optimised interface, we take a look at the OS your next PC, laptop or tablet will run.

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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

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Which OS?

With a consumer-ready beta of Windows 8 available to download, we wanted to get a better idea of which OSes our Facebook fans were running from day to day. We think **Greg Tait** might have been showing off: "Windows XP, 7, 8 and Server 2008. Android 2.3.5 and 4.0. Ubuntu 10.4 and 11.0. Bring on Ubuntu on Android," he wrote. **Israr Ahmad** also has a pretty impressive setup: "Android, iOS, Windows, OS X Lion and Ubuntu, all on virtual machines."

Operation Global Blackout

If hacker group Anonymous is to be believed, the internet could be brought to its knees on 31 March. Clearly, this news was devastating to our fans. "No Facebook? Nooooooooooooo!" wrote **Victoria Emily Kingstone**. "Well, time to download IP addresses of my favourite websites," added **Joshua Duthie**.

pcadvisor.co.uk/news

Windows 8 to get UK English

At last! Windows 8 will be the first Microsoft desktop OS to include a 'UK English' language option (tinyurl.com/7vwhojq). The entire computing world has previously used a variation on the language referred to as 'US English'. "It would be awful if our children had to continue using spellcheckers that frequently report spelling mistakes in their school work," commented **Johnnyboy**.

Magnificent marketing

We've been publishing every rumour circulating on the web regarding the latest iPad model (tinyurl.com/7z8oast). "Kudos to Apple," wrote **Justinsmorgan**. "Every little rumour creates such rabid interest, which is amazing when companies can spend billions on advertising and still no-one knows the name of their products." (See page 32.)

Adult website hacked

We reported at the end of February that a hacker had stolen one million logins from the YouPorn website (tinyurl.com/83kLj9c). "I'm off to buy some shares in Divorce Lawyers Inc," wrote **Maccyboo**. "Business is going to be booming."



Bye bye Pirate Bay

Infamous file-sharing site The Pirate Bay could be blocked by UK ISPs, following a High Court ruling that the site breaches copyright laws (tinyurl.com/6nnx9od). "There is always another 'Pirate Bay' waiting in the sidelines. The best business model I've seen is from the likes of LoveFilm and Spotify. Offering your product in an all-you-can-eat manner for a one-off flat fee could help combat piracy. Content is king and the quality is queen. Combining the pair and making them accessible to any device is the only way forward," wrote **cloud-zone**.

Flagged: Star letter

Dumbing down the desktop

The Windows 8 Consumer Preview reveals a disturbing trend in computing: the dumbing down of operating systems. I don't want my desktop PC to be like a phone or a tablet. Microsoft is making the mistake of trying to be all things to all people, enabling it to join in with the latest fad. I believe the decision to follow the crowd rather than innovate will trigger the company's demise.

All smart machines owe their programming to the PC, yet Microsoft wants to turn this great platform into a smartphone. It should be giving more power to the PC, not trying to kill it. **Mikeraidj**

Matt Egan, editor, replies: I don't think Microsoft is trying to kill the PC. In fact, the company sees the increasing diversity of personal computing devices as the long-term future of the PC. If Microsoft - and therefore Windows - is to survive and prosper, it can't afford to ignore the tablet market. But smartphones and tablets haven't replaced laptops - we're all using more connected devices than ever before. If you try Windows 8 on a desktop or laptop you'll realise that it isn't that big of an upgrade from Windows 7, but on a tablet it's like a new platform. Find out more in our Windows 8 feature (page 84).



Our Star letter writer wins a £100 gift voucher to spend on gadgets of their choice at boysstuff.co.uk. For your chance to win, tell us your thoughts on the latest tech issues:

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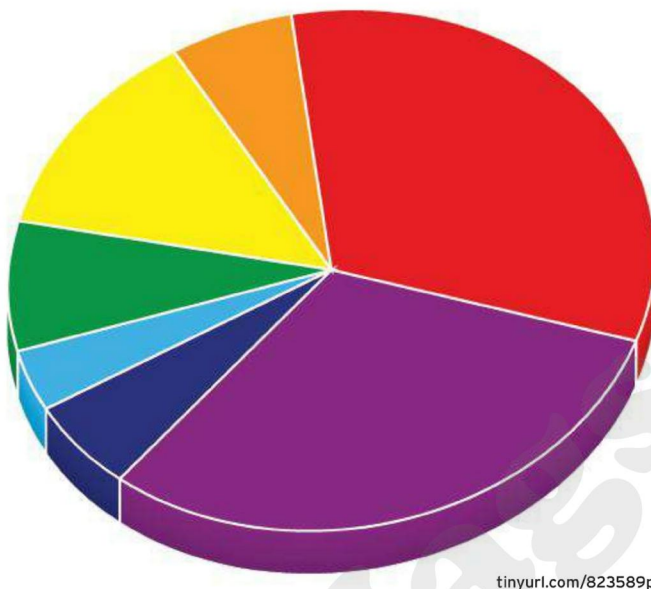
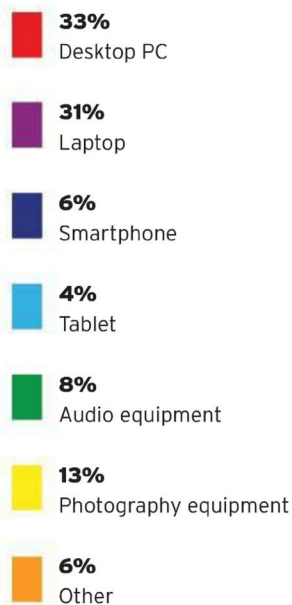
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pcadvisor.co.uk/polls

What's the most expensive piece of technology you own (excluding your TV)?



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Expensive gadgets

The results of our poll (pictured left), in which we asked readers what is their most expensive gadget, make for interesting reading. But we were more interested in the thread subsequently posted by **Blackhat** in Speakers Corner, entitled 'If the wife finds out' (tinyurl.com/879r4t8).

"My new camera body (£898) was only a few hundred in the sales (so she thinks), and my desktop was put together from spare parts in the local shop for a couple of hundred quid *cough*," he wrote.

"That works both ways: shoes and handbags never cost more than a quarter of what they really do," joked **Quickbeam**, quickly adding the word "apparently" to spare himself a black eye. (Apparently.)

"My computers are never very expensive. It's just a little white lie to prevent any upsets; it doesn't harm anyone," wrote **canarieslover**.

exdragon was delighted with **lotvic**'s response, that getting a bargain means you can then buy something else with what you have 'saved'. "I have the utmost difficulty in persuading my other half that this line of thinking is, of course, totally logical," she wrote.

"The trick with desktop PCs is to buy a decent case and change the innards," added **Input Overload**.

frybluff also piped in: "If I told the wife what I spend, how could I tell her we can't afford what she wants? (Not really!)"

As usual, **Forum Editor** was the voice of reason: "It would be an insult to her intelligence if I tried to hide the cost of something from my wife - she could find out the truth via Google in a couple of minutes anyway. What's the point in buying something if you know that it could be the cause of domestic disharmony?"

Well said FE, and shame on the lot of you!

letters@pcadvisor.co.uk

Holy Apple

I hope Mike Bennett was joking when he stated that people place as much weight on their choice of smartphone as the religion they practise (April issue, page 8). I doubt that the many billions of devout Christians, Muslims and others would assign the same level of importance to a move to another religion as they would switching from a BlackBerry to an iPhone. *Pat Doherty*

Marie Brewis, production editor, replies:
In Mike's defence, Pat, we don't think he was referring to these people, to whom there is clearly no comparison. However, an atheist might well regard the smartphone they use as a life choice like any other.

Go, go Galaxy

I was delighted to see the Samsung Galaxy S II win your Best Smartphone of 2012 award. From the reviews I've read online I was beginning to think I was alone in not wanting an iPhone. (Really. And I haven't got the 'lurgy' or anything.)

I'm not anti-Apple. With all the 'facts' in front of me, I still choose Android. It's not the wrong choice, nor the right choice; it's

my choice. Besides, who can say the iPhone is best for all users, without having seen and played with every phone - and every person?

I want to choose what apps I can install, and which one is the default for various tasks. I want to be able to add more storage without buying a whole new (expensive) phone, and click back through apps without returning to the Home screen. Some might say the iPhone is the best-looking phone; me, I think beauty comes in all shapes and sizes, not just 58.6x9.3x115.2mm and 140g.

So what if Google doesn't scan apps for malware? Have I no common sense, can I not install security software? And does it really matter if I have to charge up my phone every night? I can't use it while I'm asleep, and I have plenty of plug sockets.

Apple is well known for its 'just works' technology - no doubt the reason people who don't understand tech are so happy to follow the crowd. But this isn't the 20th century; most modern hardware 'just works' - and all without the help of Siri. I took my current Android handset out of its box, put in the battery, SIM and a MicroSD card, pressed the power button, and you'll never guess what happened... *Alan Roberts* ☒

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APPLE LAUNCHES iPad WITH HD RETINA DISPLAY

Software, graphics, camera and connectivity enhancements make the third-generation iPad a compelling upgrade



Apple has unveiled its third-generation tablet, now known only as 'iPad'. It's the first of its tablets to boast a Retina display, and also comes with iOS 5.1 preinstalled.

Apple CEO Tim Cook unveiled the device in March at an event in San Francisco. The iPad is priced from £399 for the 16GB Wi-Fi-only model. The iPad 2 remains onsale and is now available from £329 (16GB, Wi-Fi).

The iPad has the same size display as its 9.7in predecessors, but now crams 3.1 million pixels by way of a 2048x1536 in-plane switching panel. This produces a pixel density of 264 pixels per inch (ppi).

"Until you see it, you can't understand how amazing it is," said Cook.

Apple first introduced the concept of a Retina display in the iPhone 4, which packed 326ppi into its 3.5in display. The term defines how the average person sees a screen from a certain distance, where the human eye can no longer distinguish individual pixels. The larger screen means the iPad in fact has a lower pixel density than the iPhone, although users will also

tend to hold the device further away from their face than they would a smartphone.

An A5X processor offers twice the graphics performance of its predecessor, and is said to be up to four times faster than nVidia Tegra 3-based Android tablets.

Other enhancements include a 5Mp iSight camera with a five-element lens, an

“

**Until you see it,
you can't understand
how amazing it is**

”

IR filter, automatic exposure, autofocus, face detection, and image stabilisation. The iPad is also able to record 1080p video.

Apple hasn't specified the amount of RAM fitted to its tablet. The original iPad came with 256MB, which the iPad 2 doubled to 512MB; reports from those who have dismantled the latest device suggest Apple has now upped the stakes to 1GB.

The tablet also brings support for 4G LTE connectivity, which offers significantly faster speeds than the 3G to which us Brits are accustomed. Ofcom isn't expected to auction off the 4G spectrum to mobile operators until later this year, meaning UK consumers won't see 4G until at least 2013. However, the regulatory body has authorised Everything Everywhere to re-use its existing 1,800MHz spectrum for 4G trials, which begin in April (see page 12).

The iPad also supports HSPA+ and DC-HSDPA, wireless standards that offer 21- and 42Mbps downloads respectively.

Apple has not added its Siri voice assistant to the new iPad, although the tablet now handles dictation via a microphone icon on its virtual keyboard.

The iPad is 9.4mm thick, and slightly chunkier than its 8.8mm predecessor; it's also a little heavier, weighing in at 652g (the iPad 2 weighs 601g).

The tablet is available in black or white, in 16-, 32- and 64GB capacities, and with or without 4G support; all models offer Wi-Fi. The battery is said to run to 10 hours.

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WINDOWS 8 CONSUMER PREVIEW AVAILABLE NOW

Touch-optimised Metro interface allows Microsoft to expand its offerings in the mobile market

Microsoft released the Consumer Preview of its forthcoming Windows 8 OS at Mobile World Congress in February.

Windows 8 offers two user interfaces: a new Metro tile-based system, optimised for touch, and the 'Classic' Windows desktop. Keyboard-and-mouse input continues to be supported in this latest iteration of Windows, allowing users to switch seamlessly between the two modes of control.

Microsoft emphasised in its keynote the continued power of the Windows computer, yet its Metro interface is clearly targeted at the exploding market for Ultrabooks and tablets. Such devices open up computing to a new world of mobile services, including always-on



social- and cloud-based offerings, and wireless networks that combine cellular, 802.11 Wi-Fi, Bluetooth and near-field communications (NFC).

The Consumer Preview allows home users to explore the forthcoming OS; Microsoft will have detailed Windows 8's enterprise features at the CeBIT tradeshow by the time you read this.

Mobile World Congress put on display around 20 prototype devices and reference designs running ARM processors from Microsoft partners. It marks the first time the company has specified the use of non-Intel silicon. Sadly, onlookers were not allowed to get a hands-on preview.

Microsoft's partnership with ARM does not represent a compromise in performance. Indeed, Office 15, the next instalment of the company's productivity suite, was also seen to be running on ARM processors at Mobile World Congress.

Apple's App Store reaches 25 billion downloads

Disney's Where's My Water? Free nets one lucky downloader an iTunes gift card worth \$10,000

More than 25 billion apps have been downloaded from Apple's App Store since its launch in 2008.

The Mac maker has been running a competition to see which app would be successful in helping it hit the milestone, with a countdown ticker placed in its store.

Disney's Where's My Water? Free was the winning app, and the lucky downloader, Chunli Fu of Qingdao, China, won an Apple gift card worth \$10,000, redeemable at the iTunes Store, App Store and Book Store.

"A billion thanks. 25 times over. The 25 Billion App Countdown has ended. The App Store has reached 25 billion downloads. Thanks for getting us here," stated Apple.

Apple celebrated its 10 billionth download in January last year, two and a half years after its launch. The App Store has since seen a further 15 billion downloads in a comparatively short 14 months.

The App Store has in excess of 500,000 apps, and still leads its rivals in both app and download counts.



Google launches Google Play combined content store

Android Market rebranded • Media is available across all your web-connected Android devices



Google has launched Google Play, a combined content store for a number of its services, including its app store the Android Market.

In the US, the cloud-based one-stop shop includes movies, music, apps, games and books. In the UK, Play offers only movies, books and apps.

"We're eliminating all that hassle [of multiple stores, moving files and synching] with Google Play, a digital entertainment destination where you can find, enjoy and share your favourite music, movies,

books and apps on the web and on your Android phone or tablet," said Google.

Google has already rebranded the Android Market website and its associated Market app on Android smartphones and tablets.

Google Play contains 20,000 music tracks, more than 450,000 Android apps and games, the world's largest selection of e-books and thousands of movies.

Any content you purchase is available online and across all your web-connected devices.

Virgin Media to provide Wi-Fi at tube stations

Virgin Media has won a contract to provide free public Wi-Fi access at London Underground stations during the 2012 Olympics. The service will be made available at more than 80 stations ahead of the games, and up to 120 by the end of the year. The ISP said passengers will be able to connect to the Wi-Fi for free from July using devices such as the new iPad.

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Tesco offers £2.50 broadband

Tesco has unveiled a broadband service that costs just £2.50 per month. The subscription must be taken with line rental (a further £13.75 per month), and applies for 12 months. Following this period the subscription will switch to a 30-day rolling contract at £6.50 per month. Tesco's deal offers speeds of up to 20Mbps and inclusive evening and weekend landline calls.

MORE: tinyurl.com/7yrmyr7

TalkTalk unveils 80Mbps broadband

TalkTalk has announced an 80Mbps fibre-optic broadband package that will go live in April. Existing customers can pre-register for the service, which costs an extra £15 per month on top of their current Essentials or Plus subscription. The firm's fastest package previously offered up to 40Mbps. A one-off £25 activation fee applies.

MORE: tinyurl.com/7f8Long

VIRGIN MEDIA BEGINS BROADBAND SPEED HIKE

Customers will see their broadband connection speeds double or even triple

Virgin Media has begun its nationwide programme to double its customers' broadband speeds, initially reaching 1.5 million homes.

The firm is currently rolling out the improved service in Newcastle, Bedford, Cambridge and Ashford.

Jon James, executive director of broadband at Virgin Media, said: "Virgin Media has driven broadband development in the UK and we're delighted to be boosting our customers' broadband speeds once again. Following our Double Speeds programme, all our customers will be 'super-fast' as standard, and ready to access a new breed of high-bandwidth entertainment services.



"By continuing to give our customers faster speeds and greater-value services, we're committed to providing them with the best broadband in the UK."

Customers of Virgin Media's 10-, 20-, 30- and 50Mbps services will see their speeds double or triple, while subscribers to the 100Mbps

service will receive a speed boost to 120Mbps, plus a reduction in the cost of their subscription.

Virgin Media's 120Mbps service is currently the fastest broadband package available in the UK.

Subscribers to the 50Mbps deal will also be bumped up to 120Mbps when it's rolled out in their area, while the 20- and 30Mbps packages will be boosted to 60Mbps, and the 10Mbps deal to 20Mbps.

The faster network will be rolled out over the next 18 months, reaching more than 4 million customers, according to Virgin Media. Customers can find out when their area will be upgraded at doublespeed.virginmedia.com.

EVERYTHING EVERYWHERE TO ROLL OUT 4G IN 2012

Mobile network Everything Everywhere has announced plans to roll out 4G services before the end of 2012, with a trial planned for Bristol in April. The news follows authorisation from Ofcom that Everything Everywhere can use its existing 1,800MHz (2G) spectrum to provide 4G services.

The company claims that the trial will provide it with "key learnings" on the performance of 4G LTE over the 1,800MHz spectrum.

However, not all Everything Everywhere customers will immediately benefit from the faster service. A spokesperson confirmed that the rollout will occur on a "region-by-region" basis, but provided no details of expected time scales.

Everything Everywhere is also undergoing a nationwide upgrade to its 3G technology, and is currently rolling out a HSPA+ 21 service across its network. The upgrade is 60 percent complete, and due to be finalised in the third quarter of 2012.

HSPA+ 21 should enable Everything Everywhere customers to receive an estimated 50 percent increase in data download speeds (up to 21Mbps), and up to 100 percent faster upload speeds.

Everything Everywhere is also planning trials of HSPA+ 42 in the second quarter of 2012, and expects to roll out the technology to customers by the end of the year. HSPA+ 42 offers faster download speeds, at up to 42Mbps.

Orange broadband package includes calls to mobiles

First in UK to combine mobile minutes and broadband



Orange has launched a new broadband package that combines unlimited broadband and landline calls with 500 minutes of free calls to mobile phones each month.

The 'Broadband and Anytime Mobile Calls' deal costs £15 per month, plus line rental.

Sylvain Thevenot, director of marketing and propositions at Orange Broadband, said: "We want to make keeping in touch

with friends and family, no matter where they are, as simple as possible. This is why we've created the UK's first ever package with inclusive mobile minutes."

Customers will receive a free copy of McAfee Anti-virus 2012 and Parental controls, and a Bright Box wireless router. Orange services such as Orange Wednesdays and Orange Films to Go are also included with the deal. ☑



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*A 2010 QualityLogic study commissioned by HP comparing Original HP LaserJet Monochrome print cartridges with nine brands of non-HP toner cartridges available in Europe, the Middle East and Africa for the HP LaserJet P1505 and P4015 printers, HP 36A and 64A. For details, see www.qualitylogic.com/EMEAmonotonerest.pdf.

Smartphones in 2012: price

Established vendors will have a tough year as they try to keep inexpensive smartphones from Chinese vendors at bay. Mikael Ricknäs reports

Established vendors such as HTC, Sony, Motorola and LG want to set apart their smartphones from less expensive devices made by ZTE and Huawei. But as looks and hardware specifications are becoming more similar, and software differentiation harder, having a better reputation is their last ace.

Despite offering a plethora of new smartphones at Mobile World Congress (MWC) 2012, vendors such as HTC, LG, Sony and Motorola are still facing the same problems as they did before the show, said Geoff Blaber, an analyst at CCS Insight. They are being squeezed on one side by Apple and Samsung's growing market shares, and on the other by Huawei and ZTE's low pricing.

The Chinese vendors have a clear strategy, said Francisco Jeronimo, research manager at IDC. "They try to make their products as similar as possible to those from established vendors, and hope consumers will go for their cheaper versions."

The quality of Huawei's phones has improved a lot over the past couple of years,

although ZTE's products still lag behind Huawei in that regard, said Blaber.

The established vendors don't want to compete on price with Huawei and ZTE, so they need to set their products apart. Of course, doing either via software or hardware is increasingly difficult, according to Carolina Milanesi, research vice-president at Gartner.

"There isn't much I've seen that would drive me from one vendor to the next," Milanesi said.

On the hardware side, the focus at MWC was very much on processors, especially quad-core chips. "It is a race, and something that makes headlines," said Jeronimo. However, he doesn't think the addition of two more cores will make much difference to users, since there aren't many applications that can take advantage of the extra cores.

And while LG and HTC are releasing smartphones with quad-core processors and big screens, so are Huawei and ZTE.

Plan of attack

HTC is getting kudos for its deal with Dropbox, which will integrate cloud storage service on smartphones. "It's reassuring that HTC is not starting from scratch and trying build its own service," said Blaber.

HTC has also launched Media Link, which allows users to integrate their smartphones with their TVs. "It's kind of important, because HTC doesn't have a TV business and everyone is talking about integrating multiple screens," said Milanesi. But turning that accessory into an advantage, when a user is standing in a store choosing their next device, will be a challenge for the company, she added.

HTC also has an edge over Huawei on the quality of its hardware. Where it falls down is in its marketing, according to analysts.

"HTC has to stop being quietly brilliant and be a bit more gutsy in its advertising and really communicate what it stands for," Milanesi said.

Several vendors have previously tried to win over consumers by customising the Android OS they share with their rivals. But this approach isn't sustainable, according to Blaber, who pointed out that each will be back to square one every time Google releases a new version of Android.

"Google will announce the next version of Android in three or four months, and then they are on the back foot again," he said.



If established vendors really want to stay ahead of Huawei and ZTE in the market, they need to take advantage of the strength of their brand power. The one thing Huawei and ZTE still lack are well-known brands.

"Brand is particularly important in the high-end market, where phones get more complex and users want either the security or to show off the brand itself," said Milanesi.

“ They make similar devices to those from established vendors, and hope consumers will go for their cheaper versions ”

To ensure that their smartphones remain desirable in comparison, ZTE and Huawei must sell their hardware at prices some 30 to 40 percent lower than these well known brands, added Jeronimo.

New competition

Japanese vendors Panasonic and Fujitsu also hope to claim a slice of the smartphone market, and both companies presented smartphones at MWC. Their chances of success are slim, however.

"I think they are going to have a really hard time," said Milanesi. Jeronimo agreed: "They don't stand a chance."

Just like many vendors before them - including HP, Acer, Toshiba and Dell - they have the impression that strength in the laptop market will translate into success



vs brand

in the smartphone market. That's simply not the case, said Jeronimo. Panasonic and Fujitsu will succeed here only if they spend a lot of money on getting operators to subsidise their own devices, then dropping their prices below those of Huawei.

Even if there were many impressive smartphones launched at MWC, it remains to be seen how competitive they will be. That question will be answered when Samsung launches the Galaxy S III.

"Last year, everyone was stunned by what Samsung achieved with the Galaxy S II. It changed the game; it was significantly thinner [than the Galaxy S] and had a phenomenal screen," said Blaber.

MWC wasn't just about Android, though. Nokia continued to build on its Windows Phone 7 portfolio, with the introduction of the Lumia 610. This low-cost device will be available in the second quarter of 2012 with an estimated retail price of £160.

"I think Nokia has done a very good job. No-one was expecting to see a device at that price point before 2013," said Jeronimo.

The speedy arrival of the Lumia 610 shows how well the relationship between



The **NOKIA LUMIA 610** budget smartphone runs Windows Phone 7

Nokia and Microsoft is working - but now they must continue to deliver new models, including even cheaper ones, and develop more services, said Milanesi and Jeronimo.

Nokia will also face competition from the Chinese vendors. For example, ZTE has launched the Orbit, which is also an inexpensive Windows Phone handset.

"The ZTE Orbit could turn out to be a real thorn in the side of Nokia," said Blaber.

Overall, MWC was a success. Attendance was up by 11 percent over the previous year, with more than 67,000 visitors, which includes delegates, exhibitors, contractors and the media, from 205 countries, according to organiser GSM Association.

Starting next year, MWC will be held at the Fira de Barcelona Gran Via, a move that will provide approximately 50 percent more space. The event will be held on 25-28 Feb. ☒

HUAWEI and ZTE have some very promising handsets in their line-ups



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At the heart of the image





Ultrabooks: buy now, or wait?

A second wave of Ultrabooks, with touchscreens and longer battery life, is due later this year. Agam Shah investigates whether second-generation Ultrabooks are worth waiting for

A new category of thin-and-light Windows 7 laptops called Ultrabooks has emerged in the past few months, but questions remain as to whether the time is right to buy or if you should wait for Windows 8 touchscreen models.

The initial Ultrabooks resemble Apple's MacBook Air, and models are already available from HP, Dell, Acer and Lenovo. The first Ultrabooks are thinner and lighter than standard laptops, but are expensive with prices starting at around £650.

As the biggest backer of Ultrabooks, Intel has said starting prices of the devices will drop to £450 by the end of the year. The company also hopes future Ultrabooks will blur the lines between laptops and tablets, with features such as touchscreens, long battery life, always-on connectivity and voice-recognition capabilities.

A few prototype Ultrabooks with touchscreens, such as Lenovo's IdeaPad Yoga, were shown at January's Consumer Electronics Show in Las Vegas. Yoga turns into a tablet by flipping the screen backward, and users can take advantage of the touch interface in the forthcoming Windows 8 OS. The Yoga will ship later this year.

Apple's MacBook Air has proven that buyers are willing to pay a premium for thin-and-light laptops, and Intel hopes

Ultrabooks get the same response. The Intel-dominated PC market has weakened as people gravitate toward tablets with processors designed by ARM, which is also looking to enter the PC market. Intel has virtually no presence in the tablet market.

Lenovo IdeaPad U300S

We took a test unit of Lenovo's IdeaPad U300S for an extended whirl. Its starting price of around £820 may not please buyers, but the Ultrabook provided a peek into the future of Windows laptops.

Lenovo's U300S is extremely thin, with a generous 13.3in screen. It can be held in one hand and fits into a bag designed to hold smaller laptops. Ultrabooks have to meet certain design criteria set by Intel, including not being more than 21mm thick.

Our sample came with an SSD, and the Windows 7 OS booted in just over 10 seconds. Ultrabooks such as HP's Folio 13 come with a hard-drive option, but an SSD enables a faster bootup. The U300S came back from sleep mode almost instantly, a significant improvement from past laptops we've used.

The Ultrabook has a 17W variant of a Core i7 Sandy Bridge processor. Applications loaded quickly and casual shooter games ran without losing frames. The laptop's battery life was between 6 and 8 hours.

The chiclet keyboard made typing easy, and the Ultrabook was cool in use. The U300S has standard laptop features, such as USB 3.0 and HDMI ports, although the display isn't as sharp as in-plane switching screens found on some models.

When to buy

If you need a lightweight laptop right now and can afford to shell out more than £650, an Ultrabook could be worth a look. But the next phase of Ultrabooks, due later this year, may be cheaper and could include features such as touchscreens.

The first phase of Ultrabooks highlights the thin-and-light design and "ultra-responsiveness", said Becky Emmett, an Intel spokeswoman. It also provides a foundation on which the company can engineer its second wave of Ultrabooks, which will be faster and more user-friendly.

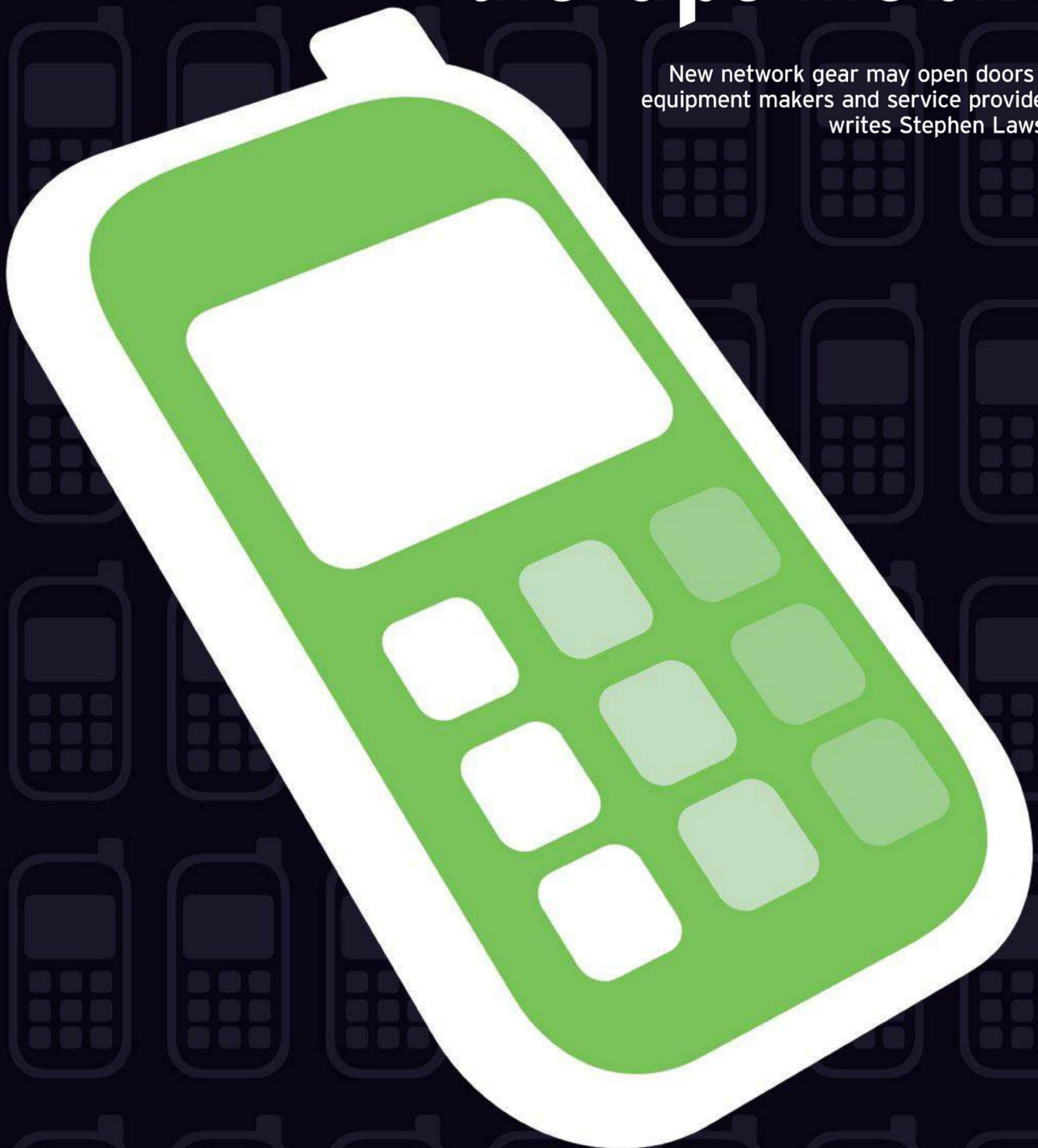
The next phase of Ultrabooks will run Core processors based on the forthcoming Ivy Bridge microarchitecture, which will speed up programs and graphics. The chips will have 3D transistors, which will make the processors faster and power-efficient.

A third phase of Ultrabooks will follow in 2013, with Intel chips codenamed 'Haswell'. Laptop battery life should improve significantly with Haswell, said Emmett. ☒

>> See page 58 for our round-up of the latest Ultrabook and ultraportable laptops

Wi-Fi, small cells could disrupt mobile

New network gear may open doors for equipment makers and service providers, writes Stephen Lawson



The rise of mixed mobile networks of Wi-Fi, small cells and traditional base stations, a major theme of this year's Mobile World Congress in Barcelona, may change the competitive landscape of both service providers and equipment vendors.

Numerous infrastructure vendors, including major suppliers, such as Alcatel-Lucent and Ericsson, as well as smaller and newer players, introduced small base stations for use inside buildings and in outdoor spaces that are dense with cellular users. These will complement the traditional macro cells typically found on cell towers and roofs, which can cover entire neighbourhoods.

Although carriers have in the past used smaller radios such as picocells to aid coverage indoors, those have been relatively expensive, specialised devices, planned and installed by carrier engineers, that often use an in-building distributed antenna system (DAS). The new generation of base stations, including femtocells already deployed in many homes, are intended to be less expensive and closer to mass-produced consumer electronics. Wi-Fi is also poised to play a bigger role in mobile networks, both in hybrid small cells and through new standards for making access points act more like cells.

Service disruption

Like other new technologies, these small network elements and tools for making better use of them could disrupt both the network gear business and the market for mobile services. More competition should mean more options and lower prices for service providers, and ultimately for consumers. But there are constraints on new players, and it's too early to know how successful the emerging players may be.

The Small Cell Forum, an industry group promoting femtocells and other new types of network-edge equipment, envisions a small-cell industry that would look more like the ethernet LAN ecosystem than current cellular infrastructure business. The Forum has published APIs that define consistent interfaces between the components of small base stations.

Today's macro base stations tend to be specialised designs rather than standard hardware made from common types of parts, said Simon Saunders, chairman of the Small Cell Forum. Likewise, the established vendors of cellular equipment often use their own interpretations of standards for signalling between the components of a network. That model needs to change because smaller cells need to be made in larger numbers, at lower cost.

"Macro cells get produced in their tens or hundreds of thousands and, right from the beginning, we've known we needed to add triple zeros to that in the world of femtocells," Saunders said. "It becomes proportionally more important to take the steps to allow reusability of parts."

But it remains to be seen whether this type of revolution will take hold, said Mark Bole, CEO of cellular filter maker Mesaplexx, who has built up several wireless startups.

"When it's a paradigm shift that's happening with a shift to the small cell it creates an opportunity for new players," Bole said. "How it will play out in the long term, and where the scale benefits will really come through are the interesting parts of it."

"It creates an opportunity, but can that opportunity really be seized by the new players?" questioned Bole.

Even if small cells are built around interoperability standards, the pervasiveness of traditional macro cells from the big vendors may turn compatibility with that older gear into a gating factor for startups after all, said Gabriel Brown, an analyst at Heavy Reading.

The new prospect of using Wi-Fi as a more integral part of mobile operator networks may also open the door to new players. Vendors both large and small, including Cisco Systems, Ruckus Wireless and ip.access, introduced products designed to use the Hotspot 2.0 specification. Hotspot 2.0 is an open standard for making Wi-Fi hotspots available without the need to enter usernames and

passwords, and to help users roam from cells to hotspots seamlessly.

Ruckus, a specialist in Wi-Fi for large venues and service providers, debuted as a provider of hybrid access points with both cellular and Wi-Fi, and of equipment for managing cellular networks. And although Cisco already sells a mobile packet core product, the growing role of Wi-Fi could make it a more significant player in mobile operator networks even without selling cellular radios itself.

However, established vendors including Ericsson and Alcatel are also integrating Wi-Fi, and unveiled strategies and products at Mobile World Congress for the heterogeneous networks that carriers are expected to start building.

Better integration of Wi-Fi into mobile networks may also open doors to new competitors to the established carriers. Dennis Steiger, CTO of Shaw Communications, sees new competitive potential in mobile through Wi-Fi. The Canadian cable operator plans to build an extensive network of Wi-Fi hotspots using Cisco gear and participate in a trial of Hotspot 2.0 using the company's service-provider Wi-Fi products.

Although Shaw originally planned to bring its customers mobile services through a traditional macro cellular network using LTE, it later decided that Wi-Fi hotspots, with a lighter overlay of LTE, better suited its subscribers' mobile needs, Steiger said.

Shaw is already discussing possible roaming agreements with mobile operators, which could weave its Wi-Fi network in with widely available mobile services. Subscribers to established mobile carriers are likely to see more Wi-Fi sites opened up to them, offering opportunities to save money or hold off data caps by offloading their activities from the cellular network.

However, those opportunities will probably come mostly in the subscriber's own country. Even a technology revolution is unlikely to make international data roaming cheap or free, at least for now, said Ovum analyst Daryl Schoolar.

"There's a lot of money in that roaming stuff," Schoolar said. ☒

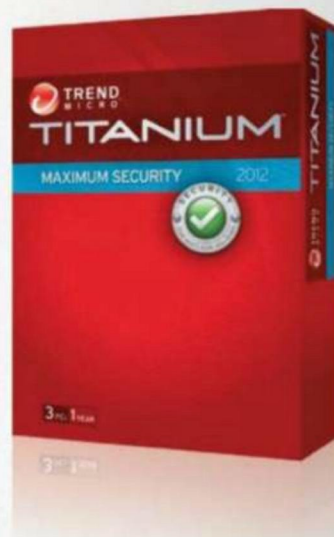
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AMD fights back against Intel

Recent moves in the server market suggest AMD is far from a spent force, writes Agam Shah

Intel suffered a setback in the server market with the news that its former partner, SeaMicro, is being acquired by AMD. But the world's top chip maker said it was internally developing technology to remain competitive in the server market.

Intel is developing integrated fabrics to boost I/O and high-performance networking and storage in servers, said Jason Waxman, general manager of Intel's Data Center business unit. The technologies are being developed as it tries to boost its presence in the market for dense servers used in cloud-computing deployments in data centres.

AMD is paying \$334m for SeaMicro, which was previously in a tight partnership with Intel to develop dense servers. AMD plans to sell SeaMicro-branded servers and license to customers its fabric technology, which virtualises I/O and ties together storage and networking. The deal was expected to close as we went to press.

Playing catch-up

SeaMicro provides AMD with an instant presence in the nascent but fast-growing dense server market, and Intel will now be playing catch-up. SeaMicro currently sells servers only with Intel processors, and it's likely that AMD will swap those with its own chips. Intel said it will continue to provide processors for SeaMicro servers, depending on the requirements.

AMD's purchase of SeaMicro was an unexpected but smart move, said Nathan Brookwood, principal analyst at Insight 64.

The dense server market is growing as companies look to curb electricity costs by deploying low-power servers to respond to web and database queries.

But AMD's prize in the acquisition is SeaMicro's specialised fabric. SeaMicro's dense servers have many credit-card-sized motherboards that are connected by the fabric, which reduces the need for extra storage and network controllers.

It could take Intel years to develop technology that is competitive with SeaMicro's fabric, Brookwood said. And Intel will need to prove its technology is reliable before it is widely adopted.

"Intel has all the technology and the smart people to put this together, but it takes time," said Brookwood.

The deal gives AMD a head start, but it will also intensify Intel's focus on developing related technology, said Dean McCarron, principal analyst at Mercury Research.

Intel's Waxman didn't specify how Intel would build the fabric and I/O technology, but said the company would utilise assets from recently acquired networking companies. In July it acquired Fulcrum Microsystems, which makes ethernet switches, and in February it purchased InfiniBand assets from Qlogic, which provides high-performance fabric technology for servers. Intel also will remain competitive through new processors, memory and system-management technologies.

But by the time Intel's fabric technology matures, analysts said that AMD could be

far ahead in the integration of SeaMicro's technology inside chips. AMD in the future will allow implementation of third-party intellectual property inside chips and, by 2013 or 2014, SeaMicro's IP could be inside Opteron server chips.

SeaMicro's application-specific integrated circuit (ASIC) controlling the fabric is placed on the motherboard alongside the CPU and memory. It could be similar to Calxeda's EnergyCore chip when integrated inside a chip, which will be used by HP in its forthcoming ARM server. The Calxeda chip includes cache, an 80-Gigabit fabric switch and optimised power management.

AMD will be able to license the fabric technology to work on ARM processors, which could also put pressure on Intel. ARM processors are mainly found in smartphones and tablets, but there is growing interest in building power-efficient ARM servers.

AMD will be able to differentiate its offerings from Intel's by selling SeaMicro technology with either ARM or x86 processors as early as 2013, said Matt Eastwood, group vice-president for enterprise platform research at IDC.

AMD currently offers only x86 chips, but the company's chief technology officer, Mark Papermaster, has not ruled out implementing ARM IP on its future chips.

But Intel's Waxman said the AMD-SeaMicro deal does not change Intel's dense server strategy, and the chip maker will continue to work with customers such as Dell and Tyan. ☒

PC Advisor meets Suzi Perry

Chris Martin chats to The Gadget Show hostess about all things tech

We recently took some time out and headed down to the Ideal Home Show in London's Earls Court to chat to Suzi Perry. Suzi is hosting the 'Home of the Future' exhibition, but may be better known to some of our readers for her time on *The Gadget Show*.

How many connected digital devices do you have on you right now?

In my bag I've got an iPhone, an iPad, probably a camera, so three.

What gadget wouldn't you be without?

My iPad. I think it's the greatest convergence gadget ever.

Even though you can't make calls?

I don't make that many calls. Data is now king and the spoken voice is diminishing somewhat. Soon we won't be able to speak at all - it will just be our fingers tapping away.

What was your first computer?

A Compaq Presario something or other. It was really early days so it could have been running Windows 95. I just remember being amazed by it because it was my first laptop. I was terribly excited.

What's your favourite app?

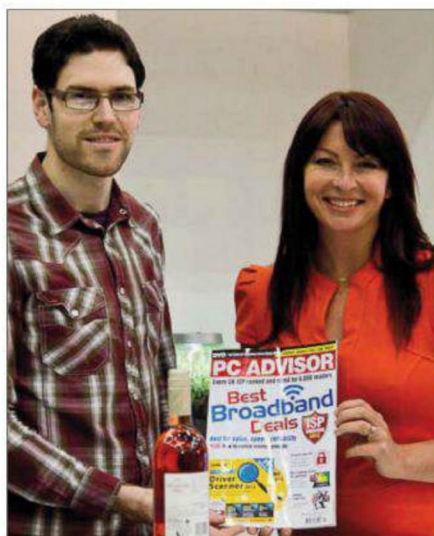
I'm still loving Instagram. I like camera apps and I love photography, so Hipstamatic and Instagram are great for taking quick photos, changing them, making them look cool and then sharing them with your mates.

What gadget can't you travel without, excluding the iPad?

A good SLR camera. It's the only time I get to take good pictures, rather than just snaps for Twitter or social networks. It's the only time I get to properly test gadgets.

What are you most excited about in the tech industry this year?

I'm really excited about skinny OLED tellies becoming more affordable. I feel like I could just put my hand in and take something out. And 4G: I can't wait. Move on already 3G. And the Lytro, the camera where you can re-focus after you've taken the picture. I love the idea of that - a sort of sideways swing in photography. I think it would be good for smartphones; I wonder whether it might be in the next iPhone.



What's your opinion on 3D?

I've never got absorbed in the whole 3D thing. I've accepted that it's good to have a 3D-ready TV. It does suit some movies and animated films. I used to think 3D was like tuberculosis - it came around every 20 years. But it seems like it's here to stay.

Worst gadget you've seen or reviewed?

I once reviewed a pair of flip-flops that had a reservoir for liquid, so you could take a drink out, walk on it all day, then pick up your shoe, unscrew it and drink out of it. And there's a cat toilet - you train a cat to go to the toilet on your toilet. It's really strange.

What task or function do you wish your smartphone or tablet could do?

I wouldn't mind better voice-recognition. Siri was introduced in the last iPhone, but it's still quite American-based and I think there's definitely a future for it. I would like to just grab it, shout at it, then throw it down - and it would do what I wanted it to do, instead of saying there's no business in the UK.

Apple says we're in a post-PC era. Do you think tablets will replace PCs or laptops?

I think that's some way off. It's an Apple line. People love the tablet market, but I still think they embrace laptops and PCs, and quite like to have that safe home computer that's not in a bag and could get bashed about.

What gadget do you wish you'd invented?

I wish I'd invented the radio or the television, because their inventors are the two Gods of

gadget creation as far as I'm concerned. Or the electric kettle, which was launched here at the Ideal Home Show in 1930.

Which up and coming company should we look out for this year?

Can I say an inventor? There's a really fantastic British inventor, Tom Lawton, who has made Bubblescope. He's invented an optical device that you put on your phone and it will take 360-degree pictures. It's £50, and it's brilliant.

What would you most like to see in the 'Home of the Future'?

We've got some good stuff this year, but I'd like things to be more affordable. We've got the transport pod, which is fantastic if you're really shattered. You crawl in and the sound resonates through the water bed as you drift off. It's like a technical cocoon I suppose, but it's \$19,000. All the things I want are always really expensive. As we know, they come down and down in price, and when they get to consumer level they boom. I'd also like a house that cleans itself.

What type of technology do you think is most responsible for getting girls excited about computer tech?

I think the first truly unisex gadget was the iPod. It was simple, it was easy to use, it looked beautiful, it worked, and everybody wanted to have one. You don't really hear about other MP3 players any more, it's always all about the iPod. It showed that girls wanted what boys wanted, but then manufacturers went on this awful condescending pink patterned thing for girls. We just want beautiful technology that works; just the same as men.

You're clearly keen on Apple's products.

Why do you think Apple has got the customer experience right, while much of the tech industry is still in the dark ages with products that don't always 'just work'?

I would put it down to Steve Jobs. I don't want you to think that I'm Apple-tastic, but the man was a complete visionary. Apple was the first company to make gadgets look beautiful and affordable. It still has people queuing around the block for its gadgets, thanks to brilliant marketing. That's what it comes down ultimately: vision and marketing. ☒

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NEWPRODUCTS

Chris Martin rounds up the hot gadgets
topping our technology wish list



Photograph by Dominik Tomaszewski

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Apple iPad <<

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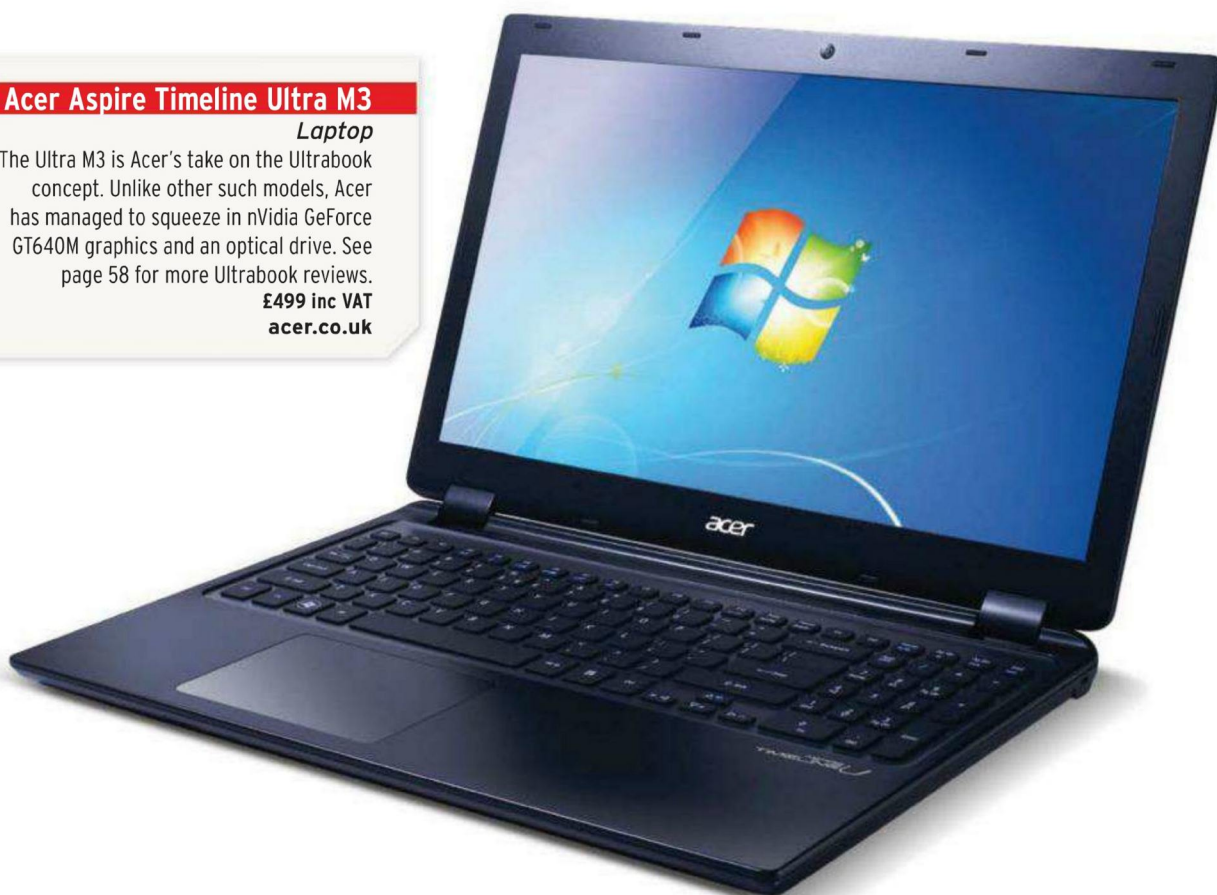
The iPad is Apple's third-generation tablet. It has the same size 9.7in screen as its predecessor, but with a Retina-quality 2048x1536-pixel resolution. It also has an enhanced A5X processor with quad-core graphics. Read our review on page 32.
£399 inc VAT (16GB Wi-Fi)
apple.com/uk

>> Acer Aspire Timeline Ultra M3

Laptop

The Ultra M3 is Acer's take on the Ultrabook concept. Unlike other such models, Acer has managed to squeeze in nVidia GeForce GT640M graphics and an optical drive. See page 58 for more Ultrabook reviews.

£499 inc VAT
acer.co.uk



>> HTC One X

Smartphone

The One X is the latest model in HTC's Android smartphone line-up. It has a sleek design and a 4.7in HD touchscreen. The One X is powered by a 1.5GHz quad-core CPU, and sports an 8Mp camera and Beats Audio.

Around £500 inc VAT
htc.com/uk



Sony Alpha A57 <<

Digital SLR camera

The Alpha A57 is a digital SLR camera with a translucent mirror for fast shooting up to 12fps. It boasts a 16.1Mp, Exmor APS HD CMOS sensor and a 3in LCD screen.

Around £700 inc VAT
sony.co.uk

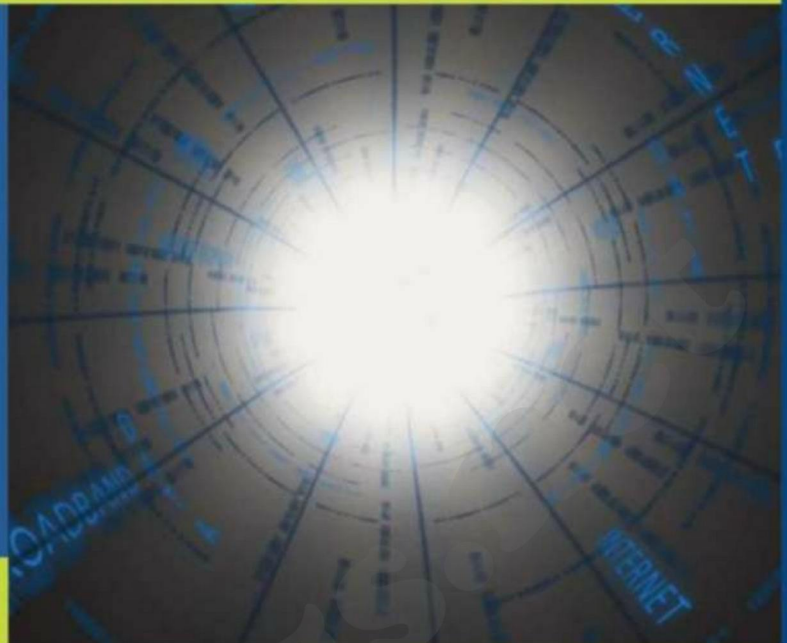
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>> Samsung Galaxy Note 10.1

Tablet

Samsung has combined its Galaxy Note and Galaxy Tab 10.1 tablets to create this Galaxy Note 10.1. It's a 10in-screen device running Android 4.0 Ice Cream Sandwich, with a stylus for notation and drawing.

Price TBC
samsung.com/uk



WD My Book Thunderbolt Duo <<

External hard drive

The My Book Thunderbolt Duo is an external drive that's available with 4- or 6TB of storage capacity, and configurable in a Raid 0/1 array. Its high-speed Thunderbolt interface can transfer data at up to 10Gbps.

£499 inc VAT (4TB)
wdc.com



Logitech Touch Mouse M600

Optical mouse

The Logitech Touch Mouse M600 is a wireless optical mouse with a touch-sensitive surface. The mouse responds to swiping and scrolling in a similar fashion to a touchscreen smartphone.

£69 inc VAT
logitech.com/uk



AOC d2357Ph <<

Monitor

AOC's 23in full-HD d2357Ph is a stylish monitor that supports passive 3D technology. Its removable stand makes it ideal for mounting to a wall.

Around £200 inc VAT
aoc-europe.com

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*Cost comparison: One year BT Retail ISDN30e with 10 channels and 100 DDI quota plus CLIP - £190.80 per month. Spitfire SIP SDSLM 2MB 1:1 with backup ADSL circuit, 10 SIP Voice over IP trunks and 100 DDIs - £94.00 per month. Saving over 50% per month with guaranteed ISDN30e call quality and backup circuit. **Offer available for limited time only, conditions apply.



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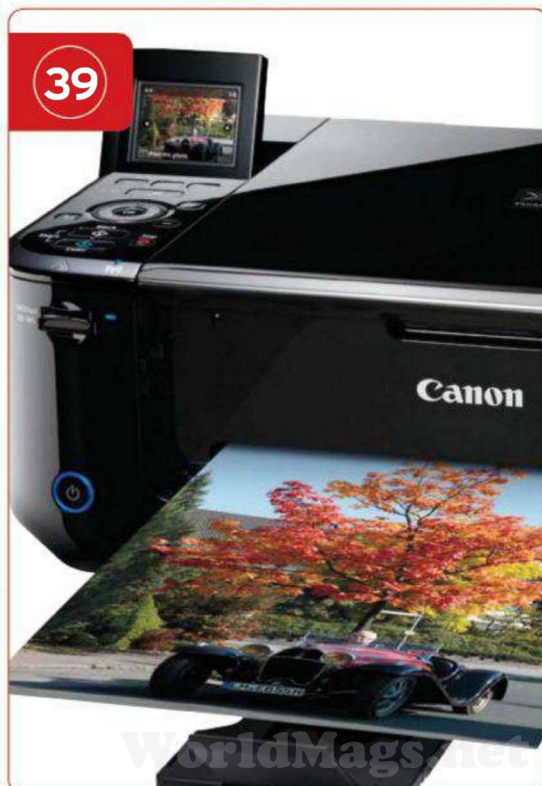
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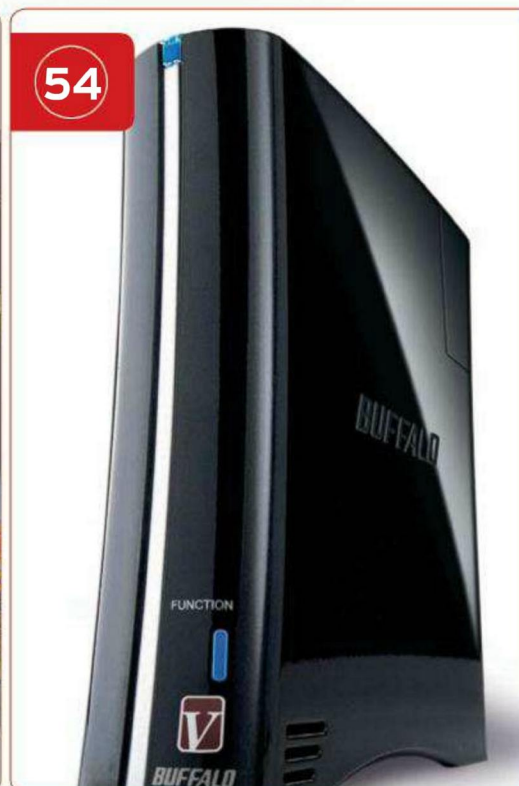
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54

ANDREW
HARRISON

Retina scan

Ever wondered why the iPad garners so many column inches? The sceptical put it down to marketing, but converts to user-first computing point to its decent design and fine engineering. The result is a handheld PC that can genuinely enhance our lives.

And now the media's magnifying glass is on the iPad 3. If you've ever used or even just held the Apple iPad 2, there's not a lot to distinguish this third-generation model. Until you switch it on.

The most badly kept pre-launch secret is true: the new iPad has a quad-resolution screen, with twice the pixel count in each direction. It crams in 2048x1536 vibrant pixels.

Provided that you hold it at the same reading distance as you might a book, you get what Apple calls a 'Retina' display.

Some Android phones are heading this way too, such as the Galaxy Nexus with its 316dpi screen. It's all about having the pixels so tightly packed you simply cannot perceive that you're looking at a dot-matrix display composed of little pinpoint elements.

Many smartphone users already live with the illusion of dot-free images, but to see photographs and video flawlessly rendered on a large 9.7in screen is a new delight to the eyes.

Where do we go from here?

Over the years, we've seen many changes in the quality of the screens we use for desktop computing. In the beginning, a mere 512x342 pixels was all you could hope for. Screen resolution was then upped to 640x480 pixels, otherwise known as VGA, and later 800x600 pixels. Desktop monitors settled at 1024x768 for many a year, until the HD arms race brought us first 1280x720 screens, then today's near-ubiquitous 1920x1080.

The next move upscale will be an important one. By going quad, or HiDPI, a 2560x1440 panel will render a PC desktop at 1280x720. The difference, though, is that typography and graphics will be pin-sharp and crisp, as if they were rendered at native super-res.



The next challenge is to squeeze down those 2560x1440-plus panels in physical size, from today's 27in flat-panel monitors to a laptop's 15in or 13in screen. We know that even integrated graphics processors in Intel's impending Ivy Bridge series can drive these kinds of resolutions. It just remains for the panel and laptop makers to step up to the mark. With the new iPad as pathfinder of Retina-esque screens, expect to see this breakthrough soon.

And as we found in our in-depth test of Ultrabook and ultraportable laptops on page 58, this can't come quickly enough. While the bodywork and styling of the current Ultrabooks owe much to Apple's MacBook Air, the displays fitted by the likes of Asus, Acer, Lenovo and Toshiba are generally of lamentable quality. We can only hope that by following Apple's lead, these manufacturers will begin to specify the kind of displays at which you actually want to look. ☒

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Prices

All prices are RRP's quoted by the manufacturer or distributor and include VAT. Prices are intended as a guide and products are not guaranteed at our quoted price. PC Advisor's recommendations are for guidance only. The publisher takes no responsibility for purchasers' decisions.

£399 inc VAT (16GB)

Contact

■ apple.com/uk

Read more

■ tinyurl.com/6mtg9ow

Specification

1GHz Apple A5X dual-core processor (ARM Cortex A9 dual-core with SGX543MP4 quad-core graphics); 9.7in (2048x1536 pixel) IPS display with capacitive multitouch; 264dpi; 16/32/64GB NAND flash storage; dual-band 802.11a/b/g/n; Bluetooth 4.0; option for 3G/4G LTE modem; microSIM card tray; assisted GPS; 5Mp stills/1080p video iSight camera; 0.3Mp FaceTime camera; 3.5mm headset jack; 30-pin dock connector; mono speaker; 10W USB power adaptor; 42.5Wh lithium-polymer battery; 241x186x9.9mm; 652g (667g inc 4G)

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



TABLET

Apple iPad (3rd generation)

When you invent the category and make the most desired product to define it, where do you go next? That's the question Apple has answered simply enough with the third-generation iPad.

The new name is noteworthy. Just as Apple pulled the rug from below the feet of tech journalists with the 'iPhone 5' launch last autumn - materialising as the iPhone 4S - so the much heralded 'iPad 3' was unveiled with an unexpected name: iPad.

It's in keeping with Apple's avoidance of the techno-jargon names so beloved, for example, of Japanese corporations: purveyors of consumer electronics that routinely inflict sadistic tongue-twisters such as KDL32CX523BU on innocent tech-loving civilians. So, like the iMac, which has seen dozens of updates in 15 years with nary a change of name, we may be witnessing a new vogue of serial mono-naming for iPad.

Resolutionary

In outward form, there's little to distinguish the new iPad from last year's sequel. The 2012 iPad is fractionally thicker, up from 8.8mm to 9.5mm. And if you're used to handling the iPad 2, you'll probably notice some extra weight, too. This has risen from 601g to 660g.

The added mass is principally a by-product of new screen tech. Apple has uprated the resolution four-fold, from the 1024x768 pixels of PCs, to the HD-punishing resolution of 2048x1536. While it displays everything the same size as before, each element has four pixels in place of one.

The result is breathtakingly sharp typography and crisp images. Anyone familiar with the iPhone 4 will recognise this 'Retina' display. Writ large across a 9.7in rather than 3.5in touchscreen, the upgrade in image quality is extraordinary.

Behind this screen is a revised display technology. It's believed to be a form of the Super High Aperture (SHA) process that allows the tight packing of thin-film transistors. Apple is tight-lipped about the minutiae of its internal technologies, but the first raft of iPads are expected to use Samsung-

made screens, with LG and Sharp slated to contribute later.

The irony of Apple's Korean arch-enemy supplying it with the very component that will push the iPad to a new level beyond its Android rivals is difficult to miss.

Squeezing four times as many pixels into the same 9.7in display gives a density of 264ppi. That's lower than the iPhone's 326ppi, but when viewed at a typical reading distance the Retina effect is restored. We looked much closer, and still couldn't see any individual pixels. Viewing most content is like looking at a glossy magazine, not a computer screen.

To achieve this effect, Apple has taken bleeding-edge screen tech, more LED backlighting, and a bigger battery to drive it all.

The battery capacity has been expanded by 70 percent to maintain Apple's class-leading battery life. As with the second-gen iPad, the company quotes 10 hours.

In three days of testing, we had to charge the unit twice; an iPad 2 may have lasted on a single charge. But our usage was far from average.

4G connectivity

Another new feature is 4G mobile connectivity. Like other fledgling technologies, we hear reports that 4G mobile data will also hammer battery life. That's not an issue in the UK, of course, since we don't have a commercial 4G service.

When Ofcom auctions the radio airspace later this year, we should know more about when the UK will get 4G. But the fourth-gen model

will be here by the time 4G is available to UK consumers.

Parts of the UK have very strong 3G connectivity, however, and we saw double-digit download speeds over 3's network. We measured in excess of 11 megabits per second (Mbps) download and 4Mbps upload speeds.

In camera

The final material difference is a revised rear camera. Previously we used this only for occasional webchats. Apple is touting the new 5Mp iSight camera as something with which to film and snap the family.

The camera now shoots full-HD video, with stabilisation too. An infrared filter in the lens is said to improve captures by removing long-wavelength light.

In our tests, video was somewhat grainy in indoor night-time scenes, but clear and sharp under decent lighting. Holding up a tablet to film or photograph still feels wrong, yet there's no missing the through-the-window effect of seeing the world rendered by an HD camera on a HiDPI panel. It's like peering through a pane of clean glass framed by a black or white bezel.

The VGA-resolution front-facing camera is unchanged.

Behind the screen

In essence, the new A5X system-on-a-chip processor offers the same power as the A5 found in the iPad 2, albeit paired with double the memory at 1GB. The difference is in its onboard graphics, which Apple has been doubled to create a quad-core display driver.



>> See the iPad in action! Watch our video review at tinyurl.com/8xc7hjb

At the iPad launch, Apple claimed that its A5X processor was up to four times faster than the best that nVidia could muster for Android tablets, the Tegra 3. Independent benchmarks now bear out the claim for the PowerVR SGX543MP4. In raw speed, it offers about twice the power of the iPad 2, and four times a Tegra 3. But by the time it's tasked with pushing 3.1 million pixels, performance falls in line with an iPad 2.

Compared to the always-cool iPad 2, the new iPad runs warmer to the touch. It's most evident when you're working the tablet hard, playing action games. We noted that most warmth came from the lower-left corner, roughly corresponding to the position of the A5X chip within.

Welcome surprise

When the iPad launched just two years ago, most of the apps available were initially hand-me-downs from the iPhone, and would sit lonely in the centre of a black screen. You could scale them up using the handy 2x button, but this would simply render them as fuzzy magnifications of the 320x480-pixel original. With the 2012 iPad, the Retina-enablement makes them more convincing,

driven through the quad-core engine. They're not quite Retina-quality in detail, but older designed-for-iPhone apps are almost indistinguishable from iPad natives.

Much about the iPad 3 is the same as with the iPad 2, including Apple's pricing of the six available models (12 with black/white options). If you're wondering what capacity to plump for, with 16-, 32- and 64GB models on offer, bear in mind that many apps have swelled in size with the Retina upgrade, and you'll need plenty of storage space if you shoot photos and HD video with its cameras.

We'd suggest that 32GB is now the minimum size that will comfortably store a useful set of apps, plus your photos and some video and music.

At just £399 for the entry-level model, Apple must have taken a hit on its margin. If the iPad 2 had any serious competition from Android, this iPad has just buried it.

Verdict

Extra horsepower from the revised quad-core graphics processor has been funnelled into maintaining the iPad 2's top-notch graphics when tasked with driving four times as many pixels. An improved rear

camera is not universally essential, nor is an uprated modem for a next-generation cellular network that's unavailable in most parts of the world. But just a short time using the iPad with its entrancing Retina display gives ample reason to consider an upgrade. Once you've tried a third-gen iPad, iPad 2's text looks plain blurry. Apple has just handed new tablet buyers the device that unequivocally retains the iPad at the zenith of tablet computing, at an unassailable price.

✉ Andrew Harrison



E-BOOK READER

Kobo Touch

The Kobo Touch is the latest Amazon Kindle-wannabe. There are three models in the range: the £70 Kobo Wireless, the Kobo Touch here at £99, and the Kobo Vox at £170.

By comparison, the Kindle starts at £89 for the Wi-Fi-only model, and £149 with 3G plus Wi-Fi.

Design-wise, the Kobo resembles every other 6in E Ink reader we've seen, sporting a resolution of 600x800 pixels. The tactile raised quilted-plastic rear (pastel blue, pale pink, white or black) gives it a hint of

luxury. A similar pattern appears on its screen as a diamond pattern.

The Kobo's 2GB storage can hold up to 30,000 books, while a MicroSD slot allows for a further 32GB.

The Kobo's display is capable of some visual nuances, with eight greyscale shades to draw upon, but its limited resolution makes the small title text of thumbnails impossible to read. The suggested reading list is therefore redundant.

Buying books is straightforward, having set up your email, card and address details. The next time you use it, any recently downloaded titles will appear on the home page.

The touchscreen is a big plus point. While the Kindle suffers from too many buttons, with the Kobo you can tap the screen to turn the page or bring up navigation options.

A slim silver bar below the screen acts as a Home button, but it doesn't work very smoothly. When you reach the end of a preview you sometimes get caught in an endless loop of going forward or back through the

handful of pages you've just viewed, with only the Store as an exit option. Switching off the Kobo clears this.

The reading experience is good, and pages turn quickly enough that you don't lose your thread.

Connecting to our home Wi-Fi network was easy. A qwerty keyboard appears onscreen, and the processor is fast enough to keep up with our typing.

The battery doesn't seem to hold its charge well. The first we knew of its low juice was when it announced a power-down with only 3 percent power remaining. We'd read only a few *Grimm's Fairy Tales*.

You can charge the device from a PC or a Mac, and transfer and manage content from there too - the Kobo shows up as an external drive.

Verdict

The Kobo Touch is a well-built, good-value touchscreen e-reader, but its many usability glitches make spending time with it frustrating.

✉ Rosemary Hattersley



£99 inc VAT

Contact

■ kobobooks.com

Read more

■ tinyurl.com/7zLsrhs

Specification

6in screen (600x800 pixel) E Ink Pearl touchscreen e-book reader; eight greyscale levels; 2GB internal storage; stores up to 30,000 books; Jpeg/e-Pub/PDF viewer; adjustable font size; Kobo Store; USB charge; MicroSD slot; 802.11b/g/n Wi-Fi; 114x165x10mm; 185g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



LAPTOP

Samsung NP600B5B-S01UK

The Samsung NP600B5B-S01UK is a solid business-focused laptop with a good turn of speed. It scored a respectable 125 points in our WorldBench 6 test.

The Samsung is powered by a dual-core 2.5GHz Intel i5-2520M processor, which does a rather impressive job of handling everyday applications, as well as some more demanding software programs.

A dedicated nVidia NVS 4200M graphics card also ensures that graphics-intensive applications aren't a problem for the Samsung. This is a professional version of the nVidia GeForce GT 520M, and in our tests it could muster 36fps playing Fear at Maximum detail.

As this laptop is not vying for attention on the high street, it doesn't sport attention-grabbing memory and storage figures. Its 4GB and 500GB respectively are average specifications for a consumer laptop, but ample for any office task.

While the construction of the Samsung isn't bad - it's certainly rugged enough to overcome an accidental bump or two - it is on the bulky side, weighing 2.7kg. And its particularly thick lid means it isn't the most portable laptop around, although it is well protected.

We measured a good battery life of around 6 hours (370 mins in MobileMark 2007). The Samsung has some endurance for taking on the road, even if the chunky weight means you'd rather not.

The screen is perhaps this laptop's best feature. It has a matt non-reflective finish, but still delivers sharp definition and rich colours. For a professional machine, though, the 1366x768-pixel resolution is poor. That's the kind of pixel count we'd expect from an 11in consumer laptop, not a 15in business model.

The keyboard is versatile, with each button of a decent size, and there's a numeric keypad to the right. However, this keypad feels cramped and doesn't lend itself well to accurate

data input; Samsung could have left out this component and given the rest of the keys some more room for manoeuvring.

There is a trackpoint steerer, should you favour this mode of cursor control, and two sets of buttons for left- and right-clicking.

Connectivity options include two super-fast USB 3.0 ports, whereas some Windows laptops have only one. Of course, they're useful only if you have compatible peripherals to plug in. The lesser-spotted eSATA is also found on this laptop's chassis.

For connecting a projector or a second monitor, VGA and HDMI are provided. And the Samsung will connect to networks using 802.11b/g/n Wi-Fi or gigabit ethernet.

A couple of extras are included for business use, including a fingerprint reader and an ExpressCard slot. The latter is becoming increasingly rare.

Verdict

If you're after a solid, functional and quick laptop for work, this Samsung is a sensible choice. It isn't the most portable model around, at 2.7kg, so you should think twice if you need to regularly take it on the road. The 15.6in screen is of a decent quality, while the keyboard is let down only by a cramped numeric keypad.

✉ Ben Camm-Jones

£800 inc VAT

Contact

■ samsung.com/uk

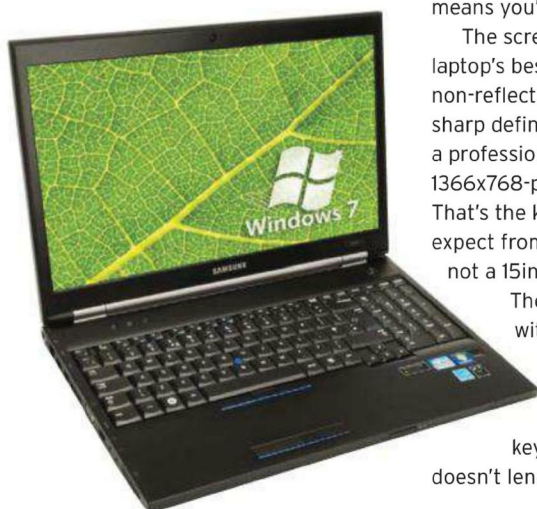
Read more

■ tinyurl.com/7e34eh7

Specification

2.5GHz Intel i5-2520M; Windows 7 Professional 64bit; 4GB DDR3-1,333MHz RAM; 500GB 5,400rpm HDD; 15.6in (1366x768) matt anti-glare display; nVidia NVS 4200M with 512MB VRAM; DVD ± RW DL drive; 802.11b/g/n; Bluetooth 3.0; gigabit ethernet; 2x USB 3.0; 1x USB 2.0; 1x eSATA/USB 2.0 combo port; VGA; HDMI; stereo speakers; headphone jack; mic input; SD/xD/MS Pro slot; ExpressCard 34 slot; fingerprint reader; 66Wh removable lithium-ion battery; 370x244x35mm; 2.7kg
WorldBench 6 score: 125
Battery life: 370 mins

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



£53 inc VAT

Contact

■ tp-link.com/en

Read more

■ tinyurl.com/85p7r9p

Specification

3G/3.75G router; 2.4GHz; 3G/WISP/AP; fast ethernet for WAN/LAN; 802.11b/g/n; USB 2.0; Mini-USB; 64/128bit WEP; WPA2; WPS; 74x67x22mm

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



3G WIRELESS ROUTER

TP-Link TL-MR3020

Mobile (or 3G) broadband lets you get online wherever you have a phone signal, without having to worry about finding and connecting to public Wi-Fi hotspots. Tethering an iPhone or Android smartphone to your laptop, inserting a SIM into a compatible tablet, or plugging in a 3G USB dongle are all ways to access the mobile web on the move. But what if you have more than one device that you need to get online?

Devices such as this TP-Link TL-MR3020 offer a cheap way to take a single 3G connection and share it with all your wireless devices. Once configured, this portable 3G router acts in exactly the same way as any other wireless router; the only

giveaway to its mobile nature is its connection speed.

At just 74x67x22mm, the TL-MR3020 is tiny and lightweight. The ability to power it over USB makes it simple to throw into a bag and take a sharable internet connection wherever you go, although you'd need a built-in battery for true portability.

The white-and-grey plastic case feels rather cheap, and that's because it is: the TP-Link has a £53 RRP, but is available from around £27 online. TP-Link's generous three-year warranty provides some reassurance, of course.

On one side is a USB 2.0 port for connecting a dongle; on another is a

3G/WISP/AP mode switch, Mini-USB for power, and fast ethernet for hooking up either a WAN or LAN as a failover. Alternatively, you can use the TP-Link as a WAN router, with 3G as the backup.

On the front is a WPS button that lets you invoke WPA2 security with a single touch, plus an LED bar that shows when the device is switched on, data is being transferred, Wi-Fi is enabled, plus the ethernet status.

Setup is supremely simple. The device can be powered from the mains or a pair of USB 2.0 ports (a Y-cable is supplied). We plugged in our dongle, switched on the TP-Link, then refreshed the list of available wireless networks on our laptop.

£949 inc VAT**Contact**■ dell.co.uk**Read more**■ tinyurl.com/6p2avfp**Specification**

2.8GHz Intel Core i7-2640M; Windows 7 Home Premium 64bit; 8GB DDR3-1,333MHz RAM; 750GB 7,200rpm HDD; 14in (1366x768) glossy LED-backlit display; nVidia GeForce GT 520M graphics with 1GB memory; DVD \pm RW drive; 802.11a/b/g/n; Bluetooth 3.0; gigabit ethernet; HDMI port; 1x USB 3.0; 1x USB 2.0 port; Mini DisplayPort; stereo speakers; headphone jack; mic input; SD/MS Pro Duo/xD slot; webcam; 58Wh lithium-ion non-removable battery; 335x234x23.8mm; 2.06kg
WorldBench 6 score: 143
Battery life: 406 mins

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**LAPTOP****Dell XPS 14z****PC ADVISOR
RECOMMENDED**

Laptops with 14in screens are few and far between in the UK, with most manufacturers plumping for a 13.3- or 15.6in panel. But if ever there was a 14in model that could excite a western audience, the Dell XPS 14z is surely it.

Taking plenty of inspiration from Apple's MacBook Pro, the XPS 14z is modern, stylish and robust. The anodised aluminium chassis looks smart, while rounded edges add to its sleek appearance.

A backlit keyboard offers lots of room to even the most inaccurate typists, and there's still space for large speakers at each side. Our only quibble here is with the font used to label the keys, which doesn't seem in keeping with Dell's design.

The Dell's Achilles heel is its screen. The 1366x768 resolution is meagre in comparison to other models – the 15z sports a 1920x1080 resolution, for example – but its definition is sharp and clear.

But it's the glare from the glossy panel that was the major source of our irritation. Reflective screens do not equate to comfortable use under most lighting conditions.

However, this panel stretches across almost the entire width of the laptop's body. With no large bezel, Dell has been able to use a chassis that's only 10mm wider than the 13.3in MacBook Air.

This is no ultraportable laptop, but the XPS 14z's diminutive frame and 2.06kg weight make it less of a burden to carry around than some laptops. Its sturdy construction means it should withstand the odd bit of battering on the road, too. The screen hinge looks particularly robust.

Blessed with a second-generation Intel Core i7 processor in the form of the 2.8GHz i7-2640M (3.5GHz with Turbo Boost), plus 8GB of RAM, the 14z puts plenty of computing power at your disposal.

We recorded a highly creditable 143-point score in our WorldBench 6 real-world speed test, while the Dell also delivered playable framerates in our graphics tests. The discrete nVidia GeForce GT 520M averaged 46fps in Fear at Maximum detail.

A low-resolution screen and the absence of a Blu-ray drive means watching HD video isn't on the cards. For other entertainment duties, such as audio playback, the Dell is sound. Indeed, the 14z is a strong all-rounder, offering decent performance for any task you set it.

Dell supplies a capacious 58Wh lithium-ion battery, which lasted nearly 7 hours (406 mins) in MobileMark 2007. Given the powerful components this battery



is required to support, this is an impressive runtime.

The connectivity options are decent, with two USB ports – one of them USB 3.0 – located at the rear of the unit, plus HDMI, Mini DisplayPort and gigabit ethernet. On the lefthand side you'll also find a mic input, headphone jack, and a multifunction card reader.

Verdict

Dell's XPS 14z could be accused of looking rather like a MacBook Pro. If this was a deliberate ploy, it's also a risky one: few laptops can endure comparison with this Apple laptop's design, build and feature set, and walk away with their reputation intact. The 14z fares better than most, despite our concerns about its screen. Indeed, Dell offers rather a lot in return for less than a grand: this is a fine-looking, sturdy and powerful laptop, which we have no hesitation in recommending.

✉ **Ben Camm-Jones**



The TP-Link appeared as an unsecured network. We connected to this, then opened a browser and headed to the device's web interface. Following confirmation that our USB dongle had been recognised on the Status page, we clicked Quick Setup to change the SSID and enter an access password.

After a reboot, any wireless device could connect to the network in the same way as if it were a standard Wi-Fi router. And just like a standard router, the TL-MR3020 offers configuration options that include WPA2 security, QoS, parental controls, a firewall and more.

The accessible connection speed depends on your hardware and the mobile operator's coverage in your area. The TP-Link is said to operate at up to 150Mbps, and our USB dongle is specified at up to 14.4Mbps.

We used Speedtest.net to measure the dongle's connection speed when plugged directly into our laptop. It recorded 4.36Mbps download, and 1.80Mbps upload.

After connecting the dongle to the TP-Link, then picking it up on the laptop as a wireless connection, Speedtest measured a slightly faster 4.61Mbps download speed, but slower 0.61Mbps upload.

Performance was barely affected when we connected to the TP-Link from the next room. Here, we recorded 4.47Mbps download and 0.69Mbps upload.

Verdict

The TL-MR3020 is a useful, portable tool for sharing a 3G connection, and it offers very good value in comparison to similar products. We found consistent and reliable performance. ✉ **Marie Brewis**

£145 inc VAT

Contact

■ zyxel.co.uk
Read more
■ tinyurl.com/7b9epw8

Specification

Supports 2x 3TB hard disks; 1.6GHz CPU; 512MB memory; Raid 0/1/JBOD; remote sharing of files via mobile app; download manager for Rapidshare; BitTorrent client; DLNA server; 1x USB 3.0; 2x USB 2.0; gigabit ethernet; 108x205x147mm



NAS ENCLOSURE

Zyxel NSA325



First-time buyers of NAS devices will typically acquire a unit that has been pre-stuffed with disks. For those willing to forgo simplicity for the benefit of customising how their storage is configured, empty enclosures are the way to go.

The Zyxel NSA325 offers such a setup, although this enclosure occupies more space than is required for its two disks inside. The glossy-black front cover has a stylish curved finish with a blue LED that's irritatingly bright. You simply fix mounting rails to the side of each disk to fit them inside.

Zyxel lists support for 3TB drives, and can be configured with up to 6TB of storage. With 4TB drives recently available, 8TB may also be an option. That's plenty of room for video and music, plus incremental system backups or anything else that consumes a lot of disk space.

Zyxel's interface is clear and well designed, but novices may find the sheer number of configuration options daunting. You can create

groups of users and set access permissions to files and folders. The Zyxel can also host a web server, and even download additional software packages from an online repository.

The NSA325 supports automatic uploads to YouTube and Flickr. This is achieved by simply dragging-and-dropping video and images into a folder on the NAS, then entering your account details.

While the Zyxel has an impressive feature set, its key selling point is its superb performance. A pair of 750GB Samsung disks configured in a Raid 0 array was able to copy a 15GB file at a brisk 64MB per second (MBps). And the NSA325's read performance was even faster: we measured an average 95MBps, which is well beyond the capability of most consumer NAS devices.

There's a USB 3.0 port at the front, plus two USB 2.0 connections at the rear. All three can be used to expand the amount of available storage, with each external drive appearing as a shared folder on



the network. Alternatively, the USB ports can be used for sharing a printer across your network.

Verdict

Zyxel's NSA325 is a well-designed NAS drive that offers excellent performance and some genuinely useful extra features. Although we'd like to see tool-free drive bays, and the blue LED on its front quickly became a source of irritation, there's little here with which to find fault. The Zyxel is competitively priced in comparison to other enclosures, although you'll have to factor in the cost of two internal hard drives.

✉ Orestis Bastounis

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pcadvisor.co.uk/competitions

Closing date: 5 May 2012

£519 inc VAT**Contact**■ kogan.co.uk**Read more**■ tinyurl.com/757jk2e**Specification**

46in LCD TV; 1920x1800;
Freeview HD tuner;
3x HDMI; Scart;
Composite; VGA;
Component; USB 2.0;
coaxial S/PDIF;
headphone jack; CI slot;
remote control handset;
1120x685x45mm
(1120x735x260mm
with stand)

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



46in LCD TV

Kogan KULED461HDAA

This Kogan is a low-cost 46in LCD TV that includes in its price a glass platform stand and a remote control.

It's a simply styled TV, which features a full-HD resolution and Freeview HD. The matt panel displays consistent image quality at most viewing angles.

The build quality is basic but functional, with a high-gloss plastic bezel. The TV is also relatively thin.

Three HDMI, VGA, Component and Composite inputs are joined by one Scart, coaxial digital audio and a headphone socket. A USB port allows a flash drive to be used for playback of stored video or to record programmes.

We used a flash drive to pause and record live TV, but found the operation to be less than slick. The buttons on the remote control are too small to easily press, and onscreen navigation was haphazard - sometimes appearing when called upon, other times not.

A tiny pair of back-facing speakers with an 8W amp produce

poor sound quality that's akin to a loud speakerphone, with tinny mid-range and no bass.

We calibrated the screen using the rudimentary onscreen display. Blacks were dark and deep, while whites stayed incandescent. Colours were harder to balance, though, and we never did manage to find a realistic setting for skintones.

The measured contrast ratio was good, peaking at 1,600:1 at 25 percent brightness. At full brightness the TV hit 294cd/m², albeit with contrast now just 50:1. The Kogan covers a good range of colours, too, with 99 percent of sRGB and 81 percent of AdobeRGB.

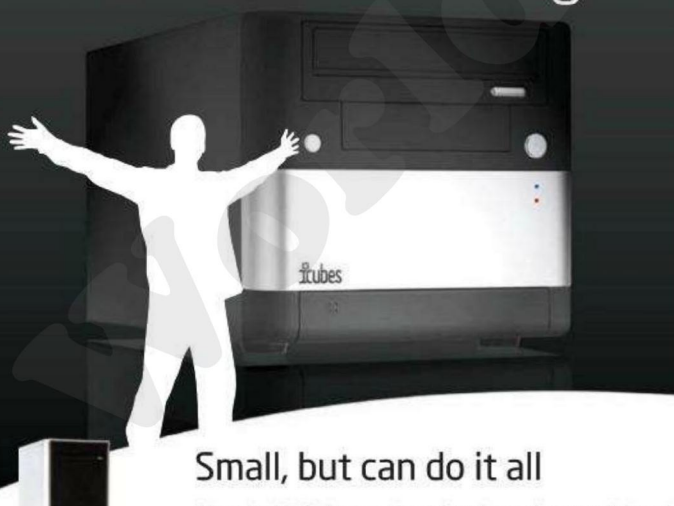
Kogan includes 100Hz MotionMax Technology to enhance the picture quality. Fast panning showed flashing break-up effects around object edges, while the motion was mechanical - about as natural as an American daytime soap. A firmware update should allow the dialling down of motion processing.



Lip-sync issues ruined the overall effect of Freeview HD, while switching channels was laggy. An intermittent issue saw a sleep warning, mid-viewing, that the set would power down in 60 seconds unless any key was pressed.

Verdict

Kogan's specifications promote a tidy package, but this TV fails to deliver. Its static image quality is fair, but defective motion processing caused troubling visual distortions in our tests. This 46in LCD screen is simply too cheap to put on a good show. **Andrew Harrison**

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Specification

AMD Radeon HD 7750;
1GB GDDR5 RAM; 800MHz
core clock; 1,125MHz
memory clock (4.5GHz
DDR effective); 400MHz
Ramdac; 128bit memory
interface; 512 stream
processors; 32 texture
units; 16 ROP units;
PCI Express; DirectX 11.1;
1x DVI; 1x HDMI;
1x DisplayPort



GRAPHICS CARD

Club 3D Radeon HD 7750

We recently saw the cream of AMD's 2012 crop in the HIS 7970 (tinyurl.com/6uzrvxc). The much cheaper 7750 follows with almost indecent haste. It's good to see the latest tech already delivered in a cost-effective package.

While the 7970 was codenamed 'Tahiti', this 7750 goes by 'Cape Verde'. It's the product of AMD's 28-nanometre (nm) manufacturing process, and also uses Graphics Core Next technology.

The 7750 includes 1GB of GDDR5 memory, which is ample for mainstream gaming. Cutting the memory interface from 384bit to 128bit is a sizeable drop, though, and the 800MHz core and 1,125MHz memory clock speed (4.5GHz DDR effective) also show economies.

The resulting memory bandwidth of 72GB per second (GBps) is a fraction of the 7970's 220GBps. There are also hefty cutbacks to the stream processors (512) and texture units (32), with only a quarter of those offered by the 7970. Many

of the specs are competitive with similarly priced cards – except for the core clock, which is beaten by both the older 6790 and 6770.

The comparison with the 6770 is useful. That card costs about the same, and has comparable specs. However, the 6770's 2012 equivalent would be the more expensive 7770.

In testing we found the 7750 to be more or less on a par with the 6770. In BattleForge it scored 31.3- and 27.5fps at 1680x1050 and 1900x1200 respectively. The 6770 managed 32.1- and 29.1fps in the same tests. The 7750 trailed the 6770 by around 1- to 1.5fps, and the 6790 by 4- to 4.5fps.

It was a similar story in Crysis 2. The 7750 recorded 19.9fps at 1680x1050, and almost kept pace with the 6770 (20.5fps); the 6790 was 3.2fps faster at 23.1fps.

In Stalker: Call of Pripyat, the 7750's 30.8fps result at 1680x1050



left it just 0.4fps adrift of the 6770, but 3.3fps behind the 6790.

Usefully, the power-efficient 7750 doesn't require a power connector from the PSU. Its thermal design power (TDP) of 55W is significantly lower than the 6770's 108W.

The card isn't totally silent, with a low hum audible from the cooling system. This Club 3D is an early version; later models may feature superior cooling.

Verdict

The affordable AMD Radon HD 7750 is light on power and, given decent cooling, will be suitable for media-centre use. It also beats the 6790 in terms of for frame-per-pound value.

✉ Robin Morris

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Product shown Epson WP-4525 DNF

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£120 inc VAT**Contact**■ canon.co.uk**Read more**■ tinyurl.com/6ujbgdj**Specification**

Printer, scanner, copier;
4800x1200dpi print
resolution; quoted print
speed: B=9.9ppm,
C=5.7ppm; actual print
speed: B=8.6ppm,
C=3.8ppm; 1200x2400dpi
scanner resolution; USB
2.0; 802.11b/g/n; memory
card drive; 100-sheet
input tray; toner cost:
B=£17, C=£18; print yield
(pages): B=600, C=400;
449x304x152mm; 5.7kg

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**PRINTER****Canon Pixma MG4150**

Canon's Pixma MG4150 is a stylish multifunction device that offers printing, scanning and copying.

The input feed is located above the output tray at the front to save space. However, this means printed sheets can get mixed up with the blank paper underneath.

The replacement of ink cartridges also takes place at the front, but Canon's FastFront mechanism isn't particularly easy to use.

A 3in colour LCD enables access to the eco and quiet modes, and also lets you manipulate photos, make photocopies and print templates. It's not a touchscreen, however, so several buttons appear below. This control panel could be simplified.

Connectivity options include memory cards, USB and 802.11b/g/n wireless. The Canon can also hook up to Android and iOS devices, as well as the PlayStation 3. The MG4150 embraces cloud computing, letting you access Canon's Image Gateway.

The copying and scanning facilities are good. The scanner's

lid is lightweight and adjustable, and even thick books are easily accommodated. Importantly, the colour reproduction is strong.

At its fastest setting, the Pixma turned out high-quality text at just 8.6 pages per minute (ppm).

In the middle mode speed fell to a still-competitive 8.1ppm, and produced characters with good definition even at 2pt.

Auto-duplexing is included, but took its toll on Canon's Fast and Standard modes, with production reduced to 4.8- and 4.1ppm respectively. This is a noticeable drop, so you're likely to use the feature only to save on paper costs.

Colour pages drop out at 3.8-, 2.5- and 1.4ppm in the Canon's Fast, Standard and Best modes.

Even in Fast mode the colour is vibrant and attractive, with



only a pale sheen detracting from the overall effect. Standard mode produces strong detail and beautifully textured images. Use photo paper for stunning results.

Running costs are reasonable for colour, at around 4.5p per page, but this is an expensive text printer, at 2.8p per page.

Verdict

This Canon Pixma MG4150 is a very good colour printer, although it'll work out rather expensive for text. The feature set is strong, and the connectivity options are excellent.

✉ **Robin Morris**

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consumption
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Specification

10.1in Super IPS+ (1280x800) touchscreen; 1.4GHz nVidia Tegra 3; 1GB RAM; 32GB flash storage, Google Android 3.0 Honeycomb, upgradable to Android 4.0 Ice Cream Sandwich; 802.11b/g/n; Bluetooth 2.1; USB 2.0; MicroHDMI; MicroSD; headset jack; SD Card slot; 8/1.2Mp rear/front cameras; 263x181x8.8mm; 596g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



TABLET

Asus Eee Pad Transformer Prime TF201

PC ADVISOR
RECOMMENDED

The follow-up to Asus' popular Transformer tablet is the Prime. It's better-looking than its predecessor, and there are a few upgrades inside.

An attractive rounded metal case is in keeping with the firm's Zenbook laptop range (see page 61). It's available in 'Amethyst Grey' and 'Champagne Gold'.

The build quality encroaches on Apple's territory, and the Prime's durable all-metal casing feels sturdy in the hand. An inserted MicroSD card will protrude a few millimetres, but this is a minor quibble.

The width and weight have been trimmed down to 8.8mm and 596g, although an optional keyboard dock turns the Transformer Prime into a netbook-size laptop. This dock adds 11mm and 540g, resulting in a 1.14kg, 19mm-thick portable.

Hardware differences

The most notable hardware difference is the processor, with Asus specifying a 1.4GHz nVidia Tegra 3. This makes the Asus the first quad-core tablet to market, and potentially one of the most powerful you can buy. The memory allocation remains a healthy 1GB, while the internal storage has been upped to 32- or 64GB.

nVidia touts a five-fold performance increase over the Tegra 2, but our tests didn't reveal such a dramatic shift. That's not to say this isn't a speedy device, and we found slick performance whether we were browsing the web, playing video or gaming.

The upgrades don't stop there: the 10.1in display is now a Super IPS+ panel, with a 1280x800-pixel resolution and Gorilla Glass glazing. The pixel density of 149dpi allows it

to display sharp images (the new iPad, page 32, offers 264dpi by comparison).

A Super IPS+ mode ramps up the screen brightness for easier viewing outdoors.



Taking photographs isn't traditionally a tablet's most elegant use, but the Transformer Prime is up to the job. It has an 8Mp rear-facing camera with an LED flash, and a 1.2Mp front camera for video chat.

Keyboard dock

The optional keyboard dock converts the Prime into a netbook. Its metallic finish matches the tablet, while it uses the same locking mechanism and Scrabble-tile keyboard as the first Transformer.

The dock includes a 40-pin power connector, a multitouch trackpad, full-size SD and USB ports, and an integral battery. The latter is said to add up to 6 hours to the 12-hour battery life promised by the Transformer in solo mode.

The dock isn't without fault, however. We like the Home, Back and screen-brightness hotkeys, but other buttons are rather small - notably the arrow and Shift keys. We also found the trackpad resistive when scrolling vertically, and overly sensitive at times.

Ice Cream Sandwich

The Transformer Prime ships with Android 3.2 Honeycomb, but the latest version is available as an over-the-air update. We found Android 4.0 Ice Cream Sandwich a joy to use on the Prime.

Those familiar with Honeycomb should find Ice Cream Sandwich equally to their taste. You get the usual set of scrollable homescreens, menus and widgets, but things are laid out differently.

One of the highlights of Ice Cream Sandwich is a multitasking

bar that displays running apps, making it easier to quickly switch between tasks or close apps.

There's no inclusion of the face-to-unlock feature found on the Samsung Galaxy Nexus; neither will you find Android Beam, since the Transformer Prime lacks near-field communication (NFC) technology.

Asus has customised the user interface in places, most notably in the notifications and settings bar. This differs slightly to vanilla Android 4.0, and includes three performance modes: Performance, Balanced and Power Saving.

Battery life

With the dock attached, Asus touts a whopping combined battery life of 18 hours - even netbooks are unable to touch it in this regard. Whether you'll see this runtime is another matter, and something that largely depends on your usage. Gaming will drain the batteries much faster than web browsing, for example.

We tested the Transformer Prime over two working days, browsing the web, running apps and playing a few demanding games. After this time the battery reported that it had 72 percent remaining.

Verdict

The Transformer Prime is one of the best Android tablets we've seen, both well-designed and -built. If you don't want the dock, you'll save around £100, making it good value. However, the keyboard is the only reason we can see to buy the Prime over the new iPad. For those averse to Apple products, the TF201 is good alternative. **Chris Martin**

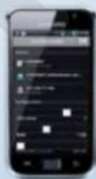
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■ netflix.co.uk
Read more
■ tinyurl.com/6sch6Lo

System requirements

iOS/Android/Sony
PlayStation 3/Apple TV

Netflix is an established video-on-demand service, enjoyed by US film fans for the past 10 years. Available in the UK since January, it offers a decent choice of films and TV programmes, allows you to access your account across multiple devices, and learns your viewing preferences, making it easier to get to the content you want to watch.

Recommendations from peers are possible: Netflix can optionally report on Facebook what you're watching and tell you what's popular with your friends.

Netflix offers a broad range of viewing platforms. As well as PC viewing, you can pull up the latest episode of a programme on an iPad, iPhone, Android tablet, PlayStation 3 or Apple TV. Usefully, you can also pause a programme on one platform and resume playback on another.

You'll probably want to start with the no-ties 30-day trial. Netflix costs £5.99 a month thereafter, with unlimited viewing.



Netflix is simplicity itself to use. There are no annoying ads before the show begins, although you will need to allow the service a couple of seconds for buffering. It's easy to skip through scenes, and without noticeable buffering or quality loss.

The video-playback quality isn't always the best, although this is largely dependent on your broadband connection.

The film library is comprehensive, with several hundred feature films

and almost as many TV series and documentaries to choose between. We found it useful to be able to dive straight into watching a film, without needing to make a decision over whether to rent or buy it outright.

Verdict

Netflix is slick, easy to use and has a decent catalogue of films and TV programmes. LoveFilm, YouTube and other video-on-demand services have much to fear. ☒



LoveFilm

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Contact

■ lovefilm.com
Read more
■ tinyurl.com/6qLo3cm

System requirements

iOS/Android/Xbox 360/
some Sony TV and
Samsung Blu-ray players;
1.5MB available storage

LoveFilm has delivered films through our letterboxes for more than five years. The company now also offers a streaming service, accessible via a Microsoft Xbox 360 games console, an Android tablet or iPad, online via a PC or laptop screen, or through certain Sony TVs and Samsung Blu-ray players.

It costs £4.99 per month for the streaming service, with a 30-day free trial. Alternatively, you can mix LoveFilm's streaming and postal services for £7.99 a month.

There's some sense in choosing the combined service, since not all films - particularly the latest blockbusters - are available for streaming. Nevertheless, by retaining its postal option, LoveFilm can often be the first on-demand service to offer the latest films. And its 6,610-strong catalogue still offers plenty of choice. We also counted 139 TV series, and subscribers to the combined service can reserve titles listed in the What's Hot section.



Using the service is easy. You simply click a film title to begin playback. A countdown indicates the length of the pre-roll ad.

We found streamed content to be smooth and stutter-free. Do note that LoveFilm is in dispute with Universal Pictures and carries none of its films.

Each film you watch is displayed in your account menu the next time you log into the service.

Verdict

We like LoveFilm a lot. Its film library offers a solid combination of streaming and DVD viewing options, putting it head and shoulders above most video-on-demand services. LoveFilm's combined DVD-and-streaming service offers very good value, too. We found using the app on our iPad a much smoother experience than that of similar streaming services. ☒





Google Movies

Google Movies is integrated to the Google Play combined content service, and available on Android tablets and smartphones.

You rent rather than buy each film, which is available to begin watching for up to 30 days. Once you've begun watching a film you have 48 hours in which to complete it. New titles cost £3.49 apiece, although we reckon charging £2.49 for decades-old films is rather greedy. And there are no free rentals.

The interface is slick. Tiles showing Staff Choices, limited edition 99p bargains and popular new releases are on display, along with star ratings for each.

Swipe to the left to view movies listed by genre. These are sensibly divided into Action & Adventure, Animation, Comedy, Drama, Documentary, Family and Horror. You can also use the search bar to quickly find a particular title.

Some categories are better represented than others - there are 500 under Drama, for example. A navigation bar would be helpful, although we've no complaints about the breadth of choice.

Programmes and video played smoothly after the initial buffering process, and we found fewer artefacts in our Google Play Movies than we did when using Netflix.

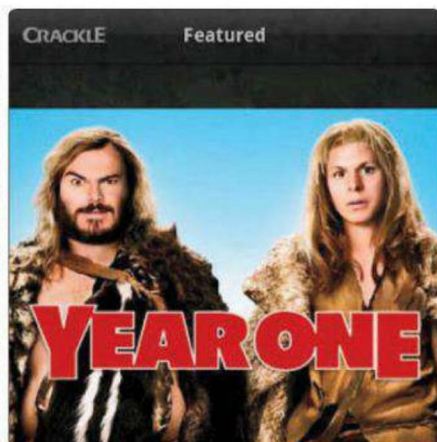
Verdict

With Google Play, entertainment options for Android have noticeably improved. The slick interface and good choice of titles should help win over Android users. ☒

Free

■ play.google.com ■ [Read more tinyurl.com/6o7xg5o](http://tinyurl.com/6o7xg5o)

System requirements
Google Android



Crackle

Crackle claims to offer Hollywood movies and full-length TV programmes, yet we discovered a very thin set of content. Previously popular on iOS, Crackle came to Android in mid-2011. Back then it boasted more than 200 films and 1,000 full-length TV programmes, but things have gone downhill.

We used Crackle on our Sony Tablet S running Android 3.2. Crackle crashed, leaving us with a splashscreen advertising the 20th anniversary of Disneyland Paris. We were getting pretty sick of seeing this ad too, given that it popped up before any film started playing. Interestingly, if we tapped the ad to bring up the browser, then closed the browser, playback of our film resumed.

The video quality of programmes was disappointing in our tests, with blocky artefacts and jerky panning shots. Cartoons were a better bet, but even here the resolution was limited. And many of the American sitcoms and Japanese anime offerings were rather young for our tastes.

There's a handful of videos showing the behind-the-scenes making of programmes, but other offerings are simply clips with links to buy the full version from Amazon.

Should you decide Crackle is for you, it's worth creating a free account so you can keep tracks on your viewing history.

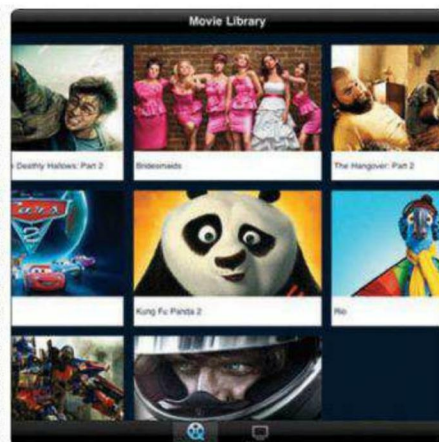
Verdict

If you've a teenager to entertain, Crackle may divert them a while at no expense to you; otherwise, there's little to see here. ☒

Free

■ crackle.com ■ [Read more tinyurl.com/6trLawd](http://tinyurl.com/6trLawd)

System requirements
iOS/Android



Blinkbox

With a breadth of films and TV programmes on offer, and a number of discounts available, Blinkbox has caught not only our eye but Tesco's too - the supermarket chain now owns 80 percent of the business. As such, there's an option to enter your Clubcard number to accrue loyalty points.

Blinkbox works equally well whether you're viewing it online on your PC, Mac or laptop, on an iPad or on an LG or Samsung Smart TV. Regular mailings alert you to deals, such as 99p downloads and a slew of free-to-air programmes. Another option is to stream for free any DVD movies you own - provided that you bought them at Tesco.

Like many video-on-demand services, Blinkbox lists many lesser-known titles to help it make up the numbers. Brief synopses and details of what else the actors have starred in, along with links to these other films, help you decide what to watch.

Blinkbox is saddled with more advertising than we'd like. There are discount deals on the home screen, and video adverts start playing as you browse the site. When using Blinkbox on a Smart TV, the same advert would play at the start of every show, while the programme itself didn't always play with sound. We had more joy with the iPad app.

Verdict

For occasional users who are happy to browse through and find discounted or free titles, Blinkbox makes great sense. It's not without its imperfections, though. ☒

Free

■ blinkbox.com ■ [Read more tinyurl.com/7sko7os](http://tinyurl.com/7sko7os)

System requirements
iPad/Smart TV/online;
1MB available storage



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INTERNET SECURITY SUITE

Bitdefender Total Security 2012

£49 inc VAT

Contact

■ bitdefender.co.uk

Read more

■ tinyurl.com/7j7cgps

System requirements

1GHz processor; Windows XP/Vista/7; 1GB RAM; 1.8GB hard-disk space



Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



After an over-zealous makeover last year, Bitdefender now claims it has "the sharp mind of the wolf and the sleekness of the dragon, the vigilance of the alpha-male and the indestructibility of the snake's body". It writes antivirus software.

Actually, it writes rather good antivirus software. Total Security adds a file shredder, encryption, PC tune-up and 2GB of online backup to the antivirus, antispyware, firewall, parental controls, social-network protection and anti-phishing of Bitdefender Internet Security 2012.

The program's interface is clean, with four large icons in the centre panel at any one time. You can scroll sideways to reveal more options. A dedicated Settings button calls up a tabbed screen with various configurable options.

Features here go beyond any standard security suite's call of duty, with the ability to virtualise your browser and protect it from online threats, plus social-network protection, which checks any links you receive from busty temptresses called Matthew X3654.

A useful feature is Auto-Pilot. In this mode, Bitdefender works without user intervention and makes intelligent choices over what action it should take with threats.



BITDEFENDER TOTAL SECURITY offers a clean, icon-based interface

Bitdefender took 19 mins 39 secs to scan our 50GB basket of test files, resulting in a very good scan rate of 83.5 files per second.

Our 1GB file-copy test completed in just 33 secs with the background processes running, which suggests a low impact on resources. During a scan this rose to 2 mins 13 secs, but you won't notice this performance hit - scheduled scans run only when the system is idle.

AV-Test awarded the Bitdefender engine 16/18, an excellent score. It lost 0.5 points in the Protection and Repair categories, and 1 for Usability.

The Repair section looks at how well the security program is able to spot and remove malware already running on your PC. The

average score here is 97 percent; Bitdefender managed 100 percent.

And it's even better than the competition on the removal of rootkits and stealth malware. The average score is 84 percent; Bitdefender managed 97 percent.

Total Security 2012 also scored highly in its ability to correct any system modifications caused by malware: the average is 57 percent, but it scored 89 percent.

Verdict

Test results suggest Total Security is one of the best internet security products money can buy. It's thorough, it's easy to use, and it puts little strain on system resources. **Simon Williams**

PC MAINTENANCE UTILITY

Avanquest SystemSuite 12.0 Professional

£41 inc VAT

Contact

■ avanquest.com/uk

Read more

■ tinyurl.com/7bqLho8

System requirements

Windows XP/Vista/7; 64MB RAM

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



PC-optimisation utility SystemSuite started life with Ontrack, was later a product of VCom, and is now part of Avanquest's stable. Version 12.0 shows a steady evolution, with four heralded improvements: the PC Analyser, which reveals unnecessary running processes; faster Registry repair; Program Optimiser, which realigns program files for faster execution; and a new anti-malware engine for its firewall.

During installation, the setup utility checks for existing firewall software and asks you to choose whether to switch to SystemSuite's or stick with your own.

The main screen offers utilities under three headings: Optimization, Security, and Fix & Maintain. The first links to 10 utilities, including

file and Registry defragmenters and several optimisers. The PC Analyser includes a breakdown of the programs launched at boot time, showing how long each takes to start and whether SystemSuite considers it necessary.

The Program Optimiser checks all the applications on your machine and makes unspecified realignments to ensure they're running efficiently. It's a bit of a 'black box' operation, as nowhere does it say what the optimiser has actually done.

The Security tab offers the NetDefence firewall controls and a log of its activity. You can set up and maintain an application white list here, although the firewall also prompts each time an app tries to use the internet.

The Fix & Maintain tab has a bumper 13 utilities, plus a One-Click Fix script, which sorts out errors on any connected hard drives. The extra utilities include file cleaners, disk- and shortcut fixers, a file shredder that meets US military standards, and a utility to track and display Windows errors.

The suite can create a bootable CD, which enables you to run its rescue app, Recovery Commander. This helps fix partition problems or a corrupt boot.ini file, and it can create and format partitions.

The interface isn't always as intuitive or accurate as Avanquest would like you to think. When we ran the overall Fix-Now script, it took 4 mins 45 secs to scan our test PC, and another 3 mins 34 secs to fix

INTERNET SECURITY SUITE

Symantec Norton 360 6.0

£60 inc VAT (3 PCs)**Contact**■ symantec-norton.com**Read more**■ tinyurl.com/7cka8gp**System requirements**

1GHz processor; Windows XP/Vista/7; 512MB RAM; 300MB hard-disk space

**PC ADVISOR
RECOMMENDED**

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★



As the number in its name implies, Norton 360 is Symantec's all-round PC protection tool. As well as antivirus, identity protection, parental-control and firewall modules, it includes PC tuning and 2GB of online backup.

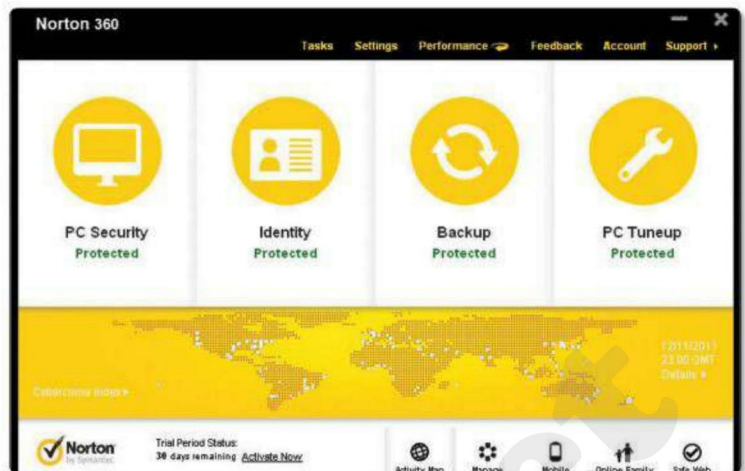
Norton's interface seems to get simpler and more blocky with each iteration. The main screen has four large panels, labelled PC Security, Identity, Backup and PC Tuneup.

PC Security covers scans, LiveUpdate, the firewall and Norton Insight, which is cloud-based intelligence on potential malware.

The Identity panel leads to Identity Safe, where the program can hold your details in encrypted form for use online. WebSafe advises on potentially dangerous sites before you visit them, while Anti-phishing controls prevent you from inadvertently giving out your details to untrustworthy sites.

Backup enables the setting up of local, network and online backups, defined by types of files rather than specific file types. You can mine down to use file types and exclude particular items from backup sets.

PC Tuneup offers disk optimisation, file clean-up, diagnostic reports and a startup manager. It's not the equivalent of



NORTON 360 6.0 offers backup and PC tuning as well as virus protection

a dedicated tune-up program, but it provides disk defragmentation, removal of temporary files and a status report. It also provides a way to control which utilities start up automatically with Windows.

A default scan of our 50GB file basket took 2 mins 26 secs. Norton checked 18,446 files, giving an average scan rate of 126 files per second. This is the fastest result we've seen in 2012 security products.

These stats are very different from those we saw with Norton Internet Security 2012, which examined 175,621 files in 27 mins. The scan rate is similar at 108 files per second, but Internet Security looked at many more files. This must be

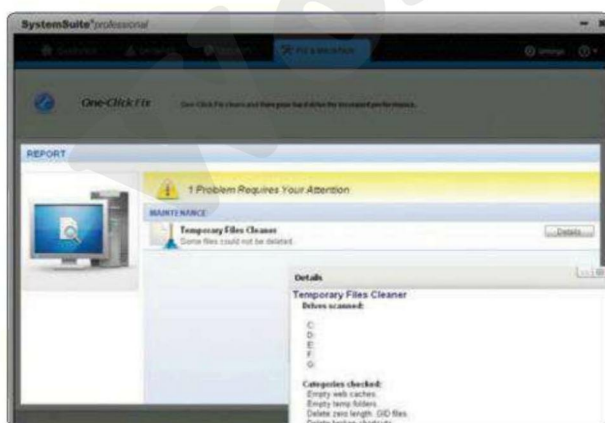
down to a difference in the default configurations of each product, since they use the same engine.

Norton 360 has the smallest footprint we've seen. We copied a 1GB file in 40 secs with antivirus running in the background, and 1 min 2 secs with a scan in progress.

AV-Test rates the Norton Internet Security 2012 engine at 15/18.

Verdict

Norton 360 offers more than just malware protection with backup and PC tuning, although neither is a stunning example of its breed. We'd like to see a few more extra features that aren't included with Windows. ☒ **Simon Williams**



SYSTEMSUITE offers a host of tools for optimising Windows

what it found - none of the issues was particularly serious.

The Optimization and Security progress bars confirmed they had finished the job, but Maintenance was stuck at 41 percent. Having

finally managed to complete SystemSuite's optimisation process, we were disappointed that the Registry Fixer still found and fixed 305 reported errors.

The Once-Click Fix on the Fix & Maintain tab took 1 min 46 secs. It reported a problem that required our attention, as some temporary files couldn't be deleted. This in itself is fair enough, but clicking the Details button didn't reveal what files were causing the problem, nor where they were located or how we could delete them.

A restart didn't rectify the problem, so frustratingly we were stuck with a persistently low Maintenance score.

A plethora of tools are provided by SystemSuite 12.0, but some of

its 'utilities' are in fact shortcuts to Microsoft's own apps or, in the case of the Registry Editor, simple revamps. SystemSuite's File Recovery, for example, just pulls files out of the Windows Recycle Bin.

Verdict

Avanquest sells a five-PC licence for £41, which seems to offer good value. The improvements SystemSuite can make to a PC are worth having, and the startup and program analysers can help make sensible choices about a Windows PC's setup and improve its day-to-day speed. Some of the ratings and reports are hard to fathom, and more transparency on what the software is doing would improve things. ☒ **Simon Williams**

PHOTO EDITOR

Adobe Photoshop Lightroom 4.0

£103 inc VAT

Contact

■ adobe.com/uk

Read more

■ tinyurl.com/7k9bzav

System requirements

Intel Pentium 4 or AMD Athlon 64 processor; Windows Vista/7/Mac OS X 10.6.8 or later; 2GB RAM; 1GB hard-disk space; 1024x768 display

Usability: ★★★★★
Features: ★★★★★
Value: ★★★★★

GEOTAG your photos simply by dragging and dropping them on to Lightroom's map



Adobe has upped Lightroom's functionality in version 4.0, adding video support, book creation, geotagging and soft proofing. But at the core of this latest release is a refinement of its ability to help you produce beautiful images.

The Adobe mantra for Photoshop Lightroom is Manage, Edit, Share. Editing is possible using the tools in the Develop module, and you can improve most images using only the first 11 sliders in the new Basic panel.

On top are Temperature and Tint controls for white balance, followed by Exposure and Contrast for luminance, then Highlights and Shadows for tonal recovery. Once you have the tones and colour to your liking, you can add refinements with Clarity and Vibrance.

Simple edits

Adobe has revisited the interface, and all Basic sliders (except for White Balance) are 'zeroed-out' in the centre of the scale. Starting with Exposure, you move the marker to the left to darken bright tones, and to the right to lighten them. It's intuitive, and reflects the way photographers think about photos.

The sliders look simple, but there's science behind their performance. For example, Highlights and Shadows provide beautiful, graduated results. And if you need to work on a specific area, many colour and luminance controls are available via Adjustment Brushes, plus Sharpness, Noise and Moire.

New to Lightroom 4.0 is Chromatic Aberration, which is corrected via the application evaluating the image, rather than a standard camera/lens profile.

Soft Proofing lets photographers tune images for print or online use.



LIGHTROOM 4.0 offers sliders for simple but precise editing controls

You choose the colour profile you want to work with, and then create a virtual soft proof that's placed in a stack alongside the original image.

Gamut warnings that use coloured overlays can indicate where colour shifting will appear for your chosen output. Slider tools then let you adjust those areas.

We put Soft Proofing to the test with a series of twilight shots to output for a graphics printer. Lightroom showed us the areas of colour it would have difficulty reproducing. When we adjusted the image, the output was faithful to its appearance on our computer.

At times we felt Soft Proofing to be too conservative, however. We often preferred the vibrancy of the original image.

Video editing

Video clips captured on a digital camera can be imported to Lightroom. These reside in the Grid view with photos by default. Lightroom chooses the image for the thumbnail, but this can be changed; when there are dozens of videos in your library, the ability to select the best frame is important.

Using the Quick Develop panel, budding movie makers can apply standard presets, non-destructively adjust the white balance, change the exposure, and tweak whites and blacks. Lightroom 4.0 even lets you make virtual copies of video clips, so you can experiment with effects without filling up your hard drive.

If you need more tools, the Capture Frame command lets you edit a single frame in the Develop Module, save your settings as a preset, then apply the preset to the entire movie. It works very well.

There are useful organisational tools, too. Snippets can be added to collections, labelled with stars, and marked up like photos. You can upload them to Facebook and Flickr, or export snippets to your drive.

It's now easy to share photos with friends and clients via email. A built-in client with its own address book lets you send images of specified sizes using your existing email account.

A Map module lets you geotag images, simply by dragging-and-dropping their thumbnails on to the map. This also shows you where existing images were captured.

Lightroom offers new options for converting RAW files to DNG. You can enable Embed Fast Load Data for improved rendering speed, while a Lossy Compression choice reduces file size with minimal impact on quality. A 24MB RAW image halves its original size, while 12MB RAW might see only 30 percent reduction.

You can now design and output photobooks within Lightroom, too. The easiest way to begin is to use the auto layout mechanism, which offers 180 templates. Once you have a basic layout, you can fine-tune using various tools, including full type control. You can send the project directly to Blurb (blurb.com) for output, or render it as PDF.

Verdict

Adobe Photoshop Lightroom 4.0's Develop Module is worth the product's £103 price alone, with more sophisticated and easy-to-use editing tools than ever. The Map and Book (photobook) modules help bring Photoshop Lightroom up to date with its Apple Aperture rival.

✉ **Derrick Story**

PROXY SOFTWARE

Netshade 4.4

\$29 (£18)**Contact**

■ raynersoftware.com

Read more

■ tinyurl.com/75pkfyy

System requirements

Mac OS X 10.5 or later;
compatible with Safari,
Firefox, Chrome, Camino
and Omniweb

Usability: ★★★★★

Features: ★★★★★

Value: ★★★★★

**PC ADVISOR
RECOMMENDED**

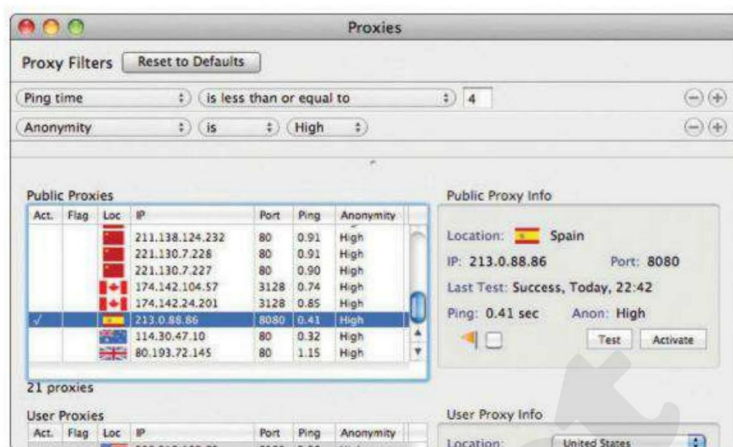
There are times when you may not wish to tell every online shop with which you do business your full address. In the same way, you might not want every website you visit to recognise you from your IP address. This is avoidable with a proxy server.

Historically, proxy servers required some know-how to set up. Netshade 4.4 is a Mac app that takes the pain out of the operation.

Netshade diverts your browsing through a proxy server. You can use your own, or browse through its list of hundreds of freely available public proxies. Each offers varying levels of quality and anonymity.

A Low Anon rating means the proxy has the potential to reveal your IP address, while Med Anon proxies will simply state that you're accessing a site via their service. High Anon is the best bet, and sites won't know you're using a proxy.

The \$29 (around £18) fee covers the first 12 months, and Netshade is \$19 (£12) a year thereafter. Rayner also offers subscriptions to its own



NETSHADE 4.4 hides your Mac's internet address from the sites you visit

collection of six proxy servers, sited in the US and Europe.

The default 'Fancy' interface flags up your selected proxy server on a picture of the earth. You can glean the server's plain-text address and anonymity rating at a glance.

You can filter the list of proxies by ping time, IP address, country or anonymity. Our only quibble is that you can't see the entire list at once.

For public proxies, routing is http; Rayner proxies allow secure https.

While Rayner can't be responsible for the quality or security of public proxies, its own proxies work splendidly. WhatsMyIP was unable to detect our IP address, but ShieldsUp knew we were using a proxy.

Verdict

Netshade 4.4 is a very simple tool that lets you add some privacy to your online life. It boasts a huge choice of free public and premium proxies. **Andrew Harrison**

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WorldMags.net

GAME

Mass Effect 3

£35 inc VAT

Contact

■ masseffect.com

Read more

■ tinyurl.com/852d356

System requirements

1.8GHz Intel Core 2 Duo or AMD-equivalent processor; Windows XP/Vista/7; 2GB RAM (1GB XP); 2.5GB hard-disk space; nVidia 7900/ATI X1800 or better; 256MB memory (with Pixel Shader 3.0 support); optical drive

OVERALL



MASS EFFECT 3 continues your battle with a genocidal machine race

The third episode in the Mass Effect trilogy is not so much trying to conclude the saga of humanity and its allies' battle against a genocidal machine race, as it is to out-bombast every other game it possibly can.

Cut scenes showing a nick-of-time escape from certain doom hit every half hour, almost every battle contains an Alamo finale, and enemies of absurd size show up regularly, only to be brought down in spectacular fashion moments later.

Between the action is galactic-scale decision making, with you holding in your hands the fate of entire species. There is a price to be paid for this torrent of spectacle, and Mass Effect 3 is a more rigid game than its predecessors. It throws out much of the already diminished roleplaying in favour of more ultra-dramatic cut scenes, boss battles, and a great deal of intense combat.

On with the war

The fighting can be exciting and varied, as you bring the customised abilities of your character and those of your preferred crew mates against vast legions of space zombies, armoured xenophobic thugs and energy-shielded robots.

Other times, the battles are rinse-and-repeat, grinding survival affairs that are formulaic in both engagement and location. Too much development time and effort appears to have been spent on the big chest-thumping moments, leaving the workaday stuff that much more ordinary.

The quieter moments remain, but they're now A-B courier missions rather than explorable hubs. This is forgivable to an extent, given that the plot hangs around urgency - the impending destruction of nearly all



Roleplaying is thrown out in favour of a great deal of intense combat

life in this galaxy. To bumble around rummaging through bins, looking for side quests and chatting to passers-by would rather spoil the mood. But there's no escaping the game's evolution into primarily an action title, interspersed by conversations in which you make increasingly difficult decisions that affect both individuals and the masses.

Some of these decisions are horrifying: the stakes, the consequences, the short-term benefits in your war against the Reapers versus potential long-term repercussions must all be considered. Mass Effect 3 builds on themes, characters, species and conflicts built into its predecessors, so retaining your Mass Effect 2 savegame is essential.

If you made reckless or brutal decisions in the previous games, they may well come back to bite you on the power-suited bottom in the finale. If you weren't in the habit of making friends, don't expect to have many people on your side here.

There are, depending on your decisions, some highly moving moments and, regardless of what you choose and do, some incredibly dark and bleak ones, too. Well-written and -performed, Mass Effect 3 is at its most powerful when it celebrates and moves in a little closer to a main cast it's built up over a half-decade. As has always been the aim, this is a game that tries to out-Star Wars Star Wars, and it's in the chemistry of its characters that this aim is most successful.

Silly and mercifully optional romance sub-plots and their

resultant soft-focus sex scenes tend to undermine this. But it's a chance to do something other than point a gun or go fetch something from the other side of the galaxy.

Mass Effect 4

Whether the eventual endings do the series and its characters justice is an argument that may rage eternal. One thing is clear: this is not the end. And a mile-wide mercenary streak is the single greatest failing of what's broadly a triumph.

If you want the 'best' ending but don't want to undertake all the fetch quests, and didn't make the right decisions in earlier games, you'll need to put a fair bit of time into the co-op multiplayer. Or play through the woeful iOS spin-off Mass Effect: Infiltrator.

Here you can shortcut your way to victory and thus to higher, plot-affecting 'Galactic Readiness' in Mass Effect 3's singleplayer - by spending real money. The game has become a commercial juggernaut, but its owners' hunger for money-making opportunities threatens to undermine what's supposed to be a powerful, self-contained story.

For all that, Mass Effect 3 is a spectacular game. It's as much a must-play as 2012 is likely to offer.

Verdict

Mass Effect 3 is epic and then some. But by dispensing with so much of the roleplaying on which the series was founded, in favour of often repetitive gunplay and kleptomania, it displays a small step back from its predecessor. ☒ **Alec Meer**



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£617 inc VAT

Contact

■ draytek.co.uk
Read more
■ tinyurl.com/7ne2zLt

Specification

Firewall router;
1-unit rackmount;
4x gigabit ethernet WAN;
1x fibre-optic WAN;
2x gigabit ethernet LAN;
1x fibre-optic WAN;
1x RJ45 console port;
2x USB 2.0; 500 VPN
tunnels; load-balancing;
SPI firewall; DoS
prevention; IPv6 support;
Bind IP to MAC; High
Availability backup option

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



ROUTER

DrayTek Vigor 3900

The Vigor 3900 is intended for businesses that need assured internet uptime. If one connection goes down, a multi-WAN router should automatically divert traffic to another available connection so business can continue as normal.

The 3900 is suitable for firms with large networks. It comes as a rackmount-only unit, with no wireless option, and its £617 price puts it in line with high-end networking hardware.

There's still a cost benefit with a router such as this, as the (relative) simplicity of configuring it should negate the need to hire external support staff. With networks of a certain size, the ongoing cost of maintaining the hardware and ensuring it's correctly set up can be more costly than the kit itself.

Four WAN ports are present, so you can configure the device to juggle four internet connections, with load-balancing and routing of specific traffic to certain connections if you wish.

There are also two LAN ports. One can be used for a demilitarised zone (DMZ), for a web server, FTP server or other computer that will be visible to the public internet; the rest of the network can be isolated behind the unit's firewall on the



other port, reducing the danger of a successful web intrusion to the LAN.

The 3900 has two SFP ports, used for fibre-optic networking - one can be used as a WAN port, and the other for a local fibre network.

A console port allows a dedicated computer for configuring the router to be always present. There are also two USB 2.0 ports, useful for adding a 3G modem or external storage.

With the possibility of four fixed-line connections and two backup 3G modems with separate mobile providers, it's hard to imagine many situations when internet access is entirely lost.

DrayTek has also considered the eventuality of the router itself failing. To this end, a High Availability feature allows a second 3900 to automatically take over if the first device goes offline.

The router supports up to 500 virtual private network (VPN) tunnels, although only 200 are available with SSL encryption.

You can add a second layer of security for workers connecting

remotely, with single-use password generation via a mobile app. Multiple WAN connections can be dedicated to a single VPN tunnel between remote offices, to provide high bandwidth and reliability between your firm's sites.

The web interface is a cut above anything we've seen elsewhere, and extremely responsive. The dashboard shows not only network load, for both IPv4 and IPv6 traffic, but also CPU and memory usage.

You can view tables for DHCP, routing and load balancing, and the firewall allows you to block traffic based on IP, port or MAC address.

DrayTek's comprehensive web-content filtering is available for annual subscription.

Verdict

DrayTek targets large businesses with its 3900 professional router. It's a good fit for companies with smaller IT budgets that still need plenty of professional features and demand assured network uptime.

✉ Orestis Bastounis

ACCOUNTING SOFTWARE

Crunch

£71 inc VAT/month

Contact

■ crunch.co.uk
Read more
■ tinyurl.com/7j59efd

Specification

Web connection

Usability: ★★★★★
Features: ★★★★★
Value: ★★★★★



Crunch is online accounting software, designed to take the hassle out of managing your business finances. No experience is necessary - all you need is a web-connected PC.

This software is aimed at micro-businesses (those with fewer than 12 employees), freelancers, contractors and consultants registered in the UK. But, unlike most similar software packages, it includes full accountancy support.

For the monthly price of £71 (a 10 percent discount is available with an annual subscription), Crunch includes unlimited access to its system and support from an account manager who can be reached via email, telephone or Skype.

There is also unlimited access to Crunch's team of accredited accountants. All business returns - company tax returns, business accounts and annual returns to Companies House - are completed and filed by said accountants.

Your self-assessment tax returns can be completed by Crunch for a fee. However, with useful suggestions on how to offset expenses against your taxable income, complete with calculations and simple explanations, Crunch should simplify the process of filing one's own tax return.

The interface is incredibly straightforward. It's easy to create invoices to clients and record sales

and business expenditure, upload bank statements and reconcile each item to invoice and expense amounts, and set up records for new clients or suppliers.

The dashboard offers an at-a-glance summary of company performance, tax liabilities, sales and expenses to date, plus messages notifying you of any outstanding amounts. Where the software really wins, however, is in its tax capabilities: it calculates tax liabilities in real time and advises you on the most tax-efficient way of drawing money out of the business, including an option to view the calculations for those who are interested.

£400 inc VAT**Contact**

■ dell.co.uk
 Read more
 ■ tinyurl.com/77s8d6d

System requirements

DLP LED projector;
 1280x800; 1.5x throw
 ratio; 0.97-2.58m throw
 distance; screen size
 0.76-2.03m; 20,000 hours
 lamp life; 300 Ansi
 lumens; 10,000:1 rated
 contrast ratio; up to
 1,073 billion colours;
 Composite; VGA; HDMI 1.3;
 Component via VGA
 adaptor; Universal I/O;
 USB-A; USB port; MicroSD
 slot; 1GB flash storage;
 mono speaker; 1W amp;
 Kensington lock slot;
 tripod mount; 100-240V
 50-60Hz 65W power
 adaptor; 105x104x36.5mm;
 360g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



PROJECTOR

Dell M110

This portable projector from Dell is an ultra-small, ultra-light device that adds hardly any weight or bulk to your laptop bag. Based on DLP technology, combined with an LED light source, it comes with a wealth of connectivity options and has a footprint just 10x10cm.

HDMI, VGA and composite video inputs are provided, with an adaptor offering component video via the VGA port. A proprietary Universal I/O connector sits next to a MicroSD slot and a USB 2.0 port, allowing you to boost the 1GB internal storage and project media without a computer attached.

The USB port can also be used to hook up Dell's optional wireless dongle, which allows you to project still images from an iPhone or Android handset via a Dell app.

The M110's tiny proportions don't allow for high-brightness output, but its 300 Ansi lumens specification is surprisingly good for a projector of this size. Provided that you keep the image size toward the smaller end of its 0.76-2.03m range, you should have no problem viewing the screen in an office environment (although dimming the lights will help).

To adjust the screen size, you'll need to move the projector back and forth - the lens has no zoom option.

Low-cost projectors often produce less than impressive colour, but the M110 boasts a range of colours wider than the capabilities of most computer monitors. However, this does mean media can look over-saturated without calibration.

Selecting the projector's sRGB display mode didn't reduce the colour gamut, but it did produce the best-looking results for photos.

To test video playback quality, we hooked up an LG Blu-ray player and settled down for *The Dark Knight*. This is no home-cinema projector, but the M110 produced a surprisingly watchable display. If you're fussy then you'll notice some odd fleshtones, with many of the actors appearing to be suffering a mild case of sunburn.

Video playback via USB was less successful. While you may get away with short video clips, you're better off using an external source to drive the video - the built-in option has a reduced framerate and is far from smooth.

Photo and music playback via USB was rather more useful, but a limited number of file formats are supported. Notably lacking

are PDF and PowerPoint, although software to convert the latter into a Jpeg slideshow is provided.

Somewhat annoyingly, the M110 doesn't ship with a remote control as standard - this costs £19. Several other accessories are available, including a £38 spare cable kit, a £21 height-adjustable tripod, and a £48 wireless dongle.

Verdict

The Dell M110 delivers much more than you might expect from such a small device. It's easy to use and delivers great-looking presentations on smaller screens. It's also extremely portable and can function without a PC. Supported file formats are limited, however, and you'll have to pay extra for the remote control.

✉ **Paul Monckton**



Crunch also includes IR35 assistance - highly topical in light of HMRC's clampdown on false employment - making the software

especially useful for contractors who wish to manage their accounts.

While Crunch is suitable for many small businesses and self-employed individuals, it probably lacks the features for anything larger than a micro-business.

The company lists as its clients digital and creative agencies, computer game developers, IT contractors, business consultants, journalists, copywriters and artists.

While those in certain building trades can also take advantage of Crunch's sleek simplicity, Construction Industry Scheme (CIS) functions do not currently appear to be supported, making the package possibly less beneficial for them.

Verdict

Crunch is a good, simple online finance-management solution for most micro-businesses, consultants, contractors and freelancers, with little to no accounting experience. Crunch is very easy to use and offers a great advantage in the form of unlimited access to accredited accountants; there's also a telephone and email support service to help resolve other queries. The pricing might at first sound expensive, but this includes unlimited accountancy support and the preparation and submission of business returns, and should save you money on accountancy fees.

✉ **Santhie Goundar**

£200 inc VAT

Contact

■ plustek.com/uk
Read more
■ tinyurl.com/7m52soq

Specification

Slide and negative (colour and black & white) scanner; CCD image sensor; LED light source; 7200dpi; 3.6 dynamic range; QuickScan and IntelliScan buttons; USB 2.0; Presto and SilverFast SE Plus 8.0 software; carry bag; 120x272x119mm; 1.6kg



FILM SCANNER

Plustek OpticFilm 8100

Many a flatbed scanner can turn its hand to 35mm slides and negatives. The OpticFilm is dedicated to the task, for those who need better quality at an affordable price.

The OpticFilm has a smart blue coat and a footprint smaller than a flatbed; while the 272mm depth is similar, it's only 120mm wide.

Slides are clipped into one of two plastic holders, then inserted into the side. One can hold up to four mounted slides, the other is for filmstrips with up to six frames. The mechanism is basic when compared to older models from other manufacturers, and the need to manually guide slides makes the Plustek unsuitable for bulk jobs.

The 8100 isn't about speed, but quality of image. The resolution stretches to 7200dpi - it sounds impressive, when compared to flatbed scanners, but is nothing new.

The scan times are modest. The lowest 600dpi setting produced a 2.2MB image in 36 seconds, while the Plustek required 45 and 53 secs

in its 2400dpi and 3600dpi modes respectively. At the highest resolution of 7200dpi, a 300MB file took 2 mins and 17 secs to scan.

The resulting quality was incredibly good in our tests, with blades of grass beautifully rendered even at the lower resolutions.

Two sets of software are included. The Presto titles are cheap and cheerful, and a little clunky, but will suffice for basic work. The SilverFast SE Plus 8.0 software is more complex than Presto, but it offers some invaluable tools and there's a WorkFlow Pilot to take you through the process.

The NegaFix option, for example, did a good job enhancing negative film scans. Even more useful is the MultiExposure facility, which scans the slide multiple times at various exaggerated exposure levels, then uses this information to create a



hybrid with superior dynamic range. Greater attention to details and better handling of extreme shades was evident in our results. This comes at a cost, however, requiring double the scan time - even a 600dpi scan took 1 min 6 secs.

Verdict

It's questionable how much of an advance the 8100 is over previous Plustek models, and there seems to be little reason to upgrade - other than the very good SilverFast software. It's not made for bulk scans, but for getting high-quality digital versions of old slides it does an excellent job. ✉ Robin Morris

£150 inc VAT

Contact

■ buffalotech.com
Read more
■ tinyurl.com/6w6xswa

Specification

1.6GHz ARM processor; 1TB 3.5in SATA 3Gbps; gigabit ethernet; USB 2.0; CIFS/SMB; AFP; HTTP/HTTPS; FTP file sharing; Time Machine-compatible; DLNA server; iTunes server; mains adaptor 100-240V AC; 45x175x156mm; 1.1kg



NAS DRIVE

Buffalo LinkStation Pro LS-VL

The Buffalo LinkStation Pro LS-VL is a single-disk NAS unit, available with 1-, 2- or 3TB of storage capacity.

It's the size of an external hard drive, and designed to stand upright. The curvy plastic case is stylish, with a function button at the bottom and air vents to assist cooling. A fan is also present inside, but we found it distracting when using the Buffalo as a music server.

On the rear of the device is a power connector, ethernet and USB 2.0 ports, plus an on/off switch.

We picked up the NAS on our iMac through Bonjour networking, then installed Buffalo's Link Navigator software (NovaBackup is supplied for Windows, and you can also use a browser for manual setup). This makes it relatively straightforward to configure file sharing, backups, workgroups and more.

LinkNavigator lets you configure the NAS to power down with your computer, although it posted modest power-consumption figures. We recorded 12W in use, and 0.1W idle.

Buffalo has created free apps for iPad and iPhone, letting you view fullscreen photo slideshows and stream 1080p video and audio. You can downgrade the video quality to ease network load, but the app won't transcode or play FLAC/MKV files.

An Auto backup feature lets you quickly and easily copy files from a USB-connected drive or camera.

Buffalo claims transfer speeds of up to 76MB per second (MBps) from the LinkStation Pro. Using the Quickbench benchmark and 10MB-100MB test data over an AFP network, we recorded sequential reads of 63MBps and writes of 51MBps. At the small-file level, these figures plummeted to 5MBps random 4kB reads and just 0.1MBps random 4kB writes.

The Blackmagic Disk Speed Test reported data transfers at 55MBps write and 57MBps read.

Using SMB/CIFS networking the Buffalo showed maximum sequential reads of 52MBps, but the write speed never exceeded 37MBps.

At the small-file level, we measured 4kB random reads at 9.6MBps and random writes at 3.2MBps.

Verdict

The Buffalo offers pro features, but its modest capacity, low price tag and stylish looks make it more suitable for the home. Data transfer speeds could be improved.

✉ Dominik Tomaszewski



£59 inc VAT**Contact**■ istorage-uk.com

Read more

■ tinyurl.com/7wjbr6s**Specification**

8GB USB flash drive (also available in 4GB and 16GB capacities); 256bit AES hardware encryption; built-in keypad; USB 2.0; 80x20x11mm; 24g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



USB FLASH DRIVE

iStorage datAshur

Losing a flash drive is all too easy, leaving your sensitive data vulnerable to unauthorised access. iStorage hopes to satisfy businesses' security concerns with the datAshur, a hardware-encrypted thumb drive that it claims cannot be hacked.

It's not just paranoia that makes the datAshur appealing: a company can be fined up to £500,000 by the ICO for breaching the Data Protection Act if an employee mislays a flash drive containing sensitive client data.

The datAshur is available in 4GB, 8GB and 16GB capacities. It differs from most flash drives in its length, which enables it to accommodate a small keypad. The drive includes a full-length anodised aluminium sleeve, which helps to protect it from dust and water. The overall build quality is smart, but tough.

To unlock the drive you enter a seven- to 14-digit code, then insert it into a USB port. The buttons are small, so large fingers may find some difficulty in hitting the correct key.

The keypad is critical for security, allowing the drive to work independently of the computer. This prevents a keylogger from recording the access code, and negates the need for OS-specific drivers.

Admin and user PINs can be created. Should an employee forget their number, the admin code can be entered to unlock the drive and configure a new user PIN.

To prevent brute-force attacks, the data is destroyed and a new encryption key randomly generated after a PIN is incorrectly entered 10 times consecutively. When you set a new PIN and connect the drive to a computer, you'll have to format the drive before copying files to it.

Data is encrypted in real time, and shouldn't slow read or write performance. The datAshur put in a disappointing performance in our tests, however. It managed an average of 12.5MB per second (MBps) when writing and 9.1MBps



when reading. A premium drive such as this should be able to hit double these figures.

We've seen similar storage devices in the form of iStorage's diskGenie and the Digisafe DiskCrypt Mobile. However, neither are as pocketable as the datAshur. The IronKey is another hardware-encrypted flash drive, but it's expensive and lacks a keypad, making it vulnerable to keyloggers.

Verdict

The datAshur is one of the more secure USB flash drives around, so the steep price tag isn't perhaps surprising. We recorded slow read and write performance, but the drive remains a good buy. **Jim Martin**

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- 1TB Serial ATA III 6Gb/s Hard Drive
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GROUP TEST

Thin-and-light ultraportable laptops have been around a while, but a new raft of lightweight portables are coming to market with Intel's backing. Ben Camm-Jones and Andrew Harrison test eight Ultrabook and ultraportable laptops in search of the best models

If you're looking to buy a new laptop, you may have picked up on the recent hype surrounding Ultrabooks. These are thin, light laptops, designed to be easy to carry and fast to boot into Windows.

The category may have only recently been defined by the 'Ultrabook' name, but the ultraportable laptop is not a new concept. Rather, it takes its inspiration from Apple's four-year-old MacBook Air.

Intel invented the label to stimulate mobile processor sales in a declining Windows PC market. It stipulates that a laptop must meet a certain set of specifications to be marketed as an Ultrabook. Intel doesn't broadcast the actual spec it imposes on laptop manufacturers, but the essentials are as follows.

An Ultrabook must be less than 18mm thick, which leaves no room for an optical drive. With an Intel ultra-low-voltage (ULV) processor inside, the battery must run to at least five hours. Solid-state storage is specified in order to achieve a maximum seven-second boot from hibernation mode. All Ultrabooks that have made it to market thus far also run Windows.

Intel's aforementioned ULV chips hail from the company's 'Sandy Bridge' family of second-generation Core i-series processors. 'Ivy Bridge' CPUs (the third generation) are expected to appear on the market within the next few months, and will offer faster performance and improved energy-efficiency.

Not all thin-and-light models come under the Ultrabook umbrella. The MacBook Air, for example, isn't preinstalled with Windows, while the Samsung NP900X3A is fitted with a traditional hard drive and appeared on the market before the category existed.

Ultrabooks have found a niche somewhere between netbooks and full-size laptops. With no room inside for an optical drive or discrete graphics processor, they make a poorer choice for entertainment. Yet Ultrabooks offer much faster performance in Windows than a standard netbook, and are up to more than just web browsing and email.

Indeed, while their components are thin and light, they're also powerful.

All Ultrabooks are able to run demanding software programs.

We've tested eight of the best thin-and-light models on the market - four of these are Intel-approved Ultrabooks - to find out whether now is the right time to dip your toes into this exciting new ultraportable laptop category.

Ultraportable laptops



Photography by Dominik Tomaszewski



APPLE MACBOOK AIR 11in (MID-2011)

£849 inc VAT • apple.com/uk • tinyurl.com/ccpoanm

The first of two MacBook Airs in our group test, this 11.6in-screen model was first introduced to Apple's portfolio in October 2010.

Apple laptops natively run OS X 10.7 Lion, so we installed Windows 7 under Boot Camp to ensure a fair test in WorldBench 6 and MobileMark 2007. You can also dual-boot Windows with Apple's OS if you're keen to stick to Microsoft's OS.

Our sample laptop met Apple's entry-level specification for the MacBook Air, making this the cheapest Mac portable you can buy. It might look a tad underpowered with just 2GB of RAM and a 64GB SSD but, despite running an OS for which its hardware hasn't been optimised, the MacBook posted test results broadly in line with the Windows-based competition.

Indeed, the MacBook Air proved to be much quicker than we might have expected. Its 1.6GHz Intel Core i5-2467M processor pushed it to a WorldBench 6 real-world speed score of 111 points.

It has room for improvement in its endurance, however, with the MacBook able to survive just over 4.5 hours (278 minutes) in the MobileMark 2007 battery-life test.

Apple's design is difficult to fault: this laptop is well put together and it looks great. Despite its diminutive size, the Air remains comfortable to use. Its aluminium unibody chassis feels robust, while several nice touches, including a backlit keyboard and a MagSafe power connector, make it a joy to use.

It's the display that really won us over. With sharp definition and a rich colour gamut, the MacBooks' screens are easily the best of the bunch. The viewing angle is wide, and Apple's anti-reflective coating means that mirror shine is barely noticeable on this glossy panel.

Lab tests confirmed our suspicions of the MacBook Air's display excellence, with the two Apple laptops capable of a significantly higher contrast ratio and very good coverage of the sRGB gamut in comparison to their Ultrabook rivals.

VERDICT: For the £849 this MacBook Air will set you back, the Asus UX21E offers double the amount of system memory and solid-state storage. But what the cheapest Air lacks in these respects it makes up in build quality, particularly with reference to the screen. OS X is a very good operating environment, but Windows is available if needed.



APPLE MACBOOK AIR 13in (MID-2011) 1.8GHz CORE i7

£1,449 inc VAT • apple.com/uk • tinyurl.com/729fhez

The 13.3in MacBook Air is the laptop that inspired the Ultrabook. At its 2008 launch it was very much the first of its kind. By losing the optical drive, Apple was able to make it slimmer than any rival laptop; the Air also embraced solid-state storage. More importantly, though, it changed the laptop market forever.

Imitators came and went, but with Intel's backing many more are set to flood the market under the guise of Ultrabook laptops.

Taking on the MacBook Air is no mean feat, particularly when a laptop is up against a built-to-order speed demon such as our sample. It lists a startlingly quick 1.8GHz Intel Core i7-2677M processor, 4GB of RAM and a high-capacity 256GB SSD. Whereas its smaller sibling (reviewed left) is a basic, affordable entry in Apple's line-up, this 13.3in version offers the best money can buy.

The MacBook Air's 130-point WorldBench 6 speed score beats all other contenders in our group test, and is all the more impressive when you consider that the MacBook was designed to run OS X rather than Windows. Battery life is also decent, and we recorded more than 6 hours (380 mins) on a full charge.

Like its little brother, though, the standout feature of this MacBook Air is its display. This is far superior to those seen on any of the Windows-based competition; given that it's the part of the computer you'll spend most of your time looking at, that's important.

Even without its screen the MacBook Air looks gorgeous, and will likely inspire envy from fellow commuters or coffee-shop customers.

It's a little pricey, and we'd like to see support for USB 3.0, but the MacBook does include a super-fast Thunderbolt interface. There's also a full-size SD Card slot - not many of the other models here, including the smaller MacBook Air, can boast this.

We like the idea of a laptop that can run a range of operating systems. Of course, you could take any of the Windows-based machines on test, partition the SSD and install a Linux distribution, but only the MacBook Airs let you run both Windows and OS X.

VERDICT: The most expensive of the thin-and-light laptops in our round-up, the 13.3in MacBook Air is a sizeable investment - but one you're unlikely to regret. The MacBook Air's build quality is phenomenal, and its components are top-notch.



ASUS ZENBOOK UX21E-DH52

£849 inc VAT • uk.asus.com • tinyurl.com/6nazr9L

Asus has attracted some criticism for slavishly trying to copy the MacBook Air's specification and outward design. While you're unlikely to mistake one for the other, Asus has clearly taken design pointers from Apple - the tapered all-metal chassis being the most obvious.

We first looked at the UX21E in January (tinyurl.com/6nazr9L), but have included it here to see how it compares to its big brother, the UX31E (reviewed right), and Apple's 11.6in Air (previous page).

The Asus scored 116 points in our WorldBench 6 real-world speed test, putting it five points ahead of Apple's entry-level model and just three behind the larger Zenbook.

We measured a runtime of 5 hours 47 mins in MobileMark, with the Asus able to keep going an hour longer than Apple's portable.

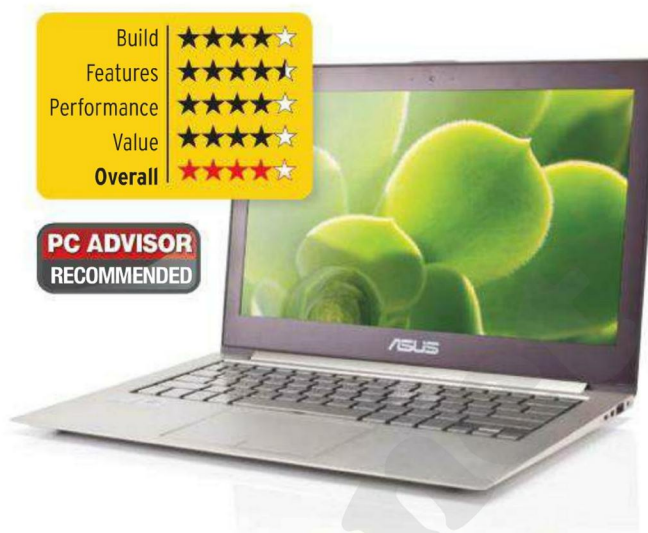
Asus' pricing matches that of the 11.6in Air, but with this laptop your £849 will net you a larger SSD at 128GB, and double the RAM at 4GB. That doesn't mean it's the better buy, though.

The Zenbook's 11.6in screen doesn't get close to the quality portrayed by that of the MacBook Air. Its glossy panel doesn't share its effective anti-glare coating for a start, and viewing angles are notably poor. Like other Ultrabook manufacturers, Asus' display offers a mere 70:1 contrast ratio, in the face of Apple's 470:1.

Neither is the keyboard as comfortable to use, with too little relief between the buttons and the chassis. In our tests, typing mistakes occurred all too frequently. The flaw isn't shared by the Zenbook's more expensive brother, but both that laptop and the Air make a fatal mistake with the power button: it's situated at the top-right corner, where one might expect to find the Delete key.

Other models in this group test, including the Lenovo IdeaPad (overleaf) and Toshiba Portégé (page 64), separate the power button from the keyboard. This design lessens the risk of you accidentally switching off the laptop mid-sentence.

VERDICT: On paper, the Zenbook UX21E would seem to offer the best value in our round-up of ultraportable laptops. It's well-priced, with generous helpings of storage space and system memory. It proved to be a very good performer in our tests, and the build quality is strong. But we're not ones to settle for second-best, and in our testing found concerns with the keyboard and screen.



ASUS ZENBOOK UX31E-DH53

£999 inc VAT • uk.asus.com • tinyurl.com/6pg68z3

The Asus is arguably the best-looking Ultrabook in our round-up. Perhaps that's because it looks so much like the MacBook Air.

While the design is undoubtedly similar to Apple's styling, there are tell-tale signs to this new take on the concept. First up is the darker, much glossier metal finish. And with the lid open, the keyboard is noticeably different.

That's not a bad thing: we like the keyboard. Asus has spared room for a dedicated Delete key, with usefully large Return, Shift, Backspace and Spacebar buttons. The keys are well-sized, and we didn't experience the same typing issues as with its smaller sibling. The touchpad is a useful size, too.

This Ultrabook is generously proportioned, but still thin and light, with a 13.3in screen. The specification is good, too, with 4GB of RAM and a 256GB SSD (but note that Asus sells only a 128GB model in the UK). The display also features a higher resolution than the 13.3in MacBook Air, cramming in 1600x900 pixels.

Despite its higher resolution, though, we still prefer Apple's panel. While the Asus offers sharp definition and usable viewing angles, its untreated gloss finish makes for distracting reflections in certain conditions. Neither is the colour depth as good. We measured just 60 percent coverage of the sRGB gamut, and an 80:1 contrast ratio.

The Asus hit 119 points in WorldBench 6, which is better than most in this round-up. But it's still 11 points fewer than that achieved by the Air, which also uses a 1.8GHz Intel Core i7-2677M CPU.

The Zenbook has a few tricks up its sleeve to help it counter Apple's performance and display advantages, and the USB 3.0 and MicroHDMI connections on its chassis are welcome additions. Nevertheless, the MacBook Air scores yet more points against the Asus with Bluetooth 4.0 and dual-band Wi-Fi (the Zenbook offers a 2.4GHz single-band wireless connection and Bluetooth 3.0).

The Asus Zenbook beat every other laptop here in MobileMark 2007, posting a very good 435-min runtime.

VERDICT: This is a very good-looking laptop, but Apple would still win the beauty pageant. Although the Asus is cheaper, with very impressive battery life, Apple wins hands-down on performance and has a significantly better display.



LENOVO IDEAPAD U300S-1080

£1,207 inc VAT • lenovo.com/uk • tinyurl.com/7bcwf5w

The IdeaPad U300s from Lenovo is a solidly built Ultrabook. Internally, at least, it stays true to Intel's template.

It's not a stunning-looking machine in comparison to some of the models on test. Unlike most ultraportable laptops, its chassis also maintains the same thickness from front edge to hinge.

The Lenovo is one of the better performers, however. We recorded 122 points in WorldBench 6 - a very good score, if some way behind rival models running the same processor.

There's 4GB of RAM and a 256GB SSD, which puts it in line with or ahead of its opponents in this round-up. And the Lenovo's 399-minute battery life is particularly impressive by comparison.

When writing up a laptop review, it's our practice to type it on the machine in question. We couldn't get used to the Up arrow's placing next to the right Shift key, however, so plumped to use another portable instead. The Lenovo's keyboard is also blighted with small Shift, Return and Backspace buttons.

We found other oversights, too. There's no SD Card reader and, compared to some other Ultrabooks here, the connectivity options are limited. A full-size HDMI port is provided, though.

The IdeaPad's 13.3in glossy screen displays rich and deep colours, but its definition is fuzzy and viewing angles are poor. We measured 64 percent coverage of the sRGB gamut, and an 80:1 contrast ratio.

When you press the power button on the U300s, the only indicator that you've kick-started the booting process is a small, faint and easy-to-miss LED on the laptop's front edge. The screen also remains blank for a few seconds, and several times we accidentally turned off the laptop on assumption that we hadn't pressed its power button hard enough.

VERDICT: The Lenovo offers a good spec and strong performance. Battery life is also impressive, making this laptop a useful travel companion. But the keyboard is awkward in use, the screen's image definition is fuzzy, and connectivity options could be better. Perhaps more likely to put you off, though, is this laptop's extravagant pricing.



LENOVO THINKPAD X1 1291-26U

£949 inc VAT • lenovo.com/uk • tinyurl.com/4xs3nu6

The Lenovo ThinkPad X1 isn't an Ultrabook by Intel's standards, nor is it much of a looker, but we think it's worthy of inclusion in our round-up as a highly portable yet functional thin-and-light laptop.

There's plenty to recommend the X1. It can quickly perform general computing tasks, and scored 126 points in WorldBench 6. The keyboard is also well executed. We found none of the flaws evident in the U300s; rather, this Lenovo's decent-size keys include large Shift, Return and Backspace buttons.

Although it comes with a traditional hard-disk drive in place of solid-state storage, its 320GB capacity is more generous than that of the SSD-toting ultraportables. Despite this hard drive's 7,200rpm spin speed, however, its access times are significantly slower. Its moving parts also mean it's noisier, and that you'll need to take more care of this portable on the road.

But the X1 retains advantages over the other contenders. It boasts a greater number of connectivity options, with eSATA, USB 2.0 and 3.0, HDMI, gigabit ethernet and DisplayPort all covered. And the Lenovo is able to offer increased login security with a fingerprint reader, and toggle switches for wireless connections.

We had a few concerns with the overly springy touchpad, which makes double-clicking more awkward than it ought to be. And although the screen offers good colour depth, its glossy finish extends to the surrounding bezel - reflections can be a problem. Our display tests measured 58 percent coverage of the sRGB colour gamut, and a mere 70:1 contrast ratio.

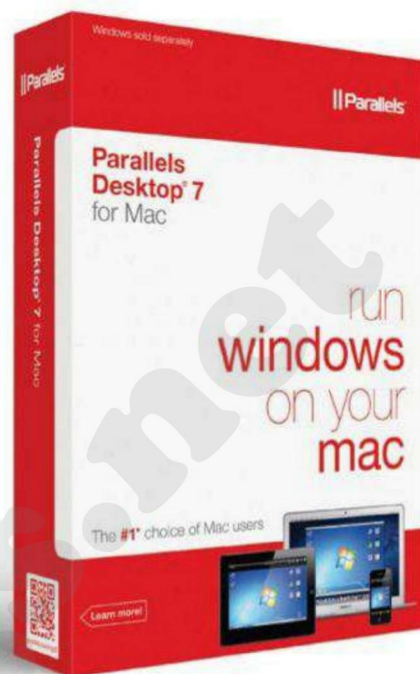
The ThinkPad recorded a comparatively poor 224 mins in MobileMark 2007, with the shortest runtime of all the laptops here.

VERDICT: The Lenovo X1 is a good example of a Windows-based thin-and-light laptop that's not an Ultrabook. Its hard-disk-based storage system helps it to offer strong value, and there are several features here not mirrored by the competition. The Lenovo isn't particularly pretty but, if looks aren't of the utmost importance, its speedy performance makes it a useful travelling work tool.

"Across the board, Internet Explorer 9 performed significantly better on Parallels Desktop than it did on VMware Fusion."

– MacTech Labs: Virtualization Benchmarks, Fall 2011

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SAMSUNG NP900X3A-B01

£1,099 inc VAT • samsung.com/uk • tinyurl.com/7brq6do

Samsung's NP900X3A has been around longer than Intel's Ultrabook campaign, although it fits comfortably into the category. In fact, this Samsung was the original pretender to the MacBook Air's crown. This is no outdated laptop, though, and it's received a processor upgrade since our original review in May 2011.

The updated CPU hasn't led to a significant performance boost, however. Although newer than the Core i5-2530UM, its i5-2467M chip recorded only a seven-point improvement in our WorldBench 6 real-world speed test, with 101 points scored.

This is a reasonable turn of pace, but the 111 and 116 points scored by the 11.6in MacBook Air and Asus Zenbook UX21E respectively put the Samsung's performance in the shade. Both laptops also use the Core i5-2467M, so something could clearly be improved here.

The reduced performance isn't limited to the processor either. The Samsung survived for longer than the Lenovo ThinkPad in MobileMark 2007, but its battery life is behind the best on test at 303 mins. The Samsung also runs hot and, when placed on a lap, becomes noticeably warm after only a few minutes use. We heard its cooling fan whirring more frequently than those of its rivals.

On the plus side, the Samsung's backlit keyboard is a cracker, and remains easy to use under any lighting condition. We were also pleased to find large, well-spaced keys.

The screen has good measured colour depth, if not the sharpest definition, and its matt finish minimises distracting reflections. Our display tests measured 77 percent coverage of the sRGB gamut - the highest here - and a very impressive 430:1 contrast ratio.

The design is aesthetically pleasing but plasticky, with a black finish in contrast to the lighter tones of the MacBook Air. We like the ability to hide away the ports on its side when not in use, too.

VERDICT: It's a shame that the Samsung couldn't squeeze more speed from its processor or juice from its battery, as the NP900X3A is a rather nice laptop. The backlit keyboard and non-reflective screen make it easy to use in all environments.



TOSHIBA PORTÉGÉ Z830-104

£1,099 inc VAT • samsung.com/uk • tinyurl.com/6ndx26w

The Toshiba Portégé Z830-104 is the ugliest Ultrabook in our group test, but highly portable at just 1.08kg and 314x226x17mm. And there's plenty to admire beyond its outward appearance. For a start, it's the only Ultrabook here to sport full-size ethernet, VGA and HDMI ports, while a fingerprint reader locks out intruders by enabling secure logins to Windows.

The Toshiba's main selling point is its multitude of connectivity options. The aforementioned full-size HDMI and VGA ports allow hook up to an external monitor or projector, while three USB ports include a single USB 3.0. Native gigabit ethernet support makes connecting to wired networks easier than fumbling with USB adaptors, while 802.11a/b/g/n Wi-Fi and Bluetooth 3.0 are also offered.

This laptop pairs a 1.7GHz Intel Core i5-2557M processor with 4GB of DDR3 RAM and a 128GB SSD. It achieved a respectable 117-point score in WorldBench 6. Although it's not the fastest laptop in our group, the Toshiba is still comfortably ahead of rivals such as the Samsung NP900X3A (reviewed left).

The battery performance also centres around the middle of the group. We recorded a 368-minute battery life in MobileMark 2007 - a useful amount of unplugged runtime.

The glossy panel lacks definition, with a certain amount of fuzziness creeping in around the edges, but its anti-glare coating works well to reduce reflections. The Toshiba covers only 56 percent of the sRGB colour gamut, though, and its 70:1 contrast ratio joins the Asus UX21E and Lenovo ThinkPad at the bottom of the pack.

The keyboard is pleasant in use, although we were frustrated by the small size of the Return key. The Toshiba's touchpad is similarly small, but easy to turn off if you'd prefer to use a USB mouse.

VERDICT: The Toshiba Portégé Z830-104 is an ideal ultraportable for the travelling professional who prioritises light weight, performance and practical features over a stylish design. The Toshiba is perhaps a little overpriced, however, given its middle-of-the-pack application speed and battery life.

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Conclusion

There's not much difference in application speed to separate the ultraportable and Ultrabook laptops reviewed here – although it's hardly surprising, given their near-identical specifications. Only one machine noticeably lagged the competition, with the Samsung's 101-point WorldBench 6 real-world speed score some way off the 118-point group average.

Don't rule out the Samsung just yet, though. Its screen is one of the better examples we've seen, if bested by Apple's two MacBook Airs. And since it predates Intel's Ultrabook spec, it also includes a useful gigabit ethernet port.

We were impressed by the Asus Zenbook UX31E. It's not the fastest machine on test, and nor does it have the best specification;

but ignore the lower build and display quality – which also mar its smaller sibling – and it makes a significantly cheaper alternative to the 13.3in MacBook Air. Do note, however, that Asus sells the UX31E with a 128GB rather than 256GB SSD in the UK.

Lenovo's IdeaPad U300s-1080 has a decent specification, with a powerful Core i7 processor, 4GB of RAM and a 256GB SSD.

	APPLE £849 inc VAT ★★★★★ PC ADVISOR BEST BUY	APPLE £1,449 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	ASUS £849 inc VAT ★★★★★	ASUS £999 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	
Product name	MacBook Air 11in	MacBook Air 13in	Zenbook UX21E-DH52	Zenbook UX31E-DH53	
Processor	1.6GHz Intel Core i5-2467M	1.8GHz Intel Core i7-2677M	1.6GHz Intel Core i5-2467M	1.8GHz Intel Core i7-2677M	
Screen size and type	11.6in glossy LED-backlit	13.3in glossy LED-backlit	11.6in glossy LED-backlit	13.3in glossy LED-backlit	
Resolution (pixels)	1366x768	1440x900	1366x768	1600x900	
Operating system	Mac OS X 10.7 Lion	Mac OS X 10.7 Lion	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	
RAM	2GB DDR3-1333MHz	4GB DDR3-1333MHz	4GB DDR3-1333MHz	4GB DDR3-1333MHz	
Storage	64GB SSD	256GB SSD	128GB SSD	256GB SSD	
Graphics	Integrated Intel HD 3000	Integrated Intel HD 3000	Integrated Intel HD 3000	Integrated Intel HD 3000	
Video out	Thunderbolt	Thunderbolt	MicroHDMI, MicroVGA	MicroHDMI, MicroVGA	
Audio	Stereo speakers, headphone jack, mic	Stereo speakers, headphone jack, mic	Stereo speakers, headphone jack, mic	Stereo speakers, headphone jack, mic	
USB	2x USB 2.0	2x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0	
Firewire/eSATA	N/A	N/A	N/A	N/A	
Optical drive	N/A	N/A	N/A	N/A	
Wireless	802.11a/b/g/n, Bluetooth 4.0	802.11a/b/g/n, Bluetooth 4.0	802.11b/g/n, Bluetooth 4.0	802.11b/g/n, Bluetooth 4.0	
Ethernet	N/A	N/A	N/A	N/A	
Card slot	N/A	SD	N/A	SD	
Other features	Webcam	Webcam	Webcam	Webcam	
Battery	35Wh lithium polymer non-removable	50Wh lithium polymer non-removable	35Wh lithium polymer non-removable	50Wh lithium polymer non-removable	
Battery life ¹	278 mins	380 mins	347 mins	435 mins	
WorldBench 6 score	111	130	116	119	
sRGB gamut	63%	66%	62%	60%	
Contrast ratio	470:1	520:1	70:1	80:1	
Dimensions	300x192x17mm	325x227x17mm	299x196x4-17.1mm	326x223x4-18.1mm	
Weight	1.08kg	1.33kg	1.16kg	1.41kg	

¹Tested in MobileMark 2007

Its battery life is good, but the construction is mediocre for a £1,207 laptop. The Chinese manufacturer's ThinkPad X1 is cheaper, and packs a useful selection of ports, but its screen is disappointing and battery life poor.

Of the other Ultrabooks here we were rather taken with the Toshiba Portégé Z830-104. It's not beautiful, but it offers the best connectivity options.

Apple's MacBook Air, in both 11.6in and 13.3in versions, has the edge over the Zenbooks in design, build and display quality. If engineering excellence and the end-to-end user experience count, the MacBook Air is the inescapable winner here.

If your only choice is now which size Air you should buy, consider how you will most often use the laptop. The 11.6in is too small

for all-day working, although it offers the best value at only £849.

Before you rush out and buy any of the models in our group test, consider whether you'd in fact be better off waiting a couple of months for faster, more power-efficient Ivy Bridge processor-equipped models to appear on the market. This Ultrabook category remains very much in its infancy. ☒

LENOVO £1,207 inc VAT ★★★★★	LENOVO £949 inc VAT ★★★★★	SAMSUNG £1,099 inc VAT ★★★★★	TOSHIBA £1,099 inc VAT ★★★★★
IdeaPad U300s-1080	ThinkPad X1 1291-26U	NP900X3A-B01	Portege Z830-104
1.8GHz Intel Core i7-2677M	2.5GHz Intel Core i5-2520M	1.6GHz Intel Core i5-2467M	1.7GHz Intel Core i5-2557M
13.3in glossy LED-backlit	13.3in glossy LED-backlit	13.3in matt LED-backlit	13.3in matt LED-backlit
1366x768	1366x768	1366x768	1366x768
Windows 7 Home Premium 64bit	Windows 7 Professional 64bit	Windows 7 Home Premium 64bit	Windows 7 Professional 64bit
4GB DDR3-1333MHz	4GB DDR3-1333MHz	4GB DDR3-1333MHz	4GB DDR3-1333MHz
256GB SSD	320GB 7,200rpm HDD	128GB SSD	128GB SSD
Integrated Intel HD 3000	Integrated Intel HD 3000	Integrated Intel HD 3000	Integrated Intel HD 3000
HDMI	HDMI, Mini DisplayPort	MicroHDMI	VGA, HDMI
Stereo speakers, headphone jack, mic	Stereo speakers, headphone jack, mic	Stereo speakers; headphone jack; mic	Stereo speakers, headphone jack, mic
1x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0
N/A	1x eSATA/USB 2.0 combo	N/A	N/A
N/A	N/A	N/A	N/A
802.11b/g/n, Bluetooth 3.0	802.11a/b/g/n, Bluetooth 3.0	802.11a/b/g/n, Bluetooth 3.0	802.11a/b/g/n, Bluetooth 3.0
N/A	Gigabit	Gigabit	Gigabit
N/A	SD	MicroSD	SD
Webcam	Webcam, fingerprint reader	Webcam	Webcam, fingerprint reader
50Wh lithium polymer non-removable	56Wh lithium-ion non-removable	50Wh lithium polymer non-removable	50Wh lithium polymer non-removable
399 mins	224 mins	303 mins	368 mins
122	126	101	117
64%	58%	77%	56%
80:1	70:1	430:1	70:1
324x214x15.5mm	332x230x18.2-22.8mm	329x226x17-19mm	314x226x17mm
1.35kg	1.75kg	1.33kg	1.08kg



Network printers

Robin Morris puts six network printers through their paces to see which is best able to handle your office printing needs



Photography by Dominik Tomaszewski

Times move slowly in the world of the network printer, with businesses spending enough on consumables that they don't need the additional expense of a pricey new printer every other year. But the technology continues to advance, and we've seen several changes take place since our previous network printer round-up.

An example is wireless, with the cable-free connectivity beginning to filter through to some of the cheaper models in our group test. However, its omission in the dearer network printers suggests Wi-Fi still isn't seen as a core infrastructure of large offices.

In a home or small office, not having to physically lay cables means a wireless model is more convenient and an attractive choice. Larger businesses, meanwhile, will almost certainly have a wired network in place, and may not want to add an unstable or potentially insecure WLAN to the mix.

For those that don't offer wireless as standard, it's often possible to add the feature at extra cost. This has been known to add as much as £200 to the price tag, however, so if you think you might want to use a wireless connection at some point in

the future it makes sense to have it from the get-go. The faster 802.11n standard can be found, but 802.11g is still adequate for most jobs.

Every professional printer has an ethernet port. This wired connection will typically be 100Base-TX, also known as fast ethernet, and specified for 100Mbps operation. Some models are equipped with the faster gigabit ethernet (or 1000Base-T) interface. If your business transmits a lot of data across the company network, a gigabit connection is preferable.

We also saw a greater range of printer technologies this time round. The typical office printer is still a laser model, which are noted for their good speed, clean and precise text, and ability to handle larger print jobs; but the inkjet is fighting back.

Epson, in particular, has developed a number of inkjets that can outperform lasers, at least in terms of running costs and graphics output. Many of these inkjets are also stuffed with features, and a good number are multifunction devices - printers that can also be used as scanners and photocopiers, and sometimes fax machines.

If your company is looking to buy an inkjet, consider what the printer will be used for. Inkjets don't tend to be able to keep pace with the workload of a busy office, and also struggle with text. Laser printers, by comparison, can churn out crisp text at 15 or more pages per minute (ppm).

The final model in our round-up uses solid-ink technology. Here, slabs of ink are melted and then sprayed on to the page. Such models tend to be very noisy and require more time to warm up, but the output is worth the wait. Duplexing seems to work particularly well with solid-ink printers. We may see more of these models in the future, but their drawbacks mean they remain niche products for the time being.

Buying advice

Print resolution

You get some indication of a model's output quality from its specified print resolution, with higher-resolution printers producing more detail, but it's no guarantee. Manufacturers will often specify the printer's maximum rather than hardware resolution, which won't always correctly reflect the actual capabilities of the hardware.

Most printers have a hardware resolution between 600x600dpi and 1200x1200dpi. Anything upwards of 600x600dpi should be sufficient, but it's worth checking the reviews on our website to see how well it fares in the real world (tinyurl.com/7xysr5e). If an expert review isn't available, try to obtain a genuine print sample (preferably a printout of your own file). There's no substitute for first-hand experience of print quality.

Paper handling

Strong paper-handling capabilities are important. This refers to the amount of paper the printer can store and use at any one time. While the typical inkjet printer often struggles with more than 100 sheets, a standard network printer will have a paper input of 250-plus sheets.

In an office environment, where the printer is frequently being sent files to process, you don't want the machine to be constantly running out of paper – the more it can store the better. While 250 to 350 sheets is typical for most workgroup printers, many let you bolt on additional trays, bringing the total capacity to 800 sheets or more.

Additional trays often aren't cheap, though. If your business does a lot of printing, you'll need to carefully consider how much paper it needs to be able to store. Keep in mind that it can be cheaper to buy

a more expensive model now rather than upgrading a cheaper model later.

When you look at paper capacity, make sure you properly understand the figures. Most network models have two means of storing paper: a main tray, and an additional multipurpose tray. The latter will generally be smaller, but capable of taking different types of media, such as envelopes.

Paper handling most often refers to the input feed, but the output figure is just as important. There's little use in having a printer that can churn through 400-odd pages if all but the first 50 will fall on to the floor or become stuck inside the printer. Most lasers feature a top-mounted output tray, and it's advisable to look for one that can cope with at least 200 sheets.

Also note the monthly duty cycle. This is the quantity of prints the manufacturer recommends your model can comfortably handle each month. Regularly push the printer beyond this figure and you might be causing it long-term harm.

Memory

Network printers will benefit from a good complement of memory, particularly if your documents involve graphical content. If you're looking to print colour images or documents that include graphics, 128MB or more is preferable. Most printers accept memory upgrades as high as 1,280MB but, as we noted earlier, it can often be cheaper to buy what you need in the first place than to upgrade later down the line.

Printer languages

Look for support for PCL and PS. These are page description languages (PDLs) that give the printer a better idea of how the final page should look. HP's Printer Command Language (PCL) and Adobe's rather more

sophisticated PostScript (PS) are commonly supported or emulated by laser printers. If your printer can handle both languages, it may make for better results.

Employee controls

Consider how the printer will be used within the office. Will all users be afforded equal access, or do you need more sophisticated controls that allow you to monitor individual users or departments, and restrict access to some features for some people?

Some printers have a front-mounted USB port. Using this you can simply plug in a USB flash drive and print files stored on it, rather than having to send files from a computer.

Secure Print lets you send a file to a printer, but it won't be processed until you physically enter a PIN. This lets you send confidential files without worrying that they may get into the wrong hands.

Running costs

The initial price of a printer isn't the only cost you need to consider. A cheap deal can often become an expensive mistake once you factor in the cost of pricey consumables. Around 1.3p per mono (text) page is reasonable, but avoid anything above 1.8p.

Colour costs tend to vary among manufacturers. You might find one printer that produces full-page colour images at 5p, and another that hits double figures. If your business will be printing lots of colour images, 10p or more per page will prove costly in the long term.

An excellent way of cutting down on paper costs is to look for a printer with auto-duplexing, which lets you print to both sides of a sheet of paper. Most printers support a manual duplex option, but it can be a tedious process for large print jobs. Expect the speed to drop by around 30 to 50 percent.



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

CANON i-SENSYS LBP7200CDN

£250 inc VAT • canon.co.uk • tinyurl.com/76khj49

The Canon LBP7200cdn is something of a veteran in the colour laser market. There are some areas where it lags behind its younger rivals, most notably in its wired-only connectivity.

A gargantuan printer, the Canon's 24.8kg mass makes it even heavier than the chunky HP. It's not unattractive to look at, with a delicately curved front. In fact, it looks remarkably similar to the HP.

The control panel is nothing to write home about. Adorned with just one button, this space is mostly consumed by a battery of lights. It wasn't always clear what the Canon was trying to tell us, and we'd rather see the icons replaced with captions.

The front-mounted paper tray isn't the best fit, and we occasionally had to pick up and shake the printer to get it to slot back into place. It carries a substantial 250 sheets, while an additional 50-sheet multipurpose tray is available. You can also bolt on a second 250-sheet tray, for a total of 550 sheets, although this £175 upgrade is rather expensive.

The output tray is reasonably secure, taking the form of a deep recess in the printer's top. Printed pages tended to catch slightly as they appeared, and were slightly crinkled in a number of our tests.

A modest 16MB of memory is fitted, which can't be expanded. This is surprising, given that the Canon seemed more easily able to handle bigger files than its closest rivals in our round-up.

The maximum stated resolution is 9600x600dpi, although the optical resolution is a more modest 600x600dpi. Our colour prints were vibrant and eye-catching, while text was professional and understated, with smooth definition under close examination.

The Canon isn't as fast as its competitors. It produced each text page at 13.3ppm, making it the slowest in the category. Auto-duplex is supported, which brings down the speed to 7.9ppm. Graphics printing is faster, though, at 9.1ppm in our tests.

The Canon isn't cheap to run, at 2.6p for a page of mono and 8.7p for colour. Its rivals here can do considerably better.

VERDICT: The Canon may be old and lacks Wi-Fi, but it still works extremely well. The running costs are rather high, however, and your money is better spent elsewhere.



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

EPSON WORKFORCE PRO WP-4535 DWF

£250 inc VAT • epson.co.uk • tinyurl.com/c82fy6k

Epson is committed to proving that inkjet printers are every bit as capable of handling your office printing needs as laser models. Inkjets are noted for their high-quality colour images, even if text clarity and output speed are sacrificed.

The Epson resembles a bulbous laser printer, but it's heavier than most at 13.8kg. Part of this bulk is courtesy of the printer's many extra features, including scanning, copying and faxing facilities.

The impressive 1200dpi scanning component is well built and retains sufficient flexibility to cover larger magazines and books. It reproduces colour well, and features a duplex ADF.

Wired 100Mbps ethernet and wireless 802.11b/g/n connections are offered; you can even hook up the Epson to wireless tablets and smartphones. A slot for USB flash drives is also present.

The Epson offers a robust 250-sheet tray at the front, and an additional 80-sheet input at the back. You can bolt on another 250-sheet tray, bringing the total capacity to 580 sheets.

The control panel is vast, with many of its buttons reserved for the fax facilities. The navigation system is usable, but old-fashioned. The 2.5in LCD is an improvement over its competitors' text displays.

Although we saw top speeds of 15.4ppm, for decent text you'll want the 14.6ppm standard mode. The quality here falls short of the standards of a good laser, but it beats every other inkjet on the market. It's only when you look at the lettering with a magnifying glass or get to the smallest font sizes that the letters become less than beautifully defined. The text looks better in the 2.3ppm top mode.

Auto Duplex printing is possible. We saw a speed drop of 41 percent in standard mode, from 14.6ppm to 8.6ppm.

The Epson is a very capable colour printer. At its fastest it could produce 7.5ppm, but the standard 6.7ppm mode offered better colours. The palette is on the light side, but very good for office use.

Inkjets tend to be more expensive to run than lasers; not this one. It costs 1.1p and 3.6p per page for mono and colour respectively.

VERDICT: This is one of few inkjets that could realistically replace a laser in the office. Its running costs are stunning, and its feature set puts most of its rivals in the shade. It could be faster, though.



PC ADVISOR
RECOMMENDED

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

HP LASERJET PRO 400 COLOR M451NW

£300 inc VAT • hp.com/uk • tinyurl.com/7d366wf

This £300 laser printer from HP is one of three models in its M451 series. Its two siblings add auto-duplexing, while this M451nw supports both wireless 802.11b/g/n and fast ethernet.

A Smart Install feature provides the printer drivers without a disc. This reduced the 20-minute process to just 3 mins on our Windows 7 PC, but a Vista machine threw up a number of problems.

Paper handling is very good, given this printer's pricing. The hefty main tray can comfortably hold 250 sheets, while a 50-sheet multipurpose tray neatly drops down from the front. A second 250-sheet add-on will set you back £120, bringing the total capacity to 550 sheets. The HP's indented top can securely hold 150 sheets.

The duty cycle of 40,000 pages isn't staggering, but it's fine for the price. More disappointing is the amount of memory fitted inside. A 128MB allocation is adequate for many purposes, but its 384MB maximum upgrade potential is a barrier to high-detail jobs.

The HP is a very fast model at this price point. Although the cheaper Epson beat its times in our tests, that printer couldn't get near to laser-quality text. The HP LaserJet churned out text at 14.3ppm. Although the resulting output was a little thin, it was extremely clean and well defined.

Colour output also comes at high-speed, and its 9.1ppm result puts it on a par with the Canon. No auto-duplex facilities are provided, although duplexing is rarely fast at this price.

Our test images were vibrant and exciting, even if the palette was a little dark. Colours were well distinguished from each other, and we experienced no obvious problems with banding or gradients.

The HP isn't the cheapest to run. Text costs around 2.1p per page, which puts it in between the cheaper Epson and more expensive (in terms of running costs) Canon. Where the HP falls down is in colour printing: 11.3p per page is very steep.

VERDICT: At £300, several models in this group test are more expensive to buy – yet the HP will prove more expensive than any of its rivals if your business frequently prints in colour. Nevertheless, it's a well-specified model that produces strong and fast output. Provided that your main priority is text, this'll prove the best choice.



PC ADVISOR
BEST BUY

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

KYOCERA MITA FS-C5250DN

£460 inc VAT • kyoceramita.co.uk • tinyurl.com/7qmxvza

Kyocera's FS-C5250DN is a truly meaty printer, and the largest of the lasers in our round-up. At 30kg it's back-breaking, but it's not just this laser's size that knocked us back: paper handling is immense.

A huge tray at the bottom can accommodate 500 sheets, while a 50-sheet multipurpose feeder is available for specialist work. With bolt-ons it can carry 2,050 sheets – a staggering amount of storage.

The memory allocation is similarly generous. The Kyocera comes with 256MB as standard, expandable to 1,280MB. This is clearly no home-office printer, as the lack of Wi-Fi connectivity might suggest.

The control panel may be more complex than those of some printers, but it remains intuitive. The LCD offers two lines of text, and kept us reasonably well informed. The bundled software is very good, with a comprehensive monitoring applet in KM Net Viewer. And it's easy to control the printer using the web-based software interface.

The Kyocera also offers a good range of printer languages, with PCL and Kyocera's own PostScript 3 emulation covered. A USB port makes it easy to plug in flash drives.

The Kyocera hit some very good print-speed figures in our tests. While it didn't reach the manufacturer-quoted 26ppm, it came very close at 24.8ppm. This is quite a turn of speed, and the Kyocera maintained clean and reasonably sharp text.

Auto-duplexing reduced the speed to 17.7ppm, a figure that should still prove acceptable to impatient users.

Colour images were also fast to arrive at 18.3ppm. The Kyocera isn't the best printer here in this regard, however, with a palette that isn't as crisp as we'd like. For standard colour images, though, the Kyocera is excellent, and our PowerPoint tests were very bold.

The running costs are extremely low. Mono and colour toner cartridges can generate as many as 7,000 and 5,000 sheets respectively, resulting in figures of just 1.2p and 5.2p per page.

VERDICT: If you want a printer that has the potential to grow and gather power, the Kyocera Mita has some very nice bolt-ons. Add superb running costs and searing speed, and this is quite a model. Only its slightly disappointing colour photo printing made us stop short of awarding it top scores all round.



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

OKI C530DN

£410 inc VAT • oki.co.uk • tinyurl.com/8xopusv

The Oki C530DN is a very clean-looking laser printer, with a low-slung appearance that will blend into any office. It also benefits from a bold control panel, with clearly labelled buttons.

The Oki is markedly different to the much larger Kyocera, with a standard paper tray that holds just 250 sheets. This isn't as rugged as the Kyocera's tray, and we had to give it a strong shove to get it into place. With add-ons the maximum capacity tops out at 880 sheets, which is still rather a lot. But it's the multipurpose feeder that most impressed us, able to take up to 100 sheets.

Like the Kyocera, the Oki comes with 256MB of memory as standard, although this can be pushed up to a maximum of only 768MB against the Kyocera's 1,280MB.

The 532MHz processor is also slightly slower than the Kyocera's 667MHz chip, and the Oki doesn't support as wide a range of printer languages. Nevertheless, the most important two – PCL 6 and PostScript 3 – are present and correct.

We found the Oki to be a rather loud printer, which could potentially irritate those sitting closest to it in the office. Even when it wasn't printing, the Oki emitted a loud hum.

The Oki doesn't want for speed and, although the Kyocera beats it on this too, there's not a lot between the two. It produced crisp – if not sensational – text at 22.3ppm. Auto-duplexing reduced the Oki's text-printing performance to 13.3ppm, which is still fast enough for the paper-saving measure to be viable.

Colour printing was a something of an anti-climax. It was fast enough, at 16.7ppm, but the output wasn't as faithful to the source material as we'd have liked, and some photos displayed an unrealistic hue. For general use, though, the Oki is more than adequate.

As with the Kyocera, the Oki has outstanding running costs. Its text figures – just over a penny per page of mono – are particularly strong, while colour costs are reasonable at 6.8p per page.

VERDICT: The Oki finds itself trumped by the Kyocera at almost every hurdle. The latter has far more potential for expansion, is faster and offers cheaper colour printing. The Oki is cheaper to buy, but by only £50, and is significantly smaller and better-looking.



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

XEROX COLORQUBE 8570DN

£540 inc VAT • xerox.co.uk • tinyurl.com/7qr7cfk

Solid-ink printers such as this Xerox model work by melting oversized crayons, then spraying the ink on to the paper. They require elaborate, several-minutes-long warm-up routines, and are rather loud in operation. But the results are very good.

Although melted ink lacks the same permanence as laser output, the Xerox's results were very polished. In our tests, colour was vibrantly handled and the text was dark and sharp. But images don't always have the same subtlety as they do with a laser, and work still needs to be done to make the technology similarly consistent.

The Xerox demonstrated good print speeds, but they fell short of the claimed figures. Xerox says 40ppm for text; we say 22.3ppm.

Colour graphics were produced by the Xerox at 17.8ppm. Duplexing also works effectively, with prints available at 19.9ppm demonstrating a minimal performance loss.

The interesting print technology doesn't mean that Xerox has skimped elsewhere. And it shows: this printer is huge. Visually, the Xerox is rather conventional-looking, with an attractive but simple control panel that allowed us to access the important features.

You can't plug in a USB drive and, while the Xerox offers wired ethernet, Wi-Fi is available only as an option.

The paper-handling facilities are immense. The standard paper tray can take 525 sheets – more even than the Kyocera. Throw in an ample 100-sheet multipurpose feeder and you have capacity for 625 sheets available out of the box. You can also bolt on additional trays to reach 2,200 sheets, while an output tray does an excellent job of keeping safe up to 350 sheets.

The memory allocation is good, with 512MB as standard (upgradable to 2GB). The 1GHz processor is fast, too. But support for printer languages isn't as extensive as with some of its rivals.

Despite the novel ink technology, we calculated competitive running costs of 1.3p for a page of mono and 7.6p for colour.

VERDICT: The Xerox is very fast in duplex mode, and otherwise produces good output with a decent turn of speed. However, it's noisy and takes a long time to warm up. We think there's still work to be done if the technology is to truly take on laser printers.

Conclusion

Which printer is best-suited to your office depends entirely on what you need to use it for. Of the three sub-£300 models here, only two are really worthy of your consideration. The Canon is a good model, but it's old and you can get more for your money.

The Epson WorkForce Pro WP-4535 DWF is an excellent model, offering almost every feature we can think of. Its running costs

are stunning, too. But, as an inkjet, it can't produce text at high-speed.

For those needing top-quality text, the HP LaserJet Pro 400 is more suitable. This laser printer ticks all our boxes for quality, but its running costs are steep for colour graphics.

With a slightly larger budget, the Kyocera Mita FS-C5250DN is the clear Best Buy. It has amazing paper-handling facilities, a fine

turn of speed, and low running costs that'll make it a very economical addition to any self-respecting office.

The Xerox ColorQube is an interesting choice, with its solid-ink technology making it a good graphics printer. It's also fast in duplex mode. But the Xerox is very noisy, and its solid ink takes some time to melt before you can get printing.

	CANON £250 inc VAT ★★★★★	EPSON £250 inc VAT ★★★★★	HP £300 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	
Product name	i-Sensys LBP7200Cdn	WorkForce Pro WP-4535 DWF	LaserJet Pro 400 Color M451nw	
Technology	Colour laser	Colour inkjet	Colour laser	
Max print resolution	9600x600dpi	4800x1200dpi	600x600dpi	
Ethernet	10/100Base-TX	10/100Base-TX	10/100Base-TX	
Wi-Fi	N/A	802.11b/g/n	802.11b/g/n	
Standard paper input	250 + 50 sheets	250 + 80 sheets	250 + 50 sheets	
Max paper input	550 sheets	580 sheets	550 sheets	
Paper output	125 sheets	150 sheets	150 sheets	
Standard/max memory	16MB/16MB	128MB/128MB	128MB/384MB	
Processor speed	N/A	N/A	600MHz	
Duty cycle (pages per month)	40,000	N/A	40,000	
Printer languages	N/A	N/A	PCL5c, PCL6, PS3	
Auto Duplex	✓	✓	✗	
USB port	✗	✓	✗	
Toner prices	£90 black, £84 x 3 colour	£25 black, £24 x 3 colour	£84 black, £98 x 3 colour	
Toner life (pages)	3,400 black, 2,900 colour	2,400 black, 2,000 colour	4,000 black, 2,600 colour	
Cost per page	2.6p black, 8.7p colour	1.1p black, 3.6p colour	2.1p black, 11.3p colour	
Dimensions	409x490x331mm	460x420x341mm	405x454x322mm	
Weight	24.8kg	13.8kg	22.8kg	
Power consumption (sleep)	395W (8W)	17W (4W)	425W (4W)	
Warranty	1 year	1 year	1 year	
Print speeds (ppm)				
Text	13.3	14.6	14.3	
Duplex	7.9	8.6	N/A	
A4 colour image	9.1	6.7	9.1	
PowerPoint	9.4	7	9.7	

How we test

We put each network printer through its paces with 10 different test files.

First we printed a single page of text 10 times consecutively to assess the print speed. We also noted how long it took each printer to start the first sheet to gauge how quickly the printer would take to get going.

A second file, consisting of the single page of text repeated 10 times, was used to

test performance with auto-duplexing. We also printed longer files containing text in different fonts and sizes to assess quality.

A number of A4 colour images were used to measure the graphics-printing speed, although we took our results from a single 6.4MB (4000x3000 pixels) photo. This was processed five times by each printer. We also printed out a five-page PowerPoint file.

Where a printer had more than one quality mode, we used the fastest 'high quality' mode for speed testing. We didn't use any eco modes.

All printers were installed and the setup routines assessed. We checked the control panels and looked to see what special features were supported. Connectivity and usability were also taken into account. ☒

KYOCERA £460 inc VAT ★★★★★ PC ADVISOR BEST BUY	OKI £410 inc VAT ★★★★★	XEROX £540 inc VAT ★★★★★
FS-C5250DN	C530DN	ColorQube 8570DN
Colour laser	Colour laser	Solid ink
600x600dpi	1200x600dpi	2400dpi
10/100Base-TX	10/100Base-TX	10/100Base-TX
N/A	N/A	N/A
500 + 50 sheets	250 + 100 sheets	525 + 100 sheets
2,050 sheets	880 sheets	2,200 sheets
250 sheets	150 sheets	350 sheets
256MB/1,280MB	256MB/768MB	512MB/2GB
667MHz	532MHz	1GHz
N/A	45,000	85,000
PCL5c, PCL6, KPDL3 (PS3)	PCL6, PS3	PCL5c, PS3
✓	✓	✓
✓	✗	✗
£86 black, £87 x 3 colour	£52 black, £113 x 3 colour	£112 black, £112 x 3 colour
7,000 black, 5,000 colour	5,000 black, 5,000 colour	8,600 black, 4,400 colour
1.2p black, 5.2p colour	1p black, 6.8p colour	1.3p black, 7.6p colour
390x523x397mm	410x504x242mm	406x521x368mm
30kg	22kg	27.4kg
428W (7W)	540W (10W)	252W (45W)
2 years	3 years	1 year
24.8	22.3	22.3
17.7	13.3	19.9
18.3	16.7	17.8
16.9	15	16.6

All-in-one PCs



Some of the earliest PCs were all-in-one designs, integrating computer and display. Paul Monckton checks the latest state-of-the-AIO-art in our comprehensive round-up of six of the best models on the market

In essence just a PC, monitor and speakers in one box, all-in-one computers come in several forms. We've reviewed stylish systems running both Windows and Mac over the following pages.

Apple's 27in iMac is an attractive machine running the company's own OS X 10.7 Lion operating system. It incorporates some cutting-edge technologies, such as the blisteringly fast Thunderbolt interface, and the highest-quality panel in our group test. However, it's really just a standard desktop PC in a more convenient form.

The Windows-based PCs we review here take a rather different approach to the all-in-one concept. These systems place a

strong emphasis on multimedia, and three of them include a touchscreen interface. You'll often find TV tuners, Blu-ray drives and HDMI ports included in their spec. This means such systems will likely find a home in your living room, where they could potentially replace your TV.

Chillblast's Fusion Powerpack represents yet another approach. Its tiny chassis is attached to the Vesa mount on the rear of almost any monitor you choose. It saves space on your desktop and, depending on your chosen monitor, it can create a sleek impression when viewed head-on. But it's really rather an all-in-two PC, with two separate cables to plug into the mains.

With all their components crammed into a thin housing, all-in-one systems must make compromises between performance and noisy cooling. To cut down on heat and power consumption, some machines use low-power processors such as the Intel Core i5-2400S or slightly faster Core i5-2500S. Slower CPUs such as the Core i3-2100, or mobile chips designed for laptops, might also be fitted by PC vendors.

All these processors are adequate for general computing tasks; for entertainment use, such as flitting between TV, internet, music and gaming, we recommend going for the fastest processor you can afford, and a full complement of system RAM.



Photography by Dominik Tomaszewski

Yet the slowest PCs here felt a little tepid and unresponsive at times. Entertainment should be about relaxation and delight, not impatience and frustration.

Many vendors believe the key to such delight is a touchscreen. Don't expect to have much fun jabbing away at the standard Windows 7 interface, although Windows Media Center is more usable when paired with a finger or remote control than a keyboard and mouse.

Where these touchscreens should really come into their own is with Windows 8 and its 'Metro' touch-optimised interface. We've tried the Consumer Preview of Microsoft's forthcoming OS and discovered a far more

enjoyable touchscreen experience. You can read our full guide to Windows 8 on page 84.

Until Microsoft's new OS is released to PC builders, however, look for vendor-specific bundled software that's designed to bring together the functions of your all-in-one PC within a user-friendly touchscreen interface.

All the systems in our group test include full-HD (1080p) or better screens. You'll also want a Blu-ray drive to take full advantage of these high-resolution panels for watching movies. If the PC doesn't have one and you'd like to hook it up a standalone Blu-ray player, check that the spec includes an HDMI input before you buy. It's also an idea to check what outputs it offers if you plan to connect

it to your TV – many all-in-ones lack a generous complement of digital connectors. What audio connectors it offers is important if you plan to add external speakers, too.

Due to space and cooling constraints, all-in-one systems rarely offer strong gaming performance. Windows systems often rely solely on Intel's integrated graphics, but some include a mobile graphics processor, such as an AMD Radeon HD 6770M or nVidia GeForce GT540M. With the detail settings turned down a notch, these discrete graphics processors can handle any title.

Here, we present a range of all-in-one PCs, with screen sizes from 21.5in to 27in, and prices starting from £699.

APPLE iMAC 27in 2.7GHz CORE i5

£1,399 inc VAT • apple.com/uk • tinyurl.com/7thnxu8

Apple's 27in iMac stands apart from the all-in-one competition. Its peerless design and build quality are combined with bleeding-edge technologies, such as the Thunderbolt interface and a multitouch mouse. It's not the only 27in-screen PC in our round-up, but none of its rivals can match the iMac's image quality or clarity.

Whereas the Windows-based PCs here max out at 1920x1080 pixels, the iMac offers 2560x1440. It also displays a wider range of accurate colours. Its Super-IPS panel technology provides ultra-wide viewing angles and delivers image quality that's good enough for professional graphic designers and photographers.

The OS X 10.7 Lion operating system makes widespread use of multitouch gestures and comes preinstalled with a selection of applications that cover most of your needs, whether that's editing photos and video, managing appointments or creating music.

Apple's hardware is based on the same Intel processors and chipsets as a Windows PC. This iMac has one of the fastest CPUs in the group, in the form of a quad-core 2.7GHz Intel Core i5-2500S. Turbo Boost lets it achieve up to 3.7GHz on a single core under load.

It demonstrated searing performance in WorldBench 6, where the iMac's 147-point score was beaten only by the Chillblast.

An AMD Radeon HD 6770M outguns any other graphics processor in the group, and delivered the best framerates in our games testing.

Our tests were conducted with the iMac running Windows 7, which is easily installed under Boot Camp but will add to the price.



Of course, the iMac isn't for everyone. Apple's allergic reaction to Blu-ray leaves the iMac without the native ability to play HD discs, and the system doesn't incorporate a touchscreen or USB 3.0 ports.

VERDICT: Apple's 27in iMac combines superb build quality with excellent performance, plus a gorgeous design. Running Windows it also offers very good gaming framerates, but it's not an ideal choice if you want a touchscreen or USB 3.0.

ASUS E2700INTS

£1,399 inc VAT • uk.asus.com • tinyurl.com/7ztaqh7

This 27in Asus all-in-one is imposing, yet stylish. It's glossy, posh and eye-catching - until you peer around the back. Here, you'll find a cheap-looking plastic casing, and access to useful USB 3.0, 2.0, audio, SD and eSATA ports unnecessarily blocked by a plastic door.

An external subwoofer can also be plugged in here, giving a welcome boost to the Asus' already decent audio quality - if preventing you from closing the plastic door.

An antenna socket on the Asus' rear panel is a giveaway to the DVB-T TV tuner found inside, while gigabit ethernet, VGA and HDMI inputs are also provided. And there's a standard Vesa mount to hold the computer to a wall.

The 27in panel offers very good quality, with superb contrast that really makes images pop. It has a reasonably responsive and easy-to-use 10-point multitouch interface, which offered smooth performance with the Windows 8 Consumer Preview. This PC comes into its own under Microsoft's forthcoming OS.

Asus claims 178-degree viewing angles for this display. We found that standing up and sitting down caused a noticeable perceived difference in brightness. It's no match for the iMac in this regard.

The Asus runs the same low-power Intel Core i5-2400S processor as Packard Bell's oneTwo L i5871, which is slightly slower than the Core i5-2500S found inside the iMac.

With 2TB of storage and 6GB of RAM installed, the system scored a respectable 140 points in our WorldBench 6 real-world speed test.



Its discrete nVidia GeForce GT540M graphics processor also ensures that most games run smoothly at moderate detail settings.

Multimedia support is excellent, with an internal TV tuner and a very good sound system, plus a Blu-ray drive. We'd like to see the ability for the Asus to drive a TV screen, too.

VERDICT: The Asus is a smart, powerful system that could effectively replace your desktop PC, TV, Blu-ray player or all three.

CHILLBLAST FUSION POWERPACK

£849 inc VAT • chillblast.com • tinyurl.com/88txv5y

Strictly speaking, Chillblast's Fusion Powerpack is not an all-in-one PC – but, coupled with the right monitor, it can pretend to be.

The Fusion Powerpack is a small Windows computer based on the Mini ITX form-factor, and attaches to the back of any monitor that has a standard Vesa mount. The fitting is sufficiently tight to be secure, yet the PC still lifts off when required. It has the footprint of a standard all-in-one, but with two power cables rather than one.

The PC is connected to the monitor via an HDMI cable, which enables audio output through the display's speakers. We were supplied with a 27in Asus VE278Q, but any Vesa-compatible monitor that's strong enough to support the PC's weight can be used.

Tucking away the PC in this manner has disadvantages. Although the PC and monitor combined offer HDMI, DVI, VGA and DisplayPort outputs, all eight of the USB ports (including two USB 3.0) are hidden behind the display and awkward to reach.

Mounted on the tiny Asus P8H67-I Deluxe motherboard is an Intel Core i5-2500K processor. It's a standard desktop model that runs at 3.3GHz and incorporates Intel HD Graphics 3000, the faster version of Intel's integrated graphics solution.

The Powerpack still lags in games – we couldn't get Crysis to run at all, although we suspect a software issue was to blame. But combined with a speed-boosting 128GB SSD, this high-end CPU powered the Chillblast to a staggering WorldBench 6 speed score of 169 points – by far the fastest in our group.

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



The cooling required for such a powerful processor to run inside a tiny case means the Chillblast is very noisy in operation, however.

VERDICT: This is a cheeky entry to our all-in-one group test, but a space-saving solution worth considering if you want the flexibility of choosing your own monitor, or to save money by using an existing one. Application performance is excellent, but the system is very noisy in use and 128GB is a tiny amount of storage for a desktop PC.

MSI AE221G-011EU

£699 inc VAT • uk.msi.com • tinyurl.com/82zh4s5

With its comparatively small 21.5in display and compact housing, MSI's all-in-one is the baby of the bunch only in its dimensions. This system delivers a full-HD image, while its discrete nVidia GT 540M graphics make it one of only three models here suitable for playing games. The MSI is also the least expensive at just £699.

Based on a 3.1GHz Intel Core i3-2100 processor, the MSI at times felt sluggish, particularly when using its touchscreen interface. We recorded 133 points in WorldBench 6, placing it joint-bottom in performance terms with the Toshiba Qosmio DX730-10U.

Its gaming credentials are more impressive, and only the considerably more expensive Apple and Asus systems could beat it.

The MSI look pleasant enough, but it has a plasticky build. It doesn't offer the level of sophistication and luxury you might expect from a device that'll likely find a home in your living room. It's also rather noisy in operation, with whirring fans always in earshot and slight speed variations drawing more attention to them.

A slim wireless keyboard and mouse are provided, with the necessary connecting USB dongle taking up one of six ports. These include two USB 3.0 connections, which are conveniently placed on the left side of the screen above a memory-card reader – and, less usefully, a power connector.

We were pleased to find two HDMI ports on the MSI's chassis, with one able to hook up a second screen and the other serving as an input for a games console, set-top box or Blu-ray player. However,

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



the MSI lacks a Blu-ray drive (a CD/DVD drive is included), and there's no TV tuner fitted inside.

MSI supplies a WindTouch application to make key functions more easily accessible through the touchscreen, but we weren't keen on it.

VERDICT: This is the all-in-one for you if you want maximum gaming performance for the minimum spend, but look elsewhere if you want decent build quality, comfortable ergonomics or quiet operation.

PACKARD BELL ONETWO L i5871

£950 inc VAT • packardbell.co.uk • tinyurl.com/7wsLoek

Featuring a 23in full-HD touchscreen and a DVB-T TV tuner, Packard Bell's oneTwo could make a great multimedia PC. Its quad-core Intel Core i5-2400S processor also gives it a performance edge over entry-level dual-core models.

The PC's simple design is effective. A hinged picture-frame-style stand protrudes from the back, allowing you some degree of tilt adjustment, while a recessed area in the top of the case provides a handle grip, making the PC easy to move from room to room. However, the huge illuminated Packard Bell logo would have been a serious distraction had it not been fitted with its own off switch.

A pair of USB 3.0 ports and an SD Card reader sit on the PC's left side, while four USB 2.0 and an HDMI input are found at the rear. We were unable to find any buttons to control basic functions such as the screen's brightness, though, and audio output is limited to a headphone socket. There's no video output either.

The Packard Bell is slightly faster than the Toshiba and MSI, and scored 137 points in WorldBench 6. Like those PCs, though, its touchscreen interface doesn't feel especially fluid. Packard Bell has developed its own software environment, and its easy-to-use TouchPortal is a worthwhile inclusion.



Packard Bell also throws in full versions of Adobe Photoshop Elements 9.0, Premiere Elements 9.0 and CyberLink's YouCam.

VERDICT: With its 23in touchscreen and speedy Core i5-2400S processor, Packard Bell's oneTwo is a good mid-range all-in-one PC with a home-friendly design and a decent feature set.

	APPLE £1,399 inc VAT ★★★★★ PC ADVISOR BEST BUY	ASUS £1,399 inc VAT ★★★★★ PC ADVISOR RECOMMENDED	CHILLBLAST £849 inc VAT ★★★★★	
Model name	iMac 27in 2.7GHz	E2700INTS	Chillblast Fusion Powerpack	
Processor	2.7GHz Intel Core i5-2500S	2.5GHz Intel Core i5-2400S	3.3GHz Intel Core i5-2500K	
Motherboard	Apple Z68-chipset motherboard	Asus H61-chipset motherboard	Asus P8H67-I Deluxe	
Memory	4GB DDR3 RAM	6GB DDR3 RAM	8GB DDR3 RAM	
Storage	1TB HDD	2TB HDD	120GB SSD	
Screen	27in (2560x1440) IPS gloss	27in (1920x1080) gloss	27in Asus VE278Q (1920x1080) TN matt	
Graphics	AMD Radeon HD 6770M, 512MB GDDR5	nVidia GeForce GT540M/ Intel HD Graphics 2000	Intel HD Graphics 3000	
Sound	Onboard Cirrus Logic CS4206	DTS surround Sensation UltraPC II	Onboard Realtek ALC892	
Optical drive	DVD SuperDrive	DVD/BD-ROM combo drive	DVD/BD-ROM combo drive	
Connectivity	Ethernet, 802.11a/b/g/n, Bluetooth	Ethernet, dual-band 802.11n	Dual-band 802.11n, Bluetooth	
Ports & connectors	4x USB 2.0, 1x FireWire 800, 2x Thunderbolt	2x USB 3.0, 3x USB 2.0, HDMI, VGA	2x USB 3.0, 6x USB 2.0, S/PDIF, HDMI, DVI, DisplayPort, VGA	
Keyboard & mouse	Apple Bluetooth Wireless Keyboard and Magic Mouse	Asus wireless keyboard and mouse, with RF USB dongle	Logitech Wireless Combo MK320	
Operating system	OS X 10.7 Lion	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	
Dimensions	650x517x207mm	660x508x233mm	643x445x320mm	
Weight	13.8kg	13.4kg	10kg	
Extras	SD Card reader, 4Mp webcam, stereo speakers	Remote control, SD Card reader, 2Mp webcam, TV tuner, stereo speakers and subwoofer	Stereo speakers, detachable monitor	
Warranty	1 year return-to-base	1 year return-to-base	2 years collect-and-return	
Power consumption ¹	67W/180W	47W/114W	51W/86W	
WorldBench 6 score	147	140	169	
MediaEspresso	8 mins 29 secs	6 mins 54 secs	2 mins 44 secs	
Games score (fps) ²	133/12	99/6	Fail	
Display parameters ³	540:1, 100%, 4.5, 3.0	1030:1, 94%, 4.0, 3.5	573:1, 98%, 4.0, 3.0	

¹Tested with the machine idling at 120cd/m² and under load in Crysis ²Tested in Crysis at 720p 'Low' detail and 1080p 'Very High' detail with 16x AA ³Contrast, percentage of sRGB gamut, chroma uniformity, luma uniformity

TOSHIBA QOSMIO DX730-10U**£999 inc VAT** • toshiba.co.uk • tinyurl.com/7aqL5cy

Toshiba's Qosmio is a 23in touchscreen PC that's ideal for multimedia use and, in particular, watching HD video. Its elegant TV-like appearance will blend in nicely with a home environment, while its silver and 'precious black' finish won't look out of place in an office.

The Qosmio is fitted with a hybrid digital/analogue TV tuner and a Blu-ray/DVD combo drive. A superior sound system features Onkyo stereo speakers and an internal subwoofer.

Connections include an SD Card reader, four USB 3.0 ports, plus four USB 2.0. The Qosmio's headphone and microphone jacks double as line-in/-out ports, letting you hook up other audio devices.

Toshiba's 'sleep-and-music' technology lets you use the Qosmio as a speaker for an external device without booting up the PC. You can also connect up a game console or laptop via the HDMI input port, even if the Qosmio itself can't use external displays.

A decent 6GB of DDR3 RAM and a capacious 2TB hard drive are installed, along with an Intel Core i5-2450M mobile processor. This dual-core chip offers slower performance than the quad-core competition, and the Toshiba scored just 133 points in WorldBench 6.

The Toshiba doesn't include a discrete graphics processor, making the £300 cheaper MSI the better overall performer.



If its £999 price tag doesn't suit your budget, the -10U is one of six Qosmio DX730 models with varying prices and specifications.

VERDICT: The Toshiba Qosmio makes for a great multimedia centre, with superior sound quality and a built-in TV tuner and Blu-ray drive. It has plenty of RAM and a huge 2TB hard drive for storage, but is a little lacklustre performance-wise and lacks proper gaming hardware.

MSI £699 inc VAT ★★★★★	PACKARD BELL £950 inc VAT ★★★★★	TOSHIBA £999 inc VAT ★★★★★
AE2211G-011EU	oneTwo L i5871	Qosmio DX730-10U
3.1GHz Intel Core i3-2100	2.5GHz Intel Core i5-2400S	2.5GHz Intel Core i5-2450M
MSI H61-chipset motherboard	Packard Bell H61-chipset motherboard	Toshiba HM65-chipset motherboard
4GB DDR3 RAM	4GB DDR3 RAM	6GB DDR3 RAM
500GB HDD	1TB HDD	2TB HDD
21.5in (1920x1080) TN gloss touchscreen	23in (1920x1080) TN gloss touchscreen	23in (1920x1080) TruBrite TN gloss touchscreen
nVidia GeForce GT540M, 1GB GDDR3/ Intel HD Graphics 2000	Intel HD Graphics 2000	Intel HD Graphics 3000
Onboard Realtek ALC887	Onboard Intel HD Audio	Onboard Intel HD Audio
DVD SuperMulti	DVD SuperMulti	DVD/BD-ROM combo drive
Ethernet, 802.11b/g/n	Ethernet, 802.11b/g/n	Ethernet, 802.11b/g/n, Bluetooth
2x USB 3.0, 4x USB 2.0, HDMI	2x USB 3.0, 4x USB 2.0	4x USB 3.0, 4x USB 2.0, HDMI
MSI wireless keyboard and mouse, with RF USB dongle	Packard Bell wireless keyboard and mouse, with RF USB dongle	Toshiba wireless keyboard and mouse, with RF USB dongle
Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
555x405x66mm	557x421x299mm	561x190x439mm
13.6kg	8kg	8kg
SD Card reader, 1.3Mp webcam, stereo speakers	Remote control, SD Card reader, 1.3Mp webcam, TV tuner, stereo speakers	Remote control, SD Card reader, 1.3Mp webcam, TV tuner, stereo speakers and subwoofer
2 years return-to-base (1 year for accessories)	1 year return-to-base	1 year collect-and-return
43W/97W	51W/84W	35W/44W
133	137	133
13 mins 29 secs	3 mins 12 secs	3 mins 34 secs
92/6	29/not tested	39/not tested
728:1, 93%, 4.0, 1.5	540:1, 98%, 4.5, 3.0	700:1, 95%, 3.5, 3.0



Conclusion

Your choice of all-in-one system is unlikely to come down to price and performance only. You should also consider what screen size is best suited to the room in which it will reside, and how you envisage using the computer. Looks can also be of prime importance.

An all-in-one PC can make an excellent space-saving replacement for a desktop PC: Apple's iMac, the MSI AE221G-011EU, and even Chillblast's external monitor-mounted PC achieve this aim.

In many cases, an all-in-one PC isn't simply a replacement for a PC, but also a substitute for a TV. In smaller rooms, combining all these functions into one

device can be an ideal space-saving solution. Such machines can provide a much bigger screen and better sound quality than a laptop, and are still less hassle to pack up and move than a desktop.

The Asus, Packard Bell and Toshiba offer good multimedia credentials, with built-in TV tuners. The Asus' 27in screen is well suited to the living room, and its Blu-ray drive means you can remove yet another external box from your home-entertainment setup. The Asus' subwoofer also enables very good sound quality.

A discrete graphics processor is required if you want to enjoy modern games at

reasonably high detail levels. The Asus is a good performer in this regard, but better still is Apple's iMac. This 27in all-in-one outperformed all challengers in our Stalker and Crysis gaming tests, and was beaten only by the Chillblast in terms of application performance in WorldBench 6.

Look to the systems from Apple, Chillblast or MSI if you want to be able to hook up an external display.

In terms of power, design and sheer awesomeness, the iMac wins our Best Buy award. The Asus is a contender for its versatility and multimedia credentials, and gets our Recommended award.

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.

In total, eight applications are used: Adobe Photoshop Creative Suite 2.0, Autodesk 3ds Max 8.0, Firefox 2.0, Microsoft Office 2003, Microsoft Windows Media Encoder 9.0, Nero 7.0 Ultra Edition, Roxio ViewWave Movie Creator 1.5 and WinZip Computing WinZip 10.0.

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

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.

Power consumption

Unlike most desktop machines, all-in-one computers may often be left switched on for extended periods. We measure power consumption when idle (120cd/m² brightness) and when running Crysis (maximum brightness).

Gaming performance

We use two games to evaluate performance: Stalker: Call of Pripyat, for its DirectX 11.0 support, and Crysis, which still has the power to stretch modern graphics to the limit.

We've included a 720p Crysis test to give PCs running integrated graphics processors a chance. For those with discrete chips we crank up the resolution to 1080p, set the quality to Very High and use 16x anti-aliasing.

Display quality

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

Subjective assessment

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

Support

Differences in warranty terms can have a big effect on our verdict. Longer warranties are better, but we also look at the terms and conditions - specifically, whether faulty systems must be returned to the vendor at your own cost, and whether parts, labour or both are included. ☒

PITY THE SOUND'S AS THIN AS THE TV.



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BELIEVE YOUR EARS

Windows 8:

Spotlight



Games



Jim Martin takes a closer look at the OS that will be on your next Windows PC, laptop or tablet

It doesn't feel like it, but Windows 7 is coming up to its third birthday. Microsoft is expected to release its successor, Windows 8, later this year. The new OS will be preinstalled on just about every new PC and laptop.

Windows 8 is a crucial operating system release for Microsoft. Unlike Windows 7, Vista and even XP before it, this latest OS isn't a mere evolution of the previous version. Windows 8 is as different from Windows 7 as Windows 95 was from Windows 3.1.

In this age of touchscreens and gestures, the keyboard and mouse seem almost antiquated and clunky. And Windows 7 looks and works pretty much exactly the same as Windows 95 did almost 17 years ago.

Seventeen years is a long time in computing terms, and one could argue that Windows 8 is long overdue. However, as we'll see over the next few pages, it's also arguable that a touchscreen interface has no place on a desktop or laptop PC.

One OS to conquer them all

With Windows 8, Microsoft has created a single OS that can run on all your devices, including smartphones, tablets, laptops and desktop

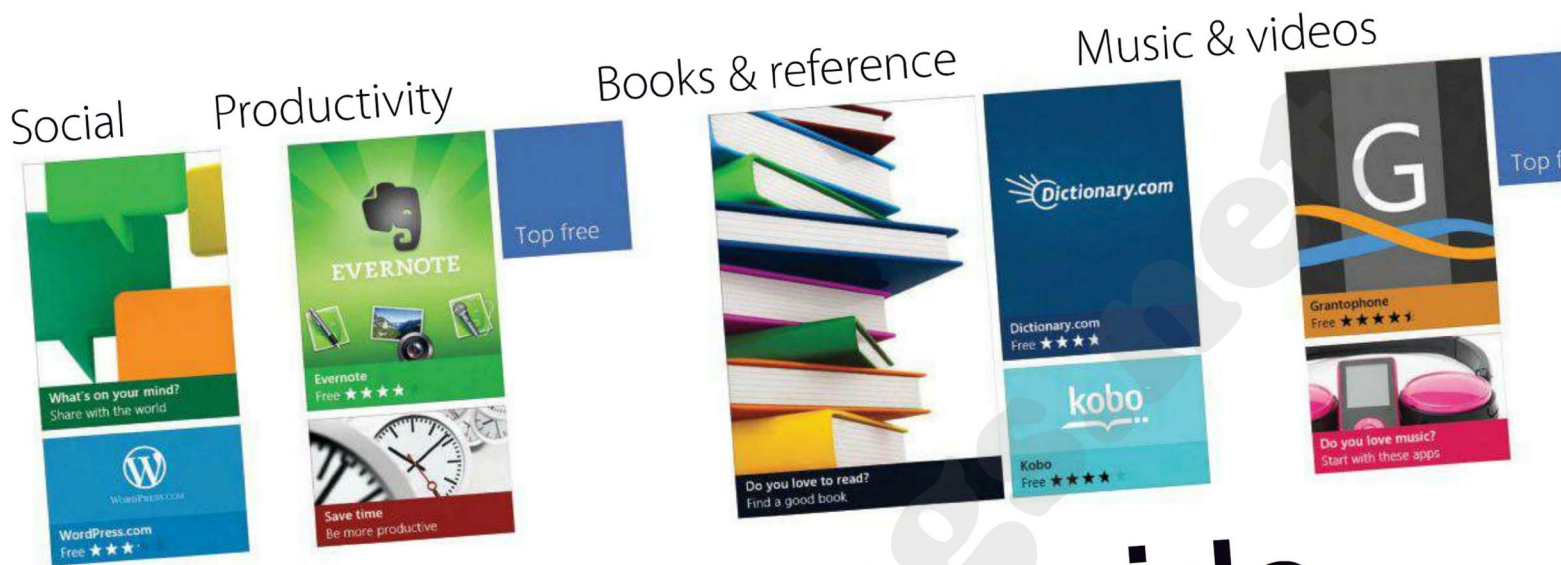
PCs. Regardless of screen size and how you interact with the device, Windows 8 will scale perfectly. That's the theory, but does it work?

We tried the new Metro interface on a range of computers, including touchscreen all-in-one PCs, laptops and tablets, and were surprised at just how well the interface copes with a huge range of screen sizes, from 10in right up to 27in.

Although no version of Windows 8 is available for smartphones yet, Windows Phone 7 already uses the Metro user interface to good effect. Microsoft Xbox 360 owners will also be familiar with the tiled Metro interface, as it was rolled out as an update in late 2011.

Resistance to change

Many computer users resent even tiny changes to the user interface with which they're familiar, and struggle to cope with programs and settings being renamed or moved. Facebook is a classic example, with each of its frequent updates and refinements met with a barrage of protest. The change from Microsoft's 'Classic' Windows desktop to Metro will no doubt lead to some people returning their new purchase to the shop from which they bought it.



the complete guide

Trouble is, without change there is no progress. Provided that you're willing to at least try the new interface - we'll hold your hand along the way - you'll quickly learn to appreciate many of Windows 8's new features.

If your computer doesn't have a touchscreen, Windows 8 can still be controlled with a mouse.

The cloud

A key feature of Windows 8 is its integration with online services. As well as the new Store, in which you can buy Metro-style apps, you can also connect apps to your existing online accounts. For example, the Mail app can pull in email from Gmail, and the Photos app can display images from Facebook. Your settings and personalisation are also stored in the cloud, so you can log into another Windows 8 PC and everything will look and work just as it does on your primary PC.

TRY WINDOWS 8 FOR FREE

The Windows 8 Consumer Preview is available as a free download. Head to preview.windows.com and click the 'Get it now' button if you want to take it for a spin. Click the 'Download Windows 8 Consumer Preview' button on the following page only if you want to upgrade the machine you're currently working on.

Our advice is not to upgrade, since the only way to return to your old OS once the Consumer Preview ends is via a recovery DVD.

The best way to try Windows 8 is to install it on a spare internal hard drive.

Alternatively, create a new partition and dual-boot the new OS with your existing copy of Windows.

Click the 'ISO format' link to download the appropriate version for your PC, then burn the file to DVD (use ISO Burner from cdburnerxp.se if you aren't running Windows 7).



The Windows 8 Start screen explained

Tap this icon to change your account picture, lock your computer or sign out

Charms bar: The Charms bar appears when you swipe your finger in from the right edge of the screen. If you're using a mouse, point the cursor to the top- or bottom-right corner of the screen

Search: Tap this to open the search box. You can tap on a category to filter the search. For example, you can search for a TV show in Video or a place in Maps

Share: As its name suggests, this charm allows you to share items with people. The options will change depending on which app is running. Extra sharing options will appear when you install apps that can share content, such as Twitter clients

Start: This charm takes you back to the Start screen if you're in another app, or switches to the most recent app if you're on the Start screen

Devices: Tap this icon to show relevant connected devices. Printers, speakers, screens and network devices can be displayed here. For example, you could select a media streamer, such as a connected Xbox, to play a particular video on your TV

Settings: Shows six commonly used settings, including network status, screen brightness and power options. This also provides a link to the new streamlined Control Panel (see next page)

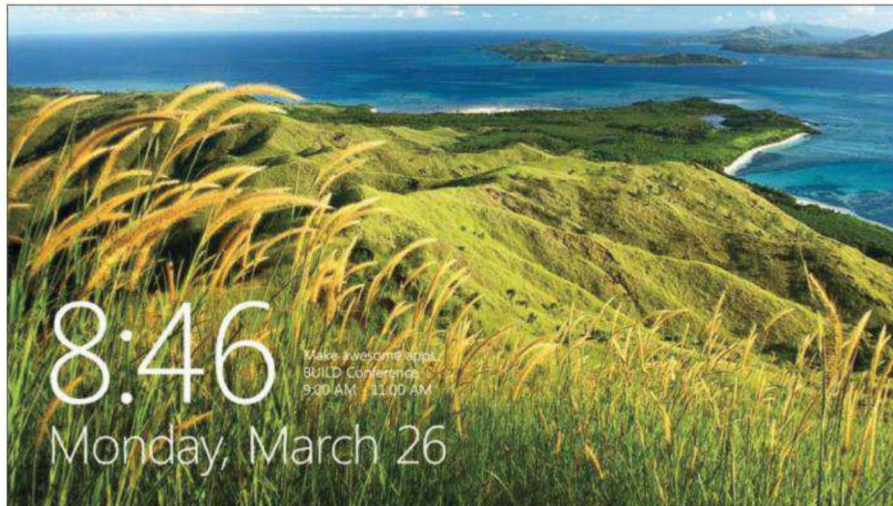
You can select tiles by tapping (or clicking) and dragging them downwards (or upwards). Unselect tiles by dragging them upwards (or downwards)

Options bar: This appears when you select one or more tiles from the Start screen and provides contextual options. Certain tiles on the Start screen can be resized, but others can't

TOP TIPS FOR GETTING AROUND THE METRO INTERFACE

- Drag in from the left to switch to the most recently used app. Drag and hold to display it to the side of the current app
- Drag down from the top to close the current app
- Tap and hold your finger on the screen to access menus in some apps
- Rearrange the position of tiles by tapping and dragging them to their new position
- Pinch two fingers together on the Start screen (and in other apps) to zoom out and see more apps at once. Alternatively, hold down Ctrl and use your mouse's scrollwheel to zoom in and out
- Display all apps by dragging upwards from the bottom of the Start screen to show the All Apps button
- Add apps to the Start screen either from the Store or by selecting them from the All Apps list and tapping the 'Pin to Start' button. 'Pin to taskbar' lets you pin the program to the Classic desktop's taskbar
- If you don't have a touchscreen, point your mouse at the top- or bottom-right corner of the screen to reveal the Charms bar. At the bottom-left is a shortcut to the Start screen. Drag down from the top-left to show thumbnails of running apps. On a touchscreen, drag right, then left, at the left edge of the screen

Metro apps



Lock screen and password options

With previous versions of Windows, you had to click on your username and enter a password to log in. Alternatively, if you weren't bothered about security, you could set Windows to boot straight to the desktop.

Windows 8 introduces a smartphone-style Lock screen, which you drag upwards to reveal a more familiar user list. The Lock screen can be customised to show your own

using taps, circles and straight lines. You might draw a circle around a person's head, then tap each eye - the options are limitless.

Settings

Although the old Control Panel still exists, the new Settings app lets you tweak things much more easily with your fingers. On the lefthand side are 12 categories: tap each to show the options on the right.

Under Personalize, you can choose a picture for the Lock screen and select which apps show their 'quick status' and notifications. Using the links at the top, you can change your account picture and personalise the Start screen. There are six abstract backgrounds and a choice of nine colours.

Notifications are also new to Windows 8. As well as informative icons on the Lock screen, pop-up messages will appear within apps from the apps that you select here. Share options include whether to show a list of sharing methods that

photo, along with the time, date and app notifications. For example, you can see the Wi-Fi signal strength, the number of unread emails and battery level (if applicable).

New to Windows 8 are three types of authentication. You can type in a traditional password, a four-digit PIN or use a picture password. The latter requires to you complete three gestures on a photo, which is easier to complete on a touchscreen than keying in a password using an onscreen keyboard, and arguably more secure than a PIN.

You can choose any photo you like and then configure a series of three gestures

you use most often, as well as prioritising apps that you most frequently share from.

Other useful settings include the ability to prevent Windows downloading updates and software on metered internet connections. This is primarily important for tablets, which could switch between Wi-Fi and a 3G network.

'Sync your settings' is another noteworthy feature. Here, you can select which preferences and personalisations to synchronise with your Microsoft account. Enable everything and you can log into another Windows 8 PC using the same

account and feel as if you're using your own computer: it will look and work just the same.

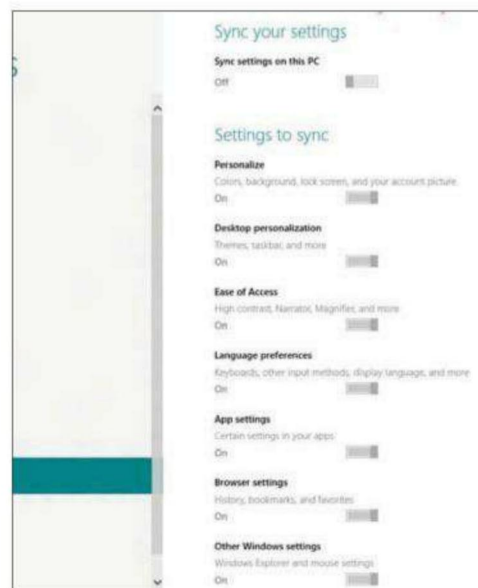
Preinstalled software

Windows 7 came with far fewer preinstalled applications than Vista. Messenger, Movie Maker, Mail and more were stripped out and made available as free downloads.

Windows 8 eschews this concept and there are more apps than ever. As you'd expect, they're designed to match the new Metro interface and are controlled by touch.

Store

The first app you'll spot is for the new Windows Store. This is where you'll browse



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Order	Description	Price £ Ex VAT
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RH174287	AppleCare MacBook and MacBook Air Protection Plan 3 Year	132.64

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RH192503	Logitech Anywhere Mouse MX	29.99
CALL TO ORDER	AutoCAD 2013 - NEW	CALL FOR PRICING

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DELL APC by Schneider Electric Windows Server

Order	Description	Price £ Ex VAT
RH189601	Dell PowerEdge R415 Rack Server: AMD Opteron 4122, 4GB Memory	877.99
RHQ76066	APC Smart-UPS: 8000VA, Rack Mountable, 230V	3,123.33
CALL TO ORDER	Microsoft Windows Server	CALL FOR PRICING

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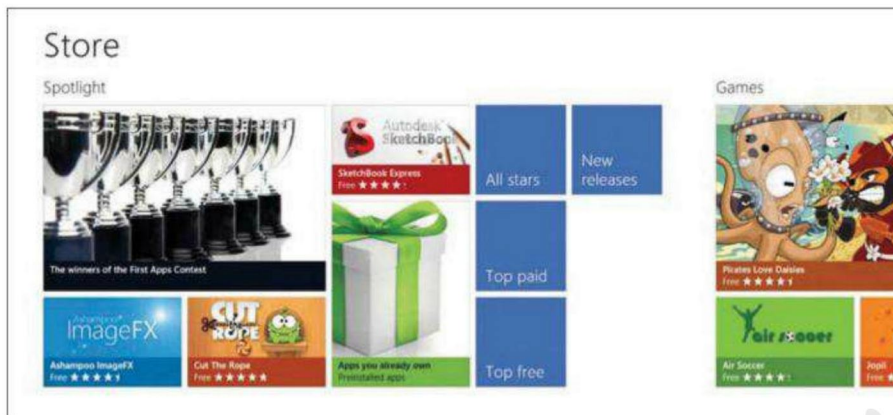


Order	Description	Price £ Ex VAT
RH189750	Lenovo ThinkPad X1 Laptop: Core i7, 160GB SSD, Windows 7	1499.99
RH147998	Microsoft Office Home & Business 2010 Product Key Card	137.99
CALL TO ORDER	Adobe® Acrobat® X	CALL FOR PRICING

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numbers and addresses. A number of panes will appear to the right, depending on the information available. For example, a What's new pane might show recent Twitter updates.

Media

Although Media Center and Media Player are still present, music, video and photos are also catered for by Metro-style apps. Music combines your local library with the music marketplace, letting you quickly add to your collection. Video is a separate app; it looks identical to music and displays files stored in the Videos folder. There's no 'video marketplace' yet, but there almost certainly will be in the final version of Windows 8.

In both apps it's easy to control playback with your fingers, but it's not so easy to find what you're looking for. Admittedly, most of the Metro-style apps are unfinished, which

and buy new apps, just as you would on a smartphone. Various categories are available; pinch to zoom out and scroll quickly through each, then zoom in when you see something you like. Tap on a particular app and a description, screenshots and user reviews will be displayed.

The choice of apps is limited. You won't yet find Amazon or eBay apps in the Shopping section, nor Twitter or Facebook in the Social category. Expect lots more to appear when Windows 8 launches later this year.

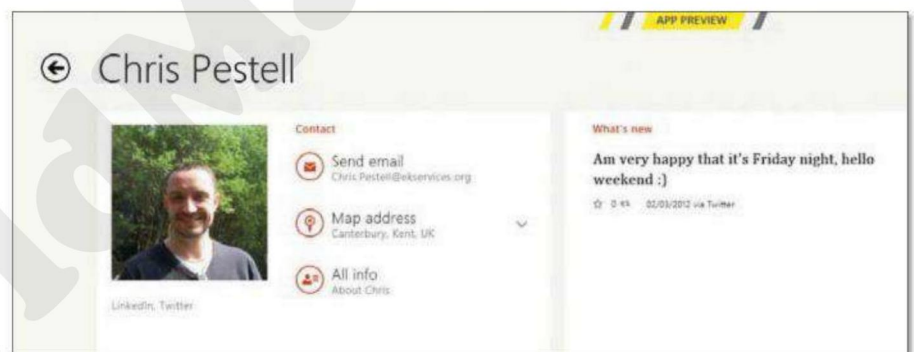
Maps

Maps uses Microsoft's Bing Maps service to provide worldwide search and directions. The interface isn't dissimilar from the Bing Maps website, but the entire screen is used for navigation. You can scroll around with your finger and pinch to zoom in and out.

When you tap and hold the screen, top and bottom bars slide into view. You can set the map to your current location, switch from Road to Aerial (satellite) views, and search for a location or business.

People

The People app brings all your contacts into one place. It's hardly a new idea, but it's the first time Windows has had a native app that pulls in contact information from various



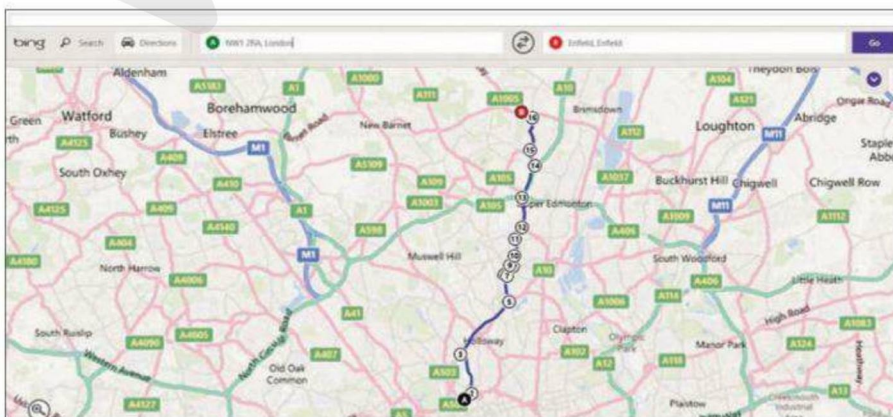
websites. The most popular social-networking sites are listed, and it's simply a case of logging in with your username and password and allowing the app to access your data.

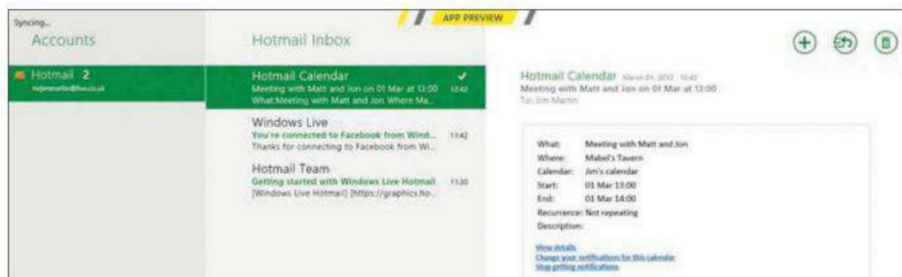
Tap on a contact and you're given options for getting in touch, including phone

explains why it isn't possible to quickly jump to artists beginning with a certain letter, for example. Currently, you can browse media only by 'most played'.

Photos is perhaps the most polished of the media apps. It puts your pictures front and centre and is perfect for a touchscreen. As well as photos stored in your Pictures folder, you can link your Facebook, Flickr and SkyDrive photos, and view them all using the same great interface.

Tap Facebook for example, and you'll see a list of albums just as you would if you tapped on the Pictures library. A clever trick is the ability to pinch to zoom out from this view, displaying smaller album thumbnails that will save you scrolling horizontally through large images. You can use the same trick when viewing photos themselves, letting you see more of the contents of an album onscreen.





Mail, Calendar and Messaging

Mail brings Hotmail to the touchscreen for the first time. The interface is split into three vertical panes. On the left is a list of folders (or accounts if selected), followed by the inbox in the middle, and messages on the right. You can link up other email services in accounts view, including Exchange and Gmail.

Messages are shown in the order they are received, rather than organised into threaded conversations. Reminder emails are automatically sent for appointments created in the Calendar app. Calendar has the same colour scheme as Mail – grey and green – and can show day, week or month views.

Tap on a specific hour to create an appointment. All the usual options you'd

expect are displayed to the left, including a list of calendars so you can select to which one the meeting belongs. By default you get three: your own, one for birthdays and a third for bank holidays.

Messaging is another app that shares a similar design. It's designed to run in full-screen mode, which can feel strange on a laptop or PC. Unlike Windows 7's Windows Live Messenger client, Messaging displays previous conversation threads so you can

jump to one and continue chatting if the contact is online.

Internet Explorer

Windows 8 ships with Internet Explorer 10.0, which has a radically different interface for Metro. Controls are hidden until you swipe upwards, with the entire screen used to display a website. Swiping up reveals the URL and search bar at the bottom of the screen.

Gone is tabbed browsing. Swiping down from the top shows thumbnails of open sites, and you can scroll right to see the full list or tap the '+' button to open a new site.



Windows 8 Classic desktop

If you're using a laptop or desktop PC, you'll see a Desktop icon on the Start screen. This launches the 'Classic' Windows interface, which looks almost identical to that of Windows 7. There's one obvious difference, though: no Start button.

This also means there's no Start menu, which can feel quite disorientating. There are various ways to launch applications. One is to use the Search tool on the Charms bar

(swipe in from the right to display it); another is to right-click the bottom-left corner of the screen to display a Start menu of sorts. This lets you open a Run box, Command Prompt and various management programs.

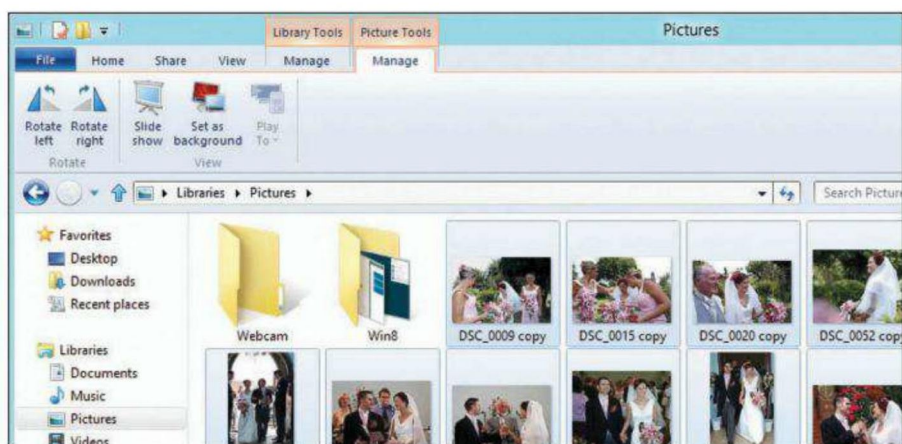
You can also pin programs to the taskbar (see page 86), or create shortcuts on the desktop. The latter option is convoluted, since you either have to browse to the program's location on your hard disk or right-click on

the desktop and choose New, then Shortcut, from the menu that appears.

Everything behaves as it did in Windows 7, so you can snap windows to the left- or righthand side of the screen, for example. The notification area is also identical, as is the shortcut to the right that closes all windows and reveals the desktop. Where you might expect to find the Start button is a toggle that lets you switch to using the Metro interface; hover over this and tap the Start screen thumbnail to access Metro.

Open an Explorer window and you'll notice the other main change. At the top is Microsoft's 'Ribbon', which will be familiar to Office 2007 and 2010 users. The Ribbon is intended to replace traditional toolbars and menus, providing quick access to commands that let you quickly complete a task.

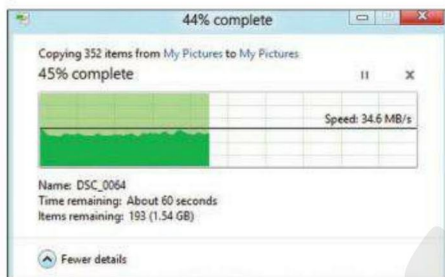
Each tab holds related commands, but in Windows 8 one or more tabs can be highlighted. In folders containing pictures, for example, a highlighted Picture Tools tab includes commands for rotating images, playing a slideshow and setting a picture as the desktop background.





The Share tab makes it far easier than before to burn to disc, email, print and compress files. There are also tools for sharing the folder with other users on your home or business network.

When you start any program not designed for the Metro interface, it will launch on the Classic Windows desktop. The old-style Control Panel is still present, as is Network and Sharing Center. And it's still possible to add gadgets to the desktop and change the



wallpaper, just as you might have done in Windows 7.

Another minor update is a real-time graph showing transfer speeds when you copy files. This appears when you click the More details button. You can also pause and cancel transfers.

The Task Manager has had an overhaul. The main list is

split into Apps and Background processes, and their memory, processor and network usage is now much easier to see. A new App History tab includes a Metered network column, so you can see which apps are eating up your monthly data allowance.

Touchscreen keyboards

Whether you're using Windows 8 on a PC, laptop or tablet with a touchscreen, there's a selection of onscreen keyboard layouts to choose between. The default view is a basic Qwerty layout and, even on a large screen, it lacks a number row. You have to tap the &123 button to display this.

A keyboard icon at the bottom right allows you to select two other styles: split and handwriting recognition. The former is ideal if you're used to typing with your thumbs, and it also includes a central numberpad. This

may appear too small to be of use, depending on the size of your screen, but it's fine on screens up to and around 10in.

Handwriting recognition isn't new, but it's been optimised for use with a stylus. For most people, the standard touchscreen keyboard will produce the best results.



SHOULD YOU UPGRADE?

When Windows 8 launches later this year, it will quickly replace Windows 7 on all new PCs and laptops. So, unless you want to get your hands dirty and install a different operating system, you'll be stuck with it.

For those who aren't planning to buy a new PC or laptop, there isn't a great incentive to upgrade - unless you have a touchscreen. The Metro user interface is optimised for touch input and, although it can be controlled using a mouse and keyboard, doing so isn't half as much fun.

Then again, using a touchscreen on a laptop or PC isn't much fun: your arm will

quickly tire of being held out in front of you, particularly when sitting down.

A tablet is the best choice for running Windows 8: a lightweight device that sits flat on a desk or on your lap is the obvious way to interact with a touchscreen. However, in this marketplace, Windows has tough competition in the form of Apple's iOS and Google's Android. We'll be comparing all these mobile operating systems, along with BlackBerry OS, next issue.

Microsoft has yet to announce its pricing for Windows 8, and cost will be a big factor in whether most people decide to upgrade

from Windows 7. It's possible that the company will follow Apple's lead and allow Windows 7 users to download the update for £20 to £30. If history is anything to go by, though, the actual cost will be more like £70, making it far less attractive.

Plus, bear in mind that the vast majority of applications will run in traditional desktop mode rather than Metro, so you'll likely find yourself using Metro only a tiny fraction of the time. Until the applications you use on a daily basis are updated to work in the Metro interface - if ever - your experience will barely differ from Windows 7. ☐

How to





build a compact PC

Whether you want a PC for gaming or everyday computing tasks, Loyd Case explains how to put together a space-saving system

Building your own PC is a highly rewarding experience. It also allows you to choose exactly which components you want. You won't have to scour adverts to find a computer that matches your requirements - you dictate how much hard-drive space and RAM there is, and whether to splash out on a powerful graphics card or save cash on an integrated chip.

Assembly is easier than you might think, and we're on hand to suggest which components work together. Over the following pages, we discuss two very different compact custom-builds.

The first is a powerful machine that's ideal for gaming, video and image editing. Unlike a standard tower, it'll fit into smaller spaces and be less conspicuous in your living room or study.

If you don't need this much power, and you aren't clamouring to play the latest games, our second build - a cheaper and less-powerful PC for general use - should appeal. We've selected the ideal components to build a compact system that can be hidden out of sight and won't make a racket when you're browsing the web.

You can stick to our list of components, but don't be afraid to swap in products that better suit your needs and budget. For example, you can increase or decrease the amount of memory and hard-disk capacity, or opt for a different CPU. You must ensure that your alterations are compatible with the motherboard, though. The best way to do this is to consult the motherboard manufacturer's website and carefully check the specifications for maximum memory speed and compatible processors.

One advantage of building your own computer is that you can install whichever operating system you like. Windows 7 Home Premium 64bit will be the best choice for most people, but if you're feeling adventurous you could try a Linux distribution such as Ubuntu. Since it's free, you can experiment without wasting any money; if you like it, you'll have saved the £70 cost of Windows.

BUILD A COMPACT GAMING PC

We've called this a gaming PC, but it's equally at home when editing HD video or completing other demanding tasks. The case is a sensible starting point when choosing components, as it dictates how much room there is for the graphics card. In Win's Dragon Slayer looks like a full tower case but smaller, yet it's deep enough to accommodate a large graphics card.

The space restrictions can make working inside this case a pain, though. For example, the hard-drive bay sits across from the power supply, limiting the latter's size to a depth of 150mm. Fortunately, Corsair's AX750 - a 750W, 80-plus-gold-certified power supply - measures 150x150x90mm.

Routing cables can also be a chore, but the Dragon Slayer is wide enough to allow wires to run behind the motherboard tray. Another issue is that the front-facing USB 3.0 connector requires you to route a cable out the rear of the case and plug it into a back-panel connector on the motherboard.

Selecting the motherboard

When building a space-saving gaming machine, we decided the limiting factors would be size and power consumption, not cost. We settled on the Asus Maximus IV

Gene-Z, a premium MicroATX motherboard with a Z68 chipset, four memory slots, and all the features you'd expect in a high-end board.

The Gene-Z is more expensive than most MicroATX boards at £140, yet not as pricey as standard ATX boards of the same class. It has onboard reset- and power switches, a robust Bios, a high-end power-supply section, and plenty of USB ports, including USB 3.0.

Also on the board is a wide selection of connectors, including digital video outputs that let you take advantage of the chipset's graphics virtualisation. This enables you to use a high-end discrete graphics card, but connect the display to the graphics integrated to Intel Sandy Bridge CPUs. It results in lower power consumption when you're not gaming, and increased performance when you are.

The Gene-Z includes Creative Labs THX TruStudio Pro software audio enhancement. This is one of the few software-based audio enhancements we like, and it produces a broad sound stage.

The board also has room for a large CPU cooler. We opted to stick with the standard Intel heatsink, due to the limited space inside the case. In any case, we didn't want to go overboard with overclocking.

Choosing the CPU and RAM

While the sweet spot in terms of price and performance for most gaming systems is an Intel Core i7-2500K processor, we've plumped for the i7-2600K. The faster clock speed (3.4GHz vs 3.3GHz), plus Hyper-Threading technology, makes this processor useful for more than just playing games.

A high-end motherboard and CPU deserve good memory. Corsair's 8GB Vengeance DDR3 kit runs at 1,600MHz and fits the bill nicely. Plus, it costs less than £40: fast DDR3 RAM is incredible value these days.

Which graphics card?

Although we didn't set a budget for this computer, our goal wasn't to construct the most expensive machine possible. And since it's a MicroATX PC, other constraints influenced our choices - including those for power and cooling. We also wanted a graphics card that made little noise, didn't consume an excessive amount of power, and could handle most modern games.

Enter the Asus GTX 570 DirectCU II, which costs around £250. It's an enormous card, taking up three slots at the back of the case due to its beefy cooling provision. Asus has removed one integrated circuit (included in most GTX designs) that limits maximum power draw. This tweak allows us to set the voltage to whatever we deem appropriate. Bear in mind, however, that without the voltage limiter you can wind up killing the card if you go too far.

Asus has an overclocking tool called SmartDoctor, but it's rather crude. If you want to overclock the card, pay a visit to the website for Asus' Matrix GPU series, select the downloads for your version of Windows, and look under Utilities for GPU Tweak. Although this tool was designed for the GTX 580 series, it works fine with the 570.

If you simply want to push the clock speed higher, GPU Tweak automatically adjusts the voltage. The PC will consume more power, but our powerful 750W power supply provides plenty of headroom.

Adding storage

You'll need lots of fast storage for your games. It's tempting to opt for solid-state storage only but, given that some modern games consume up to 20GB, this could potentially double the price of the PC. Thankfully, one of the great aspects of the Z68 chipset is its support for SSD caching through Intel's Rapid Storage Technology.



This allows you to install a small-capacity SSD and configure the system for Raid support, and the SSD acts as a huge cache for the hard drive. In other words, a relatively cheap low-capacity SSD can significantly boost the performance of your primary hard drive.

We chose a 600GB, 10,000rpm Western Digital (WD) VelociRaptor (£160) and paired it with a 20GB Intel 311 SLC-based SSD (£90). The net result: much faster boot- and application-load times than you would see from the VelociRaptor alone. If you crave more storage capacity, a 2TB, 7,200rpm drive costs around £100, and you'll see nearly the same performance due to the SSD cache.

On the optical side, all you really need is an inexpensive DVD burner. The Lite-On iHAS124 gets the job done, and costs £15.

Performance and overclocking

Even though overclocking is easier than ever, it's still risky. This PC is so fast to begin with that most people should be content to run it at stock speed. It's also worth noting that DDR3-1600 is now cheap enough that it can be more useful to tweak memory bandwidth than processor speeds.

We played a series of games to test the performance of our compact gaming PC in its non-overclocked state. The PC turned in an admittedly unplayable but still very good result of 19fps in Metro 2033, an already demanding DirectX 11.0 game in which we turned up all the detail levels and set anti-aliasing to 4x. In most games the PC ran in excess of 30fps, and it achieved more than 60fps in some titles.

In a real-world setting, you might see a 2 to 4 percent increase in this framerate if you overclock. Whether that's worth the risk of overheating and potentially damaging your hardware is up to you.

The price of glory

Our PC isn't cheap at £1,250, but this does include the Ultimate Edition of Windows 7. We chose this because Home Premium is limited to 16GB of RAM, and we wanted to build in some scope for future upgrades. Some 8GB memory modules have already started to ship, and our Gene-Z motherboard could theoretically support 32GB.

You could reduce the cost of this machine by swapping the SSD and VelociRaptor hard drive for a standard 7,200rpm disk. You'll also save £70 by plumping for Home Premium rather than Windows 7 Ultimate, provided that you don't want more than 16GB of RAM.

PRICING UP OUR SYSTEM

Total cost of PC:

£1,250 inc VAT



- **System case**
In Win Dragon Slayer
£60 inc VAT

- **Power supply**
Corsair AX750 750W
£125 inc VAT



- **Motherboard**
Asus Maximus IV Gene-Z
£140 inc VAT

- **CPU**
Intel Core i7-2600K
£235 inc VAT



- **RAM**
Corsair 8GB Vengeance DDR3
£37 inc VAT

- **Graphics card**
Asus GTX 570 DirectCU II
£250 inc VAT



- **Hard drive**
WD VelociRaptor 600GB
£160 inc VAT

- **SSD**
Intel 311 20GB
£90 inc VAT



- **DVD±RW drive**
Lite-On iHAS124
£15 inc VAT

- **Operating system**
Windows 7 Ultimate
£138 inc VAT



BUILD A COMPACT SHARED PC

Desktop PCs are increasingly being replaced with tablets and laptops, but they still have their uses. For starters, you can have a large screen and any keyboard you like. Plus, you may want a low-powered, small machine for the family to share in the living room. It'll prove convenient when you need to respond to an email, or keep an eye on what the kids are looking at online.

Such a shared PC needn't be expensive. It doesn't have to run games, for instance, and the ability to rely on graphics integrated to the CPU or motherboard rather than a discrete card brings down the cost.

You might have been using an old PC or laptop for this task for years, but now is the ideal time to replace it with a new machine and invest in a larger, better-quality monitor.

Defining your needs

Unless you plan to connect the PC to an office network, you can use Windows 7 Home Premium rather than the Professional or Ultimate editions. If the computer is to be used in an office environment where it will connect to a domain name server, you'll probably want Professional, which costs roughly £40 more than Home Premium.

You could argue that Linux is a great alternative for a light-duty, shared PC. There are several distributions tailored toward younger users; Qimo 4 Kids is a good one to try. For everyone else, Ubuntu is likely to be the best choice, as it has great community support and is constantly being improved.

Here's what we recommend looking for in a PC that's to be shared by the family:

- More responsiveness than the old PC or laptop. A faster storage system, more RAM, Windows 7 and a powerful processor

- Low power consumption. A desktop PC with a separate display will probably consume more power than a laptop, but less than an old PC with a CRT monitor. Robust sleep and hibernation modes are pluses, too

- A good wireless keyboard and mouse; both should also have long battery life

- Wi-Fi capability, either built-in or through a USB dongle, since the PC could end up situated some distance from your router

Hardware

We selected a motherboard with integrated graphics and a case with a built-in power supply, so our parts list isn't too long. This isn't necessarily the cheapest system to build, though. Our priority was functionality. Using laptop-class components pushes up the price a bit, as does low-voltage DRAM. You can save money by opting for standard RAM and a case that supports a desktop optical drive, but it won't be as small as this PC.

Although we wanted to go small, we didn't want to sacrifice power by going down the Intel Atom route. Instead, we've opted for a Core i3-2100T. This processor has a thermal design power of just 35W, which is almost half the 65W of the standard i3-2100 chip. Despite this, its two cores run at a healthy 2.5GHz, and Hyper-Threading makes it in effect a quad-core CPU. The only thing missing is TurboBoost, and without this feature it isn't able to automatically increase its speed when running demanding tasks.

The chip also supports hardware virtualisation, which can be useful in an office environment. However, the 2100T doesn't provide Intel vPro or Trusted Execution, features that support remote management.

Motherboard and case

Intel's DH67CF is a mini-ITX board with two memory sockets and a PCI Express x16 slot that could support a graphics card, but that will go unused in this build. There are lots of ports, including a DisplayPort output, a standard that's becoming increasingly common in mid-range flat-panels.

The motherboard's only real oddity is its CMOS battery. It's on the end of a wire, attached to the board through a pair of pins. You can see the battery just behind the DVI port block.

Since the plan is to keep down power consumption and physical size, we looked for a suitably low-power mini-ITX case with its own power supply. The Antec ISK 300-150 fits the bill nicely, with its understated black bezel and 150W PSU. Antec makes a similar chassis with a 65W power supply, which also would have suited our needs, but it's important to remember that the PC will draw only the power the components need - it won't consume 150W just because it has a 150W power supply.

Antec includes a bracket that allows you to stand the machine on its side so that it takes up less desk space. If you buy a wireless keyboard and mouse set, they can easily sit on top of the case when not in use.

Memory and storage

To reduce power consumption, we installed a pair of 2GB Kingston HyperX LoVo DDR3 modules. This low-voltage kit costs around £10 more than standard DDR3 modules, so you can save money here if power consumption isn't your biggest concern.

For storage, there's a pair of laptop-class devices. One is a WD Scorpio Black 750GB, 7,200rpm hard drive. You could swap this for

a 120GB SSD, but that would push up the cost and limit the amount of space available for storing large files such as videos. The second is a Samsung slot-loading rewritable-DVD drive. The slot-load feature is nice to have in a crowded, small-desk environment. Again, both components use less power than their desktop equivalents.

Building the system

As with any compact system, building into a small case can be tricky. The Antec ISK usefully accepts laptop storage, so you won't need any brackets to install the hard disk and optical drive. This illustrates a key point: make sure that your components all play well together before you buy them.

It's all too easy to buy a graphics card that's too long and blocks access to SATA ports or memory sockets. Conversely, you may find the case you've chosen isn't deep enough to accept the graphics card you want to use. If you stray from our recommendations, make sure you check your measurements. Spending a little time on research will ensure that all your components fit well. Fortunately, Antec includes a 2.5in SATA power connector that's smaller than the 3.5in connection used by desktop hard drives.

In such tight quarters, parts such as the CPU cooler can create issues, too. However, Intel's Core i3-2100T ships with one of the lowest-profile CPU coolers we've seen. It won't win any awards for cooling an overclocked CPU - neither was it designed to. Its job is to keep a 35W processor cool enough in a small case, and it did that well enough: idling temperatures were around 40- to 45°C.

Final thoughts

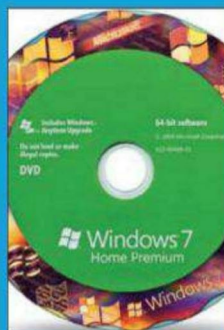
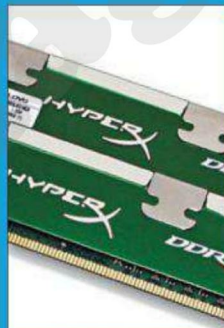
This compact, power-efficient and quiet PC cost us £491 to build. You'll need to re-use an existing monitor, keyboard and mouse, or factor them into your budget. Have a look at our Top 5 charts on page 145 for flat-panel recommendations, while you can find peripheral reviews at tinyurl.com/6tzcaxh.

You can build a cheaper system with a few tweaks. Using a slightly larger case than the Antec ISK, for example, would allow you to use cheaper desktop storage. Similarly, you can reduce the amount of storage and RAM to save a few pounds. ☒

PRICING UP OUR SYSTEM

Total cost of PC:

£491 inc VAT



- **System case**

Antec ISK 300-150
£65 inc VAT

- **Motherboard**

Intel DH67CF
£91 inc VAT

- **CPU**

Intel Core i3-2100T
£101 inc VAT

- **RAM**

Kingston HyperX LoVo
£37 inc VAT

- **Hard drive**

WD Scorpio Black 750GB
£80 inc VAT

- **Wireless card**

D-Link Wireless N 150
USB Adapter DWA-125
£16 inc VAT

- **DVD±RW drive**

Samsung SN-T083C
£31 inc VAT

- **Operating system**

Windows 7 Home Premium
£70 inc VAT

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JIM MARTIN



Protecting your data

Many of us don't find the time to back up our data, but it's essential. Imagine how you might feel if your hard drive failed and you lost irreplaceable photos and videos, not to mention important documents over which you've spent hours slaving.

With the right software, backup doesn't have to be a chore. We show you how to use CrashPlan to back up your files to the company's online servers, to an external hard drive or even another PC. This set-it-and-forget-it program will do all the hard work of protecting your files for you. See page 108.

Continuing this theme, we explain how to bolster the security of your data using Google's 2-step verification (overleaf). Setup requires a little effort, but you can then feel safe in the knowledge that even the most determined hackers should be unable to access your email and documents.

If you fancy yourself akin to Jamie Oliver or Nigella Lawson, you'll appreciate our guide to printing your own cookbook (page 116). We also look at how to install Linux, on page 112. If you've been put off Linux before, now's the time to give it a go. ☒

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Configure Google's 2-step verification

It pays to be security-conscious with your online accounts. **Jim Martin** explains how to get started with new Google safety measures that protect your email and documents

Millions of people have a Google account, which makes the service a prime target for criminals hoping to sell on valuable personal information. It's crucial that you lock down your data using a strong password, and not one that's easily guessed. Ideally, you should use an alphanumeric password that contains a mixture of upper- and lower-case letters, numbers and punctuation.

Given enough time and the right tools, any password can be unearthed by a determined hacker. Put them off the scent for as long as possible, though, and they may just look elsewhere for an account that's easier to access.

This is the logic behind Google's 2-step verification feature, which adds a second layer of protection to your data. Enable the security control in your Account Settings, and you'll need both your password and a unique code to log into your account thereafter. This code is sent to you in a text or voice message, with neither likely to be accessible to a hacker.

Enable 2-step verification

To enable 2-step verification, you'll first need to sign into your Google account. This can be achieved through any of the company's services, since your Gmail, Google Docs, YouTube, Picasa and other accounts are all linked to a single user profile.

Enter your username and password, then click Sign in. Now click on your username in the top-right corner of the



screen and choose Account Settings from the drop-down menu.

In the Security section on the Account overview tab, you'll see that Google's 2-step verification is off by default. Click the Edit link adjacent to it, then 'Start set up'. Note that you may need to re-enter your password.

Select the country in which your phone is registered and enter your number if these fields are not already filled in. Next, choose whether you want to receive your access code via text or voice message. It's possible to change this setting later.

Provide a mobile rather than a landline or Skype number if possible, since you'll want to be able to access your Google account from wherever you are. Under no circumstances should you enter a Google Talk number: you'll lock yourself out of your account, since the code that's sent to Google Voice will be accessible only after you've logged in.

Click Send code. We found the code arrived on our handset almost instantly. Enter this code, then click Verify.

The **AUTHENTICATOR** mobile app offers codes when you've lost signal or are unable to receive calls or texts



Google can **REMEMBER** each PC from which you have authorised access to your account for up to 30 days

If you are the sole user of your computer or share it only with trusted people, consider ticking the box that allows Google to remember the PC from which you're accessing your account for 30 days, without prompting you for a verification code each time you try to log into one of its services. Note, however, that you may need to enter a verification code for each Google service you use. Finally, click 'Turn on 2-step verification'.

No mobile reception?

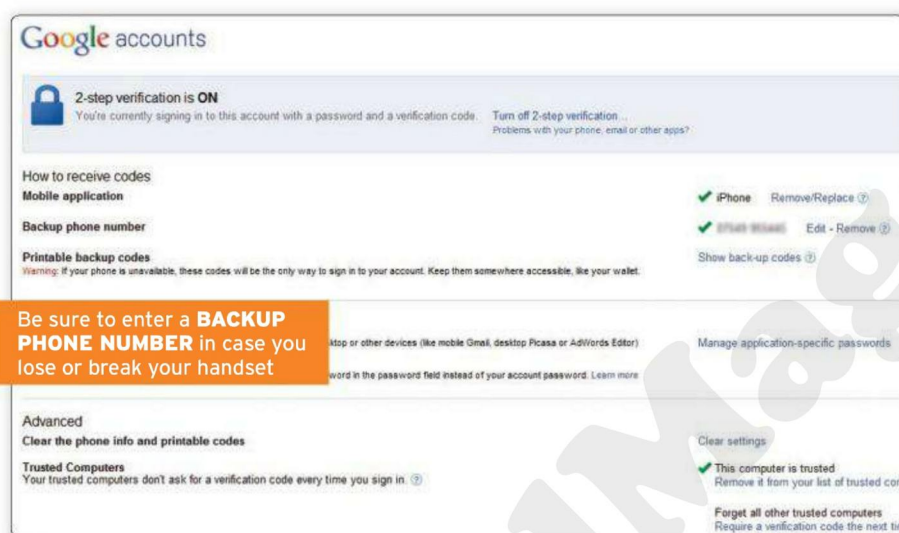
If you have a compatible smartphone, you can install Google's free Authenticator app. This is able to generate an access code in the event that your handset loses mobile reception or you are unable to accept calls

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Tech Help

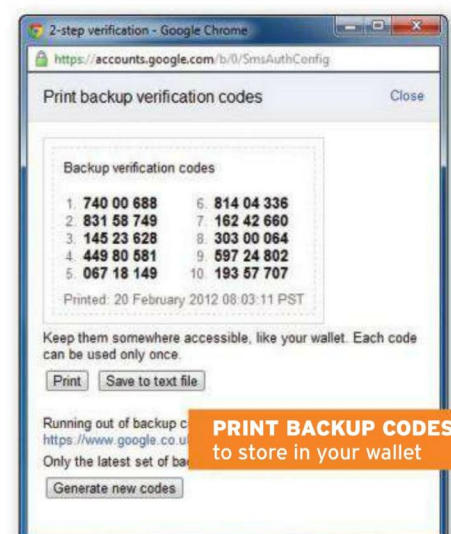


usual manner brings up an error message reporting that your password is incorrect. If this message appears, simply generate and enter a new application-specific password.

Extra precautions

Although 2-step verification makes gaining access to your Google account far more difficult for hackers, you may find yourself locked out if you lose or break your smartphone. It's therefore essential that you enter a backup phone number on the Account Settings page, and that you print out some backup codes. You can carry the latter on your person to ensure that you'll always be able to log into your accounts, no matter where you are.

If you later decide to disable 2-step verification, simply visit the Account overview tab on the Account Settings page and click Edit next to '2-step verification'. Click 'Turn off 2-step verification' on the following page, then confirm your request in the pop-up window. You'll also need to revoke any application-specific passwords you've set up. ☒



and text messages, although it still demands your phone number. The app is available on both the App Store and Android Market.

BlackBerry owners can also use Authenticator, which they should download from m.google.com/authenticator.

Back on your PC, return to the Account overview tab on the Account Settings page and click Edit next to '2-step verification'. Select your mobile operating system next to Mobile application, then follow the instructions to install the app and link your handset to your Google account. iPhone and Android users will be offered a confirmation link in the form of a QR code, which they must scan from within the Authenticator app; BlackBerry owners must enter the confirmation key manually.

Once this process is complete, you'll be able to use the app to retrieve the access code Google prompts you for when you sign into one of its services.

Application-specific passwords

Not all Google services will request a verification code; to log into these, you'll instead need what Google calls an

'application-specific password'. Calendar, Talk, Picasa and Sync are some examples, and all require the entry of a new password in place of your usual login credentials.

You'll be prompted to create an application-specific password for each of these services when you next try to log into them. Alternatively, you can configure the service now by heading to Account Settings, Account overview and clicking Edit next to 'Authorizing applications & sites'.

Enter the name of the application, then click Generate password. Copy and paste the resulting text into the box of the application that's requesting it.

You won't have to memorise or write down this password, since it can be used only once. However, a new application-specific password will be required when you first use an application or site that you haven't already signed into using 2-step verification. You can later revoke access to individual services in Account Settings if required.

It won't always be obvious that you need an application-specific password to log into some services. On an iPhone, for example, attempting to log into Gmail in the



YOUR QUESTIONS ANSWERED

Expert computing advice

Paul Monckton tackles readers' hardware and software conundrums

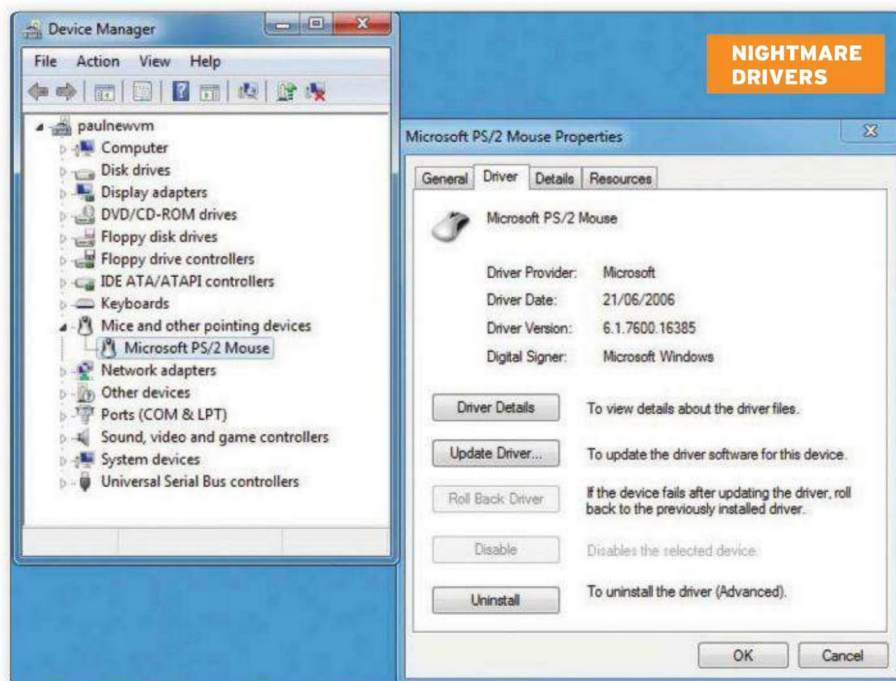
NIGHTMARE DRIVERS

Q Following an upgrade from Vista to Windows 7, my laptop has begun reporting 'Device not recognised' error messages for USB devices. My research suggests that a driver update is required. Why doesn't Microsoft issue new drivers with Windows 7? I attempted to update an ATI graphics driver manually, but couldn't find it on AMD's website. Windows' Device Manager reports that the latest drivers are installed, although some are five years old. *WBA Ecclestone*

The most reliable solution we've found to this problem sounds unlikely, but works more often than fiddling with drivers. Shut down your laptop, unplug it from the mains and remove the battery. After 10 minutes you can reinstall the battery and boot up the laptop.

There are programs that offer to keep an eye on your applications and auto-update drivers as they become available, but if your system is working well then they're often best avoided. The exception is with drivers that were designed to fix a particular issue, boost performance or add new features.

Microsoft included new drivers with Windows 7 and continues to deliver them through Windows Update. However, these generic drivers are often less sophisticated than those you can obtain directly from device manufacturers.



Although Microsoft provides everything necessary to get the device working, you may find that extra features are missing, such as greater control over settings or a more sophisticated user interface. An example of such a device is an all-in-one printer that's supplied with template software and sample images. For products such as these, it's worth visiting the manufacturer's website and downloading the latest software.

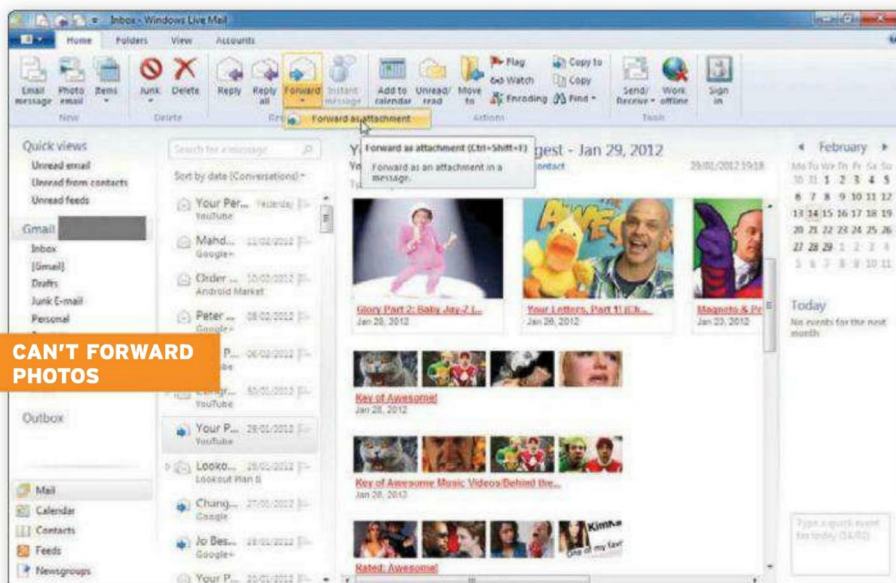
You don't mention the model name of your graphics card. Although AMD supports ATI products released in the past few years, it's unlikely to find support for products older than this. You can still install the Windows Vista Catalyst Display Driver 10.2 under Windows 7, however.

Because you're using a laptop, the process for updating graphics drivers is a little different to that for desktop PCs. Desktop users download and install the latest software from the graphics chip vendor's website, but laptop users will usually need to visit the support section of their laptop manufacturer's website.

Using a five-year-old driver is not in itself a problem. There's no reason for newer drivers to be released if the existing ones are stable and work properly.

CAN'T FORWARD PHOTOS

Q I use Windows Live Mail and can view email with photo attachments without problems. However, when I forward these messages the recipients report that the pictures are missing or displayed as a slideshow. I can get around the problem by saving the email as a document, then creating a new message and attaching the saved email, but there must be an easier way. *Philip M Crook*



Microsoft's forums reveal that plenty of Windows Live Mail users are finding the same problem, Philip. You've already found an effective workaround, but can reduce the number of steps required by clicking on the small down arrow next to the Forward button and choosing 'Forward as attachment', rather than first having to save the message.

The drawback with this method is that you won't be able to edit the original message or remove its sender and recipient information before forwarding.

We recommend you instead try the free Mozilla Thunderbird email client, available from tinyurl.com/6qLry7q.

REMOTE PASSWORD PROBLEMS

Q I've forgotten the password that's required to access my remote XP PC from a Windows 7 PC using Windows Remote Connection. I have tried the Passview utility without success. Will uninstalling and reinstalling this Windows component allow me to create a new password? *Derek Sewell*

It sounds as though the password you've forgotten is the one on the remote XP machine. To regain access you'll need to perform a password recovery or reset on that PC, not your local Windows 7 system.

To reset your XP password you'll need physical access to the PC, or be able to pass on our instructions to someone who does.

By default, XP creates an Administrator account with a blank password. If this hasn't been changed, you can log in as the Administrator and reset the password for the User account you want to access.

Restart the PC, then press Ctrl, Alt, Del twice to bring up the login window. Enter Administrator as the username and leave the password field blank (unless you changed it previously). Click Start, Run, type `control userpasswords2` and click Ok.

REMOTE PASSWORD PROBLEMS



Select the Users tab in the window that pops up, then click the account you wish to remotely access. Choose Reset Password. Enter a new password, confirm that password, then click Ok.

Restart the XP PC. You should now be able to access it from your Windows 7 PC using the new password.

If you can't log into the Windows XP system as an Administrator, you'll need to use a password-recovery tool. We like Rekeysoft Windows Password Recovery Tool (anypasswordrecovery.com) and Stellar Phoenix Password Recovery (stellarinfo.com).

DONGLE ISSUES

Q I use Vodafone Mobile Broadband with a 3G USB dongle to access the internet on my PC. I can't access any websites, yet other applications such as Windows Live Messenger appear to be online. The browser returns the following error message: 'HTTP Error 403. The service you requested is restricted and not available to your browser. The restriction can be based on your IP address, host name, browser software, time of day or other variables. Most likely you requested a service that was made available to a restricted subnet'. I've tried restarting the computer but it hasn't fixed the problem. Please help me find a solution. *Will Black*

Vodafone's support forums reveal that many users have periodically experienced this problem. You're on the right lines by restarting your PC; however, since this doesn't completely cut the power to USB devices you will also need to unplug the dongle. Disconnect the dongle in the Mobile Broadband software, then unplug the device and restart the machine. Reinsert the dongle once Windows has loaded.

PAYG INTERNET ACCESS

Q When I retired nine years ago I bought a Packard Bell desktop PC running Windows XP. I'm now considering connecting it to the web on a pay-as-you-go basis. I'll be using the connection only to read email and conduct the odd search. I suspect that mobile broadband offers the best solution, but often find that my mobile phone, connected to the O2 network, has reception trouble. How can I check the coverage and pricing of other mobile networks? And once online, how should I go about finding a suitable search engine and setting up email and security? *Brian V Davey*

Mobile broadband allows people to get online from wherever they have a phone signal, simply by plugging in a USB dongle or tethering their mobile phone (we'll explain this later). It suits people who don't like to set up direct debits or who have low bandwidth demands, since most operators restrict usage, but unused credit usually

DONGLE ISSUES



expires after a set period. Given that you're already experiencing reception problems with O2, however, mobile broadband – or, at least, mobile broadband from O2 – may not be the best solution.

Don't rule out home broadband purely on the basis of your low-usage requirements. If you have a home phoneline installed, an entry-level broadband package costs only a few pounds per month and offers a much faster connection to the web. You will, of course, need to sign up to a minimum contract term – usually from 12 months.

As an existing customer, you can take up O2's reduced price Basics package. It's free for three months, then £8.50 per month. We also recently awarded Plusnet, which costs £6.49 per month, our Best Budget Broadband 2012 award. You can read about other deals in our *Broadband Survey* in the previous issue or online (tinyurl.com/7b8xcsg).

If you're adamant that you want to stick to pay-as-you-go broadband, however, there are lots of places you can visit to get information on coverage and pricing in your area. This process is made much simpler if you're able to use a friend's computer or visit a local library to temporarily get online. If this isn't possible, all the major mobile operators have high-street branches and will happily help you instore. And failing that, you can always give them a ring.

For O2, simply call 4455 from your pay-as-you-go handset to speak to customer services; alternatively, you can get hold of a customer services representative on the landline via 0844 809 0222. For Orange dial 0800 079 0435; for T-Mobile dial 0800 956 3089; for Virgin Mobile dial 0845 650 4500; for Vodafone dial 0808 040 8408; and for 3 dial 0800 358 8460.

We entered your postcode into the online coverage checkers for each of the mobile networks. With the exception of Vodafone and, as you suspected, O2, all report good service in your area.



Sort by	Package	Advertised speed	Estimated speed	Download limit	Monthly Cost
BT	Infinity Option 2 First 3 months half price. Super-fast broadband by fibre from BT 250 Free Wi-Fi minutes a month included (more info)	40Mb	24Mb - 40Mb	Unlimited	£25.00
BT	Infinity Option 1 First 3 months half-price. Super-fast broadband by fibre from BT 250 Free Wi-Fi minutes a month included (more info)	40Mb	24Mb - 40Mb	40GB	£18.00
BT	Option 1 Online Exclusive - FREE £50 Sainsbury's gift card. First 6 months at only £3.50/mth. Evening and Weekends calls included (more info)	20Mb	2.5Mb - 8Mb	10GB	£13.00
TalkTalk	Essentials 12 months £3.25 half price. Free connection worth £30, free wireless router, free evening & weekend UK landline calls (more info)	24Mb	2.5Mb - 8Mb	40GB	£3.25
plusnet	Value No contract option available for only £25 connection fee (more info)	20Mb	2.5Mb - 8Mb	10GB	£6.49
O2	The Basics For everyday surfing and email. 3 Months Free, then £8.50 if you are on O2, £13.50 if you are not. (more info)	20Mb	2.5Mb - 8Mb	20GB	£8.50
plusnet	Extra No contract option available for only £25 connection fee (more info)	20Mb	2.5Mb - 8Mb	60GB	£11.49
TalkTalk	Plus 9 months £7.25 half price. Free connection worth £30, free wireless router, unlimited anytime UK landline calls (more info)	24Mb	2.5Mb - 8Mb	Unlimited	£7.25
orange	Broadband & Off peak calls First 3 months FREE Only £7.50 for Orange mobile customers (more info)	20Mb	2.5Mb - 8Mb	Unlimited	£22.50
Aol	Broadband First month FREE if ordered online. 2nd and 3rd	8Mb	2.5Mb - 8Mb	10GB	

**PAYG
INTERNET
ACCESS**

For the benefit of other readers, we've listed addresses for the individual network operator's coverage checkers below:

O2: tinyurl.com/7rjvbb8
Orange/T-Mobile: tinyurl.com/3v7vxkq
Virgin Mobile: tinyurl.com/6kxmbz
Vodafone: tinyurl.com/2daynv
3: tinyurl.com/75omdsf

If you're able to get online to research mobile broadband deals, you may also like to check out our Broadband Advisor at tinyurl.com/7hjxgh6 for information on both home and mobile-broadband options.

You don't say what type of mobile phone you're using, nor whether it lets you access the internet. For those who have recent smartphones and are already paying for mobile data, tethering is another solution for getting your PC online.

Tethering involves connecting your smartphone to the PC or laptop via a USB cable or wirelessly using Bluetooth, then using your handset as a modem. The advantage of such a setup is that you won't need to buy a 3G USB dongle and can use the credit on your existing SIM.

Check the documentation that came with your handset to find out whether tethering is possible. Note that depending on your usage a dedicated data SIM can offer better value, however.

Obtaining an email address is easy. If you're not allocated one with your chosen broadband service, the easiest way to set



one up is to use a free web-based client such as Google's Gmail. Head to mail.google.com and follow the instructions.

Security software is vital, but the level of protection required will depend on your online activities. Start off by installing a free antivirus program such as AVG Free (free.avg.com), and ensure that your Windows Firewall is turned on. An alert will pop up in the Taskbar if there are any problems with your security setup, although you're unlikely to need much more than basic Internet security and antivirus if you're doing little more than sending emails.

Windows XP is bundled with the Internet Explorer web browser, which you can use to visit websites and the search engine of your choice. If you use Gmail for your email you can also access this through Internet Explorer; alternatively, you can use a standalone client such as Outlook Express, which is also bundled with Windows XP.

When you first hook up your PC to the internet you'll probably find there are a lot

of updates to install. Note that these may consume a large chunk of your data allowance, but are necessary to keep your system secure and up to date.

UNWANTED STARTUP CHECKS

Q I created a second partition on my Windows 7 Home Premium 32bit laptop. Drive C holds the system and program files, while drive 'HD2' is used as a file store. At bootup the PC indicates that HD2 needs to be checked for consistency, but allowing that check enters the PC into a loop of other checks. What should I do? *Tony Paine*

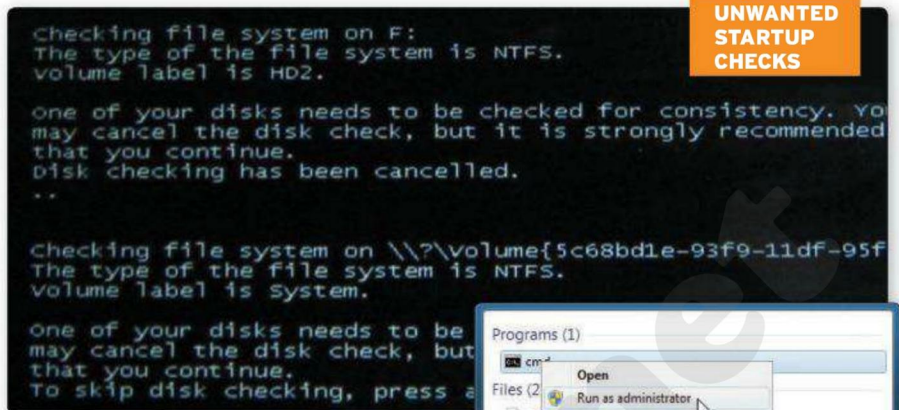
You can often fix this annoying and seemingly endless cycle of hard-drive checks by manually running them within Windows.

You don't mention what drive letter you assigned to the HD2 partition. We'll assume it's drive D, but please substitute this for your actual drive letter when following our instructions.

Click Start and type `cmd` into the search box, then right-click `cmd.exe` in the search results and choose 'Run as Administrator'. Enter the command `chkntfs /x D:` to exclude drive D from being checked at bootup.

Reboot your PC. The automatic consistency check should no longer occur.

Open another command prompt with Admin privileges. Type `chkdsk /f /r D:` to run a full check on your drive and fix any problems found.

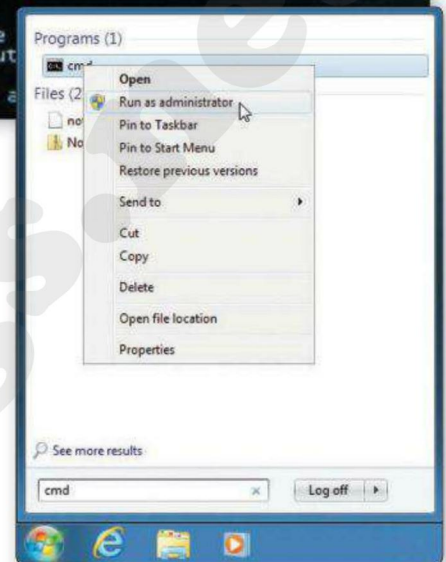


Run the command `fsutil dirty query D:` to verify that the drive is clean. The system should report 'Volume - D: is NOT Dirty'. Reboot the computer one more time and the problem should be fixed.

LAPTOP CRASHES IN BIOS

Q My Dell laptop keeps crashing. It reaches the Bios splash screen but falls over before Vista loads. It even crashes after a minute or two when in the Bios-configuration pages. I thought that it might be an overheating problem, but the fan is spinning. The power supply works fine on other Dell laptops, and I have tried the laptop with and without the battery. *imaginarynumber*

This could still be a heat-related issue, particularly if the crash is happening after



roughly the same amount of time. The fan may be spinning, but a build-up of dust could be obstructing airflow.

Clean any externally accessible vents and, if you're comfortable with doing so, take a look inside the laptop for any matted dust build-up around the heatsinks and vents. Sometimes a can of compressed air can be used to help shift stubborn build-up.

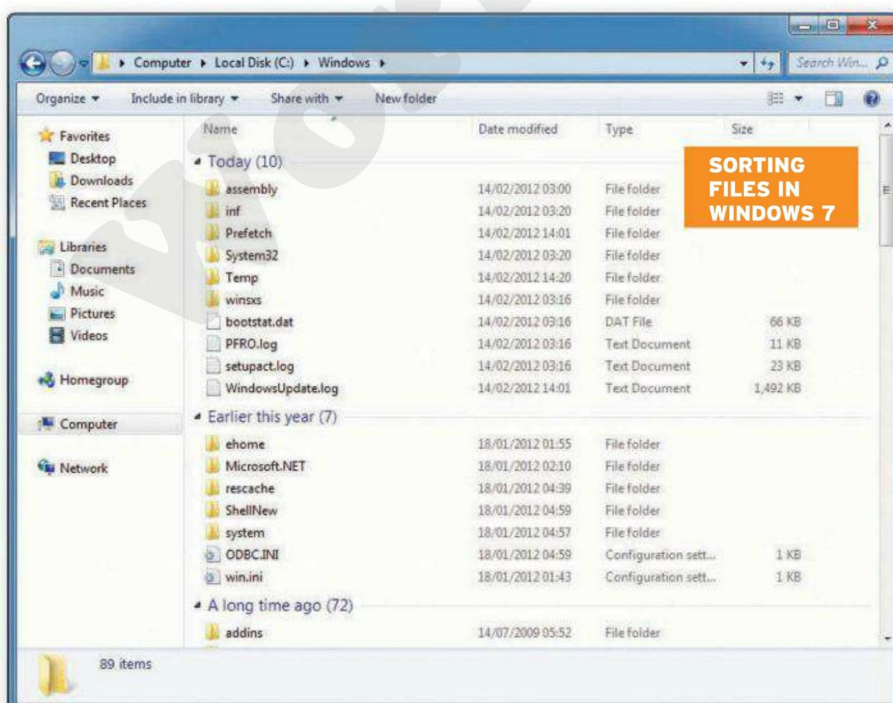
We don't know how old your Dell laptop is, but Inspiron models including the 1100, 1150, 5100 and 5150 may suffer from a known design fault that could cause the sort of symptoms you describe.

SORTING FILES IN WINDOWS 7

Q How can I stop Windows 7 filing new files alphabetically? XP showed new imports at the top of the list, enabling me to quickly and easily find them for sorting. I'm now finding myself losing all sorts of things because I can't remember their file names. *gftreeton*

Windows 7 offers more sophisticated ways of displaying your files than Windows XP, but the way you select them is slightly different.

In XP, you would either right-click in an Explorer window or go to its View menu and select 'Arrange Icons by', then choose Name,





Size, Type or Modified. The latter option gave the arrangement you describe.

In Windows 7, you can right-click in an Explorer window and choose 'Sort by'. The existing view options remain, along with two more: ascending and descending order.

The File, Edit, View is also available in Windows 7, but it's hidden by default. Press the left Alt key to display it.

Windows 7 also adds a new option called 'Group by'. You can group files together according to how long ago they were accessed. You can also combine 'Sort by' and 'Group by'. For example, you could group your files by age, and within each group sort them alphabetically.

PC WON'T CONNECT TO WI-FI

Q My father's elderly desktop PC detects the signal from our BT HomeHub, but won't connect to it. Our netbook, three laptops and a printer all connect without problems. The desktop PC will connect only when sat directly

next to the HomeHub. Is there any way to check whether this is due to an outdated wireless card? *Anon*

If the PC is connecting when it's next to the Home Hub, but won't when it's further away, it's almost certainly a signal-strength issue. We don't know what kind of wireless card is installed in the computer, but often such cards have one or more antennae protruding at the rear. Ensure that these antennae are well exposed to ensure the best wireless signal.

It's worth putting one of your laptops in the desktop PC's usual location and checking whether it reports a similarly low signal strength in that room.

If any of your laptops are using an external USB wireless adaptor, try connecting it to the desktop PC to see whether a connection is possible. If you don't already have one, purchasing an external USB adaptor for the PC should solve your problem. Look for one that comes with a USB extension cable, allowing you to place it in a more prominent position on the desk, rather than obscured by the bulk of the machine.

If the wireless card fitted inside the PC is an old or budget model, it might not be able to support the latest wireless standards available from the HomeHub. If it's a recent model supporting the 802.11n standard, buy a wireless adaptor that also supports this standard to ensure the best signal range and data speeds. ☒

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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Backing up your data



We can't stress enough the importance of backing up. Sandra Vogel looks at CrashPlan, a cloud-based service that'll protect your data in any eventuality



No matter how often we bang on about it, there will always be some people who neglect to back up their valuable data. But it's an important task, so we'll repeat our advice: fail to back up, and you'll risk losing everything stored on your PC.

You might think your daily computing activities are relatively 'safe', and have perhaps never even had a virus on your machine; you may believe it will never happen to you. But data loss is often caused by events outside of your control.

Your PC could be stolen, for example, or suffer fire damage. A simple power surge could take it to an early grave. Hard-drive failure is another what if, and data recovery won't always be possible.

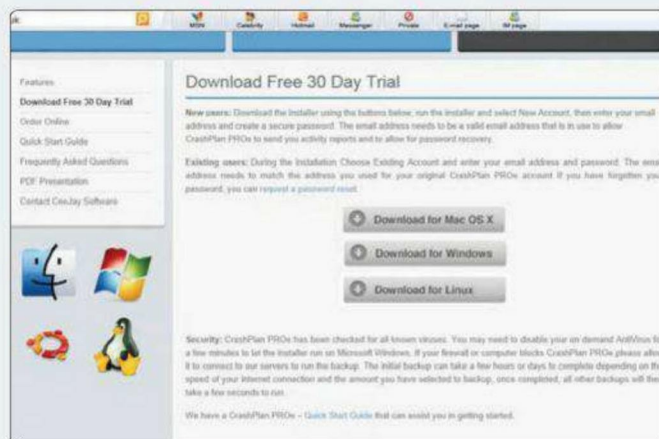
Whether your computer is primarily used for work or leisure, the results of data loss can be catastrophic.

Don't keep putting off to another day the proper safeguarding of your data. Scheduling backups to occur automatically requires only a little thought and energy.

If nothing else, you could copy to an external hard drive all your irreplaceable photos and important documents. Although this won't eliminate the potential for local damage or theft, it will rule out data loss in the event of total hard-drive failure. Offsite backup is a better choice.

Over the following pages, we explain how to set up and use CrashPlan, a cloud-based storage service with a cross-platform desktop client. CrashPlan works with Windows, Mac and Linux, while Android, iOS and Windows Phone support is coming later this year. You can download a 30-day free trial from crashplanuk.com.

BACK UP AND RESTORE WITH CRASHPLAN



START

Head to crashplanuk.com to take a look at the options on offer. For the purposes of our workshop, we downloaded the 30-day trial. Click 'Download Free 30 Day Trial', then click the correct link for your operating system. We chose 'Download for Windows'. Opt to save the downloaded file to your machine.



4 A number of configurable settings allow you to ensure CrashPlan is covering your backup needs effectively. Click Settings, then choose the General tab. From here you can specify when CrashPlan runs its backup duties; you can also give your PC a meaningful name - useful if you have more than one machine.

BEST BACKUP SOFTWARE

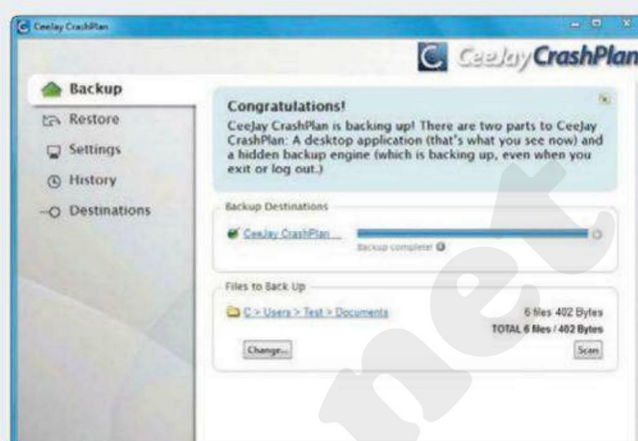
The key to a good backup system is that it's efficient, reliable, secure and transparent. These characteristics can be distilled into a few must-have features for any system.

First, it must function effectively without user intervention. CrashPlan's status emails offer reassurance that it's working as it should, without you needing to log into the service and keep tabs on it. It also offers detailed logs of its activity. Security comes in the shape of data encryption and password-controlled access.

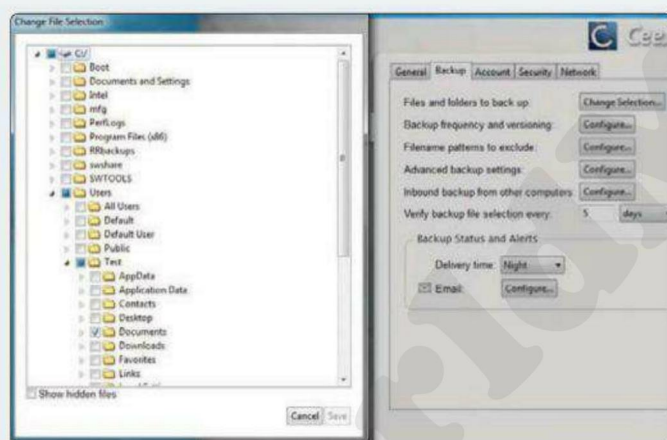
A web interface that lets you tweak backup settings from afar is also useful, particularly so if you're the kind of person who oversees



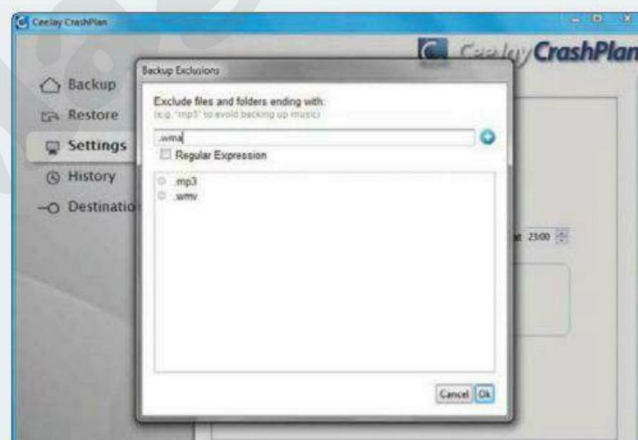
2 Run the setup file and follow the prompts to install and configure CrashPlan. The setup wizard will request that you create an account by entering a username (a valid email address) and a password. Keep a note of your login credentials, since you will need them to access the service.



3 CrashPlan will begin backing up your data as per its default settings following the completion of your account. This can take some time, depending on how much data is installed on your computer. CrashPlan will inform you when the process is complete via its simple, easy-to-navigate interface.



5 Still in the Settings menu, click the Backup tab. Choose 'Change Selection' next to 'Files and folders to back up', then check that CrashPlan is backing up everything it should. You may need to double-check where applications store their data to ensure that the selections you make here are spot-on.

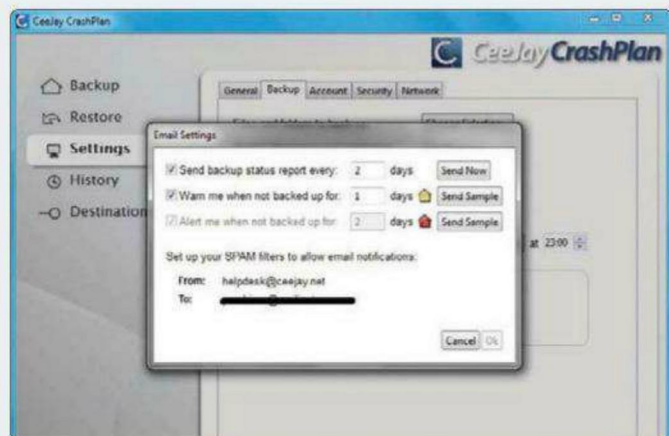


6 You can exclude certain file types to save time and space. For example, backing up your music library is unnecessary if it's already synced with a number of devices. Click Settings, Backup, then choose Configure next to 'Filename patterns to exclude'. Enter here any file extensions CrashPlan can ignore.

the management of several of your less-techy friends' machines. From here you can initiate the restoration process and even order them a new hard drive containing their archived data (if they're using the Pro service - see *CrashPlan in detail*, overleaf).

Support for multiple operating systems is increasingly important as more and more of us are using tablets, smartphones and other mobile devices, or working in cross-platform office environments. A one-size-fits-all approach to backup can also be more efficient and user-friendly than a mix of architectures. A provider which supports multiple OSes today is likely to extend that provision to forthcoming systems in the future.





7 CrashPlan offers additional peace of mind by sending out regular backup status notifications via email. To configure how frequently this information lands in your inbox, click Settings, Backup, then choose Configure next to 'Backup Status and Alerts'. Alternatively, you can switch off this feature in the same dialog box.



8 If you choose to accept CrashPlan's email notifications, it will send out clear and concise, at-a-glance updates of your backup status. Given that CrashPlan will also notify you of any issues it encounters, you shouldn't find yourself routinely needing to log into the service to check everything is okay.



11 CrashPlan affords you control over where your archived data is stored. Click Destinations, then ensure you're looking at the Overview tab. Select one of the three options offered: Computers, to back up to another computer; Folders, to back up to an attached drive; and Online, to back up to CrashPlan's online servers.



12 Backing up to another computer might be useful if you have business templates and the like that must be kept up to date on more than one machine. Note that you'll need to install CrashPlan on any PC that is to be used as a backup location. To back up to an external drive, simply specify its location on the Folders tab.

CRASHPLAN IN DETAIL

A free CrashPlan account offers up to 3TB of online storage space for your archived data; those needing more should subscribe to one of its paid-for options. Your data is stored on servers in the UK, and protected with 448bit Blowfish encryption. Should a backup be interrupted, CrashPlan will simply pick up where it left off when web access is restored.

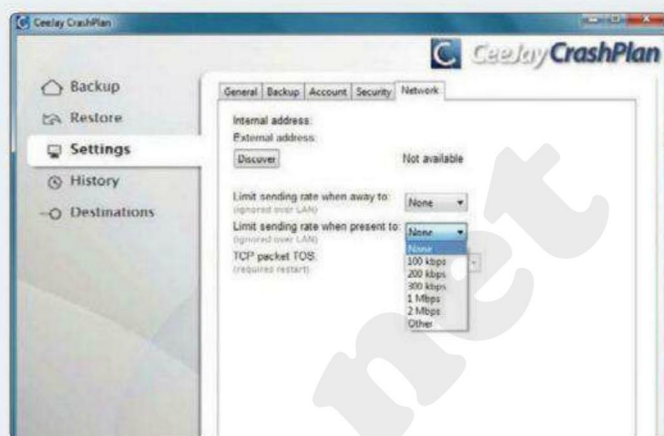
As well as backing up the data stored on your internal hard drives, CrashPlan can also back up external drives attached to

your machine. Your archived data can optionally be stored on another machine or a local NAS drive, and you can even specify where specific file types or folders are archived.

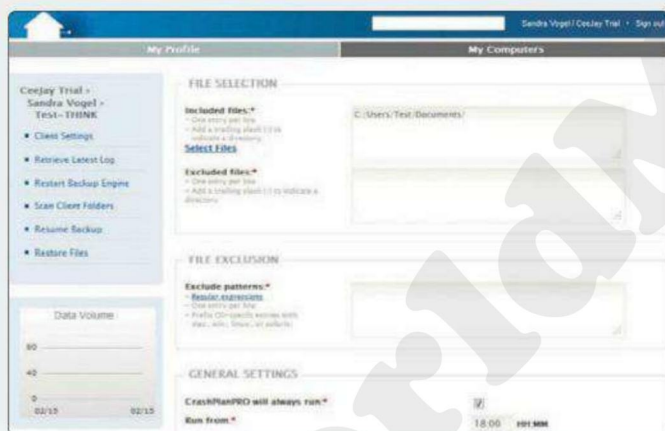
Subscribers to the Professional service (£15 per month) are able to request that their data is forwarded to them on a hard drive, and usually on the next working day. That's not bad, since it can take around 10 hours to write 3TB of data to disk. The Standard service costs £5 per month.



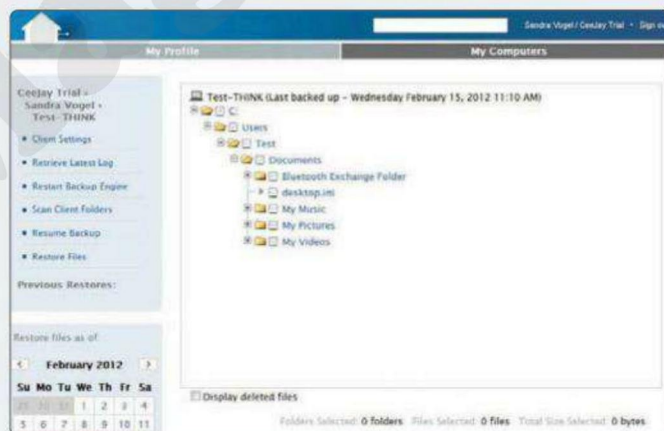
9 Access to CrashPlan's desktop client can be password-protected, which will prevent other users from accidentally messing up your backup schedule. Click Settings and choose the Security tab. From here you can also choose to encrypt your archived data using a dedicated password or your account login.



10 Unless you're lucky enough to have access to super-fast internet, you may find CrashPlan's use of your web connection is affecting your browsing experience. Click Settings and choose the Network tab. Specify the sending rate for when you are present or away from the machine using the adjacent drop-down menus.



13 If you have more than one computer registered to use CrashPlan's backup service, you can access information on them and configure their settings using the online dashboard. Any changes you make here are reflected on the computer itself, so there's full two-way transparency.



14 The online dashboard also lets you trigger the restore process. You can choose specific files and folders to restore, and which date you wish to go back to. Since this process works remotely, CrashPlan can also be a useful backup service for any less tech-savvy friends or family members whose PCs you maintain. ☒



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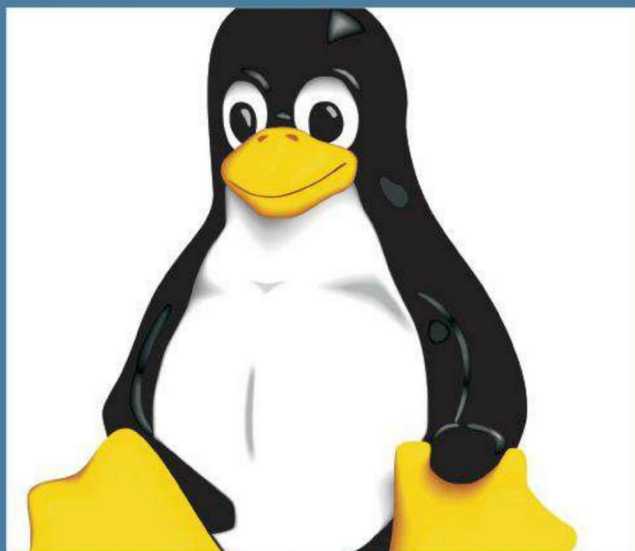
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PLUS: Get one issue free when you download the app!

tinyurl.com/pcaipad

Delve into Linux



Boot a Linux operating system from a USB stick and try your hand with a free Windows alternative. Mike Bedford shows you how



If you've ever wondered what a Linux OS is like, but have been put off by complex installation procedures, we've got news for you: it's not difficult.

Running Linux as your only OS will require either ditching Windows or installing it on a second machine or hard drive. Of course, if you need Windows to run some of your software, or are reassured by its familiarity, this won't be the best option. A better solution might be to set up Linux on a second partition and dual-boot Windows.

For those taking their first steps into the world of Linux, who aren't sure whether it's for them, using virtualisation software to run the OS within Windows might be a more appropriate solution - but a fast PC is required to enjoy usable performance.

A fourth installation option utilises a USB flash drive, letting you in effect plug in the Linux OS when you wish to use it. This is the method we'll use here, since it has no

impact on your hard disk or system performance.

Linux is available in several flavours; we're using Damn Small Linux (DSL). This slimmed-down OS is quick and simple to install and use, although more sophisticated variants are available, such as Ubuntu (ubuntu.com).

Here, we'll describe how to create a bootable system on a USB flash drive and configure a PC to boot from it. We'll then take a tour of Linux. Treat this as a preview of what's on offer: any files you create will be lost when you shut down the system.

DSL can be configured to permanently save files, but the procedure can be involved and it isn't necessary for the purposes of our tutorial.

Back up any important files on your USB drive before you begin, then download two files: `dsl-4.4.10-embedded.zip` from tinyurl.com/5vcq7, and `Universal-USB-Installer-1.8.7.9.exe`, available from tinyurl.com/y87u7aq.

INSTALL DAMN SMALL LINUX ON A USB FLASH DRIVE



START

Insert your USB flash drive to a PC, then double-click the Universal USB Installer in Windows Explorer to run the file. Select DSL 4.4.10 from the drop-down menu. Although it offers to download the distribution, this didn't work for us (which is why we instructed you to download it manually).



4

Leave the USB flash drive plugged in, then reboot the PC. Enter the Bios (look for an onscreen message before the Windows login loads that tells you what key to press). Find the boot priority menu (naming conventions vary), enable booting from USB devices, and ensure that USB devices appear above the hard disk.

APPLICATION SOFTWARE FOR LINUX

Finding a six-year-old version of Firefox bundled with DSL might have given you the impression that Linux software lags behind products available for Windows. Generally speaking, this isn't the case; we suspect that the developer chose to include this older version of the web browser to minimise the size of its distribution. Indeed, the latest version of Firefox for Linux is just as current as that available for Windows.

If this journey of discovery has persuaded you to dual-boot Linux with Windows, you'll be able to download and install much of the same software that you use under Windows.



2 You may find that the location of your DSL distribution file is already filled in; if it isn't, click Browse and manually select the file. Next, select the drive letter your computer has assigned to your USB flash drive (you can check this information in Windows Explorer, Computer if you aren't sure).



3 A warning screen notifies you that DSL will be installed on your USB flash drive, and that any existing data will be overwritten. Double-check that you selected the correct drive letter in the previous step before clicking Yes, since it's all too easy to accidentally wipe the contents of your hard drive.



5 Exit the Bios, electing to save the changes you've made. Your computer should restart, then boot into DSL rather than Windows. If it continues to boot into Windows, track back to Step 4 and try altering the settings to persuade the PC to boot from the USB drive instead of the hard disk.



6 DSL won't necessarily include drivers for all your hardware and peripherals. It's a good idea to plug in a wired keyboard and mouse before you boot into the OS. Similarly, to avoid potential driver issues with Wi-Fi adaptors, you should use a wired connection to your access point.

No-one expects to pay for a web browser but, unlike with other operating systems, you shouldn't expect to pay for other Linux software either. Applications developed for Linux are mostly free and many are open source.

Linux software goes well beyond the OS' traditional emphasis on scientific and technical computing, and includes all the productivity-type applications common to Windows. We mentioned some of those bundled with DSL in our walkthrough, and in particular LibreOffice. This well-respected office suite is free to download from libreoffice.org, where it's also available for Windows.

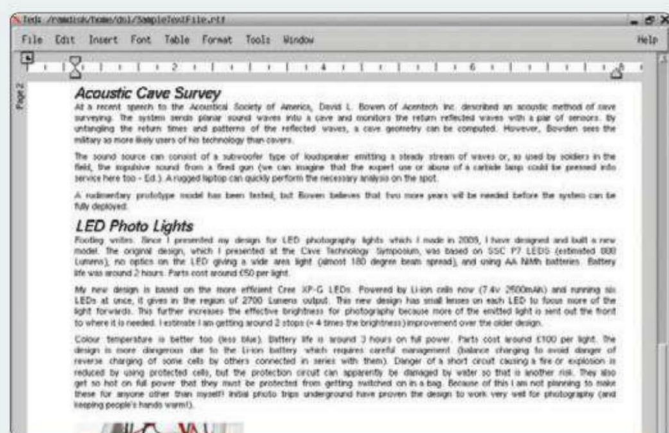




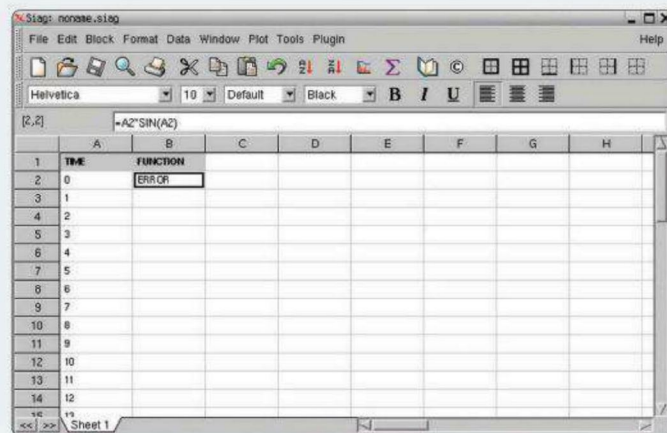
7 On first launch, a window entitled 'Dillo: Getting Started with DSL' will pop up. Dillo is a small and fast web browser. It's an ideal accompaniment for DSL, and the file displayed onscreen is simply a getting started guide. If you're a habitual reader of manuals then feel free to peruse it, otherwise join us on our quick tour of DSL.



8 Given that Dillo doesn't support the enhanced content found on many modern websites, it's useful to have an alternative browser option. Firefox is included in the distribution and, although it's a rather old version, it's better than Dillo. Click on its icon in the taskbar and get a feel for web browsing DSL-style.



11 DSL includes some basic office productivity applications. To launch its word processor, click DSL, Apps, Office, Ted Word Processing. Ted uses the RTF file format. The easiest way to try it out is to email yourself a sample file while running Windows, then pick it up in DSL using Firefox.



12 You'll find Siag Spreadsheet in the same menu. Siag has a remarkably similar interface to Microsoft Excel, but first appearances can be deceptive: those familiar with Excel won't find Siag intuitive in use. More suitable alternatives include LibreOffice, which also includes a word processor and spreadsheet tool.

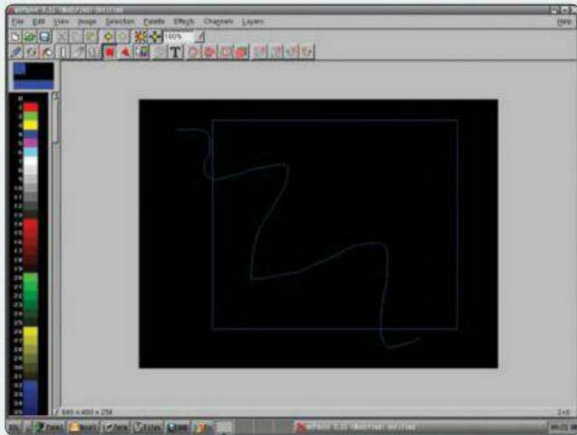
THE VIRTUALISATION OPTION

In our introduction, we mentioned that it's possible to run Linux within Windows using virtualisation software. Such programs emulate a PC's hardware and allow you to install software within the virtual PC they create. Because the software doesn't interface directly to real hardware, it represents a risk-free approach to installing Linux on your Windows computer.

One of the most popular virtualisation applications available is VMware. The full product is expensive, but you can download the

free VMware Player from tinyurl.com/3fyr8qv. Install the software, and you'll quickly find there are plenty of virtual appliances that you can download and try out. For legal reasons, however, you're limited to free operating systems such as Linux.

Head to tinyurl.com/57y43j to get a virtual version of DSL. Note that this download is a tiny BitTorrent file; in order to download the associated DSL distribution you may need to visit bittorrent.com and download and install the BitTorrent application.



9 Click the DSL button at the bottom left of the screen. This is similar to the Windows Start button. Click Apps, Graphics, mtPaint in the context menu. mtPaint is very much like Windows' Paint; try your hand at creating a work of art, then use the File, Save menu to store your painting in the default folder.



10 To later find the file you created, click the Files icon in the taskbar to open emelfm. This file manager is noticeably lacking in the graphics department when compared to Windows Explorer, but its directory structure is simple to navigate. You'll find your painting in /ramdisk/home/dsl.



13 This lightweight Linux distribution also includes some games. As with the games that are bundled with Windows, it's mostly primitive stuff. Click DSL, Games to take a look at the games on offer. Our screenshot above depicts The Ace of Penguins Freecell and Minesweeper, although there are 12 games to choose between.



14 Click on the Panel icon in the taskbar to launch DSL's Control Panel. This isn't nearly as extensive as Windows' same-name configuration utility, but it does let you set preferences for various system attributes, such as the keyboard layout and desktop background. You can also view system statistics. ☒

PORTABLE APPS

If you like the idea of carrying around your OS on a USB flash drive, Portableapps.com offers many more take-anywhere software programs. It's a great source of downloadable software that you can use on an ad-hoc basis.

If you 'hot-desk' at various PCs, being able to take your choice of word processor, media manager, web browser and other useful items with you is a boon. Your preferences are preserved, and the PortableApps software has a built-in backup tool. Since you leave no



trace of having been on the host machine, you're not inconveniencing the PC's owner by changing their setup, and there's no web history or other security issues either.

Rosemary Hattersley

Cooking up a storm



Domestic goddess Carrie-Ann Skinner is well known at PCA Towers for her culinary prowess. Here, she explains how to get your recipes in order



Whether you're just discovering the pleasures of cooking or are an established domestic god or goddess, you've probably plenty of recipes scattered about your kitchen. A few years ago, these would likely take the form of scraps of paper torn out of magazines and newspapers; these days, your recipes are more likely to be printed out from the web.

Over the years, I've accumulated reams of them. At first, I inserted them into plastic sleeves and stored them in a ring binder. But as the pile mounted up, good intentions fell by the wayside; now my kitchen has printouts littering every surface.

Thankfully, dedicated websites now let you print recipe books, making it a simple matter to save details of the best dishes and have them to hand when next you need meal inspiration.

Photobox, Blurb and Lulu are examples of such sites, and each lets you publish your own text and images in a book. Photobox even has a dedicated cookbook template, complete with stock images of ingredients - useful if you're not one for taking snaps of your culinary masterpieces.

A high-tech alternative is to take your tablet PC into the kitchen with you, launch your web browser and load up the web page containing the recipe you plan to make. You'll still need to flip between sites if you're making more than one dish, though.

Overleaf, we look at how to use ChefTap for Android, one of several mobile apps that let you collate various recipes found on the web in one central location. This makes your cooking instructions easily accessible, and your time in the kitchen far less stressful.

CREATE A COOKBOOK USING PHOTOBX



START

Head to Photobox.co.uk. Sign up for a free account if you'd like to be able to save and come back to your work later. To do so, simply click Join Free and enter your details. Click the Books tab and choose Cookbook from the drop-down menu. Select 'Create yours now' in the following window.



4 Place your images by dragging-and-dropping them into the appropriate boxes (you'll see the text 'Place photo here'). Click on a photo to zoom in and out, perform basic edits, and to check whether its resolution is sufficient for printing at this size - a green smiley face lets you know all is well.

APPLE IBOOKS AUTHOR

Apple's iBooks Author lets you create an e-book for reading on an iPad. We've also looked at an Android-specific app overleaf. The iPhone and iPod touch are currently not supported. It's an ideal medium for creating a tablet-friendly cookbook.

iBooks Author has a what-you-see-is-what-you-get (WYSIWYG) user interface, similar to that of Apple's iWork product line, and features a range of customisable templates. You can drop in text directly from Pages or Microsoft Word documents, where live alignment guides automatically flow the copy around your images. Support for multitouch widgets lets you experiment with adding



2 Select the type of cookbook you want to create from the menu on the left; we chose a Modern design, which starts at £32 plus £3.99 P+P for 26 pages. Click Create Now to render your cookbook onscreen. You can browse through its pages using the forward and backward buttons at either side of the window.



3 Upload the images you'd like to include in your cookbook. Click 'Upload and organise photos', then choose Browse to locate them on your PC. Once uploaded, images will be displayed in My albums at the bottom of the screen. Photobox also offers a selection of royalty-free stock images in the Images library.



5 Click in each text box to add a title, ingredients list and cooking instructions. Use the drop-down menus below the text-entry field to change its font, size, colour and justification. You can also use the Layouts and Backgrounds tabs to adjust the page design and add logos and background images. Click Save when you're happy.



6 If any of your images are of insufficient quality for printing, a warning triangle will appear at the top right; click this to find and resolve any problems. You can then click the Order button. Photobox lets you specify paper stock, finishing and packaging requirements before entering your payment details. [X]

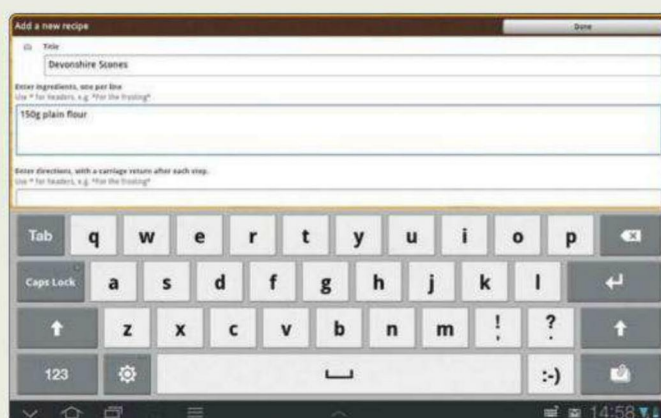
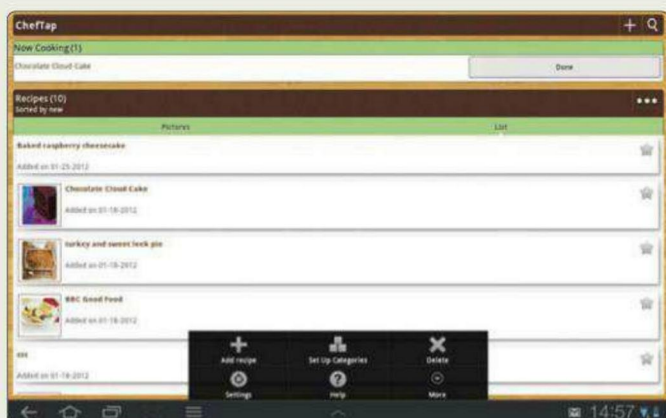
interactive photo galleries, movies, Keynote presentations and 3D objects; you can even add a glossary.

The app is currently available only from the Mac App Store, and you'll need a machine running OS X 10.7.2 or later to use it. A useful Preview mode allows you to view the e-book as it's made on an iPad connected to your Mac.

Like most other e-publishing solutions, iBooks Author can cause headaches if you want to edit an e-book you made earlier. Once exported as an ePub file, you can't edit the e-book in iBooks Author. The software supports Apple's proprietary .iba format only.



DOWNLOAD RECIPES WITH CHEFTAP FOR ANDROID

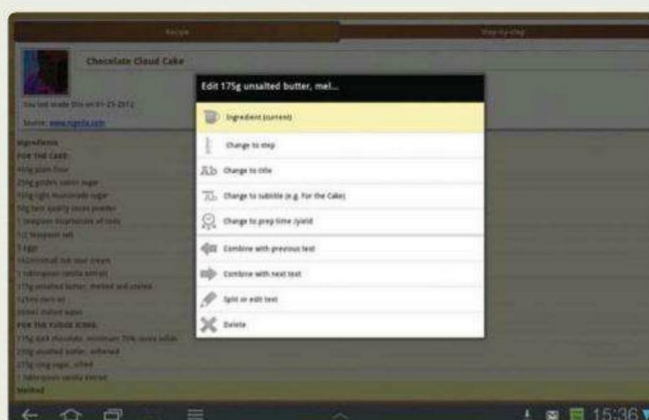
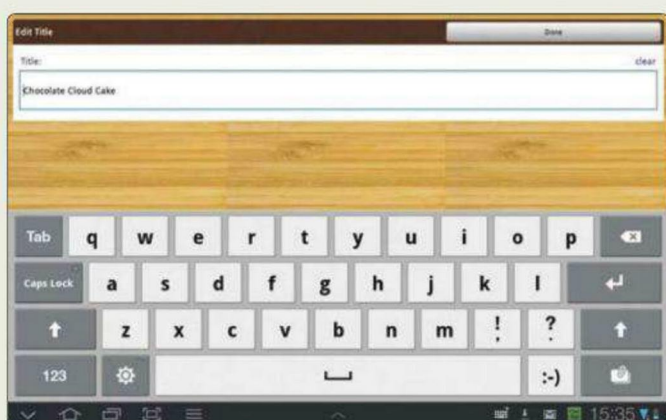


START

Download and launch the free ChefTap app from Google Play. ChefTap offers five recipes to start you off; you can import more using a number of methods. If you're a member of Allrecipes or Epicurious, you can sync your saved recipes by tapping Options, Add Recipe, 'Sync recipe box'.

2

You can also manually copy and paste or type in recipes. Tap Options, Add Recipe, 'Type or paste manually'. Enter a title for your recipe, the necessary ingredients (ChefTap recommends one per line), and the cooking instructions (with a carriage return after each step). Add an image by tapping the camera icon.



5

It's easy enough to edit any recipes you've imported into ChefTap if you find they aren't displaying correctly. Tap the recipe to open it, then tap on the text you want to change. For the title, for example, you can select a new title from those it suggests or type in your own. Tap Done to save your changes.

6

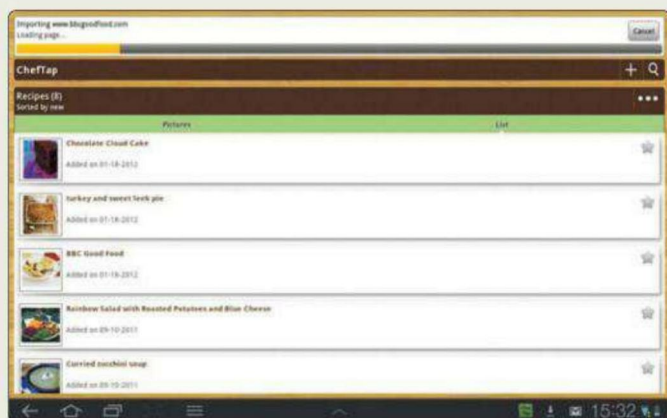
As with the title, you can change the ingredients list and method by tapping on the text and selecting one of the options offered by ChefTap. To replace the recipe's image, tap 'Add a picture'. You can take a photo using the camera built into your Android device, import one from the Gallery, or point to one online.

ALTERNATIVE BOOK PUBLISHING SERVICES

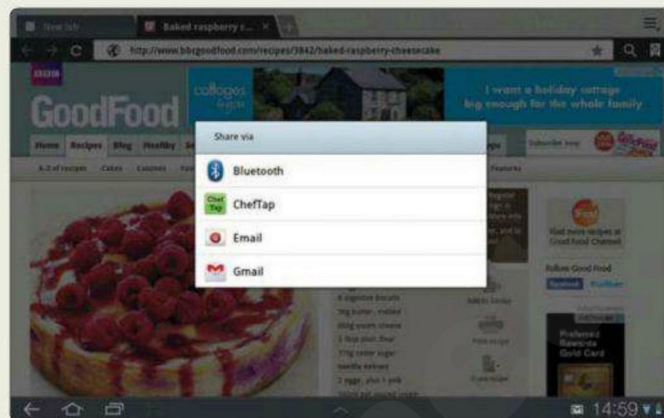
Photobox isn't the only online book-printing service you can use to combine your favourite recipes into a cookbook. Blurb.com offers a free Booksmart desktop application that you can use to work on your creations offline. You can choose a template, specify the pagination, then simply import your own text and pictures. With Blurb, you can even sell your photobooks to other members of the site or turn them into e-books for reading on iPhones and iPads. Prices start at £2.95.

Lulu is a similar service, and was designed to help anyone publish and sell their own books through online and high-street retailers. It also offers cookbook templates, among others. Lulu's pricing starts at £7.25.

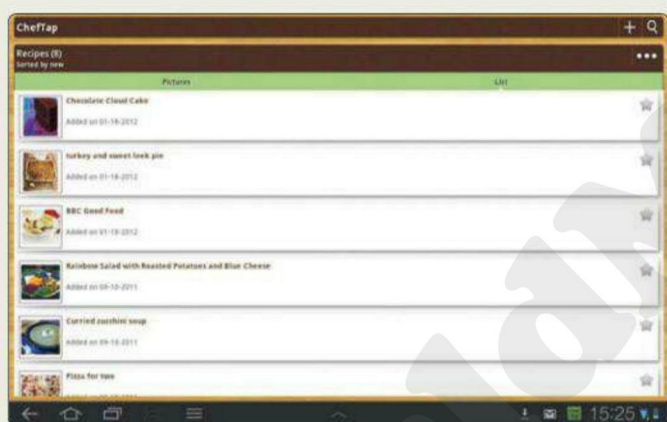




- 3** Alternatively, you can import recipes from the internet. The simplest method is to tap Options, Add Recipe, 'Enter a URL to import'. Next, enter the web address for the recipe you wish to add, then tap Ok. A message in Android's Notifications bar confirms that the recipe is being imported.



- 4** If you have recipes stored as bookmarks in Android's native browser, tap Options, Add Recipe, 'Search bookmarks for recipes', and ChefTap will add them to your collection. And if you later come across recipes you like while browsing the web, simply select Options, Share Page, ChefTap to add them to your library.



- 7** Once you've imported your recipes, ChefTap offers two view modes, accessible under its Pictures and List tabs. In Pictures mode, tapping a large image of a particular dish expands the recipe in the main window. You can also use the magnifying glass icon in the top-right corner to search for a specific recipe.



- 8** With a recipe open, click the Step-by-step tab to list the ingredients and cooking instructions side by side (you'll need to have your device in landscape mode). Use the arrows to cycle through each step. If you're cooking multiple recipes, clicking the Back key will store the recipe in the Now cooking menu.



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East-Tec Eraser 2012 FULL PROGRAM

ONLINE
REGISTRATION
REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 203\ East-Tec Eraser 2012 and open the install file

Online registration required: head to tinyurl.com/7yLbvoj

System requirements

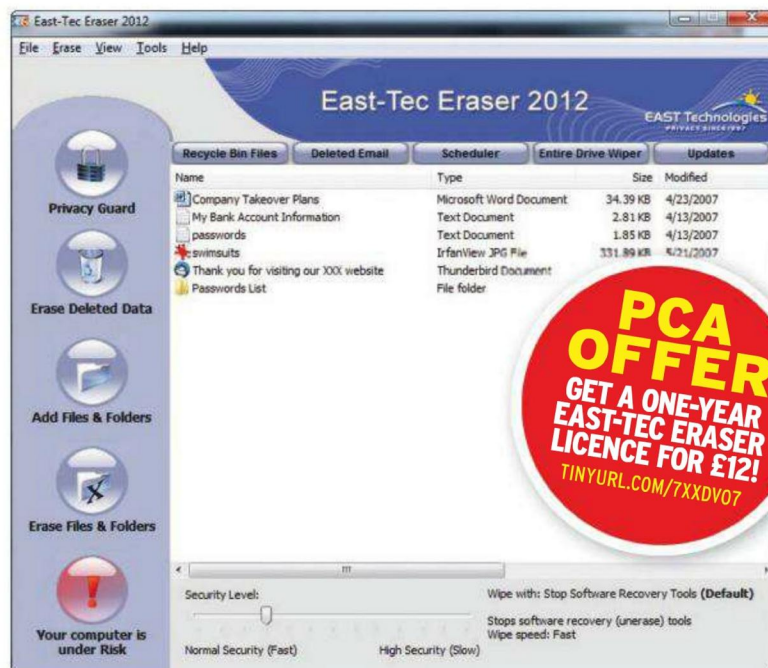
300MHz processor;
Windows 98/2000/XP/
Vista/7; 128MB RAM;
10MB hard-disk space

Protect your data and privacy and remove all evidence of your activity.

East-Tec Eraser meets and exceeds government- and industry standards for the permanent erasure of digital information. It removes every trace of sensitive data from your computer - including Internet history, web pages, pictures, cookies, conversations, confidential documents and emails - as well as your external drives, floppy disks, CDs, DVDs and USB flash drives.

Features

- Destroys evidence of online activity and sensitive data
- Supports all popular web browsers and programs
- Securely erases CDs, DVDs, hard drives and USB flash drives



Abelssoft CleverPrint 2012 FULL PROGRAM

ONLINE
REGISTRATION
REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 203\ Abelssoft CleverPrint 2012 and open the install file

Online registration required: follow the links during installation

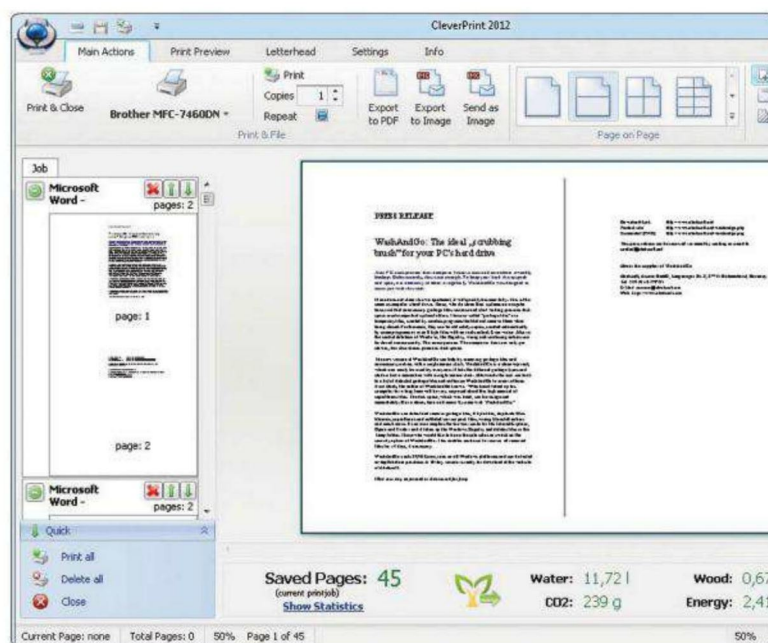
System requirements

Windows XP/Vista/7;
512MB RAM; 1024x768
screen resolution;
web connection

By allowing you to print more effectively, CleverPrint 2012 aims to reduce your printing costs by up to 50 percent. It lets you combine multiple pages on a single sheet, and exclude pages from a print job after previewing the output. You can also print to PNG, Jpeg and PDF, and automatically add a watermark or company letterhead.

Features

- Combine pages and print jobs
- Preview and cancel print jobs
- Add letterheads and watermarks
- Save print jobs for later use
- Discover how much CO2, water, wood and energy you've saved



The Cover disc is free with print issues
of **PC Advisor** magazine, available in all
good newsagents

Ashampoo WinOptimizer 2012

FULL PROGRAM

**ONLINE
REGISTRATION
REQUIRED**

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 203\Ashampoo WinOptimizer 2012 and open the install file

Online registration

required: follow the links during installation

System requirements

Windows XP/Vista/7;
60MB hard-disk space

Ashampoo WinOptimizer 2012 is a simple and intuitive PC maintenance utility, with each of its modules adopting a similar layout for the ultimate in usability. All the information you need is displayed in the main dialog for each function.

Features

- System maintenance
- One-click optimisation
- Drive Cleaner finds and deletes unnecessary files
- Registry Optimizer finds and fixes faulty/redundant Registry entries
- Internet Cleaner removes all traces of your online activity
- Defrag 3 defrags your hard drive ☒



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1-abc.net Backup 4.0 FULL PROGRAM

**ONLINE
REGISTRATION
REQUIRED**

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 203\1-abc.net Backup 4.0 and open the install file

Online registration required: follow the links during installation

System requirements
Windows XP/Vista/7

Backup 4.0 lets you select files and folders to back up, then schedule full or incremental backups to occur at a time that suits you. You can even take yourself out of the equation, and set the program to start when Windows loads.

Features

- Back up single files or folders
- Reads and writes to SD cards, USB sticks and external drives
- Backups can be saved to FTP
- Schedule full and incremental backups at a time to suit



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 203\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

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Gaming PCs



Family PCs



Business PCs



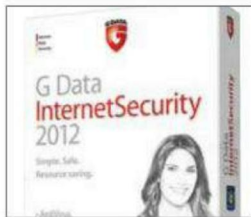
Media PCs



Netbooks



Laptops



Security software



Tablet PCs



Projectors



Blu-ray drives



Wireless routers



Smartphones



Digital cameras



Graphics cards



Flat-panel displays

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Gaming PCs	 1	 2	 3	 4	 5
	Chillblast Fusion Talisman	Quiet PC Serenity Z68 Gamer Xtreme	PC Specialist EnForcer-X	CyberPower Cobra	Yoyotech Warbird Dark Iron CS
Price	£1,299 inc VAT	£1,550 inc VAT	£1,379 inc VAT	£1,999 inc VAT	£979 inc VAT
Website	Chillblast.com	Quietpc.com	Pcspecialist.co.uk	Cyberpowersystem.co.uk	Yoyotech.co.uk
Build rating	★★★★☆	★★★★★	★★★★★	★★★★★	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★☆
Value rating	★★★★★	★★★★★	★★★★★	★★★★☆	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.3GHz (4.9GHz) Intel Core i5-2500K	3.3GHz (4.7GHz) Intel Core i5-2500K	3.3GHz (4.6GHz) Intel Core i5-2500K	3.4GHz (4.6GHz) Intel Core i7-2600K	3.3GHz (4.6GHz) Intel Core i5-2500K
CPU cooler	Thermolab Trinity	Zalman CNPS20LQ	Titan Fenrir	Advanced water cooling	Enermax ETS-T40 Cooler
Memory	8GB DDR3	8GB DDR3	16GB DDR3	16GB DDR3	8GB DDR3
Storage	30GB SSD + 1TB 3.5in HDD	60GB SSD + 1TB 3.5in HDD	80GB SSD + 1TB 3.5in HDD	128GB SSD + 1TB 3.5in HDD	60GB SSD + 500MB 3.5in HDD
Power supply	700W OCZ StealthXtreme	630W Nexus	650W Corsair TX650	Not specified	500W
Motherboard	Asus P8Z68-V	Gigabyte GA-Z68X-UD3H-B3	Asus P8Z68-V/GEN3	Asus P8Z68-V	Asus P8Z68-M Pro
USB	2x USB 3.0, 8x USB 2.0	3x USB 3.0, 7x USB 2.0	4x USB 3.0, 8x USB 2.0	2x USB 3.0, 8x USB 2.0	2x USB 3.0, 14x USB 2.0
Screen	24in Asus VS247H (1920x1080)	Not supplied	24in Iiyama E2473HDS (1920x1080)	24in AOC E2436VWA (1920x1080)	24in ViewSonic VA2448-LED (1920x1080)
Graphics	3GB Asus Radeon HD 7970	3GB Sapphire HD 7970	1.25GB Palit GeForce GTX 570	3GB Powercolor HD 7970	1GB Asus GeForce GTX 560 Ti
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Connectivity	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet, Bluetooth	Gigabit ethernet, Bluetooth	Gigabit ethernet
VGA	x	✓	✓	x	✓
DVI	✓	✓	✓	x	✓
HDMI	✓	✓	✓	✓	x
DisplayPort	✓	✓	x	x	x
FireWire	x	✓	✓	x	x
eSATA	✓	✓	x	✓	✓
Case	Cooler Master Elite 430	AeroCool X-Predator Evil	Cooler Master Storm Enforcer	Cooler Master 690 II	Fractal Design Arc
Keyboard & mouse	Trust GXT 18 keyboard, Chillblast mouse	Not supplied	Razer Arcosa, Razer Death Adder ReSpawn	Razer Lycosa, Razer Death Adder	Microsoft Wireless Desktop 800
Optical drive	BD-ROM/DVD±RW	DVD±RW	DVD±RW	BD-R/DVD±RW	DVD±RW
Operating system	Windows 7 Home Premium	Windows 7 Home Premium 64bit	Windows 7 Home Premium	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
Extras	None	Fan-speed control, choice of four case colours	Nero 9.0 Essentials, Logitech H350 USB Headset	MS Office 2010 Starter, soundproofing	BullGuard Internet Security
WorldBench 6 score	203	203	217	217	199
Gaming performance ¹	107/65/59/112fps	103/65/59/110fps	78/47/37/78fps	105/65/58/100fps	67/39/30/66fps
MediaEspresso time	4 mins 27 secs	4 mins 47 secs	4 mins	5 mins 34 secs	4 mins 5 secs
Power Consumption ²	96W/290W	60W/257W	119W/310W	125W/330W	100W/256W
Warranty	2 years collect-and-return	2 years return-to-base	1 year return-to-base	3 years return-to-base (parts)	1 year return-to-base
Verdict	<ul style="list-style-type: none"> Maximum overclocking gives fantastic performance High-quality 24in Asus VS247H monitor Average system case and cooling 8GB of RAM 	<ul style="list-style-type: none"> Superb gaming performance Towering but practical case Extremely quiet No monitor, keyboard or mouse supplied 	<ul style="list-style-type: none"> Very fast WorldBench 6 performance Gaming performance decent, but not great Tidy casing No Blu-ray drive 	<ul style="list-style-type: none"> High price tag Very strong performance in all areas Watercooling setup Keyboard and mouse worth £125 alone 	<ul style="list-style-type: none"> Low price tag Very decent performance for the money The main hard drive is a mere 500GB Many features better suited to general use rather than gaming
FULL REVIEW	TINYURL.COM/88QE2ZG	TINYURL.COM/7PDJ52L	TINYURL.COM/84Q7VYF	TINYURL.COM/827QEY2	TINYURL.COM/7AZTOS8

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

>> Buying advice



Family PCs

Desktop PC prices were correct at press time for issue 202 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

Family PCs	1	2	3	4	5
	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	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
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	x	x	✓	x	✓
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 Power2Go	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	1 year return-to-base	1 year return-to-base	3 years return-to-base (parts)
Verdict	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Generous 8GB DDR3 RAM allocation • Great overall performance • Four USB 3.0 ports • Integrated graphics • Blu-ray playback • Limited warranty • Rather bulky design 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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/7SSRKRN	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.

Business PCs	1	2	3	4	5
	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	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
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	xx	xx	xx	xx	xx
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	x	x	✓	x	x
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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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/BUOSF5V	TINYURL.COM/CF2CGZ5

>> Buying advice



Business PCs






Desktop PC prices were correct at press time for issue 202 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: 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,

Media PCs	1  PC ADVISOR BEST BUY	2  PC ADVISOR RECOMMENDED	3  PC ADVISOR RECOMMENDED	4 	5 
	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	★★★★☆	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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 E35MI-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	1,000W 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	x	x	x
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	x	✓	x	x	x
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	✓	✓	✓	x	x
LCD screen	x	x	x	✓	x
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	✓	x	x	x	x
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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Beautifully compact Great for graphics Mediocre performance No DVD drive Very low power consumption Quiet and elegant Peripherals sold separately 	<ul style="list-style-type: none"> Blu-ray drive included Silent, fanless operation Best multimedia playback of group Dual digital TV tuners Stylish Zalman case Expensive 	<ul style="list-style-type: none"> Proper media-centre controls Passively cooled, fanless design Dual digital TV tuners 2GB storage Upgradable Doubles as hi-fi when PC power off 	<ul style="list-style-type: none"> 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/88GUG5H	TINYURL.COM/7S2ZWXD	TINYURL.COM/30PHWHD	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.

Netbooks	1	2	3	4	5
	Samsung NC110	Kogan Agora Pro	Samsung NS310	Acer Aspire One Happy 2	Dell Latitude 2120 Advanced
Price	£270 inc VAT	£280 inc VAT	£312 inc VAT	£250 inc VAT	£598 inc VAT
Website	Samsung.com/uk	Kogan.co.uk	Samsung.com/uk	Acer.co.uk	Dell.co.uk
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	1.5GHz Intel Atom N550	1.3GHz Intel Pentium SU2700	1.5GHz Intel Atom N550	1.66GHz Intel Atom N570	1.5GHz Intel Atom N550
RAM	1GB DDR2	2GB DDR2	1GB DDR3	1GB DDR3	2GB DDR3
Storage	250GB hard drive	500GB hard drive	250GB hard drive	250GB hard drive	320GB hard drive
Screen size	10.1in	11.6in	10.1in	10.1in	10.1in
Screen resolution	1024x600 pixels	1366x768 pixels	1024x600 pixels	1024x600 pixels	1366x768 pixels
Graphics	Intel GMA 3150	Intel GS40	Intel GMA 3150	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	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	x	x	x	x	x
HDMI	x	✓	x	x	x
DVI	x	x	x	x	x
VGA	✓	✓	✓	✓	✓
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Windows 7 Starter 32bit	Ubuntu Linux 11.04	Windows 7 Starter 32bit	Windows 7 Starter 32bit	Windows 7 Pro 32bit
Bundled software	None	None	None	None	Microsoft Office Starter 2010
Fear (Max detail)	Not tested	Not tested	Not tested	Not tested	Not tested
Battery	48Wh lithium-ion	31Wh lithium-ion	Three-cell lithium-ion	42Wh lithium-ion	56Wh lithium-ion
Battery life	7 hrs 52 mins	2 hrs 22 mins	3 hrs 41 mins	Not tested	6 hrs 24 mins
WorldBench 6 score	36	N/A ¹	37	32	33
Dimensions	259x180x28mm	290x195x26mm	275x188x31mm	259x185x24mm	265x187x23mm
Weight	1.2kg	1.3kg	1.1kg	1.3kg	1.3kg
Warranty	1 year return-to-base	1 year collect-and-return	1 year return-to-base	1 year international	1 year collect-and-return
Verdict	<ul style="list-style-type: none"> Attractive styling Excellent battery life Only DDR2 RAM Non-reflective 10in screen 	<ul style="list-style-type: none"> Above average screen size 2GB RAM Runs Ubuntu not Windows Battery life very poor Hi-res matt screen 	<ul style="list-style-type: none"> 1GB DDR3 RAM Only 250GB hard drive Glossy screen Low battery life Expensive for the spec 	<ul style="list-style-type: none"> Good overall build quality Glossy screen Adequate performance A little hot in use Difficult to access innards 	<ul style="list-style-type: none"> Business netbook 2GB DDR3 RAM Average performance Windows 7 Professional Solid battery life
FULL REVIEW	TINYURL.COM/7QZAPKM	TINYURL.COM/43MN2OB	TINYURL.COM/444SKTX	TINYURL.COM/7D4ZP3C	TINYURL.COM/7WNFF7T

¹Not 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/yerjwpc). 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.

Sub-£600 laptops	1	2	3	4	5
	Lenovo G570	Samsung RV511	Lenovo IdeaPad S205-1038	Lenovo ThinkPad X121e 3045	MSI CR650
Price	£490 inc VAT	£530 inc VAT	£350 inc VAT	£492 inc VAT	£500 inc VAT
Website	Lenovo.com/uk	Samsung.com/uk	Lenovo.com/uk	Lenovo.com/uk	Uk.msi.com
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	2.1GHz Intel Core i3-2310M	2.53GHz Intel Core i3-380M	1.6GHz AMD E350	1.4GHz Intel Core i3-2367M	1.6GHz AMD E350
RAM	6GB DDR3	6GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3
Storage	640GB hard drive	640GB hard drive	500GB hard drive	320GB hard drive	500GB hard drive
Screen size	15.6in	15.6in	11.6in	11.6in	15.6in
Screen resolution	1366x768 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels
Graphics	AMD Radeon HD 6370M	nVidia GeForce 315M	AMD Radeon HD 6310M	Intel HD Graphics 3000	AMD Radeon HD 6310M
Video memory	1GB	1GB	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	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	4x USB 2.0	3x USB 2.0	3x USB 2.0	1x USB 3.0, 2x USB 2.0	3x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	x	x	x	x	x
HDMI	✓	✓	✓	✓	✓
DVI	x	x	x	x	x
VGA	✓	✓	✓	✓	✓
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	2x BD-ROM, 8x DVD±R, 4x DVD±RW, 8x DVD-ROM	8x DVD±R, 4x DVD±RW, 8x DVD-ROM	N/A	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)	32fps	33fps	18fps	13fps	19fps
Battery	48Wh lithium-ion	48Wh lithium-ion	48Wh lithium-ion	54Wh lithium-ion	48Wh lithium-ion
Battery life	5 hrs 1 min	5 hrs 15 mins	5 hrs 38 mins	6 hrs 15 mins	5 hrs 42 mins
WorldBench 6 score	96	105	53	72	54
Dimensions	377x250x35mm	382x256x34mm	290x168x29mm	289x208x24mm	383x250x38mm
Weight	2.6kg	2.4kg	1.5kg	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	<ul style="list-style-type: none"> • Blu-ray drive • Adequate performance • Can play some games • Capacious hard drive • Heavy 	<ul style="list-style-type: none"> • Good performance in WorldBench 6 • Large hard disk • Light gaming potential • Reflective screen 	<ul style="list-style-type: none"> • Extremely portable • More powerful than a netbook • Glossy screen • Rather slow 	<ul style="list-style-type: none"> • Business portable • Excellent matt screen • No optical drive • Relatively lightweight • Good battery life 	<ul style="list-style-type: none"> • Good sound quality • Comfortable keyboard • Not great for games • Weak processor • Expensive
FULL REVIEW	TINYURL.COM/6FZZ4XE	TINYURL.COM/5TVT8AE	TINYURL.COM/6G5EKQK	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

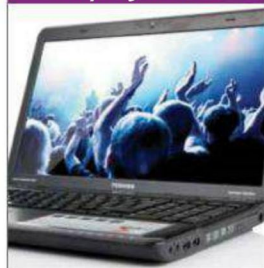
graphics, mean they don't lend themselves to video playback or gameplay. However, most netbook screens are adequate for sending emails, web browsing and word processing.

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.

£601-£1,000 laptops	1	2	3	4	5
	Toshiba Satellite P750	Samsung Series 7 Chronos	Asus U46SV-WX044X	Apple MacBook Air 11in	Acer TravelMate 8481T
Price	£999 inc VAT	£900 inc VAT	£740 inc VAT	£999 inc VAT	£795 inc VAT
Website	Toshiba.co.uk	Samsung.com/uk	Uk.asus.com	Apple.com/uk	acer.co.uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.2GHz Intel Core i7-2670QM	2.2GHz Intel Core i7-2675QM	2.3GHz Intel Core i5-2410M	1.6GHz Intel Core i5-2467M	1.6GHz Intel Core i5-2467M
RAM	8GB DDR3	8GB DDR3	4GB DDR3	4GB DDR3	3GB DDR3
Storage	750GB hard drive	750GB hard drive	640GB hard drive	128GB SSD	320GB hard drive
Screen size	15.6in	15.6in	14.1in	11.6in	14in
Screen resolution	1366x768 pixels	1600x900 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels
Graphics	nVidia GeForce GT 540M	AMD Radeon HD 6750M	nVidia GeForce GT 540M	Intel HD Graphics 3000	Intel HD Graphics 3000
Video memory	2GB	1GB	1GB	N/A	n/a
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11a/b/g/n	802.11b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	100Mbps with USB adaptor	gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 3x USB 2.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0	2x USB 2.0	1x USB 3.0, 2x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	✓	x
DisplayPort	x	x	x	✓	x
HDMI	✓	✓	✓	x	✓
DVI	x	x	x	x	x
VGA	✓	✓	x	x	✓
eSATA	x	x	✓	x	✓
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	headphone jack, mic
Optical drive	6x BD-ROM, 8x DVD±R, 6x DVD-RW, 8x DVD+RW	8x DVD±4, 4x DVD±RW, 5x DVD-RAM, 8x DVD-ROM	8x DVD±4, 4x DVD±RW, 5x DVD-RAM, 8x DVD-ROM	N/A	n/a
Extras	Webcam	Webcam	Webcam	HD webcam, multitouch trackpad, backlit keyboard	webcam
Operating system	Windows 7 Home Prem 64bit	Windows 7 Home Prem 64bit	Windows 7 Pro 64bit	Mac OS X 10.7 Lion	Windows 7 Pro 64bit
Bundled software	None	None	None	iLife 11	none
Fear (Max detail)	54fps	55fps	78fps	17fps	6fps
Battery	48Wh lithium-ion	80Wh lithium-ion	88Wh lithium-ion	35Wh lithium-ion	86.5Wh lithium-ion
Battery life	3 hrs 23 mins	8 hrs 12 mins	10 hrs 1 min	5 hrs 51 mins	11 hrs 1 min
WorldBench 6 score	131	138	114	112	100
Dimensions	381x254x36mm	362x239x24mm	333x245x27mm	300x192x3-17mm	329x240x22mm
Weight	2.6kg	2.4kg	2.1kg	1.07kg	1.78kg
Warranty	1 year carry-in	1 year return-to-base	2 years return-to-base	1 year return-to-base	1 year return-to-base
Verdict	<ul style="list-style-type: none"> • Good speed • 2GB nVidia graphics • Blu-ray playback • Glossy screen • Poor battery life 	<ul style="list-style-type: none"> • Not unlike a cheaper MacBook Pro • Strong performance • Excellent battery life • Bright screen 	<ul style="list-style-type: none"> • Solid business laptop • 10-hour battery life • Sharp, vibrant 14in screen • Great graphics handling 	<ul style="list-style-type: none"> • Template for all Ultrabooks • Very light and compact • Strong performance for size • Great hi-res low-glare screen 	<ul style="list-style-type: none"> • Lightweight business laptop • Comfortable for typing • 11-hour battery life • No optical drive • Very poor for gaming
FULL REVIEW	TINYURL.COM/BUHW64S	TINYURL.COM/7WL99PD	TINYURL.COM/C845T5Y	TINYURL.COM/CCPOANM	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.

£1,001+ laptops	1	2	3	4	5
	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	★★★★★	★★★★☆	★★★★☆	★★★★★	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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	<ul style="list-style-type: none"> • Thunderbolt, DisplayPort • Solid overall performance • 256GB SSD • Exceptional build quality • Lengthy battery life 	<ul style="list-style-type: none"> • Great performance • 2GB AMD Radeon graphics • Incredible gaming machine • Very poor battery life • Wonderful glare-free screen 	<ul style="list-style-type: none"> • 3D gaming laptop • Whopping 8GB RAM • Huge 17in screen • Superb games performance • 2x 500GB hard drives 	<ul style="list-style-type: none"> • Multitouch trackpad • Good battery life • Thunderbolt connectivity • Solid unibody chassis • Quad-core power 	<ul style="list-style-type: none"> • 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/5WTG6WP

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.

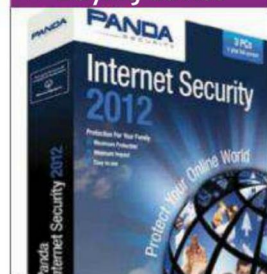
Some laptops feature switchable graphics, using the integrated graphics processor to maintain battery life and the discrete card for maximum performance.

Internet security suites	    				
	G Data IS 2012	Norton IS 2012	Bitdefender IS 2012	Kaspersky IS 2011	Trend Micro Titanium IS 2012
Annual price	£34 inc VAT	£49 inc VAT	£29 inc VAT	£39 inc VAT	£39 inc VAT
Licence terms	1 PC, 1 year	1 PC, 1 year	1 PC, 1 year	1 PC, 1 year	3 PCs, 1 year
Website	gdatasoftware.co.uk	uk.norton.com	bitdefender.co.uk	kaspersky.co.uk	uk.trendmicro.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Signature-based detection	100 percent	99.9 percent	100 percent	99.3 percent	97.5 percent
Malware blocking (full)	100 percent	100 percent	96.2 percent	100 percent	92.3 percent
Malware blocking (partial)	N/A	N/A	0 percent	N/A	3.8 percent
Clean-up of malware	60 percent	50 percent	90 percent	60 percent	70 percent
On-demand scan speed	109 secs	68 secs	116 secs	71 secs	93 secs
On-access scan speed	116 secs	154 secs	265 secs	280 secs	314 secs
Interface design	Good	Very good	Superior	Very good	Very good
Verdict	<ul style="list-style-type: none"> Excellent detection rates Good value Low impact on resources Confusing interface 	<ul style="list-style-type: none"> Good all-rounder Fast scan times Clean interface Flagged some false-positives 	<ul style="list-style-type: none"> Impacts system resources Very strong malware blocking and removal Intuitive interface 	<ul style="list-style-type: none"> Strong block rate Above-average scan times Can affect PC performance Interface needs tweaking 	<ul style="list-style-type: none"> Set-it-and-forget-it security Flagged some false-positives Reasonable scan speeds Ideal for novice users
FULL REVIEW	TINYURL.COM/7CZT5XB	TINYURL.COM/CVVDWUR	TINYURL.COM/75H3WUK	TINYURL.COM/6UEHPMW	TINYURL.COM/7QTBP6

GLOSSARY: • IS: Internet Security • SOS: Small Office Security

Antivirus software	    				
	Norton AntiVirus 2011	Bitdefender Antivirus Pro 2011	G Data AntiVirus 2011	Kaspersky Anti-Virus 2011	Trend Micro Titanium AV+ 2011
Annual price	£39 inc VAT	£24 inc VAT	£34 inc VAT	£39 inc VAT	£39 inc VAT
Licence terms	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year
Website	norton.com	bitdefender.co.uk	gdatasoftware.com	kaspersky.co.uk	uk.trendmicro.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Signature-based detection	98.7 percent	97.5 percent	99.4 percent	95.7 percent	98.4 percent
Malware blocking (full)	96 percent	68 percent	84 percent	88 percent	88 percent
Malware blocking (partial)	0 percent	20 percent	4 percent	4 percent	8 percent
Clean-up of active malware	80 percent	80 percent	80 percent	80 percent	80 percent
On-demand scan speed	121 secs	126 secs	111 secs	103 secs	187 secs
On-access scan speed	272 secs	327 secs	336 secs	310 secs	249 secs
Interface design	Very good	Very good	Very good	Very good	Very good
Verdict	<ul style="list-style-type: none"> Smooth user interface Large 'Fix Now' button Moderate impact on system performance 	<ul style="list-style-type: none"> Very good performance for malware removal Average scan speeds Three interface tiers 	<ul style="list-style-type: none"> Strong malware detection, blocking and removal Good user interface, but poorly translated 	<ul style="list-style-type: none"> Well-designed interface Easy to use On-demand single-file scans Impacts PC performance 	<ul style="list-style-type: none"> Set-it-and-forget-it security Cloud-based protection Requires web connection Good performance
FULL REVIEW	TINYURL.COM/4P5YXCP	TINYURL.COM/66SK77U	TINYURL.COM/6BFXWCS	TINYURL.COM/6HQAZWB	TINYURL.COM/4HUORV3

>> Buying advice



Security software

Every connected PC should have at least antivirus, antispyware and a firewall, and it's important that each is kept up to date. Avoid installing more than one real-time scanning component.

We work with world-renowned independent security testing lab AV-Test.org to evaluate the effectiveness of security software.

No security software is foolproof, but some are significantly better than others. And factors such as ease of setup, scan speeds, interface design and ability to deal with new threats set them apart.

The best products will offer parental controls, cloud protection, anti-phishing, anti-rootkit, virtual web browsers and keyboards, link

and file scanners, gaming modes, online backup and more.

The best value is usually offered by a three-user licence, but you can save some cash if your household has only one PC.

There are some good free antivirus products but, as in life, you get what you pay for.

[READ MORE: TINYURL.COM/7NR8FSM](http://tinyurl.com/7NR8FSM)

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- Intel Core i5 2500K Processor
- ASUS P8H61-M LE/USB3 Motherboard
- Intel GMA HD Video Card
- Inwin Micro ATX Case
- 8GB DDR3 Memory
- Sony 24x DVD-RW Drive
- 500GB Samsung F3 Hard Disk
- 22" AOC DVI Monitor
- Windows 7 Home Premium 64 bit
- 2 year collect and return warranty with lifetime support

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- Samsung Blu Ray / DVD-RW Combo Drive
- Onboard High Definition Audio
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Tablet PCs	 1 PC ADVISOR GOLD	 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	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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/1024x800	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	241x186x8.8mm	257x173x8.7mm	241x174x20-7.6mm	273x180x17mm	241x186x9mm
Weight	597g	559g	588g	960g	612g
Warranty	1 year	1 year	2 years	1 year	1 year
Verdict	<ul style="list-style-type: none"> • Exceptional touchscreen • Beautiful design and build • Best selection of apps • 10-hour battery life 	<ul style="list-style-type: none"> • 1GHz processor • Impressive 10in touchscreen • Plastic construction • 3Mp main camera 	<ul style="list-style-type: none"> • Lightweight design • Scratch-prone chassis • Android Honeycomb 3.2.1 • 16GB memory plus SD card 	<ul style="list-style-type: none"> • 10in IPS touchscreen • Slide-out qwerty keyboard • MyCloud auto backups • Great hybrid tablet/laptop 	<ul style="list-style-type: none"> • Compact design • Surprisingly heavy • Poor viewing angles • Accurate touchscreen input
FULL REVIEW	TINYURL.COM/4XV7Q4K	TINYURL.COM/3LH239C	TINYURL.COM/3TSQKP4	TINYURL.COM/7CKRSCQ	TINYURL.COM/3T2BJQL

¹3G available at additional cost

Projectors	 1 PC ADVISOR GOLD	 2	 3	 4	 5
	InFocus ScreenPlay SP8600	Vivitek Qumi Q2	NEC NP43	BenQ W1000+	ViewSonic PJ073831
Price	£695 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	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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	<ul style="list-style-type: none"> • Smooth video playback • Full-HD resolution • Great contrast levels • Bright, colourful image 	<ul style="list-style-type: none"> • Great value portable model • Lightest model here • DLP-Link enables 3D display • Exceptional lamp life rating 	<ul style="list-style-type: none"> • Portable business model • Strong Auto Focus • Customisable settings • Decent image quality 	<ul style="list-style-type: none"> • Good for home-cinema use • Excellent connectivity • Up to 80in display • Pleasing colour palette 	<ul style="list-style-type: none"> • 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

¹Ansi lumens GLOSSARY: • CM: component • CP: composite • SV: S-Video

» Buying advice



Tablet PCs

Tablet PCs combine the mobility and connectivity of a smartphone with a larger screen and more powerful processor. Rather than struggle with Windows, they run a lightweight, touch-focused OS.

You have two main choices: a tablet running iOS or Android. iOS is slick, supremely easy to use, and has a library of hundreds of






thousands of apps. But the iPad is expensive, it doesn't support memory cards, and the whole system is locked down.

Android tablets are available at lower prices. Many have ports for adding storage and connecting devices, and plenty of apps are available via Android Market – although Google doesn't vet them.

Look for a dual-core processor for smooth operation and good multi-tasking. Opt for a capacitive rather than resistive touchscreen if possible, and consider a smaller screen to minimise weight.

3G tablets are available on subsidised tariffs, but it's usually cheaper to buy them outright.

READ MORE: TINYURL.COM/7YGV8Q6

Blu-ray drives					
	 1 PC ADVISOR BEST BUY	 2 PC ADVISOR RECOMMENDED	 3 PC ADVISOR RECOMMENDED	 4 PC ADVISOR RECOMMENDED	 5
	LG BE12LU38	LG BH10LS38	Asus SBW-06C1S-U Slim	Lite-On iHBS212	Buffalo BR3D-12U3
Price	£132 inc VAT	£65 inc VAT	£130 inc VAT	£90 inc VAT	£199 inc VAT
Website	Uk.lge.com	Uk.lge.com	Uk.asus.com	Liteonit.eu	Buffalotech.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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	8x ±R, 6x ±R DL, 6x -RW, 8x +RW, 5x RAM, 8x 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	<ul style="list-style-type: none"> • 12-speed external writer • Side-mountable • Supports eSATA, USB 2.0 • Awkward to carry 	<ul style="list-style-type: none"> • 10-speed internal writer • Attractive front panel • Reliable performance • Very good value 	<ul style="list-style-type: none"> • Super-slim six-speed drive • No power supply required • Portable • Slow but reliable 	<ul style="list-style-type: none"> • 12-speed internal writer • Issues during testing • Noisy during operation • Average with 4x media 	<ul style="list-style-type: none"> • 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

Wireless routers					
	 1 PC ADVISOR RECOMMENDED	 2 PC ADVISOR BEST BUY	 3 PC ADVISOR RECOMMENDED	 4	 5
	Cisco Linksys E4200	AVM FritzBox Fon 7390	DrayTek Vigor 3200n	Zyxel NBG4615	Edimax BR-6475nD
Price	£115 inc VAT	£190 inc VAT	£375 inc VAT	£60 inc VAT	£65 inc VAT
Website	Linksysbycisco.com	Fritzbox.eu	Draytek.co.uk	Zyxel.co.uk	Edimax.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Standards supported	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11a/b/g/n
Frequency modes	2.4GHz/5GHz (dual mode)	2.4GHz/5GHz (dual mode)	2.4GHz	2.4GHz	2.4GHz/5GHz (dual mode)
WEP/WPA/WPA2	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
USB port/Network port	✓✓	✓✓	✓✓	✓✓	✓✓
Firewall	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI
Eco mode	x	✓	✓	✓	x
Average power use	Not tested	Not tested	Not tested	Not tested	Not tested
Throughput (near/far)	226/92Mbps	92/38Mbps	110/40Mbps	94/32Mbps	97/41Mbps
Dimensions	225x160x25mm	226x160x48mm	30x160x245mm	162x106x28mm	134x110x26mm
Weight	335g	not specified	400g	237g	200g
Warranty	1 year	5 years	1 year	1 year	2 years
Verdict	<ul style="list-style-type: none"> • ADSL modem required • Excellent performance • Dual-band Wi-Fi • Guest login feature 	<ul style="list-style-type: none"> • Supports landline and internet telephony • Dual-band Wi-Fi • USB port 	<ul style="list-style-type: none"> • Business multi-WAN router • Firewall offers protection • Versatile USB 2.0 port • Excellent performance 	<ul style="list-style-type: none"> • Good-value router • Strong Wi-Fi performance • Single-band Wi-Fi • Compact design 	<ul style="list-style-type: none"> • Dual-band Wi-Fi • Poor web interface • Strong performance • Good value
FULL REVIEW	TINYURL.COM/6Z7BDKM	TINYURL.COM/3QUJZBX	TINYURL.COM/7Z4XTD5	TINYURL.COM/6HACKNN	TINYURL.COM/6XDA648

>> Buying advice



Blu-ray drives

A single Blu-ray Disc holds the equivalent of 35 CDs or five DVDs. It might look like a DVD, but its shorter wavelength and narrow blue laser beam allow it to hold greater capacity. It's the storage method of choice for HD and 3D video content.

External drives are easier to install, portable, and can be shared

between PCs, but they will cost you considerably more than internal models, and may not be as quick.

If you opt for an internal drive, ensure you have enough space inside your PC. Most internal drives use the SATA interface, so check you've got a compatible port.

Look for a drive that also supports several DVD formats, but don't obsess about write speeds.

You should be able to get 16-speed DVD writing, but it's not worth paying more to save seconds.

You may find that the Blu-ray media currently on the market isn't fast enough to enjoy your chosen drive's maximum write speeds. Six-/eight-speed BD-R capabilities are standard, but even six-speed BD-R media is still rare.

READ MORE: TINYURL.COM/70EPLY6

External hard drives	1	2	3	4	5
	Seagate FreeAgent GoFlex	WD My Passport Studio	Buffalo MiniStation Extreme	Iomega Prestige	Freecom Mobile Drive Sq
Price	£190 inc VAT	£150 inc VAT	£130 inc VAT	£100 inc VAT	£105 inc VAT
Website	Seagate.com	Wdc.com/en	Buffalotech.com	lomega.co.uk	Freecom.com
Overall rating	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★☆
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	<ul style="list-style-type: none"> • Fastest write speed • Great value for capacity • Separate storage drive and USB 3.0 dock 	<ul style="list-style-type: none"> • Superbly built • FireWire 800 and USB 2.0 interfaces • AES encryption 	<ul style="list-style-type: none"> • Military-grade rugged design • Lightweight 2.5in drive • Solid 256bit encryption 	<ul style="list-style-type: none"> • Good-value USB 3.0 drive • 256bit encryption • Metal case 	<ul style="list-style-type: none"> • Ultra-compact USB 3.0 drive • No encryption • Energy-saving button • Power-saving mode
FULL REVIEW	TINYURL.COM/BN2Z92F	TINYURL.COM/6FAWBNE	TINYURL.COM/CE4Z9YM	TINYURL.COM/D4KALCW	TINYURL.COM/BMVZW3R

NAS drives	1	2	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)	£230 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	★★★★★	★★★★★	★★★★☆	★★★★☆	★★★★☆
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	<ul style="list-style-type: none"> • Suitable for small-business or home-media use • Remote access support • Low power consumption 	<ul style="list-style-type: none"> • iTunes, uPnP, DLNA options • Takes up to 6TB total storage • Excellent security 	<ul style="list-style-type: none"> • High-performance NAS • Strong RAID support • Versatile 	<ul style="list-style-type: none"> • Max 18TB (6x 3TB) storage • Great RAID support • Expensive • Fast performance 	<ul style="list-style-type: none"> • Good value, compact media-sharing drive • Limited to 2TB storage • Sluggish performance
FULL REVIEW	TINYURL.COM/BMSDR74	TINYURL.COM/65S4V4U	TINYURL.COM/3ZK5LJG	TINYURL.COM/7MX60Z7	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-plus drives and combines both advantages.

READ MORE: [TINYURL.COM/7H3HCNR](http://tinyurl.com/7H3HCNR)

Smartphones	1	2	3	4	5
	Apple iPhone 4S	Samsung Galaxy S II	HTC Sensation	RIM BlackBerry Bold 9780	Samsung Galaxy Nexus
Price	£499 inc VAT	£406 inc VAT	£499 inc VAT	£331 inc VAT	£500 inc VAT
Website	Apple.com/uk	Samsung.com/uk	Htc.com/europe	Uk.blackberry.com	Samsung.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Apple iOS 5.0	Android 2.3 Gingerbread	Android 2.3 Gingerbread	BlackBerry OS 6.0	Android 4 Ice Cream Sandwich
Processor	1GHz ARM Cortex A9	1.2GHz ARM Cortex A9	1.2GHz Qualcomm Snapdragon	624MHz	1.2GHz ARM Cortex A9
Storage/media card	16GB/none	16GB/MicroSD	1GB + 8GB MicroSD	512MB + 2GB MicroSD	16GB/none
Screen size/resolution	3.5in/960x640	4.3in/800x480	4.3in/960x540	2.4in/480x360	4.65in/720x1280
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	18 hrs/290 hrs
Camera	8Mp stills, 1080p video	8Mp, 1080p video	8Mp, 1080p video	5Mp, 720p video	5Mp, 1080p video
GPS	✓	✓	✓	✓	✓
Dimensions, Weight	59x101x15mm, 140g	66x125x8mm, 116g	68x126x5mm, 148g	109x60x14mm, 122g	68x136x7mm, 139g
Warranty	1 year	2 years	2 years	1 year	2 years
Verdict	<ul style="list-style-type: none"> • Superb retina display • Fast graphics • Responsive touchscreen • Siri voice-recognition 	<ul style="list-style-type: none"> • Huge 4.3in AMOLED screen • 16GB memory (expandable) • Shorter battery life • TouchWiz 'Hubs' interface 	<ul style="list-style-type: none"> • Media-centric smartphone • High-resolution screen • Slick HTC Sense interface • HTC Watch 	<ul style="list-style-type: none"> • Qwerty keyboard input • Media player/manager • Secure email platform • Small 2.4in screen 	<ul style="list-style-type: none"> • Uses Android 4 • Large screen • Low performance • Can't navigate one-handed
FULL REVIEW	TINYURL.COM/62TEB9G	TINYURL.COM/3HF6GOD	TINYURL.COM/5W5KC7D	TINYURL.COM/3KJ33GS	TINYURL.COM/7JRSECH

Digital camcorders	1	2	3	4	5
	Kodak PlaySport Zx5	JVC Everio GZ-HM650	Sony Bloggie Touch MHS-TS20	Canon Legria HF R106	Kodak Playfull ZE1
Price	£98 inc VAT	£300 inc VAT	£158 inc VAT	£275 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	51x55x11mm	47x9x106mm	60x64x124mm	42x100x16mm
Weight	125g	195g	125g	319g	95g
Warranty	1 year	1 year	1 year	1 year	1 year
Verdict	<ul style="list-style-type: none"> • Ruggedised design • Comfortable to hold • 2in screen rather small • Takes AAA batteries 	<ul style="list-style-type: none"> • Lightweight, easy to use • Excellent 40x optical zoom • 6.5-hour recording memory • Supports 32GB SDXC cards 	<ul style="list-style-type: none"> • Useful 8GB memory • Awkward to hold • Ideal for video; stills less so • No built-in flash 	<ul style="list-style-type: none"> • Excellent-value HD model • 2.7in flip-out LCD • Smooth 20x optical zoom • Great colour balance 	<ul style="list-style-type: none"> • Simplicity itself to use • One-touch record and share • Tiny LCD • Rather toy-like
FULL REVIEW	TINYURL.COM/3U3Y2CA	TINYURL.COM/453U838	TINYURL.COM/332U0QJ	TINYURL.COM/2VFVLQX	TINYURL.COM/79HCGJC

>> Buying advice



Smartphones

The smartphone you choose to use is a very personal choice - while some prefer a small device that slips into a pocket, others prefer a large-screen handset that's better suited to watching video and typing on an onscreen keyboard.

The screen's resolution is just as important as its size. More pixels mean text and photos look

sharper, and more information can be shown onscreen at once.

Unlike Android, iOS doesn't support Flash. However, HTML 5 is slowly replacing the standard, and Adobe has discontinued development of Flash Player for mobile devices in any case. Mobile apps can also allow you to view sites that still use Flash.

Look for a fast processor and decent graphics if you want to play games or watch video.

It's common to see mobile operators offer expensive handsets free with 24-month contracts. It'll usually work out cheaper to buy the handset outright, however, and it won't be locked to a network.

READ MORE: TINYURL.COM/7SK2AS3

Compact digital cameras	    				
	1	2	3	4	5
	PC ADVISOR RECOMMENDED	PC ADVISOR BEST BUY	PC ADVISOR RECOMMENDED		
	Sony Cyber-Shot DSC-HX9V	Nikon Coolpix S9100	Panasonic Lumix DMC-TZ20	Nikon 1 J1	Samsung MV800
Price	£230 inc VAT	£200 inc VAT	£200 inc VAT	£380 inc VAT	£180 inc VAT
Website	Sony.co.uk	Nikon.co.uk	Panasonic.co.uk	Nikon.co.uk	Samsung.com/uk
Overall rating	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★☆
Megapixel rating	16.2Mp	12.1Mp	14.1Mp	10.1Mp	16.2Mp
Maximum resolution	4608x3456 pixels	4000x3000 pixels	4320x3240 pixels	3872x2592 pixels	4608x3456 pixels
Optical zoom	16x	18x	16x	3x	5x
Maximum aperture	f3.3-f5.9	f3.5-f5.9	f3.3-f5.9	N/A	f3.3-f5.9
LCD size	3in	3in	2.8in	3in	3in
Media card	SD/SDHC	SD/SDHC	SD/SDHC	SD/SDHC	MicroSD
Battery/life	1x lithium-ion/410 shots	1x lithium-ion/270 shots	1x lithium-ion/260 shots	1x lithium-ion/230 shots	1x lithium-ion/not specified
ISO range	100 to 3200	160 to 3200	100 to 1600	100 to 3200	125 to 3200
Dimensions	105x34x59mm	106x35x62mm	105x33x58mm	106x30x61mm	92x18x56mm
Weight	215g	214g	219g	274g	124g
Warranty	2 years	2 years	1 year	2 years	2 years
Verdict	<ul style="list-style-type: none"> • Superior stills and video • Great 16x optical zoom • GPS photo tagging • Doesn't support RAW 	<ul style="list-style-type: none"> • Excellent photo quality • Longest zoom range here • 1920x1080-pixel video • Incredible 240fps slow-mo 	<ul style="list-style-type: none"> • Comprehensive menu • Warm, natural colour range • GPS geotagging support • AVCHD or Mpeg video 	<ul style="list-style-type: none"> • Mirrorless semi-compact • Solid construction • Good range of video modes • Deep colours 	<ul style="list-style-type: none"> • Flip-up touchscreen LCD • Limited 5x optical zoom • Better for video than photos • Great panorama mode
FULL REVIEW	TINYURL.COM/6CLAW3D	TINYURL.COM/6E457PY	TINYURL.COM/6XNRWUO	TINYURL.COM/7ZC25FY	TINYURL.COM/83SSNQX

Compact system cameras	    				
	1	2	3	4	5
	PC ADVISOR BEST BUY	PC ADVISOR RECOMMENDED	PC ADVISOR GOLD		
	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	£580 inc VAT	£450 inc VAT	£400 inc VAT	£580 inc VAT	£390 inc VAT
Website	Nikon.co.uk	Panasonic.co.uk	Sony.co.uk	Canon.co.uk	Olympus.co.uk
Overall rating	★★★★☆	★★★★★	★★★★★	★★★★☆	★★★★☆
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	<ul style="list-style-type: none"> • Excellent stills and video • Suitable for novice and intermediate photographers • Plenty of lenses available 	<ul style="list-style-type: none"> • Great dSLR alternative • Rotating touchscreen • Strong video-capture mode • Very fast autofocus 	<ul style="list-style-type: none"> • Compact • Great performance • Great colour fidelity • Takes clean, sharp shots 	<ul style="list-style-type: none"> • Top-notch photo results • Fully auto/manual modes • Articulated LCD screen • Strong video capture 	<ul style="list-style-type: none"> • Compact camera • Likable art filter modes • High ISO suffers noise • No built-in flash or EVF
FULL REVIEW	TINYURL.COM/6UTE9KK	TINYURL.COM/7JXCJCR	TINYURL.COM/37XOZX5	TINYURL.COM/72STE88	TINYURL.COM/BLMYMJW

» Buying advice



Compact system cameras

Compact system cameras (or interchangeable-lens cameras) bridge the gap between compacts and digital SLRs. They are ideal for those who want the versatility and quality of a digital SLR, with the ease of use of a compact.

A mirrorless design allows compact system cameras to be smaller than digital SLRs, while the

lack of an optical viewfinder means an LCD is used for composition and review. Large sensors allow them to rival an SLR for image quality.

Compact system cameras are ready to shoot in seconds, and most offer burst modes that capture several frames per second.

Although the camera lens can be swapped, not all will be compatible with your chosen

model. Panasonic and Olympus both use the Micro Four Thirds system, but Sony has its own E-mount system and Samsung uses NX-mount lenses.

Most compact system cameras record HD video, but the quality varies. If this is a priority, choose a model that can record 1080p video and also has a microphone input.

READ MORE: TINYURL.COM/7DPM3SX

Sub-£150 graphics cards	    				
	1	2	3	4	5
	Sapphire Radeon HD 6850	Sapphire Radeon HD 6790	HIS Radeon HD 6770 IceQ X	Sapphire Radeon HD 6570	Asus Radeon HD 6670
Price	£120 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	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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	<ul style="list-style-type: none"> • Powerful card for the price • Good memory bandwidth • 256bit memory interface • Single DVI slot 	<ul style="list-style-type: none"> • Playable framerates • Strong memory bandwidth • 6800-series cards faster • 256bit memory interface 	<ul style="list-style-type: none"> • 1GB DDR5 video card • 128bit interface cuts speed • Not very power-hungry • 6790 card is better value 	<ul style="list-style-type: none"> • Smooth video playback • Great value • GDDR3 memory • Half-height model 	<ul style="list-style-type: none"> • 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/3H62TJ3	TINYURL.COM/3LM8HGE

£151+ graphics cards	    				
	1	2	3	4	5
	HIS Radeon HD 6950	XFX 7970 3GB GDDR5	Zotac GeForce GTX 570	Asus GeForce GTX 560 Ti	PNY XLR8 GTX 580 LC
Price	£216 inc VAT	£480 inc VAT	£270 inc VAT	£180 inc VAT	£452 inc VAT
Website	Hisdigital.com	Xfxforce.com	Zotac.com	Uk.asus.com	Pnyeuropa.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	AMD Radeon HD 6950	AMD Radeon HD 7970	nVidia GeForce GTX 570	nVidia GeForce GTX 560 Ti	nVidia GeForce GTX 580
Installed RAM	2GB GDDR5	3GB GDDR5	1,280MB GDDR5	1GB GDDR5	1.5GB GDDR5
Memory interface	256bit	284bit	320bit	256bit	384bit
Core/memory clock	800MHz/1,250MHz	925MHz/1,375MHz	732MHz/950MHz	830MHz/1GHz	857MHz/1,053MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	1,408	2,048	480	384	512
Power connectors	2x 6-pin	1x 6-pin, 1x 8-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	11.1	11.0	11.0	11.0
Digital interface	DVI, HDMI, DisplayPort	DVI, HDMI, 2x Mini-DisplayPort	2x DVI, Mini-HDMI	2x DVI, HDMI	2x DVI, Mini-HDMI
Warranty	2 years	2 years	2 years	3 years	5 years
Verdict	<ul style="list-style-type: none"> • 2GB graphics memory • 5GHz DDR effective • Best overall value here • GTX 570 chip is faster 	<ul style="list-style-type: none"> • Good availability • Good performance • Price needs to come down • DirectX11.1 	<ul style="list-style-type: none"> • Impressive detail rendering • Outstrips Radeon HD 6970 at lower resolutions • 320bit memory interface 	<ul style="list-style-type: none"> • Affordable gaming graphics • Slightly overclocked • Just 1GB of memory • Smooth framerates 	<ul style="list-style-type: none"> • Liquid-cooled • Excellent performance • Noisier than most cards • Rather expensive
FULL REVIEW	TINYURL.COM/6GQS8XC	TINYURL.COM/6UZRVCX	TINYURL.COM/3UB8U3G	TINYURL.COM/43UXNP8	TINYURL.COM/7JSGKWA

>> Buying advice



Graphics cards

The key feature of a graphics card is its GPU. Produced by AMD or nVidia, this determines the quality of images displayed and their refresh speed. The more powerful the GPU the better, but you can get away with a lesser card by turning down a game's detail levels.

Even those on a budget should be able to get at least 1GB of DDR

video memory. Look for GDDR5 rather than GDDR3 RAM. This in effect quadruples the clock speed (GDDR3 merely doubles it).

The memory interface (or bus) governs how much data can be sent at once, so a 256bit interface lets through twice as much data as a 128bit interface. Graphics cards with the best combination of memory interface size and

clock speed should produce the best performance.

DirectX 11.x support is required for advanced, modern games; cheaper cards lack the firepower to do such titles justice, however.

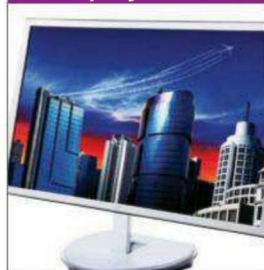
Check that a card will fit inside your PC and you have sufficient connections from the power supply unit before you buy.

READ MORE: TINYURL.COM/7BPUHQE

Sub-£200 flat-panels	1	2	3	4	5
	AOC I2353Fh	LG IPS236V	AOC I2352Vh	Iiyama ProLite XB2472HD	Hanns-G HL231DPB
Price	£145 inc VAT	£158 inc VAT	£139 inc VAT	£200 inc VAT	£119 inc VAT
Website	Aoc-europe.com	Lg.com/uk	Aoc-europe.com	Iiyama.co.uk	Hannsg.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	23in	23in	23in	24in	23in
Panel type	In-plane switching 3D	In-plane switching	In-plane switching	Vertical alignment	Twisted nematic
Native resolution	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Pixel pitch	0.27mm	0.27mm	0.27mm	0.28mm	0.27mm
Brightness	250cd/m ²	250cd/m ²	250cd/m ²	250cd/m ²	250cd/m ²
Static contrast ratio	1,000:1	1,000:1	1,000:1	3,000:1	1,000:1
Response time	5ms	5ms	5ms	8ms	5ms
Digital connector	2x HDMI	DVI, HDMI	DVI	DVI, HDMI	DVI
Dimensions	550x388x188mm	549x230x422mm	247x185x399mm	570x215x438mm	547x189x352mm
Weight	5.6kg	4kg	3.2kg	6.2kg	3.3kg
Warranty	3 years	2 years	3 years	3 years	3 years
Verdict	<ul style="list-style-type: none"> • Wide viewing angles • Excellent colours • Attractive, slimline design • No DVI connection 	<ul style="list-style-type: none"> • Impressive overall display • Accurate colours • Wide viewing angles • Great value for IPS tech 	<ul style="list-style-type: none"> • Cheap for IPS panel • Accurate colours • Plain styling • Few extras 	<ul style="list-style-type: none"> • Wonderful 24bit colour reproduction • Viewing angles not great • Height-adjustable stand 	<ul style="list-style-type: none"> • Good-value 23in flat-panel • Decent viewing angles • Older TN screen technology • Low power consumption
FULL REVIEW	TINYURL.COM/7TWLB2A	TINYURL.COM/CWMP7M8	TINYURL.COM/7HXTPVV	TINYURL.COM/3DYX75Z	TINYURL.COM/32MGMTG

£200+ flat-panels	1	2	3	4	5
	ViewSonic VP2365-LED	Philips Brilliance 241P4QPYES	NEC MultiSync EA232WMI	NEC MultiSync EX231W	ViewSonic VP2765-LED
Price	£215 inc VAT	£240 inc VAT	£246 inc VAT	£234 inc VAT	£360 inc VAT
Website	Viewsoniceurope.com/uk	Philips.co.uk	Nec-display-solutions.co.uk	Nec-display-solutions.co.uk	Viewsoniceurope.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	23in	24in	23in	23in	27in
Panel type	In-plane switching	Advanced MVA	In-plane switching	Twisted nematic	Advanced MVA
Native resolution	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Pixel pitch	0.27mm	0.28mm	0.27mm	0.27mm	0.31mm
Brightness	250cd/m ²	250cd/m ²	300cd/m ²	250cd/m ²	300cd/m ²
Static contrast ratio	1,000:1	5,000:1	1,000:1	1,000:1	3,000:1
Response time	6ms	12s	14ms	5ms	25ms
Digital connector	DVI	DVI	DVI, DisplayPort	DVI, DisplayPort	DVI, DisplayPort
Dimensions	548x433x250mm	565x220x395-516mm	550x220x379mm	540x215x401mm	642x365x474-608mm
Weight	5.4kg	5.9kg	5.8kg	4.2kg	8.5kg
Warranty	3 years	3 years	3 years	3 years	3 years
Verdict	<ul style="list-style-type: none"> • Premium IPS panel • Superb colour reproduction • Wide viewing angles • Lacks an HDMI port 	<ul style="list-style-type: none"> • Very strong image quality • Excellent viewing angles • Rotate, height adjustability • Four-port USB hub 	<ul style="list-style-type: none"> • High-calibre IPS screen • Impressive colour depth • Poor 14ms response rate • Height/tilt-adjustable stand 	<ul style="list-style-type: none"> • Solid 23in TN flat-panel • Good viewing angles • Display tweaks required • Screen dims when not in use 	<ul style="list-style-type: none"> • Large 27in display • Low resolution for size • Poor viewing angles • Slow response for games
FULL REVIEW	TINYURL.COM/5WMJLR9	TINYURL.COM/6VVODAP	TINYURL.COM/4CQGNVW	TINYURL.COM/45QT68E	TINYURL.COM/86T3PFM

>> Buying advice



Flat-panel displays

You'll spend most of your working day staring at the screen, so it makes sense to choose one that's comfortable to view.

The panel size will largely depend on your budget and amount of desk space, but those measuring 22in and above tend to offer a full-HD resolution. All but the cheapest models also have at

least one digital interface (DVI, HDMI or DisplayPort). VGA (or D-Sub) is an analogue interface, and won't provide as clean a signal.

The panel technology is important. Twisted nematic (TN) is the budget option, offering fast response times but limited viewing angles. Multiple vertical alignment (MVA) and patterned vertical alignment (PVA) screens offer

better viewing angles and higher contrast ratios than TN, but slower response times. Advanced MVA screens are more responsive.

In-plane switching (IPS) panels offer excellent viewing angles, contrast and colour accuracy, but they can be rather pricey.

Get a matt rather than gloss coating for fewer reflections.

READ MORE: TINYURL.COM/6RMBVR6



JIM MARTIN

Windows 8: no touch, no fun

It's no secret that Microsoft has developed Windows 8 primarily for tablets with touchscreens. Yet, for all the repeated assurances that the new operating system will scale to work on any device with any screen size, there's little evidence that it will.

The main problem centres around the fact that the new Metro user interface, which is geared for fingertip control, is mated to the old Windows desktop, which isn't. It's a bit like having OS X and iOS rolled into one.

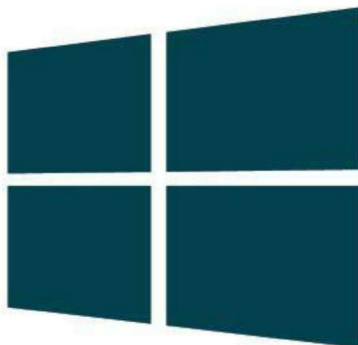
Microsoft argues that Metro isn't limited to a small screen; it works just as well on a 27in widescreen display as on a 10in tablet. But the real issue is that most people use programs such as Microsoft Word, Excel, PowerPoint and Adobe Photoshop.

“After an extended period of time your arm wants to fall off”

Not one of these programs is Metro-compatible, which hardly comes as a surprise: touchscreens are excellent for consuming content, but not as good for creating it. Few people would choose to use a software-over-a-hardware keyboard for typing an essay, but most would rather use their fingers than a mouse to swipe through thumbnails of photos or music to find the image or track they're after.

Another problem with Windows 8 for the desktop is that vertical touchscreens don't work. Indeed, Steve Jobs went on record in late 2010 on the subject: “Touch surfaces don't want to be vertical...after a short period of time you start to fatigue, and after an extended period of time your arm wants to fall off. It doesn't work; it's ergonomically terrible.”

Laptops are particularly tricky, since their screens are hinged and tend to move backwards when prodded. A touchscreen needs to be rock-solid. The same is true for



touchscreen PC monitors: they shouldn't wobble when touched, and should ideally tilt near horizontal to provide a more comfortable angle. Try propping up your keyboard vertically on the desk and you'll immediately see the problem.

As we said in our Windows 8 guide on page 84, Windows has had the same basic interface for almost 20 years. We're not against change if it improves things, and we're not afraid to embrace new ways of working. The phenomenal growth of tablet sales is testament to this. But to attempt to force this way of working on PCs may be short-sighted, not least because virtually none are equipped with a touchscreen.

Yes, it's possible to use Windows 8 with a keyboard and mouse, but it takes more effort and more clicks than it does in Windows 7. It takes four clicks just to shut down or restart, and that's just one example.

Microsoft will listen to consumer feedback and iron out many of the flaws in the Consumer Preview, but PC manufacturers will also need to sit up and listen. They need to produce touchscreens that tilt back much further than existing designs and remain planted when poked. Finally, software developers need to release Metro versions of their applications so that the old desktop becomes a thing of the past. Until this happens, Steve Jobs' verdict on touchscreen PCs will remain true. ☒

>> Next issue

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