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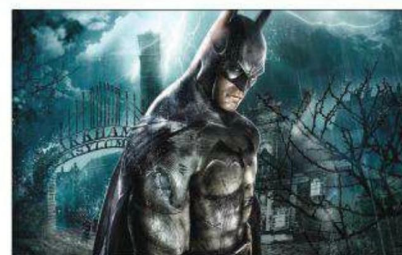
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ROSEMARY HATTERSLEY

Channel your negative thoughts

A third of British consumers have vented their fury online as companies got it wrong. And that's a very good thing...

Being connected allows us to take advantage of all sorts of things: above all else, the web is an exceptional source of information. Wikipedia allows those with a yen to do so to share their precise expertise, from how flight works to documenting every last media reference to Austrian singer Falco and his worldwide hit 'Rock Me Amadeus'.

More academic pursuits, such as distance-learning qualifications and online video tutorials, are made possible via the web - as is everything from emailing, chatting and shopping to armchair travel. And if the web has done anything, it's levelled the terms on which we can all share our opinions.

Google rankings ensure professional sites such as pcadvisor.co.uk appear in the first page of results for reviews of relevant product types, but the consumer is now just as likely to have their voice heard as the acknowledged expert. Customer ratings on Amazon, for example, carry as much weight as those from independent reviewers.

Few industries provoke as much impassioned debate about design, build quality, performance and features as consumer electronics. Rarely do we express a dispassionate opinion without being taken to task by our readers. We invest an awful lot of ourselves in our gadgetry and the items we select say plenty about us.

> **The consumer is now just as likely to have their voice heard as the expert**

Accordingly, it's now common to find customer reviews alongside 'expert' ones; indeed, you'll find many such instances on our own site, with the thousands of customer reviews we publish alongside our expert reviews.

If you're in the hospitality business, it's not just derision for an ill-chosen chassis colour or a poorly performing app you need to worry about. It's the décor, the location, the friendliness of the receptionist and whether your chips were up to scratch, not to mention the behaviour of fellow guests.

Research by web-hosting company Fasthosts recently found that a third of us Brits have vented our ire at poor customer service and product purchases via the web (tinyurl.com/cst76ug). Forums, Facebook and Twitter are the most common outlets for our frustration - rather than the more obvious route of complaining directly to the company with which you have an issue.

Vendors dislike this public airing of issues that might otherwise be quietly and privately resolved, but Fasthosts also found a reluctance on the part of companies to engage with dissatisfied customers. This is shortsighted: those that took steps to tackle issues were praised for their willingness to try and get things right.

Being called out for your shortcomings is never pleasant, but doing so earns you respect, as well as helping you and your staff get it right next time. Companies that understand this often offer discounts and other incentives. It's the 21st-century equivalent of the sign by the shop door enjoining customers to tell others if they've got things right - and them if they haven't.

So at the risk of inciting negative comments with eventually positive outcomes for both customer and vendor, we'd like to invite you to have your say about the tech companies with which you've dealt. Your feedback will lead directly to plaudits and awards for the companies in question. So head to pcadvisor.co.uk/awards and tell us what you think. You'll be doing everyone a favour. ⊠

Reader letters

PC Advisor's Inbox pages reflect the growing number of ways in which you communicate with us. For your chance to appear here, keep in touch via email, our forums, comments on our news stories, and our social-networking accounts

facebook.com/pcadvisor

Smartphone security

As Get Safe Online reported an 800 percent surge in mobile malware over four months, **Ndumiso Dominic Mcwango** wanted to know whether his desktop security would be able to scan files on a connected mobile phone. While this is potentially possible with a phone connected in Mass Storage Mode, our advice is to install software on the phone itself that will prevent malware getting on to it in the first place.

Three strikes for file-sharers

Ofcom has warned that illegal file-sharers will begin receiving warning letters regarding their activity in 2013. "This is another silly attempt at stopping piracy," wrote **Anne Henwood**. She believes file-sharers will always find a way to get around legislation and continue to download whatever they fancy, and reckons the time and effort would be better spent elsewhere.

pcadvisor.co.uk/news

Steaming at streaming

As we explained how to enable Home Sharing on an iPad, *Poshal* voiced his complaints about media streaming across all device types (tinyurl.com/bwt9fr5). "Why would I want to share music with myself from a tablet to a PC and vice versa?" he asked. "Running the PC upstairs while I'm downstairs on the tablet is a waste of energy, when I could save what I need on the tablet in the first place. Like I have the time to sit down for hours on end listening to music and watching video anyway."

Wireless security

Rick Broida's suggestion in our January issue to use a 'scary' SSID name rather than a password had some readers up in arms. But a few, including our Star letter writer (below), were intrigued. It's simply a different approach, wrote *Nick*. "If you're so concerned about security then use wires. Someone would have to physically enter your house and hook up an ethernet cable to access your network. If you must have wireless, you could wrap up your residence in aluminium foil that would prevent the Wi-Fi signal from leaking out."

Don't tell me what to view

We recently reported that the Motion Picture Association had asked several ISPs to block access to Newzbin2 (tinyurl.com/7o9jsjm). *America****No* wasn't impressed: "I've got no idea what Newzbin2 is, but if I wanted to visit the site then it's my decision to do so... When I purchase a service from an electricity company, it doesn't block me from boiling an egg when I want to."

Desktop PC pricing

Several visitors to our online reviews have commented that PCs are being sold at higher prices than quoted. This is a direct result of the flooding that recently hit Thailand, with a reduced number of hard drives shipping from the country. See page 24 for more info.

Flagged: Star letter

Playing a hacker at its own game

(Un)protect your Wi-Fi network (January issue, page 99) suggests using an offputting SSID (wireless network name), such as 'iwillhackyou' or 'C:\virus.exe', to deter hackers. This gave me an idea, whereby you could track and catch a hacker should they make it as far as your desktop.

The plan: create a folder on the desktop and call it 'Bank data' or something similar. Anyone with ill intentions would no doubt be drawn to this folder but, unbeknownst to them, it's boobytrapped. When clicked, a message is sent directly to the local police force's tracking unit, warning them that a hack is in progress. It will hopefully be able to garner their details, which will eventually lead to an arrest. *Robert Hessey*

Matt Egan, editor, replies: It's an interesting idea, Robert, but how the police could then track down the culprit is the key factor. The internet is a global resource, and most hacks are automated attacks that target millions of PCs at once. Far better to make it harder for crooks to get into your network in the first place with a robust password and WPA2 protection, in which case they'll probably leave you alone and look elsewhere.

Our Star letter writer wins an Honestech Film Scan&Save, worth £79 (**uk.honestech.com**). For your chance to win a copy, tell us your thoughts on the latest tech issues:

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twitter.com/pcadvisor
facebook.com/pcadvisor

pcadvisor.co.uk/polls

Ofcom says illegal file-sharers will begin receiving warning letters in 2013 as part of a three-strikes rule to tackle internet piracy. Will this deter you?

61%
I'm not an illegal file-sharer

18%
No, it's beyond policing now

14%
I'll just be more careful not to get caught

7%
I'm not sure – I'd have to see the letter

tinyurl.com/d3yb5vw

Search verbs

Google is the daddy of online search, but it's not your only choice. The problem is, if you aren't 'Googling' a search term – for instance, if you're using Microsoft Bing – what are you doing? **ams4127** asked his fellow forum members for advice (see tinyurl.com/6maddgg).

morddwydd: I Binged once

Bingalau: What about Bingled?

alan14: Perhaps when you find something on Bing you shout Bingo!

lotvic: Bingled might get corrupted to Bungled. My spellchecker doesn't like Bingled, but it's okay with Binged.

ams4127: 'Bingled by Bingalau' rolls off the tongue very nicely!

Quickbeam: Just as you would 'Hoover' with any make of vacuum cleaner, you 'Google' with any brand of search engine. It's just one of those lucky companies whose name has become synonymous with a particular activity. Thomas Crapper managed it too...

gengiscant: But I Google only with Google – I have never Googled with Bing. The whole thing's a guggle.

rdave13: If someone enquires how you found an answer to a problem you could simply say you 'asked it'.

Pineman100: If the past tense of 'I ring' is 'I rang', then 'I bing' would be 'I bang'. Easy!

letters@pcadvisor.co.uk

2 + 2 = 5

Last issue's letter from Dr J Newman regarding the inclusion of CyberGhost on your DVD incensed me. I value my privacy, and strongly dislike his association between people who wish to protect themselves online and paedophilia. As a nature photographer, I've lost count of how many times I've been approached by hostile parents – one took offence to me photographing a tree when her children were 50 yards behind me. *Akzo Detomaso*

Solid-state software

In 1966, the first computer I used had 16kb of memory. A few years later, people joked that we would be able to throw away rather than park our cars if prices fell as quickly with vehicles as they had with memory. With SSDs coming down in price, there's no reason why the OS, applications, security software and drivers couldn't be loaded on to such a drive, then plugged into any PC. Rather than dual-booting Windows you'd have two SSDs, with a different OS on each. And when it's time to upgrade, you simply plug in a new SSD with the latest OS preloaded. *Nigel Denton*

Caught out via email

Windows makes a fuss of ensuring that we really want to send a file to the Recycle Bin, but it never attempts to verify that we've selected the correct email address. Mistakes here can ruin lives – do you really want to send "May's away tomorrow, darling" to May Dogsbody? Some (other) people could find such a check useful! *Harry Leeming*

3Gbps vs 6Gbps

Your *PC and laptop buying guide* (Dec issue) incorrectly states that a SATA 3 gigabits per second (Gbps)-equipped PC is incompatible with a SATA 6Gbps hard drive. In fact, since the 6Gbps interface still has rough edges, a 6Gbps hard drive in a 3Gbps motherboard will often outperform a 6Gbps hard drive in a 6Gbps motherboard. *Stephen Round*

Andrew Harrison, reviews editor, replies: We perhaps should have worded our advice more clearly, which was: if you use the faster drive on a slower bus, you'll be wasting the extra money the SATA 6Gbps drive cost you. However, it's our experience that the fastest SATA 6Gbps drives perform best when connected to a SATA 6Gbps bus. ⊠

Deputy news editor: Carrie-Ann Skinner

carrie-ann_skinner@pcadvisor.co.uk

HP: A NEW SLATE IN PC MARKET

Company remains in consumer PC market • Launches tablet just months after it dumps TouchPad

HP has decided to retain its PC division just months after announcing it was looking for "strategic alternatives" for the consumer side of its computer business. Having previously called time on its TouchPad, the company has also launched a new tablet.

Meg Whitman, HP's president and CEO, said it is "right for customers and partners, right for shareholders, and right for employees" that its Personal Systems Group (PSG) stays with the company.

"Keeping PSG within HP is right. HP objectively evaluated the strategic, financial and operational impact of spinning off PSG. HP is committed to PSG, and together we are stronger," she said.

Former CEO Leo Apotheker revealed that HP was discontinuing the TouchPad and exploring the possible spin-off or sale of PSG in August. However, following a strategic review under Whitman, who was appointed as Apotheker's successor in September, HP decided to keep the group. PSG is considered to be a key component of its efforts to create long-term relationships with consumers, including businesses.

Tony Prophet, senior vice-president of operations at PSG, said spinning off the unit would have cost HP $1.5bn. "As the analysis unfolded, it became clear the costs were more significant than any benefit," he said.

A wise decision?

The original decision to sell or spin off the division was also criticised by analysts, who said the PC business contributed to the company's bottom line and added purchasing power for enterprise hardware partners. Such customers wanted the company to retain the PC unit so they could purchase hardware, software and services from one entity.

> **HP is committed to PSG, and together we are stronger**

Meanwhile, HP was losing business to competitors such as Dell, which were preying on the uncertainty around its business unit to gain new customers.

However, other analysts said the PC business had to be the first domino to fall if HP was to improve its profit margins. With PC shipments dropping and the company lacking a clear mobile strategy, it would make sense for HP to refocus its attention on high-margin enterprise businesses – much like IBM did when it sold its PC unit to Lenovo in 2005.

Slate 2

HP has also unveiled another tablet PC, the Slate 2, which has an 8.9in capacitive touchscreen. Unlike the fallen TouchPad, the Slate 2 runs Windows 7 Home Premium rather than the WebOS mobile platform and is aimed at businesses rather than consumers.

The device, an update to the Slate 500 released in 2010, runs an Intel Atom Z670 processor. There's 32GB of storage built in, and Wi-Fi connectivity as standard. Much like traditional desktop and laptop PCs, the Slate 2 can run custom applications written for x86 processors and the Windows OS.

HP said the Slate 2 can be used to access corporate documents or take notes through stylus input. With an optional external keyboard, the device can also double up as a PC.

The Slate 2 was available only in the US at press time, where it costs $699 (around £446). It's expected to be made available worldwide in the near future, but UK pricing has yet to be revealed.

HP says it will continue to produce the Slate 2 Windows 7 tablet for enterprise customers, and will also develop a tablet running Windows 8.

"We are certainly going to be there with Windows 8," Whitman said.

NVIDIA TEGRA 3 OFFERS FASTER GRAPHICS

Asus Eee Pad Transformer Prime is the first tablet to benefit from quad-core mobile processor

Tablet PCs and smartphones could benefit from improved graphics and application performance thanks to an nVidia quad-core mobile CPU.

The Tegra 3 chip is nVidia's first quad-core processor for tablets and smartphones. The company claims it offers five times faster performance than the dual-core Tegra 2, which is currently found in tablets made by the likes of Dell, Lenovo and Acer.

Tegra 3, formerly known as 'Kal El', will run at up to 1.3GHz in a quad-core configuration. The first device to sport the processor is the Asus Eee Pad Transformer Prime (pictured, see page 28 for more).

Based on ARM's Cortex-A9 processor design, the chip will run Google's Android mobile OS. It combines CPU cores with a number of processing units for tablet and smartphone functions. Tegra 3 also has 12 GeForce graphics cores, which could provide a massive boost for multimedia.

Furthermore, a low-power fifth core can run secondary tasks to reduce the processing strain on the four main CPUs. If a user wants to listen to music, for example, this core may be activated while the four high-performance cores are shut down to extend device battery life.

nVidia said the chip enables the Transformer Prime to run away from the mains for 12 hours at a stretch. However, Dean McCarron, principal analyst at Mercury Research, said the exact battery life of devices running Tegra 3, such as the Asus Eee Pad Transformer Prime, could vary with tasks.

"It's going to depend on the workload. We'll see once we get our hands on the hardware," McCarron said. "The general rule of thumb is the more intense the workload, the less life you get."

Nevertheless, Tegra 3 provides more performance headroom. Mobile devices are demanding more computing power and many form factors are evolving. Tegra 3 could be an effective gaming platform, too, added McCarron.

A Tegra 3 tablet running Windows 8 was demoed at Microsoft's Build conference in September, although the firm has yet to confirm an official launch date for its OS. Meanwhile, smartphones running the chip are expected in the first quarter of 2012.

Low-cost motherboard designed for medical applications

BeagleBoard's £56 BeagleBone motherboard is targeted at embedded application-led devices
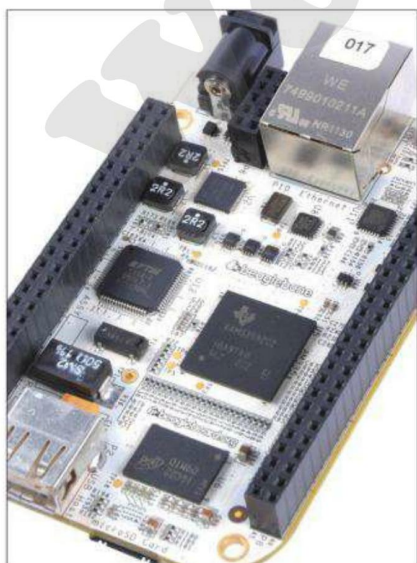
An $89 (£56) credit-card-sized motherboard that could be used for gaming and medical applications has been launched by an open-source hardware group.

BeagleBoard's BeagleBone development board runs Linux and a full web server. It measures just 86x53mm and offers gigabit ethernet, 3D graphics, USB 2.0 and MicroSD.

Based on Texas Instruments' 720MHz Sitara AM335x ARM Cortex-A8 processor, the BeagleBone is unlikely to find its way into smartphones, tablets and PCs in the near future, said Jim McGregor, chief technology strategist at In-Stat. Instead, it's designed for embedded systems running specific applications, and could also be used in audiovisual devices and projectors.

One useful device developed around the board is the Smart Pill Box, which lets off an alarm at a specific time to remind patients to take their medicine.

The open-source boards are cheap to implement, and a lot of development is based on the ARM processor and Linux OS, McGregor said. Decades of development around Linux for open-source hardware has created some easy-to-implement applications for devices.

Despite some early experimentation, open-source hardware may not reach mobile devices soon. The hardware requirements for such devices are much more demanding and dynamic, and device makers prefer to implement their own chip designs. But the possibilities are exciting, and the most recent chips from companies such as Qualcomm include the latest graphics and communication capabilities, McGregor said.

27% of UK can't get a 3G signal

More than a quarter (27 percent) of homes and businesses in the UK can't receive a 3G signal for all five of the UK's major networks, according to Ofcom. The regulator's first Communications Infrastructure report named the highlands of Scotland and mid-Wales, which are both rural with hilly terrain, as the areas with the worst 3G coverage. Furthermore, around 900,000 UK premises can't access all four 2G networks.
MORE: tinyurl.com/7cj9a25

UK firms ban personal devices

One in five (19 percent) UK firms are banning staff from using their own gadgets at work, said Casio Projectors. A study of 1,200 employees revealed that mobile phones are the most popular personal devices, with 29 percent of office workers bringing their own handsets into the workplace; laptops came second with 15 percent.
MORE: tinyurl.com/6gy97h7

One million under 13s on Facebook

Nearly a million UK children aged between seven and 12 years old use Facebook, despite being below the social network's minimum age limit of 13, said Mintel. The research firm found that half of all kids in this age group belong to a social network, with 49 percent visiting such a site every day. Just 5 percent claimed not to use a social-networking site.
MORE: tinyurl.com/73qyk7x

NINE UK EXCHANGES GET 100Mb BROADBAND

BT rolls out super-fast fibre-optic broadband to London, York, Exeter and others

BT has rolled out its fibre broadband service that offers download speeds up to 100 megabits per second (Mbps) and uploads up to 15Mbps to nine UK exchanges.

Highams Park, Leytonstone, Ilford and Forest Hill in London, along with Ashford in Middlesex, Chester, York, St Austell and Exeter are the first areas to benefit from BT's 'Infinity Option 3' service. It also continues to be available in Bradwell Abbey, Milton Keynes, where the service was trialled.

BT's Infinity Option 1 and 2 services use fibre-to-the-cabinet (FTTC) technology, whereby fibre-optic cables are laid to street cabinets, to which homes and premises are joined using copper wires. Infinity Option 3 instead uses fibre-to-the-premises (FTTP) technology, with fibre-optic cables specified every step of the way.

"We now have three versions of BT Infinity offering high speeds that allow families to do more online at the same time," said John Petter, managing director of the company's consumer division.

BT Infinity Option 3 costs £35 per month and bundles unlimited evening and weekend calls. A line-rental charge is still applicable, too.

BT also revealed it has brought forward by a year its deadline for rolling out fibre-optic broadband to two thirds of the UK. BT originally hoped the £2.5bn scheme would be completed by 2015. However, the telecoms company has accelerated some £300m worth of investment and revised the deadline to 2014.

"Our roll out of fibre-optic broadband is one of the fastest in the world, and it's great to be ahead of what was an already challenging schedule. The acceleration reflects the success of the programme to date and is testament to the hard work and innovation of our people," said Ian Livingston, CEO of BT Group.

O2 trials super-fast 4G LTE mobile network in London

1,000 consumers and businesses able to access up to 100Mbps 4G broadband

O2 has launched a trial of the 4G Long Term Evolution (LTE) mobile network in London.

According to O2, the nine-month trial will cover 25 locations in the UK's capital, which make up a 40km² area that stretches from Hyde Park to The O2 in Greenwich and encompasses Canary Wharf, Soho, Westminster, South Bank and Kings Cross.

Around 1,000 consumers and businesses will be given Samsung B3730 mobile-broadband dongles. These will let them connect to the net using part of the 2.6GHz spectrum that's currently used to provide terrestrial TV broadcasts.

O2 said those taking part in the trial would see connection speeds of up to 100Mbps.

The mobile network plans to collect performance data and feedback from customers, which will be used to "influence and shape O2's plans for the commercial implementation of its forthcoming 4G network".

However, O2 will have to wait until Ofcom auctions off parts of the 800MHz and 2.6GHz spectrums before it can roll out a 4G network. The auction is expected to take place in mid-2012, but may be subject to delays.
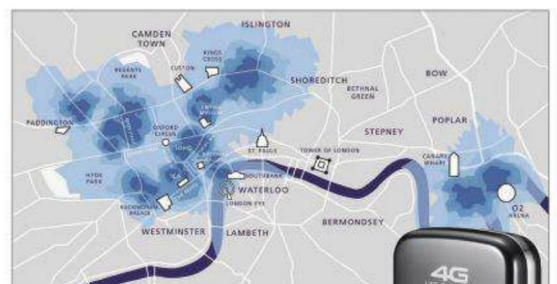
"Our work in London will give us a better understanding of the capabilities of 4G and will allow us to explore the super-fast benefits it will bring to people and industry across the UK," said Ronan Dunne, chief executive officer of Telefónica UK, which owns O2.

While O2 describes the service as 4G, the ITU in fact defines LTE as 3.9G – it falls short of one gigabit per second data transfers. ⊠

Cheaper tablets to take on the iPad 2

Mikael Ricknäs ponders whether Amazon can succeed where Motorola, BlackBerry and Samsung failed before it

Apple's already sold 11 million units of its unstoppable **iPAD 2**

While the iPad continues to be a big success, the tablet market offers a harsher climate to other vendors. It's thought that pricing strategies could be an important factor in their difficulties.

Apple sold 11 million iPads during the third quarter of 2011; while Samsung has been its most successful challenger, selling 1.6 million Galaxy Tabs in the same period, its sales figures pale by comparison. Other manufacturers have faced a tougher struggle: Motorola sold only 100,000 Xooms, and BlackBerry just 200,000 PlayBooks.

Both the Galaxy Tab 10.1 and Motorola Xoom use the same pricing strategy as Apple for its iPad 2, starting at £399 for a 16GB Wi-Fi-only model. The PlayBook now sells for around £249, but with a smaller 7in screen. So it'll be interesting to see what impact Amazon will have on the market, when its Kindle Fire goes onsale in the US for $199.

The Kindle Fire is predicted to outsell all other challengers, and prove the point that price is critical to compete with Apple. Amazon has seen such pre-order demand for its Kindle Fire that it decided to ramp up production. The company is "increasing capacity and building millions more than we'd already planned", said CEO Jeff Bezos.

The Fire does most things existing tablets do, letting you watch movies and TV shows, listen to music, read magazines and books, and more. It has a high-quality IPS touchscreen, a fast dual-core processor and a slick design. Besides a smaller display at 7in, half the storage capacity at 8GB, and a lack of productivity tools such as email, the main difference is in its price.

Does price matter?

"High-price tablets are simply not going to sell in meaningful volumes for the foreseeable future," said Richard Windsor, global technology marketing analyst at Nomura International.

Neil Mawston, director at market research company Strategy Analytics, agrees: "Pricing is critical for tablets. Apple can charge a premium, but very few others can," he said.

Amazon slashing its price to the bare minimum has driven growth, whereas Motorola, HTC and other manufacturers have tried to maximise pricing and that has backfired, added Mawston.

Rock-bottom clearance prices as HP discontinued its TouchPad – it was available for just £89 – helped demonstrate that pricing is a critical factor, according to research firm Canalys. HP shipped 560,000 units.

But other analysts believe tablet vendors need to look at more than just their pricing strategies. Robert Cozza, principal analyst at Gartner, points to the weak user interface of the Android Honeycomb tablet OS as part of the problem. Amazon, meanwhile, has added its own user interface to Android.

Media applications and content are also important factors, said Cozza. "The user experience on Android simply isn't as good as it is on the iPad, and you don't have all the applications and access to the content Apple offers," he said.

The way people view the tablet market also puts many vendors at a disadvantage, according to a survey of 4,500 tablet owners conducted by research firm CCS Insight.

Almost half see the tablet as a new product category, where branding is important. Apple is now viewed as the 'safe' brand, according to CCS Insight mobile analyst Martin Garner. Furthermore, almost one third consider the tablet to be part of their computing setup, and that's bad news for phone vendors such as HTC and RIM.

To turn things around, the Android camp has a lot of work to do. "It needs pretty hardware designs; more developers to develop tablet-optimised applications, services and websites; and Google to develop a more tablet-optimised browser and operating system, which it has done with Android 4.0," said Mawston.

Android also needs more attractive pricing, a better messaging platform, an improved application store and a stronger focus on the consumer, Mawston added.

Despite current challenges, most vendors are likely to stick it out. If vendors get tablets right, they will play a big role in the future of computing. Garner expects more "proper competitors" to the iPad to arrive in 2012, and he's not alone.

"In 2012, we can expect established vendors to launch lower-cost tablets. If there's a significant price gap to the iPad, then there may be some users who just want a good browsing experience. But they will still need strong content and services," said Cozza.

Next year will also see the launch of Windows 8, which will be used on both PCs and tablets. The OS will turn the tablet market into a three-horse race between Apple, Google and Microsoft. ⊠

There are high hopes for Amazon's $199 **KINDLE FIRE** outselling the iPad 2

Tech patent wars: a lose-lose situation

Apple vs Samsung, Microsoft and Google... are patent lawsuits out of control? Who wins and who loses? Eric Mack examines what's at stake

These days, mobile-technology patents and lawsuits go together like bread and butter. Previously, patents primarily served to help companies protect their intellectual property; now, Apple, HTC, Microsoft and smaller companies are using patents as leverage, suing one another in an attempt to gain the upper hand. The trend, experts say, is quickly spinning out of control, and hurting consumers when it comes to mobile-gadget choices and prices.

APPLE has come under fire, as HTC claims its products violate a patent that allows devices to upgrade software wirelessly

Mobile-handset-related lawsuits are up 25 percent year on year since 2006, according to Lex Machina, an intellectual property litigation firm. Blame for this increase lies with the technology landgrab involving mobile companies that are eager to get a slice of the billions of pounds at stake in the fast-growing mobile arena, said David Mixon, patent attorney for Bradley Arant Boult Cummings.

"It may not be how the patent system was envisioned to operate, but this is the way that the business has evolved among these tech giants – because there's so much money at stake, and it's so competitive, and the marketplace is changing so rapidly," said Mixon. "Everybody is desperate to secure any kind of competitive advantage that they can in the marketplace."

What is a patent worth?

Microsoft upped the Android-patent ante recently, drawing up its 10th patent-licensing deal with China-based handset maker Compal Electronics. It already has inked deals with Acer, HTC, Samsung and six other Android handset manufacturers, charging each for using its patents in their smartphones.

Although Microsoft is struggling to get its Windows Phone 7 platform to compete against Apple and the Android army, its Android patents are estimated to earn the company $444m in 2012 in licensing agreements, according to Goldman Sachs. Those numbers are based on projected royalties of $3-6 per device.

The mobile industry: lawyering up

When someone doesn't pay Microsoft, or any other mobile patent holder, the lawyers roll up their sleeves. Hundreds of patents are buried in smartphones. Not only are a phone's camera, chips, and other guts patented, but so too

are specific features, such as the 'swipe to unlock' function on the Motorola Milestone, the method an iPhone uses to receive email, and the structure underlying in-app purchases (like those that allow you to buy game levels inside a mobile app).

Such phone functions are at the heart of patent lawsuits affecting mobile firms large and small. For example, a company called Lodsys asserts that it owns the 'in-app payments' patent, and it has taken dozens of third-party iPhone app developers to court, demanding compensation.

When patents are your business

Florian Mueller, a patent expert and analyst, and writer of the Foss Patents blog, thinks Lodsys represents what are known unflatteringly as 'patent trolls'. Mueller said that Lodsys is going after app developers

WINDOWS PHONE 7 might not be raking in the cash for Microsoft, but its licensing deals with Android handset makers are

– particularly small developers – unfairly, exploiting a patent that it may never use itself just to make money.

Those small developers aren't able to defend themselves properly, and often they find it easier to pay licensing fees or penalties rather than battle it out in court. "Even a basic analysis of an infringement assertion, no matter how spurious it may be, costs them huge amounts of money by their standard," Mueller said.

Lodsys bristles at the notion that it's doing anything unethical. In a blog post, Lodsys defends itself, stating that it's simply protecting technology it rightfully owns and seeking undisclosed compensation from app developers that have made money off the back of its patent.

However, Lodsys's patent claim is just the tip of the iceberg – the patent wars are raging. Oracle is suing Google over the use of Java in Android. Apple is suing HTC, claiming that its phones copy the iPhone. And Microsoft is suing Barnes & Noble over its Nook e-readers and the way the devices allow users to tab between screens.

Stifling innovation?

Patent battles are undoubtedly costing the wireless industry billions of pounds – an expense that companies end up passing down to the consumer, indirectly.

But just how much all this patent stockpiling and legal feuding is stifling innovation is hard to quantify. Mueller points out that the amounts of money that big-name companies such as Apple and Google are spending on patent warfare are relatively small.

HTC America president Martin Fichter disagrees, however. At a recent Mobile Future Forward conference in Seattle, Fichter complained that patent battles distracted wireless companies, as they waste a lot of time and energy litigating instead of developing new technologies and user

Thousands of **APP DEVELOPERS** have been taken to court over their in-app payment systems

experiences, according to a GeekWire report. He said that the wireless industry needs to "stop itself from wasting all this energy that should go into putting better technology into people's hands".

In other words, when a company is too busy looking over its shoulder and worrying whether someone is ripping off its patents, customers lose out.

The patent wars get worse

Fichter is speaking from experience. In September, HTC acquired several patents from Google and countersued Apple, alleging that the company had violated four of its patents. It claims that Apple's Mac, iPhone, iPod, iPad, iCloud and iTunes violate a patent that allows the devices to upgrade their software wirelessly.

Many industry observers see the fight between Apple and HTC as a prelude to a larger

battle between Apple and Google. The late Steve Jobs famously called the Android operating system a rip-off of the iPhone. Apple has yet to sue Google directly, deciding to go after Android proxies instead.

In August, Apple prevented Samsung from selling its Android-based Galaxy Tab 10.1 tablet and its Android-based Galaxy S smartphone in parts of Europe including – briefly – the UK. Apple has convinced both a Dutch and a German court that Samsung is in breach of its patents.

Google, with relatively few mobile patents at the beginning of 2011, paid $12bn to acquire Motorola, adding 17,000 patents to its war chest by including the (now-defunct) patent for the original mobile phone. At the time of the acquisition, Google said the Motorola patents would help it build a stronger patent portfolio and deter intellectual property lawsuits.

Experts say the current patent wars are following a familiar pattern of new technologies. In the early days of the PC, for instance, computer makers often slugged it out in court, fighting over patents. The wireless industry will likely follow a similar patent-lawsuit trajectory. ⊠

Apple's legal team tried to put a stop to sales of Samsung's **GALAXY TAB 10.1**

Microsoft predicts the future

When we imagine future technology, we envision better versions of what we already have. But changes will sweep away almost all the products we use today. Mike Elgan explains

Ten years ago, there was no iPhone, Android phone or anything like it. The original iPod was brand-new, and there was no iTunes. There was no Xbox, YouTube, Flickr... Google was a search engine. Google Mail, Maps, Docs, Calendar, Voice, Talk, Reader and the like didn't exist.

In fact, virtually every aspect of today's consumer electronics was non-existent or beyond the imagination. So what will life be like in another 10 years?

Office Labs is a Microsoft think tank. It comes up with working concepts, many of which would require technologies and computing power that aren't yet available. The researchers create special-effects-laden videos and demos to communicate ideas.

In Microsoft's vision of the future, connected computers and displays are built into everyday objects. A woman's glasses whisper real-time translations of a foreign language in her ear. A coffee cup shows the drink's temperature and has a display that indicates how high the liquid is inside. An electronic newspaper is as thin and flexible as paper, but functions like an e-reader.

A businessman uses a clear-glass display that's controlled with a touchscreen and gestures. Both display and touch-input devices look like clear glass until they come to life with gestures. In some scenes, touch gestures become in-air gestures, as they extend beyond the screen.

Onscreen buttons, dials and other controls appear as needed, then vanish when no longer required. A clear-glass stylus is also used, suggesting a role for a pen. Keyboards are depicted, but there's a lot less typing in this future – it's replaced with voice assistance and dictation.

See-through glass displays are ideal for augmented reality. A mobile version is held up to a green plant, which is visible through the glass. The device recognises the species, and offers up information about it onscreen. The window of a taxi also turns into an augmented-reality screen, pointing out to the passenger the building where her meeting is scheduled to take place.

> ❝ **Data and documents can be transferred from anything to anything else** ❞

In many cases, surfaces that used to hold analogue information tools themselves replace the tools. Instead of a whiteboard mounted on a wall, the wall itself is now a digital whiteboard. Instead of a tablet on a table, the table is the tablet.

In one scene, two businesspeople each place a smart object on a smart table – a key fob and a flat phone or smartcard of some kind. Data spills out from these devices, and can be manipulated on the table. Data and documents can be transferred from anything to anything else. One example involves a drag-and-drop gesture from a desktop to a mobile device, while the same mobile device later becomes a virtual keyboard for a desktop computer.

Another example shows a man using a gesture to capture data using a clear-glass remote control, then moving that data from a wall-mounted device to his e-newspaper.

A smartphone is a card-like gadget so thin that a woman uses it as a bookmark. This card functions as a boarding pass, an airport map, a calendar, an augmented-reality window, a 3D holographic display and more.

The phone splits into two halves about the size of playing cards, with one displaying live video and the other held up to the ear for videoconferencing. It even projects some kind of laser beam arrow on the ground, telling Mr Future Businessman where to go.

Everything we've described is being worked on, refined and developed. If you follow current trends for computer power, display technology, networking speeds, device miniaturisation, flexible displays, touchscreens, gesture technologies and others, you get this Microsoft future.

The intelligent displays are advanced versions of what's already possible with Microsoft Surface. The in-air gestures are advanced versions of what we already see in Kinect for Xbox 360. Displays are getting bigger, while devices are getting thinner and lighter. We already have clear displays and augmented-reality systems. The past four years have ushered in thin tablets supporting gestures and intelligent voice technology. The next 10 years? Watch this space. ⊠

Social media and the workplace

Even some of the most professional institutions are relaxing access to social networks and social-media sites. Ann Bednarz wonders whether that's a good idea

When Socialware surveyed 144 financial advisers this year, 84 percent said they use social networks for business purposes, up from 60 percent in 2010. Another 10 percent said they plan to use social media in the future.

The public sector, too, is lifting access restrictions and wading deeper into social media across the globe. Among US government employees with access to social media, for instance, 37 percent are permitted to represent their organisations using the platform, and another 30 percent are allowed to do so with some restrictions.

"A lot of businesses, small and large, are moving away from the restrictive model of blocking social media to a more liberal access model," Chenxi Wang, vice-president and principal analyst at Forrester Research, summed up earlier this year.

Inside organisations, the pressure to expand social-media horizons is coming from multiple sources. Sales and marketing teams want to engage customers through social-networking sites, users want to access personal accounts from the workplace, and HR wants to be able to recruit, hire and retain social media-savvy employees. But it's IT pros who have to administer the rules.

Just over half (51 percent) of 1,400 CIOs polled in May by Robert Half Technology said they allow employees to use social media sites such as Twitter and Facebook on the job, provided that it's for business purposes, up from 19 percent in 2009. Conversely, 31 percent prohibit it in the office. The remainder said social networking is allowed for limited personal use (14 percent) or any personal use (4 percent).

The disparity between what staff say they're doing with social media and what IT departments allow isn't unusual. Software security vendor Clearswift received mixed messages about social media when it polled 1,529 employees and 906 managers for its annual research report, WorkLifeWeb 2011.

According to Clearswift, the proliferation of high-profile data breaches is leading businesses to clamp down on social-media use. Its survey found 19 percent of companies worldwide are outright blocking employee access to social-media sites, up from 9 percent in 2010. A significantly higher number of managers said their companies are selectively monitoring internet activity and blocking access to certain social sites.

Security fears are behind this retreat from social media. Half the managers surveyed think employees are oblivious to security concerns, and almost as many are worried about the leakage of confidential data via employees.

Andrew Wyatt, Clearswift's COO, said the backlash is a short-term reaction to some highly publicised data leaks. "The research provides evidence that businesses do recognise the importance of new technologies, which leads me to believe that this is a knee-jerk reaction rather than a long-term trend," said Wyatt.

> **50 percent of managers think their employees are oblivious to security concerns**

Attempts to suppress social-media activity wouldn't sit well with staff. Nonetheless, for the sake of security, risk management and regulatory compliance, firms need to craft and enforce acceptable use policies for social media.

These days, such policies are common, but security controls are lacking. In a recent Ponemon Institute survey, only 29 percent of firms had security controls in place to mitigate or reduce the risk.

In the end, letting the reins out on social-media use is tough because it requires trust. While it's critical for IT departments to address security and compliance, social-media thrives on uncensored communications. Finding the right balance is key. ⊠

Thai floods lead to increase in PC prices

After residents and local businesses, the UK consumer looks set to be one of the hardest hit by recent flooding in Thailand. PC Advisor investigates

The price of PCs is set to rocket after a series of floods in Thailand sent hard-drive costs through the roof.

The floods, which have plagued the country since July and so far claimed more than 380 lives, resulted in hard-drive manufacturers Western Digital and Toshiba halting production of drives and temporarily shutting down their factories in the country. Meanwhile, Seagate Technology said the supply of components to its factories in Thailand has also been disrupted.

Thailand accounts for up to 45 percent of worldwide hard-drive production and the flooding has damaged more than a dozen factories producing them, according to industry research firm IDC.

Western Digital, which is the largest producer of hard drives, is expected to be the hardest hit. IDC predicts that up to 75 percent of its production will temporarily shut down. The company could even lose its position as the largest maker of drives.

Meanwhile, IHS iSuppli has predicted that the overall market shortage of hard drives due to factory flooding in Thailand will reach 25 to 28 percent over the next six months. It predicts the number of hard drives shipped during the fourth quarter will decline by 27.7 percent to 125 million units, down from the 173 million shipped in the third quarter.

Vendors are keeping their most valuable customers, computer system manufacturers, supplied with hard drives in favour of the consumer retail market. The existing supply isn't infinite, though, which means eventual shortages will lead to price increases that are subsequently passed on to the consumer. Some analysts predict increases of up to 10 percent over the coming quarter.

Short supplies

The higher cost of hard drives will push up the cost of PCs and external USB drives, said John Rydning, a vice-president of research at IDC. "We generally believe the hard-drive industry will find a way to return to pre-flood production levels by March, but by that point supplies will be at extremely low levels. It's going to be a painful period from December through February for most customers," he said.

According to Rydning, the shortage of hard drives could result in PC shipments falling short by 10 percent in the fourth quarter of 2011 compared to industry analysts' previous projections.

Thailand is the world's second-largest producer of hard drives after China and a major supplier of hard-drive parts. Key component makers are located here – Nidec, for example, supplies more than 70 percent

of the world's hard-drive motors, with customers such as Western Digital, Seagate, Hitachi Global Storage Technologies, Toshiba and Samsung on its books.

Read/write heads are a key component for hard-drive manufacturers. While read/write head wafers are produced in Ireland, the US and Japan, the slider (the block on the tip of a read/write head on which the wafer is mounted) is produced in Thailand.

"For Western Digital, we believe that will be the component most critically short in 2012," said Rydning.

> " **It's going to be a painful period from December through February for most customers** "

IHS iSuppli said the PC industry appears to have sufficient stockpiles to last through the fourth quarter of 2011, but with drive production disruptions expected to last at least six months the shortage could impact laptop production in the first quarter of 2012.

From the second quarter of 2012, laptop makers are likely to start sourcing hard drives from alternative sources in different
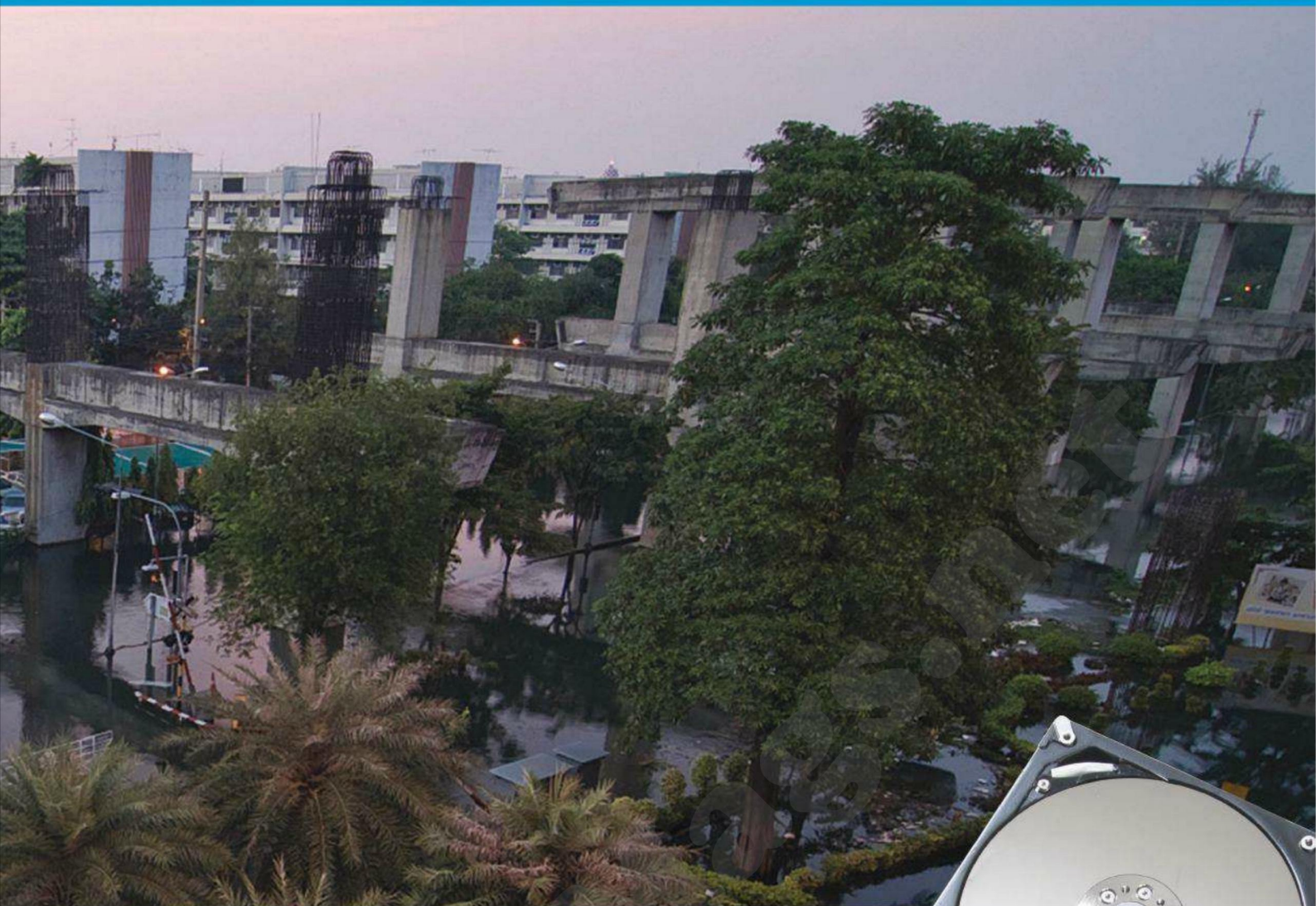
regions and using other types of storage, including SSDs.

Loren Loverde, vice-president at IDC, said hard drives account for between 7 to 10 percent of the total cost of a computer. "We do think that there will be a PC price rise," Loverde said.

Loverde said PC makers could offset the higher price by installing lower-capacity hard drives. SSDs are another possibility, but have a very small market share.

UK PC vendors already affected

According to Ben Miles from PC distributor Chillblast, the price of hard drives is rising by between £5 and £7 per day. He cited components retailer eBuyer as an example. Prior to the floods, eBuyer was offering hard drives from around £40 inc VAT; it now charges around £170 inc VAT. In fact, Miles said it's currently impossible for consumers to obtain a hard drive for less than £100.

Chillblast didn't immediately adjust the price of its desktop systems to reflect the surging cost of hard drives, which resulted in a loss on every machine it produced. Miles said this could have put the company out of business, which left Chillblast with no other option than to increase the price of every system containing a hard drive by £50 excluding VAT.

Chillblast has enough hard-drive stocks to complete its 2011 orders, but if supplies don't start flowing by 2012 then it may have to increase its prices again. Miles said that some analysts optimistically expect supplies to begin returning to pre-flood levels by February 2012, although others think it'll be closer to August. As Miles pointed out, it's not just a case of draining away the flood water from factories - equipment will also have to be rebuilt, which could take many months.

Miles advised consumers that need a new PC to buy as soon as possible, before prices rise even more. He also encouraged potential buyers to consider opting for solid-state storage, since the price difference between hard drives and SSDs is at an all time low.

More price hikes to come

Most computer manufacturers are in the same boat as Chillblast. Acer has already raised the price of its laptops in reaction to the situation, which chairman JT Wang called a "bottleneck" in the production chain.

Meanwhile, Jonathan Bakewell from Eclipse said the company has also had to increase the price of its systems by between 5 and 10 percent to cover the rocketing price of hard drives. According to Bakewell, the company has been hit "hard and fast"

with the price of hard drives "more than doubling" over the past few weeks. Eclipse has had no choice but to pass on these price increases to the consumer.

"Supplies are definitely running out," he said, while also revealing it could be at least six to nine months before hard-drive manufacture reaches the production level it was at prior to the floods.

"It's going to take a long time for the market to recover," Bakewell said. The initial impact of the shortages has been hard, he admitted, although he doesn't expect prices to continue to rise with such gusto. ⊠

NEWPRODUCTS

If you're curious about the products that will be piquing the interest of gadget fans in 2012, Rosemary Hattersley and Carrie-Ann Skinner have the skinny

Packard Bell oneTwo »

All-in-one PC

Packard Bell has revamped its oneTwo all-in-one PC, shedding a third of the original model's bulk along the way. The slimline entertainment PC packs in a Blu-ray drive, a choice of AMD or nVidia graphics, Creative THX TruStudio PC 5.1 surround sound speakers, a 5-in-1 card reader, a webcam and a host of digital connection options. Geared up to become a home-entertainment hub, the oneTwo comes in 21.5in and 23in touchscreen versions, each supporting a 1920x1020-pixel full-HD resolution and HDMI.
From £599 inc VAT
packardbell.co.uk

Ferguson Hill FH009 ⌄

Speaker system

Ferguson Hill has launched a new model in its Perspex speaker range. The FH009 is described by its maker as an "integrated home AV system". The speaker horns can either be wall-mounted or sit on stands either side of a state-of-the-art flatscreen TV or home audio system. Ferguson Hill also sells an audio receiver system that is just about small enough to fit on a shelf below the TV. This accepts inputs from any MP3 player or iPod, although there's no iPod dock to spoil its good looks.
£795 inc VAT
fergusonhill.co.uk

SanDisk Eye-Fi

Wireless SD Card

We've always liked the idea of the Eye-Fi – a wireless SD Card that lets you send photos straight from your camera to an online gallery or web archive for safekeeping. It seems SanDisk likes it, too: the flash memory company has teamed up with Eye-Fi and is co-branding its Wi-Fi memory cards in Europe. The Class 4 cards now support 802.11n wireless and come in 4GB and 8GB capacities.
£36 inc VAT (4GB)
eye.fi

LomoKino 35 Movie Maker ⌄

Analogue video camera

Lomography embraces the moving picture with this 35mm film camera. It can take a series of stills, then process them as a jerky movie that's reminiscent of the early days of cinematography. A standard 35mm film roll accommodates 144 frames of footage, so you need to plot your story carefully. The LomoKino has a tripod thread to reduce the amount of amateurish judder. Footage is imported to a PC for editing and output.

The starter Kinemacolor bundle (£87) includes the camera, a KinoScope viewer and a roll of special film.
From £65 inc VAT
lomography.com

Pure Highway 300Di ⌄

In-car DAB radio

Pure has launched the Highway 300Di, an in-car DAB radio that upgrades almost any car radio to accept digital radio broadcasts. Its compact interface box can be installed in a discreet location, while a glass-mountable dual aerial is fixed to both sides of the windscreen to obtain the best possible signal. Unlike the original Highway, however, the 300Di must be professionally installed.

Station selection and playback control is handled by a removable controller unit with an LED display and backlit buttons. This offers 30 station presets and can pause and rewind live digital radio. iPads, iPhones and iPods can also be connected.
£179 inc VAT
halfords.co.uk

⟫ Toshiba Portégé Z830
Ultrabook

The Portégé Z830 is Toshiba's first ultrabook – a new class of laptop that's being championed by Intel as successor to the netbook. The 1.12kg, 15.9mm-thick Z830 runs a second-generation Intel Core i3 or i5 processor and has a 13.3in non-glare HD LED display. Its durable magnesium-alloy chassis is finished in brushed metal, while a 128GB SSD helps keep down the weight. This Windows 7 Home Premium or Professional laptop also comes with up to 6GB of DDR3 RAM, a 1.3Mp webcam, a USB 3.0 port, two USB 2.0 ports, HDMI, an SD Card reader, a spill-resistant keyboard, and Wi-Fi and Bluetooth 3.0 connectivity.

£899 inc VAT
toshiba.co.uk
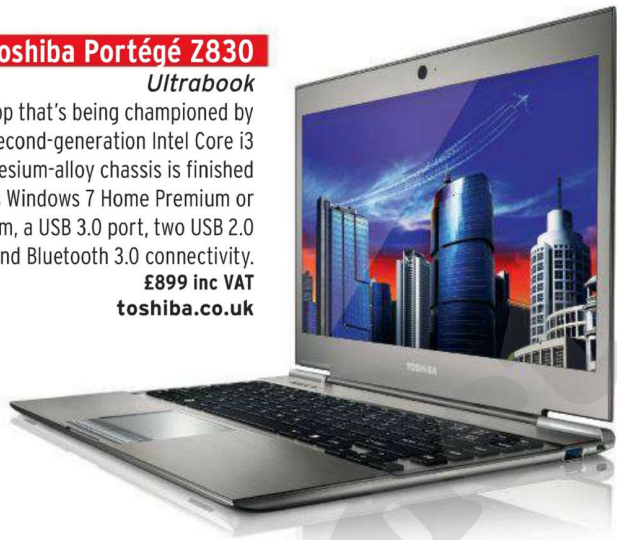
PowerSkin AP1511SEN Silicone Case ⌄
Smartphone case

The admirable multitasking skills of today's smartphones can often prove short-lived: battery drain is a real issue. If you spend the day constantly checking your email, surfing the web and listening to albums, your handset will probably be out of juice by the time you settle down in the evening for a bit of YouTube action.

The PowerSkin AP1511SEN Silicone Case with a built-in battery can power your phone for up to 360 more talk time minutes and boost its standby time by 225 hours. The tough case is made from recycled materials, is non-slip and contains a 1,500mAh battery. Versions are available for the HTC Sensation and Desire HD, Samsung Galaxy S and S II, as well as several BlackBerry handsets.
£49 inc VAT
powerskin.co.uk

Philips Fidelio AS851 ⌄
Android speaker dock

Philips says its trio of Fidelio-branded Android speakers are the first in the world to support Google's mobile platform – the variety of designs and location of the charging points has previously been cited by audio companies as a reason not to offer Android-specific products. Philips has worked around this problem with an adjustable MicroUSB adaptor that can be positioned as required. A dedicated app is used as a remote control. The 30W speakers offer rich, deep bass.
£199 inc VAT
philips.co.uk
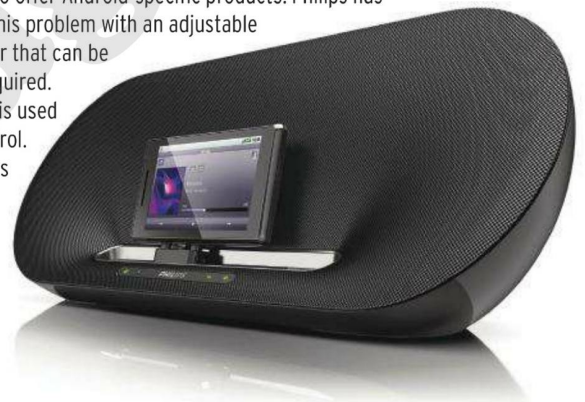
HP Pavilion dm4 Beats Edition ⌄
14in-screen laptop

HP has injected a bit of cool into its laptop line-up by teaming up with Dr Dre's Beats Audio brand. The Beats Edition version of its Pavilion dm4 laptop is supplied with its own subwoofer. Offering "the ultimate listening experience", the 14in HD LED screen laptop runs Windows 7 Home Premium and has an Intel Core i3 processor, a dedicated AMD Radeon graphics card and 4GB of DDR3 memory. A webcam, media-card slots, Bluetooth and Wi-Fi all feature on this black-and-red-clad laptop. The dm4 Beats Edition is set to go onsale in the UK in early 2012.
£899 inc VAT
hp.com/uk

Sony Ericsson Xperia Active ⌄
Android smartphone

Fitness gadgetry seems to be all the rage. The Xperia Active Android Gingerbread smartphone has a 3in LED-backlit Bravia screen, 3G and Wi-Fi connectivity, and a 5Mp camera with an 8x digital zoom. The striking-looking handset is splashproof and dust-resistant, while its touch-sensitive screen is able to discern digits even when they're wet. Detachable straps for the accompanying earphones make it suitable for use during physical activity. UK users also get a LiveView accessory that acts as a mini remote control.
£245 inc VAT
sonyericsson.com

Monitor Audio i-deck 200
Speaker dock

Speaker docks come in many guises, but few have the audiophile credentials that the i-deck 200 can cite. A pair of 100mm C-CAM bass drivers, custom-configured 50W amplifiers and 25mm gold dome tweeters provide exceptional sound quality. The 2.5kg speaker dock is compact, but it's been lovingly designed. A digital signal processor adjusts the output depending on where the speaker is sited, while a 28/56bit digital-to-audio converter optimises the sound source. The i-deck works with all current-generation iDevices.

£399 inc VAT
monitor-audio.co.uk

iball3
Game

Remember the simple but compelling electronic game Simon? If so, you'll understand the appeal of the iball3. Six lights must be illuminated in the correct order and at the right time for you to earn your place on a worldwide leaderboard. Once you've practised enough to progress beyond the first two levels, you can unlock a unique ID code and begin competing against other players via a web portal. This deceptively tricky game is likely to confound adults and kids alike, making it ideal for entertaining the family this Christmas.

£15 inc VAT
iball3.com
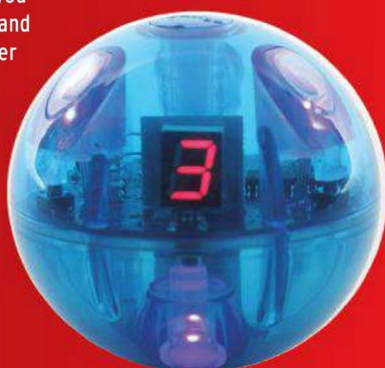
Hannspree Apple
Digital photo frame

We can't help but love this unusual apple-shaped digital photo frame. The 7in screen sports a resolution of 800x480 pixels and has a contrast ratio of 500:1. Photo slideshows can be played from a removable memory card. Hannspree also includes a USB port, allowing you to use other image sources and directly connect a digital camera. The frame also offers clock, alarm and calendar functions.

£35 inc VAT
hannspree.com/eu

Garmin FR70 Fitness Watch
Watch

Set yourself a fitness goal and make sure you're keeping to it with the FR70 Fitness Watch from Garmin. It can monitor your heart rate, how many calories you've burned and the length of your session. Subtly different in design to Garmin's existing Forerunner GPS watches, the Garmin FR70 hooks up with other ANT+ compatible devices such as treadmills and gym cycles. An optional wireless pod can be used to measure cadence and speed. The GPS fitness tool works with the Garmin Connect system, which logs workout details and targets achieved. Available only in the US at press time, it costs $129.

Price TBC
garmin.com
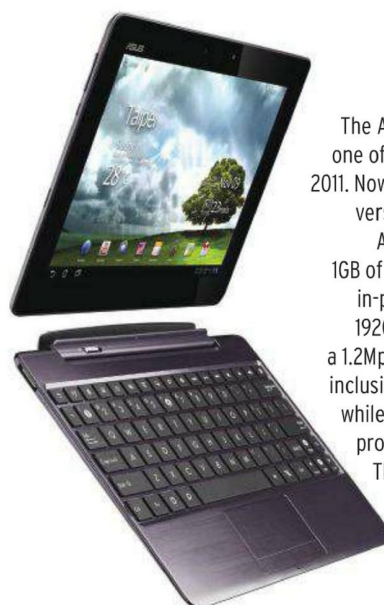
Asus Eee Pad Transformer Prime
Tablet PC

The Asus Eee Pad Transformer TF101 was one of the most likable Android tablets of 2011. Now Asus has announced a 3G-enabled version with a 1GHz nVidia Tegra 3 CPU, Android 4.0 Ice Cream Sandwich and 1GB of RAM. You also get a 1280x800-pixel in-plane switching (IPS) touchscreen, a 1920x1080 video/8Mp stills camera and a 1.2Mp webcam. Audio is enhanced by the inclusion of SRS and support for Dolby 5.1, while navigation gets a boost from more prominent buttons and predictive text. The 16GB Prime weighs 586g and has a battery life of 15 hours. It's set to launch in the UK in spring.

£499 inc VAT
uk.asus.com

Nextivity Cel-Fi RS2 >>

3G booster

If a poor 3G signal is a constant issue in your home and you're an Orange or T-Mobile customer, the Cel-Fi RS2 signal booster may be a wise investment. The signal-booster kit includes a window unit that's placed wherever you get the strongest signal, while a separate coverage unit is placed at the opposite end of the property (both must be plugged into the mains). The result is an amplified signal and fewer dropped calls. A single kit covers areas up to 13,000ft^2.

£500 inc VAT
cel-fi.co.uk

D-Link DIR 645 Smartbeam

Wi-Fi booster

Similar in concept to the Cel-Fi 3G booster, the D-Link DIR 645 boosts a Wi-Fi signal within a property. The D-Link has six multi-directional antennae that bounce signals across existing routers and access points, helping to overcome obstructions such as thick walls and doors. It can also be used to improve the overall signal strength, potentially tipping the bandwidth balance just enough to enable you to push video content as well as music and files around the Wi-Fi network.

£59 inc VAT
dlink.co.uk

TomTom Go Live 1005 World ⌄

Satnav

Drivers can now safely share their ETA with friends thanks to the TomTom Go Live 1005 World. Should you be running late for a very important date, a Twitter feature lets you pre-compose a tweet that TomTom will update with a revised ETA and post on your behalf. Expedia and TripAdvisor apps are also viewable on the device's 5in capacitive touchscreen, letting you access reviews of hotels, restaurants and attractions and compare accommodation prices. The Go Live updates traffic information every two minutes and includes safety-camera alerts. An alternative route viewer lets you see another way to get to your destination.

£329 inc VAT
tomtom.com

RIM BlackBerry Curve 9380

Smartphone

The first BlackBerry Curve to feature a touchscreen display – a 3.2in panel with a 480x360-pixel resolution – RIM's latest handset runs BlackBerry OS 7. It also supports augmented reality and near-field communications (NFC), so you'll eventually be able to waft your phone over a terminal and make micro payments. The BlackBerry browser is one of the fastest around and optimised for HTML5, which is ideal for embedded apps. Social networking, email, messaging, calendaring and navigation apps are all preinstalled. The handset has a 5Mp camera with autofocus, flash and zoom, and can capture VGA-resolution video.

Price TBC
uk.blackberry.com

Panasonic Toughpad FZ-A1 ⌄

Ruggedised tablet PC

This is the first tablet PC in Panasonic's Toughpad series to run Android 2.3. It meets the same durability standards as the company's Toughbook laptops – the dust- and waterproof FZ-A1 is able to withstand extreme temperatures and drops up to 120cm. The 10.1in multitouch tablet features a 1.2GHz Marvell dual-core chip – a tamper-proof processor that handles software and data encryption. Bluetooth and Wi-Fi connectivity are supported, while 3G is optional. This 970g device has 16GB of storage and a daylight-viewable screen with an anti-glare coating. The Toughpad lasts up to 10 hours before needing a recharge.

€850 (around £735)
panasonic.co.uk ⊠

Due to an error in the production process, on page 25 of the January 2012 issue we used the wrong image to illustrate the Asus Eee Pad Slider. We apologise for any confusion.

ANDREW
HARRISON

Back to the desktop

Times have changed since the mid-90s when *PC Advisor* launched, and no more so than in the field of the personal computer.

As we approach our 200th anniversary – that's 200 issues, of course, not years, since even Babbage hadn't alighted on his mechanical computer by 1811 – we've taken stock of the way we review PCs. In particular, the traditional notion that most people still have of the PC as a boxy tower that lives under the desk and drives a monitor by keyboard and mouse.

That desktop PC paradigm survives with enthusiast machines such as the PC Specialist system overleaf, which takes a new generation of multi-core 'Bulldozer' processor from AMD.

But buying habits have changed, and a 'PC' now is as likely to be a laptop or tablet. When a static PC is needed, it could be dedicated to gaming, media or business. In the first of our new series of desktop PC group tests, we look at general-purpose systems that can turn their hand to a variety of tasks in the home. See page 76.

Also taking most computing tasks in their stride are the multimedia laptops featured from page 60. These are akin to the desktop-replacement laptops of a few years ago, with similar processing power to desktop PCs. Their decent graphics chips enable Windows gameplay, while large screens aid enjoyment of films and gaming.

If it's cutting-edge performance you crave, we've been busy testing the first peripherals to feature the über-fast Thunderbolt interface. This Intel/Apple-designed means to connect storage and peripherals is currently found only on Apple PCs, but in the same way that various technologies were pioneered by Apple before trickling into the Windows world – think USB, Wi-Fi, FireWire and integrated laptop webcams here – you can expect to see this useful next-generation connectivity more commonplace in the coming year. ⊠

Scoring and pricing explained
PC ADVISOR TEST CENTRE

How we rate hardware
We look at how well a product is made, judge its specs and features by current standards, and consider its value for money.

How we rate software
How easy software is to install and use, what it offers in features and its price are considered.

Gold award
PC ADVISOR GOLD The *PC Advisor* Gold award honours product excellence.

Recommended award
PC ADVISOR RECOMMENDED Recommended awards are given to high-quality products that don't quite merit a Gold award.

Prices
All prices are RRPs 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.

ENTHUSIAST PC

PC Specialist FX-8150 HD

While AMD missed the boat for mobile computing, its desktop multi-core processors are still popular in workstations, servers and fire-breathing enthusiast PCs.

This PC Specialist system takes one of AMD's new '8-core' chips. Its FX-8150 is a 3.6GHz processor that's been overclocked to 4.4GHz. The system's 8GB of memory is supplied as two high-performance 4GB Corsair HyperX modules. And for extra responsiveness, the boot drive is an Intel SSD, just 80GB in capacity, but supplemented by a 1TB hard disk from Western Digital.

These components are fitted to an Asus M5A99X Pro motherboard,

which supports the fast SATA 6 gigabits per second (Gbps) interface.

Our review sample came housed in a macho Cooler Master case with red glowing coals visible through the front grill. This is a tough-looking case with three cooling fans fitted, although the largest top fan was disconnected – it was probably rendered unnecessary by the chunky Fenrir CPU cooler.

The combination of two case fans and another four from the CPU, GPU and PSU means the PC Specialist is far from silent, but it doesn't drive you to distraction either. The idle power draw is a not-inconsiderable 140W, and rose to 330W under load. That's a third of a kilowatt to keep your electric meter spinning.

PC Specialist has selected a PowerColor version of the AMD Radeon HD 6970 for graphics, while system power is sourced from a Corsair TX750 power supply.

As with the CyberPower Ultra 6 Core system in our family PC group test (page 79), we had trouble benchmarking this system due to some issues between the chipset and WorldBench. Specifically, the Nero component refused to complete, resulting in a final score of 132 points. If it had

finished, we'd estimate a score of no more than 150 points, placing this hungry CPU below the Intel Core i5-2500 in performance terms.

Gaming results were good from the combination of AMD CPU and GPU. Our standard 'High' test in Crysis drew a score of 50fps, while Stalker: Call of Pripyat flew by at 143fps (720, Medium detail) and 104fps (1080, Ultra detail).

Also included with the system is a Blu-ray optical drive that can not only read but write to BD media.

Compared to most UK vendor PCs, packing and presentation of the PC is to a very high standard. The warranty covers a single year, although you get three for labour.

Verdict

If you're looking for a cost-effective way to get some serious performance through many processor cores, it may be worth investing in a cheaper and faster-performing Intel Core i5 PC, let alone one with an i7 processor. AMD's Bulldozer processors don't present much of a threat to Intel's monopoly just yet, but PC Specialist's FX-8150 HD is a solidly made PC and reasonably fast. We suspect that enthusiasts shopping at this price would prefer something they could call "really fast", however.
⊠ **Andrew Harrison**

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

★★★½☆

THUNDERBOLT STORAGE

Promise Pegasus R6

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

★★★★☆

Launched in July 2011, the Promise Pegasus was the first external Thunderbolt device available that could connect to Intel and Apple's new high-speed interface.

Formerly known as Light Peak, the current incarnation has been developed to work over copper wires, albeit over very sophisticated cables. The Thunderbolt cable in fact hides several transceiver chips inside its plug, optimising the transmission line for the truly breathtaking speed for which the standard is specified.

With the help of this 10Gbps interface, there should be ample headroom to let a clutch of hard disks reach incredible read/write

speeds, using a Raid configuration to stripe data across multiple disks. In the case of Promise drives, this is a hardware rather that software Raid setup, which also bodes well for maximum performance.

Two version of Promise's Thunderbolt desktop storage unit are offered: the four-bay R4 and six-bay R6. Each removable tray accepts a 3.5in or 2.5in drive.

The latter capability is useful for bleeding-edge professionals who need – and can afford – to equip the Pegasus chassis with blindingly fast SSDs of 2.5in form.

The Pegasus R6 is a neatly finished tower, clad in a steel wrap with plastic fascia, all sprayed in

aluminium-coloured paint. The trays pop out easily after depressing a square button on the front.

Two Thunderbolt ports are the only connections offered, and allow the R6 to sit within a daisy-chain of such devices. This means there's no legacy support for anything but Macs; an eSATA or FireWire port could have proved useful.

Our sample came preloaded with six Hitachi Deskstar 7K1000 disks (3.5in SATA 3Gbps, 7,200rpm), pre-configured as a Raid 5 array. The current maximum capacity for 3.5in disk technology is 3TB, so up to 18TB of storage is possible.

Set up in Raid 5 with 1TB disks, you still get a giddy 4.5TB of online

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

★★★★☆

LAPTOP

HP ProBook 4530s

The HP ProBook 4350s is aimed at professional users who frequently travel and need a reliable working companion. An impressive build and specifications also make it a solid laptop for home and multimedia use.

The 15.6in LED-backlit screen has a 1366x768-pixel resolution. The panel offers slightly dull colours, but we like its anti-glare matt finish.

For a work-focused laptop, the keyboard is suitably usable. The keys are well spaced out and of a decent size, while a numeric keypad is provided to the right. It's also spill-proof. The Up and Down arrow keys are slightly squashed together, however, and it's difficult not to accidentally brush the large touchpad as you type.

There's a fingerprint reader for additional login security, while HP bundles software that helps protect your PC both on- and offline.

Wireless 802.11b/g/n and Bluetooth 3.0 are standard, while an array of ports includes VGA, HDMI, USB 2.0 and 3.0. A built-in 3G modem is optional.

The 640GB hard drive offers plenty of storage for most users, while the ProBook also has a DVD rewriter. The laptop's standard 4GB of RAM can be upgraded to 8GB should you need more.

The HP demonstrated a handy turn of speed in our tests, with the ProBook's 2.3GHz Intel Core i5-2410M processor propelling it to 115 points in WorldBench 6. This score isn't mind-blowing, but it's far from disappointing.

The version of the 4530s we reviewed doesn't appear to be available in the UK. Our sample was fitted with AMD Radeon HD 6490M graphics and 1GB of video RAM, plus a 640GB hard drive; the closest ProBook we've seen on sale sports an HD 6470M with 512MB of video RAM and 320GB of storage.

With the faster graphics chip inside, the ProBook 4530s scored 39fps in our Fear gaming test at 'Maximum' detail settings.

Our MobileMark battery-life test revealed a usable runtime, with the HP ProBook able to endure just under 5 hours.

We were most impressed by the ProBook's screen and its solid build quality. The HP's brushed-metal finish inspires confidence, and the laptop looks as though it could easily withstand a life on the road and all the bashes, scrapes and drops that entails.

For use on the move, the 2.3kg chassis won't weigh you down too much – although it is significantly heavier than, say, Apple's MacBook Air (see tinyurl.com/ccpoanm).
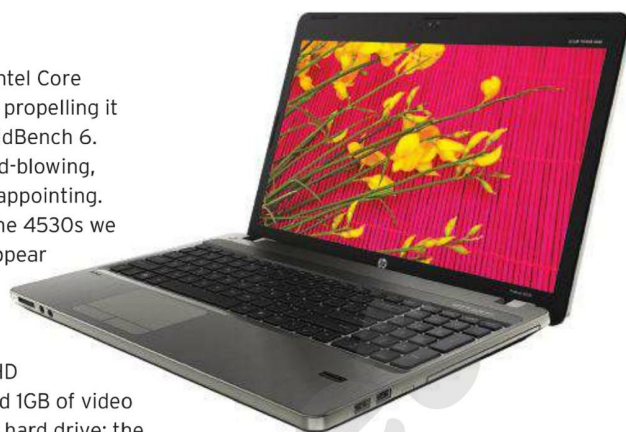
We were less keen on the large amount of software HP preloads. Some of these applications are useful, such as those that boost security, but others are more likely to irritate you than do anything remotely useful.

Even with a powerful Intel Core processor and 4GB of RAM the ProBook struggled with slow startup times. We remedied this by removing the unnecessary programs that were hogging system resources.

Verdict

The HP ProBook is a sturdy, versatile laptop that will suit those who need something both portable and powerful. Its slight build belies its rugged design, with the HP able to withstand some rough treatment. If you're prone to butter fingers, this laptop will be right up your street.
☒ **Ben Camm-Jones**

storage. This array is arguably the best arrangement for three or more disks, typically providing more speed than a single disk alone while also maintaining enough data redundancy for one disk to fail without losing any net data.

A comprehensive software utility for OS X is included, with which you can create different Raid options, audit drives and oversee operation.

In use, the Pegasus remained surprisingly quiet, despite having six churning hard disks and two rear-mounted cooling fans.

The R6 is advertised with transfer speeds up to 800MBps. We were warned by Promise that some Mac benchmark utilities may not reflect this speed, since they don't make use of all available threads. Sure enough, Blackmagic DiskSpeedTest recorded up to 586MBps for writes and 537MBps for sequential reads – both are still incredibly quick transfer speeds.

Using Intech QuickBench, we saw exactly what the Pegasus R6 was capable of. Here, the unit broke the ceiling with record speeds of 869MBps reads (100MB data), and up to 717MBps writes. Even random read/writes of smaller 1MB data chunks were impressively speedy: the Promise posted 524MBps reads and 480MBps writes.

Verdict

The Promise Pegasus lives up to its winged name, and proved to be an incredibly quick desktop storage system for Mac computers. Windows users can look forward to Thunderbolt appearing on other PCs from next year. ☒ **Andrew Harrison**

See page 60 for our multimedia laptops group test ▶

23in MONITOR

LG IPS236V

PC ADVISOR GOLD

Remarkably good image quality, a stylish design and delightful ergonomics make LG's IPS236V an excellent choice for anyone who edits photos or video – or just wants everything to look really, really good.

A showcase of great features, the IPS236V's headline act is its in-plane switching (IPS) panel. This delivers wider viewing angles and considerably better image quality than the twisted nematic (TN) panels found in budget monitors.

Colours are consistent across the screen, and don't appear to shift and dim towards the edges or as you move your head. The result is rock-solid accuracy and strain-free viewing.

But even when the panel is switched off this monitor looks great. LG's design team has put as much effort into the product's looks as it would into a TV set. Its gentle curves, transparent details and touch-sensitive controls add a distinct air of luxury and expense. The housing also conceals a pair of stereo speakers.

Thanks to its LED backlight, the panel is slim and light, making it easy to move around or pack away.

Setting up a monitor via its onscreen menu can be frustrating, but the IPS236V is effortlessly simple to use. Touching any one of the six white dots at the bottom of the bezel brings up a large, clear menu directly above it.

Part of our testing regime requires the use of a Datacolor Spyder 3 calibrator to measure the display's characteristics. This process involves making adjustments in the PC's graphics output to compensate for inaccuracies in the monitor. The LG was so accurate to begin with, however, that we made very few adjustments. The IPS236V is one of the most accurate consumer screens we've seen.

Those without calibrators should therefore be able to edit photos with confidence. Even if this level of accuracy isn't crucial, you will surely notice that this display's images look much better than those of even the best TN screens.

The display's 23in panel makes the monitor a little more compact than a standard 24in model, but it supports a full-HD resolution of 1920x1080 pixels and delivers a very crisp and clear image.

The LG features an anti-glare coating. A headphone socket, VGA, DVI and HDMI inputs are found on the rear, while the slimness of the chassis is facilitated by the use of an external power adaptor.

While the quality of the display is high throughout, the stand doesn't match that of a professional monitor.
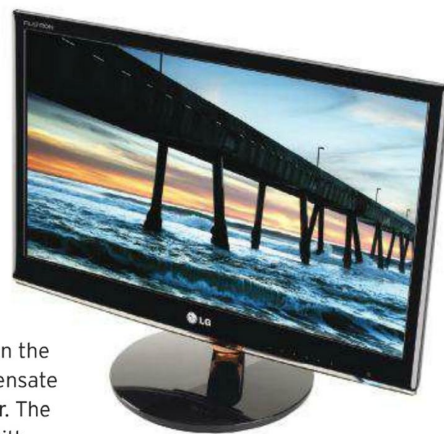
It may be pretty, but it doesn't include any height adjustment or pivot function, and the amount of tilt available is rather small.

Performance

The maximum brightness in our tests was a usefully bright 219cd/m², while the contrast ratio was 500:1. The LG's uncalibrated colour error was just 0.9dE (maximum of 3.8dE). We measured a colour gamut of 74.7 percent of the NTSC space, and 105.5 percent of sRGB.

The LG consumes just 30W, which drops to 20W with the brightness set to 120cd/m².

Verdict

Such a combination of style, features and superb performance makes the LG IPS236V a superb monitor, which is all the more incredible when you consider its budget-friendly £150 asking price.

⊠ **Paul Monckton**

23IN MONITOR

LG DM2350

If your PC and TV live in the same room, you can save a considerable amount of space by purchasing a combined TV/monitor such as LG's DM2350 3D TV monitor.

Design-wise, LG is on to a winner. The monitor resembles one of the company's lounge-friendly TVs, incorporating a glossy black finish, gentle sweeping curves, a transparent trim and discreet touch-sensitive controls. You also get a full-sized remote control.

A full set of inputs is provided, including VGA, Scart, component video and two HDMI. Optical digital is also provided.

An internal tuner provides digital TV support for Mpeg4, DVB-C and DVB-T formats, although Freeview HD isn't supported. A USB port lets you plug in storage, from which the monitor can play video.

Your PC is best connected to the screen via HDMI. We often see problems when hooking up PCs to monitors this way, due to the differences in how they follow the HDMI standard, but LG avoids the issue by detecting the connection, asking whether you're connecting a PC and then optimising the display.

A major selling point for this display is its 3D capability. The DM2350, like many 3D TVs, uses passive polarised glasses to achieve the effect, rather than pricier active-shutter types.

This polaroid version of 3D tech makes the LG capable of 3D playback direct from a 3D Blu-ray player. We donned the supplied specs and tried *Alice in Wonderland*. The DM2350 detected the 3D mode automatically. It worked flawlessly, producing a convincing 3D effect, although we found that the viewing angle and distance from the screen needed to be just right for the best results.

The TV will also have a stab at adding another dimension to 2D sources. We tested this option on the 2D version of the film and saw a marked difference – enough to warrant the inclusion of the feature.

Blu-ray playback in 3D isn't supported from your PC, but other

Specification
23in 3D monitor; 1920x1080 resolution; LED backlight; 0.265mm pixel pitch; 250cd/m² brightness; 5ms response time; 170/160-degree viewing angle; 16.7M colours; '20,000,000:1' dynamic contrast ratio; D-Sub; DVI-D; HDMI; tilt -3/19 degrees; VESA 75 mount; built-in speaker; 3-year warranty; 547x399x190mm; 3.2kg

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

★★★☆

23in 3D MONITOR

AOC e2352Phz

The AOC e2352Phz is a 23in super-slim full-HD monitor, with the added bonus of 3D support that's compatible with both nVidia and AMD graphics cards.

The monitor has a polarised panel that works in conjunction with the bundled Windows-only TriDef software to enable 3D graphics on a PC. There's support for 3D photos, video and gaming, but watching Blu-ray in 3D isn't possible.

Unlike nVidia's 3D Vision, which requires active-shutter glasses, TriDef uses cheaper passive polarised glasses. A pair is included in the box, along with a set of clip-on lenses for spectacle wearers.

Using a polarised display has the disadvantage of halving the screen's resolution while in 3D mode. This is because half the screen's available pixels must be simultaneously sent to each eye. In this setup, left- and right-eye images are interleaved as alternate rows of pixels.

TriDef's Ignition application automatically scans your PC for games, which it then matches against a 500-strong list of pre-built profiles that are designed to achieve the best 3D experience. You can launch games directly from this application and it will take care of the setup for you.

When the 3D mode works it's reasonably convincing, although the effect is sensitive to your viewing angle. It's not as silky-smooth as we'd like, but many of our problems were solved by installing an upgrade. For now, nVidia's 3D Vision offers the better experience.

YouTube also provides 3D content, and the AOC is a great monitor on which to view it. You also get support for Google Earth.

The TriDef software comes with its own photo- and media player applications that automatically switch into 3D mode when required.

Of course, you'll be using this display in 2D mode more often than in 3D. In this configuration the AOC behaves much like any other monitor based on a low-end TN panel. Viewing angles are somewhat restricted and colours inaccurate.

An LED backlight helps slim down the display, but AOC has still found room to fit an internal power supply. HDMI, DVI and VGA inputs are provided, along with an audio input and headphone socket.

Despite what is a very large, clear and rather pretty onscreen menu, the display's control buttons can be frustrating. The button legends are difficult to read unless they're brightly illuminated, while operating them by touch alone often results in pressing the wrong one.

Performance

AOC claims a 250cd/m² maximum brightness, which isn't far off our test results of 222cd/m². We measured a strong contrast ratio of 651:1, while the average uncalibrated colour error was 7.8dE.

With reference to NTSC, we found the AOC could reproduce 78 percent of the colour gamut, and 110 percent of the sRGB gamut.

At maximum settings the AOC consumed 33W; 24W at 120cd/m².

Verdict

If you're keen to see 3D on your computer, the AOC e2352Phz is an effective – if not trouble-free – solution. If you have an AMD-based graphics card and can't use nVidia's 3D Vision, then this screen offers an alternative way of playing 3D games and other stereoscopic content, with the notable exception of Blu-ray.
⌧ **Paul Monckton**

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types of 3D video and gaming are enabled through the TriDef software. This lets you view 3D videos on YouTube, and will search your PC for games that match its 3D profiles.

Other games may also work in 3D with a little tweaking of the settings.

Unlike the 3D Vision system, the TriDef software doesn't require an nVidia graphics card. This means AMD users can enjoy 3D video, too.

The display offers a fine level of control over colour output and display quality via a large menu.

A Picture Wizard guides you through a simple interactive process to get the very best picture possible. With no technical knowledge, you'll be correcting black level, brightness, gamma and colour temperature with just a few clicks.

Performance

We were impressed by the quality of the DM2350 display. Its TN panel suffers from restrictive viewing angles, but our measurements revealed that LG has done a good job of keeping the colour accurate.

The LG's maximum brightness in our tests was high at 240cd/m², and the contrast ratio impressed at 696:1. The panel could cover 77.2 percent of the NTSC range and 109 percent of the sRGB gamut.

At full brightness it consumed 40W, and 30W at 120cd/m².

Verdict

Despite its TN panel, the DM2350 delivers very good images. It may be pricey, but this excellent TV/ monitor combines performance with style, superb usability and top-notch features. ⌧ **Paul Monckton**

27in MONITOR

Apple Thunderbolt Display

£899 inc VAT

Contact
- apple.com/uk

Read more
- tinyurl.com/3fu9y9c

Specification
27in LCD monitor; 2560x1440 resolution; IPS panel with LED backlight; glossy glass front; Thunderbolt connection through Mini DisplayPort connector; 3x USB 2.0; 1x FireWire 800; 1x Thunderbolt; gigabit ethernet; power consumption (no MagSafe use, or peripherals): 23W min, 97W max, 50W average room setting; 491x650x207mm; 10.8kg

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

★★★★½

The fastest data interface ever seen on a consumer PC was launched in February this year. Thunderbolt, formerly Light Peak, is now featured on nearly every Apple Mac.

Only a few devices are available to use the technology. The first two were storage drives from Promise (page 34) and LaCie. Adding to that list is Apple's Thunderbolt Display.

Apple used to have a line of coveted monitors with anti-glare screens in 20in, 23in and 30in sizes. Now it's focusing on just one display, the 27in Thunderbolt Display.

The Thunderbolt Display looks identical to the outgoing Cinema Display LED and uses the same gorgeous 2560x1440-pixel LCD. Like previous designs, it majors with in-plane switching (IPS) tech to give unspoilt viewing from every angle.

Like the previous generation of Apple's displays, though, the Thunderbolt Display puts a pane of glass in front of the LCD. At a single stroke, this makes the display useless for many design

professionals who can't work with distracting reflections.

We found the Thunderbolt Display could work well with the blinds down and lights dimmed. In any other situation, it was too reflective for comfortable use.

The display is customised for use with MacBooks, with a MagSafe power connector able to power an Air or Pro through the screen.

With laptop and screen coupled, several useful ports become available to the MacBook. At the rear are gigabit ethernet, FireWire 800, three USB 2.0, and another Thunderbolt port to daisy-chain to a compatible device. There's no support for USB 3.0.

Built into the bezel is a mic and webcam, the latter specified as a 'FaceTime HD' camera rather than 'iSight'. It can provide an HD image when used with Skype or FaceTime,

but a fast upload speed is required for your partner to see you in HD.

Speakers are hidden in the underside of the Thunderbolt Display's bezel, where they provide clear sound with some impression of bass. High-efficiency class D amps give a slightly gritty sound.

Verdict

The Thunderbolt Display offers invaluable expansion to make a seamless one-stop solution for recent MacBooks. We don't like glossy panels, but excellent features and build quality atone.
☒ **Andrew Harrison**

GRAPHICS CARD

Sapphire AMD Radeon HD 6790

PC ADVISOR RECOMMENDED

£100 inc VAT

Contact
- sapphiretech.com

Read more
- tinyurl.com/6p9b7kz

Specification
AMD Radeon HD 6790; 1GB GDDR5 RAM; 840MHz core clock; 1,050MHz memory clock (4.2GHz DDR effective); 400MHz Ramdac; 256bit memory interface; 800 stream processors; 40 texture units; 16 ROP units; PCI Express; 2x 6-pin power connectors; DirectX 11.0; 2x DVI; HDMI 1.4a; DisplayPort

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

★★★★☆

The AMD Radeon HD 6790 is a modestly priced card that offers enough performance for gaming.

The 6790's processor is in essence a pared-down version of that used by the 6850 and 6870. It sacrifices a number of stream processors: the 6790 offers 800, against the 960 and 1,120 delivered by 6850 and 6870 respectively. This should still be enough for the majority of today's games, however.

There's also a drop in texture units, with the 6790 offering just 40 in place of the 48 and 56 of the two 6800-series cards.

Elsewhere, the 6790 is well specified. The 256bit memory interface is wide, and clock speeds are good – the Sapphire's core clock runs at 840MHz, while its memory clock runs at 1,050MHz (4.2GHz DDR effective).

The 6790's memory bandwidth of 134.4GB per second (GBps) beats the 128GBps of the more expensive Sapphire 6850. This should equate to plenty of raw speed.

The Sapphire has four ports, with two DVI, HDMI and DisplayPort. It requires two six-pin connectors for power.

Sapphire quotes a decent thermal design power (TDP) of 115W, with the 6850 specified at 127W and the 6870 151W.

Noise levels were modest in our tests, with the 6790 significantly audible only when under full load.

The 6790 struggles to keep up in full-bore gaming. In general performance, it's slightly below nVidia's successful GTX 460 series.

In Crysis, for example, the 6790 hit 24.8 and 19.4fps at 1680x1050 and 1900x1200 resolutions. The GTX 460 with 768MB of memory notched up 26.9 and 20.8fps, while a 6850 stands clear with 27.8 and 22.9fps.

In Stalker: Call of Pripyat, the 6790's figures of 29.8 and 24.9fps were several frames away from the 460's 34.6 and 27.3fps, while the 6850 posted 36.1 and 29.3fps.

In BattleForge, the 6790's 25.7 and 20.1fps slipped behind the 460's 27.1 and 21.8fps, and very noticeably trailed the 6850's 32.2 and 25.9fps.

Verdict

The Radeon HD 6790 offers a step down in performance from the 6850, despite its similar technology. Its price tag is also smaller, however, and the £25 price difference enables this Sapphire to mark itself out as a high-value option. If you're shopping for a graphics card at around £100, the 6790 is currently the card to buy. ☒ **Robin Morris**

PRINTER
Kodak Hero 5.1

PC ADVISOR RECOMMENDED

£100 inc VAT

Contact
- kodak.co.uk

Read more
- tinyurl.com/6s5bw3b

Specification
Printer/scanner/copier; 9600dpi print resolution; print speed: B=12.2ppm, C=6.8ppm; 1200dpi scanner optical resolution; USB 2.0; 802.11b/g/n; Pic Flick app; Google Cloud Print support; 2.4in TFT display; PictBridge; memory card slot; cartridge costs: B=£12, C=£13; print yield (pages): B=670, C=390; 422x399x183mm; 6.3kg

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

★★★★½

The 5.1 is the entry model in Kodak's Hero series, although its £100 price tag suggests this line-up isn't designed to be cheap and cheerful.

The 2.4in display is colourful, but the interface is old-fashioned. There are no touch-sensitive controls, and no onscreen graphics. A cursor pad is available for navigation.

Wi-Fi comes as standard, and you can use the Pic Flick app to directly hook up an iPhone, BlackBerry or Android handset. Kodak borrows Google Cloud Print for wireless printing. This works well, but it isn't as slick as it could be. PictBridge and a card reader are also included.

The paper feeding is basic but effective. There's no dual-feed option, but the printer can take up to 100 A4 sheets (or 20 using photo paper). The input tray is easy to adjust, and we couldn't trip up the feeding mechanism.

The Kodak includes a solid scanning component. The lid's flimsy and doesn't offer as much lift as we'd like, but it's well padded.

The Hero doesn't make the best text printer. That's no reflection on its quality, however, and in the middle and top modes it offers clean and crisp text. Draft mode is faint and poorly defined.

Printing speed isn't great either. Middle mode ran at 6.9 pages per minute (ppm) in our tests. Canon printers' standard modes can exceed 10ppm by comparison.

The top mode offers prints at 1.8ppm, which is typical for inkjets. Print speeds crumble using auto duplex, to 3.7ppm in middle mode.

Graphics are produced at 6.8ppm in draft mode and reasonably colourful, although a light mist appears to discolour the picture.

The 3.1ppm middle mode is marginally slower than the 3.4ppm offered by the more expensive Canon MG5350. Its dark palette is eye-catching, though, and a notch up on the Epson SX445W (page 140).

The Kodak's 1.5ppm top mode is particularly strong with photo paper;
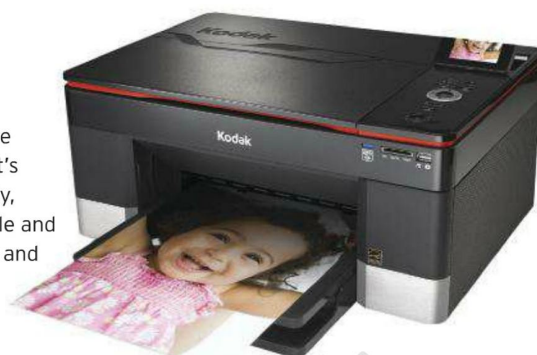
we found the Hero 5.1's reproduction to be extremely faithful.

The cartridges aren't easy to fit, despite there being only two. But the running costs are very good: using high-yield cartridges, we calculated just 1.8p and 3.3p for pages of mono and colour respectively.

Looks-wise, gone is the orange trim that has adorned almost every Kodak inkjet, replaced here with an understated red flash popping out.

Verdict

The Kodak Hero's speed is slightly uninspiring, but it proved reliable in our tests. Its running costs are remarkable. ⊠ **Robin Morris**

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Nikon

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Closing date: 1 February 2012

Specification
Simultaneous dual-band wireless; 1x gigabit ethernet WAN port; 4x gigabit ethernet LAN ports; 802.11a/b/g/n; virtual server; DMZ hosting; VPN pass-through (IPSec/PPTP); DDNS and SIP; 128bit WEP/WPA/WPA2 encryption; 64MB RAM; 2x2 Mimo configuration; 134x110x26mm

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

★★★★☆

WIRELESS ROUTER
Edimax BR-6475nD

To avoid the congested 2.4GHz radio spectrum, select routers such as the Edimax BR-6475nD support an alternative 5GHz frequency. The router broadcasts two separate wireless networks, which can be configured independently with individual settings for each.

The BR-6574nD has four LAN ports and a single WAN port, and is specified for gigabit ethernet. A Wireless Protected Setup (WPS) button simplifies connection for the password-adverse, while a switch at the back lets you manually disable the wireless.

Navigating the web interface isn't a pleasant experience – it's neither well-structured nor user-friendly. Six tabs run across the top of the page, offering access to 'General Setup' and the confusingly labelled 'S' settings, among others. On each tab you'll find submenus that let you adjust the WAN or LAN settings, and there are more menus on the page itself. Make any changes to the router's configuration and it requires

a 60-second reset, which becomes infuriating by the third time you have to do it.

Once you're used to Edimax's menu structure, all the necessary settings can be found within. These include parental controls, wireless security, a NAT- and SPI-based firewall, port forwarding and MAC address filtering.

Edimax has included a simplified Quality of Service (QoS) system, labelled iQOS. This is often ignored because of the vast amount of configuration it requires. With the BR-6475nD, rather than having to manually define every type of network traffic, applications can be prioritised simply by arranging icons on the page. We tried fully saturating our 50 megabits per second (Mbps) cable connection, but didn't find any noticeable difference in browsing speeds or ping times.

The router's good wireless performance made up for its clunky interface. Using the 2.4GHz radio, a 1GB file transferred to our test

laptop at 97Mbps over short range. At long range it managed 41Mbps.

Verdict
The BR-6475nD offers very good wireless performances, but its menu system is one of most frustrating we've seen. Along with the non-descriptive labelling, confusing layout and multi-level menus, the long reset times make this router clunky to setup. At £65, however, it offers good value when compared with other dual-band routers. ⊠ **Orestis Bastounis**

WIRELESS ROUTER
Tenda W307R

We recently looked at the Tenda W300D (tinyurl.com/3b2sxbs), a low-cost router that offered little more than the basics for an 802.11n wireless network. It was let down by poor performance and a terrible web interface. The W307R is an even cheaper, similarly specced router, but designed for use with cable rather than ADSL connections.

Unfortunately, many of the problems we found with the W300D have been carried over to the W307R. The web interface remains

badly constructed. It uses ugly compressed images, confusing labelling and looks more like an amateur attempt at web design than a professional product.

Tenda still doesn't have much of a presence in Europe, and the company relies on its English-language Chinese website. The only support number given on the box is Chinese, while the company address is listed in Shenzhen.

Two black external antennae are attached to the router. It lacks gigabit ethernet, but features four 100Mbps LAN ports at the back, plus a single WAN port. You'll find no extras such as USB 2.0 ports, although there is a dedicated Wireless Protected Setup button.

Once you find the correct menu heading, most of the usual settings can be found – albeit without some of the more advanced options you might expect from pricier models. The W307R lists basic QoS, port forwarding, a virtual server and WPA2 wireless encryption. This

covers the features most users will require from their router.

Despite the Tenda adopting the same software and external appearance as its poorly performing sibling, our tests revealed far better transfer speeds from the W307R.

At a distance of 1m from our PC the router achieved a transfer rate of 78 megabits per second (Mbps); at 10m, through two thick walls, it managed 35Mbps. This is much better than the 57Mbps and 22Mbps we recorded from the W300D. That's impressive, given that this is one of the cheapest routers on the market – some of the pricier routers we've seen are unable to provide transfer speeds this fast.

Verdict
There's only so much you can ask from a product that costs £18. While Tenda doesn't offer all the extras of competing products, the W307R is an excellent cable router for anyone who wants a basic wireless network setup. ⊠ **Orestis Bastounis**

Specification
802.11b/g/n wireless; 2.4GHz SSID frequency; 4x 10/100Mbps LAN port; 1x 10/100 WAN port; WEP/WPA/WPA2/WPA-PSK/WPA2-PSK security; 172x110x31mm; 900g

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

★★★★☆

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Vigor SoHo Series Model Selector

	Line	DECT	3G	WiFi	VoIP
Vigor 2110n	Cable		■	■	
Vigor 2110Vn	Cable		■	■	■
Vigor 2710n	ADSL2+			■	
Vigor 2710Vn	ADSL2+			■	
Vigor 2710VDn	ADSL2+	■		■	■
Vigor 2750Vn	VDSL		■	■	■

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DrayTek
www.draytek.co.uk

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- ☑ Virtually noiseless and maintenance free
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- ☑ VESA mount capability plus Kensington support
- ☑ Built-in wireless (XS35V2, XS35GT V2)

SPEAKER SYSTEM

Orbitsound T12v3

PC ADVISOR RECOMMENDED

Orbitsound's T12v3 distinguishes itself from similar products in several ways. The first is its iPod/iPhone dock; less immediate is its spatial sound facility.

The stand-out feature is the T12v3's intrinsic sound quality. It's not at all accurate in stereo soundstaging, yet its big, confident sound is rather compelling.

Behind a perforated metal grille lies an array of small speaker drivers for mid-range and treble. Four small paper-coned mid drivers are joined by two tiny tweeters, sited close together in the middle.

All the front-facing speakers are wired together in mono, rather than split into two notional stereo halves. The T12v3 creates its cloudy sound with a mid-range driver mounted at each end.

An auxiliary box plays the deep notes, standing 46cm high and 23cm square. This subwoofer's 160mm bass driver is visible only through three rear ports.

The T12v3 is solidly built from MDF and sealed with a thick piano-black lacquer. The bass box is similarly finished.

Inside are three channels of amplification – Orbitsound claims 50W for the mono speakers, another 50W amp for the endcap speakers, and 80W for the bass. These are efficient class D amps, which let the system run from a PSU the size of a laptop charger. They run cool enough to forsake heatsinks, yet produce surprisingly loud volume.

You can simultaneously connect the Orbitsound to four devices, and switch between inputs using the supplied remote control.

Our sample was pre-production, and featured a handy switch to select between mono, semi-spatial and full spatial. Final units are hard-wired to play only the full effect. The lack of an LCD display means you must adjust settings blind.

Most impressive was the simple sense of tune and timing the T12v3 brings out of music. Integration between the bass and soundbar is excellent, with none of the hole-in-the-middle problems found with many sub/sat combinations.

We heard a full-bodied sound that covered the lowest range of the bass guitar, underpinning music with a palpable foundation. Acoustic piano and voices also benefit from this sense of weight, with music appearing life-like.

Only in the higher treble were we let down by the amps' graininess.

Verdict

The T12v3 soundbar is a versatile speaker for flat-panel TVs and iPods. It makes a great sound that will amply upgrade a TV's own speakers. ⊠ **Andrew Harrison**

£299 inc VAT

Contact
- orbitsound.com

Read more
- tinyurl.com/8ywrn9c

Specification
2x 50W and 1x 80W bass amp; class D amps; 4x 50mm paper-cone mid drivers; 2x 10mm HF drivers; 2x 35mm spatial speakers; subwoofer with 160mm bass driver; 160Hz/5kHz crossover frequencies; iPod dock; Toslink and coaxial digital inputs; 2x RCA; 3.5mm input; composite video; 22V/2.5A PSU; soundbar: 600x90x90mm; sub: 460x230x230mm

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

★★★★☆

MP3 PLAYER

Apple iPod touch

PC ADVISOR GOLD

£169 inc VAT (8GB)

Contact
- apple.com/uk

Read more
- tinyurl.com/7mLqq5L

Specification
8/16/32GB capacities; 3.5in widescreen (960x640 pixels); Apple A4 processor; 256MB RAM; 802.11b/g/n; Bluetooth 2.1 + EDR; 960x720 rear camera; 640x480 front camera; 720p video capture; FaceTime; voice recorder; 3.5mm headphone output; 3.44Wh battery; 59x111x7.2mm; 102g

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

★★★★½

The 2011 iPod touch runs iOS 5 and supports iCloud. An iMessage feature lets you send secure messages over Wi-Fi, but it's otherwise identical to last year's fourth-generation model – only the touch is now available in white, too.

The touch has the same Apple A4 processor as the iPhone 4 and original iPad. Most items that run on the iPhone 4/4S will run fine, including GarageBand. There's no Siri voice-recognition, however, which is found on only the 4S.

The 960x640-pixel widescreen is good for gaming. The screen glass, however, isn't as tough as the iPhone's and easily picks up scratches. Neither is the LCD below a gorgeous in-plane switching type.

With your Apple ID you can log into Games Centre, create an alias and do battle with friends. The app allows you to play online and socially interact with fellow gamers.

Music is, of course, central to the iPod touch. Album art is displayed by default. Fingertip control of the volume – Apple has sensibly stuck with a large blob on a slider for this – and playlist creation is a breeze.

The usual white earphones are included in the package, but you'll want a better pair to enjoy the impressive audio that the touch can produce. It may be just 7.2mm thick, but the iPod touch makes a big sound that can stand being turned up to max without aural discomfort.

Contacts, reminders and email have been subtly improved with iOS 5, while Notes tapped out on other iOS devices are automatically synched with your email account via iCloud. FaceTime lets you video-call people in your address book.

The touch's camera is faster than before, and we got suitably sharp shots. Colour reproduction tends to saturate, but it's well-balanced.

Photos, video and other visuals look great on the iPod's screen: it has the sharpest pixel pitch of any portable entertainment device.

Items in the Photo menu now become part of your Photo Stream.

Non-Mac users will still have to import images manually, though.

In essence, the iPod touch continues to be a phone-free alternative to the iPhone.

Verdict

We're smitten with the latest version of the iPod touch on almost every level. Additions such as Photo Stream and the editable playlists enhance the player's usability, while iCloud addresses most of our tied-to-iTunes concerns. An irresistible buy. ⊠ **Rosemary Hattersley**

PRINTER

Epson WorkForce Pro WP-4535 DWF

£260 inc VAT

Contact
■ epson.co.uk
Read more
■ tinyurl.com/c82fy6k

Specification
Printer/scanner/copier/
fax; 4800x1200dpi print
resolution; print speed:
B=15.4ppm, C=7.5ppm;
1200dpi scanner optical
resolution; USB 2.0;
802.11b/g/n; ethernet;
2.5in TFT; PictBridge;
cartridge costs: B=£25,
C=£24 x 3; print yield
(pages): B=2400, C=2000
x 3; 460x420x341mm;
13.8kg

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

★★★★½

Inkjet printers tend to produce better colour images than lasers, but fuzzy text, high running costs and slower performance can make them a poor choice for business. The Epson WP-4535 bucks that trend.

The WorkForce Pro is closer in design to a laser than an inkjet, although its 13.8kg weight makes it heftier than most. It's not surprising when you see what it's packing.

Besides printing, you get scanning, copying and fax facilities. The 1200dpi scanning is impressive, with a well-built lid offering enough flexibility for large magazines and books. Its quality is good, too, with strong reproduction of colours. The copier, meanwhile, has a useful duplex automatic document feeder.

Two paper sources provide a total input capacity of 330 sheets; a 250-sheet tray is an optional extra.

Ethernet and Wi-Fi connectivity is included, and Epson Connect lets you tap into iPads and phones, too.

Inevitably, given its fax capability, the Epson's control panel is vast.

The navigation system is adequate, if somewhat old-fashioned. The 2.5in screen is nice, but we didn't find it easy to jump back and forwards between menus.

No memory card slots are offered. Should you want to bypass a PC to print off pictures, you can use the PictBridge port to plug in an external USB drive.

The Epson's top speed is an impressive 15.4 pages per minute (ppm), but for decent text you'll want to use the 14.6ppm standard mode. Quality here falls short of a good laser, but the text is crisp enough to beat any other inkjet. Auto duplex drops the standard mode's 14.6 to 8.6ppm.

The Epson is very capable at colour printing, too. Ignore its fastest 7.5ppm rate and instead try the standard 6.7ppm mode. The palette is a little light compared to some of the company's photo models, but it's decent nonetheless.

The Epson offers near-unbeatable running costs at 1p and 3.6p per page of mono and colour respectively using high-capacity cartridges.

Verdict

The £260 WP-4535 is initially expensive, but sensational running costs will quickly return your investment. An extensive feature set makes this one of the most versatile inkjet printers we've seen. Highly recommended. ⊠ **Robin Morris**

BLUETOOTH HEADSET

Plantronics M1100

£50 inc VAT

Contact
■ plantronics.com
Read more
■ tinyurl.com/6s2mpve

Specification
Bluetooth earpiece;
A2DP Bluetooth; Audio
IQ3 noise-cancelling
technology; voice alerts
and commands; 30ft
range; 3-mic design;
MicroUSB; claimed
battery life: 4 hours; 9g

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

★★★★☆

With hands-free headsets gradually making the transition from safe and square to stylish and sought after, recent years have seen a host of brands gun for that enviable position of the space on your ear.

Enter Plantronics' latest Bluetooth headset, the M1100. Harnessing the latest technological advances, it's an ideal model for mobile professionals and social-network butterflies alike.

With an added emphasis placed on communication on the move, the M1100 headset allows you to email, update your Facebook status and even Tweet on the go.

All this is achieved through Plantronics' Vocalyst software, an online service that's accessed by connecting your phone, pressing the voice-recognition button and uttering the words "Call Vocalyst".

Once connected, the latest sports, finance and weather news are at your disposal – simply tell the friendly Vocalyst lady which service you require.

While this is a novel idea, its execution isn't as smooth and coherent as we'd like. Rio Ferdinand's latest Tweet can get a little lost in translation, for example. To be fair, the latter may not be Plantronics' fault.

Once you've added your contacts online, getting started firing out email is simple enough: Vocalyst types as you dictate. Watch your words carefully, though: the service will send the email as soon as you've finished talking.

The device itself is light, stylish and fits snugly in the ear – something this writer's awkward-shaped auricles never take for granted.

A three-mic design and audio IQ suppression means sound quality is good. Conversations are clear and unhampered by environmental noise or sounds from your car's engine as you travel along the M1.

The design is simple yet effective, with one button apiece for voice recognition, power and volume. Chattier types may be disappointed by the claimed 4-hour talktime.

The M1100 comes with a one-year subscription to Vocalyst, which costs £25 per year. An upgrade to Vocalyst Pro is said to convert speech into a text message.

Verdict

The market is already saturated with hands-free devices, but we think the Plantronics M1100 has enough going for it to ensure its Vocalyst-enabled voice is heard among the din.
⊠ **Tom Norton**

Build: ★★★★☆

Features: ★★★★½

Performance: ★★★★☆

Value: ★★★☆☆

★★★★☆

NAS DRIVE

Synology DS1511+

One of the great advantages of a good NAS drive is its expandability. Buy a four-bay NAS unit and, even if you need only one or two drives now, you can increase the storage capacity later.

For Synology, that ability to grow your data pool goes a step further with the DS1511+. Nay, two steps further, because its network-attached Raid options can expand beyond the bounds of the internal disks, tripling capacity by adding up to two DX510 break-out boxes.

The DS1511+ is a five-bay NAS, with disks slotting into the front in push-to-release caddies. The DX510 expansion box looks identical from the front, and also has five bays. It connects via locking eSATA ports.

Based on the current maximum capacity of 3TB for a 3.5in SATA hard disk, a fully laden DS1511+ with two DX510s represents a staggering 45TB of raw capacity. That ought to be enough for anyone.

The DS1511+ is a smart and well-presented unit, if mostly finished in plastic rather than metal trim. Two 80mm fans help keep the air flowing around the internal disks.

Unlike many NAS boxes, there are no USB ports on the front in which to insert an external disk or thumb drive and exchange data. Instead, joining the two eSATA ports at the rear are four USB 2.0.

For the all-important network connection there are two gigabit ethernet ports. Besides supporting dual-link failover, whereby two independent network paths can be connected to cover one link's downtime, Synology also promises link aggregation. This enables faster operation, combining the bandwidth of two network interfaces. It requires a managed network switch to set up, however.

Synology quotes read/write speeds up to 166/198MB per second (MBps) when used this way over a Windows CIFS network.

DSM 3.2

For any good NAS installation, the hardware is only half the story. Network-storage solutions need powerful software to drive them, helping them juggle the manifold tasks a modern NAS often tackles beyond simple file serving.

For Synology, this takes the form of DiskStation Manager 3.2 (DSM 3.2). This features an approachable graphical user interface, which uses HTML5. Animations and window transparency make the environment feel more like a modern desktop Linux OS than a NAS interface.

Most of the configuration options are available from Control Panel, which is closely modelled on OS X's System Preferences interface. From here you can create Shared Folders, add and manage groups of users, and select which network protocols are enabled – CIFS, AFP and NFS cover Windows, OS X and Linux.

As well as a UPnP media server and iTunes server, Synology offers its own Audio/File/Download and Photo Stations. These allow network access from free iOS apps. A mail server is included, while WebDAV, LDAP and SNMP are all supported. More ambitious networks can also set up the DiskStation for iSCSI use.

Setup

Like most Synology NAS drives, the DS1511+ is supplied as an empty unit to which you must insert your own hard disks. Unlike some drives, such as those from Qnap, it's also bereft of an OS – you must download and install this yourself, which is a process made easier by the Synology Assistant software for Windows and Mac. Synology loads only the Linux kernel on embedded Nand flash; the rest of the OS is installed on a small partition created on every disk loaded into the NAS.

After assembling some disks and plugging the NAS into your network, the NAS is assigned an IP address and the Synology Assistant helps you locate the drive. The software then guides you through the process of installing the OS and setting up your chosen volume structure.

Aside from the usual JBOD, Raid 0, 1, 5 and 6 configurations, Synology offers its own Synology Hybrid Raid (SHR) system. This allows disks of different capacities to be mixed together, without the usual limitation of reducing the final sum to a multiple of the smallest disk in the array. In fact, this is the default Raid option in DSM 3.2.

Performance

We tested the DS1511+ over a gigabit network using one LAN port. With the networking protocol set to AFP, we fitted two 1TB and one 1.5TB WD Caviar Green disks in SHR mode.

At the 1MB file size level, we saw write speeds of about 39MBps, and reads of around 93MBps.

Moving to larger files let the Synology stretch its legs. We recorded up to 49MBps for sequential writes and 122MBps for sequential reads using 100MB data.

As can be typical for NAS drives, small file handling was much slower. We measured around 2MBps for random writing of 4kB files and 9MBps for random reads.

Using Blackmagic Disk Speed Test with its largest file tests, the DS1511+ showed 88MBps sustained read speeds and 110MBps writes.

When idle, the Synology DS1511+ consumed just 21W of power.

Verdict

The Synology DS1511+ is a powerful, expandable storage solution that would suit a small or medium business, with the potential to form part of an even larger network. File copying performance is very good, although write speed is a little below Intel-based dual-core solutions. Its user interface is one of the best in the business, accessible to home users as well as trained network admins. ⊠ **Andrew Harrison**

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McAfee All Access 2012

£75 inc VAT

Contact
- home.mcafee.com

Read more
- tinyurl.com/bn9g8bz

System requirements
Windows XP/Mac OS X 10.5/Android 2.1/ BlackBerry 4.5/Symbian S60 3rd edition or later

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

★★★☆☆

MCAFEE ALL ACCESS bundles desktop and mobile security software

Internet security suites are designed to protect your PC from malware, hackers and ID theft, but leave other computers, phones and tablets vulnerable. McAfee has extended its software to cover Macs, Android, BlackBerry and Symbian devices.

The PC component of McAfee's All Access suite goes under the name of Total Protection, which includes protection against viruses, spyware, phishing and spam.

A password-protected vault offers encryption, while anti-bot protection stops your PC being conscripted into a zombie army.

The interface is surprisingly mundane, with few buttons or graphical furniture. Most of the options are presented as hyperlinks within descriptive text, while the status displays are simple counters. It looks rather amateur.

Local backup has been removed from All Access, although 2GB of online storage is provided for each of the PCs covered by your licence. This should be enough for your document folders, but not for a full system backup.

McAfee QuickClean isn't so much an optimisation tool as it is a redundant file remover. This concentrates on temporary files, shortcuts and lost file fragments.

How much it affects system security or performance is debatable.

The nippy scanner took 1 hour 40 minutes to trawl 8,927 items within our 50GB basket of mixed executable, zip and data files.

With Total Protection running in the background, we copied a 1GB file between partitions in 49 seconds; the same file took 1 min 7 secs to transfer during a system scan. This is reasonably good, and we've seen security suites that place a greater strain on resources.

Independent testing lab AV-Test awarded Total Protection an overall score of 10.0. Its low 'Repair' score of 2.0/6.0 meant it was unwilling to certify the program, however. This test looks at how well the software can remove existing malware, including rootkits, from a system.

We tried the mobile component of the suite on a Samsung Galaxy Mini smartphone running Android. On this platform it offers data- and privacy protection, parental controls, online backup, secure locking and remote wiping. An assigned buddy can also be informed if your phone is stolen and a new SIM fitted.

At £75, the single-PC licence is expensive even if you have a PC, phone and tablet to protect. A £100 five-user licence is more reasonable.

Verdict

If you're considering purchasing separate security software for your (non-Apple) phone and PC, McAfee's All Access bundle might make sense. But its Windows repair facilities are lacking, while its Mac protection is untested. ☒ **Simon Williams**

Webroot SecureAnywhere Complete 2012

£50 inc VAT

Contact
- webroot.co.uk

Read more
- tinyurl.com/bnsjhjb

System requirements
Windows XP/Vista/7; 128MB RAM; 10MB hard-disk space

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

★★★☆☆

SecureAnywhere is Webroot's latest Windows security software. Three versions are available: Antivirus, which offers basic protection and cloud-based updates; Essentials, which adds a firewall, privacy protection and backup; and Complete, reviewed here, which includes mobile and ID theft protection, plus password management.

The control screens are rather unexciting, but offer quick-and-easy access to the program's main features. They report on any malware found and show the status of scans and other tasks.

The most interesting result from our tests is the speed with which SecureAnywhere scans. Our 50GB bundle of data includes .exe and other file types that can hold

malware. We record how long a security suite takes to scan the files, and the results tend to vary wildly between products. One program might look at a different number of individual files to another, too.

SecureAnywhere took 12 minutes 15 seconds to perform a deep scan (the default setting) and looked at 15,275 files. Compared with McAfee, reviewed above, which took 1 hour 40 mins to examine 8,927 files, it's eight times faster and tests 70 percent more files. What this test can't tell us, though, is whether Webroot does as thorough a job of scanning those files.

AV-Test evaluated version 7.0 of the Webroot engine and awarded it a total score of 9.0/18 – that's not very good. Webroot scored

particularly poorly in the detection of malware, where it found around 16 percent fewer zero-day threats than its average competitor. We hope the latest version of Webroot's antivirus engine fares considerably better in AV-Test's evaluation.

As well as antivirus and malware protection, SecureAnywhere 2012 Complete offers PC optimisation, which empties the cookie cache and removes unnecessary files. Webroot freed up 1.9GB in less than 2 mins on our test PC, which would have been a worthwhile gain if it hadn't also deleted a valid application without our prior approval.

Perhaps Webroot has a particular problem with Iolo's System Mechanic, but it doesn't have the excuse that it mistook it for a temporary file.

WINDOWS UTILITY

Iolo System Mechanic 10.5

PC ADVISOR RECOMMENDED

$39 (£25)/year

Contact
- iolo.com

Read more
- tinyurl.com/7xh4s35

System requirements
Windows XP/Vista/7

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

★★★★½

Lots of utilities claim to improve the performance of a Windows PC and prevent it slowing down. Most clear out unnecessary programs, flush caches and remove temporary files, but Iolo System Mechanic 10.5 goes the extra mile.

The latest version uses two new techniques to improve results: Program Accelerator and Crudd Remover. The latter inspects the applications installed on your PC for those that duplicate the functionality of others. It flagged up Acronis Partition Manager on our test PC, since the program's defragmenter performs a similar task to Iolo's own software. You can ignore its suggestions if you have good reason to run both programs.

The Program Accelerator aims to align programs with their dependent files, reducing loading times and increasing overall performance. This is different from a drive defragmenter, which puts chunks of programs back together and can actually reduce overall performance, according to Iolo.

The real delight in using System Mechanic is that so much of its functionality is automated. Most programs of this type instead present a list of what they think are redundant files and ask you to select
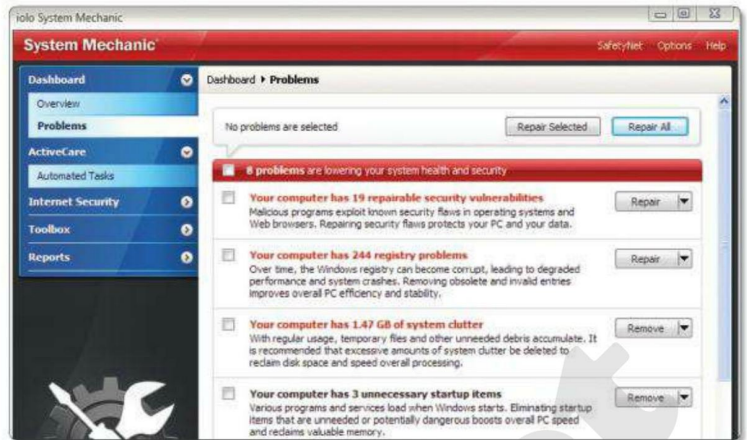
IOLO SYSTEM MECHANIC 10.5 goes the extra mile in tidying up your PC

which ones to delete. Unless you're a techie, such a list may mean little to you. System Mechanic can do this for you, and it was intelligent enough in our tests to not remove anything important.

It also performs pretty quickly, with a quick system analysis taking around 1 minute 20 seconds. Fixing the eight problems it highlighted took 6 mins 30 secs. A deeper analysis and fix, which included correcting 28GB of 'misaligned' and 24GB of fragmented files, took just over 40 mins.

We tried it on two PCs. On one it recovered around 800MB of storage, and around 1.2GB on the other.

Performance improvements are more difficult to measure. The

time it took Windows to start up was improved by 17 percent – from 2 mins 46 secs to 2 mins 22 secs – after running Startup Optimiser.

Other useful bundled tools include a Designated Drivers database, Total Registry Revitalizer and Internet Connection Repair.

Given that one copy of System Mechanic covers every PC in your household, the $39 (around £25) licence isn't overly expensive.

Verdict

This is a great example of what people want from a Windows optimisation tool. In a four-PC home, it'll cost around £6 per computer per year – a potentially good investment.
⊠ **Simon Williams**
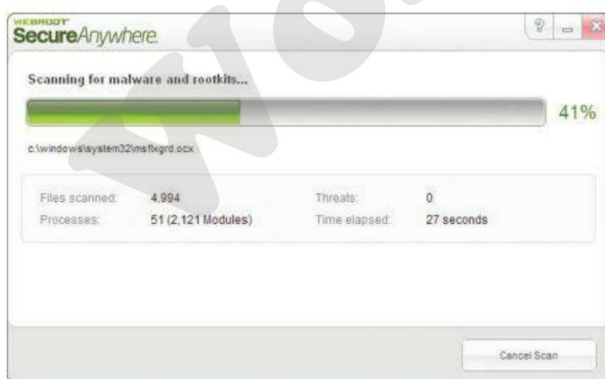
WEBROOT offers very quick scan times, but how thorough these are is debatable

The program's 16 files were sitting legitimately in Program files\iolo\ System Mechanic when the software removed them, and they weren't even to be found in the Recycle Bin, available to reinstate. We're left wondering whether there are other

applications to which this tidy-up utility might take a similar dislike.

The Complete suite also includes a sandbox, within which you can run new applications when you're not sure of their provenance. It aims to protect the rest of your system from any malware that a new program might be concealing.

The Complete package includes Webroot Mobile Security for Google Android, so you can protect your mobile devices as well as a Windows computer. The app offers an antivirus scan and advice on settings that will improve smartphone or tablet security, such as turning off its USB storage access.

We tried it on a Samsung Galaxy Mini smartphone and found it easy to use with a light footprint. The

mobile app is a free download, so you can use it on as many phones and tablets as you want.

For iOS Webroot has a free app called Webroot SecureWeb. This is in essence a web browser that scans any URLs you enter for phishing or malicious sites.

Verdict

Although it appears very quick to scan and has a small, light footprint, Webroot SecureAnywhere Complete isn't particularly cheap and doesn't appear to be that good at detecting new threats. The facility to protect an Android device may be useful, but it's becoming de rigueur for security suites from most suppliers. And steer clear of the tidy-up function. ⊠ **Simon Williams**

MULTIMEDIA SUITE

Nero 11.0

£69 inc VAT

Contact
- nero.com

Read more
- tinyurl.com/6v6dotj

System requirements
2GHz processor; Windows XP/Vista/7; 512MB RAM; 5GB hard-disk space; DirectX 9.0 graphics card with 3D acceleration; 128MB video memory; DVD drive; Windows Media Player 9.0 or later

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

★★★☆☆

Nero already offered a powerful set of tools for creating, editing, transcoding and burning video and photo slideshow discs, as well as for editing audio and backing up your data. With this latest release, Nero has revamped and improved several major components and linked them via a common media browser. The suite feels more like a cohesive product, rather than an ad-hoc collection of components.

New to version 11.0 of Nero is comprehensive support for AMD, nVidia and Intel GPU video-encoding acceleration, plus LiveBackup, MediaBrowser and Kwik Media. The latter supports music, video and photos, and imports and exports media to Android and iOS devices.

Nero 11.0 installed without a hitch, but it didn't create a desktop icon for the 'Welcome to Nero' launch application. This replaces Nero StartSmart, letting you access all the suite's modules.

The Nero Video editor, Kwik Media, BackItUp and the Recode

KWIK MEDIA is new to Nero 11.0, offering export to Android and iOS devices

CD/DVD ripper and transcoder all feature Nero's new look. This is far more intuitive – poor workflow and a steep learning curve have long been sore points for Nero.

Alas, this redesign hasn't been rolled out suite-wide, so the software isn't as cohesive as it could be. There are new welcome screens throughout, but it feels as though you're warping back in time when you open Wave Editor, Nero Express, SoundTrax and Nero Burning ROM.

Nero Video, BackItUp and Recode compare favourably with the best standalone applications in their respective fields. You'll get the most value from the Platinum version of Nero, which offers Blu-ray support.

Verdict

The Nero 11.0 multimedia burning suite is as powerful as they come and friendlier than its predecessors, but the new look isn't pervasive.
⊠ **Jon Jacobi**

DISK UTILITY

EaseUs Partition Master Professional 9.1

£13 inc VAT

Contact
- easeus.com

Read more
- tinyurl.com/chb67jo

System requirements
500MHz processor; Windows 2000/XP/Vista/7; 383MB RAM; 13MB hard-disk space

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

★★★★☆

It's rare that any user will need more in the way of disk-partitioning facilities than that which Windows offers. For those who do, however, EaseUs Partition Master Professional is better than most utilities.

The program can work with dynamic disks (the software Raid solution within Windows) as well as merge contiguous partitions.

All the functions are listed in the left pane, so you can see what will transpire when you click Apply. If you've ever forgotten to back out of moving a partition or other time-consuming operation in a program that doesn't list pending actions, you'll appreciate this feature.

This latest version of Partition Master includes a wizard that guides you through transferring your existing system to a larger hard drive. In essence it's a batch job for the existing Clone Disk function, but it saves you time and effort.

Partition Master also offers a Partition Recovery Wizard, but it didn't find all the partitions in all

PARTITION MASTER offers additional disk-partitioning facilities to Windows

their incarnations in our tests. For instance, we created two 10GB partitions, then merged them into one 20GB partition. The wizard found both, but would restore only the first at its merged 20GB size. Partition recovery is a nice feature, but it's not as effective as dedicated recovery applications.

The program includes a WinPE ISO boot disc image, but charges extra for the Linux-based disc.

Our only complaint is that it doesn't support the Mac HFS or HFS+ partition types.

Verdict

Partition Master Professional faces some stiff competition from Acronis Disk Director, Paragon Partition Manager and GParted Live, but EaseUs has done a very good job. The merge function, in particular, is very handy. ⊠ **Jon Jacobi**

AOC

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Plane
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3D DESIGN SOFTWARE

Smith Micro Poser 9.0

£159 inc VAT

Contact
- smithmicro.com

Read more
- tinyurl.com/bq9tuvo

System requirements
1.3GHz processor; Windows XP/Vista/7/Mac OS X 10.4 or later; 1GB RAM; 3GB hard-disk space; OpenGL-enabled graphics card; 1024x768 screen resolution with 24bit colour; Internet Explorer 7.0 or later; Adobe Flash Player 9.0 or later; web connection; DVD drive

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

★★★★☆

POSER 9.0 is the go-to program for making your animated figures dance

Poser 9.0 makes getting started with 3D modelling easy. It's the go-to tool any time you need to manipulate or animate a 3D figure. Whether that figure is an animal, human or alien, Poser can make it dance.

Poser comes bundled with more than 1.7GB of skeleton, nude, animal and cartoon/fantasy/anime characters, plus clothing, hair, props, scenery and textures. You can import your own in a number of formats, too. You may also purchase (and sell) additional creations from a website operated by Smith Micro.

Although Poser can create scenery and props, the program excels at the manipulation of figures. It has perfected the simplicity of controlling features, expressions and detail such as skintones. It's easy to change everything from facial features to ethnicity and age.

You control most of Poser's features with wheel-like sliders. Using the sliders with a mouse lets you modify an avatar with high precision, but the most precise controls let you key in numeric values. It can be tricky to get the exact effect you want at first, but Poser's interface is attractive, fast and easy to learn.

You can import BVH Motion, 3D Studio, PXF, Lightwave or Wavefront Objects files into Poser, and export all these plus RIB, VRML, Collada and various image files (PNG, Tiff, BMP, TGA, Jpeg and PSD).

Even if you're not a fan of Poser, the manipulative content alone may make it worth the money.

Unfortunately, if you're really hardcore and want a 64bit version of Poser, you'll have to pay to upgrade to Poser Pro 2012.

Verdict

Whether you want to make animated movies or video game avatars, you can't beat Poser for out-of-the-box simplicity. Even with no prior 3D modelling experience, it's relatively simple to adapt, pose and animate any of Poser's included templates.
⊠ **Clare Brandt**

iPHONE APP

Apple Find My Friends

Free

Contact
- itunes.apple.com

Read more
- tinyurl.com/cgo3cbz

System requirements
iPhone/iPad/iPod touch; iOS 5

Usability: ★★★★½
Features: ★★★★☆

★★★★☆

FIND MY FRIENDS keeps tabs on the locations of your trusted friends

Apple's Find My Phone is a great way to keep tabs on lost or stolen iPhones. A development of this free service is Find My Friends.

Whereas Find My Phone might be used only in emergencies, Find My Friends is a social service that works between iPhones and iPads. It enables you to follow the location of designated friends who also have an iDevice running iOS 5.

With Find My Friends installed, you log in once with your Apple ID, then send out invitations to chosen friends. Once accepted, their position is shown on a map. They can also see where you are.

You can use the app to help rendezvous with others at unknown meeting points, or check up on late-running friends to see how far away they are from you. A short-term connection can also be established, so you needn't keep tabs on each other for ever thereafter.

Click the All Friends tab to see a map showing all or any one of your linked friends' locations. Further options let you make a FaceTime call and receive directions to them.

The Me tab shows your location and lists your followers. You'll also find a 'Hide from Followers' switch here, which takes you off their radar.

In our tests, Find My Friends had a similar level of accuracy to the iPhone's built-in Maps app. In fact, it taps into Google Maps service to deliver either a street, satellite or hybrid view of the area.

As with the GPS-mapping facility, a circle of confidence is often shown that denotes an imprecise fix. This is usually refined after a few minutes.

Verdict

Find My Friends tells other people your precise location whenever they want to look you up. It's something you'd share only with trusted friends or family but, for that, it's invaluable.
⊠ **Andrew Harrison**

GAME

Tropico 4

System requirements
2GHz dual-core processor; Windows XP/ Vista/7; graphics card with DirectX 9 and Shader Model 3

OVERALL
★★★½☆

In Tropico 4 you get to play banana republic dictatorial autocrat and run your own island in the Caribbean. You drive people into the toils of communist organisation, or exploit your island's natural resources for trade and tourism like a good capitalist. Kalypso Media does a fantastic job of giving you both the tools and training to get started.

Gameplay takes place on an overhead map of your island, your palace at the centre of the city, and a harbour on the coast. Everything is built by you: do you want to focus on farming, mining, manufacturing, tourism, logging or something else? Do you want people living in hovels or decent accommodation? You also decide on global policies such as environmental standards and police sensitivity training.

Tropico 4 presents a series of stiffer challenges, too. Petitioners from your island's populace frequently pop up, asking for favours or changes to policies and giving you goals to hit.

Stimulate trade and tourism in your own Caribbean island in **TROPICO 4**

You may be the staunchest of free-market capitalists, but if the Chinese and USSR come calling, offering you cash in return for nationalising the sugar industry, you might be sorely tempted.

Tropico 3 had a clear progression of campaign missions, while this game seems more focused on intra-mission tasks. Tropico 4 functions better as an endless 'sandbox' sim, rather than a mission-driven real-time strategy game. This takes the title further from its ostensible competition. There's no bad guy to defeat and no world to save. You decide what you want and find satisfaction in the gameplay itself.

Verdict

Tropico 4 is fundamentally similar to its endearing predecessor. There's a little more direction in some ways and less in others, but the salsa soundtrack covers up a great many cracks. ⊠ **Eric Neigher**

GAME

Red Orchestra 2: Heroes of Stalingrad

PC ADVISOR RECOMMENDED

£24 inc VAT

Contact
- heroesofstalingrad.com

Read more
- tinyurl.com/6dw6d36

System requirements
2.3GHz processor; Windows XP/Vista/7; 2GB RAM; 8GB hard-disk space; nVidia GeForce 7800 GTX or AMD Radeon HD 2900 GT or better; 256MB video RAM; broadband connection

OVERALL

★★★★☆

Everyone, from the lowliest novice to the most grizzled veteran, is just a rifle round away from death

We have a friend manning a heavy machine gun next to a ticket booth for some vanished fairground, surrounded by tall, bombed-out tenement buildings. The setting sun casts long shadows and creates a thousand potential snipers' perches among the splintered floorboards and crumbling doorways. We're 30 yards behind him, leaning out from behind a corner and calling the targets for him.

"12 o'clock, moving to your 3! Behind that broken wall."

"I see 'em." The machine gun starts firing short, rattling bursts. A squad of Soviet riflemen hit the dirt, thinking the shots are coming from in front of them. Burst by burst, he massacres them as they try to crawl to safety. Then a flicker of movement from up high catches my attention.

"Up, up, up! 12 o'clock, fourth story," we snap.

"Window or doorway?"

"Um..." There is a flicker of movement as a helmet detaches itself from shadow.

"Door!" The sniper is drawing a bead just as we open fire with everything, our MP44 shaking wildly as we pepper his position. He slumps, dead. We both breathe a sigh of relief.

Red Orchestra 2 (RO2) is the most intensely co-operative game we've ever played. It's so unforgiving, and each player is so vulnerable, that you need your teammates to watch your back and be your eyes and ears.

Like its predecessor, RO2 emphasises realism. Even the

RED ORCHESTRA 2 delivers outstanding atmosphere and realism

simplest tasks require skill and experience. No weapon hits where you aim unless you have correctly adjusted the sights. Just getting to the next objective can entail 10 minutes of crawling through rubble and hiding in shadows.

As fussy and slow-paced as that might sound, RO2 can be as dramatic and evocative as early titles in the Call of Duty franchise.

It's cold in Stalingrad

Developer Tripwire has recreated locations from Stalingrad and filled them with menace and foreboding. An icy haze and eerie silence hang over a frost-glazed battlefield, where German troops defend their HQ inside the shadowed husk of the famous Univermag department store. The cold is almost palpable, as is the despair of the German troops who sometimes break the silence to say: "We're never getting out of here. We've stayed too long."

Players can take command of detailed tanks and attempt to dominate the battlefield. The vehicles require a fair bit of skill and co-operation to use effectively, however, and they're usually occupied by players who make a speciality of tank warfare. We were also frustrated with how often tanks could dominate a battle. Most servers either focus on tank combat or infantry combat, however, and very rarely both.

The character progression system seems largely irrelevant, and the game doesn't do a good job of drawing a connection between character experience and your performance in combat. Nor did our new perks and gear seem to make a big difference on the battlefield. But it's probably for the best that RO2 avoids the problem of 'super soldiers' that sometimes crop up with experience-based shooters.

Everyone, from the lowliest novice to the most grizzled veteran, is just a rifle round away from death.

RO2 is an acquired taste and brutally punishing to newcomers. But we can't overstate just how rewarding it is when we do our job right, and how absorbed we were in the action. This is one of those games that will have you holding your breath while you strain to hear an enemy, or hunching down in your chair as rounds whip overhead and cause your character to flinch.

Every kill is an accomplishment, and every capture-point defence is an act of heroism. For players with patience who crave a challenge, and who have a few friends that share those qualities, RO2 is an experience like none other. It absolutely rewards your investment in the game.

Verdict

RO2 is a punishingly hard game to learn, especially for newcomers, but you'll be instantly impressed by its outstanding atmosphere and realism, paired with the title's absorbing and dramatic gameplay.
⊠ **Rob Zacny**

ALWAYS CHOOSE SIMPLE.
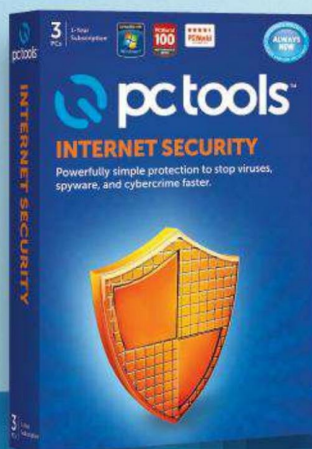
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PROTECTION   PERFORMANCE

Best satnav apps

Reviewed by Sandra Vogel
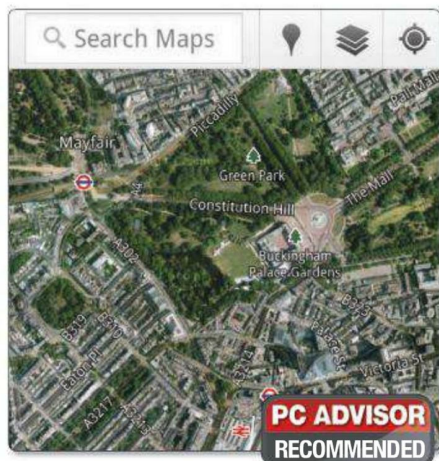
Google Maps for Android

There can't be many free smartphone apps that are better known or more widely distributed than Google Maps. The software is preinstalled on every Android smartphone, while a maps-only version is found on the iPhone. Windows Mobile and BlackBerry users can also download and use it for free.

Android users get by far the best deal, and only they get turn-by-turn spoken instructions and 3D mapping. Features such as Satellite view are available to all, and there is a range of layers you can add.

We used Google Maps with spoken instructions on Android and found it easy to work with. Maps quickly established a GPS fix and calculated directions at speed. Mapping in the Navigation mode is also good, with intelligent use of screen space and a visual of the next turn in one corner.

We like the pinch-to-zoom support, plus the ease with which layers are applied. For hiking, Google Maps on a large-screen handset negates the need for an OS map – provided you're in signal range.

On other platforms Google Maps falls down. We got horribly lost in Manchester when using it on our iPhone. Scrolling out to check where it's taking you results in you losing your place, too.

Verdict

Google Maps for Android is flexible and feature-rich. It gets extra points for delivering so much for free, but doesn't impress on other smartphone platforms. ⊠

Free

- maps.google.co.uk ■ **Read more** tinyurl.com/d7kcv3a

System requirements
All platforms; Turn-by-turn nav Android only

★★★★☆

TomTom UK & Ireland

TomTom is one of the best known names in navigation. Its iPhone/iPad app costs £49 for the UK & Ireland version, and £79 for European maps. TomTom also sells other maps, plus a £79 iPhone cradle that boosts the GPS signal and stops your handset from slipping off the dashboard.

TomTom offers the most visually efficient design of any app reviewed here. Road mapping is clear, while a panel at the bottom of the screen indicates the distance to the next turn at a glance. Lane guidance makes complex junctions easy to understand, too.

At extra cost you can unlock an HD Traffic feature that routes you around congestion. Speed-camera alerts are included, but you can also pay more to get advance warning of mobile cameras.

Less useful, but rather fun, is TomTom's assorted collection of voices, which includes the likes of Darth Vader and Homer Simpson. These must be purchased in-app, although we weren't willing to part with our cash for such novelties.

TomTom throws in some useful extras, including a Google local search. Its IQ Routes is also handy, using real-time crowdsourced data to calculate the fastest route.

Verdict

TomTom's software is slick and easy to use. Some of the in-app extras are merely gimmicks; others are more useful. At £49 it's expensive, though, and there's no Android version. ⊠

£49 inc VAT (UK & Ireland)

- tomtom.com ■ **Read more** tinyurl.com/dxs9dyw

System requirements
iPhone

★★★★☆

Bike Hub

Bike Hub is a journey planner designed for cyclists, which makes use of both roads and cycle paths. It's free for Android and iPhone.

Bike Hub uses OpenCycleMap mapping data and is aware of Sustrans and other designated cycle routes. It's designed to avoid hills where possible, but tweaks journey times where it can't (you'll probably cycle more slowly when travelling uphill). Bike Hub is able to find the fastest, quietest and shortest routes, as well as what it calls a 'balanced' route.

You can save journeys as favourites, and there's an option to email routes to other people. Bike Hub can even handle 'leisure routing', devising a trip for a certain distance or duration from a set starting point.

There's a useful facility to find bike shops within a six-mile radius of your location, and the database seems good. It matched our knowledge of shops in and around our home town, including the small independent store we regularly use. To plan a journey to a bike shop you simply tap an onscreen button.

The visual instructions are useful if you have a mount that'll fix your handset to your cycle; otherwise, spoken instructions delivered through headphones are practical when keeping the phone in a pocket or bag.

Verdict

Bike Hub is a superb app. It can't match our own local knowledge, but it's intelligent enough that we'd be prepared to rely on it in unfamiliar territory. ⊠

Free

- bikehub.co.uk ■ **Read more** tinyurl.com/dx9442x

System requirements
Android/iPhone

★★★★☆

Security issues have been raised with regards to Android apps, in particular. Before installing an app from the Android Market, consider the implications of allowing it access to the contents of your device and any personal data, including contacts. GPS smartphone apps on all platforms rely on location-based data and work by tracking your movements.

Navigon for Android 4.0

Navigon's £39 UK & Ireland navigation app has some strong competition in the free apps reviewed here. It's available for Android, iPhone and Windows Mobile.

Like TomTom and CoPilot Live Premium, Navigon has a lane-assistance function that helps you understand how to manoeuvre the forthcoming junction. Very clear graphics in this section include an information box that explains which road you're leaving and which you're joining.

In general use, however, we didn't find Navigon as user-friendly as it could be. One of our main gripes is the visual appearance of maps. They just don't have the same sleek looks as other products here, and we found it difficult to draw the same amount of information from them at a glance. This is partly a matter of personal taste, but also due to the use of colour and how the map renders onscreen.

Navigon for Android 4.0 caters for in-app purchase of add-ons, including updated maps that are released four times a year, points of interest, live traffic information and petrol station locations.

The initial cost of the app is rather steep, but for the same price as TomTom's iPhone offering you can add European maps.

Verdict
A mix of relatively high pricing and some mapping that doesn't visually appeal makes Navigon for Android 4.0 a difficult product for us to unequivocally recommend. ☒

£39 inc VAT (UK & Ireland)

■ navigon.com ■ **Read more** tinyurl.com/6uuanp4

System requirements
Android/iPhone/
Windows Mobile

★★★☆☆
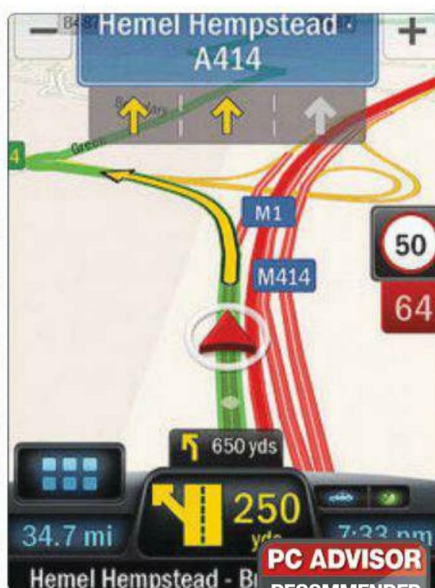
ALK CoPilot Live Premium

CoPilot has been a favourite satnav app of ours for some time, and at £20 it's cheaper than Navigon and TomTom's offerings. It's available for iPhone, iPad and Android devices. The £20 price we've listed here is for the UK and Ireland maps package.

We've always liked the clear mapping that CoPilot offers, even on smaller screens. The large, finger-friendly menu buttons are also welcome. Among the more likeable features in this latest edition is the useful lane assistance, where the giant arrows are particularly helpful at complex junctions.

We're also fans of the new drag-routing feature. You can simply use a finger to pull a planned route in a new direction. This can be useful if you see a town or beauty spot you'd like to visit en route during a long journey. This is a lot quicker than going back into the route-planning interface and adding a stopping-off point.

We also like the way CoPilot Live can display three alternate routes on screen at once. These specify the distance and time to travel, as well as the route. If you buy the ActiveTraffic service, CoPilot will also take into account real-time traffic speeds when planning your journey.

The latest edition crams in social-media services, although these won't appeal to all.

Verdict
CoPilot is an excellent tool for getting navigation instructions on a smartphone. We like its price; we love its interface. ☒

£20 inc VAT (UK & Ireland)

■ copilotlive.com ■ **Read more** tinyurl.com/8xpc3qm

System requirements
Android/iPhone/Win
Mobile/BlackBerry

★★★★☆
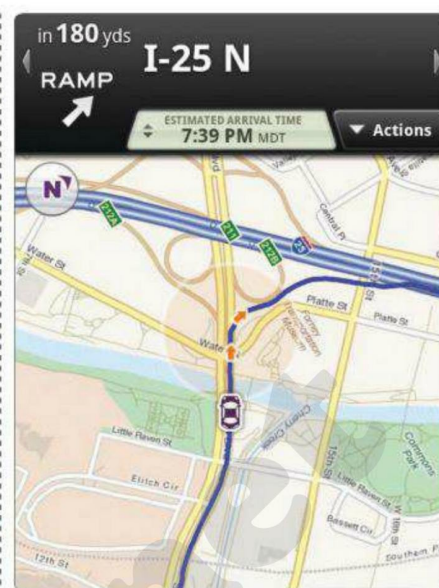
MapQuest for Android

MapQuest is a free turn-by-turn navigation app that offers an interesting alternative to Google Maps. It hails from the US, and in the UK is available only for Android.

One of the interesting things about MapQuest is the way it prioritises the finding of points of interest (POIs). When you fire up a map, a row at the bottom of the screen offers POI categories. Scroll vertically to see the full range, and tap a category for MapQuest to plot its finds on the map. It's a nice idea, but the database isn't without fault – something that was particularly obvious in the areas we know well. You can hide the row of POI categories and fill the screen with the map by dragging a tab downwards.

MapQuest uses OpenStreetMap data, which offers good mapping of tracks and alleyways as well as roads – this is useful when walking. There's a satellite view in addition to the street view, but this refused to load on our handset. The menu offers a traffic information option, too, but this also refused to work in our tests.

There's no smart searching when entering locations for navigation. You have to type in the full street or place name, then pick from the matches returned. Turn-by-turn spoken instructions are clear and onscreen visuals passable thereafter.

Verdict
MapQuest has potential, but didn't deliver on its promise. Its OpenStreetMap data is particularly useful when walking. ☒

Free

■ mapquest.com ■ **Read more** tinyurl.com/czoz2nv

System requirements
Android

★★★☆☆

MULTIMEDIA LAPTOPS

Ben Camm-Jones tests six laptops primed for entertainment. Whether it's watching films, listening to music or gaming that takes your fancy, there's something here to suit

Laptops offer a combination of performance and portability, but there's a huge variation in the amount of processing power they offer and how it's distributed. Some focus on number-crunching and fast file transfers, while others are geared up for high-end gaming or come with bombastic sound systems. Unless you're looking to spend £1,500-plus, you're unlikely to find a laptop that does everything well. Here, we've tested six models that are broadly aimed at entertainment, but are neither so pricey nor so heavy they can't also be used as the main family laptop or taken on the road.

If you're in the market for a multimedia laptop, the most important specification to look out for is its screen. This is what you'll spend most of your time looking at, whether you're playing games or watching movies. Not only will you want to consider its panel size and finish, but its resolution will also be important.

Unlike desktop monitors that tend to natively support a full-HD (1920x1080

pixels) resolution, many laptops achieve this only through upscaling. Although some high-end models support full-HD, a 1600x900- or 1366x768-pixel screen is more common here. Even the latter can offer an HD (720p) image, though.

Most entertainment-focused laptops include an HDMI port, which is useful for hooking up your computer to a TV for large-screen playback.

You may find that buying a laptop with a built-in Blu-ray drive offers a cheaper solution for full-HD film playback than buying a separate Blu-ray player for your TV. This will increase the price, however.

Buy a laptop with a 3D screen only if you already have or intend to buy a 3D TV. The technology will add hundreds of pounds to the overall price, and you'll have to fork out more for extra pairs of 3D glasses so others can enjoy the show.

Speakers are an important factor in achieving a fully immersive experience for entertainment. Brands such as Harman Kardon and Beats Audio are sometimes

selected by laptop manufacturers to suggest a focus on audio quality.

If it's gaming that interests you, look for a dedicated graphics card with at least 500MB of video RAM. We'd expect most multimedia laptops costing more than £700 to feature one. While integrated graphics can handle HD video and low-end games, they simply aren't able to display the latest titles with playable framerates.

You'll want a fast processor for strong application performance, with Intel's second-generation (Sandy Bridge) Core chips the best of the bunch. AMD's latest processors are slightly cheaper and have better integrated graphics, but they can't compete in our WorldBench 6 speed test.

When it comes to laptop memory and storage, get as much as you can find specified within your budget. Some models offer twin hard disks, which is desirable for simplified backup and recovery.

Memory card slots are standard these days, while the fast USB 3.0 interface is now found on most high-end laptops.

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

ASUS U46SV-WX044X

£699 inc VAT • comet.co.uk • tinyurl.com/c845t5y

The 14.1in-screen Asus U46SV-WX044X is the smallest laptop in this group test, and it has the lowest price tag. It might not have the most impressive specification, but there's plenty here to recommend.

The battery is probably the most notable feature, and lasted a remarkable 10 hours 1 minute in MobileMark 2007. That's almost double the 5 hrs 10 mins offered by its nearest rival, the HP Pavilion dv7-6b04ea. At 2.1kg the Asus is also the lightest laptop in our round-up, making it well-suited to life on the road.

The brushed-metal finish looks smart without being overly plain, while the Asus' 14.1in (1366x768-pixel) glossy screen does a good job: the image is sharp and colours are resonant.

Despite the laptop's slim frame, Asus has managed to squeeze in an optical drive. You also get plenty of ports for connecting peripherals, plus an HDMI port for hook-up to an HDTV, but there's only one USB 3.0 connection (along with two USB 2.0).

Inside, a 2.3GHz Intel Core i5-2410M processor is paired with 4GB of DDR3 RAM and a 500GB hard drive. There's nothing exciting here, but the specification is strong for a £699 laptop – it propelled the Asus to a 114-point tally in our WorldBench 6 speed test.

We like the keyboard, with its good-sized arrow and Space bar keys, although we found the Shift buttons rather small. As a work laptop, the Asus thus has potential.

An nVidia GeForce GT 540M graphics chip with 1GB of dedicated video memory performed very well in the five-year-old game Fear at its 'Maximum' detail settings. We recorded 78fps. This might impress gamers, and it's certainly playable. For casual gaming the Asus U46SV-WX044X is up to the job.

VERDICT: If you need a low-cost laptop that you can use to enjoy movies, music and gaming and even take on the road, the Asus U46SV-WX044X is ideal. Although you'll make a few compromises in its specification, you may find its £699 asking price hard to argue with. The Asus will also double up as a capable work tool and, if you have to spend long periods of time away from a wall socket, this laptop's 10-hour-plus battery life will impress.
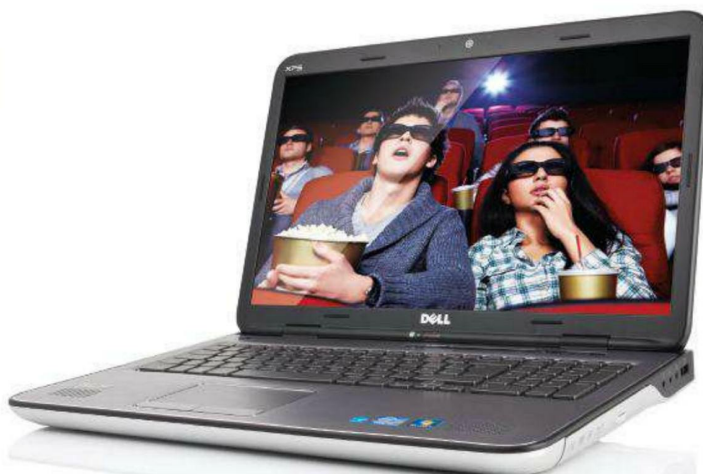
Build	★★☆☆☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★☆☆
Overall	★★★☆☆

DELL XPS 17 L702X

£1,170 inc VAT • dell.co.uk • tinyurl.com/c5bLv3d

The Dell XPS 17 is a reasonably smart-looking fully featured laptop. It has a large backlit keyboard, with good-sized keys and a numeric keypad. However, it's multimedia content that is the real focus of the XPS, and especially 3D content.

The XPS has a 3D-capable screen and comes with a pair of compatible glasses. If you want an extra pair, you'll have to fork out another £90. You can also hook up the XPS to a 3D TV via HDMI, where the nVidia GeForce GT 555M graphics card with a staggering 3GB of video memory will do a solid job of displaying the action.

As impressive as the 3D effect is, though, we're not sold on the idea for the time being. In the future, when glasses-free 3D is practical and affordable on laptops, we might revise that opinion.

The graphics card offers strong gaming framerates too, and we recorded 129fps in Fear at 'Maximum' detail settings. Games and films – a combo Blu-ray/DVD drive is built in – look great on the 17.3in full-HD (1920x1080-pixel) screen.

The Dell is a strong performer in everyday tasks too, and scored 126 points in our application-speed benchmark, WorldBench 6. This is largely due to a powerful Core i7 processor and 4GB of DDR3 RAM.

The Dell's 500GB storage provision is a little skimpy for a multimedia laptop, but USB 3.0 and eSATA ports offer an easy route to adding high-speed external storage.

We were impressed with the XPS, but also found some issues we couldn't overlook. Its large touchpad is easily knocked as you type, causing the cursor to go walkies at inconvenient moments. It also has noisy fans; despite the Dell being by far the loudest laptop in our round-up, its chassis becomes rather hot on the left side and is uncomfortable to use for long periods.

VERDICT: This 17.3in-screen 3D laptop has a high price tag at £1,170, and the Dell XPS 17 L702X comes up short in several key areas. The hard drive lacks capacity, while the 3D panel will be wasted if you haven't already invested in a 3D TV. Two design flaws quickly made themselves noticeable during use: the Dell's strong capabilities as a multimedia machine are overshadowed by heat and noise issues.

PC ADVISOR TEST CENTRE

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

HP PAVILION DV7-6B04EA

£849 inc VAT • hp.com/uk • tinyurl.com/cehvyrq

The HP Pavilion dv7-6b04ea has impressive specifications on paper, although it doesn't live up to our expectations. It's the only laptop here to run an AMD processor, and faces tough competition. The 1.8GHz A8 chip is backed with 8GB of RAM and still managed to score only 82 points in WorldBench 6. The HP isn't woefully slow, but it's some way off the two Toshiba-branded pace-setters in this category.

The HP has dual-graphics capabilities, comprising an AMD Radeon HD 6620G APU and a discrete HD 6650M processor. The combination (referred to as the HD 6755G2) allowed the laptop to record 72fps in Fear at 'Maximum' detail settings..

There are some bright spots. Storage is amply catered for, with two 750GB hard drives totalling a class-beating 1.5TB. The screen is also decent, with an anti-glare coating doing a good job of minimising reflections on the 17.3in panel. We were surprised to find its resolution stretches only to 1600x900 pixels, however, given the laptop's combo DVD/Blu-ray Disc optical drive.

It's the HP's design that sets it apart from the competition. The Pavilion is arguably the best-looking model here, with its brushed-metal finish smart enough for the office, eye-catching enough to be used on the move and neutral enough to blend into any room of the house. The keyboard is big, although the arrow keys are a little squashed, while the touchpad is backlit. The HP also feels sturdily built, and capable of withstanding a few bumps and scrapes.

A fingerprint reader offers additional login security, and you'll find a good selection of ports for connecting peripherals.

With a battery that proved itself capable of enduring 5 hours 10 minutes of our MobileMark 2007 tests, the HP would appear to be a good travelling companion. It is very heavy at 3.4kg, though.

VERDICT: We're disappointed by the HP's performance in comparison to its rivals, although it's indicative of the differences we see between Intel and AMD processors in WorldBench 6. The dv7-6b04ea has some real strengths, however, including a design that's both pleasing and practical and a generous 1.5TB storage capacity. But it's this laptop's price tag that impresses us most: just £849 inc VAT.
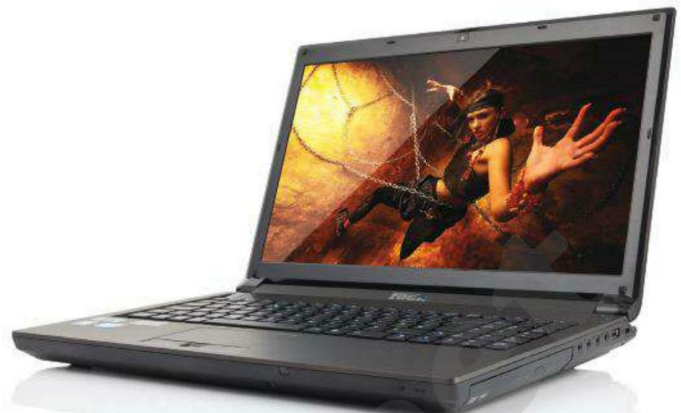
Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

PC ADVISOR RECOMMENDED

ROCK XTREME X685-I5-2540M

£1,249 inc VAT • rockdirect.com • tinyurl.com/btzsq97

The Rock Xtreme focuses on gaming, and here it certainly won't disappoint. Its Radeon HD 6990 with 2GB of dedicated video RAM scored a blistering 275fps in Fear at 'Maximum' detail settings, which is by far the best framerate recorded in this group test.

The 15.6in screen is also a corker, with a full-HD resolution of 1920x1080 pixels and an anti-glare coating that does a great job of minimising reflections without diminishing colour depth. Importantly, for a multimedia laptop, sound quality is also excellent; yet the Rock Xtreme is notable for its omission of a Blu-ray drive – particularly at a price of £1,249.

The laptop's application performance is very good, and Rock's combination of a dual-core Intel Core i5-2540M processor running at 2.6GHz and 6GB of DDR3 RAM powered the Xtreme to a respectable WorldBench score of 124 points. All this performance places a strain on the 76Wh lithium-ion battery, however – despite its capacity, the juice ran dry in just 2 hours 30 minutes in our MobileMark 2007 test. Of course, given that this laptop tips the scales at 3.1kg, you perhaps won't expect to take it on the road too often.

The 500GB hard disk offers a lower capacity than we'd expect to find at this price, although eSATA and USB 3.0 ports let you add high-speed external storage. Its battery of connection options also includes HDMI and DVI, allowing you to hook up the Rock to a TV or monitor for large-screen playback of movies and games.

The build feels rugged, with a rubbery feel to the chassis – you'd certainly expect this laptop to withstand prolonged use by frustrated, heavy-handed gamers. Pleasingly, the keyboard offers plenty of space between the keys, plus well-sized arrow and Space bar buttons; there's even room for a numeric keypad to the right. A fingerprint reader has been added for extra login security, too.

VERDICT: The Rock Xtreme is expensive at £1,249, but you get what you pay for in the excellent graphics and screen. We'd like to have seen a Blu-ray drive to expand this laptop's multimedia capabilities, but we've no complaints with the Core i5 processor or 6GB of RAM. The battery life is something of a let-down, however.

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

TOSHIBA QOSMIO X770-107

£1,399 inc VAT • toshiba.co.uk • tinyurl.com/cLq5e99

The Toshiba Qosmio X770-107 is a beefy laptop with an equally impressive feature set. An Intel Core i7-2630QM quad-core processor provides oodles of grunt, as the Toshiba proved in our WorldBench 6 test with 132 points scored – the fastest performance here.

The ample frame houses two Seagate hard disks, each spinning at 7,200rpm for faster data access. One disk is also a solid-state hybrid, with 4GB of Nand flash memory. Seagate's Adaptive Memory technology monitors your usage, then places the applications you use most frequently on to this portion of the drive for quick access.

Gaming framerates from the nVidia GeForce GTX 560M with 1GB of dedicated video RAM are fast, too – we recorded 166fps in Fear at 'Maximum' detail settings.

The Qosmio is 3D-capable, and supplied with a pair of special glasses that'll fit over your existing specs if necessary. Watching 3D movies will be a solitary experience unless you fork out for additional pairs at around £100 a pop, however.

The screen is very good, spanning 17.3in and offering a full-HD resolution of 1920x1080 pixels. It has a glossy finish, but Toshiba's anti-glare coating works a treat. The definition is sharp and the colours are rich, making the Qosmio an ideal platform for watching HD movies through its BD-RE/DVD±RW combo drive.

The backlit keyboard features well-spaced and usable keys, but the chassis has a plastic, brittle feel. This is disconcerting for such a large laptop. We handled the Qosmio very carefully, fearing that even a short drop might have catastrophic consequences.

The Harman Kardon speakers offer decent audio output, while HDMI and VGA outputs are useful for hooking up the Toshiba to a TV or monitor. It's a shame the Qosmio has only one USB 3.0 port, but the memory card slot supports the three main formats in use today.

VERDICT: The Toshiba Qosmio X770-107 will delight gamers and multimedia enthusiast with its top-notch performance and screen. A whole heap of power is provided by the Core i7 CPU and 8GB of RAM, while you get plenty of storage space and a Blu-ray drive to boot. The Qosmio is an extravagant purchase, though, at £1,399.

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

PC ADVISOR BEST BUY

TOSHIBA SATELLITE P750-137

£999 inc VAT • toshiba.co.uk • tinyurl.com/buhw64s

Boasting a quad-core Intel Core i7-2630QM processor, the Toshiba Satellite P750-137 has plenty of power to offer. It scored 131 points in WorldBench 6, with Toshiba scooping the top two placings in this benchmark. Unlike its slightly more powerful sibling, however, this Toshiba has a price tag some £600 lower. The Satellite also comes with a generous 8GB of RAM and a 750GB hard drive.

A Blu-ray drive is useful for HD film playback on the laptop's 15.6in screen, although it maxes out at just 1366x768 pixels. You can also hook up the Toshiba to a TV via its HDMI connection, and even enjoy 3D content on a compatible set.

The screen itself is decent, but the shiny bezel coupled with a glossy panel results in rather a lot of glare. Wide viewing angles and rich colour output go some way to make up for this.

We like the well-spaced keyboard and a touchpad that can be easily turned off when you type. The numeric keypad is also welcome, but we disliked the awkward placement of the Delete key. Nevertheless, this multimedia laptop is eminently capable of doing double duty as a PC on which to type up documents and reports.

Gaming performance is lower than some, with the nVidia GeForce GT 540M with 2GB of video RAM capable of just 54fps in Fear ('Maximum' detail settings). This is playable, but other laptops in this group place the Toshiba somewhat in the shade.

The Satellite is preloaded with all manner of bloatware, and it took us some time to click through various registration prompts upon the machine's first startup. This can also slow down subsequent startups. Be prepared to spend time uninstalling unwanted items.

Battery life is short, and the Toshiba endured 3 hours 23 minutes in MobileMark 2007. It's far from the best here but, combined with a 2.6kg chassis and 15.6in screen, the Toshiba is one of the more easily portable contenders in our round-up.

VERDICT: The Toshiba Satellite is a good all-rounder, and handles all types of multimedia well – if it's not the best laptop for gaming. If you already have a 3D TV, or you need an entertainment-centric laptop that's good for office tasks too, this £999 Toshiba fits the bill.

Conclusion

Asus' U46SV-WX044X should be right up your street if you need a laptop on which to watch video and play the occasional game while you're on the move, possibly spending hours away from AC power. Its 10-hour battery life is staggering for a multimedia laptop. The Asus costs just £699, offering excellent value for money.

Dell's XPS 17 has a cracking screen that's also 3D-capable. Unfortunately, this noisy beast ran rather hot in our tests.

The HP Pavilion's strongest asset is its storage provision, with its twin drives offering a generous 1.5TB capacity. It's also very well priced at £849. The catch is in this laptop's AMD processor, which simply can't keep up with its Intel counterparts.

Gamers will be delighted with the Rock Xtreme, which obliterated the competition in our gaming tests. This is a very well-built machine, although we expect a little more for our money at £1,249.

The Toshiba Qosmio has all the bells and whistles, with an Intel quad-core chip, two hard disks (one of them a solid-state hybrid), a 3D-capable screen and 8GB of DDR3 RAM. Of course, components such as these don't come cheap and the £1,399 price is steep.

Our Best Buy award goes to the Toshiba Satellite. Despite a low-resolution screen and meagre gaming performance, you'd be hard-pushed to find a better blend of components, performance and build quality at £999. ⊠

	ASUS £699 inc VAT ★★★★★	DELL £1,170 inc VAT ★★★★★	HP £849 inc VAT ★★★★★	
Model name	U46SV-WX044X	XPS 17 L702X	Pavilion dv7-6b04ea	
Processor	2.3GHz Intel Core i5-2410M	2GHz Intel Core i7-2630QM	1.8GHz AMD A8-3510MX	
Screen size and type	14.1in glossy LED-backlit	17.3in glossy 3D LED-backlit	17.3in glossy LED-backlit	
Resolution (pixels)	1366x768	1920x1080	1600x900	
Operating system	Windows 7 Professional 64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	
RAM	4GB DDR3-1333MHz	4GB DDR3-1333MHz	8GB DDR3-1333MHz	
Storage	500GB, 5,400rpm HDD	500GB, 7,200rpm HDD	1.5TB (2x 750GB), 5,400rpm HDD	
Graphics	nVidia GeForce GT 540M with 1GB VRAM	nVidia GeForce GT 555M with 3GB VRAM	AMD Radeon HD 6755G2 with 1GB VRAM	
Video out	HDMI, VGA	HDMI, DisplayPort	HDMI, VGA	
Audio	stereo speakers, headphone jack, mic input	stereo speakers, 2x headphone jacks, mic input	stereo speakers, 2 x headphone jacks, mic input	
USB	1x USB 3.0, 2x USB 2.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0, 2x USB 2.0	
FireWire/eSATA	n/a	eSATA	n/a	
Optical drive	DVD±RW	BD-ROM, DVD±RW	BD-ROM, DVD±RW	
Wireless	802.11b/g/n, Bluetooth 3.0	802.11b/g/n, Bluetooth 3.0	802.11b/g/n, Bluetooth 3.0	
Ethernet	gigabit	gigabit	gigabit	
Card slot	SD	SD/MS Pro	SD	
Other features	webcam	3D glasses, webcam	webcam, fingerprint reader	
Battery	88Wh lithium-ion removable battery	lithium-ion removable battery	62Wh lithium-ion removable battery	
Battery life[1]	10 hrs 1 min	3 hrs 53 mins	5 hrs 10 mins	
WorldBench 6 score	114	126	82	
Games score (fps)[2]	78	129	72	
Dimensions	333x245x27mm	415x287x39mm	416x275x36mm	
Weight	2.1kg	3.6kg	3.4kg	

[1]Battery life tested using MobileMark 2007 Productivity [2]Framerates tested using Fear (Maximum detail settings)

PC ADVISOR TEST CENTRE

How we test

PC ADVISOR TEST CENTRE

We test every laptop's battery life, graphics performance and overall real-world speed in our lab. All Windows laptops are tested with their default operating system.

Battery life is recorded using the industry-standard benchmark, BAPCo MobileMark 2007. We use the Productivity test, which loops a series of intensive everyday applications until the battery is empty. Pauses are added between short runs to simulate the way laptops are used in real life.

Each laptop's graphics capability is measured using the game Fear and its built-in framerate-measurement tool. Here we have tested at 'Maximum' detail settings.

We use WorldBench 6 to measure performance. This stopwatches a PC as it completes a series of scripted operations, using 10 real-world programs. The results are compared to a reference 2.2GHz Intel Core 2 Duo PC with 2GB of RAM and Raid hard drives, which sets a 100-point baseline score.

	ROCK £1,249 inc VAT ★★★★☆ PC ADVISOR RECOMMENDED	TOSHIBA £1,399 inc VAT ★★★★☆	TOSHIBA £999 inc VAT ★★★★½ PC ADVISOR BEST BUY
	Xtreme X685-I5-2540M	**Qosmio X770-107**	**Satellite P750-137**
	2.6GHz Intel Core i5-2540M	2GHz Intel Core i7-2630QM	2GHz Intel Core i7-2630QM
	15.6in glossy LED-backlit	17.3in glossy 3D LED-backlit	15.6in glossy 3D LED-backlit
	1920x1080	1920x1080	1366x768
	Windows 7 Home Premium 64bit	Windows 7 Home Premium	Windows 7 Home Premium 64bit
	6GB DDR3-1333MHz	8GB DDR3-1333MHz	8GB DDR3-1333MHz
	500GB, 5,400rpm HDD	1TB (2x 500GB), 7,200rpm HDD (4GB Nand flash)	750GB, 5,400rpm HDD
	AMD Radeon HD 6990 with 2GB VRAM	nVidia GeForce GTX 560M with 1GB VRAM	nVidia GeForce GT 540M with 2GB VRAM
	HDMI, DVI	HDMI, VGA	HDMI, VGA
	stereo speakers, headphone jack, mic input	stereo speakers, headphone jack, mic input	stereo speakers, headphone jack, mic input
	2x USB 3.0, 2x USB 2.0	1x USB 3.0, 3x USB 2.0	1x USB 3.0, 3x USB 2.0
	eSATA	n/a	n/a
	DVD±RW	BD-RE, DVD±RW	BD-ROM, DVD±RW
	802.11a/b/g/n	802.11b/g/n, Bluetooth 3.0	802.11b/g/n, Bluetooth 3.0
	gigabit	gigabit	gigabit
	SD/MS/MS Pro/MS Duo	SD/MS Pro/xD-Picture	SD/MS Pro/xD-Picture
	webcam, fingerprint reader	3D glasses, webcam	webcam
	76Wh lithium-ion removable battery	48Wh lithium-ion removable battery	48Wh lithium-ion removable battery
	2 hrs 30 mins	2 hrs 4 mins	3 hrs 23 mins
	124	132	131
	275	166	54
	376x256x43mm	412x270x58mm	381x254x36mm
	3.1kg	3.4kg	2.6kg

Buying a better camera

Fancy improving your photography skills? A more capable camera can help. Paul Monckton offers advice on the best camera to choose if you're looking to move up from a compact to an interchangeable-lens model

Everyone loves taking photos, but many of us are continually frustrated by their quality – either as a result of our own lack of skills or the equipment we're using. Photography skills are something you can work on, while buying a better camera is simple enough if you know what to look for.

In the past, better photography could be achieved using a hulking great digital SLR camera, with a range of different lenses. Today, you needn't lug all that gear around. Compact cameras with large image sensors and interchangeable lenses are almost able to match the quality of a digital SLR, with a significant reduction in size and weight.

Faster performance

Compromises are often made in terms of usability and handling, but the latest generation of interchangeable-lens cameras is able to focus and shoot as fast as – or even faster than – a full-sized digital SLR. Powerful processing engines allow for faster capture, while more shots per second equate to more chances to capture that precise moment.

Retain consumer-friendly features

A better camera needn't be more difficult to use than a standard compact. The models we review here retain ease of use, including features such as selectable scene modes, built-in help guides and in-camera editing.

Depth of field

The ability to control depth of field is a particularly desirable capability of these cameras. This lets you shoot a portrait with a sharp, clear subject and a soft background. The effect is difficult to achieve using a compact camera, but with the right lens it's easy on a camera fitted with a larger sensor.

Digital SLR vs mirrorless

Mirrorless cameras are quieter to use than digital SLRs because there's no mechanical shifting of the mirror before each shot. A digital SLR instead has an optical viewfinder, but the camera's body and lenses are considerably bulkier and heavier. This isn't ideal for portability, although it can make for more comfortable handling of the camera during shooting. A bigger body also means more room for buttons and a larger battery.

Lenses

A compact camera's lens is often specified simply in terms of the zoom range available: wide-angle for group shots and telephoto for bringing distant objects closer. While a single lens that offers both these extremes is versatile, one designed specifically for the type of photo you want to take enables far superior quality, scope for a range of apertures and much reduced size and weight.

Specialist lenses are available for shooting close-ups, portraits and landscapes.

Extreme telephoto lenses are ideal for distant shooting, while ultra-wide-angle lenses capture as much as possible in a confined space and can create dynamic, deliberately distorted images.

Lens mounts

A full-size digital SLR lens mount is compatible with a huge range of lenses, so you don't need to rely on those created specifically for your camera model. There's also a thriving secondhand market for Canon and Nikon lenses, which can help you significantly reduce your costs.

However, newer system cameras have their own proprietary mounts. This limits your choice of lenses to those designed specifically for your camera model. Other lenses may work with the aid of an adaptor, but often with reduced functionality.

At press time, the Micro Four Thirds system offered the largest range of lenses for mirrorless cameras. Panasonic lists 14 such lenses, ranging from fixed focal-length pancake lenses to telephoto zooms. There's also a 3D lens enabling stereographic stills.

Olympus also uses the Micro Four Thirds system, so you can also use lenses designed for its PEN range – of which there are 11.

A range of adaptors are also available, making a huge number of camera lenses – both new and old – available to the Micro Four Thirds system.

Photography by Dominik Tomaszewski

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

CANON EOS 600D (18-55mm kit)

£585 inc VAT • canon.co.uk • tinyurl.com/72ste88

The EOS 600D takes the ease of use of Canon's entry-level EOS 1100D and adds to it a host of features that put it way beyond novice level.

It's a full-size digital SLR camera, with shooting modes ranging from fully automatic to complete manual. This allows you to move smoothly from one to the other as your abilities improve.

Whether you're taking still images or shooting full-HD video, the 600D delivers top-notch quality and maximum flexibility. Its 3in fold-out articulated LCD screen enables shooting from any angle, while the optical viewfinder provides a 95 percent field of view.

As one of two digital SLRs in this round-up, the EOS 600D is closest to Nikon's D5100 in both specification and operation. It's easy to differentiate these cameras from the mirrorless models, but the differences are far more subtle when the two are compared against each other. We preferred the Canon's more advanced video options, including manual exposure control and a useful digital zoom, but found switching between stills and video to be more cumbersome.

In general use, however, we found the EOS 600D to be the more convenient camera for advanced users. This is due to its slightly larger and wider range of control buttons, which allow various settings to be altered without diving into submenus.

Both cameras offer superb image quality, but the Canon loses out to the Nikon model on high-ISO performance. Canon's 18-55m lens lacks the silent ultrasonic motor of Nikon's version, although the choice of lens is ultimately up to you.

With continuous shooting maxing out at 3.7fps, the EOS 600D can't keep up with much of the competition. It's also limited to bursts of 34 Jpeg or six RAW images before it has to pause for breath. This is adequate for most users, but sports and action photographers may wish for a little extra speed.

VERDICT: Very close in form and function to Nikon's D5100, the Canon EOS 600D combines beginner-friendly features with advanced controls for the enthusiast. It offers the most advanced options for full-HD video, but sports and action photographers may find it slow.

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

NIKON D5100 (18-55mm kit)

£579 inc VAT • nikon.co.uk • tinyurl.com/6ute9kk

Nikon's D5100 digital SLR is a step up from the company's entry-level D3100 model, competing directly with Canon's EOS 600D.

In addition to delivering superb image quality, the Nikon aims to strike a balance between ease of use for the beginner and sophisticated controls for the more advanced photographer.

We found the D5100 very easy to use: its bright 3in articulated screen flips out and rotates to allow shooting from all manner of awkward angles – a boon to those wishing to take advantage of the full-HD video-recording features.

Nikon has done a great job of using this display to provide information in a helpful, accessible and attractive manner. The D5100 provides hints and help every step of the way. If 'Subject is too dark' isn't clear enough, for example, pressing the Help button will bring up further explanation and a tip, such as 'Use the flash'.

The D5100 incorporates automatic digital correction of common lens flaws, such as chromatic aberration and barrel distortion. This is ideal for consumer-grade lenses used with this type of camera.

Seasoned shooters may bemoan the lack of some of the discrete buttons provided on the Canon camera for controlling settings such as ISO on the fly. Furthermore, the D5100 relies on a limited selection of motorised lenses for autofocus mode.

In-camera editing features let you crop and tweak pictures, plus add special effects filters, without the need for a computer.

The D5100's 16.2Mp CMOS image sensor offers slightly fewer pixels than the Canon's 18Mp, but it's also slightly larger. This helps reduce image noise, especially when using high ISO settings. Here, the camera excels, producing the best low-light shots of the group.

With burst shooting up to 100 shots at 4fps and a 660-shot battery life, the D5100 has the necessary stamina for outdoor events.

VERDICT: The D5100 is an excellent entry point for the keen amateur who wants to discover more about photography. It's easy to use, offers superb image quality and boasts excellent low-light performance. A huge range of lenses and accessories is available.

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

OLYMPUS PEN MINI E-PM1 (14-42mm kit)

£399 inc VAT • olympus.co.uk • tinyurl.com/bLmymjw

It's more modern in appearance, but the new PEN mini maintains the core values of the stylish and expensive-looking PEN range in a considerably smaller package. Its undeniably sensual aesthetic is embodied by its brushed-metal exterior, available in several colours.

The mini is the smallest camera in Olympus' PEN range, which also includes the E-PL3 and E-P3. When paired with a pancake lens, the mini is almost pocketable and most certainly handbag-friendly.

Because it's so much smaller than the other cameras in our round-up – even the fixed-lens Sigma DP2x is bigger – there's precious little room for control buttons. This means tweaking any of the settings is likely to require resorting to the onscreen menu.

Features such as a built-in flash and an electronic viewfinder are also sacrificed in favour of miniaturisation, although both are usable as attachments and a tiny plug-in flash is included in the box.

Plenty of help is provided via the 3in LCD, including a built-in guide that offers tips on shooting various scenes and objects. Settings adjustments can include real-world descriptions, such as 'stop motion' or 'blur background', which will be helpful to novice photographers. The mini is also packed with special effects that you apply in-camera, plus support for full-HD video recording.

Despite its tiny dimensions, the mini is a very flexible camera. It's compatible with Olympus' 11-strong range of Micro Four Thirds lenses, as well of most of those available from Panasonic and other third-party manufacturers via adaptors.

The mini is surprisingly quick, with fast startup times, a snappy autofocus and a class-leading 5.5fps continuous shooting mode. It also incorporates in-body image stabilisation.

Image quality doesn't match that of the full-size digital SLRs under tough lighting conditions, with the smaller sensor more susceptible to noise than its APS-C counterparts. Steer clear of the highest ISO settings and you're sure to be delighted with the results.

VERDICT: The prettiest and smallest camera here, the PEN mini is ideal for those who love the size and aesthetic of a top-quality compact but also want to take top-quality pictures and make use of a large range of lenses. Advanced photographers may find the lack of control buttons make the Olympus somewhat frustrating to use, however.

PC ADVISOR RECOMMENDED

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

PANASONIC LUMIX DMC-G3 (14-42mm kit)

£468 inc VAT • panasonic.co.uk • tinyurl.com/7jcxjcr

Panasonic's DMC-G3 combines the features and handling of an SLR with the reduced dimensions of a compact. Uniquely in this round-up, it features a 3in rotating touchscreen. This enables shooting from all angles and allows the use of the screen to focus and take photos.

Like Samsung's NX11, it features a hand grip on the righthand side, and there's an electronic viewfinder slightly off-centre to the left. Unfortunately, the viewfinder doesn't automatically activate when you look through it. The DMC-G3 also sports a pop-up flash, in the middle of which nestles a hot-shoe mount and a stereo microphone.

Video-capture capabilities are strong, and the Panasonic supports full-HD recording at up to 60fps interlaced or 30fps non-interlaced. There's also a dedicated video-capture button.

The DMC-G3 uses the Micro Four Thirds system. Its 4:3-format sensor is smaller than the APS-C versions found in the competition, and therefore has to work harder to minimise image noise – yet the Panasonic produces surprisingly clean pictures. Images remain usable right up to ISO 6,400, although the best APS-C cameras outstrip it in low-light performance.

The Micro Four Thirds format also enables Panasonic and Olympus cameras to share lenses, opening up the widest selection of possible glassware to users of both formats.

The DMC-G3's autofocus system is lightning-fast. It felt faster than the PEN mini, and is in a different league to Samsung's NX11 and Sigma's DP2x. We also found focusing to be very accurate. In fact, the camera's operation is speedy throughout.

Although the DMC-G3 offers some degree of built-in assistance, it's still a rather complex and at times bewildering camera to use. If you just want to point and shoot, press the dedicated iA button. This shifts the camera into fully automatic mode, while simultaneously lighting up bright blue to alert all around to the fact you don't know what you're doing.

VERDICT: The DMC-G3 is packed with advanced features and delivers blistering speed. This is the tiny camera that serious photographers will love. Despite its size, it manages to cram in a full set of handy control buttons and a large flip-out touchscreen. The Panasonic also supports a large range of lenses.

PC ADVISOR TEST CENTRE

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

SAMSUNG NX11 (18-55mm kit)

£318 inc VAT • samsung.com/uk • tinyurl.com/3oLqd93

Samsung's NX11 is a great choice for those who've always wanted a digital SLR but have been put off by their sheer bulk. Thanks to its mirrorless body, the NX11 is smaller and lighter than any SLR – yet its traditional SLR body shape, with its rubberised hand grip, is much more comfortable to hold than a compact. The mode and value selector wheels fall naturally under the thumb and forefinger, allowing quick adjustments to be made while you look through the viewfinder.

It's not until you put your eye to this viewfinder that you realise it's been replaced by an electronic version. Its 921k-dot resolution makes it considerably sharper than the 3in rear display, and you can use it in darker situations than an optical viewfinder.

Low-light shooting isn't the NX11's strong point, however. With a maximum ISO setting of just 3,200, it's a long way behind most of the competition; even at this setting, image noise is more noticeable than with either of the digital SLRs. The camera performs very well at lower ISO settings, but so do all the models reviewed here.

While the NX11 may be only a tiny bit smaller than the smallest SLR, its compatible NX mount lenses are considerably less bulky.

The NX-mount system offers a small but ever-growing selection of lenses, ranging from a tiny 20mm pancake lens up to the image-stabilised 5-200mm zoom. Forthcoming models include an 85mm f/1.4 portrait lens that's unlike anything available on any other digital mirrorless compact system. You can also use older K-mount Pentax lenses in manual mode via an adaptor.

Samsung's iFunction system lets you use the lens' focus ring to adjust other shooting parameters, without taking your eye off your subject. This is significantly quicker than using buttons to step up and down through values.

When it comes to video, the NX11 supports HD (720p) at 30fps, but not full-HD (1080p) recording. This is adequate for the vast majority of consumer uses, but it can't match the 1080p capture of some competing models here.

VERDICT: The Samsung NX11 loses out on specification in a few key areas, but offers a digital SLR-like experience in a much smaller package. Available at a very competitive price, the NX11 is the ideal low-cost alternative to a digital SLR.

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

SIGMA DP2X (Fixed 41mm lens)

£619 inc VAT • sigma.co.uk • tinyurl.com/c2r44kr

Sigma's fixed-lens DP2x takes a rather different approach to the high-quality compact. Designed for enthusiasts, it's a camera for those who know what they're doing: Sigma's purist approach leaves no room for automatic scene modes or built-in help. Instead, a sparse, pared-down design places all the most important manual controls at your fingertips, allowing experienced photographers to quickly adjust exposure without having to jump into a cumbersome menu system.

The DP2x doesn't support interchangeable lenses, while the 24.2mm lens has no zoom function. This may seem crazy in a world where compacts are often sold on the strength of their zoom capabilities. However, as any professional photographer will tell you, a fixed or 'prime' lens delivers far superior optical performance and enables a wider aperture, which in turn improves low-light performance. At f/2.8, the Sigma DP2x's lens is considerably brighter than any of the kit zoom lenses provided with the competition.

The Sigma's lens sees the world in a way that's very similar to the human eye, making the DP2x ideal for street photography and portrait shots. You just have you be prepared to move your arms – or, indeed, your entire body – in order to frame the shot you want.

The differences don't stop there: unlike every other camera reviewed here, the DP2x uses a Foveon full-colour sensor. While its physical size matches that of an SLR, its 14 megapixels are divided into layers of red, green and blue, placed on top of each other rather than side by side. At maximum resolution, your final image will contain only about 4.6Mp, but each pixel will hold thrice the amount of colour information.

With ISO limited to 3,200 in RAW mode and only 800 in Jpeg mode, the DP2x doesn't have the sensitivity to compete under low-light situations. Under more forgiving conditions, however, the camera's high-quality prime lens and unique sensor allow it to produce sharp, detailed images with great colour reproduction.

VERDICT: The DP2x will polarise opinion: the quirks that'll put off the majority will be adored by enthusiasts. But while those who know how to get the best out of the Foveon sensor will put up with the Sigma's generally slow response and small 2.5in LCD screen, there's certainly room here for improvement.

Conclusion

The digital SLR format is well established as the de facto standard for enthusiasts and most professionals, but newer interchangeable-lens models can offer the ease of use of a compact with vastly superior flexibility, performance and image quality – even if you never change the lens.

An entry-level digital SLR will transform the look of your pictures. Stepping up to the next model in the range will likely add more speed and useful extra features, such as a fold-out screen.

Canon's EOS E600D and Nikon's D5100 are excellent digital SLRs and deliver the best image quality here. The Nikon has the edge in performance and features for beginners, while the Canon is better suited to enthusiasts with more control over video.

If you don't want the bulk of an SLR, a large-sensor compact with interchangeable lenses will deliver almost the same level of image quality in a much smaller and lighter body. Crucially, the lenses are also smaller and lighter. And gone are the days when an interchangeable-lens compact meant an automatic compromise on speed.

Samsung's NX11 is the most digital SLR-like interchangeable-lens camera to use. Its large APS-C format sensor performs well in good light, enabling soft backgrounds.

It lacks support for full-HD video and is limited to a maximum ISO of 3,200, however.

The Olympus PEN mini and Panasonic Lumix DMC-G3 use a slightly smaller Micro Four Thirds sensor. Both offer very good low-light performance and extremely fast operation. The mini's tiny dimensions and good looks will appeal to fans of compact cameras, whereas the DMC-G3's superb speed, fold-out touchscreen, mode dial and control buttons will tempt enthusiasts.

Sigma's DP2x is a very different type of camera, but has a place in the hands of experienced photographers who know how to use its unique sensor and prime lens. ⊠

	CANON £585 inc VAT ★★★★★	NIKON £579 inc VAT ★★★★★ PC ADVISOR BEST BUY	OLYMPUS £399 inc VAT ★★★★★	
Model name	EOS 600D	D5100	PEN mini E-PM1	
Camera type	SLR	SLR	interchangeable lens	
Kit contents	body + 18-55mm f/3.5-5.6 IS II lens	body + 18-55mm f3.5/5.6 VR lens	body + 14-42mm f3.5/5.6 collapsible lens	
LCD	3in, 1,040,000 dots, vari-angle	3in, 921,000 dots, vari-angle	3in, 460,000 dots	
EVF	n/a	n/a	n/a	
Sensor size/type	APS-C (22.3x14.9mm), 18Mp, CMOS	APS-C (23.6x15.7mm), 16.2Mp, CMOS	Micro Four Thirds, 12.3Mp, Live MOS	
Image resolution	5184x3456 pixels	4923x3264 pixels	4032x3024 pixels	
Video capture	1080p	1080p at 24/25/30fps	1080p at 60i, 720p at 60p	
ISO range	6,400 (extended to 12,800)	100-6,400 (extended to 25,600)	200-12,800	
Image stabilisation	lens-dependent	lens-dependent	in-body	
Autofocus	9-point	11-point	35-point contrast detection	
Shutter speed	30-1/4,000	30-1/4,000	2-1/4,000	
Continuous shooting	3.7fps	4fps	5.5fps (4.1 with IS)	
Built-in flash	yes	yes	external (included)	
Guide number	13	12	10	
Opt viewfinder coverage	95%	95%	n/a	
DOF preview	yes	n/a	n/a	
3D support	no	no	3D still images	
Face detection	yes	yes	yes	
Scene modes	yes	yes	yes	
Card slot	SD/SDHC/SDXC	SD/SDHC/SDXC	SD/SDHC/SDXC	
Battery	lithium-ion, 440 shots	lithium-ion, 660 shots	lithium-ion, 330 shots	
Dimensions	133x100x80mm	128x97x79mm	110x64x34mm	
Weight (body only)	570g	510g	217g	

How we test

PC ADVISOR TEST CENTRE

Cameras can vary greatly in terms of usability, especially when manufacturers are forced to make compromises for the sake of size. We put each camera through its paces in a variety of shooting modes, noting how easily options could be accessed via dedicated buttons or an onscreen menu.

This also gave us an opportunity to assess build quality. All six cameras on test are built to a very high standard, but our build quality rating also includes the usability of the physical design, menus and button layouts.

Larger image sensors tend to mean better light sensitivity, reduced noise and the ability to maintain usable image quality at higher ISO settings. We repeatedly shot a test scene at various ISO settings, and paid particular attention to each camera's high-ISO performance.

Even the worst performers here will produce better results than a typical compact camera, but the best scores go to those which can deliver a usable photo at ISO 3,200 or above.

Our Performance score is based on a combination of image quality, shooting speed and general responsiveness, as well as the availability of features that improve versatility. These include battery life, continuous shooting speeds and HD video-recording capabilities.

PANASONIC £468 inc VAT ★★★★✦ PC ADVISOR RECOMMENDED	SAMSUNG £318 inc VAT ★★★★★	SIGMA £619 inc VAT ★★★★★
Lumix DMC-G3	NX11	DP2x
interchangeable lens	interchangeable lens	large-sensor compact
body + 14-42mm f/3.5-5.6 IS lens	body + iFunction 18-55mm f/3.5-5.6 OIS lens	built-in 41mm-equivalent f2.8 lens
3in, 460,000 dots, vari-angle touchscreen	3in, 614,000 dots, AmoLED	2.5in, 230,000 dots
1,440,000 dots	921,000 dots	n/a
Micro Four Thirds, 16Mp, Live MOS	APS-C, 14.6Mp, CMOS	APS-C (20.7x13.8mm), 14.1Mp, Foveon X3 CMOS
4592x3448 pixels	4592x3056 pixels	2640x1760 pixels
1080p at 60i/30p, 720p at 60p	720p at 30p	320x240 at 30p
100-6,400	100-3,200	50-3,200
lens-dependent	lens-dependent	n/a
23-area	15-point (35-point close up)	1 selectable from 9 points
30-1/4,000	30-1/4,000	15-1/2,000
4fps (3fps with Live View)	3fps (30fps burst mode)	3fps
yes	yes	yes
10.5	11 (at ISO 100)	6 (at ISO 100)
n/a	n/a	n/a
n/a	n/a	n/a
3D lens available	no	no
yes	yes	no
yes	yes	no
SD/SDHC/SDXC	SD/SDHC	SD/SDHC
lithium-ion, 250-270 shots	lithium-ion, 400 shots	lithium-ion, 250 shots
115x84x47mm	123x87x47mm	113x60x56mm
336g	353g	260g

FAMILY desktop PCs

The do-it-all desktop is becoming more specialised in the 21st century, and the family PC is now perhaps the closest to being a master of all trades. In the first of our brand-new series of desktop PC group tests, Paul Monckton looks at five general-purpose machines

The five family desktops we review here are traditional tower PCs, packaged with a flatscreen monitor, keyboard and mouse. We're looking for a balance of good build quality and decent performance, along with useful accessories and peripherals that let the system shine out of the box. A useful software bundle is also appreciated.

If you're not looking to play the latest Windows games, you can save money on a PC that uses graphics integrated to the CPU rather than a pricey dedicated graphics card. Both AMD and Intel sell such processors.

Intel's Core i5-2500K is a popular choice of processor, 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.

For occasional gaming or to accelerate video encoding, AMD's Fusion chips have faster integrated graphics. The trade-off is a reduction in application performance.

The AMD A8-3850 is a quad-core CPU running at 2.9GHz. It offers plenty of general speed, but will also allow you to play the latest games if you lower the detail settings.

It's possible to boost the graphics later, of course. An AMD Radeon HD 6870 or nVidia GeForce GTX 560 Ti can provide ample performance without breaking the bank.

For memory and storage, consider 4GB of RAM and a 500GB hard drive as the minimum required. All the systems here have at least 8GB of memory and 1TB hard drives. If you plan to upgrade the storage later, keep in mind that recent flooding in Taiwan has pushed up prices considerably. Things should settle down within a few months, however.

If you want a PC for watching films and videos, listening to music and chatting with friends, a decent 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. (Note that the '5' refers to the number of speakers, while the '.1' refers to the subwoofer.)

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. A good screen with decent viewing angles becomes essential when two or more people are viewing the screen at the same time.

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 DVDs or video. A Blu-ray drive is becoming a more affordable option, and the HD films it supports will make the most of your screen.

Listening to music or watching films isn't helped by a noisy PC. Quiet, sound-dampened cases can drastically cut down on the noise produced by fans and drives. Good-quality CPU coolers can also help.

Beginners may find the automated setup process of systems from larger manufacturers such as HP and Packard Bell useful. This can help you configure your machine and get online. The down side of this hand-holding gesture is often a lot of unwanted preinstalled software that can slow down your PC, however.

PCs from smaller vendors tend not to offer this help, but may offer a smaller software bundle. This may include free or obsolete versions of commercial programs; you choose to install only what you want.

Built-in wireless networking is useful if you need to site the PC far from your modem/router, as are wireless keyboards and mice that remove wires from your desk. Keyboards and mice quality is often overlooked but, as the primary interface between you and the PC, it pays to get high-quality, ergonomic components.

Don't forget to check the warranty terms, which vary wildly between PC vendors. Some offer a two- or even three-year warranty, but beware of small print that states you must pay to return the item for repairs. Even then, the warranty may be labour- or parts-only. After-sales service should form an important part of your buying decision.

ARBICO EXCEL i5256 VX

£699 inc VAT • arbico.co.uk • tinyurl.com/7ssrknr

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

Arbico's eXcel i5256 VX is a powerful yet practical home PC. At £699, it costs considerably less than all the PCs in this round-up but Braebo's Ares, yet it performs as fast as the most expensive systems when running general office and multimedia applications.

The Arbico's 3.3GHz Intel Core i5-2500K processor has also been selected by Chillblast and Eclipse, with all three machines offering similar general application performance. Despite its price tag, the Arbico scored joint-top in WorldBench 6 with 172 points.

This PC isn't aimed at gamers. It relies on the graphics integrated to its processor for such tasks, which delivered just 21fps in Crysis (Medium detail settings). This solution is adequate for multimedia, and the Arbico performs well when encoding video and playing HD films. Games are accessible, too, provided that you lower the detail settings. Alternatively, you can add in a discrete graphics card.

A 1TB hard drive and 8GB of DDR3 RAM are standard in this group – you're unlikely to find more without customising the spec.

The Asus P8Z68-v LX RTL motherboard features Intel's Z68 chipset, unlocking the overclocking potential of the Core i5 chip. It's a slightly inferior version of the board to that supplied by Chillblast and Eclipse, and omits a pair of internal USB 3.0 ports.

The 23.6in AOC 2436Vwa display offers adequate image quality and looks smart enough. This monitor also complements the black Gigabyte system case, which incorporates a handy memory card reader.

The Sumvision wired USB keyboard and mouse are cheap-feeling components, with the former a lightweight model that won't stay put on the desk. A set of Logitech stereo speakers is provided, but you don't get a subwoofer or Blu-ray drive.

VERDICT: The Arbico is a competent low-cost PC for work rather than play. Application performance is excellent, but the lack of Blu-ray support and basic speakers undermine its multimedia potential.

BRAEBO ARES

£611 inc VAT • braebo.com • tinyurl.com/6wm2drq

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

PC ADVISOR RECOMMENDED

The least expensive PC on test, Braebo's Ares makes its presence felt like a Sherman tank crashing through your living room. Its striking looks are courtesy of the brutal styling of the fearsome Inwin Dragon Slayer system case. With its military colours and blue illuminated logo, it certainly looks ready to kill something.

When pushed into action by our benchmark, the Ares' results were somewhat less deadly. The 2.9GHz AMD Fusion A8-3850 processor can't keep up with the mighty Intel Core i5, and turned in a considerably slower WorldBench 6 score of 115 points.

This score still suggests plenty of performance for the average home user, however, and what's lost in application speed is gained in graphical clout. The integrated Radeon HD 6550D processor is capable of faster graphics than any Intel chip, which is handy if you want to enjoy a bit of gaming without the added cost of a dedicated graphics card. We saw 36fps in Crysis (Medium detail). Unlike Intel's solution, however, AMD's integrated graphics can be teamed up with an external card, boosting performance at lower cost.

The ASRock A75M-HVS motherboard is combined with 8GB of DDR3 RAM and a 1TB hard drive, which are standard at this price.

The Braebo Ares is supplied with a relatively small and cost-effective 21.5in AOC F22+ display. Braebo adds a Blu-ray drive and stereo speakers with a subwoofer. You also get 500GB of free online storage with LiveDrive. Considering the low cost of this system, the Microsoft Wireless Desktop 3000 keyboard and mouse combo are particularly pleasing, and a superior option to any other bundled peripherals here.

VERDICT: For a home PC the Braebo Ares looks like overkill. It gives the distinct impression that, should you switch it on, something somewhere on the planet will explode. It offers less raw performance than Intel systems, but makes up for it with better graphics, a great keyboard and mouse, Blu-ray and free online storage for backup.

PC ADVISOR TEST CENTRE

CHILLBLAST FUSION HOTROD

£799 inc VAT • chillblast.com • tinyurl.com/7q3p93n

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

PC ADVISOR BEST BUY

Many types of specialist PC are available, but if you have only one PC in the home it's jolly useful to have one that can turn its hand to anything. Chillblast's Fusion Hotrod does just that, and if you can afford to spend £799 then you'll find this PC has plenty more to offer than the Arbico eXcel and Braebo Ares.

Based on the same 3.3GHz Intel Core i5-2500K processor as the less-expensive Arbico, the Fusion Hotrod delivers identical application performance. Both PCs scored an excellent 172 points in WorldBench 6. This PC has a couple of extra USB 3.0 ports, too.

For graphics power, Chillblast has selected a Radeon HD 6870 with 1GB of video memory. This delivers a huge boost in gaming performance over integrated graphics, and its 100fps score in Crysis (Medium detail) is five times faster than the Arbico's 21fps.

You also get a full-HD 23.6in Asus VS247H monitor. This offers considerably better picture quality than the AOC models. Blu-ray playback is provided by a Samsung combo drive, while CyberLink's Power DVD software assists with playback.

Unfortunately, the basic Sweex stereo speakers are a let-down in the context of such premium components.

A wireless keyboard and mouse combo is included in the form of the Logitech Cordless MK260. It's a better option than the cheap wired model supplied by Eclipse, but CyberPower provides a more advanced model and neither match the quality of the Microsoft Wireless Desktop offered by Braebo.

Some useful software is preinstalled, but this comprises mostly open-source or older programs that are available online for free.

VERDICT: It's far from the most expensive PC in our group, but the Chillblast Fusion Hotrod is pricey for a home PC. It also lacks useful features such as a card reader and built-in wireless networking. Nevertheless, it matches superb application performance with good multimedia and gaming credentials and an excellent monitor.

CYBERPOWER ULTRA 6 CORE SILENT EDITION

£999 inc VAT • cyberpowersystem.co.uk • tinyurl.com/88799nw

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

We had high hopes for CyberPower's Ultra 8 Core Silent Edition, which combined the latest eight-core AMD FX 8120 CPU with an impressive case, excellent build quality and decent peripherals.

Unfortunately, our hopes for great performance were dashed when we were unable to run some of our benchmarks. The CyberPower consistently failed one of the sub-tests of WorldBench, while Crysis wouldn't run at all. We reinstalled Windows, checked for the latest drivers, and even tried a different processor, the six-core AMD FX 6100. Suspecting a compatibility issue with AMD's latest CPU architecture, we then tried a six-core AMD Phenom II 1055T. The system worked flawlessly with this processor, so it's this configuration we have tested and reviewed here.

With the replacement chip installed, we recorded a WorldBench score of 123 points. It's considerably slower than competing Intel PCs.

An Asus M5A97 motherboard offers many premium features, including automatic overclocking and software control over fans and clock speeds within Windows. Unfortunately, the Phenom II 1055T doesn't feature the unlocked multiplier of the FX 8120 CPU and is less able to take advantage of the overclocking features.

An AMD Radeon HD 6750 graphics card is fitted, which provides less power than the Chillblast's HD 6870 and Eclipse's GTX 560 Ti.

The Cooler Master case exudes quality. Sound-damping materials line the case, while an Asetek closed-loop liquid cooling module provides further noise relief, plus efficient cooling.

A 23.6in HKC LED-backlit display, Logitech stereo speakers (with a subwoofer) and a Lite-On Blu-ray combo drive deliver a comprehensive multimedia experience. We were also impressed with the built-in Wi-Fi connectivity and Logitech wireless peripherals.

VERDICT: An expensive, but impressively built PC featuring superb build quality, quiet operation, a built-in card reader and Wi-Fi. Compatibility issues prevented it from reaching its full potential.

ECLIPSE SOLAR i525N560Ti

£849 inc VAT • eclipse-computers.com • tinyurl.com/d6qodth

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

Based around a powerful 3.3GHz Core i5-2500K processor, the Eclipse Solar delivers strong performance – more, in fact, than most home users will ever require. The three points it lost to Arbico and Chillblast in our WorldBench 6 test aren't worth quibbling about.

Gamers will love this PC. It's fitted with the most powerful graphics card on test, an nVidia GeForce 560 Ti. It scored 110fps at Crysis' Medium detail settings, and only the Chillblast could come close with 100fps. The system case also suggests Eclipse has gamers in mind.

Despite its relatively high price, the Eclipse doesn't stand out in terms of build quality. The Cooler Master Elite RC-430 case looks smart but lacks internal cable management, even if Eclipse has taken the trouble to neatly fasten all its cables. The case also lacks perpendicular drive bays, although it does have tool-free versions.

Very good gaming performance comes at the cost of home-user-friendly features, such as wireless connectivity and a card reader. The supplied wired keyboard and mouse are also disappointing when compared to those provided with systems costing £200 less.

Like most of the competition, the Solar i525n560Ti is supplied with 8GB of DDR3 RAM and a 1TB hard drive for storage.

A full-HD 23.6in LED-backlit monitor from HKC is included. It's a budget display, but still provides a better experience than some basic models we see. The HKC is paired with a Blu-ray drive, plus a set of Logitech LS21 stereo speakers that includes a bass-enhancing subwoofer. Note that this set is smaller than the Logitech S220 selected by CyberPower, however.

VERDICT: Pricey but powerful, the Eclipse blasts through applications and turns in impressive gaming performance. Combine this with a large monitor, Blu-ray player and speakers, and you have a great PC that's marred only by a gamers' case and poor-quality peripherals.

	ARBICO £699 inc VAT ★★★★☆	BRAEBO £611 inc VAT ★★★★☆	PC ADVISOR RECOMMENDED
Model name	eXcel i5256 VX	Ares	
Processor	3.3GHz Intel Core i5-2500K	2.9GHz AMD Fusion A8-3850	
Monitor	23.6in AOC 2436Vwa (0.248mm, 1920x1080 pixels)	21.5in AOC F22+ (0.248mm, 1920x1080 pixels)	
RAM	8GB DDR3	8GB DDR3	
Storage	1TB SATA 6Gbps HDD	1TB SATA 3Gbps HDD	
Power supply	500W Ace	500W	
Motherboard	Asus P8Z68-V LX RTL	ASRock A75M-HVS	
CPU cooler	standard Intel cooler	standard AMD cooler	
USB	2x USB 3.0, 4x USB 2.0	4x USB 3.0, 2x USB 2.0	
Graphics card	integrated Intel HD Graphics 3000	AMD Radeon HD 6550D	
Sound	onboard	onboard	
Speakers	2x Logitech S120	2x Logitech S220 & subwoofer	
Optical drive	22x Samsung SH22AB DVD±RW	12x/16x TSSTcorp DVDWBD SH-B123L BD-ROM/DVD±RW	
Operating system	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	
Bundled software	Nero, BullGuard Internet Security	Microsoft Office 2010 Starter, Nero	
Case	Gigabyte GZ-X6 Black	Inwin Dragon Slayer	
Keyboard	Sumvision USB wired	Microsoft Wireless Desktop 3000	
Extra features	card reader, 802.11b/g/n Wi-Fi	500GB secure online storage	
WorldBench 6 score	172	115	
Games score (fps)[1]	46/21	62/36	
Warranty	2-year return-to-base	1-year return-to-base	

[1]Framerates tested using Crysis (1280x720, Low/Medium detail)

PC ADVISOR TEST CENTRE

Conclusion

The spec of a 'home' PC is different for each of us, as is evident from the mixed selection of systems in our group test. Ranging in price from £611 to £999 inc VAT, these PCs cover a range of capabilities and budgets.

It's good to see features such as SD Card readers built into system cases, but we were disappointed to find expensive PCs supplied with cheap wired keyboards. Similarly, useful features such as Wi-Fi and Bluetooth are often omitted. No vendor here has included a webcam for conducting video chat, nor easy-to-use photo- or video-editing software.

For a PC designed for family use and possibly placed in a living room, we also hoped to see more understated designs. The CyberPower Ultra comes closest to our vision of such a machine, with a more suitable case than the battle-ready piece of ordnance that is the Braebo Ares.

Of the more expensive systems, Chillblast's Fusion Hotrod offers a good balance of performance, features and price.

The budget systems from Arbico and Braebo are closely matched. The Arbico offers better overall performance, an SD Card reader and wireless networking, while the Braebo Ares boasts more graphics power, Blu-ray support and superior peripherals, plus attention-seeking looks. ⊠

CHILLBLAST £799 inc VAT ★★★★☆ PC ADVISOR BEST BUY	**CYBERPOWER** £999 inc VAT ★★★★☆	**ECLIPSE** £849 inc VAT ★★★★☆
Fusion Hotrod	**Ultra 6 Core Silent Edition**	**Solar i525n560Ti**
3.3GHz Intel Core i5-2500K	2.8GHz AMD Phenom II X6 1055T	3.3GHz Intel Core i5-2500K
23.6in Asus VS247H (0.27mm, 1920x1080 pixels)	23.6in HKC 2412 (0.27mm, 1920x1080 pixels)	23.6in HKC 2412 (0.27mm, 1920x1080 pixels)
8GB DDR3	8GB DDR3	8GB DDR3
1TB SATA 3Gbps HDD	2TB SATA II 3Gbps HDD	1TB SATA3 6Gbps HDD
650W EZCool	500W Cooler Master	650W EZCool
Asus P8Z68-V LE	Asus M5A97	Asus P8Z68-V LE
standard Intel cooler	Asetek Watercooling	standard Intel cooler
2x USB 3.0, 7x USB 2.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 6x USB 3.0
Sapphire AMD Radeon HD 6870 with 1GB VRAM	PowerColor AMD Radeon HD 6750 with 1GB VRAM	nVidia GeForce GTX 560 Ti with 1GB VRAM
onboard	onboard	onboard
2x Sweex	2x Logitech S220 & subwoofer	2x Logitech LS21 & subwoofer
12x/16x Samsung SH-B123L/BSBP BD-ROM/DVD±RW	16x Lite-On IHES212-31 BD-ROM/DVD±RW	LG CH10LS20R BD-ROM/DVD±RW
Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit	Windows 7 Home Premium 64bit
CyberLink PowerDVD, free utilities	Microsoft Office 2010 Starter	none
EZCool A200D Rev 2	Cooler Master Silent RC-551-KKN1	Cooler Master Elite RC-430
Logitech Cordless MK260	Logitech Wireless Keyboard & Mouse MK320	unbranded USB wired
optional free software pack	12-in-1 card reader, soundproofing, 802.11b/g/n Wi-Fi	none
172	123	169
161/100	96/58	162/110
2-year collect-and-return	3-year return-to-base (parts only)	1-year return-to-base

How to beat 2012's WEB THREATS

How much trouble can the kids get into with your old laptop, or nan with her new mobile phone? A lot. John Oates explains how to protect your identity, bank account and computer as you venture on to the web

The run-up to Christmas accounts for the majority of all PC sales, which inevitably means January will bring lots of lovely new victims for scammers.

Even the most clued-up user can get into trouble online, and whether you're inheriting someone's old machine or setting up a brand-new PC there's a lot to remember. So what advice do you offer the schoolkid receiving dad's passed-down laptop? And how much trouble can nan get into with her new iPhone or tablet?

Today's online dangers are more likely to come from organised criminal gangs than script-writing hacker kids. A malware infection could empty your bank account and damage your computer. These crooks are hunting down your private information, which includes much more than just your bank details. Login details for websites can give away enough information to get an identity theft underway. For this reason, you'd be wise not to include your real-world address or date of birth on Facebook profiles or other publicly accessible websites.

Traditional PC viruses are becoming less of an issue. Of the new malware strains Panda Labs found in the third quarter of 2011, 77 percent were Trojan horses, against 12 percent for viruses. Trojans are software

designed to take control of your PC, whether to forward spam and phishing messages or to return data to a hacker's server. Trojans have been gaining ground for some time – a trend that's unlikely to change in 2012.

But there are other dangers that you might never even notice. A web-connected computer can be conscripted into a 'zombie network' of machines that collectively run distributed-denial-of-service (DDoS) attacks on websites or servers. Such software might drain the batteries more quickly than usual on a laptop or other mobile device, but you might not notice any other changes while your computer is busy working for a criminal

gang. If you do notice a change in how your machine or phone is behaving, be sure to investigate using an appropriate scanner.

Another danger you might run into is fake antivirus, software that places pop-up adverts on your PC's screen. Don't be fooled into clicking a link in the pop-up to download software that purports to remove a supposed infection – you'll either end up forking out for unnecessary software or malware will be loaded on to your PC.

To stay safe online, you need to use the common sense you apply to the real world. Instruct less experienced users to trust their gut instincts. If something about a website or

email looks or feels wrong, even if they can't put their finger on exactly why, it probably is – or, at the very least, further investigation into its credibility is required.

Here are a few useful tips to keep you on the straight and narrow:

Your bank will not email you if someone attempts to access your account.

Her Majesty's Revenue and Customs will not email you news of a huge tax rebate.

Young, beautiful Russian girls do not want to meet you (or, indeed, marry you).

None of these old threats is going away any time soon, and 2012 is set to bring new online dangers. Keep your wits about you.

Wi-Fi security

The majority of new PCs sold this Christmas will be laptops and netbooks. These will probably be connected to a home Wi-Fi network, which brings its own dangers. For a good overview of how to sort out your home Wi-Fi security, see the guide produced by Get Safe Online at tinyurl.com/cpaupwq.

But laptops aren't going to stay safely at home. They're going to be taken down to the local café, which offers free Wi-Fi access with every cup of coffee. However good the lattes and muffins might be, though, you need to be confident that the café owners are doing a good job of keeping their network safe.

Tablets and other mobile devices are particularly vulnerable. An iPad or other Apple device is arguably safer from malware, but social-manipulation scams and DNS attacks don't mind what platform you're using. Mac malware is on the rise, too, as Apple's market share increases.

Scammers target Wi-Fi networks at airports, train stations, pubs and cafés. Anyone logging into such networks must be especially vigilant that they select the correct network – don't allow your PC to automatically find and log into a network.

This is an easy mistake to make. You're in a hurry and need to send a quick email or confirm an appointment before jumping on a train or plane. It seems so harmless to quickly log into an unsecured wireless network, and you can't remember whether the station offers free Wi-Fi anyway.

Pie chart:
- 76.76% Trojan
- 12.08% Virus
- 6.26% Worm
- 3.52% Adware
- 1.38% Dialer

New **MALWARE STRAINS** found by Panda Labs in 2011 Q3

Wi-Fi settings panel:

Wi-Fi — Connected to IDG2 ✓

Network notification — Notify me when an open network is available ✓

Wi-Fi networks

IDG2 — Connected

Neil Bennett's iMac

000D0B4ACB18 — Secured with WEP

Be careful which **WI-FI NETWORK** you log into – not all are secure

Add Wi-Fi network

Show new users how to scan and identify available wireless networks and to carefully check which one they're joining.

Mobile malware

Mobile phones are increasingly being targeted through SMS messages or as they access the web. Parents buying smartphones for their children should also be aware of what their offspring can do with them – probably more than you can. If you're handing over a phone with a limited data plan, note that apps accessing the web on demand can rack up huge bills. Switch off the phone's GPS function when it's not needed – this will also extend battery life. And avoid unsecured Wi-Fi networks like the plague.

Recent research by Get Safe Online revealed just how fast smartphone malware is growing. The government-backed body found an 800 percent increase in the number of malware apps aimed at mobiles in just four months (see tinyurl.com/czcp9c8).

Dodgy apps often appear in app stores as free versions or updated levels for popular games and apps. Ring tones are another route of attack for malware writers. Once downloaded to your phone, malicious apps might copy your contacts, emails and saved passwords. Some even forward photographs taken by your phone.

An emerging mobile scam secretly sends premium text messages from your phone to a number owned by the fraudster.

Rik Ferguson, director at Get Safe Online and of security research at Trend Micro, explains: "This type of malware is capable of sending a steady stream of text messages to premium-rate numbers – in some instances, we've seen a message sent every minute. With costs of up to £6 per message, this can be extremely lucrative. The user won't know this is taking place, even if they happen to be using the device at the same time."

App attack

Another emerging trend for mobile devices is apps that snoop on more information than you realise. Even official apps suck up an extraordinary amount of information from your handset. How safe and well protected

Always check an app's **PERMISSIONS** before you download and install it

Android Market

Clouds & Sheep — HandyGames — FREE — INSTALL

Permissions — THIS APPLICATION HAS ACCESS TO THE FOLLOWING: — NETWORK COMMUNICATION — FULL INTERNET ACCESS

this data is depends partly on the apps you install and partly on your faith in the app developer concerned. Always read the details of what the app will have access to.

Research from Kaspersky Labs found large numbers of mobile malware strains

Get your finances sorted for 2012:

**JUST CLICK THE
Eazy Button™**

Click and your accounts
are done. With Accountz,
it's Really Truly Eazy.

accountz.com/eazy

Lock down your Facebook **PRIVACY SETTINGS**

offered for sale in official app stores and elsewhere. Many users believe anything they find in the Android Market, for example, is safe. The reality is there are no such guarantees. Kasperksy's boffins revealed a 30 percent hike in dodgy Android apps and found 34 percent of these had tried to steal users' personal data.

A big trend next year is likely to be scams that exploit a smartphone's GPS. As more people use genuine apps with location technologies, the more scammers will follow.

The security industry is starting to take this market seriously, but the scammers are already there. Independent researchers at AV-Test.org looked at free Android antivirus apps and found 90 percent missed known malware strains. Even paid-for apps from vendors such as Kaspersky and F-Secure detected only 50 percent of dodgy software. This is a topic we'll continue to monitor.

Facebook and friends

Social networking's primary danger is that you might give away enough information about yourself to make identity theft possible. If your profile includes your date of birth and address, an ID thief is well on his way. A 'happy birthday' message to your mum could lead to her maiden name, which is a common security question for many services.

Start with the basics and dig into Facebook's security and privacy settings. Turn off everything, then start thinking about what you want to allow rather than the other way around. Look again at what information you are giving away and who can see it.

Remember that your privacy depends on your friends, too. It doesn't matter how private your profile is if a friend with weak security settings tags you in a picture.

Facebook is also increasingly used as a medium for virus and spam transmission.

Requests to join game networks or sharing platforms that apparently come from friends might in fact come from criminals. Even if they are genuine, it's not imperative to accept the request and hand over more information than you're happy with.

Some of these services might be scams, but many exist to collect your information and make money from selling it on. Be aware that it might be a corporation rather than a hacker after your data, then consider what happens to that information once it's collected and whether it's properly discarded when it's no longer needed.

Twitter is another service on which it's all too easy to over-share information. A rapper tweeted about his bling gold necklace and how much he was looking forward to wearing it at his next gig. Someone saw the tweets, went to that gig and relieved him of his chain. Burglary is nothing new, but telling the world via Twitter when, for example, you're going on holiday, makes crooks' lives much easier.

You never know who you're talking to on **FORUMS**

Bulletin and message boards

However much you've talked to someone online, and however much you might trust the community of a particular forum, you don't know who someone is until you've met them and their mum. Don't be fooled into giving away too much information.

Emails and other messages

Scammers often rely on old tactics, tweaking them for new platforms and methods of communication. Facebook messages, instant messages and texts can be used just like email for spam and phishing scams.

New technology can make a scammer's messages more convincing. Emails are increasingly targeted at individuals or businesses. A business receiving an email invoice in the correct format from a regular supplier for an amount in line with usual costs might pay the bill. And an email apparently from a desperate friend stuck without money in a country she regularly travels to might suck you in.

Appeals for sick children or other charities or pleas to sign online petitions should be checked for authenticity. Google is a good first port of call, after which you could try specialist scam sites such as Snopes.com.

Fake surveys with promises of gifts, perhaps tailored to you personally, are another way of tricking you into lowering your defences. A job offer that references every skill on your CV and promises to pay a six-figure sum could be genuine – or perhaps someone's read your CV on a professional networking site.

The danger of this type of fraud is that it becomes more convincing as more and more information about us is leaked online. Cybercrooks don't always want your money, sometimes they'll be satisfied with a few details they can sell on or the opportunity to install malware on your PC.

Fake antivirus

Fake antivirus software is a threat that shows no signs of slowing. Scammers are able to exploit people's security fears using pop-up ads that claim to have detected a virus on their PC. Only they can fix the problem, they say. Never install 'security software' this way.

Buying and selling online

'Buyer beware' might work in the real world, but online sellers need to be aware of dangers too. The usual warnings apply, but with some additions. Scammers are now targeting regular users of some auction and classified sites. They use a site's reputation rankings to effectively blackmail sellers by threatening to leave negative feedback if a discount or even free goods are not given. Given how hard it can be for a seller to get their reputation restored, many will give in, keeping the fraud alive.

Going on **HOLIDAY**? Don't post it on Twitter

If you're selling anything online, be aware of the site's terms and conditions and how its complaints procedures work. Keep an eye on seller message boards, too.

Infrequent services

Watch out for companies trying to sell you services that are freely available, such as government services. For example, in some countries a search for a visa will return several paid-for services above the government's own site. With more and more government services finding their way online, the problem is set to become bigger.

For most people, however, the biggest threat comes from ordinary online purchases. Tread carefully, bargain hunters: online shopping promises price transparency and savings for all, but there are pitfalls to dodge.

The costs of saving

Saving £10 on a £500 laptop might seem like a steal, but what if you're left waiting a month for delivery? Check whether the model you want (with the exact same specification) is available from an e-tailer you've used before. Then weigh up your £10 saving against the peace of mind you'll get from dealing with a company you know.

If you've not shopped at a site before, check for a **REAL-WORLD ADDRESS**

Of equal importance is the choice of courier or delivery service. Tales of new laptops left in wheelie bins or taken miles away to depots for you to collect are less online dangers and more real-world pains.

Think twice before buying from a site you don't know. Google the company name with the word 'problems'. Have a look on consumer complaint forums. Look for a real-world address and phone number on the website. Be particularly careful if you're in a hurry – sorting out Christmas presents, for instance, or shopping while you work.

Short URLs

Twitter offers criminals a simple and increasingly popular way to infect your PC via short URLs. If no preview feature is available,

Verify suspicious appeals via Google or **SNOPES.COM**

it can be impossible to guess where you're going. Be as suspicious of these links as you would of downloading an unchecked email attachment. If you're worried, ask the friend who sent you the link to check it's genuine.

If a URL shortener has a preview service, use it. For example, the tinyurl.com service we use in the pages of *PC Advisor* lets you see where you're being redirected simply by inserting 'preview.' before the tinyurl. McAfee also offers a secure URL-shortening service.

File sharing

New film and music releases have been infected by malware, both by hackers and media companies themselves in order to discourage illegal file-sharing. If you must download torrent files (although we don't condone it), take extra care. Most sites spare little cash on security, and they make no claims for the cleanliness of the files they're offering.

Porn sites

The days of 'good' and 'bad' porn sites are over. Malware can now be found on sites as respectable as that of *The Daily Telegraph*. Although some hackers will use smut to tempt surfers, plenty more take security seriously. The truth is such sites are just as likely to harbour malware as any other type of website, and avoiding porn sites isn't enough to protect you online.

Watching videos

Downloading video content, whether or not it's of an adult nature, will often leave you open to attack. There are dozens of different media players, yet most will require you to

download a separate add-on or codec. This is where the problem lies, and Adobe Flash has long been a favourite vehicle for hackers to infiltrate your machine – always ensure you're running the latest version.

Conclusions

Any new technology brings new dangers, yet most are simply tweaked versions of the threats that have kept us on our guard for years. As we've discussed in this feature there are many things you can do to keep safe online, with the most important being to use your common sense and remain alert at all times.

The important message for new users is that staying safe online goes beyond installing an internet security suite on a new PC and promptly forgetting about it. Such products are useless unless they're regularly updated – every day, if that's how often you use your computer to get online.

Malware is getting smarter and now targets specific platforms and users. The biggest threat for 2012 is expected to be directed to smartphones, with more of us using them to get online. Just like on a PC, we need to install security software on our mobile phones and use our common sense when downloading software. We've never had to worry about mobile security in the past, so how many of us will be caught out?

Next year could well see the first widespread, damaging attack on mobiles. And if you sync your phone with your computer, here's another potential avenue of attack. Keep an eye on these forthcoming threats, but don't forget about the traditional viruses, worms and adware either.   »

Read other customer experiences: Google the site name + '**PROBLEMS**'

Setting up your new computer

Many people will be unwrapping their first computer this Christmas. If this is you, welcome to a whole new chapter. PC ownership is rewarding, but it requires vigilance to stave off the sort of threats we've outlined elsewhere in this feature.

If it's a friend or family member getting their first PC – or the first one for which they have primary responsibility – and you're the nearest thing to tech support they know, good luck. There are bound to be many questions along the way.

Assuming the machine is for someone else, find out what they will use it for. Ideally, you should help them set it up rather than do it for them. This time last year, we put a brand-new PC online with no malware protection to see how long it would last before it got infected – less than 10 minutes was the depressing result. Within 4 hours the PC was unusable.

Start with the machine's own security and password protection. If it's going to be used outside the home then set up a password. Next, check the PC's Wi-Fi settings and switch off automatic connection to available networks. If it's a secondhand computer, also run a full malware scan.

Security software

Choose a free or paid-for antivirus product. New machines often come with a trial version preinstalled, although they don't have to use this. Turn to page 139 for our Top 5 security charts. You'll also find a useful round-up of our recent security software reviews at tinyurl.com/8825ybt.

Most security software identifies malware by comparing files against a list of known threats. This list is frequently updated with new signature files, so the software must be updated periodically. The best security products will also detect malware that's not on this list based on its behaviour or user intelligence.

Internet security suites include several other useful tools besides an antivirus, including a firewall and anti-spam.

Browser choice

Some web browsers are more secure than others, although none is perfect. Many inexperienced users don't know there are alternatives to Internet Explorer, plus good reasons other than security to try them out. Find out what type of browsing they'll mostly be doing and suggest an appropriate web browser.

Once they've chosen their weapon of choice its security settings must be configured. Again, ask them what they'll be doing with the machine in order to decide which settings should be allowed. Make these changes with them, just in case they need to alter the settings later or on a different machine.

Programs and memory

Software updates aren't all about patching security holes – some can improve compatibility or help prevent freeze-ups. However, there's no point in keeping the antivirus up to date if they leave holes in their programs and OS for malware to enter through.

If the computer owner intends to use USB memory sticks or plug in other portable storage devices for backup (which is essential if they're to avoid losing their precious data), show them how to scan these peripherals for malware.

Social media

Facebook is likely to pose an ever-increasing threat to security in 2012. Given its vast number of members, Facebook is a big target for criminal gangs.

Whatever their privacy settings, tell the new computer owner never to put anything on Facebook that they wouldn't mind everyone seeing – and that means their boss and their mother.

For advice on Facebook security and privacy settings, head to our website at tinyurl.com/7ymrnks.

Also talk about what other online services they will use and inspect the settings on those sites too.

Mobile phones

If it's a mobile phone- rather than PC-shaped gift sitting under the Christmas tree, note that the same security measures must now be taken on phones. See tinyurl.com/3gh3pc7 for advice.

Resources

Get Safe Online (getsafeonline.org) is a good place to point the novice web user. And there are lashings of advice on our own website, too (pcadvisor.co.uk/advisor/security).

Major security vendors, such as Symantec, F-Secure, AVG, Bitdefender, Panda, Trend Micro and Webroot, offer some very good advice. Just remember that they're not independent.

When spam and phishing messages land in their inbox, encourage novice users to play detective. Googling the text within an email should tell them whether it's to be avoided quickly enough. Snopes.com is another useful site. ⊠

FEATURE

The games that we play

Looking for engaging ways to see you through the dark wintry nights, or for a suitable games title to bestow on a relative? *PC Advisor*'s GamePro colleagues offer their expertise on gaming

Whether you play on a PC, console, smartphone or online, gaming is increasingly popular. Thousands of titles launch each year, but not all are destined to become classics. Similarly, not all graduate from one platform to become firm favourites across all. In fact, some become emblems of the particular gaming platform on which they run: Super Mario and Nintendo are inextricably linked, even though iPhone and Android versions now exist.

If you're buying a game for a dedicated games console, you can be sure that the hardware is up to the job. With a PC game, that's not necessarily the case. Ultraportable and low-end laptops tend to run integrated graphics, which are no good for playing the latest or most intensive games. However, even budget desktop PCs are these days supplied with a dedicated graphics card and at least 512MB of video RAM. Such machines are capable of playing all but the most demanding of games, provided that you reduce the resolution a notch in order to endure a smoother ride.

Over the following pages, we look at some of the very best games titles for PC, Xbox, Nintendo and PlayStation 3.

Assassin's Creed: Brotherhood

Note: pricing for some of these titles varies widely from platform to platform and by vendor, so it's worth performing a quick search online.

20 BEST PC GAMES

The PC has an extensive variety of terrific games, from massively multiplayer online titles (MMOGs) to first-person shooters. The following games are all deserving of a place in your games library.

Alien Swarm
Free

The free-to-play Alien Swarm is a top-down shooter in which you work with up to three other people to enter off-world colonies, cleanse them of alien intruders and rescue their human inhabitants. With customisable weapons and many items to find, Alien Swarm is a fun, old-school arcade blaster that offers the additional benefit of running well on older computers. If you have even the slightest interest in blowing away teeming hordes of aliens with a few mates, you really have no reason not to play it.

Amnesia: The Dark Descent
£12 inc VAT

Set in a haunted mansion, Amnesia is a single-player first-person adventure that focuses on exploration. Staying alive and keeping your sanity is the objective in this fright-fest, which requires both puzzle solving and sneaking around, avoiding confrontation with the deadly denizens. You're defenceless in a house full of monsters of whom you almost never catch more than a glimpse. With gory graphics and top-notch, atmospheric sound, this game is one of the finest interactive horror experiences money can buy.

Assassin's Creed: Brotherhood
£19 inc VAT

The third Assassin's Creed game, Brotherhood is set in Rome in probably the deepest and most visually rich setting in the series so far. A novel multiplayer mode pits players against one another: each receives a contract on another player and must ferret out their quarry from the crowd while trying to conceal their own identity

BioShock 2

from whoever is stalking them. The plot might leave a few too many of the franchise's mysteries unsolved but, as far as gameplay goes, this assassin hits his mark.

Batman: Arkham Asylum
£19 inc VAT

The Caped Crusader has a chequered past when it comes to video games, but Arkham Asylum isn't just one of the best Batman games, it's one of the best games of the past five years. The action is stealth-based: Batman must sneak around, using his gadgets and his fists to get the drop on foes. Featuring fluid combat that incorporates a large repertoire of moves, and offering gameplay that favours lateral thinking over simple twitch reactions, Arkham Asylum is a mature title that is rewarding and enjoyable.

Battlefield: Bad Company 2
£6.60 inc VAT

The Battlefield series of military first-person shooters is well regarded for its fun, intense multiplayer mode. Bad Company 2 includes unique and varied situations and objectives,

requiring players to contend with challenges such as timing sniper shots to coincide with thunderclaps to mask detection, or strategically placing explosions to collapse a building on enemies. The squad-based online multiplayer mode is a great bonus.

Bejeweled 3
£20 inc VAT

Simple in concept but fiendishly addictive, the Bejeweled series is a hugely successful puzzle-gaming franchise that has sold more than 75 million copies worldwide. Bejeweled 3 doesn't mess with the colour-matching formula, instead adding eight different game modes, a quest mode among them. Not every one of the additions is a hit, but most introduce new goals and mechanics that are just as captivating as the original title.
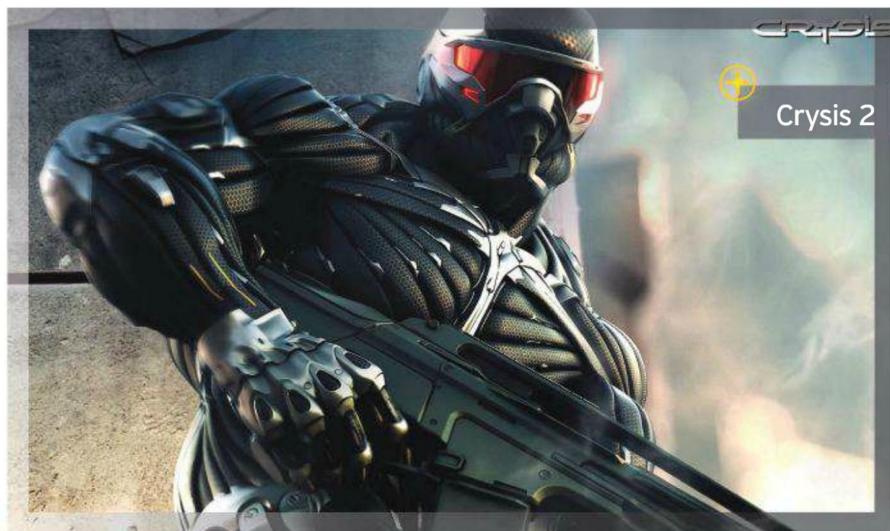
Borderlands
£10 inc VAT

Set in a world torn apart by vicious monsters and sadistic bandits, Borderlands is a first-person sci-fi shooter that blends action with role-playing-style character development

20 BEST PC GAMES

Crysis 2

(you improve your skills based on the experience you earn from completing quests and slaying baddies). With four characters that you can tailor to suit your playing style, and millions of weapons and tons of loot to discover as you traipse across the wasteland (or tool around in weapon-bearing dune buggies), Borderlands is huge fun and wonderful to look at.

Bulletstorm
£13 inc VAT

Notorious for its foul-mouthed dialogue and cartoonish ultra-violence, Bulletstorm is a first-person shooter that's formulaic at its heart. However, its terrific visuals and insane action take things to a whole new level. The game rewards you for pulling off stylish kills, which is satisfyingly easy thanks to the array of crazy weaponry you get. Definitely not a game for children, Bulletstorm sets a new high (or low, depending on your viewpoint) for over-the-top action.

Call of Duty: Black Ops
£20 inc VAT

An instalment in one of the most successful modern-day franchises, Call of Duty: Black Ops is an exceptionally realistic and intense first-person shooter. The player goes on Cold War missions in Russia, Cuba, Laos and Vietnam as a covert operative. Judging from the stunning graphics, visceral action and varied gameplay, it's easy to see why Call Of Duty is so popular. And once you're bored of the single-player mode, you can go up against others in the multiplayer mode.

Crysis 2
£10 inc VAT

Boasting jaw-dropping visuals, Crysis 2 is a first-person shooter set in a ruined New York, which is under martial law following an alien attack. The player takes a central role in reclaiming the Big Apple, working with a team of commandos whose nanosuits imbue them with superhuman powers. Offering a story as striking as the graphics, Crysis 2 is a showcase of PC action gaming.

Fallout: New Vegas
£15 inc VAT

In 2008, publisher Bethesda Softworks revived the nuclear wastelands of the Fallout series with the release of Fallout 3. Featuring a huge environment filled with characters and places to explore, the follow-up, Fallout: New Vegas, is thoroughly engrossing. Although it's a role-playing game, it also has first-person action combat sequences. This works well, delivering satisfying results.

Mass Effect 2
£15 inc VAT

Is it a shoot-'em-up or a role-playing game? Mass Effect 2 is both. It not only vastly expands the first game's cast of characters and the scope of the sci-fi story, but also adds prettier graphics, tighter combat and frequently presents you with moral decisions. Although veterans of the original will be more familiar with the story's background, new players will quickly get up to speed.

Minecraft
£15 inc VAT

Minecraft, the ultimate sandbox game, gives the player an infinitely deep box of virtual Lego bricks for building pretty much anything. Whether that's castles and statues, electronic calculators, replicas of the Starship Enterprise or just a simple safe house in which to survive a night of zombie attacks, Minecraft makes the hours fly by.

Red Faction: Guerrilla
£7 inc VAT

Although this third-person shooter has a clear objective – your task is to topple a totalitarian regime on Mars – the open environment of Red Faction: Guerrilla lets you stomp off and do your own thing. The formula effectively allows you to get to grips
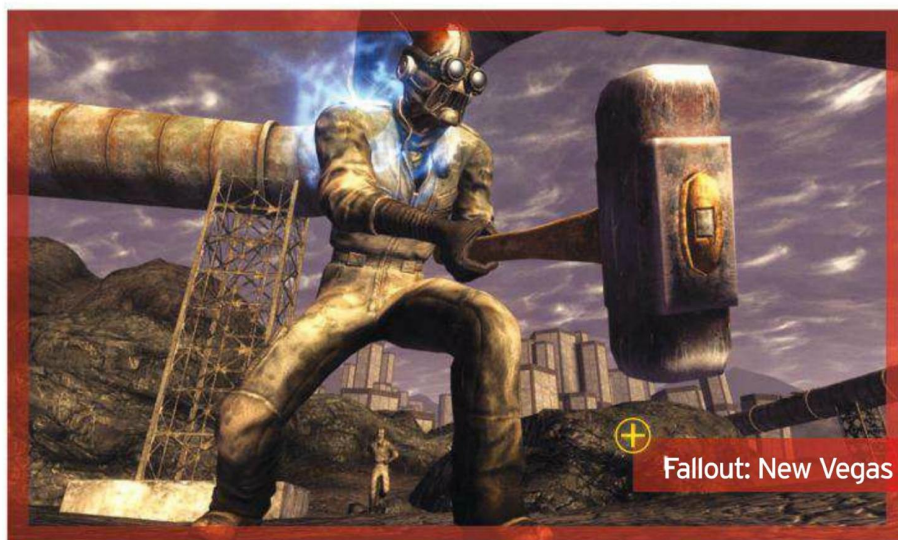
Fallout: New Vegas

with the weapons and environments. Great graphics, destructible environments and a high degree of 'Wow, I can't believe I can do that!' make this game a winner.

Rift
£15 inc VAT

Rift, a massively multiplayer online game, has quickly garnered a fervent following. Featuring four customisable classes, the game offers a heady mix of questing and dungeon crawling in a vast and beautiful environment. A game that will easily consume weeks and months of play time as you level up your character and earn ever-more-powerful gear, Rift provides a constantly changing experience.

StarCraft II: Wings of Liberty
£29 inc VAT

The original StarCraft, a military game in a sci-fi setting, is the most successful ever real-time strategy title. In Wings of Liberty, fans get most of the things they loved about StarCraft, and plenty of new features. Players command armies of specialised units and use them to wage war with other players or a computer opponent across a wide variety of landscapes. StarCraft II is tactical, strategic and creative – a war game unlike any other.

Torchlight
£15 inc VAT

Torchlight marries the whacking of loot-filled monsters with terrific dungeon-crawling action. Players roam in randomly generated dungeons, killing enemies and fulfilling quests. Torchlight stands out not only for its sense of humour, but also for including a pet that fights alongside you and that can instantly return to town to sell off items – a handy feature. It's compulsive.

Warhammer 40,000: Dawn of War II
£5 inc VAT

Set in the futuristic Warhammer 40,000 universe, where human Space Marines battle Orks, the elf-like Eldar and the bioengineered Tyrannid, Dawn of War II alters the real-time strategy formula by eliminating resource gathering and unit building. Instead, the player starts with a set number of customisable units, supplemented by friendly units on the battlefield. Gameplay is intuitive and fun, and it quickly teaches you to become a sophisticated tactician.

World of Tanks
£6 inc VAT

Developed in Belarus, this is the best tank warfare game we've tried. Players jump into an American, German or Russian World War II tank and enter battles where two teams of 15 fight for survival. Success yields credits that let you upgrade your tank or buy a more powerful one. The game requires you to use the tactical thought and strategy of

Minecraft

a tank commander. With its fantastic graphics, superb battlefields and impressive selection of historically accurate tanks, World of Tanks is highly recommended.

World of Warcraft: Cataclysm
From free

World of Warcraft is the most successful massively multiplayer role-playing game in existence. Recently overhauled with the Cataclysm expansion, it features a huge world, customisable characters and a bewildering amount of things to do. Whether you want to explore, collect virtual items, fight other players or just hang out, the game has something for everyone. And now with its free-to-play option, you have no excuse not to try World of Warcraft.
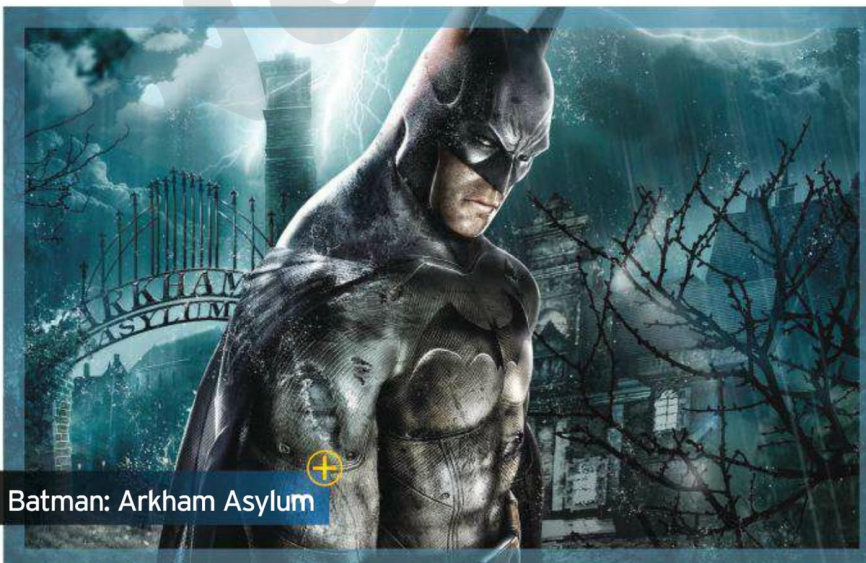
Batman: Arkham Asylum

Bejeweled 3

20 BEST CONSOLE GAMES
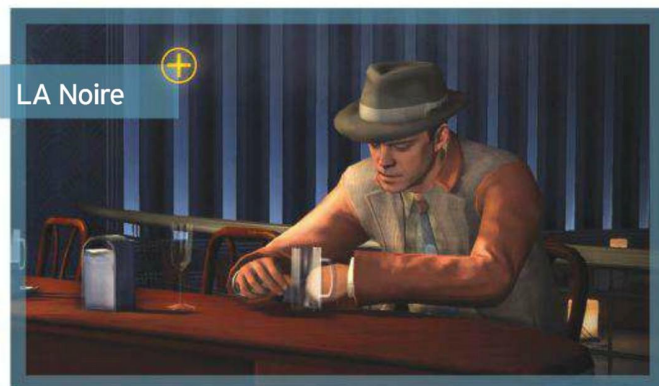
LA Noire

Looking to enjoy the finest console games? Here are our top recommendations for Microsoft Xbox 360, Nintendo Wii and Sony PlayStation 3.

Assassin's Creed: Brotherhood

Available for: PS3, Xbox 360

From £10 inc VAT

Brotherhood is the third game in the Creed series and chronicles the ongoing war between the Templars and the Assassins. Succeeding in this movie-like title requires almost as much creativity as it does action-gaming skills. In its innovative online modes, each player has a different opponent as a target, making every match a blend of action and strategy.

Battlefield: Bad Company 2

Available for: PS3, Xbox 360

From £12 inc VAT

Bad Company 2 has a lot more than the average military first-person shooter, with multiplayer maps that simulate war scenarios in areas such as the Panama Canal and the Alaskan Rockies. The single-player story tells of an alternative present-day plot in which Russia invades its neighbours – a wild take on modern war that only Battlefield can do.

BioShock 2

Available for: PS3, Xbox 360

From £10 inc VAT

Melding sizzling visuals with an amazing story, BioShock 2 is a first-person shooter set in a bio-punk alternative universe. The time: 1968. The place: Rapture, an aquatic city ravaged by a second US Civil War. As a 'Big Daddy', a creature whose organs have been grafted on to an atmospheric diving suit, the player has to figure out what to do.

Call of Duty: Modern Warfare 3

Available for: PS3, Xbox 360

£44 inc VAT

With Call of Duty: Modern Warfare 3, Activision manages the tricky feat of offering more of the same for the die-hard fans of this ultra-successful first-person shooter franchise, and some shiny new features for newcomers. It has a silly and confusing singleplayer campaign, but the barrier to entry for the satisfying multiplayer mode has been lifted smartly. The launch of MW3 made it the hottest product on the planet, and if you give it a try you will see why.

Dance Central

Available for: Xbox 360

£25 inc VAT

Dance Central uses Microsoft's Kinect motion sensor to track your every move, from side shuffles to pop-and-locks. You can match and master 600 dance moves. Dance Central is very good fun. It shows you how to boogie, and can even help you stay fit.

Dead Space 2

Available for: PS3, Xbox 360, Wii

From £15 inc VAT

Blending terror with intense first-person shooting, Dead Space 2 features accidental survivalist Isaac Clarke, who finds himself amidst Necromorphs – nasty aliens that you really don't want to be stuck on a starship with. Luckily, he has access to alien-busting tools and an upgraded mining suit. Even so, the odds are seriously stacked against him.

Gears of War 2

Available for: Xbox 360

From £14 inc VAT

In Gears of War 2, one of the best third-person shooters money can buy, the player shoots, punches, stomps, claws and tears through the Earth itself in a bitter fight against the Locust Horde infesting the planet's core. This marathon of gore, blood and explosions is relentless but fun, and includes some surprisingly strong characters.

God of War III

Available for: PS3

£18 inc VAT

In this phenomenal fighting/exploration game, super-being Kratos is on his final quest for revenge against the denizens of Mount Olympus. Featuring fantastic graphics and epic battles, God of War III is amazing. Plenty of series trademarks include gory finishing moves and detailed environments.

Halo: Reach

Available for: Xbox 360

From £10 inc VAT

Consider Halo: Reach a bookend to the sci-fi Halo saga, but an epic game nonetheless. The game introduces some elements unique to the Spartans, such as armour abilities and equipment power-ups. And a highly refined multiplayer system adds new modes.

Heavy Rain

Available for: PS3

From £25 inc VAT

Offering compelling characters, intelligent dialogue and events that require you to make critical decisions, Heavy Rain is one of the closest experiences to an interactive movie we've seen. Whether you're running from an assailant or trying to question someone, the story is constantly branching.

LA Noire

Available for: PS3, Xbox 360

£29 inc VAT

LA Noire puts you in the shoes of Cole Phelps, a war hero who joins the police
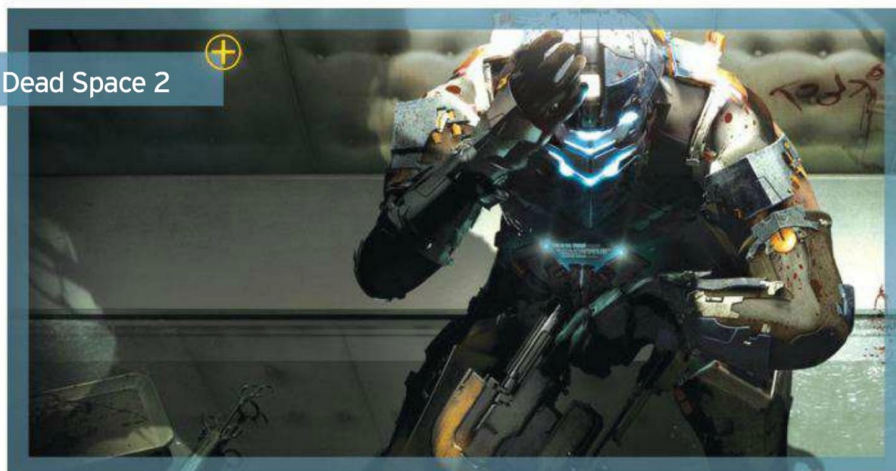
Dead Space 2

department at a time when crime and corruption in the city are at their peak. Characters' facial expressions render in extraordinary detail, which plays a key role in the game: when you're interviewing suspects and witnesses, you have to figure out who's lying based on their reactions.

The Legend of Zelda: Twilight Princess
Available for: Wii
From £15 inc VAT

Twilight Princess lives up to the high bar set by previous Zelda titles. It's absolutely stunning, with clever level designs and a great dose of action; on top of that, it opens up a new chapter and widens the series' potential. It's a particularly fun game to share with the kids.

LittleBigPlanet 2
Available for: PS3
£19 inc VAT

Co-operative platform action and photo-realistic environments that seem to be constructed from fabric and paper are the tip of the iceberg. Beneath LittleBigPlanet is a canvas for aspiring games designers. The game has thousands of user-created levels to download, and some are out of this world.

Mario Kart Wii
Available for: Wii
£25 inc VAT

There's something for every Nintendo fan in Mario Kart Wii, the craziest and most fun multiplayer racing-combat game around. It features a who's-who of the biggest names in Nintendo gaming from the past three decades, and offers competitive racing that'll have you yelling at other players in frustration and delight.

Mass Effect 2
Available for: PS3, Xbox 360
From £12 inc VAT

Impeccable storytelling ties together the impressive graphics, action-oriented gameplay and diverse mission structure of Mass Effect 2. You take the role of Commander Shepard, who is on a mission to destroy the Collectors, an alien group that's eliminating human colonies. Even the smallest decisions can come back to haunt you.

Halo: Reach
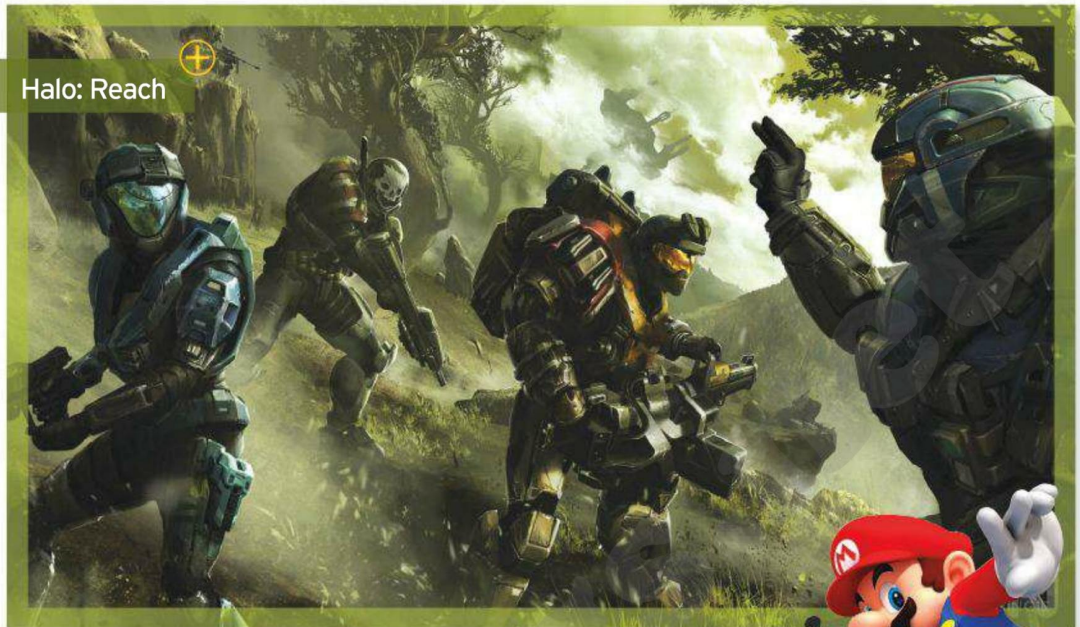
Fifa 12
Available for: PS3, Xbox 360, Wii
From £29 inc VAT

Fifa 12 is a masterclass in how to make a brilliant sports game. As well as offering realistic graphics and freeplay, the latest version adds an Impact Engine that gives players' collisions ragdoll realism, while the enjoyment of the beautiful game is enhanced by being able to engage in tactical defending and precision dribbling. How you play affects teamplay – as you become more experienced and in tune with your team-mates, so the flow between you improves. Clever stuff.

Portal 2
Available for: PS3, Xbox 360
From £23 inc VAT

In the mind-boggling first-person Portal 2, you navigate a dilapidated research centre by using a portal gun to open and close apertures and move from room to room. Escaping requires creative thinking, but the solutions are always slap-your-head obvious once you figure them out. Rewarding, fun and maddeningly addictive, Portal 2 is a must-have game.

Rock Band 3
Available for: PS3, Xbox 360
From £16 inc VAT

Want to sing, drum, play guitar or bass, or even tickle the ivories? Rock Band 3 has a role for you. It offers a fantastic selection with which to play along. There's a catalogue of thousands of downloadable songs, plus a 'Pro Mode' in-game tutoring system made to work with a Mustang Pro Guitar controller

Mario Kart Wii
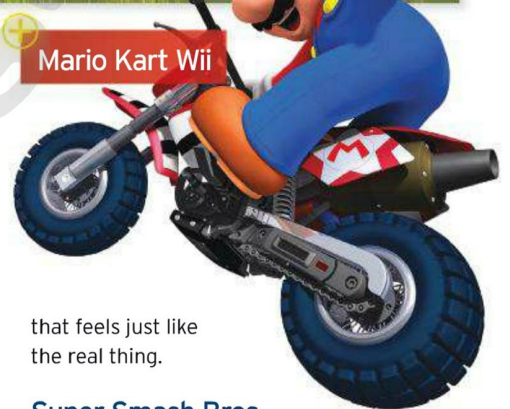
that feels just like the real thing.

Super Smash Bros Brawl
Available for: Wii
£25 inc VAT

One of the best showcases of the Wii's competitive-gaming prowess is Super Smash Bros Brawl, a high-energy multiplayer fighting game. The kids will probably beat the living daylights out of you at first. It's so much fun, however, you'll probably want to sneak in a few goes in the evening.

Uncharted 2: Among Thieves
Available for: PS3
From £15 inc VAT

When you call a title the game equivalent of Raiders of the Lost Ark, you know that the action has to be over-the-top, the characters must feature unmistakable charm, and the experience needs to rival everything else in the genre. Uncharted 2: Among Thieves does exactly that, bringing back flawed hero Nathan Drake in an adventure bigger than even he can handle. The game presents a variety of challenges, from shooting to exploring to fighting. ⊠

WINNER 2012

PC ADVISOR AWARDS NOMINEES

As we head toward a new year, we are proud to present our roll-call of honour: the best of the past year's technology, and our guide to the brands you can trust and the sites from which to buy

The votes are still coming in and the arguments raging, but the nominees for the *PC Advisor* Awards have been decided for another year. As with last year's awards, there are nearly two-dozen prizes. Many of our award categories have been wrangled over by our team of reviewers and writers, while the rest will be decided by *PC Advisor* readers before the winners are announced in early 2012.

The purpose of the *PC Advisor* Awards is to showcase excellence across the diaspora of products and services we cover online, in digital magazines and apps, and right here in the *PC Advisor* print magazine. Nominees and winners have been chosen from a year's worth of reviews, so each represents the best of the best in its particular category.

For the hardware awards, we've split up the categories along similar lines to the Top 5 charts we update every month, while we've divided the software section by program type.

In each case, products in contention had to have been reviewed by *PC Advisor* editors during 2011. Those reviews could have been online or in print – or most often both.

In addition, there are five *PC Advisor* Reader Awards. We will be running an online survey, inviting UK consumers to have their say on the best laptop and desktop PC brands, the best online retailers, and the gadget of the year. From the votes we receive we'll be able to deduce valuable feedback about the brands you favour and how well they live up to expectations. So don't forget to have your say! Head to pcadvisor.co.uk/awards.

HARDWARE

WINNER 2012

PC ADVISOR AWARDS

⭐ Best Desktop PC Brand

• Arbico
• Chillblast
• CyberPower
• Dino PC
• Eclipse

⭐ Best Budget Laptop

• HP Pavilion dv6-6103sa
• Kogan Agora Pro
• Lenovo IdeaPad G570
• Lenovo ThinkPad Edge 11
• Packard Bell EasyNote TS11HR039

⭐ Best Power Laptop

• Apple MacBook Air 11in (Mid 2011)
• HP EliteBook 8540w
• Rock Xtreme X 685-I5-2540M
• Samsung NP900X3A
• Toshiba Satellite R830-143

⭐ Best Tablet

• Acer Iconia Tab A100
• Apple iPad 2
• Asus Eee Pad Transformer TF101
• Samsung Galaxy Tab 10.1
• Sony Tablet S

⭐ Best Printer

• Brother HL 2130
• Canon iSensys LBP7750Cdn
• Epson Workforce Pro WP-4535DWF
• Kodak Hero 7.1
• Kyocera Mita FS 1320D

⭐ Best Wireless Networking Product

• AVM FritzBox Fon WLAN 7390
• Cisco Linksys E4200
• D-Link W307AV
• Netgear N600 DGND3700
• TP-Link TL-WR1043ND

⭐ Best Monitor

• Iiyama ProLite XB2472HD
• LG IPS236V
• NEC MultiSync EX231W
• Philips 273E3LH
• ViewSonic VP2365-LED

⭐ Best Graphics Card

• Asus GTX 560 Ti
• HIS ATi Radeon HD 6950
• HIS Radeon 6970 IceQ 2GB
• PNY GeForce GTX 570
• Sapphire Radeon HD 6770

⭐ Best Smartphone

• Apple iPhone 4S
• HTC Sensation
• RIM BlackBerry Bold 9900
• Samsung Galaxy S II
• Samsung Omnia 7

⭐ Best Compact Camera

• Canon Ixus HS 230
• Fujifilm FinePix HS20
• Nikon Coolpix S9100
• Panasonic Lumix DMC-TZ20
• Sony Cyber-shot DSC-HX9V

⭐ Best Digital Camera

• Canon EOS 600D
• Nikon D5100
• Olympus PEN E-P3
• Panasonic DMC-G3
• Sony Alpha A55

⭐ Best Storage Device

• Crucial M4 256GB
• Qnap TS-419P+
• Seagate FreeAgent GoFlex Ultra-portable
• Synology DS211
• WD My Passport Studio 1TB

⭐ Best Audio Product

• ADL GT40
• Arkam rCube
• Etymotic Research hf3
• Naim Audio UnitiQute
• Orbitsound T12v3

⭐ Best Digital Home Device

• Apple TV
• Cryo PC Alto
• Elgato Netstream
• InFocus ScreenPlay SP8600
• WD My Book Live

⭐ Best Portable Entertainment Device

• £89 Amazon Kindle
• Apple iPod touch (2011)
• Kodak PlaySport Zx5
• Pure Move DAB 2500
• Sony Ericsson Xperia Play

SOFTWARE

⭐ Best Security Software

- Bitdefender Internet Security 2011
- Kaspersky Small Office Security
- Panda Internet Security
- Symantec Norton Internet Security 2011

⭐ Best Photo or Video Software

- Adobe Photoshop Elements 9.0
- Adobe Premiere Elements 10.0
- Corel Painter 12.0
- Sony Vegas Movie Studio HD Platinum 10.0
- Xara Photo & Graphic Designer 6.0

⭐ Best Game

- Assassin's Creed: Brotherhood
- Dead Space 2
- DiRT 3
- Need for Speed: Hot Pursuit
- Super Street Fighter IV 3D

⭐ Best App

- Camera+
- ESPN Goals
- Facebook for iPad
- The Guardian for iPad
- Napster
- Sky Go
- Skype 3
- Spotify for iPhone
- TripAdvisor
- WhatsApp

WINNER 2012 PC ADVISOR AWARDS

READER AWARDS

- ⭐ Best Desktop PC Brand
- ⭐ Best Laptop Brand
- ⭐ Gadget Of The Year
- ⭐ Best Online Retailer
- ⭐ Specialist IT Retailer Online

WINNER 2012 PC ADVISOR AWARDS

HAVE YOUR SAY. VOTE NOW FOR YOUR FAVOURITE BRANDS AND RETAILERS AT

PCADVISOR.CO.UK/AWARDS

ROSEMARY
HATTERSLEY

21st-century toys

Many of the issues we usually cover in these pages look at firmly established technologies and address related problems. For example, one of the problems in *Helproom* (page 104) concerns an operating system upgrade and asks what legacy programs will remain compatible. But we also delve into the whys and wherefores of switching from a traditional hard drive to a solid-state disk, and consider why a modern approach to storage may not always be the best option.

Elsewhere in our How to pages we offer tips on creating a Twitter account and using it as a means of promoting your business and communicating effectively with existing and prospective customers (page 114). Social marketing lets you engage like never before with those you value – and vice versa.

You'll be communicating in an entirely different manner if you follow our *How to: Windows* workshop (page 110). Here, we tackle the intriguing task of building a robot from some basic electronic components and a plastic sandwich box.

For a slicker communication experience, Apple fans should turn to page 118 and read up on the benefits of iOS 5. Siri voice control is included only in the iPhone 4S, but there's plenty more everyone can enjoy in this free upgrade.

Finally, *Troubleshooter* showcases tools for getting to know your digital camera and provides pointers on achieving specific photography effects. See page 102. ⊠

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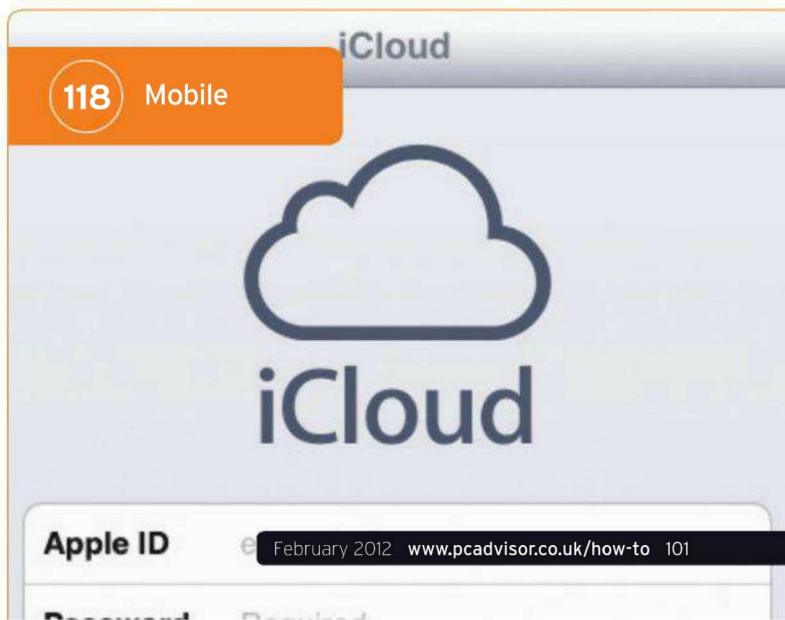
Mastering camera controls

Getting to grips with digital photography can take years. **Dave Johnson** introduces
a clever online simulator that can help to demystify many camera controls

Modern digital cameras make
photography so simple that it seems
as though you just need to press the
shutter release to take a good photo. While
that might be true for quick snaps, there are
many situations in which a little photography
knowledge goes a long way.

Exposure basics involve understanding
the correlation between aperture size (the
amount of light allowed in) and how long the
shutter remains open. Manually controlling
these involves setting the dial to aperture
priority and adjusting the aperture size, or
choosing shutter priority to dictate that
element instead.

Elements such as focal length and ISO
are less easily understood. That's why we
like CameraSim – an online simulator that
lets you see the effects of each of these
variables. Based around the controls of
specific digital SLR cameras, you can tweak
the settings and see the results instantly.

Getting started with CameraSim
Browse to CameraSim.com to try it out.
iPad owners will soon be able to download
a CameraSim app, too. You can immediately
start fiddling with the camera settings;
there's no need to register.

In the screenshot shown below left,
you see a scene exactly as it appears in a
camera's viewfinder – there's a girl at the
playground, holding a windwheel that's
spinning in the breeze. Click the shutter
release and you'll instantly see the effect
of your exposure settings. Click 'Return to
Viewfinder' to take another picture.

Use the zoom to vary perspective
CameraSim does a good job of showing the
effect of distance and focal length on your
photo. Since we can see this through the
viewfinder without taking a picture, there's
no need to snap the shutter release to
experiment with this.

Start with distance. As you move the
slider, you can see how changing your
distance from the camera to the subject
changes the look of the scene. Notice that
the girl and the playground equipment don't
change size at the same rate. Instead, as
you get closer to the subject, the foreground
gets bigger much more quickly than the
more distant background. This is called the
parallax effect, and you can take advantage
of it to focus on the subject while reducing
the emphasis on the background.

You can see this in the image below right,
where we've got very close to the subject
with a wide-angle lens to really put the
subject front and centre.

Next, move the Focal Length slider. You'll
see the foreground and background growing
larger or smaller in equal measure. This
is a good rule to keep in mind: using your
camera's zoom control is not the same thing
as using your feet to get closer or farther

from the subject. They have noticeably different effects on the photo.

Capture motion with shutter speed

The simulator should be set to Shutter Priority to start with, which lets you change the shutter speed while the camera automatically adjusts the aperture setting to match. That's great; leave it there for now. Over on the Shutter Speed slider, note the current setting (probably 1/125th second) and click 'Snap photo' to take the picture. You'll see some blur in the pinwheel.

Now try again at 1/20th of a second. The pinwheel should be completely blurred. For comparison, slide the shutter speed all the way over to about 1/500th second. The pinwheel is now frozen in time.

Under- and overexposing photos

If you move the Shutter slider too far (slower than 1/13th second), the aperture reaches its physical limit (f/36) and can't get any smaller. As a result, shutter speed settings below this point will generate an overexposed photo.

You can also underexpose the photo, but to do that you'll need to lower the camera's ISO. It's currently set to ISO 200. Lower it to ISO 100, and then notice that once you hit a shutter speed of f/2.8, the aperture is open

as wide as it can go. Since the camera can't admit more light, any shutter speed faster than about 1/1,250th second generates a dark, underexposed photo.

Change depth of field with aperture

Most photographers love to gently blur the background to draw attention to the subject in the foreground. You do that by shooting with a relatively large aperture (which corresponds to a small f/ number). You can see this in action by changing the exposure mode to Aperture Priority and setting the Aperture to f/2.8. This is the lens's largest aperture, and it should generate the least depth of field, while the background should be blurry. Indeed, you should find the photo looks like the view through the viewfinder.

Here's a bit of digital SLR trivia for you: your camera leaves the camera lens set to its biggest aperture right up until you press the shutter release in order to let the most light into the viewfinder while you compose your photo. When you press the shutter release, it 'stops down' the lens to the desired setting. If you choose the biggest aperture, you won't see a difference in the depth of field between the viewfinder and the exposed photo.

Now try the opposite extreme. Drag the Aperture slider over to f/36, which is the

smallest aperture setting, and take the shot. You should have a sharp background.

If it instead becomes blurry, check your shutter speed. The camera had to automatically set a slow shutter speed to compensate for the tiny aperture, and since this simulator assumes you're hand-holding the camera, it added blurriness due to camera shake. If you want to use a tripod, select the option to 'Use a tripod' at the bottom right. Alternatively, back off on the aperture until the shutter speed is 1/60 second. Try again and you'll find a sharper background.

More to explore

There are other things you can do with CameraSim. For example, you could increase the ISO to add more light to the scene, and then re-try the f/36 scene to get a sharper background. That'll work, but varying the ISO will also let you see the relative increase in digital noise that higher ISO settings contribute to photos.

And while you're fooling around, click over to Manual control and experiment with altering both the aperture and shutter values. See how varying the lighting from Sunny to Dim Indoors affects exposure as well. Happy virtual shooting! ⊠

You don't need a live web connection in order to experiment with virtual camera settings. CameraSim for the iPad is promised soon. Meanwhile, a less advanced tool known as SLR Camera Simulator provides three sample images with which you can manipulate and experiment with the effects of the shutter speed, aperture and ISO settings. You can also link the settings to show how the shutter and aperture settings affect one another.

YOUR QUESTIONS ANSWERED

Expert computing advice

Paul Monckton tackles readers' hardware and software conundrums

MORE SPEED; LESS SPACE

Q My PC was taking a long time to start up, so I supplemented its 500GB hard drive with a 120GB SSD on to which I installed Windows 7 Ultimate and my frequently used programs. Once set up, I had around 20GB of free space on the SSD, and startup was much faster. I now find myself constantly monitoring the SSD, however, as restore points, Windows updates and program installations all default to it. How do I go about changing the default drive for such items from C (the SSD) to D (the hard drive)? *John Munro*

The situation you describe illustrates why we steer the average user away from purchasing systems with small-capacity SSDs. We regularly see PCs with SSDs only half the capacity of your 120GB model – running out of space is inevitable without careful management.

If your motherboard supports Intel's Smart Response Technology (only those with a Z68 Express chipset do), this may offer a better use for your SSD. Here the SSD is in effect invisible to the user, and used as a high-speed cache to boost operation of the hard drive.

Smart Response won't provide as much of a speed boost as installing your OS and programs on an SSD would, but it will accelerate launch times for your frequently used files and reduce your boot time, without you worrying about it filling up.

If you can't or don't want to use Smart Response Technology, you'll need to make sure that Windows uses your hard drive instead of your SSD to store temporary files, system files and downloads. First, move your Windows swap file from drive C to drive D. This should get back a few GB immediately.

If you're not using Windows' Hibernate function, disabling it will bring back another large block of space. Simply open an elevated command prompt (click Start, type command, right-click 'command prompt' and choose 'Run as administrator') and type **powercfg –h off**. To restore Hibernate, instead type **powercfg –h on**.

When installing a program, you can simply edit the install location by substituting the 'C:\' with 'D:\'. If you want Windows to do this automatically then you'll have to do some Registry editing, but be warned that this can

MORE SPEED; LESS SPACE

cause problems with existing shortcuts that will now point to D:\Program Files. We advise against this, but have provided instructions should you be adamant that you want to change the default setting.

To permanently change the default Program Files folder click the Start menu and type regedit, then run the application from the search results. Browse to 'Hkey_Local_Machine Software Microsoft Windows CurrentVersion'. Double-click the string 'ProgramFilesDir', then change the Value data from 'c:\program files' to 'd:\program files'. If you're running a 64bit version of Windows, repeat this change in the string 'ProgramFilesDir (x86)'.

XMARKS FARCE

Another way to get back some space on drive C is to move your temporary folders to drive D. Hold down the Windows key and press the Pause button to bring up the System Properties dialog box (or select System in the Control Panel). Choose 'Advanced system settings' and select the Advanced tab. Click the 'Environment Variables' button at the bottom.

Scroll down the System variables pane until you reach 'Temp'. Double-click this and change '%SystemRoot%\Temp' to 'D:\Windows\Temp' or another folder you've created on the hard drive for this purpose. Repeat this procedure for the TMP variable.

XMARKS FARCE

Q I accidentally clicked a button to install the Xmarks add-on for Firefox, although the loader failed to complete. When I go online I now get a message stating 'Xmarks almost done. Click to finish installing'. Clicking this brings up a login window, but I no longer have the password. I want to remove Xmarks, but it won't budge. *Anon*
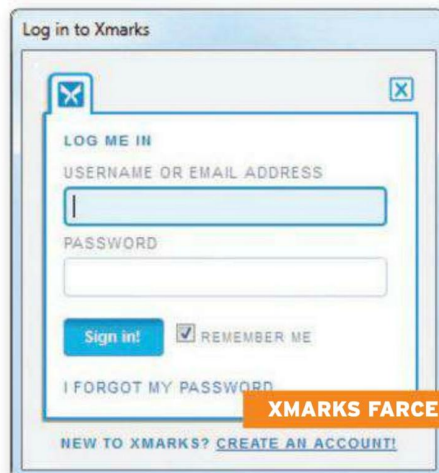
The usual way to remove an unwanted extension is to start Firefox, press Alt to open the File menu, then select Tools, Add-ons. This brings up the Add-ons Manager.

Choose Extensions from the lefthand pane. This will display a list of your installed

extensions. Find an unwanted add-on and click the Remove button beside the entry.

Xmarks is a little different to other extensions in that it requires you to log in at first run. You'll need to do so before you can uninstall Xmarks using the normal method, so if you can't remember your password you should create a new account.

Xmarks provides its own uninstallation instructions at tinyurl.com/7gbg374.

OVERZEALOUS SECURITY

Q Virgin Media Security's firewall produced the error message shown in the screenshot (right). I selected the Block option, since the .exe file appears to come from my D drive – this is used only for personal files and not applications. However, I couldn't find this path or file on my system, even with Hidden Folders visible. I found a couple of spurious companies online that offer to fix the virus if I download their software. I fear this may be a phishing scam, but I'm not sure. My security software is up to date and a full scan revealed no problems. Please help. *David Sawers*

We can't be absolutely certain from the information provided, David, but this file appears to be some sort of update program

OVERZEALOUS SECURITY

attempting to run. The IP address specified belongs to Microsoft, while the remote port 80 tells us it's trying to communicate with a web server. Browsing to this address brings up details on the Microsoft Customer Experience Improvement programme. Did you recently agree to take part, perhaps by selecting an option during an installation?

While the program looks as though it may be safe malware often disguises itself as legitimate code to trick you into running it. It's therefore advisable to run a virus scan on any such programs.

Updates typically delete themselves once they've completed their task. When you selected Block, you prevented the program

from connecting to the internet but you didn't stop it from running. It has probably now deleted itself, which explains why you can't find the file on your hard drive.

FLIGHT SIM NEEDS TO MIGRATE

Q I regularly play Microsoft Flight Simulator X, Lock-on, Falcon 4.0: Allied Force and Call of Duty on my XP PC. I'd like to upgrade to Windows 7 but I'm concerned about program compatibility. Alternatively, could I buy a Window 7 PC and use disk-cloning software to continue using my existing setup on the new hardware? I'm aware of the advantages of running Windows 7, but I really just use this PC for gaming. *Michael B Smith*

The issue of compatibility is one of the biggest potential problems facing anyone contemplating a change of OS. However, Microsoft provides plenty of tools and guidelines to help you.

Visit the Windows 7 Compatibility Centre (tinyurl.com/cgf5xvh) and download the Windows 7 Upgrade Advisor. This tool will scan your PC and flag up any incompatible software or hardware. Make sure any external devices, such as USB printers or drives, are plugged in and turned on.

LAPTOP SLEEPS WHEN I DON'T WANT IT TO

Windows laptops default to entering Sleep mode (Standby in XP) when you close the lid. Under most conditions, this behaviour is logical. If you've been working in a café and it's time to go home, you close your laptop and stick it into your bag, where it goes to sleep, saving battery power and giving itself a chance to cool down while you travel home.

But that doesn't work if you're using an external monitor. Luckily, you can change that setting. Not only can you keep the laptop on when you close the lid, but you can also set it to hibernate, shut off or do nothing.

If your laptop runs Windows XP, right-click the desktop and select Properties. Click the Screen Saver tab, then click the Power button in the lower-right corner. Click the Advanced tab. Select Sleep (or whichever option suits) from the 'When I close the lid' drop-down menu.

With Windows 7 and Vista, you can use different settings for when the laptop is on battery or AC power. That makes a lot of sense: if your PC is connected to a monitor, the chances are it's not running on the battery.

To access these settings options, click Start, type power and select Power Options. Click 'Choose what closing the lid does' and select the options you want.

Lincoln Spector

You can also browse for reports on any particular software or hardware you may have installed. Links are provided to the Microsoft Answers forums, where users discuss their experiences of running various applications within Windows 7.

Another important consideration is whether you should go for the 32- or 64bit version of Windows 7. The latter is necessary if you want to make use of more than 3GB of system memory, but brings with it yet more compatibility issues – some software is specifically designed for 32bit Windows.

Some users have reported issues with the games you mention in Windows 7, although many have got around them with driver updates and by tweaking settings.

If you find yourself having to buy a new PC, cloning your hard drive can be problematic – the new system will have different hardware to your old system, so the OS may not run. Furthermore, your copy of Windows will have been activated on the old hardware and you may not be able to transfer the licence to the new system.

You would be better off instead buying a new PC running XP, then reinstalling your software and transferring your files and settings using Window's Files and Settings Transfer Wizard (see tinyurl.com/2jc6eh). Alternatively, a third-party migration tool, such as Orlogix Transfer MyPC or Laplink PCmover, can offer additional capabilities.

You can still buy a new PC running XP, although you may need to customise the spec of a Windows 7 machine to achieve this. Also note that not all hardware configurations will support the OS, so
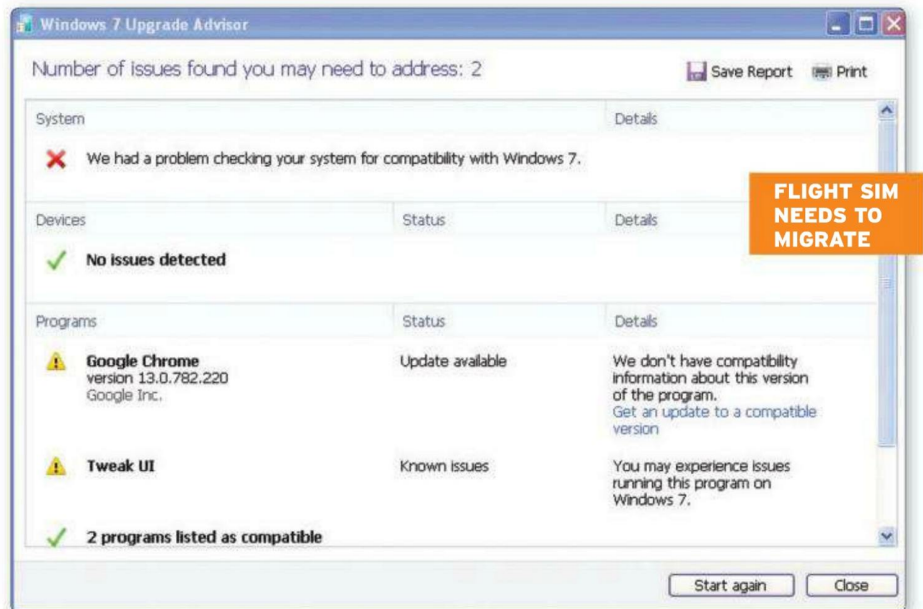
it's worth explaining what you want to use the PC for to your chosen vendor.

Of course, unless there's something wrong with your current PC, you may not have to upgrade at all. Support for XP ends in a few years, but we're a long way from being in a situation where XP-compatible hardware can no longer be purchased.

ADOBE COVER SOFTWARE

Q I clicked a program installation link on one of your DVDs and got the message 'This file is set to be launched by this PDF file. This is currently disallowed by your system administrator'. I have admin rights. *Ron Smith*

This message relates to a security measure taken by Adobe to prevent external applications being launched from inside a PDF document. Prior to this fix, it was possible for malicious code to trick you into running an external program.

The latest version of Adobe Reader stops any installation buttons in the DVD interface from working. Instead you should manually install the program by following the installation instructions listed.

This will usually involve going to My Computer, then right-clicking the DVD icon to open the disc. From here you can navigate to the Files folder, which contains the installation files for all the software included on the DVD.

UPGRADING TO WINDOWS 64BIT

Q I want to upgrade from Vista Home Premium 32bit to Windows 7 Home Premium 64bit. All my document and picture files are saved in the 32bit version. Will I still be able to access these files in the 64bit system? I also have a number of 32bit applications that I frequently use, and I need to know whether these will continue to be compatible. *Robert Kitching*

Your documents and pictures will transfer just fine to the 64bit OS as the two versions handle these files in the same way. The vast majority of 32bit applications are also compatible with Windows 7 64bit. Head to the Windows 7 Compatibility Centre (tinyurl.com/cgf5xvh) for more detailed, program-specific information.

FLIGHT SIM NEEDS TO MIGRATE

ADOBE COVER SOFTWARE

QUICKBOOKS CRASH

Q My PC suffered a major crash and I'm no longer able to open QuickBooks. I get the error message: 'QB has a problem in reading the registration file. You need to remove this file and reinstall QB – C:\Program Data\ Common Files\Intuit\QB\qbregistration. dat'. I deleted this file and then tried to reinstall the software. This didn't work so I attempted a repair installation, followed by an uninstall and reinstall. The problem remains. Other than buying a new PC, what can I do? *Richard Sewell*

According to information on Intuit's support site (support.intuit.com), this problem usually occurs when the MSXML component of Windows has been damaged. The site also reports that problems can occur if Norton 360 (or a similar Norton product) is running while QuickBooks is installed or updated.

To repair your MSXML installation, download the standalone installer directly from Microsoft (tinyurl.com/3w6tgyq). You may need to re-register the MSXML DLL files – do this by following the instructions given at tinyurl.com/bnvv6m4. (The instructions are slightly different depending on which version of Windows you're running, so we won't reproduce them here.)

Next, create or re-create QuickBook's qbregistration.dat file by following Intuit's instructions at tinyurl.com/d3xququ. You may need to perform a repair install of QuickBooks but, all being well, you shouldn't need to buy a new PC just yet.

SMALL STORE-Y

CONTROL, COPY ISSUES

Q I want to select several photos at once so I can copy them to a CD. After selecting a number of pictures, the system sometimes automatically makes copies and adds them to the same file. These files then have to be reselected and deleted – a process that can simply make further copies. How can I overcome this? *George Monteith*

This is a problem which will be familiar to many of us, but it's almost certainly not a software problem. It tends to occur when you are selecting multiple files at once by holding down the Ctrl key to add items to a selection before dragging the group of files to your destination folder.

If the Ctrl key is held down and you move the mouse before the left-click button is released, Windows will make copies of the selected files wherever the cursor lies.

This can often happen by accident – it needs only the tiniest movement of the mouse with the button held down to trigger the copy action. Sensitive pointing devices such as touchpads can also be susceptible to this sort of error, and you may find it happens more when using wireless devices that are suffering from interference or have low battery power.

SMALL STORE-Y

Q I have an Iomega StorCenter ix2-200. I was led to believe it offered 4TB of storage, yet I can see only 1.79TB. Why is this and how can I find the remaining space? *Tim Burchell*

The Iomega StorCenter ix2-200 is available in 1TB, 2TB and 4TB versions. The first step is to ensure that you have been sent the 4TB version of the drive.

According to the manual, the drive comes with its twin hard drives configured in a Raid 1 array. This means the second hard drive functions as a mirrored copy of the first – it doesn't contribute any capacity to the total amount of storage.

A Raid 1 setup prevents a failure of either hard drive resulting in data loss – the information is backed up on to the second drive. You can replace the faulty drive and the unit will automatically restore the backup, while maintaining access to your files.

CONTROL, COPY ISSUES

Home / Downloads / Adobe Flash Player /

Adobe Flash Player

Adobe Flash Player 11.0.1.152 (7.81 MB)

Your system: Windows 64-bit, English, MSIE

Do you have a different operating system or browser?

Note: The 64-bit Flash Player installer includes both a 32-bit and 64-bit version of Flash Player

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☑ Yes, install Google Toolbar - optional (2.27 MB)

By clicking the Download now button, you acknowledge that you have read and agree to the Adobe Software Licensing Agreement and the Google Toolbar License Agreement.

RESOURCES

Learn more about Flash Player
Flash Player system requirements
Distribute Flash Player
Learn more about Google Toolbar
Google Toolbar privacy policy

64BIT iPLAYER

▾ Download now

This means the total capacity available to you will be that of just one of the two 2TB hard drives. The usable formatted capacity of each drive is somewhat lower than the specified 2TB, however, which is why you see just 1.79TB.

If you need storage space more than you need the protection of a Raid 1 setup, switch the array mode to Jbod. This will combine both 2TB drives into a single 4TB volume. However, when either of these drives fails, all data stored on that drive will be lost.

The StorCenter can't convert between these two array modes while preserving your data, so if you want to convert from Raid 1 to Jbod you'll first have to back up all the data on the drive elsewhere.

Next go to the Settings tab and select Disks, Manage Disks. From here you can specify your desired data-protection option and re-build the drive array.

64BIT iPLAYER

Q I recently purchased an Acer laptop running Windows 7 64bit. I'm unable to play BBC iPlayer programmes on it, however, since the service requires Adobe Flash Player and it's not available for Windows 7 64bit. How can I get around this and use iPlayer to watch video or TV programmes that require Flash player? *Phil Reading*

Adobe Flash Player most certainly is available for Windows 7 64bit, but you must ensure that you download the correct version. Point your browser to get.adobe.com/flashplayer and your OS and browser should be automatically detected, as shown in the screenshot above.

Here, we're using an English copy of a 64bit version of Windows and running Internet Explorer. If, for some reason, the information displayed is incorrect, simply click 'Do you have a different operating system or browser?'. This will take you to a page where you can manually select the 64bit version.

If this installation doesn't work for you then follow Adobe's troubleshooting guidelines, provided at tinyurl.com/cudx8x. These will take you through the process of removing any old Flash Player components, as well as tweaking browser settings that may be preventing the installation. ⊠

CONTACT US

Do you have a technical problem that needs solving? Email your Helproom questions to helproom@pcadvisor.co.uk. Please remember to use 'Helproom' as the subject header and give your full name. 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.

Getting started with robotics

Fancy building your own robot and telling it what to do? Mike Bedford offers step-by-step instructions on how to go about it

If you thought that building a robot would set you back a small fortune, we have news for you. While robots can be hugely complicated and expensive, taking your first steps in robotics needn't be difficult or costly.

The best way to learn about robotics is to build and program your own robot. This can involve buying many different parts from a range of suppliers, or you could take a simpler route with a DIY kit.

We've used the £75 Deluxe junkBot from RobotBits (robotbits.co.uk). A £65 Basic junkBot is also available, but this model requires you to do some soldering work on the motherboard and supply your own wheels and castor.

Here, we describe how to fit together the various components in the kit. Even those with no engineering experience will be able to follow our instructions, using only a set of screwdrivers and a drill. It should take little more than an hour or two to build your own junkBot robot.

Left to its own devices, your junkBot isn't capable of much. Just like a PC, it needs to be programmed using software in order to do anything useful. Unlike PC software, though, which mostly writes information to the computer's screen, the junkBot's software drives the motors that are connected to its wheels and uses an infrared sensor to detect nearby obstructions.

To complete our introduction to robotics, we'll show you how to download a sample program to your completed junkBot. This can be modified to alter the robot's behaviour.

This is just the start, though: the sophistication of your junkBot's behaviour is limited only by your imagination and how much time you're prepared to take in honing your programming skills and developing the necessary software. Persevere, and you'll be amazed at how much you can achieve with such a simple, low-cost kit.

BUILD AND PROGRAM A ROBOT

START The junkBot kit doesn't include a chassis. You don't want something that's so heavy it'll overload the motors, nor so flimsy it'll collapse during use. We suggest a plastic box that's large enough to house the parts and long enough to be stable. We bought a 1.5-litre tub for £1.25 at our local supermarket.
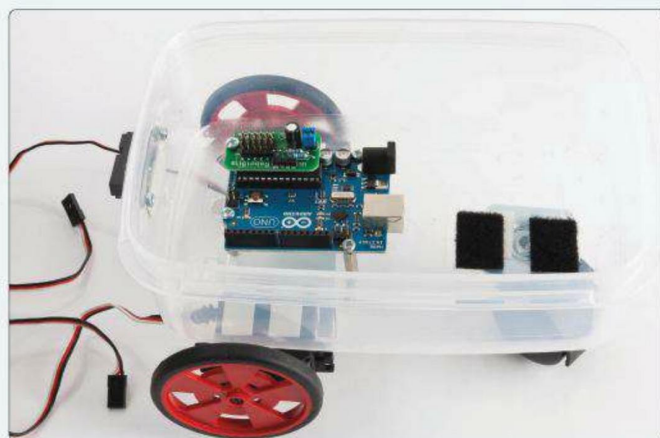
4 Fix the Arduino Uno/Mini-IO Shield assembly to the inside of the chassis using the three metal stand-off pillars and the six screws provided. Position it near the front, leaving space for the battery holder behind. You'll need to make three small holes in the base of the chassis. If you don't have a drill, use the point of a pair of scissors (carefully).

PROGRAMMING YOUR JUNKBOT

If you've never before delved into computer programming, you might have found the code you edited in Step 13 (overleaf) totally impregnable. While you don't have to understand the code to make that change, you will need a good grasp of what the instructions do if you want to modify it further or write your own code from scratch.

The programming language used by the Arduino circuit board is similar to the commonly used C language. The definitive guide is a book called *Getting Started with Arduino* by Massimo Banzi. You should be able to pick up a copy fairly cheaply online.
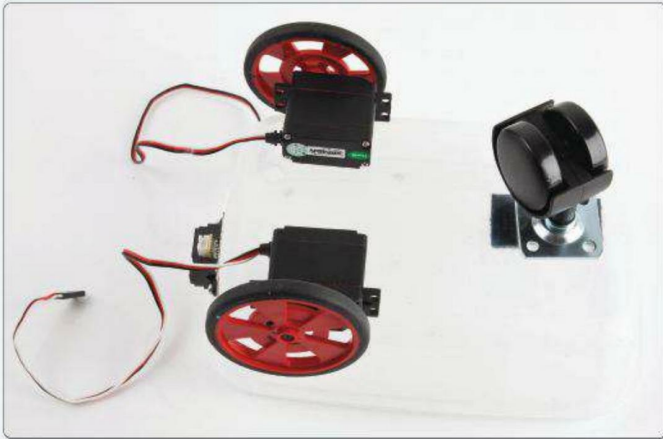
2 Attach a wheel to the axle of each servo motor (black boxes with black/white/red leads). The wheels should push in easily if they're the right way round; secure them with the small black screws. Attach each motor to the bottom of the chassis using the double-sided sticky pads provided. Fix the castor to the back, too.
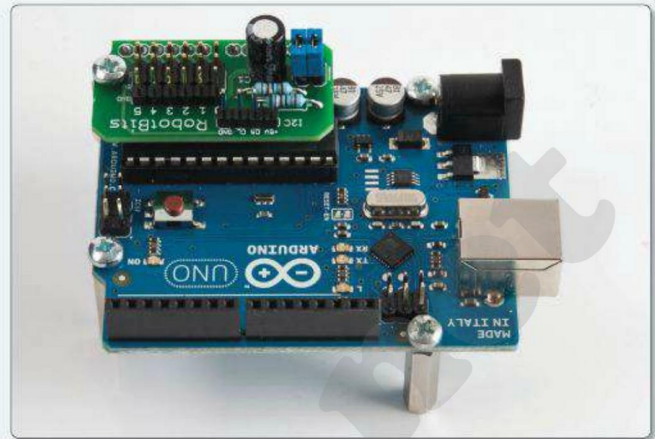
3 Plug the Mini-IO Shield circuit board into the Arduino Uno circuit board and secure it using the plastic spacer and screw. The Arduino Uno board will form the brains of your robot. The Mini-IO Shield provides an interface between the Arduino Uno and the junkBot's motors and sensor.
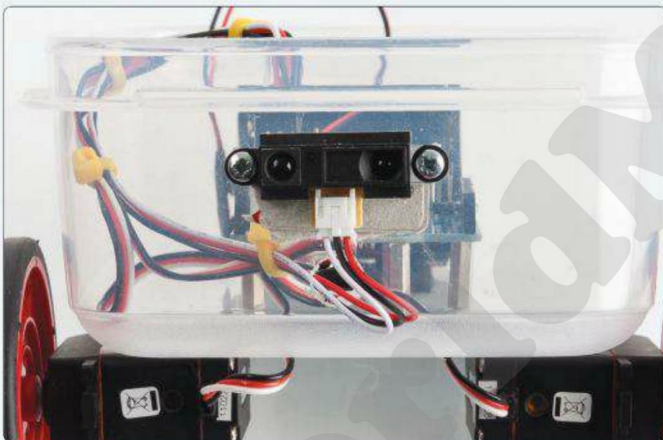
5 Attach the distance sensor to the front of the chassis (the wheel end). The two black shiny spheres (an infrared LED and an infrared detector) should point forwards. Since there's no space for adhesive pads, you'll need to use nuts and bolts. Make sure it's not pointing downwards, packing it out if necessary. Plug in its lead.
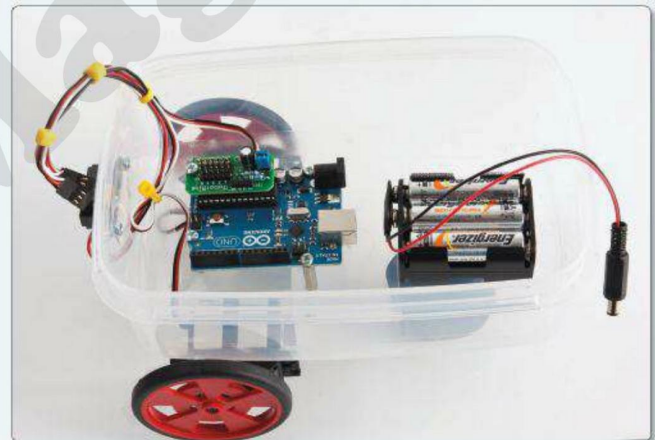
6 Insert six AA batteries into the battery holder. Connect the battery lead to the battery holder and use the two pairs of self-adhesive Velcro strip to attach the battery holder to the inside of the chassis. Position the battery holder near the back of the chassis to keep the weight balanced.

Arduino (tinyurl.com/3hmwpd) provides guidance on writing your first program – or 'sketch' as it's otherwise known. You'll also need to understand the library provided by RobotBits. This is a collection of routines that you use in a Arduino program to control your junkBot. Head to tinyurl.com/6v8btbx or see the PDF on our DVD.

If you're new to programming, though, you might find it easier to first get to grips with a simple language that allows you to try out programs on your PC rather than downloading them to a robot. We recently ran a two-part introduction to programming in SmallBasic. See tinyurl.com/3cs3uud and tinyurl.com/6dpfy9q for details.
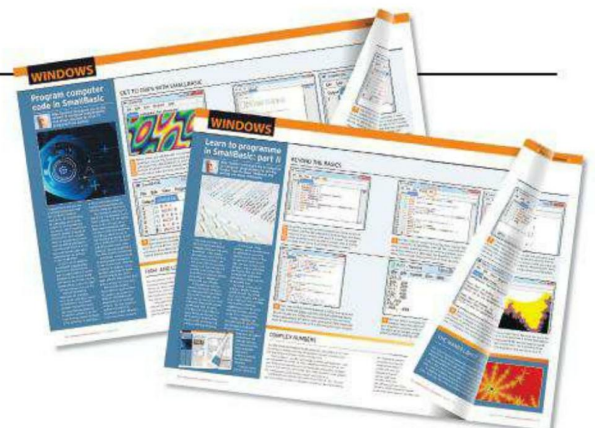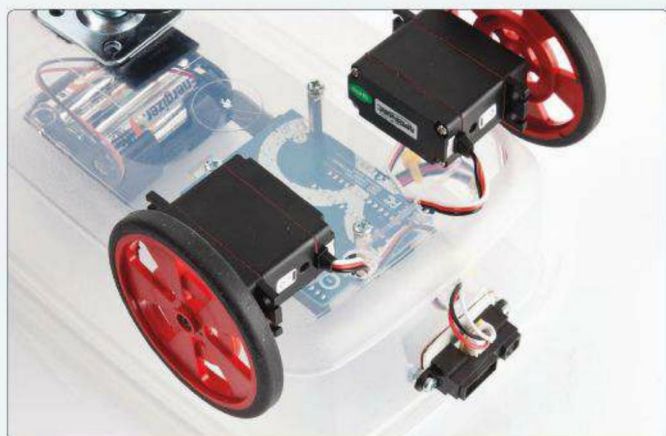
7 The motors and distance sensor are mounted on the outside of the chassis, so you'll have to make some holes for the wiring to make a neat job. Using a drill (or scissors), make holes close to where the lead exits each of the motors and another where the lead exits the distance sensor. Pass the leads through the holes.
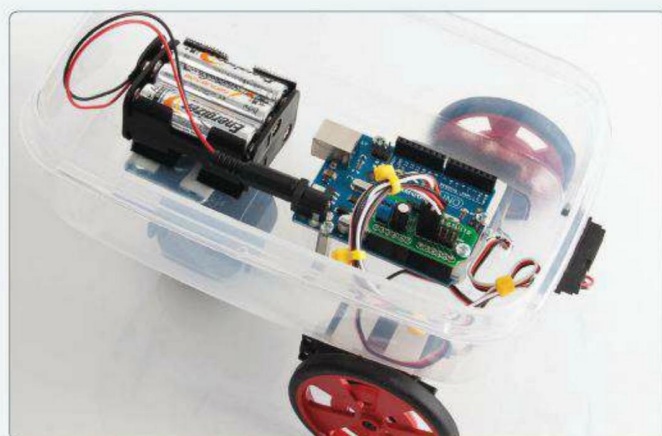
8 Plug the lead from the lefthand motor into channel 0 of the Mini-IO Shield, the lead from the righthand motor into channel 1, and the lead from the distance sensor into channel 2. In each case, ensure the white wire is the closest to the outer edge of the Arduino Uno board. Use cable ties to tidy up the wiring.
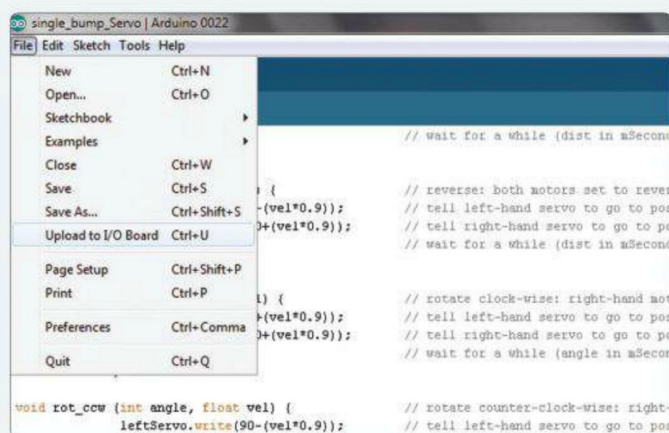
11 If it's not still connected from Step 9, connect the junkBot's Arduino Uno board to your PC using the USB cable. Select 'Serial Port' from the Tools menu and choose the COM port that you noted in Step 9. Select 'Upload to Board' from the File menu. When the 'Done uploading' message appears, disconnect the USB lead.

12 Plug the lead from the battery pack into the Uno board and place the junkBot on the floor facing a wall. It should move forward until it reaches the wall, then turn around and proceed until it finds another wall. If it moves backwards, the two motors have been connected the two wrong way around.

GETTING YOUR JUNKBOT TO COMMUNICATE

Programs rarely work properly on your first attempt. If all you have to go on is whether the motors spin and in which direction, trying to find the errors in your program can be a nightmare. Debugging your program is, therefore, just one of several reasons why you might want your junkBot to communicate with you.

One method of obtaining simple communication is to wire an LED to the Arduino Uno. By adding a few extra instructions, you could light the LED to confirm that a particular part of your code

has been executed. The Arduino tutorial at tinyurl.com/3hmwpd provides some guidance on how to do so.

Far more informative is to get your junkBot to communicate using text. The sample code contains various instructions that begin with 'Serial.print', and these do exactly that. To see these text messages, connect the Arduino Uno to your PC via its USB port while the code is running and select 'Serial Monitor' from the Tools menu of the IDE. The text will appear in a window.
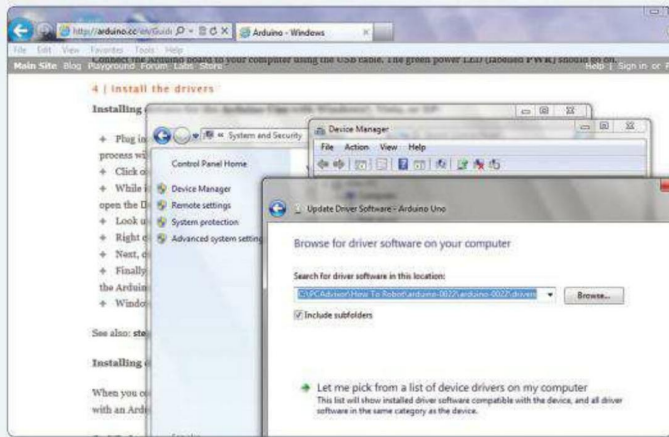
9 Download the IDE for the Arduino board (tinyurl.com/5bjrdo). Extract the files from the Zip archive, preserving the folder structure, then follow the instructions to install the driver. In Windows 7 you'll find this under 'Other Devices'; it'll move to Ports when the driver has been installed. Make a note of its COM number.
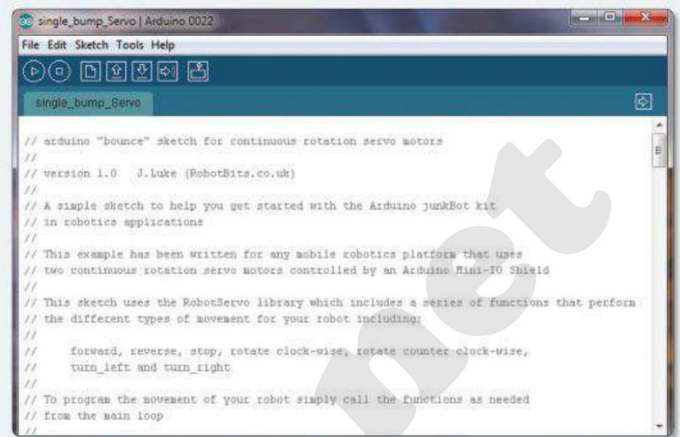
10 Start up the IDE by double-clicking the Arduino application. Download the sample code from tinyurl.com/67jwsLe, then open it in the IDE by selecting Open from the File menu. Select Board from the Tools menu and choose 'Arduino Uno'. Now compile the program using 'Verify/Compile' from the Sketch menu.


```
while(!front_bump()){            // while there is no bump keep going forwar

    Serial.println("NO bump detected - move forward");
    forward(100, 50);            // move forward for 100 mS at speed 50% of
}

Serial.println("FRONT bump detected - stopping");
stop();                         // full stop
delay (1000);                   // pause for one second

Serial.println("FRONT bump detected - reversing");
reverse(1000, 50);              // reverse for 1000 mS at speed 50% of ful
delay (1000);                   // pause for one second

Serial.println("FRONT bump detected - rotating");
rot_cw(1000, 50);               // rotate clockwise for 1000 mS at speed 50
```

13 Now try modifying the sample code. Edit it using a text editor, such as EditPad Lite (editpadlite.com). Enter the code in the screenshot in place of the code starting with 'while(!front_bump())'. The ends of some lines have scrolled off the screen, but anything after a // is a comment and won't affect operation.
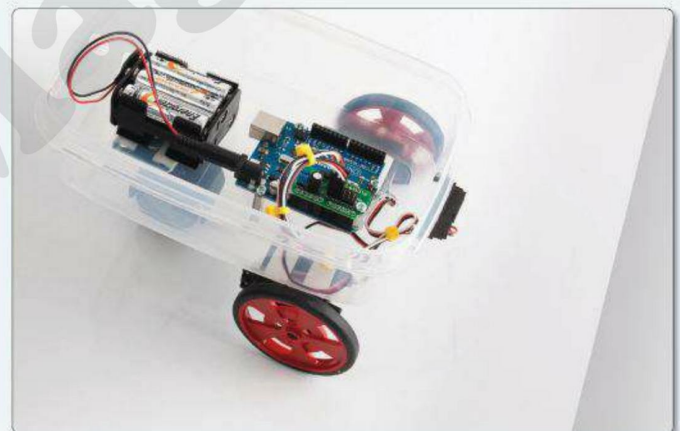
14 Repeat Steps 10, 11 and 12 with this new code. The junkBot should behave as before, but when it reaches a wall it will now stop, back up and turn around. You can now start your own voyage of discovery by altering the software further (see *Programming your junkBot* on page 110), or writing your own code from scratch. ☒

This instruction can also play an important role in the operation of your junkBot. If you're feeling ambitious, how about creating a room-mapping application that measures the distance between obstacles based on the time of travel. As the robot always turns by the same amount, you can calculate the location of walls and obstacles within the room. When it's finished, get it to communicate the dimensions to the IDE.

Twitter for business

Social-media skills are increasingly important for business as well as leisure. Sandra Vogel explains how to master micro-blogging

Twitter is one of the golden technologies of the moment. It's an ideal resource for companies, celebrities, journalists and, indeed, any individual who feels the need, to build an online presence and engage with their customers or fans. For businesses, maintaining a Twitter account is increasingly important. We'd even go so far as to say it's essential.

The micro-blogging site has become so well-established that not being a member of the Twitterati can make your business appear unprofessional in the eyes of some customers. Being able to provide instant feedback on your products or direct complaints to a listening ear is an invaluable service.

In these tough economic times, it's important that you use every tool available to you to maximise revenue. With an increasingly literate and tech-savvy customer base, not having a Twitter presence is akin to shooting yourself in the foot.

Simply registering with Twitter isn't enough. You also need to properly manage your presence, and ensure that you're responding to any tweets directed to your company. Twitter is also the one medium where the old adage that 'any publicity is good publicity' doesn't always ring true; there are plenty of examples of gaffes that have cost companies dear.

Earlier this year, for instance, an employee of a US ad agency tweeted: "I find it ironic that Detroit is known as the #motorcity and yet no-one here knows how to ******* drive." Chrysler, one of its clients, failed to see the funny side; the agency lost the account.

Such incidents happen more than you might think, but this isn't the only way in which tweets can do you or your company a disservice. Boring or repetitive tweets won't gain you any followers, for example, and there's no point in you talking when nobody's listening.

Over the following pages, we explain how your business can build and maintain a useful Twitter presence.

ATTRACT AND ENGAGE TWITTER FOLLOWERS

New to Twitter? Join today!

Full name

Email

Password

Sign up

START It's possible to see what other people are tweeting without becoming a member of Twitter yourself. However, the service is free to join and, once signed up, it's much easier to navigate the site. Head to twitter.com to register. Choose your account name carefully – you want customers to be able to find you.

PCAdvisor PC Advisor
...and its sister page the Best iOS Apps bit.ly/vGaNnV
18 hours ago

PCAdvisor PC Advisor
Say hello to @PCAdvisor's new one stop shop for all the Best Android Apps bit.ly/tb8Mu
18 hours ago

PCAdvisor PC Advisor
Yet more answers to questions you never asked us. 'Should I Remove My Laptop Battery to Increase its Life?' bit.ly/ssL67c
20 hours ago Favorite Retweet Reply

PCAdvisor PC Advisor
Pay attention mobile world. 'Norton: 'data loss biggest threat to phones, tablets' bit.ly/vHqapN

4 Where possible, link to your company's feed using the @ tag (such as @PCAdvisor). You can also use the @ tag to grab the attention of particular Twitter users. This is a subtle way of showing other members that you take Twitter seriously; use it well, and they may be more inclined to follow you.

USE A TWITTER CLIENT

Desktop clients can offer a better way to access and manage your Twitter account. These are sophisticated tools, and many of them come in versions for smartphones as well as laptops and desktop PCs. This enables you to maintain your presence out of the office.

A popular example is TweetDeck (tweetdeck.com), although there are many others. For a long time TweetDeck was an independent application, but Twitter has now acquired the company.

TweetDeck lets you simultaneously view multiple streams, separated by columns. This helps you to see who's following you,

2 Publicise your Twitter account anywhere you can in order to attract more followers. Key areas include your website, blog and email signature, but you should also add your Twitter address to your company letterhead, business cards, advertising and any other marketing materials you may produce.

3 Make the most of your Twitter feed. Provided that the majority of tweets are relevant, consider adding a feed to your blog or home page. Getting this to work might be a simple matter of using a predesigned bit of code. If you use WordPress, for example, you can drag a Twitter widget into your blog.
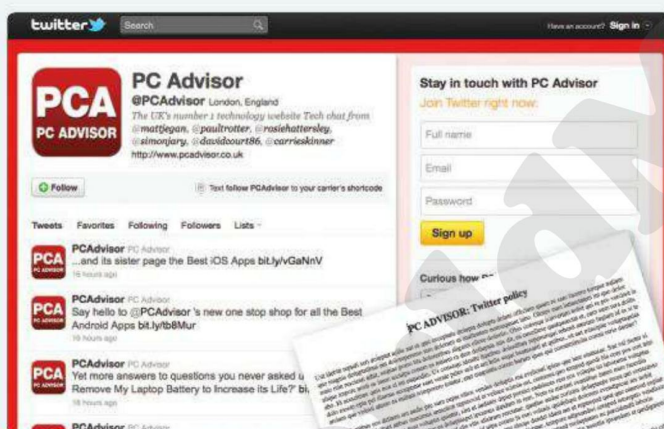
5 If several members of staff are logging into the same Twitter account, ensure that they understand Twitter etiquette and know what is and is not acceptable to tweet. Drawing up a policy is a good start and will make clear your expectations of them. Explain that sanctions will apply if the policy isn't followed correctly.

6 If a bad tweet gets posted, damage limitation is in order. Deleting the tweet will remove it from your own feed, but many of your followers will have already seen it and some may have even retweeted the post. Apologise profusely. Say you'll do something about it, and make sure you're seen to do so.

who's mentioning your company in their tweets, any direct messages you've been sent and your general integrated stream of messages at a glance. You can use TweetDeck to monitor your favourites, see trending topics, keep an eye on lists, search, and even draw in data from other social media, such as Facebook and LinkedIn. TweetDeck can also manage multiple Twitter accounts and be used to set up scheduled messages (see Step 13).
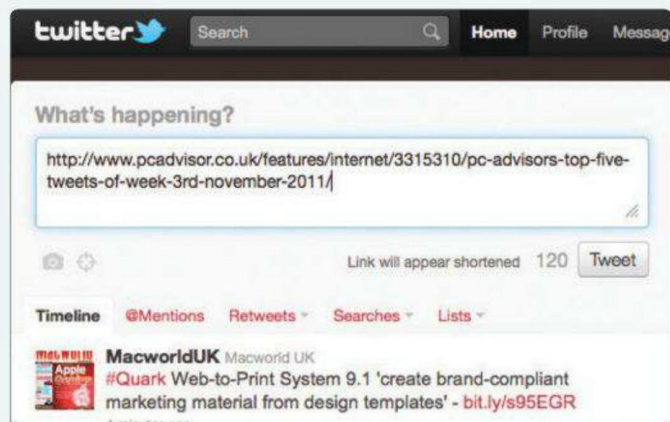
7 Squeeze as much information as possible into your tweets. Although URLs will appear shortened, the longer version still uses up to 20 characters of a tweet's 140-character limit. You may therefore wish to shorten them yourself. A URL-shortening service such as bit.ly will leave you more characters for your tweet.

8 Be concise and clear. Include generic terms that other users may be searching for. For example, we managed to squeeze 'digital camera', 'photo', 'photo frame' and 'images' into the tweet "Our new photo frames come in multiple colours and sizes. Great for digital camera photos. Show off your favourite images in style."

11 Keep abreast of new products in the market; tweeting about them may help you attract relevant followers. For instance, our fictitious photo frame seller monitors new digital camera models. By including product names in their tweets, they hope to attract photography fans who may also be interested in frames.
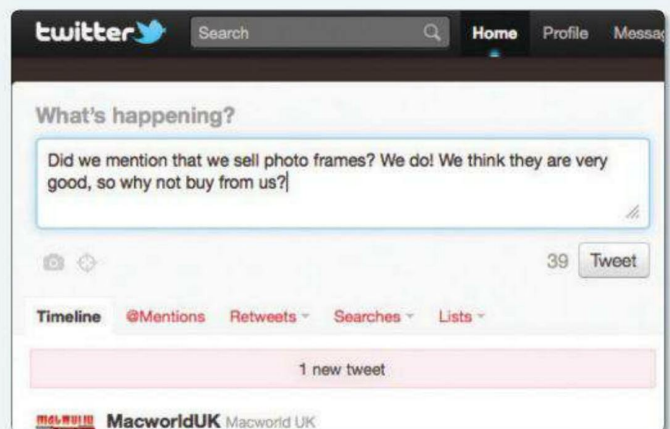
12 Tweet regularly. If you want to keep hold of your followers and hopefully attract new ones, you must maintain a strong presence. That might mean tweeting daily, although you should ensure your tweets remain relevant, lively and engaging. Don't simply repeat the same bland tweets day in, day out.

TWITTER TOOLS TO MANAGE FOLLOWING

The end game in Twitter is to acquire as many followers as possible, providing you with a wider audience for your messages and brand. There are many applications that can help you make the most of your followers. We've chosen to highlight just two, but a Google search will reveal many more such services.

As well as keeping existing followers interested, you need to ensure you attract the right sort of follower to begin with. Friend or Follow lets you see who

is following you, who you're following, and where that relationship is mutual. This can be useful when people you actively want to follow your brand aren't interested, suggesting that a change in how you write tweets or who else you're following may be in order.

The service is also useful for its ability to see who you're following when there's no benefit of doing so. Head to friendorfollow.com to get started with weeding out your follower base.

Refollow (refollow.com) is another application that can help you determine the value of individual followers or followees. You can see how often other members tweet, and see their biographies and Twitter stats at a glance. You can tag multiple users for group actions such as following and unfollowing. You can even use Refollow to find out who is following another Twitter user. It's a flexible tool for analysing your Twitter presence.

9 If your company is showing off its wares at a convention or other event, use hashtags to attract people who are interested in or visiting that event. A hashtag is a generic search term prefaced with the '#' symbol. Clicking a hashtag within a tweet will call up all tweets that contain it.
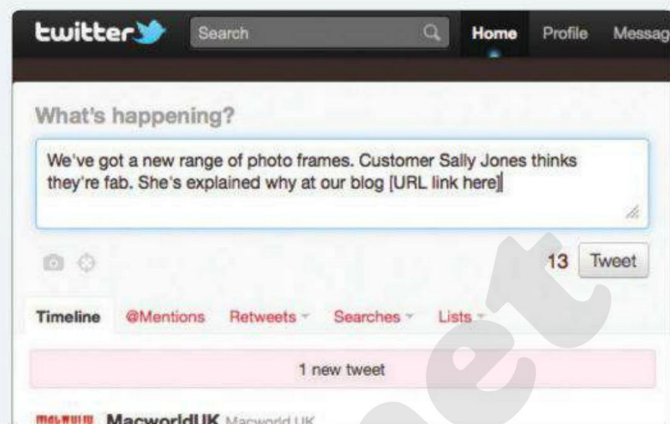
10 Crosslink your website and Twitter feed. Regularly mention your blog or website, as well as any products of particular interest. Note, however, that your followers are likely to drop you if they think you're interested only in marketing. Also remember that your tweets are searchable on Google: choose your words carefully.

13 Schedule your tweets. Rather than uploading a number of tweets at once, spreading them out will help your company stay at the top of your followers' feeds for longer. TweetDeck (tweetdeck.com) offers this feature, but there are lots of alternatives. Just remember to be available to respond.

14 Engage with your followers. Twitter is a two-way street. Respond to your followers' tweets and they may mention you kindly to others. If someone complains about your service or products, or asks for your help, a response is essential. Monitor mentions and @replies regularly and take appropriate action. ⊠

SEE HOW WELL YOU'RE DOING

There are some sophisticated tools for ranking how well you're doing on Twitter. One of the more popular such tools is PeerIndex (peerindex.com). This ranks you against other Twitter users using criteria such as how often you engage in two way activity, how much your following profile is influenced by mutual following, how well you link with other figures who have a high PeerIndex and are regarded as 'authority figures' in your area, how often your tweets are retweeted or shared on Facebook, and more.

PeerIndex is based on algorithms. You might not agree with the results its shows, but the more time and effort you spend on building up your Twitter presence the higher your PeerIndex will rise.
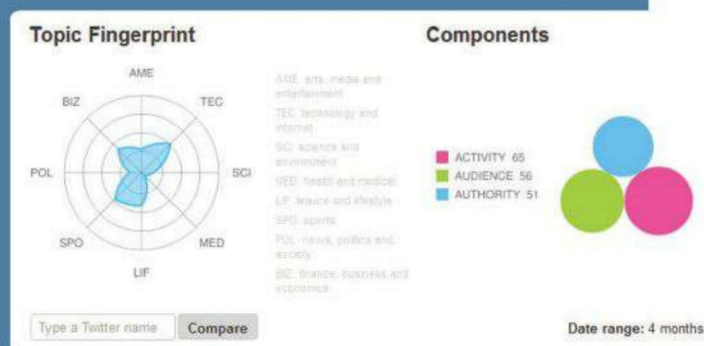
Apple iOS 5: all you need to know

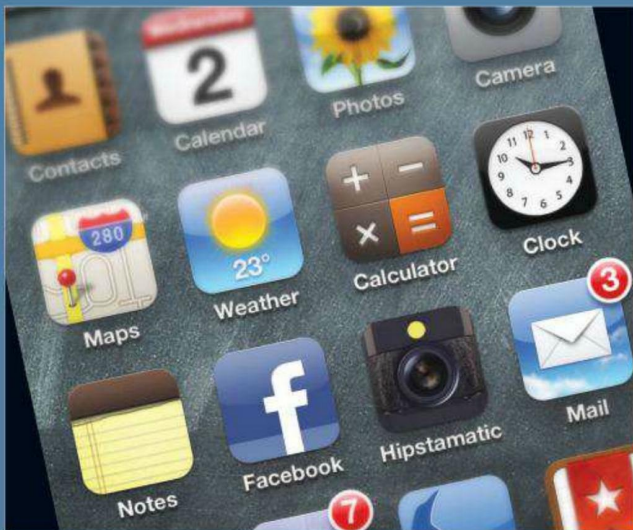Carrie-Ann Skinner explains how to upgrade an iDevice with Apple's iOS 5 operating system and take advantage of its impressive new features

The days of each household having just a single laptop or desktop PC are long gone. Many families now own a mix of mobile and desktop computers, which make working from any corner of the house or garden possible. The problem is in synching all these gadgets – something that's necessary if you want to be able to access all your content from any platform.

Cloud-based storage offers an excellent solution. You can save documents, files, photos and video to an online server, then access them from any other web-connected device. There are many such services available, but Apple's iCloud is perhaps the most polished.

iCloud is integrated into iOS 5, the latest iteration of Apple's mobile operating system. This is preinstalled on the iPhone 4S, but if you're running an iDevice that predates its release you'll need to upgrade the software yourself. The free iOS 5 update is available via iTunes.

Like other online storage services, iCloud allows data to be backed up between an iDevice, Mac or Windows PC and the cloud. What's more useful is its ability to do so automatically, and keep in sync the content on all your devices. Add a Calendar appointment on your iPhone, for example, and that change will also appear on your PC. This extends to apps and music purchased via iTunes, which are stored in the cloud and available to all devices.

Photo Stream, an iCloud service, automatically uploads and stores any photo captured by an iDevice in the past 30 days. Images uploaded by Photo Stream don't count towards iCloud's 5GB storage limit (although purchasing more space is a simple task).

iOS 5 also includes iMessage, a service that lets messages containing text, photos and video be exchanged between iDevices over a Wi-Fi or 3G connection.

Over the following pages, we explain how to download and install Apple's iOS 5, plus how to get started using iCloud and iMessage.

SETTING UP iCLOUD

START To download and install iOS 5 you'll first need to launch iTunes 10.5 on your PC and connect your iDevice via USB. Ensure that all your content is backed up before you begin. The software will detect the older mobile operating system and prompt you to upgrade. Follow the onscreen instructions to do so.

4 Click Storage & Backup and move the slider next to iCloud Backup to On. Note that once you've activated automatic backups the iDevice will no longer back up to your PC when you sync it with iTunes. Ensure the iDevice is connected to both a Wi-Fi network and a power source, then press 'Back up now'.

INTRODUCING ITUNES MATCH

While iCloud lets you store audio files purchased via iTunes (US users can also store videos), this doesn't apply to music that's been ripped from a CD and transferred to an iDevice using iTunes.

iTunes Match offers a workaround. Put simply, the service matches ripped tracks in your iTunes library with files in the iTunes Store. You download these and replace old with new, allowing you to listen to your music on any web-connected device via iTunes.

iTunes Match is able to do this by uploading a database of your iTunes Library to Apple's servers. It compares this list with the 20 million tracks offered in the iTunes Store. Anything that's already

2 Following a successful installation, click Settings on your iDevice and select iCloud. Enter your Apple ID and password (the same details you use to log into iTunes), then click Sign In. If you don't already have an Apple ID, click 'Get a Free Apple ID' and follow the onscreen instructions to register.

3 Once signed in, iCloud displays a list of content types it can sync. For each item in this list, which includes Mail, Contacts and Calendars, specify whether automatic synching should occur. Now select 'Automatic downloads' from Settings, Store to also make content purchased via iTunes available to other devices.

5 You can now access most of your content on any device with a web connection. Browse to icloud.com and sign in with your Apple ID. If you're using a PC, ensure you're using the latest version of Safari, Firefox or Internet Explorer. To access Photo Stream, however, you need the iCloud Control Panel for Windows (overleaf).

6 From this point on, any change you make to data that's configured to sync with iCloud will be pushed to all your iCloud-compatible devices. Keep an eye on how much of your free 5GB storage limit remains in Settings, iCloud, Storage & Backup. Apple will also email you warning as you approach your limit. ⊠

available from Apple can instantly be downloaded. The trade-off for this extra hoop you must jump through is 256kb AAC-format audio files that are likely to be of a better quality than the MP3 files you ripped from CD all those years ago – and a price.

If any of your files aren't available in the iTunes Store, you can upload them to the iCloud servers. This means all your music will be available through iTunes on any web-connected device.

The service is expected to launch in the US in the near future, where it will incur an annual subscription fee of $25. Apple has yet to confirm when iTunes Match will come to the UK.

USING PHOTO STREAM IN WINDOWS

START To access Photo Stream on a Windows PC (Vista SP2 and Windows 7 machines only), you need the iCloud Control Panel for Windows. Download and install the setup file provided at tinyurl.com/655kkeh. Next, click Windows' Start menu and choose Control Panel, Network and Internet, iCloud.

2 Log in with your Apple ID and password. In the following screen, select Photo Stream and click Options. The default locations of your My Photo Stream and Uploads folders will be displayed; click Change if you want to specify new locations. Click Ok, then choose Apply in the main menu.

3 To review your Photo Stream on the PC, simply open the My Photo Stream folder. To upload photos to Photo Stream, drag them into the Uploads folder. Should you need to reset Photo Stream, log into icloud.com, click on your username at the top right, then select Advanced, 'Reset your Photo Stream'.

4 The iCloud Control Panel for Windows also lets you import your contacts, calendar and Mobile.Me email to Outlook 2007 or 2010, and your bookmarks to Safari or Internet Explorer. To import such content, select each item in the iCloud Control Panel for Windows and click Apply. ⊠

ALTERNATIVE MESSAGING SERVICES

iMessage is a useful service, but only if your friends are also running iOS 5. A handful of similar messaging apps allow cross-platform conversation with friends.

WhatsApp Messenger is one of the most popular such services, and available for Google Android 2.1 or later, iPhone, Symbian and BlackBerry handsets. The Android version is free; Apple charges 69p.

WhatsApp lets you send messages containing text, images, audio and video to other users of the app. Character and message-frequency limits do not apply.

This app is also notable for the fact it's compatible with Apple's iPad and tablet PCs running Android.

Live Profile and Ping Chat are similar free services that provide the necessary tools for cross-platform conversation with friends. Both require you to enter a unique PIN (much like a phone number) to connect with others. Unlike WhatsApp Messenger, however, neither service is compatible with Android tablets or the iPad.
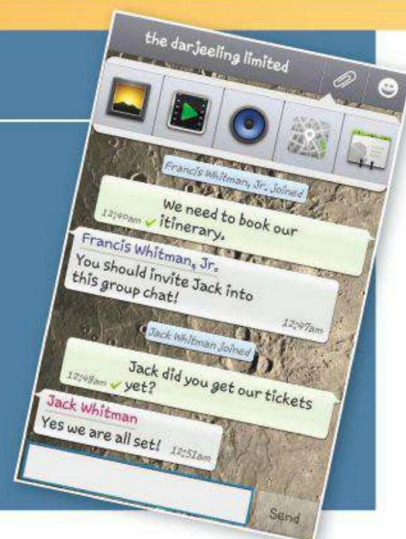
GETTING TO GRIPS WITH iMESSAGE

START Launch the Messages app on an iDevice running iOS 5. Sign in with your Apple ID and password. If you're using an iPad, you'll be prompted to confirm which email address you'd like messages to be sent from (the Wi-Fi-only model doesn't have a phone number). Select an email address and press Next.


2 Click the message icon at the top of the screen to compose a message. A new message window will appear, with a flashing cursor inside the 'To:' field. Begin typing a friend's name and Messages will offer suggestions based on your Contacts. Alternatively, enter a phone number or email address.

3 Place the cursor in the bottom text field to begin writing your message. If you want to add a photo or video, click the camera icon to the left of your message body. Browse to the content in Photos or Photo Stream, then click Use to attach it to your message.

4 Click Send, then close Messages; this app will run in the background and notify you of new messages. Note that iOS 5 will automatically use iMessage if your recipient is also running the latest software; otherwise the message will be sent via SMS. Those sent by iMessage appear in blue; SMS messages are green. ⊠
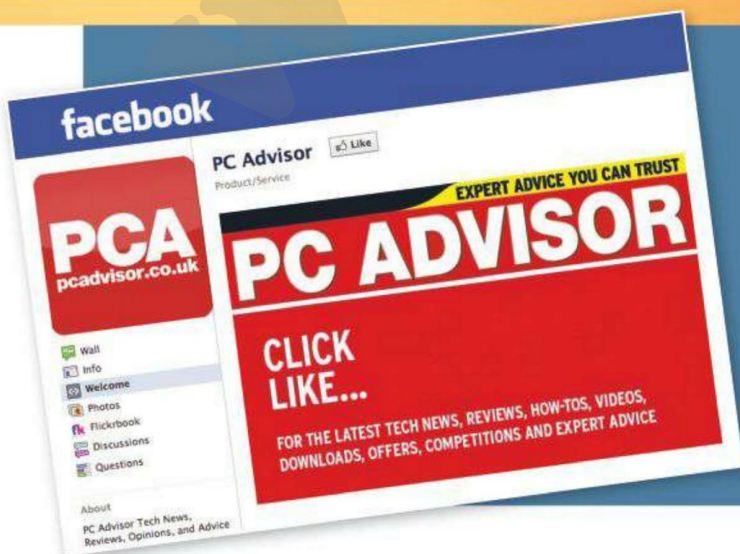
Snuko Anti-Theft & Data Recovery
FULL PROGRAM (FIVE-MONTH LICENCE)

ONLINE REGISTRATION REQUIRED

Installation details

Go to My Computer. Right-click the DVD icon and open the disc. Select Files 199\ Snuko Anti-Theft & Data Recovery and open the install file

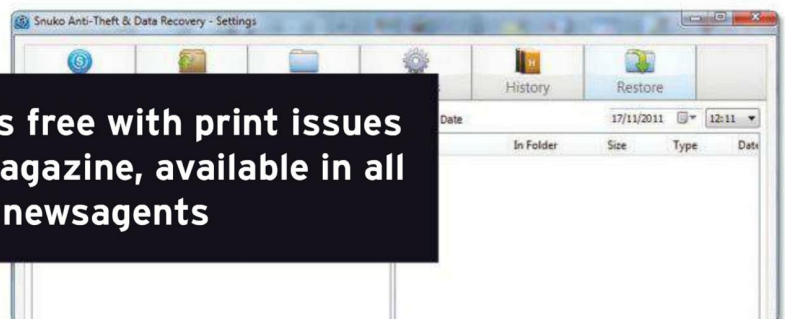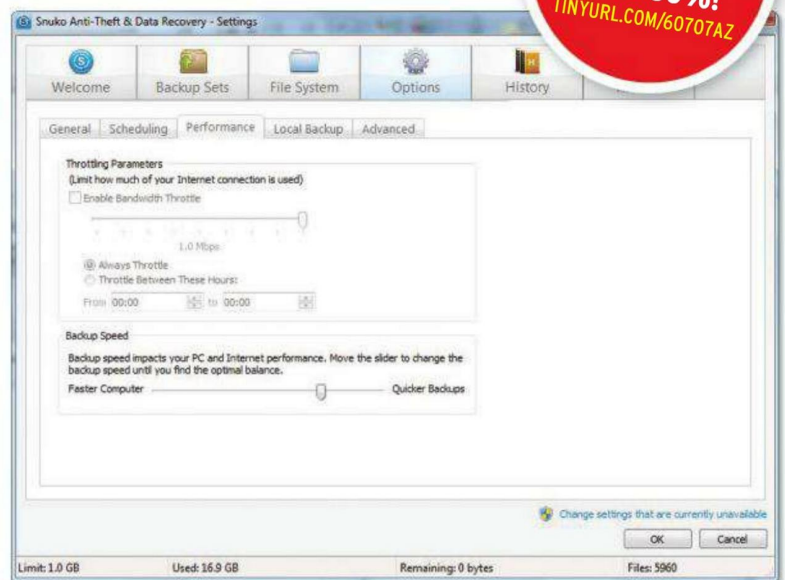**Online registration required:** follow the links during installation

System requirements

1GHz CPU; Windows XP/ Vista/Windows 7 (32bit); 256MB RAM; 100MB hard-disk space

How would you feel if your laptop was stolen? Consider the panic and stress you would experience, as well as the cost involved in replacing your laptop and all its software. Add to this the high risk you would face of your unprotected personal information being used for identity theft and/or fraud, and anti-theft protection becomes essential.

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• Geolocation device tracking

• Secretly captures images of the thief using a webcam

• Automatic registration in the world's largest lost/stolen property database

• Takes screenshots in the background

• Data-recovery feature

• Encryption and hiding of data

• Remote lock-down of device

• IP log tracking and lost device report generation ⊠

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BullGuard Internet Security 12.0
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Installation details
Go to My Computer. Right-click the DVD icon and open the disc. Select Files 199\BullGuard Internet Security 12 and open the install file

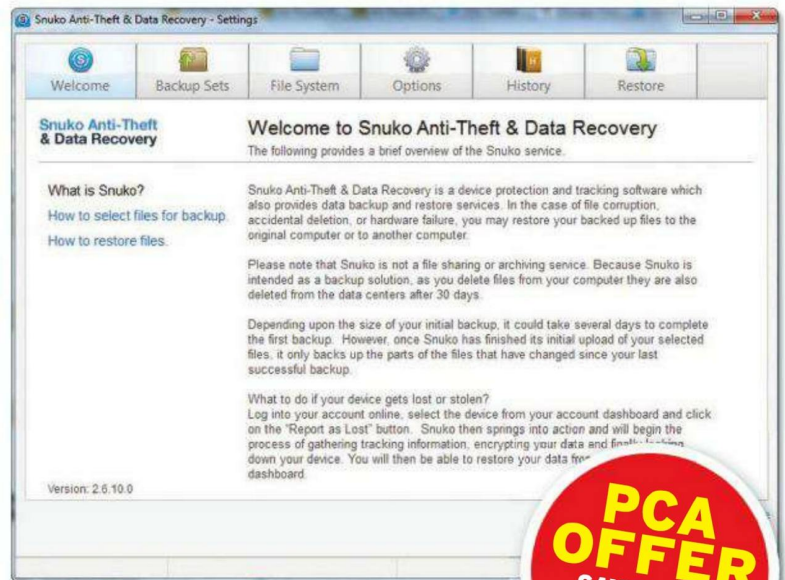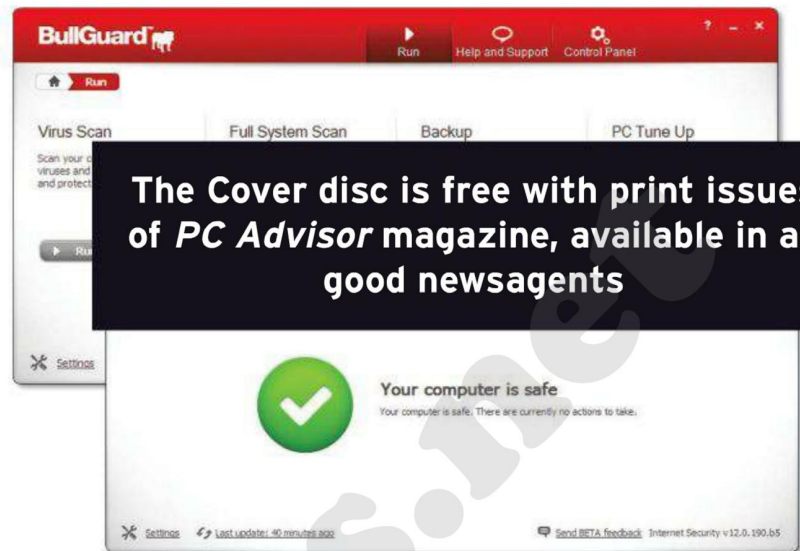**Online registration required:** follow the links during installation

System requirements
Windows XP/Vista/7; 200MB hard-disk space; Internet Explorer 6.0 or later

With an increasing number of online threats gaining sophistication, running security software is no longer an option: it's a must.

BullGuard Internet Security 12.0 is a complete security solution. It protects you and your PC from online threats, including identity theft, credit-card fraud, hackers, spam, viruses and spyware.

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FULL PROGRAM

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Installation details
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Online registration required: follow the links during installation

System requirements
1GHz CPU; Windows XP/Vista/7; 512MB RAM; 4GB hard-disk space

Magix Music Maker turns making music into an experience. Create your own songs, remixes and beats. Use informational videos and a range of sounds, loops and effects to develop your musical style, without prior knowledge.

Features
- 64 tracks for audio, Midi and video
- 1,500 new sounds and loops
- Vandal SE guitar amplifier
- Vita Sample Player
- Vita Century Keys
- Vita Saxophonia
- BeatBox 2
- Midi Editor
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Xara Xtreme 5.1 SE
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 199\ Xara Xtreme 5.1 and open the install file

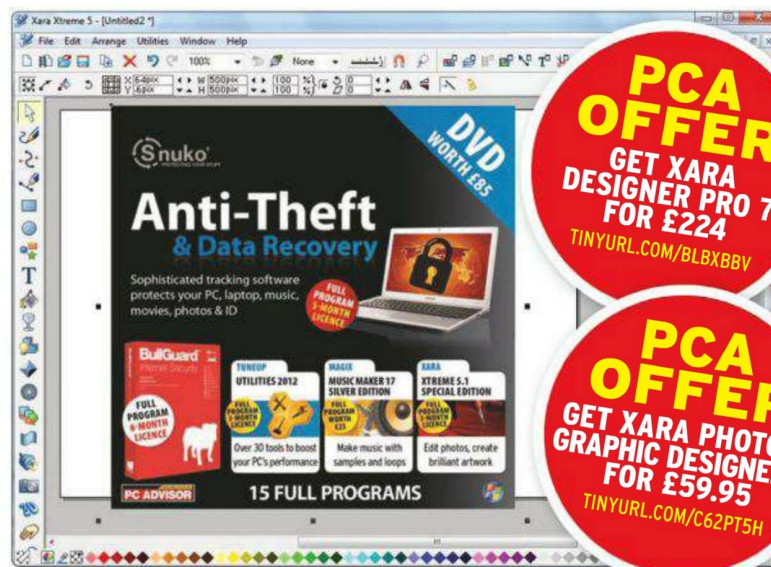**Online registration required:** follow the links during installation

System requirements
Intel Pentium processor or better; Windows XP/ Vista/7; 256MB of RAM; 400MB hard-disk space

Xtreme 5.1 is a special edition of the Xara series of graphics software titles, designed to meet all your drawing and day-to-day photo needs. It's ideal for preparing images for both print and the web.

Xara Xtreme is the perfect for:

• Creating simple logos and signs to cards, invitations, stationery, posters, flyers and brochures

• Drawing cartoons to the most ambitious works of illustration

• Creating web graphics such as buttons, icons and navigation bars, with compact graphics and high onscreen quality

• Photo work, including cropping, rotating, fixing red-eye and auto-enhancing brightness and contrast.

• Drawing and text tools can also be used on digital photos, making it easy to add captions or create impressive compositions

Whatever your skill level, the friendly user interface and unrivalled speed of Xara Xtreme is a pleasure to work with. ⊠

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FULL PROGRAM (THREE-MONTH LICENCE)

ONLINE REGISTRATION REQUIRED

Installation details
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Online registration required: follow the links during installation

System requirements
300MHz processor; Windows XP/Vista/7; 256MB RAM; 150MB hard-disk space; 1024x600-pixel screen resolution; Internet Explorer 6.0 or later

Uncompromising performance, maximum battery life, a clutter-free computing experience and smart energy efficiency is achievable with TuneUp Utilities 2012. With more than 30 tools at hand, your PC will be in top shape.

Two technologies that are unique to TuneUp Utilities 2012 allow you to experience Windows like never before. The revamped Program Deactivator restores more than 50 percent of speed and free space, while TuneUp Economy Mode improves battery life by up to 30 percent – it's nothing short of an energy-saving miracle.

A redesigned Start Center also means it's now easier than ever to optimise your Windows PC. ⊠

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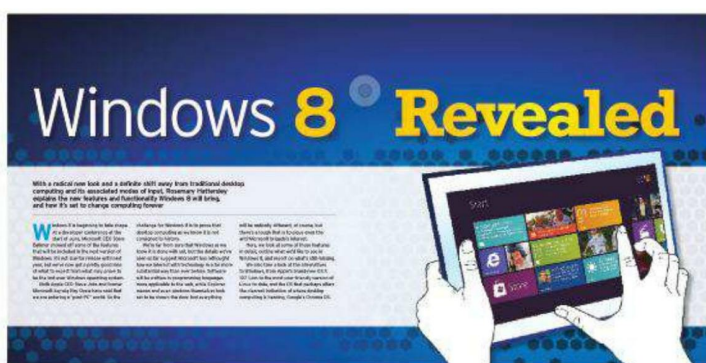# SUBSCRIBE TO PC ADVISOR AND SAVE MORE THAN 30%

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Letter from the Editor

PC Advisor hit the news stand in 1995. Not every family had a PC, and if they did it was a noisy beige box used for spreadsheets, newsletters and the occasional game. Surfing the net mostly meant using dialup: snarling up the

"There's no better way to get expert advice"

phoneline to find atrocious-looking websites. Such days are gone.

In the past 16 years, we've covered the inexorable rise of the internet, an exponential increase in computing performance, and the birth of the mobile- and cloud-computing eras.

Along the way we've seen false starts and spats, technology successes and failures, and malware that refused to die. We've watched as Microsoft slowly got to grips with PC security, Google swallowed the world whole, and Apple defied those who believe that substance always beats style (it doesn't).

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Now we can all access everything, at any time, from everywhere, PC Advisor is bigger and better than ever. Our unrivalled team of experts continues to bring you news of the latest PC hardware and software, as well as independent, lab-tested reviews of the world's best technology products.

Each month we review hundreds of computer products, cover thousands of news stories, and write yet more features and expert guides. And to the latest issue of the magazine we bring only the most interesting and important of each.

If you're an expert in computing, an interested hobbyist, or a total beginner, there's no better way to get expert advice you can trust than with a subscription to PC Advisor. Join the PC Advisor team and enjoy the next 16 years of computing in the best company possible.

Matt Egan, Editor,
PC Advisor
matt_egan@pcadvisor.co.uk

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Top-ranking chart entrants are eligible for either Best Buy or Recommended awards. A Best Buy takes the top spot, thanks to a winning combination of features, performance and value for money, while Recommended products are excellent alternatives. Almost as good, they offer great value, quality and performance. Chart placings are based on a calculation of features and performance compared to price, so the highest-scoring products usually also represent the best value for money.

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With their slim profiles, emphasis on style and performance, and large, bright screens, all-in-ones make ideal family PCs. And with the finger-friendly Windows 8 OS on the horizon, these touchscreen PCs are even more appealing.

PC ADVISOR BEST BUY

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All-in-one PCs

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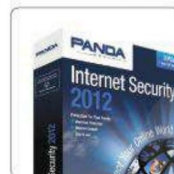
Sub-£600 laptops

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Tablet PCs

Projectors

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Prices

Desktop PCs
Desktops up to £500
£751 to £1,000

Laptops
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£601 to £1,000
£1,001 and over

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Printers under £150
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Graphics cards under £150
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Flat-panels under £200
£201 and over

Prices listed are those quoted by the distributor or manufacturer and include VAT. They are intended only as a guide and you may see products on sale for less or more than our quoted price.

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Index

Top 5 Sub-£500 PCs

			Processor type Processor speed	RAM Hard-disk capacity USB 2.0/3.0 ports[1]	Motherboard PSU Power rating	Flat-panel display Pixel pitch Native resolution (pixels)	
PC ADVISOR BEST BUY	1	**Chillblast Fusion Neutrino** 0845 456 7831 chillblast.com Last month 1	• £499 inc VAT • 2-year collect-and-return warranty	Intel Core i5-2500K 3.3GHz	8GB DDR3 RAM 1TB SATA 6/2	Asus P8H61-M LE/USB3 EZCool 500W	21.5in AOC F22+ 0.25mm 1920x1080
				>> WorldBench 6			**165**
PC ADVISOR RECOMMENDED	2	**Arbico eXcel 5250MX V2** 0845 625 2627 arbico.co.uk Last month 2	• £500 inc VAT • 2-year RTB warranty	Intel Core i5-2500K 3.3GHz	4GB DDR3 RAM 1TB SATA 6/2	Asus P8H61-M LE/USB3 Ace 500W	21.5in AOC F22+ 0.25mm 1920x1080
				>> WorldBench 6			**159**
	3	**CyberPower Ultra Triton** 0844 371 2727 cyberpowersystem.co.uk Last month 3	• £499 inc VAT • 3-year RTB warranty (parts only)	AMD A6-3650 2.6GHz	8GB DDR3 RAM 1TB SATA 4/4	MSI A75MA-G55 WinPower 450W	21.5in AOC F22+ 0.25mm 1920x1080
				>> WorldBench 6	**111**		
	4	**Palicomp Phoenix i5 Sonar Advanced** 01270 898 104 palicomp.co.uk Last month 4	• £499 inc VAT • 1-year RTB warranty	Intel Core i5-2500K 3.3GHz	8GB DDR3 RAM 1TB SATA 6/2	Asus P8Z68-V LX WinPower 450W	21.5in AOC F22+ 0.25mm 1920x1080
				>> WorldBench 6			**163**
	5	**Eclipse Voyager i525H61** 0844 472 3723 eclipse-computers.com Last month 5	• £499 inc VAT • 1-year RTB warranty	Intel Core i5-2500K 3.3GHz	4GB DDR3 RAM 1TB SATA 8/2	Asus P8H61-M LE/USB3 EZCool 650W	21.6in HKC 2219A 0.28mm 1920x1080
				>> WorldBench 6		**154**	

Top 5 £751-£1,000 PCs

			Processor type Processor speed	RAM Hard-disk capacity USB 2.0/3.0 ports[1]	Motherboard PSU Power rating	Flat-panel display Pixel pitch Native resolution (pixels)	
PC ADVISOR BEST BUY	1	**Chillblast Fusion Claymore** 0845 456 7831 chillblast.com Last month 1	• £999 inc VAT • 2-year collect-and-return warranty	Intel Core i7-2600K 3.4GHz	8GB DDR3 RAM 1TB SATA + 30GB SSD 6/2	Asus P8Z68-V LE Corsair 600W	23.6in Asus VS247H 0.27mm 1920x1080
				>> WorldBench 6			**163**
PC ADVISOR RECOMMENDED	2	**Arbico Elite Z685** 0845 625 2627 arbico.co.uk Last month 2	• £1,000 inc VAT • 2-year RTB warranty	Intel Core i7-2600K 3.4GHz	8GB DDR3 RAM 1TB SATA +60GB SSD 4/2	Asus P8Z68-V LX Xilence 580W	23.6in Asus VS247H 0.27mm 1920x1080
				>> WorldBench 6		**159**	
	3	**Eclipse Matrix i726R697** 0844 472 3723 eclipse-computers.com Last month 3	• £999 inc VAT • 1-year RTB warranty	Intel Core i7-2600K 3.4GHz	16GB DDR3 RAM 1TB SATA 6/2	Asus P8Z68V LE Cooler Master 650W	23.6in HKC 2412 0.27mm 1920x1080
				>> WorldBench 6			**180**
	4	**Medion Akoya P5704 D** 0845 434 6003 medion.com Last month 4	• £835 inc VAT • 1-year RTB warranty	Intel Core i7-2600 3.4GHz	8GB DDR3 RAM 1TB SATA + 64GB SSD 8/2	H6H72-EM FSP 450W	none n/a n/a
				>> WorldBench 6			**168**
	5	**Chillblast Fusion Volt** 0845 456 7831 chillblast.com Last month 5	• £999 inc VAT • 2-year collect-and-return warranty	Intel Core i7-2600K 3.4GHz	8GB DDR3 RAM 1TB SATA + 40GB SSD 6/2	Asus P8Z68-V LE Corsair 600W	23.6in Asus VS247H 0.27mm 1920x1080
				>> WorldBench 6			**184**

GLOSSARY • PSU: power supply unit • RTB: return to base • TB: terabyte • Multiplier-unlocked = overclockable [1]External [2]Gaming scores in fps. Fear tested at 'Maximum' (1024x768). Crysis tested at basic

>> Buying advice

Sub-£500 PCs

Desktop PC prices were correct at press time for issue 198 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 here will be available as specified. These charts are intended only as a guide.

Processor: Intel's Core i5-2500K delivers superb performance and its integrated HD 3000 graphics are more than adequate for HD multimedia and low-level gaming. The non-overclockable i5-2500 is slightly cheaper and delivers the same application performance, but it features less powerful graphics.

AMD's A6 CPUs are slower in desktop applications but feature faster integrated graphics. They also support DirectX 11.0.

PC ADVISOR TEST CENTRE

Graphics-card maker Graphics chip Memory/interface	Games scores: Fear (1024x768) Crysis (Low)[2]	Sound card Speakers Subwoofer	Max disc speeds	Operating system, software and extras	**VERDICT**
Intel Intel GMA HD 3000 n/a	18 13	onboard 2x Chillblast no	24x DVD-R/24x +R/ 12x -R DL/16x +R DL/ 6x -RW/8x +RW/ 12x -RAM/16x -ROM	Windows 7 Home Premium 64bit (choose Windows 7 32bit at no extra cost)	The Fusion Neutrino is based on Intel's i5-2500K: a wise choice, particularly when combined with 8GB of RAM and a 1TB hard drive. The H61 chipset supports USB 3.0, but is unable to take advantage of the CPU's unlocked multiplier. As standard, this PC turned in a strong 165 points in WorldBench. It's no gaming PC, but the Chillblast's integrated graphics, twin speakers and 21.5in monitor are up to the job of processing HD multimedia. TINYURL.COM/6F442WW
Intel Intel GMA HD 3000 n/a	18 13	onboard 2x Arbico no	22x DVD-R/22x +R/ 12x -R DL/ 6x -RW/8x +RW/ 12x -RAM/16x -ROM	Windows 7 Home Premium 64bit (choose Windows 7 32bit or XP at no extra cost)	Arbico's eXcel has a similar spec to our Best Buy, but pairs its Core i5-2500K with just 4GB of RAM. The effect of this is evident in WorldBench 6, where the Arbico scored 159 points. Gaming performance is in line with the competition, and Arbico also supplies a 21.5in full-HD monitor and twin speakers. USB 3.0 support lets you supplement the 1TB hard drive with high-speed external storage. The case is a budget model, but adequate. TINYURL.COM/638E59Z
AMD AMD HD 6530D n/a	53 23	onboard 2x Logitech S120 no	24x DVD-R/12x +R DL/ 6x -RW/8x +RW/ 12x -RAM	Windows 7 Home Premium 64bit, Office Starter 2010	CyberPower's Ultra Triton is the first PC in a long while to enter our round-up with an AMD CPU. Its A6-3650 is slower than the Intel equivalent in application performance, but offers significantly faster integrated graphics. The CPU can be overclocked if you crave more speed. A gamer-friendly Azza Orion case is fitted with a 1TB hard drive and 8GB of memory. Peripherals include the popular AOC F22+ display and a set of Logitech speakers. TINYURL.COM/3QNH8EO
Intel Intel GMA HD 3000 n/a	17 13	onboard 2x Logitech S220 yes	24x DVD-R/24x +R/ 12x -R DL/16x +R DL/ 6x -RW/8x +RW/ 12x -RAM/16x -ROM	Windows 7 Home Premium 64bit (choose Windows 7 32bit at no extra cost)	Palicomp promises a lot for your money, with a Core i5-2500K CPU, 8GB of RAM and a subwoofer-equipped set of Logitech speakers. The case offers smart, yet relatively sober, looks. We're more impressed by the Z68 motherboard, which lets you take advantage of the overclockable CPU. It also boasts four memory slots, 6Gbps SATA and, should you want to add an SSD, SRT. At stock speed, the PC turned in 162 points in WorldBench 6. TINYURL.COM/6DGKQPL
Intel Intel GMA HD 3000 n/a	17 13	onboard built into flat-panel no	22x DVD-R/22x +R/ 12x -R DL/16x +R DL/ 6x -RW/8x +RW/ 12x -RAM/16x -ROM	Windows 7 Home Premium 64bit	Eclipse's 3.3GHz Intel Core i5-2500K delivers good application performance and adequate graphics power for an excellent multimedia experience and low-level gaming, but you can get more for your money. A standard 4GB of RAM and a 1TB hard drive are fitted to an H61-chipset motherboard. It's 21.6in HKC 2219A display is marginally larger than the AOC favoured elsewhere and features built-in speakers (external speakers are not supplied). TINYURL.COM/3CDW5LT

Graphics-card maker Graphics chip Memory/interface	Games scores: Crysis Stalker: Call Of Pripyat[2]	Sound card Speakers Subwoofer	Max disc speeds	Operating system, software and extras	**VERDICT**
Palit nVidia GeForce GTX 570 Sonic Edition 1.28GB/PCI Express	99/55 199/118	onboard 2x Logitech S220 yes	12x BD-ROM 16x DVD ± R/ 8x ± R DL/ 6x -RW/8x +RW/ 12x -RAM/16x -ROM	Windows 7 Home Premium 64bit (choose Windows 7 32bit at no extra cost)	Chillblast has blended the latest technologies with premium components, combining the Core i7-2600K with a 30GB SSD. SRT allows the latter to boost performance of the 1TB hard drive. Also courtesy of the Z68 chipset is 6Gbps SATA and USB 3.0. The PC performs well, but has 'only' 8GB of RAM. An excellent Asus monitor is supplied, along with Logitech speakers and a Blu-ray drive. Chillblast also supplies the fastest graphics card here. TINYURL.COM/6YKCL8R
MSI nVidia GeForce GTX 560 Ti 1GB/PCI Express	100/46 192/101	onboard 2x Arbico no	12x BD-ROM/8x -R/ 8x -R DL/8x -RE/ 8x -ROM DL 16x DVD±R/12x ±R DL/ 12x ±RW/12x -RAM	Windows 7 Home Premium 64bit (choose Windows 7 32bit or XP at no extra cost)	The Elite uses its 3.4GHz Core i7-2600K to good effect, but recorded the lowest WorldBench score here. Arbico has installed Windows 7 on a 64GB SSD, which makes a huge difference to system responsiveness. You won't find the Arbico so fast in gaming, although it's better equipped than the Medion. The motherboard supports 6Gbps SATA and USB 3.0, while Arbico supplies an excellent full-HD monitor, stereo speakers and a Blu-ray drive. TINYURL.COM/5W0UP47
AMD AMD Radeon HD 6970 2GB/PCI Express	88/55 184/112	onboard built into flat-panel no	4x BD-ROM/ 8x DVD±R/8x ± R DL	Windows 7 Home Premium 64bit	With a staggering 180-point scored in WorldBench 6, the RAM-packed Eclipse is a force to be reckoned with. This PC lacks an SSD, however, and doesn't feel as snappy in use as competing systems. There's support for USB 3.0, plus a fast Radeon HD 6970 graphics card. No external speakers are provided, while the supplied monitor is an average LED-backlit model. The Eclipse Matrix does offer plenty of upgrade potential, however. TINYURL.COM/659VL7G
AMD AMD Radeon HD 6750 1GB/PCI Express	76/39 133/73	onboard none n/a	10x BD-R 16x DVD ± R	Windows 7 Home Premium 64bit	It lacks a monitor and still costs £835, but the Core i7-2600-powered Medion offers strong performance and quality components in return. A 64GB SSD allows for enhanced boot times and operational speed, and the 168-point WorldBench score is impressive for a PC with 'only' 8GB of RAM. The Blu-ray drive is able to write to as well as read compatible media, while 802.11n Wi-Fi comes as standard. We were less impressed with the graphics. TINYURL.COM/4Y9F06C
MSI AMD Radeon HD 6970 2GB/PCI Express	95/54 196/113	onboard 2x Logitech S220 yes	12x BD-ROM 16x DVD ± R/ 8x ± R DL/ 6x -RW/8x +RW/ 12x -RAM/16x -ROM	Windows 7 Home Premium 64bit (choose Windows 7 32bit at no extra cost)	Chillblast's Fusion Volt is not only the fastest PC our chart, but it also takes advantage of Intel's SRT to boost hard-drive performance. A Radeon HD 6970 graphics card with an improved cooling solution delivers excellent gaming results. The Asus motherboard provides all the latest technologies, while you also get a set of stereo speakers and the same super-sleek Asus monitor that we admired in the Arbico and Chillblast's first PC. TINYURL.COM/3FQJU7F

(1024x768, 'High Quality', DirectX 9.0) and more advanced (1680x1050, 'Very High Quality', DirectX 10.0) settings. Stalker: Call Of Pripyat tested at 720p 'Medium' and 1080p 'Ultra'

Memory: Expect up to 8GB of RAM and don't settle for less than 2GB. Some processors require DDR3 RAM, while others can use either this or DDR2 memory. Check your motherboard has free slots if you plan to upgrade later.

Storage: A terabyte is within the budget of a sub-£500 PC, although prices are currently rising due to recent flooding in Thailand (see page 24 for more information). Storage is easy to add later, of course.

Get a drive that can write to the DVD ± R formats at 16-speed or better. If you want to get 8.5GB on to one disc, get a drive that can write to dual-layer discs at eight-speed.

Flat-panel: PC makers often compromise on the monitor. All the PCs in our chart come with full-HD flat-panels. Expect to find a 21.5in model, although these are often marketed as 22in screens. It's best to get one with a digital connection (DVI, HDMI or DisplayPort), letting you get the best image quality available and hook up devices.

Graphics card: Intel's Core i3 and i5 CPUs come with integrated graphics processors that deliver around double the performance of older Intel integrated solutions. Sandy Bridge chips are even faster and offer features such as dual-monitor outputs.

ATI's Radeon HD 5450 is a popular choice at this price. It doesn't offer a great speed boost over integrated graphics, but it adds DirectX 11.0 support and multiple outputs.

Power supply: Expect only a basic power supply unit at this price. Without power-hungry components installed, there's simply no need for a more powerful supply. A 450W or 500W model is a good starting point for a sub-£500 machine.

Top 5 All-in-one PCs			Processor	RAM Hard-disk capacity	Ports & connectors	Wireless connectivity	Screen Resolution (pixels)
1 BEST BUY	**Apple iMac 21.5in** apple.com/uk tinyurl.com/6276q4s **New**	• £999 inc VAT • £999 (RRP) • 1-year RTB warranty	2.5GHz Intel Core i5-2500	4GB DDR3 500GB HDD	4x USB 2.0, FireWire 800, Thunderbolt	802.11a/b/g/n, Bluetooth, gigabit ethernet	21.5in IPS glossy LED-backlit 1920x1080
			>> WorldBench 6				139
2 RECOMMENDED	**Sony Vaio VPC-L22Z1e** sony.co.uk tinyurl.com/3r9ppg6 **New**	• £1,600 inc VAT • £1,600 (RRP) • 2-year RTB warranty	2.2GHz Intel Core i7-2670QM	8GB DDR3 1TB HDD	2x USB 3.0, 3x USB 2.0, HDMI	802.11b/g/n, Bluetooth, gigabit ethernet	24in glossy 3D touchscreen 1920x1080
			>> WorldBench 6	n/a[1]			
3	**Asus ET2400XVT** uk.asus.com tinyurl.com/6Lxtsn4 **New**	• £1,277 inc VAT • £1,277 (RRP) • 1-year RTB warranty	1.73GHz Intel Core i7-740QM	6GB DDR3 1TB HDD	2x USB 3.0, 4x USB 2.0	802.11b/g/n, Bluetooth, gigabit ethernet	23.6in glossy 3D touchscreen 1920x1080
			>> WorldBench 6	n/a[1]			
4	**HP TouchSmart Pro 610-1130UK** hp.com/uk tinyurl.com/69tvukz **New**	• £1,200 inc VAT • £1,200 (RRP) • 1-year RTB warranty	3.2GHz Intel Core i5-650	6GB DDR3 1.5TB HDD	2x USB 3.0, 4x USB 2.0, 2x HDMI	802.11b/g/n, Bluetooth, gigabit ethernet	23in glossy touchscreen 1920x1080
			>> WorldBench 6				122
5	**Sony Vaio VPC-J21L8E** sony.co.uk tinyurl.com/42ykrru **New**	• £850 inc VAT • £899 (RRP) • 2-year RTB warranty	2.3GHz Intel Core i5-2410M	4GB DDR3 1TB HDD	2x USB 3.0, 2x USB 2.0, HDMI	802.11b/g/n, Bluetooth, gigabit ethernet	21.5in glossy touchscreen 1920x1080
			>> WorldBench 6				84

Top 5 Netbooks			Processor	USB 2.0 ports FireWire ports	RAM Hard-disk capacity	Dimensions (wxdxh) Weight	Wireless connectivity
1 BEST BUY	**HP Mini 210-3002sa** hp.com/uk tinyurl.com/4yfd5ho **New**	• £269 inc VAT • £269 (RRP) • 1-year collect-and-return warranty	1.66GHz Intel Atom N570	3 0	1GB DDR3 250GB	268x191x32mm 1.4kg	802.11b/g/n, Bluetooth
			>> WorldBench 6	38			
2 RECOMMENDED	**Samsung NC110** samsung.com/uk tinyurl.com/7qzapkm **New**	• £240 inc VAT • £240 (RRP) • 1-year RTB warranty	1.5GHz Intel Atom N550	3 0	1GB DDR2 250GB	259x180x28mm 1.2kg	802.11b/g/n, Bluetooth
			>> WorldBench 6	36			
3	**Kogan Arora Pro** kogan.co.uk tinyurl.com/43mn2ob Last month 3	• £280 inc VAT • £289 (RRP) • 1-year collect-and-return warranty	1.3GHz Intel Pentium SU2700	3 0	2GB DDR2 500GB	290x195x26mm 1.3kg	802.11b/g/n, Bluetooth
			>> WorldBench 6	n/a[1]			
4	**Samsung NS310** samsung.com/uk tinyurl.com/444sktx Last month 5	• £330 inc VAT • £330 (RRP) • 1-year RTB warranty	1.5GHz Intel Atom N550	3 0	1GB DDR3 250GB	275x188x31mm 1.1kg	802.11b/g/n, Bluetooth
			>> WorldBench 6	37			
5	**Dell Latitude 2120 Advanced** dell.co.uk tinyurl.com/7wnff7t **New**	• £598 inc VAT • £598 (RRP) • 1-year collect-and-return warranty	1.5GHz Intel Atom N550	3 0	2GB DDR3 320GB	265x187x23mm 1.3kg	802.11a/b/g/n
			>> WorldBench 6	33			

[1] Not tested Note: WorldBench 6 works only in Windows [2] Not tested using MobileMark 2007

>> 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 N450 is a popular chip. It consumes little power and gets the job done. Just don't expect massive processing muscle.

Storage: Netbooks usually come with either 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 sufficient for basic tasks.

Wireless: 802.11b/g was standard on netbooks, sometimes with Bluetooth, but

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	Graphics card Maximum memory Fear (Max)	Dimensions Weight Power consumption	Max disc speeds	Operating system, software and extras	**VERDICT**
	AMD Radon HD 6750M 512MB 100fps	528x189x451mm 9.3kg not tested	8x DVD ± R/ 4x ± R DL/ 8x -ROM	Mac OS X 10.7 Lion, FaceTime HD webcam, Magic Mouse, wireless keyboard	The iMac is preloaded with OS X 10.7 Lion. It excelled in our benchmarks, with its 139-point WorldBench score beating all others, while the AMD Radeon HD 6750M delivered strong games performance. You won't find a Blu-ray player or USB 3.0 support here, but you will find the faster Thunderbolt connection. Neither do you get a touchscreen, although the supplied Magic Mouse features a touch-sensitive body for scrolling. The 21.5in IPS panel is small, but it offers unparalleled image quality.
	nVidia GeForce GT540M 1GB 116fps	608x168x429mm 12kg 87W (idle), 135W (under load)	6x BD-ROM/4x -R 8x DVD ± R/ 6x ± R DL/ 8x -ROM	Windows 7 Home Premium 64bit, webcam, wireless keyboard	The Vaio has some of the best specs in our chart, including both 3D and Blu-ray support. The Core i7-2670QM quad-core processor usually runs at 2.2GHz, but climbs to 3.1GHz with Turbo Boost enabled. The Sony decimated its rivals in our gaming tests; we weren't able to run WorldBench, but it should be plenty fast for most tasks. The large 24in glossy display offers strong blacks, bright vivid colours and crisp text. This dream entertainment all-in-one computer carries a hefty price tag, though.
	nVidia GeForce GT460M 1.5GB 40fps	582x50x495mm 13kg 40W (idle), 78W (under load)	4x BD-ROM 8x DVD ± R/ 6x ± R DL/ 8x -ROM	Windows 7 Home Premium 32bit, webcam, 3D glasses, wireless keyboard	The ET2400XVT's strong specs include a 23.6in touchscreen, support for nVidia's 3D Vision technology (active-shutter glasses are supplied), and a slew of USB 3.0 and 2.0 ports. The i7-740QM quad-core CPU supports Turbo Boost, allowing the 1.73GHz processor to run at 2.93GHz when the PC is under load. However, it's significantly slower than the second-gen processors seen elsewhere in the chart. The 23.6in screen isn't the most accurate we've seen, displaying a slight oversaturation of some colours.
	AMD Radeon HD 5570M 1GB 72fps	584x103x450mm 11.8kg 67W (idle), 112W (under load)	4x BD-ROM 8x DVD ± R/ 6x ± R DL/ 8x -ROM	Windows 7 Home Premium 64bit, webcam, TV tuner, Beats Audio, wireless keyboard, remote	This chunky all-in-one offers great potential for entertainment and office productivity. Although the 23in screen is no larger than that of the competition, its chassis is much thicker, at 103mm. Input is via a wireless keyboard, mouse or remote control. The Beats Audio-branded speakers deliver crisp highs and mids, and excellent bass for their size. Blu-ray is also thrown in. Application performance is good, but the graphics card isn't particularly powerful. The TouchSmart's tilting stand is a nice touch.
	Intel HD 3000 n/a 17fps	525x185x398mm 9.8kg 41W (idle), 72W (under load)	8x DVD ± R/ 8x ± R DL/ 8x -ROM	Windows 7 Home Premium 64bit, webcam, wireless keyboard	Sony has copied the square edges and styling of its Bravia TVs with astonishing accuracy. This all-in-one is extremely compact, with a small 21.5in display. The specs are decent, although the WorldBench score of 84 is unimpressive. The touchscreen display is capable of two-point multitouch, but it's overly sensitive. We were surprised to find no Blu-ray drive. This PC also lacks a dedicated graphics card. The wireless keyboard is comfortable to type on, and the selection of USB ports is decent.

	Screen size Native resolution (pixels)	Graphics card Maximum memory	Flash memory drive	Max disc speeds	Operating system, software and extras	**VERDICT**
	10.1in 1024x600	Intel GMA 3150 n/a	yes	n/a	Windows 7 Starter 32bit	With last issue's Toshiba disappearing from the market, this brightly coloured HP takes top spot. It may not suit the boardroom – we reviewed the grey version; the pink version is more garish. With a WorldBench 6 score of 38, the HP is fast for a netbook, while the keyboard, according to HP, is 93 percent of a full-size version. It's certainly very usable, enabling almost error-free typing. The speakers are as well, and the 10.1in screen with an anti-glare coating offers a nice image. Battery life is very good.
	›› Battery life 7:54					
	10.1in 1024x600	Intel GMA 3150 n/a	yes	n/a	Windows 7 Starter 32bit	After initial problems, etailers now have good supplies of the NC110. That's good: this netbook is one of the better models on the market. The 1.5GHz CPU isn't as fast as the HP's, but 36 points is a good showing for a netbook. The 1GB of RAM is standard, but it's only DDR2. Battery life is excellent, with the Samsung lasting for almost 8 hours. The matt screen offers good quality, and won't suffer from distracting reflections. A small, light chassis and good battery life make the Samsung a road warrior.
	›› Battery life 7:52					
	11.6in 1366x768	Intel GS40 n/a	yes	n/a	Ubuntu Linux 11.04 Natty Narwhal	Fitted with an 11.6in screen, the Agora Pro just about qualifies as a netbook (Kogan bills it as an ultraportable laptop). The single-core SU2700 Pentium is joined by a useful 2GB of RAM and a large 500GB hard disk. The matt screen works well in daylight, and its 1366x768 resolution is welcome. Buttons on the full-size keyboard are a little wobbly, but quick typing is easy. The Kogan Agora Pro was noisy in our tests, and battery life is poor. But its Ubuntu OS allows the Pro to run with ease.
	›› Battery life 2:22[2]					
	10.1in 1024x600	Intel GMA 3150 n/a	yes	n/a	Windows 7 Starter 32bit	The NS310 is a brand-new netbook, yet appears to be stuck in a time warp. Rather than break free from the shackles of Microsoft, Samsung has chosen to trot out another Wintel notebook. The electric blue finish is interesting, but there's little else here that wasn't available three years ago, with the exception of Bluetooth 3.0. The low weight is pleasing, although a small battery reduces the runtime considerably. It's barely faster than its predecessors, while the low-resolution screen is glossy.
	›› Battery life 3:41					
	10.1in 1366x768	Intel GMA 3150 n/a	yes	n/a	Windows 7 Professional 32bit, Microsoft Office Starter 2010	You can get cheaper versions of this netbook from Dell, and that's probably just as well – even given the ruggedised casing, the £598 price tag is exorbitant. The specs are good, with 2GB of DDR3 memory, a fast 320GB hard drive, and Windows 7 Professional rather than Starter. Nonetheless, performance is nothing to write home about, and even the battery life lacks endurance compared to some models here. The keys are almost full-size, but the touchpad is rather small. You can find better value.
	›› Battery life 6:24					

Prices are intended only as a guide and are correct at press time

newer models support faster 802.11n, too. As they are designed to be used on the move, the faster Wi-Fi technology comes in handy when copying large files. 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 sometimes sacrifice dedicated function keys, for example.

Extras: To keep cost and weight down, mini-laptop manufacturers compromise heavily on extras – don't expect to get a CD/DVD drive, a FireWire port or an ExpressCard slot, for example. You'll find three USB ports, but they may be crammed together tightly, which can make plugging in two devices side by side tricky unless you use a USB hub or an extension cable.

| Top 5 Sub-£600 laptops		Processor	USB ports FireWire Memory card reader	RAM Hard-disk capacity	Dimensions (wxdxh) Weight	Wireless connectivity
1 Samsung RV511 samsung.com/uk tinyurl.com/5tvt8ae Re-entry	• £500 inc VAT • £500 (RRP) • 1-year RTB warranty	2.53GHz Intel Core i3-380M	3 0 yes	6GB DDR3 640GB	382x256x34mm 2.4kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				105	
2 Lenovo IdeaPad S205-1038 lenovo.com/uk tinyurl.com/6g5ekqk Last month 2	• £350 inc VAT • £350 (RRP) • 1-year RTB warranty	1.6GHz AMD E350	3 0 yes	4GB DDR3 500GB	290x168x29mm 1.5kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				53	
3 Lenovo G570 lenovo.com/uk tinyurl.com/6fzz4xe Last month 4	• £500 inc VAT • £500 (RRP) • 1-year RTB warranty	2.1GHz Intel Core i3-2310M	4 0 yes	6GB DDR3 640GB	377x250x35mm 2.6kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				96	
4 Dell Inspiron 17R dell.co.uk tinyurl.com/64nqqk8 Last month 5	• £599 inc VAT • £599 (RRP) • 1-year RTB warranty	2.4GHz Intel Core i5-2430M	3 0 yes	4GB DDR3 500GB	423x287x30mm 3kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				114	
5 MSI CR650 uk.msi.com tinyurl.com/5trk7f4 New	• £511 inc VAT • £511 (RRP) • 1-year RTB warranty	1.6GHz AMD E350	3 0 yes	4GB DDR3 500GB	383x250x38mm 2.3kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				54	

Top 5 £601-£1,000 laptops		Processor	USB ports FireWire Memory card reader	RAM Hard-disk capacity	Dimensions (wxdxh) Weight	Wireless connectivity
1 Toshiba Satellite R830-143 toshiba.co.uk tinyurl.com/6xwtk99 Last month 1	• £730 inc VAT • £749 (RRP) • 3-year RTB warranty	2.3GHz Intel Core i5-2410M	2 0 yes	6GB DDR3 640GB	316x227x27mm 1.5kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				122	
2 Apple MacBook Pro apple.com/uk tinyurl.com/5td25pq Last month 2	• £999 inc VAT • £999 (RRP) • 1-year RTB warranty	2.3GHz Intel Core i5-2415M	2 1 yes	4GB DDR3 500GB	325x241x23mm 2.1kg	802.11 a/b/g/n, Bluetooth
	≫ WorldBench 6				117	
3 Medion Akoya P6631 medionshop.co.uk tinyurl.com/636p2jc Last month 3	• £700 inc VAT • £769 (RRP) • 1-year RTB warranty	2.3GHz Intel Core i5-2410M	4 0 yes	8GB DDR3 750GB	380x260x34mm 2.6kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				121	
4 Acer Aspire 5750G acer.co.uk tinyurl.com/3kgtspa Last month 4	• £670 inc VAT • £699 (RRP) • 2-year RTB warranty	2GHz Intel Core i7-2630QM	3 0 yes	4GB DDR3 640GB	382x253x33mm 2.6kg	802.11b/g/n, Bluetooth
	≫ WorldBench 6				126	
5 Medion Erazer X6811 medionshop.co.uk tinyurl.com/4mqooc8 Last month 5	• £800 inc VAT • £979 (RRP) • 2-year RTB warranty	2.53GHz Intel Core i5-460M	2 0 yes	4GB DDR3 640GB	390x265x46mm 3.2kg	802.11b/g/n
	≫ WorldBench 6				113	

GLOSSARY • RTB: return to base • SSD: solid-state drive   [1]Gaming framerate scores in fps, at 1024x768-pixel resolution and 'Maximum Quality' settings [2]Not tested Note: Windows is not preinstalled on
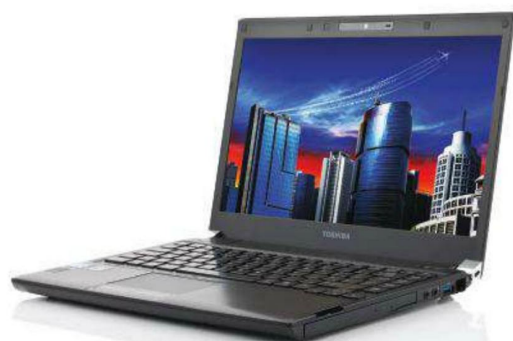
≫ Buying advice

Laptops

Processor: Intel chips remain the dominant force. The Intel Core 2 Duo CPUs offer strong battery life, but if you want the best performance then you'll have to look to the Intel Core i5 and i7 chips. The latter, in particular, are incredibly fast.

The Core i5-M520 and i7-620M are currently extremely popular choices in £1,001-plus laptops, offering a good mix of speed and battery life.

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.

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Screen size Native resolution (pixels)	Graphics card Memory	Games score (Fear)[1]	Max disc speeds	Operating system, software and extras	VERDICT
15.6in 1366x768	nVidia GeForce 315M 1GB	33	8x DVD ± R/4x ± RW/8x -ROM	Windows 7 Home Premium 64bit	After a brief hiatus, the RV511 is available in good numbers again. And with last month's Best Buy exiting the market, the RV511 re-enters at the top. Its performance is superb, with a 2.53GHz Core i3 CPU powering it to 105 WorldBench 6 points. A capacious 640GB of storage and 6GB of RAM are provided. Battery life isn't vast, but it compares reasonably with most models here. The 15.6in display is reflective, with its shine concealing washed out images. But the RV511 is generally a capable model.
>> Battery life			5:15		
11.6in 1366x768	AMD Radeon HD 6310M n/a	18	n/a	Windows 7 Home Premium 64bit	This 11.6in-screen Lenovo IdeaPad is extremely portable, but has far more in the way of power and specifications than a similar-sized netbook. The screen is criminally glossy, but offers a sharp, well-defined image. The 1.6GHz AMD E350 processor shows its age, and a WorldBench score of 53 isn't great. Nor are the graphics capable of doing any justice to games. But the 500GB hard drive is capacious, and typing is very comfortable. Battery life is also very good. This Lenovo is an ideal travel companion.
>> Battery life			5:38		
15.6in 1366x768	AMD Radeon HD 6370M 1GB	32	2x BD-ROM 8x DVD ± R/4x ± RW/8x -ROM	Windows 7 Home Premium 64bit	This is exactly the sort of functional laptop you might expect from Lenovo, and it doesn't fare badly in the looks department either. Our sample developed a row of dead pixels, but otherwise impressed. Its score of 96 points in WorldBench 6 is adequate at this the price, and the HD 6370M graphics controller makes this one of the few low-priced laptops that can handle games. The 640GB hard drive is capacious and this model can even handle Blu-ray playback. It's a little heavy at 2.6kg, however.
>> Battery life			5:01		
17.3in 1366x768	Intel GMA HD n/a	n/a	8x DVD ± R/4x ± RW/8x -ROM	Windows 7 Home Premium 64bit, Microsoft Office 2010 Starter	A study in clean, simple design, the Inspiron 17R is highly configurable and supports many of the latest technologies, including USB 3.0 and Intel's Wireless Display (WiDi). Perhaps most startling at this price, though, is the giant 17.3in display. A Scrabble-tile-style keyboard is recessed into the desk, with the cursor arrows and numeric keypad delineated from the main keys. The 114 points notched up in WorldBench 6 is impressive. Battery life isn't great, but the Dell makes an ideal desktop replacement.
>> Battery life			3:30		
15.6in 1366x768	AMD Radeon HD 6310M n/a	19	8x DVD ± R/4x ± RW/8x -ROM	Windows 7 Home Premium 64bit	Creeping in at the bottom of the chart, the MSI is hamstrung by a high price and a weak processor. The latter is a dual-core 1.6GHz AMD E350, a chip that Lenovo also places in its IdeaPad. But while that laptop is designed primarily to be portable, the CR650 is intended as a primary PC. Gaming performance isn't fantastic either, while the 15.6in screen doesn't send out the sharpest picture. The sound quality is good and the keyboard fine. A better price is needed to make this a tempting purchase.
>> Battery life			5:42		

Screen size Native resolution (pixels)	Graphics card Memory	Games score (Fear)[1]	Max disc speeds	Operating system, software and extras	VERDICT
13.3in 1366x768	Intel HD Graphics 3000 n/a	18	8x DVD ± R/4x ± RW/ 5x -RAM/8x -ROM	Windows 7 Home Premium 64bit	A highly portable laptop, the Toshiba Satellite's application performance was superb in our tests. Its integrated graphics are rather underpowered for gaming, however. The Toshiba looks smart. Its keyboard has small keys, but is easy to use for prolonged periods. Battery life is excellent, and the best in the chart at 7 hours and 32 minutes. The 13.3in screen has a matt finish and is usable in a variety of lighting conditions, if the colour depth suffers slightly. This laptop is ideal for taking on the road.
>> Battery life			7:32		
13.3in 1280x800	Intel HD Graphics 3000 n/a	18	8x DVD ± R/4x ± RW/ 5x -RAM/8x -ROM	Mac OS X 10.6 Snow Leopard	Its £999 price tag means the MacBook Pro only narrowly makes it into our chart, but this doesn't stop it from offering very good value. Capable of dual-booting into Windows (although you will need to factor in the cost of the operating system), it produced a solid WorldBench 6 speed score of 117. It doesn't have a dedicated graphics card, and its gaming scores are poor. However, battery life is good, and the keyboard is comfortable to use. The Pro is attractive and superbly built.
>> Battery life			6:29		
15.6in 1920x1080	nVidia GeForce GT 540M 1GB	79	8x DVD ± R/4x ± RW/ 5x -RAM/8x -ROM	Windows 7 Home Premium 64bit	The Medion's killer feature is its display. The only panel here capable of supporting a full-HD resolution, this 15.6in screen offers deep, rich colours and sharp definition. It is a touch glossy, though. The touchpad is very good, while the GeForce GT 540M graphics card will keep gamers happy. The Medion has plenty of grunt, with an Intel Core i5-2410M and 8GB of DDR3 RAM inside. Battery life is rather average, although the 750GB hard drive is capacious. It looks like a budget laptop, but performs well.
>> Battery life			4:38		
15.6in 1366x768	nVidia GeForce GT 540M 1GB	74	8x DVD ± R/4x ± RW/ 5x -RAM/8x -ROM	Windows 7 Home Premium 64bit	The Aspire 5750G packs fast components into a distinctive blue textured chassis. Performance is impressive, and the Acer achieved a strong score of 126 points in WorldBench 6. Gamers will be pleased with the nVidia GeForce GT 540M graphics, which propel the 5750G to a creditable score of 74fps in Fear. Battery life is good, given this performance. The screen is marred by a reflective finish, however, and large gaps between the keys are disconcerting. The Acer has plenty to shout about.
>> Battery life			5:03		
15.6in 1366x768	nVidia GeForce GTX 460M 1.5GB	158	8x DVD ± R/4x ± RW/ 5x -RAM/8x -ROM	Windows 7 Home Premium 64bit	The Medion Erazer X6811 is built for business: gaming business. The nVidia GeForce GTX 460M is a meaty graphics processor. Combined with its 1.5GB of GDDR5 memory, it takes gaming in its stride. It's a hefty slab of a laptop, but the Core i5 CPU is efficient and the Medion lasted for longer than 4 hours in our tests. The keyboard is plasticky in feel, and the trackpad is a little small. The Medion's screen isn't glossy, but the low-grade image suffers from limited viewing angles.
>> Battery life			4:02		

Apple Mac PCs, which are tested under Windows and Boot Camp for comparison only

Prices are intended only as a guide and are correct at press time

Memory: The minimum offering if you're paying more than £600 should be 2GB. Most offer more. The more memory you have, the smoother your laptop will run.

Hard drive: It's difficult to upgrade a laptop's hard drive, so get as much storage space as you can. For best performance and increased reliability, look out for a solid-state drive. Expect less capacity than with a hard drive.

Screen: If you're after a desktop-replacement machine, go for at least 15in. For film playback, 17in widescreen models are even better. For ultraportables, 13in or under is best.

Graphics card: When shopping for a more expensive laptop, the best cards include the two highest entries in the GeForce family, the 330M and 320M. The ATI Mobility Radeon HD 5650 graphics chip is also fast and supports DirectX 11.0. Look for at least 256MB of graphics memory.

Integrated graphics in Intel Core i-series CPUs 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 chip to maintain battery life and the discrete card for maximum performance.

Top 5 Tablet PCs

	Platform	Screen size/res (pixels)	Storage Media card slot	Connectivity[1]	Processor RAM	Claimed battery life (in use)	Other	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY **Apple iPad 2** apple.com/uk tinyurl.com/4xv7q4k Last month 1 • £399 inc VAT • £399 (RRP) • 1-year warranty	Apple iOS	9.7in 1024x768	16GB none	802.11a/b/g/n, BT	1GHz Apple A5 512MB	10 hrs	0.3/0.7Mp cameras	241x186x9mm 597g
			The iPad 2 may not be hugely different to the original – although it is slimmer and faster – but the first iPad was stunning. Brilliant as a web-connected device that fits in the space between smartphone and PC, the iPad 2 works well as an e-book reader or video player. Two cameras are useful for video chat with FaceTime or Skype. The iPad 2 can also come with 3G, and up to 64GB of storage.						
2 PC ADVISOR RECOMMENDED **Samsung Galaxy Tab 10.1** samsung.com/uk tinyurl.com/3Lh239c Last month 2 • £399 inc VAT • £399 (RRP) • 1-year warranty	Android HC 3.1	10.1in 1280x800	16GB none	802.11b/g/n, HSPA, BT	1GHz Tegra T20 1GB	9 hrs	3/2Mp cameras	257x173x9mm 559g
			This is the tablet Apple wants to stop you buying, given its similarities to the iPad. The Tab 10.1 is ultra-slim and the best Android tablet we've seen yet. In essence a landscape device (the iPad excels in portrait mode as well), its display is almost as gorgeous. The battery life is good, although charging (by mains only) is slow. The screen needs a little more pressure to work, and web browsing is slower.						
3 **Sony Tablet S** sony.co.uk tinyurl.com/3tsqkp4 New • £399 inc VAT • £399 (RRP) • 2-year warranty	Android HC 3.1	9.4in 1280x800	16GB SD	802.11b/g/n, BT	1GHz nVidia Tegra 2 1GB	8 hrs	0.3/5Mp cameras	241x174x20-7.6mm 598g
			Hats off to Sony for its original design and for reskinning the Android Honeycomb interface. The plastic Sony Tablet S is just lighter than the iPad 2, with a page curl effect along one edge. This makes it easy to grip the tablet in one hand, and raises the display in landscape mode for convenient viewing and text entry. The lack of HDMI is less impressive, but offset by Sony Entertainment features.						
4 **Acer Iconia Tab A100** acer.co.uk tinyurl.com/3t2bjqL New • £280 inc VAT • £280 (RRP) • 1-year warranty	Android HC 3.0	7in 1024x600	8GB microSD	802.11b/g/n, BT	1GHz nVidia Tegra 2 1GB	5-8 hrs	2/5Mp cameras	241x186x9mm 612g
			The 7in Acer is light but solidly built, and manages to look rather chunky. You get the full complement of connection options, while the screen is dark, bordering on brooding. Vertical viewing angles aren't great. We had no issues with accurately inputting text. The 5Mp camera and GPS module work well. Battery life is good too, and the Acer makes a good case for Android on a 7in-screen tablet.						
5 **Packard Bell Liberty Tab** packardbell.co.uk tinyurl.com/5w55ec6 New • £299 inc VAT • £299 (RRP) • 1-year warranty	Android HC 3.2	10.1in 1280x800	16GB microSD	802.11b/g/n, BT	1GHz nVidia Tegra 2 1GB	10 hrs	2/5Mp cameras	177x260x13mm 760g
			The Liberty Tab may be an imposing slab, but it's very well connected with slots for an SD Card, HDMI and docking. It looks smart, and Packard Bell has done a good job of disguising the Acer Iconia tablet that lies within. The interface is clean and uncluttered, and the admittedly rather reflective screen has good viewing angles. The tablet is muted during gameplay, although GPS is spot-on.						

GLOSSARY • BT: Bluetooth • HC: Honeycomb [1]3G available at additional cost

Top 5 Projectors

	Projection technology Resolution	Brightness (Ansi lumens) Contrast	Supported aspect ratios	Noise levels (dB) Battery	Connections	Lamp Lamp life	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY **InFocus ScreenPlay SP8600** infocus.com tinyurl.com/3hqanpv New • £770 inc VAT • £799 (RRP) • 5-year warranty	DLP 1920x1080	1,800 5,000:1	16:10, 16:9, 4:3	30 (26 eco) no	VGA, HDMI, component, S-Video, composite, USB	230W 4,000 hrs	326x254x104mm 3.4kg
	The ScreenPlay SP8600 may lack some of the pleasing design touches of more expensive InFocus models, but it's still a fantastic projector. Building on the Vivitek H1080FD, it adds several important upgrades, including a DarkChip 3 DMD engine. The zoom range is narrow, but the performance is impressive, with crisp images and clear motion. This is an excellent projector for smooth HD.						
2 PC ADVISOR RECOMMENDED **Vivitek Qumi Q2** vivitek.co.uk tinyurl.com/3txmwpk Last month 2 • £520 inc VAT • £670 (RRP) • 3-year warranty	DLP 1280x800	300 2,500:1	16:10, 16:9, 4:3	32 (28 eco) no	VGA, HDMI, USB	LED 30,000 hrs	162x102x32mm 635g
	A reduced price tag puts the Q2 ahead of the BenQ. Designed for portability, the Qumi packs in better specs than many pico models. Compact and smooth, but offering a generous 1280x800 native resolution and 300 Ansi lumens, the Q2 can project an image in a reasonably well-lit room. It offers 3D facilities when plugged into a DLP-Link source. The Qumi Q2 is remarkable for its size.						
3 **BenQ W1000+** benq.co.uk tinyurl.com/6kfuemf Last month 1 • £830 inc VAT • £840 (RRP) • 1-year warranty	DLP 1920x1080	2,000 3,500:1	16:10, 16:9, 4:3	28 (26 eco) no	VGA, HDMI, component, S-Video, composite, USB	180W 4,000 hrs	325x254x95mm 3.4kg
	Now beaten as a home-cinema model by the InFocus, and behind the Vivitek as an overall deal, this full-HD projector is still a decent and well-connected model. The BenQ also packs some strong specs, including a 3,500:1 contrast ratio and a brightness rating of 2,000 Ansi lumens that ensures you don't need to watch movies in a darkened room. Pictures aren't crystal clear, but the image is pleasing.						
4 **NEC NP43** nec-display-solutions.co.uk tinyurl.com/62w3796 Last month 3 • £610 inc VAT • £622 (RRP) • 2-year warranty	DLP 1024x768	2,300 1,600:1	16:9, 4:3	37 (32 eco) no	VGA, S-Video, USB	200W 1,000 hrs	246x72x177mm 1.7kg
	With its crisp white casing, the NP43 looks attractive. Tipping the scales at just 1.7kg, it's highly portable, and its rating of 2,300 Ansi lumens gives it an impressive brightness to weight ratio. Its best feature is the Auto Focus, which kicks in every time you resize the screen. Add the highly customisable settings and decent image quality, and this is a great choice for businesses on the move.						
5 **ViewSonic PJD7383i** viewsoniceurope.com/uk tinyurl.com/3bw7zzw Last month 5 • £1,129 inc VAT • £1,129 (RRP) • 3-year warranty	DLP 1024x768	3,000 3,000:1	4:3	32 (27 eco) no	VGA, composite, S-Video, USB	210W 4,000 hrs	290x126x254mm 3.5kg
	Perfect for schools and businesses, combining networking with an innovative controller and an ultra-short lens, this is an extremely good projector – if not a cheap one. It's not small, but networking facilities let you manage it from a single location. A slightly darkened room is needed for the best results, and the palette lacks intensity when projecting dark images (particularly with films).						

Prices are intended only as a guide and are correct at press time

>> Buying advice

Tablet PCs

Tablet PCs bridge the gap between what PCs and mobile phones do. They couple the mobility and connectivity of a smartphone with elements of a laptop – in particular, larger screens and more powerful processors.

A tablet is a thin slab, dominated by its screen. Instead of struggling to run Windows, they run a lightweight, touchscreen-focused mobile platform. The most developed and optimised is Apple iOS, with Google Android and OSes from HP and RIM following. Some tablets offer 3G connectivity, and are available on subsidised data contracts.

Tablets are ideal for web browsing, email, reading e-books, playing games and watching video. However, you won't be tempted to write long essays or reports on a tablet's onscreen keyboard.

Top 5 Internet security suites		Signature-based malware detection	Malware blocking		Successful cleanup of active malware	Scan speed (secs)		Interface design	Extra features
			Fully blocked	Partially blocked		On-demand	On-access		
1 PC ADVISOR BEST BUY	**Panda Internet Security 2012** pandasecurity.com/uk tinyurl.com/63sbhfn Last month 1	• 3 PCs, 1 year: £50 inc VAT	99.96%	85.4%	n/a	100%	n/a	n/a	Very good	USB vaccine, virtual keyboard, safe browser, parental controls
		Panda Internet Security 2012's interface is well-designed and easy to use, while the product itself offers very good protection and doesn't clobber your PC's performance. Panda led the way in cloud-based protection; while this is less significant now that Panda's competitors have followed suit, it's a commendable approach to online security. New signatures are automatically pushed to your PC.							
2 PC ADVISOR RECOMMENDED	**Kaspersky Small Office Security 2012** kaspersky.co.uk tinyurl.com/3cn9k8s Last month 2	• 5 PCs and 1 server, 1 year: £159 inc VAT	99.4%	94.6%	n/a	94.4%	n/a	n/a	Good	staff access limits, encrypted backups, file shredder
		If you run a small business with several PCs to protect, Kaspersky Small Office Security 2012 is a sensible purchase. It protects up to five PCs and a server. If you use a network server to share data and applications, it's a simple matter to share your security provision too. Small Office Security offers very good value, with centralised security and similar ease of use to the company's consumer product.								
3	**Symantec Norton Internet Security 2011** norton.com tinyurl.com/5u49p8f Last month 3	• 3 PCs, 1 year: £49 inc VAT	98.7%	96%	4%	80%	126	291	Very good	rootkit/ID/network protection, parental controls, SafeWeb
		Symantec Norton Internet Security 2011 is a streamlined and extremely effective anti-malware application. Symantec continues to update and advance its user interface and malware-detection rates incrementally. With solid protection across the board and some impressive results in our tests with AV-Test.org, Norton Internet Security 2011 easily earned our Best Buy crown. Highly recommended.								
4	**Kaspersky Internet Security 2011** kaspersky.co.uk tinyurl.com/4us5hzq Last month 4	• 3 PCs, 1 year: £49 inc VAT • 1 PC, 1 year: £39 inc VAT	95.7%	92%	0%	80%	109	315	Good	anti-phishing, virtual keyboard, parental controls, SafeSurf
		Known for being a power user's anti-malware tool, Kaspersky has quietly developed its 2011 internet security suite into a somewhat kinder, gentler application. This excellent security suite will at last appeal to the masses. Some useful extras are included, but the installation is a headache. Kaspersky Internet Security 2011 provides solid defence against malware and has a friendly interface.								
5	**Bitdefender Internet Security 2011** bitdefender.co.uk tinyurl.com/69wtdep Last month 5	• 3 PCs, 1 year: £39 inc VAT • 1 PC, 1 year: £29 inc VAT	97.5%	68%	20%	80%	131	305	Very good	online fraud and ID theft protection
		Bitdefender Internet Security 2011's overall protection levels are very good, but short of the topmost tier of security software products in this chart. Bitdefender's multiple-mode interface is complicated, but this fully featured suite blocks malware effectively. This is something of a budget option and, while it has its issues, Bitdefender Internet Security is still a good fit for almost any class of user.								

Top 5 Antivirus software		Signature-based malware detection	Malware blocking		Successful cleanup of active malware	Scan speed (secs)		Interface design	Extra features
			Fully blocked	Partially blocked		On-demand	On-access		
1 PC ADVISOR BEST BUY	**Symantec Norton AntiVirus 2011** norton.com tinyurl.com/4p5ycxp Last month 1	• 3 PCs, 1 year: £39 inc VAT	98.7%	96%	0%	80%	121	272	Very good	Pulse updates, Sonar 3 behavioural protection, Insight
		Symantec Norton AntiVirus 2011 does a very good job of detecting and removing malware, and it has a smooth user interface. We particularly like the way it alerts you to potential problems with a red warning message and large 'Fix now' button. Norton has a moderate impact on system resources compared with rival antivirus products, and earned solid scores in our system-speed tests.								
2 PC ADVISOR RECOMMENDED	**Bitdefender Antivirus Pro 2011** bitdefender.co.uk tinyurl.com/66sk77u Last month 2	• 3 PCs, 1 year: £24 inc VAT • 1 PC, 1 year: £14 inc VAT	97.5%	68%	20%	80%	126	327	Very good	gaming mode
		Bitdefender Antivirus Pro 2011 does a good job at detecting malware, and was the top performer in this chart at removing infections from our test machine, but it has some trouble blocking live malware attacks. Three interface tiers are available: Basic, Intermediate and Expert; the last of these is a convoluted mass of tabs but offers plenty of features for advanced users. Scan speeds are average.								
3	**G Data AntiVirus 2011** gdatasoftware.com tinyurl.com/6bfxwcs Last month 3	• 3 PCs, 1 year: £34 inc VAT • 1 PC, 1 year: £24 inc VAT	99.4%	84%	4%	80%	111	336	Very good	cloud security
		G Data AntiVirus 2011 has muscle where it counts most, offering strong malware detection, blocking and removal capabilities, which it couples with a good user interface. However, it isn't as good as the other products in this chart at showing security status at a glance, and some of the text is poorly translated from German. Pleasingly, G Data AntiVirus 2011 flagged no false positives in our tests.								
4	**Kaspersky Anti-Virus 2011** kaspersky.co.uk tinyurl.com/6hqa2wb Last month 4	• 3 PCs, 1 year: £39 inc VAT • 1 PC, 1 year: £29 inc VAT	95.7%	88%	4%	80%	103	310	Very good	Rescue CD, desktop gadget
		Once known as the power user's security tool, Kaspersky's Anti-Virus 2011 software offers a well-designed interface and is easy to use. We particularly like Kaspersky's 'hot spot', which lets you drag individual files to it for on-demand scanning. Kaspersky Anti-Virus 2011 is very good at blocking malware – particularly brand-new threats – but noticeably slowed down other activities on our test computer.								
5	**Trend Micro Titanium Antivirus Plus 2011** uk.trendmicro.com tinyurl.com/4huorv3 Last month 5	• 3 PCs, 1 year: £39 inc VAT • 1 PC, 1 year: £29 inc VAT	98.4%	88%	8%	80%	187	249	Very good	cloud security
		Trend Micro Titanium Antivirus Plus 2011 is a set-it-and-forget-it security product that does a good job of blocking malware. The program is cloud-based, and dependent on an active internet connection. The upside is there's no need to worry about manual updates. Infections are consistently staved off and active malware is almost always removed. Advanced users may crave more control.								

Prices are intended only as a guide and are correct at press time

>> Buying advice

Security software

We work with world-renowned independent security testing lab AV-Test.org to evaluate the effectiveness of internet security and antivirus software. While many products offer similar results in terms of malware detection and disinfection, other factors such as their ease of setup, scan speeds, interface design and ability to deal with brand-new threats set them apart.

The best products will offer features that go beyond the traditional antivirus, antispyware, antispam and firewall concoction of internet security suites – you might see parental controls, 'cloud' protection, anti-phishing, anti-rootkit, virtual web browsers and keyboards, link and file scanners, gaming modes, online backup and more included.

With many households now owning more than one computer, the best value is usually offered by a one-year, three-user licence. However, you can save some cash with a single-user licence if you have only one computer.

Top 5 Sub-£150 printers

	Technology / Max printer resolution	Actual print speed (ppm)	Optical scanner resolution / Fax capabilities	Supported interfaces	Cost per page	Memory-card slot/ Auto-duplex / Input capacity	Dimensions (wxdxh) / Weight
1 PC ADVISOR BEST BUY **Oki C110** oki.co.uk tinyurl.com/yLno5rv Last month 1 • £135 inc VAT • £152 (RRP) • 3-year standard warranty	Colour laser 1200x600dpi	B=15.8 C=2.5	no scanner no fax	USB	B=3.6p C=5p	no/no 100	396x380x275mm 14.4kg

A laser printer for £135 is a good deal; one that also offers colour is almost impossible to find. But the Oki C110 manages it. This version has no ethernet or auto duplexing options, but it's a very usable colour laser printer that produces cleanly defined text at 15.8ppm. Colour is realistic, but rather faint. The Oki C110 is slow in laser terms, but fast compared to inkjets working in high-quality modes.

2 PC ADVISOR RECOMMENDED **Brother HL-2130** brother.co.uk tinyurl.com/4yrrdjm Last month 2 • £68 inc VAT • £90 (RRP) • 1-year standard warranty	Mono laser 2400x600dpi	B=20 C=n/a	no scanner no fax	USB	B=3p C=n/a	no/no 250 sheets	368x360x183mm 6.7kg

Looking like a compact version of Brother's standard-sized printers, the HL-2130 lacks the Samsung's chic design. But it's robust, and very straightforward to service. The 250-sheet input tray is substantial, and noise levels are pleasingly low. There are no advanced features, but it prints text very well, producing 600dpi output that's clean and crisp – and at 15.8ppm. Graphics are less successful.

3 **Canon Pixma MG6250** canon.co.uk tinyurl.com/3koof7a Last month 3 • £138 inc VAT • £150 (RRP) • 1-year standard warranty	Colour inkjet 9600x2440dpi	B=12.4 C=5.2	4800x4800dpi no fax	USB, cloud, 802.11b/g/n	B=2.9p C=6.7p	yes/yes 2 x 150 sheets	470x367x173mm 9.2kg

The MG6250 isn't a cheap inkjet, but it comes with almost every feature you might want – from dual paper trays and direct-disc printing to Wi-Fi and cloud computing via Canon's Image Gateway. Add to that the great print results, particularly on photographic paper, and this is a very good model. Scanning is good, too. We'd prefer a fully touch-sensitive interface, rather than the slightly clunky hybrid Canon offers.

4 **Epson Stylus SX525WD** epson.co.uk tinyurl.com/3scrzpc Last month 4 • £74 inc VAT • £149 (RRP) • 1-year standard warranty	Colour inkjet 5760x1440dpi	B=15 C=4	2400x2400dpi no fax	USB, 802.11b/g/n	B=2.4p C=8.2p	yes/yes 150 sheets	455x359x164mm 6.2kg

It's not as strong on photographic results (although the text is very good) as the MG6250. Nor is the Epson as fully featured. However, it costs around half the price, and improves on the cheaper SX425W with auto-duplex, enhanced speed and quieter operation. It's not the prettiest printer, but you can scan and copy documents, and the Epson can be shared over a network. The running costs are competitive.

5 **Samsung ML-1865W** samsung.com/uk tinyurl.com/4o574r5 Last month 5 • £100 inc VAT • £100 (RRP) • 1-year standard warranty	Mono laser 1200x1200dpi	B=15.4 C=n/a	no scanner no fax	USB, 802.11b/g/n	B=3p C=n/a	no/no 150 sheets	341x224x184mm 4.2kg

Now pushed into fifth, the Samsung is one of the most compact printers we've seen, but its design is practical, with flexible paper trays that can be tidily tucked away. Wireless connectivity is another bonus, and the AnyWeb Print software is a smart inclusion. The Samsung is reasonably swift, but the Brother offers cleaner text at 600dpi. Running costs are typical. Its Wi-Fi capabilities may still give it the edge.

Top 5 £151+ printers

	Technology / Max printer resolution	Actual print speed (ppm)	Optical scanner resolution / Fax capabilities	Supported interfaces	Cost per page	Memory-card slot/ Auto-duplex / Input capacity	Dimensions (wxdxh) / Weight
1 PC ADVISOR BEST BUY **Kyocera Mita FS-1320D** kyoceramita.co.uk tinyurl.com/6gg9ukv Last month 1 • £160 inc VAT • £200 (RRP) • 2-year warranty	Mono laser 1200x1200dpi	B=26.1 C=n/a	no scanner no fax	USB	B=1.4p C=n/a	yes/yes 250	375x393x250mm 12kg

The Kyocera Mita isn't the most heavily featured of laser printers here but, for a mix of capable print quality and strong pricing, the FS-1320D is the perfect choice for text-hungry businesses. Paper handling is decent, although you'll need its sibling, the FS-1370DN model, if you want ethernet connectivity. Text quality is strong and performance very high. Running costs are lower than average.

2 PC ADVISOR RECOMMENDED **Samsung ML-3710ND** samsung.com/uk tinyurl.com/75rb5nz **New** • £203 inc VAT • £203 (RRP) • 1-year standard warranty	Mono laser 1200x1200dpi	B=28.6 C=n/a	no scanner no fax	USB, ET	B=1.4p C=n/a	no/yes 250 + 50	366x368x253mm 10kg

The ML-3710ND is an excellent mono laser. It's ugly, with its two-tone ridged casing, but it has ethernet connectivity for easy network integration, and the paper input can be boosted to as many as 820 sheets. Text quality is good, and duplexing is usable. Add a feature that monitors your impact on the environment (among other things) and low running costs, and the ML-3710ND is a fantastic printer.

3 **Brother MFC-J6910DW** brother.co.uk tinyurl.com/4g8has5 Last month 3 • £335 inc VAT • £450 (RRP) • 1-year warranty	A3 colour inkjet 19200x19200dpi	B=13.3 C=3.6	1200x2400dpi 33.6kbps	USB, ET, 802.11b/g/n	B=1.5p C=5p	yes/no 2 x 250	540x489x331mm 18.5kg

No ordinary printer, the Brother MFC-J6910DW can print on A3 as well as A4 pages. It works better in this format, and the Brother's A4 print quality isn't a patch on A3. Dual 250-sheet paper trays are convenient. The printer's 3.3in TFT screen and USB and memory card slots aid non-PC access. Connectivity options are superb, with the Brother supporting both wired and wireless networking.

4 **Epson Stylus Office BX925FWD** epson.co.uk tinyurl.com/6bw3gu4 Last month 4 • £230 inc VAT • £260 (RRP) • 1-year warranty	Colour inkjet 5760x1440dpi	B=17.6 C=14.2	2400x2400dpi 33.6kbps	USB, ET, 802.11b/g/n	B=2.4p C=5.4p	yes/yes 2 x 250	446x368x300mm 9.8kg

The BX925FWD supports both wired and wireless networking, and has two paper trays. The touch-sensitive control panel is intuitive. The Epson works better as a colour graphics printer than it does as a text churner - it's just too slow when operating as the latter, while duplex is so slow as to be almost a waste of time. But colour images are eye-catching, and spectacular photos are possible.

5 **Kyocera FS-C2126MFP** kyoceramita.co.uk tinyurl.com/3sbLhjw Last month 5 • £952 inc VAT • £1,000 (RRP) • 1-year warranty	Colour laser 600x600dpi	B=25.2 C=23.4	600dpi 33.6kbps	USB, ET	B=1.3p C=5p	yes/yes 250 + 50	514x550x580mm 36kg

A heavyweight in cost and bulk, the Kyocera is suitable for business use. It has strong security options, with SSL data encryption and IPSec allowing for private and secure network communications, plus Private Print. Its paper handling can be upgraded to 1,300 sheets, and the 1,024MB of memory doubled. Capable scanning, copying and fax facilities are included. Speed is very impressive.

GLOSSARY • B: black • C: colour • dpi: dots per inch • ET: ethernet • ppm: pages per minute

Prices are intended only as a guide and are correct at press time

>> Buying advice

Printers

These days, many printers are multifunctional, offering printing, faxing, copying and scanning functions. The trade-off can be slower performance and a more limited resolution.

For some people it will make more sense to buy an efficient, single-function printer for producing documents, then use a copy shop or a separate photo printer for your best shots.

If you want to produce photos at up to A4 size and need a printer that can produce a combination of photos and documents, a colour inkjet or multifunction printer will be the best choice.

Long-term costs: On top of the initial outlay, consider the cost of consumables (inks, paper and printheads), time and maintenance. Vendors will often sell cheaply and make their money back later.

Speed concerns: Be wary of claimed print speeds, too: some printer manufacturers craftily quote print speeds based on Draft mode output.

PC ADVISOR TEST CENTRE

Top 5 Blu-ray Disc drives

		Blu-ray speeds	DVD speeds	Max storage	Interface type	Label technology	Burning software & extras should include[1]
1 PC ADVISOR BEST BUY — **Lite-On iHBS112** — liteonit.eu — tinyurl.com/65pxhuj — Last month 1	• £70 inc VAT • £100 (RRP) • 2-year warranty	-R/8x -R DL/ 2x -RE/8x -ROM	16x ±R/8x ±R DL/6x -RW/ 8x +RW/12x -RAM/16x -ROM	50GB	SATA (internal)	none	CyberLink Blu-ray Suite
		The best mixture of price and performance, this Lite-On is a clear top buy. This Lite-On iHBS112 Blu-ray drive can also be found in a more expensive retail version (the iHBS212) with additional LightScribe facilities. Both drives are fast, with 12-speed BD-R facilities, although they're only marginally faster than the technically inferior LG. Nonetheless, the Lite-On proved the top performer.					
2 PC ADVISOR RECOMMENDED — **LG BH10LS30** — uk.lge.com — tinyurl.com/2bg4a37 — Last month 2	• £65 inc VAT • £130 (RRP) • 1-year warranty	10x -R/8x -R DL/ 2x -RE/10x -ROM	16x ±R/8x ±R DL/6x -RW/ 8x +RW/12x -RAM/16x -ROM	50GB	SATA (internal)	LightScribe	PowerDVD 8.0, PowerProducer 4.0
		The Lite-On iHBS112 is newer, faster and only marginally more expensive but, should it become unavailable, this LG Blu-ray drive is a very close contender. Indeed, the difference between the two isn't as great as you might expect, and the LG was only slightly slower in our tests. The bundled PowerDVD 8.0 software suite is useful, and playback is smooth. You can even label discs using LightScribe.					
3 **Plextor PX-LB950UE** — plextor.be — tinyurl.com/43zvjlh — Last month 3	• £140 inc VAT • £161 (RRP) • 3-year warranty	12x BD-R/8x -R DL/ 2x -RE/8x -ROM	16x ±R/8x ±R DL/6x -RW/ 8x +RW/12x -RAM/16x -ROM	50GB	USB 3.0, eSATA	LightScribe	PowerDVD 9.0, PowerProducer 5.0
		An external Blu-ray writer, the Plextor can be connected to a USB 3.0 or an eSATA port. USB 3.0 was faster in our test, but your choice of connection will rest on what you have built into your PC. The Plextor is a handsome drive, but requires an external power supply. Convenient and reasonably fast, it's a good alternative to the Best Buy for those who want portable 12x BD-R facilities.					
4 **Lite-On iHOS104** — liteonit.eu — tinyurl.com/yccmty5 — Last month 4	• £40 inc VAT • £45 (RRP) • 1-year warranty	4x -ROM	8x -ROM	n/a	SATA (internal)	none	PowerDVD 8.0 BD
		The key to the Lite-On iHOS104's low price is that it's a read-only internal Blu-ray drive. More expensive optical drives include the ability to write to DVD and CD, but Lite-On reasons that there's no sense in doubling up on features you probably already have. The playback quality is very good, video is vivid, and TrueTheater does an excellent job of upscaling standard-definition video.					
5 **Buffalo MediaStation BR3D-12U3** — buffalotech.com — tinyurl.com/453bx7L — New	• £199 inc VAT • £199 (RRP) • 2-year warranty	12x -R/12x -R DL/ 2x -RE/8x -ROM	16x ±R/8x ±R DL/6x -RW/ 8x +RW/5x -RAM/8x -ROM	50GB	USB 3.0	none	PowerDVD 9.0, PowerProducer 5.0
		An external drive that can offer 12-speed BD-R writing over USB 3.0 (when the included TurboUSB utility is used), the Buffalo is an effective, if rather expensive, means of adding fast Blu-ray writing to multiple PCs or laptops. The speed is good, given the limitations of current media, and noise levels are low. The MediaStation's software bundle is comprehensive, even if it does take time to load up.					

GLOSSARY • BD-XL: triple- or quad-layer Blu-ray media [1]Always check before buying

Top 5 Wireless routers

		Wi-Fi standards supported	Frequency modes	WEP/WPA/WPA2	USB port Network port	Firewall	Eco mode Average power use	Wireless-n throughput (near/far)	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY — **Cisco Linksys E4200** — linksysbycisco.com — tinyurl.com/6z7bdkm — Last month 1	• £125 inc VAT • £170 (RRP) • 1-year warranty	a, b, g, n	2.4GHz/5GHz (dual mode)	yes/yes/ yes	yes 4	NAT/SPI	no not tested	226Mbps 92Mbps	225x160x25mm 355g
		A wireless router that requires a separate ADSL or cable modem, the E4200 offers four gigabit ethernet ports and stand-out wireless capabilities. Dual-band wireless, a special guest login web page (that gives visitors access to the internet but not your local network) and UPnP media serving are welcome features. Performance is also very good, and the E4200 is the fastest router we've seen.							
2 PC ADVISOR RECOMMENDED — **AVM FritzBox Fon 7390** — fritzbox.eu — tinyurl.com/3qujzbx — Last month 2	• £210 inc VAT • £210 (RRP) • 5-year warranty	a, b, g, n	2.4GHz/5GHz (dual mode)	yes/yes/ yes	yes 4	NAT/SPI	yes not tested	92Mbps 38Mbps	226x160x48mm not specified
		Far more than just a wireless router, the FritzBox supports landline and internet telephony, and will even help you manage your calls. It supports both 2.4GHz and 5GHz frequencies, while 512MB of internal memory and a USB port allow shared storage of larger files. The transfer speeds are good, too. Some features are overkill for a home user, but this is a very comprehensive router for the money.							
3 **Zyxel NBG4615** — zyxel.co.uk — tinyurl.com/6hacknn — New	• £60 inc VAT • £65 (RRP) • 1-year warranty	b, g, n	2.4GHz	yes/yes/ yes	yes 4	NAT/SPI	yes not tested	94Mbps 32Mbps	162x106x28mm 237g
		It might not look it, but this well-priced Zyxel is a powerhouse of a router. Its graphical menus make it easy to set up, and a dedicated WPS button is great for quickly hooking up other wireless devices. The design is compact if boring, although the nine LEDs are informative. The USB ports are versatile and the performance is extremely nippy. It lacks the ability to create 5GHz networks.							
4 **DrayTek Vigor 2830Vn** — draytek.co.uk — tinyurl.com/3vawhsz — Last month 3	• £205 inc VAT • £205 (RRP) • 2-year warranty	a, b, g, n	2.4GHz/5GHz (dual mode)	yes/yes/ yes	yes 4	NAT/SPI/ per-user rules	yes not tested	88Mbps 30Mbps	210x155x25mm 500g
		The DrayTek has had a price hike since our original review, but it still offers good value. Network support stretches to ADSL2+, cable or both, letting you balance the load across two web connections. A 3G failover option will keep you online should both those go down. The firewall is sophisticated and highly customisable, and the web filtering is highly effective. Transfer speed is also very good.							
5 **Netgear N600 DGND3700** — netgear.co.uk — tinyurl.com/3bzz7yh — Last month 4	• £125 inc VAT • £135 (RRP) • 3-year warranty	a, b, g, n	2.4GHz	yes/yes/ yes	yes 4	NAT/SPI	yes not tested	75Mbps 30Mbps	220x153x31mm 500g
		The Netgear offers dual-band operation across both cable and ADSL2+ networks. It's plain-looking, but its many ports and connectors include gigabit ethernet and USB. A DLNA server lets you stream music and video from an attached USB hard drive to a compatible device. The web interface looks cheap, but includes lots of configuration options. More importantly, it offers strong performance.							

GLOSSARY • Mbps: megabits per second • SSID: service set identifier

Prices are intended only as a guide and are correct at press time

>> Buying advice

Blu-ray Disc drives

DVD formats: To handle the bewildering array of DVD recording and playback formats, we recommend buying a drive that supports as many as possible. Look for labels such as LG and NEC's SuperMulti or Lite-On's Super All Write.

Blu-ray Disc: Six-/eight-speed BD-R (Blu-ray Disc writable) capabilities are standard, but bear in mind that even six-speed BD-R media is still rare.

Speed: Don't obsess about the highest speeds. You should be able to get 16-speed DVD writing, but it's not worth paying over the odds to save seconds.

Internal or external? External drives are easier to install and can be shared between PCs, but will cost you considerably more than internal models. Most internal drives now use a SATA interface, so check you've got a compatible port. Older PCs may not be compatible.

Top 5 External hard drives

		Capacity tested / Capacity range	Transfer speed: fastest/other	Spin speed	Interfaces	Software Encryption	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY	**Seagate FreeAgent GoFlex Ultra-Portable** seagate.com tinyurl.com/5vefv3t Last month 1	• £168 inc VAT • £200 (RRP) • 2-year warranty	1.5TB / 320GB to 1.5TB	94MBps (USB 3.0) / 65MBps (FW800)	5,400rpm	USB 2.0 (USB 3.0, eSATA, FW800 optional)	Seagate Dashboard / 192bit	88x119x22mm / 303g

The £143 Seagate FreeAgent Go-Flex Ultra-Portable is supplied as a USB 2.0 drive, but Amazon sells it with USB 3.0 for an extra £25. FireWire can also be added, making the versatile GoFlex drive a great choice for the future. Another adaptor streams content to your TV or share GoFlex drives over your local network. Overall speed is great, and the capacity is generous. This offers real value.

		Capacity tested / Capacity range	Transfer speed: fastest/other	Spin speed	Interfaces	Software Encryption	Dimensions (wxdxh) Weight
2 PC ADVISOR RECOMMENDED	**Western Digital My Passport Studio** wdc.com/en tinyurl.com/6fawbne New	• £110 inc VAT • £110 (RRP) • 3-year warranty	1TB / 500GB to 1TB	76MBps (FW800) / 38MBps (USB 2.0)	5,400rpm	FW800, USB 2.0	WD utilities / 256bit	126x84x22mm / 334g

This sturdy hard drive packs more than just a useful FireWire 800 port or two. Western Digital also offers sublime design and build credentials, which are worth their weight in solid aluminium when it's your precious data on the line. The bundled software has been improved, letting you set up AES encryption. FireWire 800 performance is excellent; the My Passport Studio also works over USB 2.0.

		Capacity tested / Capacity range	Transfer speed: fastest/other	Spin speed	Interfaces	Software Encryption	Dimensions (wxdxh) Weight
3	**Western Digital My Book Studio** wdc.com/en tinyurl.com/3dx8mn8 Last month 2	• £170 inc VAT • £170 (RRP) • 3-year warranty	3TB / 1TB to 3TB	73MBps (FW800) / 38MBps (USB 2.0)	n/a	FW800, USB 2.0	WD SmartWare / none	165x135x48mm / 1.1kg

Now available from Anvika, the Studio has up to 3TB in one smart metal chassis. Inside is one of WD's low-power Caviar Green disks. This spins more slowly, draws less power and produces less noise and vibration than the full-power drives. Indeed, it's near silent. Performance is very good, with FW800 recording peak reads of 73MBps and writes of 67MBps. If only it supported Thunderbolt.

		Capacity tested / Capacity range	Transfer speed: fastest/other	Spin speed	Interfaces	Software Encryption	Dimensions (wxdxh) Weight
4	**G-Drive Slim 500GB** hitachi.co.uk tinyurl.com/3m33cn5 New	• £70 inc VAT • £100 (RRP) • 3-year warranty	500GB / 500GB	29MBps (USB 2.0) / n/a	5,400rpm	USB 2.0	G-Drive utilities / none	129x82x10mm / 150g

Available from Anvika, this basic external hard drive from Hitachi offers only a USB 2.0 interface. And its 5,400rpm spin speed is slow. However, the G-Drive Slim performs roughly on par with other external USB 2.0 drives. There is a small issue with noise, and we could hear the disk head clicking during operation. The finish is also a little imperfect. However, this drive is slim, and its price tag is good.

		Capacity tested / Capacity range	Transfer speed: fastest/other	Spin speed	Interfaces	Software Encryption	Dimensions (wxdxh) Weight
5	**Hitachi LifeStudio Desk Plus** hitachigst.com tinyurl.com/289p4vc Last month 5	• £87 inc VAT • £150 (RRP) • 3-year warranty	1TB / 1TB to 2TB	29MBps (USB 2.0)	7,200rpm	USB 2.0	LifeStudio / none	123x83x181mm / 1kg

Hitachi's LifeStudio Desk Plus is a 1TB external hard drive that offers pretty standard real-world transfer rates, but its strong software suite makes it easy to sort photos and video on an attractive 3D wall. It's easy to use, if not the most customisable of drives. The Desk Plus has loud fans and becomes quite hot during operation. The £80 drive offers very good value for mass-storage needs, though.

GLOSSARY • FW: FireWire • MBps: megabytes per second • TB: terabyte

Top 5 NAS drives

		Capacity tested / Capacity range	Internal drives Spin speed	UPnP DLNA Remote access	USB port Raid options	Operating systems	Software	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY	**Synology DiskStation DS211** synology.com tinyurl.com/65s4v4u Last month 1	• £220 inc VAT • £225 (RRP) • 2-year warranty	n/a / up to 6TB	2 / n/a	yes/yes/yes	yes / 0/1	Win 2000/OS X 10.3 or later	DSM 3.0	88x218x161mm / 1kg

Synology has built this enclosure (to which you can add up to two hard drives) around its own OS, which allows almost unprecedented flexibility. Its 29 different control areas cover everything from DLNA, UPnP and iTunes server to firewalls and wireless connection. The security is excellent, and performance is very good. Noise levels are low, and this would make a great audio or video server.

		Capacity tested / Capacity range	Internal drives Spin speed	UPnP DLNA Remote access	USB port Raid options	Operating systems	Software	Dimensions (wxdxh) Weight
2 PC ADVISOR RECOMMENDED	**Qnap TS-419P+** qnap.com tinyurl.com/3zk5Ljg Last month 2	• £425 inc VAT • £450 (RRP) • 2-year warranty	n/a / up to 12TB	4 / n/a	yes/yes/yes	yes / 0/1/5/6/10	Win XP or later/ OS X/Linux	TurboNAS 3.4	180x235x177mm / 3kg

A NAS enclosure (you buy drives separately for it), the four-bay Qnap can support drives holding up to 12TB of data. Its 1.6GHz ARM processor consumes less power than Intel-powered devices, and just one cooling fan is needed. The software is sophisticated yet approachable, and the choice of Raid options is capable. Performance is better than that of many home and small-business models.

		Capacity tested / Capacity range	Internal drives Spin speed	UPnP DLNA Remote access	USB port Raid options	Operating systems	Software	Dimensions (wxdxh) Weight
3	**Zyxel NSA310** zyxel.co.uk tinyurl.com/3voqrxx Last month 3	• £135 inc VAT • £135 (RRP) • 3-year warranty	2TB / 2TB	1 / n/a	yes/yes/yes	yes / n/a	Win XP or later/ OS X	zPilot	58x196x130mm / 662g

Zyxel's NSA310 is a modestly priced but high-storage device that offers an excellent way to share storage over a home network. Little bigger than a 3.5in hard drive, it offers gigabit ethernet, eSATA and two USB 2.0 ports. The versatile software and simple web interface generally work well, although the transfer speeds aren't the best we've seen. It offers good value for money, though.

		Capacity tested / Capacity range	Internal drives Spin speed	UPnP DLNA Remote access	USB port Raid options	Operating systems	Software	Dimensions (wxdxh) Weight
4	**Western Digital My Book World Edition II** wdc.com/en tinyurl.com/yh8xytc Last month 4	• £295 inc VAT • £430 (RRP) • 3-year warranty	4TB / 2TB to 4TB	2 / 5,400rpm	yes/yes/yes	yes / 0/1	Win XP/OS X 10.4 or later	WD Anywhere	173x147x58mm / 1.1kg

Still available in steady numbers, this 4TB drive from Western Digital is a decent option. Based on the original Western Digital My Book, the My Book World Edition II has a pair of drives that can be used in Raid 0 or 1 arrays. Time Machine adds value for Mac users, and the web interface offers a choice of modes to satisfy all users. Ideal for cross-platform storage and media streaming.

		Capacity tested / Capacity range	Internal drives Spin speed	UPnP DLNA Remote access	USB port Raid options	Operating systems	Software	Dimensions (wxdxh) Weight
5	**Iomega iConnect Wireless Data Station** iomega.co.uk tinyurl.com/2ud3zth Last month 5	• £55 inc VAT • £70 (RRP) • 3-year warranty	256MB / expandable	4 / n/a	yes/yes/yes	yes / n/a	Win XP/OS X 10.4 or later	Iomega software	27x131x161mm / 270g

Not your conventional NAS drive, this inexpensive device allows you to access and share information stored on USB devices across your home network or the internet. Usable with up to four drives, you can even attach printers and cameras to the iConnect Wireless Data Station, although there's no Raid-style redundancy. Configuration was mostly straightforward and streaming was extremely fast.

GLOSSARY • DLNA: Digital Living Network Alliance • ET: ethernet • NAS: network-attached storage • UPnP: Universal Plug and Play   *Prices are intended only as a guide and are correct at press time*

>> 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. Drive enclosures are also available that let you add your own choice of hard drives.

Most NAS drives allow virtual partitions, letting you keep data such as PC backups separate from media files. Home-oriented NAS drives also include media servers to allow easy streaming of content.

To augment data integrity, access speed, capacity, or all three, individual hard disks can be combined in a number of Raid configurations. Raid 0 'stripes' data across multiple drives to increase access speeds. Raid 1 mirrors the contents of one drive on to another, providing a cloned backup. Raid 5 is available with three or more drives and combines both advantages.

PC ADVISOR TEST CENTRE

Top 5 Smartphones

		Platform	Storage Media supported	Screen size/res (pixels)	Input method	Connectivity	Apps	Battery life talk time/ standby	Camera GPS	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY	**Apple iPhone 4S** apple.com/uk tinyurl.com/33hoyex **New**	• £499 inc VAT	Apple iOS 5	16GB none	3.5in 960x640	capacitive multitouch	HSDPA, 3G, BT, 802.11b/g/n	Safari, FaceTime, iTunes, Siri, App Store, Maps	8 hrs 200 hrs	8Mp yes	59x10x115mm 140g
		Successor to the iPhone 4, the 4S conceals most of its improvements on the inside. The retina display is still the best smartphone screen we've seen, while the graphics have now been bolstered. The 3G modem is twice as fast, and the new 8Mp camera works well. Siri voice recognition feels natural to use. The 4S may resemble last year's vintage, but Apple pours a lot of new wine into an old bottle.								
2 PC ADVISOR RECOMMENDED	**Samsung Galaxy S II** samsung.com/uk tinyurl.com/3hf6god Last month 2	• £475 inc VAT	Android GB 2.3	16GB microSD	4.3in 480x800	capacitive touchscreen	HSDPA, 3G, BT, 802.11b/g/n	TouchWiz	not specified	8Mp yes	66x125x8mm 116g
		A slim, lightweight, nippy handset with a SuperAmoLED screen, the Galaxy S II is one of the first handsets to run the Gingerbread 2.3 version of Android. It takes a more angular design than its predecessor to accommodate a marginally larger 4.3in touchscreen, and feels more rigid. The CPU has been upgraded to 1.2GHz, and the camera to 8Mp. Usability and navigation are joyous experiences.								
3	**HTC Sensation** htc.com/europe tinyurl.com/5w5kc7d Last month 3	• £499 inc VAT	Android GB 2.3	1GB microSD	4.3in 540x960	capacitive touchscreen	HSDPA, 3G, BT, 802.11b/g/n	FriendStream, Torchlight, Mirror, Watch	500 mins 285 hrs	8Mp yes	68x126x5mm 148g
		HTC calls the Sensation a 'multimedia superphone' and given its razor-sharp screen, decent video playback and great audio, we can see why. If you can handle its sheer size, this is an excellent phone and a superior entertainment player. There's a 1.2GHz dual-core CPU, a 4.3in screen and an 8Mp camera. A touch-sensitive ring guides navigation. The Mirror app will be a useful inclusion for some.								
4	**Sony Ericsson Xperia Arc** sonyericsson.com tinyurl.com/3uryj4h Last month 4	• £349 inc VAT	Android GB 2.3	1GB microSD	4.2in 854x480	capacitive touchscreen	HSDPA, 3G, BT, 802.11b/g/n	Timescape	6 hrs 400 hrs	8.1Mp yes	63x125x9mm 117g
		Running the Gingerbread version of Android, the Arc uses Sony's Bravia engine to deliver balanced colours and sharp images on its huge 4.2in (854x480) display. This screen is ideal for web browsing, but it guzzles juice. The Arc is super-slim at 8.7mm, and shockingly light at 117g. An 8.1Mp camera with an autofocus and LED flash takes good-looking, vibrant pictures. Audio quality is exceptional.								
5	**RIM BlackBerry Bold 9780** uk.blackberry.com tinyurl.com/3kj33gs Last month 5	• £331 inc VAT	BlackBerry OS 6	512MB microSD	2.4in 480x360	SureType keyboard	HSDPA, 3G, BT, 802.11b/g	BlackBerry AppWorld, Browser, Maps	6 hrs 408 hrs	5Mp yes	109x60x14mm 122g
		The Bold 9780 looks identical to its Bold 9700 predecessor, but features more memory and the new BlackBerry 6 mobile platform. A refreshed home screen, various software enhancements and a better web browser are improvements. It feels well built and has one of the best screens we've seen on a BlackBerry handset. As you'd expect from a BlackBerry, the Bold 9780's email support is strong.								

GLOSSARY • BT: Bluetooth • GB: Gingerbread • GM: Google Maps • MS: Mediascape • NFC: near-field communications • TS: Timescape

Top 5 Digital camcorders

		Max resolution (pixels) Aspect ratio	Display CCD sensor	Zoom	Formats	Internal storage Compatible media	Connections	Dimensions (wxdxh) Weight
1 PC ADVISOR BEST BUY	**Kodak PlaySport Zx5** kodak.co.uk tinyurl.com/3u3y2ca Last month 1	• £120 inc VAT • £149 (RRP) • 1-year warranty	1920x1080 16:9	2in 1/3.2in	4x digital	Mpeg4, Jpeg	128MB SD/SDHC	Micro-HDMI, MicroUSB	58x112x18mm 125g
		The Zx3 was our favourite compact camcorder of 2010, so this ruggedised Zx5 has a lot to live up to. The buttons on the rear are now better spaced, and Kodak's added a dedicated Share button, a speaker and a removable battery. Build quality is faultless, with the 125g PlaySport able to fit comfortably into one hand. Our outdoor test shots revealed lush green grass and punchy red and blues.								
2 PC ADVISOR RECOMMENDED	**JVC Everio GZ-HM650** jvc.co.uk tinyurl.com/453u838 Last month 2	• £282 inc VAT • £420 (RRP) • 1-year warranty	1920x1080 4:3, 16:9	2.7in 1/4.1in	200x digital 40x optical	Mpeg4, Jpeg	8GB SD/SDHC/SDXC	HDMI, USB 2.0	51x55x111mm 195g
		This lightweight JVC Everio has a generous 8GB internal memory (room for up to 6.5 hours of video or 9,999 photos), which is expandable via SD/SDHC/SDXC cards up to 32GB in capacity. It fits comfortably in the hand and is easy to operate, despite some rather small touchscreen buttons. A small amount of noise is picked up by the mic during operation. It offers good value at £282.								
3	**Sony Bloggie Touch MHS-TS20** sony.co.uk tinyurl.com/332uoqj Last month 3	• £150 inc VAT • £220 (RRP) • 1-year warranty	1920x1080 16:9	3in 1/2.5in	4x digital	Mpeg4, Jpeg	8GB SD/MS	HDMI, USB 2.0	47x9x106mm 125g
		A £25 price cut sees the Sony Bloggie Touch move up to third. This is an excellent model where the primary focus is video blogging. Its unconventional shape is potentially hampering, and the fixed cameraphone-style lens isn't the best for setting up stationary shots. The intuitive interface makes the Sony Bloggie easy to use, though, and recording quality is generally good, even if there's no flash.								
4	**Canon Legria HF R106** canon.co.uk tinyurl.com/2vfvLqx Last month 4	• £275 inc VAT • £425 (RRP) • 1-year warranty	1920x1080 16:9	2.7in 1/5.5in	80x digital 20x optical	AVCHD, Jpeg	none SD/SDHC	HDMI, USB 2.0	60x64x124mm 319g
		Canon's build quality is as impressive as ever in this budget camcorder with a 2.7in flip-out LCD screen. A camcorder first and foremost, the Legria HF R106 has a large lens and a 20x optical zoom, enabling it to capture great-looking full-HD (1920x1080-pixel) video. Colour balance in natural light was superb in our tests, and we were also impressed with the Canon Legria's close-up shots.								
5	**FlipVideo Flip UltraHD** theflip.com/en-gb tinyurl.com/nesp78 Last month 5	• £98 inc VAT • £160 (RRP) • 1-year warranty	1280x720 16:9	2in 1/4.5in	2x digital	H.264, Mpeg4, Jpeg	8GB n/a	USB 2.0	109x56x30mm 168g
		For sheer ease of use, the FlipVideo Flip UltraHD sprints ahead of the competition. The simple button layout enables anyone to pick it up and get shooting. The Flip UltraHD improves on its predecessor by adding HD (1280x720-pixel) capture, and the 8GB of storage (sufficient for 2.5 hrs filming) means no worrying about memory cards. The Flip's 2in screen is excellent and video quality is good.								

GLOSSARY • CCD: charge-coupled device

Prices are intended only as a guide and are correct at press time

>> Buying advice

Digital camcorders

Camcorder manufacturers have moved from devices based on tapes and hard disks to gadgets with flash memory. A 'proper' pistol-grip camcorder with a flip-out LCD screen will help you follow the action more easily, pan and zoom.

HD video: HD video can be of a higher visual quality than broadcast TV or DVD – it captures video at either a 1280x720- (720p) or 1920x1080-pixel resolution. Beware that '1080' can refer to either 1080i or 1080p, and the latter progressive-scan is preferable.

Video is usually compressed with Mpeg4, and often wrapped in its Blu-ray-friendly variant AVCHD. However, you'll need to watch out for compatibility issues with your video-editing software.

Shooting in HD can produce crystal-clear footage, but you inevitably end up with huge files. Consider investing in an external hard drive (see our pick of those available on page 142 or online at tinyurl.com/ybw3s6w).

PC ADVISOR TEST CENTRE

Top 5 Sub-£150 graphics cards

		Graphics processor	Installed RAM	Memory interface Core clock	Memory clock DDR effective	Ramdac Stream processors	Power connectors	Interface	DirectX Digital interface
PC ADVISOR BEST BUY 1	**HIS AMD Radeon HD 6850** sapphiretech.com tinyurl.com/3xruqw5 Last month 1	• £125 inc VAT • £160 (RRP) • 2-year warranty	AMD Radeon HD 6850	1GB GDDR5	256bit 775MHz	1GHz 4GHz	400MHz 960	1 x 6-pin	PCI Express	11.0 DVI, HDMI, DP
		The HIS version of the 6850 has fallen in price and now beats the previous XFX card in this slot. The Sapphire is another good alternative, also retailing for £125. A fantastic mid-range card, the 6850 has good memory bandwidth and high-quality architecture. Noticeably faster than the 768MB GTX 460, and not too far off the Radeon HD 6870, it's a very powerful card at this price.							
PC ADVISOR RECOMMENDED 2	**Sapphire AMD Radeon HD 6770** sapphiretech.com tinyurl.com/6feq6ap Last month 2	• £98 inc VAT • £110 (RRP) • 2-year warranty	AMD Radeon HD 6770	1GB GDDR5	128bit 850MHz	1.2GHz 4.8GHz	400MHz 800	1 x 6-pin	PCI Express	11.0 DVI, HDMI, DP
		The 6770 is little more than a rebadged 5770 – the increase of the HDMI to version 1.4a and better Blu-ray support are the only differences. That's not necessarily a bad thing, though, and the 5770 remains a decent card for the money. The power requirements are modest and, given the affordable price tag, speed is good. Owners of 5770s should keep their hands in their pockets, however.							
3	**Sapphire AMD Radeon HD 5670** sapphiretech.com tinyurl.com/2fqgfjd Last month 3	• £65 inc VAT • £90 (RRP) • 2-year warranty	AMD Radeon HD 5670	1GB GDDR5	128bit 775MHz	1GHz 4GHz	400MHz 400	none	PCI Express	11.0 DVI, HDMI
		This Sapphire Radeon HD 5670 features the same specifications as the HIS and XFX versions it replaces in our chart. A mile away in performance from the likes of the 1GB AMD Radeon HD 6850, it struggles even in DirectX 10 games. Power levels and sound levels are modest, though, and if you need a DirectX 11.0 card for a media-centre PC, the Sapphire is an inexpensive choice at £65.							
4	**Sapphire AMD Radeon HD 6570** sapphiretech.com tinyurl.com/3h62tj3 Last month 4	• £65 inc VAT • £65 (RRP) • 2-year warranty	AMD Radeon HD 6570	1GB GDDR3	128bit 650MHz	900MHz 1.8GHz	400MHz 480	none	PCI Express	11.0 DVI, HDMI
		Graphics cards don't get much cheaper than this. This tiny card consumes little power and has half-height dimensions that make it ideal for a media PC, but it still surprises with some of its specifications. The 1GB of memory is generous, even if it is of the DDR3 variety. Its overall capabilities are limited, but video playback is smooth – as an upgrade from onboard video, the 6570 works well.							
5	**Asus AMD Radeon HD 6670** uk.asus.com tinyurl.com/3Lm8hge Last month 5	• £65 inc VAT • £65 (RRP) • 3-year warranty	AMD Radeon HD 6670	1GB GDDR3	128bit 800MHz	900MHz 1.8GHz	400MHz 480	none	PCI Express	11.0 DVI, HDMI
		Now priced at around £70, the Asus AMD Radeon HD 6670 remains competitive with a useful 1GB of video memory and an 800MHz core clock. However, the Asus' graphics performance is strangled by its 128bit memory interface. This version's memory is of the DDR3 variety rather than the GDDR5 seen elsewhere, which slices the effective memory clock in two. The 6570 offers better value.							

Top 5 £151+ graphics cards

		Graphics processor	Installed RAM	Memory interface Core clock	Memory clock DDR effective	Ramdac Stream processors	Power connectors	Interface	DirectX Digital interface
PC ADVISOR BEST BUY 1	**HIS AMD Radeon HD 6950** hisdigital.com tinyurl.com/6gqs8xc Last month 1	• £220 inc VAT • £240 (RRP) • 2-year warranty	AMD Radeon HD 6950	2GB GDDR5	256bit 800MHz	1250GHz 5GHz	400MHz 1,408	2 x 6-pin	PCI Express	11.0 DVI, HDMI, DP
		The 6950 has commanded a high position in our chart for several months now. This HIS version offers an 800MHz core clock and 5GHz memory clock speed. The specs sound impressive, with the narrower stream processor unit allowing for an increased number of SIMD engines. It isn't as fast as nVidia's GeForce GTX 570, but a big price difference allows the 6950 to take top spot.							
PC ADVISOR RECOMMENDED 2	**MSI GeForce GTX 570** uk.msi.com tinyurl.com/3ub8u3g Last month 2	• £270 inc VAT • £275 (RRP) • 2-year warranty	nVidia GeForce GTX 570	1,280MB GDDR5	320bit 732MHz	950MHz 3.8GHz	400MHz 480	2 x 6-pin	PCI Express	11.0 DVI, Mini-HDMI
		This MSI version is very similar to the PNY incarnation of the nVidia GeForce GTX 570 we originally reviewed. Gigabyte does a slightly slower version, too. Cheaper than a GTX 580, but still adding a bit of oomph to graphics, the 570 is a great graphics card. The memory bandwidth is good, while it outstrips the HD 6970 at lower resolutions and still matches it at higher detail levels.							
3	**Asus GeForce GTX 560 Ti** uk.asus.com tinyurl.com/43uxnp8 Last month 3	• £180 inc VAT • £190 (RRP) • 3-year warranty	nVidia GeForce GTX 560 Ti	1GB GDDR5	256bit 830MHz	1GHz 4GHz	400MHz 384	2 x 6-pin	PCI Express	11.0 DVI, HDMI
		The £180 560 Ti offers affordable gaming firepower. While it has two cores less than cards based on the 550 Ti, its specs are strong – and this Asus version has a core clock 8MHz higher than the generic version we reviewed. The 384 stream processors are great, and the huge texture fill gives the 560 Ti a significant boost over the 550. Smooth framerates are possible in almost every game.							
4	**Sapphire AMD Radeon HD 6950 Flex** sapphiretech.com tinyurl.com/3nk8wfw Last month 4	• £230 inc VAT • £240 (RRP) • 2-year warranty	AMD Radeon HD 6950	2GB GDDR5	256bit 800MHz	1,250MHz 5GHz	400MHz 1,408	2 x 6-pin	PCI Express	11.0 DVI, HDMI, MDP
		This version of the Radeon HD 6950 has a lower specification than the standard card. Its trump card is enhanced EyeFinity support, letting you connect three monitors – two connect via DVI, while a supplied adaptor is used for the third. This is a powerful card for such a feature, so it's an obvious choice if you want multi-screen brilliance. It's not likely to be available for a long time, however.							
5	**Gigabyte GeForce GTX 560 Ti OC** uk.gigabyte.com tinyurl.com/68q3avg Last month 5	• £205 inc VAT • £250 (RRP) • 3-year warranty	nVidia GeForce GTX 560 Ti	1GB GDDR5	256bit 900MHz	1GHz 4GHz	400MHz 384	2 x 6-pin	PCI Express	11.0 DVI, HDMI
		An overclocked version of the 560 Ti, the Gigabyte pushes the core clock speed up to 900MHz. It is faster than the standard version, although not by enough to compensate for the £25 difference between the two cards. Power consumption is modest, though, and this card beats some tough competitors, such as the Radeon HD 6870. The standard 560 Ti offers better value.							

GLOSSARY • DP: DisplayPort • MDP: Mini DisplayPort

Prices are intended only as a guide and are correct at press time

>> Buying advice

Graphics cards

Graphics processor: The GPU determines the quality and refresh speed of images. The GTX 570 is the highest-performing card here, while the 460 and Radeon HD 6850 represent excellent value. Gamers may have to switch off some detail settings with a cheaper card. Substituting one brand of card for another with the same graphics chip and memory allocation won't affect performance.

RAM: Even those on a budget should be able to get a minimum of 1GB of DDR RAM. For high-end cards, look for 1,280MB or even more.

Features: DirectX 11.0 support is required only for the most advanced games; cheaper cards are likely to lack the firepower to do justice to DirectX 11.0 games. Demand a DVI or HDMI connection.

Dual-display support: This useful feature adds a second HDMI port to your PC setup.

PC ADVISOR TEST CENTRE

Top 5 Sub-£200 flat-panels

			Screen size/ LCD type	Native resolution (pixels)	Pixel pitch	Dimensions (wxdxh) Weight	Brightness (candelas per m²) Contrast ratio[1]	Response time (milliseconds)	Digital connector
PC ADVISOR BEST BUY	1	**Iiyama ProLite XB2472HD** iiyama.co.uk tinyurl.com/3dyx75z Last month 1	• £185 inc VAT • £200 (RRP) • 3-year warranty	24in VA	1920x1080	0.28mm	570x215x438mm 6.2kg	250 3,000:1	8ms	DVI, HDMI
		Rather more expensive than the other flat-panels in this chart, the Iiyama plays host to a VA panel. This gives it wonderful 24bit colour reproduction, and the depth of the palette is a vast improvement over the competition here. Viewing angles aren't without fault, but they're better than on TN models. The Iiyama offers height and rotation adjustments. A superb screen for the money.								
PC ADVISOR RECOMMENDED	2	**BenQ V920** benq.co.uk tinyurl.com/23thrLt Last month 2	• £90 inc VAT • £130 (RRP) • 2-year warranty	18.5in TN	1366x768	0.3mm	355x157x457mm 2.4kg	250 1,000:1	5ms	DVI
		BenQ's V920 continues to hold firm at a tempting price. The viewable screen size is a mere 18.5in but, assuming this is acceptable, this polished, nicely curved monitor is fantastic for the money. The monitor's tricky menu system and narrow viewing angles aren't ideal, but the colour is bold and punchy given the price. The BenQ V920 monitor also offers great value for money at £90.								
	3	**Hanns-G HL231DPB** hannsg.com tinyurl.com/32mgmtc Last month 3	• £130 inc VAT • £159 (RRP) • 3-year warranty	23in TN	1920x1080	0.27mm	547x189x352mm 3.3kg	250 1,000:1	5ms	DVI
		The Hanns-G HL231DPB doesn't boast astonishing image quality, but it's very pleasing to the eye. We also like its low price tag and large 23in screen. Power consumption is a modest 27W, and the 170-degree viewing angles are standard for twisted-nematic technology. Hanns-G claims a dynamic contrast ratio of 8,000,000:1, but there's nothing else preposterous about this value screen.								
	4	**BenQ G2222HDL** benq.co.uk tinyurl.com/2f2s23u Last month 4	• £110 inc VAT • £160 (RRP) • 3-year warranty	21.5in TN	1920x1080	0.25mm	505x175x393mm 3.8kg	250 1,000:1	5ms	DVI
		The BenQ G2222HDL is a very serviceable 21.5in screen that nicely fills the middle ground between the budget but small BenQ V920 and the larger Hanns-G HL231DPB. Although hefty, this BenQ is still reasonably stylish. This flat-panel display's menu system is tricky to operate and viewing angles aren't great, but image quality is very respectable, with surprisingly rich colour.								
	5	**Hanns-G HL245** hannsg.com tinyurl.com/3zsgyjh Last month 5	• £138 inc VAT • £138 (RRP) • 3-year warranty	23.6in TN	1920x1080	0.27mm	560x200x405mm 4.1kg	250 1,000:1	5ms	DVI
		Despite its chunky style, this screen is relatively slender, measuring 20mm at its slimmest point. At 23.6in, it's the largest model in the chart – and remains affordable. Settings are kept to a minimum, and the control panel is illogical and awkward. However, the image quality is passable for the price, especially when you tone down the brightness. It's not a great choice for watching films.								

GLOSSARY • HDCP: High-bandwidth Digital Content Protection • IPS: in-plane switching • PVA: patterned vertical alignment • TN: twisted nematic • VA: vertical alignment

Top 5 £201+ flat-panels

			Screen size/ LCD type	Native resolution (pixels)	Pixel pitch	Dimensions (wxdxh) Weight	Brightness (candelas per m²) Contrast ratio[1]	Response time (milliseconds)	Digital connector
PC ADVISOR BEST BUY	1	**ViewSonic VP2365-LED** viewsoniceurope.com tinyurl.com/5wmjLr9 Last month 1	• £210 inc VAT • £210 (RRP) • 3-year warranty	23in IPS	1920x1080	0.27mm	548x433x250mm 5.4kg	250 1,000:1	6ms	DVI
		Aimed at professionals, the 23in VP2365-LED combines premium-grade monitor technologies, ergonomic features and superior image quality. It's ideal for those who work regularly with HD video. The IPS panel delivers the best colour reproduction and widest viewing angles, while the LED backlight makes for a slim, lighter and less power-intensive design. There's no HDMI port, however.								
PC ADVISOR RECOMMENDED	2	**NEC MultiSync EA232WMi** nec-display-solutions.co.uk tinyurl.com/4cqgnvw Last month 2	• £240 inc VAT • £300 (RRP) • 3-year warranty	23in IPS	1920x1080	0.27mm	550x220x379mm 5.8kg	300 1,000:1	14ms	DVI, DP
		The ViewSonic offers slightly better value, but the NEC overcomes some sluggish response rates to establish itself as an excellent choice for general PC and graphical use. The high-calibre IPS panel provides for considerable depth of colour. The styling may be sober, but the features (which include a height- and pivot-adjustable stand) are immense. The menu options are impressive, too.								
	3	**BenQ VW2420H** benq.co.uk tinyurl.com/38qnyx2 Last month 3	• £201 inc VAT • £220 (RRP) • 2-year warranty	24in PVA	1920x1080	0.28mm	434x189x581mm 3.9kg	250 3,000:1	8ms	DVI, HDMI
		BenQ has large stocks of this £201 VW2420H screen, available direct through its site, but you may be able to find it elsewhere for less than £200. Its PVA panel provides a balanced but attractive colour scheme and displays sharp text. Viewing angles are better than on a TN screen, too. Response rates aren't the best but, for general use, the BenQ VW2420H is a fantastic screen.								
	4	**Samsung C27A750** samsung.com/uk tinyurl.com/4xqkxpe Last month 4	• £475 inc VAT • £475 (RRP) • 1-year warranty	27in TN	1920x1080	0.31mm	639x233x485mm 5.2kg	300 1,000:1	2ms	HDMI
		Only just becoming available in the UK, this is a fascinating screen if you can find it. It's not just the astonishingly slim casing and all-in-one stand that makes this Samsung so different. A hub conceals USB 3.0 and ethernet ports, while UWB technology lets the screen connect to a laptop without cables. It's expensive for a twisted-nematic panel, but offers an interesting glimpse of the future.								
	5	**NEC MultiSync EX231W** nec-display-solutions.co.uk tinyurl.com/45qt68e Last month 5	• £234 inc VAT • £260 (RRP) • 3-year warranty	23in TN	1920x1080	0.27mm	540x215x401mm 4.2kg	250 1,000:1	5ms	DVI, DP
		NEC's lightweight EX231W has a high-quality construction that suggests it's built to last. However, its twisted-nematic panel means colour reproduction isn't as good as on an IPS panel. The overall image quality is acceptable, though, with decent viewing angles. Human Sensing can detect when you're not sitting at the screen and dim the brightness, but needs tweaking for best results.								

[1]Figures given are manufacturers' static contrast ratios unless otherwise stated

Prices are intended only as a guide and are correct at press time

>> Buying advice

Flat-panel displays

Response time: How quickly the pixels can switch, typically cited as grey-to-grey response time. The lower the figure, the smoother the motion.
Pixel pitch: How closely packed picture elements are and, consequently, how finely detailed the image will be. The lower the figure, the better.
LCD type: Most are TN; IPS and PVA offer better colour depth and viewing angles.

Colours, brightness and contrast: A spectrum of 16.7 million colours is the norm. Discount manufacturers' contrast-ratio claims greater than 1,000:1. This will usually be the dynamic ratio. Expect brightness figures of 250 candelas per square metre (cd/m²) or more.
Extras: A DVI, DP or HDMI connection is crucial to achieving a clean signal, but you may also need a VGA option. Flat-panels often feature integrated speakers, but quality varies. Height-adjustment and tilt facilities can be useful for avoiding a sore neck.

MATT EGAN

Unravelling the mobile security conundrum

What do you look for in a mobile phone? As well as the ability to make calls – and no-one really cares about that – the modern smartphone hosts a standard feature set: email, a web browser and multimedia capability.

Screen size, storage and connectivity may change depending on how much you want to spend. Then it's a question of platform: some prefer Apple's slick but locked-down environment, with its curated book of apps; others are more at home in Android's rough-and-ready world. Windows is a must for a chunk of the population, and many mobile emailers remain addicted to BlackBerry.

What is less often considered by consumers is how secure a smartphone is. And yet, even more than a PC, your handset offers up the keys to your email, bank account and all manner of personal data. If you want to steal someone's ID, you'll need little more than their phone.

It's a conundrum plenty of businesses face every day. How do you give your staff mobile access to email and productivity tools, without opening the door to hackers?

Ever wondered why so many enterprises run BlackBerry phones? It's simple: RIM BlackBerry Enterprise Server software is a tool that allows the network administrator to remotely run a secure fleet of phones. If a BlackBerry is mislaid, it can be bricked and wiped by tech support. And updates can be rolled out fleetwide.

A CEO may think it'd be cool for all staff to have iPhones, while the finance director thinks Android is a better idea – but the network admin is a BlackBerry fan with a soft spot for Windows. I guarantee it.

Trouble is, it's a decision that's almost immaterial. Give someone a locked-down BlackBerry, and they'll turn up at work with two phones: one for work, one for pleasure. Short of putting in metal detectors and relieving staffers of their gadgets at the door, you can't stop people

bringing in phones of all flavours – each one a potential Trojan horse, capable of bringing malware in and taking data out.

Mobile computing is a fact of life, and it's not going away. Neither are the risks, and try as you might you can't remove them all. The only safe phone is one that's never used. But the risks can be managed.

Whether used principally for business or pleasure, every mobile device should run security software. But unlike in the Windows world, the principle reason is not to fend off malware. Indeed, research by AV-Test suggests Android antivirus doesn't work (tinyurl.com/73tjd2n). The data gathered will help security vendors get a handle on the threat dynamic, but mobile antivirus is no panacea.

Much more important is the ability to remotely locate, lock and wipe your mobile device. The best mobile security solutions do exactly that. Norton Mobile Security, for instance, offers a web interface where you can find out where your phone is. Then, if it is in the hands of a crook, you can make it emit a loud scream, take a photo of the miscreant, track its location, wipe all the data and lock out prying eyes. Other tools offer similar functions. Use them, and you may lose your handset, but not your valuable data. And just as every Windows user should have antivirus, antispyware and a firewall, no mobile device should be left unprotected. ⊠

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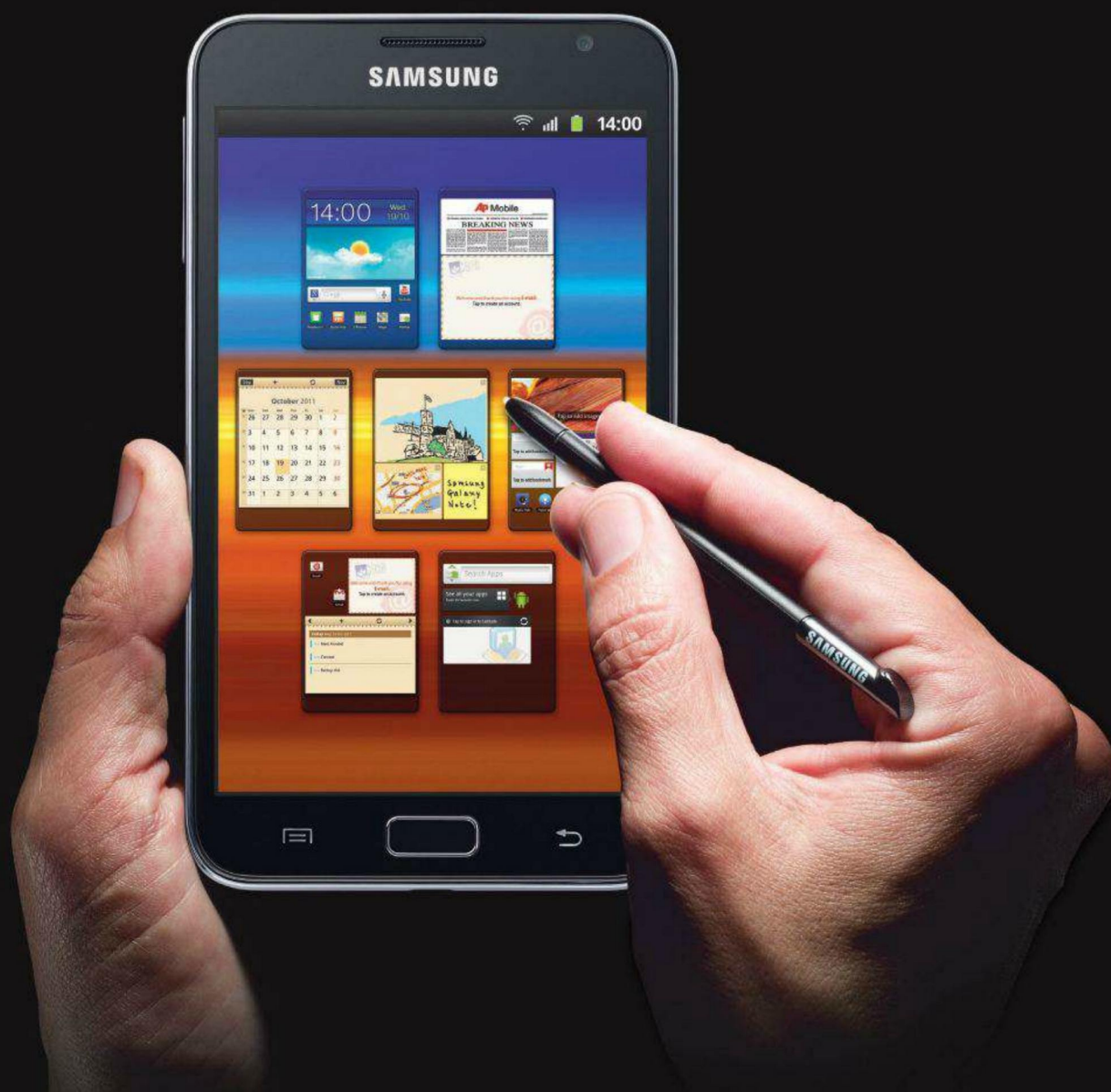
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