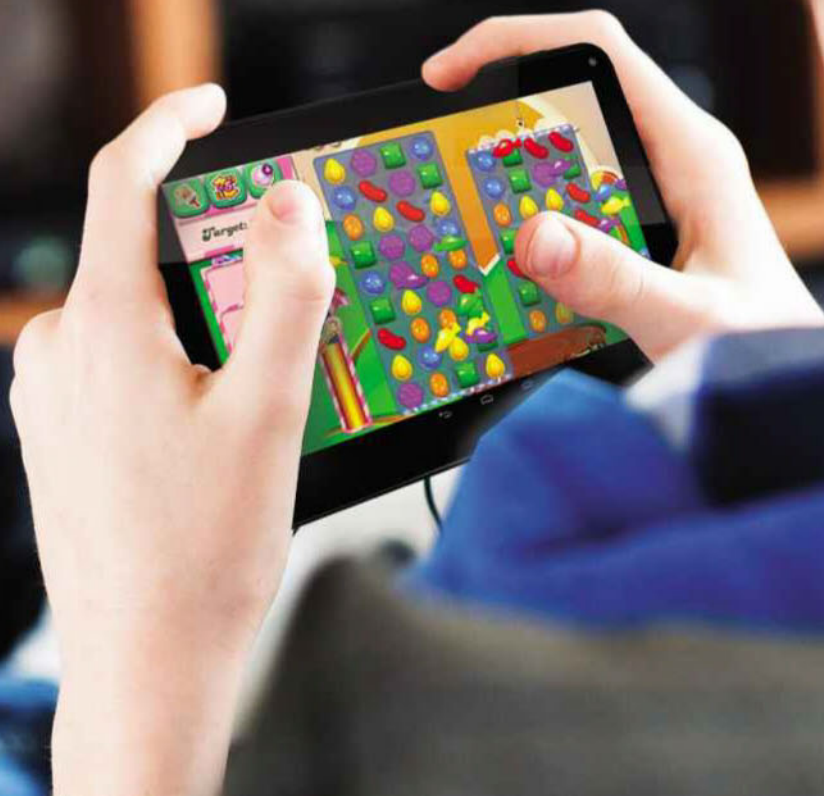# micro mart
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IS **CANDY CRUSH SAGA** KILLING VIDEOGAMING?

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Is Candy Crush Saga Killing Videogaming?

The PC gaming industry, and the way we pay for games, is changing dramatically, and Candy Crush is leading the charge...

It seems strange to propose that a game so young is having ramifications so broad for videogaming, for the PC, and for the charging models employed by software publishers. Yet the arrival and success of a once-small title by the name of *Candy Crush Saga* has led to the software industry into something of a shake-up – and not necessarily for the better.

Ten Years Ago

Back in 2004, the PC videogames industry was, not for the first time, in flux. Sales of games consoles were rampaging, piracy was high, and more and more publishers were leaving PC gaming behind for more lucrative waters. The number of interesting releases was seemingly in terminal decline.

At the same time, gaming in general was more mainstream than ever – though not always for the right reasons. 2004 saw, for instance, the hugely controversial *Manhunt* hit the front page of *The Daily Mail* – though on a more positive note, there was also lots of hype around Nintendo readying the soon-to-be-hugely-successful DS console for launch, and *Halo 2* and *Grand Theft Auto: San Andreas* became big sellers.

> ❝ **As recently as March this year, World Of Warcraft still had seven million subscribers** ❞

Despite the seeming dominance of consoles, 2004 also had a trio of major PC games that resonate to this day, in different ways. *Far Cry*'s a gaming series that's still going, albeit by reimagining itself with each new release. Not only was its first incarnation excellent, *Far Cry* pushed heavily against the boundaries of what even a high-spec PC could do. However, with one of the main criticisms of PC gaming being the investment needed to stay on top of it, *Far Cry*'s innovation also counted against it, and became a key piece of evidence in the argument; you were being railroaded into buying new hardware in exchange for one of the very best titles of the year.

Still, *Far Cry* did things that consoles struggled to match for a long time, and showed what PCs can do better than any other platform: to push against technical barriers, and take advantage of a continually evolving platform. Indeed, even the eventual Xbox 360 *Far Cry* spin-off lagged a long way behind.

The PC isn't evolving at quite the same rate at the moment, though (some would preface that with 'thankfully') – and Moore's Law, in any practical sense, feels long gone. Nowadays, a good spec PC bought in 2012 is likely to be perfectly fine in 2014; back then, two years really was beyond a lifetime in computing terms.

A 2004 release that was arguably even more important was *Half-Life 2*, a game so good and so genre-defining that we're still eagerly awaiting the a sequel a decade later. It remains a flat-out classic, though one that's since been successfully ported to other formats. As a game, however, it offered a real sense of storytelling progress, of a world you felt a part of as you worked your way through. What *Half-Life 2*, crucially, was the Steam gaming platform created by its developer, Valve.

Steam is now the main platform through which digital PC games are bought, and – in spite of some controversies – its continued success has helped maintain and secure PC gaming's foothold. The flipside of this success is that it's regularly cited as undermining the commercial viability of the PC as a gaming platform. That's not an irrelevant point to what we're talking about here.

The last of the three? That'd be *World Of Warcraft*, arguably the most influential of the lot. Whilst the number of subscribers paying a monthly fee to enjoy *World Of Warcraft* is long way down on its peak, it was a game that established and matured a new the revenue model for publishers everywhere. When *World Of Warcraft* hit big, the wheels of change were very much set in motion. Buying a game once, and never paying a penny towards it again became an anachronistic business model almost overnight.

All of a sudden, there was a proverbial gaming Holy Grail to aim for: customers who wouldn't just buy a game once, they'd pay to play it each and every month. As recently as March this year, the game still had seven million monthly subscribers, and it's estimated that *WoW* has brought Activision/Blizzard over $10bn in revenue so far. It is the top grossing videogame of all time, by a country mile, and is still bringing in tens of millions of dollars every single month.

These three games, each released in 2004, address different strands of an argument explaining why PC gaming is far from dead. At least one of them, though, hints at the situation the market finds itself in right now: adapting to the realisation that getting small payments on a regular basis is more lucrative than up-front purchases.

The Changing Model

Since *World Of Warcraft* hit big, most publishers have moved away from wanting consumers to go into a shop, buy a game, and happily play it in isolation. As such, various tactics have been implemented to encourage them to keep spending on the games they are committing to.

The one that's garnered no shortage of controversy is the online pass approach that's becoming more and more popular on games consoles. This is an additional fee that's required to continue playing a game online. Publishers have been looking for a return for the ongoing server costs that rack up when providing multiplayer support for a game, and at first, this applied to second hand titles. Why, reasoned games publishers,

Applications

If free to play is, in effect, a sort of extension of the shareware model, can we expect it to lend itself to other software too? After all, companies such as Adobe have moved away from charging hundreds – if not thousands – of pounds up front for extensive software suites. Instead, they charge a more manageable monthly subscription fee, that achieves three things. Firstly, it basically pushes everyone onto the same version, courtesy of continual online updates. Secondly, it keeps a revenue stream coming in, whereas previously the firm may have just taken a single up front payment. Thirdly, it makes products such as InDesign and PhotoShop affordable to far more people.

Will this stretch further? Will firms look at releasing tools that allow you to use certain functions for free, but make you pay for others? If they do, then it really does come full circle. That's exactly what shareware was doing 20 years ago...

▲ *The ones without a price tag by them are free. So most of them, then*

> ❝ **Why, reasoned games publishers, should someone buying second hand get the same online functionality?** ❞

should someone buying a game second hand be entitled to the same online functionality as someone who bought the game new? As such, a one-time use registration code was included in the game box, and second hand purchasers of the title concerned were invited to fork out if they wanted online features. In some cases, it worked out more cost effective to buy the game from scratch in the end.

More recently, the 'season pass' has become the latest wheeze. This also controls access to some online features, although is effectively a pre-order mechanism for all of a game's subsequent downloadable content (DLC) – a feature that we'll be coming to that little later.

Another underlying shift over recent years is that tablet and mobile market that's been the driving force in gaming innovation – certainly when it comes to payment models. With the rise of App Stores, getting an upfront payment of a consumer has become more and more difficult. Instead, we're entering a time where games known as 'free to play' become more prevalent, with titles such as *Candy Crush Saga* leading the charge. It's by no means the sole example of what we're going to talk about, but it is the most staggeringly successful. To the point where it's built a commercial model that hundreds of others are desperately trying to copy, whether it comfortably fits their products or not.

The Start Of The Crush

The roots of *Candy Crush Saga* are entwined in a company called King that, at one stage, was staring down the face of going out of business. However, it eventually made a success of Facebook games, and has built itself into one of the biggest game publishers on the planet in terms of revenue. It's not done this through cutting edge games. It's done it through cutting edge revenue models.

Candy Crush Saga made its debut just over two years ago, on April 12th 2012. As with many King titles, it began life as a Facebook game. Even to this day, it's hugely popular on Facebook,
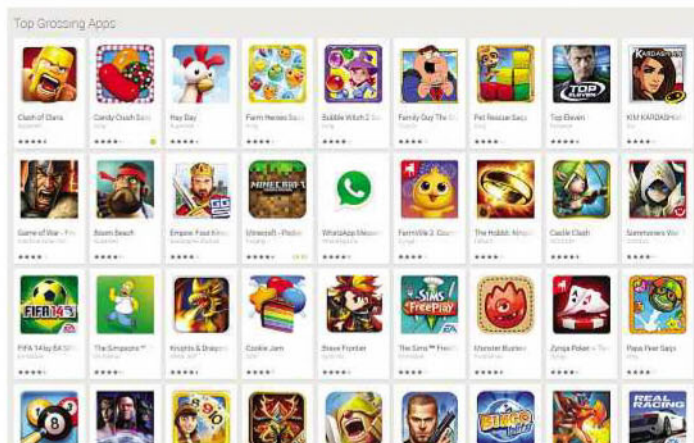
and King built in a social mechanic whereby you request to another user that you get a fresh collection of lives when you run out. A simple idea like that is responsible for thousands upon thousands of social media posts each and every day.

Later that year, *Candy Crush Saga* was released for Android devices and iOS. It did not take long to become a huge hit. In 2013, it became the most downloaded app for Apple devices. Now, in 2014, it's estimated that over 90 million people play *Candy Crush Saga* worldwide, and that the game brings in revenues of at least $800,000 a day for its publisher; hundreds of millions of dollars of revenue a year for a puzzle game. Just as this issue of *Micro Mart* was going to press, news reached us too that spin-off candy merchandise is now available to buy. *Candy Crush Saga* has become something of a phenomenon.

It's Free! Sort Of!

What's interesting about that the game though is that there's no charge to play *Candy Crush Saga*. You can download it for free on whatever platform (you can even play it now, away from Facebook, in a web window on your PC), and you can get to the very end of
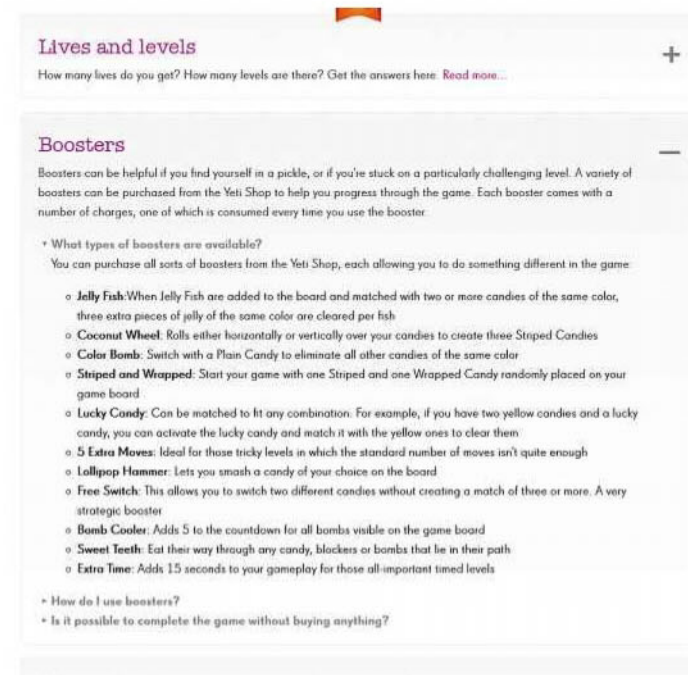
▲ *Here's the post from King's website listing Candy Crush Saga add-ons. Note that no prices are listed*

DLC

Console gaming popularised the idea of downloadable content for a game, whereby you could buy more levels/maps/add-ons for a small fee once you'd enjoyed the game proper. Even that though hasn't been without controversy.

Take the excellent *Need For Speed: Most Wanted*. The PlayStation 3 version of the game offered extra tracks for £6 apiece. If you paid, you might then logically sit back and wait for them to download; but no – the levels were on the disc already! This highlights a problem with 'DLC' – there's a niggling feeling that, in some cases, what you're getting is a bit of the main game that's been sliced off so as to extract a few more pounds further down the line.

That's less the case now than it was, but it seems major game releases now have to come with a bevvy of added features that you no longer get with your initial purchase. That doesn't really sound like progress to us.

---

the game without spending a penny. This is, as you've probably gleamed, known as the 'free to play' model, and the majority of people who download and try free to play games never surrender any cash at all. King, for one, is very keen to make this point. However, that fact is not for the want of trying on the part of the firm. On Facebook, generating revenue from free to play is relatively straightforward as advertising can be targeted around the game. As an app, *Candy Crush Saga* tries a few different methods to part you from your hard-earned. The big one is its attempts to sell upgrades, cheats and help to get you through the game. In days of old, if you were stuck on a computer game, you either had to type in a POKE from your favourite 8-bit magazine, follow a walkthrough, cheat some other way or just bash your way through it somehow. King, however, builds cheating mechanisms directly into its game. Stuck on a game and just need a few more moves to finish a level? No problem... for a couple of quid, King can help you out.

For King has harnessed the microtransaction, a feature that gets Apple bad press over from time to time. This coverage is usually generated by parents bemoaning their offspring running up a big bill without them noticing; this time, though, we suspect it's the parents spending the money.

King certainly offers lots of ways to help you spend. Further helpful options on the menu include add-ons to delay bomb explosions, smash any candy you like on the board, give you more time or get rid of any candy in your way. Basically, for every obstacle the game's designers have built for you, King sells the *deus ex machina* to get past it. Most of these minor miracles are priced at a couple of pounds but, at the other extreme, you can spend nearly £30.

Turning The Screw

In principal, it's hard to grumble too much about this. After all, you're not being charged for the game up front. Yet there's something a little discomforting about the way *Candy Crush Saga* turns the screw.

The game, as you might expect, starts off quite softly. It's bright, colourful, attractive and simple – match three 'candies' and they disappear, while combos and longer links are rewarded. This is all genially explained for you, and the first few levels of the game are a breeze. Then it ups the ante gradually, and with skill. It's as you get a bit deeper into it that alarm bells start to ring. For, as the game starts to get harder, the gameplay gets infinitely more frustrating – some may even characterise it as being unfairly difficult.

What we mean by that it's fairly common knowledge now that there's a degree of luck involved in *Candy Crush Saga* and not every level is beatable every time. You get a random selection of colours and candies at the start of each level, and the potential to complete a stage relies on having the right mix at the beginning of a challenge. From that starting point onwards you need the skill and fortune to do whatever you need to do, but it's worth reiterating: sometimes levels are simply not passable, no matter how well you play.

That, then, makes it less a game of skill and a little more a game of chance. In fact, King has faced accusations, which it denies, that *Candy Crush Saga* is actually a gambling title. That, in the same way as a fruit machine works, you're encouraged to spend more to beat it. It gives you enough victories along the way to keep you interested, but even a hardened player of the game may find themselves stuck on a given level for weeks if they're not willing to fork out a bit of cash.

The further issue here is that *Candy Crush Saga* isn't upfront about this. It lets you into the foyer of its posh building for free, but doesn't give you the prices of optional extras until you're likely to need them. Then, it rides in, a proverbial knight in shining in-app armour, and offers you things that can get you past a damningly difficult stage. Even if you're resistant to this approach, there are times when you've been stuck on a level for a long, long time that temptation is likely to rear its head.

You *can* beat the game if you don't spend any money, and it's important to restate that, but it's a lot harder and will take a lot longer – especially once you go above level 200 – if you don't put your hand in your pocket. Some levels feel impossible, and sometimes you don't want to wait a few hours for the game

replenish the lives it gives you to play with (you can, of course, pay to have them topped up quicker).

On top of all this is the fact that there's no option to buy the game outright. At no stage can you, for argument's sake, just hand over a straight £20 (for example) and get everything in one package. The game wants to keep backing you into corners, convincing you that you're on the edge of beating it, and then teasing you into more in-app purchase.

Payment

It's the in-app purchase that's the killer feature here, and no game has made anywhere near the success of it as *Candy Crush Saga* has. Unsurprisingly though, it's this payment model that's of increasing interest to PC game developers keen to find a new way to make cash from their wares.

You can already see the influence of *Candy Crush Saga* in the huge collection of Apple and Android titles that work on the same model. One, in particular, attracted ire recently – Electronic Arts' mobile version of the 1997 PC game *Dungeon Keeper*. It's free to play billing quickly attracted controversy, because EA offered playes a straight-up choice between waiting extraordinarily long periods of time to do something in the game, or paying to get it quicker. Trivial tasks like digging land were set to take a day (in real time) to complete. A whole day, for a real time strategy title that's hardly drop-in, drop-out.

Fast-tracking through the game's many slowdowns requires the in-title currency (gems) and topping up the small amount you're given to start with, you need to get your wallet out. Helpfully, you're told that the best value transaction is for 14,000 gems, for the princely sum of... wait for it... £70!

That's twice the asking price of *Dungeon Keeper* when it first arrived on the PC. Double! What's more, that original asking price got you the full game, without you ever needing to trouble your piggy bank again. For this mobile version, EA offers various packages of gems, with no guarantee at all that you'll not need to go back for more. Staggering – and a policy that virtually

66 What would have been standard full price releases are now being put together with a free to play model in mind 99

forces us to point out that the full original game can be bought online (at the wonderful **GoG.com**) for well under a tenner. Unsurprisingly, we – alongside many others – opted to go for that deal instead.

While *Dungeon Keeper* serves as a headline example, in truth there's no shortage of alternatives. *Farmville* used to be the poster child for this sly business practice. *The Simpsons: Tapped Out* and *The Sims: Freeplay* also work hard to make you poorer. Indeed, if you go down the list of the top grossing apps at the Google Play Store, the majority of them are free. In fact, free to play dominates the chart.
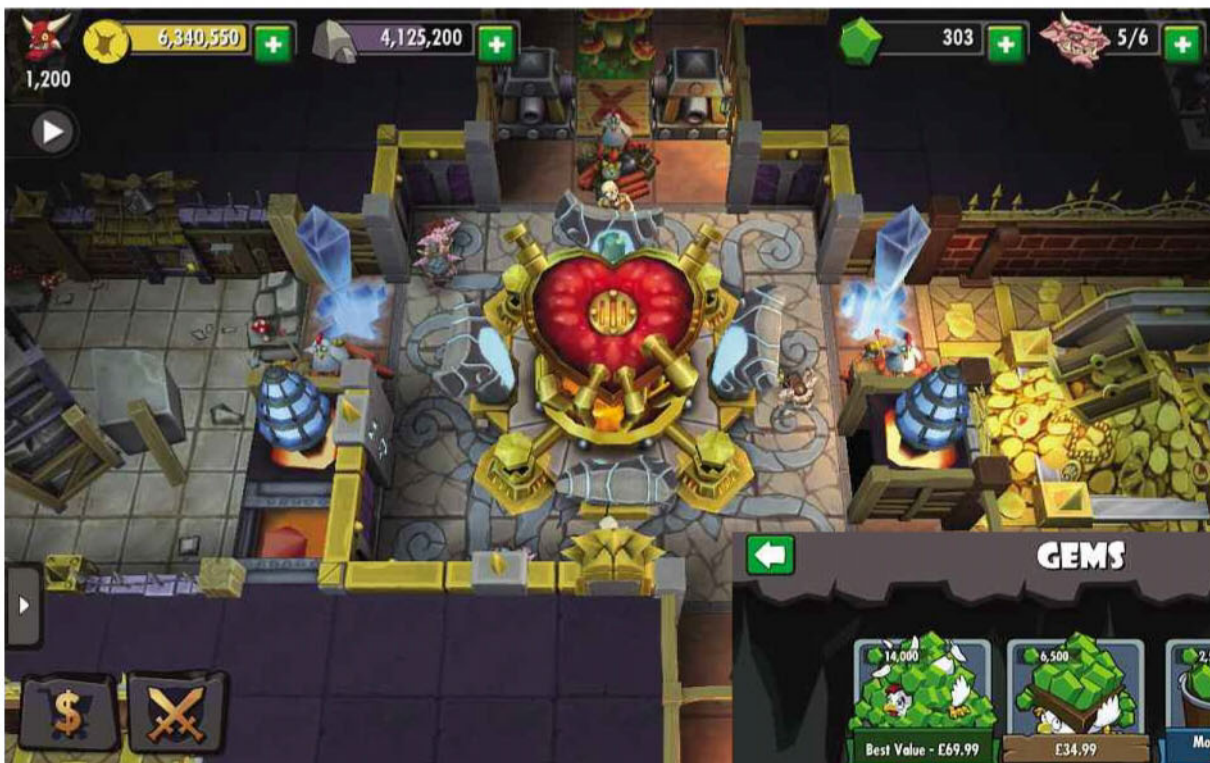
> *Dungeon Keeper's recommended in app purchase: £69.99. Really*

That seems like a contradiction, but you only have to dig into the in-app purchases to find the real story of why free to play is the most lucrative model in videogaming right now, and why more and more publishers are looking to bring it to the PC.

Games that once upon a time would have been standard full price releases are now being put together with a free to play model in mind instead. The effect is so marked that John Romero, one of the people behind games such as *Doom* and *Quake* has argued that "free-top-lay has killed a hundred AAA studios" – and presumably, many of the innovations and games they could have bought to the table.

Ironically, Romero is a defender and exponent of the free to play approach, having released *Doom* and *Quake* as shareware on the understanding that people would pay for more if they liked what they saw. It's not hard to see the advantages, especially as AAA videogames are falling into a similar trap to movies: if they don't make lots of money in a week or two, then they're swiftly dumped pending the arrival of the next big title. Given that some are costing hundreds of millions of dollars to develop, studios and publishers are looking for a longer term return on their investment. Free to play offers such a chance.

The Game Benefit

Free to play, for all its problems, does offer a clear benefit to the gamer. The lack of an up front charge allows you to try the game – after which you're only likely to hand over any cash if you like what you see. Yet, we inevitably come back to the effect of *Candy Crush Saga*: King has not only taken a relatively basic game

and made it successful, and made the model – whether we think it's exploitative or not – stick. This means that, while *World Of Warcraft*'s was one the setup publishers, if not developers, were striving for. Now, their sites are being set lower.

There may yet be further ramifications: *Candy Crush Saga* has questioned the need to invest millions into developing games that are a flat out gamble. Free to play appears to be a market that rewards simplicity and familiarity – and, at the end of the day, you can add parts of your game as you go along. If it's successful, then you can bolt on extra quests and levels, without the expense of having them finished from day one. Put simply, the incentive to put together a deep, engrossing videogame lessens with every $800,000 that goes through King's coffers.

That's King's fault (although its aggressive attempts to trademark common words have won it few friends). If it hadn't established the model, another company would have eventually made it pay – but it feels like it's the champion of a model that promotes piecemeal over substance, where games can be served up in little pieces, and beaten faster if you're willing to pay up.

While consumers who are actively buying full priced games and spending a lot of money of software and hardware are seemingly less likely to purchase something this way, it doesn't matter because they're in the minority. By asking for a pound here and there, and by breaking up what it has to offer, King has made a raging success of a revenue model that the videogames industry can't follow quickly enough – even if it means angering these diehards. While it's hard to make a case that *Candy Crush Saga* is killing videogaming, there's a sense that its success is dumbing it down, and diluting some of the things that made computer

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▼ *ASRock X79 Extreme 11*

The **Best** Money Can Buy:
Motherboards

What kind of PC could you build if budget was of little concern? Aaron takes a look in the first of a high-end PC series...

It's no secret that we like a good, money-saving deal here at Micro Mart. We pride ourselves on informing you, the reader, on how to get the very best value when shopping for PCs and components. The recent economic climate has made this all the more important and desirable, but what if we could ignore this thrifty spending? What if money wasn't a concern, and instead of limiting the power and performance you could go for, what kind of powerful hardware could you expect to find?

We're going to focus on this very question and have a look at the kinds of hardware you can find if you're not all that concerned about limiting your budget. We'll look at some of the cutting-edge hardware available and components that demand higher prices for better performance and more features.

Of course, the most expensive isn't always the best, and we're not simply going to look at hardware that costs the most for the sake of it. We're going to look at higher-end deals that warrant your attention, and we'll cover various aspects of the home PC, from CPU to keyboard, and motherboard to monitor, beginning with the foundation of the PC, the motherboard.

This is a component that can greatly affect your PC, from which hardware you buy for it, to how well it performs. It also affects your future expansions and upgrades, as well as how much storage and memory you can have. This makes your motherboard choice very important, and being able to spend more money will usually allow for a greater level of performance, as well as an array of more powerful functions. Let's have a look at some of your options.

Product: ASRock X79 Extreme 11
Price: £470

A lot of people may not consider ASRock motherboards as being all that desirable, especially when it comes to high end, but the Extreme 11 could change that opinion. Although arguably more well known for budget boards, ASRock has produced quite a mammoth board here, packed with features that make it a viable high-end board.

It's an Intel X79 chipset model with an LGA2011 socket and supports the Core i7 range of CPUs, with up to 64GB of DDR3 RAM. It also supports four-way SLI and CrossFireX, with PCIe 3.0 x16. Add to this eight SAS2 (RAID), two SATA-600 (RAID) and two eSATA-600 ports, as well as Creative EAX HD audio, two gigabit Ethernet ports and a mass of USB ports, and you've got a flexible, and fast system foundation. The build quality is also good, with gold, solid capacitors and a dual-stack MOSFET, which can help with power conservation.

This is a high-quality board in terms of features and construction, but it does have a rather packed surface area, which could make it a little tricky when it comes to maintenance and upgrading. With the right chassis, however, this issue could be addressed.

Product: Asus Intel Z97 ROG Bundle
Price: £400

This is a deal we found on Dabs.com, and it's quite a good one at that. It consists of an Asus Intel Z97 ROG motherboard, Intel

Core i7 CPU (4770K) and 8GB of Vengeance Pro RAM. It's a good deal for a gaming bundle, and the price nets you a great initial setup, complete with a very good motherboard that's well suited for gamers, thanks to support for the whole Intel Core CPU range and SLI/CrossFireX,.

Of course, as this is a bundle, the board itself isn't exactly cutting-edge and is more of an entry-level option, but for £400, if you have the cash to spare, this is a superb deal.

Product: Gigabyte Z97X-GAMING G1
Price: £350

This gaming-focused board from Gigabyte is a bit of a powerhouse, and it supports Intel's Core range of CPUs and 'extreme gaming', four-way GPU setups. Of particular interest is the inclusion of a quad-core Creative 3D audio processor and a specialised gaming network focus, offering lag-free gaming sessions.

The build is complemented by gold-plated audio and display ports, and the whole board has undergone a stressful 168-hour, sever-level durability test, which should ensure the unit is more than capable of handling prolonged gaming sessions.

Other specifications include support for up to 32GB DDR RAM, ten SATA-600, one SATA Express port and Bluetooth 4.0, as well as dual-band wi-fi.

Product: Asus Rampage IV Black Edition
Price: £350

This is another Asus board, this time not part of a bundle but still part of the ROG family. The Rampage IV Black Edition is an overclocking board that allows users to tweak the performance of their system in real time using a graphical interface. It's an excellent board for advanced system tweakers who like to get the most out of their hardware, and as a gaming board, it's got it where it counts.

The LGA2011 CPU socket allows support for the Core i7 range, as well as Intel Xeons, and you can install up to 64GB of DDR3 RAM, along with ten SATA drives and two eSATA units. There's on-board HD audio, Bluetooth, gigabit Ethernet and wi-fi (including 5GHz ac).

It's a pricey board, sure, but one that offers far more performance out of the box than most, and if you don't like that, the powerful overclocking features will allow you to address any issues.

Product: Asus Crosshair V Formula-Z
Price: £160

Yes, it's another Asus board, but this time it's an AMD CPU compatible model, supporting the FX, Phenom II, Athlon II and Sempron 100 CPUs. Like the Intel options we've looked at already, this is an ROG model board, so it's designed for gaming and for users who need more power, and better performance.

The AMD 990FX chipset supports dual SLI and CrossFireX, and you can cram up to 32GB of RAM onto it, install eight internal hard drives, two eSATA units and utilise gigabit Ethernet. Sadly, there's no built-in wi-fi with this model, but the board has plenty of expansion slots, should you wish to install a wireless card. The on-board audio is better than most, however, with the SupremeFX III device offering clean and crisp HD audio.

Product: MSI Z97 XPOWER AC
Price: £270

If there's one word to describe this MSI board, it's durable. The board has gone through rigorous military level tests, including burn-in tests to ensure its reliability. In terms of actual features, it supports Intel's fourth and fifth generation of Core CPUs, as well as

➤ *Asus Intel Z97 ROG Bundle*

➤ *Gigabyte Z97X-GAMING G1*
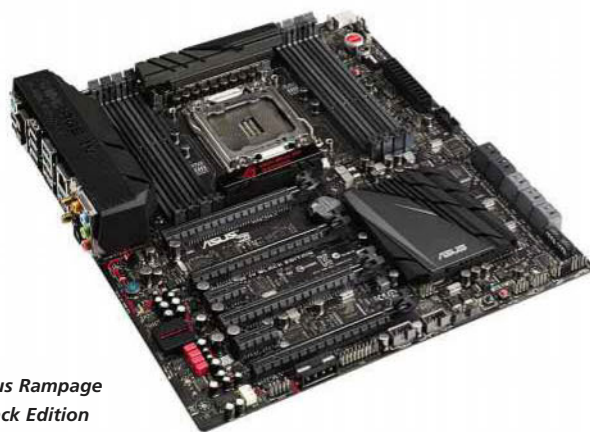
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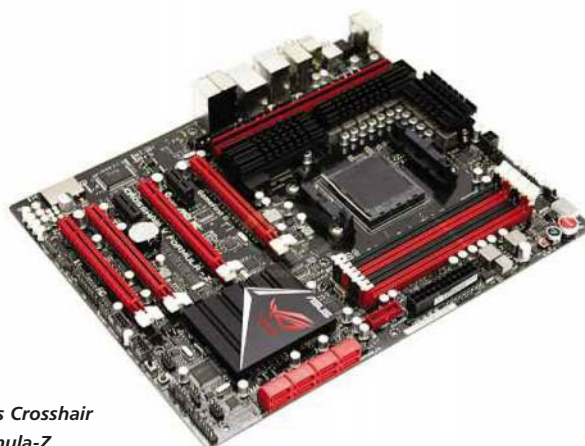
➤ *Asus Crosshair V Formula-Z*

Pentium and Celeron, and it can handle 32GB RAM. It has full four-way support for SLI and CrossFire graphics tech, and there's even an easy-to-access on-board VGA graphics switch.

MSI's OC Genie makes overclocking easy with the Z97 and, as always, it's a tweaking tool designed for everyone, even those with no prior experience, and any extra heat generated is taken care of by the specially designed thermal heatsink, which incorporates water cooling.

Other standard features include six SATA connectors and full RAID support, as well as Bluetooth, gigabit Ethernet and wi-fi (802.11a,b,g,n,ac).

It's an impressive motherboard and is a high-quality performer, even right out of the box without any tweaking. Well worth a look.

Product: EVGA Z97 Classified
Price: £280

EVGA may not have the high profile enjoyed by the likes of Asus and MSI, but that doesn't mean its boards are any less impressive from time to time. The EVGA Z97 Classified is a great example, and it's a unit that puts the focus on cutting-edge tech and user-controlled overclocking.

The board supports Intel's fourth and fifth generation of Core CPUs for its LGA 1150 socket, and the Z97 chipset setup has some great features up its sleeve. Up to 32GB of RAM can be installed, along with six hard disk ports (with RAID support), and there's four-way SLI and CrossFire to be utilised, making this another perfect choice for gamers.

Overclocking is supported too, with the added bonus of the new GUI BIOS interface, which eliminates those worrying text screens of yesteryear and replaces them with a much more user-friendly interface. An evolution of motherboard settings we're all thankful for.

Product: Asus Sabertooth Z77
Price: £320

If we said the MSI Z97 board was durable, this model from Asus is just plain bulletproof. Well, almost. The striking design of this board, covered as it is with black panels, flip-down dust defenders and 'thermal armour', clearly demonstrates its hardy construction.

This build uses special thermal air tech to improve airflow around the components and has a 'thermal radar', which monitors internal temperatures in real time so it can alert you to any problems. This is very useful when overclocking, and all of this is tested to military standards.

The LGA 1155 socket supports Intel's Core CPUs, and the board can hold up to 32GB RAM. There's room for ten hard disks and support for both SLI and CrossFire.

All of the protection is also designed to limit the amount of dust and detritus that can get into the system, which can also help overall system health and performance. So if you want a powerful, durable and unique motherboard option, you could do worse than this.

That just about covers our brief look at some of the more pricey motherboard options around, and as you can see, there's no need to worry about too many limits or restrictions when you're not limited to a smaller budget. You can start a PC build off with a bang, boasting a powerful motherboard for all that lovely, expensive hardware to sit on.

Next time we'll continue our look at the more expensive side of the PC hardware market with a focus on CPUs. See you then. **mm**
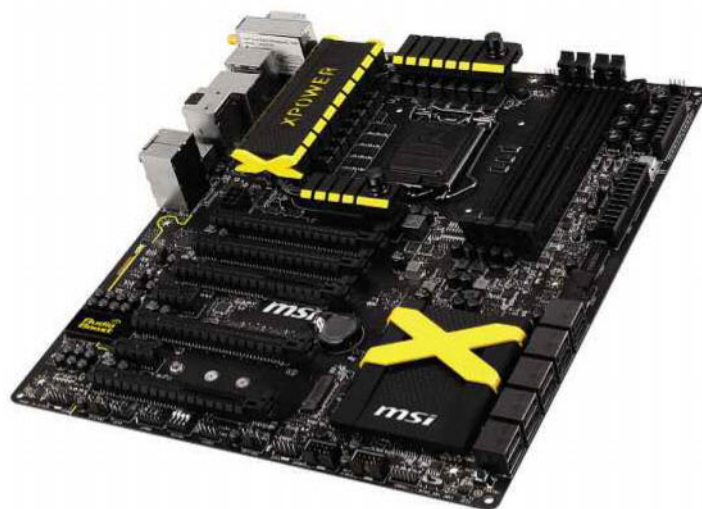
⌃ *MSI Z97 XPOWER AC*
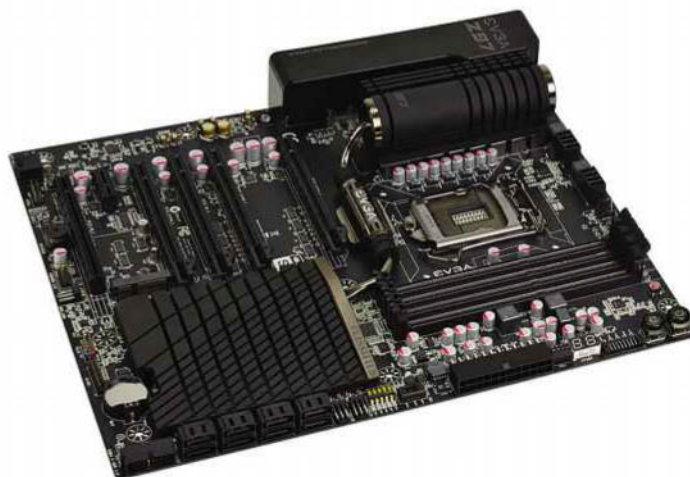
⌃ *EVGA Z97 Classified*

⌃ *Asus Sabertooth Z77*

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Diagnosing Network Problems In Windows

David Hayward looks at how to fix some simple network problems

L ocating and diagnosing networking problems can be one of the more difficult and frustrating issues that face the computer user. While it's easy enough to simply restart the computer, thus restarting all the core services, the problem could well be found further along the line. Then again, it might not be a fault with your software or hardware.

The problem with networking faults is the fact they can be caused by almost anything: perhaps something that loaded incorrectly when you started Windows up; a faulty network interface on your motherboard; a dodgy cable end that was recently pulled when you last did the hoovering; maybe even an issue with your router or any switches that lie between you and your access to the internet. Finally, it could be a problem your ISP is having at that time, where everything has slowed to a crawl and for some reason you can't communicate with an IP address beyond the UK.

There are a vast number of reasons as to why you're having a network problem. So with that in mind, we'll have a brief look at some of the diagnosis techniques and tools, commands and connections, tips and troubleshooting that can all combine to give you the user an intense, networking headache.

Simple Scenarios

Let's assume that you've powered up your PC and clicked on IE, Firefox, Chrome or whatever else that allows you to browse the internet, and instead of there being your usual home page, you're left with a blank screen.

Naturally, you try another page, maybe even another search engine, but within seconds you come to the conclusion that your internet connection is down. The same can also be said for accessing any internal network resources, such as loading something off a NAS box or connecting to a wireless printer, for example.

Either way, something untoward is going on, and it can be as simple as a knocked cable or as complex as your Hosts file being corrupted or a hardware fault.

A cable tester will check the integrity of the Ethernet cable
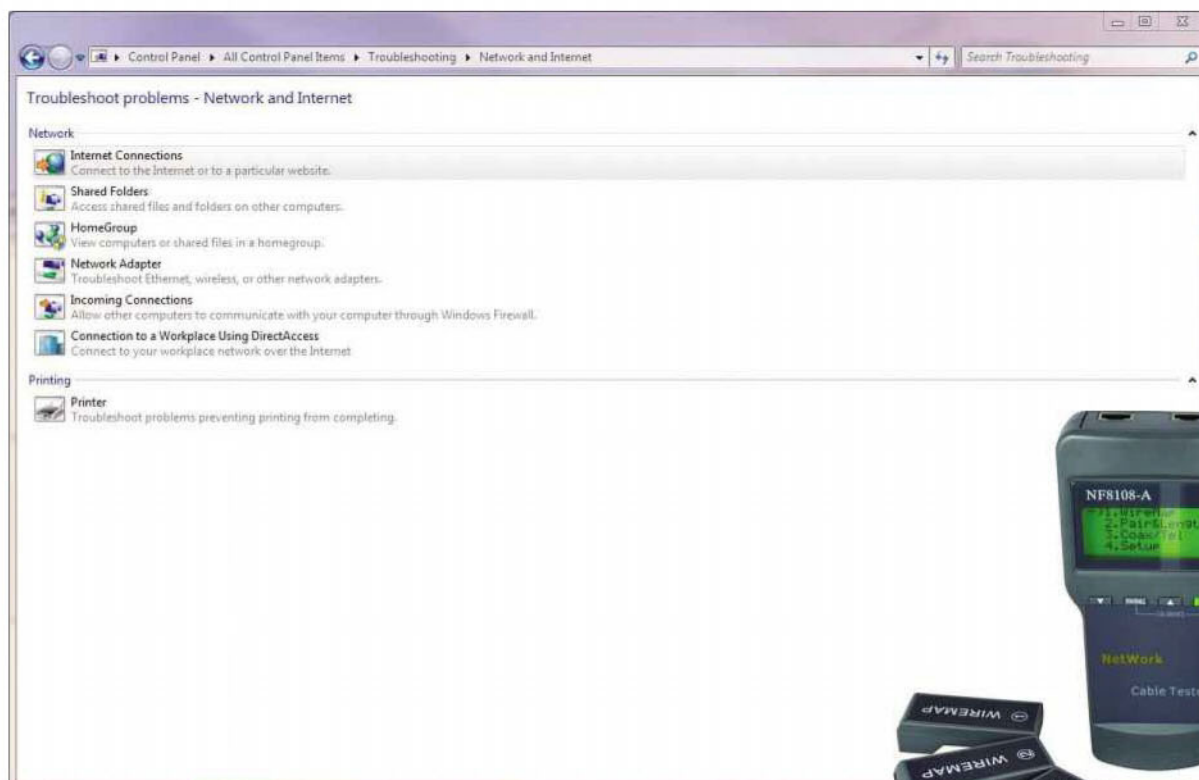
Windows troubleshooting may be simple, but it can be effective

Visual Checks

The first thing to do, of course, is make a quick visual check. If you connect to your home network via a switch or a powerline adapter and it's in easy reach of where you are, then take a glance at it and make sure that all the visible LEDs are green and functioning accordingly.

Red LEDs usually indicate a loss of connection on network hardware, or no lights at all can indicate a loss of a connection,

> 66 **It can be as simple as a knocked cable or as complex as your Hosts file being corrupted or a hardware issue** 99

so take a moment to just double check the status of the device.

If it's a powerline adapter, then these things have a habit of stopping due to losing communications with their paired device. In that case, you can usually remedy the situation by unplugging them, waiting a few seconds and plugging them back in again. Simple stuff, but it works.

If you're connected to a switch, then have a look and make sure it's powered up and that the connection to your PC is in the relevant network port securely, as well as the connection that goes off to the router, downstairs or whatever.

If everything from the PC looks okay, then the problem could lie further down the cable – unless an LED is informing you otherwise – so you can quickly take a look at the other end of

the cable or unplug the other powerline adapter. Also, check the ends of the network cable for any signs of wear and tear or damage. If the end of the cable is dangling by the last few threads of the cable inside, then it's obvious the time to replace it has come. If the cable looks okay, but the lights on either end of the switch/router say otherwise and if this is a common issue with your setup, then it could be time to invest in a cable tester to check the integrity of the cable. If it's faulty, then at least you'll know and you can arrange a replacement.

Finally, check the network device you're trying to communicate with, router, NAS or printer and see if everything is looking okay with it and that it's actually powered up.

Nine times out of ten, a network problem can be easily resolved simply by looking at the connections and checking they haven't been intentionally (children, cats, etc.) or unintentionally (hoovering, turning the power off at the switch) meddled with.

The visual checks may sound time consuming, but in reality they can be run through very quickly, and if you know your home network, then you've usually got a pretty good idea of where a potential problem may lie.

Windows Checks

If everything physical seems okay through the visual checks, the network connection issue may well be something to do with your PC.

If the problem occurred from the moment you started the PC, then it could have something to do with the key essential networking services not loading or starting correctly. This doesn't happen too often, but it does happen, and the best remedy is to simply restart your PC. You could check the state of the network services by pressing the Windows key and 'R', then entering

The netstat command is quite revealing and tell you a lot about the connections on your PC

Firewalls

The Windows firewall can go a little heavy on the rules sometimes. Usually it's no fault of its own, but rather a game being installed that requires registration from an external server, a program that needs to get through to check for updates or even browser updates chopping and changing the rules in the firewall without you even knowing.

Therefore it's a good idea to check the rules on your Windows firewall should something be letting traffic through that shouldn't be there or if it's failed spectacularly and stopped all communications.

You can open the firewall via the System and Security section in the Control Panel, but an often easier way to read the rules is via a Notepad pipe from the command line.

Enter the following in to an administrator level command prompt (click on the Start button, type 'cmd', then when it appears in the list, right-click and choose 'Run as Administrator'):

netsh advfirewall firewall show rule name=all > firewallrule.txt

This will dump all the necessary details of the Windows firewall into a handy text file. Next, enter:

notepad firewallrules.txt

This will open the text file in Notepad. You can then browse through them and see if there's out of place, closed or just plain wrong.

'services.msc' and pressing Enter. This will launch the Services window, where you can see what's started and what hasn't. Generally speaking, starting the services yourself is perfectly fine, but there's usually something else that needs starting beforehand or afterward, and the whole thing gets messy or doesn't work quite as well as it should, so let Windows sort it out and reboot.

The next best check is the condition of the PCs IP address, default gateway and subnet. To do this, enter the command prompt (Windows key and 'R', enter 'cmd' into the box and hit Enter) and type:

ipconfig /all

This will detail the connections you have on your machine, either physical or virtual, and list their respective IP addresses and if they're looking at the correct router or not.

Things to look out for here include the default gateway (usually your router), DNS servers (how your PC translates addresses to names) and the IP address (the home network address of your PC).

If the default gateway looks wrong (i.e. it's looking at 0.0.0.0), then your PC isn't getting anything from your router. Likewise, the DNS servers could be down and not responding, so you won't be able to translate 89.21.0.39 to the Micro Mart forum (or rather TeleCity). And the IP address of the PC could be 169.254.0.0, which is the link local block allocated between hosts on a single link, the default IP address as dished out when the PC can't see a local network.

The best here is to check that the router is up and running and that you haven't installed any other DHCP server recently, like a NAS device or other router. Also check that your PC isn't using a manual IP setup, but rather DHCP to pick up the router.

If all else fails, you could reset the IP configuration data of the PC by entering the following:
ipconfig /release

This will release the name specific data (not always needed but useful to try). Next enter:

ipconfig /renew

This command should renew the address lease from the DHCP server (your router) and refresh everything. You can then check with 'ipconfig /all' again to see if this have alleviated the problem.

Should you suspect your PC has become infected with some kind of malware and is being used as a connection to send and receive data without your knowledge, which can greatly affect the network, you can check for TCP and UDP port usage, along with the process ID of the program by entering:

netstat – nao

This rather complex list will detail the incoming and outgoing active connections for your PC and, in particular, what programs or system services are using them. Careful checking of the PIDs will reveal a suspect program, should one exist.

If you also suspect that the ISP's DNS servers are at fault, either by being slow, bombarded by an outside source or just plain wrong, then you could try to pathping a known external address to see where the problem lies. For example, the following will pathping the Micro Mart Forum:

pathping forum.micromart.co.uk
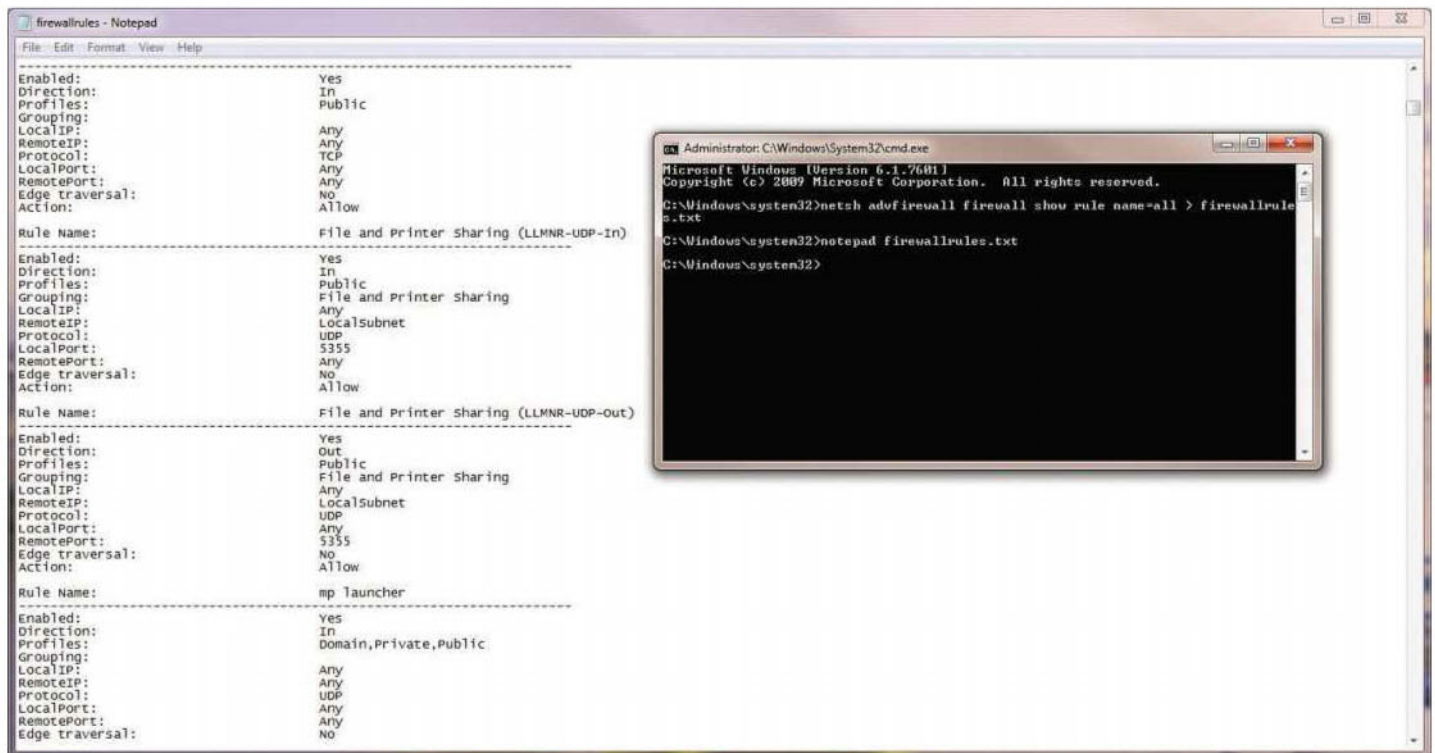
▲ *Checking the Windows firewall can help resolve some networking faults*

Should the fault lie beyond your router, then there's not a lot you can do about it, other than try to locate another DNS server and enter that manually into the PCs networking setup. Also, you could pathping your own internal router, to see if there's anything at fault somewhere along the line. Generally, this won't reveal much unless you're attached to a big corporate network, but it's often worth a look.

Finally, to add to the built-in list of tools, sometimes the most simple are some of the most effective. By this we mean the Windows Network and Internet Troubleshooting Wizards. Surprising as this may sound, the Network and Internet Troubleshooting Wizard can go some way to analysing your current network connection and seeing if there's anything untoward going on with it.

> ❝ **Do yourself a favour, if you can: keep the network as lean as possible and as easy to maintain as possible** ❞

In addition to the basic ping test and connection integrity, which is all it's really doing in the background, you can troubleshoot any problems you may be having with the Homegroup setup, which can relate to shares on other devices or PCs. And, it can also do a swift check on the state of the Windows Firewall, which in the past has been known to go a little off-key and block all incoming connections.

Generally speaking, though, for the vast majority of us, the built-in Windows command prompt tools are more than enough to identify a problem in our home network.

Get Angry

Wireshark and NVision are both solid network analyser tools, but if you want something just as effective and more powerful than the standard Windows command yet simple to use, then Angry IP Scanner may be the third-party tool to go for.

It's an open-source and cross-platform network scanner that can analyse IP addresses and ports, then determine whether it's alive or not, before gathering the hostname, MAC address and data regarding the device that's attached to the port. It can scan switches, and if you have a layer-2 managed switch, it can tell you what's actually connected to each of the Ethernet ports.

It's certainly worth a look at and can be downloaded from **goo.gl/Txd9TH**.

Third-party Tools

There are times that the built-in commands of Windows (tracert, ping, pathping, nslookup, netstat and so on) simply won't reveal the kind of detail you need to get into to help pinpoint a certain network problem.

Most of the time, a common network fault can be resolved through the built-in commands, but if you have a potential problem with malware, several routers, rogue packets or just something you can't put your finger on but you know exists, then you'll need to delve deeper and use one of the many third-party tools available.

When we say many tools available, we mean it. There are hundreds, probably thousands, of tools and programs that can be run to determine the exact nature of your network. There are some old classics that still work today: Ethereal (now called Wireshark), Mapnet, View2000, Netmeter, LANExplorer and Alchemy Network Monitor are just a few of the programs and tools that can be found and will reveal a lot more about the packets, traffic and overall effectiveness of the network your PC

nVision is a large and complex tool to help diagnose networking problems

Wireshark offers unparalleled amounts of data on your local network
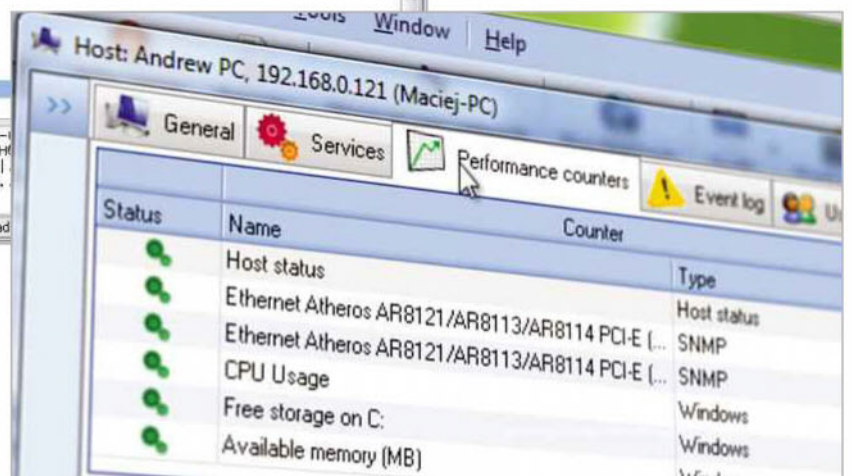
is attached to. The trick of course, is finding out which will work the best for you.

One of the best all-round network scanners and analysers is Wireshark. The latest version, V1.10.8, is available via from **goo. gl/PASm4S**, but it does ask for the installation of WinPcap, which is the Windows version of the Libpcap library driver to capture packets. It's not essential to install WinPcap, but it can make for a better all-round network diagnosis if you do. The only reason we're mentioning this is because some anti-malware clients regard WinPcap as an infection of some kind, and it used to have a bad press among users some time ago. It's up to you, but you can get away without it being installed.

Wireshark will provide you with a graphical representation of what's going on inside your network. It's a packet analyser that captures the packets on the network and returns as much detail as possible regarding those packets. With it you can troubleshoot network problems, examine any security flaws and learn a lot about the internal network protocols and what's happening to all those ones and zeroes inside the cable.

Its use is a little too long winded to get into here, but it's relatively easy overall, and there's a handy how-to included with the program.

NVision (previously known as NetVision) is another old-school network analyser that's been brought up to date for modern networks and users. Along with its sibling kit of useful tools, NetTools, all of which are available from **goo.gl/YPrHAk**, NVision is an all-powerful set of network management programs combined into a single suite. With it you can gain graphical

reports of all the connected clients, nodes, devices, switches, routers and so on. The software will analyse the type of connection, speed and whether or not it's degrading over time; you can see the response times of other computers and devices on the network, as well as any services you have installed such as POP3, HTTP, FTP or SMTP. And you can measure and track the services and networking usage of every machine connected to your network, including the ability to remotely connect or terminate a connection should something happen.

It is indeed a powerful tool, probably a little too powerful for the average home user, admittedly. Still, you now know of its existence, and should the need ever arise, you can have it installed, scanning and analysing your network for problems or potential problems in no time.

Keep It Simple

One of the easiest rules to remember when you're checking for network problem – and one that you'll kick yourself later for not doing – is to keep the design of your home network as simple as possible.

We've seen so many overcomplicated home networks grind to a halt, and the poor maintainer of the network is then left to work out which of the wireless extenders, mini switches, extended routers or powerline adapters is at fault. So do yourself a favour, if you can: keep the network as lean as possible and as easy to maintain as possible. That way, when a network error does occur, you'll be able to nail down the culprit in no time. **mm**

Your Letters

Reviewing The Camera Review

I enjoyed your recent articles on digital cameras but would like to mention a few issues, you knew someone would! Firstly, whilst the price of a DSLR hasn't dropped significantly in years, you now get more for your money. There are features on mid-range and even entry level DSLR models that were only found on pro cameras at one time.

Apart from the obvious component quality, dust, water sealing and the extra options on more expensive DSLRs, you are paying for quick access to the cameras settings via buttons on the camera body so you don't have to keep accessing the menus. I think too much can be made of quick access for non-pro enthusiasts. Many people will set up a camera the way they want it, and won't need to change many major settings that often. Settings that are frequently changed from shot to shot, like ISO or exposure compensation can often be configured to a function button that even cheap DSLR cameras often have. Quick access is fine, but it's an expensive option that many new users probably won't benefit that much from.

You mentioned that storage can be an issue because of the file sizes when shooting in RAW, but storage is only memory card size – and there are plenty of big SD cards. You don't even need the biggest fastest card available, as often you will flatten the battery before filling the card. Buy a spare battery rather than a huge SD card.

DSLR cameras are not all big and heavy, a first time buyer really needs to visit a camera shop and try some different models. This is especially the case if you have big hands, as some models are surprisingly small. Your choice of 'Best DSLR's' regarding budget, features and image quality, jumped a lot in price range and omitted some DSLR's around the £400-500 price range that are excellent cameras and very similar to models costing a few hundred pounds more. These cameras are more than adaquate for a first time buyer or even someone like myself who has been taking photos for years. Be realistic about whether you need all the latest GPS and wi-fi options, they don't improve your photography.

There are savings to be made by buying older models, especially with cashback offers. Recently, I bought a Nikon D5200 with a Nikon 18-55mm VRII lens, extra battery and two years warranty After a £50 cashback offer, it cost £435. When released, in 2013, it cost £700!

Don't forget the used market. Buy from well respected dealers and you can still get a warranty. If you want to take good photographs then buy a cheap DSLR and spend your money on a photography course where you will learn to use it properly; the Auto mode won't take you far!

Mike Daddow

Dongle Disaster!

We bought a Samsung 32" 1080p 'ready' TV about five years ago. It has a SD (Standard Definition) tuner. Until the analogue TV signal was switched off, we recorded programmes on a Panasonic VCR. At analogue switch off, we bought a SD digi-box with two Scart connections, and carried on recording. However, three weeks ago, our valiant VCR spat the dummy.

As my sister had just installed a YouView box deal from TalkTalk, I had the opportunity inspect it. Great, except it would cost us £10 more that our TalkTalk 'Essentials' package. Researching the various options, it was cheaper to buy a Humax HDR-2000T (500GB) HD (High definition - twin Freeview tuner) at £169 from Amazon. If we then wanted YouView that could be accomplished by an extra Humax WLAN WiFi USB dongle at £29.

The Humax's Manual instructs how to do this through the Humax TV Portal. So far so good. The HD pictures and recordings are truly wonderful - we are at last up to date, at least until everyone gets swept away by 4K!

I decided to investigate the Humax dongle, to see if we could backtrack on iPlayer etc. What was that about curiousity killed the cat? Humax's website was down so I emailed them. They replied that the HDR-2000T (500GB) did indeed operate on Linux. Yes it might operate with alternative dongles, but only theirs was guaranteed to work. For a pensioner, £29 for a dongle is a bit steep. Why couldn't they incorporate wi-fi in the first place?

After more Googling I took a punt and bought a CSL WLAN USB Adapter V4 from Amazon at £11. Guess what? It did not work! The 2000T just would not recognise it, despite the fact that the CSL has Linux drivers. It is not the dongle's fault; it works perfectly on my desktop Ubuntu 14.04 LTS system. Plug it in, it was instantly recognised, put in the security code – no problems. It downloaded 400MB of Ubuntu updates at a decent speed.

If I was prepared to void the two year warranty on the 2000T, I might investigate what is inside the Humax and see if I could 'jail break' the system, and make it recognise any Linux based dongle. I cannot afford to do that, though, so it is either forget iPlayer or fork out £29 and hope Humax are right.

Alternatively, perhaps Mark Pickavance could be diverted from his 401st "Logging Off" to investigate. The HDR-2000T is obviously a Linux computer in disguise, but like the Kindle Fire HD, it has been throttled. If *Micro Mart* would have a whip round to buy a Humax HDR-2000T (500GB) plus Humax dongle, and do a bit of reverse engineering, perhaps we would all benefit. Meanwhile, I'll use the CSL on another job.

Tron Fisher

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Component Watch

'More power' isn't always the answer, except when it is...

If you're looking for a new PSU, you might take the easy route and go for an inexpensive, bog-standard unit, but what if you want something different? Something with better-quality output and superior features? Well, in this week's Component Watch, we're looking at deals on high-end PSUs in the hope that we can convince you that a bargain is worth paying for at any price!

Deal 1: Cooler Master G750M (750W)
RRP: £81 / Deal Price: £62

This 750 watt modular PSU is packs enough punch to satisfy virtually any power-hungry system builder out there. That means it's ideal for anyone who needs enough juice to run multiple graphics cards using CrossFireX or SLI, and the Cooler Master name is a reliable staple of gaming systems too, much beloved by gamers everywhere. As far as we can see, this PSU is no exception to the general rule regarding the quality of its products and so, given the discount you can get, represents a great deal.
Where to get it: Dabs (**bit.ly/XA7Y65**)

Deal 2: Cooler Master Silent Pro M2 (620W)
RRP: £110 / Deal Price: £63

We've already established that Cooler Master is generally a name you can trust, so with a discount running at close to 40%, the company's 620W Silent Pro M2 is a fantastic offering. It may not have the outright ooomph of the G750M, but with excellent thermal performance and 80PLUS Silver-rated electrical efficiency, it won't waste your money or power, and its silent running capabilities mean it'll remain discreet. The modular and silent features make it a perfect choice for Home Theatre PC enthusiasts, but it'll work just as well in virtually any system.
Where to get it: Scan (**bit.ly/1y15J6W**)

Deal 3: Be Quiet! Pure Power L8 (630W)
RRP: £90 / Deal Price: £65

A good power supply is an essential component of any cool or silent computer, and the Be Quiet Pure Power L8 is designed to be both cool and silent while still delivering the amount of juice required to power even the most demanding system. An 80PLUS Bronze rating and CrossFireX certification means you can be confident that your system's being well-provided for – and at less than £65, it's a bargain too!
Where to get it: Dabs (**bit.ly/1kkmKYF**)

Deal 4: XFX ProSeries (750W)
RRP: £140 / Deal Price: £95

This semi-modular power supply contains XFX's EasyRail technology to help you quickly and easily configure it for optimum performance. Aimed at hardcore gamers, it's designed specifically for SLI and CrossFireX operation with an 80PLUS Bronze rating. It looks great, too, which is something that can't be overlooked when thinking about gaming PSUs!
Where to get it: Dabs (**bit.ly/UQLcoY**)

Deal 5: Seasonic M12II EVO Edition (850W)
RRP: £110 / Deal Price: £80

If your PC needs a lot of power, the Seasonic M12II 850w PSU will prop it up magnificently, with near-perfect 80PLUS Gold rated conversion and a modular design, it's both space- and power-efficient. It even includes a "Hybrid Silent Fan Control", allowing it to operate in fanless, silent or cooling mode to balance temperatures and noise to your needs. One for the discerning gamer.
Where to get it: Overclockers UK (**bit.ly/1s7NFtr**)

NEWS AND VIEWS

Warmachine Arrives For Battle

MacBook Pro Adds Faster Processors

More power!

Apple is so keen to get more of you on its books, that it's now updated its Macbook Pro with Retina display, which now offers improved processor power and better memory alongside all that lovely styling.

Throwing in a lower starting price for the top-of-the-line 15" notebook (now 'just' £1,999), and also reducing the non-Retina 13" MacBook Pro (by £100 to £899), the processor improvements could bring a few more customers to Apple's core.

On the 13" Retina model, the dual-core Intel Core i5 processors are up to 2.8GHz (with Turbo Boost speeds of up to 3.3GHz) anf the RAM is up to 8GB from 4GB. As for the 15-inch model, that sports quad-core Intel Core i7 processors up to 2.5GHz with Turbo Boost with speeds up to 3.7GHz and a mighty 16GB of RAM. The fact that this can be configured with i7 processors up to 2.8GHz could be important to power users, too. You can fill yer boots, and empty your bank accounts, over at **www.apple.com/uk**.

Spruce Up Photos With Ashampoo

Effortless revamp of snaps with Photo Optimizer 6

With the summer season coming to a close in a few weeks' time, thoughts may turn to those digital holiday snaps you took of family and friends. While your own prowess with digital photography might not be up to scratch, help is at hand thanks to Ashampoo Photo Organizer 6, a package that promises to revitalise your photos with very little effort indeed.

The package will let you optimise colours and contrasts for simple photos or an entire collection with a few clicks, while the likes of image sharpness and alignment can be modified just as easily. You can also correct minor blemishes, whiten teeth, remove red eyes and generally make everyone look their absolute best, without having to worry about complicated tasks as this is aimed at the average PC user.

Handily, the package also automatically creates backups of your photos in the background and as this promises to be less power-hungry than previous versions, plus better structured, you should be improving your digital photos in no time at all.

The website for this is over at **www.ashampoo.com**.

Utopia's latest designed for high-performance gaming

The kind chaps over at Utopia Computers have been in touch with details of a re-imagined gaming desktop PC. What's more, it tells us the aggressive-sounding Warmachine system is purpose-built and designed to offer what the multi award-winning firm claims is the best price/performance ratio on the market.

Specifically, the revamp includes a new chassis, powerful hardware and efficient cooling for scalable performance from just £485. From he Level 1 configuration (powered by NVIDIA's GTX 750 1GB graphics card) to the Level 3 system (utilising NVIDIA's GTX 760 & 770 2GB) there is power, longevity and upgradability included, and if you want one, it will be shipping within 72 hours of ordering. Lovely stuff – especially as it's bagged up with Utopia's ten-year limited warranty. You can learn more about this over at **www.utopiacomptuers.co.uk/warmachine**.

Wearable Gadgets Easy To Track

Security concerns crop up again

If you're interested in the growing trend for wearable tech, pay heed to a slice of research from security experts Symantec, which suggests that those wearing them can be easily tracked with little more than a Raspberry Pi computer kitted out with a Bluetooth radio module to pick up the gadgets' broadcast signals.

Symantec took such a system to parks and sporting events, where people were easily singled out and tracked. As a result, the security firm's research team is warning that the makers behind wearable technology should be doing more to protect users' privacy while out and about.

You won't be surprised to hear that the issues surrounding tracking wearable technology lie in the way that they communicate with smartphones or other portable systems, which seems obvious when you say it. Still: food for thought.

Video Games Are... Great!

Latest research suggests children should play

It's the tech debate that just won't abate: are video games good for children? You'll have read about studies that say no, absolutely not. You'll have also read studies that suggest that perhaps gaming does present some benefits to kids. This latest piece of research from Oxford University is in the Yay camp.

Scientists in the study which analysed British surveys involved 5,000 young people aged 10 to 15-years-old found that young people who spent less than an hour a day on video games were "better adjusted" than kids who didn't play at all. Unsurprisingly, that's where the benefits end as children exposed to consoles for over three hours a day were apparently less satisfied with their lives overall.

So, the conclusion for now is that age-old adage: everything in small doses.

Hi, John here – Anthony's on Holiday this week...

Personally, I've never been a fan of games like *Farmville*, or *Candy Crush Saga*. While I do appreciate games that can be picked up and played casually – and generally stay away from things that are going to take up too much of my time – I like them to have a little bit more substance than those titles appears provide. Certain members of my family love all that stuff, though. That's fair enough, I suppose... Each to their own.

I do, however, have to keep a check on the younger members of the family when they start to become engrossed in games such as these (the current favourite being *Moshi Monsters Village*) to make sure they don't get sucked into the whole micropayments things we're covering in this week's lead feature. Something that would probably end up with me being out of pocket.

Such business models are potentially having a wider impact that just our bank accounts, though. They could very well be changing videogames forever. Should we care? I do... but you'll have to decide for yourselves.

Until next time...

Meanwhile... On The Internet...

The big internet news virtually everywhere last week was the staggering claim by Hold Security that something in the region of 1.2 billion usernames and passwords (**tinyurl.com/MotI1324a**) had been stolen from over 400,000 websites around the world by a shadowy Russian gang it's dubbed CyberVor – a feat that it believes to be the largest data breach currently on record (**tinyurl.com/MotI1324b**).

It's a shocking number, almost too big to comprehend; and as such, it was quickly met with scepticism from certain quarters – but not just because of the sheer scale. The spotlight quickly turned on the credibility and actions of the company making the accusations, with many commentators questioning the motives of Hold Security, which quickly moved to charge interested parties $120 to reveal whether details from their systems were on the list.

Indeed, the credibility of Hold Security has become something a discussion amongst experts. Bruce Schneier quickly fell on to the side questioning the validity of its report on the hack (**tinyurl.com/MotI1324c**), while Brian Krebs – listed as a 'trusted advisor' by Hold – moved to support the company, and the man behind it, Alex Holden (**tinyurl.com/MotI1324d**), who he says was central to his scoop revealing the massive Adobe hack earlier this year.

The truth, as is usually the case, is probably somewhere inbetween. If we had to put money on it (we don't, thankfully) we'd reckon that, yes, something along the lines of what Hold alleges happened did happen. However, considering that even it's own report states that some of that massive database amassed by 'CyberVor' was bought commercially, the whole thing may not be as massive as it initially seems.

What's we'd also say is that Hold and its allies have handled the whole affair badly (especially when it comes to how its website has gone about signing up those interested in finding out if they are affected by the brief: **tinyurl.com/MotI1324e**). Some have even accused it of showing with more than a hint of cynicism in its approach, and thus has bought this reaction upon itself (we'd agree with this conclusion, which is eloquently explained in this round-up by Mashable's Christina Warren: **tinyurl.com/MotI1324f**). The moral? Be careful out there... And don't jump to believe what you read 'cause everyone's got an angle (**tinyurl.com/MotI1324g**). Except us, of course...

We're going to evoke the spirit of *The Phantom Menace* – if you pardon the paranoid pun – for a second now... Ready?

"I heard the press talking about metadata. I've been wondering: what is metadata?"

Well, if you've ever felt like a young padawan when we've talked about issues like this in the past, we'd like to point you in the direction of this handy little 'Explainer' feature put together by Dan Nolan for *The Guardian*... Which does a nice job of laying it out in a decent amount of not-too-confusing detail (**tinyurl.com/MotI1324j**).

It may pay pay to bone up a bit on your terminology too, if recent reports of a new inside source leaking stories to reporter Glenn Greenwald turn out to be true (**tinyurl.com/MotI1324k**). The speculation comes following an article published on the journalist's site, The Intercept, last week covering the expansion of the US' Terrorist Screening Database (**tinyurl.com/MotI1324l**), which holds the names of people American authorities believe to be "known or suspected terrorists". Apparently there are now something in the region of 680,000 people on that list – which would garners those individuals the closer attention of law enforcement agencies, private contractors and other governments who are afforded access to it.

Interestingly, the information used in the article originated from a file that was created after Edward Snowden did a runner with his massive cache of embrassing powepoint presentations, and other assorted documents of a highly classified nature, leading to rumours that there's a whole new manhunt going on behind the scenes as we write.

We like a bit of Wikipedia news, and we couldn't help noting that it's been in the headlines again following f a court's decision that it was allowed to publish the now-infamous 'monkey selfie' pics without paying photojournalist David Slater for the right (**tinyurl.com/MotI1324h**). Hilariously for us, the decision was based on the fact that the monkey actually pressed the shutter, not the photographer. It's not so funny for Slater, though, who claims the legal action cost him £10,000 pounds, and the case much more in lost income.

.AVWhy?
Videos For Your Eyes...
Not Necessarily For Your Brain

Films like *Lost In Translation*, and TV shows like *Will & Grace* have got mileage out of the trope of western actors doing ads for Japanese products (like this: **tinyurl.com/MotI1324m**), but we've never come across anything as weird as Christiano Ronaldo flogging the Facial Fitness Pao in a commerical that's gone very viral. Cleverly, Christiano doesn't actually use the device – which hints that he's as astute without a ball as with one (**tinyurl.com/MotI1324n**).

Aaaaaaaaand Finally...

You may remember the tenure of Simon Brew as *Micro Mart*'s Editor – keen eyes will have noticed that his name still pops up from time to time. Well, in another life, Simon spends a lot of time watching films and television shows and writing about them for *Den Of Geek* – a website that's also part of the Dennis Publishing 'family'.

We mention this because, last week, he made us insanely jealous by being invited to the Cardiff premiere of the new *Doctor Who*, about which he wrote a spoiler-free review (**tinyurl.com/MotI1324i**), which we currently believe was the first legitimate review of *Deep Breath* to appear anywhere (he types very fast, we've seen him go like the clappers on deadline). No doubt there'll be more coveragethe hype for August 23rd ramps up.

QUICK BITS... Apple has officially completed its $3bn acquisition of Beats Electronics and Beats Music

Caption Competition

"It's the new Android temperature app, but I can only just get it into my mouth!"

This chap looks familiar. Let's see what you made of him, with a selection of this week's caption entries:

- **Malc Wright:** "Oh no it's almost as broke as the MM Forum."
- **JayCeeDee:** "All right - I'm sorry. I shouldn't have taken that Selfie before I got dressed!"
- **Wyliecoyoteuk:** "I SAID 'THE VOLUME GOES UP TO 11'!"
- **Doctoryorkie:** "Call yourself a modern teenager? This phone is last months model!"
- **Doctoryorkie:** "...and the second rule of mime school is we don't post videos of mime school."
- **Thomas Turnbull:** "Google voice search needs a more sensitive microphone to work properly."
- **Doctoryorkie:** "Call that a big mouth? THIS is a big mouth."
- **SpaceAlien:** "You posted a selfie with Justin Bieber? Haaa Haaa Haaa"
- **Doctoryorkie:** "So it was you who broke the MM forum."
- **EdP:** "It is the new Android temperature app, but I can only just get it into my mouth!"
- **Allan Gregory:** "Selfy destruct..."
- **JayCeeDee:** "HOW did you not know that was a video call - and WHY did you tell him you were still shopping!"

Thanks to all of you who battled the MM forum changeover to enter, but the winner was EdP with "It's the new Android temperature app, but I can only just get it into my mouth!"

To enter this week, head to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) and say something funny (but not too rude) about the picture below or email us via **caption@micromart.co.uk**.

Crytek UK To Close

Homefront title rights sold

Sad news coming out of Nottingham as the future of one of Britain's homegrown gaming studios appears to have been closed down.

Crytek UK's major ongoing project was the latest *Homefront* game, or at least it was before the title was handed over to Koch Media's video games label Deep Silver. Founded a few years back, Crytek has been reportedly facing financial difficulties for a while now and it's quite possible that the passing over of this title was to play a part in securing its future somehow.

Interestingly, the title will remain in Nottingham under the hands of Deep Silver's subsidiary Dambuster Studios and reports have suggested that much of the staff have transferred over from Crytek UK to continue work on the *Homefront: The Revolution*.

Armenians Asked To Write On Wikipedia

A call to keyboards

A national campaign has started over in Armenia, aiming to raise the quality and amount of articles on the site that are written in the country's native language.

A group called One Armenian, One Article is asking the nation's good people to each write an article for the site, which is ever-increasing in its popularity in the country. by all accounts. With just 390,000 pages numbers on the site at the moment, perhaps this campaign could really take off.

Snippets!

5S Beaten By 5C

Apple's iPhone 5S has moved over for the 5C model to become Britain's mobile of choice, according to the uSwitch.com Mobile Tracker. Has the 5S dipped because of the impending iPhone 6? Probably, but this has all handed other handsets such as the LG G3 an opportunity to climb the charts and find an audience. Spare a thought for Samsung's once-popular Galaxy S3, though... Now out of the top ten.

WP Users Can BBM

The BlackBerry Messenger messaging platform is now fully available to Windows Phone users, after officially coming out of its beta testing period. With BlackBerry having announced its plans to launch BBM on Windows Phone earlier in the year, it's good to finally see it take its place alongside the existing availability for Android and iOS devices.

Flappy Birds On Fire TV

Surprisingly, the follow-up to the much-talked about *Flappy Bird* app – y'know... the one that got so successful the developer freaked out a bit – has arrived just six months after the original was shut down.

Flappy Birds Family has appeared on the Amazon App Store, but is only available for the Fire TV set-top box at the moment. With a Person vs Person mode, more obstacles and local spilt-screen multiplayer action, this does sound like a genuine sequel to us. But then, we can't be sure as we don't have Fire TV access like our American friends, obviously.

Hrumph.

Microsoft Sues Samsung

Surprise, surprise

In yet another royalties issue, Microsoft has filed a lawsuit against Samsung, this time for being late in making a patent royalty payment.

On the matter, Microsoft wrote in a blog post: "Today's legal action is simply to enforce our contract with Samsung. We don't take lightly filing a legal action, especially against a company with which we've enjoyed a long and productive partnership."

The royalty payment pertained to Android phones and it's thought that this bit of Android licensing business has netted Microsoft a pretty penny over the years. Indeed, estimates abound of the firm earning between $1bn and $2bn from Android device makers paying royalties with over half of Android devices made with licensing deals in place. Wow, we'd sue too.

Typo Is Back!

Keyboard bounces back from BlackBerry injunction

If you watch any trash television at all, it's quite possible that you'll have heard of American TV host Ryan Seacrest. Perhaps most known over here for his role on US singing contest *American Idol* but he is also behind company Typo, a firm responsible for a keyboard case for the iPhone that looks quite a lot like the BlackBerry keyboard. So much so, in fact, that the Canadian company sued Typo and was granted an injunction banning the firm from selling the accessory earlier this year.

Undeterred, Typo is back in the form of Typo 2. This has had a change of shape to the keys, moved the layout around a bit and generally had a bit of a play around with the 'board to keep lawyers at arm's length.

The board is now available for pre-order for a mid-September delivery and we'll be watching this one's progress with interest. As will BlackBerry.

Facebook Fails Again

Second outage in two months

Social media chaos abounded at the start of the month as Facebook suffered from a second outage in as many weeks, leaving users worldwide scratching their heads as posts and feeds became inaccessible. The social media giant handed everyone the usual apologies and promises of a fix as soon as possible – which took only about an hour for UK users, as it happens – and while we have no reason for the downtime at this stage, this is becoming all too regular an occurrence for Facebook fans.

QUICK BITS... Sales of Sony's PS4 consoles and games have helped the company register an increase in

Community Corner

Announcements and other stuff

This is the part of the magazine that belongs to you. If you'd like to send us a picture of your messy computer desk or a photo of you holding Micro Mart on holiday or in a strange place, this is where we'll print it. And should you fancy sending us pictures of cats reading MM… well, let's just say we won't be displeased. Email us at **letters@micromart.co.uk** or get in touch via the forum.

MM Forum: Head to **forum.micromart.co.uk** for discussions about all things PC, networking, OS, mobile, and tech related.

MM Folding Team: With a home on the forum, the Micro Mart folding team is a productive part of Stanford University's distributed computing project. To find out more about folding, and to put your spare GPU or CPU cycles to good use, head to **tinyurl.com/MMFolds**, say hi and help us fold!

The Micro Mart community forums are powered by InstantForum.NET the leading ASP.NET discussion forum platform from InstantASP. Learn more at www.instantasp.co.uk

Agora Cracks Android Market

Kogan brings budget battle to UK

We love a good bargain – who doesn't? – and Australia-based outfit Kogan is trying to royally shake up the Android smartphone market with the launch of its Agora 4G over here in the UK.

Marketed by the company as the best-value 4G smartphone in the world, and available for just £149 from **www.kogan.com**, the Agoa 4G runs on Android 4.4 KitKat and sports a 5" HD display. Also in its specification is a 1.2GHz quad core processor, full-day battery life, 1GB RAM, 8GB internal storage, built-in FM coverage and an 8MP rear camera. Kogan wants to bring smartphones to the masses and it's certainly trying its best with this one.

A 4G phone at under £150 isn't to be ignored and we can imagine this selling a fair few units from visitors to the Kogan site.

USB Malware Can Exist Without Detection

BadUSB attack lives up to its name

New malware known as badUSB has been developed that can take over a PC without detection. Sitting on a USB drive's firmware, any countermeasures aimed at stopping it can be bypassed according to security research labs over in German. In fact, the only way to get around the risk posed by this is to basically only use flash drives that have been used within your own home or business.

This exploit poses a very serious threat in theory with no effective defences in existence to combat it. A timely reminder, then, to know your flash drives and keep tabs on where they came from.

LinkedIn Slapped With Huge Fine

$6m payout in wages and damages

Networking site LinkedIn has been told to pay nearly $6m in wages and damages following regulators' ruling that it had failed to take into account all hours worked by its staff.

That sum included a mighty $3.3m in unpaid wages and a further $2.5m in damages to be paid out to 359 former and current employees for mistakes in calculating their working time. Furthermore, the company agreed to provide compliance training and issue its policy on overtime work to relevant staff following its violations of US labour law.

REVIEWS

Garmin Dash Cam 20

Garmin utilises its GPS technology in a new way

Having worked in the insurance industry, I'm well aware that determining blame in any accident can be less than straightforward. What complicates matters are the high number of drivers on the road who aren't insured, and those who intend to profit from the claims handling systems by creating intentional accidents.

In those circumstances, it would be helpful if you could provide an independent view of events to support your story, and the Garmin Dash Cam 20 is designed to provide that for you.

The device is about the size of a large ring box, and is attached to the windscreen of your car using a sucker mount. The fixed focus lens can capture video in up to 1080p resolution and 30fps, along with still images, all of which are stored on to a Micro SD card. That can be 32GB, and a 4GB is included. When recording, the device uses inbuilt GPS technology to time and position stamp the location, providing further evidence about when and where an event took place. As the recordings are overwritten eventually, a motion detector in the Dash Cam 20 recognises a heavy breaking or impact event, and immediately tags that footage not to be erased.

Exactly how long the recordings last is entirely dependent on what quality you use, and the size of the Micro SD. Using VGA quality and a 32GB card you could record 38.4 hours of travel, and the audio conversations in that vehicle. At the other end of that spectrum using 1080p and a 4GB card would loop the last 48 minutes.

Garmin provides cabling to connect the Dash Cam 20 to your PC, and also so that it can take power from a car socket. The advantage of using that power option is that the camera will automatically record when the ignition is turned, and shutdown when the engine stops.

You can charge the battery in the camera to avoid a dangling cable, but it then becomes your responsibility to turn the camera on and off, and recharge it. And, disappointingly the battery only lasts an hour.

So is this worth it? Well, the problem here is that this device is mostly benefiting the insurance companies, but it's you that's paying for it. If, by installing this device you got a lower premium then it would be worth it, but only a few insurance companies are being that proactive. Typically a 10% discount is being offered for Dash Cams, but you'd need to make sure it was working in the event of a crash.

My other concern is that should someone intentionally crash into you to claim whiplash injury then notice this device, potentially exposing them to a criminal prosecution, they might react aggressively. What's more, should you do something silly and cause an accident, the other driver might insist that you turn over the footage as evidence.

It's a shame that driving has come to this but, given the sums of money involved in automotive insurance these may become compulsory on UK roads in the next decade.

mm Mark Pickavance

An eyewitness that won't be looking at Facebook when you crash

Specifications
Dimensions: 6.6cm x 8.21cm x 3.69cm
Weight: 121g
Screen: 2.3" TFT LCD
Recording framerate: 30 FPS
Battery life: up to 1 hour
Storage: Can accommodate a MicroSD up to 32GB (Class 10 recommended), a 4GB card is included
Also features: Incident detection (G-Sensor), GPS to locate events, Microphone to record cockpit audio

micro mart

7 Quality
7 Value
7 Overall

Otone Twins

In need a set of portable speakers this summer?

DETAILS
- Price: £14
- Manufacturer: Otone Audio
- Website: goo.gl/YKZoKP
- Required Spec: Spare USB port (or USB to microUSB connection), 3.5mm audio port

Otone Audio has already impressed us with its cleverly designed Accento portable speaker, so we were looking forward to seeing what it could do with a set of standard stereo desktop speakers. In reality, of course, there's not a huge amount you *can* add to a pair of desktop speakers to make them considerably different from the millions of other desktop speakers available. However, when you can pay between £5 to £15 for a very basic pair, the quality of the product dictates the price.

The Otone Twins are really good quality speakers for this price range; powered by USB with an attached cable and 3.5mm audio jack cable, they deliver a decent level of audio through the two 2" full-range drivers to a maximum volume of around 70dB – which isn't too bad for a set of 1.5W speakers.

They're very portable, measuring 72 x 125 x 78mm and weighing just 570g, so you can easily hook them up to a

The Otone Twins are certainly better than the average 2.0 speaker sets

Granted, there's not much to them but they're solid enough and sound great

They're also available in pink, or black and silver

laptop or even a phone if you had the correct USB to microUSB connections and enjoy your music collection by the poolside with a little more oomph than the device can normally deliver.

They are available in a range of colours: pink, silver and black, and each features a front grill with a cut out section toward the bottom of the speaker where the volume control is located on the right-hand speaker, and the Otone badge on the opposite number. Beyond that, each speaker is solidly constructed. Yes, they're light and plastic looking, yet there's none of the flexing, sharp edges nor wobbly dials normally associated with the cheaper range of desktop speakers. In terms of design, they won't win awards, but they feel of higher quality than expected and will certainly last you well beyond the lifespan of some of the competition.

Sound quality was surprisingly good; with the volume up as far as it would go and hooked up to a phone there was little distortion. The higher and mid-range frequencies were picked up nicely, and there was a slight hint of bass, just enough to compliment the output,

though not enough to satisfy an audiophile. In a busy or loud, ambient environment, such as on the beach or by the side of an outdoor swimming pool, the Twins proved to be effective enough to be heard by everyone in the group.

Otone has managed to come out on top here, thanks to good audio reproduction, a portable design and solid build. Plus, its managed to do all this and still only charge a mere £14. If you require simple, portable speakers then the Otone Twins will make for an ideal set for travelling with; or simply remaining static on your desktop. Either way, they're a great deal, and certainly worth every penny.

mm David Hayward

A great pair of portable and compact USB-powered speakers

Specifications

- Total RMS Power: 3W (2 x 1.5W)
- Frequency Response: 150Hz ~ 20KHz
- Signal to Noise Ratio: >70dB
- Drivers: 2 x 2" Full range, 3 ohm
- Audio Input: 3.5mm stereo jack
- Power Supply: 5V USB
- Dimensions: 72 x 125 x 78 mm
- Weight: 0.57kg

micro mart
8 Quality
8 Value
8 Overall

Acer Aspire Switch 10

Acer tries to make an inexpensive system akin to Microsoft's Surface RT

When Microsoft launched the Surface RT machines in 2012 this writer was somewhat confused by the thinking behind the product. What I didn't follow was why Microsoft would use its software engineering resources to create a version of Windows 8 on ARM processor, when you could just use Intel Atom to offer a lesser spec machine? It's taken nearly two years, but I now have my answer, in the affordable form of the Acer Aspire Switch 10.

Upon my first encounter, I wasn't shocked to discover that the Switch 10 is mostly plastic – at this price point, anything else would have been a surprise. As such, however, it doesn't appear very abuse resistant. It also seems thick for its overall size and (at 1.17kg) heavy for such a small device.

You can make it lighter by detaching the magnetically connected keyboard, and thus turning it into a pure tablet, but that accessory is useful for both typing and offering a range of ways to support the screen in different situations.

The tablet alone is a more-holdable 585g; that's nearly 120g heavier than an iPad Air (but 60-odd grams lighter than a standard iPad with Retina screen) by way of comparison, and contains a complete PC system built around the Intel quad core Atom Z3745

> ❝ **The Switch 10 serves to underline that Windows RT was a mistake** ❞

1.33GHz. This is surprisingly spritely running the 32-bit version of Windows 8.1 on 2GB of RAM, and shoehorned on to a 32GB SSD.

After updates, that leaves around 16GB of free space for user files and applications, though thoughtfully Acer did also provide a Micro SD slot for some easy expansion.

What impressed me was how well this system ran generally,

and with x86 compatibility it can run most Windows applications well. There is more than enough power here to run Office tools, browse the web, play *Angry Birds* and even render HD movies smoothly. However you dice it, this is never going to be a gaming platform, but for multimedia use it is more than adequate.

The other strength of the Switch 10 is the excellent

LumiFlex display that Acer's put in this system. It might only be 5-point multi-touch, and 1366 x 768 resolution, but its colours are punchy and the viewing angles good. Being 10.1" across the extra detail of 1080p would have been lost, so this resolution seems to work well in this context.

External ports are always something of a lottery on tablets, and the Switch 10 is no exception to this general rule. On the tablet/screen is a Micro-USB port (but, unfortunately, not one you can use to charge the device), an audio jack, Micro-HDMI out and the Micro SD slot. A full size USB port is provided on the keyboard attachment, though it is only capable of USB 2.0 speeds.

Another snag is the very tight storage, exacerbated by Acer's inclusion of Microsoft Office Home and Student 2013. While that represents a great value package, actually installing it eats most of what space you get. For another £35, there's a 64GB model, which is definitely worth the extra if you intend to use Office extensively – a great plan, unless you have hands the size of mine, that find the keyboard rather small and difficult to use at speed.

The Switch 10 underlines that Windows RT was a mistake, and that configurations like this are better – ultimately Windows 8 is an odd animal, though, and the Switch 10 is neither a great laptop nor an exceptional tablet because of it.

That's a shame really, because there is plenty to like, not least Windows plus Office on a system for less than £300. That's great for a student, but I'd worry about how long this enclosure would survive in a satchel. If it had been moderately more robust, I'd of been more inclined to recommend it.

mm Mark Pickavance

A small tablet and keyboard hybrid with average battery life

caused the system to fall backwards when I tried to use it. Acer has an alternative keyboard coming, I'm told, that includes a 500GB hard drive. The weight of that might alleviate this problem, I hope. Though, of course, this will also add to the weight.

Screen brightness was also problematic initially, due to the vagaries of the light sensor that controls it by default. Suddenly the screen would dim for no apparent reason, something that eventually became so annoying that I disabled it and adjusted manually.

That aggressive brightness control could be related to the limited effectiveness of the battery. In general use, the system lasts about four hours, which isn't a great amount of time if you need to work for the whole day without mains power.

Other critical features include an Ambient light sensor, digital compass, G-sensor, MIMO technology, gyroscope, 802.11n wi-fi, Bluetooth 4.0 HS, Stereo speakers and a microphone. So, if you're thinking that his sounds a nice deal for less than

£300, mostly you're right: it is. This system is far from perfect, though, and there are some big caveats that you need to be aware of.

The first issue is that in a normal laptop layout the weight of the tablet section

micro mart

6 Quality

9 Value

6 Overall

Dragon Go Speakers

A new Bluetooth speaker system from Nakamichi

There's been quite an upsurge in the sales of portable speakers recently, with models from companies at both ends of the audio spectrum. It seems that users are no longer satisfied with the poor quality audio provided by mobile phones and media players.

This new Dragon Go Bluetooth Speaker system from Japanese company Nakamichi is a relatively low priced device, with twin speakers providing a power output of 5 Watts RMS each, rated at 50W MAX, although the sound would distort unbearably long before it reaches that level. It also has a Bass unit built into the end of the case.

Just to clarify my comment about distortion, I'm taking about the published specs; in point of fact, considering its size, the unit has pretty good sound output with quite an effective bass component. Something that's difficult to achieve with such small driver units.

It's also quite a small enclosure, measuring just 180mm x 75mm x 70mm, but the build quality is good and it's nicely designed. It has a black metallic grill at the front and contrasting grey panels surrounding the sides. The rest of the case is covered in a black soft touch material that doesn't attract the dust. Not a major selling point, but if you own any of those glossy black devices you'll know exactly why we're making note of it. The unit has a built in 4000ma lithium battery, which under normal use should last roughly eight hours.

As it's a Bluetooth device it's ideal for smartphones or Bluetooth-based media players. Though, if you only have a standard device, you can connect the speaker through the usual 3.5mm jack socket on the back. With Bluetooth V3.0 it works up to 10 metres away; and if you're using a phone as the media source, you can also answer the phone by speaking through the units on board microphone.

There are control buttons built into the top of the speaker for power, volume, track navigation and Bluetooth on/off. One of these doubles as a switch for the on board charger and when you want to answer the phone.

I was surprised to find that there was no charger in the package, although there is a micro USB socket on the back which is the same size as a modern phone charger, so I guess that's how you're meant to charge it. It does however come with a standard USB to microUSB cable and a 3.5mm to 3.5mm jack cable. The USB cable is provided so you can use the speaker as an emergency charging station, very useful for those times when your phone gives up just when you needed to make that emergency call; while the other cable provides a connection to devices that don't operate via Bluetooth. In fact I found it very useful while watching videos on my laptop, which doesn't have Bluetooth but does have an abysmally poor speaker built in.

One thing I've seen on similar speakers that's missing from the Dragon Go is an SD card slot, again it's not a major issue, but very useful if you wanted to use the speaker as a standalone unit.
mm Joe Lavery

A reasonably priced speaker that has good output, and couple of extra features thrown in

micro mart
8 Quality
7 Value
8 Overall

Withings Pulse O2

Roland Waddilove checks out an activity tracker from a new name in the sector

DETAILS
- **Price: £100**
- **Manufacturer: Withings**
- **Website: www.withings.com**
- **Required Spec: n.a.**

The names Cédric Hutchings and Eric Carreel may not be instantly familiar to you, but these two gentlemen are concerned about your health and well being. Cédric and Eric are the founders of Withings, a company that creates products and services designed to enable people to track aspects of their lifestyle. One such product is the Withings Pulse O2, which is described as an 'activity tracker'.

This small device, measuring 43 x 22 x 8mm and featuring an equally small touchscreen, can attach it to your wrist, belt, clothing (using the supplied attachments) or be stored in a pocket, whereupon it can be used to provide feedback as to your sleep pattern, heart rate, blood oxygen level and general activity. This includes such metrics as steps taken, distance travelled and the amount of calories burned by these activities, the measurements for which can then be synchronised to a smartphone or tablet via a Bluetooth connection.

Powered by an internal battery, providing up to two weeks of usage, the Pulse O2 keeps its controls to a minimum. A single button on top of the unit allows you to turn power on/off, cycle through modes and activate a sync. On the rear of the device is a light sensor that provides heart rate and blood oxygen level data. A microUSB port on the base of the product can be used to charge the device with the supplied USB lead.

In order to set up your Pulse O2 you will need to download the free Withings Health Mate app onto your smartphone or tablet (versions are available for iOS and Android), which can be used to set up a free Withings account containing your personal information. The Pulse O2 will then receive the necessary software that allows it to gather the data that will be fed to your smartphone or tablet.

The Pulse O2 touchscreen only has limited viewing capabilities due to its small size. Only one set of data can be displayed at any one time. You can cycle through the different sections by using the button on top of the device, though. You can also scroll through previous days of data by dragging a finger across the screen.

This device can also measure heart rate and blood oxygen level. In order to carry out these tasks you will need to place a finger on the rear-mounted light sensor for a few seconds before the relevant figures appear on the screen. Withings tells me that this blood oxygen level testing is a first for activity trackers and will prove extremely useful for mountain climbers, athletes who train in high altitudes and those with breathing problems.

The device can also be set to record your sleep pattern. For this particular task it is best if you have the Pulse O2 attached to your wrist using the supplied accessory. For other times I preferred to make use of the belt/clothing holder.

The Health Mate app presents the data gathered by the Pulse O2 on its Dashboard or Timeline screens. There is an option to drill down to check on weight, activity, sleep and heart sections and receive basic advice based on your performance. A Help section which I found more useful that the Quick Start Guide, is included in the package.

mm Roland Waddilove

A useful device for the health conscious

micro mart

7 Quality
6 Value
7 Overall

Toshiba Q Series Pro SSD 256GB

Mark checks out some of the first fruits of Toshiba's purchase of OCZ

Without giving away too many trade secrets, this review was originally slated to be on Toshiba's Q Series HDTS212EZSTA, though before I could even put pen to paper on that, it was discontinued. Thankfully, its creators had the new Q Series Pro to offer me instead – and it's a much more interesting device. Toshiba recently acquired OCZ, you see, and the Q Series Pro is one of the first products to emerge following those changes.

What hasn't changed is that Toshiba is still using the same pressed metal sleeve to encase the module. Though in this design it is now just 7mm thick, and is supplied with a spacer to stop it rattling around in a

> ## In real world testing I managed 518 and 489 MB/s; very decent scores

9.5mm 2.5" storage bay of a laptop. If you're investing in an SSD you're really looking for a performance benefit, though, and the quoted read/write speed for this device is 554/512 MB/s. Those numbers hint the

effective read limit cap, and the write speed is very respectable. In real world testing I managed 518/489 MB/s; very decent scores given the vagaries of my Intel test equipment.

So how does this compare with the likes of Samsung and Crucial? The problem here for Toshiba isn't the MB/s, it's the IOPS (I/O Operations Per Second) on random writes. It quotes just 35,000 IOPS for 4KB QD32, where the 256GB Crucial M550 is specified at 80,000 and the 256GB Samsung 840 Pro is 90,000. If you're only interested in your system booting fast and apps launching rapidly then these numbers are irrelevant, but if you catalogue large collections of images (and each requires a thumbnail image written) then this isn't the product for you.

It's worth noting, though, that the two products I compared it with cost more: the M550 is another fiver, and the 840 Pro is more than £40 dearer. Pricewise the Q Series Pro directly competes with the 840 EVO (60K IOPS) and the SanDisk Ultra Plus (39K IOPS). That's another problem. Put simply: the Q Series is better than the Ultra Plus, but it's outgunned by the EVO across the board. A while back, an SSD like this would be a must-buy, but the market is rapidly evolving, and pushing best-in-class to also-ran in the blink of an eye.

For most system builders the Q Series Pro represents good performance at a very reasonable price. Given the competition, though, that's a cost that's only likely to go down from here on in.
mm **Mark Pickavance**

Specifications
- **19nm MLC NAND Flash**
- **256 GB capacity**
- **SATA III Interface (6GB/s)**
- **Read/Write Speed (ATTO 2.47): 554/512 MB/s**
- **Random Read (4KB, QD32): up to 90.000 IOPS**
- **Random Write (4KB, QD32): up to 35.000 IOPS**
- **Trim Support**
- **S.M.A.R.T. Support**
- **Reliability (MTTF) 1.500.000 hours**
- **Operating temperature: 0° C - 70° C**
- **Dimensions: 100 mm x 69.85 mm x 7 mm**
- **NTI Echo (migration software) by download**
- **Box Content Solid State Drive, Spacer for 9.5 mm applications, Quick Start Guide, Warranty Leaflet**

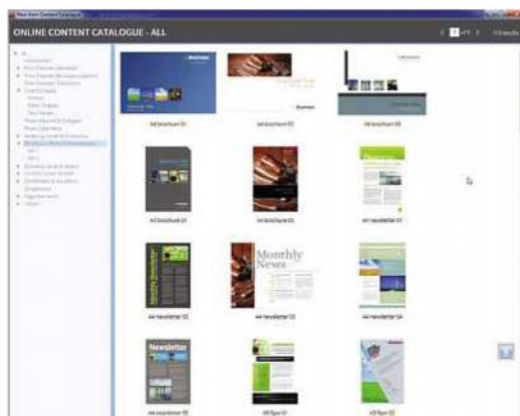**A cost effective SSD with some decent performance benefits**

micro mart
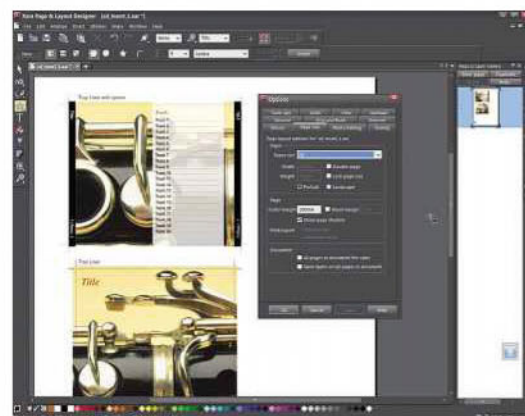|	
7 Quality	
7 Value	**7** Overall

Page And Layout Designer 10

Xara upgrade its page layout program, adding a couple of design and usability enhancements

⌃ *The new online catalogue is a great resource*

⌃ *There's plenty of new content to get you started*

Page and Layout Designer was introduced as a 'Document Processor', the distinction from word processors being it's much wider scope. Basically it includes tools and a design structure engine, capable of handling graphics in a way that word processors simply cannot. It's essentially a program more dedicated to layout and design, yet encompassing many of the graphic and editing elements from the other products in the Xara range.

These are naturally not as comprehensive as the stand alone products, but they do provide most of the rudimentary tools needed in a DTP environment. They also have the advantage of a certain commonality, so users of other Xara products will feel immediately at home.

This latest version includes a few interesting new features, which adds to the pretty comprehensive arsenal it already included. To begin with Xara's added an online extension to the Design Gallery, displaying templates, clipart and smartshapes within a new Content Catalogue. This supplements the gallery that's installed with the program, but displays the content in a web browser at a larger size.

If you're unfamiliar with Xara products, the amount of content you get with the program is staggering; everything from print themes, greeting cards, flyers, photo albums, to buttons and literally hundreds of clipart objects.

SmartShapes have long been a useful feature of Xara products. They are professionally designed, customisable objects that you can drag into a document and adapt to fit your particular project. The handles that appear when an object is selected, allow you to change the size, shape and other attributes while retaining the overall style and design. This release adds new arrows, speech bubbles and fancy text panels that are quite a time saver when you're creating or modifying a layout. I

understand that Xara intend to keep adding to this collection via the online catalogue.

The main menu now includes a drop down insert option, providing another method of accessing the online content, or adding other content to your documents; this includes page numbers, images, shapes and the new Font Awesome Symbols. These are basically a collection of icons that can be inserted within text like any other character, and because they are vector based they can be scaled without losing their resolution.

If you're importing images, the program is now capable of automatically detecting their orientation and correcting them if necessary. Other import improvements have been added with support for .doc files; the PDF filter has been replaced to add much better editing. This now allows editing of PDF files that previously I couldn't edit, which is great for filling in PDF based forms. They've also improved the RTF import/ export filter to cover text styles, embedded bitmaps and more.

Another feature I particularly like that pops up when you insert a new object, is the dialogue to match the colour and text style with the

overall theme of your current document. This is more useful than it sounds, particularly if you're importing graphics that have complex tonal elements, which can take some time to reproduce manually.

This is without question an excellent product that I am perfectly happy to recommend; it has some genuinely useful improvements and at £10 is well worth an upgrade for those with a previous version.

As with all Xara products, you can download a free trial version from the company's website to try before you buy. **mm Joe Lavery**

You get a lot for your money, and Xara Page and Layout Designer 10 adds more useful features

GROUP TEST

Fast Response Monitors

Fast response monitors used to be in a league of their own, and command a princely sum. These days though, a good all-round 1- or 2ms response monitor can be had for just a tad over a hundred pounds.

David Hayward has got hold of six such fast response monitors of varying sizes and prices, to see which comes out as the best

Fast Response Monitors

Acer G276HLA

DETAILS
- Price: £170
- Manufacturer: Acer
- Website: goo.gl/JBCeif
- Required Spec: HDMI, DVI, VGA connections

micro mart

7 Quality
7 Value
7 Overall

Acer often provide us with exceptional monitors, within a very reasonable price range. There are times where it's slipped up, and the quality of the product has dropped, but on the whole it does a pretty good job of delivering the goods. We were therefore quite looking forward to getting our hands on a brace of its G27HLA 27" monitors for a dual display setup we had in mind. Thankfully, we weren't disappointed.

The Acer G276HLA is, by any standard, a very good monitor. It's a larger than average, 27" TN panel with a decent enough 2ms response time that comes with HDMI, DVI and VGA inputs and a dynamic contrast ratio of 100,000,000:1. Viewing angles are 170° on the horizontal, and 160° on the vertical, which isn't up to IPS standards but good enough for the average user.

The build quality is good too; there's a ½" glossy bezel around the screen, with the OSD controls located in the bottom right-hand corner together with the power. Connectivity around the back of the monitor is easily accessible, and there's the relevant holes for VESA mounting should you wish – although if you're doing that you'd probably prefer the video inputs to be facing down rather than straight on, as they are in this example.

It's certainly sturdy enough to sit on a desk and take a few knocks. The included stand is a four-point cross that slots up into the bracket around the back of the monitor, and then screwed in place. This makes for a solid foundation, but one that doesn't impede the monitor's adjustable angle in any way. It's also surprisingly light, weighing in at around 4.5kg with the stand in place, which isn't too bad considering it's not the thinnest panel we've ever come across.

We found the G276HLA to be a bright, clear monitor to use, with great colour reproduction. The 2ms response time is a benefit for watching video or playing games, but it also means there's very little eye strain when spending long hours in front of a Word document or CAD package.

When a pair of these monitors are placed together the effect is quite stunning, and a massive improvement over even a brace of standard 24" desktop monitors. Because of these combined points then, the Acer G276HLA scores somewhat better than expected. The addition of a USB hub and a set of speakers wouldn't go amiss, though. While this would bump up the price considerably, it saves you from having to buy an extra USB desktop hub to replace the handy, within reach, ports you can have with a USB enabled monitor.

On a separate note, we found the OSD buttons to be a little fiddly, and difficult to locate properly. This was exacerbated by only having a few seconds to press the correct button before the OSD powers off automatically.

Acer has put together a very good quality monitor here, though. While, on paper, it may seem fairly average, what lifts it above the norm is the larger 27" display, its 2ms response time and that £169 price. It won't win any awards, but with that screen, connectivity options and such a reasonable price to boot, this ultimately a monitor that will suffice, and provide you countless hours of day-to-day use.

⌃ The Acer G27HLA isn't a bad monitor

⌃ With a nice large screen and reasonably quick response time, it's generally enough for most users

Asus VN247H

DETAILS
- Price: £150
- Manufacturer: Asus
- Website: goo.gl/bxN2NK
- Required Spec: HDMI, VGA, DVI connection

Asus tend to lean toward the cheaper end of the scale when it comes to monitors. Its products are generally very good and certainly affordable, but often lack some of the feature-driven 'punch' another manufacturer would opt for.

Its VN247H, however, is something a little different from the norm: a 24" LED 1920 x 1080p backlit panel, with a Smart Contrast Ratio of 80,000,000:1 and a response time of just 1ms. It has a pair of HDMI ports, DVI, VGA, 3.5mm audio jack for PC input and a 3.5mm headphone jack. There are also a pair of 2W speakers hidden in there, and the entire unit is surprisingly compact and light, measuring in at 548.6 x 394 x 194mm and weighing 3.7kg.

In terms of design, Asus has been rather clever, and produced a monitor with a super narrow bezel of around 9mm thick. What this means of course is when you have a multiple monitor setup, the gap between one monitor and the next is so narrow it's much less evident. There's even a nice image of a nine VN247H monitor setup on the Asus site to elaborate on the benefits of this thin bezel, just in case you ever fancy setting such a monstrously beautiful thing up.

While it's quite an impressive monitor, it does have some odd features that, although good, do make you wonder why on earth Asus decided to include them. For instance, the rear of the

▲ *This Asus model is one of the lightest monitors we've tested*

▲ *And it has a scratch proof rear, for some reason*

monitor is textured and scratch proof, with the OSD controls placed underneath, bottom right – to help keep the bezel thin, one presumes. This works on that count, but makes them extremely awkward to get to. Maybe we're getting cynical in our old age, but what's the point

of having the rear of the monitor scratch proof?

That stand, though, is more than suitable for the job and quite stylish. The leg protrudes from the bottom of the monitor at an angle and sits on a circular foot, allowing the user to adjust the VN24H's

viewing position forward (by 5°) and backwards (by 20°).

Other interesting features of this monitor include 'Splendid Video Intelligence Technology', which optimises the video performance by auto adjusting the monitor output and enhancing colours, brightness levels, sharpness and so on. Naturally, this can be turned off and adjusted – should none of the number of preset video modes, from which you can choose, appeal.

There's also an Asus technology introduced with this monitor called Quickfit Virtual Scale. What this does is allow you to preview photos and documents on-screen in actual size prior to printing them out via a monitor hotkey. It's a clever feature, and one that would certainly suit a designer or photography enthusiast.

The monitor performed perfectly well in our tests. It's solid enough to be moved around without feeling like you're about to break it, the connectivity is ample and the image produced by games, video and normal day-to-day desktop duties was as good as you could expect from a 24" model. The sound was a little weak, but that's generally the deal with monitor speakers.

At a price of around £150, you can't go wrong with with the Asus VN247H.

micro mart

8 Quality
8 Value
8 Overall

Fast Response Monitors

Iiyama ProLite GB2773HS-GB1

DETAILS
- **Price: £271**
- **Manufacturer: Iiyama**
- **Website: goo.gl/nTv4JF**
- **Required Spec: HDMI, DVI, VGA connections**

⌃ *Although the Iiyama does a decent enough job, it feels a little cheap*

⌃ *It is one of the better home user ergonomic monitors though*

This Iiyama ProLite model is aimed squarely at the gamer for a number of reasons. The first is impressive 1ms response time, the second is the impressive 144Hz refresh rate. The fact that it's actually sub-titled 'Pro-gamer', is also something of a giveaway as to its intended market. However, even if you're not a pro gamer this monitor is certainly going to look good, no matter what you output to the screen.

The GB2773HS-GB1 is a 27" TN LED backlit panel capable of 1920 x 1080 (higher resolutions for a 27" screen would have better), with an Advanced contrast ratio of 5,000,000:1. We've already mentioned the 1ms response time, but it's the addition of the 144Hz refresh rate that makes for the smooth visuals and eliminates any visible signs of screen tearing when the action speeds up or panning of landscapes occurs.

Connectivity on this model is pretty average, though: there's a single HDMI, DVI and VGA port, along with 3.5mm audio in and headphone out. It's enough, granted, but most modern monitors feature dual HDMI. The speakers though are slightly better than the average, being 2.5W as opposed to the usual 2W. It's not much, but just enough to make a noticeable difference.

The design of the GB2773HS-GB1 is okay, but there's rather a thick shiny black bezel surrounding the screen that tends to distract somewhat. It's also quite a heavy monitor weighing 7.4kg, and measuring in at 647 x 415.5 x 230mm.

> ❝ **Despite the bland design this is an ergonomically minded monitor** ❞

However, despite the bland design this is an ergonomically minded monitor, something we don't often see outside of the business world. It's height adjustable, to a maximum of 107mm, can swivel 45° both left and right, and can tilt 17° up and down. The height adjustment alone is enough of a selling point to make note of, and something that is sorely missed and often neglected in a vast number of home-targeted monitors.

We did find the monitor casing felt a little cheap, and the OSB menu buttons, located on the front of the monitor in the lower right of the screen, appeared to need two or more presses before they actually decided to work. The movement and ergonomic adjustments were okay, though, so in this case we'll assume that once you have the monitor in a comfortable position there'll be little need to move it about.

In our usage tests the Iiyama ProLite GB2773HS-GB1 fared very well. The picture quality was great throughout the movies, fast action sequences and normal day to day duties. The gaming side of things, which this monitors prides itself at being good at, was more than suitable and very smooth in terms of performance and action.

The Iiyama ProLite GB2773HS-GB1 is one of the more expensive monitors in this group, priced at around £271, but it does a good enough job and the ergonomics are certainly worth some of that premium. There are other monitors available for less that offer just as good picture quality, though – and, in all honesty, would you be able to tell a 144Hz monitor from that doesn't offer such a high refresh rate?

micro mart
6 Quality
7 Value
6 Overall

BenQ GL2450

DETAILS
- Price: £105
- Manufacturer: BenQ
- Website: goo.gl/TevUYq
- Required Spec: DVI, VGA connections

▲ *The BenQ GL2450 lacks a number of essentials to make it really good monitor*

▲ *It's just not worth spending your money on, to be honest*

Basic monitors are all fine and well, and they do have a place in the home or workplace, but there comes a point when a product can become a little too basic. This BenQ GL2450 is one rung up the ladder from being totally basic, but not by much.

This is a 24" TN LED backlit panel capable of 1920 x 1080 with a native contrast ratio of 1000:1 and a dynamic contrast ratio of 12,000,000:1. It has a 2ms response time, which is reasonable enough, but sadly lacks any HDMI – instead opting to provide a single DVI and VGA; there are also no built-in speakers on this model, although in some respects that's not a bad thing.

The lack of HDMI isn't too much of a disability, however it does make the BenQ GL2450 a little less appealing to those who run multiple systems from a single monitor. We, for instance, have three different systems connected to our monitors, as do many other users. So the inconvenience of having to remove or swap out cables on the GL2450 can get quite annoying over time.

The design of the BenQ GL2450 is rather bland. It's a glossy black finish, prone to dust, scratches, cat hair, and fingerprints, with a reasonably thick bezel surrounding the obviously-cheaper-than-normal screen. Speaking of cheap, the overall feeling throughout the case, stand, and tilt movements is extraordinarily basic. In fact,

it's quite surprising to see BenQ putting its name to this as its products are usually of quite a good standard.

However, saying that, the image quality was slightly better than we expected it to be, based on the exterior quality of

> ❝ **The image quality was slightly better than we expected it to be, based on the exterior** ❞

the monitor. It wasn't great, not by a long shot, in fact it was the worst of the group, but we've seen worse from monitors twice the price of the GL2450. It certainly lacks colour depth, richness or sharpness, although there were no visible signs of tearing or anything during fast gaming or movie sequences thanks to the 2ms response time. The problem throughout was the washed out (or, rather, cool temperature) look that

this monitor produced. We did alter the setting slightly via the OSD, but it never really quite delivered anything as good as the other monitors on test.

While this won't bother someone who would use it exclusively for word

processing, or even browsing to some extent, as soon as you start viewing a significant amount of colours on screen (and we're not just talking about games, TV or movies here) you'll begin to notice the cold blue-tint to almost everything, and the washed out feeling we just mentioned.

Needless to say we weren't overly fond of the BenQ GL2450, however, in this day and age you get what you

can afford and in this case for a tad over £100 the GL2450 would best suit the infrequent computer user who, when they do use it, will simply tap away in Word. For those who require more from a monitor though, this is, unfortunately, one to avoid.

micro mart

5 Quality
7 Value
6 Overall

Fast Response Monitors

AOC E2461FWH

AOC has had something of a run in recent years of really good, value for money monitors with a wealth of features and great performance. This, the E2461FWH, is a slightly older model (being from 2013), but it's certainly more than enough for the vast majority of users to sink their teeth into.

It's a 24" LED backlit panel, with the obligatory 1920 x 1080 resolution a very reasonable 2ms response time. It has a 50,000,000:1 dynamic contrast ratio and an exceptionally thin screen of just 13mm. On the subject of thin, the AOC Style line is very much in vogue with the current home user's monitor wishes and features an equally remarkably thin bezel around a good quality panel. The rear of the monitor is textured and the ports, rather than having them embedded in the back of the panel, are integrated into the rear mount under the VESA fixings and above the stand arm. This helps keep the thin aspect throughout, although there is a compromise.

The compromise in this case is the lack of connectivity. Around the back we have HDMI, VGA and DC power in – of the power brick variety and not the kettle lead kind – which for the most part is generally enough, but as with other monitors we've tested the lack of an extra port will drastically reduce the monitor's effectiveness to the

▲ **The AOC E2461FWH, with red tint glow on the base**

▲ **Very stylish, and not a bad monitor either**

> **❝ A great screen inside a stylish monitor case for a just over a hundred pounds ❞**

user who requires multiple connections to various machines and other devices.

However, what the E2461FWH lacks in connectivity it certainly gains in the quality of the visuals. This is easily one of the best screens we've tested, with

to take the rigours of a frantic gamer or being moved around a lot. There are also some subtle red tinted highlights to the base of the stand that, while doing nothing more than providing a pleasing glow, are quite stylish. As with most ultra-thin bezel monitors, though, the OSD controls are located around the back right-hand side, and as such are quite fiddly to get used to. Also, and for some unknown reason why, the symbols indicating the function of the OSD control are also around the back of the monitor. Are we the only people in the world who don't bother looking around the rear of our monitors once they're in place?

The AOC E2461FWH performed magnificently when gaming, watching movies or TV, photo editing and during the day-to-day word processing and internet activities. This monitor pretty much handled everything with aplomb, making it a fantastic all-rounder; when you consider the price £109, it's incredible value as well.

AOC has managed to bundle a great screen inside a stylish monitor case for a just over a hundred pounds, but in doing so they've sacrificed an extra port or two and continued the awkward trend of rear mounted OSD controls. Saying that, this is a lovely monitor and well worth the asking price.

crystal clear, sharp edges, deep colours, blacks and greys and no noticeable tearing during moments of high intensity action or rapid visuals.

The quality of the monitor also extends to the outer casing, which is certainly solid enough

micro mart

8 Quality

9 Value

8 Overall

Philips 242G5DJEB

DETAILS
• Price: £270
• Manufacturer: Philips
• Website:
goo.gl/jZLiO0
• Required Spec:
HDMI, DVI, VGA, USB 3.0,
MHL device

▲ This Philips monitor has pretty much everything, and then some

▲ Including a funky, retro remote

Just as with the Iiyama ProLite monitor, this Philips 242G5DJEB is a monitor with the gamer squarely targeted in its sights. It trumpets this by making sure the semi-magical 144Hz badge adorns nearly every conceivable surface of the box and packaging. It's not just gamers that would greatly benefit from the features this monitor has to offer, though.

The 242G5DJEB is a 24" TN LCD backlit panel with a rapid 1ms response time and, of course, the aforementioned 144Hz refresh rate. The standard contrast ratio is 1000:1, with a Smart Contrast offering an impressive 80,000,000:1. Connectivity on this model is, quite frankly amazing: a pair of HDMI ports, DVI, VGA and both a normal DisplayPort and the obscure mini-DisplayPort for added effect. One of the HDMI ports is also MHL compatible, so you can hook up your phone or tablet and enjoy a spot of big screen *Angry Birds* should the need ever arise. Added to that little lot is a four-port USB 3.0 hub with one of the ports designated as a Fast Charger.

In terms of image-related features, there's also a new Philips video mode called SmartImage, which offers several pre-defined modes dedicated to certain aspects of gaming: FPS mode, Racing mode and RTS mode all speak for themselves, but can also take up the option of customising your own preferred modes and store them in the alloted Gamer1 and Gamer2 preset slots.

Another concept that could be of interest to gamers is the SmartFrame feature, that enables you to highlight a specific area on the screen by boosting the gain level of RGB for the selected area. This, in theory at least, will allow you see an opponent by focusing your attention to the area specified. Whether you would actually find this of any use is going to be down to personal preference, but it's another example of the innovative features that make up this monitor's impressive spec sheet.

Finally, you can add to that list SmartKeypad, a remote control on a wire (very 80s Betamax), that gives you access to the OSD controls without having to reach over the monitor while mid-game.

Build quality is very good throughout, but in terms of the design, this monitor is surprisingly basic. However, the extraordinary level of connectivity and features make up for its rather drab and bland looks. Still, you could argue that looks aren't as important as features or price, but for those who do care about such things it's worth looking more into at any rate.

In our tests the Philips did reasonably well, although the picture quality wasn't quite as crisp, nor the colours quite as brilliant as the previous AOC. It was certainly quite the performer, though, and thanks to the 1ms response time and the 144Hz refresh rate the content on-screen whizzed by without any perceivable difficulty inherent to fast motion imagery. Aside from the gaming side of things, normal day to day duties performed well, and despite the picture quality not being as good as we expected, it's still adequate enough for photo or video editing.

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9 Quality
7 Value
8 Overall

Asus VN247H

We were impressed with the Asus VN247H. It has everything you could need, whether you're gaming, watching video or just having to work in front of it for hours on end.

It's also not a bad price either, and the 1ms response time is plenty to get the best from your PC on.

Philips 242G5DJEB

Fair enough, it may checkout as the second most expensive monitor in the group, but the Philips 242G5DJEB has a huge amount of potential and is loaded with connectivity, extra features and some pretty impressive performance enhancements too.

How We Tested

Each monitor was subjected to a rigorous set of tests involving us playing a variety of games, *Burnout Paradise*, *Battlefield 4* and *Skyrim*; movies, and normal day-to-day word processing as well as photo editing using Gimp. It's a dirty job, but someone's got to do it.

	Acer G276HLA	Asus VN247H	Iiyama ProLite GB2773HS-GB1	BenQ GL2450	AOC E2461FWH	Philips Brilliance 242G5DJEB
Price	£170	£150	£271	£105	£110	£270
Dimensions	639 x 442 x 179mm	548 x 394 x 194mm	647 x 415 (522) x 230mm	436 x 579 x 179mm	545 x 400 x 214mm	565 x 517 x 220mm
Weight	4.6kg	3.7kg	7.4kg	4.1kg	2.6kg	6.27kg
Screen size	27"	23.6"	27"	24"	23.6"	24"
Response time	2ms	1ms	1ms	2ms	2ms	1ms
Static contrast ratio	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1
Dynamic contrast ratio	100,000,000:1	80,000,000:1	5,000,000:1	12,000,000:1	50,000,000:1	80,000,000:1
Resolution	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080

Tech Origins
Linux

David Briddock explores the story behind the world's most successful operating system

The UNIX operating system grew out of work performed by academic institutions in the late 1960s. By the early 1970s, companies new and old raced to offer commercial versions.

But the UNIX world often resembled a battleground. Fierce rivalry existed between competing versions. Copyright infringement court cases were vitriolic affairs, and licence costs were far too high for the typical home PC user.

Multics And Unics

In the 1960s, Massachusetts Institute of Technology (MIT) teamed up with a number of technology companies to develop a brand new operating system called Multics (Multiplexed Information and Computing Service).

Although Multics was experimental in nature, the potential was clear to see. So in 1970 AT&T, one of the principal players, dropped out of the Multics team to concentrate on their own Unics operating system.

The C language was key to the development of both Multics and Unics. During this period the language evolved rapidly to meet the needs of developers. Most importantly, the C compiler was ported to numerous platforms. This ensured it was a relatively straightforward task to have the operating system running on the latest hardware.

Andrew Tanenbaum

Many years later in 1987, computer science professor Andrew Tanenbaum developed his own UNIX clone. Called MINIX (which meant minimal UNIX) it could run on the small, affordable personal computers of the day.

It was his professorship role that inspired Tanenbaum to create a free, powerful and flexible operating system suitable for teaching computing. MINIX was in many ways quite innovative with its microkernel architecture, yet it didn't gain much momentum outside the academic communities.

Linux Torvald

Meanwhile in Helsinki, a software hacker called Linus Torvald was working on his own software project. The distinct lack of software products in his native Finland drove Torvald to write most of his software from scratch for his first computers, the Commodore VIC-20 and Sinclair QL.

> 66 **The Linux core, known as the kernel, has grown substantially in functionality** 99

After studying Tanenbaum's book *Operating Systems: Design and Implementation* and playing around with MINIX, he decided to build a UNIX system for himself – just for fun. Implemented on the popular Intel 386 chipset, it was the birth of Linux.

Critically, Torvald decided to adopt the GNU General Public Licence (GPL). This helped to encourage community involvement, while offering protection from commercial exploitation. And he could benefit from Richard Stallman's collection of GNU libraries and tools, such as the GNU Compiler Collection (GCC) and command line shells.

The Linux Phenomenon

In summer 1991, Torvald released Linux 0.1 to an eager world. The GPL strategy paid off immediately. In just two years, Linux was transformed from a single-person project to a world-wide development project with over 100 developers. With community help, the first stable 1.0 version was released in 1994. Version 2.0 appeared just two years later.

Over the last two decades, the Linux core, known as the kernel, has grown substantially in functionality and reliability. The latest Linux 3.13 kernel contains more than 17 million lines of code in over 43,000 files.

Today Linux can be found everywhere. It's in smartphones, tablets, broadband routers, smart TVs, automobiles, millions of PCs and the servers that drive the worldwide web. And as the trend for wearable technology gathers pace, its influence is destined to continue. **mm**

‸ *Andrew Tanenbaum*   ‸ *Linus Torvald*

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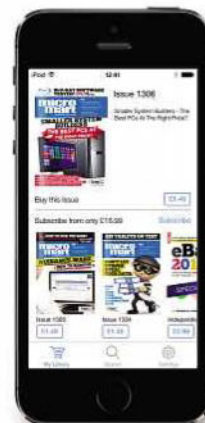Each issue of *Micro Mart* will be delivered directly to your device each week.

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How-to Basics
Powershell Introduction *Part 1*

This week, **David Hayward** gets to grips with a command line tool

Powershell, in case you didn't know, is a new command line shell similar to that of the old MS-DOS command shell from Microsoft. Well, we say new, but it actually started life about seven years ago and its roots can be traced back even further with the implementation of the Windows Script Host from Windows 98 (the Active Script Engine).

It's basically a configuration and script management framework built on the .NET Framework, targeted at system administrators so they can administer their entire network from a single console with a collection of scripts. With bigger and more complex active domains, Powershell will expand the capabilities of the traditional GUI management console tools, thus hopefully making life a little easier for the system admin. Plus, learning it now, while it's still big in the industry and lacking in skilled technologists, will certainly look pretty impressive on the old CV.

Powershell already comes as part of Windows 7 onwards, including the more recent server versions, but you can download v1.0 for Windows XP from **goo.gl/uE7dyl**.

Getting Started

The first thing you'll see when you load up Powershell is a DOS-like command windows, only with a blue background and the familiar black background.

In here all your usual command line arguments and executables can be run alongside any existing batch files and VBScript files. So commands such as dir, cd, cls and md will all work, but there are also a ton of other commands included, like ls and things called Cmdlets.

Cmdlets are Powershell specific commands that are linked with lot of aliases as predefined from the Powershell command line. There are over 200 core Cmdlets but, you can write your own along with a help file.

A Cmdlet is therefore just another script, albeit a more powerful or specific one than normally used in a command line situation. An example of Cmdlets can be:

get-location: Displays the current directory.
set-location: Will change the current directory.
copy-item: Copy files.
remove-item: Remove a file or directory.

move-item: Move a file.
rename-item: Rename a file.
new-item: Creates a new file or directory.

However, you can also use:

gl

This is an alias to the get-location command, much as in the Linux terminal.

To get a list of Powershell aliases, enter the following:

get-alias

So common commands such as cd (change directory) are, in fact, an alias of set-location; copy or cp is an alias of copy-item and so on.

For a huge list of what's a Cmdlet, alias or even a function (such as a drive letter C:, D: etc.), enter this command:

get-command

If it's easier to read, you can pipe the output to a text file with the following:
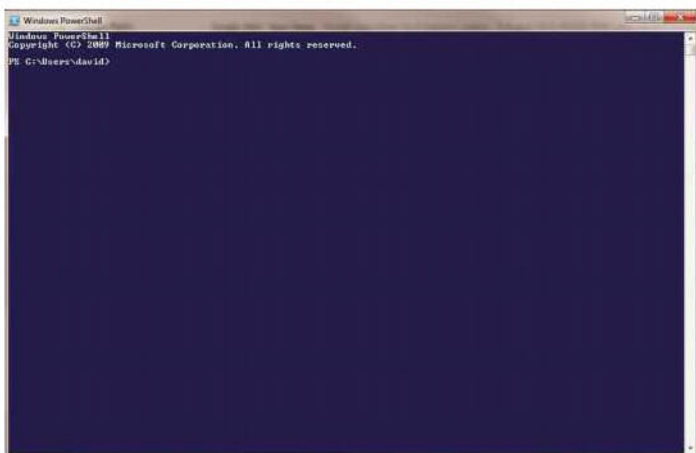
▲ *The Windows Powershell in all its glory*

<div style="border:2px solid red">

Execution Policy Won't Apply

If you've entered the set-executionpolicy remotesigned command and instead of Powershell accepting the command, you receive a red-lettered alert informing you that access to the registry key is denied, then you'll need to do the following:

• Click on start and type in regedit.
• Browse down the registry for the entry HKEY_LOCAL_ MACHINE\SOFTWARE\Microsoft\Powershell.
• Right-click the Powershell entry, then left-click Permissions.
• Highlight Users (Windows\Users) and tick the box next to Full Control.

The next time you enter the set-executionpolicy command and answer Y, Powershell will accept it.

</div>

▲ The execution policy command will allow you to run scripts

▲ To access Powershell, simply enter it into the start search box

▲ If you can't run the execution policy, this reg hack will do the trick

    get-command > commands.txt

One thing you'll no doubt notice by now, when listing large sections of commands or help functions, is that there's generally always an elipsis (three full stops or dots) after some descriptive text. This means that there's a lot more information included with the Cmdlet, but Powershell decided that it was too much to fit onto the screen in one go.

If you therefore want to view the entire additional information with each Cmdlets, alias, function and pipe it to a file for later reading, then enter:

    get-command | format-list

And to pipe it to a text file:

    get-command | format-list > commands.txt

Or if you want to use an alias:
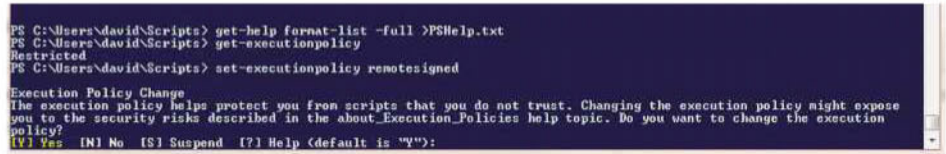
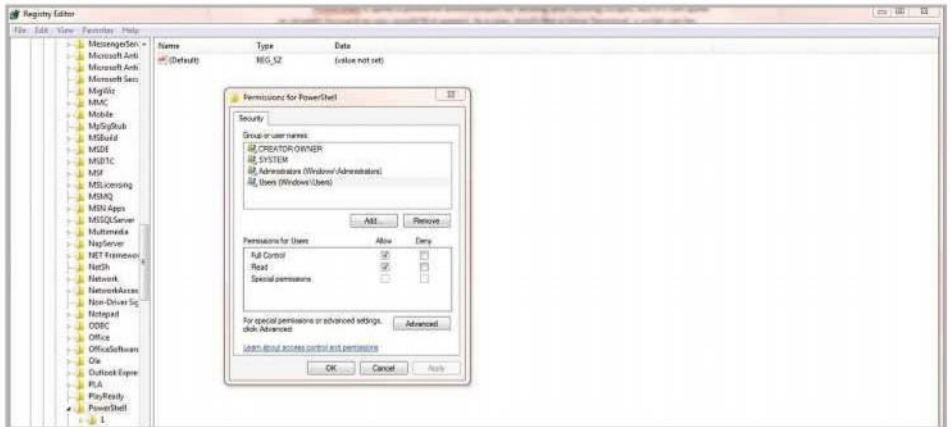   gcm | format-list

More Help
Powershell has quite an extensive help system built into it, but it's also rather complex and in some cases it's not all that helpful, to be honest. By far the best method of learning the intricacies of Powershell is via an online tutorial or from a book, but if you fancy giving the built-in help a try, then enter the following:

    get-help format-list -full

And, once more, to pipe that to a text file to make it easier to read, enter:

    get-help format-list -full > PSHelp.txt

The help system isn't too bad if you're just looking for a few commands to try out. For example:

    get-service | format-list

This command has a decent enough explanation associated with it: "This command formats information about services on the computer as a list. By default, the services are formatted as a table. The Get-Service cmdlet gets objects representing the services on the computer. The pipeline operator (|) passes the results through the pipeline to Format-List. Then, the Format-List command formats the service information in a list and sends it to the default output cmdlet for display."

Slightly more complex commands, however, are naturally more aimed at the knowledgeable system admin and, as a result, the help information associated with it is as long-winded as the command itself. For example:

    $a = get-childitem $pshome*.ps1xml

Scripting, Before You Begin
Toying with the various Cmdlets and aliases is all fine and well, but it's only the tip of the Powershell iceberg. If you stick with just the Cmdlets, then you're only using a slightly more elevated version of the command prompt. To really use Powershell in the way it was designed for, you're going to have to start playing around with some scripting.

Powershell is quite a powerful environment for writing and running scripts, but it's not quite as straightforward as you would first expect. In a way, much like a Linux terminal, a script can be edited in any text editor, but it won't work until it becomes executable. In other words, until it has been stamped as an executable file, it's just another text file.

This is known as the Windows Execution Policy, which can be viewed by entering:

    get-executionpolicy

This by default will say 'Restricted'. To get past this and to be able to run any script created by you or from a digitally signed online source, you'll have to enter:

    set-executionpolicy remotesigned

This will result in a brief warning about running potentially harmful scripts and a quick Y or N to check this is actually what you want. In Microsoft's defence, running an unknown script can have some nasty consequences, like if a batch file had the command 'format C: /y' hidden in it.

The idea here, though, is to be careful what you run and learn about the commands before executing every old thing you come across on the internet. For now, though, and if you're careful, you can answer Y (see boxout for an error message).

Next Week
Next week, we'll continue our introduction to Powershell with a look at scripting and how it works. **mm**

What Do Multiple CPU Cores Do?

We've all grown accustomed to buying dual-, quad- and even octa-core processors, but do we really need them, wonders James Hunt

It's been almost ten years since the first dual-core desktop CPUs appeared on the market, and since that time, multi-core architecture and processor parallelisation has become the preferred refuge of CPU manufacturers everywhere. As transistors crept ever closer to the point where shrinking them further would be both physically and financially difficult, the solution to a demand for more powerful processors wasn't to follow the existing technique, pushing clock speeds faster and faster: it was to stick two CPU cores together and let them do double the work of one. And then to double that. And then double it again.

But are multi-core CPUs being used to their full effect? What's the difference between AMD's eight-core chips and Intel's quad-core chips? And does it matter how many cores you've got? Multi-core processing has had one undeniable effect on the computing industry, and that's to make it considerably more complicated. That's why we've looked into what multi-core processing means and whether it's actually useful to you, the actual user, or just another way to keep CPUs selling.

Single Vs Multi-threaded Processing

The useful thing about multi-core chips is that they're good at multi-threaded processing. That sounds logical enough on paper, but it doesn't really give you any indication of what it actually means. To help you understand how processing works and how multiple cores can help make chips faster, think of each core as being like a lane of traffic on a motorway. Cars carry the data, and each colour car represents a different processing thread.

In a single-core chip, you have a single lane road, which traffic travels down. Cars of every colour join the same lane and can

only proceed as fast as the one in front of them, whether it's the same colour or not. This means the core is serving multiple different threads, and data travels slowly because threads hold one another up.

In a multi-core chip, you have two (or four, or six, or eight) lanes of traffic, and the cars of different colours can each separate into different lanes. This allows more cars to reach their destination in less time, and means that the streams of traffic aren't interrupted as often. While the cars are still travelling the same distance, they get there more quickly – especially if one breaks down or begins to travel slowly.

It's a crude explanation of what happens inside a chip, but it's basically correct. Of course, the truth of the matter is less straightforward.

That analogy makes it sound as though a leap from one to two CPU cores would increase performance by 50%, essentially doubling the CPU's capacity – but other factors further influence the amount of data that can reach each core, such as internal bandwidth and storage access times, both of which can have an effect on the speed increases gained from adding an additional core to a processor. The bottlenecks created by these components are outside the processor itself, so no amount of adding extra cores can reduce them.

> ❝ In a single-core chip, you have a single lane road, which traffic travels down ❞

Indeed, because of bottlenecks and a lack of optimisation, when adding a second core to a CPU was first tried out commercially, it only resulted in a 10-20% performance increase. Many dual-core CPUs performed worse than single-core ones, because they ran at a slower clock speed and the extra core didn't fully compensate for that shortfall.

There's a further problem in that the workload isn't divided evenly between the available cores. You can assign different program threads to different cores, which is good for multi-tasking, but modern chips are so fast that running more than one application at a time doesn't even tax a single core. Assigning a browser to one core and a word processor to other isn't likely to result in much of a performance increase, because both are so resource-light in the first place.

Where multiple cores help most is in allowing a single resource-heavy program to divide its workload between multiple cores, using multi-threading. Unfortunately, programs must be specially written to take advantage of multi-threading in this manner, and it's very rarely the case that they are. We still see only the true advantages of parallelisation when programs are built specifically to take advantage of it – and given that almost all of us are running quad-core chips, it happens less than you might think.

Multi-core processing does have other advantages, of course. Having two cores means both can run slower to achieve the same performance, which increases reliability and lifespan compared to a single core of equivalent capabilities. They can also make more efficient use of available bandwidth, since one can process instructions while the other is processing it. But even now, true multi-threading is rare – especially in the places it'd be most useful to home users.
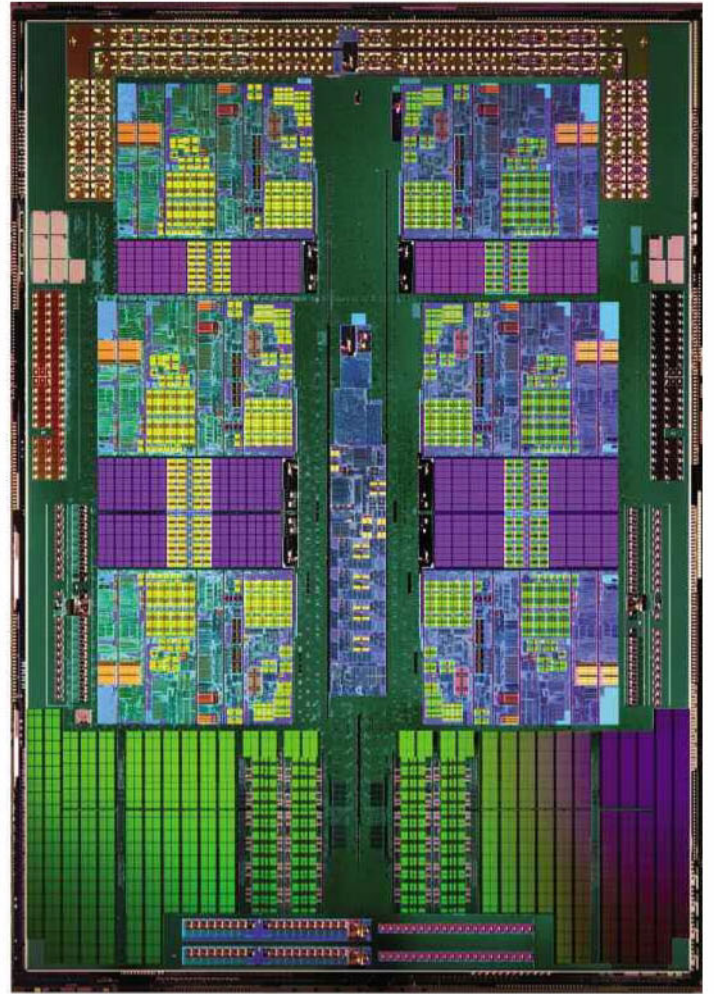
Multi-threading For Games And Applications

When it comes to buying high-end chips for gaming purposes, you'll hear a lot (not least from us) about how Intel's CPUs are currently vastly superior to AMD's. That's because Intel's single-core performance is much better than AMD's, and even now most games still rely heavily on single-threaded processing, which only uses one core.

While some games do support multi-threading, it's generally inefficient to add this support, given the time it takes to code the extra capabilities. The majority of games – even the most modern examples – simply don't do enough calculations to make any implementation of multi-threading give a significant performance return. Especially once the visuals have been delegated to a GPU, there's no real burden on the CPU that would mean true multi-threading could improve performance to the point where it would justify the time spent coding it.

Having additional cores does give some performance leap when gaming (after all, background processes can still be assigned different cores to the game itself), but the improvement is greatest when you move from single core to dual core, because this allows a game full use of an individual core. Moving from dual-core to anything higher offers considerably less of a boost, and moving from quad core to anything higher gives almost no noticeable performance improvements – certainly none worth paying for!

This is part of the reason that you'll often see gaming PCs that run on Intel's Core i5 CPUs rather than the more powerful Core i7 chip. It isn't a question of trying to save money on chips that are almost but not quite as good – it's that the performance

leap for games is so low that it's not worth spending the extra money on the higher-end chips if you're only building a gaming PC. The main benefit that Intel's Core i7 chips have over their Core i5 siblings is their extra Hyper-Threading capabilities, which is something games can't make proper use of.

In theory, the Core i7's Hyper-Threading means it can process faster, but in practice the speed increase can be as little as 5% on single-threaded tasks, and some of that increase can be attributed to the marginally faster clock speeds of Core i7s. Since games run mostly single-threaded, there isn't a lot of slack to pick up. If you buy a Core i7 over a Core i5 you spend far more money than the limited improvements can justify.

For the most part, the types of applications that take full advantage of multiple CPU cores are professional media editing programs, where lots of heavy data-crunching is required. Video

66 Good multi-core performance isn't indicative of good performance generally 99

conversion and 3D rendering suites are particularly improved by multi-core chips, and certain anti-viruses (those that do their processing locally) are also able to take advantage of extra cores. Simpler programs, like web browsers, word processors and media players gain almost nothing from the availability of extra cores, because they can't multi-thread.

If you're a heavy user of software that does multi-thread correctly, you should see that AMD's chips compete with Intel's far more convincingly than they can in gaming rigs, and you can justify the cost of a Core i7 because it'll be able to flex its full might. But even now, it's rare for a home user to get full use out of a multi-core system. More than anything else, the type of software you plan to run is a particularly important requirement to consider when you're looking into what type of CPU to buy. If you're gaming, look at single-core performance first.

Benchmarking Considerations

One of the interesting quirks of multi-core computing is that the tools used to benchmark multi-core chips are more able to avail themselves of the extra cores than any other program that most users will run on them. What this means is that two chips can perform very differently in the real world than they do under synthetic benchmarking conditions.

If you run synthetic tests, for example, they tend to show a 50% performance increase for each additional core – the theoretical maximum. Tested in practical situations, each new core results in a performance increase somewhere between 15% and 35%, which is far lower. AMD and Intel chips also perform very similarly under benchmarks, because the synthetic testing allows AMD's additional cores to compensate for the single-core performance shortfall you'd feel under normal usage.

These factors make it tough to compare CPU performance based on benchmarks alone, because good multi-core performance isn't indicative of good performance generally, nor does it tell you how good your CPU will be when it comes to playing games or videos. As with most benchmarks, the statistics can be manipulated for marketing purposes and often are.

But once chips are using different architectures, comparing using synthetic benchmarks is largely pointless. If you want to rely on benchmarks, stick to using them within processor families only. Clock speeds at Intel aren't any relation to clock speeds at AMD, and cores at Intel aren't any relation to cores at AMD, so comparisons are only of any practical use inside the families.

If you really want to compare the performance of two sufficiently different chips, the best way to do so is to avoid anything that tests synthetically and stick instead to real-world tests, such as those done by benchmarking software Fraps, where the reading involves actually running a game rather than just crunching numbers!

Intel Vs AMD

We've mentioned several times that Intel and AMD use completely different architectures, but what does that actually mean?

Intel's multi-core architecture contains true CPU cores, meaning each chip has a floating-point unit alongside its main processor core. By comparison, one of the problems with AMD's multi-core approach is that its cores aren't true cores, because they don't incorporate a separate floating point unit. AMD's cores share an FPU in pairs, meaning its eight-core CPU is made from four units, which are roughly equivalent to Intel's cores for normal operation. Combine that with generally poorer single-core performance, and you start to see how AMD's eght-core chips can offer performance worse than Intel's similarly priced quad-cores.

Some of Intel's chips also include Hyper-Threading, which is a way of doubling the capabilities of any compatible core.

CPU cores all have the same limitation: they can only execute one instruction at a time and must wait while the next is loaded. Even though this happens incredibly quickly, it still leaves a

Moore's Law
Originally given in 1965 by Gordon E Moore, Moore's Law is a rule of thumb, which describes the development and possible limitations of computer hardware, particularly when applied to processors. Moore observed that the number of transistors in integrated circuits had doubled every year. He also predicted that the trends of exponential growth would continue for at least the next ten years.

In actuality, it has continued to be true for almost 50 years.

The reason this matters is that while Moore's law has guided hardware development as much as described it, it cannot continue indefinitely. The trend of smaller circuits with more transistors can only be pursued to the point where physics can accommodate them, and eventually – probably within a decade – it is believed that Moore's law will no longer apply, as CPUs reach a plateau in their development that cannot be risen above.

As these limits approach, parallelisation using multiple cores has become necessary. By circumventing the problem of heat dissipation associated with greater clock speeds, multi-core computing has ensured that Moore's law remains relevant to the wider industry – at least for now.
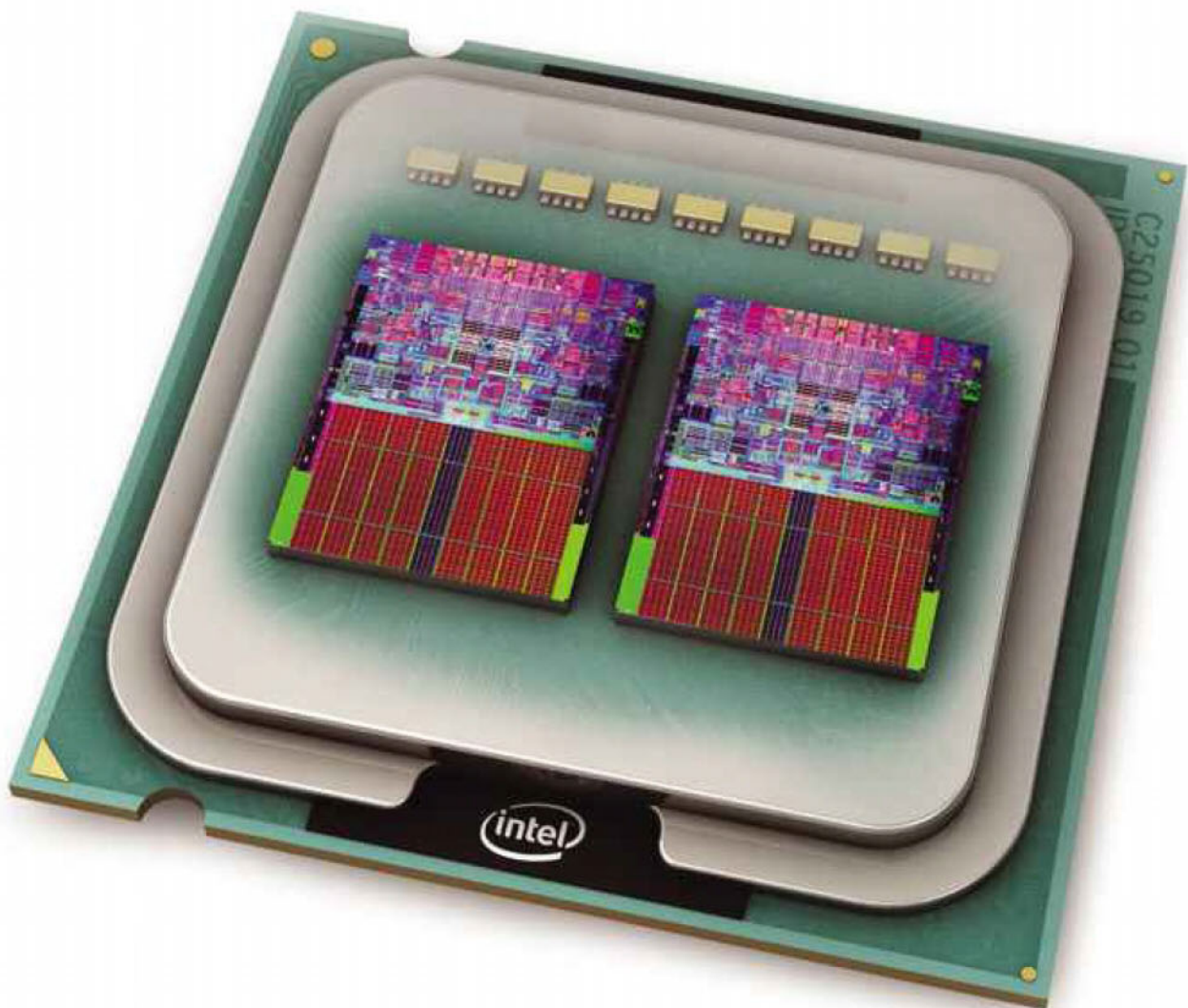
small gap between executions as the next instruction is loaded from the incoming thread. Hyper-Threading essentially fills that gap with instructions from a second thread, and the CPU core alternates between taking instructions from each of the two threads to ensure that there's no idle time. As an instruction from one thread is preparing to load, an instruction from the other is being executed.

> ❝ **Good multi-core performance isn't indicative of good performance generally** ❞

This means that the CPU executes twice as many instructions with almost no drop in performance, essentially allowing them to act like two physical cores instead of one.

Do We Need Multi-core CPUs?

The question of whether we need multi-core chips or not is slightly redundant at this point. Not because the answer is clear (in fact, it's very much up for debate) but because the alternatives don't really exist in the home computer market. If you want anything more than the most basic, low-end system, you have to buy a multi-core chip.

A bigger question is actually one for manufacturers, and it's much more pressing: what are they going to do next? When they first went on sale, multi-core CPUs solved the problem of single-core CPU architecture reaching its technical and financial apex. Intel thought the Pentium 4 architecture would be good up to 10GHz – instead, it couldn't go into production much beyond 3GHz.

Multi-core chips allowed manufacturers to add performance capacity beyond this point, but we're seeing similar flatlining of performance improvements. More cores isn't going to result in significant improvements anymore. Indeed, it's telling that Broadwell's focus isn't on adding speed to Haswell, but on improving things like power efficiency and heat generation.

Still, parallelisation isn't a bad idea in itself. It's a safe bet multi-core architecture is going to be the standard from now on. It's even creeping into mobile chips, with four and even eight cores becoming increasingly common. All that remains is to see whether the rest of the industry catches up to the power your current chip has and whether multi-core computing will ever live up to its potential. **mm**

➤ *If you don't like cleaning your interstellar transport of dust, then avoid the 'Pillars of Creation' in the Eagle nebula, some 7,000 light years away*

Hunting Dust Bunnies

Mark Pickavance looks at the nemesis of personal computing, dust, and how you can try to combat it

⌃ *Dust can reduce the efficiency of the cooling to the point where it no longer works, and instead of reducing temperatures, it actually makes things worse.*

➤ *Creating a dust and contaminant free environment for working isn't possible in most homes and businesses. This is one at Tin Star Manufacturing Ltd. in Dong Guan City, Guangdong province, where workers are assembling product packaging*

Dust isn't just a PC problem, but ornaments aren't usually damaged by the loads placed on them by a fine coating of the stuff.

For numerous reasons, dust and computers don't mix well, which is one of the reasons that all processors are manufactured in spotlessly clean dust-free environments.

Sadly, it's not possible for most people to create those controlled situations at home and work, and as a result, computers and dust share an unnatural bond.

Unfortunately, it's the computers that come off worst, as they don't like having their cooling systems invaded and their fans wrecked by the billions of invisible particles that fill the air around us.

Is solving this problem just a matter of dusting more often?

The Duster: Friend Or Enemy?

Most homes own a feather duster or modern equivalent, which is normally used to clear horizontal surfaces of collected dust. But the question you need to ask yourself is: when you've brushed it off a table or PC, where does it go?

Well, generally back into the air, to settle elsewhere in the home. In the same way that a fan only moves warm air around and doesn't produce any actual cooling, dusters generally relocate the dust, for it to return later.

The exceptions to this are when you use a duster that's got an

> **Polishing usually imparts a charge, which then attracts particulates in the air around it with the opposite ionisation**

electronic charge, and then take that outside the house to detach the dust. Or the duster has some sort of sticky compound on it that you can wash later.

There are a number of commercial cloths you can buy that fit into the latter category, and they are designed either to be washed for reuse or thrown away with the dust they've collected.

Another consideration when dusting is to understand that rubbing a surface with fabric can cause the build-up of static electricity. Polishing usually imparts a charge, which then attracts particulates in the air around it with the opposite ionisation. Some cleaning products claim to stop this charge building up, but how effective they are will depend on many factors, like the humidity and the relative charge levels of other surfaces.

Typically the worst surfaces are those associated with electronics devices, where the normal operating function of the devices creates an additional charge that then causes dust to collect and adhere to it.

In short, dusting addresses the visible problem, but ignores the billions of tiny bits of dust pervading the air inside your home or business. Unless you hermetically seal the location, stopping these entering is just about impossible.

Dealing With Dust - Filters

The best way to keep you PC dust free is to not let it get inside in the first place.

However, making that statement is easier than achieving a dust-free environment, but a good enclosure can contribute positively.

The critical design feature that you need is fine mesh filters that can trap incoming dust before it gets inside the computer.

As effective as filters can be, there are a few caveats to using them that you need to be aware of.

The first of these is that some dust is very fine and will migrate into the computer whatever you do. So filters provide a first line of defence and not a 100% solution.

Their effectiveness is also reduced if they're not cleaned on a regular basis, because once the filter clogs, it stops letting air

through which it can filter. If the case has a negative air pressure, caused by a fan blowing air out, and the filters are clogged then dust-carrying air will enter through other gaps.

Filters should be removed and, if they're made of plastic, washed every few months to keep them operating well, and if you've an especially dusty home, you might even want to examine them on more regularly.

If you don't do this and the filter gets blocked, this could lead to an overheating problem, due to insufficient air exchange. The warning signs for this are elevated system temperatures and higher than normal fan speeds.

Some cases don't come with filters. In this scenario, you can buy third-party filter panels that are designed to fit between the outside and the fan drawing air into the case. These will work well, if you have a design that doesn't leak air from other directions.

Dealing With Dust - Fans

The way that dust collects is in two specific ways. I've already talked about static charges, but moving parts can quickly build up a charge that will then cause fine dust particles to stick to them. Once established, it's easier for subsequent dust to stick to that coating, progressing the contamination.

But there's also another phenomenon at work, which is to do with the speed that air travels around, and where parts inside the case can slow it down. Should the speed of the air carrying the dust slow enough, then those particles can land and collect.

This is most likely in structural dead-ends or in very restricted sections where the flow can be interrupted.

A straightforward way to address these issues is to maintain a good air flow through the case, by having multiple fans keeping a constant supply of air coming in and being ejected. If your system allows the fan speed to fall when the system isn't working hard, then you might want to adjust that so the fans can't either slow excessively or stop altogether. That might make for a quieter PC, but it will also allow more dust to adhere to the inner surfaces, regrettably.

The downside of fast moving fans is that they generate more static, which makes dust adhere more strongly to them. In some respects, you just can't win this battle.

Fan makers often divide their products into two types: high flow and static pressure. The high flow variety are built for high

▲ The CPU and cooler from a laptop after three years of operation. With this level of dust ingress, this machine would be very unlikely to reach four years' use, without intervention
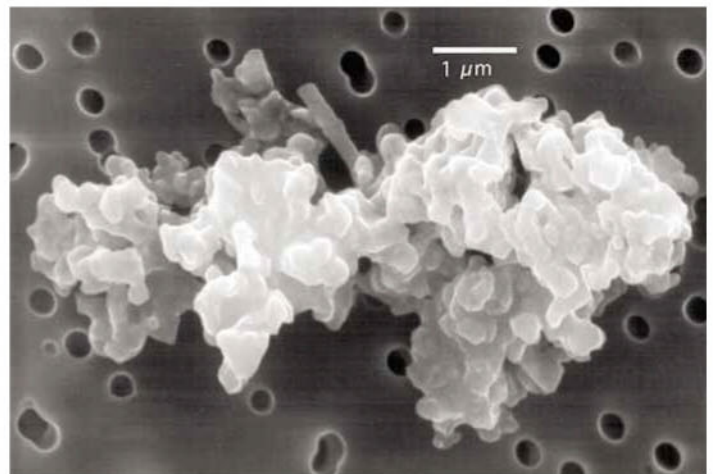
▲ Dust comes in many forms that might be animal, vegetable or mineral based. This example of a porous chondrite, imaged in an electron microscope, originated in outer space

rotational speeds and moving lots of air rapidly, reducing the chance of dust collecting but upping the static levels. The ones built for maintaining static pressure are those you generally use to pressurise the case positively or to provide a constant flow to a radiator cooling system. Using the right fans, rotating at the correct speed is vital if you're not to convert your PC into a dust filtration system for the whole house. But whatever you do, some dust will collect, and this needs to be managed.

Fans are just more of the problem, than much of a solution.

Dealing With Dust - Coatings

There are a number of heavily marketed phones on the market by Samsung and Sony that feature 'Super hydrophobic' coatings that make them effectively waterproof. What's also true about these nano-coatings is they also make it difficult for dust to stick to surfaces treated with it.

Can you use these and other anti-static coatings on PC parts? Well, there seems no good reason why not, other than some of the more exotic nano stuff can only be applied professionally. Some fan manufacturers are starting to experiment with using it on the blades of their products, and it might well become a standard feature in the future.

Some people swear by just using branded furniture polish and even products designed for cleaning the plastic interior of vehicles. These are cheaper, and their anti-static qualities well known, but they must be re-applied every few months.

A problem with using them is that they only really work well on clean flat-ish surfaces, and it's very hard to apply them to the complicated surface of a motherboard, for example.

In short, coatings might well be the answer, but as yet these things haven't been accepted into general use, and how well they work is mostly hearsay.

That said, looking at them while working on this feature has sparked my interest in them for both mobile and desktop PC applications. For phones, tablets and touch-screens, there are also oleophobic (technically 'lipophobic' is a more accurate word) substances that repel oil, specifically that coating our fingers. Apple has extensively used these on its iPhone and iPad ranges since the iPhone 3GS, and it has also appeared on HTC designs and Nokia Lumia devices.

With those products making use of this technology, I'm inclined to test some products and see if they provide any degree of protection from dust contamination, along with other virtues.

> ❝ **Using the right fans, rotating at the correct speed is vital if you're not to convert your PC isn't a dust filtration system for the whole house** ❞

General PC Cleaning

Okay, despite your best efforts, the PC got dusty. What's the best way to clean it?

Flat surfaces are easy to deal with: a duster and some polish should shift that rather rapidly. But very little of the PC other than the case is going to be that simple.

What you're going to need to deploy at some point is a vacuum cleaner, so you can suck the dust out of complicated and fiddly shapes.

What you need to be extra careful about is not damaging the PC, because some vacuums (not mentioning any names) have so much force available that they'll pull capacitors and other small parts clean off the motherboard.

Personally, I'd deploy a dust-buster sized device, unless the contamination is so bad that it requires something heavy duty.

What often helps is a degree of dismantling, to provide greater access. Taking things apart makes for a more thorough

clean, but there are some areas I'd be really careful about working with.

One part to specifically avoid opening is the PSU (power supply), as it not only voids the warranty, but it can also be dangerous. That's rather annoying, because dust has a tendency to collect in the PSU, where it can cause the unit to eventually fail.

If your PSU has collected lots of dust, make sure that you disconnect the power line before you attempt to vacuum the dust out, and never run a PSU where dust has caused the fan inside to seize.

Should vacuum power be insufficient to shift the dust or it's packed into hard-to-reach places, then the best method for shifting it is to deploy some pushing power.

You can buy cans of compressed air cheaply, if you don't own a bench compressor, and many come with thin nozzles that you can use to accurately direct the blast of air where you most need it.

Having used compressed air a few times, I'd strongly recommend you take the PC outside the house, or you'll blow the dust out of the computer, only to relocate it around your home.

Use short sharp blasts, and be careful that you never use it directly on fan blades that can rotate. If you do this the fan might rotate so rapidly that the bearing fails, making the effort you've made in cleaning them entirely pointless.

So What Is Dust?

Technically, the definition of dust is solid particles with diameters less than 500 microme of, that generally means that they're light enough to be carried by an air current, but heavy enough to settle out if left undisturbed.

The exact make-up of dust entirely depends on the environment you live in, the geographical location and special factors. So the dust in a typical home won't have the same chemical constituents as that collecting inside the wrecked nuclear reactor at Chernobyl, near the base of Mount Etna or in the Gobi desert.

It's also not exclusively an Earth experience. Dust collects on spacecraft, and dust storms are seen ravaging distant worlds and moons. Dust is a universal experience, not just something special to living on this planet.

Depending which scientists you believe, it's been estimated that space alone dumps between five and 300 tons of dust onto the planet each and every day. Arriving as micro meteorites, much vaporises, but some actually makes it though the atmosphere to add to our already thriving dust collection.

If this wasn't Micro Mart but a tabloid newspaper, I'd be telling you that 70% or more of dust is indeed human skin, but this is generally as bunk a statistic as the source might suggest. There is no standard recipe for household dust; instead it alters according to many factors, and the exact amounts of each ingredient are practically home or business specific.

What it might include is skin cells, animal fur, fine make-up powders, cigarette ash, pollen, the excreta of dust mites, flakes of paint, fine soil, volcanic ash, industrial pollutants and, as coated much of UK recently, sand from the Saharan desert. And, as some of these parts hint, it can change seasonally or because of distant events carried by the prevailing weather. A home that's left dormant for some time collects dust, seriously undermining the theory that it is largely human skin.

Vacuum cleaner makers often talk about the effectiveness of their products in removing dust, specifically quoting HEPA (high-efficiency particulate air) certification. This standard (MIL STD 282) requires that a filter removes 99.97% of particles at 0.3 micrometers, though no filter is 100% effective. In the

▲ *The Dust Bowl of 1936, where poor farming practices combined with regional drought conditions to cause an environmental and economic disaster*

USA, many homes have centralised vacuum systems that have the advantage of ejecting the air they collect outside, avoiding the recontamination issue.

All dust is bad for computers, but by far the worst is that related to volcanic activity, as the sharp edges of the grains act abrasively on any moving surfaces. They also aren't great for users either, as once inhaled they can damage the lungs rapidly.

In this respect, the bi-product of dust mite infestations are at the lower end of the dust threat.

The approach to cleaning fans and coolers requires a more subtle approach.

Cleaning Fans And Coolers

As I mentioned earlier, static and low pressure areas enhance dust collection, and the parts that suffer most in a PC are fans and coolers (mostly CPU, but also GPU).

One important side effect of dust on fan blades it that it creates an imbalance that makes the fan noisy and eventually damages the bearing.

If once you've cleaned a fan it still makes a noise, then it's a good bet that the bearing isn't good, and you need to bin that fan.

Some better fan makers have designed their products to have removable fan assemblies so you can take the blades out and wash them away from the PC.

Gelid, Cooler Master and Enermax all make fans built like this, though they cost a little more than designs that aren't made to be easily disassembled.

If your fans do get dusty and don't come apart, the best method is to remove them from the PC and use some warm soapy water applied with a cotton bud to the worst areas. Make sure that no water gets need the motor or cabling, and make sure you clean both sides of the blade.

Replacement fans are cheap, so at the first signs of blade damage or bearing problems, the best plan is to file the item in the round filing cabinet, and buy a new one.

CPU coolers and, to a lesser degree, GPU coolers are a major source of dust problems, and dust can contribute to overheating faults if not addressed in a timely fashion. What often happens is that you look inside the PC and see dust
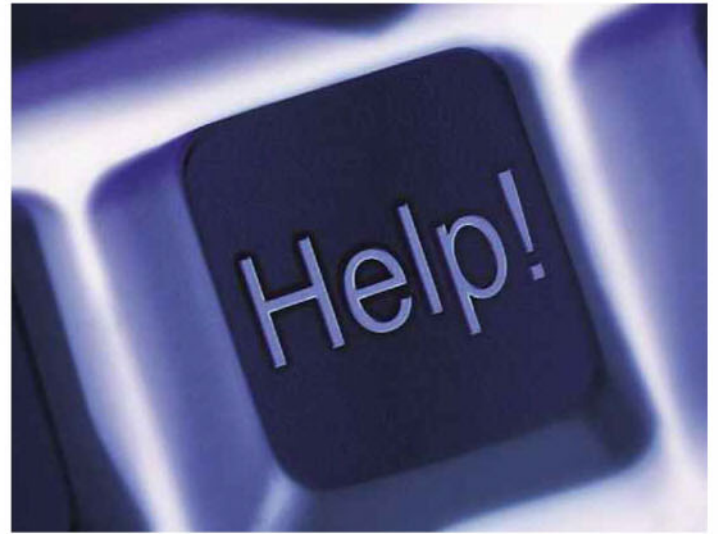
⌃ If the PC gets this dusty, you've ignored it far too long

on the CPU cooler fan, which you clean, and then don't look deeper. If you've got dust accumulating on the fan, then it's pretty much guaranteed that it will also have collected between the narrow fins of the heat sink, where it will reduce the effectiveness of it massively.

It's a messy job, but there isn't any other solution than to remove the whole assembly and clean it away from the PC.

Those desperate to do this without doing that will often remove the fans and vacuum the fin assembly best they can, but without being able to see directly through the fins, it's impossible to determine how effective this cleaning has been.

> **❝ All sophisticated electronics have a finite lifespan, and dust just accelerates that process ❞**

It's often better to bite the bullet, pull the CPU cooler out entirely and freshen the thermal compound on the CPU while you're about it.

Cleaning an elaborate fin assembly is easiest with compressed air, but doable with a strong vacuum if you don't have that facility. Another useful tool is a small, previously unused paintbrush, which is good for coaxing dust from delicate structures without damaging them.

Those who get bored doing this might consider switching from air to a sealed water cooling solution, as cleaning the radiator is an easier job and generally has better access.

Having the radiator outside the PC is the best solution, but that generally involves building it from scratch rather than buying a sealed, pre-built system.

Clean How Often?

More than six months shouldn't go by without you taking a look inside your desktop PC, even if it's just a quick check. Depending how dusty the environment is around it, you might experience a rapid collection or a remarkably slow one.

What you don't want to do is not look for some considerable time, over a period where a minor inconvenience turns into a large expense in time and money.

If you look at six months, and there has been a dust collection that needs work, then you need to put a repeating event in your diary system to remind you it's time to dust the PC. Time in the human mind is a very elastic thing, and it's easy to think that you did something recently that was actually a couple of years ago.

Create a regular cycle for inspection, and then decide when you need to give the inside a proper spring clean.

Final Thoughts

Those people who ignore the build-up of dust on their systems are the same wildly optimistic people who don't have a backup or any updated anti-virus package, and who play the national lottery with a high degree of certainty that they'll win big one day.

I can say with some degree of certainty, based on extensive personal experience, that the more dust you allow into a computer, the shorter its life will be.

The problem is that like predicting the effects of global warming, exactly when these choices will have catastrophic consequences isn't easily calculable. And that's the same crutch that these and global warming deniers cling to. The PC hasn't died yet, so therefore it must be fine. But in fact it's actually been dying since the day you bought it, and having it clogged with dust is just accelerating that inevitable non-operational condition. All sophisticated electronics have a finite lifespan, and dust just accelerates that process.

What doesn't contribute positively to the situation is the advent of cloud computing where the message is that you don't need backups, and your 'stuff' is secured away from your computer. How true this is or will become is up for some debate, but spending good money on a computer only to abuse it seems remarkably wasteful.

It doesn't take much time or money to keep a system relatively dust-free, and it should reward your vigilance with extended longevity and reliability.

Or you could do the opposite, increasing the amount of power it consumes and the likelihood that you'll be buying a replacement sooner rather than later.

The choice is yours. Personally, though, I clean on a regular basis. **mm**

5 Things To Be Scared About

Most of the time, we're fans of technology, but sometimes things come along that make us wonder. Here are some of the worst

1. Facebook Experiments

Ever since we all started handing over ludicrous amounts of our personal information to web companies, there have people who have warned us against it. Your privacy is being eroded, they told us. Your data is a product that's being sold, they said. And they were right, but as creepy as companies like Google and, of course, Facebook might seem, we continue to sign up with them and share ever increasing amounts of our information.

In spite of this acceptance of how Facebook operates, though, there was still a definite degree of surprise when it transpired that this giant of social media had also been using the site to experiment with its users.

Apparently, during 2012, Facebook manipulated news feeds to see if the emotional content that they were exposed to then affected what kind of things they themselves posted.

Facebook said there was "no unnecessary collection of people's data" (whatever that means, and like it doesn't already have all your data), but the fact remains that a huge scary corporation has, to paraphrase the Happy Mondays, been twisting your melon.

➤ *No need to panic, but that's basically you in the jar*

2. Google Glass

From Gmail to Maps to YouTube, there's no doubt Google contributes huge amounts to the world in terms of entertainment and information. But it's not a charity, so the fact it doesn't charge you for any of this is a pretty big clue as to what it's really selling. It's all about selling ads and user statistics (though not personally identifiable information, of course).

As ominous as all that might seem, it's taken to a whole new level with Google Glass. Although advertising was prohibited from Glass apps when it was first handed to developers, there have since been hints that it could eventually arrive on the wearable device.

Despite making the wearer look like a Universal Soldier, Google Glass doesn't currently have the ability to actually take control of your mind, but there's still something worrying about a future where people are constantly looking at a screen – one that happens to be collecting data and is able to track your movements with GPS. We still kind of want one, though.

▼ *One minute you're wearing smart glasses, the next you're pulling your own face off. An obvious transition when you think about it*

3. Self-driving Cars

Google, as many of you will know, has been trialling driverless cars for some time, but it's not the only name in the game, and work on automated automobiles has been going on for decades. Nevertheless, we're now reaching a point where it's looking like a fairly commercially viable technology.

Who knows, in ten years' time the humble London cabbie could be replaced by a computer. On the face of it, that sounds like an appealing prospect. No more having to make small talk with the driver. And no more listening to tales of Z-list celebrities throwing up on the back seat.

But are we really ready to hand that kind of responsibility to machines? It's not like you can simply tap a computer on the shoulder if it's going the wrong way. It's easy to think computers won't make mistakes like humans, but it's humans who program them in the first place, and a mistyped line of code here or there could potentially have deadly consequences.

Worst of all, a computer won't help get your bags out of the boot.

▼ *No more having to stop to touch up your lipstick? The future can't come soon enough*

4. 3D-printed Gun

Guns don't kill people; people kill people. That's what a lot of Americans like to tell us, anyway. Of course, you might be tempted to point out that people who kill people in America tend to do it with guns, but we'd advise you to keep such obviously logical conclusions to yourself and not to direct them at a US citizen. You might get shot.

Much to the bemusement of the rest of the world, the US solution to gun violence seems to be more guns, so it comes as little surprise that this nation should be home to the world's first 3D printed firearm. While everyone else on earth looked at 3D printers and thought "That's cool. I could print a hat out of chocolate" or something along those lines, an American saw this technology and thought "That's cool. I could probably kill someone with that."

The American in this case was 25-year-old Cody Wilson, a student at the University of Texas (so that's another stereotype fulfilled). What's particularly frightening about this young man is the fact that Defense Distributed, which he founded, is non-profit organisation, and it publishes his gun designs as open source. Odd as it might seem, it would be comforting in a way if he was motivated purely by good old-fashioned, cynical avarice. But no, he's just doing it for fun.

▼ *The USA, where common sense (and lots of people) go to die*

5. Self-guided Bullets

Apologies if it seems like we're picking on the US here, but it really does seem fond of coming up with new and inventive ways to make people dead. And making people dead is not something we approve of here at Micro Mart.

Not content with unmanned drones and shotguns that can shoot around corners (see **tinyurl.com/mmgun1324** for more of America's crazy scary weaponry), the Defense Advanced Research Projects Agency (DARPA) this year released footage of its latest instrument of death: a guided sniper bullet. You can see it doing its thing at **youtu.be/vX8Z2MDYX3g**.

Being something that's used to blow people's brains out, it obviously needs a snappy name, and they don't get much snappier than EXACTO. You might be wondering whether the block capitals mean you have to shout it, but it is in fact an acronym for Extreme Accuracy Tasked Ordnance.

Apparently, "The system combines a maneouverable bullet and a real-time guidance system to track and deliver the projectile to the target, allowing the bullet to change path during flight to compensate for any unexpected factors that may drive it off course."

Scary as these bullets may be, though, the good news is it doesn't look like you can print them at home just yet.

➤ *Who you calling trigger happy, punk!!!?*

Search apps for iOS

Get surgical with your searching, with Keir Thomas's selection of six of the best search apps for iOS

Search engines are the maps of the internet, in that they tell us how to get to where we want to go. If a site doesn't appear in the first five to ten pages of a search engine's results, then it might as well not exist.

Google dominates the search space, of course, but Bing is nibbling at its toes – particularly when it comes to video searching. Additionally, both older and newer search enterprises such as Yahoo and the privacy-obsessed DuckDuckGo have significant numbers of fans.

Unsurprisingly these big names are represented in the world of apps, and below we take a look at them. As usual, all can be downloaded free of charge from the App Store. All run on the iPhone/iPad Touch but, strangely, only half run natively on the iPad. Presumably the folks behind search engines think we only want to search on the go.

It should be noted that if you simply want to switch away from Google for searching within Safari, then you can do so using the Settings app. Just tap the Safari entry within the list, then the Search Engine entry. You can choose between Google, Yahoo and Bing

although – as in the Yahoo Search app review below – it must be noted that Bing powers Yahoo nowadays, so in reality the choice is simply Google or Bing results.

Bing

The Bing app is designed only for the iPhone/iPod Touch. Like nearly all apps, it'll work fine in magnified mode on an iPad, but we're left wondering why there's no native iPad version. The same iPhone-only approach is taken by the DuckDuckGo app reviewed elsewhere, but at least they can make the excuse they can't spare the expense, being a minnow in this particular ocean. But Microsoft?

Once installed, you soon realise this is every inch a Microsoft app, because it packs in thousands of features, many lifted straight from competing apps. You want search? You got it. You want barcode/QR scanning? You got it. Voice search, news aggregation, tie-in with SkyDrive? You got it.

The result is an app that throws simplicity out of the window, creating a painful initiation period of tap-and-try (along with its best mate, tap-and-what-the-hell-just-happened).

Basic search is easy enough to access: just tap into the search field at the top of the app window and start typing. Results then appear below. However, even when searching, things are a little confusing: a toolbar appears above the keyboard, and the icons are a left-facing arrow, an X and a down-facing arrow. Any guesses? Experimentation reveals the first takes you back to where you were, cancelling the search; the second clears the search field (or cancels the search if there's no text typed there); and the third simply hides the keyboard. Why is Microsoft trying to rewrite the user-interface design guidelines when most would agree iOS gets it just about right?

Tapping the microphone in the search field lets you dictate search phrases, and this is relatively fast. Recognition takes at most a second or two, and then the results appear virtually instantaneously. Tapping the camera lets you scan barcodes, cover art or activate text recognition. The latter two are clever. Cover art searching means you can scan book, CD, DVD or videogame covers to find the item online – although it seems only one result is provided each time, instantly making the function next to useless. You can't scan

▲ Bing packs in features but nobody at Microsoft has realised that with mobile apps, simplicity is key
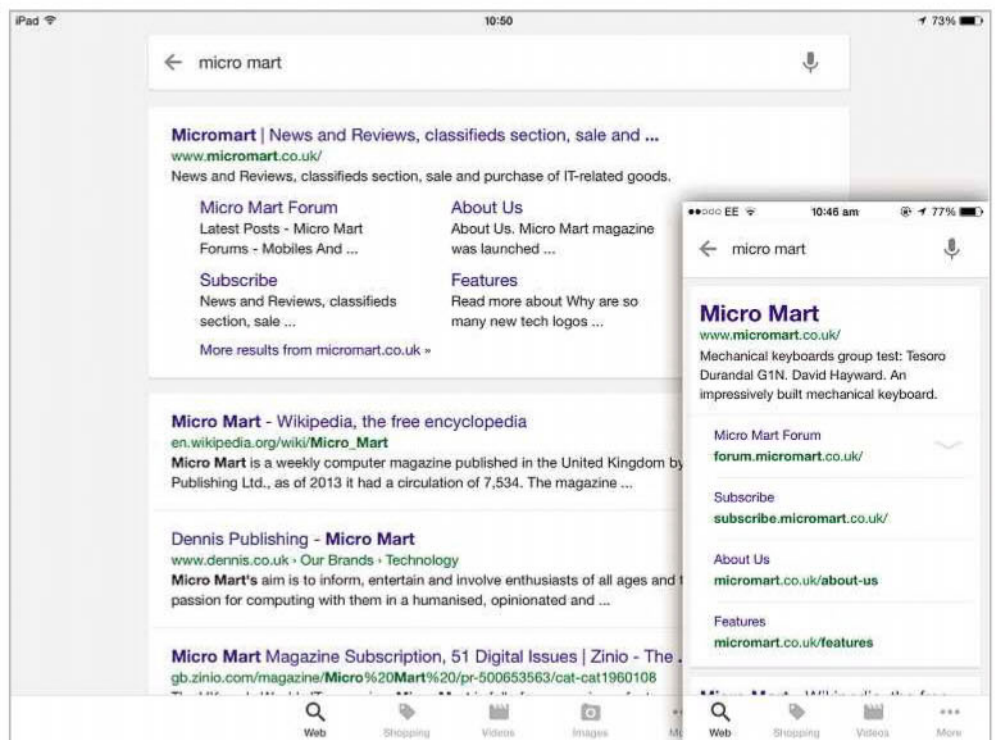
▲ Google Search's voice search and Google Now features are simply amazing, but you can forget all about privacy

the cover of, say, a DVD in Tesco to check against prices online. The text recognition feature is accurate and clever, and it lets you select from the recognised words to create a search phrase. We're not sure how this can prove useful in everyday life, though.

You can tie in your Microsoft account to save images straight to your SkyDrive space, as well as create search bookmarks. You can also see what's trending in terms of searches, view Bing cover images and save out a screenshot of the search results to your camera roll. Features, features, features! Who doesn't like lots of features?

Sadly, none of this changes the fact that Bing is simply miles behind Google in search results quality. Searching for 'Micro Mart' in all the other apps here showed your favourite magazine as a top result. Bing interpreted the search query as a typo, listing the MicroMark website, then showed an online shop that happened to share the same name. The only mention of the magazine outside of a sponsored ad was right at the bottom of the first page of results.

Google Search
Google wants your online soul and, if you provide access via this app, it will perform magic. It will tell you the weather, show places to visit nearby, tell you how far you are from home, tell you how your favourite sports team is doing, when the next bus is due and much more – all without you needing to ask first.

Information is shown as a series of virtual index cards that appear beneath the main search field.

All this comes as part of the Google Now feature, which works by keeping an eye on your Google calendars, previous web searches, your reminders and email. Yes, the app is indeed stalking you online, but that's how Google operates nowadays. Google's corporate motto is 'Don't be evil', but an increasing number believe that should be changed to, 'Don't be creepy.'

Ethical issues aside, this is an app that's at the cutting edge of user-friendly app design. The card system works very well, and unwanted information can simply be flicked away.

Something that has to be seen to be believed is the Google app's speech recognition, which is class-leading. Once you tap the microphone icon in the search field, words are recognised based on context as you say them. This process is shown live. Searches happen virtually instantaneously afterward. But you don't even have to tap the microphone icon to voice search; if the app is open, saying 'OK Google' will activate it. You have to pause for a split second between 'OK Google' and the search word or phrase, but it otherwise works very well. If the search results feature a highlighted section – like the Wikipedia excerpts that sometimes appear at the top of standard Google searches – the app will read this out to you via a very good

British English speech synthesis. Essentially, this is Siri Lite. Say 'OK Google' and then 'Who starred in On the Buses', and the answer will be told to you out loud. Other examples you can try include 'OK Google – What's the weather?', 'OK Google – How can I get to Birmingham?' and 'OK Google – Where can I see The Purge Anarchy?'.

Regardless of how you get your search results to appear – typing or speaking – tapping one of them opens it in the app as a new tab, and swiping to the right reveals the search results again. Tapping the menu button at the bottom lets you open the result in Chrome or Safari, or share via email or iMessage. Curiously, there's no option to share the result via Facebook or Twitter, or even on Google+. The URL can also be copied for pasting elsewhere. A nice feature found on this menu but not found in other apps is page search.

You can search images, news, books, shopping and videos, as well as the web, although perhaps surprisingly there's no way to refine searches by date.

The app works equally well on the iPad and iPhone, and the app running on the iPad simply gets more space for on-screen items but otherwise is mostly identical.

This an impressive app, and we all know Google's search results can't be beaten. Just be aware that getting the most from the app entails having it track your movements, letting it peek into all your other Google

services, and also activating web history. The app might be free, but you're paying a higher price than all the other apps here.

DuckDuckGo

This is another app that's for iPhone/iPod Touch users alone, although iPad users can access it in magnified mode. It provides access to DuckDuckGo, a search engine highly rated by many for its no-knowledge approach. DuckDuckGo does not remember who you are, track your movements across the web or do any of the creepier things that Google is generally (and increasingly) criticised for.

The app takes an unusual approach of being stuck between two stools. On one hand, it's a content aggregator, which is to say it takes the juiciest stories from various sites and shows them to you when the app starts. Tapping any then opens the story for reading within the DuckDuckGo app. Several editorialised options are selected by default, including some of the juicier Reddit.com sub-reddits, along with tech news sites, The Onion, Smithsonian and so on. The sources list can be edited by tapping the Settings cog icon, although you can only choose from the (substantial) list of sources already provided. This isn't a news reader, and you can't input your own choice of RSS/Atom feed.

On the other hand, and understandably, the app lets you search via DuckDuckGo. A search field is always visible at the top of the screen, and results are shown within the app. Selecting any result then opens it within the app for viewing.

The search field features an exclamation mark at the left, and experienced DuckDuckGo users will know why: the so-called !bang syntax lets you filter results to a particular domain or interest. Typing '!a Barry Manilow' will search only Amazon for Barry Manilow, for example. There are many, many bangs to learn and they're listed at **duckduckgo.com/bang.html**. A handful of popular examples are shown below the search field when you tap the ! button.

Once results are shown, tapping the share button lets you share the search query via iMessage, Mail, Twitter, or Facebook, and you can also opt to open the search results in Safari instead of the DuckDuckGo app. It's also possible to favourite the search, in which case it'll be accessible via the Settings menu, or simply copy it to the clipboard for pasting elsewhere. The same share button is visible when you tap a search result for viewing within the app, and it offers the same options but this time shares the URL of the page you're viewing.

While this is a great-looking app and worth installing for the content aggregator
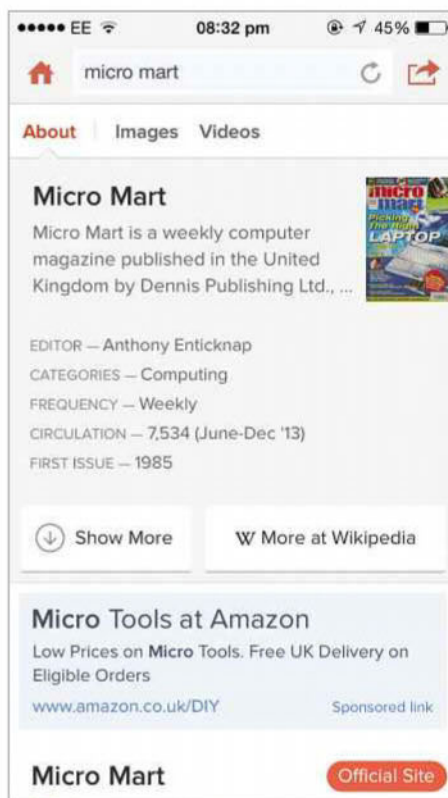
▲ DuckDuckGo promises truly anonymised searches via a intriguing app, but searches simply take too long to complete

alone, it doesn't fix one big problem with DuckDuckGo: searches are slow. We were waiting five to ten seconds for results to appear – and that's on a 13Mbit ADSL connection. Additionally, the app crashed frequently on our iPhone 5.

If you're a DuckDuckGo fan, then this app is a shoo-in but sadly there's little here to convert others.
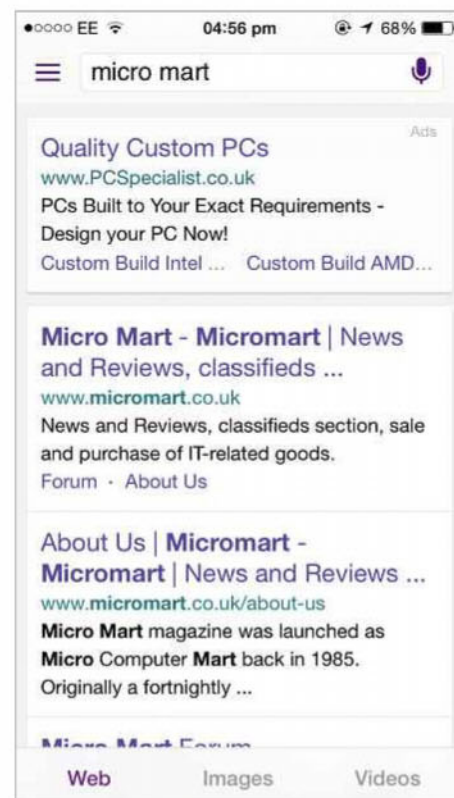
Yahoo Search

Two things immediately struck us as disheartening about this app. The first is that it only works on the iPhone. Still, apparently that isn't unusual, as Bing and DuckDuckGo demonstrate elsewhere in this group test. The second oddity is that search results are provided by Bing. That's right, Yahoo is no longer an actual search engine in and of itself. This switcheroo happened five years ago across the board, and the result is you'll get identical search results in the Yahoo and Bing apps.

The app is also curiously limited in that it lets you perform only web, image and video searches. Compare and contrast that to the Yahoo website, which attempts innovation: you can search within news, shopping, local, answers and celebrity categories.

Nor does the app let you refine searches by date or limit the results to geographic areas.

But let's stop concentrating on what the app doesn't do and look at what it does do…

▲ Yahoo Search is well made but also of negligible use unless you're a undying fan of Yahoo

which is surprisingly little beyond the basics. Search terms can be typed, or you can tap the microphone icon to speak. Initially this didn't work on our iPhone 5 until we forced quit and restarted the app. Once you've spoken, the app displays a busy message, before showing the recognised text and then opening a page of results. On a fast ADSL connection, it took a few seconds on average until results appeared. Accuracy is as good as any other speech recognition – a request for a good tofu recipe was interpreted as looking for a toffee recipe, for example, but a line quoted from Dickens was reproduced verbatim.

Tapping a search result opens it in the search app itself, and the user must tap the Done button at the top right when finished in order to return to the search results. There's no toolbar at the bottom, which will quickly drive Safari users mad. The situation isn't helped by the fact the Done button disappears when you scroll up.

Redeeming the situation slightly when viewing search results is the share button, which opens a pop-up window styled similarly to the basic iOS share sheet, wherein you can share the URL via iMessage, Mail, Twitter, Facebook or Tumblr. You can also open the page in Safari or simply copy it to the clipboard.

Tapping the menu icon lets you log in with your Yahoo account, but this seemed to
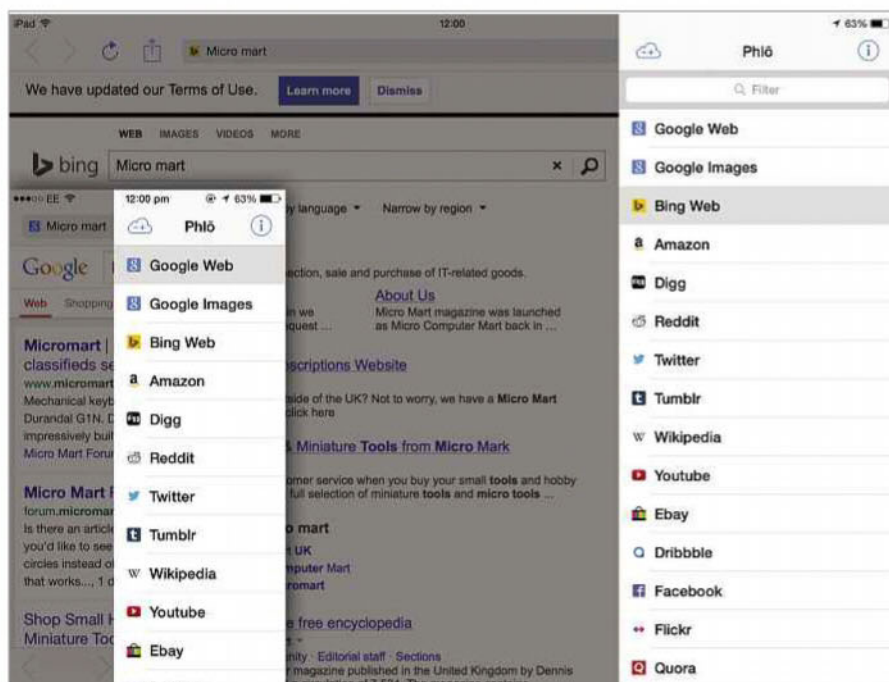
▲ Phlo provides instant access to virtually all the major engines, as well as instant searches of popular websites
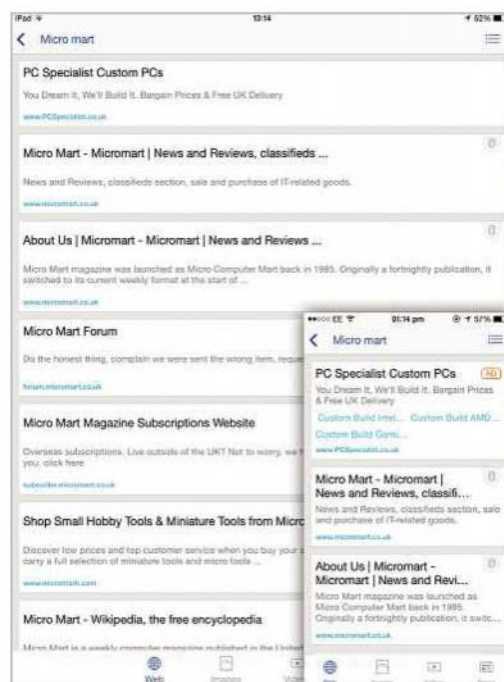
▲ Dogpile aggregates the results from the most popular search engines and lets you view what others are searching for too

do nothing at all. Perhaps your searches are logged for future reference somewhere, but there appears to be no way to access them from this app.

The Yahoo Search app is well made but arguably unnecessary and with a few design niggles that make using it a pain.

Phlo

Sometimes using multiple search engines can be useful, particularly if Google just can't seem to find the results you want. Yet switching from site to site or app to app can be an annoyance. Phlo aims to help. Typing a search phrase when the app starts searches Google, but tapping the menu icon at the top right lets you instantly run the search phrase through not only other search engines like Bing and DuckDuckGo but also through sites like Amazon and content sites like Digg or Wikipedia. Subcategories of search engines are also available, such as Google Images.

Tapping one of the entries performs the search immediately at the website of the site concerned, and it's important to know that there's no magic happening here; what you see within the app is exactly what you'd see if you visited the site with Safari and typed the search phrase manually. In some key ways, Phlo is little more than a replacement browser with a little unique search functionality.

Similarly, tapping a search result opens it for viewing within the app, although tapping the Share button on the toolbar lets you switch to Safari or Google Chrome, as well as share the URL via iMessage, Mail or Facebook.

For £1.49 per year, you can sign up to Phlo Sync, a cloud service that syncs your search sites and history across all your iOS devices, and across all desktop platforms via plug-ins for the Chrome, Firefox and Safari browsers. The trouble is that iCloud already does most of this.

There's also a dedicated Mac app that works very much like this iOS app, except via a pop-up search box triggered by a keyboard shortcut. On the desktop Phlo makes a lot more sense.

Dogpile

Dogpile is as old as the modern internet, first appearing online in 1996. Its goal then, as now, is to act as a search aggregator, providing the best results from the top search engines. This app was obviously released more recently than 1996 but has a few tricks up its sleeve in addition to search.

When the app starts you see a picture of Arfie, the cartoon dog who represents the service. He isn't like Clippy in that he doesn't actually do anything other than sit there with a ball in his mouth. Search queries are typed into a field at the top of the screen, which remains there no matter which 'mode' you switch the app into. The other two modes are Discover and Fetches. Discover lets you browse "popular headlines and trending topics" (to quote the developer) in the form of what appear to be search terms recently used by others. You can filter by various categories such as News, Sports, Entertainment and so on.

It isn't explained what the Fetches mode does, but our best guess is that it's the most recent searches run through Dogpile, although presumably after some filtering has gone on for obscenities.

Tapping any of the phrases will then search Dogpile using them, and you see the same results screen as if you'd typed your own search phrase.

The results list is a little odd in that each entry in the list is represented by its own virtual card, which isn't a very efficient way of using screen space on a phone. Only three results fit on the screen at any one time, in fact. On an iPad screen, the app will only work in portrait orientation, and the results simply look very boring.

Tapping any result opens it within the app for viewing, and tapping the Dogpile button at the bottom marks it as a favourite for referencing later, similar to bookmarking. You can also tap the Share button to share the URL in iMessage, Email, Twitter and Facebook, as well as copy it for pasting elsewhere, but there's no way to open the URL immediately in Safari or another browser.

Dogpile provides image, video and news searches too, and you can switch between them by tapping the icons at the bottom of the search results list.

Dogpile has always been an intriguing service but has simultaneously struggled to be anything more. Some people swear by it, but for most of us, this app will fail to provide any compelling reason to switch away from direct Google searches. **mm**

PC Tip Of The Week

NSA Recommended Security Tips

David Hayward shows how to secure your PC like a pro

The last couple of years have really highlighted the lack of PC security, safety and anonymity knowledge that most users have.

Taking your digital security seriously is now something that every computer or device user should have instilled in them from the moment they switch it on. Regardless of whether you think they're not looking at you because you do nothing wrong or not, the fact of the matter is this is our privacy that the powers that be are meddling with, and although they've done it for centuries (long before the digital age, through other means), we've only now got the media to share their injustice to.

So what can we do? Well, funnily enough, the NSA (those who are spying on everyone) has released a series of tips to help improve your PC security. Crazy eh?

Enable Automatic Updates

The NSA recommends that if you're using Windows, Mac or Linux, then you should keep up to date with the latest software updates and, if possible, you should enable the Automatic Updates feature in Windows to ensure you get the latest security patches.

Mind you, it could also be a way to make sure their latest cracking technology is securely loaded onto your machine.

Encrypt Your Drives

If it's ultra-tight security you're after, then you can't get much better than encrypting the contents of your hard drives.

BitLocker is the Microsoft built-in encryption technology, from Enterprise and Ultimate versions of Windows 7 through to Pro and Enterprise versions of Windows 8.1. However, there are many alternatives that are equally as good and probably not crackable by the NSA.

Disable Your Built-In Microphone

On laptops in particular, the built-in microphone is permanently powered on. While this doesn't sound like much of a security tip, there is the ability to hack a remote computer stealthily and silently listen in on any conversations going on.

Granted we're getting a little cloak and dagger, Mission Impossible here, but since this has come from the mouth of the NSA, we can pretty much expect it to be perfectly viable.

Disable Or Cover Your Webcam

Likewise, where your microphone can be used to listen in on any conversations, the webcam can be hacked to allow a view of everything in front of it, namely you.

If you're in fear of being watched by the NSA, then cover it up or disable it. Or alternatively, as our esteemed editor does, work in just your underwear so they'll have something to look at.

Disable Any Unneeded Network Services

This is actually a good idea. If you don't use Bluetooth, IPv6 or wi-fi, then disable them, as they can be used to gain access to your computer.

Also, disable file and printer sharing, biometric and smart card enhancements and check your Windows firewall rules are valid and up to date.

Conclusion

Naturally, the best way to stop the government or secret police from spying on you is to live in a cave or the ruins of Furness Abbey and adopt a Wildman lifestyle. That's a little extreme, though.

Basically, just think about the security of your digital self and the devices you use. If all else fails, then have a read of these actual NSA security files on the features of Windows 7 and other operating systems, with advice on protecting home networks: **goo.gl/VwuZL0** and **goo.gl/qys9jO**.

▲ *Dear NSA, please don't arrest us. It was all Anthony Enticknap's fault. He made us do it*
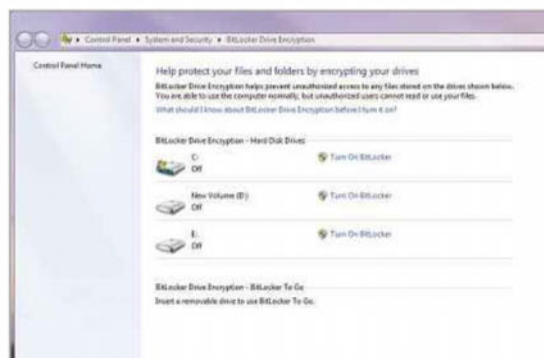
▲ *Bitlocker drive encryption provides a huge level of digital security*

▲ *You never know who's on the other end of a webcam*

The Things That Frustrate Us About...

Netflix

Like movies? You'll love Netflix. Except for these few minor problems

Netflix is another one of those services that feels too good to be true. Hundreds upon hundreds of movies and TV shows, available instantly, for the price of a coffee and a muffin per month? Madness. But this is the world we've built for ourselves. Netflix offers more entertainment than you could ever work your way through in a lifetime, even if you did nothing but sit and watch it, and it's all cheap and legal and convenient – you can stream movies through your computer, games console or smartphone, whenever and wherever you want.

So what's the catch? There are a few annoying niggles that render Netflix not quite perfect…

Eeeek! Endless choice

The Netflix interface is, for the most part, pretty simple and intuitive. You can either search for a title, director, genre or keyword to find something to watch, or you can browse through Netflix's extensive and ridiculously detailed categories to find something to suit your tastes. (Dark suspenseful gangster movies, anyone? Romantic sports movies?)

The problem is that means it's perfectly possible to spend more time browsing Netflix than actually watching anything. And if you do settle on something and find after 20 minutes that you're not into it, it's very easy to just stop and find something else. Our attention spans must be getting shorter by the day.

Here's another minor niggle related to the search system: to see more info about a title, you hover over it and wait for Netflix to pop up a window telling you more about it. Click on it, and you'll find the movie or TV show automatically starts playing. Oops.

Fix it: There's no fix for this, really. The massive amount of choice is a feature; it's our brains and indecisive nature that are fault.

Oh No! Algorithms

Another feature that can start to seem like a bug is Netflix's clever recommendation algorithms. If you watch something, it'll take note and recommend you more things like it. You can also give ratings to things you've watched to give Netflix more info on your preferences…

But what happens when you let your niece watch half a dozen episodes of iCarly on your Netflix profile? Your recommendations will be wall-to-wall kids' shows forever more. Nightmare.

Fix it: You can create different profiles for different users in the same Netflix account, which solves this problem. Each user gets his or her own history and watch list, so the recommendations are tailored to the person, not the household. Just remember to switch to the right person every time you watch something!

Argh! Disappearing titles

Not everything on Netflix is forever. Titles are constantly being added and removed, and that means if you've been meaning to watch something for ages, you probably ought to shift it to the top of your to-do list, or you might find it's gone before you get round to it.

Fix it: There's no official warning system about when something's about to be taken off Netflix, though several unofficial fan sites have popped up to either issue warnings or just let you know when you've missed the boat. If something you really wanted to watch is gone, though, at least there are hundreds of other options available…

Specialists

Linux

David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment
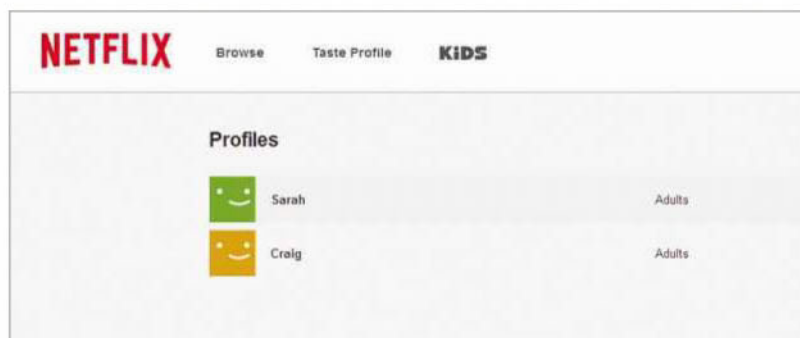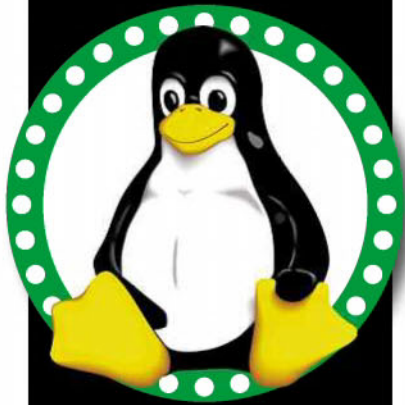
Tales of Linux

Another open source story

Chris is a chap who, like most of us, is also the appointed family IT support (amongst his many other skills). Being a *Micro Mart* reader and Linux aficionado he also has one or two Linux stories in his considerable cranium. Of which this is one.

Once upon a time, as Chris puts it, there was a sister and "feckless" ex-husband who had a penchant for the... Shall we say: 'dodgier' side of the internet. On a near weekly basis, poor Chris was lumbered with the inevitable task of cleaning up the well-used machine and ridding it of all manner of untoward nasties – the sort you can only catch from visiting the aforementioned sites of a dubious nature, where you'll find women skilled in the art of pleasuring men.

Chris was, after a while, at his wits end – until a bolt from the blue struck him with the severity of a well-aimed half brick, and he suggested that the sister tried Linux.

"Sister dearest, how would you like to try Linux?" He asked. With the obvious reason being she can run Linux alongside the Windows XP installation, without the brother-in-law's nasty habits infecting her account area.

A sound idea it was, too... And within twenty minutes the system had both XP and a flavour of Linux installed and running smoothly.

All's Well With Linux

After a month of near silence from the much-loved sister and ne'er-do-well brother-in-law (at least from the perspective of having to fix the machine), Chris asked how things are, and how she was getting on with Linux. The reply was. "Oh we've been meaning to ask you, we could do with some extra space..."

"So you want me to get rid of Linux?" Assumed Chris.

"Oh no no," came the reply, "we were wondering if the machine would work *without* XP on it."

As it happens, and in Chris's own words, the sister took to Linux "like a duck to water" and even looks for complete Linux compatibility when choosing any PCs or hardware. A win all round then for Chris and his sister.

Further to the tale, and as a sort of 'happy' ending at least, the aforementioned

> **❝ Oh no no, we were wondering if the machine would work *without* XP ❞**

incompetent brother-in-law soon became an ex brother-in-law and ex-husband, and was replaced with a much better model who came with his own technical abilities and laptop – and, thankfully, without the porn habit as well.

Well done to Chris and his sister, we say. We'd also like to say we're rather enjoying these takes on life with Linux we're getting from you guys, so if you have any more (with happy Linux endings, or not), please send them in to the usual address and we'll re-tell them for everyone to enjoy – providing they're clean enough to print, that is.

◄ *There's no way we're going to use an image to illustrate Linux Vs Porn, so here's Linux Vs XP*

VS.

Sweating The Details

Apple's eye for technology design is unparalleled, but has never fully extended to what you see on the screen

Even if you're not a huge fan of Apple, it's hard to naysay the company's dedication and craft when it comes to minimal design. Even from its earliest days, Apple had an eye for making technology contemporary and friendly, but since the time of the iMac, Apple has essentially become an R&D department for entire industries. The iMac spawned dozens of copycats, the iPhone transformed the appearance of smartphones, and the MacBook Air resulted in PC notebook manufacturers clamouring to produce similar form factors.

Much of Apple's success over the past decade has stemmed from its dedication to elegance and simplicity. This is what probably leads to those accused of plagiarising Apple's designs countering that the various form-factors it creates are 'obvious'. However, it seems that all too often, it takes Apple to show everyone what 'obvious' is.

It's also clear on using Apple kit that the company's fastidious attention to detail and desire to create something beautiful hasn't entirely extended to software. If anything, Apple's software interface vision has been muddied since brushed metal interfaces began infiltrating Mac OS in 1999. Although there have been some attempts to unify things since, these have frequently been half-hearted, resulting in only a few apps being updated before the next major change arrived.

With iOS 7, Apple design head Jony Ive made an effort to infuse the OS the same kind of beauty, simplicity and elegance he and his team bring to hardware. The results were mixed, in part because software's simply much bigger than hardware. When your job entails designing a small collection of devices – a couple of iPhones, two tablets, a few desktops and notebooks – it's feasible to sweat the details and try to make everything perfect. The sense of craft and care evident in the likes of an iMac or an iPad is no fluke, and although Ive and his team are undoubtedly skilled, it helps that Apple focuses on only a few items at a time.

With software, though, every app could be considered the equivalent of a piece of hardware – indeed, they're often more complex, having multiple components and elements – each of which needs designing and refining. iOS 7's design language alone hasn't been enough – even nearly a year after its debut, rough edges remain everywhere, despite the system's penchant for minimalism.

The same is true of OS X 10.10 Yosemite, Apple's forthcoming update to its desktop operating system. Now in open beta, up to a million Mac users can check out the revamped interface, which seems to borrow heavily from both iOS and Windows Vista, making heavy use of flatter components and transparency.

However, extended use again highlights a lack of consistency. Some apps boast a streamlined unified taskbar, others do not; transparency does not work in the same way across apps and, frankly, often negatively impacts on usability by causing contrast issues. Most troubling, though, is the sense that Apple hasn't yet figured out how to make what you see on a Mac's display anywhere near as beautiful, elegant and, well, obvious, as the hardware it runs on.

That's not to say Yosemite isn't a step forward; the general feel is lighter and somehow both more professional and friendly. What's more, this is still beta software, and therefore likely to evolve. Perhaps what Yosemite and iOS 7 alike show however, is that – while Apple can strive for better interfaces – the true beauty of its products will likely forever remain only skin-deep.

◄ *OS X Yosemite is a step forward from Mavericks, but still boasts inconsistent and some questionable design elements*

Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find **Craig** on Twitter at **@craiggrannell**

Mac

Child's Play

Summer holidays mean bored kids, so Ian McGurren has sought out some creative tablet fun to keep them entertained

Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

A familiar phrase to those in charge of their darling offspring during the summer holidays, "I'm bored" is also two words that's difficult to counter without substantial outlay or resorting to mindless TV.

Although an iPad can alleviate this boredom, many parents are rightfully concerned about their little ones spending all day staring at one, saucer-eyed, when they could be doing something much more stimulating. Yet while it's true that the iPad has plenty of mindless runners, shooters and candy crushers, there are also an increasing number of games and apps that can stimulate young minds as much as they excite.

Take *Miximal* from Yayatoy, a mix and match game for pre-schoolers that has over 1000 animal sections that can be mixed and matched to teach about animals as well as problem solving, recognition and more. Each is animated in nice, attractive and fun ways too. *Drawnimal*, by the same team, is for slightly older kids, aiming to teach them to think 'outside of the pad'. There's an animal for each letter of the alphabet,

and the child is instructed to first draw round (I.e outside) the ipad itself, so for example the ears and tail of a cat. On completion they trigger the animation and see their animal come to life. It's simple, clever and different.

Next is a couple of apps ideal for adult and child time – *Foldify* and *Foldify Zoo*. Both are paper cutout apps, so both again use the iPad as the jumping off point, with the imagination also taking place outside of the tablet. *Foldify* is a series of cut out drawing plans that can be drawn onto by the user, with a 3D depiction shown alongside the cut out plan so any drawing can be seen as a preview. It's not just drawing either, as images can also be used. Want to make a cut out paper superman with your child's face on it? Easy to do here.

Foldify Zoo is the same idea but this time with a library of zoo animals. Each animal also has information about it displayed too, so it's a great way of having a make-and-do session and learn about the world at the same time, without it being forced learning. Like the *Foldify* designs, the animals can also be customised too.

Remember *Fuzzy Felt*? One of those toys from a simpler age that was literally the practice of sticking bits of felt on a playboard to make a scene. *Easy Studio* takes a similar idea but adds stop motion animation into the mix for a really simple way for kids to make their own animated video shorts. The interface itself is very simple, you use different shapes to build your scene up, take a shot, move some parts, take another shot and so on. It's the simplicity that appeals but, like Lego and other creative toys, it is something only limited by the child's imagination. You can also add music, use seasonal templates (for fun at Christmas, for example), and even make animated greetings cards. All of which can be exported into the photo library for sharing too.

Finally, for those kids who have a creative and logical mind there's *Hopscotch*, a very simple introduction to programming that's not dissimilar to the old BBC Micro Logo turtles those children of the 1980s may remember. *Hopscotch* uses a cast of cool monsters and a logical instruction language to guide kids in programming anything as simple as drawing shapes to animation, simple games and more. The code is drag and drop, so easy to edit and to play around with to encourage experimentation too. They say app programming may well be a key skill in the future, comparable to the web design of now, and where we had BASIC in the 1980s to hone future coder's skills, *Hopscotch* might just be the ticket to fire up the inquisitive young minds of today, and foster their future ambitions.

Stocks And Squares

Shaun has had a sneaky peek at a couple of upcoming Sinclair ZX Spectrum games

Jonathan Cauldwell is apparently putting the finishing touches to the sequel of his 2006 hit game *GameX: The Games Exchange* for the Sinclair ZX Spectrum. The original allowed you to trade stocks and shares in any one of 16 games to make profits, but in order to collect the dividend payment you would be required to play each piece of entertainment software that you have invested in. However, the Tax man was always watching and would take some of your earnings for each mistake by increasing your taxable rate steadily by up to 10% a time.

GameX was pretty ground-breaking at the time, especially for a machine with only around 40KB available to the programmer. Many of the sub-games featured in this impressive production could have been standalone releases, so being able to mix and match them without the need for a multi-load was pretty awesome.

On the surface, *GameX II* continues in the same vein but with a different mix of games to invest in and play through. Achievements have been added to the proceedings and each goal reached will unlock one or more feature, or add a bonus.

GameX II features multiple characters from Jonathan's other games – notably EggHead, whose first outing was in 1989, before eventually featuring on a *Crash* cover tape back in 1990. That means it's the 25th anniversary of the oval-shaped hero, so it's good to see him back.

The search is currently on for a subtitle to *GameX II* – specifically, a clever play on words. If you have any suggestions, send them to him via Twitter (to **@ZXSpectrumDev**) or keep an eye on **www.spanglefish.com/egghead** for more news.

Equality

Bob Smith is back to his best, and has released a playable preview of his upcoming isometric puzzle game for the Sinclair ZX Spectrum titled *X=Y=Z*.

The task is to guide one or more cubes from the start tile to the end block by placing directional markers for the movable objects to follow. Each level consists of pathways which have a varying level of safety with a number of stones to cross; as you would expect, there are a limited number of safe routes to take and markers to place along the way, as well as a finite supply of directional markers to place on each level.

The preview contains four levels to whet your appetite, and this sort of production is ideal for those brainy kids out there (I'll let you know when
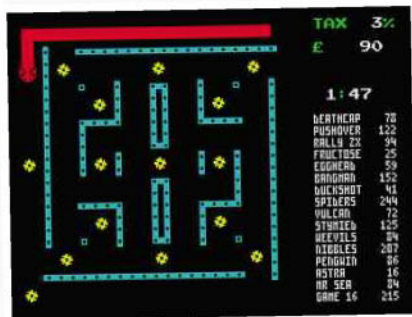
▲ *GameX is one of the best Sinclair ZX Spectrum games of the last decade, and its sequel is looking pretty good too*
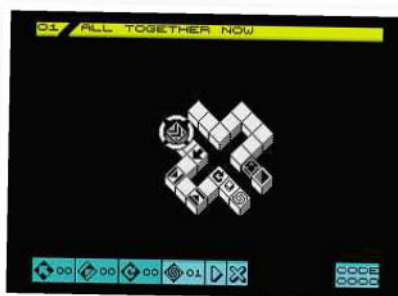
▲ *Bob Smith's latest Isometric puzzle game for the Sinclair ZX Spectrum*

I've beaten level one) – to grab the download archived in TZX format, head over to **bobs-stuff.co.uk/extras/xyzdemo1.tzx**, or keep an eye on Bob's Stuff page on Facebook, over at **facebook.com/bobs.stuff**.

We're Jamming

Throwback Games (**throwbackgames.net**) have put out an excellent preview of its upcoming Commodore 64 Basketball simulator for one to four players onto YouTube.

The game is called *Jam It*, and has all of the moves of the pros, including slam dunks, three-point shots and intelligent co-operative computer opponents. Any well-executed moves may be studied by slow-motion replays and detailed statistics are available after each game. There are also lusciously pixelated Cheerleaders during the interval as well.

To see Jam It in action, head over to **youtu.be/BtL-pD2yMFM**, or check out the aforementioned website for the latest news on this production.

Shaun has a passionate interest in 8-bit computing and gaming and has been finding novel ways to use retro technology since 1994

Retro

Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming

There's No Place Like Homefront

There's been trouble behind the scenes on Homefront: The Revolution, as Crytek UK is to be closed. The game's still in development at Dambuster

This week, **Ryan** looks at a turbulent few weeks for Homefront: The Revolution, and looks ahead to the space-based MMO, Seldon Crisis ...

Plug & Play

The 2011 shooter *Homefront* didn't set the world on fire, but it did offer gamers a compelling gung-ho invasion scenario, courtesy of legendary Hollywood screenwriter and director John Milius (the scribe responsible for *Dirty Harry*, *Apocalypse Now*, *Big Wednesday* and *Red Dawn* amongst others). So it's been interesting to keep up with its sequel, *Homefront: The Revolution*, as everything's pointing to a game that addresses the deficiencies of its predecessor.

Its development team promised a less scripted, less linear experience – one of the more intriguing idea being that the populace will react differently depending on your actions in the game, adding to feeling that players are part of a real resistance movement in a living, breathing and very much besieged city. Bravely storm an invader's convoy, and the locals might just be inspired to run out onto the streets and help your cause.

Unfortunately, *Homefront: The Revolution*'s development has been decidedly tempestuous so far. Having survived the messy collapse of THQ in 2011, the game landed in the lap of Crytek, which handed the task of actually making the sequel to Crytek UK – the studio formerly known as Free

Radical, which made the classic *TimeSplitters* games.

Things seemed to be progressing nicely, until in early July rumours that Crytek UK was having cashflow problems began to circulate – with programmers apparently being paid late and the game's lead designer heading off for pastures new. After weeks of such ominous whispers, Crytek UK finally published an official statement on the 25th July, stating it was in a "transitional phase" and that much-needed capital "had been secured."

Then, just six days later, it was reported that the transitional phase the studio was referring to was in fact a total shut down.

As part of a series of cuts, Crytek UK is to be closed, and staff at Crytek's Austin studio will also be reduced. Further, Crytek has sold *Homefront* to Koch Media, which will now publish the game under its Deep Silver brand.

It's not all bad news for *Homefront: The Revolution*, though. The game's development will continue under the eyes of Deep Silver's studio, Dambuster – with team members from Crytek UK moving across to "continue their hard work". So, while it's always sad to hear about another British developer closing its doors, especially one with Crytek UK's history behind it, but it's at least some comfort to learn

Beyond Good & Evil 2 Is Happening!

It's over a decade since the original *Beyond Good & Evil* came out, but time has done little to diminish its status as a highly regarded classic.

A sequel's been teased off-and-on since, but little of substance has been seen or heard since a trailer emerged in 2008. Now, however, Ubisoft has finally revealed that original designer Michel Ancel is working on it. In a statement given to Eurogamer, Ubisoft's Xavier Poix described the game as one that will "push past the boundaries of a proverbial sequel", and will use "next-gen technologies to deliver a truly surprising, innovative and exceptional game." Here's hoping they reveal more soon.

➤ *Ubisoft has officially announced that work is underway on Beyond Good & Evil 2. We've no clue as to when it'll be out, though*

▲ There's a new Asimov-inspired sandbox space game on the horizon. Called Seldon Crisis, it promises a harsh, uncompromising universe

that its current work-in-progress will survive, and that the people working on it will get to see the project through to completion.

All being well, the open-world shooter will be out in 2015.

Online

For the past few years, *Eve Online* has quietly carved out its own little niche, helped by a devoted hardcore of players who conspire to create some of the most unique events in online gaming – such as a huge space battle where hundreds of expensive space ships are destroyed in a hail of laser fire. However, as developer CCP prepares to expand its *Eve* universe with a series of spin-off titles, the space-trading MMO may be about to face a major new competitor.

Seldon Crisis is a forthcoming sandbox game loosely based on the writing of sci-fi author

Isaac Asimov – specifically, his *Foundation* series of novels, first published in 1942. Like *Eve Online*, you start out with a small space craft, and the aim is to find a means to acquire larger ships and explore the galaxy. Exactly how you go about this can vary: you can become a pirate, a mercenary-for-hire, or a trader, shrewdly transporting or producing goods without having to kill other people in the process.

The game's being developed by Chaos Interactive, a British company based in Italy, and while the first footage from its work-in-progress is clearly under-cooked (there's not much to see yet, save for a handsomely designed spaceship or two) its game shows a fair bit of promise. For one thing, the team have stated, in one of their developer blogs, that *Seldon Crisis* "is oriented towards old and mature platers", and that

"no compromise will be made to water down or soften the player". What this means is that, for better or worse, *Seldon Crisis* will be 'full loot' – in other words, other players will be able to swoop in, blast you, and take all your belongings.

"We are looking to [make] a real, harsh universe with a player-driven economy, and full loot is a necessity to make this work," the developer writes. "The full loot is the key for a sandbox, and can only work when things explode and things get replaced."

Seldon Crisis might have a way to go yet, but the foundations of an interesting game appear to be in place. You can find out more about what's in store over at **www.seldoncrisis.com**.

Incoming

If you have even a passing interest in the Japanese games industry, you'll be aware that dating simulators are extremely popular. If you're really, *really* into Japanese games, you may even have sampled one or two of them. It's unlikely that you'll

have played anything quite like *Hatoful Boyfriend*, though (and that's not a typo, the game's creator is Hato Moa). It's a dating sim full of pigeons (again, not a typo) where, as the only human at St PigeoNation's Institute – a "prestigious school for birds" – you have to fit in among your new, feathered friends, attend classes, and ultimately, find yourself a partner. "Follow your heart as you choose your path and go on romantic dates," the game's press release tells us, before warning we must also be "wary of fowl twists and turns along the way."

A cult hit in Japan, *Hatoful Boyfriend* has now been translated into English. While we're not sure whether it's the funniest adventure game we've seen recently or the most terrifying, we want to play it as soon as possible – which means waiting until August 21st.

You might also like to know there's also a *Summer Of Dove* edition, which adds a digital comic, soundtrack, and other downloadable goodies.
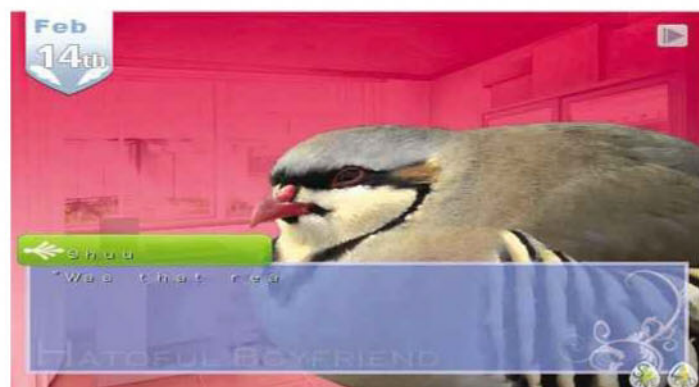
▲ You play the only human in a school for pigeons in the exceedingly strange dating sim, Hatoful Boyfriend. No, we don't know what's going on here, either...

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Socket 775 System. Coolermaster Case, audio + USB. Asus P5KPL-AM EPU E6600 CPU. 250 GB Hdd. DVDRW, ATI 5450. Boxes, drivers. Samsung 19" Monitor HDMI USB. Keyboard mouse. Windows 7 Professional SP1. £100 collect from Louth, Lincolnshire.
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Email: jvital@mail2web.com

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Dell OptiPlex 755 (80 GB, Intel Core 2 Duo, 2.33 GHz E6550, 1GB memory, DVD/CDRW) Ultra small form factor. Fantastic small and very fast computer. You will need to load the drivers. XP Pro or Vista Business can be loaded for an extra £10. The hard drive and memory can be upgraded for an extra cost. £70 plus £10 for delivery.
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Motherboard Bundle. 3Ghz AMD 64bit CPU 512MB Ram 5xpci 2xSATA 2IDE 1Gb LAN 6 channel sound firewire. Comes with driver CD and manual. Good for gaming, office work, surfing the net, watching movies, generally a good all round system. Spec can slightly be changed if required. Please email or call me for a price.
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PC gaming hardware. I have got 1 x force feedback steering wheel, 1 x force feedback joystick, 1 x normal joystick, lots of game pads. Please email or call me for a price.
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Tel: Rob Pratt (01189) 781753 Email: robpratt@bizitsolutions.co.uk

Computer Monitor. HP s2231a. 1080p, 22 inch display, 1920x1080 resolution. 60 Hz, contrast 15,000:1. Price £40 ONO
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Two Apple G4 iBook Laptops. 12" screen, 800 MGHZ CPU 640MB RAM. OSX (Tiger) 30GB HDD batteries ok M/Chargers, nice machines. £105 each or £200 for the two.
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Gaming PC HAF-X case. ASUS P6X58D-E, i7 930 4GHZ 6GB Corsair i7 mem, gigabyte gtx470, Asetek CPU LCLC 240mm radiator + watercooling. Two 12cm fans, PSU needs replacing. DVDRW, networking, original software, extra cabling. (Price: £400 ONO).
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SATA Drive Tray For Laptops. Allows you to remove your CD/DVD Optical Drive and Insert a second Hard drive.
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Two Apple G4 iBook Laptops. 12" screen, 800 MGHZ CPU 640MB RAM. OSX (Tiger) 30GB HDD batteries ok M/Chargers, nice machines. £105 each or £200 for the two.
Email: micksharp@live.co.uk

XFX Radeon HD 6870. 1GB GDDR5. Original packaging, never overclocked..£75 plus £6.95 pp.
Tel: Simon Hardwicke (01536) 724334 Email: simon.hardwicke1@ntlworld.com

Asus Sabertooth 990FX Mobo. £100 plus £6.95pp (with Phenom II 980 add £50).
Tel: Simon Hardwicke (01536) 724334 Email: simon.hardwicke1@ntlworld.com

Lian Li PC-X2000 Computer Case. Supports mATX, ATX, eATX; hot swap SATA drive compartment. Includes
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Matricom G Box Midnight MX2 Android HTPC. New boxed. £85 ono. Postage £3.
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Cartridges for a Xerox 8500/8550 Phaser Colour Laser Printer. 6 Black, 5 Cyan, 4 Magenta, 2 Yellow solid block cartridges going very cheap! Check out cost new from Choice Stationary and make me an offer. My Xerox has given up the ghost after several years.
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Tel: Alex Thomas (01842)813630 Email: chack-pobly12@hushmail.com

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Tel: (01964) 622867 Email ian.macklin@mypostoffice.co.uk

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Tel: Mike Whittington (07533) 270020 Email: mike.whittington@blueyonder.co.uk

XFX HD 7950 GPU. I have 2 for sale, both have 6 months guarantee, willing to split, £180 for pair or £100 each + delivery.
Tel: Mike Whittington (07533) 270020 Email: mike.whittington@blueyonder.co.uk

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Email: paul_999@sky.com

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Tel: Carole Walker (07551) 293083 Email: omendata@gmail.com

Arima HDAMA rev G serverboard. Dual Opteron 250 cpus included.Totally unused stock. Extended format. 4GB SDRAM, Socket 940. Updated bios to 2.18b, Windows 7 compatible. A real bargain. £45 courier incl.
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ASUS P5N-Sli Motherboard with SATA and IDE sockets. Includes manual cables and Intel 2 core panel, cables and Intel 2 core 2.4 ghz. CPU cooling fan and 4GB RAM. £75 including postage.
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Gateway MT6220G Laptop. Dual Core CPU, 2GB memory, 200GB HDD, 15"4 WXGA screen, Vista license. Excellent condition long battery life. Wireless superb, some disks. £120 with free postage.
Tel: (01619) 501218 Email medicineman@ntlworld.com

Toshiba Satellite L350-159 17 inch screen laptop. 320GB HDD, Vista license, 4GB memory. Restore disks, charger, WED lightly. Wireless excellent, long battery life, excellent condition. £165 with free postage.
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ASUS P8B75-m socket 1155 motherboard. With Pentium 620 processor and 4 gigs memory drivers for XG7.8 on disk. Original box and rear 1/0 cover £50. Free postage, please ask questions.
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Be Quiet Power Zone 750W '80 Plus Bronze' Fully Modular Power Supply. I won this in a competition, brand spanking new. This PSU normally retails for £100, selling for a bargain-tastic £75.
Tel: Martin Welch (07971) 528739 Email: welch_martin@yahoo.co.uk

Mini-USB finger optical laser mouse. Attaches to your finger and has two side buttons - great replacement for standard mouse. £10 p&p included.
Tel: Gary Gemmell (01415) 712822 or (07551) 293083 Email: omendata@gmail.com

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New, boxed Belkin 24-Port CAT 5e Patch Panel. Part # F4P338-24-AB5. The RJ45 CAT 5 patch panel is 19 inch rack mountable and supports both 568A and 568B installations. Compatible with both 110 and Krone punch down tools. £15.00.
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Tel: Michael (01452) 303732

HD 5850 XFX Black Edition for sale. It has been flashed with the Asus Bios and can be made to run as fast as a HD 5870. This is a high end card, has no problems playing all the latest games. Comes with box. £65 including P+P.
Tel: Martin Welch (07971) 528739 Email: welch_martin@yahoo.co.uk

Nvidia Geforce GTX 670 2GB. Made by MSI O/C model. Not overclocked. VGC. £110 plus postage.
Tel: Tim Stirland (01623) 624509 Email : tim.stirland@btinternet.com

4 Belkin Master Cube Surge protectors. Not only mains but telephone line protection too. Three were used for a short time, one is brand new. The part number is F9T110ukCW. £15 inc p&p.
Tel: Alan (01258) 446500 Email: alan@asandco.co.uk

1 TB SATA drive 3.5 inch, formatted ready for use. I can load genuine XP Professional from Microsoft with genuine Certificate of Authenticity for an extra £10. Refurbished. £35 + £3 p&p.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Dell OptiPlex 745 (80 GB, Intel Core 2 Duo, 2.33 GHz E6550, 1GB memory, DVD/CDRW). Ultra small form factor. Fantastic small and very fast computer. You will need to load the drivers. XP Pro or Vista Business can be loaded for an extra £10. The hard drive and memory can be upgraded for an extra cost. £60 plus £10 for delivery.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Intel Core i3 3220 3.30GHz processor. Pulled from working PC due to upgrade. Will be provided in anti static packaging. £50.
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Two laptop hard drives, formatted and ready to go. 100GB, 2.5 inch and 120GB and 2.5 inch. The smaller is a WD1000BEVS. The other, Toshiba mk 1255GSX. £35 with free postage.
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MSI KT4AV-L Socket A motherboard + Athlon 2200 CPU + 1GB DDR memory. 1 X AGP slot, 6 X PCI slots, 3 X DDR DIMM slots. Excellent condition, £25 + P/P.
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ASUS Fonepad with neoprene slip case. 16GB 7" Android tablet with Wi-Fi & unlocked 3G phone functions,
Micro-SD slot, Model K004 (ME371MG). Warranty to 31 May 2014. £135 plus P&P
Tel: Ian Bonnett (01932) 856971 Email: a2345@btinternet.com

Dell Ultra small form factor GX620. Pentium D 2.8 /512/80 CD includes AC adaptor. Fantastic small machine that is very powerful ONLY £25 plus £8 for p&p. I can upgrade the memory and hard drive for an extra cost. You will need to load the drivers yourself. Refurbished.
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11 Quality Peach compatible sealed CLI-8 cartridges. Yellow (3), magenta (2), cyan (2), black (2),PGI-5 black (2).
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E6300 CPU with stock cooler. Fully working, available due to upgrade. £10 plus £3 postage.
Tel: John Beech (01928) 733622. Email: johnbeech@dsl.pipex.com

Intel Core i3 3220 3.30GHz processor. Pulled from working PC due to upgrade. Will be provided in anti-static packaging. £50.
Tel: Mark Sullivan (01142) 745864 Email: mark.sullivan34@aol.co.uk

PC for sale. Athlon Dual Core 3Mhz CPU, cooler, Asus M3A board, 2GB DDR2, Nvidia GT8600 500MB, 750W PSU, XPSP3, Sony 17" Monitor, £150.
Tel: Ray Dawson (01202) 893997 Email: ray.dawson02@btinternet.com

Gateway MT6220G Laptop. Core 2 CPU 2 GB memory, 100GB HDD, excellent 15.4 inch WXGA screen hinges. Excellent condition, excellent battery lasting 2 and a half hours. Wireless. £129.
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Toshiba L350-169 17 inch screen laptop. 2 GHZ Core 2 processor, 120GB HDD, 4GB memory, Windows Vista. Excellent condition, lightly used. £170 post free, email me any questions.
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PC with AMD Athlon 6000+ dual core 3Mhz CPU, quality cooler with external speed control, Asus M3A motherboard, 2 GB DDR 2 RAM, Nvidia GT8600 graphics 500MB, 750W PSU, Audigy sound card, case fans front and rear, XP with SP3 and original XP CD - together with Sony 17" LCD Monitor (no missing pixels). £150, sensible offers considered.
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Enermax Galaxy 1000 watt Gaming PSU. Modular, 80+ Gold with all accessories, boxed. Perfect for bitcoin mining, not new but unused. VGC. £80.00.
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Antec 900 ATX Gaming Case. Not new but unused, VGC. Boxed, with all accessories. £57.00.
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Free CPU and RAM. Athlon 64 3200 socket 939 CPU and 4 x 512MB ddr 333 strips.SAE and I will post back to you.
Tel: Jo Barden (01255) 870690 Email: cornsnake@cornsnake.plus.com

Sapphire Radeon HD 6770 1GB in original box with power supply conversion cable and driver CD. £50 inc P&P.
Tel: John O'Regan (01525) 862933 Email: t2o@greenbee.net

MSI Motherboard G41M-P28 LGA775 socket. Also two 2GB matched Kingston DDR3 1333 RAM. Both unused in original packing. £35, inc postage.
Tel: JG Moorhead (01606) 852461 Email: moorhead373@btinternet.com

3 x Devolo dLAN Highspeed II adapters (used, working, unboxed). CD containing software utilities and documentation. £17 collection in Oldham or £20 posted to UK.
Tel: Ken Vickers (01616) 78 6139 Email: mail2luzl3y-gym@yahoo.co.uk

Linksys WMP54G Wireless PCI card. £8 collection in Oldham or £11 posted to UK.
Tel: Ken Vickers (01616) 78 6139 Email: mail2luzl3y-gym@yahoo.co.uk

USB printer cables, assorted. Blue see-through with silver tips, black with gold tips. 1.8m, £1.00 each. IDE cables, grey, £1.00 for 2. Some round, black and colours £2.00 each.
Tel: (01582) 612716 Email: alex.1922@hotmail.co.uk

Gateway Dual core laptop excellent condition. 100 GIG HDD 15.4 inch WXGA screen. Long battery life, 2GB memory, charger, legal Windows Vista. £129.95 plus £10.95 postage.
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PNY Europe GEFORCE GT520 DDR3 1GB PCIE 2.0. £22
Tel: (02393) 117877

TP-LINK 32-BIT PCI 10/100M fast Ethernet adapter TF-3239DL. £11.
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E-mu 0404 PCI Professional Audio card. Works perfectly with Windows XP, 7 and 8 32 and 64bit OS's. Optical, Co-ax, MIDI inputs/outputs as well as analogue. Price £50, delivery £3.50.
Tel: Peter Van Win (01702) 559210 Email: vanpwin1@googlemail.com

Akai Apc40 MIDI Controller. As new, in full working order with software, paperwork, etc in original carton. £240 ovno Delivery £6
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Hitachi Deskstar T7K250 HDT722525DLA380. 250 GB, Internal, 7200 RPM, 3.5". Used only for storage, taken from working PC, no bad sectors. £20, price includes P&P.
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Dell GX3020 SFF Desktop, P4/3.2 Hyper-threaded 2 GIGS RAM, 80 GIG hard drive, CDRW-DVD combo, network, sound, XP Pro, C.O.A, reload disk, ready to use, £45, PayPal OK.
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Toshiba laptop. SP 6100I, complete except no HDD, unable to boot, charger. Windows 2000 installed. Wi-fi. RAM, DVD all present, good screen. Buyer collects. Spares or repair £15.
Tel: Keith Turner (07799) 041618

Desktop computer. With Intel Core 2 Duo E7200, 2.53 GHz, 2 GB RAM, 75 GB HD, DVD/CD-RW, keyboard, mouse, 17" monitor. £ 120 plus delivery (free in London).
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Sapphire HD6670 Ultimate graphics card. 1GB, passive, boxed, new. £55 inc post.
Tel: Mick Young (02072) 321695 Email: mick.young@o2.co.uk

Blackmagic Design Intensity Pro video editing card. Boxed, new. £100 inc post.
Tel: Mick Young (02072) 321695 Email: mick.young@o2.co.uk

Hitachi Deskstar T7K250 HD T722525DLA380 250 GB hard drive. Internal, 7200 RPM, 3.5". Used only for storage, taken from working PC, no bad sectors. £20, price includes P & P.
Tel: (01202) 826057 Email: geoffandcynth@themailspot.com

NAS Two Bay Server. Zyxel 221. Complete with 2x Samsung 1TB hard drives, installed. All new, not been used. Ready to go. Price includes courier delivery. £200
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Apple G4 dual tower. 1GHZ processor system, 756mb ram, DVD SuperDrive, OS 10.4 £100 or nearest offer.
Tel: Paul Brogden (07545) 496002 Email: paul-brogden2007@hotmail.co.uk

Apple iMac G4 for sale. 2004, 1.25GHZ G4 processor,17 inch screen, 1.25GB RAM, 75GB hard drive, OS 10.4, DVD SuperDrive. Comes with keyboard, mouse, and speakers. £150 or nearest offer.
Tel: Paul Brogden (07545) 496002 Email: paul-brogden2007@hotmail.co.uk

Apple iMac Intel 2006 for sale. 20 inch screen, 1 TB hard drive, 2GHZ processor dual core, DVD SuperDrive, 2GB ram, OS Lion. No keyboard or mouse included. Mint condition. £400 or nearest offer.
Tel: Paul Brogden (07545) 496002 Email: paul-brogden2007@hotmail.co.uk

AsRock mobo N68-S. Original box and contents. £20 P+P extra at cost.
Tel: (01842) 879932 Email: mmadds@btinternet.com.

Lenovo ThinkPad X220. Brand new in box. 2nd Gen Core i5 processor, Intel i5-2520M / 2.5 GHz (Max Turbo Speed 3.2 GHz), Windows 7 Professional 64-BIT (SP1). Open to offers of £425 ovno.
Tel: Tim Wright (01268) 472483 Email: tim20k@tesco.net

Dell Inspiron 1525 laptop. Spares or repair £65. Has faulty screen and cracked bezel otherwise perfect working order. Works with external monitor. New PSU & battery. No hard drive. Email for full details.
Tel: Kevin Cazens (01792) 581036 Email: kevin_cazens64@hotmail.com

HP Slimline (S3150) computer. NVIDIA graphics, Intel core2, 2GB RAM, 250GB HDD built-in freeview card with remote KBD, mouse WIFI, MS office 2007 home. £120 including postage.
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HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad to MicroMartClassifiedAdverts@gmail.com and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

Wanted: Fully working mainboard for AMD socket AM3/AM2+, DDR2, micro-ATX size.
Email: Brian bmorgant@yahoo.co.uk

Wanted: Factory system restore disc for a Dell Inspiron 1750.
Tel: Darren Day (07707) 556193 Email: ddshaggy@btinternet.com

Wanted: 4GB (2 x 2GB) of Corsair DDR2 RAM. 800Mhz XMS2-6400. Must be in good working condition.
Tel: (01928) 733808 Email: wilsal9@aol.com

Wanted: One Series Printer HP DESKJET 610c in good working order. One servicing manual (Not Users Instruction Manual) for the HP DESKJET 610c Printer. Old Zip Discs.
Tel: (01214) 777691

Wanted: A socket LGA 775 motherboard to enable me to build a computer for a local Royal British Legion member. He's able to pay for a 2nd hand board as long as it's not too expensive. I've got the other components.
Tel: Ken Driver (01890) 820295

Wanted: Gigabyte G41MT-D3 1.3 motherboard in good condition. Please notify price and postage.
Tel: 0121 455 8526 Email: j.cleary@virgin.net

Wanted: I am looking for 2gb (2x 1gb) of Muskin Redline PC3200 at 500Mhz.
Tel: (07817) 861011

Wanted: 2 sticks of 2GB - PC2-4200 (533MHz) desktop memory, 2 of 1GB. To complete a computer for a disabled ex-serviceman who has little money. Any other donations of bits & pieces of computers would be most welcome as I put together units for hard up ex-service people. Free of charge.
Tel: Ken Driver (01890) 820295 Email: ken@branxton.plus.com

WANTED: Foxconn H61MXL-K I/O backplate. Please state price & postage cost.
Tel: Steve Wilson (01617) 939906 Email: sb.wilson1@ntlworld.com

Wanted: Texas Instruments Laptop Power Supply Cable. Mine has failed and without it, I cannot use or charge batteries. Have complete working system with all software.
Tel: (01525) 288072 Email: jauung2@btinternet.com

Wanted: DDR2 800mhz, 4GB. 2x2GB.
Tel: (07817) 861011

Wanted: The Pet Companion. Has anyone a copy of the 1981 book "The Pet Companion"? This book collected the first 12 issues of Microcomputer Printout Magazine. Will pay £20 for a copy.
Email:Thomas Turnbull turnbull50@sky.com

Wanted: A fully working and proven Compaq (HP) DC7600 PSU. HP part number is 462434-001. Also a Compaq (HP) DC7900 PSU. HP part number is 379294-001 381023-001. Both must be 365 watt, not 240 watt versions. Must also be correct fit for SFF, not tower, CMT or USFF models. Thank you.
Tel: Mr Earl (07872) 495140

Wanted: Motherboard with 3GB CPU or higher wanted. Must have AGP interface.
Tel: (07817) 861011 Email: medicineman@ntlworld.com

Wanted: SDRAM laptop modules. Either PC100 or PC133 for elderly Dell Latitude CPt C Series Laptop. Wanted x2 SDRAM modules up to 254 MB for Dimms A + B (Non Parity).
Email: cjevans@fsmail.net

SOFTWARE FOR SALE

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Windows 7 Home Premium NOT BRANDED 32 and 64 bit versions. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £35 including P & P.
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Email: ianmatthewuk@yahoo.co.uk

Windows XP Professional. New, 100% genuine. Disc, manual, certificate of authenticity. Dell branded but will load onto any computer. £15 including delivery.
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Trend Micro Titanium Maximum Security 2014. Genuine licence key directly to email. 3 devices for 1 year, for smartphones, PC, and Mac. £6.50 incl delivery.
Tel: 0203 519 7628 Email sales@bitsmith.it

Windows Vista Business edition disc and certificate of authenticity. New and 100% genuine. Only £15 including postage and packing.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Microsoft Office Professional 2007. In original wallet with original licence Code. £100. Price Includes P&P.
Tel: Carole Walker (07551) 293083 Email: omendata@gmail.com

SOFTWARE WANTED

Wanted: LG GSA 2164 D software disc to replace broken original.
Tel: Glen Fremantle (01387)248976 Email:bldamsys@yahoo.co.uk

Wanted: Nero 9 reloaded for Windows 7. £80 given.
Tel: (01629) 732623

Wanted: SmartDisk HD250 Installation CD. Novice Linux CDs with instruction manuals reasonable prices will be paid.
Tel: Alun (01525) 288972 Email: jauung2@btinternet.com

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• Keep copies of all correspondence

• When sending out goods, at the least obtain a certificate of posting from the Post Office

If in any doubt, feel free to mail us at editorial@micromart.co.uk. Every year, thousands of successful transactions take place through our classifieds, and that's just how we like it. Help us help you keep them one of the safest and most secure places to buy and sell computer kit.

ASK AARON

Aaron

Child Safe

Not that my child is getting older, I'm looking forward to getting him interested in the PC and, in turn the internet, which I think will be invaluable to him at school. As I have only one computer, which I have to use too, I'm concerned about security and accidental file deletions and so on, not to mention safety on the internet. In fact, the internet issue is something I'm very concerned about, and as much as I want him to use the internet, I'm also very wary.

So I'd like to know if you can suggest a safe way for my child to use the computer, especially when it comes to going online, which he'll be doing eventually. I've looked into Windows' built-in options, like search filters, but could do with something a little more useful and more attractive to him.

Paul

First and foremost, I'd set up a limited user account for your child, just to be sure. This will limit their access to the system, making system tasks and changes unavailable. I'd also ensure your account and any others are password protected for a bit of extra peace of mind.

Second, you should take a look at Safe Search Kids (**www.safesearchkids.com**). This is Google's special child friendly search engine, which you can set up within Google's search preferences and lock. It has strict filters designed for use by children (including safe image searches), meaning they should be safe and sound, even when using a traditional web browser.

In terms of specific internet safety, one of the most popular free options is KidZui.com (**www.kidzui.com**). This is a specialised internet browser that's designed just for kids, with various security features and allows safe internet use via the custom interface. It even has special features like ZuiTube, which streams child-safe YouTube videos, and ZuiGames, which presents age-appropriate games.

Another popular tool is Qustodio (**www.qustodio.com**). This is available free and as a paid-for version, and it's a powerful child safety tool that can restrict internet searches, limit usage times and even monitor your child's social network activity, one of the most potentially troubling aspects of today's PC use for our young 'uns.

K9 Web Protection is yet another option and is also free. This specialises in protecting your whole PC and its users, including your children. You can block sites, enforce safe searching, set time limits on use and view reports, and it has an anti-tampering function to prevent nay fiddling. What's more, it also secures the PC itself, with anti-virus and anti-malware functions, as well as protection from potential scams.

Of course, perhaps the ultimate way to secure your PC for your child's use is to install an operating system specifically designed for them. This is easy enough, and Linux is one option that you can use. A great example is Qimo (**www.qimo4kids.com**). This is a simple, lightweight OS that doesn't tax PC specifications and contains an interface that's colourful, friendly and has everything your child needs.

◄ *Google's Safe Search is a useful tool for parents*

▼ *Using a child-friendly OS keeps both your children and your PC safe*

Phantom SSID

As the king of Siam once said 'It is a puzzlement.'

I set up a wi-fi network with a Virgin Media Superhub in modem mode, and a TP-Link router with a TP-Link wi-fi range extender. This had an SSID of, for arguments sake, 'ssid 1' and 'password 1'.

After there were some problems,which seemed to be caused by the router, I disconnected the TP-Link router and put the Superhub as a router with the SSID of 'ssid 2' and 'password 2'. So far so good.

I now find that my phone and laptop still connect to 'ssid 1' and 'password 1' with a good signal, even though the TP-Link router is completely disconnected and in a drawer. If I connect them to 'ssid 2' the signal is poor

I thought that the extender might be the cause so I paired it with the Superhub, but it has made no difference.

How can the original SSID and password still be usable?

The router is a TL-WR841n, and the extender is a TL-WPA4220/TL_WPA281. I have just noticed that the 'ssid 1' signal is good near the extender but poor near the Superhub.

I hope that you can clear up the mystery.

Jim

This is a very odd problem that can occur when changes are made to home networks. And, like many PC problems, there can be a number of causes and fixes. A common cause is down to the way Windows stores known networks. Windows, by design, remembers every network it connects to, and when it attaches to a new network it assigns it a name using the SSID you enter. Although an SSID may change, the network itself may not, so Windows continues to use the old name.

Another very common cause of such problems is to do with the router or network hardware being used – in this case, the Virgin Media Superhub. Sometimes devices can retain old settings, and this can get confused in the transition. The best way to check for this and fix it is to perform a factory reset on the router. Resetting the hub to the factory defaults should erase all traces of the old network setup, along with old SSIDs. If you do this, also be sure to remove old network entries on each device, and make sure Windows 'forgets' any old networks. Once this is done, set up your hub again, and then connect your devices to it.

Removing networks is simple enough in Windows, especially in Windows 8 and 8.1. Simply open up PC Settings, go to Network,and then Connections. Here you'll see the various networks, as well as an option for managing your network connections. Click this, and you'll be able to easily choose the network you want Windows to forget.

You can also remove network via the command prompt (as an administrator), should you wish to. To do this, open up a command prompt (type 'cmd; at the run/search box). When in the command prompt, navigate to c:\windows\system32. Type 'netsh wlan show profiles' to see a list of wireless network profiles on the system. To delete one, type 'netsh wlan delete profile='profile name' (replace profile name with the wireless network name, of course). To delete all profiles type 'netsh wlan delete profile name=* i=*', which will remove them all in one go.
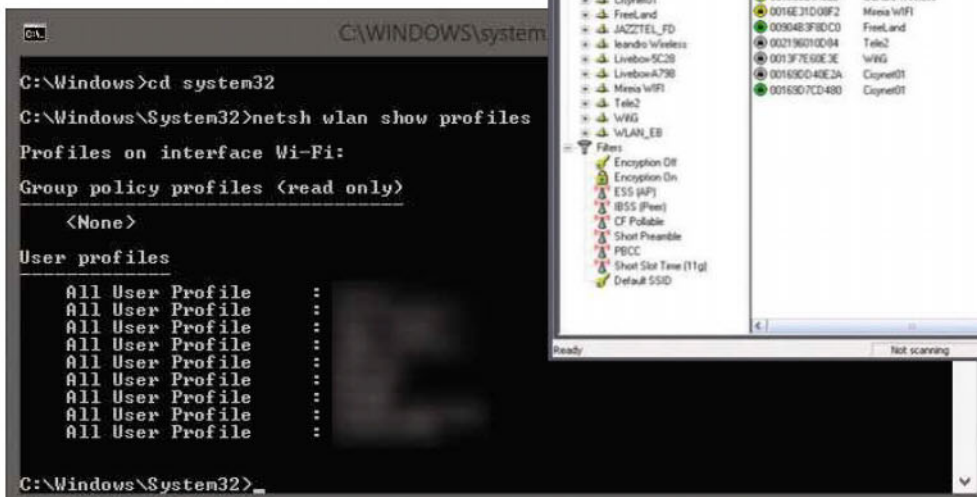
Returning to the router, it may also be a good idea to update the firmware, as this has also been known to solve these problems, so a reset coupled with this may help greatly.

One thing I should mention is the fact that it's not entirely out of the realm of possibility that a neighbour could be using the same SSID, which would explain how the network is still live, without all of the fuss. It's certainly worth checking.

A tool that can help is a network sniffer, such as Netsumbler (**www.netstumbler.com**). This will scan the area for wireless networks and provides you with plenty of information on each, so you can see if there's anything untoward going on.

> ➤ *Tools like Netstumbler can be used to detect wireless networks in the area*

> ▼ *Among other ways, you can list and remove wireless networks via the command prompt in Windows*

ASK JASON

Jason

Cheap As Chips

I was stunned to read in *Micro Mart* a few weeks back about the Dell laptop available for £179. I've just gone to buy one, but it seems I've missed the boat – the price has now risen to £199. That's still remarkable, but I've seen a similar Lenovo at **www.ebuyer.com** for just £170 (after a £30 cashback). Which would you choose? I've included the specs for both below. Also, what's the catch? A friend reckons they'll be infuriatingly slow.

Lenovo B50 (model MCA28UK)
- CPU: Celeron N2815 (dual-core, 1.86GHz-2.13GHz)
- Memory: 4GB
- Drives: 320GB HDD; DVD rewriter
- Screen: 15.6"; 1,366 × 768
- Graphics: Intel HD
- Networking: 802.11n; Bluetooth; LAN
- Other: USB 3.0; HDMI; webcam; card reader
- OS: Windows 8.1 with Bing (64-bit)

Dell Inspiron 15 (model 3531)
- CPU: Celeron N2830 (dual-core, 2.16GHz-2.41GHz)
- Memory: 4GB
- Drives: 500GB HDD
- Screen: 15.6"; 1,366 × 768
- Graphics: Intel HD
- Networking: 802.11n
- Other: USB 2.0; HDMI; webcam; card reader
- OS: Windows 8.1 with Bing (64-bit)

James, Gmail

Your friend possibly has a point, James. You do need to exercise caution regarding the CPUs on sub-£200 laptops. As you know, the Lenovo and Dell both pack Celeron Nxxx CPUs. These are entrants in Intel's new Bay Trail family. The laptop chips (Bay Trail-M) and desktop chips (Bay Trail-D) are called Celerons, but the tablet chips (Bay Trail-T) are called – wait for it – Atoms.

At heart, then, the laptops you've earmarked are Atom-based. These latest chips are like rocket ships compared to the Atoms of old, but benchmarks comparing the Celeron-branded models to 'proper' Celerons (cut-down Core i3s) are practically non-existent. Odd. At a very rough guess, I'd say that clock-for-clock they're half as fast at best.

Does that matter? Well, for general usage – web, email, word-processing, Facebook games, music and video playback – performance should be fine. It was on the older Atoms, too – barely! Your perception of either laptop's usability will likely depend on what you're used to and what you expect.

Which of the two would I choose? Some people have complained about the quality of the Lenovo's touchpad (just plug in a USB mouse), while others have complained about the quality of the Dell's construction (it's perfectly acceptable). In truth, there's little between them. If the Dell were still £179, I'd be tempted, chiefly because of the faster CPU and bigger HDD. However, as long as the Lenovo remains at around £169, it surely takes the prize. You also gain an optical drive, USB 3.0, a LAN port, and Bluetooth.

Of course, if you shop online and aren't happy with your purchase, the Consumer Contracts Regulations (replacing the Distance Selling Regulations) allow you fourteen days from receipt to inform the seller you wish to return it (even if it's been used). Also, James, other sub-£200 laptops are likely to be arriving thick and fast (see the next query for one reason why). By the time you read this, the Dell and Lenovo may have been bettered. Quite a few offerings will doubtless eschew low-end Intel CPUs in favour of low-end AMD APUs, but that's nothing to worry about.

◄ *Faced with stagnant sales and competition from other markets, laptops were always likely to tumble in price*

The King Of Bing

I'm looking to buy a laptop for my son's birthday. I'm hoping he'll put it to good use for homework, but I might be clutching at straws there!

I've noticed some models have Windows 8.1 and others seem to have Windows 8.1 with Bing. What's the difference?

I. Young, TalkTalk

Microsoft sells Windows 8.1 with Bing for $15 a pop (about £9), but only to manufacturers and only for installation on systems costing no less than $250 (the cut-off in the UK appears to be about £230).* It's identical to regular Windows 8.1 except that the default search engine has to be pre-configured as Bing. Manufacturer's aren't allowed to change this, but users are. Microsoft obviously hopes most won't bother.

This new manoeuvre is an attempt by Microsoft to hinder Google. It's not just about search engines, but also about Chromebooks, which are picking up market share left, right, and centre. Windows 8.1's lowered licence cost means entry-level laptops can now match Chromebook prices. We're seeing that as plain as day with the likes of the Dell and Lenovo (highlighted in James's query, above).

Of course, it's also proof that Windows 8.x is a disaster. Just as E.T. on the Atari VCS/2600 is blamed as a major contributor to the video-games crash of the early 1980s, Windows 8.x may well be blamed as a major contributor to the decline of the PC thirty years later.

* It's completely free when installed on devices with screens under 9".

▲ What's Windows 8.1 with Bing when it's at home?

▲ Better than Windows 8.x?

Cable Fable

I'm having trouble with the HDMI output on my Android tablet. I've been using the cable supplied in the box, but video sent to my TV will often freeze, occasionally with the picture weirdly split in two. If I give the cable a wiggle, the video will sometimes start playing again, but only for a while.

For the time being I've switched to the HDMI cable from my Wii U, and I'm having no trouble at all. Clearly the problem lies with the tablet's cable. I expect it's cheap and nasty. What should I look for in a quality replacement? How much should I spend? Some cables claim to eliminate ghosting and improve colour representation – but is that just marketing bull?

Alex Speddings, Dumfries

As with any cable carrying a digital signal, an HDMI cable will either work or it won't. The only real consideration is whether or not it meets the desired technical specification. For example, any cable will carry a 1080p signal, but to carry a 4K/UHD/2160p signal, a cable needs to support at least HDMI v1.4.

Any issues will become apparent more or less immediately. In short, Alex, you'll get artefacts – chunks of scrambled picture or periods of garbled sound. Or freezes, as you've found. These are the same issues encountered when trying to watch a Freeview channel when the reception's poor.

Any talk of ghosting, colour representation, and image brightness is utter poppycock. Not since the days of analogue TV has anyone had to worry about ghosting. A digital signal is just a stream of 0s and 1s that either get through or don't. There's no middle ground, and certainly no scope for variance or ambiguity.

Common weak points on cheap HDMI cables are the connectors, however. By their nature, HDMI cables are quite fat, with limited flexibility. Any great stress near the connectors – when routing a cable from a tablet on the floor to the back of a TV, perhaps – can break the solder joints. It's by no means guaranteed, but cables costing a little more will typically withstand a bit more rough-and-tumble than a cheaper brand.

A broken connector is almost certainly the fate that's befallen your tablet's cable. At certain angles, electrical contact becomes broken, so no signal gets through. The TV keeps displaying the last received frame until the connector's wiggled and electrical contact is re-established. Throw the cable away and buy another. Ignore anything that's 24-carat gold-plated, triple-layer shielded or 'lifetime' guaranteed, though – it's all rubbish, Alex. Spend more than a fiver on a 1m cable and you've been robbed.

▼ Expensive HDMI cables should be left on the shelf to be bought by the sort of customer who blindly maintains that vinyl gives better fidelity than a CD

Crowdfunding Corner

We have two very different, but very handy, Kickstarter projects this week

Packed Pixels

If you're used to a dual-screen setup at home, moving to a laptop with its single, usually quite small, screen can be something of a comedown. This Kickstarter project might solve all that, however, as the Packed Pixels second screen allows you to have a multi-monitor setup on any PC simply by attaching it to the side of any monitor.

Crucially, the tablet-style device is small and light enough to pack alongside a laptop – plus, it can be run without the need for an additional power supply other than the laptop, can be attached in seconds, and requires no extra software to work. It's even compatible with Windows, OS X and Linux. Connections can be made through either DisplayPort or Mini DisplayPort, though if you don't have the required socket on your laptop you can always use a converter.

Its power will be provided by a spare USB port (or, failing that, it can get juice from any mains-connected USB power supply) and you can either mount the screen on its desk stand, or connect it with a removable bracket, making it easy to use one Packed Pixel with multiple PCs. The screen is 9.7″ – the same as an iPad – while the super-HD resolution of 2048 x 1536 means you can also use it for any fullscreen purpose.

A single package requires a pledge of £140, with £10 shipping outside the UK. With 21 days to go at time of writing, the goal of £165,000 is still some way off, but a big push could still ensure it reaches its goal with time to spare. If you want to back it, there's still plenty of time.
URL: tinyurl.com/q2f2vbj
Funding Ends: Monday, August 27th 2014

MaCO

It's near-impossible to run your desk these days without it being a tangle of chargers and data cables. Clearly, something has to be done, and that something might just be the MaCO – a Magnetic Cable Organiser.

The MaCO system helps keep your cables neat, organised and tangle-free. You can attach it to walls or desks to keep data cables and headphones properly organised when not in use, while the Platform add-on makes sure they don't slip off the desk or get tangled with one another. By inserting one end of your cable into the slots of MaCO, you can secure the cable and lock it with the magnetic fastener, or use them to mount the cable on any magnetic surface.

It's designed to attach and detach with ease – all you have to do is pull the two ends of the cable and it'll release. It's small and light, and its colour-coded bands help you organise and recognise the different cables you have.

Unfortunately for anyone in search of a real bargain, the early bird tiers have already sold out, but you can still get three MaCO magnetic bands (as pictured on the left of the image) in black for just $10 Australian dollars (AUD), with and additional $5 AUD shipping. For $13 AUD you can get them in a selection of colours, and for $34 AUD plus $15 AUD you get a platform too (as pictured on the right of the image). The Kickstarter has already gone well past its goal of $10k AUD, so at this point they're collecting stretch goals, including a cable storage pouch and a selection of new colours.
URL: tinyurl.com/q4zjshq
Funding Ends: Friday, August 25th 2014

Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Q-Dir

Don't like Windows Explorer? David Hayward has a solution

The Windows built-in Explorer has served us for many years as the only file manager worth using. It has seen some significant updates in recent years, with Windows 7 and especially Windows 8.1, but it essentially remains the same and does a pretty good job.

However, it's not as good or as powerful as it could be, and it lacks some of the better or more advanced functionality that a decent Linux or Mac file manager has to offer. So what can be done about it?

Q-Dir

Q-Dir is a tiny program (just 1.4MB for the 64-bit OS version), which makes file management a little easier and considerably more advanced than anything Microsoft has built into its systems.

It has a four-pane window view, and each window can be used to view different locations on your system. Alternatively, you can select from 12 other views, managing the panes from the handy selection along the top of the Q-Dir window.

Within each pane you can choose the type of view you want (large icons, details and so on), as well as being able to fast change from one directory to another using the built-in shortcuts around the borders of the individual panes.

You can choose to launch the program in a variety of different languages, as well as having the ability to launch the command prompt, run a program, shut down the computer or print the current contents of each of the panes. There are also different colour schemes to indicate a compressed file or folder, HTML link or hidden object. Also, built-in Windows programs, such as Notepad or Regedit, can be further configured to launch via a customisable list of shortcuts.

To add to its complexity, Q-Dir's individual panes can have another tab added to them through Ctrl+T, so in essence it's possible to have umpteen tabs within all four panes and have the ability to drag and drop from one location, whether that's a local, network, FTP or other online source, to any of the other multiple tabs or panes that are already open.

Powerful, But Not Quite

Although Q-Dir is a powerful and useful file management tool, the added bonus of it being able to double up as an internet browser as well would certainly be more useful or as a file and text editor. That way anything found in a web page could be copied easily to and from other documents.

That said, Q-Dir is pretty impressive and certainly makes your file management and access to resources a little more effective and efficient than using the standard Windows Explorer.

Conclusion

We think Q-Dir is a really useful tool and one that is worth getting to grips with. If you're sick of the usual Explorer limitations or you just fancy giving something else a try, then Q-Dir may well be up your street.

Q-Dir can be found at **goo.gl/pNl5H1**, with links to the portable version, Unicode and 64-bit versions, along with more info regarding the many features and bug fixes from previous versions.

Features At A Glance
- Free
- Can view four panes of different explorer locations
- Can drag and drop between panes and tabs
- View pictures, video and files easily across multiple sources
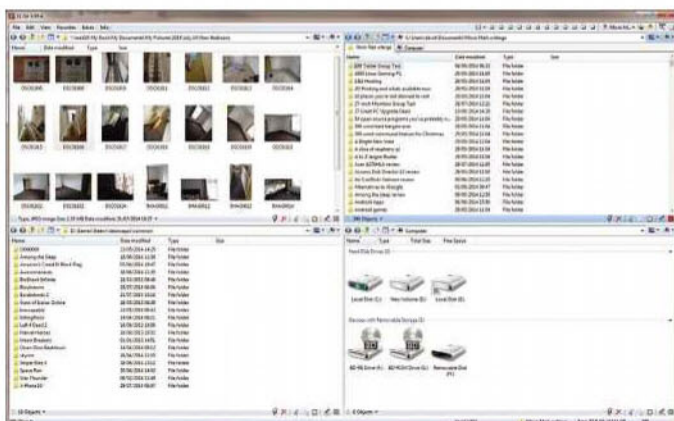
▲ *Q-Dir is a pretty impressive file manager for Windows*
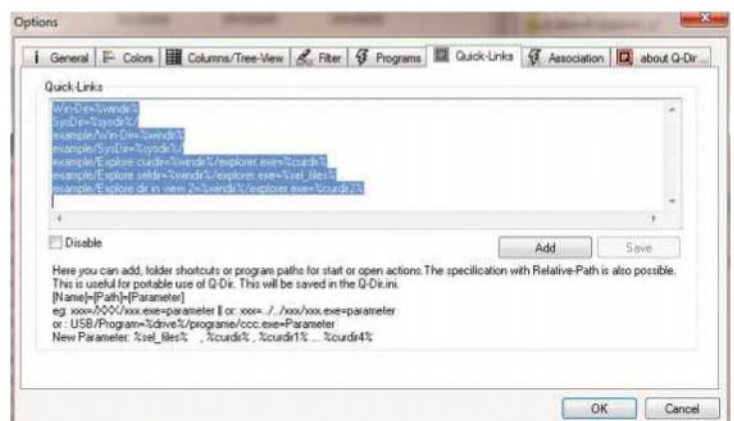
▲ *The options can be further tweaked to your preference*

Logging Off

I love it when a device is described as 'hotly anticipated', when the reality is that the thought of its arrival makes the majority of people yawn. So, you can imagine that I'm over the moon with the language that some websites are using about the upcoming iPhone 6, the first truly new phone that Apple has launched since the iPhone 5 in 2012.

So, according to the Apple fans, what can they expect when it appears in September (or October, or not at all)? A bigger screen... Gosh, that Tim Cook really knows how to thumb his disdain for whatever any other phone maker is doing, doesn't he? Yes, I'm sure it will have all manner of funky features to amaze the faithful, but I'm inclined to remember the fingerprint reader they gave the iPhone 5s (and unpopular 5c) and how that has hardly set the world on fire.

The bigger screen is going to be a welcome change, but it's one that other phone makers embraced some years back, when the late Steve Jobs was telling people 'no one's going to buy' a big phone. That statement was made in 2010 at the iPhone 4 launch, a design dictated by Jobs insistence on a paltry 3.5" display.

Since Apple has broken with tradition, and not sent an engineer out this year to get drunk and misplace a prototype of the iPhone 6, we'll get to see if the phone has a 4.7", 5" or 5.5" screen (or a combination of those) when it launches, if it launches when lots of Apple rumour sites suggest it might.

Those locations are also talking about a Sapphire finish on that screen that's 'impossible to scratch'. Note, that doesn't translate into 'impossible to break'. And, a really weird 1704x920 resolution has also been mentioned, which is lower than the current crop of 1080p or higher Android designs.

The leaked images of iOS 8 show something remarkably like iOS 7, albeit with the ability to have more than one App at a time running. Given Apple's insistence that everyone copies it, I find it curious that each new release of their OS seems to incorporate features from Android or even Windows Mobile.

But here at *Micro Mart*, we like 'value for money' is there anything in the Apple bag of iPhone sunshine for us? No, it appears not. If Apple fans are lucky, then the pricing will be the same as the iPhone 5s, an eye-watering £704 for the 64GB model. Or, as has been hinted at stateside, it will be another $100 more. That's north of £800 to you or me.

Whatever the features it has, that's a ridiculous amount compared with what I paid for my very functional Android phone. I'm still using the excellent £129 Motorola Moto G 16GB bought from Tesco (and then unlocked). Or, alternatively the Nexus 4 16GB that I rebuilt from broken parts a few weeks back for about £90.

Both these have larger displays that the iPhone 5s, and enough power to run any Apps I've seen on that platform. You can buy a serviceable smartphone for less than £100, and I'm not talking something that barely works, either.

Yet, despite this pricing differential I'm sure the iPhone 6 will sell remarkably well, to those people who love Apple styling more than they do their own bank accounts.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Future-Proof, **8** Step-In, **9** Cradle, **10** Mod Perl, **12** Agree, **14** Feint, **16** Promote, **19** Trends, **20** Update, **22** Verbal Nouns.
Down: 1 E-Fit, **2** Step-Up, **3** Trinary, **4** Epoch, **5** Mojang, **6** Affluent, **11** OneDrive, **13** Arduino, **15** Nonary, **17** Medium, **18** Essay, **21** Tass.

THIS WEEK'S CROSSWORD

Across
7 .sl TLD (6,5)
8 Pop up screen message indicating that input from the user is required to proceed. (6)
9 An unstable kaon produced as the result of a high-energy particle collision. (1-5)
10 The quasiparticle resulting from the quantization of plasma oscillations. (7)
12 In computer science, a snapshot of the measure of various conditions in the programme. (5)
14 A greyish-black form of corundum containing iron oxide or other impurities, used in powdered form as an abrasive. (5)
16 A reusable putty-like pressure-sensitive adhesive produced by Bostik, commonly used to attach lightweight objects to dry surfaces. (3-4)
19 A device for making and breaking the connection in an electric circuit. (6)
20 In 1996 they became the first private airline company in Lithuania. (6)
22 Printed material produced by an intaglio printing process in a rotary press. (11)

Down
1 Identified by screen name, handle or nickname. (4)
2 Greek mythological messenger and herald of the gods. (6)
3 A high-speed solid-state switching device which is triggered by a pulse of coherent light and is used in the triggers of nuclear devices. (7)
4 Image hosting website created by Ludicorp in 2004 and acquired by Yahoo in 2005. (5)
5 Leading manufacturer of automated fingerprint identification systems. (6)
6 They made the Fightboard and Fightmouse for gamers, but now focus on top quality case modding. (8)
11 Free peer-to-peer file sharing client program shut down by US court injunction in 2010. (8)
13 An annual publication containing tabular information in a particular field or fields arranged according to the calendar of a given year. (7)
15 Turn on or around an axis or a centre. (6)
17 A force that tends to cause rotation. (6)
18 Members of the political party that urged social reform in 18th and 19th century England - in opposition to the Tories. (5)
21 The right to take another's property if an obligation is not discharged. (4)
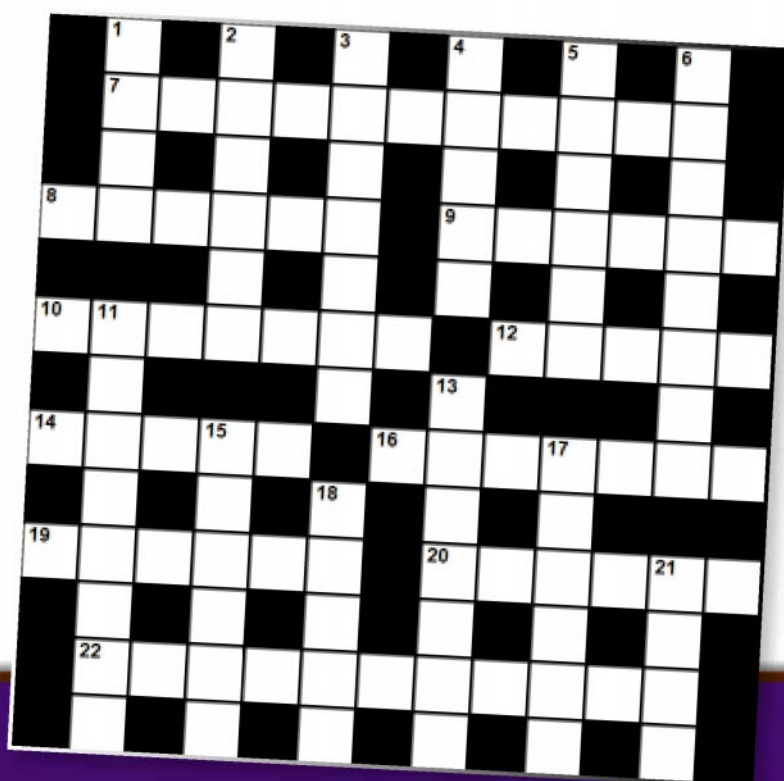
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» **Could a Raspberry Pi be your only PC?**

» **Plus app tests, hardware reviews and more**

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