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## Three simple ways to get a speedy PC

If you've a need for speed we'll explain how to ramp up your PC's performance for free

ver the past few weeks in the *PC Advisor* office we've been focusing on the fast and the furious: no, not the dreadful/incredible film series (I haven't seen it), but the need for speed in all things PC. Our conclusion: there are three ways to avail yourself of a super-fast PC or laptop. We've been trying out them all, and are excited to bring you the unofficial *PC Advisor* Guide To A Speedy PC.

The most effective – and most expensive – way to source a slick system is to shell out for a new one. It is an unbreakable law of tech that as time goes by computer components become faster, so the new PC you buy today will feel slow in comparison to its newer rivals tomorrow.

## Super power, super speed

Take a look at the super-powered gaming PCs we have recently tested and you can see that modern desktops produce amazing power and performance (see page 52). Power PCs such as the YoYoTech Warbird Titanium Pro SLI (see page 57) gobble up the most intensive 3D games in a way that would have been unthinkable just a year ago. It's a seriously fast computer, and it's not even our Best Buy.

Okay, not everyone has the moolah to shell out for a £1,500 PC just to feel the force of fast. But even the relatively inexpensive laptops that lead out our hardware reviews section (see page 32) would have been power PCs a couple of years back, never mind the Ultrabooks and power laptops that feature in our Top 5 Charts (page 127). And how about modern smartphones such as the Samsung Galaxy S4 (see page 34)? With Geekbench 2 and GLBenchmark results of 3,227 and 41fps, the S4 is nothing if not a powerful and fast personal computer. It has more computational power than your desktop of five years ago could dream of.

## A cheaper way to a faster PC

But purchasing a new PC, laptop or even smartphone is not practical if you're trying to deal with a sluggish PC armed only with a recession-hit wallet. Fortunately there are two great ways to speed up any Windows PC or laptop without having to buy new. The most effective of these is a hardware upgrade for your existing system, such as loading the OS on to an SSD. Solid-state drives have no moving parts, which makes them quieter and less susceptible to damage than HDDs.

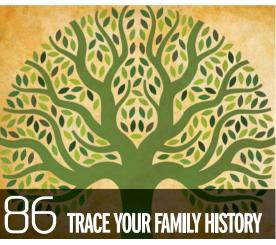
Crucially SSDs are a lot faster at reading and writing data than are spinning hard disks, which makes a huge difference if your PC or laptop is trying to access the operating system multiple times each second. We review six of the best SSDs on page 60 – for just £174 and a relatively simple upgrade you could enjoy a much faster computer.

Not all PC speed-boosters are hardware-based, however, and not all of them even cost money. There are some simple software tweaks that can make any PC or laptop faster. They are easy to do and don't take up much time – on page 94 we outline 12 simple must-do PC tasks. Give them a try today and enjoy a faster future.  $\boxtimes$ 









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## Reader comments









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

## letters@pcadvisor.co.uk

## Windows 8 not to blame I think it's a bit mean blaming Windows 8 for the decline in PC sales (page 12, July issue). Manufacturers have been selling fewer and fewer desktops every year, and the increasing popularity of tablets is no doubt taking its toll on laptops, too. There's also that tiny little thing known as a recession going on in the UK. Sure. Windows 8 might be one reason behind the decline, but I very much doubt that it's the main reason. Graeme Waterman

## Career gaming

I was really excited to see your article on career gaming in the previous issue (page 16). I'd be great at that, I thought, and it might even get my parents off my back! Then I realised you had to win to make money. That's not such a good job then. I'll probably earn more per hour if I stick to helping out with odd jobs around the home. Ben Williams

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## Android to rescue PC market

With Windows 8 struggling to boost laptop and PC sales, vendors are reportedly turning to Android (see tinyurl.com/bp75a8t). "This seems like a stupid idea," wrote parousia. "I can't understand why you would create a laptop with less functionality and support, just because the PC market isn't doing so well. Is it really Windows that is causing the PC to fail, or just the times we live in?"

## Return of the Start button

Microsoft will reinstate the Start button in Windows 8.1 (see tinyurl.com/d3j7gk7). "Given time, Microsoft will revert to the entire Windows 7 interface and it will be safe to buy a new PC again," wrote ethel the frog.

However, Brian didn't see the point in Microsoft's backtracking. "Windows 8 is very easy to use and offers a lot more than Windows 7. Why do you need a Start button, what do you think it will let you get to quicker than in Windows 8? I can get to anything in Windows 8 as quick as, if not quicker, than I could in Windows 7. It's called 'learning something new'."

"I don't know why so many people are against Windows 8," added Duncan. "I have



found it fine with or without a touchscreen. I really don't see what all the fuss is about."

## Unlocked, SIM-free and cheap

Archos has unveiled a trio of budget Android handsets, including the 35 Carbon at a staggeringly low price of £79 (read more at tinyurl.com/cr6sLyx). "It really is about time that phones appear that are unlocked and SIM-free," wrote arc. "The network operators have had it too easy for too long."

"These days, phones can cost more than some desktop computers and laptops, and users still get locked into a contract. Fingers crossed these phones from Archos will start the ball rolling."

## Flagged: Star letter

## Typing solutions for the disabled

I've been reading your reviews of mechanical keyboards in the June issue. I appreciate that these keyboards are of a high quality, but the fact remains that they conform to the utterly ridiculous and too often injurious standard keyboard design.

Even if we accept that keyboards must be flat and adopt a Qwerty layout, why do manufacturers persist in the irregular staggering of the keys, which obliges typists to make twisting movements? By simply laying the keys in straight columns, one source of injury would be removed, and many people spared a life of pain and disability.

PC Advisor has looked at the Maltron alternatives only once - in an article on weird keyboards. You failed to mention the health benefits of the two-handed Maltrons. and commented with ignorant, insensitive sarcasm on the single-handed version, which is intended for those who have only one functional hand. The one-hander is a solution for the disabled, not a frivolous adventure into silliness. Helen Hagerty

Andrew Harrison, reviews editor, replies: Thanks for your letter. I wasn't aware of the Maltron keyboard, but I'd like to know more.

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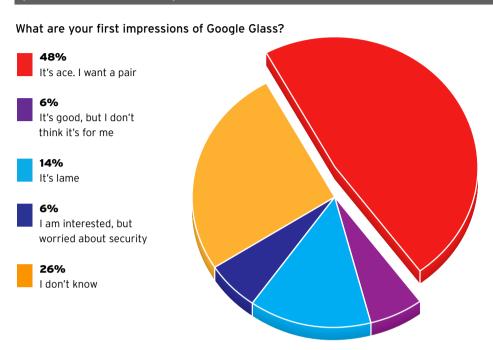
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Based on 4,338 votes, tinyurl.com/ckrdxf8

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## IM or SMS?

With IM overtaking SMS, we asked which people preferred. "Whatever works," wrote Jonny Jones, "Depending on where in the UK you are, sometimes there's no fast data signal. So sometimes it has to be SMS."

## Recycle your tech gear... in the US

Recycle your old tech gear... You'll be doing your part to boost the 27 percent electronics recycling rate in the US (read the full story at tinyurl.com/cxn6ovv). This is a UK magazine that once again is covering US issues rather than our own. Come on guys, pull up your publishing socks. Ian Cogings

Marie Brewis, managing editor, replies: We are indeed a UK-based publication, Ian. but the internet is a global resource and even the print magazine is sold all over the world. A huge number of the millions of visitors to our website live outside the UK.

## Mini graphics performance

In your recent mini PCs group test you state that the Mac mini's "gaming performance is superior to that of the Chillblast PC, thanks to its considerably faster integrated

processor" (see tinyurl.com/c62Ltoh). Since when has Intel graphics been fast, especially for gaming? Ian Cogings

Andrew Harrison, reviews editor, replies: The point the editor was making was that the Mac mini's gaming performance is better than that of the Chillblast Fusion NUC, despite both PCs having the same Intel HD Graphics 4000 graphics. This is because the Mac mini has a faster main processor. Granted, you'd never consider much gaming with even the best that Intel can make right now.

## The weather is on Fire

I saw your video review of the Netatmo Urban Weather Station on your Facebook page. I've got a Kindle Fire and found an awesome weather app for it. Would the Urban Weather Station work with a Kindle Fire HD? Jen Hemmings

Jim Martin, features editor, replies: There isn't a Netatmo app in the Kindle store right now (although you could install the Android version if you really wanted to by rooting your device), but we managed to see the data just fine using the Kindle Fire's browser. Join us online: pcadvisor.co.uk/forums



## Google Glass

Google Glass is the latest in wearable technology, a pair of smart glasses that can feed you information about the surrounding area, including giving you directions, taking photos and video, and making video calls. Pretty neat, right? Hmmm....

Quickbeam Does it contain any beer?

Nontek It's well out of my price range!

Aitchbee I see spectacle wearers will need to have laser treatment on their pork pies as their Gregory Pecks will get in the way! Google Dentures is the next obvious advancement on the techno horizon, I reckon.

lotvic It's getting more and more difficult to distinguish between sane people and others in the street who appear to be talking to themselves. Now they'll be focusing on the fardistant as well. The council is going to be busy fitting bumpers to lampposts.

wiz-king More people walking into the road without looking - I foresee a rise in the pedestrian death rate.

eddie At the present state of development, a eureka moment is needed to solve the headache/ disorientation problem. All attempts at such products so far have suffered from this problem and it's likely to stunt their future development.

Join in at tinyurl.com/d3spwL5.

## iolo System Mechanic Pro 11.5

Due to errors in the production process, some readers have reported problems installing iolo System Mechanic Pro 11.5 from the July issue Cover Disc+. Those affected should download the file from this issue's Disc or Disc+, or contact Letitia (letitia\_austin@idg.co.uk).  $\boxtimes$ 

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## **ANDROID STEALS iPAD's TABLET MARKET CROWN**

Yet Apple continues to sell more iPads and iPad minis than any other single tablet manufacturer

Android tablets have overtaken Apple's iPad with the majority of tablet market share in the first quarter of 2013.

Tablets powered by Google's Android operating system were more popular with consumers than Apple's iPad and iPad mini during the first quarter of the year. According to IDC's most recent stats, Android made up 56.5 percent of the market, compared to 39.6 percent for iOS.

During the same quarter of 2012, iOS had a 58.1 percent share, and Android 39.4 percent. Both have shown a growth in sales, but Android more so, at a whopping 247.5 percent.

## Tablets an unstoppable force

IDC said: "Tablet shipments totalled 49.2 million units in Q1 2013, surpassing that of the entire first half of 2012. With growth fuelled by increased market demand for smaller-screen devices, tablet sales have shown no sign of slowing down."

Overall growth of the tablet market in the first quarter was 142.4 percent year on year. The news comes after BlackBerry CEO, Thorsten Heins, predicted tablets would be dead in five years' time.

"In five years I don't think there'll be a reason to have a tablet anymore. Maybe a big screen in your workspace, but not a tablet as such. Tablets themselves are not a good business model," said Heins.

Apple remains the top single vendor, however, with a total of 19.5 million units shipped during the guarter, higher than IDC's estimate of 18.7 million.

"Sustained demand for the iPad mini and increasingly strong commercial shipments led to a better-than expected first quarter for Apple," said Tom Mainelli, a Research Director at IDC.

Samsung took second place with 8.8 million units shipped. IDC said the Korean giant's smartphone growth has helped its tablet business, often bundling the two together. Asus took third place from Amazon, thanks to sustained demand for the Asus-made Google Nexus 7.

Microsoft took fifth spot with the launch of its Surface tablets. The software giant shipped 900,000 units, most of which

were Surface Pro which have so far been available only in the US and Canada. The firm is to launch the Pro in the UK on 23 May, with a starting price of £719.

"Beyond the Surface products, Windows 8 and Windows RT tablets continued to struggle to gain traction in the market. Total combined Windows 8 and Windows RT shipments across all vendors reached 1.8 million units." said IDC.

There are rumours that Microsoft will launch a smaller 7in version of Surface, but it may not be the firm's saving grace. "The market is moving toward smart 7- to 8in devices, but Microsoft's larger challenges centre around consumer messaging and lower-cost competition. If these challenges are addressed, along with the desired screen-size variations, we could see Microsoft make further headway in 2013 and beyond," said Ryan Reith, program manager for IDC's Mobility Tracker.

	Q1 2012 shipments (millions)	Q1 2012 market share	Q1 2013 shipments (millions)	Q1 2013 market share	Shipment growth
GOOGLE ANDROID	8	39.4%	27.8	56.5%	247.5%
APPLE iOS	11.8	58.1%	19.5	39.6%	65.3%
WINDOWS (RT & 8)	0.2	1%	1.8	3.7%	800%

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## MICROSOFT ANNOUNCES WINDOWS 8.1 OS UPDATE

Free update will be delivered through the Windows Store • Public preview available 26 June

Microsoft has confirmed it will release an update to its Windows operating system with Windows 8.1, previously known as Windows Blue. The software giant said it would deliver a public preview of Windows 8.1 for Windows 8 and RT at its Build conference on 26 June.

Microsoft said it will change key aspects of its Windows 8 operating system for PCs, laptops and tablets, admitting that the steep learning curve users have claimed to have experienced is "definitely real".

## What is Windows 8.1?

Windows 8.1 is an update to the Windows 8 operating system. Rather than releasing service packs, as it did with XP, Vista and Windows 7, Microsoft will issue new versions of the OS much like Apple does with OS X.

The firm already does a similar thing with Windows Phone – for example, Windows Phone 7.5 Mango and 8 Apollo.

Tami Reller, head of Windows marketing and finance, said: "Windows 8.1 will deliver the latest innovations across an increasingly broad array of form-factors of all sizes, display, battery life and performance, while creating new opportunities for our ecosystem. It will provide more options for businesses, and give consumers more options for work and play."

## When will it be released?

A public preview of Windows 8.1 will be delivered at Microsoft's Build conference on 26 June. Microsoft hasn't specified a release date for the final version of Windows 8.1, but it is expected to arrive later this year.

## What's Windows Blue?

Windows Blue is simply the codename for the next version of Windows 8. When the





final version of the software is delivered it will be called Windows 8.1.

## What features will it bring?

Microsoft has yet to detail what the update will bring to Windows 8, but promises more details over the coming weeks. However, screenshots published on Winforum point to features that may arrive with Windows 8.1.

These include a 50/50-split for the multi-tasking Snap Views function and the inclusion of Internet Explorer 11. Other smaller changes include new tile sizes for the Modern UI Start Screen and a Personalize menu for quickly changing colours schemes and backgrounds.

It's not shown in the screenshots, but there is talk that Microsoft will bring



back the Start button and Start Menu with Windows 8.1.

Another rumour suggests users will be able to boot straight to the desktop, bypassing the Start Screen.

SkyDrive integration may also be ramped up, with the option to auto-upload photographs and additional backup choices.

## Will the Start button return?

According to reports, Windows 8.1 will herald the return of the iconic Start button that Microsoft left out of Windows 8.

However, the new Start button may simply offer a way to access the Start Screen and will not open the familiar Start Menu for finding and launching recent or favourite programs. In effect, it will mirror the function of the button already present in the Charms bar that shares the same square flag logo.

## How much will it cost?

Despite rumours that Microsoft may adopt a model similar to that of Apple in charging a small fee for its operating system updates, Windows 8.1 will be delivered through the Windows Store as a free update.



## 02 bucks two-year mobile-tariff trend

02 has announced its Refresh tariff, which splits the cost of a smartphone with calls, texts and data. With new handsets coming to market left, right and centre, it allows customers to upgrade their device whenever they like, rather than being stuck with it for two years. Customers choosing the Refresh tariff will pick a separate Phone Plan and Airtime Plan.

MORE: tinyurl.com/ccz3sw6

## Free broadband with tech buys

John Lewis is giving away free broadband subscriptions with in-store technology purchases. Customers buving internet-connected devices such as tablets and laptops can get six months of free broadband when they sign up to a yearlong contract (from £11/month). MORE: tinyurl.com/c2sgtkk



## **Galaxy S4 suffers** storage woes

Samsung's Galaxy S4 has already been criticised for its stock shortages, and now for its meagre amount of internal storage. The 16GB model has only 9GB available for apps and files. The S4 was investigated on BBC's Watchdog in May. MORE: tinyurl.com/c8thnrb

## LAPTOP MAKERS DROP WINDOWS 8 FOR ANDROID

Android-powered laptops to arrive at affordable price points

With Microsoft's Windows 8 operating system struggling to boost laptop and PC sales, vendors are reportedly turning to Android.

With increasing sales of Android tablets worldwide, laptop makers are turning to Google's OS in a bid to rejuvenate demand. The news comes after Windows 8 was largely blamed for a huge slump in global PC sales by research firm IDC.

According to Digitimes, which cites insiders at numerous laptop vendors, Intel has begun promoting Android-powered convertible devices despite its Windows-focused Ultrabook brand.

HP has already announced its SlateBook X2, a laptop-tablet hybrid with a detachable 10in screen. The Android-powered X2 will begin shipping in the US in August at \$479.

Lenovo is reportedly planning to launch an Android version of its 11in Yoga device in May.

Following on from HP and Lenovo, there are also rumours that Toshiba. Acer and Asus will launch Android laptops in the third quarter.



Intel estimates the sweet spot for Android laptops is around \$500, which means we could see them retailing in the UK at around £399.

The combination of consumer familiarity with Android and decent word- and documentprocessing software mean the new laptops could garner "strong demand", according to the sources.

Microsoft won't be best pleased by the rumours, since it prefers the vendors to promote their Windows 8 tablets, such as the HP Envy x2.

## INSTANT MESSAGING OVERTAKES THE HUMBLE SMS

Use of instant-messaging services such as WhatsApp and iMessage has become more popular than use of SMS.

Research published by Informa claimed that last year 19 billion messages were sent via chat apps, and only 17.6 billion through SMS.

While the free services benefit users, it is likely to

have a large impact on mobile operators, which rely on SMS text messages as key revenue.

Informa analyst Pamela Clark-Dickson said some operators are already "seeing a decline in their messaging revenues", while research firm Ovum calculates that more than \$23bn revenue was lost in 2012.

Informa believes IM will continue to grow, but this doesn't mean an imminent end for SMS. It predicts that 50 billion IMs will be sent per day by 2014, compared to around 21 billion text messages.

"There is still a lot of life in SMS," said Clark-Dickson, with many users of feature phones dependent on SMS.

## Samsung to help launch 5G by 2020

## Technology promises download speeds hundreds of times faster than 4G



Samsung has announced developments in 5G mobile broadband, which it claims could launch by 2020.

The Korean technology giant has made the world's first adaptive array transceiver, which is at the core of 5G mobile broadband. The tech, which operates in millimeter-wave Ka bands, will provide data speeds hundreds of times faster than 4G LTE-Advanced networks.

Samsung said its adaptive array transceiver can transmit data at more than 1Gbps using the 28GHz frequency. It plans to accelerate research and development of 5G so it can be commercialised by 2020.

The technology will allow the transmission of vast amounts of data, and make possible real-time streaming of ultra-HD content.

The European Commission plans to invest €50m in 2013 to bring 5G services to the market by 2020. ⊠

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# BIG DATA

90 percent of the world's data was created in the past two years. Martyn Casserly looks at new ways to harness this information and prevent us being swamped in a digital deluge of data

he 1992 film *Sneakers* has a scene in which Sir Ben Kingsley and Robert Redford play two hactivists discussing the concept of power.

"It's not about who's got the most bullets," states Kingsley, "it's about who controls the information. What we see and hear, how we work, what we think... it's all about the information."

Some 20 years later those words are more true than ever. Yet real power doesn't stem from the acquisition of information, but the ability to find notable patterns within that data. Trend analysts have been working on this principle for years, but our everexpanding use of the internet and the sheer volume of data created demands a new approach, known as 'big data'.

According to IBM, we create a staggering 2.5 quintillion bytes of data every day. That's roughly equivalent to half a billion HD movie downloads. This information is generated from a variety of sources, including social media, digital photos and video, retail transactions, and even the GPS built into mobile phones.

Perhaps more interestingly, though, IBM claims that "90 percent of the data created in the world today has been created in the past two years".

## Data overload

Harnessing this vast array of information is no easy matter. It requires super-fast computers that can process colossal amounts of data and produce results in time frames that, until very recently, would have been impossible. And the way this data is stored is a far stretch from the kind of databases used in the past. But the potential rewards are so great that big-data research is rapidly becoming a digital gold rush.

"Big data marks the beginning of a major transformation," explain Kenneth Cukier and Viktor Mayer-Schonberger in their book *Big Data*. "Just as the telescope enabled us to comprehend the universe, and the microscope allowed us to understand germs, the new techniques for collecting and analysing huge bodies of data will help us to make

sense of our world in ways we are just starting to appreciate."

Financial institutions pay big money for analysis that allows them to predict the future movements of markets, while insurance companies use it to determine the potential risks of each policy holder. The medical profession is discovering how careful examination of large data sets can aid the diagnosis of diseases such as breast cancer, and even law-enforcement is making use of the predictive power that big data allows.

The BBC's 'Horizon' programme looked at the work of Professor Jeff Brantingham, whose PredPol system is helping to lower crime in districts of Los Angeles. The analytic software developed by his team used both historical and current crime records, plus wider data for the areas in question. It then produced a list of predictions on where and when crimes were most likely to occur, which the police department used to strategically deploy its officers. Following a six-month trial, the police confirmed that burglaries were down by 27 percent, and there was a 13 percent decrease in crime overall.

"Our behaviour is very regular, and very patterned in ways that is often frightening to us," said Brantingham. "Offenders are no different: they do exactly the same things over and over and over again, and criminal offending patterns emerge from that regularity of behaviour."

PredPol has been so successful that not only is it being rolled out to several other divisions of the LAPD, but it's also reached our own shores: Kent Police is currently trialling the software.

## Big science

Data has also become an important ingredient for what's known as 'big science'. This seeks to discover the origins of life and how our bodies work.

The Human Genome project, which set out to decode the genetic building blocks of life, took a team of dedicated scientists a decade of intensive work to complete. Today, with the new technologies developed for big data, that same task could be completed in a day.

Astronomers are now able to map the skies with much higher-power telescopes and collate terabytes of data in a fraction of the time.

Particle physicists working on the Large Hadron Collider were able to record the behaviour of subatomic particles travelling at unbelievable speeds and process that data to potentially discover the Higgs Boson (or 'God') particle, which could change the future of science in a profound way.

All these advances in data-collection and -manipulation are exciting and potentially life-changing, but none more so than the Brain Research through Advancing Innovative Nanotechnologies (BRAIN) programme announced by President Obama in April.

BRAIN's goal is to map the activity of the human brain. Using state-of-theart equipment, scientists will attempt to simultaneously monitor, record and analyse billions of neurons. The programme hopes to find cures for conditions such as Alzheimer's, strokes, and autism, with additional research focusing on mental illness.

## How, but not why

There are those who argue that the nature of big data means discoveries can be made without scientists truly understanding the origin or motive of the problem - they'll know how something happens, but not necessarily why.

"As humans, we have been conditioned to look for causes," explain Kenneth Cukier and Viktor Mayer-Schonberger, "even though searching for causality is often difficult and may lead us down the wrong paths. In a big-data world, by contrast, we won't have to be fixated on causality; instead, we can discover patterns and correlations in the data that offer us novel and invaluable insights. The correlations may not tell us precisely why something is happening, but they alert us that it is happening. And in many situations that is good enough."

## HP focuses on design to retain PC crown

HP is hoping that a refined focus on laptop and tablet design will help it to reclaim the PC market. Agam Shah examines its chances

ewlett-Packard is barely holding on to the top spot in the laptop and desktop market, but it hopes a renewed vigour regarding product design will help reverse the fortunes of its PC business.

The company is standardising the design and features of its laptops and tablets to help customers identify its products and also to cut manufacturing costs. Similar to Apple's strategy, HP is standardising on materials, colours, designs and features, which have been inconsistent across its consumer and enterprise product lines.

## **Building brand recognition**

HP had silos for products, with each family having different philosophies, colours and designs, said Chad Paris, creative lead of notebook product design at the global business unit.

"In looking at that, nothing said to me it is HP," Paris said.

Some of the new product designs were visible in the ProBook laptops launched in May. The company is standardising on a round HP logo on the top of its laptop and tablet lines - a change from the past, when logos were either rectangular or simply didn't appear.

"In the past you may have seen 20 different logo sizes in various colours across our products. Our logos will now be much more consistent in terms of size. You want that consistency to build brand equity and recognition," Paris said.

HP has in the past tried to personalise its products such as laptops with many different colours, notably incorporating artwork by fashion designer Vivienne Tam on some of its portable products. HP is now minimising the number of colours

HP's new **PROBOOK 400**series includes the 13.3in
430 and 15.6in 450

it uses, and some of the new laptops it launched earlier this year are available in fewer colours.

Some of the new features are manifested in the touchpad, with most laptops now offering two click buttons. That's a change from an earlier design in which HP integrated the click buttons into the touchpad.

The company is making small changes such as standardising audio features and the location of the power button across laptops and tablets. Other features, such as the keyboard type, will be unique to product lines. The ProBooks will have water-resistant keyboards, for example.

## Fighting off the competition

HP remains the world's number-one PC maker, but it faces tough competition from China-based Lenovo, according to recent surveys by multiple research firms.

HP in 2011 toyed with the idea of selling or spinning off its Personal Systems Group, which deals in client devices such as PCs and tablets, but the unit was ultimately retained.

The standardisation of design took shape with the arrival of Meg Whitman as CEO in September 2011. HP is now expanding into the tablet market: last year it launched the ElitePad business tablet, and it recently began shipping the Slate 7 Android tablet.

Some of the first fruits of the laptop design standardisation effort are visible in the ProBooks, Paris said. He added that redesign is also being driven by Stacy Wolff, vice president of design for HP.

"With the support of Whitman, with Wolff driving the centralisation of design, we are able to focus on what the strategy should be in 2013 and beyond," Paris said.

But radical changes can't be made overnight. Some long-term users of Lenovo's ThinkPad laptops, for example, cried foul when the PC maker announced it would incorporate design changes, including a redesigned keyboard and integrated battery.

Paris acknowledged that radical changes in product design can't be sudden, especially for faithful HP laptop users. But HP will continually evolve the design based on user feedback and focus groups.

The company has also revamped its server business. HP combined its two server businesses into a new division called HP servers, and also created a Converged Systems business that will deal in purposebuilt systems based on specific applications and usage models.



## New Intel Atom chip a challenger to ARM

Intel says its Atom chips with Silvermont architecture will break the myth that ARM is more power-efficient. Agam Shah investigates

ntel's forthcoming Atom chips with new CPU architecture will be up to three times faster and five times more power-efficient than their predecessors, breaking the myth that ARM processors are more power-efficient.

Intel expects the new architecture, codenamed Silvermont, to be in Windowsand Android-based smartphones, tablets, PCs and servers later this year. Atom chips codenamed Bay Trail will appear in tablets around the end of 2013.

Tablet chips based on Silvermont are two times faster on single-threaded performance than comparable chips based on the current Atom architecture codenamed Saltwell, said Intel fellow Belli Kuttanna. Using the same metric, he said Silvermont tablet chips use 4.7 times less power than their predecessors.

Bay Trail chips will also appear in hybrid laptops with detachable and folding screens, and in low-cost desktops. Users can choose between long battery or performance in Silvermont smartphones or tablets.

"Silvermont is a complete redefinition of the Atom architecture," Kuttanna said.

Silvermont CPUs can scale up to eight cores and represent the first major redesign of the Atom architecture since the first netbook chip was released in 2008. The chips will also include new performance and power-management features.

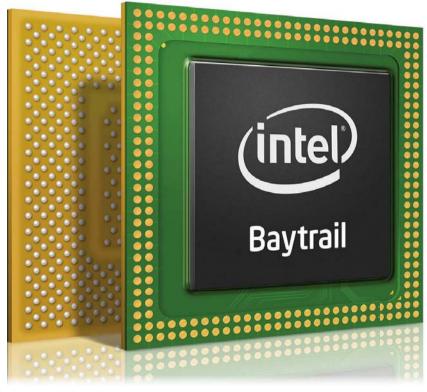
## Eyes on ARM

Silvermont comes at a time when the chip maker is trying to find its footing in the smartphone and tablet markets. Intel hopes that Bay Trail will attract a new set of PC buyers and give it a legitimate shot to compete against ARM, which rules the smartphone and tablet markets.

Previous Atom chips were criticised for their poor performance in comparison to those from ARM, whose reputation lies in maximising power-efficiency. Intel maintains that it has already caught up with ARM on power-efficiency with the recent Atom smartphone chips codenamed Medfield.

However, Intel's chief product officer Dadi Perlmutter said Silvermont chips will offer better performance-per-watt and break the myth that ARM CPUs are more power-efficient.

"This solution will be even better," said Perlmutter, who is also the executive vice president and general manager of the Intel Architecture Group.



## Improved performance

Silvermont CPUs incorporate a number of improvements. Out-of-order execution enables more efficient processing of instructions via clock cycles, and the chips will have more internal bandwidth, with a faster fabric that connects the CPU to other processors such as GPUs. In addition, Silvermont is able to move data faster from the shared cache into DRAM, which enables quicker task execution.

Silvermont also includes the latest virtualisation and security technologies, some of which has been borrowed from previous architectures for servers and PCs.

The cores are also flexible on performance and power consumption. CPU cores can be clocked up or shut down when idle. Intel said the flexibility provided by its cores is a better option than ARM's Big.Little, which incorporates different types of CPU cores to meet power and performance needs. Samsung's Exynos 5 Octa eight-core processor incorporates a Big.Little design with four high-power cores for demanding tasks and four low-power cores for tasks MP3 playback and voice calls.

With Intel's chip, no switching would be needed between low- and high-power

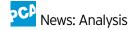
cores to meet different performance needs, Kuttanna said. A single Silvermont core can cover different ranges of power and performance, with no algorithms required to switch between cores.

"We can go up and down the range and cover the entire performance range," he said. "You don't pay the complexity price."

The new architecture is also able to share power between CPUs, graphics processors and other cores in a chip. Algorithms can monitor power delivery, thermal and electrical features, and bring down power consumption based on the device type. Tablets and smartphones will be able to more quickly resume from idle mode, too.

Atom chips based on Silvermont will be made using the 22-nanometre (nm) process, in which a 3D transistor allows more transistors in a smaller space. The chip will be smaller and more power-efficient than the current Atom chips codenamed Clover Trail, which are based on the 32nm process.

Intel is advancing to the 14nm process later this year, but it hasn't confirmed when new smartphone and tablet chips based on the process will be released. Intel Atom's chips made using 14nm manufacturing technology are called Airmont. ⊠





## Nokia has high hopes for Asha 501

Nokia's budget smartphone has an upgraded user interface and platform based on the acquisition of Smarterphone. Mikael Ricknäs explains

okia has expanded its smartphone line-up with the Asha 501, which comes with an improved touchscreen user interface to help keep at bay low-cost Android-based products.

The launch follows Nokia's announcement that sales of its mobile phones in the first quarter of 2013 had dropped by 21 percent year-on-year to 55.8 million units. The product family has become important for Nokia because future growth is expected to come from low-end smartphones, and its Windows Phone-based products are still not cheap enough to address the entire market.

The phone and its underlying platform is, in part, the result of last year's acquisition of Norwegian company Smarterphone.

## Slow moving in the Fastlane

The Asha 501 will cost \$99 (around £64) before taxes and subsidies when it ships in June. The GSM phone has a 3in screen, a 3.2Mp camera, Wi-Fi connectivity and a choice between one or two SIM cards. Dual-SIM capability has become essential in many developing countries.

One of the advantages of a smaller screen and less powerful hardware is better battery life: Nokia claims up to 48 days on standby. However, rather than the hardware, Nokia is placing the biggest emphasis on the user interface, which has two main screens: Home and Fastlane. Home is a traditional, icon-based view for launching individual apps or accessing a specific feature. Fastlane shows recently accessed contacts, social networks and apps. It can display up to 50 of the most recent activities.

The underlying platform has been improved to offer better performance and flexibility, including the ability to add new features and functionality more easily in future updates, according to Nokia.

On the software side, the company will also put out a version of its mapping software Here during the third quarter for the phone, which will offer basic services. The Asha 501 doesn't have GPS, so it has to rely on cellular network positioning to tell users where they are.

Third-party applications that have been preloaded or integrated include Facebook, Twitter and games from Electronic Arts and Gameloft.

When the phone starts shipping it is expected to be available via approximately 60 operators and distributors in more than 90 countries worldwide.

At the end of April Nokia also announced the Asha 210, which has a dedicated WhatsApp button and software clients for Twitter and Facebook. The phone has a 2.4in screen, a 2Mp camera, Wi-Fi and a Qwerty keyboard. It will ship in the second quarter.



## Google I/O 2013 round-up

During its annual developer conference Google announced updates to Android, Google Play, Google+, Chrome and Maps, as well as a new rival to Spotify. Chris Martin explains the key details

oogle's sixth annual I/O developer conference was held in May, with some interesting updates announced during the keynote.

Google said: "We believe computing is going through one of the most exciting moments in its history: people are increasingly adopting phones, tablets and newer devices. This spread of technology has the potential to make a positive impact in the lives of people around the world - whether it's simply helping you in your daily commute, or connecting you to information that was previously inaccessible."

As Google warned before the event, its announcements were focused on software and development rather than hardware – no new Nexus devices were unveiled, although Google has announced that it will sell a version of the Samsung Galaxy S4 running stock Android 4.2 Jelly Bean. It will go on sale in June at \$649. Read on for our round-up of the key software updates.

## **Android**

As we expected, Google failed to take the wraps off Android 5.0 Key Lime Pie. Rather, it announced a plethora of updates to its existing services, and celebrated its growing popularity with consumers: Android has now reached 900 million activations.

It was no secret that Google was planning Google Play Game Services. Similar to Apple's Game Centre, but not a standalone app, the service provides multiplayer modes, leaderboards, achievements and cloud saves, the latter linking gameplay to your Google account rather than your device, meaning you can pick up where you left off on any



Android or iOS phone or tablet, or even the web. Supported games include World of Goo, Super Stickman Golf 2 and Triple Town.

The other big Android announcement was an update to Google Play Music to rival Spotify and Rdio. An All Access service allowing unlimited music streaming has launched in the US for \$9.99 per month.

Also new is an update to Google Play Books that enables you to upload and view your own PDF and ePub files. Plus Google Search has been updated to include reminders, upcoming book, film and music releases, and real-time traffic information.

## Google+

Google unveiled a redesign of its Google+ social network that is cleaner and simpler, much like the updated Google Play Store. A standalone version of Hangouts (aka



Google Babel) has also been launched, which combines text, photos and live video across Android, iOS and PCs.

Users can now automatically upload 15GB (up from 5GB) of full-size photos for free. New features offer to pick the best photos and automatically enhance them, while Auto Awesome can create new content such as animated GIFs from your photos.

## Chrome browser

There are now more than 750 million Chrome users, according to Google. The firm previewed a VP9 video codec that allows for faster video-streaming performance, plus an API for faster payments.

## Maps

The next generation of Google Maps was also previewed, offering an experience tailored to individual users. Google said: "Every click draws a new map, highlighting the things that matter most." The more you use the service the smarter it gets, recommending places to go or alternative routes and modes of transport. Activity Recognition will know whether you're in a car, walking or cycling, and works independently of GPS.



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## Toshiba Portégé Z10t *Hybrid laptop/tablet* ≪

Toshiba's first entry to the convertible Ultrabook category is the Z10t. This Windows 8 tablet has an 11.6in full-HD screen that can be docked to a keyboard to form a proper laptop. Performance is provided by an Intel Core processor and an SSD.

Price TBC toshiba.co.uk

## >> Samsung Galaxy Tab 3

## Tablet

The third-generation Galaxy Tab has arrived in 7in form with new physical and touch-sensitive buttons. It runs Android 4.1 Jelly Bean and is powered by a 1.2GHz dual-core processor and 1GB of RAM. With a screen resolution of 1024x600, we're hoping the Galaxy Tab 3 will be a budget device.

Price TBC samsung.com/uk

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## Nokia Lumia 925 «

## Smartphone

Replacing the Lumia 920 as Nokia's flagship smartphone, the 925 is both slimmer and lighter. It's also clad in shiny aluminium rather than brightly coloured plastic. The handset has a dual-core processor and offers the maximum screen resolution allowed by Windows Phone 8 (768x1280 pixels).

Around £400 inc VAT (SIM-free) nokia.com/gb-en





## Logitech G500s

Mouse

This customisable gaming mouse from Logitech features a dual-mode scrollwheel and 10 programmable controls. Its weight and centre of gravity can be adjusted, and the 6500s has a sensitivity range of 200- to 8200dpi. A hydrophobic coating aids durability and helps to prevent hot palms sticking to the mouse.

£59 inc VAT logitech.com/en-gb



## 

E-reader

An alternative to the Kindle Paperwhite is Kobo's Aura HD. With a 1440x1080 display, it has a higher screen resolution than any e-reader on the market. The screen also features 'ComfortLight' technology, which allows users to read in the dark without needing an overhead light. There's space for around 3,000 books, but a microSD card slot means adding more is easy.

£139 inc VAT kobo.com

## Samsung NX2000

Digital camera

The latest addition to Samsung's compact-system camera range is the NX2000. It offers a 20.3Mp ASP-C CMOS sensor and an ISO range up to 25,600. There's a choice of 12 interchangeable lenses, an 8fps continuous mode, Wi-Fi and NFC.

Price TBC samsung.com/uk



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## Onkyo ES-HF300 >>

Headphones

Onkyo has made its move into the headphone market with the ES-HF300. These on-ear headphones are made from aluminium and house two 40mm titanium drivers. The unorthodox design includes removable 'audiophile-grade' insulated copper cables.

£179 inc VAT uk.onkyo.com/en ⊠





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## Smart watches

As well as the new products we know about, the rumour mill is always spitting out scraps of information about what tech manufacturers might launch next. Here we look at the smart watches that could be coming your way later this year



## >> Samsung Galaxy Smart Watch

Smart watch

Unlike Apple, Samsung has confirmed that a smart watch is on the way, but it's been a long time coming. No further details have been provided by the manufacturer, but it's highly likely that the watch will adopt Samsung's Galaxy branding. Our illustration shows the Galaxy Smart Watch with a similar design to its Galaxy phones and tablets, with the familiar physical Home and touch-sensitive buttons. It will probably run Android with the TouchWiz UI.





## Google Nexus Smart Watch <<

Smart watch

Search giant Google is also thought to be working on a smart watch. In 2011, Google applied for patents for a 'smart watch' with a 'flip-up' dual-screen display and a 'tactile user interface'. Beyond this, there are no details hinting at what it will be like. We've based our design on the Nexus 4 smartphone and wouldn't be surprised if, like other Google devices, the smart watch carries the Nexus branding.



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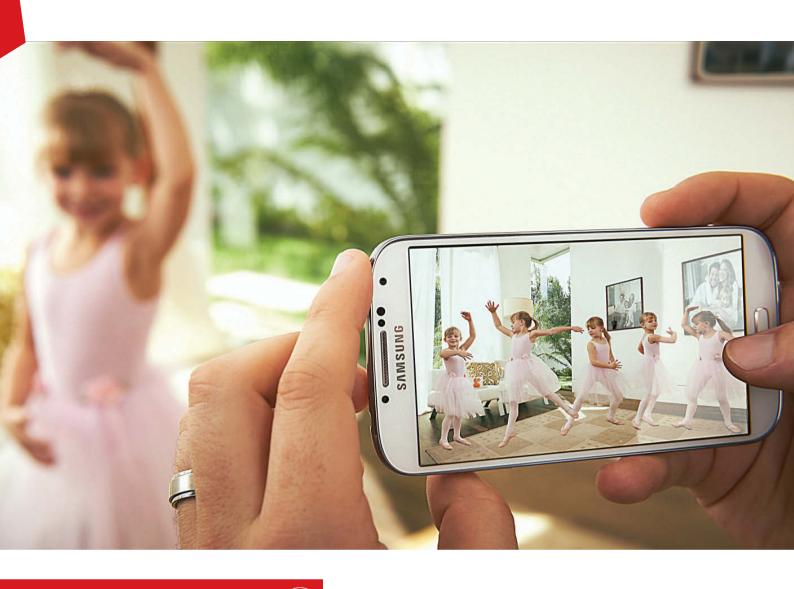
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Samsung Galaxy S4 34







**ANDREW HARRISON** 



## It was 30 years ago today...

s far as the record-buying public is concerned, digital audio was born in August 1983. That's when the first CD was delivered from Philips' European pressing plant in Germany. Little did co-inventors Philips and Sony know that the CD would not only come to rule the music world for decades to come, but help trigger aftershock revolutions in home video and PC storage.

For readers of a certain age, who can forget the sight of jam being spread on a disc on *Tomorrow's World*, with the sound of the Bee Gees still playing as the laser ploughed through the strawberry preserve?

Even now, 'CD-quality' is taken as the gold reference by which many judge good sound reproduction quality. That was depressing more than two decades ago when flaws in the format were first uncovered; trebly so today on CD's 30th anniversary, when technology and our knowledge of digital audio has advanced so far beyond what was possible when the format was developed in the 70s.

Maybe it was the impending end of the 20-year patent cash cow, or maybe it was a genuine drive to make amends for their far-fromperfect sound, but in the very late 90s Sony and Philips put all their marketing might behind a successor to CD, the Super Audio CD.

While half the consumer-electronics industry was backing a new high-resolution music format based on the runaway success of DVD video - DVD-Audio or DVD-A - using more bits to describe the music, Eindhoven and Tokyo proposed something altogether more radical.

They found another way to sample music digitally. It needed just one bit to toggle 0 or 1, rather than 16. But then they set the sampling frequency, the number of times per second that the music wave was measured, at 64 times more frequent than the 44,100 times per second of regular CD.

The result was better-than-CD quality, yet the format, in common with DVD-A, practically disappeared (excepting some

audiophile interest and independent record labels keeping it alive). Victor in the high-resolution music wars was... MP3, then AAC, as the iPod generation put convenience (and 'free') above awkward and expensive.

Thanks in no small part to the happy hacking of PlayStation 3 enthusiasts, the obscure DRM of SACD was cracked. And Direct Stream Digital (DSD) is returning - not enough to upset the iTunes Store, but restoring a glimpse of better-than-CD quality. It's only fitting that we should unite computer with hi-fi to hear what the CD could have become. Turn to pages 39 and 44 for our reviews of DSD liberated by PCs and USB cables.



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## £729 inc VAT

### Contact

- dell.co.uk
- Read more
- tinyurl.com/d4vdjon

### Specification

2GHz Intel Core i7-3537U (dual-core, 3.1GHz with Turbo Boost); Windows 8 64bit: 8GB DDR3 SDRAM: 1TB 5,400rpm hard drive; 17.3in (1920x1080) TN display; Intel HD 4000 and AMD Radeon HD8730M (2GB): 802.11b/g/n: gigabit ethernet: Bluetooth 4.0: 2x USB 3.0: 2x USB 2.0: HDMI;  $8x DVD \pm RW$ ; SD/MSslot; headphone socket; 65Wh lithium-lon battery: 407x265x35mm; 2.9kg



## I APTOP

## **Dell Inspiron 17R-5720**

Dell's Inspiron 17R is an affordable desktop-replacement laptop that provides useful performance and a large, attractive display for a little over £700.

It's not the most elegant of laptops. With its 17.3in screen and built-in optical drive the 17R is 35mm thick when folded flat, and weighs a hefty 2.9kg. This is definitely a laptop that will spend most of its time at home or in the office.

It'll earn its keep, though, powerful enough to handle both home entertainment and serious productivity apps. And the full-HD screen provides a very bright, clear image - we were able to watch a film perfectly well with the brightness set to 50 percent.

Turn up the brightness and the viewing angle is around 150 degrees, which will be handy if you ever need to give PowerPoint presentations. The glossy screen is reflective. however, and the speakers are also rather poor - particularly with higher frequencies, which sound like a Dalek snorting Helium.

For the most part, the Inspiron 17R is well put together. Its large chassis allows enough room for a full-size keyboard and numeric keypad, both with large, comfortable keys that travel well. The trackpad is small by comparison (100x55mm), but we like its chunky buttons.

There are several models in the 2013 Inspiron 17R range; we tested the top-end £729 model that runs Windows 8 on a 2GHz Core i7 dual-core processor. It comes with 8GB of memory. a 1TB hard drive and both integrated Intel HD 4000 graphics and a discrete AMD Radeon HD8730M with 2GB video memory.

This specification offers very good value, and compares well with the competition. However, the use of a dual-rather than quad-core processor and a slow hard disk undermined the Inspiron 17R's performance. It produced a slightly disappointing score of 2,535 points in PCMark 7.

Even so, the Dell has enough horsepower to handle basic web browsing and productivity tasks. With 8GB of RAM to hand it's also capable of more demanding tasks such as photo- and video editing.

You can play the latest games. too, if not at their ultimate detail settings. Running Batman: Arkham City at the screen's native 1920x1080 pixels, with DirectX 11 and High graphics detail, we recorded only 21fps. But with Low detail the Dell offered a playable 42fps.

We found a workable compromise by reducing the screen resolution to

1600x900. This allowed the laptop to play Batman at 35fps with DirectX 11 eye-candy and Medium detail.

There's a large cooling vent on the left side of the unit, but the Inspiron 17R never became uncomfortably warm or noisy even under full load.

The graphics processor does take its toll on the battery, though, allowing the Dell to run away from mains power for only 90 minutes. Using AMD's Catalyst software to toggle on integrated graphics boosted this to 3.5 hours when streaming video over Wi-Fi.

The Dell Inspiron 17R is too big and heavy to carry around, but it's a good, affordable choice if you're looking for a desktop-replacement machine that has the power to handle productivity software at work, and a spot of gaming at home. 🗵 Cliff Joseph

## LAPTOP

## Medion Erazer X7819

medion.com ■ tinyurl.com/cq23kyv

Specification

£959 inc VAT

2 4GHz Intel Core i7-36300M: Windows 8 64hit: 16GR DDR3 SDRAM: 750GB hard drive: 17.3in (1600x900) TN display: GTX 760MX (1.5GB); 3x USB 3.0;

428x288x42-62mm; 3.9kg

Build \*\*\* Features: \*\*\* Performance: Value. \*\*\*

You can get passable gaming performance from a laptop for around £700, provided that you tone down the resolution and detail settings, but if you want to enjoy smooth graphics at a high resolution you'll need to spend £1,200 or more.

That was certainly the case prior to Medion's unveiling of the Erazer X7819, which throws down an impressive gauntlet to its gaming rivals. It's not the most powerful gaming laptop we've seen, but its performance could satisfy all but hardcore gamers at just £959.

Like most gaming laptops the Erazer is something of a beast in girth and mass, sporting a large 17.3in screen and a weight so great it broke our scales. Medion specifies it at 3.9kg, to which you should add another kilo for the mains charger.

It looks impressive, though. The sturdy plastic chassis has a smart fake-metal finish, joining the gratuitous glowing lights usually found in shoot-'em-up territory.

There are several models in the Erazer range, wielding either 15.6in or 17.3in displays, with prices up to £1,400. We tested the entrylevel X7819, which costs £959 and has a quad-core 2.4GHz Intel Core i7-3630QM processor, 16GB of memory and a 750GB hard drive. The model featured on Medion's website at this price at press time has only 8GB of RAM, however.

As well as the built-in Intel HD 4000 integrated graphics there's a dedicated nVidia GeForce GTX 670MX with 1.5GB of video memory.

We were pleased to find the Erazer's screen has a non-reflective matt finish, but disappointed that it's been downsized to 1600x900 pixels. Models with full-HD displays are available, but bust the £1,000 barrier.

Brightness and viewing angles aren't good, with the image noticeably darkening as your head moves 45 degrees to the side.

The Medion Erazer scored a downbeat 3,375 points in PCMark 7. The hard drive also means this laptop boots sluggishly - it took around 45 seconds to get up enough



## £700 inc VAT

### Contact

- uk.msi.com Read more
- tinyurl.com/ck25bcy

### Specification

2.4GHz Intel i7-3630QM (quad-core, 3,4GHz with Turbo Boost); Windows 8 64bit: 8GB DDR3 RAM: 1TB 5,400rpm hard drive; 15.6in (1920x1080) matt TN display; Intel HD 4000 and nVidia GT 645M (2GB): 802.11b/g/n; gigabit ethernet: Bluetooth 4.0: 2x USB 3.0: 1x USB 2.0: HDMI; VGA; tray-load Blu-ray/DVD drive; SD slot; headphone socket; microphone socket; 49Wh lithium-ion battery; 383x250x38mm; 2.5kg



## LAPTOP

## MSI CX61 ONF

It's not going to win any awards for design, but MSI's CX61 provides good multimedia features and performance at a competitive price.

MSI's marketing materials waffle on about the CX61's "tapering silhouette... evocative of F1 racers". But with its built-in Blu-ray drive, the CX61 measures a chunky 38mm thick and weighs a hefty 2.5kg. This is not a laptop that you're going to casually sling into a backpack and carry every day.

The MSI's display is a highlight, providing a bright, sharp image with a full-HD 1920x1080-pixel count. It also has an anti-glare coating and wide viewing angles that will be useful when watching video at home or running presentations at work.

The speakers are a cut above average, too - there's a metallic twang on the higher frequencies, but the bass is enough to add a welcome firmness to the overall sound quality.

The keyboard feels solid enough, with plenty of travel on the keys and room for a separate, full-size numeric keypad. However, the single Windows key is located to the right of the Space bar, which some people may find getting used to difficult.

A set of cursor keys are squeezed in to the right side of the keyboard, with the result being an off-centre Space bar, leaning noticeably to the left of the keyboard.

The trackpad is rather small - just 75x45mm - with two narrow buttons below. Less nimble-fingered users may not find the MSI CX61's

ergonomics

to their liking.
Originally
launched last summer,
this latest version of the CX61
steps up from a dual-core Intel Core
i5 processor to a quad-core Core
i7-3630QM running at 2.4GHz, along
with 8GB of memory, a 1TB hard
disk, and both an nVidia GT 645M
graphics card and integrated Intel

This specification comes in at a reasonable £700, which can be reduced to £612 if you're happy to forsake the Blu-ray for a DVD drive.

HD Graphics 4000.

The 5,400rpm hard drive lets down the side a bit, and with it the MSI could record just 3,046 points in our PCMark 7 benchmark. You'll also notice the lack of pace of this drive when booting the CX61. It boots into the Windows 8 Start screen in just 15 seconds, but takes another 30 to gather its thoughts and launch another application.

Once it's got its act together, that Core i7 processor provides enough power to handle a wide range of applications, including demanding photo- or video editing. It can also handle a spot of casual gaming. Running Batman: Arkham City at 1920x1080 was a struggle, but at 1280x720 pixels we saw 25fps with High detail, and 35fps with Low.

The cooling fan kicks out some warm air when using the nVidia graphics during gaming sessions, but this wasn't loud enough to be annoying or obtrusive over the Batman soundtrack.

The MSI's battery life isn't great. We recorded just three hours when streaming video over Wi-Fi with the integrated graphics - and that was with power-saving mode engaged.

## Verdict

The MSI CX61 ONF looks chunky and old-fashioned when compared with modern laptops, but its powerful processor and attractive full-HD display make it a good, affordable desktop-replacement laptop that's suited to multimedia work and entertainment. 

Cliff Joseph



steam to launch Windows programs (with no antivirus installed).

But once the Erazer hits its stride it provides very good gaming performance for the money.

In Batman: Arkham City at the Erazer's native 1600x900, DirectX 11 and High detail, it managed a comfortable 40fps. Should you need more speed, at Medium detail we saw 50fps.

We saw a similar story in Stalker: Call Of Pripyat, in which the Medion hit 50fps with High detail.

The cooling fan hummed loudly, even when using the integrated graphics. You could use the speakers in an attempt to drown out the fan when playing games or watching films, but you'll also have to contend with their tinny sound.

The keyboard and trackpad are large and firm enough to take a pounding during gaming sessions, and several keys - including the W, A, S, D gaming control combo - are highlighted in red to enhance visibility. The left and right mouse

click buttons are attached to a single pivoted bar, which proved too stiff for comfortable use.

Battery life is a mixed bag. We were able to get a little over four hours when streaming video over Wi-Fi using the Intel HD Graphics 4000, but just 90 minutes when running our gaming tests.

## Verdict

The Medion Erazer might have a simply so-so screen, but its gaming performance can rival that of laptops costing hundreds of pounds more. If you're looking for a laptop that can handle some gaming for less than £1,000, the Erazer X7819 is a speedy option. ☑ Cliff Joseph

## £535 inc VAT

## Contact

- samsung.com/uk Read more
- tinyurl.com/ca5p7Lf

### Specification

1.9GHz Qualcomm Snapdragon 600 quadcore processor; Adreno 320 GPU; 5in (1080x1920, 441ppi) SuperAMOLED display; Google Android 4.2.2 Jelly Bean; 2GB RAM; 16/32/64GB internal storage: microSDXC slot (up to 64GB): 13Mp rear camera with LED flash (1080p video); 1.9Mp front camera; dual-band 802.11a/b/g/n/ac; NFC; Bluetooth 4.0; GPS/ Glonass; infrared remote; accelerometer; RGB light sensor; compass; proximity sensor; gyro; barometer: Micro-USB: GSM/HSDPA/LTE: 9.8Wh removable lithium-ion battery; 70x137x7.9mm;

## PC ADVISOR RECOMMENDED





## **SMARTPHONE**

## Samsung Galaxy S4

Samsung's Galaxy S4 is one of the most anticipated phones of the year, faster and more feature-packed than ever. It's sold with a plethora of interesting software, marking it out from a very similar crowd.

The S4 looks something like a cross between the S III and the Galaxy Note 2. Available in 'Black Mist' and 'White Frost', with more colours expected later in the year, the S4 looks standard, but stylish.

Despite Samsung's insistence on sticking with the same-style flimsy plastic rear as the S III, the S4's design is impressive. Samsung has managed to squeeze into a smaller handset a larger screen. It's thin and light at 7.9mm and 130g, but it can't compete with the iPhone 5, Sony Xperia Z or HTC One on style.

The front-facing camera and a row of three sensors are blemishes on the front of the handset, and particularly visible on the white model. The touch-sensitive buttons sitting either side of the Home button can be difficult to reach and, at the same time, too easy to accidentally press.

## Performance

In common with the HTC One the S4 is sold in the UK with a quad-core Qualcomm Snapdragon 600 processor, here clocked at 1.9GHz (versus 1.7GHz). Add 2GB of RAM and the S4 stormed our benchmarks, appointing itself as the new record holder in both

> Geekbench 2 (3,227 points) and GLBenchmark (41fps). The former is significantly higher than the HTC's 2,721 points, and almost twice that of the S III.

Its 1,092ms result in SunSpider can't quite match the iPhone 5's 903ms, but it's still a very good result.

In real-world use we found the S4 could be slow to open certain apps, which could be a symptom of its storage problems.

The S4 is available with 16-, 32- or 64GB of internal storage, of which well over 6GB is consumed by the OS and

preinstalled software, which can't be uninstalled. There's a microSDXC slot for storing your media, but you can't install apps here.

The 5in full-HD screen is impressive. The SuperAMOLED panel offers vibrant colours, but these are less excessive than they have been with previous Galaxy handsets. The S4 matches the Xperia Z's pixel density of 441ppi, but the 469ppi HTC One wins this spec battle.

You can use this screen while wearing gloves and, thanks to the S4's support for air gestures, you needn't make finger contact to answer calls or browse the web.

Connectivity includes dual-band 802.11ac, Bluetooth 4.0, GPS, NFC and support for 4G LTE. There's also an infrared emitter that allows you to use the S4 as a TV remote, and a barometer which is used in conjunction with the S Health app to monitor your comfort level.

## Software

The Galaxy S4 runs Android 4.2 Jelly Bean with Samsung's TouchWiz user interface. This interface will be familiar to S III owners, with the Settings menu split into tabbed sections. Games, music, films and books can be bought from either Google Play or the Samsung Hub.

Samsung has preinstalled what seems like a never-ending list of software - some of it rather clever, and some a little gimmicky.

Smart Scroll and Smart Pause use eye-tracking technology to automatically pause and resume movies and games as you look away from the screen, or to scroll down web pages as you read. We found Smart Scroll difficult to get your head around, and it doesn't work if you wear glasses or are using the Chrome browser or Gmail.

One of our favourite features is Multi Window, which can snap two apps side by side.

Two key apps are S Translator and S Health. S Translator can provide audible or text translations in eight foreign languages, but it requires an active data connection. S Health can track your workouts, calorie consumption and weight, offer stats on your health, and monitor your comfort level based on temperature and humidity.



The Galaxy S4 has a 13Mp rear camera that supports full-HD video recording, plus a 1.9Mp front camera for video chat. Our test shots and footage were very impressive, showing excellent detail, and good exposure and colour saturation.

Samsung has expanded on the standard Android Camera ann with several features. Dual Shot, for example, simultaneously captures from both the front and rear cameras. This puts everyone in the frame, with the resulting image displaying a small thumbnail of the person behind the camera.

Less gimmicky camera add-ons include Sound & Shot, which captures audio alongside still shots; and Drama Shot, which can combine multiple images and is ideal for showing action in a single frame.

The Galaxy S4's battery has around 25 percent more capacity than that of its predecessor, and Samsung claims the larger screen uses less power. The 9.8Wh cell didn't last as long as we'd hoped, however, and at the end of our working day we had just 35 percent remaining. With lighter usage you can expect the S4 to last two days before needing a recharge.

## Verdict

The Samsung Galaxy S4 is a great smartphone that offers class-leading hardware and performance, but it's not flawless. We're disappointed with the plasticky build quality, and the amount of available storage space is a sore point for Samsung. The S4 is feature-packed, but some are little more than gimmicks. **Chris Martin** 



## £200 inc VAT

### Contact

- mobiwire.co.uk Read more
- tinyurl.com/bvqp9wp

### Specification

1GHz ARM Cortex-A9 dual-core processor: 4.3in (480x800, 256ppi) IPS display; Android 4.0 Ice Cream Sandwich; 1GB RAM; 4GB storage; microSDHC; 802.11b/g/n; Bluetooth 3.0: microUSB: 5Mp rear camera with dual flash: VGA front camera: GPRS/EDGE 850/900/1,800/1,900MHz; UMTS/WCDMA 2,100MHz; 2x 5 6Wh hattery: 69x127x11mm; 152g



### **SMARTPHONE**

## MobiWire Gemini

The MobiWire Gemini is a budget Android dual-SIM handset that fails to stand out from the crowd - in its design anyway. The plain black plastic slab is unremarkable. but its rounded corners make it comfortable to hold.

The phone has an odd stepped contour below its three touch buttons. It isn't svelte at 11mm and 152g, but neither is it brick-like.

Its dual-SIM operation will prove attractive to those who are looking to combine home and work SIMs in a single handset. The two batteries bundled in the box is another plus.

The Gemini's specification is about right for the price, with a 1GHz dual-core ARM processor and 1GB of memory, but just 4GB of storage, expandable via microSDHC.

Geekbench 2 awarded the Gemini a not awful 930 points. It didn't fare so well in our other tests, though, with a sluggish 2,005ms in SunSpider and a stuttering 4fps in GLBenchmark.

In real-world use the phone feels reasonably nippy when navigating Android's home screens and menus, but web browsing and gaming are far from a smooth experience.

A decent 4.3in IPS screen packs 480x800 pixels, giving a middling pixel density of 216ppi. Images look vibrant, but everything's a bit rough around the edges. More troubling was the display and touch buttons' failure to quickly respond, which is rare with capacitive technology.

Connectivity options are standard-fare, with Wi-Fi, Bluetooth, GPS, plus an FM Radio. There's no near-field communication or 4G here.

The thick casing prevents the use of a standard Micro-USB cable for charging and data synching, but two usable leads are supplied.

In good lighting, the 5Mp rear camera performs reasonably well. Photos look natural, but are prone to softness around the edges. It struggles indoors, while video is blurry and lacks detail. The front camera is a standard 0.3Mp model.



Each 5.6Wh battery may get you through only one day's use. Note that there's no separate charger to keep the spare ready to go.

### Verdict

There's nothing exciting here in terms of performance or design, but anyone who needs a dual-SIM handset will find the Gemini a well-priced option. The spare battery is a nice touch, too. Martin

## £149 inc VAT

## Contact

- prestigio.com Read more
- tinyurl.com/nvzkgqq

## Specification

1.2GHz ARM Cortex-A9 dual-core processor; 5in screen (480x800, 187ppi); Android 4.1 Jelly Bean; 512MB RAM; 4GB storage; 2x Mini-SIM card slots; microSDXC; 802.11b/g/n; Bluetooth 2.1; Micro-USB; aGPS; FM radio; 5Mp rear camera; 0.3Mp front camera; GSM 850/900/ 1,800/1,900MHz; WCDMA 900/2.100MHz: 8.1Wh lithium-ion battery; 79x149x10.8mm; 201g



## **SMARTPHONE**

## Prestigio MultiPhone PAP5000 Duo

Another cheap-and-cheerful dual-SIM smartphone, the Prestigio MultiPhone PAP5000 Duo costs just £149 SIM-free. Unlike the MohiWire Gemini (reviewed above) the PAP5000 does stand out from the crowd - but not for the right reasons. It's a brick of a phone and makes this year's big smartphones, such as the Samsung Galaxy S4 (left), look small by comparison.

This 150mm-tall, 201g device is seriously cumbersome in the hand. Despite its plastic build, the chunky Duo seems solid.

For an inexpensive device, the PAP5000 has a reasonably decent dual-core processor in the form of a 1.2GHz ARM Cortex A9. However. there's only 512MB memory and 4GB of storage, with less than 1GB available to the user. Fortunately, there is a microSDXC expansion slot.

We recorded a slow 2,010ms in the SunSpider JavaScript test, and a mere 4fps in GLBenchmark. Geekbench 2 refused to install due to an unexplained storage error.

Like 2013's flagships, the Prestigio has a 5in screen. But this panel has a significantly lower resolution of 480x800, resulting in a pixel density of just 187ppi. Graphics and text look rough, and the TN panel severely limits the viewing angle.

Connectivity is basic, comprising single-band 802.11b/g/n, Bluetooth 2.1 and GPS, but those dual-SIM slots will appeal to anyone looking to combine work and home SIMs in a single handset. Only the primary SIM slot supports 3G cellular data.

In common with the Gemini there's a 5Mp rear camera and a 0.3Mp webcam for video chat. The quality of our test shots and video was disappointing, lacking detail and often out of focus. The camera didn't adapt well to light changes either.

The Duo runs Android 4.1 Jelly Bean. It's not the absolute latest version, but close enough. Prestigio has made a few tweaks to the interface, with the addition of some quick settings in the notification bar. We're not keen on the placing of the



Back touch key to the right of the Home button, and Google Now won't open with an upward swipe.

Within four hours' use we'd burned through 40 percent of the 8.1Wh removable battery's capacity.

## Verdict

The PAP5000 Duo is bulky, with limited features and short battery life, but it does provide dual-SIM slots on a budget. Martin

## £420 inc VAT

## Contact

- uk.lge.com Read more
- tinyurl.com/ctr7aaw

### Specification

29in monitor: 2560x1080: 21:9 aspect ratio: 0.26mm pixel pitch; IPS panel; tiltadjusting stand (-5 to 20 degrees); white LED backlight; 3H Hard antiglare coating; rated brightness: 300cd/m<sup>2</sup>: rated contrast ratio (dvnamic): 5.000.000:1: 178/178-degree (H/V) viewing angles; 5ms response time; true 8bit panel with 16.7 million colours; DVI-D; 2x HDMI; DisplayPort; MHL inputs; audio jack input; stereo speakers with 14W amplifier; Kensington security lock slot: 700x209x387mm: 5.2kg





## 29in MONITOR

## LG 29EA93

When widescreen isn't wide enough, LG's 29EA93 stretches the 16:9 definition further by offering a 29in display with a 21:9 aspect ratio. This 2560x1080 IPS panel has a built-in three-port USB 3.0 hub and support for hardware calibration.

The extra screen space means documents fit nicely side by side, and spreadsheets can show many more columns. Films can be watched without the letterbox effect you get with a 16:9 display, and games can become more immersive. But films and games that do use 16:9 will now appear with black bars at the sides.

Build quality is pleasantly high. The monitor is mainly constructed from plastic, but it feels sturdy and features several subtle design touches that lend it an expensive feel with no small measure of style.

The tilting stand sits too low on the desk for comfort and features no height adjustment. You could wall-mount the display, however.

The monitor is controlled by a row of four touch-sensitive buttons that sit below the bezel on the right. Selecting the menu button brings up a row of large, colourful icons. Although the layout is clear, the controls are overly sensitive.

At the rear are DVI-D, DisplayPort and a pair of HDMI ports, one of which supports MHL for connecting Android phones.

Out of the box the LG's picture is excellent, but there are several advanced functions to

maximise display quality and make the most of the screen size.

The picture-in-picture mode allows you to simultaneously use two input sources, for example a PC and a Freeview box. You could overlay one display inside the other in the usual way, but the extreme width of the LG also makes it practical to display them side by side.

LG includes Windows-only software such as Screen Split, which sits in the taskbar and automatically organises your open windows into any of a selection of predefined layouts, designed to make efficient use of the screen space.

Dragging the corner of one window causes the others to automatically resize, keeping all fully visible. We found this software to be unhelpful and confusing. The built-in help option didn't work and the interface offered no practical explanation on how to use it.

You can confidently edit photos and video on this factory-calibrated display, which offers very accurate colour out of the box. In our tests there was no visible difference before and after calibration, and

measured colour errors were as good as non-existent.

Contrast measurements were not as good as many other displays we've tested, at just 560:1, but in general use the display looks bright, punchy and sharp.

The LG display was measured with a 79 percent gamut of Adobe RGB, and 99 percent sRGB.

The 29EA93 has built-in support for hardware calibrators, so you can ensure optimum output accuracy is maintained. This is a fully automated process, LG's software taking control of the monitor and adjusting the settings for you as it completes.

Power consumption at maximum brightness was relatively high at 38W. At 120cd/m<sup>2</sup> it drew just 23W.

## Verdict

The LG's 2560x1080-pixel ultra-wide aspect ratio is great, but brings compatibility issues with existing software and hardware. Our sample delivered highly accurate colour out of the box. Manual Paul Monckton

## 39in LCD TV

## Panasonic TX-L39E6

Contact panasonic.co.uk

£699 inc VAT

■ tinyurl.com/c34yuuf

## **Specification**

39in (1920x1080) LCD TV; Freeview HD: 10W amp: 3x HDMI: Scart: Component: digital audio coaxial: ethernet, 802.11b/g/n; 2x USB 2.0; CI; 879x519x49mm; 11kg



Panasonic's TX-L39E6 is a 39in LCD TV that provides access to the firm's recently refurbished Smart TV portal. While the enticingly affordable E6 series doesn't sport the high-quality IPS panel found further up the range, and it's tworather than three-dimensional. we don't think you'll mind when you kick back to browse iPlayer or stream a movie from Acetrax.

Indeed, you might well feel smug, having snapped up one what could prove to be one of this year's bestvalue flatscreen TVs.

The E6 comes in five screen sizes spanning 32- to 50in. The model reviewed here is the 39in TX-L39E6. Although 39in is an unusual screen

size, it's not without bijou charm. This TV typically sells for £699.

The design is ace. The set has an ultra-thin grey/silver bezel with a trendy translucent lip. It's also slim at just 37mm thick. Black and white finishes are available.

Connections include three HDMI, ethernet, Scart, component AV-in and an optical audio output. There's also a CI port and USB media reader, but no SD slot. Wi-Fi is built-in.

While Panasonic may be using a journeyman panel with the E6, that doesn't mean it's a dud. Indeed, contrast is extremely good and the screen delivers seriously broody blacks, although these are rather sensitive to off-angle viewing.

While this set lacks the pictureprocessing brawn seen on pimped-up Panasonics (there's no Intelligent Frame Creation), images are crisp and vibrant. If the set does have an Achilles' heel it's with limited motion resolution - there's nothing above 850 lines when measured at 6.5ppf (pixels per frame), but at this screen size that's not really a problem.

Sonically, the set is thin but functional, although we found one anomaly with the optical output. On any new Freeview HD screen we would expect to be able to route out Dolby Digital 5.1 from connected HDMI sources. However, we could get only stereo from the Panasonic. This would be an issue if you planned to



#### £360 inc VAT

#### Contact

- scan.co.uk Read more
- tinyurl.com/bnzkqja

#### Specification

12Mp CMOS sensor: 4096x2160 (4k), 2704x1440 (2.7k), 1080p, 960p, 720p and WVGA resolutions; 15fps (4K) to 240fps (WVGA); MP4 video format: mono AAC audio: Protune mode: 12Mp still images: waterproof housing rated to 60m depth: Wi-Fi control: assorted mounts; 74g

#### PC ADVISOR RECOMMENDED Build: \*\*\*\* Features: \*\*\* Performance: Value

#### DIGITAL CAMCORDER

#### GoPro Hero3 Black Edition

GoPro is fast becoming the Hoover of rugged camcorders, arguably the best-known specialist in video cameras built for extreme sports.

Its Hero3 is available in three versions, including the top-end Black Edition reviewed here, Regular and Surf. The latter is supplied with surfboard mounts and ties.

The Black Edition has the highest-resolution sensor of all Hero3 models, and with it the top shooting specification.

It sports a 12Mp CMOS sensor that can capture motion video well above 1080p. Amazingly, the GoPro will shoot in 4k resolution (4096x2160 pixels) at 15fps. There's also a 2.7k mode, which operates at 30fps, and 1440p at 48fps.

For shooting fast motion there's even a 240fps option, albeit at a standard definition of 800x480.

GoPro has built in Wi-Fi connectivity. The remote control bundled with the Black Edition uses this wireless link to allow you to switch shooting modes and toggle on and off recording.

There's also a GoPro iPhone app. The GoPro can act as a mini hotspot to which you can connect your iPhone, and the app then lets you remotely configure settings and begin recording. There's a mini video preview, too. This is rather handy, as the standard GoPro bundle doesn't

include an LCD display. You can buy an attachable touchscreen LCD for £80.

The Hero3 is sold with the signature GoPro waterproof housing, able to repel water up to 60m. You also get guick-release and J-Hook buckles, the latter for attaching the camera to a vertical surface, plus a three-way pivot, curved and flat adhesive mounts.

Shooting 4k video with a device as tiny as the GoPro seems absurd. although image quality is decent if a little ierky due to the low framerate. The 2.7k or lower options will be more realistic for the majority of shooting scenarios.

Image quality is surprisingly good in most conditions. This is a fixed-focus camera with no image stabilisation, but low-light performance is commendable, and the image has plenty of detail.

Footage is recorded to a microSD card in MP4 format at up to 45Mbps in Protune quality mode, and we had no problems editing footage in Adobe Premiere Pro CS6.

The lens is small, but in Wide mode it provides an extensive field of view that causes a noticeable fisheye appearance. This is potentially an advantage for footage in which you want to see as much of the surroundings as possible.



We didn't notice any chromatic aberration, and in the Protune option footage is captured in a less-processed mode, akin to RAW mode in stills images, so even more of the colour is retained.

At 4k resolution, the data rate hits 50Mbps, and compression artefacts are kept low.

Audio is not a strong point. It's captured in mono only, at 48kHz sample rate, and the housing muffles the pickup considerably.

#### Verdict

After trying the GoPro for various activities, including mountain biking and ice skating, we can see why the GoPro name is almost synonymous with the action-camera concept. We would like to see a helmet strap in the box as standard, but image quality is good in a variety of conditions, the design is reassuringly rugged, and the Wi-Fi controls make operating a camcorder that may be attached to your clothing or vehicle very friendly. 

James Morris



drive a home cinema from the TV's audio output.

Where this TV really differs from last season's models is the interface. There's been a big drive to simplify and personalise the Smart experience. A new Voice Guidance feature is on hand to give you a spoken tour of the features.

More significantly, the TX-L39E6 also debut's Panasonic's new My Home Screen interface. This is dramatically different from the old-style Viera Connect interface, offering a choice of three preset designs (with an emphasis on lifestyle, info or TV content) as well as the option to configure your own, which is simply a case of selecting your preferred apps and streaming services on to an empty grid.

As far as personalised TV goes, it's the most advanced out there and optional, so you don't have to let the Home Screen take over your TV whenever you turn it on.

There's a broad range of streaming IPTV services available, including BBC iPlayer, YouTube, Netflix, iConcerts, Acetrax and DailyMotion, plus the usual social media clients.

Multimedia file playback support is excellent from USB, covering all key codecs and containers, although across a home network MKV files aren't recognised.

#### Verdict

All things considered, the Panasonic TX-L39E6 is a great smart TV for the money. It looks beautiful, delivers sharp, high-contrast HD images and boasts an extremely sophisticated user interface and a decent selection of IPTV. It's easy to use and live with. Steve May

#### £145 inc VAT

#### Contact

- uk.asus.com Read more
- tinyurl.com/bpruys5

#### Specification

AMD Radeon HD 7790: 1GB GDDR5 RAM: 1GHz core clock (1,075MHz Boost); 1,600MHz memory clock (6,400MHz DDR effective): 400MHz Ramdac: 12-8bit memory interface: 896 stream processors: PCI Express interface: DirectX 11: 2x DVI: 1x HDMI: 1x DisplayPort; 1x 6-pin PSU connector needed: 3-year warranty



#### **GRAPHICS CARD**

#### Asus AMD Radeon HD 7790 DirectCU II OC

The 7790 is a cunning twist on AMD's 7000 series, and puts up a strong fight against nVidia's price-conscious 650 range. But the launch of the new Boost (reviewed below) has stolen AMD's thunder.

There's nothing particularly radical about the 7790. It plays host to a new chip, codenamed Bonaire, which is smaller and more compact than the previous Cape Verde.

The most obvious point of comparison would be the Radeon HD 7770. In some areas the 7790 even approaches the pricier 7850.

In factory-specified trim both 7770 and 7790 have the same 1GHz speed, but Asus has here added a 75Hz boost. Complemented by an increase in texture units - from 40 on the 7770 to 56 - the texture fill rate hits 60.2GTps, which is more than 50 percent greater than the 40GTps of the 7770. It's still some distance behind the 70.3GTps of nVidia's GTX 650 Ti Boost, though.

The Asus 7790's 1,600MHz memory clock (a 100MHz increase

on the factoryspecified 7790) gives it a massive advantage over the 1.125MHz of the standard 7770. The effective figure of 6.4GHz is a huge jump on the 7770's 4.5GHz. It even beats the 650 Ti Boost's 6,008MHz.

However, while nVidia was smart enough to kit out the Boost with a 192bit memory bus, the 7790 is saddled with the same 128bit as the 7770. Low memory bandwidth tends to choke the potential speed of lower-cost cards.

The 7790's 102.4GBps bandwidth is impressive compared to the 72GBps of the standard 7770, but pales against the Boost's 144.2GBps.

The 7790 is pleasingly light on power. Its 85W TDP is nearly 50W below the 650 Ti Boost's 134W.

In our performance tests the 7790 remained several frames behind the Boost in most areas.

In Crysis 2 it gave figures of 26.6and 18.9fps at the largest display sizes (1900x1200 and 2560x1600). putting it almost three frames ahead of the 7770, but some way behind the Boost's 30.5- and 21.1fps.

In Stalker: Call of Pripyat the 7790's framerates of 54.6- and 29.8fps were a long way adrift of the 650 Ti Boost's 65.9- and 41.3fps.

#### Verdict

Only a few months ago the 7790 would have been a great-value card. but now the 650 Ti Boost offers superior performance for very little extra cash. I Robin Morris

#### £156 inc VAT

#### Contact

- uk.msi.com Read more
- tinyurl.com/dye3ow8

#### Specification

nVidia GeForce GTX 650 Ti Boost; 2GB GDDR5 RAM; 1,033MHz core clock; 1,502MHz memory clock; 400MHz Ramdac; 192bit memory interface; 768 stream processors; 64 texture units; 24 ROP units; PCI Express: DirectX 11: 2x DVI; 1x HDMI; 1x DisplayPort; 1x 6-pin PSU connector needed; 3-year warranty



#### **GRAPHICS CARD**

#### MSI nVidia GeForce GTX 650 Ti OC Boost Twin Frozr

The continued pursuit of high performance and great value for money has driven both AMD and nVidia to unleash new products in the same month. Although the nVidia GeForce 650 Ti Boost is more a new tilt on older technology. the results are compelling for mid-range purchasers.

Working with the tried-and-tested GK106 chip, the Boost builds on the standard GTX 650 Ti. The 928MHz processor been pushed to 1,033MHz, and a Boost feature can turn up the throttle to 1,098MHz. The memory clock speed has been raised, too. from 1.350MHz to 1.502MHz.

The Boost retains the 650 Ti's 768 stream processors and 64 texture units, but raises the number of raster operation units from 16 to 24. More crucially, it improves on the memory interface. The Ti's 128bit kept a lid on performance, but the Boost has a 192bit version.

Memory bandwidth comes in at massive 144.2GBps, as opposed to the 86.4GBps of the 650 Ti.

The Boost also improves on the 650 Ti's texture fill rate, using that Boost feature to push the figure from 59.4GTps to 70.3GTps.

The Boost has a high TDP of 134W, which is a significant jump on the 110W of the standard 650 Ti. In practice we found the difference to be about 18W.

Helped by MSI's customised dual-fan design, the card is reasonably quiet, and remained relatively cool throughout testing.

In Crysis 2 the 650 Ti Boost produced framerates of 30.5- and 21.1fps at the highest resolutions (1900x1200 and 2560x1600). These are comfortably superior to the 7790's scores of 26.6- and 18.9fps, and even the powerful 7870 could offer only 33.7- and 22.6fps.

As the tests got easier, the Boost extended its advantage, pushing up the framerates to 65.9- and 41.3fps in Stalker, opening up double-figure leads over the 7790.

It was also a good margin ahead in BattleForge, offering framerates of 59.8- and 36.1fps against the 7790's scores of 51.5- and 28fps.

#### Verdict

The MSI GeForce GTX 650 Ti OC Boost Twin Frozr is a fantastic card for the money, in some areas almost getting close to the £200 7870. It totally outclasses the HD 7790 for an extra £11. 🗵 Robin Morris



#### £500 inc VAT

#### Contact

- hdanywhere.co.uk Read more
- tinyurl.com/dxuzfa9

#### Specification

HDBaseT transmitter: 100m claimed range: remote control; 4x IR blaster; 4x HDMI inputs; 1x HDBaseT RJ45 output; 2x ethernet; 317x27x155mm; HDBaseT receiver: 1x HDMI output; 1x HDBaseT input: 2x ethernet: 110x23x23mm

#### **PC ADVISOR** RECOMMENDED



#### **NETWORK SWITCH**

#### HDanywhere 4x2 HDBaseT Hybrid Matrix

UK audiovisual distribution specialist HD Connectivity was an early advocate of HDBaseT multisignal networking technology. Its expensive 4x4 Multiroom+ system was released last year; now it's launched this far more affordable HDanvwhere 4x2 Hvbrid Matrix.

For the first time it brings what was a tool of the posh custominstall crowd into get-your-handsdirty territory. For £500 you get a HDMI matrix switcher and a single Multiroom+ receiver.

For those not yet up to speed, HDBaseT can simultaneously carry HD video, multichannel audio. network data, power (up to 100W) and control data via Cat 5e/6 cable.

Boasting 10.2Gbps bandwidth, it can handle uncompressed HD video and audio, is 3D-ready, and theoretically compatible with 4K Ultra HD. In short, it's just what you need for a relatively future-proof home-entertainment network.

The Hybrid receiver is well made. It has a pressed-aluminum chassis,



with fins that can be used to secure it to racking or a wall.

To the rear are four HDMI inputs and one HDMI out, along with an HDBT RJ45 output to feed a remote receiver. There's also a phono stereo audio feed and an optical digital audio output on the main unit, plus a 100Base-T ethernet loopthrough.

The Multiroom+ receiver is a smaller affair, sporting a single HDBT connection, plus HDMI and ethernet outputs. No local power supply is required.

The system doesn't take long to get up and running, although fine-tuning can take hours if you have to massage handshaking and EDID issues. By incorporating HDMI into the system, there's potential for DRM digital restrictions to throw spanners into the distribution works.

Performance is excellent. The transmission process doesn't compromise the image quality of any selected feed, and there is only a minor transmission lag. The piggybacked networking also works a treat, ideal for bringing a wired connection to a remote smart TV.

#### Verdict

While this box isn't completely domesticated, the HDanywhere is the most persuasive option we've seen yet if you want to route HD video and internet around the house. Steve May

#### £990 inc VAT

#### Contact

- chordelectronics.co.uk Read more
- tinyurl.com/nvegg7L

#### Specification

24bit and 1bit digital-toanalogue convertor; 16- to 24bit, 44.1- to 192 kHz and 1bit DSD64; 1x USB; 1x Toslink optical; 1x BNC coaxial digital inputs; four-element Puls Array DAC; FPGA custom convertor topology with WTA filter; 12V DC input; 12V mains adaptor: 160x70x40mm; 400g

#### **PC ADVISOR** GOLD



#### Chord Electronics QuteHD

Chord Electronics is a premium British audio brand, known for its high-end and pro-audio amplifiers. Twelve years ago it added digital expertise to its portfolio with the Chord DAC64, an aluminium ingot the size and weight of a house brick.

Shrinking silicon processes have allowed the revered sound to trickle into something smaller and more affordable than today's £5,000 version: the £990 QuteHD.

It's simple from the outside, with three digital inputs and one pair of phono outputs. To select the input you may need to pull the cables; the QuteHD locks first to USB, then Toslink optical, then coaxial.

There's no power switch either. To turn it off, you yank out the cable. The construction quality is first-class - the QuteHD is literally tank-proof.

Look through the clear porthole and a clever, chromatic system shows to what digital frequency you're locked. With stock 44.1kHz, the stuff that CDs are made of, the glass aperture glows deep red.

Feed the Chord 48kHz material and you'll find orange there instead.

Double CD's baserate to 88.2kHz and we mellow with yellow. Green is the colour for 96kHz, the top spec for audio from video DVD. Light blue lamps 176.4kHz, while indigo spells 192kHz, the QuteHD's highest sample frequency capability.

Well, not guite. For the QuteHD joins a small club of DACs that speaks Direct Stream Digital (DSD). With CD rips played from a Mac mini into its asynchronous USB, the QuteHD delivered like a maestro.

transparency in treble detail as a reference dCS Delius, and soundstaging was less cinematic in width. But its drive and dynamism are unbeatable, with incredible delineation of every instrument. CD sounded far less seedy, and a whole lot more like high-

resolution recordings.

The QuteHD's secret weapon is its ability to unravel DSD into an organic, believable sound that'll have vinyl lovers spinning on their decks.

#### Verdict

Rarely has a product upturned our expectations of what sound quality is attainable under £1,000 than this DAC. With the lightshow firmly set to violet for DSD, this baby brick is unbeatable. It sets a reference point that'll be very difficult to follow.

Andrew Harrison



# Best apps & games for kids

Keep your kids entertained with these great apps and games

martphones and tablets are great for entertaining children of all ages, provided that you're happy to hand over your expensive gadget.

Hoards of developers promise that their app is best for your child, and it can be difficult to know which to choose. To help you decide, we've rounded up five of the best apps and games to entertain your kids.



Toca Hair Salon 2
Price: £1.49 inc VAT
Available on: iOS

Now on to its second version, Toca Hair Salon 2 is a creative app that lets kids play at hairdressing. Using the touchscreen, they can cut, colour, wash and style their chosen character's hair, then add accessories and take a snapshot. There's no right or wrong way to proceed, so kids have the freedom to play however they want. Character interaction is realistic, with often humorous facial expressions and audible reactions. There are no in-app purchases or ads.



# Colour & Draw for kids Price: 69p-£1.49 inc VAT Available on: Android, iOS

Every child loves drawing and colouring-in, so Colour & Draw should prove an instant hit. Using the touchscreen as a digital canvas, children can draw and colour using pencils, brushes, crayons and an airbrush. They can choose to start with a blank slate, or work from a template design or photo stored in your gallery. It's ad-free, but extra templates can be purchased if desired.





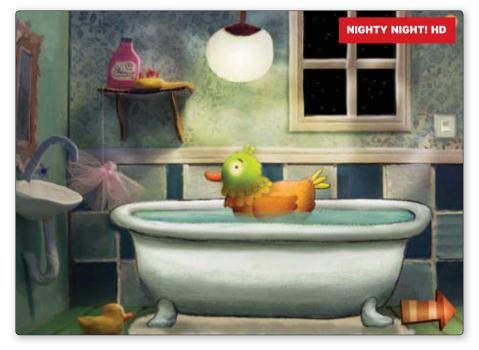
# Little Digits Finger Counting Price: £1.49 inc VAT Available on: iPad

Little Digits is a fun, educational app that can help youngsters learn to count. Little Digits records the number of fingers pressed on to the iPad's 10-point touchscreen, with that figure displayed as a cute, colourful illustration. Basic addition-, subtractionand number-order games provide your children with a fun, educational challenge. The default narration is English, but a clever feature allows you to replace this voice with your own. There are no in-app purchases, adverts or links to social media.



# Nighty Night! HD Price: £1.49-£1.99 inc VAT Available on: iOS

Getting a child to go to sleep can sometimes feel like an impossible task. Nighty Night! HD aims to provide a helping hand in the form of an electronic storybook. To help get kids in the mindset for going to sleep, Nighty Night! encourages them to first say goodnight to and put to bed their animal friends. Seven interactive characters include a dog, pig, sheep, duck, cow, fish and a chicken. Interior and outside lights both in the home and at the barn must be switched off at bedtime. The app features stunning illustration and animation by Heidi Wittlinger, narration from actor Alistair Findlay, and is accompanied by melodic Iullaby music.





### Magic Piano Price: Free

Available on: Android, iOS

Kids love making a racket, so the more musical the better for your ears. Magic Piano is a free app that's well worth the download. As its name suggests you can play piano on a touchscreen, but Magic Piano is more than just this. You can also choose between various keyboards and play along to more than 600 songs. Tracks include pop, rock, classical and movie soundtracks. Not all songs are free to play, but you can unlock more by watching videos. Furthermore, a game mode allows the kids to earn achievements as they play, and their proud parents can share their performances with friends. 🗵 Chris Martin

#### **ENTERTAINMENT APP**

#### Twitter #Music

#### Free

#### Contact

- music.twitter.com
- Read more
- tinyurl.com/cdkfv3y

#### **System requirements**

iOS 6.0 or later; 18.2MB storage

Twitter #Music is not simply another music-streaming service. Yes, you can use the app to listen to music on your iPhone or iPad, but only via Spotify or Rdio. You can also preview songs via iTunes.

More importantly, Twitter #Music tells you what you might like to play based on Twitter posts. The power of social adds a personal level to the recommendations.

Four sections each have 140 picture tiles representing music artists. Popular shows you the artists currently being discussed the most on Twitter: Emerging is what it considers hidden talent found in tweets; Suggested is what Twitter thinks you'll like based on your social musings; and #NowPlaying shows you artists recently Tweeted by people you follow.

The first two are interesting in an "Oh, that's what's most popular on Twitter" kind of way. With only an image of the artist, their rank and the name of the track, there's no compelling reason to click to

play the songs. Perhaps if #Music becomes popular and Twitter users start to overtly use the hashtag to promote what they feel passionately about it could become a good place to find breaking music.

Suggested and #NowPlaying have more potential. But potential is all, for now. In my case, the former was reasonably accurate, but oddly skewed toward classic folk and pop.

#NowPlaying shows you what artists have been Tweeted by people vou follow, but for this section to work the people you follow need to be Tweeting about music. In all probability you need them to be using Twitter #Music and posting about the songs they are playing from within the app.

The app feels like an early draft, and we'd like to see more advanced features such as the ability to tag music to listen later, and to see other tracks by the same artist. Still, Twitter #Music is brand-new and free, so take it for a spin.



#### Verdict

The concept of Twitter #Music is sound, but it requires a sufficient volume of your Twitter contacts to engage before it will become useful to you. 🗵 Matt Egan



#### **GAME**

#### Cut The Rope: Time Travel

Free (Android) 62p (Android HD) 69p (iPhone) £1.99 (iPad)

#### Contact

- zentolab.com
- tinyurl.com/c2qfiq5

#### **System requirements**

iOS 4.3 or later: 32.5MB (iPhone), 71MB (iPad). varies for Android

In the latest instalment of Cut the Rope, lovable green monster Om Nom must follow his tasty sweet as it is sucked into a time machine. Each chapter is set in a new time period, and features a different ancestor of Om Nom.

Time Travel looks and plays just as well as the other titles in the series, with its glossy, colourful style.

At launch there were six worlds, each containing 15 levels, but more will be added over time. You begin your quest in the Middle Ages, then proceed through The Renaissance, a Pirate Ship, Ancient Egypt, Ancient Greece and the Stone Age.

Given that there are two characters within each level (Om Nom and his ancestor), there are also two sweets. It doesn't matter which sweet goes to which character, but the levels are typically engineered such that it's rather obvious where they are supposed to go. As usual, you must also try to feed Om Nom and collect three stars to get the maximum score.



There are a few new physics and elements with which to interact, including bombs, ninja stars, chains rather than ropes, portals, rockets and even a button that freezes time. These give a sense of fresh life to what is in essence a tweaked version of the original title.

We enjoyed playing with the new toys, but the level difficulty isn't high enough for our liking. Only a handful of levels required brain power to solve. There is some variety in terms of whether you need good timing or to do things in the right order.

If you do get stuck, which is unlikely, you can use tokens to give Om Nom telekinetic powers. Om Nom dons some radical shades and can then move around the candy with his mind. Using this mode will also reveal hidden stars. You can earn tokens or buy 20 for \$1.99.

#### Verdict

Time Travel is another fun game in the Cut The Rope series, and free to play on Android. The addition of several new game mechanics are fun to explore. However, the app is let down by a lack of complexity, meaning you'll quickly complete it without feeling particularly challenged. <a> Chris Martin</a>



#### INTERNET SECURITY

#### AhnLab V3 Internet Security 8

#### £50 inc VAT (3 PCs)

#### Contact

- global.ahnlab.com/en Read more
- tinyurl.com/cuq8dbr

#### **System requirements**

500MHz processor; Windows XP/Vista/7/8; 256MB RAM: 300MB drive space

AhnLab may be something of an unknown to UK customers, but V3 Internet Security 8 has a very conventional interface, with none of the flat Windows 8 cosmetics that many of its rivals have adopted.

The main dashboard offers six options on the left, with an information pane to the right. At the top are buttons for accessing the Settings, Update and Help menus.

The suite's main modules are virus scanning, network intrusion prevention and a personal firewall, with anti-phishing and website filtering, spam protection and simple system tuning as ancillaries. It doesn't include parental control or multi-platform protection.

Full and custom scans can be initiated or scheduled from the control panel; you can also scan single files or folders.

The program required 11 minutes 44 seconds to scan our 50GB basket of files. It reportedly examined just 8,765 of 1.2 million files, giving a slow scan rate of 12.5 files per second.

On a repeat test AhnLab examined the same number of files, but required only 3 mins 4 secs to do so, suggesting the software uses fingerprinting to check only the files that have changed since the previous scan.

Copying a 1GB file with a scan running added only 4 secs to this



AHNLAB V3 is a decent security suite, but some way off the competition

time, meaning the low resource footprint was just 9 percent.

V3 Internet Security has a chequered history with independent testing lab AV-Test. It failed to gain certification on Windows 7 in December, and scored just 8.5 out of a possible 28 points. Not only is this a low overall score, but in the Repair section AhnLab recorded just two points out of six. Less than half the malicious components of the test threats thrown at it were removed

AV-Test has since evaluated it running on a Windows 8 machine. and found slightly improved performance, and its 10-point score allowed it to regain certification.

Even so, AhnLab V3 still managed to record just two points out of six for Protection, and only its Usability rating of 4.5 allowed it to keep its head above water.

The Protection section looks at widespread- and zero-day malware attacks. V3 Internet Security scored 99 percent in the former, but just 84 percent in the latter.

It shows just how strong the competition is that 84 percent is 11 points below average, and that 99 percent only hits the mean.

#### Verdict

Scraping an AV-Test certification may put off some people. AhnLab V3 Internet Security 8's standards in malware protection are now very high, but we wonder whether its scanning should be more thorough. It's very easy to set up and use and, for general-purpose home protection, it's definitely better than having nothing, but there are more secure alternatives available at lower cost. Simon Williams





#### **Free Audio Editor**

#### Free

#### Contact

- free-audio-editor.com
- Read more
- tinyurl.com/as8kg58

**System requirements** Windows XP/Vista/7



Editing audio tracks is an integral part of everything from preparing a party mix to putting together a song demo. Buying a pro-level editing suite for some uses is over the top, though; you don't need to spend anything to handle the basics.

Free Audio Editor and its companion program, Free Audio Converter, may not be a CuBase or Wavelab killer, but work together to provide the core tools for recording, editing and saving audio tracks to a variety of media.

The main screen is dominated by two waveform displays for the left and right channels. By default the program shows the entire track across the width of the screen, but

both axes can be expanded: the magnifier + and - buttons offer staged zoom, although a slider for continuous adjustment would be more convenient.

Many common editing tasks have dedicated buttons in the multiple toolbars of the ribbon at the top of the screen. For example, to normalise a track - adjust its volume so it peaks at a set level - you simply click on the Normalise icon and enter a level or select a preset.

There are speed buttons to top-and-tail tracks - cutting out those annoying clunks and bumps at the mic - and to handle fades and simple stereo transitions.

The Effects tab offers modulation, time and pitch, filter and equalisation, and extend effects, with varying degrees of success.

Speed change worked well on the tracks we tried, while pitch change was less successful, sometimes introducing unwanted buzzing into the sound. Echo and reverb both worked well.

You can keep these effects on display in a command bar down the left side of the screen. This panel can also show your favourite tools, and customisable keyboard shortcuts are supported, too.

Although a progress bar appears while effects are applied to any but the most trivial of files, the program

#### PASSWORD MANAGER

### Siber Systems Roboform2Go

#### \$40 (£26)

#### Contact

■ roboform.com

#### Read more

tinyurl.com/bw64fxr

#### **System requirements**

500MHz processor; Windows XP/Vista/7/8; 128MB RAM: 20MB drive space

Usability: Features: Value:

Roboform began life as an automated form-filling tool. The handling of login data was then something of an aside, but has now become the program's core function.

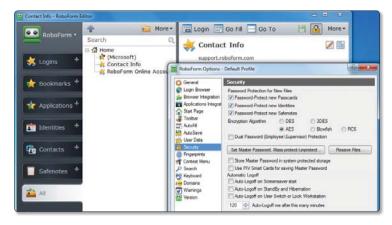
The latest version, which is also available as a portable app, simplifies the rigmarole of maintaining multiple secure passwords for the many logins required by modern life.

Roboform integrates with your web browser and any applications you might want to password-protect. It forms an extra toolbar in all the main web browsers, on Windows, OS X and Linux. Apps are available for iOS, BlackBerry and Android. The USB version is restricted to Internet Explorer or Firefox on Windows.

The program records your login data in the form of a Passcard, then makes it accessible with a couple of mouse clicks. Clicking on a Passcard in the drop-down list in the Roboform toolbar will automatically log you into a site or service, without you needing to know your details.

This also makes it easier to regularly change and use complex passwords for each site. If you need a hand creating such a password, Roboform can generate pseudorandom passcodes on demand.

A snag with Roboform is that modern web browsers, all of which are now free, already handle



SIBER SYSTEMS ROBOFORM2GO is much more than a simple form-filler

automated logins. Most will even pester you for permission to store vour login details.

Whether you need a specialised tool on top of this depends in part on how much security you demand. Roboform stores all login details in encrypted form; you can choose between DES, 3DES, AES, Blowfish and R6 algorithms. A master password is used to unlock the data.

Siber Systems also offers an online service called Roboform Everywhere (\$20 per year). Because all your login details are stored online, you can't lose them if your browser falls over or you have to reinstall Windows. You can get at them from any device that can access Roboform Everywhere.

If you take a laptop away with you and then realise you need to access a site you've only ever visited from your desktop PC, you'll still be able to access the login details.

Roboform can also archive bookmarks, identities, contacts and notes. You can customise the way these are saved, creating secure local or online folder structures.

And, of course, Roboform can still automatically fill in online forms.

#### Verdict

Roboform is a convenient, secure solution for storing multiple usernames and passwords and avoiding an easier-to-remember one-password-fits-all approach. However, the USB version is limited to just two Windows browsers and, unless you are very security-minded, could be considered overkill. It's easy to record and access login data with just a couple of mouse clicks. ⋈ Simon Williams



FREE AUDIO EDITOR automates everyday audio tasks

is quick enough when working on a track of up to three or four minutes not to require any coffee making.

Getting tracks into Free Audio Editor can be as simple as loading a file or making a recording with the supplied applet. But on the two Windows 7 machines we tried, the

program failed to automatically pick up the default audio feed and we had to adjust settings in the Control Panel before it 'heard' the system sound.

The program can import WAV, MP3, WMA, OGG, CDA, VOX, RAW, G72x, AIFF and MPC files, and save to WAV, MP3, OGG or WMA. There are also options to strip the audio from an Mpeg video or a downloaded YouTube clip.

If you have several files to process you can use Free Audio Converter to batch-process and transfer files to and from a wide range of audio formats.

As well as saving edited files to a computer or audio player,

you can burn audio CDs and DVDs from directly within the editor for archiving or to play on disc players.

#### Verdict

For basic editing needs, Free Audio Editor covers all the bases. This program is fast and easy to use, and automates everyday audio tasks. Shortcomings, such as not being able to open more than one stereo track at once, will restrict sound enthusiasts, but it will take most people a while to hit these stops. Deluxe and Plus versions of the Editor and Converter with more complete feature sets are available, priced at \$30 and \$20 respectively. ☑ Simon Williams

#### AUDIO PLAYER

#### Audirvana Plus 1.4



#### Contact

audirvana.com

#### Read more

■ tinyurl.com/qgbdepn

#### **System requirements**

Intel Mac; OS X 10.6 or later; 2GB RAM (4GB recommended); OS X-compatible DAC



#### **USEFUL OPTIONS**

include Exclusive 'hog' and Integer modes, plus the ability to resize memory cache Audirvana Plus is a software music player that helps to disprove the idea that all digital music players sound the same. It's able to play in OS X every high-resolution format you might ask of it.

Audirvana Plus can work as a standalone application, complete with its own player interface, or serve as a background application that powers iTunes.

#### **Standalone**

The look of Audirvana Plus is skeuomorphic of a 1980s hi-fi amp. With the inclusion of a big central information display that shows album artwork, it could even be said to resemble an AV receiver.

You load music into a playlist by dragging tracks or folders into its Dock icon, or press the Playlist button by the amplifier's left foot to open a dedicated window.

Other buttons on the amp include Display Off, which hides the app, and Power, which quits Audirvana. A large knob to the right serves as a volume control, and works with DACs that support adjustable gain.

Within the app's Preferences you can also elect whether to engage a digital volume control, and then play with advanced dither features.

As well as displaying embedded cover art, the main display gives rich track information for each file. Just above the linear timeline bar is a readout of the file's type and sample frequency; the opposite end shows what's being outputted to the DAC, indicating whether the app or the Mac's Core Audio settings have recoded the audio stream.





AUDIRVANA PLUS 1.4 is skeuomorphic of a 1980s hi-fi amplifier

Audirvana Plus can upsample audio, such as 16bit/44.1kHz CD to 24bit/96kHz, a strategy that can be heard to confer some of the better sound quality of actual higher-sample-frequency audio.

Sample-rate conversion is by default handled by the well-regarded iZotope 64bit SRC plug-in algorithm, with plenty of fine-tuning available for the filter characteristics.

Also on the Filters tab is an option to globally invert signal polarity. A toggle button on the front panel would have been useful, though, rather than you having to delve into Preferences each time you want to experiment.

#### **Direct Stream Digital**

As well as the usual compressed and lossless formats of MP3, AAC, FLAC and ALAC, Audirvana Plus is one of very few software players that understands Direct Stream Digital (DSD). This is the 1bit high-resolution format taken by SACD, Sony's 20th-century replacement for the CD that failed to gain mass-market traction, but for which there is a strong underground audiophile following. DSD's natural sound can be extracted from SACD, and bought commercially as .dff and .dsf files.

If you have a DSD-capable DAC – more than 40 models have launched in the past two years – you'll get to hear the potentially jaw-dropping walkthrough sound of this quixotic 1bit audio format being played natively. And even without a DSD DAC, you can set Audirvana Plus to convert DSD on the fly into all manner of PCM for a regular DAC.

By setting Audirvana Plus into iTunes Integrated Mode, it's also possible to convert and save DSD files as lossy or lossless PCM files of varying sample rates. This key feature enables your DSD to be heard on devices such as the iPhone and iPad, although it will then inherit some of the shiny signature of PCM audio.

For use on an iPhone remember that you'll need to restrict sample frequency to 44.1kHz, since Apple's phone can't play audio beyond 48kHz sample frequency.

#### Sound quality

The sound quality is a noticeable step above that of iTunes. Audirvana is able to show increased clarity, with better perceived stereo precision, so there's less ambiguity about the positioning of instruments and voices in the mix.

Focus can be tightened further in some cases by selecting additional options on the Audio System tab.

'Exclusive access mode' lets the playback software take complete control of the audio bus. This can also prevent system alerts and other effects from being unexpectedly sent to your hi-fi system.

The Direct mode, combined with Integer mode where available, will reduce Core Audio stages from the signal path for better sound. This neatly replaces some core functionality that was removed from OS X with 10.7 Lion.

We compared Audirvana Plus to our preferred BitPerfect and Decibel players, using PCM tracks such as 16- and 24bit FLAC, WAV and ALAC. We found Audirvana to have even kinder treble and effortless extension, along with a better sense of colour and vigour.

Turning to DSD music, we found the combination of Audirvana Plus, a compatible DAC and a Mac mini could offer clearly better sound than even the best 24bit/96kHz and 24bit/192kHz material we could find.

#### Verdict

Audirvana Plus is perhaps the best stereo music player available for the Mac. It's incredibly versatile, not to mention stable and dependable. You owe it to your ears to hear how Audirvana Plus can nurture the hidden sound of your ripped collection. 

Andrew Harrison



#### GAME

#### **BioShock Infinite**

#### £24 inc VAT

#### Contact

- bioshockinfinite.com
- Read more
- tinyurl.com/cf5rpud

#### **System requirements**

2.4GHz processor; 2GB RAM; 20GB drive space: DirectX 10-compatible AMD Radeon HD 3870/nVidia 8800 GT/Intel HD 3000



#### **ELIZABETH** is a

fascinating character who doesn't get in the way and doesn't need your protection



All other shooters seem so dull in comparison to BioShock Infinite's whirlwind of colour, fantastical scenes and incidental detail. Set in a sky-city in 1912, it's a fusion of the vintage and the impossible, within which it spins a yarn of alternate realities and simmering social tensions.

The most important fusion is that of cannily mainstream action and science-fiction, plus some thoughtful political and historical destruction.

It's almost a shame that BioShock Infinite is a shooter, as telling its tale from behind a gunsight limits the interactions the player can have with its fabulous, skybound world.

You can play virtual tourist, soaking in the many sights, sounds and disturbing social structures of this pre-digital city, and in this regard at least the first-person perspective is ideal.

The power of Columbia - an ultra-religious, racially intolerant community, which has seceded from the US - comes from getting your boots on the ground. You rummage through its streets, shops and secret dens and gradually uncover its secrets and strange, violent history.

But once the time comes to engage with any of the people you see, all you can do is pull or not pull the trigger - and, most of the time, you'll be pulling. Non-enemy characters are little more than living statues, mere window-dressing for an amazing and beautiful setting.

#### Elizabeth

There's one key exception: the mysterious Elizabeth. You, as debt-ridden private investigator/ mercenary Booker DeWitt, have been sent to Columbia to retrieve





BIOSHOCK INFINITE is set in a fantastical sky-city back in 1912

why, you're not sure for whom, and you don't know what you'll encounter en-route.

Elizabeth turns out to be a prisoner of Columbia's self-elected ruler/despot Zachary Comstock, a 'prophet' adored by Columbia's well-to-do white population, but less so by its black inhabitants who are treated as virtual slaves.

Allegories for American history and more contemporary social problems run deep, although the need for BioShock to also be a rollercoaster adventure means it doesn't go into too much detail on the issues it raises. But raising them at all, within the context of a big-budget, mainstream shooter targeted at the Call of Duty crowd as much as the more discerning adult gamer, is a minor miracle.

Even so, the plot's fixation on the mystery of Elizabeth, and her ability to open temporary access to alternate realities, means the nature of Columbia and its society is increasingly sent to the background.

Elizabeth is a fascinating and charismatic non-player character, and one who's by your side for the bulk of the game. Mercifully, she doesn't get in the way, she doesn't need protection and she's not an annoyance. In fact, her ability to call on aid from those alternate realities. and to chuck you any health, ammo or cash she comes across makes her an invaluable companion. You'll even miss her when she's not there.

Who she is and what her powers can do is central to the game's elaborate and twist-heavy plot.

Opinions may be divided about how it all pays off, but what's for sure is that it's very carefully and thoughtfully done, never doing things for shock or spectacle alone.

Perhaps it's not, in the final analysis, as compelling as the discomfiting nature of Columbia and the dark vignettes you'll encounter, but in the context of your average videogame plot it's a masterpiece.

The action itself is less remarkable, due to humdrum enemies and oddly similar guns.

#### Weapons and powers

As with earlier BioShocks, you mix-and-match guns with magic, here named 'Vigors' and capable of felling or incapacitating enemies with the likes of fire, electricity, water-tentacles, psychic control or a horde of angry crows.

You're almost never forced into using one particular weapon or power. You're free to choose which most suits you, then spend the money you collect on upgrading them. The guns might be a little homogenous, but the Vigors are powerful and vicious.

In the larger levels are Skyrails. rollercoaster tracks running above Columbia on which you can dodge or hunt down enemies at speed. These could be used more often, since the high-speed battles are the game's most thrilling.

It's a world of improvement in both spectacle and flexibility from your average shooter, but it won't be the action that lingers in your mind after the simultaneously compelling and infuriating final scene plays. It'll be Columbia itself, one of the most amazing game-places ever created.

#### Verdict

BioShock Infinite is an incomparably ambitious shooter that deftly weaves meaningful characters and social commentary into an amazing setting. 

Alec Meer

#### **GAME**

#### **Euro Truck Simulator 2**

#### £22.95 inc VAT

#### Contact

- eurotrucksimulator2.com
- Read more
- tinyurl.com/q2a8mry

System requirements
Windows XP/Vista/7/8

We never thought a truck-driving simulator game could be so much fun, but Euro Truck Simulator 2 proved us wrong. There is something soothing in watching the world go by from the high and mighty cockpit of a Volvo FH16 Globetrotter XL.

If you're used to more traditional racing games, getting used to the way trucks handle may take some time. They really do feel like trucks: slow to accelerate, jarringly fast to brake, ungainly to manoeuvre, and immensely powerful.

In this decidedly niche title you find yourself in the driver's seat of a full-trailer truck, hauling freight across Europe. Vehicle interiors are painstakingly rendered, and countryside views are breathtaking. The climate and time of day change, so you could find yourself enjoying a balmy spring day in one ride, and trying to navigate under torrential rain in the dark of night in the next.

You start the game as a freelance driver for hire, taking on trucking jobs across the continent. From one



EURO TRUCK turns a rather mundane activity into a compelling challenge

job to the next you gain experience, unlock abilities, and set aside a nice nest egg you can eventually use to buy a truck of your own and start a trucking company.

Euro truck Simulator lets you customise the controls and decide just how much of the driving you want the game to do, and how much you want to handle on your own. Manually switching gears on a truck hauling 20 tons of ore, while navigating through a massive open pit mine, is no mean feat - which is why it's nice to have the game take care of that detail for you.

Euro Truck Simulator 2's attention to detail, convincing physics and striking visuals transcend its niche status. This is a game so well-made, it can make you a fan of the category just by virtue of its sheer quality alone. The demo's enough fun that you'll find yourself speeding to buy the full game.

#### Verdict

A beautiful surprise, Euro Truck Simulator 2 takes a seemingly mundane activity and turns it into a compelling challenge.



#### GAME

#### Microsoft Flight

#### Free

#### Contact

- microsoft.com
- Read more
- tinyurl.com/qek3fjv

System requirements Windows XP/Vista/7/8 Microsoft Flight is the current incarnation of a long and illustrious franchise of games, dating back to 1977. You can start playing for free: simply download the game and embark on a series of missions planned to both teach you the basics of flight, and hook you into buying later missions and aircraft.

Flight is the last of its kind: Microsoft permanently stopped work on the game in July 2012, just a few short months after releasing it.

The graphics are gorgeous, and the scenery feels realistic. Hawaii serves as the backdrop for the first introductory missions, in which you get to fly two aircraft bundled with the free download: a thoroughly modern Icon Deluxe light aircraft and a WWII-era Boeing PT-17 Stearman biplane. These missions run you through the rudiments of taking off, controlling the craft in the air, and landing.

While the introductory missions are interesting and fun to play, and the graphics are strikingly



FLIGHT has gorgeous graphics, but very little hand-holding for beginners

beautiful, gameplay is marred by the need to navigate using landmarks, rather than traditional waypoints. In particular, one of the challenges starts out midflight, and you have to land the plane. The trouble is, it's not clear where is the airstrip.

The careful narration that leads you through many of the other missions is utterly lacking on this one. Manually switching on the aircraft's GPS map does reveal an airstrip, but after navigating all the way to it and executing a landing, we discovered it wasn't the right airfield and failed the challenge.

Another point of frustration is the low number of available missions. Flight offers less than 10 missions; once you want to make progress, you have to pay up.

In other words, the game suffers from the same issues plaguing many other pay-to-play titles, and even its fancy graphics can't redeem it.

#### Verdict

Despite its beautiful looks and impressive lineage, Microsoft Flight fails to offer a truly compelling gameplay experience.



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#### **£141** ex VAT £170 inc VAT

#### Contact

nuance.co.uk

tinyurl.com/bpqp7yx

#### **Specification**

1GHz processor: Windows XP/Vista/7/8; 1GB RAM (2GB recommended); 2.7GB drive space; 2Mp camera with autofocus



#### **OCR SOFTWARE**

#### Nuance OmniPage Ultimate

This Ultimate edition of Nuance's OmniPage is successor to version 18. It doesn't instantly grab you as a massive step forward, but it remains the best OCR package you can buy.

Our main reservation about OmniPage has always been its interface. It's not that it lacks versatility or features; it's simply not user-friendly. And, on this score, little has changed. The main screen still proves rather forbidding.

OmniPage is a consistent package once you get the hang of it, and its workflows remain a powerful method of creating jobs that can apply to the source material the exact tools you wish, and in the order you wish.

However, you will need to be prepared to explore the program's many menu options in some depth to feel comfortable with the main interface Informative help files are there to assist.

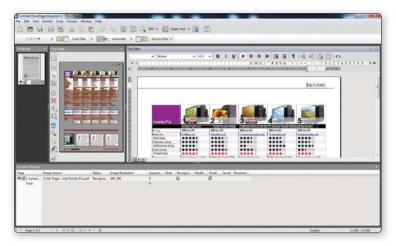
The choice of views (including the dual-view page image and text editor) work as well as ever, and it remains very easy to manipulate and make corrections. But newcomers would probably prefer something a little brighter and zippier.

#### LaunchPad

For such people, help may be at hand. OmniPage Ultimate offers multiple ways of working with data. Rather than firing up the main program, you might instead load LaunchPad. This is an iPad-style front-end with large, bright icons.

Selecting these allows you to specify what you want to convert (a magazine article or spreadsheet,





for example), what you want it to be turned into (perhaps a searchable PDF or an e-book file), and where vou'd like it to be stored.

The interface is cheery and quick. Its speed means that it'll appeal to more than mere OmniPage apprentices, and it even has a few options that let you tap into some more advanced features.

It's still no substitute for a main interface that'll be prepared to quide vou by the hand should you feel out of your depth. But as a swift means of firing up jobs, LaunchPad works.

#### In the office or the cloud

OmniPage isn't aimed purely at individuals, though, and the DocuDirect segment can sit on any office network, orchestrating jobs and automatically sending them to the right place.

This is particularly useful when there's a basic scanner attached to the office network - DocuDirect gives the scanner a more sophisticated software interface that allows its capabilities to be more directly controlled.

Indeed, OmniPage's batchprocessing is excellent, allowing you to even reschedule a significant workload so that it gets processed at a later, more convenient time.

Cloud access is the slickest we've seen in any program, and the Nuance Cloud Connector lets you drag files to and from the cloud as easily as if you were copying them to another drive on the computer. File-conversion is seamless, too.

OmniPage Ultimate has increased support for e-books, and you can turn documents into ePub format for use on a variety of e-readers,

including the Nook, Kobo, Sonv Reader and the iPad.

OmniPage is now better able to scan from camera images; where there's text in the image, it does a very reasonable job of conversion.

We didn't detect the 25 percent performance increase claimed by Nuance, but the software is more comfortable with camera shots. It can also read out documents or turn them into MP3 files. This is an interesting idea, and the accuracy of the spoken text is good.

The feature does tend to simply read from left to right, so columns and tables can prove problematic. Nonetheless, if you need documents dictated through an MP3 player, for instance, it's a fast and relatively easy solution.

OmniPage has long been renowned for the accuracy of its text recognition, and the latest version can do little to bolster an area in which it already excelled.

Whether dealing with tricky pages of dictionary entries, or pages with multiple footnotes, the program passed our tests with flying colours.

Conversion of PDF files to searchable versions has been enhanced with eDiscovery, a method of looking more closely at files to determine what needs to be turned into text and what should be left unconverted.

#### Verdict

OmniPage is a powerful package for serious users. We'd like to see an alternative interface more attuned to the relatively inexperienced. For power users, though, OmniPage is probably the best OCR package on the market. Mobin Morris



#### **NETWORK SWITCH**

#### Netgear ProSafe Plus XS708E

The Netgear XS708E is the first 10GbE network switch to cost less than £1,000. As business networks become increasingly burdened with traffic, it behoves the company sysadmin to release some pressure with more bandwidth than the current gigabit network allows.

Rolling out the 10x-speed upgrade isn't as simple as the migration from 10/100 to gigabit. That's not least because no client devices can latch on to the extra speed. We're talking laptops, tablets and the vast majority of desktop PCs.

Currently, if you want to move data from PC to PC over a network at greater than 20th-century hard-disk speeds - that is, faster than around 115MBps - you'll need a 10GbE PCI Express card. These cost upwards of £500 for a single-port

NIC, and their form-factor means they're suitable only for large PCs.

Part of Netgear's ProSafe line, the XS708E sits between real industrial switchgear and consumer network tech such as wireless routers. Functionally, the XS708E is between a fully managed- and an unmanaged switch.

The former is in essence plugand-play, but with limitations in its scope: the latter is more versatile. but requires networking savvy and will usually command a higher price.

The XS708E's configuration options include VLAN, simple QoS, IGMP snooping and port trunking (LAG). This link aggregation is useful to combine two gigabit network ports on a business NAS drive, for example, to give closer to 2Gb throughput.

Netgear's ProSafe Plus setup software is Windows only, and also requires WinPcap (link layer network access) and Adobe Air.

Performance is difficult to evaluate without advanced network measurement equipment. We encountered no performance issues, although whether it can approach the advertised 10GbE performance, and how well it sustains that performance when all ports are fully loaded remains unknown.

The device is suitably solid, a relatively plain 1U box with just an IEC power inlet and a Kensington lock slot at the rear, and eight RJ45 ports at the front. One of these can be exchanged with an adjacent fibreoptic connector for 10Gb SFP+ fibre.

#### Verdict

It's still expensive for an eight-port switch, but the Netgear XS708E is priced well below £1,000 and should make the first steps into the next generation of 10GbE networks a little easier to climb. M Andrew Harrison

#### £625 ex VAT £750 inc VAT

tinyurl.com/crsr2aL

#### **Specification**

8-port 10GbE network switch; semi-managed L2; 1x SFP+ fibre port; 1U full-width chassis: rack-mount ears included: 330x43x207mm: 3.6ka





#### **£150** ex VAT **£180** inc VAT

#### Contact

#### Read more

#### Specification

Mono laser printer;

600x600 print resolution; quoted print speed: B=38ppm; actual print speed: B=22.8ppm; USB 2.0; gigabit ethernet; 250-sheet input tray + 50-sheet multipurpose tray; up to 850 sheets with optional tray; 256MB memory; auto duplex; toner cost: B=£150: print yield (pages): B=8,500; 399x382x263mm; 14.1kg



#### Dell B2360dn

Network-ready sub-£200 laser printers with highly capable paper-handling facilities aren't exactly thick on the ground, but Dell is looking to partly rectify this situation with the quietly impressive B2360dn mono laser printer.

At 14.1kg it isn't terribly light, but its 399x382mm footprint is relatively compact, and takes up less deskspace than many of the printers in our Top 5 charts (see page 140). That's despite some very significant paper-handling capabilities.

It includes a substantially built 250-sheet tray, plus a 50-sheet multipurpose feed. And if 300 sheets isn't enough, you can bolt on an optional 550-sheet tray (£115).

The specified duty cycle of 80,000 sheets a month is ample for a small-business model such as this.

The Dell is built to melt into the background, and its crisp black casing looks relatively sophisticated. Add some subtle angles to the top of the printer and the look is understated, but pleasing.

The centrally mounted control panel is easy to grasp. You don't get any homefriendly features such as a large colour display or touch-sensitive controls. However, the menu

options and the simple left/right and select buttons work effectively.

There's 256MB of memory, which is a handsome amount at this price.

The B2360dn has both USB 2.0 and gigabit ethernet support as standard. You also have the option to add an external wireless adaptor (£40), and this will allow you to print from Android devices as well.

Dell promises a print rate of 38 pages per minute (ppm). We recorded 22.8ppm, or 12.5ppm with auto-duplexing engaged.

Print quality isn't outstanding, but the characters are reasonably dark and moderately well defined. For everyday text churning the B2360dn hits the mark, but it's rather disappointing on graphics.



The Dell's running costs are acceptable, with the high-capacity toner cartridges producing a cost per page of less than 1.8p. It is well worth paying for the high-capacity toner - the lower-capacity version is almost half the price, but will push the cost per page up to 3.4p.

#### Verdict

The Dell isn't the best choice for top-speed high-quality text, but it still fares reasonably well in these areas. More crucially, it offers very impressive paper handling for the money. If you need a cheap but robust page-churner to serve a number of systems in a small- or medium office, this is a fantastic option. Robin Morris



#### **£400** ex VAT £480 inc VAT

#### Contact

- hp.com/uk
- tinyurl.com/czo5p65

#### **System requirements**

Colour inkjet printer; 2400x2400 (from 600x600) max print resolution; quoted print speed: B=70ppm, C=70ppm; actual print speed: B=42.9ppm, C=15.8ppm; USB 2.0; ethernet: 802.11b/a/n: USB flash drive port; mobile device support; 4.3in display; 500 + 50 sheet input tray (maximum of 1,050 sheets with optional drawer); 512MB memory (maximum 512MB); 75,000-page monthly duty cycle; toner cost: B=£90, C=£95 x 3; print yield (pages): B=9,200, C=6.600 x 3: 517x399x414mm: 17.1kg

#### PC ADVISOR GOLD



#### **HP Officejet Pro X551dw**

Laser printers have had the text-printing market sewn up for several years with their strong quality and high print speeds. However, 2013 has seen the launch of a batch of potential laser-killers - inkjet printers that claim to match lasers in terms of text and speed. while providing better colour graphics and lower running costs.

Most interesting of these was the Lomond EvoJet 2 Office (tinyurl.com/cLgag5v), with its static printhead. HP has now launched its own take on this idea, and the X551dw's PageWide technology employs a longer-width printhead.

Only the paper moves, with the printhead remaining fixed in place, so allowing for higher speeds than standard inkjets. The printhead contains 42,240 nozzles - short of the Lomond's 70,000, but still an impressive figure.

#### A gargantuan beast

The X551dw is a gargantuan beast of a printer, swallowing up a large part of our desk with its doublewidth dimensions. It's smaller, if taller, than the Lomond, however,

HP has tried to make the most of this, carefully crafting the output tray so you have large amounts of storage space below. Should you want somewhere to store your cartridges or paper, this could save you room elsewhere.

The HP's main input tray takes 500 sheets, while a multipurpose trav takes an additional 50 sheets. Should you need more, you can bolt on a 500-sheet tray (£160).

Inkjets aren't traditionally known for their vast paper handling capabilities, but a potential 1,050 sheets ought to be enough for all but the largest of workloads.

The large 4.3in touch panel is a delight to use, with gorgeous graphics and a simple but logical layout. From here you can access the normal library of HP print apps, and you can access mobile devices and the cloud.

A USB port lets you access flash drives, but there's no provision for memory cards.

The extensive support for remote access allows network administrators to get quick access to the printer using just a web



browser. The control panel can also be locked, and some features of the printer temporarily disabled to restrict access from mobile devices or control colour features. Ethernet is 10/100 standard and this can be upgraded to gigabit.

#### Performance

HP claims this printer can produce text at 70ppm. In the lowest General Office setting our lab results did actually approach this when used over large workloads.

Including the five-second warm-up routine the HP took just 14 secs to run through our 10-page document, producing a real-world speed of 42.9ppm. Normally we'd congratulate the printer for getting to its first page so quickly, but the printing speed is so fast that this small amount of time constitutes over a third of the total print time.

Assuming it churns out additional pages at the rate of 10 sheets every nine seconds, we estimate print speeds could approach the mid-60s on large print jobs.

The print quality at this speed is very good for an inkjet, although the text itself has a slightly grey tinge.

A second fast mode, Professional, churns out pages at the rate of 30ppm - getting toward 40ppm if you remove the similarly short warm-up process.

The figures are very clean in this mode although, again, the text stops just short of being true black. It is very close, though, and we doubt few will have qualms concerning the HP's print quality.

A very slow (6ppm) Professional mode produces pristine characters although, again, the tint remains ever so slightly grey.

The HP has auto-duplexing, and in the fastest mode we saw the speed drop from 42.9- to 23ppm. This remains an impressive figure, and becomes even more so when you consider that around 11 seconds of the 26-second job were taken with the printer warming up.

Once the printer is turning out sheets it works at around 40ppm, and will produce soaring speeds over large print jobs.

Graphics were considerably slower, with the fastest two modes generating sheets at the rate of 15.8ppm and 10.3ppm, and dropping to 6.2ppm in Presentation mode. The warm-up times are longer here, due to the greater detail of the print jobs. Nonetheless, first-print times weren't excessive, even with substantial image files. The results are full of colour, even if there's a dark cast to the palette.

Feed the HP with photographic paper, and the resulting prints are excellent. The X551dw eclipses most lasers (and the Lomond) in this area.

Consumables are easy to change. The front-mounted compartment is ideally placed for comfortable access, and you simply slide out and replace the cartridges.

Black and colour costs run at 1p and 4.3p a page respectively. These running costs are sensational.

#### Verdict

The HP Officejet Pro X551dw is very cheap to run, and with a string of strong features and good paper handling it works exceedingly well. Speed is searing, too, outpacing many a laser printer. The text quality isn't as dark as we'd like, but it's otherwise a sensational printer.

Robin Morris





Beautiful, fast, fluid 😾 Windows 8

# Windows gaming provides the perfect excuse to supercharge a

desktop PC. Paul Monckton tests six Windows 8 powerhouses

amers want power, excitement and flat-out speed. Gaming PCs represent the only desktop PC category in which we allow overclocking.

The Intel Core i5-3570K is difficult to beat for all-round performance at a reasonable price. You can opt for the supreme power of the more expensive Core i7-3770K, which can process double the number of threads, but you'll pay a considerable premium and see minimum improvement to gaming speeds.

We use PCMark 7 to quantify the general performance of each machine. When most PC vendors are selling in essence the same box of bits, differences can be attributed to the level of overclocking and the use of fast memory and an SSD. Graphics cards still come into play for non-gaming tasks such as converting video formats, which is also reflected in the overall PCMark 7 score.

#### Graphics card

Graphics cards fall in and out of favour as AMD and nVidia leapfrog each other with the latest technologies. It's wise to base your GPU decision on the type of games you like to play, since many titles are sponsored by one of the two graphics-card designers and are thus likely to run better on its own cards. In this group test we see examples from both nVidia and AMD.

Never skimp on the graphics card in a gaming PC - it's the single most expensive component, but essential for the best Windows gaming. Accordingly, many of the PCs here are fitted with high-end cards such as the nVidia GeForce GTX 680 and AMD Radeon HD 7970.

You can save money with a factoryoverclocked card with a lower base spec, such as an HD 7950 with boosted clock speeds. These often cost significantly less with a minimal reduction in performance.

Dual-card solutions can also be a good idea, depending on the prices of the cards available at any given time. Two systems here have dual-card configurations: one keeps down the price, but retains decent performance; the other delivers the fastest framerates possible, but at a higher price.

If you choose a motherboard that supports nVidia's SLI or AMD's CrossFireX, you could add a second graphics card later.

#### Cooling

Cooling is essential if an overclocked CPU is not to overheat. The basic Intel CPU cooler UK vendors often fit simply won't do. Expect to find large heatsinks and several fans.

Liquid-cooling systems offer reduced fan noise and greater cooling capacity than airflow alone. Meanwhile, the dust filters attached to a computer's fans can help to reduce the incoming debris that clogs up games machines, causing them to run even hotter and louder.

Gamers like their systems to look the part, but the case needs to be practical. Internal cable management aids airflow, while fan controllers let you reduce noise or boost cooling as necessary.

#### Monitor

Look for a monitor that's large, clear and offers a fast response time. TN panels offer the fastest response times, but IPS panels are now sufficiently fast and provide superior colour reproduction. Their wider viewing angles will benefit any other user of the PC, too. Console gamers may want a display that has multiple HDMI inputs.

#### **Peripherals**

The keyboard and mouse you use can make a huge difference to your gaming skills. An enthusiast system should come with peripherals designed for gaming. You'll benefit from the improved responsiveness of wired rather than wireless devices. Look for high-resolution mice, and keyboards with programmable keys and backlighting.

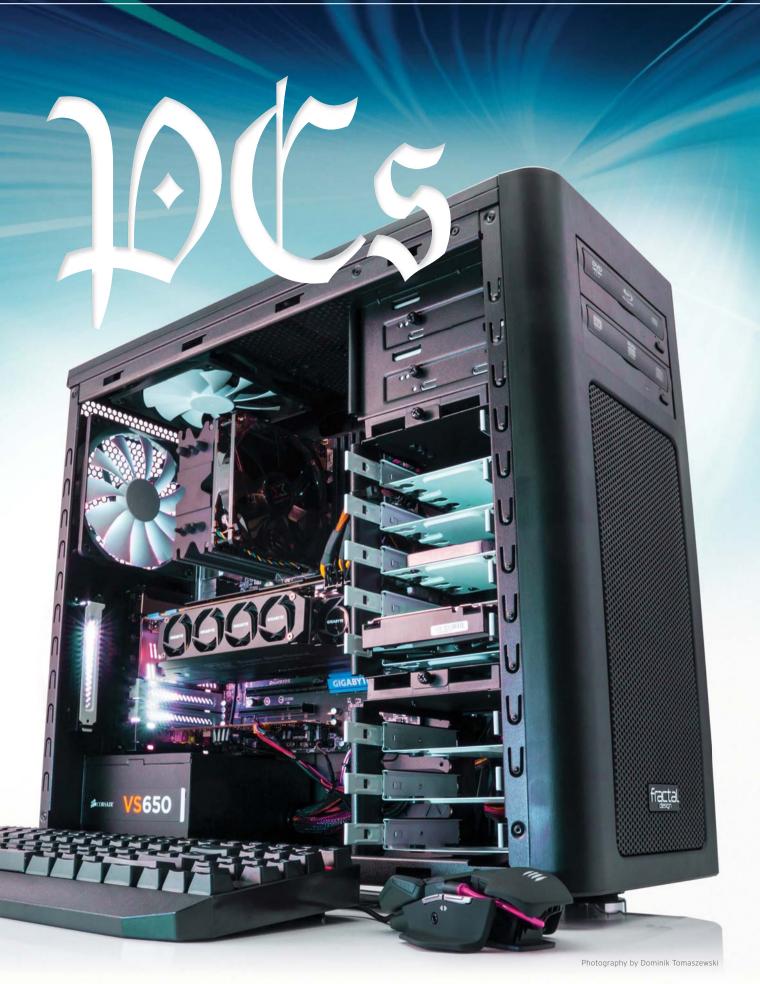
High-grade mechanical switches in keyboards have a better 'feel' and provide longer life than cheap membrane switches. Some draw attention to the W, A, S, D keys with a different colour or texture.

A gaming soundcard can provide a more immersive experience by adding multiple sound effects, with improved audio fidelity and reduced noise. Also consider a gaming headset with a built-in mic.

#### Warranty

Warranty terms are crucial. The longer the better, but also look for a collect-andreturn rather than return-to-base option.





#### **CHILLBLAST FUSION CARBINE**

#### £1.199 inc VAT • chillblast.com • tinyurl.com/c4va62u

It's the least expensive of this group, but Chillblast's Fusion Carbine nevertheless delivers a great balance of performance and features.

Housed in the popular Fractal Design Carbide 300R system case, the Fusion Carbide has a hefty, solid appearance, with twin optical drives and handy USB 3.0 ports clearly visible from the front.

Inside we find an Asus P8Z77-V LK motherboard fitted with a 3.4GHz Core i5-3570K processor, which has been overclocked to a respectable but tempered 4.6GHz. The CPU is cooled by a Corsair H55 sealed-unit liquid cooler, which is a higher-performance version of the H40 model supplied by Eclipse.

A 1TB hard drive is complemented by a 120GB Samsung 840 SSD, and 16GB of memory is included. These core components allow for very good performance, as is evident from the Chillblast's 6,594-point score in PCMark 7.

The Fusion Carbine also performs well in gaming. Chillblast has selected two nVidia GeForce GTX 650 Ti Boost cards - the cheapest available option if you wish to pair two cards via SLI.

This PC was competitive in all tests except Final Fantasy XIV at its highest-quality settings, with this pairing able to deliver excellent performance for the money. On occasion it even beat the Dino PC.

An IPS display is included in the form of the 23.6in liyama Prolite X2377HDS-1. It may not be as responsive as the fastest TN panels, and less stylish than some of the AOC monitors supplied with the competition, but it offers great image quality.



The supplied Gigabyte Force K3 keyboard is a gaming peripheral, albeit an entry-level model with rubber-dome keys. It's a wired board featuring water-resistant keys, a built-in wristrest and prominent W, A, S, D and arrow keys. It's paired with a basic Gigabyte M6800 gaming mouse with switchable dual-dpi settings.

**VERDICT:** The Fusion Carbine delivers excellent performance across the board at an appealing price. The supplied keyboard and mouse are proper gaming peripherals, albeit entry-level models.

#### CYBERPOWER INFINITY FUSION GT

#### £1,499 inc VAT • cyberpowersystem.co.uk • tinyurl.com/cxskwfk

CyberPower's Infinity Fusion GT is a premium gaming PC featuring a moderately overclocked CPU and high-performance AMD graphics.

Intel's 3.4GHz Core i5-3570K processor has been overclocked to 4.6GHz, allowing the Infinity Fusion to deliver good application and gaming performance. This chip is cooled by a Corsair H60 liquid cooler, which offers slightly higher performance than the H55 offered elsewhere. The use of a thinner radiator allows for twin fans.

Like Wired2Fire, CyberPower has plumped for a high-end AMD graphics card in the form of the Radeon HD 7970, here manufactured by XFX. This card offers slightly faster memory performance than that of the Wired2Fire, but overall performance is largely similar.

The Infinity Fusion GT achieved the fastest storage performance of the group, thanks to a pair of 128GB Plextor M5S SSDs configured as a Raid O pair. However, the Dino PC was only a fraction slower with its single 256GB version of the same SSD, without the added complexity and danger of Raid O.

These components are clearly visible through the transparent side panel of the Corsair Carbide 300R case, which also provides plenty of expansion room and two front-facing USB 3.0 ports.

A Blu-ray drive that writes as well as reads is handy, but we were disappointed by the low-cost mouse and keyboard.

A smart-looking 23.6in AOC i2367FH monitor is included. It has a very thin bezel and offers great colour reproduction, although its IPS panel technology can't provide the very fastest response times.



CyberPower participates in AMD's 'Never Settle Reloaded' promotion, which entitles you to free copies of Bioshock Infinite, Far Cry 3 and Crysis 3 - games that total around £90 at retail.

VERDICT: The CyberPower Infinity Fusion GT is an expensive gaming system with decent performance. It comes with a standard keyboard and mouse, but is also the only PC here to feature a Blu-ray writer. The CyberPower's twin SSDs provide very fast storage, but this paring ultimately adds unnecessary complication.

## PCs PCP

#### **DINO PC ANGRY LIZARD 3770K**

#### £1,649 inc VAT • dinopc.com • tinyurl.com/cs5rrk8

Combining the most powerful system processor with the fastest single graphics card, Dino PC's Angry Lizard 3770K produced some of the best performance results in our gaming PCs group test.

The Angry Lizard boasts a 3.5GHz Intel Core i7-3770K CPU that has been overclocked to 4.6GHz. This chip achieves higher performance through Hyperthreading, which doubles the number of processing threads to create eight virtual cores.

This speed trick is reflected in a PCMark 7 score of 6,930 points, placing it at the top of our performance chart for general-application use. This result was helped along by a fast 256GB Plextor M5S SSD.

A large Xigmatek Dark Knight SD1283 Night Hawk Edition CPU cooler performed an adequate job, but was rather noisy under load.

The Dino PC's Gigabyte-branded nVidia GeForce GTX580 Super Overclock Series graphics card is cooled by a row of five small fans. This version of the card comes with OC Guru tuning software and sees the clock speed boosted from the standard 1,137- to 1,202MHz.

The Dino PC displayed significant performance gains in Final Fantasy XIV, although lower-cost systems managed to deliver superior performance in our other gaming tests.

The Angry Lizard is the only PC here to include a dedicated soundcard. The Asus Xonar DGX is a gaming card with a built-in headphone amp. It also accelerates up to 128 simultaneous sound effects, which can create a more immersive sonic experience while relieving the CPU of some of the sound-processing burden.



A 24in LG 24EN43VS-B monitor is supplied, which features a fast TN panel, slim design and easy-access perpendicular connectors. Dino PC also bundles an impressive-looking Saitek Cyborg V7 customisable keyboard and a Cyborg Rat 3 five-button mouse.

**VERDICT:** The Dino PC Angry Lizard 3770K delivers exceptional performance and provides excellent features, but its use of pricey components is evident in its price tag. If raw performance is all you seek you can get close for considerably less money.

#### **ECLIPSE VENGEANCE 15357r795 OC**

#### £1,280 inc VAT • eclipsecomputers.com • tinyurl.com/bonq9dL

The Vengeance i5357r795 OC's rather aggressive appearance comes courtesy of its Zalman Z9 U3 system case. Through the Z-shape front panel shines a blue illuminated fan, for which a thumbwheel speed control and digital temperature readout are provided.

Inside, the ubiquitous Intel Core i5-3570K has been overclocked to 4.7GHz. That's a little higher than that configured by Chillblast and CyberPower, yet overall performance was nowhere near as good as we had hoped. The Eclipse scored 5,864 points in PCMark 7, and its gaming results were among the slowest here.

The system's AMD Radeon HD 7950 graphics card offers lower performance than the beefier Radeon HD 7970 offered by some of the competition, but you can still enjoy a great gaming experience at decent resolutions and settings.

This PC ran into overheating problems in our tests, regularly hitting 105°C and causing the CPU to throttle its speed. The Corsair H40 liquid cooler used here is a slightly lower-performance version of the H55 and H60 models found elsewhere, but the main problem was that Eclipse had boosted the core CPU voltage to 1.3V. Lowering this voltage setting should rectify the problem.

The supplied monitor is an AOC i2369Vm, which is very similar in specification to that offered by CyberPower. It features a very thin, frameless bezel, plus a high-quality IPS rather than TN panel.

The Gigabyte K8100 keyboard has a huge built-in wristrest, LED-backlit keys and a macro facility. There's also a built-in USB 2.0



hub, 20 anti-ghosting keys and a touch slider for volume control. Three groups of keys feature different levels of elastic force, and it features configurable gaming profiles. The Leviathan mouse has eight programmable buttons and switchable settings up to 3200dpi.

**VERDICT:** A configuration error has spoiled Eclipse's chances of excelling in our group test, but this PC has potential to perform better. Gaming performance also falls behind the competition, and the poor assembly and weak warranty push it to the bottom.

#### WIRED2FIRE DIABLO PREDATOR GAMING PC

#### £1,399 inc VAT • wired2fire.co.uk • tinyurl.com/c7fubd7

Wired2Fire's Diablo Predator is a great mid-priced gaming system with a good set of gaming-specific features and peripherals.

Like most of the competition the PC is based on a 3.4GHz Intel Core i5-3570K processor, here overclocked to 4.8GHz. Some hefty cooling is required to operate at this speed, and Wired2Fire has employed a huge Xigmatek cooler that's fitted with a pair of 140mm fans. These run more slowly and quietly than those inside the Dino PC, while delivering greater airflow.

Gaming graphics are provided by a factory-overclocked AMD Radeon HD 7970 card, which delivers excellent performance. The model used here is the X Edition from VTX.

The system is housed in a Fractal Design Arc Midi R2 case, a relatively low-cost housing with sturdy build quality.

Despite the huge overclock of the processor and 240GB SSD, the Wired2Fire came in last place in PCMark 7, with 5,324 points. We also experienced two BSoD errors during our torture testing. But gaming results were good – particularly good in the high-detail tests, in which we saw 40 percent higher framerates than the lowest-performing PC.

An AOC E2461FWH monitor is supplied. Its TN panel offers fast, blur-free graphics, but is inferior to the IPS screens here in terms of image quality and viewing angles.



The Zalman ZM-K500 is not a gaming keyboard, but it feels sturdy enough to withstand some frenzied gaming action. It's paired with a Razer Abyssus three-button gaming mouse.

**VERDICT:** Our testing suggests Wired2Fire may have pushed the Diablo Predator's CPU a little too far in pursuit of ultimate performance, but it offers good value and some appropriate peripherals for gamers.

	CHILLBLAST £1,199 inc VAT PC ADVISOR	CYBERPOWER £1,499 inc VAT	DINO PC £1,649 inc VAT	
	BEST BUY	A A A A A A A A A A A A A A A A A A A	XXXXXX	
Product name	Fusion Carbine	Infinity Fusion GT	Angry Lizard 3770K	
Processor	3.4GHz (OC to 4.6GHz) Core i5-3570K	3.4GHz (OC to 4.6GHz) Intel Core i5-3570K	3.5GHz (OC to 4.6GHz) Intel Core i7-3770K	
CPU cooler	Corsair H55 water cooler	Corsair H60	Xigmatek Dark Knight SD1283 Night Hawk	
RAM	16GB 1,600MHz DDR3	8GB 2,133MHz DDR3	16GB 1,600MHz DDR3	
Storage	120GB SSD + 1TB HDD	2x 128GB SSD (Raid 0) + 1TB HDD	256GB SSD + 2TB HDD	
Power supply	750W Corsair CX750W	600W Corsair CX600	650W Corsair VS650W	
Motherboard	Asus P8Z77-V LK	MSI Z77A-G45	Gigabyte GA-Z77X-D3H	
Operating system	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit	
Display	23.6in (1920x1080, IPS) liyama X2377HDS	23in (1920x1080 IPS) AOC 12367FH	24in (1920x1080, TN) LG 24EN43VS-B	
Graphics	2x Palit GeForce GTX 650 TI Boost, 2GB VRAM	XFX Radeon HD 7970, 3GB VRAM	Gigabyte GeForce GTX 680 OC, 2GB VRAM	
Sound	Onboard	Onboard	Asus Xonar DGX	
Connectivity	Gigabit ethernet	Gigabit ethernet	802.11a/b/g/n, Gigabit ethernet, Bluetooth 4.0	
Ports	6x USB 3.0, 2x USB 2.0, 2x HDMI, 4x DVI, 2x DisplayPort	4x USB 3.0, 4x USB 2.0, HDMI, 2x DVI, mini DisplayPort, PS2, S/PDIF	8x USB 3.0, 2x USB 2.0, HDMI, DVI-I, DVI-D, DisplayPort	
Optical drive	Lite-On BD-ROM/DVD±RW	Pioneer BD-R/DVD±RW	Lite-On BD-ROM/DVD±RW	
Case	Corsair Carbide 300R	Corsair Carbide 300R	Fractal Design Arc Midi R2	
Keyboard & mouse	Gigabyte M6800, Force K3	Logitech MK330	Saitek Cyborg V7, Cyborg Rat 3	
Other	Chillblast Family PC Pack	Bioshock Infinite, Crysis 3	BullGuard, surge protector	
Warranty	2-year collect-and-return	3-year return-to-base (1-year parts)	3-year return-to-base (2-year parts)	
PERFORMANCE				
PCMark 7 Overall	6,594	6,259	6,930	
Games score (fps) <sup>1</sup>	138/74, 150/47, 124/32	134/75, 152/73, 131/32	114/61, 209/77, 120/30	
Power consumption <sup>2</sup>	74W/370W	75W/401W	95W/425W	

Games tested: Alien vs Predator 720p/1080p, Max; Final Fantasy XIV720p Med/1080p Max; Sniper Elite V2 720p/1080p, Med 2Measured when idle and under load respectively

#### YOYOTECH WARBIRD TITANIUM PRO SLI

£1,300 inc VAT • yoyotech.co.uk • tinyurl.com/d337kuj

The Warbird Titanium Pro SLI was the fastest overall performer in our gaming group test, thanks to a high overclock and powerful graphics.

YoYoTech has selected the 3.4GHz Intel Core i5-3570K and, like Wired2Fire, boosted it to 4.8GHz. It's fitted with a Corsair H55 sealed-unit liquid cooler, which keeps temperatures relatively low.

Like Chillblast's Fusion Carbine, the YoYoTech uses a pair of nVidia graphics cards to accelerate gaming speeds. This time we find two MSI-branded GeForce GTX 660 Ti cards. These are faster than the entry-level 650 Ti Boost cards used by Chillblast. Together they form a formidable graphics sub-system, which delivered noticeable performance gains across our gaming tests.

One of three systems housed in the Corsair Carbide 300R system case, the Warbird's exterior looks somewhat familiar. Blue interior lighting shines through a transparent side panel.

In addition to two graphics cards you get a 3TB hard disk and a 120GB Samsung 840 SSD. The PC also features built-in 802.11n Wi-Fi.

External components are rather less impressive: there aren't any. Add a decent-quality monitor, keyboard and mouse to this system and you're looking at a price closer to £1,500, making the YoYoTech one of the most expensive of the group. Also note that this system comes without a Blu-ray drive. One isn't essential for gaming use, but

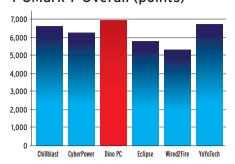


its absence is notable, given that the Warbird is the only system here to omit what can be a very useful asset.

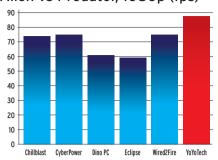
**VERDICT:** This is an impressively fast PC, and its hugely overclocked processor doesn't appear to have been over-stretched. The £1,300 price may appear to be good value, but remember that it doesn't include a monitor, keyboard, mouse or Blu-ray drive.

ECLIPSE £1,280 inc VAT	WIRED2FIRE £1,399 inc VAT	YOYOTECH £1.300 inc VAT
***	***	PC ADVISOR RECOMMENDED
Vengeance i5357r795 OC	Diablo Predator Gaming PC	Warbird Titanium Pro SLI
3.4GHz (OC to 4.7GHz) Intel Core i5-3570K	3.4GHz (OC to 4.8GHz) Intel Core i5-3570K	3.4GHz (OC to 4.8GHz) Intel Core i5-3570K
Corsair H40 water cooler	Xigmatek Prime SD1484	Corsair H55 water cooler
16GB 1,600MHz DDR3	8GB 2,133MHz DDR3	8GB 2,133MHz DDR3
120GB SSD + 2TB HDD	240GB SSD + 2TB HDD	120GB SSD + 3TB HDD
650W Cooler Master GX650	650W Corsair VS650	750W Cooler Master GX750
Asus P8Z77-V LX	Asus P8Z77-V	Asus P8Z77- V
Windows 8 64bit	Windows 8 64bit	Windows 8 64bit
23in (1920x1080, IPS) AOC i2369Vm	23.6in (1920x1080, TN) AOC E2461FWH	Not supplied
XFX AMD Radeon HD 7950, 3GB VRAM	VTX AMD HD 7970 X Edition, 3GB VRAM	2x MSI GeForce GTX 660 Ti, 2GB VRAM
Onboard	Onboard	Onboard
Gigabit ethernet	802.11 b/g/n, gigabit ethernet	802.11n, gigabit ethernet
4x USB 3.0, 6x USB 2.0, HDMI, DVI-D, 2x DisplayPort	6x USB 3.0, 2x USB 2.0, HDMI, DVI, VGA, DisplayPort, WLAN connector	4x USB 3.0, 2x USB 2.0, 2x HDMI, 4x DVI, 2x DisplayPort
Lite-On BD-ROM, Samsung DVD±RW	Pioneer BD-ROM/DVD±RW	Pioneer DVD ± RW
Zalman Z9 U3	Fractal Design Arc Midi R2	Corsair Carbide 300R
Gigabyte K8100, Dragon War Leviathan	Zalman ZM-K500, Razer Abyssus	Not supplied
None	Classic Shell (Windows 7 UI)	None
1-year return-to-base	2-year collect-and-return (3-year labour)	3-year return-to-base
5,864	5,324	6,772
107/59, 137/61, 99/24	135/75, 164/75, 131/32	163/87, 190/70, 175/45
71W/314W	84W/507W	105W/458W

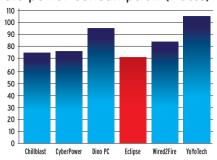
#### PCMark 7 Overall (points)



#### Alien vs Predator, 1080p (fps)



#### Idle power consumption (watts)



#### Conclusion

With prices ranging from £1,199 to £1,649 there's plenty to choose from in this issue's selection of gaming PCs.

Even the least expensive model from Chillblast will offer a very satisfying gaming experience, thanks to an overclocked Core i5-3570K processor and a pair of lowercost graphics cards that team up to deliver respectable gaming framerates.

Paying the top-end price tag of £1,649 for Dino PC's Angry Lizard 3770K will get you many extras, including a more powerful CPU and serious gaming peripherals in the form of Saitek's Cyborg V7 keyboard and Rat 3 mouse. It also comes with a gaming

sound card and plug-in Wi-Fi card, not to mention excellent gaming performance from a factory-overclocked GTX 680 graphics card.

Between these two extremes are plenty of options, whether you favour AMD or nVidia graphics. You also need to choose between a TN or IPS monitor. Serious gamers may prefer the faster response time of a TN panel, but we think the majority of users won't notice the difference and will prefer the improved image quality of IPS.

CPU power is important for gaming, but the graphics card will have the greatest effect on your framerates and will probably be the most expensive component in your

system. You should therefore make sure the graphics performance reaches the level you require before looking at the quality of external peripherals.

YoYoTech's Warbird Titanium Pro looks very inexpensive, considering that it offers the fastest overall performance with most games. However, this price is for the base system only and you'll have to add the cost of a monitor, keyboard and mouse when comparing it against the other systems. This would amount to at least £200 if you're thinking of buying peripherals of the same type of quality as those supplied with other systems in our group test.

#### How we test

#### Application performance

We test each PC for performance, measuring its speed in everyday computing tasks and its ability to play games.

For this group test we used PCMark 7, an industry-recognised test suite that uses 25 different workloads to measure areas such as storage, computation, image and video manipulation, web browsing and gaming.

An overall score in the high 6,000s is excellent for an overclocked gaming system.

#### Gaming performance

We've used three games to evaluate graphics performance. We run our tests at 1280x720and 1920x1080 pixels at various detail settings.

Framerates are recorded using the following games and quality settings:

Final Fantasy XIV: 1280x720, Medium quality; 1920x1080, Maximum quality.

Alien vs Predator: 1280x720, all settings at Maximum quality; 1920x1080, all settings at Maximum quality.

Sniper Elite V2: All options set to Medium quality, advanced shadows off, Supersampling off; all options set to Ultra quality, Advanced shadows.

#### Power consumption torture testing

We measure the power consumption of each PC base unit (excluding the monitor and other peripherals) when idle and again while running at its performance limit.

During the idle test the PCs hard drives are still spinning and the powermanagement features are not enabled.

For the full-load torture test, we run Prime 95 to force all CPU processing threads to maximum utilisation and stress system memory. At the same time we run the Geeks3D Furmark benchmark to stress any installed graphics cards. We leave these tests running for five minutes, then record the system's power consumption and CPU temperatures reached, reporting on any problems we find.

#### Overclocking

Gamers will do anything to squeeze out the last drop of performance from their hardware, and many are likely to have the knowledge to manage that power. This is our only PC category in which we allow overclocking of the processor.

We require that any tweaked component is designed for the stress that overclocking adds, and that the PC vendor offers a comprehensive warranty to help cover the increased likelihood of component failure.

#### Subjective assessment

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

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

#### Support

Differences in warranty terms can impact our scoring. Long warranties are sought after, but we also look at the terms and conditions - specifically, whether faulty PCs must be returned to the vendor at your cost and if both parts and labour are included.



# "Mr Scaife inspired me."

This is my story

"At high school I was always trying new business ideas, from running the school tuck shop to toy manufacturing, which was encouraged by my physics teacher, Mr Scaife.

We took my business idea - selling crisps to local offices to the bank. Armed with a cheque book and a £50 overdraft, I immediately knew I wanted to run my own business.

Leaving the crisps behind me, I now run an industry-leading employee benefits business with offices in London, Australia and New York and thanks to an excellent team we are showing no signs of slowing down.

fasthosts

Behind the scenes, we require a technology provider to ensure our clients get the best possible experience. Fasthosts infrastructure is reliable, secure and supported by real experts. They have helped us become UK market leaders and are successfully supporting our international growth plans."

Glenn Elliott CEO & Founder. Asperity Employee Benefits

Glenn Elliott

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Give your PC or laptop a speed boost by fitting an SSD. For most people, this is the single best investment to prolong your computer's life, writes Andrew Harrison

sefully capacious SSD storage has only recently been available at prices that won't make your eyes water. When we published our first round-up in 2010, the largest available drives were 256GB in capacity and cost around £2 per GB. Today that figure is closer to 80p.

If you're looking to spruce up a tired PC, nothing does a better job than an SSD. For desktop PCs you can sometimes get away with a lower-capacity (read cheaper) SSD boot drive, then dump your other files on a less expensive but slower hard-disk drive. Note that low-capacity SSDs will require regular maintenance to prevent them quickly filling up with application files.

Most PCs sold today are laptops, within which there's very rarely the room for both an SSD and a hard drive. USB 3.0 enables external storage to work at the same speed as internal hard disks, but forever plugging in and unplugging drives is a hassle, and not ideal on the move.

The sweet spot between capacity, performance and price is currently found in 256GB SSDs, but with 512GB drives becoming more affordable we asked vendors to supply their largest-capacity drive for our group test. SSDs 256GB or larger tend to perform better, too.

Note that user-accessible capacity can vary, since some drives reserve more of the available storage to improve their maintenance routines and/or long-term reliability (known as over-provisioning).

#### What makes a good SSD?

Even the cheapest SSD will knock spots off the fastest hard disk money can buy. So you could simply look for the cheapest available SSD with the capacity you need.

However, for performance-led applications, such as servers and media production, it pays to find a drive that is both fast and robust. And even at the consumer-level there are crucial factors to consider besides just price, such as tech support and device reliability.

#### Performance

The easiest test is the sequential read test. This is the headline metric that carries over from the hard-disk days. While it's useful to know that your drive can replay the entire contents of a 25GB Blu-ray in less than a minute, it doesn't demonstrate why an SSD makes your PC feel so fast.

Solid-state technology excels in its dexterity with juggling small files. Not only can it read and write files between 500B and 500kB much faster than can mechanical disks, it can do so with more than one thread at a time. Hard disks use memory cache to help them manage such tasks, but continuous intensive tasks can defeat this. Modern SSDs, with the right controller technology and firmware programming, truly excel with 32 or more simultaneous computing threads.

We can get an idea of just how well an SSD copes with parallel data-processing tasks by measuring its small-file transfer speeds using the industry-standard 4kB random read or write test with increased queue depth. This will indicate how many I/O operations it can handle per second (IOPS). The finest SSDs can hit 100,000 IOPS - a nominal figure waved in marketing materials, but a worthy benchmark target nonetheless.

#### Maintenance

All SSDs support the Trim command to pre-erase deleted data, although your OS may not by default support the facility. Garbage-collection routines enabled by the controller should ensure heavy use doesn't slow the drive over time, while wear levelling helps to prevent excessive strain on too few data blocks.

Hubris is to be expected from manufacturers, which insist their drive will not require refinement. In truth, faults and bugs are often discovered following the drive's release. To resolve such defects you may be expected to update the controller firmware on the drive; be warned that only two of the SSDs reviewed here (Crucial and Plextor) will allow you to do so without using a Windows PC.



# Solid-state drives





#### **CORSAIR NEUTRON GTX 240GB**

#### £190 inc VAT • corsair.com • tinyurl.com/kv954fc

The first SSD to appear in this group is in many ways the most intriguing. Designing a good SSD is a tricky task, with plenty of the clever work going into the controller chip and its firmware. Many brands take the quick and easy route of buying in that controller knowledge, which explains the recent prevalence of SandForce controllers. For the Neutron GTX, though, Corsair turned to new brand Link\_A\_Media and its LAMD LM87800 controller.

Two models of Neutron are available, standard and GTX, with the difference lying in the choice of NAND flash. The GTX uses the latest toggle NAND flash, combined with 256MB DDR2 memory cache. The firmware can be upgraded in Windows only, and Corsair provides a reassuring five-year warranty.

Corsair lists 85k write IOPS for the Neutron GTX - a good figure, given that many SSDs struggle to hit that with their read operations, which are typically faster in solid-state-land. In our tests we got close to this figure in AS SSD using 64 threads, with a result of 77k IOPS. CrystalDiskMark (CDM) with its 32 queue depth recorded 87.8k in 4kB random write IOPS and 92.8k for reads.

Sequential read/write performance, as measured by CDM, was a little lower than is now typical for SATA 6Gbps solid-state tech, at 431- and 467MBps. These write-centric figures were in effect mirrored when using random rather than compressible (0x00) data, showing that the LAMD controller does not rely on compression tricks to enhance measured performance.

The best drag-race results were found in the ATTO benchmark, which reported peak read- and write speeds of 557- and 511MBps.

VERDICT: The Corsair Neutron GTX is a very strong candidate in this group, which is all the more surprising given the original and novel choice of controller technology. If low weight, a long warranty and stellar write performance appeal, you won't go wrong with this SSD.



#### CRUCIAL M500 480GB

#### £320 inc VAT • crucial.com/uk • tinyurl.com/m2ncsmj

Behind Crucial stands Micron Technology, one of the world's largest semiconductor makers. Its M500 replaces the award-winning m4, and is available in capacities from 120- to 960GB. The 480GB model we tested offers the best value of the group, at just 67p per GB.

Spare capacity may be important here, since NAND flash manufacture uses smaller dies. Micron employs 20-nanometre (nm) MLC NAND, which is likely to have slightly reduced lifespan compared to earlier technology. Shelving off nearly 20 percent gives the controller more opportunity to assign fresh flash when blocks die.

Crucial specifies the M500 with 72TB data-writing endurance. This converts to 65GB of writes for each day of the three-year warranty period, so longevity should be satisfactory.

Other features include AES-256 and TVG Opal 2.0 drive encryption (although this may be available only to Windows 8 at present), plus adaptive thermal monitoring to throttle speed when the drive is pushed beyond a comfortable operating temperature.

In the controller's chair is a Marvell 88SS9187, which offers high performance with all types of data. This is followed by 512MB of fast DDR3 memory in the 480GB model.

Crucial specifies up to 80,000 IOPS for both reads and writes. With AS SSD we saw a trend that favoured reads (85k) over writes (75.8k), but both are good figures. CDM reported even faster read capability, with nearly 90k peak read IOPS. That benchmark reported less outstanding sequential reads and writes, at 470- and 427MBps.

Even ATTO couldn't tease out more write speed, settling on a relatively humdrum result of 539MBps reads and 433MBps writes.

VERDICT: Crucial's M500 isn't the fastest SSD, but it supports multiple operating systems, does a good job of balancing large- and small-file transfer speeds, and is attractively priced without relying on slow performance three-layer cell (TLC) flash technology.





## 240<sub>GB</sub> \*\*\* Build **Features** \*\*\* Performance \*\*\* Value Overall

#### **PLEXTOR M5 PRO 256GB**

#### £174 inc VAT • plextor.com • tinyurl.com/ptygg27

It may not be the biggest name in SSD technology, but Japanese company Shinano Kenshi, aka Plextor, is pushing to build a reputation as a leading player with dependable products. The M5 Pro tops its five SSD product series, and is one of the first consumer SATA drives to proudly boast 100,000 IOPS.

At the M5 Pro's heart is the same Marvell 88SS9187 controller as is found in the Crucial, but it runs Plextor's custom firmware. Listed features include Robust Data Hold-out Algorithm for long-term read capability, plus a 128bit error-correction code.

Plextor tells us it subjected 400 units to 500 hours of extreme testing with no failures, and that each unit sold is burned-in to weed out potential issues. Plextor backs up its faith in longevity with an attractive five-year warranty, while multi-platform ISO boot discs are available to download for carrying out firmware upgrades.

In the lab the Plextor acquitted itself with some of the highest performance figures we've measured. Its random read IOPS in AS SSD approached the magic 100,000 mark, with 98.1k read- and 78.6k write IOPS, while busting into the three-figure territory in CDM with 103.3k peak IOPS reads. AS SSD also assigns a nominal point-score based on the aggregate of weighted results, and here the M5 Pro topped our performance chart with 1,124 points.

Sequential read/writes in CDM showed a slightly read-centric tuning, with 504- reads versus 437MBps writes. These results were similar to the 547- and 457MBps returned by ATTO.

This is the cheapest SSD in our round-up at £174, and is beaten on value only by the Crucial, costing around 68p per GB.

VERDICT: Plextor excels in raw performance and quality assurance, and its M5 Pro is the cheapest high-performance drive in this group. Despite some very tough competition, the M5 Pro is a worthy winner of our Best Buy award.

#### PNY XLR8 PRO 240GB

#### £215 inc VAT • pny.com • tinyurl.com/pday5ph

PNY is a US flash storage company and an nVidia graphics partner. It offers two SSD product ranges: Prevail for enterprise applications (low power, longer endurance); and XLR8 for gaming and media enthusiasts. The XLR8 also has a Pro option that carries a '3k promise', referring to 3,000 program/erase (P/E) cycles. While that may sound impressive, previous generations of MLC flash offered 5,000 or more P/E cycles, and SLC exceeds 50,000.

The PNY is the only SSD here to use a SandForce controller. Once ubiquitous, reported reliability issues and the emergence of faster, more stable competition has undermined its popularity.

With the SandForce SF-2281 controller and Intel 25nm MLC, PNY can list up to 550MBps read- and 520MBps write speeds, plus 85,000 random read/write IOPS.

Our testing didn't support PNY's claims for IOPS figures, but sequential transfers exceeded those advertised. In AS SSD's 64-thread 4kB random test the read IOPS reached only 54.2k, while the write IOPS were unusually higher at 60.2k. CDM pegged the drive's peak IOPS higher still at 67.3k (writes again).

CDM's sequential tests showed the classic shortfall between synthetic and real-world data-transfer speeds: 490- and 492MBps for reads and writes with a string of zeroes; and 495- and just 324MBps with random data.

AS SSD awarded the XLR8 Pro the lowest overall rating with a 758-point score, yet ATTO's sequential drag-race challenge put the XLR8 Pro among the fastest SATA SSDs you'll find: 555MBps reads and the highest sequential write result here of 530MBps.

VERDICT: Operating system support is limited, media files transfer slower than advertised, and the price isn't competitive. However, the PNY's SandForce controller and fast Intel flash can provide decent results, if less impressive than those of more recent SSDs.



## TOSHIBA HAMINIANA MAN Build **Features** Performance Value **Overall**

#### SAMSUNG 840 PRO 512GB

#### £370 inc VAT • samsung.com/uk • tinyurl.com/ou4Lejg

Samsung has worked hard from a nearly standing start to gain consumer mindshare as a premium supplier of SSDs for aftermarket  $\,$ upgrades. The Korean giant is one of only two brands (the other being Toshiba) that can control the entire design and manufacture of the flash memory, the controller and the controller firmware.

In 2012 Samsung split its range into the 840 and 840 Pro Series. The latter (reviewed here) is a development of the 830 Series, while the standard 840 is the world's first SSD to use cheaper TLC flash.

In control is a proprietary three-core ARM processor running Samsung's firmware, and the firm uses its own 21nm toggle NAND flash. The DDR2 memory cache has been increased to 512MB.

Samsung backs this MLC-based drive with a five-year warranty, but platform support for firmware upgrades is limited to Windows.

With this drive fitted interference to Bluetooth left our MacBook Pro inoperable. This may be just a rogue sample, and we're awaiting a replacement drive to be certain.

The goal was 100,000 IOPS and, given the right metric, that's what Samsung has achieved. AS SSD indicated lower - but still impressive - figures of 86.7k and 81.1k for 4kB read and write IOPS respectively. The same benchmark also indicated the second-best nominal score here, with 1,094 points.

Halving the number of threads to 32 in CDM, we found the best peak IOPS result of the group, with a stunning 103.8k read IOPS. Write IOPS weren't far behind either, at 93.5k.

CDM showed the Samsung's indifference to data type. Not only did the random data test match that of compressible data, it exceeded it. The best results were 516MBps reads and 496MBps writes, while ATTO returned the highest sequential read results of 562MBps.

VERDICT: There's little doubt that in the right computer the Samsung 840 Pro is one of the top consumer solid-state drives available today. Pricing is competitive and the essential small-file IOPS performance is on the money, too.

#### **TOSHIBA THNSNH512 512GB**

#### £380 inc VAT • toshiba.co.uk • tinyurl.com/ph6xnk5

You could be forgiven for thinking that Toshiba ought to be leading the pack in SSDs - after all, the company invented NAND flash back in 1989. But, until recently, Toshiba had been focused on supplying semiconductor storage to enterprise customers, and is almost unknown for its consumer SATA SSDs.

The THNSNH512 doesn't help matters with its less-than-catchy name, and the one-year warranty doesn't inspire confidence. No firmware support is offered to the end user, although Toshiba assures us that these tools will be made available when required.

Inside the SSD is Toshiba's own 19nm MLC flash and a controller that features the company's Quadruple Swing-By Code (QSBC) for read-error correction. Advanced power-management is said to ensure the lowest energy consumption, which is an important consideration for laptop use.

While Toshiba has hitherto been supplying SSDs to the trade, the sample of this new consumer drive was similarly bereft of any packaging, accessories or top-side labelling.

Our lab results were mostly very good, leading with near-100,000 IOPS from CDM's 4k random read test (98.5k). AS SSD showed an interesting and strong bias toward read performance, hitting 92k IOPS, while 4kB random write IOPS languished at just half this with 49.1k IOPS. AS SSD also scored the Toshiba well, with 954 points, albeit putting it in fifth place in this competitive group.

CDM confirmed that no conspicuous data-compression techniques are employed, with the 503- read and 477MBps write results barely moving when switched to incompressible random data, where we recorded 501- and 473MBps. Headline sequential results from ATTO were among the best, with 554MBps reads and 519MBps writes.

VERDICT: The Toshiba THNSNH512 put in a marvellous show in the 4kB read and sequential-read tests, but it has some way to go in terms of marketing and retail availability, as well as small-file write performance, before it becomes a go-to consumer choice.



## Double the screen, double the excitement The UltraWide 21:9 display with Multiview

Take your viewing experience to the limit with the UltraWide 298X4QIAB display with Multiview. Connect and view two different sources at same time in picture-by-picture or picture-in-picture mode. Follow the game while checking email or watch a movie while chatting on social media – you can access nearly any device with the HDMI, DVI and DisplayPort connections. The sleek Ultra Narrow Bezel maximizes your viewing area with a touch of style. No matter what you're doing, you'll be impressed by the ultra-high 2560 x 1080 resolution and IPS panel that delivers true-to-life colors and unbelievable 178-degree viewing angles.













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#### How we test

We lab-test SSDs on a Windows 7 PC comprising an Asus P8P67 motherboard, Z77 chipset, Intel Core i5-3570K and 8GB of RAM.

Drives are connected to the Intel SATA 6 Gbps AHCI bus and tested using a range of Windows tools. No single benchmark will tell you everything you need to know; we use several to test different aspects of a drive's performance.

ATTO is the maker's favourite, since it gives the highest results for simple sequential read/write speeds. CrystalDiskMark 3.0 typically reports slightly lower speeds, and crucially can be configured with random data besides default Os (OxOO) and 1s (OxFF). We use both to spot compression strategies. But if you want to know how quick your PC will feel, ignore the sequential large-file figures altogether and focus on the small-file random reads and writes.

AS SSD also uses incompressible data to find realistic results, and can measure up to 64-thread queue depth; CDM works to QD32, and can still show higher IOPS figures than AS SSD.

Benchmark results can vary with different capacities of the same drive; larger drives tend to have greater parallelism (multiple data streams) and offer better performance than smaller drives, which typically suffer slower write speeds.

#### Conclusion

With the possible exception of the PNY XLR8 Pro, which still ticks the damn-fast box but would require a price drop to be truly competitive, all the SSDs in the group test are startlingly fast.

The Corsair Neutron GTX is a surprise outsider that really impresses. While it's priced at the higher end of the pack, at around 79p per GB, it offers great small-file juggling. Laptop weight-watchers may also note it has the lowest mass of 47g.

Toshiba is only now starting to address the consumer retail market. Its SSD has great promise with top-tier sequential and good read IOPS, but it's tardy with essential write IOPS.

Samsung's 840 Pro is one of the swiftest SSDs you'll find but, like others, non-Windows platform support is poor.

A longer warranty is all that's missing from the Crucial M500, which stands as the new budget-performance champion. It offers keen pricing and performance that is plenty quick enough for most mortals. Decent firmware upgrade support just adds to its appeal.

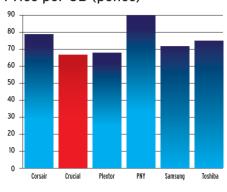
The same latter consideration applies to the M5 Pro. We were impressed with Plextor's quality assurance, and its outstanding IOPS figures. Combined with some very competitive pricing, it deserves our Best Buy as the best all-round SSD in this group. ⊠

Model Neu Capacity tested 240G	utron GTX	M500	
Capacity tested 240G			M5 Pro
	GB	480GB	256GB
Product code CSSD	D-N240GBGTXB-BK	CT480M500SSD1.PK01	PX-256M5P
Price per GB 79p		67p	68p
Memory cache 256M	MB DDR2	512MB DDR3	512MB DDR3
Controller Link_	_A_Media LM87800	Marvell 88SS9187	Marvell 88SS9187
Encryption None	e	AES 256bit	AES 256bit
Flash Sams	nsung/Toshiba Toggle NAND	Micron 20nm MLC NAND	Toshiba Toggle NAND
Firmware update support SSD T	Toolbox for Windows	ISO boot disc (n/a at present)	ISO boot disc
Warranty 5 year	ears	3 years	5 years
Weight 47g		64g	59g

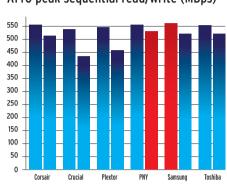
PERFORMANCE				
ATTO peak sequenti	Read: 557MBps; Write: 511MBps	Read: 539MBps; Write: 433MBps	Read: 547MBps; Write: 457MBps	
CDM Seq 0x00	Read: 431MBps; Write: 467MBps	Read: 471MBps; Write: 428MBps	Read: 504MBps; Write: 437MBps	
CDM Seq random	Read: 430MBps; Write: 467MBps	Read: 470MBps; Write: 427MBps	Read: 504MBps; Write: 436MBps	
CDM 4kB QD32 rando	n Read: 363MBps; Write: 342MBps	Read: 351MBps; Write: 343MBps	Read: 404MBps; Write: 347MBps	
CDM peak IOPS	92.8k (read)	89.8k (read)	103.3k (read)	
AS SSD IOPS	88.6k (read); 77.3k (write)	85.0k (read); 75.8k (write)	98.1k (read); 78.6k (write)	
AS SSD (points)	1,057	1,038	1,124	



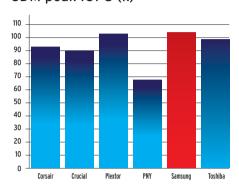








CDM peak IOPS (k)



PNY £215 inc VAT	SAMSUNG £370 inc VAT  PC ADVISOR RECOMMENDED	TOSHIBA £380 inc VAT
XLR8 Pro	840 Pro	THNSNH512
240GB	512GB	512GB
SSD9SC240GCDA-RB	MZ-7PD512	THNSNH512GCST
90p	72p	74p
Not specified	512MB LPDDR2	Not specified
SandForce 2281	Samsung MDX (3-core ARM)	Toshiba TC58NC5HA9GST
AES 256bit	AES 256bit	None
Intel synchronous-mode 3k P/E rated MLC	Samsung 21nm Toggle DDR 2.0 NAND	Toshiba 19nm MLC Nand
Firmware Update software for Windows	SSD Magician for Windows	None
5 years	5 years	1 year
94g	54g	52g

Read: 555MBps; Write: 530MBps	Read: 562MBps; Write: 519MBps	Read: 554MBps; Write: 519MBps
Read: 490MBps; Write: 492MBps	Read: 509MBps; Write: 490MBps	Read: 503MBps; Write: 477MBps
Read: 495MBps; Write: 324MBps	Read: 516MBps; Write: 496MBps	Read: 501MBps; Write: 473MBps
Read: 207MBps; Write: 263MBps	Read: 406MBps; Write: 365MBps	Read: 385MBps; Write: 226MBps
67.3k (write)	103.8k (read)	98.5k (read)
54.2k (read); 60.2k (write)	86.7k (read); 81.1k (write)	92.0k (read); 49.1k (write)
758	1,094	954



# DISCOVER LEW BROWSER

Internet Explorer, Chrome and Firefox dominate the web-browser scene, but there are some great alternatives, and you don't need to abandon your favourite browser to take advantage, writes Roland Waddilove

hich web browser do you use? Are you a fan of Google Chrome or Mozilla Firefox? Perhaps you simply use the one that came bundled with Windows: Internet Explorer is still one of the most popular web browsers.

Many alternative browsers are available, and we're not just talking about Safari and Opera. Some of them are very good, too. What you may not know is that these alternatives are actually based on your favourite web browser. You can have all the performance and features of Chrome, Firefox or Internet Explorer, but with a whole bunch of extra functions and tools, too.

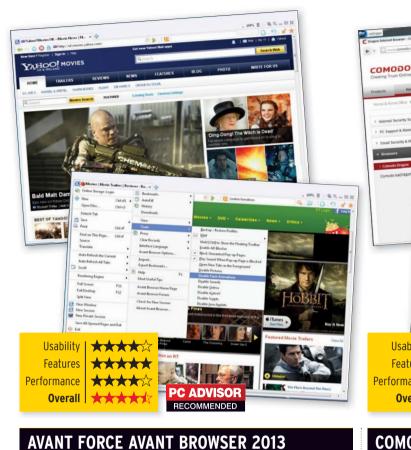
Chrome itself is based on the free, open-source Chromium project. The rendering engine (the code that is responsible for displaying web pages in the browser window) is based on the open-source WebKit. Anyone, then, can take the WebKit rendering engine and add their own menus, functions and features. The end result is a browser that has almost the same performance and HTML5 compatibility as Chrome because the rendering engine is identical, but with a brand-new set of features. It's a bit like skinning an app, which replaces the stock window graphics, toolbar and menus with alternatives.

Mozilla, the Firefox developer, makes its rendering engine available to anyone who wants to use it. Programmers have taken the Firefox engine, called Gecko, and wrapped it in their own window controls, toolbars and menus. They have added a range of cool features and released the result as an alternative browser. If you like Firefox then an alternative browser based on the same rendering engine can give you all Firefox's features plus a whole lot more.

The same is true of Internet Explorer. Microsoft's browser uses the Trident rendering engine. Every version of Windows has Internet Explorer built-in and programmers can use it within their own applications. Internet Explorer- or Trident-based alternative browsers do have a drawback, though: they're limited to whatever version of the engine is installed in Windows. If you have Internet Explorer 8 installed then alternative browsers use the Internet Explorer 8 engine, for example. If you want to use an Internet Explorer-based alternative browser, make sure you upgrade to the latest version of Internet Explorer first.

A common complaint from web users is that a particular site no longer works in their browser. The simple solution is to use a different browser. After all, they are free. A couple of alternative browsers have all three rendering engines and you can switch from Trident to Gecko to WebKit at the click of a button. If a site doesn't work, you just swap engines and reload the page.

With these alternative browsers you can have your cake and eat it. You can switch to a full-featured browser, yet continue to use your favourite, whether it is from Microsoft, Mozilla or Google.



#### **Features** \*\*\* Performance **Overall COMODO ICEDRAGON 20**

\*\*\*

Usability

#### Free • avantbrowser.com • tinyurl.com/czLzojv

Avant Browser isn't simply a skinned version of someone else's browser. For a start, it includes the three main rendering engines: WebKit, Gecko and Trident. Lunascape also manages this trick, but Avant Browser succeeds where that browser fails.

The engines used by Avant are just one step behind the latest versions, and web pages can be viewed as Chrome 25, Firefox 19 or Internet Explorer (with the latter you get whichever version is installed on your machine). This makes them almost as good as the native browsers in terms of performance and HTML5 compatibility.

More than 20 themes are provided. The default has a Firefox-like button in the top-left corner for accessing menus, and there are plenty of useful features. You can set the default rendering engine; the current page can be reloaded in a different engine from the right-click menu; and you can view a page in three different engines on three different tabs. That's useful for web developers, plus anyone who finds a particular page won't load with their current engine.

There are options to automatically refresh the current web page or all tabs, at intervals of between 10 seconds and 10 minutes. That's handy for news, sport, stock market and other websites that display live, frequently updated data.

An ad blocker removes unwanted adverts from web pages, while pictures, Flash, sounds, videos and other page elements can be disabled for a faster, cleaner browsing experience. An interesting feature opens all images in a new tab, too.

Avant Downloader manages all your downloads and gives you the option to shut down your PC when the last one is complete. That could be useful for downloading big files overnight or at the end of the working day. Web pages can be saved as HTML, text, or as an image. You can even select any part to be saved as an image, which is useful for clipping content from pages.

**VERDICT:** Avant Browser is a great browser and offers some genuinely useful features. It can also sync your bookmarks, RSS feeds and passwords with other PCs and devices.

#### Free • comodo.com • tinyurl.com/cy3vegz

Comodo offers an excellent range of free software and, as might be expected from a security company, most of its products are designed to make your PC safer in some way or another.

IceDragon is Firefox wrapped in a new skin, with some tweaks and extra features that make it better and more secure. Firefox 20 was released only a few days prior to the writing of our review, so it was no surprise to find IceDragon using version 19.

Comodo also offers the Dragon browser, which is in essence the same as IceDragon, but based on Chromium rather than Firefox.

One of the nice features of IceDragon is its use of Comodo's DNS servers, which are used when converting URLs to IP addresses. All browsers use DNS servers, but these are typically your ISP's servers. Comodo claims its DNS servers are faster and more secure. They filter out phishing, spyware and malware websites, parked domains with adverts, and so on. You can use Comodo's DNS servers with any browser, of course, so it's not an exclusive feature.

IceDragon has an option to switch to virtual-browsing mode. This runs the browser in a virtual environment that is isolated from the rest of the system; even if you visit a website hosting malware, it won't be able to infect your PC. However, virtual mode requires Comodo Internet Security to be installed on the PC. A free version is available, if you're prepared to replace your current software.

Other security features include the ability to scan a web page and produce a report that shows whether it is safe or known to engage in phishing, harbour malware and so on. Crash reports and performance reports are not sent back to developers, and there are a few other under-the-hood security tweaks, too.

In all other respects, this is simply the latest version of Firefox. If you're a fan of Mozilla's browser, you'll feel right at home. It has the same features, menus, extensions and add-ons. It's just more secure.

VERDICT: Comodo IceDragon is highly recommended if PC security is of particular importance to you. Google Chromium enthusiasts are equally well served by Comodo Dragon.





#### **FLASHPEAK SLIMBOAT 1.1.29**

#### Free - slimboat.com - tinyurl.com/czyscua

Slimboat exists in both Chromium and Internet Explorer variants; we've reviewed the former here. It's just one version behind the latest - Slimboat uses Chromium 25. This is good news: it means the browser is fast and has excellent support for HTML5.

Slimboat, which is available for Windows, Linux and Mac, is very similar to Chrome, but with a more traditional interface. You'll find a menu bar at the top, a toolbar with address and search boxes, a bookmarks bar and browser tabs. Eight skins are provided.

The Language menu is an unusual feature, but one that could prove useful if you frequently visit foreign-language websites. There are options to translate either the page or selected text, a choice of Bing or Google translation services, an Auto Translate Selection option and more. The Slimboat browser itself supports many languages, between which you can switch at will.

Sets of tabs can be saved into groups, which can then be opened with a single click of the mouse. It's an alternative approach to bookmarking individual sites. You can also create and use multiple identities when filling online forms. You simply select an identity and Slimboat fills in the form with the relevant username, password, address and other details.

The browser has several features built-in that for most popular browsers require an extension or add-on. For example, a 'Share This Page' menu works with Facebook, Twitter, Pinterest, Google+ and other social networks and email services. Plus, an advert blocker can clean up web pages by removing unwanted ads.

Aliases can be created as shortcuts for URLs. For example, you could associate 'y' with YouTube, so that typing 'y' is all that's required to take you directly to the website.

The status bar can cleverly be used to display the current weather forecast, and clicking this brings up a seven-day forecast.

**VERDICT:** Slimboat is an interesting variation on Chrome, with some useful extras. There's even a portable version, making Slimboat ideal for carrying on a USB flash drive and using wherever you are.

#### **LUNASCAPE 6.8.3**

#### Free • lunascape.tv • tinyurl.com/cx3zvq5

At first sight Lunascape is an exciting, interesting browser, with some unusual features. Unlike most competing browsers, which are based on either Firefox, Chrome or Internet Explorer, it contains all three.

You can choose a default engine when starting the browser or opening a new tab, and a button on the toolbar lets you quickly switch between the engines. This is useful if a particular site fails to display correctly or a feature isn't working properly in, say, Internet Explorer. You can click the button to switch to Firefox and reload the page. If you like, you can open the same page using all three engines in side-by-side tabs. Developers will find this feature particularly useful, allowing them to quickly check for compatibility issues.

Lunascape suffers with dated rendering engines, though. It appears to use Firefox 3.6, and the WebKit (Chrome) engine isn't the latest version either. The Internet Explorer version depends on what is installed on your PC. Performance and HTML5 compatibility are very poor, and prevent us being able to recommend this browser.

That's a shame, because Lunascape has a good range of features, particularly for tabbed browsing. It can tile tabs in the window, allowing you to see several pages at once; it can watch the clipboard and open a tab whenever you copy a URL; and it can use the empty space to the right of tabs to display a news ticker. Tabs to the right, tabs to the left, and inactive tabs can be closed. There is one tabbased irritation, though: to manually close a tab you have to switch to it and then close it. Other browsers allow you to simply click the X.

Lunascape supports RSS feeds. A panel on the left is used to manage subscriptions, and the feeds appear as drop-down menus in a toolbar. Select some text on a web page and a menu pops up with options to search, translate, copy and more. Other browsers require you to select the text, then right-click to access these options. Web pages can be saved as images, there are mouse gestures and more.

**VERDICT:** With up-to-date engines, Lunascape would be a great browser. For now, though, it fails miserably with modern HTML5 compatibility and performance. We can't recommend it.



# Sign in to start your online music collection Usability **Features** Performance **Overall**

**TORCH**MUSIC

#### **MAXTHON CLOUD 4.05**

#### Free • maxthon.com • tinyurl.com/cmtg9n6

Maxthon Cloud adds a new skin and features to the Internet Explorer and Chrome engines. Chrome is updated so frequently that although it was up to version 26 at press time, version 22 used by Maxthon is just six months old. Maxthon uses whichever version of Internet Explorer is installed on the PC, and a button to the right of the address box lets you switch between Internet Explorer and Chrome.

A number of extras are bundled with the browser. An optional dock sits on the left side of the screen providing icons for launching various features. One opens a Downloads window that's more convenient than Chrome's Download tab. There's also a note-taking widget, which is handy when using the web for research. An RSS button opens a newsreader tab, and you can subscribe to news feeds and import feeds from Google Reader. The dock can be customised, and there's a palette of extra items such as eBay, YouTube, Twitter, Pinterest and others,

The status bar at the bottom of most browsers is rarely used for anything beneficial, but Maxthon adds a system monitor. It can display CPU usage, upload and download speeds, memory usage and more. You also get a button to trigger the ad blocker, a Safari-like reader mode that strips web pages of clutter, Magic Fill for online forms, and a night mode for browsing in dim light.

Maxthon Cloud provides several useful online services. For example, it syncs browsing data across all your computers, tablets and smartphones (iOS and Android).

You can also push content to other computers and devices, such as links, text and images, and downloads are also stored online, which enables them to be downloaded to other PCs and devices.

VERDICT: If you like feature-laden browsers, Maxthon will be right up your street. It has some useful cloud-based features that aren't offered by other web browsers. There are useful extensions, too.

#### **TORCH MEDIA TORCH BROWSER 23.4**

#### Free • torchbrowser.com • tinyurl.com/d698euf

Torch is based on Google Chromium, running version 23. It's slightly more outdated than some of its rivals, but still just a few months old. The browser offers decent performance and HTML5 support.

Torch Browser offers some unusual features. At either side of the window are semi-transparent drop zones, which can be made completely invisible, but still operational.

The left drop zone is for sharing: you can drag a link or image from a website, and a panel of tiles pops up with Facebook, Twitter, Google+, Pinterest and LinkedIn sharing options. Drop the item on the relevant tile to share it with your friends or followers.

The right drop zone offers tiles for conducting an image search, and for searching the web, Wikipedia, and so on. There is a button for general Facebook and Twitter posts, too.

A video downloader is built into Torch. The Media button on the toolbar is enabled when a clip is playing on the page; click this and the video can be saved to disk as an .flv file.

A BitTorrent client is built-in, and the toolbar button opens a new tab with all the standard controls you would expect. You can add, start, pause and remove torrents, set bandwidth limits, view peers, trackers and activity and so on. It's great for grabbing big Linux distros and other files distributed this way.

A Torch Music toolbar button opens a tab and displays free music that you can listen to within the browser. You can browse the suggestions on the home page or create your own online music collection by signing in. It's really just a clever portal and player for accessing music videos uploaded to YouTube, so it's all legal and the audio can't be saved or shared with others.

VERDICT: This is a great alternative browser that adds to the Chrome engine some interesting extras. Like Maxthon, it's in need of an update, but particularly worth considering if you use BitTorrent.

### Conclusion

Lunascape stands out from the crowd, but for all the wrong reasons. Its rendering engines are past their use-by date. Torch Browser and Slimboat are both reasonably good browsers, with the former offering support for BitTorrent. Comodo offers extra security - but if you have an internet security suite installed, do you need them?

This is more of a two-way contest between Avant Browser and Maxthon, and there's little to choose between them. Avant has a triple engine, which means it can be used in Mozilla Firefox, Google Chrome or Internet Explorer modes. You can quickly and

easily switch from one to the other without having to switch browsers, so all your bookmarks and settings are always to hand.

Maxthon is marginally better: its cloud-based features could be very useful to those who use more than one computer or device and, let's face it, that's most of us these days.

Maxthon is available for Windows, OS X, Android and iOS, and can automatically sync tabs, bookmarks and settings between devices. It's an excellent web browser that uses the latest version of Chrome, but adds a bundle of extra features. ⋈

	PC ADVISOR RECOMMENDED				PC ADVISOR RECOMMENDED	
	AVANT FORCE Avant Browser 2013 Free	COMODO IceDragon 20 Free	FLASHPEAK Slimboat 1.1.29 Free	LUNASCAPE Lunascape 6.8.3 Free	MAXTHON Maxthon Cloud 4.05 Free	TORCH MEDIA Torch Browser 23.4 Free
Website	AvantBrowser.com	Comodo.com		Lunascape.tv	Maxthon.com	TorchBrowser.com
Windows	XP, Vista, 7, 8	XP, Vista, 7, 8	XP, Vista, 7, 8	XP, Vista, 7, 8	XP, Vista, 7, 8	XP, Vista, 7, 8
Mac	×	x	✓	Coming soon	✓	x
Linux	×	x	✓	×	×	×
Tabbed browsing	<b>√</b>	✓	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>
Password manager	✓	✓	✓	<b>✓</b>	✓	✓
Form filler	<b>√</b>	✓	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>
Download manager	✓	✓	✓	✓	✓	✓
Parental controls	×	x	×	x	×	x
Sync to other devices or PCs	✓	Add-ons available	×	x	<b>✓</b>	Add-ons available
Special features	Video downloader	Comodo DNS	Ad blocker, video downloader	Mouse gestures	Ad blocker, system monitor	BitTorrent, Torch Music
Browser engine(s)	Firefox 19, Chrome 25, Internet Explorer 10	Firefox 20	Chrome 25	Firefox 3, Safari 535, Internet Explorer 10	Chrome 26, Internet Explorer 10	Chrome 23
Anti-phishing	×	✓	×	x	✓	x
Private mode	✓	✓	✓	×	✓	✓





# A NEW GENERATION OF THRIL

AOC is proud to be awarded the PC Advisor Monitor of the Year 2013. From the wonderful impression our i2352Vh created, AOC are continually improving our technology, designs and product range.

A new dimension of entertainment is here: the myMulti-Play (q2963Pm). The giant 73.7 cm (29") display delivers true cinema feeling at home, thanks to its 21:9 format and UWHD resolution of 2560 x 1080 pixels. Not only can you watch Cinemascope movies in their native format, but the energy-efficient myMulti-Play with LED backlights is also equipped with MHL connectivity, which allows you to directly display the content of any compatible mobile device such as a smartphone or tablet PC on the big screen.

This perfect entertainer takes you to an entirely new dimension of thrill!

www.aoc-europe.com







Great design

Ultra slim

Multiple inputs for enhanced multimedia capabilities

### Model specifi cations: q2963Pm

21:9, screen size 73.7 cm (29"), UWHD resolution 2560 x 1080, MHL™ interface (Mobile High-Defi nition Link), DVI, HDMI, 6 ms response time (GtG)







# AOC displays - internationally awarded time and time again:









PI · d2357Ph PC World, 05/12,



TR: e2251Fwu PC Extra, 03/12, Editor's Choice



TR: d2357Ph ନିଧନାନ୍ତ୍ରେ 05/12,



Computer Shopper,

03/12, Best Buy





GB: i2353Fh PC Gamer, 04/12, **Expert Reviews** 03/12, Best Buy Editor's Choice





# PC ADVISOR AWARDS 2013

We present our roll call of honour for the best of the past year's technology, and our guide to the brands you can trust

he arguments are over, the battles won and lost, and an almost impossible task is completed. Our team of experts has taken into account the 2,000 or so tech products we've reviewed over the past 12 months and created a list of only the very best in key product areas. The PC Advisor Awards winners for 2013 await you over the next few pages.

Our annual roll call of honour considers every piece of hardware and software that has passed through our Test Centre over the past year. We looked for innovation and excellence, outstanding performance and value for money, then created the shortlist that was published in the previous issue.

Only excellent products make the PC Advisor Awards shortlist, and we congratulate all the manufacturers represented on the list. If a product still looks great from the viewpoint of up to

a year after its first review, the chances are that it is great.

That does, however, mean that the PC Advisor Awards winners list is not necessarily a buyer's guide - for that you should read our group tests and Top 5 charts. Some of the products here may no longer be available, and in some categories they may have been superseded. But rest assured that each is the standout product in its own area, for reasons we will explain.

Whittling down the shortlist to pick out individual winners isn't easy. In all cases arguments could be (and were) made for products other than the eventual winners. But winners there must be, and in each case we've explained our reasoning and why that particular product is best.

We also list the hardware makers and online retailers you voted worthy winners of Reader Awards from page 84.

Best Windows Desktop PC Brand76
Best Budget Laptop76
Best Windows Laptop76
Best 7in Tablet77
Best 10in Tablet77
Best Smartphone77
Best Monitor78
Best Printer78
Best Wireless Networking Product78
Best Network Storage Device79
Best Storage Device79
Best Portable Storage Device79
Best Graphics Card80
Best Camera80
Best Audio Product80
Best Digital Home Device81
Best TV81
Best Security Software81
Best Photo/Video Software82
Best Game82
Best Mobile Game82
Best Business Laptop83
Best Business Printer83
Best Business Software83
Best Specialist Online IT Retailer84
Best Online Retailer84
Best Laptop Brand84
Best Desktop PC Brand84

# Hardware Awards

# BEST WINDOWS DESKTOP PC BRAND

### Chillblast

In one of the most competitive categories of product PC Advisor reviews, Chillblast stood out head and shoulders above the rest, seeming to score a Best Buy or Recommended award every month. Chillblast has produced gaming and family PCs, business PCs and all-in-ones, small-form-factor systems and media centres. Each time it has managed to combine solid build quality with good value and excellent performance. The strongest of a strong group, Chillblast is the winner of our Best Windows Desktop PC Brand award. tinyurl.com/bLbbsev



# THE RUNNERS-UP

CyberPower tinyurl.com/cp57m5j Lenovo

tinyurl.com/cq35tvL

**PC Specialist** tinyurl.com/cbbsu3w QuietPC tinyurl.com/bw468bn

**C ADVISOR** 

WINNER

# BEST BUDGET LAPTOP

### Asus K55VD

Winner in another tightly contested category is our Best Budget Laptop, the Asus K55VD. One of the cheapest Ivy Bridge laptops we'd seen when we reviewed it in August, the K55VD also has a DVD writer and a dedicated graphics card capable of playing 3D games. It isn't the prettiest, but Asus' K55VD delivers surprisingly good performance for your money. The touchpad takes some getting used to but, as with the smallish 500GB hard disk, these foibles aren't deal-breakers in a laptop that offers outstanding value. tinyurl.com/8ct9nxx



Acer Aspire V3-571 tinyurl.com/cqkL4pd Dell Inspiron 15R 5520 tinyurl.com/97jwhys

HP Envy Ultrabook 6-1010ea tinyurl.com/8jf3yjg

Lenovo IdeaPad U410 tinyurl.com/cjL7qn9

# **BEST WINDOWS LAPTOP**

### Alienware M14x

The Alienware M14x marked a breakthrough for laptop technology, boasting as it did in May last year the first Intel Ivy Bridge processor we'd seen in a portable. It brought high-end performance into a compact and portable machine with a justifiable price tag. The M14x looks cool, but it's what's on the inside that counts. For your hard-earned pounds, this Alienware offers high levels of gaming performance and plenty of connectivity inside a portable shell with a screen big enough for gaming. tinyurl.com/cLgscmv



Lenovo IdeaPad Z580 tinyurl.com/92goLxy

Samsung 900X4C tinyurl.com/6vz5tog Samsung Series 7 Chronos tinyurl.com/7wL99pd

Toshiba Satellite Z930 Ultrabook tinyurl.com/d2928ef





# **BEST 7in TABLET**

### Google Nexus 7

A true game-changer, Google entered the tablet market with its Nexus 7, made by Asus. The Nexus 7 launched at the startlingly low price of £159 and was the first device to ship with Android 4.1 Jelly Bean, offering a 7in screen and a guad-core processor. Google set a new standard for budget tablets. It's an unbelievably well-equipped device for such a low price. The silky-smooth performance and high-resolution IPS screen are highlights. If you're looking for a tablet that costs less than £200, look no further than the Nexus 7. tinyurl.com/cgba439



# THE RUNNERS-UP

Apple iPad mini tinyurl.com/cLjwuvs

Amazon Kindle Fire HD tinyurl.com/ch6cLnz

Barnes & Noble Nook HD tinyurl.com/cm8Lqkg

BlackBerry PlayBook 2.0 tinyurl.com/bqpxmbx

# **BEST 10in TABLET**

# Apple iPad with Retina Display

The iPad 4 is Apple's latest and most powerful tablet. It's the quickest iPad yet, and a solid choice for a tablet in which we can barely find fault. As we've come to expect from the iPad and iPhone, and the Mac range for that matter, the build quality is exceptional. Attention to detail is paramount, and the iPad feels as premium as it always has. The Nexus 10 runs it close at a much cheaper price, but taking into consideration the whole iOS ecosystem the iPad with Retina Display remains the pinnacle of tablet tech. tinyurl.com/crstdsk



# THE RUNNERS-UP

Asus Transformer Pad TF700 tinyurl.com/ckgrb3s

Google Nexus 10 tinyurl.com/arL2kdg Samsung Galaxy Note 10.1 tinyurl.com/cojqf54

Toshiba AT300 tinyurl.com/c58eoga

# **BEST SMARTPHONE**

### Google Nexus 4

Has there ever been a better year for smartphones? And yet even among the cream of the crop the Nexus 4 rises to the top. As long as the storage capacity will suffice, the Nexus 4 is the definition of a bargain. You quite simply get the performance and features of a high-end smartphone for half the price you would expect to pay. Unless you're set on an iPhone, the Nexus 4 is an unbeatable deal - like its the big brother, the Nexus 7, it's a genuine game-changer, bringing high-end quality to bargain hunters. tinyurl.com/d7htpfj



# THE RUNNERS-UP

Apple iPhone 5 tinyurl.com/b5hktan

HTC One S tinyurl.com/bsxfL6g

Motorola Razr i tinyurl.com/d2xq94v Samsung Galaxy S III tinyurl.com/cq4fm7x

# Hardware Awards

# **BEST MONITOR**

### AOC i2352Vh

The AOC i2352Vh is a dream monitor for anyone who has a limited budget, but still needs great image quality for tasks that demand accurate colours, such as photo editing. Fortunately, connectivity hasn't been overlooked, with the AOC offering a trio of VGA, DVI and HDMI inputs. Better IPS panels are available, but none can beat the AOC on value - a great bargain monitor. tinyurl.com/7hxtpvv



# THE RUNNERS-UP

BenQ G2750HM tinyurl.com/bqkt65s

Dell S2440L tinyurl.com/cxwjjLm Philips Brilliance 241P4QPYES tinyurl.com/6vvodap

ViewSonic VX2336s-LED tinyurl.com/86jf4w2

# **BEST PRINTER**

### HP Photosmart 7520 e-All-in-One

The HP Photosmart 7520 e-All-in-One printer is a well-rounded machine for a busy home or small office. The running costs are satisfyingly modest, and the HP does an awful lot very well. Speeds are often very good, and it fared particularly well on photos in terms of speed and quality. Add in the wonderful interface, and this is a very good all-rounder. A great printer. tinyurl.com/98g9xte



# THE RUNNERS-UP

Canon Pixma MX895 tinyurl.com/92yq4sf

Epson Stylus Photo PX730WD tinyurl.com/8gbg8c4

Lomond EvoJet 2 Office tinyurl.com/cLgag5v

Pantum P2050 tinyurl.com/c764sz2

# BEST WIRELESS NETWORKING PRODUCT

### Netgear WN3000RP

The Netgear WN3000RP is a wireless extender that's easy to set up and has excellent range. Wireless extenders are the only way to extend wireless coverage so, provided you're willing to accept the technology's shortcomings, the good long-range performance and straightforward setup process means the WN3000RP is worth considering in any home or business environment. An interesting and worthy winner of our Best Wireless Networking Product award. tinyurl.com/cr3jnz8



# THE RUNNERS-UP

Apple AirPort Express tinyurl.com/6Lh6oos

D-Link DIR-857 tinyurl.com/82kwLjo DrayTek Vigor 2850Vn tinyurl.com/d5qswb3

TP-Link TL-MR3020 tinyurl.com/85p7r9p



# BEST NETWORK STORAGE DEVICE

# Synology DS412+

The Synology DiskStation DS412+ is a compact, powerful four-bay NAS drive with sophisticated features and services, while still remaining accessible to non-specialists. This extremely capable NAS box will have a very broad appeal, with superb read/write performance. Thanks to its best-in-class interface it can be tackled by less technical users, whether applying it into service as a powerful home media server or business storage and virtualisation device.

tinyurl.com/6uuL4de



# THE RUNNERS-UP

Netgear NAS Duo V2 tinyurl.com/bmsdr74

Qnap TS-659 Pro II tinyurl.com/d7qhems

WD My Book Live Duo tinyurl.com/cr783mg

**Zyxel NSA325** tinyurl.com/7b9epw8

# BEST STORAGE DEVICE

# Samsung 830 Series 256GB

The 830 Series 256GB is a SATA 6Gbps SSD built with Samsung silicon throughout. While this SSD doesn't top the league tables for overall performance, it is still one extremely quick storage drive. Samsung seems to have tweaked its controller to favour read speed at most file sizes, suggesting it may have the edge in PC boot times, for instance. Priced between the Crucial m4 and Corsair Performance Pro drives of the same capacity, it is a worthy winner. tinyurl.com/6u8onj6



# THE RUNNERS-UP

Corsair Performance Pro tinyurl.com/braynsc

G-Tech G-Raid Thunderbolt tinyurl.com/cxef6mh

Hitachi Deskstar 5K4000 tinyurl.com/dy6zhgj

WD Red 3TB tinyurl.com/d4L7ogg

# BEST PORTABLE STORAGE DEVICE

### **Buffalo MiniStation Extreme 1TB**

It's difficult to find fault with Buffalo's MiniStation Extreme: this external drive provides good performance and features at a competitive price. It's a little chunkier than many of its portable rivals, but that's because of its military-standard shockproof casing that is designed to withstand drops of up to 2.3m. Its rugged design, good performance and attractive price make it an excellent choice for anyone who needs a reliable portable disk. tinyurl.com/ce4z9ym



# THE RUNNERS-UP

Elgato Thunderbolt SSD tinyurl.com/c866w2v

Freecom Mobile Drive Sq tinvurl.com/bmvzw3r

iStorage diskAshur tinyurl.com/cx3dnhy WD My Passport Edge for Mac tinyurl.com/bmg7sw9

# Hardware Awards

# **BEST GRAPHICS CARD**

### Zotac GeForce GTX 680

The Zotac GeForce GTX 680 is a high-end graphics card based on nVidia's Kepler chip. The GTX 680 doesn't totally outclass AMD's latest HD 7970, but it's faster and less power-hungry than many of its more expensive rivals. It's unlikely to be the last word in single-GPU technology for this architecture. For now, though, and until Compute capabilities become more significant, this is the best high-end graphics card on the market. tinyurl.com/ctaaLLo



# THE RUNNERS-UP

Asus GTX 660 Ti tinyurl.com/d5bv2ng

MSI GeForce GTX 670 tinyurl.com/crdw78j

Sapphire HD 7770 OC tinyurl.com/bwj7bL9

**XFX 7970 3GB GDDR5** tinyurl.com/6uzrvxc

# **BEST CAMERA**

### Panasonic Lumix DMC-TZ30

The Panasonic Lumix DMC-TZ30 is a wonderfully versatile camera that's small, powerful and ideal for travelling. The Lumix DMC-TZ30 is a fine compact camera with a big-zoom lens and a good-quality sensor. Easy to carry, it can be used in almost all situations, even for video recording. tinyurl.com/bpzt2se



# THE RUNNERS-UP

Canon EOS 650D tinyurl.com/c9wjtm4

Nikon D800 tinyurl.com/bpo654k Samsung NX20 tinyurl.com/bantomo Sony NEX-C5R tinyurl.com/dy48e9e

# **BEST AUDIO PRODUCT**

### Cambridge Audio Sonata NP30

The Cambridge Audio Sonata NP30 is a capable network audio player, able to play from local music files or internet streams. As a standalone unit the NP30 sounds especially great with 24bit audio. The addition of ALAC support is a very useful string in Cambridge Audio's already strong bow. Audio quality is good, with the capability of further improvement with an outboard digital-to-analogue convertor. tinyurl.com/bpb5toc



# THE RUNNERS-UP

Apple GarageBand for iOS tinyurl.com/cj3m26v

Bitcount ClearTune tinyurl.com/c5pbb3s **Chord Electronics Index** tinyurl.com/cpc3wfq

Ferguson Hill FH009 tinyurl.com/brgrwyf



# BEST DIGITAL HOME DEVICE



### BT YouView Humax DTR-T1000

YouView is a subscription-free TV service that combines Freeview HD with catch-up TV from the past seven days. If you want a PVR that supports both these services and comes in one easy-to-use box, this Humax is difficult to beat - especially if you're getting it free with your broadband package. Just don't make the mistake of thinking this is a Humax HDR-Fox T2 with the addition of on-demand TV. It isn't. It's much, much more. tinyurl.com/atemgj3



# THE RUNNERS-UP

Belkin @TV Plus tinyurl.com/bvnt7xq EnergyEgg Solo tinyurl.com/d7m326o **HD Anywhere Multiroom+** tinyurl.com/c4ske3w

Sony BDP-S790 tinyurl.com/b4sojo5

# **BEST TV**

### Panasonic Viera TX-L47WT50

Offering razor-sharp HD and a well-stocked internet portal, Panasonic hits the ground running with this 47in LED TV show-stopper. The Panasonic Viera TX-L47WT50 will look great in your lounge, has generally good 3D, and multimedia file support is convincing. There are cheaper sets of comparable size around, but few offer this level of sophistication and performance. A worthy winner.

tinyurl.com/76cobek



# THE RUNNERS-UP

Philips 46PFL7007 tinyurl.com/c8hnhzu

Samsung UE46ES6800 tinyurl.com/ctx7rqq

Sonv Bravia KDL-46HX853 tinyurl.com/7nazsgo

Toshiba 46TL963 tinyurl.com/cnmxxhk

# BEST SECURITY SOFTWARE

### **Bitdefender Internet Security**

Bitdefender Internet Security 2013 is an internet security suite that offers excellent protection and a user-friendly interface. Bitdefender does have some mild scanning-speed issues, but otherwise it's an easy-to-use suite that gives you several nice extra services. It's well priced and offers solid performance. tinyurl.com/cafehs7



# THE RUNNERS-UP

G Data InternetSecurity tinyurl.com/7czt5xb

Kaspersky Internet Security tinyurl.com/6uehpmw

**Norton Internet Security** tinyurl.com/cvvdwur

Trend Micro Titanium IS tinyurl.com/7qtbap6

# Software Awards

# BEST PHOTO/VIDEO SOFTWARE

# CyberLink PhotoDirector Ultra 4

In the fourth version of its Adobe Lightroom and Apple Aperture wannabe, CyberLink adds face recognition and OS X support. PhotoDirector Ultra 4 provides both easy and powerful photo-editing features, plus organisational tools. It has useful features for tagging faces and removing unwanted objects in photos. It also has a set of 'people beautifier' tools and can apply HDR-like effects to individual photos. With support for RAW camera formats and an affordable price, it deserves to be a popular choice for editing photos. tinyurl.com/9xdLeft



# HE RUNNERS-UP

Adobe Photoshop CS6 tinyurl.com/cy3mnmc

**Adobe Premiere Elements 11** tinyurl.com/d2gt7yp

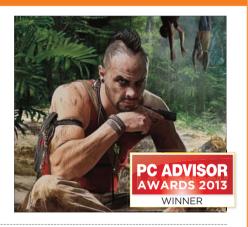
Magix Movie Edit Pro 2013 tinyurl.com/d5p78ro

InPaint tinyurl.com/bw3qv4k

# **BEST GAME**

# Far Cry 3

The last big game release of 2012 was flying somewhat underneath the radar even without the difficulty of arriving after all the sound and fury of all those Call of Duties, Borderlands and Assassin's Creeds, but open-world shooter Far Cry 3 turns out to be the best game of the year. Enormous, gorgeous, unsettling and liberating - Far Cry 3 is an unexpected triumph. tinyurl.com/cs6gqwb



# THE RUNNERS-UP

Guild Wars 2 tinyurl.com/99ncrmv Mass Effect 3: Extended Cut tinyurl.com/d6rzfzu

Torchlight II tinyurl.com/cn7cx54

World of Tanks tinyurl.com/dxcfhzk

# **BEST MOBILE GAME**

### **Draw Something**

Hilarious and crazily addictive, Draw Something is the best thing since Pictionary and was a massive success when it launched. Since a free version of Draw Something is available, there's no excuse to not download it immediately. Plenty of your friends are bound to be playing it and, provided you have got a Facebook account, you'll be able to instantly see those who are. We can't be sure just how long Draw Something will remain popular, but for now, it's a must-have. A true phenomenon. tinyurl.com/crkqqsk

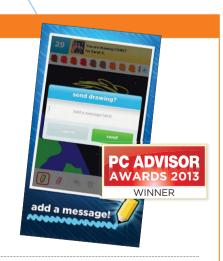


**Bad Piggies** tinyurl.com/bwLgfac

Football Manager Handheld 2012 tinyurl.com/d28e674

**New Star Soccer** tinyurl.com/ckhgjoj

Walking Dead for iOS tinyurl.com/bsury5p





# **Business Awards**

# **BEST BUSINESS LAPTOP**

### Dell Latitude E6420 ATG

The Dell Latitude E6420 ATG is described as a 'business-rugged' laptop and, although we wouldn't recommend that you throw it around the boardroom, you can be confident that it'll withstand a bit of rough treatment. The E6420 is solid and speedy. With the top-spec Intel Core i7 and Samsung SSD option, performance is undeniably good. The price tag may look a touch steep, but if you need a laptop that won't object to some rough riding in your work it should pay back its premium. tinyurl.com/cba725b



# THE RUNNERS-UP

Acer TravelMate P6 tinyurl.com/8wps2c6 HP ProBook 4530S tinyurl.com/84bfm4x Lenovo ThinkPad X121E 3045 tinyurl.com/7r5woar

Toshiba Portégé Z930-108 tinyurl.com/cL3ac74

# BEST BUSINESS PRINTER

# Samsung ML-2955DW

The Samsung ML-2955DW mono laser printer is notable for its very low street price of £90 and its full network connectivity, namely USB, ethernet and Wi-Fi. This printer is priced to fit the budget of small or home offices - at least initially. The toner costs over time will be dear but, for the home and small office, this Samsung printer is a winner.

tinyurl.com/ccLszdm



# THE RUNNERS-UP

Dell C3765dnf tinyurl.com/dxvawrg Epson WP-4595 DNF tinyurl.com/dyw94rw HP LaserJet Pro M401dw tinyurl.com/cegep73

Kvocera FS-4300DN tinyurl.com/9y9hht3 Oki C530dn tinyurl.com/8xopusv

# BEST BUSINESS SOFTWARE

### Nuance PDF Converter Professional 8

Nuance PDF Converter Professional 8 is an affordable but powerful alternative to Adobe Acrobat, and offers better value in many ways. Its features will be useful to anybody who regularly works with PDF files. Direct editing speeds up final tweaks to documents. Voice-powered notes also improve productivity. tinyurl.com/bo7fq84



# THE RUNNERS-UP

Acronis True Image Home tinyurl.com/bcmjou7

Crunch

tinyurl.com/7j59efd

NaturallySpeaking 12 tinyurl.com/d5zq5n3

Paragon Drive Copy 12 Pro tinyurl.com/bregybr

tinyurl.com/c3zc45w

# Reader Awards

# BEST SPECIALIST ONLINE IT RETAILER

It was a close-run thing, but Misco just edged out Laptops Direct as our Best Specialist Online IT Retailer. Misco has been around for more than 25 years and offers a portfolio in excess of 30,000 competitively priced products, including laptops, desktops, tablets, printers and more. It seems to be a winning combination, as the readers of PC Advisor voted Misco as their number-one Specialist Online IT Retailer of 2013. misco.co.uk



# BEST ONLINE RETAILER

### Play.com

Our readers' favourite online store is entertainment reseller Play.com, which saw off the likes of Amazon, Argos and John Lewis in our reader awards. Both a direct reseller and host of a merchant market, Play offers access to a wide range of products in multiple countries. It seems to be a combination that works for PC Advisor readers, as Play.com wins our 2013 reader award as Best Online Retailer. play.com



# BEST LAPTOP BRAND

### Apple

One category that was in no way close was the Best Laptop Brand reader award. Indeed, only the combined votes for Dell and the Dell-owned Alienware were even in the same ballpark as our overall winner Apple. The Mac-maker simply makes great laptops - not cheap, but blessed with incredible build quality and excellent performance and features. Apple laptops are a class above in terms of quality something recognised by the readers of PC Advisor. apple.com/uk



# BEST DESKTOP PC BRAND

### Alienware

The gamers have spoken. Dell's gaming sub-brand Alienware garnered sufficient votes to see off the challenge of other tier-one PC makers such as Lenovo and Dell itself. Alienware makes gaming PCs of a quality above all other specialised gaming PC brands, garnering firm support from the gamers in PC Advisor's readership. That makes Alienware the clear winner of our reader award for Best Desktop PC Brand 2013.

alienware.co.uk 🗵







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# ND 4000 Gaming PC

CPU: Intel i7 3770K (4 x 3.5 GHz) OC @ 4.6 GHZ

RAM: Corsair 16 GB DDR3 1333 MHZ

HDD: 1 TB SATA-III 7200 RPM 64 MB

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Graphics Card: NVIDIA GTX 660 3 GB

Motherboard: Gigabyte Z77-D3H

Case & PSU: Corsair R200 & Cooler Master GX 600W PSU

Optical Drive: 24x Dual Layer DVD Re-Writer

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

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

FREE - Metro Last Light & Hitman Games

FREE - 16 GB USB2.0 Flash Drive

FREE - 3 Year Waranty & Free Next Day Delivery

# **Next Day Delivery PCs**

# ND 1000 Gaming PC

Amazing Price & Performance!

- ✓ AMD FX 4130 (4 x 3.8 GHZ)
- ✓ 16 GB DDR3 1333 MHZ RAM
- √ 1 TB (1000 GB) SATA-III
- ✓ NVIDIA GeForce GTX 650 1 GB
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# Included Benefits

FREE - ASSASSINS CREED III GAME

FREE - UK DELIVERY

FREE - 3 YEAR WARRANTY

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Amazing Spec - Amazing Price

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FREE - UK DELIVERY

FREE - 3 YEAR WARRANTY

FREE - WEBROOT / NERO / POWERDVD



# ND 3000 Gaming PC

Inc VAT & Delivery

EXTREME Performance - LOW Price !!!!

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- ✓ NVIDIA GeForce GTX 660 2 GB
- ✓ Gigabyte B75M-D3H Motherboard
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FREE - UK DELIVERY

FREE - 3 YEAR WARRANTY

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# Trace Your Family History

Interested in your ancestors? Mike Bedford explains all you need to know to begin researching your family tree

f you've always fancied delving into your family history, but were put off by the time and effort involved, we've got news for you. No longer does researching your ancestry involve spending ages travelling the length and breadth of the country in search of information held in parish records and at local record offices. Instead of searching through paper records that could be located many miles from home, all this information and so much more can now be accessed online.

As a result, interest in family history is currently at an all-time

high. According to a 2012 report by market-research firm Global Industry Analysts, family history is now the second-most searched subject online, magazines on the subject abound, and adverts for genealogical services appear on primetime TV.

While much easier searching is undoubtedly a key reason for this phenomenal growth, so many other online services and software packages are now available to cater to this huge demand. The previous generation of family history enthusiasts had to draw family trees on huge sheets of paper,

but today software makes light of this task and provides a much better result in the process.

Here, we take a look at some of the online services and software packages that could assist you in your quest. If you've yet to take your first steps in discovering your family's past, we hope this round-up will serve to illustrate the wealth of available resources and provide you with the incentive to make a start. If, on the other hand, you're already underway, we trust that there are new products and services in our guide that can further assist you in your pursuit.







# The basics

The purpose of this article is to provide an overview of the software and services available to the family history enthusiast. It isn't our aim to provide comprehensive instructions on how to research your genealogy. This is the domain of specialist publications; if you're new to researching your heritage, read up on the subject.

You might also like to make contact with a local family history society - the Federation of Family History Societies (ffhs.org.uk) will be your first port of call. However, to put our overview of products and services into perspective, let's take a quick look at the basics to see where our main themes fit in.

The first step is to record everything you already know about your family history. In the days that family trees were hand-drawn and additions or changes could mean starting over from scratch, it made sense to collect a lot of information before starting to create a family tree. However, with the ease of editing provided by software, we suggest that you enter this information into a genealogical database as you go. Genealogy software,

which provides a database and a means of displaying the data as a family tree, is one of our main topics.

Now it's time to go a bit further afield by talking to relatives who will be able to fill in some of the gaps in your knowledge. If you're able to talk to parents, grandparents, uncles, aunts, and great-uncles and aunts, you could probably go back another generation or two. Remember that a family tree is a very good way of communicating relationships that everyone can understand.

This being the case, when you talk to your relatives it would be a good idea to take the story so far with you on a laptop. Initially, you might want to record just the basic relationships, dates and places but, as you progress, you'll probably find that you want to add more background information. Take the opportunity to ask whether your relatives have got old photographs or movies of the people they're telling you about.

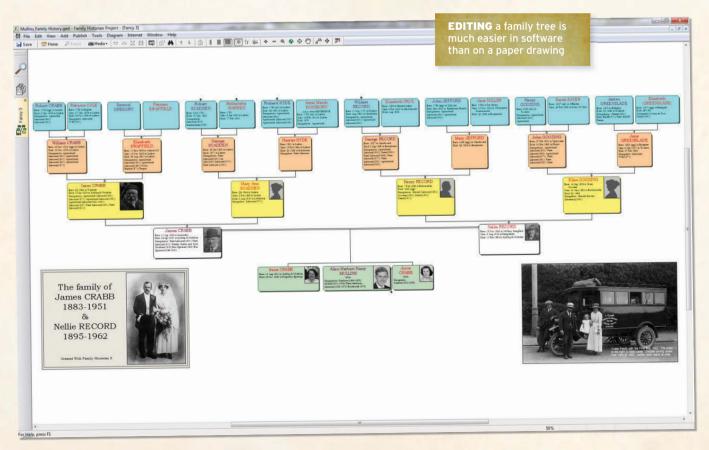
Also ask them for stories about these people you never knew and, if they're happy for you to do so, you could record your

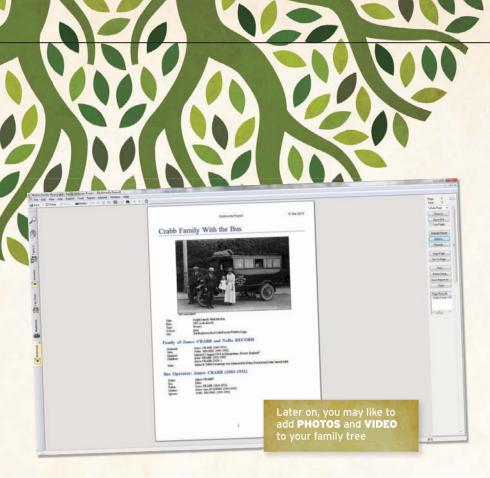
conversations so you don't miss anything. Many of the better family tree packages allow you to add media of all sorts; handling media is another of our main themes.

Once you've exhausted the information readily at hand it will be necessary to start consulting official records of various types. Included here are the obvious ones such as birth, death and marriage certificates, census and electoral rolls, school and military records and more. Some of this information is freely available, whereas you'll need to pay a fee to access more detailed information.

At one time you had to understand how to search these types of record although, increasingly, a few dedicated subscription sites for family history enthusiasts are providing the means to do so automatically. Online sources of information is another subject we'll look at in some detail.

Relatives and official records aren't your only resource for information, though. Around the country, even around the world, there will be people who have information that could help fill the gaps in your family





tree. At one time, making contact with these people would have been a near-impossible task but, today, thanks to social networking, you stand a much better chance of hooking up with them. Another topic we'll investigate is using social networking in your quest. In addition to the usual social-networking sites such as Facebook that everyone has heard of, we'll also take a look at specialist socialnetworking sites set up specifically for those who are researching their family history.

In all probability, your pursuit will never end: you'll always want to add one more name to the extremities of your family tree. Even so, there will undoubtedly come a time when you'll want to share your work with others. Our final theme, therefore, is publishing the results of your endeavours. Methods include creating a dedicated website or perhaps a Facebook presence

for your family, having your family tree printed out on a large-format printer, or even publishing a book.

# Genealogy software

Unless you want to spend a long time with a pencil and ruler and be prepared to regularly redraw your family tree as you discover new facts, genealogy software will be a key tool in tracing your history.

In this section we'll look specifically at software that runs on your PC. However, some online services provide a facility to store information in the cloud and use it to draw your family tree online.

Here we discuss, in general terms, what you could expect of a genealogy package. Before you make a purchase, we suggest you read some independent comparative reviews, including our own review of Family Historian 5 (tinyurl.com/6uofjq6). Specialist family history magazines would be a good place to look, for example, tinyurl.com/c4vjL5j.

Putting it simply, genealogy software provides two main functions. First, it allows you to create and edit a database of your family history; second, it provides tools for displaying the data in various ways, most notably as a family tree. However, it would be wrong to consider these two functions as totally independent, since some packages allow, for example, the database to be edited by dragging around onscreen items

RELATIONSHIPS in a way

while viewing a family tree. Indeed, it would be extremely rare to carry out the two processes sequentially since, for most family history enthusiasts, the search for additional information is never-ending. Furthermore, being able to graphically view the story so far is often an aid to further research.

Most packages use a proprietary standard for their database, and it's not guaranteed that a database from one package can be imported into another. If the necessary export and import functions aren't available, nearly all software can write and read in the GEDCOM format, which is considered the standard for genealogical databases.

However, many packages don't support all the options within the GEDCOM specification, which means records might not import fully to a different package. Note that compatibility between different packages isn't an issue only if you're considering changing from one vendor to another: since family history research can often be a collaborative venture, it pays to be able to import from as many other packages as possible so you can merge other peoples' research with your own.

The data can be displayed in various ways. While some packages allow you to create websites, CDs and DVDs, and books of your family history, most of these can be considered wrappers for the more fundamental ways of illustrating your family history. Basic methods of presenting the data include readable reports and charts of various types, the latter being what most people would think of as family trees.

However, the phrase 'family tree' is a broad term that encompasses several types of genealogical chart. The two classical types of chart are the descendants chart and the ancestors chart. So, for example, a descendants chart of Fred Bloggs shows Fred at the top, followed by his children in the line below, grandchildren in the line below that and so forth.

Fred Bloggs' ancestors chart again shows him at the top but, this time, parents appear below, then grandparents and so on.

Another option is the hourglass chart, which is a combined descendants and ancestors chart with a named person in the middle. Depending on your preference, charts can often be formatted vertically so they are read from the top to the bottom, or horizontally, in which case they're read from left to right.

Traditionally, family trees contain basic textual information and not a lot more. So, for example, the box that represents a person might include their name, plus dates for birth, marriage and death.

There's a limit to how much data you'd want to display in each box by default, since it would affect how much of the tree you could view at once. Most packages allow you to show a photograph in each person's box, but the better packages allow you to associate with the people in your tree a whole range of additional textual information, photographs, video clips and audio recordings.

While you might not automatically display all this data, there will be a way by which someone viewing a chart onscreen can access the additional data.



# **Online** genealogy services

Formerly, researching your family history involved investing a lot of time and petrol money in travelling around the country to view official records and meet long-lost family members. To some, this made the quest all the more enjoyable. But if time is in short supply, using online services can substantially speed things up.

Elsewhere in this article we look at how to use social media to track down information about your family, but here we're concerned with online access to official records of various types. Some

of these resources also allow you to compile a family tree online or collaborate with other family history enthusiasts.

Making contact with others is beneficial, and an online family tree will probably help in your liaison. However, in the main, online utilities for creating family trees are not nearly as sophisticated as dedicated genealogy packages that run on your PC. These are discussed later on; here we will concentrate on search facilities.

The most fundamental records that you'll need to access are birth, marriage and death certificates, followed by census records. The indexes to birth, marriage and death certificates are freely available from FreeBDM at freebmd.org.uk, although they are not yet 100 percent complete.

The indexes themselves contain very little information and are really useful only for ordering a copy of the certificates themselves (which cost £9.25 from the Government Record Office, gro.gov.uk).

There's an initiative to provide transcripts of census records at freecen.org.uk. Also, at freereg.org.uk, are the partially transcribed parish records of baptisms, marriages and burials, which provide a source of information before the introduction of national certificates of births, marriages and deaths in July 1837.

For more complete records in the form of parish records and gravestone transcripts, sometimes freely available, try local family history society websites - ffhs.org.uk will help you find the relevant societies.



To go to the next level of detail it would be worthwhile consulting local record offices, which are able to provide information for those researching their family history. Here you'll find records such as wills, census, parish and military records, but what actually appears online will vary.

In many cases you'll find online indexes and, while these are useful in that you won't end up making a wasted journey, viewing the actual records will often involve visiting the record office in person.

Another useful free resource is the National Archive (nationalarchives.gov.uk), the equivalents of which are nas.gov.uk in Scotland and proni.gov.uk in Northern Ireland.

In addition to the basic records we've already encountered, here you can find records of immigration, military service, occupations, criminal convictions, prison inmates and much more. In the main, the free information online will take the form of indexes and you'd need to pay a fee to view the records themselves.

Moving on from these sources of free information, subscription sites providing online genealogical service are plentiful. At the most basic, these provide a onestop shop so you don't have to search out information on multiple separate sites.

For example, on a single site you may find birth-, marriage- and death-certificate indexes (although you'd still need to pay the Government Record Office for a copy of the certificate), plus census, parish, military and perhaps even occupational records.

In addition, with the exception of birth, marriage and death certificates, some of the better sites can offer access to actual records as opposed to just the indexes.

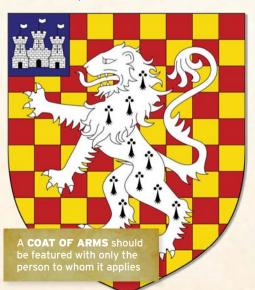
A useful facility provided by Ancestry.co.uk, especially if you're just starting out, is the Ancestry Hints feature. Just start creating your family tree online, perhaps by adding details of yourself and the previous couple of generations, and Ancestry will automatically search through a whole range of records, showing what

additional information is available for people already in the tree. While this will never replace the manual searching through individual types of record, it can help beginners by cutting out a lot of the hard work.

Online genealogical sites differ in the amount of information available and in their ease of use and features. Before parting with your cash, you'd be encouraged either to sign up for a free trial, if available, or read comparative reviews in the specialist family history press. While Ancestry claims to be the UK's largest with 1 billion records for the UK and a further 11 billion worldwide, others sites to consider include FindMyPast (findmypast.co.uk), GenesReunited (genesreunited.co.uk) and FamilyRelatives (familyrelatives.com).

Using media to illustrate your family history

At its simplest, a family tree has a separate box for each individual, which contains basic information such



as a name, a date of birth and, if applicable, the date on which that person died. A family tree looks so much more attractive, though, if those boxes also contain photographs of the people represented. Many family tree programs allow you to associate with individuals other media, such as movie clips and audio recordings.



While there's a limit to how much media you'd want to cram into your family tree, as you research your family you might decide to collect related photographs, old maps and more. For example, you might be interested to see how your ancestors' home town looked when they were alive, or perhaps search out photographs of the Air Force base on which a relative served during WWII. Then, if you decide to share your family history on a website or, perhaps, produce a book of your family's past, all this media will come in handy.

Photographs of your family members will almost certainly come from within the family, so start looking in those boxes in the attic and ask your relatives what they have. In addition to albums of prints, also look out for negatives, slides, old cine films and audio tapes.

For that personal touch, if they're happy for you to do so, make audio or video recordings of your relatives as they talk to you about family members you've never met. For details on how to bring old media into the digital age, see tinyurl.com/bcmhmhe.

In addition to media from within the family, you might find photos online that are relevant to your quest. DeadFred.com is a free genealogy photographic database but, given that even its 110,000 records is tiny in comparison to the number of people who have ever lived, don't expect too much.

For photographs of places, though, you stand to do a lot better. One particularly useful source is Francis Frith





(francisfrith.com), which has a large collection of historic photos and maps of most towns throughout the UK.

Don't forget about local history societies, and perhaps even your local library.

You might even find that some of your ancestors had the right to bear arms, so a coat of arms might not go amiss against their name on the family tree. Remember, though, it would be inaccurate to show a coat of arms that purports to be your family coat of arms at the top of your tree because it's individuals, not families, who are granted arms.

Social networking for family history

To start your journey into your family's past you'll probably talk to family members and consult online sources of official records or genealogical services sites. Often you'll come to a dead end, though, which is when you might choose to cast your net wider.

Social-networking sites are a good way of making contact with people

you've never met, and some of those people may have information relevant to your search.

Most obviously, you should consider using regular social-media sources such as Facebook and Twitter to track down useful contacts and, if you want, to allow others to find you. In your enthusiasm to delve into your family's past, though, do bear in



mind the potential security risks involved in sharing too much information with people you don't know.

In time you'll hone your skills at using social-networking sites for researching your family history but, initially, try searching Facebook for your surname or other surnames in your family tree. If you have a common name you might end up with a vast number of results, but you can always filter the results in various ways. If you find anyone who is a possible family member, invite them to be friends: they might have some new information for you.

In addition to general social-networking sites, investigate some of the sites specifically set up for family history enthusiasts. While some of these offer similar facilities to the more familiar social-networking sites, and others help family history enthusiasts collaborate, most are primarily geared to providing a host of other genealogical services, such as searching records and creating family trees.



One website that, perhaps, goes further than most in the provision of social-networking features is MyHeritage (myheritage.com), which claims "to make it easier for people around the world to use the power of the internet to discover their heritage and strengthen their bonds with family and friends".

The site claims 72 million registered users and 23 million family trees, so this is a resource that shouldn't be ignored. A basic subscription, which includes search facilities, 250MB of storage and 250 names on your family tree, is free. More storage and additional facilities attract a monthly fee.

A Google search for 'social-networking family history' will reveal plenty more websites to investigate.

It's also worth bearing in mind that some of the online genealogical services have features that tie in with Facebook. Ancestry,

# for example, allows you to link and record Sign In + Subscribe Get Help ancestry.com An Expert KITT MEMBERSHIPS Home Family Trees + Search + DNA + mycarivas Publish Family History Books Turn pedigrees into page turners. your family tree as a **BOOK**

Facebook information for people in your family tree. This way, when a person updates their profile photograph, it'll be automatically updated on your tree.

You can offer direct access to a person's Facebook profile from the family tree. Perhaps even more useful is the fact that Ancestry will use Facebook to suggest people who might be family members, and provides a Living Relative Search facility.

# **Publishing** your family history

So you've researched your family history and want to share the fruits of your labour with family and friends, or perhaps even the world. Here we suggest how you could go

about doing so. Some methods are generic, in the sense that you could use them for disseminating any information, but it would be remiss of us not to mention them. Others are aimed squarely are family historians.

The simplest method is to save your family history as a GEDCOM file, which you

> can then upload to specialist sites for sharing genealogical data or email to your family and friends.

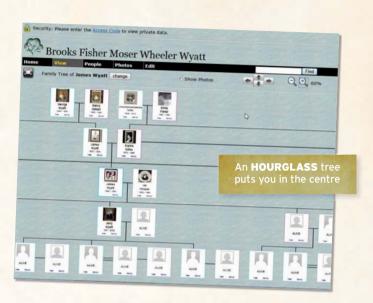
However, unless vou choose a site that will also draw your data as a family tree, this will appeal only to other family history enthusiasts who will have the necessary software to interpret the data and draw a family tree.

Unless vou're a hardcore

genealogy enthusiast, though, you'll probably want to make your family history more accessible to people who just want to see the information without any hassle.

Some of the online family history services offer a means of sharing your family tree on their site, and this is often a free service.

If you want more control over how you present the information and would like to provide much more than just a family



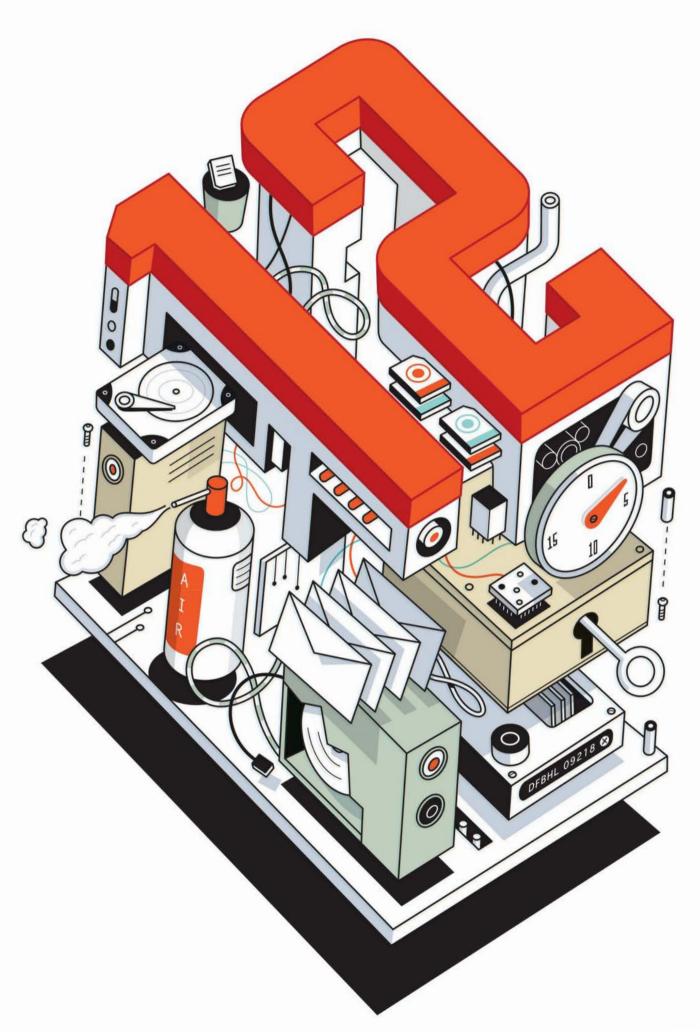
tree, you could consider using Facebook for disseminating your family history; this is also a good way of searching out more information about your family.

Better still, use a dedicated website, or at least a few pages on your personal website. Some of the genealogy software packages can generate web pages on your family history, but for most flexibility you'd need to design your own.

You could host on your own site the family tree, plus as much as you want in the way of additional text, photographs, movie clips and audio recordings. Even if you're not experienced in building websites, some genealogy software (Family Historian, for one) can automatically build websites from the information you've collected.

If you like the idea of publishing your family history in the traditional paper format, there's no shortage of resources. My History (my-history.co.uk) can print your family tree using the output from any genealogy software, from 17- to 42in wide and up to 150ft long. It also lets you create and print a book of your family history. Some of the general online genealogical services sites also offer publishing facilities.

Alternatively, if you can output your requirements as a PDF file, you needn't use a specialist family history company and you'll find plenty of online companies offering large-format printing and small print-runs of books. For designing the book in the first place, while you could certainly use standard software such as Word, some of the more advanced genealogy packages such as Family Historian can simplify this process. ⊠





# must-c casks

### Alex Castle offers 12 simple tips that can help you get your PC into shape

omputers may have become a lot more user-friendly over the past decade, but they're still far from perfect. PCs and laptops require a certain amount of configuration and maintenance to operate at their full potential. Unfortunately, because we humans are also far from perfect, we frequently fail to put in the work we should, and end up with a slower, sloppier, less-secure machine as a result. No more excuses! Whipping your PC into shape requires but a dozen simple tasks. None is complicated, most take a matter of minutes, and all will have a major effect on how well your computer works. Even better, by the time you're done you'll never have to worry about doing many of these tasks again.

Clean the case. keys and display Are you keeping your computer clean? It's not just important because a dirty PC looks bad, or is less pleasant to use; a clean computer can last longer. Dirt and dust build-up in and around your computer can clog the fans and air intakes, causing your hardware to run hotter, which lowers its expected lifespan.

You'll need a Phillips-head screwdriver, a can of compressed air, paper towels, and acetone or isopropyl alcohol.

So, if your PC is looking a little musty, take

the time to clean it.

Once you're ready to begin, shut down your computer, unplug it, and move it somewhere with a little open space in which to manoeuvre. Look on the back panel for the screws that hold the case's side panels in place. Unscrew these and put them somewhere safe. Remove the side panels, usually by sliding them backward and then pulling them away. If you haven't cleaned

the computer in a long time, you should immediately see where dust has collected.

You're likely to find the most dust on the fans inside the computer and on the vents outside. You can remove a lot of dust simply by gently wiping the fans with a paper towel, and by using a lightly dampened paper towel on the vents. Sometimes fans have removable dust filters, which can be taken off and washed.

Once you've wiped away any piled-up dust, use the can of compressed air to blow the dust out of the inside of any heatsinks, such as the one attached to the CPU.

Use the air to clean out remaining dust from the system's various fans, too, but be careful: a sustained blast of air can spin the fan too fast, damaging it. Either use short bursts of air or hold the fan with your finger to prevent it from spinning. Afterward, clean out any other dust you see inside the case.

Your keyboard is next. Start by clearing out as many crumbs as possible: simply turn the keyboard upside-down and give it a good shake. Unless you're interested in seeing a

disgusting reminder of why you shouldn't eat biscuits at your desk, you should perform this step over the sink or a bin. Use the compressed air to dislodge any crumbs that may be stuck under the keycaps, then repeat the flip-and-shake procedure. If you have a mechanical keyboard, you can also pop out the individual keys to remove particularly stubborn debris.

If your key tops have become grimy, lightly moisten a paper towel with isopropyl alcohol and scrub them. While you're at it, use the rubbing alcohol to give your mouse a thorough rubdown. Pay special attention to the areas where your fingers make contact. Flip over the mouse and ensure the sliding surfaces (where it makes contact with the desk or mouse mat) aren't dirty, and that dust isn't collecting in the optical sensor.

Finally, wipe the monitor. Although paper towels are useful for most other PC cleaning tasks, we don't recommend them here as they can scratch your screen. Instead, use a microfibre cloth - the kind that comes packed with most glasses, sunglasses and

computer monitors. You can also find them in the cleaning section of just about any supermarket. Give the screen a quick, light wipe, and see if any dirt persists. If it does, dampen the cloth with water, or a 50-50 mixture of water and vinegar.

2.

### Back up your data

The 12 tips in this article aren't necessarily ranked by importance. If they were, however, this tip would be first, followed

by about seven blank pages to let the message sink in, and then everything else.

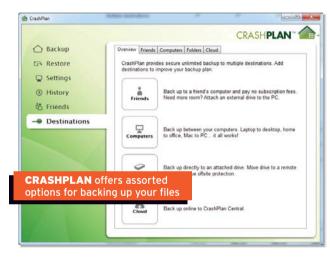
- if your house burns down or is burgled, for instance, you could lose your backup and the original data. That's why it's smart to also use offsite storage.

Fortunately, CrashPlan makes offsite backup easy. You can back up encrypted data to a friend's computer for free, provided that person is also running CrashPlan on their computer and can spare the storage space. If you don't have a friend with enough disk space (and you don't want to buy them a new external hard drive for the purpose), you can sign up for CrashPlan's online backup service, which costs \$36 (£24) per year for 10GB of storage or \$60 (£40) per

year for unlimited space.

Whether you're stashing your data online or offline, CrashPlan's automatic-backup feature takes a lot of the headache out of backup management.

Even if you don't want to bother with software utilities, however, you owe it to yourself to back up your most critical files. Manually slapping data on to a DVD or an external hard drive is a lot better than doing nothing. Be safe, not sorry.



Your computer is not invincible.
Hard-drive failures happen, as do floods, fires, earthquakes, thefts and other calamities. The hardware inside your computer is replaceable, but the data - whether critical business documents or precious family photos - might not be.
If you don't want to face the gut-wrenching realisation that you've lost something important, you need to have a backup plan.

First, you need backup software. A number of options are available, including Carbonite and Mozy, but here we'll discuss CrashPlan (crashplan.com). This free utility provides all the functionality you need for local and offsite backup. To get started, just download and install the CrashPlan software. When the program runs, you'll see the straightforward backup procedure: select drives or folders to back up, choose a storage location, then click the Start Backup button.

The simplest form of protection is to back up your files to another location on your computer, to an external drive, or to other computers you own. This approach allows for fast and easy transfers, but poses some risks 3.

# Guard against malware

If you've been using PCs for a long time, you might be tempted to think you don't need antivirus

software. "I never open suspicious email attachments, and I stay away from dodgy sites," you might say, "and I haven't seen any malware in years." You're still vulnerable.

As the Java breach in early January proved, you don't have to do anything stupid to get a virus, and it takes only one infection to make you wish you'd spent a few minutes setting up an antivirus. If you haven't done so yet, do it now.

The big question is whether to use free or paid-for antivirus. Paid-for products offer the most comprehensive protection, and come with extra features such as a firewall and live support. However, if you follow precautions regarding what you download online, the core features of free antivirus should be enough to protect you to a reasonable level, in conjunction with the Windows Firewall.

You could start with AVG AntiVirus Free 2013. Our testing has shown that the AVG suite offers top-notch threat detection and removal, and the free version comes with a surprisingly robust set of features, including email, hyperlink and download scanning. It takes only a few minutes to set up – just grab the downloader from tinyurl.com/aptkfok and let it do its thing. Just be sure to uncheck the various AVG Secure Search and Security toolbar options during installation to avoid filling your system with unwanted bloatware.

The program prompts you to run a full system scan after it installs. If your machine has any malware, AVG will quarantine it and offer to clear it out. After that, you can leave the program running in the background; by default it will automatically update its virus definitions daily, and scan your PC once per week. You can change the frequency and timing of those tasks by going to Options, Advanced Settings, Schedules.

4.

# Update your software

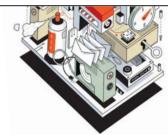
Unlike fine red wine, software does not get better with age. It's more like chocolate

milk: great when you first get it, but more and more likely to make you sick the longer it sits there. In other words, old software is a security risk, often containing vulnerabilities that an attacker can use to get into your system. Plus, failing to update apps means missing out on great new features that the programs' creators may have worked in.

Secunia Personal Software Inspector offers an easy, free way to scan your PC to find software that needs updating. Download it from tinyurl.com/cfdwv53. After you run the installer, Secunia PSI asks what you want it to do when it finds an out-of-date application; you can choose to manually determine which updates to download, but we suggest selecting the automatic option. The point, after all, is to make it easier to keep everything current.

Afterward, click the Scan button. Once the scan completes, you'll see a list of the programs installed on your computer, along with a subset of programs that are out of date. Secunia PSI can update some of the programs for you (and if you chose the automatic option during setup, it will already be downloading the updates for those applications), while others require manual updating. Below each non-automatic update,





you'll see a 'Click to Update' link. Click this and Secunia will begin the process.

Secunia PSI starts on boot by default and runs in the background, keeping a vigilant eye out for insecure programs. Once per week the utility prompts you to update any outdated software.

You should also set Windows Update to automatically download new patches. In



Windows 8 open Settings in the Charms bar, then select 'Change PC Settings', Windows Update. In Windows 7 or Vista click Start, All Programs, Windows Update, Change Settings.

### Defrag your drives

Defragmenting (also known as defragging) consolidates the data on your hard drive, making reads and writes more

efficient and speeding up access times.

If you're using Windows Vista, 7 or 8, the OS automatically defragments the hard drive once a week, late at night. If you want to see when it runs, search for 'disk defragmenter' in the Start menu or Start screen and click the result. However, if you're still using Windows XP, you need to manually defragment every couple of weeks or so using the built-in defragmenter (go to Start, All Programs, Accessories, System Tools, Disk Defragmenter).

Note that you'll want to disable Windows' automatic disk defragmenting if your machine contains an SSD. Fragmented data doesn't slow down SSDs because of the way they read and write information - in fact, hardware manufacturers claim that defragging the drive adds unnecessary wear and can reduce the life span of an SSD.

### Organise your files

We're not judging you for letting your data get out of hand: it happens to the best of us. Sometimes it's just too tempting to save

time by dumping files and folders into your Documents folder or on to the desktop... you can always tidy things later. Well, later is now.

> First, download DropIt (tinyurl.com/cgu2aw9). Imagine that you owned a magical dustbin, and that any item you dropped into it would instantly teleport to the proper place. That would make tidying up the house a lot easier. wouldn't it? That's what the open-source DropIt is, only it's for your computer.

Any file you drop on to DropIt's desktop icon is automatically sorted according to rules you define. When you run the program, you will

see a blue box with an arrow, which you can drag around your screen. Right-click this box, then choose Associations.

A menu will open in which you can create rules, such as 'Any file ending in '.jpg' or '.png' should move to my Pictures library.' Setting up a comprehensive list of associations can take a while but, once done, you can organise any folder on your computer in no time at all.

After you've installed and configured DropIt, you can make the rounds and bring order to your computer's cluttered file system. Start with your desktop. The desktop functions best as a temporary space to keep files as you're working on them. Filling it up with icons merely slows you down every time you have to find something. The Start menu or taskbar (with Jump Lists) is a better place to store shortcuts to programs and files that you regularly access. Other places that frequently get cluttered are your Documents folder, the root of the C: drive and your Downloads folder.

If you're using Windows 7 or 8 use the Libraries feature. Libraries let you organise a group of files, even if they are stored in various places. See our tutorial next issue.

### Throw out the chaff

Assuming you're following this guide in order, you will have noticed a different problem when organising

your files. You probably have a lot of old and useless files, documents and applications taking up valuable space on your hard drive.

Maybe you cleared some of them out while you were organising, but chances are those were just the tip of the iceberg. Your next step should be to conduct a thorough audit of everything on your hard drives.

Use SpaceSniffer (tinyurl.com/bxhk8f8), a free application that visualises all the data on your machine, showing you each folder as a coloured square - the bigger the box, the more drive space that folder is occupying. A full scan takes only five to 30 minutes, depending on the capacity and speed of your drives. After the scan is complete, you can double-click any square in the graph to drill down and discover what's taking up so much room. SpaceSniffer lets you easily see where all your gigabytes are going.

It's simple to delete excess files, but getting rid of programs can be more of a pain. PC Decrapifier (tinyurl.com/bekpnf3) can help you quickly uninstall multiple

programs at once. Revo Uninstaller (tinyurl.com/6ms987u) is a handy tool if you try to uninstall a program, but still find it taking up space. Revo Uninstaller lists all the software on your computer and lets you manually obliterate any stubborn programs. It then scans for data or Registry entries that the program may have left behind, and deletes those as well.





Once you've given your PC a thorough, manual cleansing, run an automatic cleaner such as CCleaner (tinyurl.com/ajxuxc8) to see whether you missed anything, CCleaner scans your computer for known space-wasters,

of a volume as a safe, and TrueCrypt as its key. Click the Create Volume button and then choose 'Create an encrypted file container'. Proceed through the remainder of the volume-creation wizard. You can safely

> leave the default selected if you don't understand something.

Once the utility has created your volume, you need to mount it. Think of this action as opening the safe, although it will remain open only while TrueCrypt is running. Click Select File, find the volume file vou made. then click Mount and enter the password.

When TrueCrypt mounts a volume, your PC will see it as though it were a new hard drive. Open File Explorer and look for the new drive - it

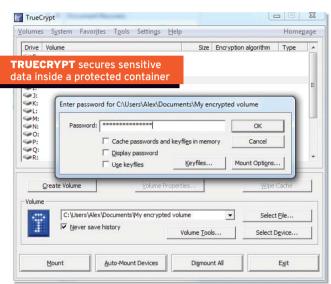
should be empty. Move the folder of sensitive files on to this drive. When you're done, close TrueCrypt. The sensitive files are now hidden inside the encrypted volume.

contains at least 10 characters, and include a mix of upper- and lowercase letters as well as symbols and numbers. A letters-only password can be secure provided it's at least 20 characters long.

Don't use the same password across multiple websites. Even people who pride themselves on using a secure password often fall into the trap of reusing passwords. Do that, and a security breach at any site you use could compromise your most sensitive accounts. If you absolutely can't manage different passwords for each of your accounts, at least use a unique password for your email account and for any accounts that hold sensitive financial information.

Finally, don't get too attached. No security system is perfect, which is why it's important to change your passwords regularly. If one of your passwords is cracked, you don't want someone to be able to snoop on you indefinitely. By changing your most important passwords every six months and your lesssensitive passwords every year, you can minimise the damage done.

KeePass (tinyurl.com/cog9ous) can make this task easier. This free application can track all your passwords, and generate secure passwords on demand.



including temporary Internet files and log files. You can review the files it finds, then tell CCleaner to erase them all, potentially clearing up gigabytes of wasted space.

### **Encrypt your** private data

How much of your life resides on your computer? Do you keep medical records, bank statements,

or other files that you wouldn't want other parties to access? We're not saying that you shouldn't store sensitive data on your computer: it's one of the best ways to keep track of such things, assuming that you have a strong backup plan. You should encrypt those sensitive files, however, to make sure that your information is protected should it wind up in someone else's hands.

First, find all the sensitive files on your computer: financial and medical records, contracts, and anything else you wouldn't want strangers to see. Place them all into a folder. You can (and should) organise them in subfolders, just as long as you have one root folder that encompasses them all.

Install TrueCrypt (tinyurl.com/cfqbdgw), a free and open-source program that provides easy-to-use, government-grade encryption. TrueCrypt stores encrypted files inside a container file called a volume; think

### Change your passwords

Performing this task is just as crucial as backing up your data. Most users, unfortunately, make

several fundamental password errors that can compromise their online accounts and data, and the easiest way to fix them is to

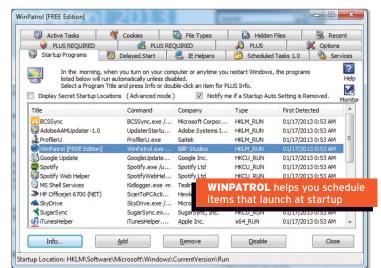
start from scratch, When vou're selecting new passwords. keep the following three tips in mind.

Create a strong password. A password that's too short or too simple is a password that's easy to crack. To keep yours safe, make sure it

**Optimise** startup

One of the most frustrating experiences in computing is

waiting for a clogged-up PC to boot. You have to wait through the power-on self-test (POST) screen, then pass the Windows Startup







screen, and then tolerate the most irritating part of all: when you can see your desktop, but the computer is still unresponsive and too slow to use. Of course, it wasn't always like this - when you first bought the PC, it booted guickly. So what happened?

Software happened. You installed all sorts of applications and utilities, and they took liberties with Windows, setting it up so that any variety of programs and services now automatically launches when the operating system boots. Now, Windows has to launch scores of programs, monitoring utilities, updaters, antivirus and other services every time it starts up, meaning that you have to wait an extra few minutes before you can check vour email.

You need to take back control of your computer's startup sequence.

First, run CCleaner. We mentioned this utility earlier to clear out some hard-drive space, but it doubles as a startup manager. Click the button labelled Tools at the left of the CCleaner window, and then click Startup. You'll see a list of every program that is currently set to launch when Windows starts. Scan through the list, and whenever you see a program that you don't need to use every time you start the computer, click it and select Disable.

If you want finer control over the startup process you can try WinPatrol (tinyurl.com/dxxfw6d), another great free application. Like other utilities, WinPatrol shows you a list of startup programs and services, but it also gives you the option to schedule startup so your computer doesn't try to load everything at once.

To do this, find the program that you want to delay in the main Startup Programs tab, right-click that program, then select 'Move to Delayed Start Program List'. After that, you can switch to the Delayed Start tab, select a program, and click the Delay Options tab, where you can choose how long you want Windows to wait before launching the selected program.

Organise your inbox When you're trying to get things done, email can be

your worst enemy. Sure, it's invaluable for doing business and keeping in touch, but it can also be a distraction and a massive time sink. You might not be able to get back all of the hours you spend on email, but you can at least reclaim the wasted time spent staring at your overflowing, messy inbox.

First, create multiple folders ('Labels' in Gmail) dedicated to specific topics in order to better organise your messages.

An average user's selection might include folders designated for work, bills and receipts, newsletters, online shopping and the like. You can create a new folder in Outlook 2010 by selecting the Folder tab and clicking New Folder (in the New group). In Gmail, click More labels.

labels' in the left pane.

'Create new

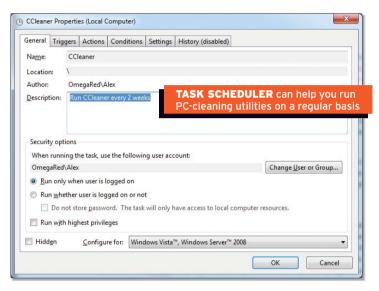
Next, clean out the inbox. This can seem daunting, but the purpose of the inbox is to serve as a temporary holding zone for new messages, not to be a permanent warehouse for every email you've ever received. Sort your messages into the folders you just created, ruthlessly deleting any items that aren't worth retaining. Keep email that needs responses in your inbox, or better yet, create a 'Needs response' folder and sort the messages there.

To keep your inbox clean from now on, continue the practice of sorting messages as you receive and respond to them. Alternatively, you could use Outlook rules (File, 'Manage rules & alerts', New Rule under the Email Rules tab) or Gmail filters (Gear icon, Settings, Filters tab, Create a new filter) to automatically sort incoming email to specific folders based on criteria such as the sender or specific words included in the message. Most major email clients support message filters.

If you don't want to deal with the hassle of manually maintaining your inbox's sanctity or creating a plethora of automated rules and filters, check out Sanebox (sanebox.com), a paid-for service that works with any IMAP email account and does a scarily good job of sorting your incoming messages. At only

a pound or two per month, Sanebox is relatively affordable, too.

Finally, get proactive and unsubscribe from any newsletters or daily-deal emails that you don't regularly read. You'll be surprised at how much inbox clutter that action can eliminate.



**Automate** everything Keeping your PC running smoothly and

securely doesn't have to be a headache. Many of the tasks that are described in this article have to be performed only once, or involve software that updates automatically. For the rest, Windows' built-in Task Scheduler can help you keep programs running on a regimented schedule.

Start by searching for Task Scheduler by name in the Start menu (in Windows Vista and 7) or Start screen (in Windows 8). Once it's open, click the 'Create Basic Task' option to make a simple but automatic, timer-based action. The wizard that pops up will ask how often you want the task to be performed, and what program you want it to launch. For example, you could set up a task that launches CCleaner and SpaceSniffer once every two weeks.

Since a basic task won't launch a scan when it opens a program such as CCleaner, it isn't a completely automatic approach. Still, postponing necessary maintenance is more difficult when Windows pops up the needed tool on a regular basis. ⊠

# NEW PC ADVISOR APP DOWNLOAD IT FOR FREE TODAY!







# **Expert advice**

Having an internet connection wherever you go is one of the main benefits of owning a smartphone, but most tablets don't offer the same luxury. In Troubleshooter (page 102) we explain how to share your smartphone's 3G or 4G connection with a tablet or laptop.

Windows 8 has had some bad press, but under that controversial Modern user interface lurk some useful new features. File History is just one of them, and stores multiple versions of documents and other files. Turn to page 110 to find out how to set it up.

Keeping track of your personal finances is no easy task, especially if you have several accounts. Money Dashboard (page 116) offers a secure, free way to link those accounts and visualise your income and spending, as well as setting goals.

Another handy utility is Pocket (page 114). Whenever you see an interesting article, video or image online you can add it to Pocket, then look at it later on just about any device, even if you have no internet connection.

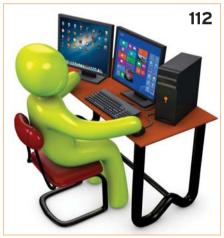
We also show you how to share peripherals such as a keyboard and mouse with multiple computers on page 112, and explain how you can draw a coat of arms for display on your family tree (page 118).

# 

Draw a coat of arms ..... 118

Index







# QUICK TIP: TYPE FASTER ON YOUR IPHONE WITH SHORTCUTS

Typing on an iPhone or iPod touch can be fiddly. The autocorrect system is remarkably good, but you can still save time by setting up custom shortcuts.

You can simply enter a few letters of a word or phrase, and the keyboard will automatically swap in the full term. One such shortcut is set up by default: 'omw' translates to 'On my way!'

You can create as many shortcuts as you like, and use this method as a workaround for iOS' many annoying autocorrect suggestions, such as changing 'were' to 'we're' or refusing to accept that your own name is an acceptable word.

To create a shortcut, tap Settings, General, Keyboard, Add New Shortcut... Enter the word or phrase and shortcut in their respective fields, then tap Save.

You can disable autocorrect and the spelling checker in the Keyboard menu, but resisting this temptation can allow for faster, more accurate typing.



# Use your smartphone as a Wi-Fi hotspot

**David Court, Chris Martin** and **Jim Martin** explain how to tether your tablet to your smartphone and get internet access on the move

nless you own a tablet with cellular connectivity built-in, your mobile internet connection will likely be through your smartphone, whose smaller screen isn't as well suited to browsing the web and streaming video. One workaround is to use your smartphone as a portable Wi-Fi hotspot, and share its data connection with your Wi-Fi-only tablet.

This is known as tethering or internet sharing. Many smartphones provide this feature, including iPhones, BlackBerrys, Windows Phones and Android handsets.

### Does my phone work as a hotspot?

Not all smartphones support tethering, but most popular models do, including the iPhone, Samsung Galaxy S III, Nokia Lumia 920 and BlackBerry Z10.

However, it's important to check whether your mobile operator allows tethering before using your smartphone as a Wi-Fi hotspot. In some cases, the mobile operator can prevent the option from appearing on your handset; in others, it's physically possible to set up tethering, but if it's not permitted on your tariff you could get a warning or cut off for breaking the rules. Some operators are more lenient than others.

If you happen to have a giffgaff SIM in your iPhone, you're out of luck. Apple doesn't recognise giffgaff as an official carrier. To get around this you would have to jailbreak your handset (see tinyurl.com/bcr67fd).

### My tariff won't allow tethering

If your tariff doesn't allow tethering, the most obvious solution is to switch to a contract that includes it or request a bolt-on to your current tariff. This might result in you paying more each month, but it's likely to work out cheaper than the alternatives.

If you haven't already bought a tablet, you might consider buying one with 3G or 4G connectivity as standard. You'd then have to get a data-only SIM card for it, and either pay on a monthly or pay-as-you-go basis for this separate tariff.

Another option is to invest in a portable Wi-Fi hotspot, also known as MiFi. These battery powered devices are in essence wireless routers into which you pop a SIM, just as you would a 3G or 4G tablet. They cost from around £50 or might come as part of a package with a data SIM.

If you want a device that will work in other countries as well as the UK, check out Globalgig (tinyurl.com/cv8gqf3).

# How tethering works

Put simply, the process of tethering involves enabling the hotspot option on your smartphone, configuring wireless security with a password to prevent other people piggybacking on your connection, then connecting your tablet to the wireless network just as you would with any hotspot.

You'll have to enter the password the first time you connect, but on subsequent occasions your tablet should remember the login and automatically connect. It's the same process if you have a MiFi router.

### Pitfalls of tethering

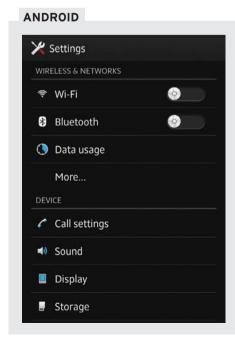
One potential problem with using your phone as a portable Wi-Fi hotspot is that your tablet will think it's connected to a fixed-broadband rather than mobile connection.

This means it could very quickly gobble up your monthly data allowance. Whereas your smartphone will avoid downloading app updates and any other large data files over 3G, your tablet will think it's using a standard Wi-Fi connection and assume that large downloads are acceptable.

In such a scenario it's worth disabling automatic updates and downloads, and keeping a close eye on how much data is











being consumed. This information can be found in your smartphone's Settings menu or via a dedicated app.

Disable the hotspot when not in use to prolong your smartphone's battery life.

### iPhone (iOS 6.0)

**Step 1:** From the Home Screen tap Settings, General, Personal Hotspot. If you can't see this option, contact your mobile provider. It may be that you can add tethering for an extra fee.

Step 2: Simply slide the switch in the Personal Hotspot menu to the ON position. Make a note of the network name (this is the name of your iPhone) and the Wi-Fi password. The hotspot is now discoverable.

Step 3: Ensure Wi-Fi is enabled on your tablet or laptop and search for available wireless networks. Select the one that matches your phone's name (in this example, 'Karen's iPhone'), then enter the password.

### Android 4.0+

Step 1: Open the Applications menu and select Settings. Below Wi-Fi, Bluetooth and Data usage tap More.

Step 2: You will be presented with the Wireless & Networks menu. Provided your operator supports the feature, within this list you should see 'Tethering & portable hotspot'. Tap it.

Step 3: Tick the box next to 'Portable Wi-Fi hotspot', then tap Ok to the warning message that any ongoing operations such as media transfer will be interrupted.

Step 4: Depending on the version of Android you're running, below 'Portable Wi-Fi hotspot' will be an option for 'Portable Wi-Fi hotspot settings' or 'Configure Wi-Fi hotspot'. Tap this to edit the Network name, enable security and enter a password.

Step 5: On your tablet or laptop, select your handset from the list of available Wi-Fi connections, then enter the password.

### BlackBerry 10

Step 1: Open System Settings either from the app icon or the drop-down bar.

Step 2: Select Network Connections, Mobile Hotspot. Note that your hotspot will not work if data is switched off.

Step 3: You'll now be taken through a number of setup stages. The first few are just information and warnings. Tap Next when you're ready.

Step 4: Set a password for your mobile hotspot and tap Next.

Step 5: On your tablet or laptop, select your handset from the list of available Wi-Fi connections, then enter the password.

You can tether over USB or Bluetooth. Select Network Connections, Internet Tethering to specify the protocol.

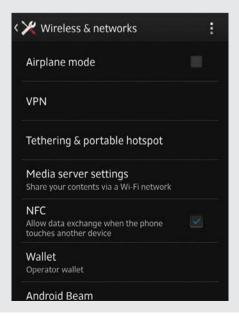
### Windows Phone 8

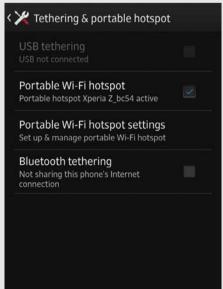
Step 1: Swipe left from Windows Phone's Home screen, then scroll down and tap Settings, Internet Sharing.

Step 2: Enable Internet Sharing and tap Setup at the bottom of the screen.

Step 3: Enter a name and a password for your hotspot.

Step 4: On your tablet or laptop, select your handset from the list of available Wi-Fi connections, then enter the password.









### YOUR QUESTIONS ANSWERED

# Expert computing advice

We tackle readers' hardware and software conundrums

### **BOOTABLE USB STICK**

I used the Windows 7 USB/DVD Download Tool to create a bootable USB flash drive from which to install Windows 7. I want to do the same with Windows 8, but the tool isn't working. I get the error message: 'We were unable to copy your files. Please check your USB device and the selected ISO file and try again'. Is the tool incompatible with Windows 8?

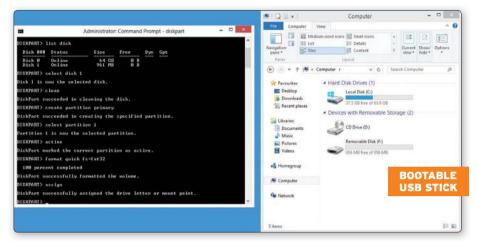
The Windows 7 USB/DVD Download Tool usually works fine with Windows 8. The problem you're seeing is related to the format of your USB flash drive. If there is information in the Master Boot Record (MBR) the tool is sometimes unable to overwrite it. However, simply re-formatting the flash drive won't clear it.

To clear the MBR you should use the diskpart command. This will completely erase your flash drive; we assume you've already backed up your files in preparation for this, given that the Download Tool has the same effect.

Open a Command prompt with admin privileges. In Windows 8 press Windows, X and clicking 'Command Prompt (Admin)'. Now enter the following commands (press Enter at the end of each line):

diskpart Launches the diskpart program

list disk Provides a list of all the disks attached to your PC, including your USB



drive. It's important to note the correct disk number as we will erase the corresponding disk. The column labelled Size should give you a clue as to what's what. It's a good idea to remove any other external drives first

select disk x Where x corresponds to the number of your flash drive

clean This erases the selected disk

Now we will create a new partition on the drive and give it a drive letter. Type:

create partition primary select partition 1 active format quick fs=fat32 assign exit

You can now close the Command Prompt. When you next try the Windows 7 USB/DVD Download Tool it should work correctly.

### TRANSFER MY STICKY NOTES

I've been making heavy use of the Sticky Notes program built into Windows 7, but I now have to return the laptop I've been using. How can I back up my Sticky Notes without having to copy and paste the text into another app?

The Sticky Notes program saves all its data in a single file called StickyNotes.snt. You can locate this file by opening an Explorer window and entering into the address bar %AppData%\Microsoft\Sticky Notes.

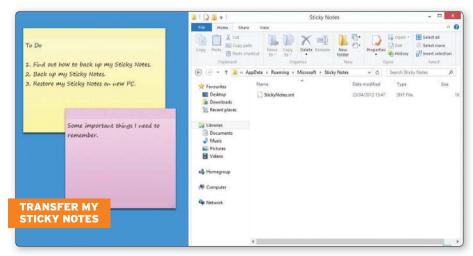
Close the Sticky Notes program (but not the individual notes) and copy this file somewhere safe. You'll probably want to delete it from the system, too, unless you want the new owner to read your notes.

If you want to use your saved Sticky Notes on a new PC, simply reverse the process. Unfortunately, you can't merge two saved StickyNotes.snt files, and you'll have to delete any existing Sticky Notes on the new PC before you can copy over the file.

When copying the file, select the option to overwrite the existing file if prompted.

# **RAW USB STICK**

I've been using a 32GB USB flash drive for many months without incident, but I was recently greeted with the message 'You need to format the disk drive before you can use it'.



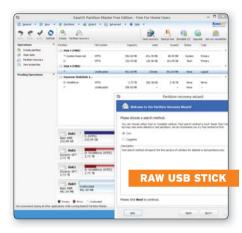


I'm unable to access any data on the drive. I've looked in the Windows Disk Management application and I can see my USB drive now has a RAW rather than FAT32 partition type. Can I get back my data, or will I have to cut my losses and reformat the drive?

When this happens it's usually possible to recover your data, but you'll need to download a tool to do it. We've managed to successfully recover data in this scenario using EaseUs Partition Master Free Edition (tinyurl.com/avfrzy5). EaseUs offers several very similar data-recovery tools, often with overlapping features, but for this particular task Partition Master does the job.

The process of recovering your partition is simple, but not obvious. Start Partition Master, then select Partition Manager rather than Data Recovery.

Locate your USB drive in the table of disks at the bottom of the window. Rightclick the partition you wish to recover. then select Partition Recovery.



Try the Fast mode first, which should do the trick. If not, the program will give you the option to try again in Complete mode.

When your partition is found, select it by placing a tick in the box beside it, then click Proceed. Partition Master will automatically restore the partition and you can exit the program.

You should now be able to access your files from within Windows.

### MONITOR SPACE WASTED

I recently bought a 27in monitor with a 2560x1440-pixel resolution, which allows me to comfortably view many open windows at once. However, now that I'm using Windows 8 I find the Start screen overwhelmingly huge - it's like being slapped in the face with a multicoloured pillow. Furthermore, all the Modern UI apps run full-screen, which seems like a real waste of pixels. Is there any way I can make better use of my screen space in Windows 8?

There are a number of things you can do. Firstly, you're probably aware that the Snap feature in Windows 8 lets you run side-byside two Modern UI apps. To use Snap, grab the top of a Modern UI app and drag it to the side of the screen until a vertical bar appears. Let go, and the app will snap to the side of the screen. Opening another Modern UI app will cause it to fill the remaining portion of the screen, leaving the two apps running side by side.

# SET YOUR DEFAULT FONT SIZES TO MATCH YOUR SCREEN

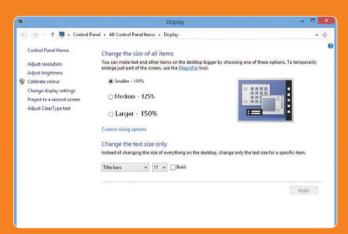
PC displays come in many different sizes and with varying resolutions, but Windows generally doesn't take into account the physical size of your display when setting font sizes.

This means that if you buy a 21.5in display with a 1920x1080 would on a 27in display with the same number of pixels. In many read. Sometimes users may be tempted to reduce the display in blurry text and greatly reduced image quality.

Windows 8 offers three preset font sizes. Smaller - 100% is the default; Medium - 125% and Larger - 150% will provide correspondingly bigger fonts. Changing these settings will also adjust the size of other onscreen items to match the fonts. You can adjust the setting within Control Panel, Display

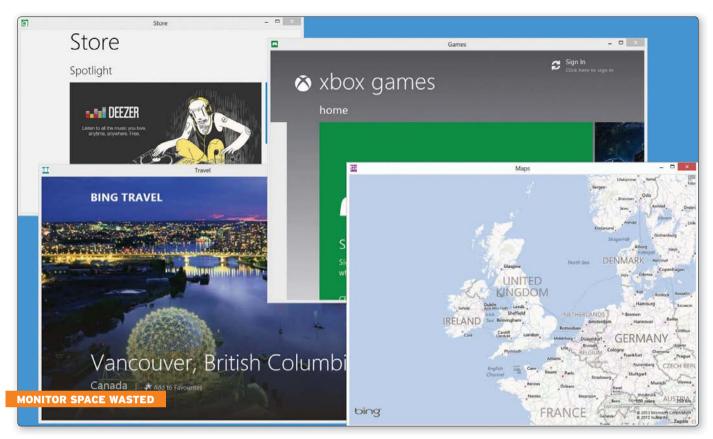
However, these options are imprecise. If you have more than one PC, you can accurately set the font sizes and match font also set your screen fonts to match their printed size.

screen in pixels per inch (PPI). This figure is sometimes referred to as dots per inch (DPI).



You will need a ruler that measures in inches. Select 'Custom Sizing Options' to bring up a picture of a scale in inches. Hold up your ruler to this scale, then drag the scale left or right until it aligns as closely as possible with your ruler. On our display the two scales match at 106%. Now click Ok.

You will have to sign out and then log back into Windows for the changes to take effect.



This also works in the traditional desktop mode: the app snapped to the side will appear alongside the desktop. If you snap the desktop to the side, each of your open windows will be displayed vertically down the screen in its own tile.

This feature is rather restrictive in that snapped apps are of a fixed size, occupying a thin vertical column at the left or right of the screen. Most apps aren't suited to running in this format, although it's good for Twitter and instant-messaging apps.

If you're prepared to install third-party software, you can run Modern UI apps in individual windows on the desktop using

Stardock's \$4.99 ModernMix utility (get it from tinyurl.com/c5vgxsb). You can also switch freely between windowed mode and the standard full-screen mode.

Modern UI apps as you wish, and make full use of your large screen.

### MULTIPLE IMAGES PER SHEET

How can I print several different images on to a single sheet of paper? Before I upgraded to Windows 8 I used Photo Wizard to achieve this, but I can't see the same option in the settings. Please help.

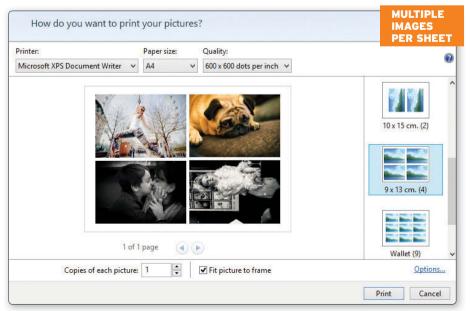
This will enable you to open as many

A simple way to print several different images on to one sheet is to open a File Explorer window and browse to the folder in which your images are stored.

Select the images you want to print, either by dragging a marquee around them or individually selecting the photos by holding Ctrl and clicking on each in turn.

Right-click and select Print. From here you can select from a menu of layouts, among which are multi-image options. Select one of these to print out different images on a single page. This method also works in Windows 7 and Vista.

You will need your chosen images to be in the same folder to achieve this. If this isn't the case, consider creating a temporary folder and copying into it the relevant images. Alternatively, you could add your various picture folders to your Pictures library and print the images from there.



### RECENTLY OPENED DOCUMENTS

The Windows 7 Start menu usefully displays the most recently used programs and opened documents. How can I access a similar list in Windows 8?

Windows 8 doesn't have the Windows 7-style Start Menu, but it does maintain lists of recently used items in a similar way.

If you're using File Explorer, Windows will, by default, add an item to your favourites called Recent Places. Clicking on this will show you your most frequently accessed folders. You can also add a Recent Items

link in your favourites, which will contain your most recently-accessed files.

To do this, open a File Explorer window and enter into the address bar %AppData%\Microsoft\Windows\. This should take you to a folder containing an icon titled Recent Items. Drag this to your Favourites and you'll be able to quickly access it from any File Explorer menu. You can also create a tile for this icon on your Start screen by right-clicking it and selecting 'Pin to Start'.

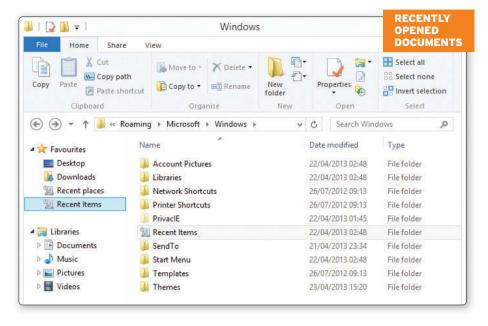
Windows offers other ways to access recent files and documents, too. If you're using the traditional desktop and you have File Explorer pinned to your taskbar, you can right-click the File Explorer icon to see a list of recently or frequently used folders. The same system works for other pinned icons, which will maintain their own lists of frequently accessed documents.

So, for example, if you have Microsoft Word pinned to the taskbar, you can right-click the icon to quickly access recently used Word files. This is exactly the same as in Windows 7.

If you wish, you could install one of the available Start Menu apps available for Windows 8, such as Stardock Start8 or Classic Shell, which will add a Windows 7 Start Menu to your Windows 8 desktop, complete with the Recent Items option.

### **BOOT INTO MEDIA CENTER**

Pi've recently replaced my homeentertainment PC with a new system running Windows 8. I'm enjoying the faster boot times but, as I'm using it primarily for TV and music, I want it to boot straight into Media Center in full-screen mode. Can you help?



There are a few things to consider when moving to Windows 8 on a dedicated Media PC. Firstly, Media Center itself is no longer supplied as part of Windows and must be separately purchased. The second issue is that Microsoft wants users to boot into the lock screen and then into the new Start screen; the option to boot directly into Media Center has therefore been removed.

To disable the lock screen you can make a configuration change using the Group Policy Editor. From the Windows desktop press Windows, R to bring up the Run dialog box. Type **Gpedit.msc** and hit Enter to bring up the Local Group Policy Editor.

Navigate to Computer Configuration, then Administrative Templates, Control Panel, Personalisation. In here you will find the option 'Do not display the lock screen'. Double-click this and set it to Enabled, then click Ok. From now on, you shouldn't see the lock screen when the system boots.

The Start screen is itself customisable, and you're only a click away from entering Media Center. You could remove all tiles except the one for Media Center, then place it somewhere prominent, but if you want the system to boot straight into Media Center things get a little tricky.

One method would be to create a batch file and set it to launch Media Center maximised at startup. This won't bypass the Start screen altogether, and you will still see it for a moment, but the PC will load Media Center without user intervention.

To do this, create a batch file (we called ours StartMCE.bat) and edit it to contain the following commands:

Start /min %windir%\explorer.exe Start /max %windir%\ehome\ehshell.exe

# TECH JARGON BUSTER

INTEL NUC: Next Unit of Computing.

NUC is a family of ultra-compact

PC platforms that combine a small

motherboard with a non-upgradable Intel
processor featuring integrated graphics.

Three versions exist, offering slightly
different features and performance levels.

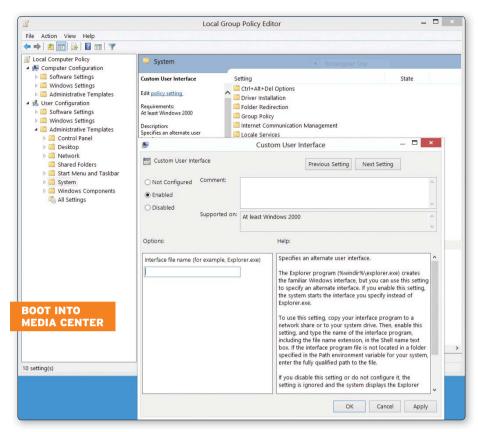
**BYOD:** Bring your own device is a policy through which employees are encouraged to use their own devices for work purposes. Advantages of this policy are that users don't need to carry two phones or two laptops and can work on a device with which they are already familiar.

Disadvantages include concerns over data privacy and the ability for firms to modify or erase personal data. associated protocols that allow online payments to be made worldwide. The system works with no central authority and runs on free, open-source software. Bitcoins are stored in virtual wallets, which can reside on a computer, a mobile device or in an online wallet. They can be transferred without the need for an intermediate financial authority.

LOCAL GROUP POLICY EDITOR: A tool that allows the editing of certain advanced settings within Windows. In versions prior to Vista these settings applied to all users on any single PC, but later versions allow configuration on a per-user basis. Typical settings include enabling or

disabling access to Windows features. The concept extends beyond the local PC to networks of computers running within an organisation, allowing such settings to be centrally managed.

GOOGLE GLASS: Also known as Project Glass, Google Glass is a head-worn gadget incorporating a battery powered Head Up Display (HUD). Sitting just above the user's right eye, the gadget is able to display visual information in your field of view. This could be anything you like, but will usually be similar to the kind of information with which you would interact on a smartphone. You can also use Google Glass to take pictures and record video of what you're seeing.



This will first launch the Windows Explorer shell, including the Start screen, and then immediately launch the Windows Media Centre in maximised mode.

Save this batch file somewhere easy to remember. We created the folder C:\Start.

Return to the Group Policy Editor and open User Configuration, Administrative Templates, System. Double-click 'Custom User Interface' in the right pane. Select Enabled, then type in the full path name to the batch file you created earlier. Click Ok.

Now, when you start the PC, you will momentarily see the Start screen, which will then immediately be replaced by the Media Centre interface. If you wish, you can eliminate the Start screen entirely by omitting the first line from the batch file. Be aware, though, that doing this means none of your usual Windows startup programs will run, and when you exit Media Center you will be left with a blank screen.

If you want to return to normal Windows from here, you can press Ctrl, Alt, Del and select Task Manager. Choose File, 'Run New Task', and type explorer.exe in the Open box. Click Ok to bring up the standard Windows interface. 🗵

# CONTACT US



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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 any damage arising as a result.

Always back up your system before you make any changes, including software installations.

to respond to letters or telephone requests, but we will endeavour to answer queries submitted by email or via our Helproom forum.

### For more PC help go to: pcadvisor.co.uk/helproom



# **SEARCH THE** PC ADVISOR FREE **ONLINE HELPROOM**

The PC Advisor online Helproom contains an indispensable database of answers to common questions regarding all aspects of PC problems. This ranges from general Windows issues to problems with specific apps, and covers all types of PC hardware and software, including system components and peripherals.

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If our online database can't solve your problem, try posting a question in the Helproom forum, where more than 200 queries are answered every day. The forum is manned by our team of Helproom Angels, who are ready and willing to lend a hand with anything from system crashes to virus alerts.

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## Backing up important files in Windows 8



We all need to back up our important files, and Windows 8 makes that task easier than ever with its new File History feature. Cliff Joseph explains how to enable it



A friend recently bought a Mac for the first time. He told me he wouldn't return to Windows until it had an equivalent to Time Machine (the automatic backup program built into OS X).

Well, what's he waiting for? Windows 8 has a File History backup feature that offers something like the simplicity and ease of use of Time Machine. It lacks only the intergalactic eye-candy that adorns Time Machine's graphical interface.

File History is a refinement of the Windows Backup feature built into Windows 7 (which is also buried in the depths of Windows 8 if you want to continue using it).

File History allows you to create automatic backups of your files on an external hard disk or network drive. It works with folders and files stored in your Windows libraries, including your Documents, Music, Photos and Videos folders, as well your Favourites, Contacts and files on your desktop.

Windows Backup allows you to schedule backups on a daily, weekly or monthly basis, but File History works more like Time Machine. It performs continuous incremental backups that allow you to save multiple versions of a file.

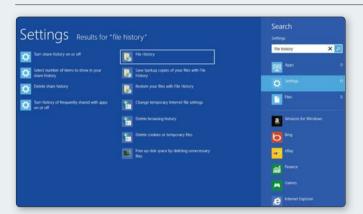
If you accidentally delete or need to revert to a previous version of a file, you can easily step back through the various saved versions.

By default, File History makes hourly backups, but you can alter the frequency from 10 minutes to a single daily backup. You can also specify how long you want File History to retain old versions of your files.

File History isn't as clever as Time Machine, which allows you to restore anything from a single file to your entire operating system. Windows rather awkwardly splits these two tasks between File History and System Restore, while individual PC makers may also include system recovery options of their own.

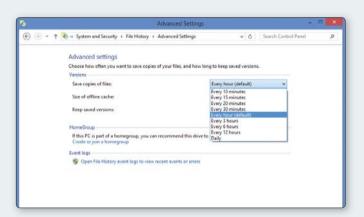
However, File History is very easy to use, and once you've set it up you can forget about it, safe in the knowledge your data is secure.

## **USING WINDOWS 8 FILE HISTORY**

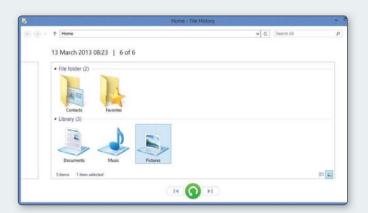


TART

Search for 'file history' in the Windows 8 Start screen; you'll find it listed under Settings. If you're not a fan of the new Start screen, you can also find File History in the 'System and Security' section of the main Control Panel.



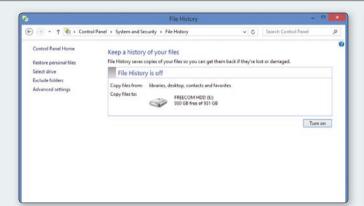
Click Advanced Settings if you wish to modify the way File History works. By default the software creates hourly backups, which will be fine for most people, but you can alter this to anything from 10 minutes to 24 hours.

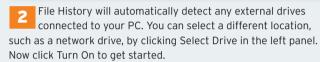


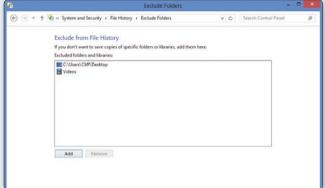
To restore files click 'Restore Personal Files' in the File History control panel. Our most recent backup was created at 08:23, 13 March. To restore from that backup we simply select the folder or file that we need and hit the green Restore button.



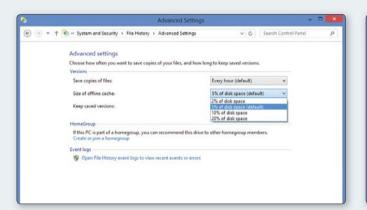




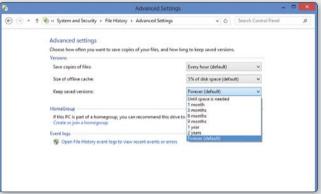




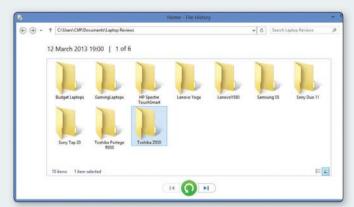
File History will back up your libraries, Documents, Music, Photos and Videos folders, Contacts, Favorites and the contents of your desktop. You can prevent a folder from being backed up via the Exclude Folders option.



File History makes incremental backups of files, so it shouldn't consume too much space. However, by altering the offline cache you can limit the amount of disk space used for backups. Choose a new value from the 'Size of offline cache' drop-down menu.



You can also specify how long File History retains old versions of your files. You can keep them forever, or for a specified number of months or years. You can also choose to retain the files until the space is needed.



It's not explained very well, but you can step back through older versions of your files by clicking on the panel to the far left of this window. Let's view those created on 12 March to locate a review we've accidentally deleted and need to recover.



Right-clicking a file or folder provides two options: select Restore and the old version of the file will replace the current version; choose Restore to and File History will save the file to a different location, leaving both versions intact.

## Share your peripherals with multiple machines



Orestis Bastounis explains how you can share peripherals between your PCs using Synergy, the software equivalent of a KVM switch



If your desk is home to more than one computer, reaching for separate peripherals each time you switch between them can be a real hassle. Most desks don't have room for multiple keyboards and mice, and it's more convenient to use one set of peripherals to control all your computers.

Traditionally, this meant investing in a KVM switch; these days, you can achieve the same end using free software, such as Synergy.

This app lets you move the mouse pointer to the side of one computer's display and on to a second machine's screen, as though it were a multimonitor setup. This does mean you'll need a separate monitor for each computer, and the systems must be connected to the same network.

Synergy sends your mouse movements and keyboard presses to the second PC, which behaves as though the peripherals are directly connected to it.

The software works with any number of laptops and desktops, across Windows, OS X and Linux. This means you can, for example, copy text from a Mac, then paste it into a document on a PC.

Provided that you have a fast Wi-Fi network or use an ethernet connection, you won't experience any lag when moving the mouse or typing.

Synergy can be fiddly to set up, though. In addition to installing the software, you'll need to assign a static IP address to the computer to which the peripherals are attached (the Master PC).

The exact process depends on which router you have. Virtually all routers let you assign fixed IP addresses. We'll demonstrate how to do so using a Thompson TG585 router, but the same principles apply to all brands.

The final job is to assign screen names to the other computers, so Synergy knows which screen is on the left, and which is on the right.

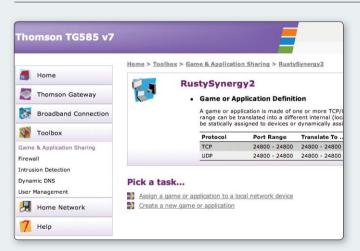
In truth, the only tricky aspect is correctly configuring your network, which we've covered in *Assign a static IP address* (right). Once Synergy is up and running, you'll wonder how you managed multiple computers without it.

## GET STARTED WITH SYNERGY



TART

Head to synergy-foss.org and click the Download link. Make a donation if you wish to do so, or simply click Continue. Download the correct installer for your OS. Choose 32bit if you aren't sure which version of Windows you're using.



Another option within this interface will allow you to open ports for certain applications. Synergy uses 24800 by default, so follow your router's manual to open this port, enabling both TCP and UDP protocols and applying it to the Master PC. Save the changes.

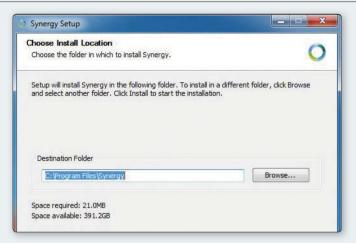
## ASSIGN A STATIC IP ADDRESS

There are different ways to assign a static IP address to your computer. The simplest is to manually enter an IP address in Windows. However, most home routers have a DHCP server that automatically assigns IP addresses, so this method might cause a conflict if the same address is already assigned to another device.

The correct way to assign a static IP is to tell your router to always assign the same IP address to a computer with a certain MAC address. Every networking device has one of these unique codes.

Log into your router. If you don't know its IP address, open a Command Prompt (search for **cmd** in Windows 7 or 8), type

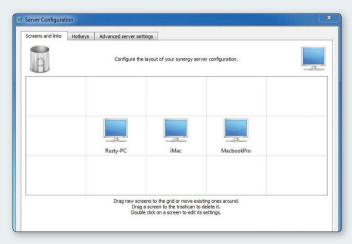




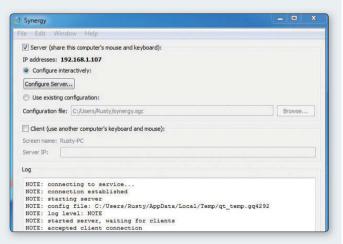
Run the downloaded file. Agree to the terms and conditions, then click Next to install the software. You'll need to download and install the appropriate version of the Synergy software on each computer you intend to use with your shared keyboard and mouse.



Log into your router via your web browser. Look for a page that lists all the devices connected to the router. Identify your 'Master' PC, then ensure its IP address is static rather than dynamic, with a value such as 192.168.1.107. See below for details.



Launch Synergy on the Master PC and tick the Server box. Click Configure Server. For each client, drag the monitor icon into the main window, then arrange the icons to match your physical setup. Double-click each icon to name it. Click Ok, then click Start.



Open Synergy on each Client PC. Check the screen name in the Settings, then tick the Client box. Enter your Master PC's IP address and click Start. If all is well, you can now begin sharing your keyboard and mouse between PCs.

**ipconfig /all** and press Enter. Your router's IP address is the same as the Default Gateway. You can also see the MAC address for each network adaptor (shown as the Physical Address), but be sure to note down the address for the correct adaptor (laptops will usually have two - one for Wi-Fi and another for ethernet).

Type this IP address into a browser's address bar, preceded by http://. Log in with your username and password. If you don't know these, look in the manual or on the router itself.

Our Thompson DG585 router has a menu called Home Network; look for a similar menu in your own router. You might see a list of

connected computers from which you can select the Master PC, or you may have to manually enter its IP or MAC address.

However your router handles it, enter an IP address in the same format as your router's: the same first three numbers (for example 192.168.1.) and then a fourth number between 2 and 254. Make sure this number is different to your router's address.

If you're having problems, you may need to refer to the manual that came with your router. Alternatively, try visiting your router manufacturer's website, or contacting its support department. Tech forums can also be helpful (see pcadvisor.co.uk/forums).

## Pocket your favourite text, photos & video



You've found something really interesting online, but you just don't have the time to give it your full attention. Sandra Vogel shows you how to pocket it for later



Pocket might sound like an odd name for an app, but it's an appropriate one. When you're out and about and want to keep important things on your person, they could well end up in your pocket. This app is a web-based version of a pocket. It's a place in which you can store the things you don't have time to look at when you find them.

Pocket has a more specific purpose, and there's a clue in the previous name for the app: Read It Later. The name change concerns the fact Pocket works with more than just text: you can store images and video, too.

Pocket solves the problem of discovering something online that interests you, but not having the time to immediately view or read it. In the past you might have sent yourself an email containing the URL, bookmarked the site or jotted down the address.

You might also be using Evernote or a similar app to keep a list of these items. That will do the job, but Pocket is a far more elegant solution. Pocket integrates with your web browser, so you need only tap its icon to save something for later.

As well as the various browser extensions, Pocket is available for iOS and Android, and Amazon's Kindle Fire tablets. Unofficial apps are available for other devices, including Windows Phone, BlackBerry and Symbian.

The mobile apps allow you to log in anywhere, any time, and catch up on what you've saved. No internet connection is needed, so you can read web pages, watch video and listen to audio on a plane or anywhere else.

One of the great things about Pocket is its ease of use. One click and the content is stored. You can even email links to Pocket and it'll save them for later. It's as easy to mark something as read, or delete it altogether.

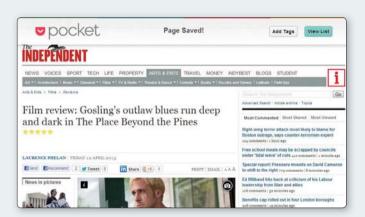
Pocket does a good job of presenting content, too, stripping out paraphernalia that can make websites difficult to read and offering a clean, modern interface.

## **GET STARTED WITH POCKET**



TART

Head to getpocket.com and click 'Sign Up Now' to create a free account. You'll use this to log into Pocket. You don't need to leave open the browser tab to work with Pocket, so you can safely close this after entering your details.



When you see something online that you want to save for later you can either hit Ctrl, Shift, S on the keyboard or click the Pocket icon at the top right of the screen. Plenty of apps allow you to save content to Pocket, including Twitter, Flipboard and Pulse.

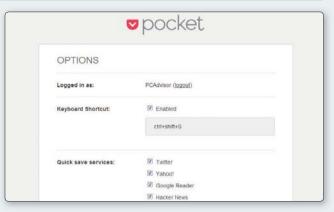


You can mark an item as read and favourite or delete it using icons at the top left of the screen. Read items are sent to an Archive, which prevents them appearing on the home screen, but you can still access them if needed.





Set up a browser extension or plug-in for Chrome, Safari or Firefox. In Chrome, for example, type chrome://extensions in the search bar and then search for Pocket. Add it to Chrome and you'll see a small downward pointing arrow in the top right.



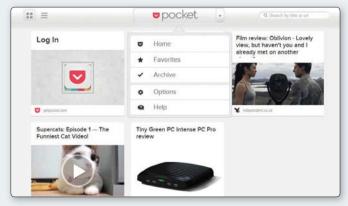
Right-click the extension icon and select Options, then log in via the browser window that opens. The Ctrl, Shift, S keyboard shortcut for adding content to Pocket is enabled by default, as are various quick-save services.



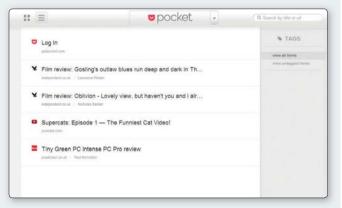
When you're ready to view your items, log in at getpocket.com or launch the mobile app for your phone or tablet. On an iPad the default view shows an image and headline for each item. You can switch to a list view by tapping the icon at the top left of the screen.



Tap on an item to view it. Pocket strips out the unnecessary detail from the source page, leaving you with a clean-looking view. Tap the double-A icon at the top right to change the fonts and their size or invert the colours to assist readability.



Click the down-arrow next to the Pocket logo to switch between Home, Favorites and Archive, or to access the Options or Help menus. At the bottom of the screen you can sort items by newest, oldest, title or site source, and separate text, images and video.



You can assign tags to group similar items and make them easier to find. This makes Pocket a great resource for collecting research items for short-term projects. You can also search items and view them as lists.

## Manage your money with an online budget



David Bayon explains how you can create a budget using some free and simple online software to help stretch your personal finances further



Online banking makes it simple to keep track of your finances, but don't stop there. Knowing your account balance is far less useful than understanding exactly where your money goes. And having and sticking to a personal budget can be essential in these trying economic times.

You could use a standalone budgeting application to this end. Traditionally, these have simply been souped-up Excel spreadsheets, but times are changing. The popularity of an application such as You Need A Budget is proof that a friendly modern interface can transform a dry topic, particularly when you throw in mobile companion apps.

But there is an even easier option. The latest wave of online budgeting services plugs directly into your online bank and credit-card accounts, adding controls that can help you to save money on a daily basis.

Money Dashboard tracks all your accounts, producing graphs of where your money goes, your net spend and much more. But its most useful feature is the budget, which it can create on your behalf. Over time, as it learns your payees and Direct Debits, it will be able to automatically process transactions, and Money Dashboard will quickly become your online banking go-to when you need to save for a holiday, pay an unexpected bill or simply decide whether you can afford another night out.

The threat of identity theft means you should remain wary of handing over your logins, particularly for financial accounts. You do this at your own risk.

Keep in mind, however, that Money Dashboard uses the same industry-standard security practices as many of the world's leading banks, and the software is read-only, meaning it can't be used for withdrawals, payments or to transfer funds. Your login is not stored by Money Dashboard either.

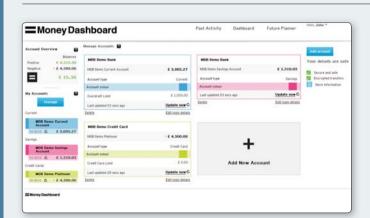
If you're too wary to try Money Dashboard, stick to an offline budgeting application that works with manually uploaded statements.

## BETTER BUDGETING WITH MONEY DASHBOARD

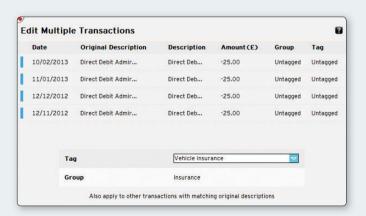


TART

Head to moneydashboard.com and create a free account. No doubt you'll be concerned about the handing over your banking credentials, so check out the Security section to get an explanation of its encryption methods and how it works.



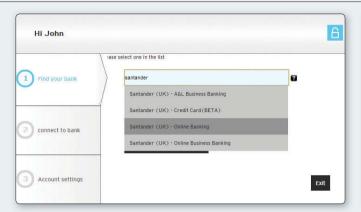
Within a few moments your account(s) will be connected to the software. For each account you can edit the name and type, and assign a colour. If you have more accounts elsewhere, click 'Add New Account' from the summary screen.



Tick the boxes next to Direct Debits or recurring transactions, then click Edit to bring up more options. From here you can apply the same category tag to all existing and future transactions that match those selected, greatly cutting your workload.







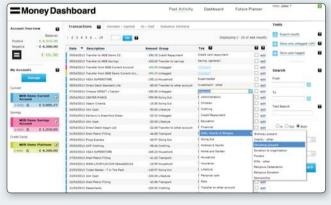
When prompted to add a bank account, you can either select an account from the drop-down menu or enter the first few letters of its name into the search box. There may be multiple entries for each bank, such as current, business, credit card and savings.



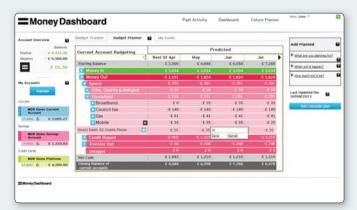
Next you'll need to enter your login details. The fields provided will be specific to your bank; if you're not sure what information to enter, go to your online banking login page and compare the names of the fields.



Click the Money Dashboard logo to return to the dashboard. This displays a summary of your activity, but it's incomplete (note the alert). Money Dashboard can auto-categorise many transactions, but it needs some help. Click Past Activity at the top.



Every transaction must be correctly tagged. Scan the Tag column for any obvious automated errors, then click 'Show only untagged' to isolate those that need attention. For each entry select an appropriate category from the drop-down menu.



With the dashboard up to date, click Future Planner. It will take a moment to calculate figures based on your spending habits. Go to Budget Planner, and expand any of the categories to see your predicted spend. You can edit these amounts for future months.



That's your basic budget, but there's lots more with which to experiment. Click the Help buttons next to any feature to learn how to, for example, set aside money for Savings Goals, alter your payday, and split transactions between categories.

## Draw a coat of arms



Following on from our feature on tracing your family history, Mike Bedford shows you how to quickly and easily create a coat of arms for display on a family tree



Elsewhere in this issue we investigate software and services that can help you trace your family history (see page 86). As you delve into the past it's possible that you will discover ancestors who were entitled to bear arms (displaying a coat of arms that is, not brandishing a musket). This being the case, it's not uncommon for family history enthusiasts to take an interest in heraldry.

Traditionally, coats of arms are drawn by heraldic artists, who work with traditional materials such as inks, watercolours and gold leaf on high-quality paper or vellum. This process costs a few hundred pounds, however.

For a passable result, the availability of drawing and painting software has removed the need for some artistic motor skills. But unless you have an eye for design, you'll probably be disappointed with the end result.

A third option removes the need for design skills, yet produces results that are

perfectly good enough for placing on a family tree. Here we'll show you how to use dedicated heraldry software, and look at two packages that are very different in their approach.

Our first solution, Coat of Arms Design Studio, is a specialised drawing package that is able to implement the basic principles of heraldry. This free software runs online, while a \$20 (£13) Pro version can also run offline.

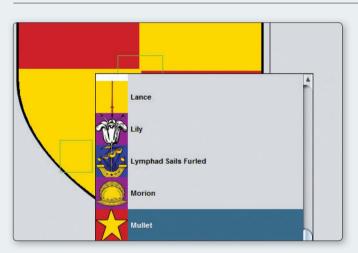
The second, DrawShield, is able to interpret the blazon - the way in which a coat of arms is described - and automatically draw it for you.

Despite what you may have heard, there is no such thing as a family coat of arms. Arms are granted to individuals and passed down through the male line of descent. It's possible that you could find someone with the same surname who was entitled to bear arms, but you would be entitled to bear those arms only if you could demonstrate a direct lineage.

## GET STARTED WITH COAT OF ARMS DESIGN STUDIO



Head to tinyurl.com/cemme29. We're going to create the arms of Robert de Vere, Earl of Oxford. If the background was a single colour you'd click on 'Background Color or Fur', but we need divisions. We'll create these in the next step.



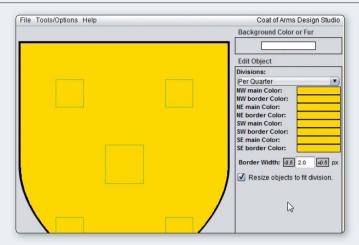
Our coat of arms has no borders between the divisions so set the Border Width to zero. Our next job is to add a mullet (star) to the NW quarter; click on the green box in that quarter and select 'Add a Division'. Choose Mullet from the 'Select a Charge' menu.

## **USING DRAWSHIELD**

The official description of a coat of arms is known as a blazon. It's written in a mixture of English and Norman French, according to very strict rules. The blazon for the coat of arms we created in the workshop above is 'Quarterly Or and Gules in the first quarter a mullet Argent', which makes sense once we know that Or is gold, Gules is red and a mullet is a star with five points.

Since any reference to a person's coat of arms will almost certainly provide the blazon, using a clever piece of software called DrawShield provides an easy way to draw a coat of arms. The web app can be found at tinyurl.com/cevh6sj.

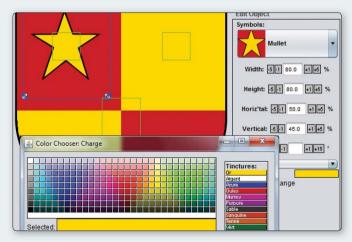




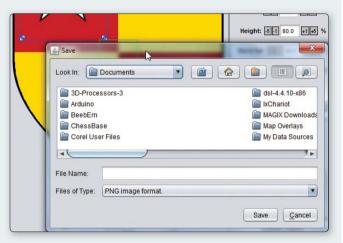
Click on the green box labelled 'Click here to add objects' and select 'Add a Division'. The Divisions dialogue appears to the right of the shield; select Per Quarter from the Select Division menu. This divides the coat of arms into four quarters.



By default all the quarters are gold. We need the NW and SE quarters to be red. First choose 'NW main Color', select Gules from the Color Chooser menu that pops up, then hit Save. Repeat this process for 'SE main Color'.



Next, we need to change the mullet from its default gold colour to silver. In the box to the right of the coat of arms click on the gold box labelled Color. This will bring up the 'Color Chooser' menu. Select Argent, then hit Save.



If you might want to edit your coat of arms later you should save the design in the software's proprietary format. Also save it as a graphics file in PNG format. Select 'Save Coast of Arms Design' and/or 'Save (Export) Image' from the File menu.

Try typing 'Argent, a lion rampant gules and a bordure sable bezanty' into the box at the top left and click 'Draw Shield!'. A shield matching that description will appear onscreen; you can save it to disk in SVG format by clicking on 'Save to file'.

DrawShield is easy to use, but it has some drawbacks in relation to Coast of Arms Design Studio. First, although it will usually work with simple coats of arms, it's not difficult to find a blazon that it can't interpret. Second, the blazon defines the essential features, but allows for a degree of artistic choice. DrawShield provides no flexibility in terms of customising elements.







## iolo System Mechanic Pro 11.5

## ONLINE REGISTRATION REQUIRED

## FULL PROGRAM (SIX-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

Installation details
Go to My Computer.
Right-click the disc
icon and open the
disc. Select Files
217\iolo System
Mechanic Pro 11.5
and open the file

Online registration required: follow the links during installation before 3 July 2013

**System requirements** Windows XP/Vista/7; 256MB RAM; 120MB drive space; internet connection

System Mechanic is an all-in-one computer maintenance and repair program that combines System Mechanic's superior performancetuning capabilities with lab-certified protection against viruses and spyware. This all-inclusive suite incorporates a combination of essential tools to keep your PC running fast and error-free, permanently rid your system of viruses and spyware, safeguard and recover your important files and photos should disaster strike, and securely wipe sensitive data from your hard drive.

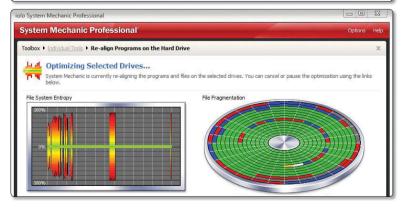
Consistently recognised by leading experts and independent labs as the most effective performance-boosting program of its kind, System Mechanic offers an all-inclusive solution to the myriad problem sources that result in PC slowdowns, crashes, freezes and infections. Its unique approach to computer care makes System Mechanic the ultimate all-in-one PC insurance policy.

### **Features**

- Program Accelerator supercharges program performance
- ActiveCare keeps PCs running like new
- AcceleWrite speeds PCs by optimising file-storage activity
- CRUDD Remover eliminates the root cause of system drag
- Internet Connection Repair puts you back in the virtual fast lane
- AntiVirus and AntiSpyware disinfect and protect your PC ☒







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## Abelssoft CloudClippy 2013

## **FULL PROGRAM**



Installation details
Go to My Computer.
Right-click the disc
icon and open the
disc. Select Files
217\Abelssoft
CloudClippy 2013
and open the file

Online registration required: follow the links during installation before 3 July 2013

**System requirements**Windows XP/Vista/7/8;
50MB drive space;
internet connection;
Microsoft .Net 4.0

Framework

Extend your Windows clipboard with CloudClippy! By synchronising your clipboard between PCs, it offers the easiest way to transfer files, photos and documents from one PC to another. You can also quickly share with your friends photos and other documents stored on the clipboard.

Share immediately: With a single click CloudClippy creates a private link that you can share with friends.

Photo recognition: CloudClippy automatically recognises pictures, which you can view online via links.

Storage saver: Multiple files in the clipboard will be automatically packed in a zip archive prior to data transfer.

Clipboard 2.0: CloudClippy recognises and allows you to load



from the clipboard elements such as documents, photos and files.

Start anonym: CloudClippy creates an anonym account with a limited amount of storage space (25MB) and upload allowance (200MB), so you

don't even need to register. However, registration is easy and lets you benefit from more storage space (150MB per file) and larger uploads (500MB). Up to 20 files can be saved, and each file can be downloaded up to 500 times.

## 1-abc.net Password Organizer 6.0

## **FULL PROGRAM**



Installation details
Go to My Computer.
Right-click the disc
icon and open the
disc. Select Files
217\1-abc.net Password
Organizer 6.0
and open the file

Online registration required: head to tinyurl.com/cbcdosj before 3 July 2013

**System requirements** Windows XP/Vista/7/8

You probably have several different passwords to remember, for everything from your instantmessaging and email clients to online banking. 1-abc.net Password Organizer helpfully stores your passwords and login data, so you need to remember only a single master password.

Password Organizer also takes the hard work out of creating secure passwords, allowing you to generate on demand passwords that no-one could guess.

Many useful features within the program allow faster access to your password data. For example, with a single click you can launch and log into your favourite programs, or fire up a browser and sign into websites. You can also take advantage of global hotkeys to avoid having to copy and paste login data from Password Organizer each time you



need it. Plus you can export or print out all your password data.

AES encryption prevents anyone from accessing your logins without knowing your master password.

1-abc.net Password Organizer allows you to generate multiple secure passwords and remember only one, leaving you free to concentrate on the important things in life.

## The Cover disc is free with print issues of *PC Advisor* magazine, available in all good newsagents

## East-tec Eraser 2013



## FULL PROGRAM (THREE-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

## Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 217\East-tec Eraser 2013 and open the file

Online registration required: follow the links during installation before 3 July 2013

System requirements

300MHz processor; Windows XP/Vista/7/8; 256MB RAM; 50MB drive space Leaving behind precious data on a retired computer, be it a personal or work machine, can pose a serious security risk. If that PC is passed on without the data being securely erased, it isn't difficult for someone with only a little tech-savvy to restore your files. Even if you aren't getting rid of the PC, masses of unwanted files can contribute to sluggish system performance.

Eraser 2013 offers advanced data erasure, and can greatly improve data security and PC performance. Using algorithms that meet and exceed government- and industry standards, Eraser guarantees the permanent erasure of any data you no longer need.



## Ashampoo Home Designer Pro

FULL PROGRAM AVAILABLE ONLY ON THE DISC+



## Installation details

Download Ashampoo Home Designer Pro from tinyurl.com/ homedesigner

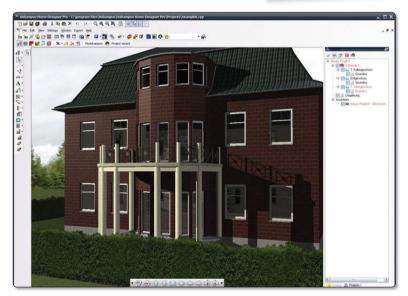
Online registration required: follow the links during installation before 3 July 2013

**System requirements** 

Windows XP/Vista/7/8; 50MB drive space; internet connection; Microsoft .Net 4.0 Framework Ashampoo Home Designer Pro is 3D planning software with which you can plan and furnish a room, flat or even a whole house. A wide range of elements, including large catalogues of objects, materials and textures, is available for your project.

Using this software you can design your dream home and surrounding grounds. You can realistically shape the terrain, and add a terrace, paths or flower beds.

2D and 3D views allow you to view your home as an exact ground plan or as the finished build would look. You can print or save your project in various formats and, if you already use Home Designer, import or edit a previous project.



## **DISC INSTRUCTIONS**

Place disc in drive. Open the file 'Click here to begin.pdf' for extra information.

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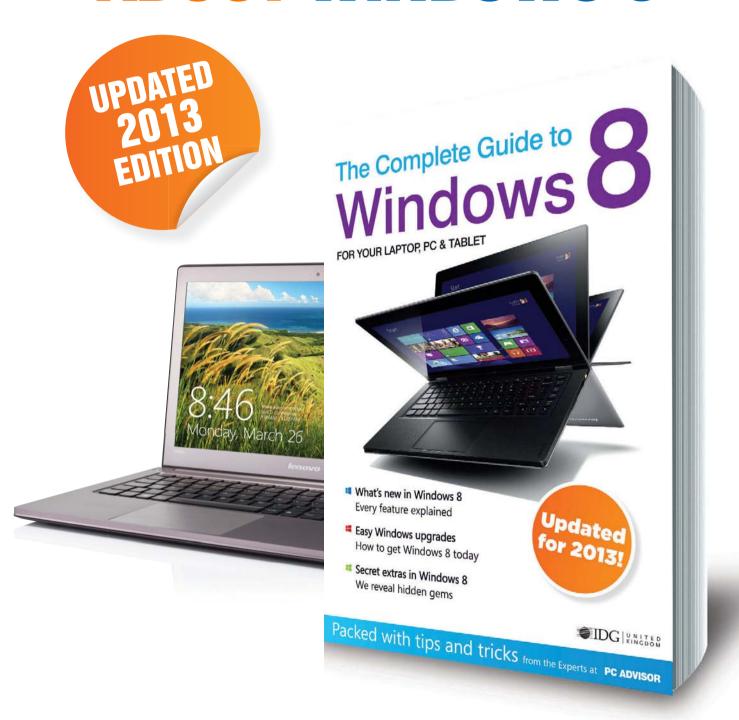
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## **ALL YOU NEED TO KNOW ABOUT WINDOWS 8**









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**Graphics cards** Graphics cards under £150 £151 and over

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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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Ultraportable laptops	PC ADVISOR SOLD	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	PC ADVISOR BESTBUY	5
	Apple MacBook Air 13in	Apple MacBook Pro 13in Retina	Samsung 900X4C	Apple MacBook Air 11in	Acer Aspire S7-391
Price	£1200 inc VAT	£1,449 inc VAT	£850 inc VAT	£849 inc VAT	£1,500 inc VAT
Website	Apple.com/uk	Apple.com/uk	Samsung.com/uk	Apple.com/uk	Acer.co.uk
Build rating	***	****	***	***	***
Features rating	***	***	***	***	****
Performance rating	****	***	***	***	****
Value rating	***	***	***	***	***
Overall rating	***	***	***	***	***
Processor	1.8GHz Intel Core i5-3427U	2.6GHz Intel Core i5-3230M	1.7GHz Intel Core i5-3317U	1.7GHz Intel Core i5-3317U	1.9GHz Intel Core i7-3517U
RAM	4GB DDR3L	8GB DDR3L	8GB DDR3	4GB DDR3L	4GB DDR3
Storage	256GB SSD	256GB SSD	128GB SSD	64GB SSD	256GB SSD
Screen size	13.3in gloss (anti-glare)	13.3in gloss (anti-glare)	15in matt	11.6in gloss	13.3in glossy touchscreen
Screen resolution	1440x900	2560x1600	1600x900	1366x768	1920x1080
Graphics	Intel HD Graphics 4000	Intel HD Graphics 4000	Intel HD Graphics 4000	Intel HD Graphics 4000	Intel HD Graphics 4000
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n
Ethernet	Via adaptor only	Gigabit with adaptor	Gigabit	Via adaptor only	N/A
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0	2x USB 3.0
FireWire	×	×	×	×	×
Thunderbolt	✓	√ (2)	×	✓	×
DisplayPort	✓	✓	×	✓	×
HDMI	×	✓	✓ (Micro HDMI)	×	✓
DVI	×	×	×	×	×
VGA	×	×	×	×	×
eSATA	×	×	×	×	×
Media card slot	✓	✓	✓	×	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam, multitouch trackpad, backlit keyboard	HD webcam, multitouch trackpad, backlit keyboard	Webcam	HD webcam, multitouch trackpad, backlit keyboard	HD webcam
Operating system	Mac OS X 10.8 Mountain Lion	Mac OS X 10.8 Mountain Lion	Windows 7 Home Prem 64bit	Mac OS X 10.8 Mountain Lion	Windows 8 64bit
Bundled software	iLife 11	iLife 11	Samsung Recovery Solution	iLife 11	None
Fear (Max detail)	29fps	29fps	28	28fps	Not tested
Battery	50Wh lithium-ion	74Wh lithium-ion	62Wh lithium-ion	35Wh lithium-ion	35Wh lithium-ion
Battery life	8 hrs 20 mins	8 hrs 44 mins	8 hrs 3 mins	6 hrs 10 mins	4 hrs 20 mins
WB 6/PC Mark 7 score	132/4,497	Not tested/4,596	125/not tested	129/not tested	Not tested/5,038
Dimensions	325x227x4-17.5mm	313x219x19mm	375x237x15mm	300x192x3-17mm	323x224x12.5mm
Weight	1.34kg	1.64kg	1.67kg	1.07kg	1.3kg
Warranty	1-year return-to-base	1-year return-to-base	1-year return-to-base	1-year return-to-base	1-year return-to-base
Verdict	Now £50 cheaper     Decent turn of speed     Stunning battery life     Nice 256GB SSD     Ultra quiet	Big price cut and slightly more speed     Strong performance     Fantastic battery life     Limited future expansion	Sleek and stylish     Good matt screen     Comparatively fast     Great battery life     Lots of memory	Reasonable price tag     Very light and compact     Strong performance for size     Good graphics     Great build quality	Incredibly thin at 12.5mm     Well-built and sturdy     Fast performance     Large keyboard, touchpad     Battery life not the best
FULL REVIEW	TINYURL.COM/8C7LYCO	TINYURL.COM/BQBSHQC	TINYURL.COM/6VZ5TOG	TINYURL.COM/CCPOANM	TINYURL.COM/CNLW3DF



## Ultraportable laptops

Apple's MacBook Air sets the standard for thin-and-light laptops, which are usually referred to as Ultrabooks or ultraportable laptops.

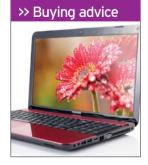
Most run fast and silent SSDs for storage, which can partly explain their higher retail price, but some manufacturers are now fitting slim 7mm hard disks. All Ultrabooks run Intel CPUs (AMD variants are known as Sleekbooks), often a low-power version identifiable by its U suffix. The 1.7GHz Intel Core i5-3317U is a popular example.

Beware of cheap glossy panels with poor contrast and colour gamut and, if possible, judge in person the screen quality and viewing angles before you buy. Ports are limited due to space constraints, but look for built-in ethernet or dongles that allow full-size ports to be connected.

A smaller chassis means a smaller, often non-removable battery. Expect six-plus hours of life.

There's no room for an optical drive, but you can always connect an external USB version.
READ MORE: TINYURL.COM/CEAHEZK

Sub-£500 laptops	PC ADVISOR RECOMMENDED Toshiba Satellite L850D-12Q	2	3	Asus X501A	5
Price	£350 inc VAT	Acer Aspire V3-571 £450 inc VAT	Lenovo G580 £400 inc VAT	£340 inc VAT	Acer Aspire V5-571 £450 inc VAT
Website	Toshiba.co.uk	Acer.co.uk	Saveonlaptops.co.uk	Uk.asus.com	Acer.co.uk
Build rating	10SIIIDd.CO.dk	Acelico.uk	Saveoniaptops.co.uk	****	***
Features rating					
Performance rating		****		***	
Value rating	****				
Overall rating		<del>***</del>			
Processor	1.7GHz AMD E2-1800	2.5GHz Intel Core i5-3210M	2.4GHz Intel Core i3-3110M	2.2GHz Intel Core i3-2328M	2.3GHz Intel Core i3-2365M
RAM	6GB DDR3	8GB DDR3	6GB DDR3	4GB DDR3	8GB DDR3
Storage	750GB HDD	750GB hard drive	1TB HDD	320GB HDD	750GB hard drive
Screen size	15.6in gloss	15.6in gloss	15.6in gloss	15.6in gloss	15.6in
Screen resolution	1366x768	1366x768	1366x768	1366x768	1366x768 pixels
Graphics	AMD Radeon HD 7340	Intel HD Graphics 3000	Intel HD Graphics 4000	Intel HD Graphics 3000	Intel HD Graphics 3000
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	10/100	Gigabit	10/100	Gigabit	x
Bluetooth	✓	✓	✓	×	✓
USB	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 2x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	×	×	×
DisplayPort	×	×	×	×	×
HDMI	✓	✓	✓	✓	✓
DVI	×	×	×	×	×
VGA	✓	✓	✓	✓	✓
eSATA	×	×	×	×	×
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	8x DVD±RW	8x DVD±RW	8x DVD±RW	N/A	8x DVD±RW
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Windows 8 64bit	Windows 7 Home Prem 64bit	Windows 8 64bit	Windows 8 64bit	Windows 7 Home Prem 64bit
Bundled software	Nero 12 Essentials	Microsoft Office Starter	N/A	McAfee Security trial	None
Stalker (Low/High)	17/13fps	Not tested	37/24fps	10/17fps	Not tested
Battery	48Wh lithium-ion	48Wh lithium-ion	48Wh lithium-ion	47Wh lithium-ion	37Wh lithium-ion
Battery life	3 hrs 45 mins	5 hrs 18 mins	4 hrs 0 mins	4 hrs 35 mins	5 hrs 2 mins
PCMark7 score	1,265	123 WorldBench 6 points	2,614	1,389	Not tested
Dimensions	380x242x33.5mm	380x253x33mm	375x240x36mm	380x253x35mm	382x253x21-23mm
Weight	2.35kg	2.6kg	2.4kg	2.1kg	2.3kg
Warranty	1-year return-to-base	1 year collect-and-return	1-year return-to-base	1-year return-to-base	1-year collect-and-return
Verdict	Very low price     Bright and clear screen     Quality trackpad, keyboard     Lacks performance     A little heavy	Strong general performance     Not much gaming potential     Excellent trackpad, keyboard     Reflective screen     Decent battery life	Decent performance     Screen very glossy and has narrow viewing angles     Irritating touchpad     Rather weighty	Low price     Decent build quality     Surprisingly good speakers     Very poor for gaming     No optical drive	Hard drive now 750GB     8GB of RAM     No ethernet     Onboard graphics     Decent battery life
FULL REVIEW	TINYURL.COM/AXNXBB4	TINYURL.COM/CQKL4PD	TINYURL.COM/A786DEY	TINYURL.COM/B7YOHCJ	TINYURL.COM/CABAX8Z



## Sub-£500 laptops

Budget laptops are quick enough for most people, but economies are often made in build quality.

At the top end of the category you should find a highly capable Intel Core i-series processor. This will probably be a second-gen Sandy Bridge chip (ix-2xxx part number), but look out for a newer Ivy Bridge model (ix-3xxx).

Windows 7 and 8 run on 2GB of RAM, but 4GB or more is useful.

Hard disks are the norm at this price, with 250GB enough for most people. If you're a video hoarder look for 500GB or more.

Wi-Fi is standard, but Bluetooth is not a given at the price.

The bodywork and display are the main areas in which costs are cut. Expect creaky plastic bodies, bendy frames and faux-metal paint jobs. Keyboards and trackpads are also likely to feel cheap and erratic.

Gloss screens hide inferior image quality. Colours are vivid, but the contrast may be poor. Check the visibility at an angle.

Some laptop manufacturers scrimp on the battery. Look for a rating of 48Wh or more.
READ MORE: TINYURL.COM/CA9EXZ6

£501-£1,000 laptops		2	3	windows 7	5
	Chillblast Genesis Mini	PC Specialist Optimus IV	Toshiba Satellite P845t-101	Toshiba Tecra R940-1JG	Asus VivoBook S400E
Price	£699 inc VAT	£968 inc VAT	£749 inc VAT	£720 inc VAT	£700 inc VAT
Website	Chillblast.com	Pcspecialist.co.uk	Toshiba.co.uk	Toshiba.co.uk	Uk.asus.com
Build rating	***	***	***	***	****
Features rating	***	****	****	***	****
Performance rating	***	***	***	***	***
Value rating	***	***	***	***	***
Overall rating	***	****	***	***	***
Processor	2.6GHz Intel Core i5-3230M	2.4GHz Intel Core i7-3630QM	1.7GHz Intel Core i5-3317U	2.6GHz Intel Core i5-3230M	1.9GHz Intel Core i7-3517U
RAM	8GB DDR3	8GB DDR3	6GB DDR3	4GB DDR3	4GB DDR3
Storage	1TB hard drive hybrid	1TB hard drive + 120GB SSD	640GB hard drive	320GB hard drive	500GB hard drive
Screen size	11.6in matt	17.3in matt	14in gloss touchscreen	13.3in matt	14.1in gloss touchscreen
Screen resolution	1366x768 pixels	1920x1080 pixels	1366x768 pixels	1366x768 pixels	1366x768 pixels
Graphics	GT 650M/Intel HD 4000	GTX 660M, Intel HD 4000	Intel HD Graphics 4000	Intel HD Graphics 4000	Intel HM70 Express
Video memory	2GB	2GB (660M)	N/A	N/A	N/A
Wireless	802.11a/b/g/n	802.11b/g/n	802.11b/g/n	802.11a/b/g/n	802.11b/g/n
Ethernet	Gigabit	Gigabit	10/100	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0, 1x USB 2.0	3x USB 3.0, 1x USB 2.0	3x USB 3.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	×	×	×
DisplayPort	×	×	×	✓	×
HDMI	✓	✓	✓	✓	✓
DVI	×	×	×	×	×
VGA	✓	✓	✓	✓	✓
eSATA	×	✓	✓	✓	×
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Speakers, mic
Optical drive	N/A	4x BD-ROM	8x DVD±RW	None	None
Extras	Webcam	Webcam	Webcam	Intel WiDi	Webcam
Operating system	Windows 8 64bit	Windows 8 Standard 64bit	Windows 8 64bit	Windows 7 Pro or 8 Pro	Windows 8 Pro 64bit
Bundled software	None	None	None	None	None
Fear (Max detail)	Not tested	Not tested	Not tested	Not tested	22fps
Battery	48Wh lithium-ion	76.9Wh lithium-ion	48Wh lithium-ion	66Wh lithium-ion	44Wh lithium-ion
Battery life	4 hrs 45 mins	2 hrs 55 mins	4 hrs	5 hrs 30 mins	3 hrs 27 mins
PCMark 7 score	4557	4,572	2648	2898	Not tested (2,928 PCMark 7)
Dimensions	287x207x37mm	405x270x50mm	349x234x24mm	341x239x27.4mm	339x239x21mm
Weight	1.8kg	3.3kg	2.2kg	2kg	1.9kg
Warranty	2-year collect-and-return	3-year RTB (1-year parts)	1-year return-to-base	1-year return-to-base	2 year International
Verdict	Not quite an Ultrabook Small but good-quality screen Decent gaming speed Hybrid HDD/SSD No optical drive	Excellent performance despite the price hike     Massive 17.3in screen     Blu-ray drive     Battery life not great	Large touchscreen Lacking power Decent battery life Strong speakers Slow hard drive	Hybrid ultraportable and desktop replacement     Decent performance     WiDi technology     Trackpad a little fiddly	Almost an ultraportable     Poor battery life     Trackpad and keyboard     not the best     No optical drive
FULL REVIEW	TINYURL.COM/C8E6MTK	TINYURL.COM/ABQB6QP	TINYURL.COM/C6MN5LU	TINYURL.COM/D2L6WHK	TINYURL.COM/CZHXTYM

## >> Buying advice

## £501-£1,000 laptops

If you're prepared to pay more than £500, you can get a laptop with a better selection of internal components, a higher-quality build, and faster performance.

Most laptops at this price have 15.6in widescreen displays, but beware of budget panels with a coarse resolution - 1366x768 pixels is wide, but creates fuzzy text and images. Look for anti-glare matt panels over glossy screens.

Intel introduced its third-gen Core chips in 2012, aka Ivy Bridge, which offer integrated GPUs capable of half-decent gameplay. You'll also find 2011's Sandy Bridge chips, identifiable by a leading 2 rather than 3 on the part number.

Battery life can stretch to six hours, but don't take it as a given.

Expect at least one USB 3.0 port, which allows for faster data transfer with compatible peripherals. Gigabit ethernet is now standard, and you may find even faster ports such as eSATA or Thunderbolt at this price.

Look for 4GB of RAM, and an SSD if you don't mind offloading media files to external storage.
READ MORE: TINYURL.COM/BUHSEAR





## £1,001+ laptops

Invest £1,000 or more in a laptop, and you can be reasonably sure of getting a high-quality PC.

Sometimes that money will be spent on getting a thin-and-light laptop, with good performance to boot. Alternatively, you may prefer a rugged laptop that's able to withstand wear and tear on the road, or a performance-first

high-powered workstation. Whatever your need, accept no compromises in build quality.

The best laptops should offer very good screens. Beware of glossy shiny panels that allow distracting reflections in certain lighting conditions.

Ultraportables may have 256GB or more of solid-state storage, but won't have an optical drive or GPU.

Workstation laptops will have faster - often quad-core - CPUs and a mobile graphics processor.

Rugged laptops are engineered for strength, at the expense of light weight and sleek design. Look out for milspec standard ratings, such as MIL-STD-810G.

You'll find a wide range of ports, high-grade components and extras. READ MORE: TINYURL.COM/CC3KBMM







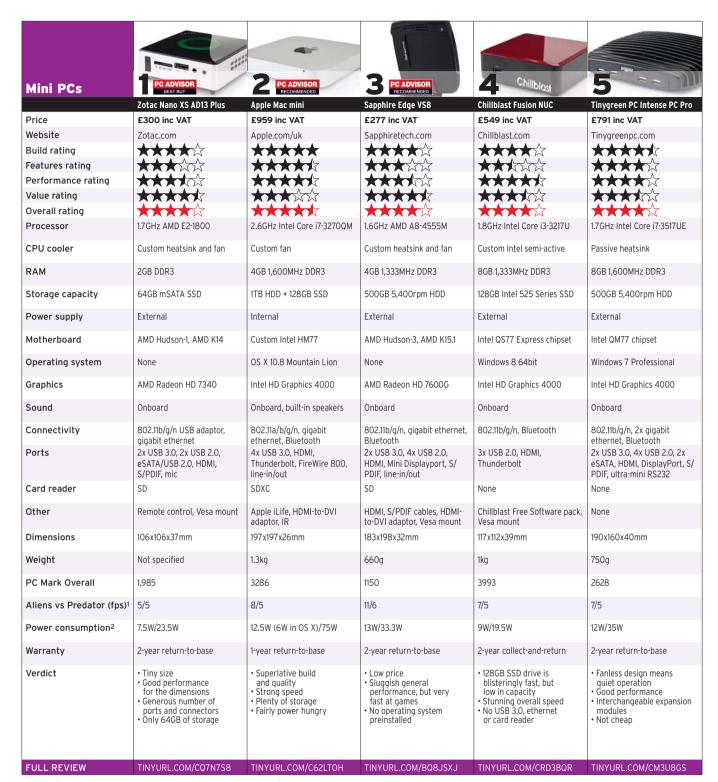
## **Tablets**

Tablet PCs combine the mobility and connectivity of a smartphone with a larger screen and more powerful processor. Rather than struggle with Windows, they run a lightweight, touch-focused OS.

You have two main choices: a tablet running iOS or Android. iOS is slick, supremely easy to use, and has a library of hundreds of thousands of apps. But the iPad is expensive, it doesn't support memory cards, and the whole system is locked down.

Android tablets are available at lower prices. Many have ports for adding storage and connecting devices, and plenty of apps are available via Google Play although Google doesn't vet them. Look for a dual-core processor for smooth operation and good multi-tasking. Opt for a capacitive rather than resistive touchscreen if possible, and consider a smaller screen to minimise weight.

3G tablets are available on subsidised tariffs, but it's usually cheaper to buy them outright. READ MORE: TINYURL.COM/TYGVB06



 $^{1}$  Alien Vs Predator tested at 720p and 1080p, High Quality respectively  $^{2}$ Measured when idle and under load respectively



## Mini PCs

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Mini PCs look good, fit into the smallest of spaces, and usually offer cooler, quieter operation and lower power consumption than their desktop counterparts. However, there are a few down sides. For example, a mini PC doesn't have enough internal space for a discrete graphics card or a desktop (3.5in) hard drive. All other upgrades and expansion will usually be achieved externally.

With this in mind, pay particular attention to the connectivity options. If you want to hook up external storage, look for USB 3.0

ports. For connecting the PC to a standard LCD monitor you can use HDMI. If you have an external music system with digital inputs you may also want an S/PDIF connector on your mini PC.

Mini PCs typically ship without a keyboard or mouse, and often come without an OS. Remember to factor in the cost of these items. READ MORE: TINYURL.COM/D29YONN

All-in-one PCs	PC ADVISOR BEST BUY	PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4	5
	Dell XPS One 27 Touch	Apple iMac 27in 3.4GHz	Apple iMac 21.5in 2.7GHz	Toshiba LX830-12W	Acer Aspire 5600U
Price	£1,679 inc VAT	£2.179 inc VAT	£1,099 inc VAT	£800 inc VAT	£870 inc VAT
Website	Dell.co.uk	Apple.com/uk	Apple.com/uk	Toshiba.co.uk	Acer.co.uk
Build rating	***	****	****	***	***
Features rating					
Performance rating					
Value rating					
Overall rating	XXXX	****			
Processor	3.1GHz Intel Core i7-3770S	3.4GHz Intel Core i7-3770	2.7GHz Intel Core i5-3335S	2.5GHz Intel Core i3-3210M	2.4GHz Intel Core i3-3110M
RAM	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3	4GB DDR3
Storage capacity	2TB HDD + 32GB SSD	1TB HDD (integrated SSD)	1TB HDD	1TB HDD	500GB HDD
Screen	27in IPS touchscreen	27in IPS	21.5in IPS	23in IPS touchscreen	23in IPS touchscreen
Screen resolution	2560x1440	2560x1440	1920x1080	1920x1080	1920x1080
Graphics card	nVidia GeForce GT 640M	nVidia GeForce GTX 680MX	nVidia GeForce GT 640M	Intel HD Graphics 4000	nVidia GeForce GT 630M
Video memory	2GB	2GB	512MB	n/a	1GB
Wireless	802.11b/g/n	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	√	√	✓ (10/100)	√	√
Bluetooth	✓	√	√ (10/100)	√ ·	✓
USB	6x USB 3.0	4x USB 3.0	4x USB 3.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 1x USB 2.0
FireWire	x	×	x	x	x
Thunderbolt	*	√ (x2)	√ ·	×	×
HDMI	<i>√</i>	×	×	 ✓	<i>√</i>
Media card slot	· ✓	<i>-</i>	<i>-</i>	·   ✓	· ✓
Max disc speeds	BD-ROM/DVD±RW	None	None	DVD±R	DVD±R
Max disc speeds	BD ROW/DVD I RW	None	Notice	DVD±N	DVDIN
Extras	2Mp webcam, wireless keyboard/mouse, speakers	1.3Mp webcam, wireless keyboard/mouse	1.3Mp webcam, wireless keyboard/mouse	1Mp webcam, wireless keyboard/mouse	2Mp webcam, wireless keyboard/mouse
Operating system	Windows 8 64bit	OS X 10.8 Mountain Lion	OS X 10.8 Mountain Lion	Windows 8 64bit	Windows 8 64bit
Power consumption	79W (idle), 138W (load)	77W (idle), 132W (load)	40W (idle), 69W (load)	36W (idle), 57W (load)	42W (idle), 56W (load)
Aliens Vs Predator 720p	15fps	44fps	11fps	5fps	8fps
Aliens Vs Predator 1080p	28fps	81fps	22fps	8fps	15fps
PCMark 7 score	5,876	4,114	3,100	3,351	2,413
Dimensions	491x71x664mm	650x203x516mm	450x528x175mm	566x52x415mm	574x43x422mm
Weight	15.9kg	9.5kg	5.7kg	7kg	9.2kg
Warranty	1-year next-day in-home	1-year return-to-base	1-year return-to-base	1-year UK pickup & return	1-year return-to-base
Verdict	Superb build quality     Stunning 27in IPS display     Nice graphics adaptor     Rather large and heavy	Gorgeous screen     Great gaming power     No optical drive     or touchscreen     Not a cheap configuration	Build quality hard to beat     Excellent screen, even if     only 21.5in     Not the largest of     all-in-ones     No optical drive     or touchscreen	Decent overall performance     Poor for gaming     Built-in TV tuner     WMC remote, but no WMC	Competitive price     Rather sluggish     performance     Average specifications     Plenty of preinstalled     software
FULL REVIEW	TINYURL.COM/CQW5ZY9	TINYURL.COM/D2GD77D	TINYURL.COM/BK83EB8	TINYURL.COM/CKH5J9L	TINYURL.COM/CG5F5HY



## All-in-one PCs

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

All-in-one PCs build into a large (21- to 27in) monitor all the components they require to run, making them an excellent and stylish solution for saving space.

However, with limited internal space for cooling, all-in-one machines tend to include less powerful components than traditional desktops. Expect to find integrated or laptop graphics processors and mobile CPUs inside.

All-in-ones aren't usually easy to upgrade, but many are pre-packed with Wi-Fi, Bluetooth, speakers and even Blu-ray players. Touchscreen displays are likely to become more desirable once Windows 8 is released. If you buy one now, ensure the image quality hasn't been compromised and that it's sufficiently responsive to touch.

The quality of the supplied keyboard and mouse (usually wireless) is critical. TV tuners and HDMI ports are welcome additions. READ MORE: TINYURL.COM/87VW5KJ

Business PCs	Chillblast Fusion Sapphire	PC Specialist MPC-3470T	Quiet PC Serenity Value	Eclipse eBiz Precision 1322H61	Arbico 15357 Pro
Price	£549 inc VAT	£479 inc VAT	£795 inc VAT	£569 inc VAT	£579 inc VAT
Website	Chillblast.com	Pcspecialist.co.uk	Quietpc.com	Eclipsecomputers.com	Arbico.co.uk
Build rating	<b>*</b>		****	***	***
Features rating					
Performance rating	***	***	***	***	***
Value rating			***	***	***
Overall rating		***		***	
Processor	3.4GHz Intel Core i5-3570K	2.9GHz Intel Core i5-3470T	3.4GHz Intel Core i5-3570K	3.3GHz Intel Core i3-3220	3.4GHz Intel Core i5-3570K
RAM	8GB DDR3	8GB DDR3	8GB DDR3	16GB DDR3	8GB DDR3
Storage capacity	1TB HDD	1TB HDD	1TB HDD	1TB HDD + 120GB SSD	1TB HDD + 60GB SSD
Motherboard	Asus P8B75-M LX	Asus P8H61-I R2.0	Gigabyte GA-Z77-D3H	Asus P8H61-MX/USB3	Asus P8B75-M LX Plus
CPU cooler	Standard Intel cooler	Standard Intel cooler	Gelid Tranquillo	Standard Intel cooler	Xigmatek Apache
Power supply	EzCool 500W	Power Man 160W	Nexus NX-5000 R3 530W	Generic 500W	Ace 650W
Screen	23.6in Iiyama X2377HDS	N/A	N/A	23.6in Edge10 EF240A	N/A
Screen resolution	1920x1080 pixels	N/A	N/A	1920x1080	N/A
Graphics	Intel HD Graphics 4000	Intel HD Graphics 2500	Intel HD Graphics 4000	Intel HD Graphics 2500	Intel HD Graphics 4000
Video memory	N/A	N/A	N/A	N/A	N/A
USB	3x USB 3.0, 7x USB 2.0	2x USB 3.0, 7x USB 2.0	5x USB 3.0, 7x USB 2.0	3x USB 3.0, 5x USB 2.0	2x USB 3.0, 6x USB 2.0
Sound	Onboard	Onboard	Onboard	Onboard	N/A
Speakers	Built into monitor	N/A	N/A	Built into monitor	N/A
Case	CiT Fortress	In-Win BM643	Nexus Thrio 310	NA-705B	CiT Templar Micro ATX
Keyboard	Logitech MK260 (wireless combo)	Microsoft Comfort Curve 3000, Logitech USB mouse	Gigabyte GK-KM6150 (wired combo)	Microsoft Optical Desktop 400 (wired)	Logitech MK120 (wired combo)
Optical drive	24x DVD±RW	8x DVD±RW	24x DVD±RW	24x DVD ± RW	24x DVD±RW
Operating system	Windows 8 Professional	Windows 8 Professional	Windows 8 Professional	Windows 8 Professional	Windows 8 Professional
Bundled software	Family software pack	PowerDVD, card reader	None	None	None
PCMark7 overall score	4,217	3,419	3,713	4,170	6,037
Power consumption	36W idle/84W load	27W idle/53W load	31W idle/105W load	43W idle/69W load	41W idle/108W load
Warranty	2-year collect-and-return	3-year labour, 1-year parts	2-year collect-and-return	1-year RTB	2-year RTB (1-year parts)
Verdict	Competitive price     Strong performance     Excellent 23.6in IPS screen     Case could be more understated	Small-form-factor     Conservative on power     Not as fast as the more powerful models here     Cramped internals make it difficult to upgrade	Rather expensive     Very quiet operation     Good all-round performance     Lack of SSD affects     performance in our     benchmarks	Modest processor     16GB of RAM generous, but wasted     Screen of only average quality     Messy internals	Not the cheapest Price doesn't include a monitor Powerful processor probably not necessary for office use SSD could be of larger capacity
FULL REVIEW	TINYURL.COM/CX5T8X5	TINYURL.COM/ADM2BEJ	TINYURL.COM/9WP5SSS	TINYURL.COM/ABFZOA3	TINYURL.COM/COQEWFX



## **Business PCs**

Changes in exchange rates and component supply issues mean we can't guarantee PCs listed here will be available as specified. All our prices include delivery charges.

Provided you have sufficient RAM (at least 2GB, but preferably 4GB), any modern CPU will provide enough power for low-level admin tasks. Intel's Core i3 provides ample performance for general use and come with integrated graphics, saving you the cost of buying an additional card.

In a typical networked business environment there will be storage available on the LAN, so you're unlikely to need a large hard drive. A 500GB drive should be ample.

Wireless keyboards and mice can cause issues in the workplace

due to interference between adjacent workstations. A decent wired kit is ideal, while quiet-typing keyboards can be less distracting.

For small businesses with just one or two PCs, Windows 7 Home Premium is cheaper but can't connect to servers. The Pro edition is a better option for businesses, especially if you need compatibility with older software.

Family PCs	PC ADVISOR BEST BUY	2	PC ADVISOR RECOMMENDED		5
	Chillblast Fusion Lynx	Wired2Fire Diablo Predator	CyberPower Ultra Scylla SE (MKII)	PC Specialist Vanquish HD-660	Eclipse Solar i5357N66Ti
Price	£799 inc VAT	£899 inc VAT	£699 inc VAT	£899 inc VAT	£929 inc VAT
Website	Chillblast.com	Wired2fire.co.uk	Cyberpowersystem.co.uk	Pcspecialist.co.uk	Eclipsecomputers.com
Build rating	****	***	***	***	****
Features rating	****	****	***	****	***
Performance rating	****	****	******	****	****
Value rating	****	****	****	***	***
Overall rating	****	****	****	****	****
Processor	3.4GHz Intel Core i5-3570K	3.4GHz Intel Core i5-3570K	4.2GHz AMD FX-4170	3.4GHz Intel Core i5-3570	3.4GHz Intel Core i5-3570
RAM	16GB DDR3	8GB DDR3	16GB DDR3	8GB DDR3	16GB DDR3
Storage capacity	120GB SSD + 1TB HDD	120GB SSD + 1TB HDD	2TB HDD	120GB SSD + 1TB HDD	64GB SSD + 2TB HDD
Motherboard	Asus P8B75-M LX	Asus P8Z77-V LX	Gigabyte GA-78LMT-USB3	Asus P8H77-M	Asus P8Z77-V LX
CPU cooler	Standard Intel cooler	Xigmatek Achilles CPU cooler	Standard AMD cooler	Standard Intel cooler	Standard Intel cooler
Power supply	700W Chillblast	600W Corsair CX600	500W Cooler Master	450W FSP Dual Rail	650W EZCool
Screen	23in Iiyama X2377	23in AOC i2352VH	24in Edge10 EF240A	23in AOC i2352VH	23.6in Acer G236HLBbd
Screen resolution	1920x1080 pixels	1920x1080	1980x1080	1920x1080	1920x1080
Graphics card	XFX AMD Radeon HD 7770	nVidia GeForce GTX 660	MSI AMD Radeon HD 7770	Palit nVidia GeForce GTX 660	nVidia GeForce GTX 660 Ti
Video memory	1GB	2GB	1GB	2GB	2GB
Wireless	802.11b/g/n	N/A	802.11b/g/n	802.11b/g/n	N/A
USB	1x USB 3.0, 1x USB 2.0	3x USB 3.0, 6x USB 2.0	2x USB 3.0, 6x USB 2.0	2x USB 3.0, 6x USB 2.0	3x USB 3.0, 6x USB 2.0
Media card slot	×	×	×	×	×
Sound card	Onboard	Onboard	Onboard	Onboard	Onboard
Speakers	2x Logitech LS220	None	2x Logitech LS220	2x Logitech LS220	None
Case	Cooler Master Silencio 450	Xigmatek Asgard Pro	Cooler Master Elite 430	Cooler Master Elite 311	Cooler Master K350
Keyboard	Logitech MK260 wireless combo	Octigen JK-745, Logitech B110 wired keyboard and mouse	Logitech MK320 wireless combo	Logitech MK260 wireless combo	Microsoft Desktop 600 wired combo
Optical drive	Lite-On BD-ROM, Samsung 24x DVD ±RW	LG BD-ROM/DVD ± RW combo drive	Pioneer BD-ROM/DVD±RW combo drive	LG BD-ROM/DVD±RW combo drive	Lite-On BD-ROM/DVD±RW combo drive
Operating system	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit	Windows 8 64bit
Bundled software	CyberLink PowerDVD 10	None	None	CyberLink PowerDVD 10	None
Sniper (Med/High)	41/9fps	Not tested	43/9fps	60/15fps	75/18fps
PCMark 7	5311	6376	2842	5768	5058
Warranty	2-year collect-and-return	2-year RTB	3-year RTB (1-year parts)	3-year 'Silver'	1-year RTB
Verdict	Hefty 16GB of memory     Lightning-fast storage     Vibrant IPS screen     Noise-damping     material in case	Best overall performance     Strong gaming power     Quality AOC screen     Chillblast offers marginally better value for money	Low price     AMD chip not as fast as the Intel equivalents     No solid-state storage     Well-made casing	Impressive overall performance     Good gaming potential     Strong AOC screen     Not the cheapest	Relatively expensive     Capacious and fast storage     GTX 600 Ti offers great gaming framerates     High noise levels
FULL REVIEW	TINYURL.COM/BX2QODV	TINYURL.COM/AECXMNQ	TINYURL.COM/BYTG8QG	TINYURL.COM/A2VE9NZ	TINYURL.COM/AB2ESOZ



## Family PCs

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A family PC needs to offer decent performance in every area, able to cater for the needs of each individual - but there are some areas where you can cut costs.

If you're not itching to play the latest games, opt for integrated rather than dedicated graphics. AMD processors are more adept in this regard, while Intel CPUs offer faster application performance.

Intel's Core i5-3570K will form the core of a powerful home PC, although the older Core i5-2500K may be offered at lower cost and supports easy overclocking. Consider 4GB of RAM and a 500GB hard drive as the minimum; both are easy to upgrade later.

Screen quality is crucial, with the best displays using IPS tech. A Blu-ray drive will help make the most of a 23.6in full-HD monitor.

For Skyping, watching films and listening to music, decent speakers and a webcam are essential. READ MORE: TINYURL.COM/BL4UREB

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- •16GB PC3-12800 DDR3 Memory
- 120GB Samsung 840 Series SSD

- 1000GB 7200rpm HDD
   Blu Ray ROM / DVD-RW Drive
   Corsair 750W PSU
   Onboard High Definition Audio
- Windows 8 64bit (or Windows 7 64 bit)23" liyama X2377 IPS Monitor,
- Keyboard & mouse

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- \* Chillblast won more qwards in the leading IT press publications PC Pro, PC Advisor and Computer Shopper combined than any other retailer 2010-2012
- \*\* World`s fastest PC based as tested by PC Pro Magazine





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**PC ADVISOR** 





Internet security suites	PROTECT HOU PROTEC	Norton by Symantec INTERNET SECURITY PC ADVISOR RECOMMENDED	INTERNET SECURITY 2013  Bitdefender	PC ADVISOR RECOMMENDED	INTERNET SECURITY 2013 ROLL
	F-Secure IS 2013	Norton IS 2013	Bitdefender IS 2013	Trend Micro Titanium IS 2013	Kaspersky IS 2013
Annual price	£39 inc VAT	£49 inc VAT	£44 inc VAT	£59 inc VAT	£49 inc VAT
Licence terms	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year
Website	F-secure.com	Uk.norton.com	Bitdefender.co.uk	Trendmicro.co.uk	Kaspersky.co.uk
Overall rating	***	***	***	***	***
Signature-based detection	99%	99.8%	98.8%	100%	98.1%
Malware blocking (full)	100%	100%	100%	100%	94.4%
Malware blocking (partial)	0%	0%	0%	0%	0%
Clean-up of malware	90%	60%	90%	80%	80%
On-demand scan speed	76 secs	79 secs	121 secs	110 secs	70 secs
On-access scan speed	230 secs	175 secs	341 secs	341 secs	368 secs
Interface design	Very good	Superior	Very good	Very good	Very good
Verdict	Good value for money     Great scores in most tests     User-friendly interface     Fast scan speed	Real-world attack scores bode well for its efficacy     Consumes few resources     Polished, simple interface	Good value for money     Exceptional in some tests     Can slow startup     MyBitdefender a nice touch	Brilliant performer     Scan times a little low     More guidance required     Expensive	Excellent at cleaning up infections; not so hot on detection     Impacts system speed
FULL REVIEW	TINYURL.COM/CKKPBWF	TINYURL.COM/8U7W6OA	TINYURL.COM/CAFEHS7	TINYURL.COM/CRZZ73Z	TINYURL.COM/BRY3CTZ

GLOSSARY: • IS: Internet Security

Antivirus software	Norton  Pc advisor BEST BUY	PC ADVISOR RECOMMENDED	G Data AntiVirus  PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED	TITANIUM ANTIVIBUS
Annual price	Norton AntiVirus	Bitdefender Antivirus Pro	G Data AntiVirus	Kaspersky Anti-Virus	Trend Micro Titanium AV+
Licence terms	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year	3 PCs, 1 year
Website	Norton.com	Bitdefender.co.uk	Gdatasoftware.com	Kaspersky.co.uk	Uk.trendmicro.com
Overall rating	***	****	****	***	***
Signature-based detection	98.7 percent	97.5 percent	99.4 percent	95.7 percent	98.4 percent
Malware blocking (full)	96 percent	68 percent	84 percent	88 percent	88 percent
Malware blocking (partial)	0 percent	20 percent	4 percent	4 percent	8 percent
Clean-up of active malware	80 percent	80 percent	80 percent	80 percent	80 percent
On-demand scan speed	121 secs	126 secs	111 secs	103 secs	187 secs
On-access scan speed	272 secs	327 secs	336 secs	310 secs	249 secs
Interface design	Very good	Very good	Very good	Very good	Very good
Verdict	Smooth user interface     Large 'Fix Now' button     Moderate impact     on system performance	Very good performance for malware removal     Average scan speeds     Three interface tiers	Strong malware detection, blocking and removal     Good user interface, but poorly translated	Well-designed interface     Easy to use     On-demand single-file scans     Impacts PC performance	Set-it-and-forget-it security     Cloud-based protection     Requires web connection     Good performance
FULL REVIEW	TINYURL.COM/4P5YCXP	TINYURL.COM/66SK77U	TINYURL.COM/6BFXWCS	TINYURL.COM/6HQA2WB	TINYURL.COM/4HUORV3



## Security software

Every connected PC should have at least antivirus, antispyware and a firewall, and it's important that each is kept up to date. Avoid installing more than one real-time scanning component.

We work with world-renowned independent security testing lab AV-Test.org to evaluate the effectiveness of security software.

No security software is foolproof, but some are significantly better than others. And factors such as ease of setup, scan speeds, interface design and ability to deal with new threats set them apart.

The best products will offer parental controls, cloud protection, anti-phishing, anti-rootkit, virtual web browsers and keyboards, link

and file scanners, gaming modes, online backup and more.

The best value is usually offered by a three-user licence, but you can save some cash if your household has only one PC.

There are some good free antivirus products but, as in life, you get what you pay for. READ MORE: TINYURL.COM/7NR8FSM

Sub-£150 printers	PC ADVISOR	2 PC ADVISOR BEST BUY	3	PC ADVISOR RECOMMENDED	5
	Samsung ML-2955DW	Oki C110	Pantum P2050	HP Photosmart 7520	Epson Expression XP-605
Price	£100 inc VAT	£126 inc VAT	£45 inc VAT	£125 inc VAT	£80 inc VAT
Website	Samsung.com/uk	Oki.co.uk	Pantum.com	Hp.com/uk	Epson.co.uk
Overall rating	***	***	***	***	***
Technology	Mono laser	Colour laser	Mono laser	Colour inkjet	Colour inkjet
Max print resolution	1200x1200dpi	1200x600dpi	1200x600dpi	9600x2400dpi	5760x1440dpi
Actual print speed	B=22.2ppm	B=15.8ppm/C=2.5ppm	B=15.8ppm	B=17.6ppm C=7.9ppm	B=11ppm C=4ppm
Scan/fax facilities	none	None	None	1200x2400 scans	1200x2400 scans
Supported interfaces	USB 2.0, 802.11b/g/n, ethernet	USB 2.0	USB 2.0	USB 2.0, 802.11b/g/n, HP ePrint	USB 2.0, 802.11b/g/n
Cost per page	B=2.7p	B=3.6p/C=5p	B=2.4p	B=2.4p/C=4.8p	B=3p C=6p
Media card/auto duplex	×√	××	××	<b>√</b> √	<b>√</b> √
Input capacity	251 sheets	100 sheets	150 sheets + manual	125 sheets + 20 tray + 25 ADF	120 sheets + 20 photo
Dimensions	348x338x197mm	396x380x275mm	380x260x236mm	454x551x220mm	390x341x138mm
Weight	7.2kg	14.4kg	6.1kg	8.6kg	7.1kg
Warranty	1 year	3 years	1 year	1 year	1 year
Verdict	Speedy for the price     Slim but well-defined text     Reasonable running costs     Wi-Fi/wired network support	Good-value colour laser     Performs better than     an equivalent inkjet     No duplex mode	Now available for just £50     Decent design     No fancy features     Solid running costs	Nice 4.3in touchscreen     Separate photo/ADF trays     Good speed for an Inkjet     Competitive running costs	Impressively sharp output     Intuitive 2.5in touchscreen     Numerous features     Auto-duplex a little slow
FULL REVIEW	TINYURL.COM/CCLSZDM	TINYURL.COM/YLNO5RV	TINYURL.COM/C764SZ2	TINYURL.COM/98G9XTE	TINYURL.COM/CZ6TXZS



GLOSSARY: • B: mono • C: colour • ppm: pages per minute



## **Printers**

Most printers are inkjet or laser models, and there are colour and mono flavours of each. Lasers tend to be more expensive to buy, but provide better-quality output, particularly where text is involved.

The price you pay instore is only the beginning; also consider the cost of replenishing the ink and paper. Duplexing lets you print to both sides of a sheet, saving paper but slowing output.

Multifunction printers can save you money if you also require scanning facilities; some models include copy and fax functions, too.

A USB port lets you connect a printer to a single PC, but built-in wireless networking allows it to join a home or office network. A memory card slot will let you bypass a PC for printing.

Never trust a manufacturer's claimed print speeds; we run our own tests to properly assess each printer's performance.

High-capacity paper trays and auto document feeders are also worth looking for. READ MORE: TINYURL.COM/BUX9QMO



Wireless routers	PC ADVISOR RECOMMENDED	2	3 PC ADVISOR BEST BUY	PC ADVISOR RECOMMENDED	5 PC ADVISOR BEST BUY
	Apple AirPort Express	D-Link Cloud Router N600	Cisco Linksys EA6500	Asus RT-AC66U	AVM FritzBox Fon 7390
Price	£79 inc VAT	£75 inc VAT	£170 inc VAT	£170 inc VAT	£200 inc VAT
Website	Apple.com/uk	Dlink.com	Linksysbycisco.com	Uk.asus.com	Fritzbox.eu
Overall rating	***	***	***	***	***
Standards supported	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n/ac	802.11b/g/n/ac	802.11a/b/g/n
Frequency modes	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz	2.4GHz/5GHz	2.4GHz/5GHz (concurrent)
128/256bit WEP/WPA2	√×√	√×√	√ <b>x</b> √	√×√	√×√
ADSL Modem/Guest NW	<b>x</b> √	×√	<b>x</b> √	<b>x</b> √	×√
Parental cont./mobile app	<b>√</b> √	<b>√</b> √	<b>√</b> √	<b>√</b> √	✓✓
Firewall	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI	NAT/SPI
Ports	10/100 WAN, 10/100 LAN, USB	Gig WAN, 4x gig LAN, USB	Gig WAN, 4x gig LAN, 2x USB	Gig WAN, 4x gig LAN, 2x USB	10/100 WAN, 4x gig LAN, 2x USB
Average power use	Not tested	Not tested	10.2W	9W	Not tested
Throughput (near, far, ac)	94Mbps, n/a, n/a	142Mbps, 115Mbps, n/a	266Mbps, 195Mbps, 471Mbps	270Mbps, 199Mbps, 457Mbps	92Mbps, 38Mbps, n/a
Dimensions, weight	98x98x23mm, 240g	111x93x145mm, 330g	256x184x40mm, 500g	207x149x36mm, 450kg	226x160x48mm, not specified
Warranty	1 year	1 year	2 years	2 years	5 years
Verdict	Sleek, flat and square look Concurrent 2.4/5GHz Extremely easy setup Digital audio output	Cloud features Parental controls Interesting looks Up slightly in price	Stunning performance     Excellent interface     Strong QoS     802.11ac isn't cheap	Decent value     Versatile antennae     Great for file-hosting     and media streaming	Supports landline and internet telephony     Dual-band Wi-Fi     USB port
FULL REVIEW	TINYURL.COM/6LH600S	TINYURL.COM/9LGFF8Y	TINYURL.COM/AWYOPYX	TINYURL.COM/BU79W64	TINYURL.COM/3QUJZBX



## Blu-ray drives

A single Blu-ray Disc holds the equivalent of 35 CDs or five DVDs. It might look like a DVD, but its shorter wavelength and narrow blue laser beam allow it to hold greater capacity. It's the storage method of choice for HD and 3D video content.

External drives are easier to install, portable, and can be shared

between PCs, but they will cost you considerably more than internal models, and may not be as quick.

If you opt for an internal drive, ensure you have enough space inside your PC. Most internal drives use the SATA interface, so check you've got a compatible port.

Look for a drive that also supports several DVD formats, but don't obsess about write speeds. You should be able to get 16-speed DVD writing, but it's not worth paying more to save seconds.

You may find that the Blu-ray media currently on the market isn't fast enough to enjoy your chosen drive's maximum write speeds.

Six-/eight-speed BD-R capabilities are standard, but even six-speed BD-R media is still rare.

READ MORE: TINYURL.COM/70EPYL6



NAS drives	PC ADVISOR RECOMMENDED	PC ADVISOR BEST BLY	PC ADVISOR RECOMMENDED	4	PC ADVISOR RECOMMENDED
	Synology DS413	Synology DS412+	Zyxel NSA325	Iomega StorCenter ix2-200	Qnap TS-419P II
Price	£415 inc VAT (diskless)	£460 inc VAT (diskless)	£90 inc VAT (diskless)	£110 inc VAT (diskless)	£390 inc VAT (diskless)
Website	Synology.com	Synology.com	Zyxel.co.uk	Go.iomega.com	Qnap.com
Overall rating	***	***	***	***	***
Drive bays	4	4	2	2	4
Processor	1,067MHz Freescale P1022 dc	2.13GHz Intel Atom D2700	1.6GHz processor	1.6GHz ARM Marvell 6282	2GHz Marvell 88F66282
Memory	1GB DDR3	1GB DDR3	512MB DDR2	256MB DDR3	512MB DDR3
Remote access	✓	✓	✓	✓	✓
eSATA	✓	✓	×	×	✓
USB port	2x USB 3.0, 1x USB 2.0	2x USB 3.0, 1x USB 2.0	2x USB 2.0	1x USB 2.0	4x USB 2.0
Raid options	0/1/5/5+s/6/10/JBOD	0/1/5/5+s/6/10/JBOD	O/1/JBOD	O/1/JBOD	0/1/5/6/10/JBOD
Software	DSM 4.1	DSM 4.1	zPilot	Iomega StorCenter Manager	TurboNAS 3.6.1
Dimensions	165x203x233mm	165x203x233mm	108x205x147mm	202x99x149mm	177x180x235mm
Weight	2kg	2kg	1.8kg	2.5kg	3kg
Warranty	2 years	2 years	1 year	3 years	2 years
Verdict	Less powerful than DS412+     CPU requires less cooling     Versatile, friendly interface     Cloud Station indispensable	Superb read/write performance eclipses DS413     Powerful options     Attractive and intuitive	Cheapest drive here     Decent performance and features for the money     Complex interface	Low price     Cloud/social media features     Relatively slow transfers     Unattractive admin panel	Well priced     Robust cabinet construction     Solid performance     Old but effective interface
FULL REVIEW	TINYURL.COM/B562XW3	TINYURL.COM/6UUL4DE	TINYURL.COM/7B9EPW8	TINYURL.COM/BZ2DK38	TINYURL.COM/72N4GBN



## **NAS** drives

NAS drives are ideal for businesses or home users who require large amounts of dependable and secure storage, accessible to anyone logged into the local wired or wireless network.

Instead of connecting a hard disk directly to one PC, the NAS is connected to a network via a router. Many NAS drives are typically supplied without disks, letting you add your own selection.

Most NAS drives allow virtual partitions, letting you keep data such as PC backups separate from media files. Home-oriented NAS drives also include media servers to allow easy streaming of content.

To augment data integrity, access speed, capacity, or all

three, individual hard disks can be combined in a number of Raid configurations. Raid 0 'stripes' data across multiple drives to increase access speeds. Raid 1 mirrors the contents of one drive on to another, providing a cloned backup. Raid 5 is available with three-plus drives and combines both advantages.

READ MORE: TINYURL.COM/7H3HCNR



¹Ansi lumens GLOSSARY: • CM: component • CP: composite • ET: ethernet • SV: S-Video

Interchangeable -lens cameras	PC ADVISOR RECOMMENDED	2	PC ADVISOR BEST BUY	Coon	Kon PENTAX
	Panasonic DMC-G3 (14-42mm)	Nikon D5200 (18-55mm)	Nikon D5100 (18-55mm)	Canon EOS 600D (18-55mm)	Pentax K-01 (18-55mm)
Price	£300 inc VAT	£505 inc VAT	£400 inc VAT	£450 inc VAT	£425 inc VAT
Website	Panasonic.co.uk	Nikon.co.uk	Nikon.co.uk	Canon.co.uk	Pentax.co.uk
Overall rating	***	***	***	***	***
Megapixel rating	16Mp	24.1Mp	16.2Mp	18Mp	16.28Mp
Maximum resolution	4592x3448 pixels	6000x4000 pixels	4923x3264 pixels	5184x3456 pixels	4928x3264 pixels
Optical zoom	3x	3x	3x	3x	N/A
Maximum aperture	f3.5-f5.6	N/A	f3.5-f5.6	f3.5-f5.6	N/A
LCD size	3in	3in	3in	3in	3in
Media card	SD/SDHC/SDXC	SD/SDHC/SDXC	SD/SDHC/SDXC	SD/SDHC/SDXC	SD/SDHC/SDXC
Battery/life	1x lithium-ion/270 shots	1x lithium-ion/660 shots	1x lithium-ion/660 shots	1x lithium-ion/440 shots	1x lithium-ion/540 shots
ISO range	100 to 6,400	100 to 6400	100 to 6,400	100 to 6,400	100 to 12,800
Dimensions	115x84x47mm	129x98x78mm	124x97x79mm	133x100x80mm	121x59x79mm
Weight	336g	555g	510g	570g	480g
Warranty	3 years	3 years	3 years	1 year	1 year
Verdict	Great dSLR alternative     Rotating touchscreen     Strong video-capture mode     Very fast autofocus	Great value at sIrhut.co.uk Excellent image quality Strong build quality Versatile 3in screen	Cheaper, but offers less detail than the D5200     Suitable for all levels     Good choice of lenses	Now at an excellent price     Top-notch photo results     Fully auto/manual modes     Strong video capture	K-mount lens     Impressive image quality     No optical viewfinder     Slower than digital SLRs
FULL REVIEW	TINYURL.COM/7JCXJCR	TINYURL.COM/AJE7VWA	TINYURL.COM/6UTE9KK	TINYURL.COM/72STE88	TINYURL.COM/BOAJTO8



## Interchangeable-lens cameras

Compact system cameras (or interchangeable-lens cameras) bridge the gap between compacts and digital SLRs. They are ideal for those who want the versatility and quality of a digital SLR, with the ease of use of a compact.

A mirrorless design allows compact system cameras to be smaller than digital SLRs, while the lack of an optical viewfinder means an LCD is used for composition and review. Large sensors allow them to rival an SLR for image quality.

Compact system cameras are ready to shoot in seconds, and most offer burst modes that capture several frames per second.

Although the camera lens can be swapped, not all will be compatible with your chosen model. Panasonic and Olympus both use the Micro Four Thirds system, but Sony has its own E-mount system and Samsung uses NX-mount lenses.

Most compact system cameras record HD video, but the quality varies. If this is a priority, choose a model that can record 1080p video and also has a microphone input.

READ MORE: TINYURL.COM/7DPM3SX

Sub-£150 graphics cards		2	3		5
	Sapphire HD 7770	MSI GeForce GTX 650	Sapphire Radeon HD 7750	MSI GeForce GTX 650 Ti OC	Gigabyte GeForce GT 640 OC
Price	£96 inc VAT	£90 inc VAT	£80 inc VAT	£120 inc VAT	£90 inc VAT
Website	Sapphiretech.com	Uk.msi.com	Sapphiretech.com	Uk.msi.com	Uk.gigabyte.com
Overall rating	***	***	***	***	***
Graphics processor	AMD Radeon HD 7770	nVidia GeForce GTX 650	AMD Radeon HD 7750	nVidia GeForce GTX 650 Ti	nVidia GeForce GT 640
Installed RAM	1GB GDDR5	1GB GDDR5	1GB GDDR5	1GB GDDR5	2GB DDR3
Memory interface	128bit	128bit	128bit	128bit	128bit
Core/memory clock	1GHz/1,125MHz	1071MHz/1250MHz	800MHz/1,125MHz	954MHz/1,350MHz	1,050MHz/1,800MHz
Ramdac	400MHz	400MHz	400MHz	400MHz	400MHz
Stream processors	640	384	512	768	384
Power connectors	1x 6-pin	1x 6-pin	None	1x 6-pin	None
Interface	PCI Express	PCI Express	PCI Express	PCI Express	PCI Express
DirectX	11.1	11	11.0	11.0	11.0
Digital interface	DVI, HDMI, Mini-DisplayPort	2x DVI, Mini-HDMI	DVI, HDMI, DisplayPort	2x DVI, 1x Mini-HDMI	2x DVI, HDMI
Warranty	3 years	3 years	2 years	2 years	3 years
Verdict	• Faster than 650 and 7750 • Decent value for money • Plenty of stream processors • Low sound levels	Marginally slower than 7770     Superb overclocking     Very different to 650 Ti     MSI version has second fan	Cheapest card in the chart     Low specs include     800MHz core clock     Lacks power in some games	Plenty of performance Good set of specifications Hampered by 128bit memory interface	Costs more than 7750     Falls far behind 7770     The best version of this card     Three digital connectors
FULL REVIEW	TINYURL.COM/BWJ7BL9	TINYURL.COM/AKT2XOM	TINYURL.COM/7ZB50E3	TINYURL.COM/8Z5BDCZ	TINYURL.COM/90SWMK2





## **Graphics cards**

The key feature of a graphics card is its GPU. Produced by AMD or nVidia, this determines the quality of images displayed and their refresh speed. The more powerful the GPU the better, but you can get away with a lesser card by turning down a game's detail levels.

Even those on a budget should be able to get at least 1GB of DDR

video memory. Look for GDDR5 rather than GDDR3 RAM. This in effect quadruples the clock speed (GDDR3 merely doubles it).

The memory interface (or bus) governs how much data can be sent at once, so a 256bit interface lets through twice as much data as a 128bit interface. Graphics cards with the best combination of memory interface size and

clock speed should produce the best performance.

DirectX 11.x support is required for advanced, modern games; cheaper cards lack the firepower to do such titles justice, however.

Check that a card will fit inside your PC and you have sufficient connections from the power supply unit before you buy. READ MORE: TINYURL.COM/7BPUHQE



£200+ flat-panels	PC ADVISOR RECOMMENDED	2	3		5
	Dell S2440L	Asus PA248Q	AOC 12757Fm	ViewSonic VP2765-LED	Philips 248X3LFHSB
Price	£201 inc VAT	£325 inc VAT	£230 inc VAT	£360 inc VAT	£210 inc VAT
Website	Dell.co.uk	Uk.asus.com	Aoc.co.uk	Viewsoniceurope.com/uk	Philips.co.uk
Overall rating	***	***	***	***	***
Screen size	24in	24in	27in	27in	23.6in
Panel type	Vertical Alignment	In-plane switching	In-plane switching	Advanced MVA	Twisted nematic
Native resolution	1920x1080 pixels	1920x1200 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Pixel pitch	0.28mm	0.27mm	0.31mm	0.31mm	0.27mm
Brightness	239cd/m <sup>2</sup>	201cd/m <sup>2</sup>	237cd/m <sup>2</sup>	1,200cd/m <sup>2</sup>	326cd/m <sup>2</sup>
Static contrast ratio	1,200:1	630:1	660:1	378:1	800:1
Response time	6ms	6ms	5ms	25ms	2ms
Ports	HDMI, VGA	4x USB, HDMI, DVI, DP, VGA	2x HDMI, VGA	DVI, DisplayPort	2x HDMI
Dimensions	568x191x418mm	557x416x235mm	622x449x130mm	642x365x474-608mm	578x443x194mm
Weight	3.6kg	6.4kg	5.7kg	8.5kg	5.1kg
Warranty	3 years	3 years	3 years	3 years	3 years
Verdict	Premium build quality Very good VA panel Excellent contrast ratio Calibrate for best results	For graphics professionals     Good control over image     Very accurate colour     16:10 contrast ratio	Nice 27in IPS panel     Versatile viewing angles     MHL Android hook-up     Last few remaining	Large 27in display Low resolution for size Poor viewing angles Slow response for games	Graceful design     Illuminated Lightframe     bezel reduces eye fatigue     Twisted nematic panel
FULL REVIEW	TINYURL.COM/CXWJJLM	TINYURL.COM/CPYX7MQ	TINYURL.COM/C53K8KP	TINYURL.COM/86T3PFM	TINYURL.COM/6MJA2NS



## Flat-panel displays

You'll spend most of your working day staring at the screen, so it makes sense to choose one that's comfortable to view.

The panel size will largely depend on your budget and amount of desk space, but those measuring 22in and above tend to offer a full-HD resolution. All bar the cheapest models also have at

least one digital interface (DVI, HDMI or DisplayPort). VGA (or D-Sub) is an analogue interface, and won't provide as clean a signal.

The panel technology is important. Twisted nematic (TN) is the budget option, offering fast response times but limited viewing angles. Multiple vertical alignment (MVA) and patterned vertical alignment (PVA) screens offer

better viewing angles and higher contrast ratios than TN, but slower response times. Advanced MVA screens are more responsive.

In-plane switching (IPS) panels offer excellent viewing angles, contrast and colour accuracy, but they can be rather pricey.

Get a matt rather than gloss coating for fewer reflections. READ MORE: TINYURL.COM/6RMBVR6





## Big Brother: getting bigger every day

CTV is everywhere, but it isn't only your physical movements that are watched: every digital footstep you take online is tracked by advertisers, website owners... maybe even governments. But if you think Big Brother is unbearable now, it's about to get much worse.

By the end of 2019, all UK homes should have had their electricity and possibly gas meters replaced with so-called smart meters. Some households already have them, and energy companies (and the government) are quick to point out the benefits: more accurate bills and the opportunity to save money, since you get a clearer picture of how



energy is used. Smart meters can even help in restoring power to homes following a power failure, since the energy company can tell whether a home has a live electricity supply.

Not many people know about smart meters yet, but everyone should be worried about how the data they collect is used. If collected frequently enough, it'll be easy to work out what you get up to each day.

At a basic level it will know when you put on the kettle, cooked dinner and watched TV. But it will also show when you weren't at home, either at work or on holiday, for example.

Scarily, it's possible to get much more information than merely the total amount of energy being used at any one time. Each electrical device has a unique power 'signature', which could allow energy companies to tell not only what equipment you own, but when you use it.

Technology is also being developed to analyse your TV's power use to figure out what you're watching.

This information is incredibly valuable. Companies will undoubtedly want to use it to help them sell you targeted goods and services. Say you own a Sony Vaio laptop; rival laptop makers would love to know its model name so they can target you with tailored upgrade offers.

There could be more sinister tracking in future, too. When electric vehicles become more common, they could report on your every journey.

Our privacy is eroded with each technological step forward. We can only hope that safeguards are put into place to secure our data.

## Next issue

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## Family PCs

We review six desktop systems that'll CENTRE suit every member of the family, whether

they want to work or play.



## **TEST** Wireless speakers

Whether you want a portable Bluetooth CENTRE speaker for music on the go or the

convenience of wirelessly playing music from your smartphone at home, you'll find your ideal match in our group test of the best wireless speakers.

### Windows 8 tablets

Microsoft designed Windows 8 to work best with a touchscreen, and even launched a special 'RT' version just for tablets. We round up the best Windows 8 tablets and find out whether any are worth buying.

## Smartphone cameras tested

Is your smartphone your main camera? Do you want it to be? We test six of the best smartphones, including the new Samsung Galaxy S4, to see how their cameras compare for photos and videos.

## Sell your photos online

Reckon you're the next David Bailey? If you're handy with a camera, you could make some extra cash by selling your snaps online. We explain how to do it.



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