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60 Technology: Good Or Bad?

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The £50 iPad Beaters

Amazon has just released its cheapest Fire tablet yet. But is it good enough? David Crookes asks whether we're only getting what we pay for with the rising number of £50 tablets

In November, a new Apple tablet is set to be released in time for the Christmas rush. Called the iPad Pro, it's being billed as thin, light and epic, and it is certainly bigger than any other iPad, with a 5.6 million pixel Retina screen measuring 12.9 inches.

It has refined Multi-Touch technology and the ability to edit 4K video, as well as a A9X chip, which provides a CPU performance almost double that of the iPad Air 2. It also has a new peripheral called the Apple Pencil. "Who wants a stylus?" Apple founder Steve Jobs famously asked when the iPhone was revealed in 2007. 'Apple' is the answer today.

But for Apple, it's seemingly all about expanding the range and the size of its tablet offering, and bigger certainly appears to be better according to its current philosophy. The iPhone gained extra height last year, and the latest model of the iPad is now following suit. But it also follows that with a larger iPad comes a higher price. An iPad Air 2 starts from £399, and the iPad Pro is expected to retail at around £600.

"Some machines are costing less than some iPad cases"

Yet there's a flipside to all this. Amazon has also been busy with its own range of Fire tablets, and it too has a new addition as it continues to transition from being a mere retailer of other company's products into a creator of its own tech. The one new Fire tablet that has been catching the most attention is about as far removed from the iPad Pro as you could get. It is an altogether more basic machine. And it costs just £49.99.

Before we take a look at what this device is and what it does, let us first consider what Amazon is actually trying to do. As we all know, the company started as a seller of books, but it has been widening its scope for many years, and now it sells just about anything you could imagine wanting to buy. Along the way, there have been some changing patterns of buying behaviour, not least the move to digital.

Amazon spotted this early and created its ebook reader, the Kindle. This has allowed the company to ride the fall in physical book purchases and capitalise on digital buys. Buoyed by that success, it then saw that people were switching from DVDs and Blu-rays to streaming, so it snapped up Lovefilm, created Amazon Prime Video and started to offer the content on its own range of tablets.

Those tablets have enabled the company to tap into new revenue streams, not least by allowing Amazon to set up its own potentially lucrative app store. But they have also been successful, and a key element to this has been the low price of some of the models. While the iPad Pro also has less expensive siblings – the forthcoming iPad Mini 4 among them – Apple has nothing that can be purchased for the price of a decent meal for two.

You're Fired

The £49.99 Amazon Fire therefore has the ability to pick up many sales and further reduce the iPad's market share. This may well worry Apple, which has already seen the iPad's portion of the tablet cake fall to some 25%. But is it actually worth buying? After all, the cheapest Amazon Fire is pulling in a different direction: it's sticking with the familiar 7" screen offered by many other small tablets, including the Google Nexus 7 and the original Tesco Hudl, and it doesn't even have an accompanying crayon, let alone a chunky hi-tech pencil.

Yet you only have to look at the Amazon website to see which feature it's promoting first and foremost. "Unbelievable price," it says, and there's no doubting that it is. The situation is also more jaw-dropping in America where the tablet is retailing for even less: a staggering $49.99. And, as if to underline just how cheap it is, there's a six-pack bundle for $249.99 which, in effect, means Amazon is giving one away free for every five that are bought.

Amazon's Fire tablet has therefore become a throwaway device, albeit one you may actually want to keep. At this price, it's a drug, luring in customers, getting them hooked into the Amazon ecosystem and making them feel euphoric at having

How Much?

The JYJ

At £28.58, the JYJ 7" tablet is available from the Amazon Marketplace with free delivery. It runs Android 4.2 Jelly Bean and only has a resolution of 800 x 480, but it does have front and rear cameras and access to Google Play. What concerns us the most about this tablet is the warning in the product description on Amazon: "For your safety, please do not use the product when charging, beware of accident!" Just a tad worrying.

bagged a bargain. At the same time, it's perhaps something that you would risk taking away on holiday with you and not worry about dropping it in the pool. Surely it's a no brainer of a purchase?

Certainly, on the face of it, the Amazon Fire is a decent little device. It looks far better than other tablets in this price range, and the screen, with a resolution of 1024x600 at 171ppi, has a wide viewing angle and a great contrast level. It comes with a quad-core 1.3GHz processor and 8GB of storage as standard. It also has mono sound, a built-in microphone and two cameras.

The Amazon Fire will last you the bulk of the day if you use it heavily, with the company promising up to seven hours of reading, web surfing, video watching and music listening. It's durable too. Amazon boasts that in "tumble tests", the latest iPad Air is twice as likely to break than the Fire.

> **"Tesco's Hudl 2 remains a very attractive tablet"**

When buying the machine, there are also a few extras to consider (or dismiss). Among them is a choice of case, which is faintly ridiculous given they cost as much as £19.99 – why add a significant percentage sum to the price? We're also surprised that Amazon even bothers to add the option of a £19.99 two-year Protection Plan and a £9.99 screen protector. But even casting those attempts at grabbing extra cash to one side, there are some other niggles concerning the device itself.

The Limitations

First of all, you may find the Fire limiting in some respects. While the basic resolution still makes the screen watchable, you certainly can't be expecting the Amazon Fire at this price to be on a par with anything that Apple is making. The cameras are merely adequate, since the rear is 2MP with 720p HD video recording and the front is VGA, meaning they simply 'do a job';

How Much?

Alldaymall A88X

Sure, it's from a company we've never heard off, but this tablet has Android 4.4 KitKat, a 1024 x 600 capacitive screen, 8GB of storage space and a quad-core processor that's described as being "incredible powerful", which inspires a lot of confidence. Indeed, it is "up to four times faster CPU". But four times faster than what? Anyway, if it takes your fancy, it costs just £29.99.

we'd be surprised if we saw adverts showing a photograph with the tagline 'taken by the cheapo Amazon Fire' plastered along the bottom.

At the same time, the processor is made by Mediatek, which teamed up with Amazon on the New Fire HD tablets last year. The company tweeted the Forbes website to let it know that the CPU is a MediaTek MT8135, which is made up of two A15s and two A7s. That means the technology is adequate, but it may well be slower than you want it to be over extended periods of use. When coupled with 1GB of RAM, this issue will be intensified depending on what you're using the tablet for.

It also transpires that of the 8GB of storage available, just 5GB of it can be used to store various media, which includes games, videos, books and apps. With the size of files getting ever larger, you will soon find that you run out of space. Thankfully, the Amazon Fire can be expanded, but it comes at a cost. A 32GB micro-SD card will be an extra £11.99, 64GB is £19.99 and 128GB is £53.99, but at least it's removable. Even so, the prices are certainly small enough for your wallet to cope, yet in comparison to the price of the tablet, it can start to niggle at your sense of a bargain.

The same is true with the special offers and sponsored screensavers that you have to put up with in order to take advantage of the £49.99 price. This has long been the case with Kindle tablets, but to remove them will cost you an extra tenner. Then you get to the matter of the operating system. The vast majority of tablets in this price range rely on the ever dependable and widely used Android operating system, which ensures you have access to Google Play and all of the benefits of Google products. The latest Fire runs a version of OS Fire that is dubbed Bellini.

For those wanting a seamless switch from Android, this will continue to be an annoyance. It means you have to repurchase apps, films, books and games from Amazon, assuming they're available. That said, Amazon does point to having more than 38 million movies, TV shows, songs, books, apps and games,

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and the Fire also provides unlimited access to more than $10,000 worth of paid apps, games and in-app purchases. It's a sweetener that tastes good until you realise that, when you narrow it down, there are actually only 300,000 apps which is roughly the number in the Windows Phone Store. By comparison, Statista points to 1.6 million apps in the App Store and 1.5 million in Google Play.

Software Perks

You soon realise that the Amazon Fire is less a tablet about cutting-edge technology but more about tying you into all things Amazon, and yet some of the services are very appetising. Indeed, this is where things start to really look up for the Fire. There are benefits for those willing to splash out £79.99 each year for Prime membership, including downloading Prime Instant Video films and television programmes, which can be viewed offline, as well as more than a million songs, thousands of audiobooks and many more ebooks. There's also unlimited cloud storage for content and photos that you take on the device.

> **"Amazon Fire has become a throwaway device, albeit one you may actually want to keep"**

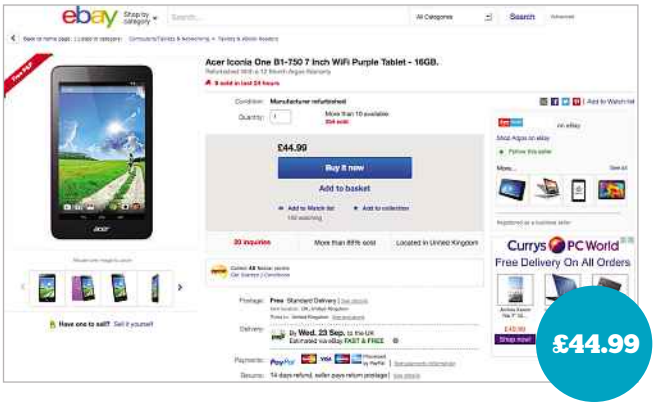
On top of that is access to features that are exclusive to Amazon. The Fire may be offered at a cut-down price, but Amazon is not skimping on the breadth of the services that users of the lower-end tablet can enjoy. They include Advanced Streaming and Prediction (ASAP), which looks at what a user likes to watch and pre-buffers programmes and films in anticipation, and X-Ray, which can translate text in Kindle books and provides extra information about your read.

The tablet also allows for the Second Screen feature, so you can connect it up to the Amazon Instant Video app running on the Amazon Fire TV, Fire TV Stick or PlayStation. Plus there's FreeTime, which provides access to lots of goodies for children; Family Library, which lets people link two Amazon accounts and share books; and Word Runner, which helps you to read faster (so you buy greater numbers of novels, we would guess).

How Much?

Acer Iconia One B1-750

Now this isn't strictly a brand new £50 product (it's £44.99 and refurbished for a start), but there are lots of these 7" tablets to be had at Argos's clearance store on eBay (you'll find others there too). At the time of writing, more than 254 of them had been sold and those getting them will be pleased. It has a solid 1280 x 800 screen and a 1.83GHz quad-core Intel Atom processor.



Prime members can also use On Deck, which keeps the Fire tablet current with popular Prime movies and TV shows, as well as Amazon Original Series such as the forthcoming show with former Top Gear presenter Jeremy Clarkson. And if you get stuck, you can contact customer services with Mayday Screen Saving, which lets an Amazon tech advisor guide you through the tablet's features by drawing on the screen or showing you each step.

It is these aspects of the Amazon Fire that make the tablet worth considering. Without them, it is simply a tablet at a price low enough to make for an impulse purchase that you can throw around, forgiving any shortcomings that would otherwise eat away at your expectations. With them, the tablet becomes an intriguing, almost must-have prospect, especially if you're already a big fan of Amazon and have already amassed a sizeable library of content.

One positive aspect of tying into the Amazon ecosystem is that what you lose out on in terms of the number of apps available, you gain in terms of cross-platform usability. Kindle books can be read across all devices, for example, and you can also watch purchased programmes and films on your television. It very much depends on what you want to use your tablet for: among the 300,000 apps, there are the big hitters of social media and lots of games, some made by Amazon's own gaming studio and so initially exclusive. You could always find a way to root your Fire to install the Google Play store. It may well void your warranty, but at this price, do you actually care? If nothing else, you'll learn a new skill.

Rise Of The Low-Priced

The Amazon Fire is not the only cheap tablet around, though, and we're already at the point where some machines are costing less than some iPad cases. One of them is a brightly coloured thing called the Dragon Touch. At £42.71, this is another 7" tablet with the same amount of storage space as the Amazon Fire, albeit with the bonus of running Android 4.4, yet it also has a less powerful CPU than the Fire.

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*Y-cam HomeMonitor customer survey March 2015, percentage of customers that said they would recommend Y-cam HomeMonitor, 6+ on a scale 1-10

Some Dragon Touches have been reported as having a low battery life and charging problems, but they will run Google Play and they have filter software called Zoodles that make them child friendly (although you'll be able to find this in Google Play). Reviews for the machine are a mixed bag but some people casting their opinion seem to expect a fully featured tablet at this price. That is never going to happen, and it's silly to even think that such tablets will beat the higher-end offerings from the likes of Samsung and Apple. In many instances you get what you pay for, and it ultimately comes down to what you think you'll be using the tablet for.

If you're looking for a device that will let you surf the web, check emails and consume media, then these inexpensive tablets are certainly worth considering rather than the more expensive offerings. They're built for this very purpose, and they're aiming themselves at a market that isn't seeking to stretch the boundaries of a tablet by pushing it into becoming a workstation or something on which you want to edit videos.

For so many people, a computer is the go-to for the most demanding tasks, and a tablet is simply something that offers a more pleasurable, larger screen for reading and entertainment. To that extent, the Amazon Fire and the Dragon Touch have the potential to eat into the market share of the iPad, and it's most likely why some fairly well-known names such as Lenovo, Huawei and LG are entering this space.

One of the most impressive low-end products is the Lenovo TAB 2 A7-10, which we've seen for sale at just £51.96, down from a retail price of a smidgen over £70. It is very similar to the Fire, with a 7" wide-angle viewing screen at 1024 x 600, and a

How Much?

Hudl 1

So you're not a Tesco shopper and you prefer to buy your potatoes at Sainsbury's or Lidl. Either way, you won't have enough Clubcard points to knock a decent chunk off the price of a Hudl 2. If this is the case, don't worry. Just snap up the Hudl 1 instead. A refurbished unit is available from Tesco Direct for £49.99, and even though it's getting a little old now, it's still worth a look.

MediaTek CPU – specifically a MT8127 1.4GHz quad-core. It also has Dolby audio with a front-facing speaker and, crucially, it's powered by Android 4.4 KitKat (upgradable to Lollipop), which means you're not restricted to a proprietary operating system like the Amazon Fire. There is also satellite GPS.

For a little bit more – around £60 if you look hard enough – you could try the Huawei MediaPad T1 7.0. It has the same resolution as the Lenovo and a slightly slower 1.2GHz Spreadtrum SC7731G CPU, but it has Android 4.4.2 overlaid with Huawei Emotion UI 3.0. Both its front and rear cameras are 2MP, and it looks great. With a thickness of just 8.5mm and weighing 278g, it claims to be able to browse the web for up to eight hours and allow you to watch up to 12 hours of movies. It also boasts a standby time of more than 300 hours.

Not to be outdone but costing more than the other tablets here is the LG G Pad 7.0 Tablet. It isn't a name that trips off the tongue, but it does show what an extra spend will get you. For more than twice the price of the Amazon Fire, you can get yourself a five megapixel rear camera with a 1.3 megapixel front-facing camera. The tablet is also powered by a quad-core Snapdragon processor, yet just 8GB storage like the others. Even so, there are some nice innovations to make up for it, from the intuitive keyboard to the ability to pair the G Pad to an Android smartphone via a system called LG Qpair 2.0. The screen can also split in two so apps can be used in each half. This is a feature the iPad has only begun benefitting from.

If this is the price bracket you're looking to tap into, then the options widen further. Tesco's Hudl 2 remains a very attractive tablet, and it's clear the supermarket giant is keen to pull out all of the stops in order to get people using it. From a choice of colours to the 8.3" full HD touchscreen and Dolby sound, the feature-set is jaw-droppingly good: how about 2GB of RAM and an Intel Atom quad-core processor? Android KitKat? And how about getting all of this for £99? What makes this even more remarkable is that if you have enough Clubcard Vouchers, then you can bag this baby for £50,

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This quality and potential price is the real game changer here, and it makes it better than so many other tablets in its bracket. Still competitions remains, though. The Linx 7" tablet with a 1.83GHz Intel Atom Z3735G and 32GB of storage is a great offering that is more than capable of functioning as a handheld games tablet. It uses Windows 8, and it can be upgraded to Windows 10. But at £89.99, you may feel as if you're not getting enough extra performance for your money when compared to the cheaper alternatives. In comparison to an iPad Mini, though, it's well worth thinking about.

Yet this is precisely what Apple will not want people to do. For a long time, £50 tablets have been poor quality, with resistive screens and cheap innards, often speedily knocked out in Chinese factories to make the unknown manufacturers slapping their brands on them a quick buck. But that has changed. The Amazon Fire and Hudl 2 make very good cases for your money, and they should also cause you to reassess what you actually want a tablet for. It will also make it harder and harder for Apple to persuade potential customers that its all-singing and all-dancing range of tablets are 12 times as good.

This is perhaps why it's looking to corner the business and professional market with the iPad Pro, knowing that a £50 tablet is unlikely to be able to appeal to those in this space for a long time. The higher-end products that the major companies are producing will come to only be appreciated by the most heavy and demanding users, whereas so many millions will feel they're getting great value from a less expensive tablet that can so easily be cast aside for a dearer model if the need ever arose. It may not be good news for less well known names (Otterbox, which makes the 77-5097_ Defender case for iPad Air 2 at £49.64 must feel severely threatened by the low-end invasion by the big boys), but it's just the way the market is going.

That's because more and more tablets are hitting the £50 point. Indeed, Archos recently updated the 70 Xenon with the 70B Xenon, complete with its 512MB of RAM, 4GB of storage and dual-core processor. It will no doubt struggle to shift too many given the specs, but it may spark a new race to the bottom with slightly less well specced machines going below the £50 mark in a bid to grab consumer cash (although we will draw the line at companies such as Lexibook claiming a 4.3" screen to be a tablet!).

Time will tell whether or not these tablets will eventually come to utterly destroy the iPad's market share or whether Apple will look to create its own true budget machine. It wouldn't be entirely desirable to see such a thing happen, since ambition and the pushing of boundaries is what keeps technology moving on. Yet good, affordable tech is just as crucial because, in this case at least, it can introduce larger numbers of people to the delights of computing. Tablets for the masses? When they work as well as some of the products on the market, they're not a bad medicine, are they? **mm**

How Much?

BTC Flame

For some reason, we keep thinking of a flame-grilled Burger King when we see this tablet. But anyway, we digress. This device costs £32, and while it appears to have battery issues, it at least runs Android 4.4 and comes with a A33 quad-core A7 CPU at 1.2GHz. You can have it in a variety of colours and even run games on it. After all, if you want to run FIFA 15, the description on Amazon explains that it "goes great on your tablet". Sounds good. We think.

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The Tablet And Smartphone Round-up

David Hayward checks out the latest mobile devices on the market

It seems likely hardly a week goes by without some new phone or tablet being announced and hailed as the greatest thing ever. If you tried to keep up to date with the movements of the mobile world, you'd probably be glued to your screen 24 hours a day.

So to help you get a little rest from staring at the next big announcement, we thought we'd put together a quick round-up of the latest tablets and phones, including those that should (according to the manufacturers, at least) be with you by the time you read this.

Tablets

Although at one time the ultimate in luxury items, the humble tablet has managed to claw its way up from the middle ground between a laptop and a phone to become not only a gaming platform but also one that's great for on-the-go productivity and other forms of entertainment.

Android tablets have since dropped dramatically in price too, from several hundred down to less than £50 in some extreme cases. However, the top-of-the-range models, with multi-CPU/GPUs, incredible screens and gigabytes of memory will still set you back a fair bit. Anyway, here are a collection of the latest tablet offerings from around the internet.

Asus ZenPad 8.0 (Z380C)

Asus has a good range of affordable tablets under its belt these days: the MeMo, Nexus and Vivo are all good examples of such low-cost but decent products.

The latest addition to the fold is the ZenPad 8.0, with a tempting price of just £119. This 8" LED WXGA tablet has a

The Asus ZenPad: an affordable and capable tablet

maximum resolution of 1280 x 800, a 10-point multi-touch capacitive screen, Gorilla Glass, anti-fingerprint coating and an Intel Atom x3-C3200 quad-core processor.

There's an ARM Mali 450 MP4 GPU and 1GB of memory added to that, with either 8GB or 16GB of storage available. You also get 802.11 b/g/n wi-fi, Bluetooth 4.0, and Miracast support. Other connectivity includes a micro-USB, micro-SD card reader, and a two-in-one headphone and microphone socket.

A 2MP front camera, 5MP rear camera, DTS HD Premium Sound, G-Sensor and an okay eight-hour battery round off the specifications nicely.

The Atom X3 isn't the most powerful processor to ever grace the technology scene, but it's sufficient for running the installed Android 5.0 (Lollipop), browsing, lightweight gaming, office and productivity tasks and watching video. More demanding gaming may require something with a bit more grunt, however.

In terms of design, for this price you're not going to get anything too astounding, but the ZenPad isn't too bad. There are interchangeable cases, available in a wide range of colours and patterns, and there's a kind of Apple-esque or Galaxy Note 10.1 look to the front of the tablet.

The screen is reasonably good too, fairly well detailed and sharp, with a good level of contrast too, thanks to Asus VisualMaster technology that optimises and enhances the display somewhat.

The ZenPad 8.0 won't set the mobile world alight, but for just over £100, it's not a bad tablet to have handy. For more details, the Asus ZenPad 8.0 page can be found at **goo.gl/6TsfHs**.

Acer Predator 8

Although it's not due until October/November,, this is one of many tablets we've got our beady eyes on and are hoping to get a review of.

The Acer Predator is set to be the latest and greatest in gaming tablets, taking on the might of the already established Nvidia Shield. The specifications of this tablet are unusual, from a mobile gaming point of view, but nonetheless quite impressive. This 8" full HD 1920 x 1200, 10-point capacitive screen hides the latest Intel Atom x7-Z8700 processor, with an Intel HD Graphic Gen-8-LP GPU, 2GB of memory and either 32GB or 64GB of storage.

There's an SD card slot for support of up to 128GB cards, Bluetooth 4.0, 2x2 MIMO wi-fi, four front-facing speakers and a feature Acer is calling TacSense, which is basically a kind of force feedback.

The screen is near IPS-like in its display, with good viewing angles and a bright, crisp and colourful image. It certainly looks very impressive, from what we've seen so far, and provided the hardware can keep up, the gaming should look just as amazing.

"Although at one time the ultimate in luxury items, the humble tablet has managed to claw its way up from the middle ground between a laptop and a phone"

Speaking of gaming, many critics are puzzled as to why Acer chose Intel over Nvidia or Snapdragon. The Intel Atom x7 range isn't exactly a thoroughbred in the mobile gaming world, and to pitch a competitor to the likes of the Nvidia Shield using untried and untested hardware is a risky step to take. For the moment, we'll just have to trust that Acer has made the right decision; doubtless we'll find out soon enough.

You can expect the Acer Predator 8 to cost in the region of £250 when it's released, and if you want a little more info you can watch the Acer promotional video at **goo.gl/Rmu9mo**.

EE Harrier Tab

The EE Harrier range has a new addition in the form of the larger Harrier Tab. Its predecessors, the Harrier and Harrier Mini,

The Acer Predator 8 could be the top gaming tablet of 2015/16

➤ *The EE Harrier Tab isn't too bad and has a lot going for it*

were actually pretty good tablets and generally highly rated by the media and users alike.

The Harrier Tab is an 8" full HD device with a Snapdragon Octa-Core 615 processor with an Adreno 330 GPU. It has 2GB of memory, 16GB of internal storage, a SIM card slot for various EE plans, and it runs Android 5.1.

In terms of connectivity, you'll get 4G LTE, 3G HSPA, Bluetooth and wi-fi. There's a front-facing 2MP camera and a decent 8MP rear camera with LED flash.

The price varies depending on the plan you opt for, but the basic starts with an up-front cost of £149, which is a pay-as-you-go setup. The upfront cost drops as you progress up the plans, but the monthly charge increases. However, plans seems to change daily in this game, so you'll have to scout around for the best deal if you're interested.

The Harrier Tab isn't too bad a tablet. It's certainly not the quickest on the market, but it's no slouch either. Likewise, the screen quality is pretty good too; it's as bright and clear as you would expect from a modern tablet and it has some good IPS quality viewing angles too.

The only downside, of course, is that you're tied in with EE – not that there's anything wrong with EE, but you lose the freedom of owning your tablet, which may put a lot of consumers off.

Of course, if you don't the EE plans and you're happy with the specifications and overall cost, then the Harrier Tab isn't a bad little tablet to have.

For more information regarding the tablet and the various plans, head to **goo.gl/5hNypp**.

Sony Xperia Z4 Tablet

One of the big names in tablets recently was the release of the Sony Xperia Z4, the company's flagship device with a high price and a set of exceptional specifications.

The Xperia Z4 boasts a 10.1" 2K screen with a resolution of 2560 x 1600 and is powered by a 2GHz octa-core Snapdragon 810 processor and Adreno 430 GPU. It has 3GB of memory, 32GB of internal storage and runs Android 5.1 with a probable upgrade to Android M in the not too distant future.

There's a front facing 5.1MP camera and an 8.1MP rear camera, with full 1080p video recording and HDR. And you have a micro-SD card with support for up 128GB cards.

➤ *Sony's flagship tablet will take some beating, but it's extraordinarily expensive*

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> **The big news on the pundits' lips is the launch of the iPhone 6S and 6S Plus**

As you would expect, there's Bluetooth 4.1, USB 2.0 and micro-USB ports, 802.11ac with MIMO support and CAT 6 LTE.

Just by looking at it, there's little doubt that this is a Sony product; it's visually quite stunning. The screen is a thing of beauty to behold, thanks in part to the high resolution and to Sony's Triluminos technology, which really brings out some spectacularly bold colours, with superb sharpness and quality. It's easy to wax lyrical over it, but if you get the chance to play around with one in a shop, we can highly recommend it.

The significant downside, as you can imagine, is the price. While absolutely wonderful and shiny in every conceivable way, the Sony Xperia Z4 does cost £499. That's a lot of money to be spending on an item of technology that will be out of date in less than a year – given the speed at which mobile technology marches on.

Saying that, we have a Galaxy Note 10.1 that's still going strong and can knock out a game or two without too much difficulty. We imagine, then, that given the specifications of the Z4, it'll still be able to hold its own a couple of years down the line.

For more information on this superbly presented but shockingly expensive tablet, the home page can be found at **goo.gl/rgOpqi**.

Other Notable Tablets

Among the many tablets that are out or due out soon, here are a few that didn't make the main list:

iPad Pro: Due out in November and priced at around £600/700, this 12.9" Apple monster has some mouth-watering specs.

HP Pro Slate 8: This nicely designed and top-quality 7.8" tablet has a lot going for it. The Nvidia Tegra quad-core 2.3GHz means it'll make short work of anything you can throw at it.

Acer Aspire Switch 10E: This Windows 8.1/10 tablet looks and feels much like a Surface Pro 3 but with better colours available. There's a good 12-hour battery life, and you can buy it for around £279 from Currys.

Microsoft Surface Pro 3: Who says a good tablet has to have either Android or iOS on it? Windows tablets are still going strong, even the Surface Pro 3 that's been with us now for about a year.

Smartphones

If you thought tablets were racing ahead at a rate of knots in the technology world, then your head is guaranteed to start spinning once you try to keep up with phones.

With each successive release of a phone, the specifications get a little better, the style is altered slightly, there are a few

The much coveted iPhone 6S, with some tasty features available

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A surprisingly good phone from ZTE, the Axion Elite

extra bells and whistles attached, and the screens become even clearer with higher definitions available.

iPhone 6S And 6S Plus

The big news on the pundits' lips is the launch of the iPhone 6S and 6S Plus. Every other year Apple gathers a crowd of whooping and wailing journalists and bloggers in a big room ,and with much pomp and ceremony shows off its newest line of phones. That's not meant as a dig at Apple; in fact, we're quite envious of those who will be showing off their posh new iPhones by the time this goes to press.

The iPhone 6S and its bigger brother, the 6S Plus, don't hold back in the performance stakes. The 4.7" screen of the 6S (5.5" on the 6S Plus) features a Retina HD display with the fancy new 3D Touch technology, which has a 1334 x 750 resolution.

The A9 processor with M9 motion co-processor is said to be up to 70% faster than the iPhone 6 A8 CPU. There's 2GB of memory, the most an iPhone has had so far, with storage options from 16GB, 64GB and up to 128GB.

That 12MP iSight camera with dual-LED, Live Photos feature, optical image stabilisation (on the iPhone 6S Plus only) and countless other elements is the talk of the media airwaves. Such features as 4K video recording and the ability to take 8MP stills while recording at 4K are technologies that iPhoneographers will go weak at the knees for.

The list of incredible specifications goes on, but one of the most appealing aspects of the iPhone 6S and 6S Plus is the introduction of iOS 9 with its major enhancements and a smarter Siri. As an Android user, even I have to admit it looks pretty amazing.

Pricing and contracts vary across the major networks, but essentially you're looking at something in the region of £540 for the iPhone 6S and £620 for the iPhone 6S Plus. If you're an Apple user, then you'll find nothing new from this entry, but if you're considering a new phone or jumping ship from Android to iOS, the iPhone 6S may well the leap you take.

For more info on just how good the iPhone 6S and 6S Plus are, take a look at the official Apple page at **goo.gl/MNwS4T**.

"If you thought tablets were racing ahead at a rate of knots in the technology world, then your head is guaranteed to start spinning once you try to keep up with phones"

ZTE Axon Elite

ZTE is one of those companies that tend to be shoved to one side as the producer of cheapo Chinese knock-offs, but it's certainly not. In fact, the company has a vast range of high-quality phones on offer that cover many different territories.

The ZTE Axion Elite is the newest member of the smartphone range and is targeted at European users for a release in late September.

As far the specifications go, it's not too bad. You'll find a 5.5" IPS LCD capacitive touchscreen with full HD 1920 x 1080 pixels, a Snapdragon 810 octa-core 2GHz processor with an Adreno 430 GPU and a decent 3GB of memory.

Other Notable Phones

As with the tablets, here are some smartphones we left off the list that are worth checking out:

Samsung Galaxy S6 Edge+: The Edge+ is all about style and looking pretty magnificent. It works too, but for an eye-watering £750 it might be a bit too costly for most users.

Sony Xperia M4 Aqua: As the name suggests, the Sony Xperia M4 Aqua is capable of being dunked in water. That's a good thing, but don't expect to mimic Jacques Cousteau anytime soon.

Honor 7: The Honor 7 is a phone from a subsidiary of Huawei, and it comes with a decent set of specs and security features such as a fingerprint scanner. Expect to pay around £260 for one.

Huawei G8: The Huawei G8 should be available by the time you read this and boasts the fact that it's made entirely from metal. We're not sure of the exact price yet, but expect around the £400 mark.

How 3D-printed rats could offer schools a vegetarian dissection

alphr.com
A fresh take on technology

There's 32GB of internal storage, Android 5.0 and a micro-SD card slot with support for up to 128GB cards. So far, so good.

Surprisingly, the Axon Elite comes with a dual 13MP and 2MP rear camera setup, with a front facing 8MP camera, both of which are pretty decent by most users' standards.

The usual Bluetooth, wi-fi, G-sensors and networks finish off the remaining specifications nicely, and the reported 12-hour battery life remains to be seen, but considering the rest of the feature list, we expect it lasts a good part of the day before needing a charge.

Another interesting feature here is the square fingerprint sensor on the rear of the phone. According to early testers, this security feature is quick, responsive and accurate and works very well indeed. Failing using your fingerprints to unlock your phone, ZTE has also included eye scanning and voice unlocking.

From what we've heard, the ZTE Axon Elite is certainly a good performer. The combination of the fast processor and 3GB of memory mean that it'll handle just about everything you can throw at it from the modern Android world.

There's no word yet as to how much it'll cost, but by the time you read this that information should be readily available. Until then, though, you can take a look at the list of features and ogle the ZTE gallery at **goo.gl/k7Gvrn**.

> **"With ever more powerful mobile processors being released and some interesting features being introduced, there always seems to be something worth reporting"**

Wileyfox Swift

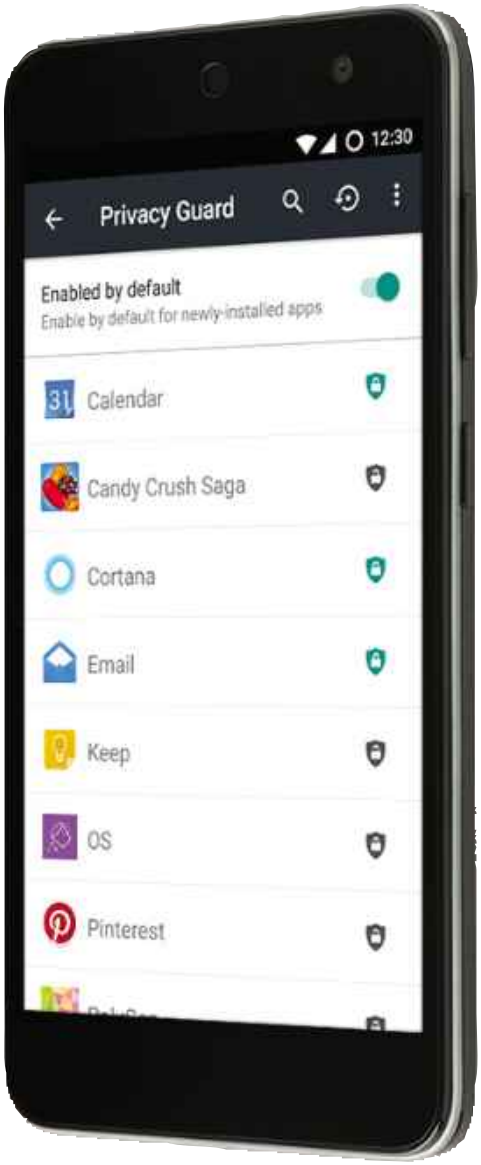
You can be forgiven for not having every heard of Wileyfox before, to be honest we hadn't until recently. As it happens, Wileyfox is a UK-based phone company that has taken the best parts of mobile technology and bundled them into a phone that the user wants, rather than what the user has no choice but to get.

It's a bold project but one that looks like it's going to work. For starters, the phone is certainly well specified, with a 5" HD IPS screen, Snapdragon 410 processor and Adreno 306 GPU.

You'll find 2GB of memory and 16GB internal storage, as well as an SD card slot with support for up to 32GB cards. There's also a 13MP rear camera with dual LED flash and HDR and a further 5MP front-facing camera for decent selfies or video calling.

One of the interesting features regarding the Wileyfox Swift is the company's use of Cyanogen 12.1 rather than a standard Android version. Many users and experts alike claim that Cyanogen is far better than vanilla Android, and in this case Android 5.1. Cyanogen is more secure, including all the extra security management elements that Google leaves out of the standard Android build, and there's an additional bundled security feature called Privacy Guard, which allows you to restrict the information that apps can leech from your device.

There are a number of really fascinating features included with the Swift, in terms of apps and so on. The hardware too



The Wileyfox Swift, we have a lot of love for this phone

isn't too bad either, with one particular point we liked being the removable battery.

Anyway, it's well worth looking into if you're in the need for a new phone but fancy something a little different. The Swift costs just £129 and will be, if it's not already, available very soon. In the meantime, you can check out the company's web page at **goo.gl/RhPgsk**.

Conclusion

While we could carry on with further models of tablets and phones, we have to draw the line somewhere. Needless to say, there's a vast range of products available that are far beyond the usual selections you find when you pop into one of the many high street shops and browse their plans.

It's clear that the level of technology displayed in both the tablets and the phones we've looked at here shows no sign of stagnating. With ever more powerful mobile processors being released and some interesting features being introduced, there always seems to be something worth reporting on. That, surely, is something worth celebrating. **mm**

'With moments of real genius, some of his poems will last as long as poetry is read.'

– Benjamin Zephaniah

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Felix Dennis

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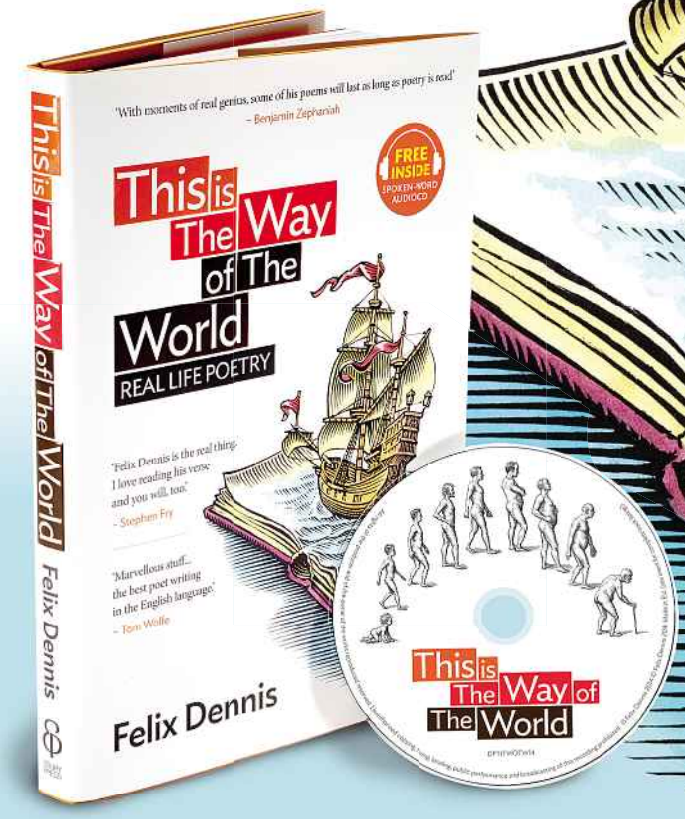


A book of poems for those who don't read poetry (as well as for those who do!)

A collection of 'real life' poems by Felix Dennis, one of Britain's best-loved poets, charting life's course from infant to endings with illustrations by Bill Sanderson.

www.felixdennis.com contains many poems, published and unpublished, as well as a library of sound recordings and video footage of Felix Dennis's verse and poetry tours.

EBURY PRESS

Code With AI2

Touch Animation

Build an Android touch animation app with **David Briddock.**

Last time we built a handy sketching app. This time we'll be staying with the Canvas component to discover how it can be used to develop touch animation apps. Remember, all you need to play along is a Windows/Mac/Linux PC, web browser and Google account. This time, though, you'll also need an Android smartphone or tablet to test the app.

What We'll Learn

Animation coding is often a rather arduous task, but with AI2 it's simple and fun. In fact, we only need a few components and a small number of code blocks to build a working app. By the end of this short article you'll have the gained foundation knowledge necessary to create any number of games and cartoon-like animations. So let's get started, shall we?

Starting AI2

In your browser, you will need to navigate to the AI2 home page (**ai2.appinventor.mit.edu**) and sign in with your Google account. You'll then need a new project so in the Projects menu select the 'Start new project' option and give it a meaningful name, for this we used 'MMTouchAnimation'.

Screen Properties

With that done, you will automatically be taken to the Designer View where there's already a component called Screen1. We'll drag and drop the other components onto this screen as and when we need them.

To the right is the Properties panel for the currently selected Screen1 component. In this panel, ensure the AppName is 'MMTouchAnimation', then set the Title to 'MM Touch Animation' and the ScreenOrientation to Portrait. Now we'll add some screen components.

The Canvas

Animation takes place on something called a canvas, which is analogous to an artist's blank canvas. We can draw onto this canvas or place graphical objects, commonly known as sprites. These sprites can move, collide and interact.

In the lefthand side component Palette open the group called Drawing and Animation. Now grab a Canvas component and drop it into the Screen1 area in the central Viewer panel.

With the Canvas1 component selected in the righthand Properties panel set the Height and Width to the 'Fill parent...' option. Notice that Canvas1 now covers the whole of Screen1.

The Sprite

Next we need a graphical sprite to animate. We could just use a pre-defined Ball component. However, let's go a step further and create our own custom sprite.

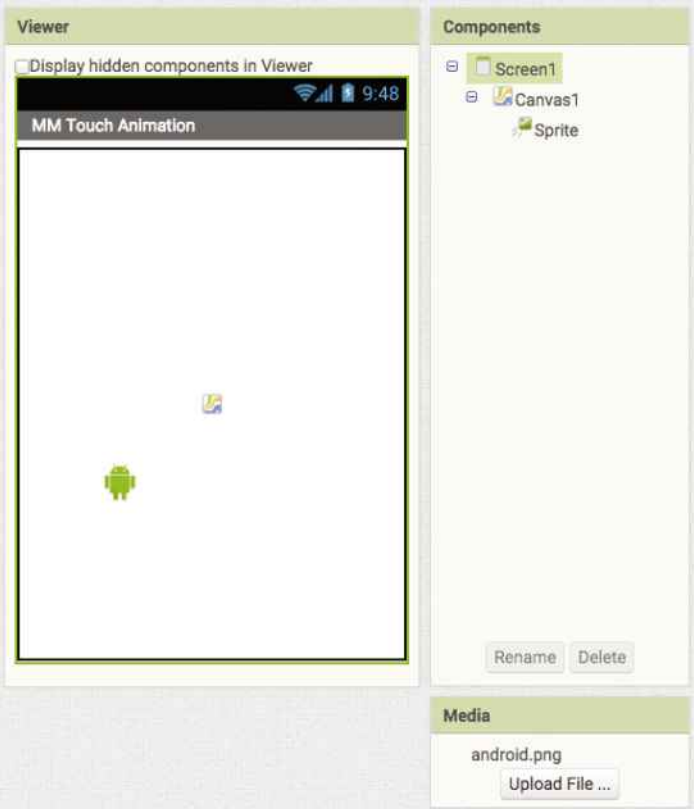
For this you'll need access to a suitable image file, something icon-sized will work best. You could use Google to search for and download a suitable image (which is what we did to get the the Android one you see here).

Grab an ImageSprite component from the same Drawing and Animation group, then drop it onto the Canvas1 area. With the ImageSprite1 selected, rename it to 'Sprite'.

We only need to set one sprite property, namely the Picture. Click on this property and from the popup options select the 'Upload File...' button.

Use the 'Choose File' button to find the relevant file on your PC and then click 'OK'. You should visually see the sprite image change in the Viewer panel.

Notice that the small Media area, located at the bottom of the Components panel, is now populated with the image file name we just uploaded.



AI2 designer view

App Code

It's time to start coding, so click on the Blocks View button located on the green bar. The behaviour we're going to add has three distinct aspects. Firstly we'll start the sprite moving with a finger swipe gesture. Secondly, we'll stop the sprite moving by tapping it. And thirdly we'll ensure that when the sprite reaches the edge of the canvas it bounces.

> **With this knowledge you can create any number of games and cartoon-like animations**

All the code blocks we need are associated with the Sprite component, located in lefthand side Blocks panel.

Motion

First we'll set the ball in motion. Select the Sprite component and drag a brown 'when Sprite.Flung' block onto the coding area. To fill in the inner 'do' space grab a green 'set Sprite.Heading to' block and snap it inside. Hover over the 'heading' attribute (in the parent brown 'when Sprite.Flung' block), grab the 'get Sprite.heading' block and snap it at the end of the green block .

The ball speed has a default value of zero. We need to change this so grab a green 'set Sprite.Speed' block and snap it just under the last green block. The value is set with a basic blue Math group number block. Snap this onto the end of the green 'set Sprite.Speed' block, then click on it to change the value to ten.

All Stop

We also want the ball to stop when it's tapped. Grab a brown 'when Sprite.Touched' block and drop it into the coding area.

To fill in the inner 'do' space grab a green 'set Sprite.Speed' block and snap it inside. Now we just need a basic blue Math value block. Snap this onto the end of the green 'set Sprite.Speed' block. The default value of zero is perfect.

Bouncing

Finally we need to bounce the ball around the canvas. Grab a brown 'when Sprite.EdgeReached' block and drop it into the coding area.

To fill in the inner 'do' space grab a purple 'call Sprite.Bounce' block and snap it inside. To set its value hover over parent block's 'edge' attribute, grab the 'get edge' block, then snap it next to the 'edge' tag in the purple block.

And that's the coding done. Ensure the warning and error counts in the bottom left corner are both zero then carefully check your code against the Blocks View image.

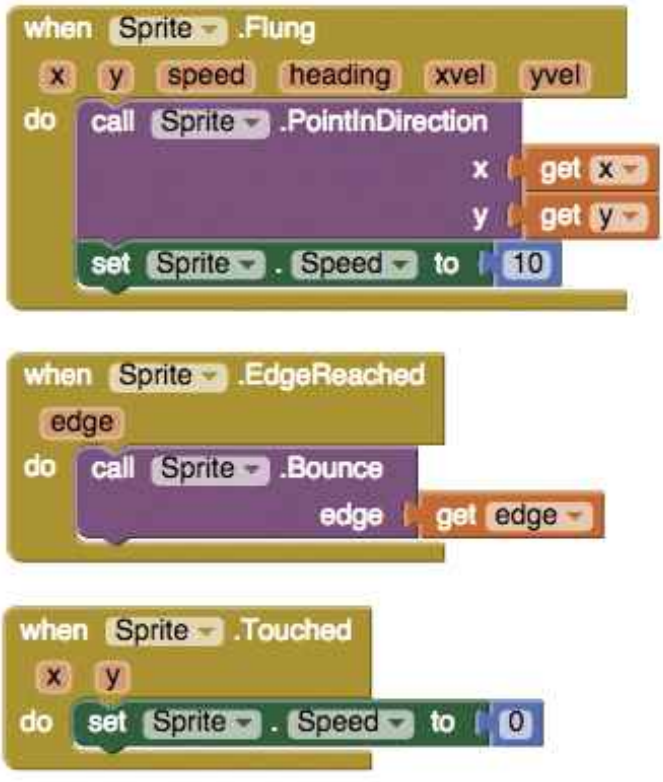
Unless you have a touchscreen PC you'll need to test with the AI Companion App installed on an Android device (as we discussed earlier in the series).

Going Further

As we've discovered animation apps are simple and fun to build with AI2. Feel free to try different images, alter the 'flung' sprite speed or anything else that springs to mind.

Before you 'sideload' (**goo.gl/ZMKgAe**) this app onto an Android smartphone or tablet why not add an app icon. Simply set the Screen1 property Icon to an image file. Ideally it will be 48x48 pixels in size, but any smallish image will do, so why not use the sprite image you previously uploaded.

Next time we'll build a game-style animation app that uses the orientation sensor to control movement and speed.



AI2 blocks view

Remembering... Time Computers

David Hayward recalls a long forgotten manufacturer from the 'golden era' of the PC

The mid-nineties were a fantastic period for the personal computer; a veritable 'golden age of the desktop', where advertising in magazines was still king, allowing the reader to price up their dream computer and *Micro Mart* seemed as thick as a phone directory. Good times.

Among the many suppliers that seemed to appear overnight, like mushrooms, the Time Group quickly established itself as a big player in the market. The Time Group consisted of Time Computers, Tiny, Colossus and MJN – names many of you will no doubt recall from the pages upon pages of adverts they took out.

However, despite the other popular named brands, it's Time Computers that we'll focus on in this instance. Time was actually a part of a wider umbrella group called the Granville Technology Group, the brainchild of its founder, Tahir Mohsan. Through Granville Technology, the company could sell its manufactured goods direct from its headquarters Lancashire at a much lower cost than most of the other competitors around at that time.

Time was famous for its package deals, with a decent Pentium PC in a stylish looking case complete with 14" monitor, scanner, printer, keyboard and mouse and even a webcam. All for the rather decent price of around £700 – knocking off a good £500 or thereabouts, from some of its main competition.

History

The Granville Technology Group Ltd and the Time Group started life in 1994. It sold mainly through advertising in the magazines at the time as a mail order company. The pickup of PC sales during that time meant the company group was on solid ground and, as such, it could branch out a little and start to sell its products through a UK-wide chain of shops – we even had one in Norwich.

Actually, it's a little more complex than that, as the administrators soon found out when the entire group collapsed some ten years later. The Granville Technology Group was the umbrella group, with the Time Group being responsible for Time Computers and Tiny – as far as we can tell. However, there was also The Computer Shop, which was a high street shop, selling Time and Tiny computers along with other technology manufactured from the group's Simonstone manufacturing plant.

It gets a little confusing, especially for us since we're not business minded entrepreneurs. Unfortunately, the bubble was burst in July 2005, where the company (Granville) went into receivership with a loss of over 1600 staff. There were rumours of money going missing, and the administrators had a difficult time of tracing ownership for the various individual companies thanks to the convoluted structure of the group.

In its prime, though, Time came up cool – but, occaisionally very odd – TV ads. Most notable was the one staring Leonard Nimoy, whose gravely tones just made you want to go out and buy a Time computer. straight away. On the flipside there were the batch of odd, evil supervillain Dr. Apocalypse adverts, that were... well, not quite as good.

The Good

Good prices for a lot of kit, and the PC specs themselves were pretty good.

The Bad

The sad loss of a lot of jobs.

Conclusion

Time Computers was a brand that readers of a certain age will no doubt remember fondly; even if it's just for the adverts they posted in the magazines or showed on the telly. I personally never had one, but the lowly computer shop I was working in at the time never had any of its computers in for repair, so that must say something for the quality!

Did You Know?

- The Leonard Nimoy ad was filmed at the Griffith Observatory in LA
- According to a Zdnet article, the group sank over £70m in the red
- Time resurfaced in 2006 as Time UK Factory, although it's no longer trading
- Tahir Mohsan was also the founder and chairman of the ABF (Asian Business Federation)
- Time and Tiny once accounted for one third of the British PC sales

The ever impressive Leonard Nimoy in the Time TV advert

Pretty good prices, taken from the other lesser accepted TV adverts

Component Watch

Some PC games demand you move away from the mouse and keyboard. These deals will help you do just that...

The market for PC game controllers has shrunk considerably over the years as gaming keyboards and other high-end peripherals take their place for PC gamers. But if you want a console-like experience with the visuals and power of a desktop system, there's still hope. Here are the best prices we could find for five PC game controllers.

Deal 1: Trust GXT 24
RRP: £19.99 / Deal Price: £12.05

This controller from Trust has two analogue sticks, four shoulder buttons and 12 programmable action buttons with turbo features, and it's designed to work seamlessly and simply with any game. Its low price reflects its slightly smaller size compared to most controllers, so it's ideal for children or people who find existing models a little too hard to get on with. It's not a spectacular piece of hardwre, but it certainly gets the job done.
Where to get it: CCL – bit.ly/1VscCtH

Deal 2: Speedlink Strike FX
RRP: £29.99 / Deal Price: £21.06

As controllers go, the Speedlink Strike FX isn't particularly inspiring in its design approach, presenting as a no-frills and fairly straightforward clone of the PlayStation controller, even if it is in clear plastic. Button-switchable support for both XInput and DirectInput gives it an interesting feature that most people probably won't notice, but in general it's only ticking the most basic boxes. Let's face it: you'd happily spend more on a takeaway pizza, so in that sense it has to be worth a shot.
Where to get it: CCL – bit.ly/1hew8w8

Deal 3: Guillemot Hercules Thrustmaster GPX Lightback
RRP: £34.99 / Deal Price: £25

The Guillemot Hercules Thrustmaster GPX Lightback (to give it its full title) is an Xbox and PC-compatible controller with a bunch of extra features over the standard, including a rubber grip, greater precision and various types of built-in lighting, from backlit analogue sticks to LED indicators that show the sensitivity of the shoulder triggers. Considering the price is lower than most others, it has to be worth a punt.

Where to get it: Ebuyer – bit.ly/1VscCtH

Deal 4: Microsoft Xbox 360 Wireless Controller for PC
RRP: £44.99 / Deal Price: £29.59

Still one of the greatest games controllers around, the competition has to do a lot to beat this one. Fortunately for the competition, the price of the Xbox 360 controller is often a sticking point; the RRP is quite high for what is essentially a no-frills, general-audience controller. Unfortunately for them, we've found the best deal on the PC version, so if you're looking to buy one, this is the place to go with.
Where to get it: CCL – bit.ly/1Oaqk5j

Deal 5: Logitech F710
RRP: £49.99 / Deal Price: £39.99

Logitech's peripherals are known for being reliable and cheap, but the Logitech F710 is a strong piece of gaming equipment despite its mid-range price. As wireless controllers go, it's heavy but well built, and although it's no more capable technically than any other generic console controller, it does have rubber grips and a PlayStation-style layout. Completely wireless with vibration feedback and 12 programmable buttons, it's an ideal gift for gamers everywhere.
Where to get it: Currys – bit.ly/1QMWku6

NEWS AND VIEWS

America And China Make Nice

New PCs. NEW PCs!

Check out Overclockers Marvel-lous beauties

Laughing in the face of console fans who dismiss PC gaming as a thing of the past, Overclockers UK has gone and launched not one, but two, brand new systems. Gaming systems, at that.

The first is a 4K gaming system known as the Marvel 4K. Designed to deliver 4K gaming for a not-ridiculous price, it is powered by a Super Flower PSU, uses high-grade components, and graphics power comes from an ASUS STRIX Radeon R9 390X 8GB graphics card. If this isn't enough power for you, upgrade options include the Radeon Fury and FuryX 4GB HBM and the PC comes equipped with a selection of rapid solid state drives, mechanical hard drives or a solid state hybrid drive – whatever's your poison.

Besides this powerful chap, Overclockers has also launched a lower-definition 1080p gaming system, also with the Marvel moniker. The customisable Marvel 1080p PC is a fully AMD APU-based system, billed as being the perfect partner for the likes of *League Of Legends* and *Counter Strike: Global Offensive*. Both systems can be themed with LED lighting colour of your choice, and they will set you back £800 for the Marvel 4K and £400 for the 1080p unit.

The website, if you're interested in seeing more information on either of these, is **www.overclockers.co.uk**.

No more cybercrime, apparently

The Presidents of America and China have said in a joint press conference that neither country will be taking part in economic cybercrime. Aw, isn't that lovely? The conference took place at the White House, but it wasn't all smiles and waves, with President Obama adding that should China be seen to be upping its cybercrime activity, it can expect to be met with a bunch of sanctions.

The Chinese President said that on his side of the bargain, neither country would knowingly support cybercrime practices, and would instead abide by "norms of behaviour".

Why the action now? Well, unless you've been hiding under a rock for a while, the Chinese government has been accused of being behind a breach of government databases in the States, alongside breaching multiple private firms' systems.

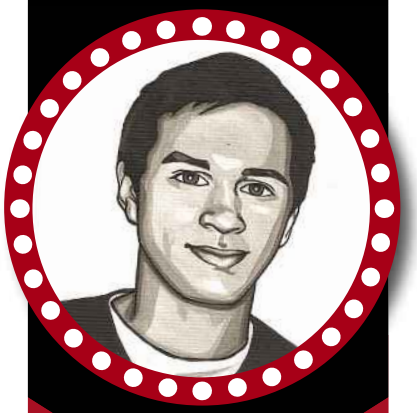
Blackberry Goes All Android

'Priv' smartphone announced by Mr Chen

Company earnings reports are typically rather dull affairs. They do have a tendency to unveil a tidbit or two of information every now and then, however, and Blackberry's latest neatly falls into this category. The company's latest earnings report saw CEO John Chen announce that the rumours were true: Blackberry is going to release an Android phone. Called the Priv, it's apparently a smartphone that's all about Blackberry's commitment to its heritage and your privacy.

The bottom line is that this is hardly surprising news, given that the rumour mill has been producing stories of the firm's activity in the Android aren for a little while now. While Blackberry's official blog hasn't given too much away, and Chen himself declined to give any further tips regarding features during his reveal of the phone on Canada's Business News Network, web commentators have since suggested that the Priv will be built around a Snapdragon 808 processor, 3GB RAM, a whopping 18MP rear camera and a 1440p display.

The Prive, for now anyway, will be most notable for having one of the more awkward tech demonstrations we can remember witnessing from a CEO – even in a world where Cortana refuses to play nice with it's creator's CEO – thanks to Chen's uneasy handling of the phone. Find the video for yourself online. Slick, it ain't.



Amazon's new £50 tablet is an intriguing prospect. No, it's not exactly a powerhouse, but if you just want something with a reasonable screen, which you can watch videos on and browse the web, it's ideal.

In fact, if it does have a major weakness, it's the size. Of course, a lot of people like the 7" form factor, but I've never really seen the point. Some time ago, I bought a Nexus 7, which, of course, has a 7" screen. However, I also have an old iPad 2 and a S5, and for me the seven incher just occupies an awkward middle ground between the two. I have my phone when I'm out and about, but if I'm at home and want to do something on a larger screen (without grabbing my laptop), then I want at least a 10" display.

For that reason, I won't be buying the new Amazon Fire tablet, but I'm still impressed by it, and I think it could really be a game changer in the budget tablet market. Will you buying one? Drop us a line and let us know.

Until next time,

Anthony

Editor

Meanwhile... On The Internet...

When you think about it, the chances of Edward Snowden ever being able to maintain a low profile are pretty slim. His fame – or infamy, depending on your point of view – will likely trail the quietly spoken former NSA contractor until the day he dies. Still, it was a surprise when **@Snowden** popped up on Twitter last week, and even more surprising that it turned out to actually be *the* Snowden (**tinyurl.com/MMnet83a**). Yet, there he was (**tinyurl.com/MMnet83b**), looking thoughtful in his profile photo – taken as part of a feature for *Wired* (**tinyurl.com/MMnet83c**) – with a bio that stated he "used to work for the government. Now I work for the public", and promoting his role as a director of the Freedom Of The Press Foundation (**tinyurl.com/MMnet83d**).

For his first tweet, he eschewed the "Testing", that many people opt for, and refrained from making the geeky "Just setting up my Twttr" joke; instead he went for a much more Dom Joly-esque "Can you hear me now?" before choosing to follow **@NSAGov**, which is, as we write, still the only account he receives tweets from despite racking up 1.24 million followers in the interim. That's some high-level trolling right there.

Even with all his experience of technology, though, Snowden still managed to make a newbie mistake; specifically, he forgot to deactivate the email notifications for Follow, Favourite Retweets and DMs, only to then be swamped by 47GB worth of emails from the social media network (**tinyurl.com/MMnet83e**). "Lesson learned", at he put it.

Cyber-squatting – the act of buying up a catchy or famous domain name, and waiting for someone else to come and buy it for big bucks – was big news in the early days of the internet. Julia Roberts, Kodak, Dell (**tinyurl.com/MMnet83f**) and even Microsoft (**tinyurl.com/MMnet83g**) have fallen on the wrong side of issue, usually because they've not paid due attention to renewing their domain names, or not kept up with new Top Level Domain options that could provide opportunities for people to trade using their names (**tinyurl.com/MMnet83j**).

We thought it was a thing of the past, though, until we read the story of Sanmay Ved who, according to his recent blog post (**tinyurl.com/MMnet83h**) somehow managed to acquire **google.com**, via Google Domains (**tinyurl.com/MMnet83i**) for the not-so-princely sum of $12. It didn't last long, in fact it apparently took Google less than a minute to work out something was a miss and reverse the sale – which it could do, luckily, because Ved was using it's own service to make the purchase.

Good while it lasted, though.

Well that didn't take long... Last week we reported on the decision of Christopher 'moot' Poole to sell 4Chan to Hiroyuki Nishimura, the man behind 2Channel, which inspired the infamous messageboard in the first place. Last week, the site's new had to face up to it's first big controversy under his tenure. Just a day prior to Chris Mercer's horrific shooting spree at an Oregon college (**tinyurl.com/MMnet83r**) a anonymous message posted to 4Chan's / r9k board appeared to predict the events. Indeed, in the wake of the Mercer's crimes, the FBI declared it was investigating whether the post came from Mercer himself (**tinyurl.com/MMnet83s**), while commentators have mused that the fact that it's the kind of post that reflects a scary sub-set of 4Chan's users (**tinyurl.com/MMnet83t**).

We've done similar rant ourselves, but not with the panache of Jon Oliver, who last week turned his considerable satirical ire to the proliferation of Facebook Privacy Statements (tinyurl.com/MMnet83k). The phenomenon, which see's Facebook users post pseudo-legal statements to their profiles – ostensibly to assert ownership of any content they subsequently post there – are, of course, hogwash couched in grand language.

However, as Oliver astutely observes (**tinyurl.com/MMnet83l**): "just because you say something in the style of a southern debutante, doesn't make it legally binding", in the same way as referencing the Rome Statute (**tinyurl.com/MMnet83m**) supercede the massive T&C statement you agreed to when signing up. However, in a bid to help all those struggling with the concept, Mr. Oliver assured viewers that the only way users could protect their privacy was to share his video with all their friends. Seems legit (**tinyurl.com/MMnet83n**).

Aaaaaaaaaaaand Finally...

It may have only just turned five (**tinyurl.com/MMnet83o**), and begun as a way to compensate for the less-than-stellar camera on the iPhone, but the Facebook-owned Instagram has now overtaken Twitter, apparently, by grabbing a whopping 400m users. That, dear readers, is a lot of selfies and shots of dinners (apparently, 40bn images have been shared across the platform in that time) that ads up to a $35bn company.

If it's rapid expansion has caused any psychological crises amongst its managers, however, perhaps they should check out the quite wonderful Texts From Your Existentialist (**tinyurl.com/MMnet83p**). It's an Instagram account that's the work of LA artist and poet Eileen Henry (**tinyurl.com/MMnet83q**), and could provide the perfect reading matter when they fancy a wallow.

.AVWhy?

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

Ever wondered why you find it hard to leave the internet alone? Well, this video from Mashable has a dig at explaining exactly why we find the online world, and all the wonderful fluff that fills it, so addictive (**tinyurl.com/MMnet83u**). As with so many of the things we like doing even if we know we shouldn't, it's largely down to a chemical called Dopamine, which our brain releases small amounts of when we learn new things. See! It's not our faults, we're all truly are information junkies these days... Pesky brains.

QUICK BITS... A songwriter has claimed that he made just over £3,700 from over 178 million streams of the hit

Caption Competition

This angry man was the subject of issue 1381's caption competition. Here's what you thought should subtitle the pic:

- **Thomas Turnbull:** "Having a smashing time with my new TV!"
- **wyliecoyoteuk:** "Jeremy still needed to interact with BBC employees now and again."
- **EdP:** "Tom takes force-feedback too literally."
- Half-a-daily: "The curse of the Wii strikes again!"
- **EdP:** "I thought he said it was 4K, not faulty!"
- **Dennis James:** "The perfect way to welcome another TV appearance by Russell Brand."
- **Darren LeWarne:** "My mate said if my TV stops working, I should hit it. It's possible he didn't mean the screen."
- **Chris Boyle:** "How to put a CRT into permanent sleep mode."
- **Jon Moran:** "Bob the removal man's first day at work didn't start well, after he was told to 'box the telly'."
- **Ondrive:** "An England Rugby fan offers ITV feedback on its World Cup coverage."

Our favourite submission this week, though, was Thomas Turnbull's "3D glasses still cause problems when it comes to boxing simulations." If you don't agree, there's only one thing to do, really: prove you're funnier. So why not head over to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) and by caption the picture below – or email us your funnies via **caption@micromart.co.uk**, remembering to ad the issue number to the email title. Ta!

America Runs Out Of Web Addresses

No more IPv4 addresses available

So it's finally happened... It's hardly a surprise, but North America has finally run out of the old IPv4 web addresses, with ARIN (the American Registry for Internet Numbers) stating that it's handed out the very last block.

Its advice to companies now is, fairly obviously, that they should start to move to IPv6, if they haven't been moving towards that already. IPv6 is hardly anything new, of course, with Africa now the only region with any decent number of IPv4 address blocks left. This is a big deal in web circles, but something that should have been prepared for: this day was always going to come, people.

Facebook Users Face Downtime

World falls apart

It's a measure of the world we live in that a story of Facebook outages makes the BBC News. The Beeb's website carried a headline about the service's woes as the social networking site suffered two outages in a week at the end of September, with the second one forcing people to do something less boring instead for a full 40 minutes!

The news story did point out that the issue of outages shouldn't be sniffed at, as Facebook's share price was hit as a result of these incidents – which is a big deal for a big company.

Brilliantly, Kingston Police even took to Twitter to give the following advice when the second outage occurred: "Yes we can confirm Facebook is down, please don't call us! What a great opportunity to spend some time with your family... #FacebookDown". Who said the Police don't have a sense of humour?

Meghan Trainor single 'All About That Bass', a song he co-wrote

Snippets!

Apple Fans: "Meh"

According to a survey carried out by online mobile accessory retailer MobileFun.co.uk, only a little over a quarter of existing Apple customers said that they will be upgrading to the iPhone 6S or 6S Plus. The survey asked 80,000 previous accessory customers on their thoughts of the new products unveiled at Apple's Keynote, and just 26% said they'd be interested with the rest either not sure or not interested at all.

Apple's new Rose Gold colour hasn't gone down well either, with 74% expressing negative feelings about it. The Apple Watch is more of a winner, though, as a third of respondents said they intended to buy one soon.

Rift To Offer Minecraft

This year's Oculus Connect conference for VR developers had one big announcement. *Minecraft* is coming to the platform. Yes, a video at the event confirmed that the Windows 10 edition of the game will launch on the Oculus Rift next year, and gamers will be able to navigate around their worlds using the Xbox One controller. The Oculus CEO also confirmed that the Oculus Touch handheld controller system will be out in the second quarter of next year.

Last-gen CoD Cut Back

Xbox 360 and PS3 users should be warned: they're not going to like this...

With *Call of Duty: Black Ops 3* due for released next month, it appears that the Xbox 360 and PS3 versions of the game will not be equal to the full *CoD* experience. Multiplayer and Zombies modes will be included, but that's it; there will be no single player campaign mode. Throwing massive elements of a title is a, err... 'brave' move by Activision, and quite possibly one it may regret. It asserts, however, that the last-gen of consoles couldn't "faithfully" recreate the campaign mode, it's going to have to live with its decision.

iPhone Sales Smash All Records

Apple makes lots of cash shocker

Congratulations to Apple for registering yet another barnstorming sales weekend. This time, it's the new iPhone models that have sold like hotcakes around the globe.

In an official statement, Apple said that it had sold over 13 million new iPhone 6s and 6s Plus models just three days after they launched. In case you're left in any doubt, that's a new record. The sales aren't going to stop either, as the new models will be available for sale in over 130 countries come the year's end.

Have you got one? If so, we hope you're happy with it, as that's a whole lot of money to spend. We certainly hope that you're happier than the users who have complained on Reddit over the iPhone 6S Plus getting too hot to handle. A Reddit user posted what is apparently a screenshot of the phone with a warning message in the camera app that the device had to cool down before the flash could be used to take a photo. Cue users adding to the thread with similar complaints over heat issues.

Netflix Tells You How To Make The Switch

Wi-fi switch build detailed by on-demand service

This is a bit of a weird one. On-demand video service Netflix has provided instructions on how to make your very own home Netflix kit, which essentially amounts to a wi-fi microcontroller that can set yourself up for the perfect night in.

The Netflix Switch device will, according to the firm, let users turn on the television, dim the lights, silence the phone and quite possibly even order in some food. Before you make a start on the project, you need to bear in mind that Netflix suggests some knowledge of soldering irons and a general sense of how electronics and programming works.

The Switch works by the user setting up an application server to allow it to talk to the net. Then, you add some code relevant to the application you want to carry out – silencing your phone, for example, or ordering in a takeaway. Thankfully, Netflix has provided Android code for the phone-silencing app on its website – **makeit.netflix.com/the-switch**.

Odd thing to provide your users with, but there you go.

NETFLIX

QUICK BITS... **The latest DLC content for PS4 and Xbox One gamers of Batman: Arkham Knight**

Oink Goes Into Orbit

Amateur radio festival boldly goes where no-one has gone before

So now we can add 'pig' to the list of things that have been sent up into space, and it's all thanks to a homegrown festival. Hamfest is a national UK festival celebrating all things amateur radio and for this year's event, held in Newark in Lincolnshire, the plucky participants chose to launch a high-altitude balloon in the shape of a pig – named Pinky Pig.

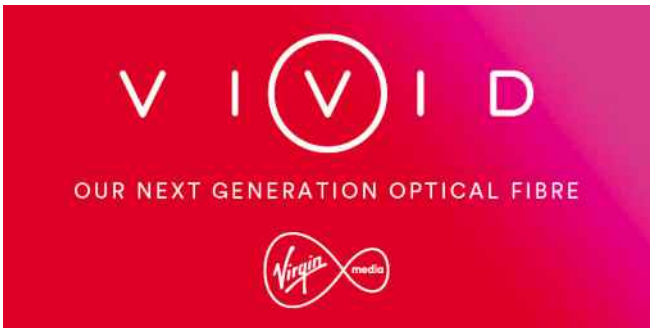
Pinky did rather well as it happens, reaching a mighty 25,927m before parachuting back down to Earth, eventually landing safely in a field somewhere in Grantham.

The porcine flight was tracked by low-power radio trackers and its journey plotted via Google Earth. Why a pig? We think the question should really rather be: why not?

Virgin Goes Supersonic

Ultrafast 200Mb/s broadband launched

Virgin Media has laid down a mighty big marker by launching a 200Mbps ultrafast broadband service. Called Vivid, it will be available for existing Virgin customers to upgrade to, and the firm will be contacting its 4.6m broadband customers to see if they'd like to do just that. The firm's MD of Consumer said that "Vivid from Virgin Media is the new standard".



Pebble Comes Full Circle

Smartwatch goes all the way round for first time

Smartwatch firm Pebble has unveiled its first circular model – the Pebble Time Round. While that's a bit of an awkward name, the watch itself – seen over at **www.pebble.com** – is really quite a looker. Promising to be lighter and thinner than any other watch in its range, and indeed any range in the world.

Measuring just 7.5mm in depth and weighing a mere 28g, it utilises an always-on e-paper display that 'camouflages' the smart applications within. It can perform tasks such as summoning a timeline to keeps tabs on your day ahead, while notifications, messages, incoming calls and music can all be controlled from the watch itself. It takes just 15 minutes of charging to get a day's worth of use and it's splash resistant for those rainy days. Available in a variety of band sizes, watch finishes, faces and band options, the looks on offer are all rather snazzy for this kind of thing.

included the 2008 Tumbler Batmobile pack from The Dark Knight movie. Nice

MSI Nightblade MI

It may be compact, but there's a lot going on inside here

DETAILS
- Price: £699
- Manufacturer: MSI
- Website: goo.gl/gsqo8l
- Requirements: Keyboard, mouse, monitor or TV

The design of the Nightblade is ideal for the living room

The MSI Nightblade range has recently added to its catalogue of gaming systems with the launch of the Nightblade MI. MSI has primarily developed the Nightblade MI for the mini-ITX, 1080p gaming community or, to translate, those who prefer their living room gaming to be based around a PC rather than a console, and want a discrete system for that purpose.

That being the case, the design of the Nightblade MI needs to be as compact and efficient as possible, while still delivering the kind of performance required. Thankfully, the Nightblade's ITX dimensions hide an impressive set of specifications: our test machine consisted of an ITX B85 motherboard, Intel core i5-4460S at 3.0GHz, 8GB 1600MHz DDR3 memory, a 128GB Transcend SSD370 with Windows 10 pre-installed, and a secondary 1TB WD Blue hard drive.

Graphics come courtesy of an MSI GTX960 OC edition with 2GB of GDDR5 memory, and a base clock speed of 1178MHz, with a boost clock speed of 1241MHz. That's a good choice of card, as it's relatively cool when running thanks to the pair of propeller blade technology fans and its intelligent management system.

Connectivity on the Nightblade MI is also pretty decent. The backplate houses a PS/2 mouse and keyboard combo port, gigabit Ethernet, four USB 2.0 ports and a pair of USB 3.0 ports. There's a six-port OFC set of audio ports, and from the rear of the GTX960 you get a pair of DisplayPort and HDMI ports, along with DVI. Furthermore there's an Intel 3160 AC wi-fi, Bluetooth 4.0, a DVD/RW optical drive, another two USB 3.0 ports situated on the front – to the right of the case – as well as a headphone and mic port.

That's quite a lot to pack into a case that measures just 127 x 234 x 340mm, and you would be forgiven for immediately jumping to the conclusion that the inside of the Nightblade MI must be all-but on fire. However, MSI has seen fit to install its Silent Storm Cooling design, whereby a heatpipe and sealed heatsink in the chassis manage to keep the entire system cool by displacing the heat and forcing cool air through two chambers within the case. This means that the individual components keep cool enough even when under the stress of gaming.

It's a clever design, and it works well. It even leaves room in the case for another 3.5" hard drive, fitted via a removable caddy from the top of the chassis. With this option available, the Nightblade can easily double up as a media centre as well as a games machine.

In our tests, the 3DMark 11 score was an impressive 8614 overall, making it capable of playing most, if not all modern triple-A titles. Additionally the PCMark 8 score was 4572, meaning that the Nightblade is more than just a tiny power packed gaming machine, it can also take on video encoding and other media duties as well as day-to-day office tasks.

The MSI Nightblade MI is an excellent living room and small desktop PC. It's more than powerful enough for the average gamer and media enthusiast, and it doesn't cost too much either.

The cooling technology inside keeps everything in good order when the action heats up

There's plenty of connectivity too

The test model costs £699, but there's a cheaper Pentium K/GT740 option, also minus the SSD, for £499. By December, there'll be Skylake builds of the Nightblade with i5 and i7, GTX960 and 970 GPUs for between £799-£999. Any of those would add up to superb mini-ITX gaming and media PC dependent on your needs.

mm David Hayward

A well specified and cunningly designed ITX PC

ViewSonic PJD7830HDL

Mark enjoys some big-screen entertainment courtesy of ViewSonic

DETAILS
- **Price: £579**
- **Manufacturer: ViewSonic**
- **Website: tinyurl.com/oxzg8ng**
- **Requirements: PC, console or video device with HDMI, VGA or Component outputs.**

With the price of LCD TV's at rock bottom, and the sizes massive, it would be a reasonable conclusion that projectors had gone the way of the dodo. Yet, the ViewSonic PJD7830HDL demonstrates that they're still an option for those who prefer the versatility of a projected image.

Weighing in at 2.8kg this isn't a small item, especially if you intend to ceiling mount it. Though it's been designed with a relatively short throw ratio of 1.1 to 1.5x, so you can place it on a low coffee table and still get a pretty big projection.

The issue with any installation is always going to be cabling, because not only does the PJD7830HDL need mains power, you'll also need to connect it to your output device, be that a PC, games console or PVR platform. For that purpose, this design offers you VGA, HDMI and component inputs, though the last one is a shared function with the VGA. The real kicker here, though, is that there are only two HDMI inputs, and one of those isn't placed for easy access.

While one is on the back, the other is hidden under a removable panel to the front-right, that requires a Philips screwdriver to open it. The area behind the panel allows space for an optional wi-fi adapter, but results in an awkward to access HDMI input for anything else.

However you connect, this is a 1080p resolution device that projects an impressive 3,000 lumens from its replaceable lamp. ViewSonic claims you can create a screen up to 300" with it, and my experimentation supported that assertion – though I don't own an uncluttered wall that large.

As with any projector there are two critical factors that need to be considered in conjunction with the purchase price; bulb replacements and power consumption. The lamp is rated for 4,000 hours normal use and 10,000 if you like DynamicEco mode. Assuming normal mode, you should expect approximately a three year lifespan with the projector being used four hours a day. With a replacements in the £129+VAT price bracket, expect another £50 each year in running costs. That's not the end the expense however, because in use the projector can consume 315 watts – at least double what a 50" LCD would, and triple the power draw of the same size LED TV – so that's roughly another £50 a year in electricity costs, based on average price and usage.

Leaving cost aside for a moment, there are some really very worthwhile aspects to this design, not least the excellent contrast and colour representation. Even in a daylit room the projected image seems punchy and sharp, assuming the target wall is sufficiently smooth and not strongly coloured. There also isn't excessive lag involved in the image decoding, so it works well for console gaming, especially on racing games or flight simulations.

What's missing here is some of the refinements we expect in modern technology, like lots of HDMI ports, Bluetooth and wi-fi as standard. Without these features, you're left with just great image size as the primary draw.

mm Mark Pickavance

A powerful video projector that lacks sufficient connectivity

Lenovo Thinkcentre E50-00 Desktop

Mark dons the disguise of the infamous El Bastardo, to review the Lenovo E50-00

DETAILS

- **Price: £179.99 (Ebuyer)**
- **Manufacturer: Lenovo**
- **Website: shop.lenovo.com/gb/en/desktops/lenovo/e-series/e50-00/**
- **Requirements: VGA monitor**
- **Part No. 90BX001HUK**

Hola, y bienvenidos a mi opinión. Or 'Hello, and welcome to my review'. These pages will mainly cover my conclusions about the Lenovo E50-00, which was delivered in error to me with a Spanish version of Windows installed. After numerous attempts I couldn't convince it to *habla Inglés*, so covering it turned out to be *especialmente difícil*.

In fact, out of the box, this machine proved to be a major head scratcher on number of levels, not least in terms of how amazingly light this small business computer was, even for its relatively diminutive size. I rapidly worked out that the reason it was so svelte was that it didn't have an internal PSU, and therefore the box largely holds fresh air. With mobile systems becoming ever more powerful, the cross over point between them and desktop systems are embodied very precisely by this computer.

However, taking that path has an impact on flexibility, usually a strength of the Desktop PC, and something that is all but missing from this design. If the motherboard or external PSU dies in the future, then replacing those might not be straightforward as it doesn't use standard, widely available PC parts.

Specifications	
Processor	Intel Pentium J2900 2.41GHz Turbo boost up to 2.66GHz Intel Q87 Express
Memory	4GB DDR3 1600MHz Expandable to 8GB (Single slot)
Hard Drive	500GB SATA
Optical Drive	DVD Writer
Software	Operating System: Windows 7 Pro + 8.1 Pro 64-bit
Graphics	Intel HD
Audio	Realtek ALC662-VD
Input Devices	USB Slim Keyboard and mouse
Power Supply	External Adapter
Dimensions	Width 160 mm Depth 425.88 mm Height 386.50 mm
Weight	9.58kg
Interfaces	4 x USB 2.0, 1 x USB 3.0, handset, microphone, serial port, RJ45, VGA, 3 audio, PS/2 (mouse and keyboard)
Expansion	1 x PCI-E x 16, Full Height (One x 4 link) 1 x PCI-E x 1, Full Height 1 x 5.25" Drive Bay 1 x 3.5" Drive Bay
Warranty	1 Year Manufacturer Warranty

Also, the only realistic upgrade paths you can take from here are the RAM (4GB installed), which – as this is laptop tech – is on a single SO-DIMM slot, or take advantage from a couple of PCI-E slots. Those slots are physically x16 and x1, though before anyone gets any ideas about putting a big discrete GPU in here I should point out that the x16 is actually x4 electrically. And, the external PSU is only rated to just 3.25A.

On this model Lenovo is offering three processor options, and unsurprisingly they'd sent the best one in the review machine. For even less money you can have the Celeron J1800 or Celeron J1900, but those with more to spend can have a Pentium J2900.

Our *Español* review machine had precisely that CPU, a dual-core that runs at a brisk 2.4GHz when threatened with a Piñata stick. This is Bay Trail-D silicon that is surface mounted in the FCBGA1170 form factor, fabricated using a 22nm process with a

maximum power envelope of 10 watts. It also has 2MB of L2 cache, double that of the Celeron's, and a four core DX11 compliant integrated Intel HD GPU.

What needs saying as clearly is possible is that this has precisely zero potential as a games platform, however you tweak it. While it might suffice for light office duties, it's not going to win any favours with heavy database, spreadsheet or image manipulating users either. For the less demanding user it does come with a 500GB hard drive, a DVD writer, and Windows 7 Pro pre-installed.

That qualifies it automatically for the Windows 10 upgrade – should its purchaser be ready to embrace Microsoft's brave new vision of the future.

In terms of added value, Lenovo also threw in a mouse and keyboard. However, it also decided to pre-installed MacAfee, apparently just to restore balance in the computing universe.

> **"This machine proved to be a major head scratcher on number of levels"**

The good things about this system are how light it is to carry when deploying, and how it doesn't take up much space alongside a desk. Where I was less impressed with it was when trying to justify a few curious choices, like why it only has VGA video out and not – at minimum – HDMI or DVI? Only having a single USB 3.0 port also seems an unnecessary limitation, given the Intel Q87 Express chipset it utilises has offers six, along with eight USB 2.0 ports.

Despite these and other reservations, and the lack of any meaningful expansion, I can see lots of business people jumping at this, purely because of the price. There are lots of people looking for just such a low cost device; one that does just enough to be useful. A phrase that sums up the E50 pretty well.

Hopefully, when Lenovo delivers yours it will be configured in English, or it will inspire you to converse in another language enough to change its regional settings. So, all that remains is for me to thank Lenovo for sending me the E50: *Estamos muy agradecidos estaba todo riquísimo*.

mm Mark Pickavance (aka *El Bastardo*)

A low cost business desktop built from laptop technology

Seiki SE39UA01UK 39" LED 4K TV

Mark checks out an amazingly cheap 4K TV

DETAILS
- **Price: £210 (Ebuyer)**
- **Manufacturer: Seiki**
- **Website: uk.seiki.com**

No, that isn't a typo on the price, this 4K TV really is £210. We've even found it on sale with free delivery from one particular UK online retailer. My first thought was that, surely, this is too good to be true – and in many respects that's precisely what it is.

Unboxing the Seiki SE39UA01UK was full of surprises, not least how light a 39" TV can be these days. Even with the stand this TV weighs in at just 7.6kg. Indeed, it can be easily wall mounted using the VESA 100 mounts on the rear. Along with the TV, Seiki provides a decent sized remote, a HDMI cable, and some component and composite adapters. That's more than most TV brands give you, and useful for anyone with a console or Sky/Cable box they want to attach.

In terms of connecting devices, this TV is reasonably well specified. It has three HDMI ports (all 1.4), VGA, SCART (yes, really…), in addition to the YPBPR and AV phono options that the included adapters add to the options on offer.

There is also a single USB port, designed to allow you to use an inbuilt PVR function and present photos, music and video in a very limited selection of formats.

These features are all sideshows really, because when you get this device powered up you really want to see glorious 4K, don't you? The panel sports a native 3840x2160, and connecting a PC using HDMI it automatically dropped into that mode to present a desktop so huge that the pointer needs a Sat Nav to find its way around.

However, it also revealed a rather huge caveat regarding the SE39UA01UK and its Ultra HD capabilities: because it only has HDMI 1.4 ports, the 4K resolution it supports is limited to a 30MHz refresh. This limitation, combined with the processing adding further lag, meant that the pointer was a good 350ms behind any mouse movements.

Gamers generally moan when a monitor introduces more than 30ms delay, making this lag level totally unacceptable. Dropping the resolution to 1080p didn't

Specifications
Panel Size: 39"
Active Area: 853.92mm(H) x480.33mm(V)
Aspect Ratio: 16:9
Resolution: 3840x2160
Refresh Rate: 120Hz (at 720p)
Brightness: 250 cd/m2
Contrast Ratio: 5000:1
Viewing Angle: 176°(H) x 176°(V)(CR≥10)
Response Time: 6.5ms

help, as it still doesn't support the headline 120Hz in that mode. Therefore as a monitor option the SE39UA01UK is a bust, unless it's to show slides or something else that doesn't require any screen interaction or high frame rate.

I've read reports of people flashing this TV's firmware with one meant for the 50" model and enabling 120Hz at 1080p, but I can't confirm this and it isn't anything I'd recommend you try for yourself. It's really up to Seiki to release an official update to address those limitations but, as it makes other products that specifically do those things already, I'd be shocked if it upgraded this one any time in the near future... Or ever, in fact.

The lack of 60Hz refresh on the top resolution is a real deal-breaker for a number of reasons. One being that Sky has already said that, when it finally brings in its 4K sports service, it will be broadcast at 60Hz. That chops this TV's 4K viewing options off at the kneecaps even before the services have been launched.

That leaves the SE39UA01UK as just a basic TV. In some respects it is fine as just that, though it's not without a few other limitations. The decoder electronics in this device seem to have been borrowed from something much older. I almost immediately came to this conclusion because it not only searches for analogue services that don't exist here any longer, it only supports SD digital streams. Therefore, unless you hook this up to a SKY HD box or an external Freeview HD decoder you won't be seeing any live HD content on this set.

That was disappointing, as was the lack of a second USB port to power an external drive. That's because it means the TV's PVR functionality is limited to what you can fit on a USB flash stick. There are also a slew of other odd specification choices that I don't really understand. There was, however, one I really objected to: the power cable being permanently attached.

Yet, what I kept coming back to was that, while this is technically a 4K TV, with the exception of you pushing something from a PC at it in 4K resolution, it would never be used for that purpose. In short, it's a 4K TV for people who want to say they've got 4K without any real understanding of what that actually means.

The lack of even a decent HD decoder relegates the Seiki SE39UA01UK to a being a reasonably sized set that your granny can watch Corrie on; the price is good even for that purpose. My frustration here is that using the screen with a PC hints at what this panel could actually do had Seiki not wired it to some primitive decoding and processing hardware to nail the cost down to this admirably low level.

I've noticed that Seiki do make a 42" 4K TV with 60Hz capability for as little as £310. I'd recommend that, if you want less frustrating 4K functionality cheaply, you start there, and not here.

mm Mark Pickavance

Not a practical 4K monitor, in case you were tempted

Bitdefender Total Security 2016

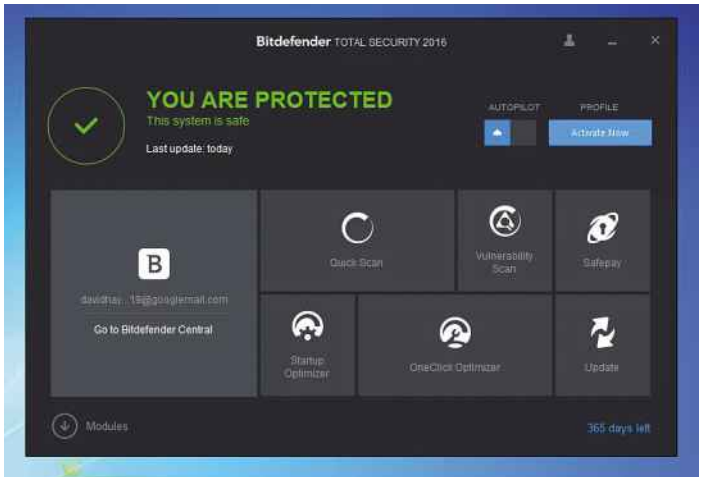
Taking on internet threats with advanced machine intellience

DETAILS
- **Price: From £39 for three PCs/1 Year**
- **Manufacturer: Bitdefender**
- **Website: goo.gl/kgbIMq**
- **Requirements: Windows 7, dual core 1.6GHz CPU, 1GB RAM, 1GB HDD Space**

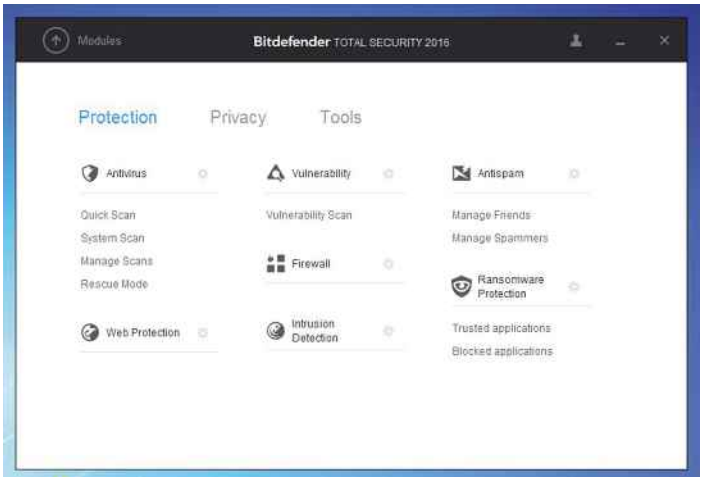
The problem with new internet and system security software isn't so much the advanced levels of protection that continually need to be updated and act intelligently, it's trying to package all of that along with useful features and tools in an easy to understand and use front-end. It's devilishly tricky to get the right mix, while still having a friendly interface for the user.

Bitdefender, though, has once again managed to pitch the right level of usefulness, tools and features, while still incorporating an astonishingly high level of intelligent security, with its latest all-in-one protection product, Total Security 2016.

The latest threats to your system are blocked with a unique combination of advanced Artificial Intelligence, machine learning scanning techniques and Cloud based technologies. For example, the rising trend in ransomware is kept at bay with the world's first proactive protection system that will prevent any untrusted program from deleting or modifying work documents, images, videos and the usual targeted folders. There's also a dual layer approach to anti-ransomware with a Ransomware Behavioural Detection (RDB) system, which will scan all installed programs for hints of ransomware activity and take measures to stop it and protect your data.



The front end is surprisingly easy to navigate, considering the technology contained within



Access to further modules, tools and settings is just a click away

Of course, this is just one element of the many-layered steps Total Security 2016 takes to keep your system safe. The anti-spam, web filtering, anti-rootkit, anti-malware, and anti-virus protection features are by far the best in the industry, and are continually improving thanks to the intense development cycle of Bitdefender's updates and the detection abilities of the machine learning-based technology.

Preserving your computer's performance levels is also a top priority. We're told the software is capable of adapting to your configuration and conducting its scans and system monitoring without having any perceivable impact on the speed of the system. That's no idle boast, or marketing guff, either. Testing on an old Dell laptop, carrying a Windows 7 image riddled with a selection of malware and viruses, Bitdefender caused, at most, a 2% drop in the overall performance of the system. The end result is a computer that's still useable, even when having its digital guts turned inside out in the hunt for threats.

Considering the amount of technology that's lurking under the surface, the software's also easy to use. The dashboard consists of seven one-click tiles, for accessing a particular element, scanning the system, or logging into the new Bitdefender Central – an online console that keeps management of your subscription and devices, alters and upgrades. You can dig a little deeper of course, accessing individual modules and tweaking the settings for your protection and privacy, as well as listing the tune-up and anti-theft tools.

There's a lot to take in with Bitdefender Total Security 2016, more than enough for those with a particular need to take advantage of. However, it also manages to cater for those who just want a simple interface and not to worry about what's going on behind the scenes.

Does Bitdefender still retain its crown as the best security system available? Yes, quite frankly, and it looks to keep that position for some time to come too. So, if you require a complete security package for your systems, look no further..

mm David Hayward

A good price for the ultimate in system security and protection

micro mart
9 Quality
9 Value
9 Overall

Dragon Professional Individual

Michael has been talking to his computer again

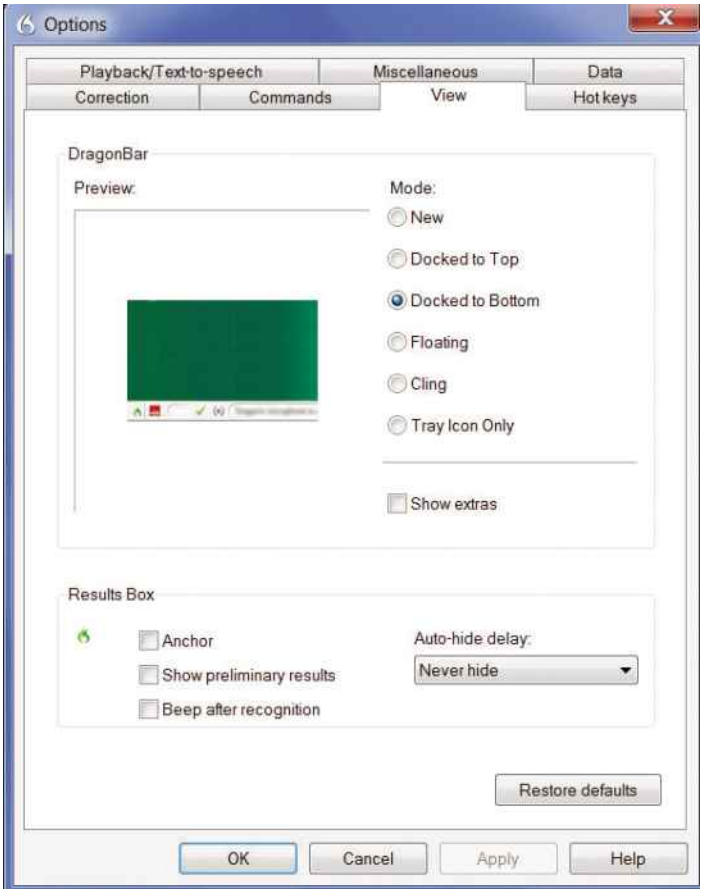
EDITOR'S CHOICE micro mart

DETAILS
- **Price: £279**
- **Manufacturer: Nuance**
- **Website: www.nuance.com**
- **Requirements: Dual core processor, 2GB RAM for 32-bit or 4GB for 64-bit, 4GB of hard disk space running Windows 7 and later**

With its latest speech recognition software, Nuance has opted move towards a product that's more suited to office workers than a home user. This review is based on the Dragon Professional Individual product, which provides features designed to improve productivity potential.

Following the software's *modus opperandi*, it first fires up in trial mode. This gives the user up to five launches; a restriction removed by entering the product's serial number. If any earlier version of the software is detected, then an offer will be made to make use of its data to help create your user profile – otherwise you're led through a process of selecting your geographical region, accent, and setting up your microphone. In either case the software will offer to analyse your documents and sent emails to get a better understanding of your writing style and use of vocabulary. This process, depending upon the amount of data, can be time consuming, but is worth it.

An interactive tutorial covers good dictation habits, using the software to apply corrections as you navigate and select text and web-based features (there are extensions downloadable for IE, Firefox and Chrome). Taking time to go through this will certainly be beneficial for first time users.



Option menu

New DragonBar

Dragon Professional Individual presents access to its functionality in the form of a graphical 'DragonBar', which by default arranges itself at the top of the screen from where it can be moved left or right. The bar can be moved to other positions on the screen, but this does result in a change of appearance to a rather plain version. When not in use, it will collapse itself down to a single icon representing the microphone button.

In its fully opened state, the DragonBar features icons covering options including Profile, Tools, Vocabulary and Audio plus the ability to turn the microphone on/off (the icon changes from red to green accordingly), and select from a choice of modes listed under "Now listening for". By default you are placed in recognising dictation and commands mode. Other modes include being on the look out for numbers, spelling words plus targeting either dictation or commands.

Several new features have been added to this software. You can create new smart format rules and apply them to selected text, and auto-text commands used to insert boilerplate text into a document following a specified phrase being uttered by the user. The boilerplate text can include variables as can any created commands.

Whether using audio files you have recorded yourself or those created by others, this software can transcribe the content and produce editable text. You will need to create user profiles for those audio files recorded by third-parties. A wizard will lead you through this process. Any elements created within Dragon Professional Individual can be synchronised for use with the cloud-based Dragon Anywhere app for iOS and Android devices.

First and foremost Dragon Professional Individual is speech recognition software, and Nuance claims it to be up to 99% accurate. I was able to match this accuracy when dictating a 533-word document. The resulting text contained just five mistakes, including one relating to formatting.

mm Michael Fereday

Excellent software, more suited to office workers, who can afford the price increase, though

micro mart
9 Quality
7 Value
9 Overall

GROUP TEST

Video Editing Software

For many of us, Windows Movie Maker is about as far as we've gone in terms of video editing at home.

While perfectly functional, though, Movie Maker leaves a lot to be desired. To do anything more advanced, something a little more powerful is necessary and can yield some splendid professional results.

We take a look at six video editing packages and see which help us release our inner Spielberg.

Video Editing Software

Adobe Premier Elements 13

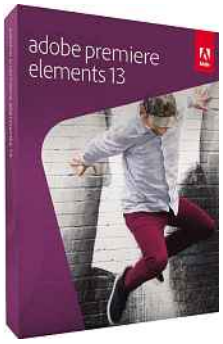
DETAILS
- **Price: £65**
- **Manufacturer: Adobe**
- **Website: goo.gl/qXSbLd**
- **Requirements: 2GHz CPU, Windows 7 or later, 2GB RAM, 15GB HDD space**

It's easy to use, although it hasn't changed a great deal over the years

Since we started writing this, Adobe released its new update to Premier Elements, bringing the version number to 14 and featuring many new additions to the series, including better support for 4K video. However, in this instance, we've got number 13 to review.

Adobe Premier Elements 13 is a vast improvement compared to the last version I used, which was version 11 a few years ago. Since then things have been chopped and changed, added, improved and generally spruced up.

Most of the previous options are still there, such as InstantMovie, allowing the user to create a movie without the hassles and time spent finding the right clips, themes or music. And Quick, Guided and Expert modes allows you to get editing immediately. Guided helps you out with a series of steps, and Expert will offer more advanced options, adding a more user friendly interface to the powerful editing of Elements.



The Time Remapping feature is an impressive and powerful part of the Elements series, allowing you to pause, fast forward or apply a slow motion effect to a specified portion of a layer or zone. The result can be made to look very impressive but, in all honesty, it does take a significant amount of work to hit the nail on the head and get it right, without it ending up resembling the famous Benny Hill chase scene.

The Organiser has had a bit of a facelift, and a new menu system has been adopted, incorporating Media, People, Places and Events – all of which can be tagged, identified and categorised according to your specifications or through face recognition technology. It's a lot more stable than previous attempts, but on very large picture and video folders, it can become so slow as to appear to have crashed – something which seems to have plagued it since the earlier versions.

New filters that remove camera shake, haze removal and a far better facial recognition are a good inclusion to the software. Interestingly, many of the newer filters and technology have been borrowed from Photoshop CC but given a new lick of paint for version 13 of Elements.

Overall, the look and feel of Adobe Elements hasn't changed a great deal. There are naturally better UI layouts and such and, of course, there are more options to get to grips with. The addition of exporting to 4K, including 4K capture, is a natural progression in the industry. And Adobe does a cracking job of it – with version 14 adding more support and UHD technology.

Whereas previous Adobe Elements may have felt a little stale in comparison to other video editors available, version 13 (and by the looks of it, 14 too) has managed to tip the scales in Adobe's favour. With prices from around £65 it's not too badly pitched either.

All in all, Adobe Premier Elements 13 is a great video editing package. It has everything the average user could ask for and will satisfy enthusiasts and professionals alike.

CyberLink PowerDirector 13

DETAILS
- **Price: £59.99**
- **Manufacturer: CyberLink**
- **Website: goo.gl/6X07zH**
- **Requirements: 2GHz CPU, 2GB RAM, Windows 7 or later, 10GB minimum HDD space**

The CyberLink PowerDirector interface is certainly easy on the eyes

It's also easy to use and quite powerful considering the price

Just as with Adobe, CyberLink has recently released version 14 of the PowerDirector suite since our initial review of version 13. Which is typical. As you can no doubt imagine, there are many new improvements over version 13, but essentially the core program and tools haven't changed all that much.

CyberLink's suite of video, DVD and Blu-ray tools has seen most PC users through many years of service. Whether that service is good or bad depends on your experience with using CyberLink products, but on the whole, this flagship video editing software from CyberLink does a pretty good job.

In its most simple form, PowerDirector allows the user to capture, edit, manipulate and output the content to the highest possible standard. Full HD, 2K and 4K are all supported, with PowerDirector being the first consumer video editing software to support end-to-end editing of full 4K Ultra HD.

Since version 11, PowerDirector has come in four different version: Deluxe, Ultra, Ultimate and Ultimate Suite. Each version offers a slight addition of and tool from the last. The jewel in its crown tool, though, is the way that PowerDirector intelligently and automatically adjusts the scenes according to the content. Faces, motion, zoom, panning, poor lighting and a severe cases of shaky camera hand are all enhanced through the "magical" Content Aware Editing, a tool that is present in all versions except for Deluxe.

Automatic enhancements aren't for everyone, but in terms of the budding video editing enthusiast or advanced amateur, the Content Aware Editing feature works like a charm and can produce some rather excellent results from what would seem a relatively poor section of video or stills.

Beyond the magical capabilities of PowerDirector, the Design Studio tools (Title Designer, PiP Designer, Particle Designer and Menu Designer) are an absolute breeze to use, and through the intuitive drag-and-drop timeline, you'll be knocking out some stunning video in next to no time. The emphasis here is ease of use; even if you haven't played around with a video editing suite before, PowerDirector's interface is simple to read and understand.

There are thousands of effects you can apply throughout your video including the ability to create a 3D video. In fact, through the DirectorZone, the online community for PowerDirector, you'll have access to over 300,000 free effects and templates.

> **"One of the fastest and most capable video editing suites available"**

Effects, 4K resolutions and 3D aside, PowerDirector is one of the fastest and most capable video editing suites available. Through the various multi CPU and GPU accelerated performance enhancements for Intel, AMD and Nvidia , the TrueTheatre Technology can apply its wonderful 'magic' in a matter of minutes. Plus, it's also a very stable product. The 15-minute video we produced was rendered without a hitch in just a couple of minutes – complete with a multitude of effects.

In terms of price, PowerDirector isn't too bad, considering what you get. Starting at just £59.99 for the Deluxe edition and rising to £209.99 for the Ultimate Suite, it can hardly be classed as highway robbery, especially when you compare the result with fully professional suites that cost in the thousands.

On the whole, PowerDirector is an excellent choice for someone who wants a seemingly professional result, without taking a degree in media studies.

LoiLoScope2

DETAILS
- **Price: £78**
- **Manufacturer: LoiLo Inc**
- **Website: goo.gl/Vp4MNh**
- **Requirements: 1.6GHz CPU, 2GB RAM, Windows 7 or later, 10GB HDD space**

To be perfectly honest, we hadn't heard of LoiLoScope before looking into the other video editing products on test. If it wasn't for following a link of someone doing a *Sonic the Hedgehog* speed run, then we would have completely missed it altogether.

LoiLoScope is a breath of fresh air to what's considered as the normal, routine approach to video editing. The interface offers the same functionality of the more clinical video editing products but in a far less formal environment.

The interface is a kind of working mix between the Windows 8.1 interface and XBMC, with good clarity and a straightforward approcah. Within the New category you'll find the common 'Create New Project' and so on, but you'll also see a wide variety of tutorials that when clicked will launch a slideshow type guide that will run through almost every aspect of the software and video editing in general.

The alternative interface doesn't end there. The main UI is a click-zoom, movable desktop, which houses the various objects needed to complete the tasks at hand: import images, video and music, burn to DVD or Blu-ray and so on. The traditional timeline is still present, but not the main focus of the software, although it can be brought to the forefront of the desktop for when you're working on it.

▲ ***The LoiLoScope UI is a breath of fresh air***

➤ ***But it does lack most of the modern features of the competition***

Trendy interfaces aside, LoiLoScope is a well-packaged product that incorporates a wealth of impressive features. You can import from virtually any source and output to the standard and popular formats, minus 4K, 3D or anything else that's ultra-modern. There are many effects that can be applied to the final video, including colour change, flip, rotate, invert, PiP and transparency.

It's also blindingly fast, and in our test, it retained its snappy feel throughout the entire video production, no matter how many elements we added. The hardware acceleration is well designed, without a doubt, but the overall speed of the program could be down to the fact that's extremely lightweight compared to the other products on test.

LoiLoScope is a decent video editing program, but it's clear that it's designed for a playful amateur, enthusiast or someone who doesn't so much care about the latest 4K technology and simply wants to create a very nice looking video. That said, it's obvious that with LoiLoScope you're not going to get anywhere near the same level of professionalism that you're going to get with the CyberLink or Adobe products and, regrettably, LoiLoScope costs just as much.

On the plus side, it's a good product and a bit of a surprise for us. If you require a capaable video editor but you don't fancy handing your cash over to the big names and you don't mind losing out on the latest advances in cinematic magic, then this is certainly going to be your weapon of choice.

Magix Movie Edit Pro 2015

DETAILS
- **Price: £39.99**
- **Manufacturer: Magix Software**
- **Website: goo.gl/4GSdPX**
- **Requirements: 2GHz CPU, 2GB RAM, Windows 7 or later, 10GB HDD**

Magix Movie Pro 2015 is an okay video editor, but it lacks the polish of the other entries

However, it's reasonably well priced and will work well enough for the average user

The previous MX-branded versions of Magix Movie Edit were quite good, but times change, and although the numbers on the end of the title may alter, the product has to keep up to date with what's available and what's useful.

Movie Edit Pro 2015, which is the 21st version of this product, has had something of a spring clean since the mid to late-teen version and a significant overall performance improvement, but there appears to be a distinct lack of attention to detail throughout the entire product.

The timeline interface and controls are very good, easy to understand and easy to navigate, and they feature a new UI look, with the video and audio from one source being combined on a single track, allowing you to add more tracks and keep tabs on what's going on throughout the entire video. Additionally, should you need to, you can then split the tracks accordingly into their own separate tracks relatively easily.

There's also the addition of a Chroma Key Engine, which works in the same way as a Hollywood green screen. In other words, you superimpose the image of the person/object onto a new background layer. Interestingly, this element works very well. Most of the time, there's no obvious visual issue that would lead you to think the subject has been 'green screened'. The engine does an impressive job, although the supplied templates are a little amateurish.

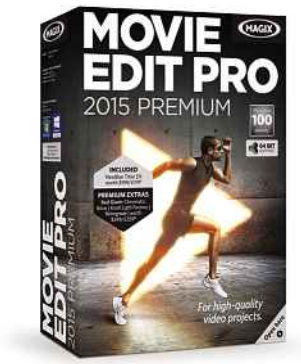
The biggest improvement, however, is on the performance side of things. Movie Edit Pro loads up very quickly, allowing you to import content quickly, and it uses the abilities of modern CPUs and GPUs to render the video and scenes in an acceptable time.

The problems we had with Movie Edit Pro, though, stem from a rather slow moving and clunky interface beyond the timeline. There were times when a menu took a good 30 seconds to appear after being clicked, and these menus can ultimately confuse and lose the new user and beginner. Also, if any images, music or video we used in the timeline were moved to another location or deleted from the temporary folder, then gaps appeared, as opposed to the component being tagged as being offline. This messed up the positioning of the timeline and subsequently fouled up the entire project.

Granted, this isn't a common problem to come across, and we only discovered it when the location of the content, a NAS drive, went offline. However, it's worth considering, especially in this day and age, where cloud services and network storage are the norm.

We were also not overly happy with the in-product help and support, which lacked content and brushed over some of the meatier aspects of the program.

Although Magix Movie Edit Pro 2015 is a reasonable product, it doesn't really square up to the other software in this group. There are some sterling efforts to make a unique product, but we feel that a bit more care and attention is necessary before this can score higher.



micro mart
5 Quality
6 Value
5 Overall

Sony Vegas Pro 13

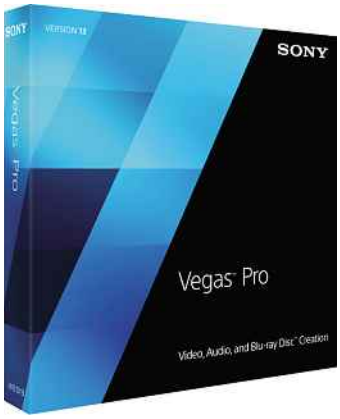
DETAILS
- **Price: £393**
- **Manufacturer: Sony**
- **Website: goo.gl/n4X3lu**
- **Requirements: 2GHz CPU, 4GB RAM, Windows 7 or later, 1GB HDD space minimum**

Sony Vegas Pro 13 is an exceptionally powerful video editor

Sony Vegas Pro is one of the favourite video editing packages among the current generation of YouTubers. While it may not feature some of the extensive effects and filters of Adobe and CyberLink's software, it does a pretty decent job.

There are three versions of Vegas Pro 13 available. Vegas Pro 13 Edit has the basic editing elements, with few tools available; Vegas Pro is the mid-range of the versions and has a good selection of plug-ins and other features; and finally Vegas Pro 13 Suite is aimed at more professional editors, with a complete package of every possible element and support for up to 4K video.

The interface is fairly complex at first glance, with numerous panes, menus and the standard timeline branching from the lower portion of the screen.



It does pretty much everything, but it costs an arm and a leg

> **"Sony Vegas Pro 13 is powerful and fairly easy to use"**

However, new to this version are dockable panels, so you have the option to chop and change the initial layout and UI to better suite your needs - and re-add them as the need arises.

Actually editing a video within the timeline is surprisingly easy, considering the complexity of the UI. Thanks to a handy Multi-Tool pop-up menu, located below the timeline, you're able to access the more frequently used tools with relative ease. This naturally makes the workflow a little more efficient, and it's a lot easier to get to grips with for those of us who aren't professional editors.

One of the new additions to the Vegas Pro package is Pro Connect, through which you can collaborate between teams on a particular project through a new iOS app. This app allows you to add markers, frame by frame comments and even colour code areas of the timeline in a multi-editor project. With various gestures, you're also able to scroll, swipe and jump to various points in the editing process and make your mark on the lifecycle of the editing project easily enough.

It's also a good way to ensure that the collaborators of the project are all being used to their best effect, and it can cut down on piracy and illegal sharing as the videos used in the collaboration can only be accessed via the app.

There are numerous other effects and add-ins included with version 13, but considering the price of the product (we're looking at around £400 here), it's not really a huge improvement over the previous versions. While this is certainly a good video editing package, it doesn't quite live up to the same quality and abundance of features that Adobe or CyberLink has to offer – especially taking the cost into account.

All in all, though, Sony Vegas Pro 13 is powerful and fairly easy to use. It's no doubt capable of creating some stunning videos, and amateurs will be happy with the level of ease on offer too. Sadly, though, it's just too expensive for most folk.

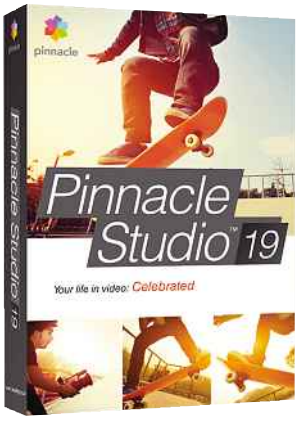
Pinnacle Studio 19

DETAILS
- **Price: £49.95**
- **Manufacturer: Corel Inc**
- **Website: goo.gl/1UO3bP**
- **Requirements: 1.8GHz CPU, 2GB RAM, Windows 7 or later, 8GB HDD space**

You'll probably need to upgrade for the more useful features

Ever since Corel started to develop Pinnacle Studio, the software has gone from strength to strength and offers a complete video editing package with precise controls and a huge range of features.

This new Pinnacle is a very streamlined model compared to the previous versions. Clips are Imported with relevant ease and handled automatically, should you so wish, through the new interface. Even tape-based importing is supported, provided you have the hardware at hand. Editing is flexible, fast and helped out significantly through the SmartMovie and SmartSlide feature sets. And you can now edit your videos anywhere through the integrated cloud service and Pinnacle Studio for iPad.



Pinnacle Studio 19 is certainly a good video editor

There are plenty of effects built in, ready to add a bit more of a snazzy appeal to your videos – over 1,500 effects to be precise, which range from the standard 2D sparkly to the more graphically inspiring 3D animations. Likewise, there are plenty of pre-configured templates that range from weddings, holidays, birthdays to sci-fi, comics or movies. In addition to the many effects, you can opt to render your final video in full stereoscopic 3D, with full support to output to the likes of Nvidia 3D Vision, 3D HDTVs or the PS3. You can correct the colour and control the 3D depth or parallax effect, then burn the video onto an array of media and other formats, except for 4K, as that's reserved for the Studio Ultimate version.

The cloud side of things is pretty impressive. With 25GB of storage included with the product and a further 25GB available once you register it, you'll have plenty of space available to upload to and manage via your iPad. The interface on the iPad version of Pinnacle differs slightly from the Windows version but not enough to cause any problems.

Pinnacle also makes good use of dual monitor setups, with a simultaneous display of the source video and the timeline video, although the same can be accomplished on a single monitor without any noticeable problems with the viewing of the UI.

The use of Nvidia CUDA acceleration certainly helps the rendering and editing of the video move along at a healthy pace, although not as fast as CyberLink's featured product. The system was stable enough, though, and there were no freezes or crashes.

There's a lot going on in Pinnacle Studio 18, but some of the more advanced and essentially more useful technologies have been left out in favour of the other versions. The more productive Studio Plus is a far better choice, and it only costs around £10 more. Obviously, the more comprehensive Ultimate version contains everything, with support for 4K and hundreds more bonus effects, but it costs more.

Having said that, with the Studio version costing around £50, Studio Plus £80 and the Ultimate version £99, it's certainly a lot cheaper than the Sony product.

Pinnacle Studio 19 is a pretty good video editing package. There are enough features for amateurs and enthusiasts, and there's plenty of technology in use. However, those with more advanced requirements will need to upgrade to the Plus or Ultimate version to get the best from the software.

Adobe Premier Elements 13

For the cost, Adobe Premier Elements has everything you could possibly hope for. It's powerful, fast and comes loaded with tons of features, as well as support for newer technologies and video formats.

CyberLink PowerDirector 13

The product from CyberLink is just as good as Adobe, if not better in some aspects. It's easy to use and is just as powerful, while still retaining a human interface that amateurs and professionals can understand.

How We Tested

Each product was installed and tested on a Gigabyte Z97M-DS3H motherboard, with an Intel Core i7-4790K, 16GB of memory and Nvidia GTX970 4GB, running Windows 10. For the test we used a Terraria walkthrough, with voice and music to produce a 40-minute video at 1080P.

	Adobe Premier Elements 13	CyberLink PowerDirector 13	LoiLoScope2	Magix Movie Edit Pro 2013	Sony Vegas Pro 13	Pinnacle Studio 19
Price.	£65	£59.99	£78	£39.99	£393	£49.95
Blu-ray Support	Yes	Yes	Yes	Yes	Yes	No – needs upgrade version
3D Support	Yes	Yes	No	No	Yes	Yes
Ultra HD 4K Support	Yes	Yes	No	Yes	Yes	No – needs upgrade version
Social Network Capabilities	YouTube, Facebook	Facebook, YouTube, Vimeo	YouTube, Facebook, Twitter	YouTube, Facebook, Twitter	YouTube, Facebook, Vimeo etc	YouTube, Facebook, Cloud service

Your Letters

Why I Love BT

After re-reading the article on BT by Mark in issue 1371 (BT and Openreach) I can confirm talking to BT is a complete waste of time. At the time of writing this, 11.11am my download speed 1.3Mb/s so it has improved slightly, but I am 16Mb/s short of the national average. My slowest has been 25minutes to download 40MB of Data (AVG anti-virus), so today its racing along at supersonic speed, my dialup was quicker

I tried to talk to BT about this woefully inadequate service but the person from one of our old colonies seemed to be reading from a script, so was the next one I spoke to and the next, never the same person always the same script and Questions its never their equipment so it must be mine.

So why, your readers will ask, do I not change to another provider like Talk Talk? Well, it took two months of letters to get my migration code from them,they ignored two recorded delivery letters (ome back Tiscali).

Sky? All I have to say is the Murdoch Clan.

Virgin? I contacted them three weeks ago about changing, no feedback as of yet – not a very good sign for future customer relations. Plus Net used to be independent now owned by BT. Hyperoptic? Never heard of them. Fuel? As above

As with the rest of the small companies who provide broadband they may be swallowed up by one of the big 3 if they grow too big, and then back to square one.

What can I say about Ofcom? In the pockets of the big three. Powerless and toothless, a sop to the British public so Parliament can debate the Welfare of Cats Act (it's real) and any other bit of loony legislation that so called members can put forward. Legislation for the breaking up BT reorganising the communication industry for the future should be a priority not your local moggy.

My speed is still rocketing along 1.3Mb/s " can this pleasure never end"

Dave Shaw

Don't You Just Hate 'Improved' Features?

The recent changes to Windows have shown us that manufacturers' approach to, and reasons for, change are different to those of their users. They change things because if they don't they've nothing to sell in a saturated market. They have little or no real interest in necessity, usability, or actual customer desire for change. Hence the continued existence of Windows XP, 7 and Office 2003 just to give examples.

However, even worse is the 'change-for-change's-sake' attitude that permeates the industry: the move to the ribbon in Office was a prime example – looks different, works adequately, but added extra complexity while removing a whole swathe of functionality and usability from the product. It is liked by some people, hated by others, but it was in the simplest sense a totally unnecessary change as it added absolutely nothing to the product.

The best example yet, however, is Amazon's 'improvements' to the search facility of the Kindle Paperwhite. It took a system that worked well, efficiently, and was consistently presented, and replaced it with one that is barely usable. When you are reading a book you can no longer look up anything except text in that book, whilst on the main page the facility searches everything (dictionary meaning, content of your library, the Amazon store, your library titles etc) with no choice of what to search.

Previously you chose what to look for, which made absolute sense: why would anyone want to find out what a particular word means and books with that title on Amazon at the same time? The new system is either ridiculously constricting in books, or ridiculously resource consuming elsewhere. And worse, the user has no control over what they are doing.

Dick Pearson

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STEP 3 Tap 'Subscribe'

available on kindle fire

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STEP 2 Tap the 'Subscribe' button

STEP 3 Choose whether to create an optional Zinio account

STEP 4 Enter your Apple ID password to confirm

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Turn Your Monitor Into **A Smart TV**

James Hunt shows you how to make your display do a little more

It may not have escaped your notice that the line between TVs and computer monitors is pretty thin these days. An LCD panel with high-definition pixels and incredibly bright backlight? Sounds familiar to us. Indeed, if you have a high-end monitor, it may even look better than your TV.

In most cases, the only thing your monitor is really missing is the surface trappings of a TV. Monitors don't contain anything that can receive a TV signal, the built-in speakers aren't up to much (if they exist at all), and there's no remote control to let you change channel – and ultimately, that's why monitors are a fair amount cheaper than a TV of equivalent quality.

But the big advantage monitors have that a new TV doesn't? You already own one. And for less than 60 quid, you can quite easily turn it into the smart TV you've always wanted.

Monitor Requirements

Before we start, there are a few things you need to make sure your monitor has so you can turn it into a TV with the minimum of fuss.

1. A Free HDMI Port

You'll need some way to make your monitor receive a signal, and HDMI is the standard for consumer AV equipment. Some monitors have a couple built in; cheaper ones might only have one – but in that case you can buy an HDMI multi-way or similar. If you want to go really low-fi you can just swap the HDMI cables around if and when you're ready to watch TV or use your computer, but a multi-way switcher is a nice middle-ground between cost and convenience. Or you could just use a spare, stand-alone monitor.

2. Audio Output

It doesn't matter whether it's tinny built-in speakers or a headphone/aux-out port that allows you to connect a standard part of freestanding speakers; you need some way to get the audio out of the monitor. This is why HDMI is quite important, because the technology delivers sound and video. If you put a video signal into a VGA or DVI port, there won't be any sound. Normally your PC can handle the audio output, but if you're bypassing the system entirely (and you will be!), then there has to be some way to get sound out of the monitor itself.

3. A Spare Plug Socket

All smart TV hardware needs its own power socket. This is probably the only major disadvantage this setup has over buying an actual smart TV; you use the same number of plug sockets but only have a single screen. Still, they're not hard to come by, and at least if your monitor is plugged in you're guaranteed to have a socket nearby.

Smart TV Hardware

So if you have a monitor with speakers and a spare plug socket nearby, all you need is the hardware to actually receive a TV signal. And in that regard, your options are wide open. But what are the advantages and disadvantages of the hardware on offer? We've taken a look at the most popular options to find out.

Apple TV – www.apple.com/uk/appletv

If you already own an iPad, iPhone or Mac of some description, it's hard to find a good reason to choose anything other than the Apple TV – besides the fact that it's about to get a refresh (maybe even by the time you read this) and will therefore be out of date quite quickly if you buy it today.

Priced at £59, the Apple TV can mirror the content of iOS devices to any HDMI-compatible screen using a wi-fi connection, and it comes with a number of pre-installed apps that allow you to access video content from providers like Netflix and Now TV, as well as the contents of your iTunes library and any video you've managed to transfer onto your iPhone or iPad.

“The big advantage monitors have that a new TV doesn't? You already own one”

The selection of software is fairly limited. One of the biggest omissions is that there aren't many ways to watch live TV on it. There are no native iPlayer, ITV player or 4oD apps, so you have to stream the relevant software off your iOS or OS X device to watch even free terrestrial programming. Similarly, the only way to get your own content onto it is through your iTunes library, so you need a PC running iTunes to access it through Home Sharing (and iTunes has to be open at the time). If you're in the Apple ecosystem already, none of this is any great hassle, but if you aren't, Apple TV isn't much use for anything more than Netflix and rentals.

Admittedly, it does have a great selection of foreign territory news channels, if you're into that (we're not, though), and it's hard to complain about the remote control, which is gloriously small and simple. Unfortunately, at more than double the price of certain competitors, it's on-brand as Apple hardware in being more expensive than it necessarily is useful. Maybe the forthcoming refresh will give it a kick in the right direction, but even then it's never going to be the right companion for a PC monitor.

Google Chromecast – www.google.co.uk/chrome/devices/chromecast

Just as Apple's TV ecosystem is as closed as its smartphones, so Google's TV ecosystem is as open as its smartphones. The Google Chromecast is a media-streaming stick that plugs directly and discreetly into any free HDMI port and turns any monitor into what is essentially a fully functioning smart TV once paired with a phone, tablet or computer.

“The big difference between Chromecast and most other devices is that it’s quite simple in its own right”

The big difference between Chromecast and most other devices is that it’s quite simple in its own right; it relies on your existing hardware to do the heavy lifting of downloading and streaming content. But that, in turn, means it’s also very versatile, because if there’s an Android app for whatever you’re doing or a web page you can load in Chrome, you get working, unrestricted playback. Screen mirroring means you can even use it to play Android games on your TV if you want.

At £30, the Chromecast is very affordable for this type of device, and its support is excellent across the board (except in Apple and Windows Phone devices, unsurprisingly). Compatibility with services like iPlayer, Netflix, YouTube and more is assured, and that includes live streams where available. Only a few apps, like Sky Go, prevent you from mirroring content from your TV.

Potential problems with the service are largely down to network bandwidth. Mirroring screens can be a data-heavy activity, and if you don’t have a Wireless AC network in place – and a strong one at that – you’re likely to encounter problems, especially if you want to stream HD. It’s also not much good as a stand-alone device. If you don’t already have some smart hardware to use it with, you’re out of luck, because there’s no Chromecast Remote or setup capability other than logging in through the app or browser.

Ultimately, it builds on exactly the same principal that makes you want to use your monitor as a TV in the first place. If the hardware is already in another device (in this case, your PC, phone or tablet), why duplicate it in another? Chromecast simply facilitates the two talking to one another, but for £30 it’s hard to complain given the sheer range of capabilities it’ll bestow upon even the lowliest monitor.

Amazon Fire TV Stick – www.amazon.co.uk/gp/product/B00KAKUN3E

The Amazon Fire TV Stick operates more on the level of the Apple TV than Google Chromecast, even though at £35 it’s priced a lot more closely to the latter and resembles it more closely, being shaped like a USB data stick that happens to plug into an HDMI port.

Although the Fire TV is obviously very Amazon-heavy on its offerings, with links to the likes of Amazon Prime Instant Video and the Amazon store front and centre, it’s possible to install others apps. Unfortunately, features like the main library and voice search don’t really acknowledge anything other than Amazon’s own services, which causes some inconvenience if you dare to spread your wings any wider.

Interesting extras not offered by other services include the ability to both view photos and listen to music stored in the Amazon Cloud Drive service, and an optional game controller (£34.99), which you can use to play any number of Android apps compatible with the platform. Unlike Chromecast, you don’t stream to this device; you’re running the apps right off it, so it’s both very versatile and slightly frustrating in that not everything you want to do is possible, even if your phone or tablet can do it.

The main benefit to this approach, however, is that the Fire TV doesn’t require any extra hardware to work. You won’t be forced to pair up your smartphone or tablet to use it, even though you can if you want, and unlike the Apple TV, its software is user-customisable to the point of allowing you to choose which apps are installed. It even includes an app for its main competitor, Netflix, though somewhat begrudgingly.

Again, the lack of live TV remains a disappointing omission, but if you’re already an Amazon user who uses several of its existing services – and crucially prefer them – or someone who wants the stand-alone functionality of an Apple TV without the high price and the customisability of a Chromecast without the requirement for additional hardware, then the FireTV is definitely going to look like the best choice.

NowTV – www.nowtv.com

NowTV is essentially a pay-as-you-go version of Sky’s standard TV service, and while it’s available as an app on several platforms, it also sells a hardware set-top-box which you can use. And crucially, it gives you access to something most of the others don’t: native, directly streamed live TV. The catch? Substantial cost.

NowTV isn’t just the hardware, after all; it’s also the service. And the service is Sky TV’s, without the mess and obligation of

a contract. The Now TV box starts at £14.99 and requires only a network connection and HDMI-enabled screen to show you live TV. Once you have the box, you also have to buy the necessary passes to use it, which come in a variety of combinations. £6.99 gets you a single day of Sky Sports, £10.99 gets you a week and £31.99 a month. Movie prices are much cheaper at £9.99 for a month's access, and the 16-channel entertainment pack prices are cheaper still: £24.99 for three months or £40 for six months.

"The Fire TV is obviously very Amazon-heavy on its offerings, with links to the likes of Amazon Prime"

So while the hardware is cheap, that's largely because you're going to pay handsomely afterwards. It's not entirely divorced from other forms of smart TV conversion (after all, you really need a service like Netflix to make the most of an Apple TV, FireTV or Chromecast), but the difference here is that the subscription comes with hardware, assuming you want it.

In addition to live channels, you also get access to the on-demand service with its own exclusive content, and you still get access to things like iPlayer and 4OD, even if there isn't an app service in the same sense as something like the FireTV. Once you sign up for the service, you can also register it on up to four other devices including your set-top box, which is also useful (especially if you go away from home).

The benefit of NowTV is that it gives you access to a lot of programs and channels you can't get anywhere else, but it's also worth noting that quality is capped at 720p (so not full HD), and its focus on external streaming means you'll need a fast broadband connection too. So it's far from perfect, but it's also offering stuff no other way of converting your monitor into a TV can compete with on its own. Probably worth it, as long as you have the money spare.

Alternatives?

If any of this sounds too fiddly for you, the only other real alternative is to get a TV card for your PC. This doesn't convert your monitor into a TV so much as it does your entire computer, so in that sense it's a little different, but the ability to watch TV at your desk is ultimately bestowed on you.

Unlike those that stream content (live or otherwise) over the internet, TV cards still require an old-fashioned aerial input to access normal Freeview content. Some will allow you to link up a satellite receiver (but, importantly, not decode Sky TV), and others will take a passthrough signal from a separate Freeview box, but the technology is much less useful than it was.

Still, if you want live TV and have an aerial connection you can use, a TV card offers functionality as good as any smart TV, and you don't have to do all the frustrating swapping and splitting of cables to make it work. It does also require you to have your computer switched on, which all of the above methods don't, and that's a fairly major difference.

Of course, if you don't mind having your PC switched on when you're watching TV, you could just be streaming channels over the internet without a TV card anyway.

Ultimately, there are many different ways you can transform your monitor – old or new – into a smart TV, each of which has its own advantages and disadvantages. The suitability of each method depends heavily on your existing hardware, viewing priorities, and financial capabilities, but it's safe to say the method you want is out there. **mm**

The Rise Of The Machines

Has Technology Done More Bad Than Good?

Would we be better off without technology? Chris Hallam weighs up the many pros and cons of modern life

Hurrah for technology! Let's face it: it's great. Without technology, you would probably be sitting in a darkened cave now, listening to spiders scurrying about like some prehistoric Robert the Bruce dreaming of some Raquel Welch-like cave girl. Assuming you could even read, you wouldn't be reading this. You wouldn't have the internet for one thing. For another, without technology as a subject, this article wouldn't be here for you to read anyway. You'd probably be reading one about woolly mammoths or something instead.

Thankfully, this isn't the case. You may even be reading this while on an international flight. Whereas even 50 years ago, foreign travel was a rarity for most of us (unless we had been involved in a world war and were dropping bombs/being dropped somewhere), today, most of us have been abroad and taken almost perpetual advantage of the myriad technologies at our disposal.

But while some technology might be seen as indisputably good, has technology always transformed our lives for the better?

The Internet

Let's begin with something conceivable. Everyone over 30 who's reading this can remember a world without the web. In the 80s, it was the norm. Was it better or worse? Would you gladly wake up without the internet tomorrow, or does the thought of the internet being destroyed fill you with terror?

The slow entry of Uncle Internet into everyone's lives was very gradual. "The information superhighway showed the average person what some nerd thinks about *Star Trek*," said Homer Simpson, in an early reference to the web in the mid-90s. And, initially, it might have seemed like the web might mean little more than that.

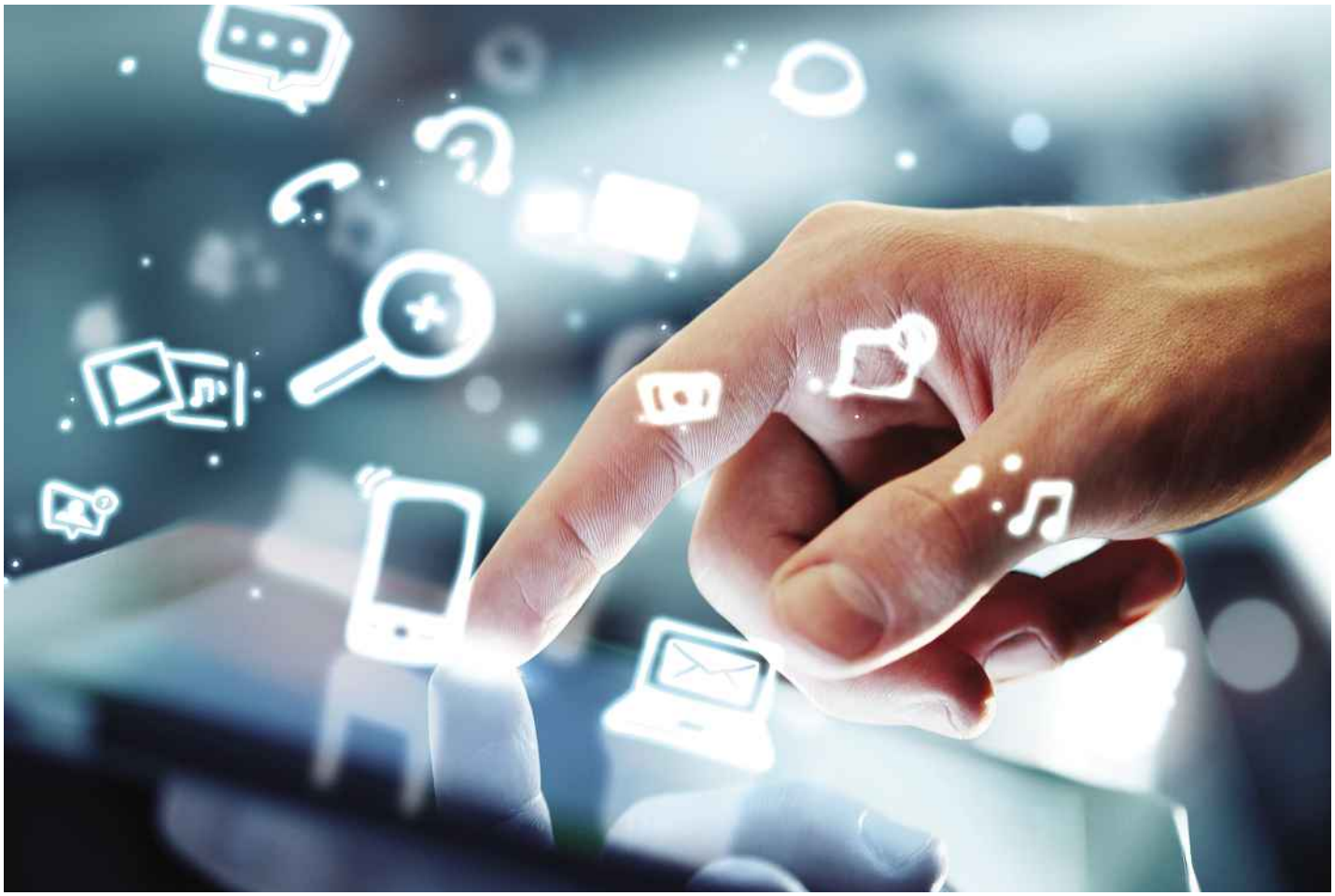
Email marked the first big change for most people. Most folk, who hadn't written a letter in years, were soon typing away, much of the novelty coming from the simple ease with which it was possible to write one (no paper, pens, stamps or home addresses required) and, indeed, how easy it was to send the same email to many people at once. With most people texting by the start of the century, the rise of Facebook in the second half of the last decade and Twitter by the end of it, even the simple email soon came to seem as old

> **“ Would you gladly wake up without the internet tomorrow? ”**

fashioned as a pager or a fax. That said, the number of emails only overtook the number of letters being sent in 1995. Today, over 200 billion emails are sent every day – and many of them are even sent by real people.

Soon we were tentatively pre-ordering books online, then ordering everything else, then looking at the news, then applying for jobs, then looking up our school friends on Facebook, posting photos of meals we are about to eat, replacing our music and film collections, meeting our partners, booking our holidays and so on. While it is just possible still to ignore the web, it is undeniably everywhere.

How good is all this? The rise of online pornography is regarded by many as a bad thing. 14% of internet searches are related to sites devoted to sex.



On a more positive note, though, one in five relationships now begins online. Internet dating has massively increased the range of dating options available to the average person. On the other hand, both the web and the growth of mobile phones (more on this later) have made both cheating and getting caught cheating easier. The list of pros and cons grows longer all the time.

More crucially, the web is arguably failing in the one area that was supposed to be its chief selling point: the spread of information and knowledge. In the UK, the rise of the web has coincided with a simultaneous collapse in newspaper sales. Perhaps this is simple enough: people are getting their news online instead. But are they? The data is by no means clear. And with 'dumbing down' already a concern 20 years ago, it is by no means clear whether the internet has led to a more intelligent, well informed populace than that which existed before. The odd thing about the internet is that it promised to unleash a tidal wave of information. Yet are the populace as a whole genuinely better informed than they were 25 years ago? Does internet learning produce a shallower, more easily digestible but ultimately incomplete range of knowledge than that gleaned from books? It is unclear.

A complicating factor is the fact that the rise of the web has coincided with a decline in print media: instead of relying on newspapers, people are turning to the web for news. But are they? The data is again unclear. There are certainly grounds for concern that for all the news resources now available, many people are not receiving any news at all.

“ Some would argue that the shrinking of the world has taken some of the romance out of it ”

Even ignoring the major concerns raised by the web (namely, that it promotes pornography and potentially facilitates terrorism), there are other issues. The anonymity granted by many online forums seems to bring out a nasty side to people's character that might otherwise never have been given vent to. There is also concern that the information disseminated on the web is too often either wrong or inadequate, unleashed in digestible, bite-size, quiz-show-friendly chunks rather than providing the all round information books can provide. There is nothing new, for example, about people misdiagnosing themselves, having accessed only a small amount of medical info, but it has certainly escalated with the web.

Much of this, of course, is merely a side effect of the massive extension of freedom of speech, the internet has enabled. So too is the propagation of nonsense: the less believable conspiracy theories have flourished in the age of the web. Easily verifiable but untrue rumours continue to flourish as much as they did before, if not more so.

A black propaganda tool and promoter of pornography the web may be, but are we really a better informed populace than we were before we first went online?

Mobile Phones

Nothing better illustrates people's ambivalent feelings towards technology than the mobile phone. Most people both hate and love their mobiles.

In 1995, statistically, some people you knew had a mobile phone. By 2000, you had one, even if you hadn't really wanted one before; they are intrusive, cost us money and are annoying. Yet if we lose or break it, we feel almost as if we have lost a limb.

For a few short years, although both came into vogue at about the same time (the mid to late 90sd), the worlds of the mobile phone and the internet were kept strictly separate. But when the two got together, a formidable combination was created. Today, we can watch films, TV shows and read books on them; the actual calling up of people to talk is increasingly secondary. No wonder people are glued to them. "Everything in the world is on the internet," the comic Dave Gorman said in his early 21st century *Googlewhack Adventure*. "And I don't know about you, but I find everything in the world pretty distracting."

The recent TV series *The Tribe* demonstrated how even the poorest Ethiopians now have mobile phones, sometimes travelling to the next village to top them up. These people often live the simplest lives imaginable, yet the world of texting and downloads has even penetrated their existence. It's not all bad, of course. Mobiles have made communication much easier. The creation of the text message, although only introduced as an afterthought, played particularly well with British users, who often preferred texting to direct verbal communication. Many of us will have witnessed how many people (particularly teenagers) are slavishly fixated on their mobiles. All of us have undoubtedly suffered from the phenomena of having one-to-one conversations endlessly interrupted by the other person stopping to text or check their phone, the implication being that they would rather be talking to anyone else than you.

In fact, this probably isn't the case, but when there are numerous social alternatives available, it is endlessly tempting to see what's out there. In many cases, there isn't much. It's like enjoying a song on the radio but still switching it over in case there's an even better one on another station. Despite this, many of us feel compelled to check what's happening on Facebook multiple times a day. As the comedian Andy Parsons pointed out, this is effectively the equivalent of opening your front door several times a day on the off chance that someone might be there.

Usually, nothing much else is happening.

Travel

Make no mistake: the world is smaller than it used to be. It isn't, of course, but it feels that way. Maps rarely have a blank area saying only 'Here be dragons' on them any more. Few of us would describe the Czech Republic as a 'far away country', as the British Prime Minister Neville Chamberlain did of Czechoslovakia in 1938. Many of us will have been to Prague on stag nights.

New YouGov research asked adults in the US and the Britain whether they had ever travelled internationally, and found that 91% of British people had left the UK for a holiday and only 8% say hadn't. 50% of Americans said they'd left the US for a 'vacation', while 48% said they hadn't.

Aside from Europe, North America is the most popular destination for Britons, with 44% of British adults saying they've been there. Africa (30%) is the second most popular destination, and 27% of Britons have also been to Asia. 14% have been to Australia, and 12% have been to South America.

Generally speaking, this is in many respects a good thing. But fear not! There is always a downside! Constant air travel has, of course, greatly increased pollution and helped facilitate the spread of international terrorism as well as some hideous accidents. It has ensured we can enjoy a mini-break in Turkey today, but we may one day all die because of it.

On a woollier note, while it may have enabled many of us to sample wonders of the world that our ancestors would probably have never seen, some would argue that the shrinking of the world has taken some of the romance out of it. Never mind 80 days; you can travel round the world within a day now (though you wouldn't see much of it). Although there were never any dragons, in spite of what the maps may have said, it was nice to imagine there could be, wasn't it?

Irrefutables

Let's face it: some things are hard to argue for or against. Weapons technology might be generally seen as a bad thing, for example. It was impossible for the human race to destroy itself in 1800. Now, thanks to nuclear weapons, germ warfare laboratories and pollution, we could kill ourselves en masse in numerous ways either deliberately or by accident in the time it would take to watch an episode of *Big Bang Theory*. That said, some would argue certain technologies have ensured we're protected from society's enemies just as many argue atomic bombs were essential in ensuring Allied victory in the Second World War.

Medical advances alternatively seem irrefutably like a good thing. In the past, we were desperately vulnerable to all variety of minor ailments. No wonder people in 19th century novels often 'die of a broken heart' or men (as in the case of a character in DH Lawrence's 1914 book *Sons and Lovers*) perish after slightly scratching their neck.

Here is a depressing fact: 40% of the entire human race up until this point never made it past the age of one. That's 40% who never even got to the point of properly realising they actually existed.

Today, as in *Star Trek*, we live longer and prosper, largely thanks to the appliance of science. But there is a downside to this too: overpopulation. Charlton Heston film fans take note. We are in as much danger of a *Soylent Green* scenario (catastrophic overpopulation) as we are of *The Omega Man* (finding ourselves to be the last person on Earth). And let's not even get started on *Planet of the Apes*.

> **"The information disseminated on the web is too often either wrong or inadequate"**

The End?

Imagine you fancy seeing the film *The Wizard Of Oz*. Bad luck: it's the year 1850. Cinemas haven't been invented, and even if they had, films have not been invented either (I think this makes sense), and anyway the book it's based on hasn't even yet been written. Try going to see the Great Exhibition instead.

Okay, it's 1950. But *The Wizard of Oz* isn't showing at the cinema currently. It came out in 1939. It will probably be shown again soon (this happened more often then), but it's not on now. Perhaps it'll be on TV. Statistically, you are unlikely to own a television in 1950, but let's say you do, as it's not that unlikely either. There is only one channel. You have no means of taping it, so you'll just have to hope you can see it when it's on. And even when it does, it won't be in colour. Not any of it, not just the beginning and end bits, which aren't in colour anyway.

It's now 1975. There are three channels and you have a colour set. Unfortunately, it's on the same day as your sister's wedding. Bad luck! I'm sure your sister won't mind. By the early 80s, you'll be able to tape the film off TV, and then soon after buy the video and watch it whenever you want. By the start of this century, you can watch it easily on DVD. Today, you can easily download it in moments.

My point? Technology has improved life in many ways beyond our wildest dreams. It has also created unforeseen unimaginable horrors like that nasty bit with the baboon in the teleporter in David Cronenberg's *The Fly* (which is also available to download). On the plus side, teleporters haven't actually been invented yet.

But perhaps there is a downside to everything. Either way, there is no escape. Clipping your heels together and saying "There's no place like home" over and over won't help. Technology is here to stay. We are all stuck in an Oz of our own creation… **mm**

Goodbye Windows RT

After some substantial initial commitment, Microsoft's interest in Windows RT has all but vaporised. Is the latest update the last one this OS will be seeing?

Microsoft launched its Surface hybrid computers in October 2013, after first demonstrating a device at the January 2011 Consumer Electronics Show. Designed to take on both Apple and Google in the tablet space and reinvigorate flagging PC sales, the expensive Surface hardware came in two distinct flavours that shared a physical scale and outward styling.

The original Surface (aka Surface RT) used an Nvidia Tegra 3 SoC, and the Surface Pro that arrived eight months later used an Intel i5-3317U. While they looked very similar, the Tegra-powered Surface couldn't run any legacy x86 apps but ran an OS compiled for that architecture: Windows RT 8.0.

This design was updated with the Surface 2 to use a more powerful Tegra 4 Soc, though there was no equivalent ARM-based model in the Surface 3 range.

The early sales of these products had been very poor, to the extent that Microsoft was forced to write off $900 million on unsold stock.

The Surface and Surface 2 therefore stand alone in that they have an OS that almost no other hardware shares, so they've been sidelined from the development path that the PC and even the Lumia phone range enjoys.

If the lack of any ARM Surface 3 product didn't provide a strong enough hint, when Windows 10 was announced, Microsoft was rather cagey about how that OS would translate to the Surface platform.

With the final arrival of those changes, the future, or lack of it, for ARM-based Windows is now crystal clear.

Windows RT Hits The Buffers

The first hint that those machines running Windows RT wouldn't be coming along for the Windows 10 ride first appeared a while ago.

When discussing the future of Windows as far back as November 2013, Julie Larson-Green stated that Microsoft would not be supporting three operating systems in the future. Many people at the time took this as hinting that the Lumia range was for the chop or was to be unified with the Windows RT products.

Clarification ultimately came when in January 2015 Microsoft revealed its Windows 10 plans and how they related to the branded hardware it made.

After spreading the good news about Windows 10 and its free upgrade, it then added in its statement, "We are working on an update for [Windows RT] Surface, which will have some of the functionality of Windows 10."

And if that wasn't clear enough, the fine print detailed those machines that would be getting a free upgrade: "It is our intent

Windows RT 8.1 now has a similar Start menu to Windows 10, but none of the features that would really extend its life in any meaningful way

that most of these devices will qualify, but some hardware/software requirements apply and feature availability may vary by device . . . . Some editions are excluded: Windows 7 Enterprise, Windows 8/8.1 Enterprise and Windows RT/RT 8.1."

Alongside that bombshell, Microsoft also stopped releasing firmware updates for these machines. The last Surface firmware update came in March 2015, and the Surface 2 received one in April 2015.

The only glimmer of hope left was the promise of 'some' Windows 10 functionality coming through, and eventually it did.

Update 3

After what probably seemed like an eternity to those that own them, Microsoft finally released Update 3 to the Surface and Surface 2 machines in September – a full four months after PC owners got Windows 10.

Whatever hopes owners had about the grace with which Microsoft would leave their abandoned systems was soon dashed, because other than a token gesture in updating the Start menu, and a few other UI fixes, these machines are still running Windows RT 8.1.

The official statement that came with it read, "Microsoft has issued an update for Windows RT devices, which bring several UI improvements including the popular Windows Start menu and changes to the lock screen. The update can be pushed to any Windows RT devices already running Windows 8.1 RT via Windows Update."

Critically, there was no fix to allow Windows RT 8.1 to execute universal apps from the app store, so going forward there are unlikely to be any new apps for these machines.

Microsoft hasn't explicitly ruled out an Update 4, but given how relatively few of these machines are in active use and their relative unimportance in where the company now wishes to go, that seems highly unlikely.

The best that Surface and Surface 2 owners can hope for is a trade-in offer on the new Surface 4 machines when they're launched, but I wouldn't bank on it.

What Can You Do?

Those who own a Surface or Surface 2 have two choices really, neither of which is probably much comfort. The first is that you accept Upgrade 3 for what it is and consign the machine to running the version of Office it includes. You could also just use web-based tools on it, though there's no desktop version of Chrome or Firefox, unfortunately.

If you have a machine that hasn't been upgraded to Windows RT 8.1 and is still on Windows RT 8.0, then it can be jailbroken. Doing that allows you to not only add your own desktop apps from a very small selection that have been written for ARM, but you can also put Android on this hardware.

By doing that you give up what the machine can currently do, including the pre-installed Office apps.

Personally, if it was me, I'd find someone who likes to store epitaphs to failed computing strategies in their loft, and sell it to them, because as a tablet it never was much use, and as a PC it's equally disappointing.

Should I Buy One?

I'd probably recommend against it. While you will get a very finely made machine that includes Office 2013 built in, you need to trade that against the lack of support for universal apps and x86 applications, and the unlikelihood of any future updates.

What makes the choice easier is that, for whatever reason, the unsold stock of both original Surface and Surface 2 machines aren't really being pushed with any great enthusiasm at anywhere near a bargain price.

A quick search online revealed that the original Micro Surface RT can't really be found, unless you want a second-hand one. The Surface 2 32GB model can be bought for £300 or slightly less, though that doesn't include a keyboard, critically. Once you've added the price of a Touch or Touch Cover keyboard, the inclusion of Office seems to be substantially less of a bargain, given what other hardware makers will give you for £400.

Windows RT Outside Microsoft

It may amaze some to discover, but Microsoft wasn't the only company making Windows RT tablets.

Asus, Dell, Lenovo and Samsung all made Windows RT hardware at some point, though it varied how widely they were released and how long they continued in production. Acer had also intended to join this party but pulled out at the last minute, stating that it had to re-evaluate the situation when Windows RT 8.1 appeared.

The Asus VivoTab RT, Dell XPS 10, Lenvo IdeaPad Yoga 11 and Samsung Ativ Tab were all discontinued, and there's no word if any of these will get update 3 either.

The VivoTab RT wasn't a huge success for Asus. CEO Jerry Shen said, "It's not only our opinion; the industry sentiment is also that Windows RT has not been successful."

Now consider that the Student version of the Surface 3 (which has 64GB and is Atom-based so is x86 compatible) is only £377.10 directly from Microsoft. However, it only includes a year subscription to Office 365, and Microsoft still wants another £109.99 for the Type Cover.

I can attest that this version of the Surface will run Windows 10 and universal apps, so it's got a chance of being part of something bigger should Microsoft's store ever contain anything as wonderful as Apple and Google have in their software repositories.

The Windows RT machines will never be part of this climb to the future, because they've been abandoned alongside base camp, as Microsoft struggles to rationalise what it can really achieve with its unbreakable desire to summit.

Final Thoughts

With hindsight, Windows RT was a very bad idea from the outset, and I can only conclude that all the Microsoft employees who lived through the failed PowerPC version of Windows NT must have left the company when this idea got resurrected.

Intel and Microsoft were the two keystones on which the whole PC ecosystem was founded, and that you could have one (or AMD) without the other seems utterly ridiculous.

The obvious choice for the lower-specified machines was the Intel Atom or even an AMD APU, but instead Microsoft repurposed ARM technology to do something that it was never really intended for

The result was attractive looking hardware that was generally unresponsive and limited in what software it would feasibly run.

Launching it with x86 versions, Microsoft was always likely to confuse people, and according to third-party testimony, that's precisely what happened. Customers bought this new 'PC' and then tried to run the sorts of things that they had on their old system, which wouldn't install or run. They then returned them to the stores or online services that they'd been bought from, demanding a refund.

> **"Because as a tablet it never was much use, and as a PC it's equally disappointing"**

Ironically, if Microsoft had sold these as something else and had made the interface not look like Windows 8, then maybe it would have been more successful.

We'll probably never know how unsuccessful these devices were, because that would distract from the 'now', in marketing terms.

I suspect that Microsoft has a large number of the original Surface warehoused somewhere, along with the Surface Mini it decided to make and then never launch. If it got CyanogenMod to put Android on them, I'm sure they'd sell.

There has been talk that Microsoft might try to use ARM in some mini Windows 10 tablets that will be able to run universal apps, but I'm sceptical of such thinking.

The Surface 3 range doesn't contain any machines that aren't x86, and when the Surface 4 arrives, I'd be surprised if it breaks with that plan.

There aren't enough Surface RT and Surface 2 owners to pressure Microsoft into supporting Windows 10 on these machines, even though it's developing its phones on a very similar platform.

It will be interesting to see if the new flagship Lumia phones are based on ARM or some Intel low-power chip, in line with the company's renewed commitment to x86.

Meanwhile as Windows 10 morphs though evolutionary software development, consider that Windows RT is one branch of this family tree that became extinct, mostly through natural selection. **mm**

Top 5 Things Techies Like To Argue About

Join us as we retreat to a safe distance...

1 MP3 Vs Vinyl

If we were to say either one of these was better than the other, you can guarantee we'd get 'letters', informing us why we're wrong. Those on the side of vinyl will say it's a true reproduction of the source material, while MP3 is merely a compressed sample. Digital fans will point to the high quality of lossless formats, while also mentioning the flaws in vinyl. Never, though, will they concede ground to the other side. We say put the dance floor in no man's land and enjoy the tunes in whatever format they arrive.

2 Cheap V Expensive Cables

It's not just the world of music that's been affected by the advent of digital formats; people now even fight about cables. Most techies seem to agree that when it comes to analogue cables, paying for the expensive ones, with their gold components and so on, makes for better quality video or audio. On the subject of leads for digital formats, however, there's much less agreement. Can a £50 HDMI cable do a better job of delivering the ones and zeroes of a Blu-ray better than one that costs £5, or are they just a rip-off?

3 Defrag Or Not

The idea of defragmenting a hard drive (let's forget about SSDs for now) is pretty straightforward. As you use your drive, files get stored in different areas of it, and some of them are broken into fairly disparate parts. By defragging, you put those parts in a more logical order, which gives the drive's heads a bit less work to do, thereby increasing access speed. Well, that's the theory, anyway. Of course, no one can agree on this, and those against defragging say the fast speeds of modern drives makes it completely pointless. We say do it if you want and don't if you don't. Can we stop fighting now?

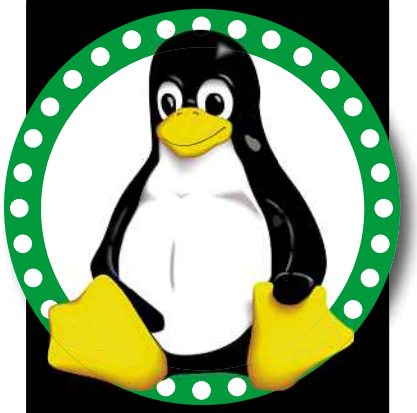
4 Apple Vs Everyone

Whether we're talking about iPods, iPads and iPhones or Macs, the stereotype associated with Apple users paints them as smug and with more money than sense. We're going to come off the fence for a moment and say that's not really a fair representation any more. Sure, Apple computers are still luxury items, but thanks to mobile phone contracts, the iPhone isn't just restricted to those who drive BMWs and have trust funds. The real question, then, is whether Apple's walled garden approach is better than the relative freedom of Windows, Android and so on. That, we say, is up to you.

5 Windows Vs Linux

And finally, we come to the ultimate way to get computer enthusiasts bearing their teeth and growling at each other (well, inasmuch as typing on a web forum will allow). Windows 'just works' and is better for games, say Microsoft users. Linux is more secure and costs nothing, say fans of the open-source OS. Intriguing stuff, but what about this?: each one has advantages and disadvantages, and if you're happy with what you have, then stick with it. Or, in other words, why can't we all just get along!?

After counselling, Jane and Bill finally agreed that he could just install Boot Camp on their iMac



Space: The Final Frontier For Linux?

Penguins in space and an Orange Pi board

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

We imagine it's a little difficult to get tech support while a few hundred miles above the planet. This was one of the main drawbacks of moving the International Space Station over to Linux – a project that started off a few years ago. However, thanks to the Linux Foundation, all the necessary staff have completed their training, and the IIS is now fully Linux.

Obviously due to XP having now been buried once and for all by Microsoft support, Nasa needed to look to the next OS capable of delivering the goods while on board the space station. "We migrated key functions from Windows to Linux because we needed an operating system that was stable and reliable – one that would give us in-house control. So if we needed to patch, adjust or adapt, we could," said Keith Chuvala, of the United Space Alliance, the company that operates and maintains the space station's scientific internal network of computers, called opsLAN.

The OS in question that opsLAN decided on was Debian 6, as opposed to 7 or 8. The reason is fairly obvious: compatibility and reliability testing has already been handled well enough for Debian 6, so to use an untested OS on the crew laptops would bring an element of uncertainty into the mix. Naturally, should anything go wrong, it's not like someone from IT support can nip up to fix the problem.

Although Linux isn't a new OS in Nasa's arsenal, this is the first time the crew laptops and science stations have been running exclusively Linux throughout. And it's also worth noting that it's just the crew laptops running Debian, and nothing like the thrusters, environmental support or life support systems – they're still being run on the custom system designed by the Nasa boffins.

The systems that will be controlled by the newly installed Debian laptops will be external cameras, internal cameras, connection to some scientific apparatus and sensors and a number of other vital day-to-day operations.

Orange Pi?

Orange Pi has recently announced a new version of its single-board computer, the Orange Pi PC.

It's cheaper than the previous version of the board, at roughly €13 and comes with a 1.6GHz AllWinner H3 quad-core Cortex-A7 CPU with H.265/HEVC 4K support and a 600MHz Mali 400-MP2 GPU.

You'll find 1GB of DDR3 memory, a 100Mb Ethernet port, TF and MMC card slot and a HDMI port. Additionally, there's also a 3.5mm audio port, CSI input connector camera, three USB 2.0 ports and a further USB 2.0 OTG port and the customary 40-pin header that's also compatible with the Raspberry Pi B+ board.

The Orange Pi PC board also comes with support for Ubuntu and Debian, as well as Android and the familiar Raspberry Pi and Banana Pi OS images, so there's enough project potential for anyone who fancies getting to grips with this new entry in the super-small single board world.

"Orange Pi PC is for anyone who wants to start creating with technology – not just consuming it. It's a simple, fun, useful tool that you can use to start taking control of the world around you," said the Orange Pi developers.

Behind those tinfoil walls is the void of space, but at least Linux is in front of you

Peculiarities Of The Amiga Platform

There are certain things about the classic Amiga format that are unique, as Sven Harvey explains

Born into a computing market dominated on one side by 8-bit home computers such as the Commodore 64 and ZX Spectrum, with a growing direct competitor in the form of the Atari ST alongside, while the business market was in the midst of a move from CP/M to IBM's PC, the compatibles, MS-DOS and the coming Windows, the Commodore Amiga stood alone in many ways.

PCs were beeping monochrome monsters running MS-DOS, while the 8-bits generally were looking long in the tooth. Using the same 68000 processor as the Atari ST and Apple's Monochrome Macintosh, but running a fraction slower at just over 7MHz, the Amiga was more powerful thanks to its architecture.

RAM

When developing the Amiga, Jay Miner and the rest of the team extrapolated the ideas from the Atari 8-bits the lead designer had worked on, turning the custom chip idea into proper full-blown co-processors. The new chips, which looked after the graphics, sound, interfacing and other functions, with no CPU cycles being utilised, essentially meant that even with a single-core main processor/CPU, multiple functions could take place at once. The closest thing Commodore had to that at the time was the disk drives designed for the Commodore 64 being able to go off and get on with disk copying or formatting thanks to their own CPUs.

The Amiga architecture allowed the custom co-processing chipset to just get on with things, in a similar way to modern GPUs taking work off the CPU, thanks to Agnus (one of the processors, Alice on AGA machines) taking control of memory functions. Amiga machines had at least two forms of random access memory (RAM), one being chipRAM (also known rather inaccurately as graphics RAM on Workbench), accessible under control of Agnus, by either the main CPU or by any of the Amiga chips to do their work. FastRAM, however, being 16- or 32-bit, was enslaved to the CPU. Most Amiga machines tended to ship with just chipRAM, and the addition of fastRAM would produce a jump in machine speed by double in many cases. For example, adding 2GB or 4MB of RAM to an A1200 allows the 68E020 to directly access that extra RAM, allowing it to run at full speed, while Alice allocates the chipRAM to the AGA chipset. Not quite the same idea of videoRAM, chipRAM is perhaps more of a forerunner of the memory now shipped specifically on graphics cards to serve the GPU on those cards.

Acceleration

All Amiga machines, bar the A600 (being as it was supposed to be the A300) and the CDTV have full DMA expansion abilities and can allow the interfacing of a much faster processor, which takes over from in-situ CPU. In some of the big box Amigas, this even takes the form of a specific CPU card slot. However, with the A500 (and A1000) the side expansion (aka Zorro I or DMA) allows the addition of PC bridgeboards with an Intel-type processor, RAM, hard disks or a full-blown faster CPU.

Similarly, the trapdoor of the A1200 allows more RAM, faster processors and even graphics cards. This is fairly special in the realms of computing, where a secondary board contains a new main processor, leaving the stock processor in place, and it's certainly unique in home computing, where such an upgrade required board modification or chip piggybacks. In the case of the CD32, it's perhaps even more bizarre, because how many games consoles allow the addition of a new processor, RAM and ports? Only the Sega 32X perhaps was in remotely the same vein.

The ability to expand Amiga machines with better processors and more RAM to the degree that was possible, without user-unfriendly modifications being needed, really did make a huge amount of difference in non-gaming applications, unlike its peers.

The trapdoor slot on this A1200 has been populated with an accelerator card, giving the machine a much faster 68030 processor and 16MB of FastRAM

Sven Harvey has been our Amiga specialist for over 16 years, drawing on his 25 years retailing computer and video games and even longer writing about them

Amiga

Back Berry

Ian McGurren checks out BlackBerry's surprising new handset

Ian McGurren 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

We're now at a point in the smartphone market when it has move from 'emerging' and is now sitting in the 'established' phase. It was here that we would begin to see the victors of this first burst of emerging technology, and while it's quite obvious to us now who that is, at the beginning of all this, the names Apple and Google would have featured far less than names like Microsoft, Nokia and BlackBerry (known at the time as RIM). It's easy to think of smartphone year zero as 2007, with the announcements of Apple's iPhone and Google's Android, and arguably these are the starting points for the modern smartphone. But both were just following the same path set out by Microsoft, Nokia and BlackBerry some years before. BlackBerry, in particular, had a phone that was mostly reliant on the web, with the BlackBerry's email client, so beloved of '24-hour on-call' staff or at least their bosses.

If that's the case, then, why do I rarely make reference to BlackBerry in Mobile Mart? It's for the same reasons many of you likely never make reference to it day to day either: missed opportunities, bad decisions and WhatsApp. BlackBerry made many devices after 2007. Some carried on with the standard BB keyboard and screen approach, others adopted the firm's own QNX OS, including its Playbook tablet. It even had an app store, though what little apps it did have, it consistently charged for when they were free on other platforms. BlackBerry made mistake after mistake and even saw its previously healthy enterprise sector fall away to iOS and Android. After WhatsApp killed BBM, it killed it in the consumer sector too.

So we come to what might be the first BlackBerry that's back on the right track, albeit not with the naming. The BlackBerry Priv is the company's first BlackBerry device that doesn't run a BlackBerry-made OS, but instead uses… Android 5.0. Yes, in the same year that Nokia has released an Android device, and with rumours MS may have a similar unit under wraps, BlackBerry has opted to discontinue its (sort of) Android-compatible QNX OS and jump all in to Android. This isn't an Amazon-like version either, with heavy customisation on the top that makes it barely recognisable, but regular, easy-to-spot and easier-to-use Android Lollipop.

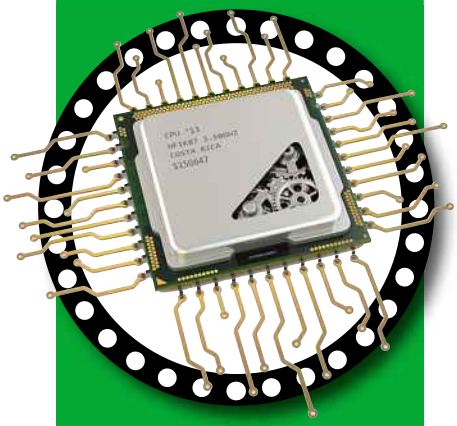
However, other than some vague press shots and a video that's maybe not the device's best advertisement, little is known about the hardware. BlackBerry's CEO claims a Qualcomm SoC, not a huge surprise, and rumours suggest the screen will be around 5.7" with a QHD resolution.

But if this is just an ordinary Android device, what does it offer that the others don't? At first glance, like previous high-end BlackBerry handsets, it's very well made and business like, but its USP over the other droids is that famous BlackBerry keyboard, so beloved of business users the world over. In combination with BBM, email and more, it's possible the user might have the best of both the business and non-business worlds.

In the time BlackBerry has been losing ground in the enterprise sector, both iOS and Android have been making ground. It's possible that BlackBerry has finally understood that old adage of 'If you can't beat them, join them', but is it too late? Enterprise uptake of new technology is often slower, with longer contracted terms, and its possible those in a four- or five-year purchasing cycle may have opted for BlackBerry back then, and on seeing the new device, opt once again for it. But with the likes of Apple and Samsung making heavy plays with even heaver marketing budgets for this lucrative market, BlackBerry might not have the sway it once did.

The Priv is its most forward-looking product in ages, one almost certainly at the urge of the shareholders, but BlackBerry has seemingly set up shop in the last-chance saloon, practically pulling the pints, with its series of failures over the past few years. This could be the first of many or the last of a long line.

Drumming Up Excitement



Bleep up your life with Roland's expressive and addictive Aira instruments

The other week I was lucky enough to attend BPM, the UK's premier DJ and music production expo, one of the best in the world. BPM not only provides equipment and software manufacturers with the chance to display their wares, it also gives DJs and musos a place to meet, swap tunes, showcase techniques and share best practices.

Another highlight is the large number of seminars convened over the three days on which BPM is held. I attended a fantastic seminar by DJing legend Mark EG on how to use social media to maximise bookings and exposure. Mark EG has a lot of social media experience and went way beyond the basics without making the topic boring, difficult to follow or complicated. Although he applies his social media experience to DJing, his techniques and advice would apply to any endeavour, so take advantage of any opportunity to see one of Mark EG's seminars if you want to improve your online presence.

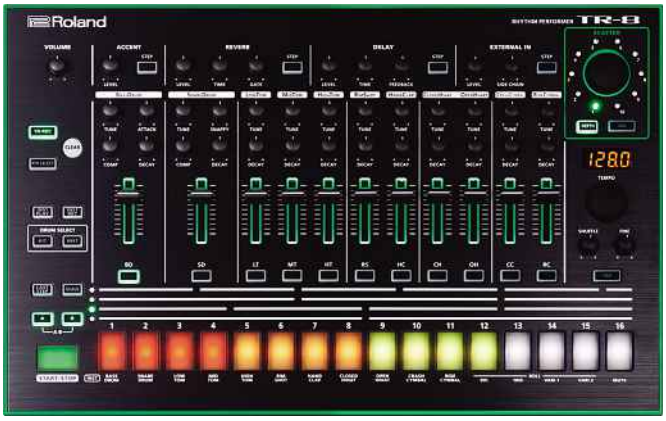
For me as a tech journalist, though, the event is all about the gear, and the stand I was most interested in visiting was the Roland one. Specifically, I wanted to check out the latest additions to the Roland Aira range (**tinyurl.com/q8y4eg4**), which is comprised of synthesisers, drum machines and production equipment that's designed to provide old-school sound and hardware manipulation with new-school ease of use and computer integration.

Roland has been responsible for some iconic kit, and two products in particular will appeal to fans of electronic music, and especially acid house: the Aira TB-3 and Aira TR-8. These units recreate the squelchy, resonant bass sounds of the TB-303 and warm, expressive drum sounds of the TR-808 and TR-909 drum machines respectively, and more besides. Roland TB-303 and TR-808 sounds can be heard on tracks as disparate as Stakkar Humanoid's 'Humanoid' and Marvin Gaye's 'Sexual Healing'.

The majority of units possess high-quality audio interfaces too and can send and receive MIDI data via five-pin DIN connectors or over a USB connection with a PC. This means you can plug a Roland Aira TB-3 into a PC, load up music production software such as Ableton Live 9 and route all audio through the TB-3. You can then hear the sounds of the mix as well as the sound of the TB-3.

The unit that most excites me at the moment is the Roland MX-1, which is a production mixer that'll excite the button-pushing nerves of anyone who likes to perform live or sequence on the fly, as it marries traditional music production workflows with the ability to manipulate the music ad-hoc with effects. You can even sequence the effects so they affect the track you're mixing at a specific point.

Anyone who loves the power of computer-based music production but loves the natural, tactile feel of hardware should check out the Aira instruments. Some of the units, such as the TR-8 and System-1, can be expanded to include other sounds or instruments via a computer. Prices start from £149 for the Roland Aira VT-3 voice transformer to around £459 for the Roland Aira MX-1 mixer.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

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*

Guerrillas In The Midst

XCOM 2 will offer an exciting twist on the alien invasion format, with the player controlling a squad of resistance fighters against a powerful occupying force

This week, Ryan checks out Firaxis' new XCOM game, and takes a closer look at the four-player co-op shooter, Vermintide...

Plug & Play

As fans of Julian Gollop's classic turn-based tactics games, 2012's *XCOM: Enemy Unknown* was about as good a sequel as we could have hoped for. Given that so many updates of 80s and 90s games generally miss the point of what made the originals so great (*Syndicate*, we're looking at you), it was refreshing to see just how deep and uncompromised *Enemy Unknown*'s gameplay was.

As we discovered earlier this year, Firaxis is currently working on the sequel, simply titled *XCOM 2*, and it promises to offer an even more expansive and absorbing tactical experience than its predecessor. Once again, it's humans versus aliens, though this time the scenario sees Earth already subjugated by invaders. With our planet now ruled over by a despotic alien-controlled government/army called Advent, it's up to the player to end the occupation by commanding a squad of tough freedom fighters. As in the previous *XCOM*, tech research and resource management are the keys to success; what really excites us about *XCOM 2*, however, is the changing world Firaxis is creating. Each battlefield will be procedurally generated, meaning that no two encounters will be quite the same, forcing players to constantly think on their feet and adapt to unfamiliar environments rather than memorising pre-existing map layouts. *XCOM 2* guerrilla war theme also changes the tone of the battles; these are surprise attacks, not the full-on skirmishes of the previous *XCOM*. You'll start each mission with the alien forces unaware of your squad's presence; how you complete your objectives – either stealthily or with all guns blazing – will depend on your tactics and general competence.

The aliens themselves have been given something of an overhaul. Firaxis recently unveiled the Faceless, a new type of enemy that, going by the studio's description, sounds absolutely terrifying:

"The aliens' power of genetic manipulation knows no bounds," Firaxis' recent web update reads. "Operatives have discovered that the Faceless transforms from a seemingly ordinary looking human into the towering monstrosity. In its transformed state, the Faceless stands nearly two stories tall, with an exaggerated reach and strength relative to its full form."

Firaxis' sequel will, therefore, offer a stern challenge for even the most seasoned *XCOM* veteran, and one far removed from the invasion we fended off back in 2012. Indeed, the only disappointing thing we've learned about *XCOM 2* so far is that it's been delayed. Once scheduled for launch in November, its release is now set for the 5th February 2016. We've a feeling it'll be well worth waiting for.

Online

Zombies have become a rather over-familiar threat in videogames, so what about giant rats? They're the central menace in the forthcoming *Warhammer: End Times - Vermintide*, a first-person co-op game which pits four players against a horde of humanoid, very angry rodents. Comparisons to the hit *Left 4 Dead* games are inevitable, but *Vermintide*'s distinguished first by its greater emphasis on close-quarters combat, and second by its colourful array of player characters to choose from – witch hunter, dwarf, waywatcher, empire soldier and bright wizard. The player characters in *Left 4 Dead* were memorable enough, but they have nothing on the bright wizard, whose hair's on fire.

Set among the cobbled streets of a medieval city, *Vermintide* unleashes wave after wave

▲ *It's a quartet of warriors versus an invading army of humanoid rats in Fatshark's potentially great co-op shooter, Warhammer: End Times – Vermintide*

of its toothsome enemies, the Skaven, whose relative intelligence, compared to *Left 4 Dead*'s zombies, results in some unpredictable encounters. Unwary players could find themselves surrounded by a horde of, say, Slave Skaven – one of several varieties of vermin you'll find in the game. Cut down their ranks, however, and you're likely to see the rats beat a hasty retreat, no doubt to regroup and attempt another attack when you aren't expecting it. *Vermintide*'s new gameplay trailer even shows one Skaven sneak up behind a player and hook them round the throat with what appears to be a halberd. In situations like this, it looks as though victims will only survive if another player helps.

Vermintide's enemies also occasionally carry miniguns and grenades (thrown by the superbly named Poison Wind Globadier), while some Skaven, the Stormvermin Patrol, are so heavily armoured that it's often safer to sneak them than to engage in a stand-up fight.

Aside from killing Skaven, you'll have to complete a range missions to survive, which can range from planting explosives at pre-defined locations on the map to wresting strategic landmarks from enemy control. Mostly, though, *Vermintide*'s all about the combat, and what we've seen looks earthy, frenetic and satisfying.The witch hunter can blast away at Skaven with his dual pistols, but it looks far more fun to wade in with an axe; garden-variety Skaven are lightly armoured and flail about almost comically when they're attacked. By contrast, the Elite Skaven are huge, violent and verytough.

Fatshark may lack the pedigree of *Left 4 Dead*'s Turtle Rock Studios, but *Vermintide* could be the title that puts the Swedish developer firmly on the gaming map. The game is out on the October 23rd.

Incoming

XCOM 2 isn't the only game that has had its release date pushed back in recent weeks. Io Interactive's *Hitman*, once set for release in December, is now coming out in early 2016. *Hitman* is Io's reboot of its long-running stealth and assassination series, with a more open, less story-focused approach than 2012's *Hitman Absolution*, which received somewhat mixed reviews. Maps are set to be much larger, encouraging more varied and individual approaches to completing each mission. Io has said there'll be regular updates, too, which should keep us busy with additional objectives to stalk and shoot our way through. Unfortunately, Io's ambitious plans for *Agent 47* mean that his new game will take a little longer to push over the finish line.

"It's safe to say *Hitman* is the biggest venture we've ever undertaken at Io-Interactive," the studio writes in a recent release. "Not just in terms of scope and ambition but also in terms of the size of the game world itself. The playable area and density of our locations goes beyond anything we've built before. We're striving to create a series of living, breathing worlds in those locations and we get pretty obsessed about every detail that you'll experience."

Io's clearly throwing considerable resources into *Hitman*, with other projects in development reportedly cancelled in order to make the reboot its main focus. Let's hope it breathes new life into a great, long-running franchise, and the wait until March 2016 is worth it.

▲ *Io's really going back to the drawing board with Hitman, with greater player freedom, larger maps and regular content updates. The reboot's now scheduled for March 2016*

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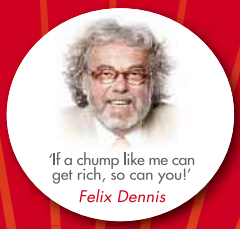

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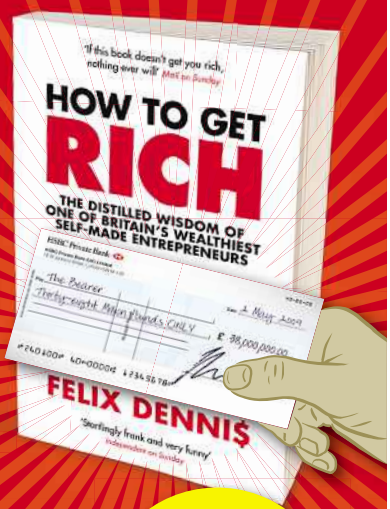

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£5.10	£11.90	£23.80	£13.10	£26.20
£6.80	£13.60	£27.20	£14.80	£29.60
£8.50	£15.30	£30.60	£16.50	£33.00
£10.20	£17.00	£34.00	£18.20	£36.40

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- ☐ Accessories
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Step 3

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Acer Aspire 1670 laptop. No hard disc. Otherwise in excellent condition. In laptop bag. £45.
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Dell Latitude Laptop E5421 i5 (very fast). 4gb ram, 160 gb Hard drive DVDRW fantastic condition. Cheaper than any on Ebay. Very good battery life. You can collect from Manchester r Portsmouth or I can courier out to you next day for an extra £10. Please call or email for any questions. It has Windows 7 64 bit installed and activated with a genuine certificate of authenticity ONLY £110 please add £10 for delivery.
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Email: ChrisSalter@hoarelea.com

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Tel: (01286) 678584
Email: gw7hav@googlemail.com

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E-mail: scobieg09@gmail.com

XFX GeForce Nvidia 8800Gts Graphics Card For Sale. £40.00 + Post. In perfect working order
Email: ken.toole1@virginmedia.com

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Email: fabstock1@gmail.com

HP Microserver n40l / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated & updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/COAs. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/Islands. Payment by Cheque OK subject to clearing, Paypal at £25 additional (to cover their fees).
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Email: info@jmcomputing.info

2x 512MB PC3200 DDR400. Two sticks were removed from working system. £5, plus £1 P&P.
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Email: alan@asandco.co.uk
Asus M2N2-SLI Deluxe motherboard bundle. With AMD Athlon 64 4000 CPU, 4GB of Corsair RAM plus fan, backplate, manual and driver CD. £40
Email: david.white38@ntlworld.com

HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

WANTED: Gigabyte GA-Z77X-D3H motherboard**.**
Email: johnbeiry@gmail.com

WANTED: PC Tower case (beige colour if possible) to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.
Tel: Bill (07742) 061569 or (02641) 769503.

WANTED: Fractal Design Define XL full tower case. R1 (original version) in black.
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Email: mm@tectron.co.uk

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Email: davethomas96@aol.com

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Email: davethomas96@aol.com

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Email: a2345@btinternet.com

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Sim City 2000. Boxed and original. Classic gaming. £15.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

SOFTWARE WANTED

Wanted: Instructions! A couple of long shots, but does anyone have instructions for the TEXET T581 BN programmable scientific calculator or the ZOOSTORM Fizzbook NL2 model [not the one available on the net - wrong model]?
Email: Alan Cox alancox28231@gmail.com

Wanted: PictureToExe software, for making picture shows.
Tel: (01202) 610602
Email: ivor.mary@talktalk.net

Wanted: Quicken 2001 UK Edition. I need to reinstall the program, but have lost my original installation CD.
Email: david.maddams@icloud.com

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• Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk

• Keep copies of all correspondence

• When sending out goods, at the least obtain a certificate of posting from the Post Office

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Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Safe Backups

I hope you can help with what's possibly a strange question.

After a terrible flood at my friend's house, she was facing a potentially catastrophic problem. Her laptop, on which she has thousands of photos (including all of her sons since he was born, plus years of her work documents) was damaged. Luckily, I managed to recover the contents of its hard drive, but I stressed to her the importance of making backups. As she is not at all technically minded, I suggested a cloud service, as this would be the simplest, as I could set it up for her to automatically back up.

However, she did not want to go down this route, as she does not trust cloud storage companies and would feel unhappy with having pictures of her son, not to mention her sensitive work documents, stored this way.

I was therefore wondering if it would be at all possible to set up either a simple external hard drive or NAS unit at my house that my friend can upload her backups to? Something that would function as a kind of 'personal cloud' that she could back up to, preferably automatically, but that as it will be off-site to her own house offers a greater degree of protection? (If, for example I simply set up a NAS at her house, it is likely it would have been destroyed by the flood too.)

I've searched around on the internet for guidance but haven't had much luck. Most people simply suggest a cloud storage company or the solution is so technically challenging it makes my brain hurt!

I'm hoping you can help. If there's any way of setting something like this system up, we'd both appreciate it.

Leonard

The importance of backups really can't be overstated, especially where irreplaceable items like family photos are concerned, so you're right to suggest this, and off-site storage is also a very good idea. There's a reason big businesses take this route too. It's the computerised version of the old adage of keeping all your eggs in one basket.

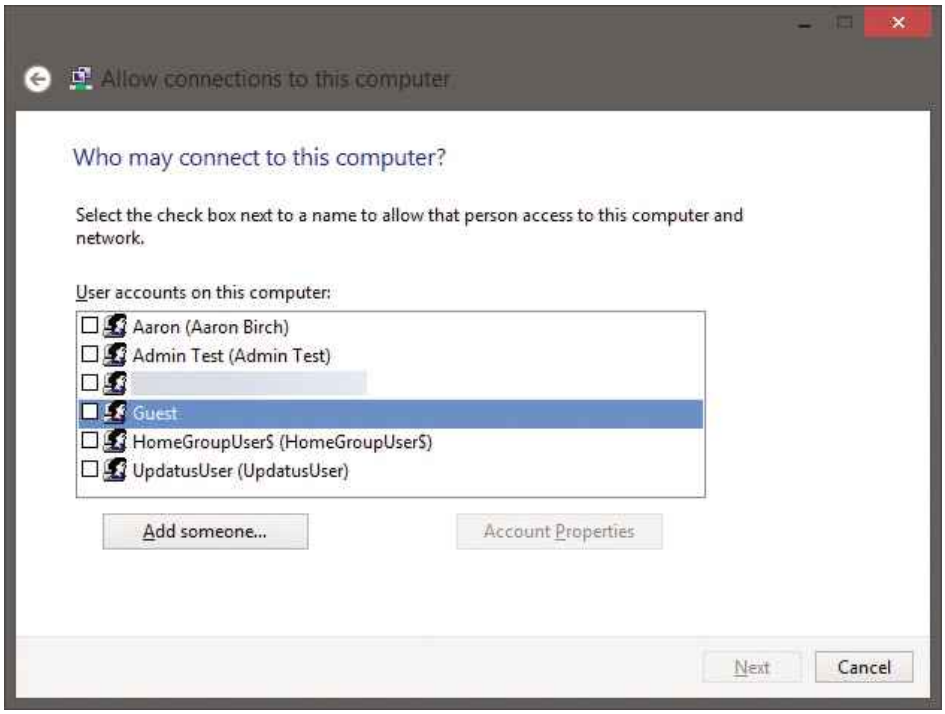
Cloud storage has become very popular because of this, as it offers anyone the chance to store their files in a safe location. However, your friend isn't alone in her wish not to place personal data onto an external server somewhere in the world. Although these services are perfectly safe, it's still a location not under your direct control, run by people you don't know, so it's only natural for some hesitation to be present. Your option of storing files on your network is a good alternative.

There are various ways you can achieve this, with perhaps the most complex being to set up your own server that could be accessed externally (which I'll elaborate on later). This may be overkill, however, and I feel your best option would be to buy a simple NAS unit. Many such units already come loaded with the ability for web access, so your job is pretty much done for you. All you'd need to do is set up the NAS and its online accessibility, and your friend could then use her web browser to navigate to the NAS and access her files at any time. A NAS will cost money, though, and VPN setups can be free.

It's also worth noting that many routers also allow the contents of a USB or external hard drive to be accessed from the internet, so you may not even need a NAS. I'd check your documentation and see if this is a good option.

I would advise against using port forwarding on a NAS or

Teamviewer has some easy to use and secure VPN functionality



Creating a VPN within Windows is easy enough but not the most secure option

other device for the most part. This does make it possible to share files online from a NAS that lacks this built-in support, but it's also a security risk, and given the sensitive nature of the files you and your friend are concerned about, it wouldn't be the best course of action. Port forwarding is needed, however, if you decide to create your own VPN within Windows.

If you would rather take this VPN server route, the best way would probably be to set up your own VPN (virtual private network) and set up a server on that. This can then be accessed from anywhere, and there are plenty of free options if you look around online. You could even use remote access tools like Teamviewer if you wish. Although designed mainly for remote control and support, this software can also be used to create a VPN connection, one that's secure and easy to set up. I'm going to explain how to do this in Windows without extra software, but if you'd prefer an easier method, Teamviewer may be your best bet. You can grab the software and VPN instructions from ***www.teamviewer.com****.*

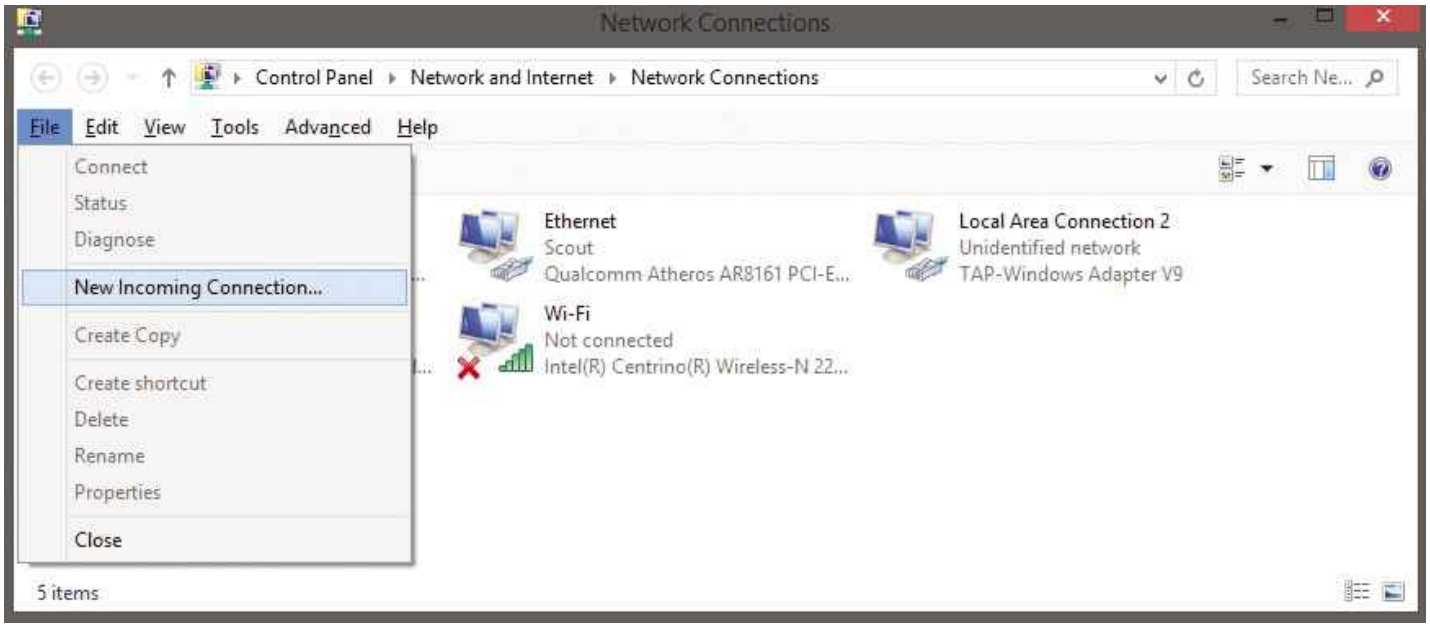
To set up a VPN connection within Windows 7 or 8, which requires no extra software, you'll need to be able to forward ports on your router, so check your documentation for how to do this, then proceed.

First, search for 'ncpa.cpl.' This will open up the Network Connections window. Once open, go into the File menu (press Alt if you don't see it) and select New Incoming Connection. You'll need to select the user accounts that can connect remotely to your system, so it's a good idea to add a new, limited account for this purpose. As you're going to be opening a port directly to the internet, which is a security risk, always make sure this user has a very strong password set up.

When you've created/selected to the user(s), click Next and tick the 'Through the internet' option, and on the next screen choose the permissions and then click the Allow access button to set up the VPN connection.

Now, you need to go to your router's config screen and open up the required port using port forwarding. The port you need to forward is 1723, and you should forward the port to the IP address of the computer running the VPN server. If possible, for added security, create a port forwarding rule that forwards a random external port to an internal port. This will give you added protection. Again, consult your router documentation for instructions.

Now, all you need to do is provide your friend with the VPN server's IP address. With this, she can use Windows' normal 'Connect to a network' option, and she can enter your VPN address, along with her credentials to log into your server and access her files.



By adding a new network connection, you can give people access to files on your network

ASK JASON

Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
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Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

Monitoring The Situation

When I start up my PC I have to wait for up to ten minutes before I can do anything useful with it. During that time, a disk-usage analyser I've installed shows 100% read activity on drive C:, with occasional bursts of writing. I've tried to find a way to determine what program is causing this, but to no avail. The PC is self-built and has a Core i5 CPU and 8GB of RAM. Drive C:, for Windows, is a 2TB HDD (30% used), and there's also drive D:, for data, which is another 2TB HDD (50% used). Originally the PC was running Windows 7, but things are just the same even now I've upgraded to Windows 10. I've also tried using a different HDD for drive C:, again to no avail. Help!

David, Gmail

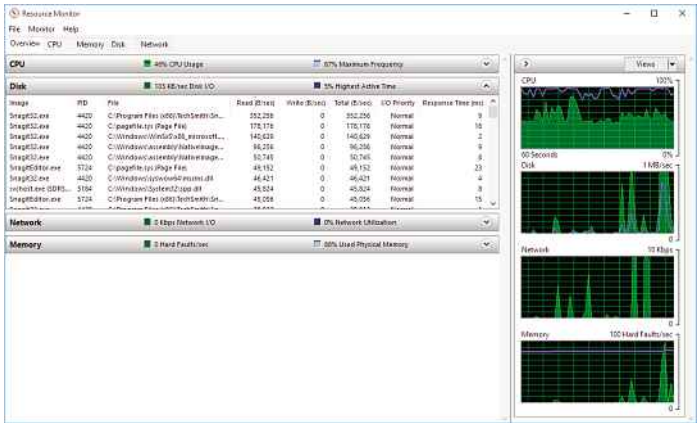
I think you need to open up Windows 10's Resource Monitor. By far the quickest way is to type 'resource monitor' in the desktop search bar and hit Enter on the first result. By default, Resource Monitor will display only CPU activity, so click the relevant arrow to reveal the disk panel. You may also have to stretch the window so that you can see all the columns. Lastly, click the top of the Read column to sort the files in order of highest read activity.

If you do this as soon as Windows boots – assuming the PC's not so sluggish that it won't play ball – you should be able to discover which file is causing all the hurt (maybe there's more than one file). If it's not obvious what program this file relates to, simply ask Uncle Google.

One possibility is that there's a misbehaving driver. Once you've pin-pointed this you can use Device Manager to update it – or downgrade it if the version installed is already the latest. The snag with this theory is that your drivers will have changed when you upgraded from Windows 7 to Windows 10, so it's difficult to explain why any problem would have carried over.

*Another possibility, then, is that a rogue program is at work. Your programs *would* have carried over during the upgrade, which perhaps is why Windows 10 hasn't provided a magic cure. Find out what this program is – an anti-virus tool is my bet – and update it or blitz it. Of course, this theory doesn't answer why the problem persisted even after you'd swapped the boot drive. Was Windows factory-fresh on this, free from third-party software? Or did you clone your old setup and reinstate it?*

Windows' own Resource Monitor is often all you need in order to pin-point files or programs that are slowing things down



Farcebook?

Some while ago I set up a Facebook page for our local World War II airfield-history group. I used my history-group email address as the login. I then made my personal Facebook page one of the admins – this has a different email address. All was fine for some time, but about nine months ago I found my history-group login didn't work. Entering the email address just returned the following error: 'We've locked your account because someone recently tried to log in from an unfamiliar location.'

I was prompted to change the password, which I did, but I still couldn't log in. Nine months later, I still can't! I've tried to report a fault, but clicking the relevant link doesn't actually do anything. I've posted a query in the Facebook forums, but I've had no response at all. I can still add posts to the history-group page via my personal page, but I can't get in through the front door, so to speak. Any ideas?

Stephen Fryer, Devon

I'm confused, Steve. A Facebook page has to be set up from within a Facebook account. The two are different things. An account can only be created by an individual – not a business or interest group – and it requires a login. The owner can then set up a page and is automatically made the first admin (an account doesn't have an admin, just the owner). Any admin can add further admins, and access to the page is via each admin's own account – there's no direct login.

That's my understanding, anyway. You can test it by visiting the Facebook homepage when you're not logged in. Below the option to create a new account is a link labelled 'Create a Page'. Click this and you'll be asked to select the type of page – for a history group you'd probably select 'Cause or Community' – but you'll then find you can go no further until you log in to an account.

So what's going on? Well, I really don't know! That error message does suggest that at some point you created an account – or a page? – using your

Sky's The Limit

My wife and I both have iPads, and these connect to our home wi-fi without issue. However, we also have a couple of Android devices, and these won't connect at all. Oddly, though, they connect to my brother's wi-fi just fine.

I suspect the problem lies with our old router, which is a Sky-badged Netgear model that's eleven years old. If you think this is the case, how simple or hard would it be to swap to a new router? We're still with Sky (ADSL).

Leslie Ditchburn, Gmail

Old routers and new devices often don't play nicely together

I think you're right: the problem is the router. No question, it's ancient, though I can't think it's quite eleven years old. Sky didn't enter the broadband market until 2006.

What encryption is the router using? Hopefully it's WPA2-PSK, but this might be the TKIP variant, not the AES variant (which was fairly new in 2006). You'll need to inspect the router's settings to see what's what. Normally with a Sky router this is done by entering 168.192.0.1 in your browser's address bar and using 'admin' as the username and 'sky' as the password (ignore the quotes).

If WPA2-PSK is currently set to TKIP, try AES instead (if it's available). If AES is already set, try TKIP. TKIP encryption is much weaker and not recommended, but if those Android devices can suddenly connect, at least you've found the problem. It's possible, too, that the stumbling block is the router's SSID (the name it broadcasts). If this contains characters other than letters and numbers, get rid of them. Again, you'll need to enter the router's settings to do this.

Regardless, Leslie, it's definitely time for a new router. Give Sky a bell and say you want to leave. You should then be transferred to the retentions department, and with a bit of luck you'll be offered a new router for free if you agree to sign up to a new 12-month contract.

*You *can* use your own router with Sky (except on the fibre service), but you need the current router's connection credentials – its internal username and password. You'll probably find these are hidden, and Sky won't supply them. There's also no guarantee the router won't get blocked, as Sky doesn't really condone the use of non-Sky equipment. For more information on all this, visit www.skyuser.co.uk, an unofficial help site. In particular, try goo.gl/JxWsNk.*

history-group email address as the login. Maybe the rules have changed, and maybe once it was indeed possible to set up a page as a separate entity. Can any other readers shed some light? Regardless, I wouldn't worry, Steve. As you're an admin, you have complete control over the page already. You could even delete it.

If I've misunderstood and you really do need to log in, log out of your personal account and click 'Forgotten your password?' on the Facebook homepage. Enter your history-group email address and click Search. Assuming an account is actually found, you should then be able to send yourself a link to reset the password.

Still no joy? Have a look at goo.gl/jQ0u0e. This site offers a long, long list of Facebook contact links. Each one leads to a form you can fill in to send a message for help. I reckon your best bet is to use the form for 'Security Checks Preventing Login'. Maybe, just maybe, someone at Facebook will deign to respond.

If you're struggling to find a way to contact Facebook, this site could be the answer

Crowdfunding Corner

This week, we look at a virtual reality camera and what could be your very own robot sentry

Shot: Turn Your iPhone Into A VR Camera

VR headsets have become a fun toy for every tech dabbler, but creating VR content is difficult without specialist equipment. That's why the Shot exists: to put VR cameras in the hands of people who would otherwise be unable to afford them.

Compatible with the iPhone 6 and 6S, the Shot is a lens attachment composed of two lenses that increase the field of view of your phone's camera. In addition, the bundle includes an app that allows you to easily record and share immersive content.

You need a VR headset to experience the material you record properly, which is why the maker also includes a Google Cardboard-compatible VR headset to build.

At time of writing the early bird tiers are not yet full, but amounts are limited. If you get one, it's just 62 (plus 30 shipping) for a unit (£68), and the full price is only £13 more. Higher tiers get you the chance to buy multiple units at a discount, so if you can find someone to partner up with, that'll save you a fair amount of money.

The project is still in its very early stages overall, with the maker chasing a high but achievable goal of just under 90,000 (£66,500). Three days in, it's made a sixth of its total, but that's a big hill to climb at this speed – if you're interested, back it sooner rather than later or it might not happen at all!

URL: kck.st/1MYi8Vy
Funding Ends: Thursday, 29th October 2015

JSW S+ Home Sentry

Robot vacuum cleaners are one thing, but in the age of smart devices, why should it stop there? If there's a motorised unit capable of travelling through your house already, what else might it be capable of?

The JSW S+ home sentry is a good example of what's possible: a vacuum-cleaning robot with built-in camera and wi-fi capabilities that allows you to see what's happening in your home from anywhere with internet access. A built-in motion detector means it can be set to sound an alarm and notify your phone if it detects intruders, and of course it can be activated and deactivated, even steered, completely at will.

The 2600mAh lithium battery means it can work continuously for 120 minutes without recharging, and there's a dual-mode anti-scratching system combining sensors and protective film to stop it damaging your furniture or itself. As well as vacuuming, it can even be set to mop up.

The basic model – just the sentry itself – can be picked up on an early bird offer for $299 with UK shipping (£220 in total), which is $150 (£110) off the retail price. Quite good value by any standard! Higher tiers include extra accessories, and everything should ship in November of this year. The maker nare only looking for $20,000 (£14,700) and it's almost at the target. Indeed, by the time you read this, it might even have met it!

URL: kck.st/1QL5pDw
Funding Ends: Thursday, 29th October 2015

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

Macrium Reflect Free Edition

A simple, but powerful, solution to cloning and imaging

Disk imaging and cloning is a practice that has saved many an IT support technician and home enthusiast.There are countless times we've build a PC for a friend or relation only to have to come back to it several months later to find that 'fiddling' has rendered it unbootable and useless. In these cases an image of the PC before we handed it over to them was a wise move and cut down on wasted build time. Likewise, a new SSD to replace the aging and slow hard drive can be easily cloned across, once you've manually sorted the size difference.

We had a similar situation recently, where an SSD from a previous machine was upgraded and the old unit earmarked to become the main system drive of another PC. It's an easy enough setup, but the task of finding the right cloning software was more difficult than we first anticipated. Thankfully someone recalled using Macrium Reflect, the Free Edition, with some success, so naturally we took a look.

Macrium Reflect

Macrium Reflect Free is a clever and well laid out GUI front-end to the built-in Windows Volume Shadow Copy Service. This makes it a faster alternative to most other third-party cloning and imaging programs, and as a result of utilising the Windows services it also means that the compression of imaging can be reduced up to 40%.

As the title suggests the program is free, but is limited to imaging, cloning, accessing created images, scheduling backups and creating Linux and Windows PE bootable media. For most purposes, including the situation in which we needed it, this covered everything satisfactorily. What's more, it has a rather tiny install footprint and is exceptionally quick in its operation.

Thankfully we didn't need to create a bootable media device. Cloning the volumes on a hard drive to a SSD simply required us to hook up the SSD via a SATA-to-USB cable, give it some power and run Reflect. Both the drives were recognised and it was a simple one-click solution to opt for cloning the main drive and selecting a destination. The entire cloning process took less than half an hour, and several minutes later we had the old drive out and the new SSD in.

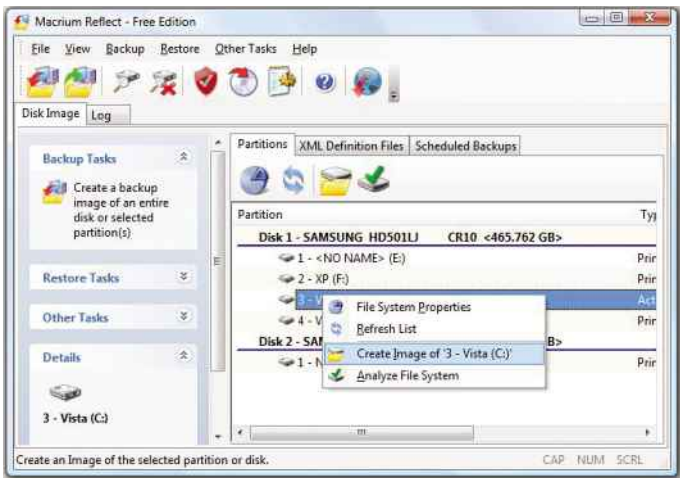
Features At A Glance

- Free
- Support for UEFI, GPT and RAID
- Uses Volume Shadow Copy Service
- Very easy to use

Conclusion

Cloning software we've used in the past never really did the job; all of them copied the system volume information across, but there was usually some issue regarding the boot procedure, which often became fouled up somewhere. We've also suffered random disk failures, unloaded drivers and unexplainable system slow-downs. So, as you can imagine, we were prepared for the worst.

Nothing of the sort happened, though. The SSD booted, Windows sprang into life and everything was as it should be. Even the system partition remained hidden when we opened Explorer, which came as a surprise. Alongside that, a Windows update that occurred during the cloning process finalised itself and reported a successful install. In short, we were fairly impressed. So the next time you're called upon to clone or image a PC, consider Macrium Reflect Free Edition. It may help you out considerably.



Reflect Free has an easy on the eyes GUI, and it's remarkably quick too

Macrium have done a sterling job with Reflect Free

Logging Off

A while ago, I wrote a feature about replacement inkjet samples, in which I noted that Epson T0713 Durabrite Ultra was by volume more expensive than a 1982 bottle of Krug Collection Champagne. It also doesn't fizz, have smoke, pastry and caramel nuances or come in a gorgeously crafted wooden presentation case.

However, I've since discovered that this isn't the most expensive ink Epson makes – not by a long shot. For those in the proofing or reproduction business, it makes the amazing Epson 9900, a printer that costs a whopping £4,794 to own.

But the initial outlay is nothing, because the cheapest (and smallest) 150ml cartridges cost £56 each, and this printer needs 11 of them to function!

Moving up past the 350ml cartridge options to the biggest 700ml 'HDR' ones, they're a staggering £208 each or an eye-watering £2,288 for a full set.

With printing that expensive, you'd really want to use every last drop of ink in them, wouldn't you? Well, you might, but Epson is much less keen, it seems.

A fine art company based in Seattle uses the Epson 9900 and was curious about why the cartridges didn't seem that much lighter when they were empty compared to when they were full.

Getting inside of them isn't an easy job, but this company managed it and discovered that in a 700ml capacity cartridge, typically there was at least 100ml and up to 150ml of ink unused. Yet its printer declared that there wasn't a drop left to print and refused to continue without replacement.

Predictably annoyed by this, given the costs, Bellevue Fine Art took this shortfall up with Epson. Epson's reactions ranged from just ignoring it to telling the company that it was wrong, oddly. I'm curious how you can open a cartridge and find ink that isn't there, but Epson effectively stonewalled on the subject.

Personally, I'm not keen on being ignored, and unsurprisingly considering how much Bellevue Fine Art spends with Epson, it wasn't happy either.

Its solution was both forward thinking and direct: it made a YouTube video detailing it investigation and proving scientifically that you do get sold 700ml of super-pricey ink, but you don't get to use the last 14-21%.

(And those who use the 350ml carts instead get even less percentage wise, if you wondered.)

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If you want to see this production, you'll find it under 'Wasted Ink in the Epson 9900', and at the time of writing this, 778,443 people had found that subject enlightening.

I'm not sure what Epson thinks of it, but it could always ask Google to remove the video if it thought it misrepresented Epson or contained an inaccuracy.

The real answer is probably to stop buying this company's product until it works out that there's a limit to how low a business should go to increase profitability.

That's the same lesson that one German car maker is currently learning the very hard way, and I'm sure in the fullness of time it will be one that others, possibly in the tech sector, will also get.

In the meantime, if you like to print using all the ink you bought, I'd cross Epson off that brand list from the outset – although realistically, you might have to forget other big brands too.

Mark Pickavance

LAST WEEK'S CROSSWORD

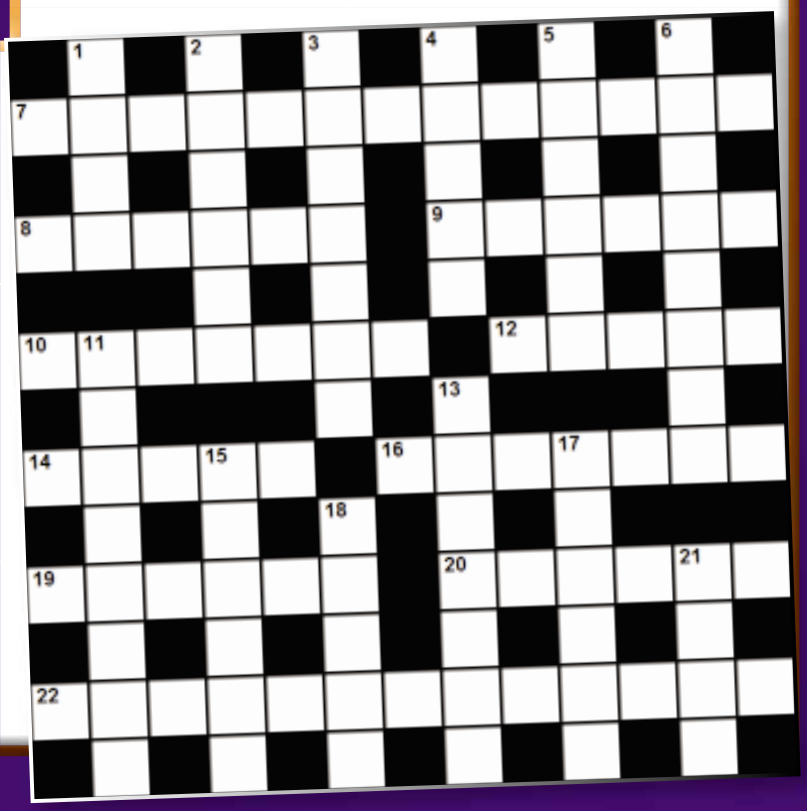
Across: **7** Platform Games, **8** Recoup, **9** Anchor, **10** Stretch, **12** Store, **14** Blurb, **16** Ordered, **19** Utopia, **20** Notify, **22** Extraordinary.
Down: **1** Blue, **2** Stroke, **3** Compact, **4** Smear, **5** Mascot, **6** Resource, **11** Teletext, **13** Grenada, **15** Report, **17** Extant, **18** Yahoo, **21** Form.

DISCLAIMER
The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Some time ago, we bought ourselves a Google Cardboard kit from eBay, which brought us much delight and fanscination – for approximately a day. Then, of course, we realised there actually wasn't much to do or look at with it, and we put it away and forgot about it. Recently, though, we've been watching 360º videos on YouTube, and we noticed, when watching these on our phone, that there was a Cardboard symbol, which allows us to watch these things with our cheapy headset. Fantastic! So this week, we've spent a fair bit of time watching such things as three pilots flying an aeroplane, allowing us to look all around the cockpit; two blokes sitting on a wall having a chat; and, among our favourites, a chap flying a drone with a camera attached to it, with that camera's display shown on the ground in the 360 video (confused? Just head to youtu.be/FxW402CvSHA). We also watched a 360 video of four young South Korean ladies in short shorts dancing to terrible dance music. Oddly enough, in spite of not liking the music, we watched this one to the end. Must be the power of technology.

THIS WEEK'S CROSSWORD

Across
7 Relating to the study of manuscripts and their interrelationships. (13)
8 This key is normally situated at the very top left position of your computer keyboard. (6)
9 .ug TLD (6)
10 A young woman who behaves in a boisterously assertive or crude manner and engages in heavy drinking sessions. (7)
12 UK delivery service company formed by the 2010 acquisition of the UK domestic business of DHL by Home Delivery Network. (5)
14 Special certification given to two-engine commercial aircraft for long overwater flights. (Acronym) (5)
16 A unit of length used in aerial navigation; exactly 1,852 meters; historically based on the distance spanned by one minute of arc in latitude. (3,4)
19 People who have reached the age of majority. (6)
20 A recompense for worthy acts or retribution for wrong doing. (6)
22 Partly bipedal herbivorous dinosaurs of the mid Cretaceous period, having a parrot-like beak and probably ancestral to other ceratopsians. (13)

Down
1 Automated programs for carrying out particular tasks over a computer network. (4)
2 The closing section of a musical composition. (6)
3 Philae's comet orbiter. (7)
4 A curve or other figure formed by all the points satisfying a particular equation of the relation between coordinates. (5)
5 Archaic name for the emperor of Japan and the subject of a Gilbert & Sullivan comic opera. (6)
6 A policy or technique of aggressive marketing or advertising. (4,4)
11 World leader in high-end 3D design, engineering and entertainment software. (8)
13 Homer, Marge, Bart, Lisa or Maggie. (7)
15 Shrewd or crafty management of public affairs. (6)
17 Distressing bank holiday? (6)
18 Hebrew patriarch, son of Abraham and Sarah and father of Jacob and Esau. (5)
21 The rapid oxidation of a material in the exothermic chemical process of combustion. (4)



In Next Week's Micro Mart*

- Essential advice to get the most from your SSD
- What's been happening with 3D printing?
- What Google's new hardware will mean for you and for its competitors
- Plus the usual mix of news, reviews and advice

* May be subject to change

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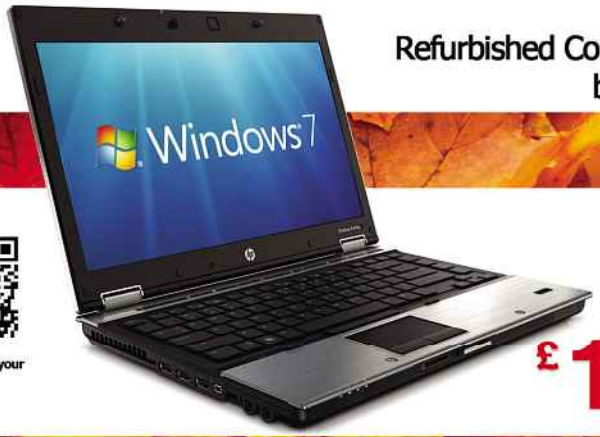

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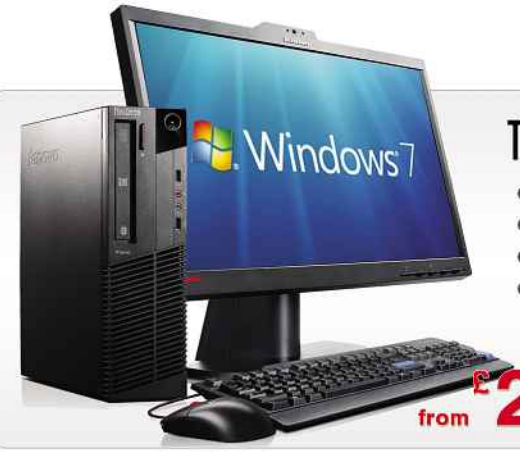

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