micro mart
Computing in the know

From Just £60!

ALL CHANGE FOR Microsoft

It's got big plans for the future, but will they work?

Plus

Why Facebook Could Be Bad For Company Brands ‹

How Tablets Are Changing The Workplace ‹

The Impact Of Machine-To-Machine Communication ‹

Roku®

Every TV needs a Roku

The Roku streaming player.
The #1 Streaming box in America
is now available in the UK!
From only £34 ^{50}

Choose your Roku

No PC needed
Just connect Roku to your TV and wireless
(Wi-Fi) network at home, and you're up
and streaming in minutes.

	ROKU LT	ROKU 2 XS
	Best value in HD streaming	Fully loaded plus games!
Lots of entertainment channels available, including hundreds of free movies	✔	✔
Works with most TV's	✔	✔
Built-in wireless (Wi-Fi b/g/n)	✔	✔
Plays high-definition video (720p)*	✔	✔
Plays the best HD video (1080p)*		✔
Enhanced RF remote with motion control for games		✔
Ethernet port and USB port***		✔
Expandable memory slot plus Bluetooth**		✔

SAVE 30% COMPARED TO MSRP

MSRP £49⁹⁹
CCL ONLY
£34⁵⁰

MSRP £99⁹⁹
CCL ONLY
£69⁹⁹

Contents

This week...

THIS IS THE INTERNET OF EVERYTH

PEOPLE

CESS

THINGS

DATA

38 Graphics Cards On Test

64 Tablets At Work

38 Graphics Cards On Test

If you want to do more than the most basic of gaming, you'll need a discrete graphics card. You could spend hundreds of pounds and get the latest all-singing wonder-card, but for many of us that's not an option. Thankfully, there are some pretty decent budget options, and we've been putting a few through their paces

64 Tablets At Work

There's no doubt, with all their games and apps, that tablet computers are great for fun. However, they're also quite effective work tools, too. Leo Maxwell examines how tablets are being used in the workplace in a number of interesting and novel ways

68 VLC Secrets

For many of us, VLC is just a video player, which doesn't need extra codecs. As great as that is, it's also capable of so much more. Keir Thomas explores the hidden depths of this versatile multimedia program for this week's selection of software secrets

72 Surface Damage

In spite of some good initial impressions, Microsoft's Surface tablets have not sold as well as it would have hoped. Mark Pickavance looks at the numbers and considers what they mean for the future of this product

Also In This Issue...

29 Component Watch
Looking for a monitor that's not going to break the bank? Step right up!

29 Crazy Tech
Ever fancied playing *Space Invaders* while collecting coins? Of course you have

58 A NAS For My Digital Life, Pt.2
Gordon Moore returns with the second part of his NAS guide

63 Company Profile
Sarah Dobbs delves into the history of security company Bitdefender

95 App Of The Week
David Hayward talks foreign with the help of Google Translate

One
Microsoft

David Briddock analyses Steve Ballmer's announcement of Microsoft's biggest upheaval in decades

Steve Ballmer

Microsoft is under pressure. Reaction to Windows 8 is at best mixed, millions of RT Surface devices lie unsold in warehouses, and Nokia isn't selling nearly enough Windows Mobile smartphones. An 8% drop in first quarter 2013 revenue and dwindling profits prompted a dramatic share sell-off in July. Yet Microsoft seems to be in fighting mood.

On 11th June Microsoft CEO Steve Ballmer released a detailed 3,000-word press release entitled 'Transforming Our Company' and went public with an equally lengthy all-employee email. Ballmer began the press release with the words, "As the times change, so must our company."

Similar But Different

Remember 1995? In May of that year, Bill Gates published his 'Internet Tidal Wave' memo. The intention was to rally the company to seize the opportunities presented by the internet.

As we know, it wasn't enough. Microsoft proved to be too slow, too shortsighted and too encumbered by its past to take maximum advantage. In the meantime, Google, Amazon, eBay, Facebook and others took the high ground.

Gate's 1995 memo wasn't backed up with any substantial organisational change. In contrast, Ballmer's 2013 vision for a new Microsoft involves large-scale, company-wide change – change that's spawned a radically different org chart with revised groups, responsibilities and reporting lines

This time, it appears Ballmer really means business. He wants Microsoft to become a very different company with a new focus and a revised set of priorities.

The Grand Design

A key aspect of the strategy is to greatly simplify internal structures and gel disparate divisions into a focused, cohesive, communicative whole.

At its heart, the company will be organised by function: engineering (including supply chains and data centres), marketing, business development and evangelism, advanced strategy and research, finance, HR, legal and operations (including field, support, commercial and internal IT).

During the second half of 2013, Engineering is to be consolidated into just four main areas, namely Operating System, Apps, Cloud and Devices. However, the Dynamics division remains a distinct area to ensure a special focus. In addition there's acknowledgement that technological advances from the Microsoft Research (MSR) group must be better integrated into mainstream product design and development activities.

Ballmer admits this Engineering remodelling holds many challenges. The fine details will take time to hammer out. Nevertheless, such a dramatic reorganisation has considerable impact on current and future plans for Microsoft's high-profile product lines, including Windows 8.1, Xbox One and Windows Phone. The intention is to generate real and lasting benefits for users, plus improved clarity for both internal and external developers.

◄ *The Road Ahead by Bill Gates*

New Responsibilities

All this internal restructuring has transformed Microsoft's org chart. Virtually every part of the company is affected in some

▲ *Microsoft senior management*

way. And, as you'd expect, the creation of four new engineering areas has caused considerable management reshuffling.

Terry Myerson moves from head of Windows Phone engineering to lead the new Operating Systems group. Myerson's responsibilities include Windows, Windows Phone and Xbox operating systems, plus anything that's directly attached to the OS core, such as Xbox Live.

> **❝ This time it really looks that Ballmer means business ❞**

Qi Lu moves from head of Microsoft's Online Services division, to lead the new Applications and Services group. This puts Lu in charge of engineering for Bing, MSN, Office 365, Office servers (Exchange, SharePoint, Lync) and clients, Dynamics CRM and ERP, Skype, Yammer and Lync.

Satya Nadella, who headed Microsoft's Server & Tools business (STB), now heads the new Cloud and Enterprise group. Nadella retains responsibility for all of Windows Server, System Center, SQL Server, Visual Studio and other STB products (including Windows Azure). Windows Embedded also stays in this group, which covers the Global Foundation Services unit.

Julie Larson-Green, the current head of Windows and Surface engineering, now heads the new Devices and Studios group. Larson-Green's responsibilities include engineering activities for Surface, Xbox, mice, keyboards, games and entertainment.

Marketing, evangelism, business development and finance areas are encompassed in new centralised divisions. Tami Reller heads the new cross-company Marketing group. Tony Bates takes overall responsibility for the new cross-company

⌃ *Microsoft Dynamics in F1*

Evangelism and Business Development group, which includes partnerships such as Nokia and Yahoo. Meanwhile, Amy Hood heads the new Finance group.

Internal Challenges

However, it's not just about company restructuring and reassigned responsibilities. These sweeping changes are an attempt to address a number of internal challenges, which Ballmer sees as key to Microsoft's future success. They are nimbleness, communication, decisiveness, collaboration and motivation.

Nimbleness isn't something normally associated with Microsoft, yet as Ballmer said, "In a world of continuous services, the time frame for product releases, customer interaction and competitive response is dramatically shorter." He accepts Microsoft has to

> ❝ **Social gaming is high on the 're-imagine' list** ❞

improve the speed and accuracy of its decision making process, without losing sight of the customer's needs.

Large companies always have communication problems, especially when they span multiple continents. Microsoft is larger than most. The numerous new groups and divisions, combined with simplified reporting lines, aims to have a positive effect on information exchange while helping to clarify ownership and accountability.

Even when Microsoft has a handle on the communication side of things, it still has to improve its decisiveness. It's vital that the media and public at large receive plain, unambiguous messages. To retain existing users and attract new customers, Microsoft must ensure it understands the benefits arising from each new initiative. Muddled roadmaps and unconvincing product positioning doesn't help anyone.

Collaboration is equally important. Engineering departments, typically filled with highly talented, focused and self-motivated staff, can pose a serious challenge. Yet unlike the insular computing departments of yesteryear, today little is achieved without effective inter-team cooperation.

While there are many ways to motivate staff, Ballmer's idea is to focus on customers. If they're impressed and excited by Microsoft's devices, products and services, the employees are bound to be enthused about the work they do and the difference they can make.

Guiding Principles

In the communications, Ballmer said, "Going forward, our strategy will focus on creating a family of devices and services for individuals and businesses that empower people around the globe at home, at work and on the go, for the activities they value most."

To achieve this focus, Ballmer highlighted a number of guiding principles. In essence, they translate into a coherent range of first-party and partner devices, which run a consistent and familiar operating system and deliver both consumer and enterprise services.

Let's dig deeper into what these key principles actually mean.

Family Of Devices

A key aspect of the new strategy is to provide a unified set of technologies that are applicable to everyday life. Ballmer clearly sees this as a unique opportunity: "No technology company has as yet delivered a definitive family of devices useful all day for work and for play, connected with every bit of a person's information available through one cloud."

Microsoft's device family already includes smartphones, tablets, hybrids, laptops, desktops, games consoles and TVs. The plan is to extend this family to include wearable computing devices, such as smartwatches and sporting accessories, and incorporate a new breed of Machine-to-Machine communication (M2M) devices - part of the fast evolving Internet-of-Things (IoT) revolution (read more about this on page 30).

The goal is to ensure users are presented with the same welcoming and friendly user interface wherever they go and whatever activity they do. A device-independent way to find, collate, organise and publish information. No need to relearn how to send an email, create a document or view your photo collection. No need to manually transfer digital artefacts between systems, convert files from one format to another or enter personalised configuration settings multiple times.

A unified device family is also a boon for application developers. They'll be able to use the same APIs, SDKs and tools regardless of device format, permitting tight synchronisation with core operating system features and powerful search platform services. This is bound to increase not only the quantity of apps and services available but also lift their overall quality.

Ballmer is clearly convinced Microsoft is in a unique position to create this device family: "Only we can bring it all together to create one experience for everything that's important in people's lives."

The One

The 'One' theme is prevalent throughout these public announcements. "Microsoft is best positioned to take advantage of the power of one and bring it to our over 1 billion users," said Ballmer. He even has a sound bite for the concept: "One Microsoft all the time."

What does 'One' represent, though? To Ballmer it means "One experience, one company, one set of learnings, one set of apps, and one personal library of entertainment, photos and information everywhere. One store for everything." In essence Ballmer wants consumers and enterprise customers to think of Microsoft as a constant in their life.

Nice idea, but does Microsoft have the clout to make it happen? After all, Apple and Google have exactly the same idea at the top of their agendas.

In the enterprise world, Microsoft certainly has an opportunity to strengthen an already powerful position, but the consumer space is far more complex and fragmented. Suppose you had to pick a single organisation to supply all your technology needs. Where would you place your allegiance?

Nevertheless, it's clear Microsoft is committed to 'One'. The recent launch of the Xbox One hints at a new marketing strategy, so we shouldn't be surprised to discover new and updated Microsoft products have 'One' somewhere in their name.

Smart Software

Ballmer made numerous references to the core "shell". The foundations of this shell have already been laid with the release of Windows 8. Windows 8.1 builds on this foundation.

In future releases Microsoft intends to enhance and optimise the user interface while maintaining its fresh, modern look. More specifically the plan is to create a smarter UI, through the utilisation of search, location, online commerce and other types of user interaction data.

Ballmer spelt out the development challenge when he said, "Our UI will be deeply personalised, based on the advanced, almost magical, intelligence in our cloud that learns more and more over time about people and the world." He continued later

Microsoft Research (MSR)

Established in 1991, this group employs over 1,000 scientists and engineers working in 13 research centres - including the UK Cambridge site (goo.gl/x7T6f), which developed the Kinect body movement technology. MSR has built a worldwide reputation for ground-breaking innovation in the areas such as quantum computing, security, graphics, information retrieval, natural interfaces, artificial intelligence and machine vision.

Microsoft System Center

System Center is a comprehensive set of products aimed specifically at helping enterprise IT administrators manage networks of Windows Server and client desktop systems. The list of capabilities includes configuration control and patch deployment, security and data protection, asset management and tracking. System Center also encompasses configuration and administration of software as a service (SaaS) and cloud-based apps.

66 Is putting all your commercial eggs in 'One' Windows-shaped basket a wise move? 99

with, "Our shell will natively support all of our essential services, and will be great at responding seamlessly to what people ask for, and even anticipating what they need before they ask for it."

The goal is to help people make better decisions. Important decisions in their personal, professional lives. Microsoft's Bing Platform, Office products and InfoNav technology are prime candidates for 'smart' facelifts.

Of course, for this to happen we must supply Microsoft with information about our daily routines, social connections, buying patterns and so on – something most of us already do on a regular basis via services and products from the likes of Google, Apple, Amazon, eBay and Tesco.

Self Expression And Social Interaction

Another theme in Ballmer's communications is the strong emphasis on technologies that make a real difference to people's lives – specifically, mechanisms that allow people to feel an integral part of an experience, rather than just an end user.

When Ballmer talks about "Scenarios that are ripe for digital re-imagination," what can we expect?

Skype is an increasingly vital asset in Microsoft's social armoury. Billions of minutes of Skype calls are made every quarter, and usage continues to rise year on year. Enhancements that let Skype users become deeply involved in live experiences from remote locations is clearly on the Microsoft radar.

However, Skype is just one example. There's prior notification of a bevy of value-added experiences created by Windows apps, which use technology that's difficult to replicate with browser-centric services. Further improvements in multimedia tools, online integration and group sharing are guaranteed.

And yet, while the social technology receives plenty of attention, becoming another social network isn't part of the plan. While Ballmer considers social communications to be of high-value, he also views it as a time-absorbing activity.

⌃ *Microsoft Research in Cambridge*
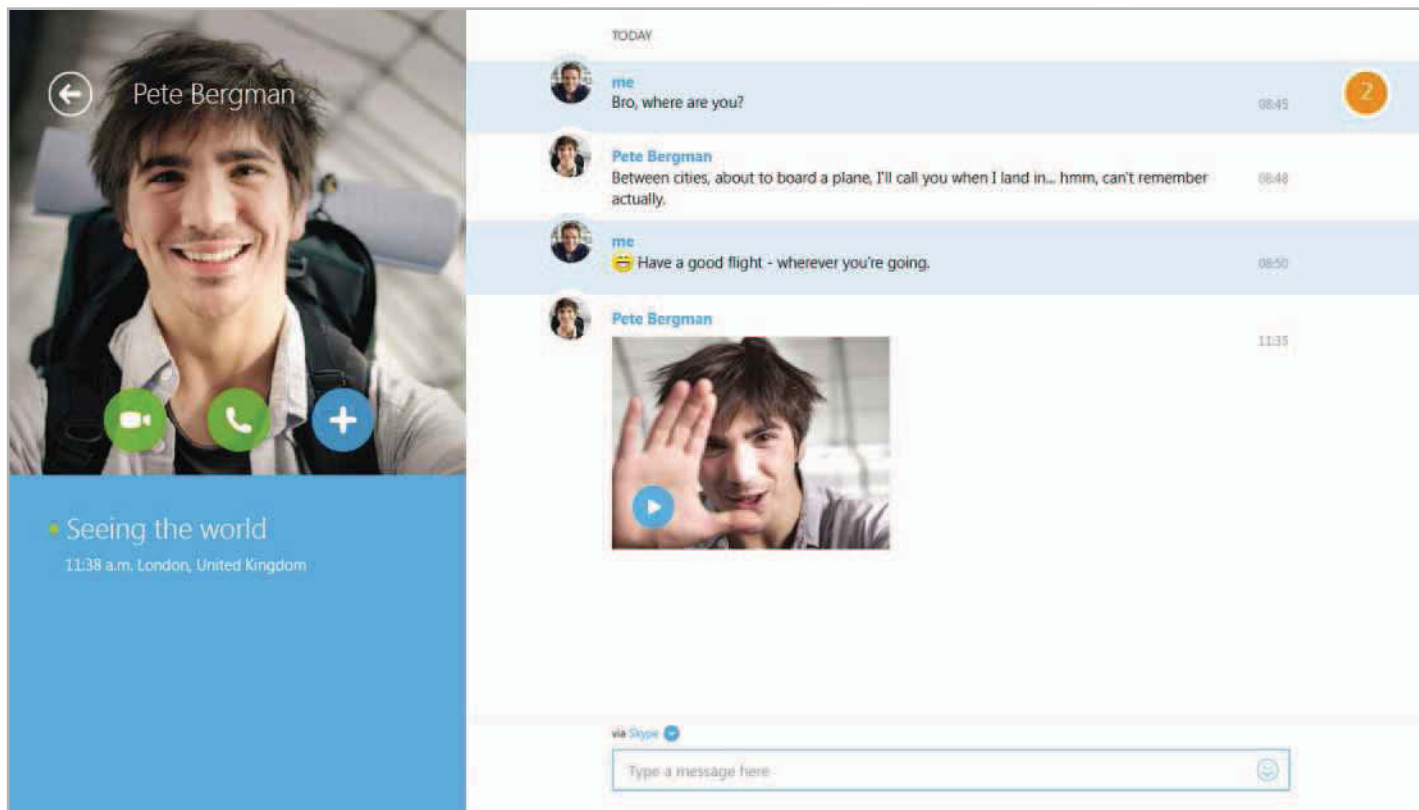
▲ *Microsoft Skype*

So, the plan is to 're-imagine' email, conferencing, remote-event participation and any number of other social interactions. This challenge is to be addressed by new media-rich, next-gen documents in combination with new hardware, software and services.

Social gaming is high on the 're-imagine' list. The aim is to deliver a more intensive, interactive, immersive and engaging gaming experience through advances in group participation. It's something Ballmer calls "Serious fun." He sees it reaching out far beyond the hard-core gamer community, into areas such as fitness, health, education and live events.

How does the Microsoft Office line of products fit into this picture? Tablet and smartphone users have little interest in overly large, feature-rich, desktop-centric apps like Word and Excel. It'll be interesting to discover if these are also destined to be re-imagined.

Enterprise Still Key

Microsoft still generates large parts of its revenue from the enterprise product line. Results posted for Q1 2013 showed a healthy 8% increase in server and tools revenue. Specifically multi-year licensing revenue grew 19%, SQL Server Premium revenue rose more than 20%, and the System Center range also increased by over 20%.

Ballmer acknowledged the importance of this area when he said, "Enterprises buy productivity, insights and peace of mind," so reorganisation and strategy plans must include a task to handle enterprise needs for today and tomorrow.

Central to the new strategy is a blurring of distinction between business and non-business products. In other words, the same family of devices, apps and services should cater for personal, home-based and enterprise activities.

Today, data management involves not only capturing and storing ever increasing volumes of information, but also having access to the tools, knowledge and expertise to unlock its insights. When a business understands customer data, it's able to deliver personalised products and services, and respond in a speedy yet appropriate manner to changing needs and circumstances.

As part of the engineering group restructuring, Microsoft intends to focus on improved analytical and data visualisation

> 66 **It amounts to one of the biggest reorganisations since Microsoft's inception in 1972** 99

technology. And, with data privacy a constant worry, robust data security solutions are essential to retain the confidence of enterprise customers.

Enterprise developers are important too. As the world becomes ever more reliant on digital technology, innovative software-driven solutions that solve real-world problems frequently make the difference between business success and failure. Powerful languages, libraries and tools empower development teams to deliver higher-quality bespoke solutions.

Asset Consolidation

Far reaching though this strategy is, it doesn't abandon Microsoft core strengths. The Windows platform will be available across a growing range of device types and screen formats. This platform must provide a familiar yet seamless experience on small mobile or wearable screens all the way to high-resolution wall-size displays.

Microsoft's world-renowned Research group (MSR) has already delivered numerous innovations, including the ground-breaking Kinect technology. MSR technology is an important factor in all this engineering re-imagining, so Ballmer is keen to establish a much tighter integration between MSR and the various new Engineering groups to maximise potential benefits and transform great ideas into products as quickly as possible.

Windows Azure will continue to provide search and problem-solving features based on ever more sophisticated machine

> ❝ **Steve Ballmer's communications mark a seminal moment in Microsoft's history** ❞

intelligence, which is able to compute the answers to a gamut of user-posed problems through a natural user interface.

Microsoft's latest Xbox One platform, complete with an enhanced version of the Kinect motion-detection technology, continues to be a high revenue earner. It offers industry leading games and acts as multi-genre entertainment centre.

Microsoft's 25 year commitment to the enterprise community will not only continue but will benefit from increased levels of engagement and focus. The result should be a new generation of high-value, business-centric products, services and professional development tools.

Why Now?
Obviously, senior Microsoft executives have been discussing 'One Microsoft' for months, if not longer, so why broadcast their intentions now?

Microsoft's steady, year-on-year loss of market share and rapidly diminishing desktop sales are just two good reasons. A strong movement away from large, do-everything operating systems in favour of simpler touch and swipe interfaces and solution-focused apps is another.

Then there's Apple and Google. While they fiercely battle it out for world domination in smartphones, app stores, cloud services and so on, everyone else is left scrabbling for slivers from the global pie. Coming second (or third) best is something relatively new in Microsoft's 40-year history, so the question should be, 'Why not now?'

Going Public
Why did Microsoft decide on such a detailed public announcement? That's a tough question to answer. After all, major reorganisations typically take place behind closed doors, with only a few carefully managed titbits released to the press.

Maybe top management wants to demonstrate they have absolute confidence in this strategic vision and their ability to carry it off? Or maybe it's to illustrate how differently Microsoft operates compared with the clandestine, insular world of Apple?

One thing's for certain, Ballmer himself has put his reputation on the line in a very public manner. And with so many details out in the public domain, the media will pounce if Microsoft fails to adopt the proposed strategy or waters down the prescription.

Conclusion
Nobody can deny this is a hugely ambitious strategy. It amounts to one of the biggest reorganisations since Microsoft's inception in 1972. If nothing else, the nature and content of these announcements shows Microsoft is preparing for battle, and doesn't intend to watch from the sidelines as equally aggressive plans from Apple, Google and others reduce its market share still further.

Is it too ambitious a vision? How long will it take to become a reality? Will the staff react favourably to such a widespread change? Even more importantly, is putting all your commercial eggs in 'One' Windows-shaped basket a wise move?

Whatever the answers to these questions turn out to be, just like the Bill Gates memo of 1995, Steve Ballmer's communications mark a seminal moment in Microsoft's history. **mm**

NEVER SETTLE: Reloaded

Beat the heat with the best games, on the best graphics

Buy **SAPPHIRE** HD 7000 series products and get the best games FREE*

SAPPHIRE TOXIC HD 7970: Mad and Dangerous.

It's a beast. Very, very special edition. By default, factory overclocked with 6GB of GDDR5. But it doesn't stop there. Dynamic Boost make things even faster. And if that's still not enough, our most extreme model offers a Lethal Boost Button, pushing your card to previously unimaginable limits.

Get Crysis® 3 and BioShock® Infinite free with purchase.

SAPPHIRE HD 7870 DUAL-X : Keep it cool with Dual-X.

Dual-X is a multi heatpipe cooling system coupled with two advanced fans that run slowly, efficiently and quietly — even under extreme load. Other features include 2GB GDDR5 overclocked to 1200MHz.

Get Tomb Raider™ and BioShock® Infinite free with purchase.
In APAC region, get Devil May Cry™ and BioShock® Infinite.

SAPPHIRE HD 7770 Vapor-X: Exclusively from SAPPHIRE.

High-end graphics cards use more power, which means they get hotter quicker. With the innovative Vapor-X, we were the very first to apply aerospace-industry vapor chamber technology to graphic cards.

Get Far Cry™ free with purchase of a SAPPHIRE HD 7770 or get BioShock® Infinite free with purchase of a SAPPHIRE HD7790.

From participating etailers and retailers.

Cards shown here are for illustration purposes only. Other HD 7000 series cards qualify for AMD's Never Settle Reloaded promotion.

*Bundle options may vary.

AMD RADEON GRAPHICS
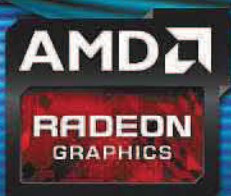
Get Radeon™ in your system.

SAPPHIRE
www.sapphiretech.com

Your Letters

Linux Blues

I installed Ubuntu on a laptop to provide music when I was in the bath. However, I grew tired of it constantly wanting to update itself every time I switched it on. So, I turned off the automatic update, but recently changed my mind, as I read there was a new version out. I spent the best part of a couple of hours with update, but when it was finally finished, I found the sound no longer worked. I googled this, but the answers seemed to be in a foreign language, with sudo this and sudo that. Given that I could never get the email client to work with a password, I thought enough was enough and put XP back on.

I suppose the moral is 'if it aint broke, dont fix it.'

Andrew S Redding

SSD Life

This is a tale of my first and only venture into the murky world of SSDs. I bought mine from PCWorld in February of this year a SanDisk Ultra 120GB. Three days ago it went to the dark side with no warning. I inserted my Acronis repair disk for Windows 7 64-bit (that I created during the migrating process), which - of course - was futile as the the drive was no longer visible in the BIOS. This failure was evident as soon as the BIOS screen closed and the on-screen message was boot disk failure. All this after not-quite six months!

I know the failure rate of these things are high compared to spinners, but six months is extremely poor. So tomorrow I'm off to PCworld for a full refund - NOT a replacement - and I will be purchasing a WD Velociraptor instead, as I do not think SSDs are reliable enough.

Clive Beasley

Shortcut Short

I'm still reading MM in my ninth decade. I tend to use keyboard shortcuts learned long ago, so I expect ALT+F4 to shut down any Windows version.

Indeed it does - much to the surprise of current Windows 8 users!

Kind regards,

Jon White

PC Slowdown

I was looking at *Micro Mart* Issue 1151 [*published c.April 2011, by my calculations - John*] page 64, which reviews the Zalman ZM1000HP Power Supply: it said it was a longer supply than the standard ATX spec.

So, someone at Zalman thought of longer PSUs way back then and they must have had a reason for it. I only thought about it in Issue 1264 (Your Letters), which was a lot later - so Zalman were ahead of me! Where is this idea now, though? I suspect that PC development has slowed down a bit since around 2009/2010.

USB3 would be another example of relatively slow PC development: it's a few years old now, but USB2 is still common and USB3 is not yet the totally universal standard. And 64-bit computing? Yet another example of 'slow take off'.

Of course slow development is not the same as no development. The progress of USB3 will continue I think, but longer power supply cases? I read in *Micro Mart* that you could judge the quality of a power supply by its weight. But will a longer PSU simply be too heavy to 'take off'?

Harry Deakin

GET IN TOUCH...

By email
letters@micromart.co.uk

By post
Micro Mart
30 Cleveland Street
London
W1T 4JD

Online
forum.micromart.co.uk

AOC

STYLE

A NEW GENERATION OF THRILL

AOC is proud to be awarded the PC Advisor Monitor of the Year 2013. From the wonderful impression our i2352Vh created, AOC are continually improving our technology, designs and product range.

A new dimension of entertainment is here: the myMulti-Play (q2963Pm). The giant 73.7 cm (29") display delivers true cinema feeling at home, thanks to its 21:9 format and UWHD resolution of 2560 x 1080 pixels. Not only can you watch Cinemascope movies in their native format, but the energy-efficient myMulti-Play with LED backlights is also equipped with MHL connectivity, which allows you to directly display the content of any compatible mobile device such as a smartphone or tablet PC on the big screen.

This perfect entertainer takes you to an entirely new dimension of thrill!

www.aoc-europe.com

Great design　　　　Ultra slim　　　　Multiple inputs for enhanced multi-media capabilities

Model specifi cations: q2963Pm
21:9, screen size 73.7 cm (29"), UWHD resolution 2560 x 1080, MHL™ interface (Mobile High-Defi nition Link), DVI, HDMI, 6 ms response time (GtG)

AOC displays – internationally awarded time and time again:

Vivendi Sells Stakes In Activision

Amazon Ditches Super Saver Delivery

Sub-tenner purchases no longer qualify

The world's largest online retailer has decided that it's going be that little less obliging to its customers by dropping the 'free' on some of its deliveries.

Amazon's Super Saver delivery here in the UK has the company to establish itself as the go-to retailer when it comes to online sales. However, if you're looking to buy products for under a tenner, that super-saver offer will no longer apply to certain purchases. Fortunately, the new rule will not apply to orders of books, DVDs, music, video games and software - so, a heck of a lot of the products we'd be buying from Amazon anyway - and the company itself has said that the move will only impact a small proportion of orders. If you're after a low-cost gadget, for example, you might end up a little out of pocket, but lump that with some low-cost music or books and you won't be affected.

The impact of this on the bottom line could be questioned and it does lead one to wonder whether the firm might make further changes going forward. Speaking of bottom line, the firm somewhat surprisingly reported a loss in the second quarter of the year because of rising operating costs. It will be hoping to get things back on track quickly.

Bing Brings Pop-Up Warnings

First to respond to government child abuse call

Microsoft's search engine, Bing, is the first of the search engines to bring in pop-up warnings for people searching for online images of child abuse.

It will notify users that such images are illegal and offer counselling service details in a direct response to government calls for web companies to do more to block access to such disturbing imagery.

Yahoo! is said to be considering a similar policy to Microsoft's, though Google is reportedly not planning on such pop-ups. It is, however, going to carry on reporting material and will help the experts to battle with the issue.

As for Bing's pop-ups, they will appear when users search for various terms included on a blacklist put together by the Child Exploitation and Online Protection Centre.

QUICK BITS... Sony and Panasonic are looking to develop an optical disc that can hold at least 300GB of data, compared with
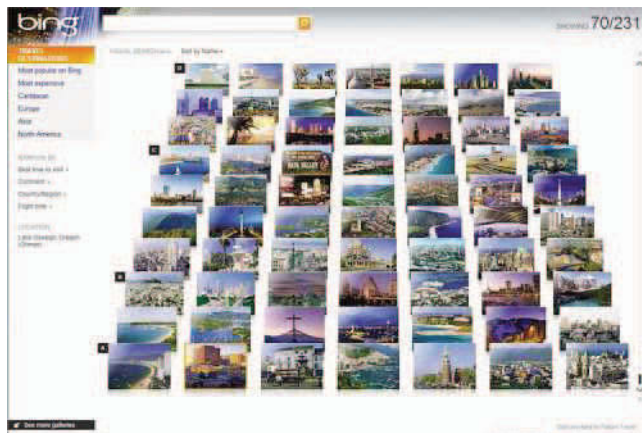
French firm agrees to give up its control

The French media group Vivendi has agreed to sell the vast bulk of its stake in Activision to the company for a whopping £5.3bn.

Part of a wider plan to restructure the business and reduce its debt levels, the selling of its stake means that Vivendi can set itself up for the future. As for Activision, it's going to be hoping to kick on from here, with the CEO Bobby Kotick stating that the company "should emerge even stronger - an independent company with a best-in-class franchise portfolio and the focus and flexibility to drive long-term shareholder value."

With the success of the likes of *World of Warcraft*, *Call of Duty* and *Skylanders Giants* withing its portfolio, it's got every chance of doing just that.

Samsung Launches Latest Smart Chip

Twice the power

Samsung has made a big move in the mobile sector with the launch of its newest high-end smart device processor, the Exynos 5 Octa.

Said to offer over double the 3D graphics power of its forerunner, the chip will include the latest GPU architecture from Brit outfit ARM Holdings and it will have begun mass production by the time you read this. It's big news for both firms, then, with CPU-specialist ARM making a further step into the GPU sector as others encroach on its usual stomping grounds.

Why should the Exynos 5 Octa stand out from the crowd? Well, it features six - yes, six - ARM Mali T628 CPU cores for multi-tasking, plus four of ARM's high-end A15 cores coupled with four A47 cores, allowing for greater battery life. Always nice to hear a British success story although the company has reported a 70% year-on-year profit fall thanks to higher marketing and research & development costs, plus patent-related expenses.

As for Samsung, it's been doing okay of late with a record quarterly profit posted of £4.5bn, a 50% hike on the same period a year prior. It can thank the likes of the Galaxy S4 for the sales boost.

the 50GB that dual-layer Blu-rays can handle

I'm back. As you may have noticed, I wasn't here for the last issue, but was instead enjoying a bit of downtime in Devon. Partly deliberately and partly due to limited internet access, I was fairly cut off from my work and what was happening in the technology world.

While it made a nice change, it's good to be back. However, just a couple of days after I returned, news broke that Microsoft was being made to change the name of SkyDrive, after legal action from BSkyB. Of all the things I missed, the ridiculous legal shenanigans of multinational corporations was not one of them.

Fortunately, the plans for 'One Microsoft', which David Briddock looks at this week, might help to cushion this blow. The service could quite simply be rebranded something like 'OneDrive' as part of this unified strategy.

Of course, what would be even better is if Microsoft wins an appeal and gets to continue using the SkyDrive name. As it is, the courts are just insulting our intelligence by suggesting we can't tell the difference between the two brands.

Until next time,

Anthony

Editor

Meanwhile...

On The Internet...

Twitter is, generally, brilliant. Except when it's not. Like so much of the internet, it's only as good as the people using it – making it also a bit like the real world, then. Observe the debate surrounding the horrible, unjustified trolling of Caroline Criado-Perez over the last few weeks (**tinyurl.com/Motl1272a**). The co-creator of **thewomensroom. org.uk**, a site that seeks to expose and offer an alternative to gender bias in the media (we recommend you read the interesting About Us blurb) was subjected to a tirade of abuse and threats following her successful campaign - in conjunction with another heavily trolled Twitter user, Stella Creasy MP - to get Jane Austen's picture on the £10 note. What's most disturbing about it all is the inference that the campaign is somehow co-ordinated or at least being egged-on by some external interested party or group.

Creasy is perhaps the most interesting personality involved in this fascinating debate. A new MP who has made a profile for herself in the past year or so, she pretty much dominated a *Newsnight* debate with blogger Toby Young - which you can see, along with the rest of the show's extensive coverage of the matter, at **tinyurl. com/Motl1272b** - and has managed to score good political points on an issue she obviously feels very personally connected to, without coming across as doing it just for that purpose. It's certainly a whole lot better than Claire Perry MP (the force behind the ISP porn block, whose apparent understanding deficit regarding how the internet works, we discussed last week) did from her encounter with Guido Fawkes, anyway. Plus, she's was the author of one of the best troll-squashing tweets of recent memory: "That's Dr dumb blonde bitch to you, actually" (she has a PhD).

While it's perhaps right to see these attacks as a problem with society rather than Twitter itself (**tinyurl.com/Motl1272c**), it's interesting whether we treat social media as a very focused reflection of the problems of society as much as its a creator of them (**tinyurl.com/Motl1272d**). Which begs the question (as the Leveson enquiry has with regards to the wider press): is stricter better? Does media need to policed more tightly? Do we need to have more people telling us what we can and can't say? Or do we need to work with wider society to make such outbursts less and less acceptable? Hell, are we even capable of changing?

What's galling to people that don't want such material in their feeds is the sleight of hand that companies like Facebook, Twitter and Tumblr try to play when they're called out on why they don't do more on such things. The 'we're just a conduit' defence is, perhaps, starting to wear a little thin. It strikes many people that they can't have it both ways: they're not providing a public service, they're showing us adverts and selling us to advertisers. They are publishers now, the logic goes. Rules must apply.

Ms Creado-Perez' example of just how nastily misogynistic the internet (and the world) can be is not the first of its kind, and it won't be the last. It's not the same as it was, but the internet is traditionally a male-dominated arena. It may not be so much the case now, but... seriously, just look at all the porn that's been left lying around and know what we say was true. Ironically, Twitter splits about 60/40 female, ditto for Facebook, while sites like Pinterest and Tumblr are even more skewed towards female users. Reddit, the social media network that bought us r/CreepShots and r/GoneWild as well as terabytes of other less-than-SFW content, is apparently 65% male - the last figures we could find for Google+,

.AVWHY?
Videos for you eyes...
In Meanwhile...'s corner of the shed, 'Does a bear defecate in the forest?' (or a variation thereof) has long been the accepted way to answer in the affirmative. Usually in reaction to an enquiry as to whether we're desirous of additional caffeine presented in the form of a coffee-like drink at any particular time. However, recent video evidence provided by Canadian Park-keepers, courtesy of a motion-activated video camera (**youtu.be/AihvuZiDhsg**) highlight the fact that bears do a whole lot more when we're not looking at them. In fact, they're quite busy little fellas, aren't they? Here's our recommendation, though: don't just go sticking the word 'Bears' into Google, okay? You may not get what you bargained for. Just a tip. Welcome To The Internet (**tinyurl.com/ Motl1272l**)!

from 2011, reckon it was about the same. Basically - at least according to the US-centric stats put together by web monitoring firm Royal Pingdom (**tinyurl.com/Motl1272e**) I'm using as reference here - the 'geekier' things get, the more male dominated the discussion is (check out the numbers for Slashdot, you can almost smell the testosterone). Like infographics? here's our fave on the subject: **tinyurl.com/Motl1272f**.

As the internet has grown in influence, debates like this one have grown in their ferocity and importance. It kinda makes me wanna quote *Mars Attacks* (which probably paraphrases Rodney King: **en.wikipedia.org/wiki/Rodney_King**) and say "Why can't we all just... get along?"

Trolls are bad, m'kay? Yeah. Especially when they use The Silk Road (no, we're not linking) to send you heroin through the mail (**tinyurl.com/Motl1272g**). No, really. That really happened.

The internet may be lacking humour a bit at the moment, but It still has movie geeks, which is nice. How about a Toho-inspired remix of the *Pacific Rim* trailer (**tinyurl.com/Motl1272h**)? Yeah? Thought so. 16-bit *Iron Man 3*, anyone (**tinyurl.com/Motl1272i**)? Ahhhh, g'wan!

Do *you* know what's happening on 24th September? The much-followed, oft-parodied YouTube channel Pronunciation Book does, but it's not telling. In a seismic shift in tone, this esoteric little corner of the internet revealed itself as perhaps the slowest burning viral marketing campaign ever, when it started uploading ominous countdown messages some three years and 700-odd videos after it was created (**tinyurl.com/Motl1272k**). Rumours as to what may be happening when the countdown ends abound. 4Chan and Reddit are on fire; we'll probably all be disappointed, but kudos to whoever came up with the long game this one's playing.

QUICK BITS... There are now over 100 million people using the Facebook For Every Phone app each month

Caption Competition

"Windows Phone sales disappointing. Microsoft turns to plan bee"

It's time for the caption competition – a competition of captions, if you will. Let's see what you made of this happy looking bee:

- **gfmoore:** "What use is this to me?"
- **John Davies:** "I tell you, this is the 'Bees Knees', plus you get a free copy of The Swarm. How great is that?"
- **sgb101:** "Where's my Honeycomb gone? Stupid Android update. What would a bee want with Ice Screen Sandwich?
- **@SlobJunkie:** "Micro Mart tracks down the last user of Android Honeycomb."
- **Thomas Turnbull:** "I'm getting a real buzzzz from my bee- utiful new tablet."
- **Thomas Turnbull:** "I've never used one of these before so I'll have to wing it."
- **dudeofblokes:** "I wish this caller would buzz off."
- **dudeofblokes:** "I wish these callers would leave me bee.
- **dudeofblokes:** "So that's all where all the buzz over smartphones comes from."
- **Darren LeWarne:** "Microsoft turns to Jerry Seinfeld's Bee Movie character in latest promotional drive."

Thanks for all your entries, and well done to our winner, Ted Way, who came up with "Windows Phone sales disappointing. Microsoft turns to plan bee."

If you've got something funny to say about the picture below, get yourself to our forum (**forum.micromart.co.uk**), where you can always see the current caption picture, or email us at **caption@micromart.co.uk**.

Ballmer: "We Got Surface RT Tablet Wrong"

CEO admits demand overestimated

The boss

The honourable Steve Ballmer has found himself admitting that Microsoft overestimated consumer demand for the Surface RT tablets, and that he isn't best pleased with the devices' sales figures.

The statements have emerged as it turns out that Microsoft has $900m worth of unsold stock and Ballmer has been quoted as saying Microsoft "built a few more devices than we could sell". This would seem to be putting it mildly, if we're honest, and this all does rather shine new light on the recent price cuts the company put in place on its devices.

Ballmer also isn't too happy about sales of other partner devices running Windows, stating that "we're selling as many Windows devices as we want to."

Developer Awarded Multiple Millions Over Madden

Gaming guru entitled to massive royalties

A developer of the original PC version of sporting title *John Madden Football* has found himself entitled to a huge amount of royalties - more than $11 million, in fact.

A lawsuit that was filed in 2011 noted that Robin Antonick stated that EA was in breach of a 1986 contract promising him a 1.5% royalty on any "derivative works" that stemmed from the original. EA felt that those early console versions were developed independently of Antonick's original title, but he argued - successfully, as it now turns out - that executives at EA has access to and knowledge of his code and design documents.

Now that Antonick has won his case, he's considerably richer than all of us.
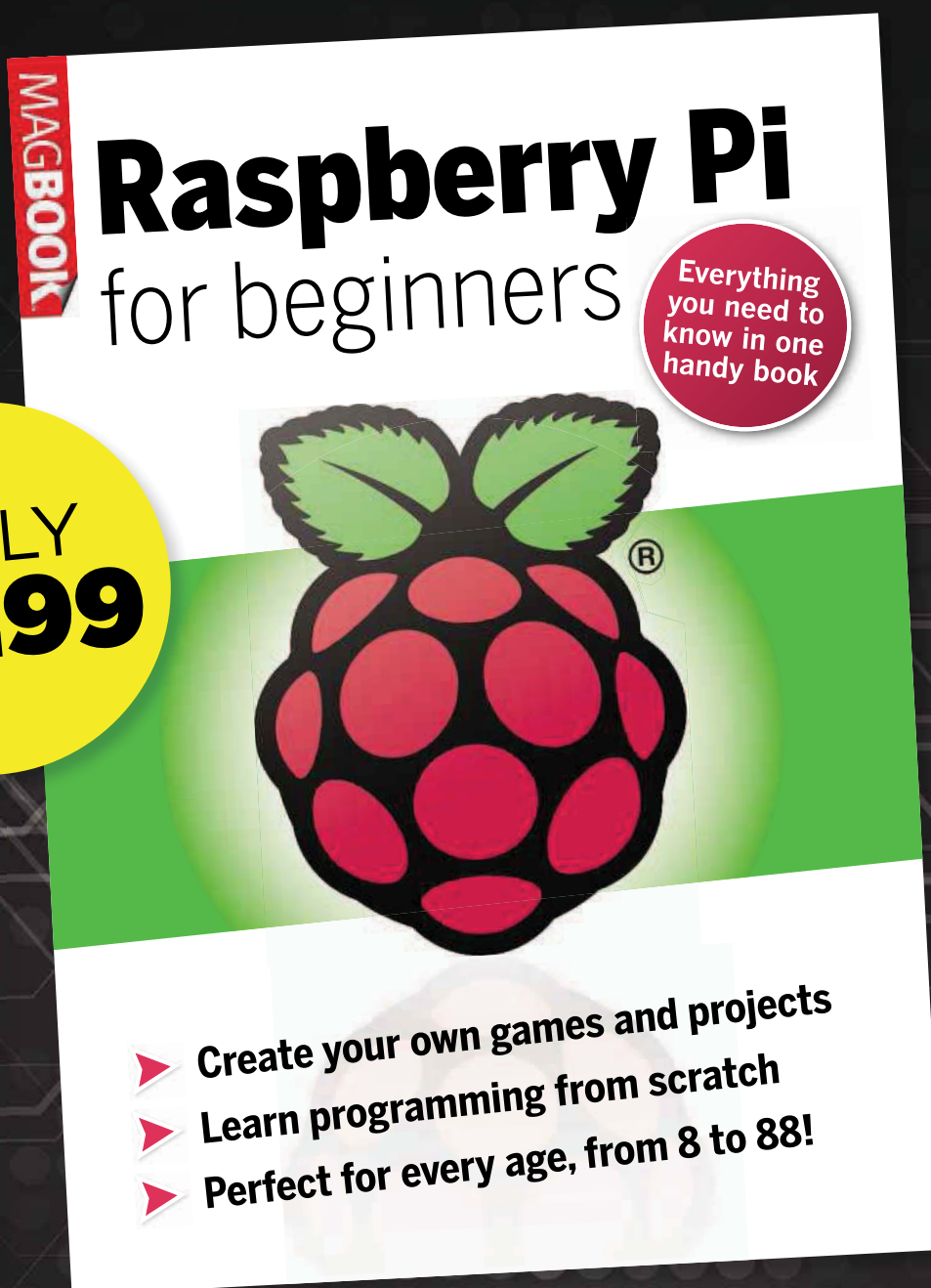
We have previously brought you news of Canonical's Ubuntu Edge smartphone and it turns out that early backers of the development have stumped up nearly $3.5m in the first 24 hours of the funding campaign.

At the time of writing, the total figure had reached over $7m, which is some progress on the way to the $32m target sought on crowdfunding site Indiegogo. It's also pretty good exposure for Indiegogo as it seeks to hold its own against its rival, Kickstarter.

Microsoft One-eighty Mark II: DEVELOPER!

Microsoft has decided to allow independent games developers to self-publish on the Xbox One console after all. Independent developers will be able to create and publish to the Xbox One whenever they like and set their own pricing at the same time. This marks a reversal in its previous policy, which stated that only recognised publishers would be able to release games on the next-gen console when it launches in November.

Xbox corporate vice president has said that "Our vision is that every person can be a creator". So now you know.

Apple Loses Profits Crown

Apple has lost its position as the world's most profitable mobile manufacturer. Samsung's Galaxy handsets have seen an impressive level of demand and because of this, the South Korean company has moved into the lead in financial terms for the first ever time. Where Apple made $4.6bn operating profit from its iPhone Q2, Samsung made around $5.2bn from its handsets during the same period.

Zynga Suffers Sharp Fall

Gaming company sees drop in gamers and revenues

Gaming firm Zynga hasn't had a great time of it just lately, as it turns out, with the company admitting a sharp drop in its revenues and its players.

The social gaming giant behind the likes of *Farmville* has gone as far to admit that it's going to steer clear from games using real money in a bid to improve things. Zynga's average monthly users were 40% lower than its figures last year at 187 million and its revenue was also down on last year - 38% down, in fact, at £150m.

The company is going to focus on free-to-play social gaming from here on in, although it's the firm is still evaluating the real-money gaming products in the UK. The company's CEO then is calling for a 'back to basics' to help turn around the share fall which greeted this news.

Google Offers Alternative To Apple TV

Low-cost dongle delivered

Apple TV now has a bit of fresh competition from global giant Google in the shape of a dongle device called Chromecast.

The low-cost dongle can be plugged into a TV's HMDI port, allowing people to stream media from smartphones, tablets and computers. It's already out in the States for a measly $35, but we don't know when, or even if, this is going to launch in other countries, including our very own.

Google has tried to venture down this road before, of course, so it will be hoping that the new Chromecast hardware will lead to more success this time round.

Sleeves For Nexus 7

Laptops covered too

Sleeve specialist WaterField Designs has announced sleeves and cases for the recently upgraded, slimmer Nexus 7 Android tablet.

The custom-fitted Google Nexus 7 cases include a SleeveCase, Slip Case, Suede Jacket and the Travel Express case fitting in a bunch of accessories, scratch-free interior pockets, foam lining, plus an impact-resistant, screen-protecting, plastic insert. As for the Ultimate SleeveCase (pictured), this has a water-resistant, ballistic nylon shell, plus a screen-protecting plastic insert to keep the new Nexus 7 from damage, and a choice of trim colour and strap.

The website for details is **www.sfbags.com**.

Community Corner

Announcements and other stuff

This is the part of the magazine that belongs to you. Want to show us your messy computer desk or send us a picture of Windows crashing in a public place? Perhaps you've got a picture of yourself holding Micro Mart while on holiday? If you have any news you'd like to share with the rest of the Micro Mart readership, please get in touch via email (**letters@micromart.co.uk**) or one of the following:

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

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

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

UK Gets New Gaming Event

Exist2Game to be held in venues around the country

Independent retailers around the country are to play host to an gaming event which aims to let gamers experience "the latest and greatest in PC gaming technology".

Whether you're a hardcore gaming fanatic or a casual player, you're welcome to turn up at retailers in the likes of Birmingham, Leeds and Kilmarnock on the 28th and 29th September to take your gaming to the next level.

During the event, a national *Counter Strike* tournament will offer big prizes and demonstrations on system building and the like will be availalbe. Places will be on a first-come, first-served basis so register your interest at **www.Exist2Game.com** ASAP.

Twitter Petition Reaches Thousands Of Signatures

'Report Abuse' button agreed following petition and MP intervention

The torrent of abuse thrown at Caroline Criado-Perez via Twitter led to a petition being drawn up asking for the addition of a "Report Abuse" button.

Thousands of signatures have been added to the petition, which was drawn up following abuse and rape threats received by Criado-Perez after she had successfully campaigned for women to be included on UK bank notes, and various MPs have been having their say on the issue. The general consensus is that Twitter really needs to pull its finger out a bit quicker to deal with this kind of thing.

Naturally, a Report Abuse button would go a long way to help stop such nasty business in future and, to its credit, Twitter has responded by announcing that it was indeed planning on having such a button accompanying every tweet.

Eve Online Hosts Mammoth Battle

In space, no one can hear you, erm, blast everything in sight

An epic five-hour space battle took place on *Eve Online* on 28th July.

The news was picked up by the BBC, no less, and the battle was between two of the game's biggest alliances who were, by all accounts, fighting for control of resources found within the game. The battle was so massive that time was slowed down to help the servers cope with everything that was going on.

One of the game's developers confirmed that this was indeed one of the biggest battles the game had ever seen. If you were involved, congratulations.

Fight!

Component Watch

Don't want to break into the piggy bank for a new monitor? Check these out...

In this week's Component Watch, we're looking at small, compact monitors that could be yours for less than £100. Suggestions that this might be anything to do with a certain Component Watch compiler having just moved house and spending the moving day fantasising about owning smaller and lighter things are pure speculation, and anyone making them is merely mud slinging. However, if you're building a low-end system and want to keep monitors within a reasonable price range, this should have you covered!

Deal 1: Acer G226HQLB 21.5" Monitor
RRP: £95.00 / Deal Price: £84.99

It's not the most exciting monitor you'll find on the market - or even on this page, but the Acer G226HQLB does offer high definition images and vivid text at a reasonable price, while still being attached to a familiar and reliable brand name. With a 1920 x 1080 resolution and 5ms response time, it has average specs for the price range, but don't think anything else about it is average - if it looks stripped-down, that's because all the money has gone into the screen itself, which is a laudible decision by Acer!
Where to get it: Ebuyer (**bit.ly/XUnimQ**)

Deal 2: AOC E2260SWDA 22" Monitor
RRP: £105.00 / Deal Price: £89.99

One of the most expensive monitors we've looked at for this week's Component Watch, the AOC E2260SWDA is unsurprisingly feature-filled. With 1920 x 1080 resolution, a 5-15° tilt, 5:4 switch, Kensington Security Lock and built-in AOC speakers it's required a retailer discount to get it into the criteria. There's also an ambient light sensor which can dynamically raise and lower brightness (like your smartphone), which ensures the most appropriate and comfortable appearance without wasting power and money. All that's pretty good stuff, but the £15 discount from Aria makes it all the sweeter.
Where to get it: Aria PC Technology (**bit.ly/134Ikmh**)

Deal 3: LG 22EN33S-B 21.5" Monitor
RRP: £99.99 / Deal Price: £84.90

The LG 22EN33S is clear, bright and slim with LG's own "mega-contrast" technology to ensure an excellent-quality image at all times. It's also 30% more efficient over conventional LED displays, and has a built-in cable manager to help you keep your desktop organised! It's no slouch technically speaking, with a 1920 x 1080 resolution, 5ms response time and 200 cd/m² brightness. Despite being basic, it also offers the ability to adjust screen tilt forwards or backwards, which is the kind of feature that might sway you (no pun intended).
Where to get it: Pixmania (**bit.ly/169XatV**)

Deal 4: HANNS-G HL229DPB 22" Monitor
RRP: £99.99 / Deal Price: £89.00

Hanns-G's HL series of monitors are low-budget but high-quality models aimed at office and home users, and the HL229DPB is a particularly good example of the range, with 1920 x 1080 resolution, 5ms response time and a contrast ratio of 20000:1. As well as a great picture, you also get decent sound from the built-in speakers. An ideal buy for anyone who doesn't want to skimp on quality when building a low-budget system.
Where to get it: Ebuyer (**bit.ly/Y5U6db**)

Deal 5: BenQ G2250 21.5" Monitor
RRP: £89.99 / Deal Price: £77.99

Despite this bargain price for the BenQ G2250, it doesn't skimp on quality. The 21.5" panel has a full HD resolution (1920 x 1080), 5ms response time and a dynamic contrast ratio of 50000:1. There are also six pre-set modes tailored for different tasks, like gaming and movies, and a special "Eco" mode designed to save power and money! Not bad for less than £80.
Where to get it: Aria PC Technology (**bit.ly/19YRCVz**).

Crazy Technologies
Space Invader Coin Bank

David Hayward raids his piggy bank in the pursuit of retro games

Designed by Tomohiro Nishikado and released in 1978, *Space Invaders* took the world by storm. Its legacy still reigns supreme in the gaming world, and with it being cloned, copied and featuring in countless movies, books and other media, it's little wonder the world's most popular videogame should make an appearance as a coin bank.

Before we go on to the main course of this week's Crazy Tech, we found out a little snippet of information, which may or may not be true but is an interesting urban legend nonetheless. According to internet myth, when *Space Invaders* was released in Japan, there was such a surge of public gaming that the country actually ran short of ¥100 coins and that the arcade owners at the time couldn't empty the cabinets fast enough to keep the coins in circulation.

Save Money, Save The World

The *Space Invaders* coin bank is a wonderfully tiny unit, measuring just 20.8 x 15.2 x 13.2cm and resembling one of the cocktail arcade cabinets from years ago.

It takes just three AA batteries and when suitably powered up will start a quick test run, with the classic invaders and laser cannon moving around. After that, you screw everything back up as

normal and slot in the coin tray, which slots in under the unit and forms the base and part of the legs.

On one side of the *Space Invaders* coin you'll find the coin slot, along with a left/right directional stick, a big red fire button and a pinhole reset button. When a coin is inserted, the unit will emit a 'credit' drop sound, like in the actual game cabinet itself, and after pressing the red fire button you can start an actual game of *Space Invaders* with the real sound effects.

100 Yen

The coin tray is capable of storing up to 80 ¥100 coins, but (and this is the only bugbear we have this unit) we were a little short of ¥100 coins. Being the enterprising lot that we are here in the Micro Mart shed, we raided Mr Enticknap's collection of old and foreign coins (when he wasn't looking) and managed to dig out some worthy substitutes for the ¥100.

We discovered a number of alternatives: a South African two-rand coin circa 2002, a token from Great Yarmouth Pleasure Beach. If you don't own either of these, then a 20-pence piece will do the trick.

Conclusion

The *Space Invaders* coin bank is one of the oddest items we've seen in a while, but at the same it's also one of most fun devices we've played with. With it only coming in

at £27.99 from Funstock.co.uk (**goo.gl/ mDJQja**), we were mightily impressed.

Fair enough, the LCD screen on which you play *Space Invaders* is small and the instructions are all in Japanese with no translations, but the novelty value this little unit has far outweighs any problems you may have from it.

Check it out on Funstock and relive those glory days of defending the earth from the never ending assault by our cosmic cousins, hell bent on domination and destruction. Plus you get to save enough 20p pieces for a pork pie at lunchtime.

▲ *Yep, Space Invaders with the full sound effects*

Other oddities

We were rather taken by the *Space Invaders* coin bank, so we thought we'd have a look around for some other wonderful and equally odd items of this nature.

For example, the Mega Drive Sonic the Hedgehog portable key ring unit, which connects to a TV via an included audio/video cable. Or perhaps the very cool Atari Flashback 3 Games Console, which is designed on the original Atari 2600 and comes with 60 built-in games. Clearly, we've been missing out on some super stuff here.

▲ *Space Invaders, the legend continues*

▲ *The unit is remarkably small, but pretty sturdy*

Machine To Machine Communications

An Introduction

David Briddock explains how M2M communication impacts our technological world

We live in a data-rich world. Our technology-centric lives provide clues about spending habits, where and how we travel, what we eat and drink and how we spend our leisure time.

Financial economies, trading markets and currencies completely rely on technology to process, share and analyse data. And businesses from the biggest corporations to the smallest shops have access to a growing store of customer-derived buying patterns and trends.

Yet, hidden almost out of sight, there's an even bigger change taking place. Swarms of smart, interconnected, sensor-enabled machines pour huge quantities of data into the cloud every second of the day. These devices will increasingly appear in our pockets, wallets, homes, vehicles, workplaces, high streets and countryside.

If you thought the mobile revolution wouldn't be matched for personal impact, think again. Governments, companies, farmers, health workers, scientists and individuals are going to find it impossible to escape the influence of machine-to-machine (M2M) communications.

Smart Things

This widespread proliferation of intelligent, sensor-enabled, network-connected devices is known as the 'Internet of Things' (IoT). It's a phrase we'll hear with increasing frequency as this decade unfolds. Many organisations already refer to IoT in their product and service marketing information. Others, keen to put their own mark in this space, have devised their own terms for the same phenomena, such as IBM's Smart Planet and GE's Industrial Internet.

Communication giant Cisco has hyped up the concept still further with its 'Internet of Everything' (IoE) vision. Here, Cisco is essentially suggesting that at some point everything we own, wear, carry, use and reside within will become smart.

Machine Talk

Machine-to-machine communication has been around since the dawn of computing. Known as telematics, it invariably involves highly specialised hardware, software and communication systems.

Telematics data is transmitted via wires, such as cables or phone lines or packet-based radio signals. The radio signals use a random selection of radio frequencies to support a variety of transmission distances and reduce interference.

Both wired and wireless data communications tend to be based based around non-standardised protocols, which vary considerably from supplier to supplier.

Telematic companies, like Honeywell (**honeywell.com**), Siemens (**siemens.com**) and Qualcomm (**qualcomm.com**) provide complete end-to-end systems which, due to their specialised nature, are high-cost solutions.

The proprietary nature of the systems makes it impossible to mix and match elements from different suppliers, and challenging for other companies to provide value-added hardware or software components.

Billions And Billions

If telematics has been around for ages, why all the buzz? Well, there's general agreement that 2013 is the year when the number of internet-connected devices overtakes the planet's human population. By 2020 this figure is expected to reach tens of billions.

Recent increases in the number of connected devices have largely been down to growth of smartphone and tablet sales. With around 40% of all new mobile phone sales today being smartphones, this upward trend will continue.

However, personal smart devices are only part of the picture. It's the widespread proliferation of a new breed of M2M communications devices that will transform telematic technology into IoT or IoE networks.

The M2M Difference

M2M takes the telematics concept and blends it with today's standardised hardware platforms, wireless communication technology and internet services. A typical M2M device is based on off-the-shelf boards and low-cost yet highly sensitive digital or analogue sensors.

These devices often have their own on-board processing capability. Built-in computing power leads to smart devices running intelligent software to deliver data analytics and automated control functionality.

M2M network design and installation is simplified by embedded, standardised wireless communication capabilities. Arrays of smart

devices and network hubs to be quickly constructed or extended and cellular technology enables similar network topologies to be deployed almost anywhere.

The M2M Benefits

The combination of readily available off-the-shelf boards and sensors, existing networking technology and access to the internet has two key benefits.

Firstly, it ensures the cost an M2M-based data gathering solution is far lower than the previous telematics scenario. Secondly, M2M solutions are highly scalable and deployable in virtually any environment or location.

Taken together, these benefits are proving highly attractive to business and commerce, industry and manufacturing, health and social services, agriculture and environmental science.

However, it's not all plain sailing. There are some challenges to overcome.

The Network Address Issue

A tsunami of network-connected M2M devices puts a spotlight on the internet's device addressing system. To avoid network chaos, it's essential every device has its own unique internet protocol (IP) address.

The familiar IPv4 system is limited to around 4.3 billion device addresses. A few decades ago, this 32-bit standard might have seemed perfectly adequate, but today it's completely used up. And demand is still gathering pace.

Even the most conservative predictions forecast a doubling in number of internet-connected devices by 2020. Some suggest a ten-fold increase is more plausible. Whichever figure proves to be correct, these are very big numbers.

IPv6 To The Rescue

The new IPv6 system is based on 128-bit addresses. This amounts to a colossal leap in capacity. Each organisation and person on the planet can have billions of addresses, and there'd still be plenty left over. In other words, IPv6 easily accommodates Cisco's IoE vision.

IPv6

The latest specification of the communication protocol that underlies the web is the internet protocol version 6 (IPv6).

Developed by the Internet Engineering Task Force (IETF) IPv6 uses a 128-bit address format, compared with 32-bit for the previous IPv4 specification. This 128-bit address space accommodates 340 trillion trillion trillion addresses - enough to assign trillions of addresses to every star and planet in the universe.

IPv4 addresses are typically specified by four numbers (ranging from 0 to 255) separated by periods, as here:

192.168.2.235

With IPv6 each address is defined by eight groups of four hexadecimal digits separated by colons, like this:

2001:0db8:85a3:0042:1000:8a2e:0370:7334

IPv6 benefits include greater scalability, easier network management, auto-configuration capabilities and improved security through built-in IPSEC. However, as IPv6 isn't interoperable with IPv4, upgrading an infrastructure can be an expensive and time consuming exercise.
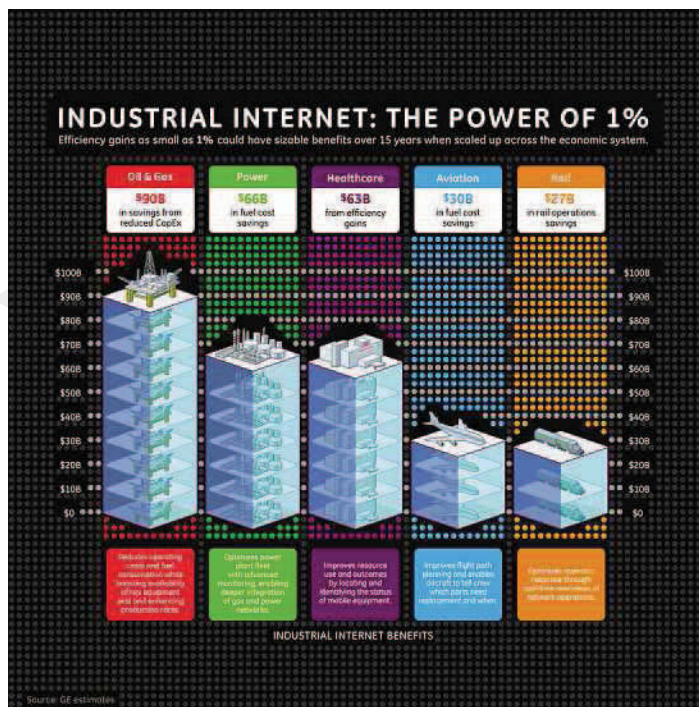
⌃ GE Industrial Internet

⌃ Cisco Internet of Everything

HIGH SPEED VS SUPERFAST

3G Was the third generation of mobile networks, and the first with high speed mobile data

4G Is the fourth generation of mobile networks, with even faster speeds than its predecessor 3G

HOW FAST?

3G AVERAGE 1.5MB/S

4G AVERAGE 8-12MB/S

MAKING **4G** TYPICALLY **5X FASTER** THAN 3G

A smarter planet starts with smarter products

Innovation for a smarter planet

▲ *IBM Smarter Products*

4G Technology

4G is the fourth generation mobile phone network. The International Telecommunication Union (ITU) standards state 4G must be based on Internet-style IPv6 packet-switching technology, rather than the circuit-switching technology used by 3G incarnations.

Network speeds are measured in bits per second (BPS). The potential speed of the 4G network is 1GBPS for stationary or slow moving devices, and around 100MBPS when applied to fast moving cars or trains. Even the 100MBPS figure is a considerable increase on the 7MBPS maximum seen by 3G users.

As always transmission constraints, and sharing a network cell's bandwidth with other devices, will mean lower real-world speeds.

◄ *EE 4G Speed*

The IPv6 system was officially launched in early June 2012, but despite the urgent need, progress has been surprisingly slow. Part of the reason relates to the substantial cost of upgrading existing equipment. And even when funding is available, finding suitably experienced people to make the necessary changes isn't easy.

In fact, worldwide it's often the up and coming technology territories, such as African countries, that lead the way. Unburdened from existing infrastructure, they're free to install the latest IPv6-compliant network technology.

The Data Traffic Issue

Even when IPv6 becomes the norm, the sheer number of connected devices poses another challenge, namely network capacity and data traffic management.

Typically, each M2M transaction involves only a tiny amount of data. A customer sale transaction, set of traffic flow figures or series of air temperature values takes no more than a few bytes. When we're talking about billions of smart devices, though, it soon adds up.

Our network infrastructures are already under strain from the rapid rise in smartphone ownership and surge in wi-fi connected personal devices. M2M data traffic only increases the push for increased capacity.

Video Culture

Let's take smartphones as an example. A recent Cisco report suggests 92% of mobile internet traffic emanates from smartphones, even though currently they only account for 18% of the mobile phone marketplace.

Much of this traffic is down to video, with YouTube and the BBC iPlayer accounting for a sizeable proportion of the overall figure. The problem only becomes more acute as the sales of smartphones continues to rise.

And what about tablet devices? Tablet sales are also growing strongly, with some cheap enough to qualify as an impulse purchase. And a tablet is an even better format for watching video.

Cellular Network Investment

While the 3G network is far more efficient in radio spectrum use than 2G, it's still not scalable enough to cope with the imminent flood of M2M communications.

With smartphone ownership growing so rapidly, a speedy rollout of new 4G and 5G networks is the only way to stop meltdown. Across the globe, the mobile industry is investing billions of dollars each and every year to improve existing coverage and roll out new infrastructure.

Here in the UK, the current leader is EE (**ee.co.uk**), formed from the merger of T-Mobile and Orange. However, it will be years before we'll enjoy a 4G network with the same coverage as the existing 3G service.

Wi-fi Mesh

Travel almost anywhere in a town or city today and you'll invariably see the names of numerous wi-fi routers appear on your smartphone, tablet or laptop. Currently, most of these routers are associated with private, location-specific bubbles of access. However, this mesh of overlapping wi-fi hubs has hidden potential. In future, they could marshal M2M information through shared wi-fi hub services.

While it's certainly not possible at present, BT's Fon (**btfon. com**) sharing wi-fi service gives a glimpse of what may become a commonplace state of affairs.

Building For Tomorrow

Today, there are very few places on the planet that don't have some sort of cellular or wi-fi coverage. And the massive year-on-year investment in wireless services provide almost daily coverage improvements. Where holes do exist, the more expensive satellite communication technology fills in the gaps.

Consequently, technology organisations aren't hanging around waiting for IPv6 or 4G. Instead, they're hard at work with smart network grid construction, M2M hardware device fabrication and intelligent software development to build high-value, information-rich services.

Next time, we'll look at how an M2M-enabled world is a smarter world. **mm**

Byte Sized Languages
Go

David Briddock wonders if Google Go's obvious
potential is enough to entice developers

Origins and People

Go is a relatively new language. Google
officially revealed the project's existence
(**golang.org**) in late 2007. By November
2009 core developers Robert Griesemer,
Rob Pike and Ken Thompson released
their fledgling language into the open
source environment.

With help from the open-source
developer community, Go version 1.0
appeared in March 2012 under a BSD
licence. Today, the compiler targets
Windows, Linux, Mac OS X, FreeBSD,
OpenBSD, NetBSD and Plan 9, and runs on
both Intel and ARM processor architectures.

The ambitious design goals posed
a serious challenge. They included a
lightweight feel, high performance,
scalability, simplified concurrency,
workman-like syntax and a tweaked OO
implementation.

At first glance, Go syntax (**goo.gl/
X5MRF**) seems rather similar to C with
its curly braces and familiar 'if', 'for',
and 'switch' flow control keywords. Look
closer and you'll discover a different
approach to variable declaration, special
types such as maps and array slices, and
optional trailing semicolons.

Go's package-based library is
particularly extensive, with individual
elements imported from these packages
as required.

Developer Highlights

Go doesn't have classic object-oriented
(OO) features such as type inheritance,
assertions and method overloading. Instead
it favours a composition approach with
implicit interfaces. Composition helps avoid
the spaghetti-like code that often results
from inheritance-based OO designs.

This compositional approach also
ensures Go programmers have an easier
time addressing the challenges posed
by concurrent computing environments,
when compared with rival languages. Go
uses the notion of 'channels' to support
inter-thread communication and multi-
core processor programming.

The 'go' command-line tool is
particularly powerful. It's able to build,
package, compile, test, benchmark
and profile Go code. Intermediary
configuration files aren't required, as
operations are geared around directory
tree structures and parsed file contents.

Developer Lowlights

Go introduces many syntax subtleties.
The reimplementation of familiar coding
conventions, even for the best of reasons,
is always a risk. It's easy to alienate time-
strapped developers who, after only a
cursory glance, fail to understand the
underlying reasons behind these changes
or the finer points of its design.

Although arguably superior, Go's
compositional approach to OO
programming challenges the developer
to think and code differently. However,
a developer must fully embrace this
approach to avoid missing out on
many of the key benefits Go is designed
to provide.

Maybe the biggest issue is Go's
newness. Companies and individuals
are unsure how well the language
operates in real-world developments.
At present there's a distinct shortfall of
experienced Go programmers. And, just
as importantly, many are well aware of
Google's propensity to drop projects
without warning.

The Future

Go appears to have met its original lofty
goals and contains many coder-friendly
features. Yet it still faces stiff competition.
It's not the only language to address
performance, scalability and concurrency.
Languages such as Clojure and Scala tout
similar credentials and have already gained
influential, highly active communities.

To be assured of its future Go needs
to become the language-of-choice for a
number of high profile, non-Google projects.

⌃ *Go Logo and Mascot*

⌃ *Rob Pike*

Facebook
Bad For
Business?

Is setting up a Facebook
page for your business
really the best way to
promote yourself?
Sarah Dobbs investigates
some of the drawbacks
to marketing via the
social media giant

Setting up a Facebook page for your business seems like online marketing 101. Facebook is ubiquitous: everyone uses it, from the school kids on the bus to your Mum. What's more, it's quick and easy to set up a page - far quicker and easier than setting up a website, not to mention cheaper. It's become one of the most basic promotional tools available, and not having a Facebook page at all seems like a statement in itself. Is it really a good idea for all businesses, though?

As frustrating as Facebook's changes to settings and layouts can seem when you're just using it to organise your social life, they can be even more stressful if you're trying to use the site to promote a business. The company also has a fairly rigid set of rules about things you can and can't do on your Page, which could make maintaining a useful Facebook page more hassle than it's worth.

Making Your Content Visible

It used to be that, when you made friends with someone or Liked a Page on Facebook, you were subscribing to all of that person or Page's updates. From that moment on, everything they posted would appear in your Timeline. That's not the case anymore; now, Facebook decides which content it thinks users are most interested in, based on their previous interactions and settings. It sounds sort of fair enough, since there's so much content being posted to Facebook every second of every day, but for anyone trying to promote something - a business, a band, a blog, or whatever - it's very bad news indeed.

> ❝ **Now, Facebook decides which content it thinks users are most interested in** ❞

On average, only about 12% of the people who've Liked your Facebook brand page will actually see your posts. Really. Only 12 out of every 100 people who Like your page will see your post on their Timelines. That's scarily low, but there is a way you can increase that number. You can pay to 'promote' a post; how much it costs depends on how many people you want to reach, and it can be pretty cheap, but cheap isn't the same as free.

Once you pay to promote a post, more people will see it, but it'll also be marked "Sponsored", to let people know it's an advert. Again, that seems fair enough from a user's standpoint, but the way people interact with adverts is different from the way they interact with things that Friends/Likes post. Considering we're talking about people who've already expressed an interest by Liking your page, that's kind of frustrating.

Sticking To The Guidelines

Another way you can get more people to see your posts is to encourage users to share your posts with their friends. One way you might think of spreading the word is to encourage people to Like or Share a post in order to enter a competition - that seems like a pretty obvious thing to do, right? Unfortunately, it's against Facebook's rules.

In Facebook's Page Guidelines (**tinyurl.com/MMFBook1**), there's a whole section on how promotions can be run, and the

How Facebook Might Be Good For Business
We don't mean to be completely negative about this, because in spite of the difficulties with using Facebook promotionally, it can still be useful for brands to have a presence there. Here are some of the things Facebook offers that are worth using.

A free and easily shareable presence for your brand
Your customers might not visit your website every day, but they probably do log onto Facebook every day, so if you've got a Facebook Page it's possible they'll check it out. If you've posted something particularly interesting, they might even share your content with their friends, since Facebook makes that so incredibly easy - and that's the kind of promotion you can't pay for.

A really easy way to broadcast news
Posting to a Facebook Page is easier than updating content using even the simplest WYSIWYG website builder. You just type into a text box and hit Post. You don't need to worry about formatting text or managing a layout; Facebook does all that for you. That can seem very reassuring to anyone not fluent in HTML - it's almost impossible to break a Facebook Page.

Insights into who's interested in your stuff
When you're logged in as an admin on a Facebook Page, you can see who's seeing your content; you can get a breakdown of the gender, age, and location of the people who've liked your page; and you can see anyone who's tagged your Page in a status. It's all very easy to explore, and gives business owners real data on their potential customers.

A simple way to talk to your customers
Facebook makes it easy to talk directly to the people who you're hoping will spend their money on your stuff, and build relationships that feel personal. That can be invaluable. Also, while a dissatisfied customer might not bother to write a letter or even an email, they will post to Facebook, which gives you the opportunity to make things right, and look good in the process.

facebook

rules are pretty strict. For starters, you can't run a promotion (which means any kind of competition) on your Facebook Wall - it has to be in a separate tab. That requires a bit of specialist Facebook knowhow to set up, which might be a problem to begin with. Next, you can't use any of Facebook's mechanisms

to automatically enter users into a competition - so you can't tell them to Like your Page or post to get a chance to win.

You also need to make it clear that your competition isn't endorsed by Facebook and that by sending in information users are sending it to you, and not Facebook. You can't even use Facebook messages to notify your lucky winner about their prize - you have to contact them away from Facebook, which is a bit of a faff.

Things have relaxed a bit since the early days of Facebook pages, though. Prior to 2011, you actually had to get written permission from Facebook to administer a promotion on your Page. Facebook can, and does, change its rules quite often, and it's important that you have a good understanding of what they are at any given time to avoid falling foul of them and having your page suspended.

Dealing With Users

Another thing that many businesses don't factor in when deciding to set up a Facebook Page is that, done properly, it takes a lot of time to create and maintain an effective Facebook presence. You can't just add your content and leave it; you need to regularly add and update information on your Page, monitor activity on the Page and engage with your potential customer base. That means thinking of ways to tell them about your business that they'll actually be interested in - not always as easy as it sounds.

Perhaps more importantly, it means listening to users, as well as broadcasting to them. A brand that just makes posts but doesn't reply to comments isn't really using Facebook properly, and runs the risk of attracting negative comments. Increasingly, nowadays, customers are using social media to get in touch with brands; it's easier, for one thing, but also most customers know brands don't want the bad publicity of having negative comments on their Facebook Page and will therefore often respond more quickly to Facebook comments than emails.

If you get nasty comments, you'll need to identify them, respond quickly and appropriately. Being rude to customers is never a good idea, but on Facebook it tends to attract a crowd, and that's definitely the wrong kind of publicity. You'll need to factor in time to keep an eye on your Page, and be prepared to deal with stroppy customers pushing for their own way where everyone can see them.

❝ Facebook can, and does, change its rules quite often, and it's important that you have a good understanding of what they are ❞

Advertising Facebook

Most of theses problems are just extensions of the trials of running a business in the real world. You might struggle to get people to pay attention to you, have to worry about various regulations, and deal with angry customers without ever touching Facebook. The real issue with using it to promote your business, and which isn't immediately obvious but becomes striking the more you explore the promotion options, is that you're not really promoting your business when you make a Facebook Page. Most of the time, you're promoting Facebook, which benefits from pretty much everything you do with your account, and pretty much everything users do on your Page.

When you add buttons to your website to encourage users to share your blog posts or items for sale on Facebook, you're really promoting Facebook. When you buy advertising space to promote your Page, Facebook benefits twice: it gets your money, and it gets user activity on its own site. It gets data on users and what they're interested in, and users generally won't even have to leave Facebook's own platform. When you promote your Facebook content, well, that's the same deal.

What Facebook wants is for you to use its site, rather than your own, so that it gets advertising revenue and user data, and if you get something out of it in the process, that's almost a by-product of the real transaction.

So Is It Worth It?

You might still feel that the benefits of using Facebook outweigh the problems, and that's a totally fair assessment - it's not like there aren't zillions of big businesses making Facebook work for them right now, and it absolutely might win you a few more sales/customers/fans - which could instantly make the effort cost-effective. If you haven't got a massive marketing budget, but you do have a bit of time to invest in creating content and interacting with users, Facebook might be a pretty good promotional tool for your particular business.

It's worth actually thinking about what you want to get out of a Facebook Page, though, and knowing exactly what you'll have to put into managing it, before you sign up. It might not be as obvious a decision as it seems. **mm**

How much are Facebook Likes worth?

When building a Facebook Page, many businesses focus on getting more and more Likes - Facebook all but insists on that, by making some features accessible only to Pages with a certain number of Likes. But since Liking a page doesn't guarantee the 'Liker' will see all of a Page's posts, those Likes might not turn out to be worth much.

Studies suggest that only 1.3% of Facebook users actually engage with the brands they've Liked. That means you can take your Like count and divide it by almost a hundred to see how many people are actually engaging with your brand on Facebook. Bit discouraging, isn't it?

Other Social Media Networks To Use

Beyond Facebook, there are lots of ways you can promote yourself or your business online, whether or not you choose to use Facebook. Depending on what it is you do, some of them might be more suitable than others, and of course they all come with their own set of pros and cons. Still, if you're looking to do some self-promotion, here are some networks you might think about using...

Twitter

Next to Facebook, it's the most obvious social network out there. It's quick to set up and easy to update (you only have to post 140 characters at a time, after all) but it does allow for multimedia content and linking to other platforms, so that's useful. It can require a significant time investment, though, because people tend to want to chat, and if you're not engaging, they'll lose interest.

Pinterest

If whatever it is you're promoting comes with a lot of appealing images, Pinterest might be for you: it's basically an online scrapbook, where users can pin images they like. If you've got something stunning to share, it might attract a lot of attention. The site doesn't encourage much conversation, either, so you can probably get away with pinning and running.

YouTube

Not much use unless you're good at making videos, but if you are, this can be a brilliant way to attract attention and possibly even get your brand to go viral. Beware, though: the comments sections on YouTube are probably the most vicious of anywhere else on the internet and will need policing vigourously.

Google +

It's kind of like Facebook, but much quieter. For now, at least. Maybe it'll really take off soon? If your own company website doesn't currently rank all that highly in Google's algorithms, it might be worth setting up a page on Google+.

GROUP TEST

Budget GPUs

You don't have to break the bank to get decent graphics performance. As long as you don't expect cutting-edge power, then one of these budget cards should be enough for your needs

AMD Radeon HD 7750

DETAILS
• Price: £70,
www.scan.co.uk
• Manufacturer:
www.amd.com

This is the weakest of the three AMD cards on test but, despite its low-end stature, it's still got quite the pedigree – like the HD 7770, this Cape Verde-based card has an architecture derived from high-end chipsets.

That means it's built on the same 28nm architecture as the rest of its stablemates, and it's even got 1.5 billion transistors inside its die – the same number included in the HD 7770, and more than Nvidia has packed into the GeForce GT 640.

Elsewhere there are 512 stream processors, a core clock that's set at either 800MHz or 900MHz, and a huge variety of memory configurations. The HD 7750 can be bought with either 1GB, 2GB or 4GB of DDR3 or GDDR5 memory, although board partner choices means you may have to hunt around for some of the rarer configurations. We've tested the 1GB GDDR5 model.

The more modest power requirements of this card mean that, unlike its bigger brothers, it doesn't need an external power connector – it's driven entirely by its PCI Express socket. It's a little smaller too, although the HD 7750's 172mm PCB is still larger than the 146mm Nvidia card.

The HD 7750 returned a reasonable set of benchmark results. A score of 34fps in the High-quality *Bioshock* benchmark is eight frames faster than the GT 640 and suggests that this demanding game will be playable at full HD on one screen. The HD 7750 was similarly impressive in *Battlefield 3*, with an average of 34fps easily beating the Nvidia card's 27fps result.

The AMD card romped through the less demanding *DiRT 3* test to a score of 76fps, a full 19fps more than the Nvidia card. Only in the taxing *Crysis 3* benchmark did the HD 7750 struggle: while its 28fps average is nine frames better than the GT 640, it's still not playable.

The Radeon's dominance is highlighted by our theoretical tests. The HD 7750's 3DMark Cloud Gate graphics score of 14,281 batters the 10,287 result of the Nvidia card, and it's ahead in every other 3DMark test.

The HD 7750 couldn't compete with its Nvidia-powered rival in our thermal tests – an issue that also afflicted the HD 7770. The AMD's idle and peak temperatures of 47°C and 69°C are, respectively, eight and ten degrees hotter than the GT 640.

Still, that's not really an issue when the performance gap between the HD 7750 and the GT 640 is considered. The AMD card is £10 more expensive, but we'd gladly pay the difference: the HD 7750 is capable of playing most games at full HD resolutions and high-quality settings, while the Nvidia can't simply can't hack it. The Radeon is the best of this test's cheaper cards.

micro mart

6 Quality
7 Value
7 Overall

AMD Radeon HD 7770

The Radeon HD 7770 is one of two AMD cards in this test to use the Cape Verde core, and it's the most powerful too – the other is the weaker, cheaper Radeon HD 7750.

The Cape Verde chip is based on the Graphics Core Next architecture that debuted with AMD's high-end cards. It's a cut-down core, understandably, but its specification still compares well to the similarly priced Nvidia GeForce GT 650. The AMD card has 1.5 billion transistors – more than the Nvidia hardware – and the HD 7770's 640 stream processors outstrip its rivals 384.

The HD 7770 comes in either 1GB or 2GB GDDR5 memory configurations, the same as its rival, but it can't compete on speed: the AMD card's memory is clocked at 1,125MHz, with the Nvidia card's RAM clocked at a mighty 5,000MHz. The HD 7770's core clock of 1,000MHz isn't bad either, but Nvidia's chip runs 58MHz faster.

It sounds like the two cards will be close in benchmarks, but the AMD chip took a convincing lead in most of our tests. The HD 7770's *Battlefield 3* result of 45fps was four frames more than Nvidia could manage, and the gap widened elsewhere: the HD 7770's stellar score of 57fps in *Bioshock Infinite* was 22 frames faster than the Nvidia chip.

The HD 7770 scored a slick 98fps in *DiRT 3*, with the

> **66 The AMD chip took a convincing lead in most of our tests 99**

GTX 650 falling behind with 80fps. *Crysis 3* is this week's most demanding benchmark, and the HD 7770 scored a still-playable 32fps – the same result as the GTX 650.

It's a virtual clean sweep in gaming tests, and the AMD chip also flexed its muscles in 3DMark's benchmarks. In the mid-range Cloud Gate test the HD 7770 returned an overall score of 10,793 and a Graphics result of 17,417, with the Nvidia lagging behind in both benchmarks. And in the high-end Fire Strike test the AMD card was around 20% faster than its rival from the green team.

There's one area where the AMD card can't match

its rivals, and that's in our thermal and power tests. The HD 7770's idle and peak temperatures of 47°C and 73°C aren't dangerous, but they're much higher than the GTX 650's 27°C and 60°C figures. The HD 7770 will provide a little more drain on your electricity bill too, thanks to its peak power draw of 141W – the GTX 650 sucked just 114W from the mains at peak.

The AMD card isn't quite as manageable as the Nvidia chip either. While both parts require six-pin power connectors, the HD 7770 is 209mm long – much larger than the Nvidia card. You'll need to ensure there's room

in your PC, especially if you're building inside a small-form-factor chassis.

We're willing to pay a marginally higher electricity bill, though, when this card is so much better than its main rival. The HD 7770 trounces the GTX 650 in three of the four games benchmarks, and it's got just enough power to handle high-end games on a single screen. If this month's victorious Nvidia card is too expensive, this is the best alternative.

micro mart

7 Quality
9 Value

8 Overall

Budget GPUs

AMD Radeon HD 7790

The Radeon HD 7790 stands out for a couple of reasons: it's AMD's most powerful mid-range graphics card and, at £110, it's the most expensive GPU in this group.

For that money, you get a card that uses the same basic architecture as the high-end HD 7970. The core inside this card has been cut back in order to hit the lesser budget, but it's still got a tantalising specification: just over two billion transistors inside a 28nm die, a clock speed of 1,000MHz, and a mighty 896 stream processors – the most of any card in this test.

It's available with either 1GB or 2GB of GDDR5 RAM that's clocked at 1,500MHz, and its 128-bit memory bus is the equal of every other card here. Its major rival is the Nvidia GeForce GTX 650 Ti and, like that card, the HD 7790 requires one six-pin power connector to work. It's physically larger too: our sample's 212mm length outstrips the Nvidia card's 146mm PCB, so it's worth getting out a tape measure if you want to slot this card inside a smaller PC.

The HD 7790 didn't provided good scores in all of our games benchmarks, but it lagged behind the Nvidia card in three of the four tests. Its 39fps average in *Crysis 3*'s Medium-quality benchmark at 1,920 x 1,080 was six frames slower than the GTX

650 Ti, and the AMD card was five frames behind the competition in *Battlefield 3*'s High-quality, full HD test – it scored 55fps.

The AMD card's score of 119fps in the *DiRT 3* test indicates that it'll play this game without breaking a sweat, but the GTX 650 Ti rattled through the same benchmark at 122fps.

AMD's chip could only take the lead in one of our games tests – *Bioshock Infinite*. The HD 7790's score of 57fps in the High-quality full HD test was two frames quicker than the Nvidia card.

These results are surprising considering the HD 7790's class-leading performance in theoretical benchmarks. The HD 7790's overall result of 21,924 in 3DMark's Cloud Gate test is marginally ahead of the GTX 650 Ti's score of 21,259, and this gap was maintained across Cloud Gate's graphics run.

The gap widened in the more demanding Fire Strike test. The HD 7790's graphics and overall scores of 3,573 and 3,244 are significantly quicker than the GTX 650 Ti's results of 3,186 and 2,929. It's clear, then, that the HD

7790 just isn't deploying its raw power as efficiently as the Nvidia card.

The HD 7790's idle temperature of 45°C is much higher than the Nvidia card's 33°C result, but there was little to choose between the two chips when we stress-tested the cards – at peak performance the AMD chip's 71°C result was only one degree hotter than its rival. The two cards were close together in power tests, with the HD 7790's idle and peak draws of 48W and 142W virtually identical to Nvidia's requirements.

There's not a huge amount of breathing room between the HD 7790 and GTX 650 Ti but, in several key categories, the AMD card falls behind. It's slower than its rival in three out of the four games tests, it's a little more expensive, and it's more cumbersome. It's for that reason it's not able to compete with the award-winning GTX 650 Ti.

micro mart

8 Quality
7 Value
8 Overall

Budget GPUs

Nvidia GeForce GT 640

The GeForce GT 640 is this test's cheapest card, at £60, but there's a sign that this chip might not be cut out for gaming – unlike the two other Nvidia cards on test it's a 'GT'-branded part rather than a 'GTX' card.

The GT 640 is based on the same GK107 core as the GTX 650, which means this cheaper card still has 1.3 billion transistors, 384 stream processors and a 28nm die. Nvidia has made cuts in other areas in order to reduce performance: the 900MHz clock is the poorest of the three Nvidia cards on test, and only DDR3 memory is available. The GT 640 comes with either 2GB or 4GB of RAM, but it's slower than the GDDR5 found on more powerful cards.

The GT 640 doesn't stack up well against AMD's Radeon HD 7750 either. While the Nvidia card is £10 cheaper, the AMD product has more transistors and stream processors in tow.

The Nvidia card's poor stature is reflected in this week's worst set of benchmark results. The GT 640 was the only card to slip below 20fps in the Medium-quality *Crysis 3* run thanks to its 19fps average, and it didn't return playable framerates in two other games: the GT 640's *Bioshock* average of 25fps was 12 frames slower than the Radeon HD 7750, and the Nvidia card's *Battlefield* result of 27fps also lagged behind.

Only in the less demanding *DiRT 3* did the GT 640 score a playable average of 57fps, but that score doesn't compare well: the HD 7750 scored 76fps, and this test's two fastest cards are more than twice as quick as the GT 640.

Suffice to say, the Nvidia chip propped up the table in theoretical tests too. Its overall score of 8,101 in 3DMark's Cloud Gate test is almost 2,000 points behind its nearest rival, and the GT 640 was around 25% slower than the HD 7750 in the trickier Fire Strike benchmark.

The GT 640 might be this test's weakest chip, but it couldn't even excel in all of our thermal benchmarks. The Nvidia card's peak power draw of 108W is higher than the 101W draw of the more powerful HD 7750. The GT 640's peak temperature of 59°C is better, mind – no other card in this test was cooler.

The GT 640 finally wins some points for versatility. Its lack of power means that half-height and passive models are readily available, so it's an ideal card to slot inside a silent media or small-form-factor PC – while passive versions of the HD 7750 are easy to find, they're all much larger than fanless GT 640 cards. The Nvidia card also doesn't need a six-pin power connector to function.

In fact, the GT 640 only really makes sense if you need a card for a passive or small-form-factor PC and, even then, we'd always advise you buy the HD 7750 if you've got the room. The GT 640 hasn't got the grunt for gaming at anything but low resolutions and quality settings, so it's difficult to recommend despite having this test's lowest price.
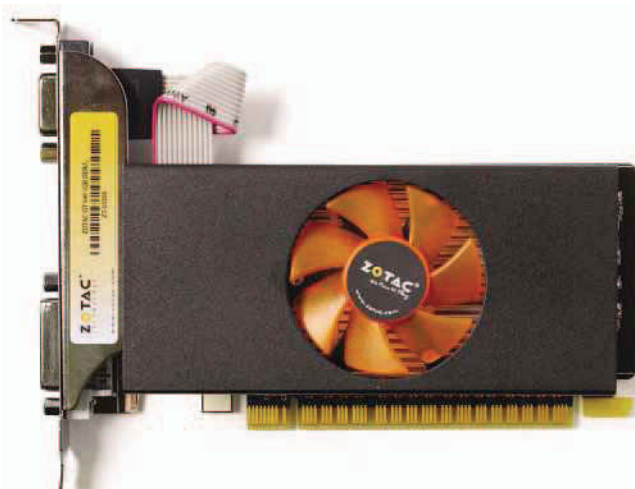
micro mart

5 Quality
6 Value
6 Overall

Nvidia GeForce GTX 650 Ti

Nvidia's graphics card ranges are infamously busy, but over the last couple of years the firm has been introducing Ti-branded cards in order to add ever more products to its rosters. These cards are often stand-out parts, and that's no different with the GTX 650 Ti.

Despite its name, this card is architecturally very different from the standard GTX 650. For starters, it's built with 2.5 billion transistors – almost double the number included in the standard card, and more than any other GPU in this test.

It's got 768 stream processors, which is so many that Nvidia has had to use four SMX units rather than the two it uses for its lesser cards, and they're clocked at a respectable 928MHz. The GTX 650 Ti is available in either 1GB of 2GB configurations and, in either case, the GDDR5 memory is clocked at 5,400MHz.

The only thing missing is Turbo Boost, which dynamically overclocks the card's core to give a little extra power – a feature only included on the GTX 650 Ti Boost.

It's a potent specification that paid dividends in our benchmarks. The 650 Ti's 44fps result in *Crysis* at Medium quality and full HD resolution is the best on test, and it's also ahead of its rival in *Battlefield 3* and *DiRT 3* – in those tests it scored 60fps and 122fps; the Radeon HD 7790 scored 55fps and 119fps.

Only in one games test did the Nvidia card fall behind the competition. The GTX 650 Ti's *Bioshock Infinite* average of 55fps is good, but it's two frames slower than the AMD Radeon HD 7790.

The Nvidia card is also a little slower in theoretical tests. In 3DMark's Cloud Gate benchmark the GTX 650 Ti scored 21,259 in Gaming and 11,660 in the Overall test, with the Radeon HD 7790 scoring 21,924 and 11,969 in the same benchmarks. It's a small gap and, if anything, it illustrates the increased efficiency with which the Nvidia card deploys its power.

We've no complaints about the GTX 650 Ti in our thermal and power benchmarks. Its top temperature of 70°C is in the middle ground in this test. Our rig's idle power draw of 45W falls is less than every AMD card here and, while the GTX 650 Ti's peak power draw of 143W is the highest here, it's only a single watt greedier than the Radeon HD 7790.

The GTX 650 Ti is a powerful card, and that means it requires a chunky cooler. That means single-height cards are thin on the ground, with most 650 Tis taking up two motherboard slots. Passive options aren't available either, and the card will require one six-pin power connector – so make sure your PSU's up to scratch. There's one saving grace, though, and it's the 146mm PCB – short enough to fit into modestly sized machines.

There's plenty to like about this mid-range card, with its modest size, good thermals and efficient power requirements all playing their part, but the main draw is undoubtedly gaming performance. The GTX 650 Ti is quicker than its main rival in three out of our four games benchmarks, and it's almost £10 cheaper to boot. If you want a card for single-screen gaming that doesn't empty your bank account, the Nvidia GeForce GTX 650 Ti is the product to buy.

micro mart

Quality 9
Value 9
Overall 9

Budget GPUs

Nvidia GeForce GTX 650

The GTX 650 might share most of its name with the victorious GeForce GTX 650 Ti, but a glance at the specification indicates that there are very few similarities between that impressive part and Nvidia's mid-range offering.

The GK107 core used in this chip only shares its 28nm manufacturing process with its more powerful brother. There are only 1.3 billion transistors, which is half the number included in the Ti card, and 384 stream processors – a poor show when compared to the 640 that AMD crammed into its competing Radeon HD 7770.

The core clock of 1,058MHz is more respectable, and we've no complaints with the speed of the 5,000MHz GDDR5 RAM. All in all, though, it's a mixed bag under the hood, even if the tiny 146mm PCB means this card will fit into the snuggest of PC enclosures.

The lack of a powerful specification showed in our benchmarks. The GTX 650's 35fps average in *Bioshock Infinite* is playable, but it's a whole ten frames behind the Radeon HD 7770 – and the Nvidia card's 41fps result in *Battlefield 3* was four frames slower than its rival.

The Nvidia card easily handled *DiRT 3* thanks to a score of 80fps but, once again, the AMD card was better – it ran through the same test to an average pace of 98fps. Only in the *Crysis 3* benchmark did Nvidia catch up – the GTX 650's

32fps score was equal to the HD 7770.

The gulf between the two cards was further illustrated by 3DMark's tests. The GTX 650's overall Cloud Gate score of 10,552 was marginally behind the HD 7770's 10,793 score, but in the graphics test the Nvidia card scored 15,077 – and the Radeon romped away with 17,417.

The gap between the two cards was more pronounced in the Fire Strike benchmark. The GTX 650 scored 2,088 and 1,989 in the graphics and overall tests – but the HD 7770 beat it with results of 2,577 and 2,778 in the same benchmarks.

The GTX 650 stole back some ground in our thermal benchmarks. Our test rig's peak power draw of 114W was much lower than the HD 7770's top figure of 141W, and the Nvidia card's maximum temperature of 60°C was 13 degrees cooler than its rival from the red team.

That's scant consolation, though, when benchmark results are considered. The GTX 650 is significantly slower than the HD 7770 in three out of our four games tests, and both cards cost the same amount of cash. If this test's winning GTX 650 Ti is too expensive, the HD 7770 remains the next best option.

micro mart

6 Quality
7 Value
7 Overall

EDITOR'S CHOICE

micromart

Nvidia GeForce GTX 650 Ti
It's top dog in most of our gaming tests and it's cheaper than AMD's nearest rival. It's simply the best value budget graphics card.

HIGHLY COMMENDED

micromart

AMD Radeon HD 7770
The HD 7770 expertly toes the line between price and performance, handling any top title on one screen while not breaking the bank.

HOW WE TESTED

Every graphics card is tested in a machine built using an Intel Z77 motherboard using a Core i5-3450 processor, 8GB of RAM and a 1TB Seagate Barracuda hard disks.

We use *Crysis 3*, *Bioshock Infinite*, *Battlefield 3* and *DiRT 3* for real-world games tests alongside 3DMark, and power figures are derived from measuring the whole system's power draw when idle and stress tested.

	AMD Radeon HD 7750	AMD Radeon HD 7770	AMD Radeon HD 7790	Nvidia GeForce GT 640	Nvidia GeForce GTX 650	Nvidia GeForce GTX 650 Ti
Manufacturing process (nm)	28nm	28nm	28nm	28nm	28nm	28nm
Transistors	1.5b	1.5b	2.08b	1.3b	1.3b	2.54b
Stream processors	512	640	896	384	384	768
Clock speed	800MHz/900MHz	1,000MHz/1,100MHz	1,000MHz	900MHz	1,058MHz	925MHz
Shader clock speed	N/A	N/A	N/A	900MHz	1,058MHz	925MHz
Memory amount/ type	1GB/2GB/4GB DDR3/GDDR5	1GB/2GB GDDR5	1GB/2GB GDDR5	2GB/4GB DDR3	1GB/2GB GDDR5	1GB/2GB GDDR5
Memory speed	1,125MHz	1,125MHz	1,500MHz	1,782MHz	5,000MHz	5,400MHz
Memory bus width	128-bit	128-bit	128-bit	128-bit	128-bit	128-bit
DirectX support	11.1	11.1	11.1	11.1	11.1	11.1
OpenGL support	4.3	4.3	4.3	4.3	4.3	4.3
Interface	PCI 3.0	PCI 3.0	PCI 3.0	PCI 3.0	PCI 3.0	PCI 3.0
PCB size	172mm	209mm	212mm	146mm	146mm	146mm
Power sockets	N/A	1 x 6-pin	1 x 6-pin	N/A	1 x 6-pin	1 x 6-pin
TDP	75W	80W	85W	65W	64W	110W
Crysis 3 1,920 x 1,080 Medium	28	32	39	19	32	44
Bioshock Infinite 1,920 x 1,080 High	37	45	57	25	35	55
Battlefield 3 1,920 x 1,080 High	34	45	55	27	41	60
DiRT 3 1,920 x 1,080 High	76	98	119	57	80	122
3DMark Cloud Gate Overall	9791	10,793	11,969	8,101	10552	11660
3DMark Fire Strike Overall	2020	2,577	3,244	1,449	1989	2929

REVIEWS

Eclipse Galaxy i332r777

An overclocked graphics card, Full HD monitor and impressive case for a surprisingly low price - how does this full PC package stack up against the competition?

Eclipse is a long-term player in the UK PC market, and it's no surprise to see the firm in rude health when it's putting together packages like this. Its latest machine doesn't just include a base unit – for £660 inc VAT you get a monitor, keyboard and mouse too.

It's a generous deal, and the monitor included - LG's 24EA53VQ - is a 24" IPS panel with a native resolution of 1,920 x 1,080. It's not got the sheer levels of quality needed for complex colour work, but it's bright, reasonably accurate and has decent contrast, which makes it ideal for gaming. It's not without issues, though: colours are a tad oversaturated, and we're not too keen on the stand, which is a little flimsy and is barely adjustable.

The Core i3 processor isn't particularly speedy, but Intel's budget Ivy Bridge chips have enough power to handle everyday computing. The i3-3220 is a dual-core, 3.3GHz

part that's accompanied by 8GB of RAM, and the combination scored 0.82 in our application benchmarks - a perfectly respectable result that'll only see it struggling when tasked with the toughest software.

The graphics card is also modest, but capable. AMD's Radeon HD 7770 runs at 1,000MHz, but the VTX-made card used here is overclocked to a

more impressive 1,100MHz. The chip rattled through our 1,920 x 1,080 High-quality *Crysis* test at 56fps and scored a still-playable 34fps when we upgraded the quality settings to Very High - proof that this machine will handle virtually all modern games as long as it's only asked to run a single screen.

Elsewhere there's a 2TB hard disk thatm along with everything else, is plugged in to an Asus P8H61-MX USB3 motherboard. As its name suggests, the backplate has two USB 3 ports, but it's a modest affair throughout: there are two memory sockets able to accept a maximum of 16GB rather than the 32GB, four-slot boards we're used to seeing, and the single PCI-Express x16 is already used - so there's no chance of dual-graphics. There's no point fitting an SSD because of the quartet of slower SATA 3Gb/sec ports, and elsewhere there are only two PCI-Express x1 slots.

It's a shame, as the 650W power supply has plenty of upgrading headroom and we

like the Cooler Master K350 chassis. Its angular exterior looks fierce, and a combination of black paint and sensible building makes this a good-looking, tidy PC in every department. There's a side-window for showing off the interior, and plenty of room to add storage – much of which, unfortunately, will go to waste.

It's quiet too, and the keyboard and mouse are comfortable if lacking in high-end features. The Eclipse has enough power on offer for everyday computing as well as high-end single-screen gaming, and it's contained in a case that's more than up to the job. The addition of peripherals is rare at this price and makes this package great value - if you're looking for an affordable PC that's ready to go out of the box then this is excellent.
mm Mike Jennings

A great buy if you're after a fully-featured PC that doesn't break the bank

Specifications
3.2GHz Intel Core i3-3220
8GB 1,333MHz DDR3 RAM
2TB Seagate Barracuda hard disk
Asus P8H61-MX USB3 motherboard
AMD Radeon HD 7770 graphics
Blu-ray reader
LG 24EA53VQ 24in 1,920 x 1,080 IPS TFT
Microsoft Wireless Optical Desktop 800
Windows 8 64-bit
One-year RTB warranty

micro mart

8 Quality
9 Value
8 Overall

EDITOR'S CHOICE micro mart

AOC i2369Vm

Mark looks desperately for a gotcha in the remarkable AOC i2369Vm monitor

micro mart
8 Quality
9 Value
9 Overall

Over the years, I've written far too many reviews that salute the feature set of a product, then only then ask why you can't get the same at a more affordable price?

It is therefore something of a culture-shock to be sent a product where I'm inclined to turn that perspective on its head, and wonder why the AOC i2369Vm doesn't cost more?

At less than £150, a typical 23" 1080p monitor might come with HDMI, even the cable, but you are usually looking at a cheap panel with poor viewing angles. The AOC i2368Vm comes with HDMI, and a HDMI cable, along with VGA and a second HDMI port. One of those even supports a Mobile High Definition Link (MHD), for you to attach your phone or tablet via a special USB cable that AOC included.

That's a nice touch, but the real shocker is that one of the four inputs is DisplayPort!

Getting that many inputs is wonderful, but DisplayPort is an option I've only previously seen in £200+ monitors, which goes a long way to explain why the technology isn't more popular.

If the DP option is the critical selling point, then you might assume that for the money this is a cheap TN panel with poor colour representation and dire viewing angles. It isn't. The i2369Vm has a super-crisp IPS panel with 178° viewing in both the horizontal and vertical planes, and a genuine 1000:1 contrast ratio. That, coupled with a frame edge of less than a centimetre, make this a desirable display.

The colours are rich and sumptuous, with no noticable backlight shadowing, and no blurring or trails once the action speeds up. There's a subtle balance in this design between the needs of representation and performance that seems very close to being ideal.

No monitor is perfect, though, and the amount of plastic here might put purists off. It also only offers a brightness density of 250 cd/m², which is enough but hardly lavish illumination.

I will also concede that the active power consumption of 33 watts is also slightly on the high side of what you can expect at this scale. Also, there are some very small speakers inside - so small that AOC doesn't quote a wattage for them I could find in the specifications. Honestly, though, none of these points constitute an excuse not to buy because, even amalgamated, they don't detract from what is essentially a very serviceable design.

I'm still somewhat bemused that you can get this monitor, which includes such a good IPS panel and fantastic selection of input options, for less than £150. There doesn't appear to be an obvious reason why it's that cheap, so it's probably best not to spend too long trying to find out.

The only problem I predict with these will be getting hold of one, because I can't foresee many hanging around unsold for very long. **mm Mark Pickavance**

A professional quality monitor at an great, economy price

MediaShare Wireless

Michael finds a wireless streaming device that doesn't always keep its promises

USB flash sticks and memory cards have been around now for a good number of years. In that period you could have probably collected a fair number of these small storage devices as we have done. Maybe, like the ones we have collected, they tend to reside in a drawer or box as they wait to be put to some practical use. Verbatim believes that it can offer a possible solution that will put these devices to good use with its MediaShare Wireless offering.

This product, like the Kingston MobileLite Wireless kit, offers to stream content stored on USB flash sticks and SD memory cards to a variety of mobile devices running on the iOS and Android platforms. Pocket-sized (112 x 79 x 14mm), this small device can set up its own network that can accept clients running a free downloadable app from the appropriate store. Unlike similar systems we have seen, this Verbatim network is private and thus password protected so that any intruders can be blocked. Annoyingly the supplied password contained characters that could be mis-identified.

Connections are available to charge the unit's 3000mAh Lithium-Ion battery pack via a micro USB port. There's also a standard USB port and a SD memory card slot for adding

> ## 66 When we moved on to using two devices, problems began to appear 99

media content. Running various tests, the battery gave me just under seven hours of use rather than the promised nine hours of continuous movie streaming promised by Verbatim.

Our tests cast some doubt on the Verbatim claim that this MediaShare Wireless product should be able to communicate with up to five devices at the same time. While working with one device, the MediaShare

Wireless unit was able to cope without breaking sweat. However when we moved on to using two devices, namely a Motorola RAZRi smartphone and a Google Nexus tablet, problems began to appear. Streaming the same data to both devices simultaneously was generally trouble free.

However, if one of the streams was paused by the device, then the chances of the

streams freezing increased greatly. In some of these instances it was possible to unblock the freeze by moving the movie along a little, but this did not always work and we were required to exit the app and then restart it in order to continue viewing the movie. There were at least a couple of occasions when even this solution failed to have the desired effect, as the Google Nexus would claim not to recognise the video and refuse to play it. We then had to shut down the tablet and restart it before it would recognise and play the movie.

Attempting to stream two different movies either from the same source or using both the attached USB flash stick and SD memory card, to the two test units only increased the frequency with which the problems appeared. I even came across one instance when the audio became jerky although the picture quality was unaffected. The various tests were carried out with all the devices in the same room, which should have removed any issues related to the distances of the system from devices and made the results all the more dissapointing.

mm Michael Fereday

A nice idea but performance did not live up to expectations

IRIScan Book Executive 3

Michael puts a hand-held scanner through its paces

⌃ *Readiris Pro 14*

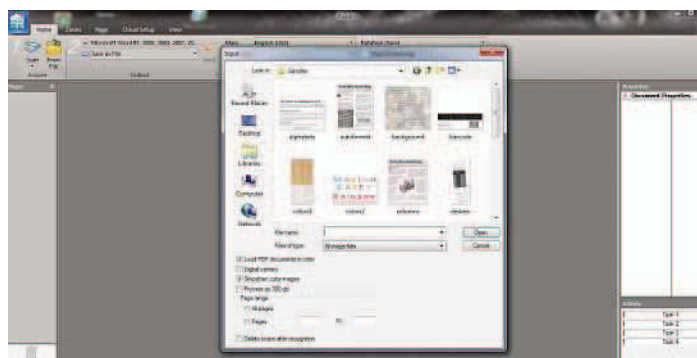⌃ *After I pressed the scan button*

IRIS has developed a number of scanning products, its latest being the IRIScan Book Executive 3 we're looking at here. It's a handheld page scanner with wi-fi capability; you simply slide the scanner over the pages of a document or a book and the resulting scans will be stored in memory until they can be transferred to a computer or mobile device by various methods.

This kit consists of the scanner unit, micro-to-standard USB lead, 2GB micro SD memory card, four AAA batteries, soft carry pouch and a CD containing two software applications and a getting started guide in PDF format. You can also download a free app from the appropriate store so that your scanner can work with your iOS or Android 4.0 device.

The two software programs, namely Readiris Pro 14 and IRIScan Direct, need to be installed separately. Readiris Pro 14 requires the entry of a product key to extend its usage beyond an initial ten days. For Windows users this product key consists of 34 characters while a Mac user will only need to enter a 15-character key. A small LCD window on the scanner provides feedback as to the type of scan and resolution setting plus the number of scans currently stored in memory. Buttons are provided to cycle through the available options, while there is a large silver button to turn the power

on/off and instigate a scan. The supplied micro SD card can be inserted into a slot on the front of the scanner to provide storage capacity for up to 2000 scans, depending on the resolution and scan type you opt for.

Scanning is generally fairly easy; you need to ensure you have a firm base for the document and use a smooth sliding motion over individual pages. You do have to take the process a little on trust as you are unable to see the scan while it is being made.

The scanner offers you a choice of wi-fi or USB connectivity. The wi-fi option is scanner-centric, which means your computer and/or mobile device will need to join the scanner's network rather than vice versa. Devices linked to this network will be disconnected from the Internet while this situation exists.

With a smartphone or tablet connected to the network and the appropriate IRIScan Book app installed, you can download scans to the mobile device. Depending

upon their format either PDF or JPG, you will be able to rotate, crop, save or open them in another application. Using the scanner to communicate with a computer via a network involves using a URL (10.10.1.1.) in order to download your choice of available scans.

The supplied IRIScan Direct software allows you to scan documents straight into applications such as word processors, spreadsheets or graphics programs. However this process can only be carried out via USB - in fact the program will refuse to load unless it detects a USB link. The on-screen image appears once the scan has been completed.

Greater functionality, including OCR technology, is available with the Readiris Pro 14 program. The OCR feature produces a reasonable level of accuracy. This software does have a Scan button which merely opens up a list of available scans for loading rather than allowing you to scan a new document.

The IRIScan Book Executive 3 is not a replacement for a flatbed scanner. It has been designed for use when away from home and in this type of environment it can fulfil a useful purpose.
mm Michael Fereday

Despite some idiosyncrasies, a useful road-warrior tool

micro mart

7 Quality
6 Value
6 Overall

Zotac Zbox Nano ID65 Plus

Zotac's newest mini-PC is both tiny and powerful

Although barely biger than a stack of CDs, the new Zbox Nano ID65 Plus is one of Zotac's highest end offerings, and retails for £550 (£475 for the barebones ID65). At this price point, the Mac Mini is a viable alternative (but a little bigger), as is Gigabyte's Brix GB-XM1-3537, which is somewhat cheaper at £415 for the barebones system.

The chassis is lovely, with glossy black plastic on the top and bottom and solid aluminium side panelling. It's reassuringly weighty and well built, and the top has a ring that glows soft blue when the system is powered on.

The screws that give you access to the interior are actually the rubberised feet, which give the case good grip when standing. If you'd prefer to hide the system out of sight, you can do so using the supplied VESA monitor mount.

The ID65 Plus has frankly astonishing levels of connectivity given its size. Four USB 3 and two USB 2 ports are joined by a 7-in-1 card reader and an eSATA port, so it should easily meet almost any external storage needs. On the audiovisual front, HDMI

> ❝ The ID65 Plus has frankly astonishing levels of connectivity given its size ❞

and DisplayPort connections are found on the rear, while a standard pair of audio jacks are located up front. An adaptor to turn the headphone port into an optical S/PDIF is provided, and 5.1 surround sound can also be made available via the HDMI port.

Wi-fi and Bluetooth are fully supported, and a Gigabit Ethernet port completes the mini-PC's networking capabilities. Finally, an IR receiver at the front ensures the Zbox Nano would serve you well as a media player, although you'll need to supply your own compatible remote.

A Windows driver disc is bundled with the Zbox Nano, but no operating system is installed, so that's an extra cost to be wary of (unless you opt for a Linux build). The OS must also be installed via USB, using a flash drive or portable optical drive.

With the feet easily removable with your thumbs,

it takes no time at all to get inside the ID65 Plus, and the first thing you'll see is the hard drive and memory. Sadly, the system is limited to single channel memory, but Zotac fills it with a 4GB 1,600MHz stick (the fastest supported speed). A 500GB Toshiba 2.5" hard drive is also bundled with the Plus edition.

The Plus is fairly priced compared to the barebones option, but users could easily double both the RAM and hard drive capacity for only £15-20 more than what the Plus costs if they opted for the barebones system.

An unusual inclusion is a nanoRAID daughterboard, which turns the single SATA 6Gbps connection into two mSATA slots. If two drives are connected to it, they can also be configured as a RAID array, which is cool for the

---

3DMark 11 (Performance Preset)
Zotac Zbox Nano ID65 Plus: 634
Zotac Zbox ID89 Plus: 415

tiny handful of people who'd use it.

A single small fan predominantly cools the CPU, but is also responsible for the only cooling that the rest of the system receives as well. It can get a touch noisy in use, especially when the system is under load. It's not likely to ruin the experience, though, but with such media-oriented systems the quietest fans are always the best ones.

> **❝ It can get a touch noisy in use, especially when the system is under load ❞**

The CPU itself is an Intel Core i7-3537U, a dual core Ivy Bridge chip with a TDP of just 17W - it's most often found in ultrabooks. It's clocked to 2GHz, but can boost to 3.1GHz in the right scenario. It also features Intel's onboard HD Graphics 4000, which is clocked at just 350MHz with a maximum dynamic frequency of 1.2GHz.

The Ivy Bridge cores do a wonderful job in tasks like image manipulation, video encoding and media playback (including 'full fat' Blu-ray ISOs), especially considering how low the power draw of the chip is. Gaming, however, is far less impressive. The Intel HD Graphics 4000 is a step up over the HD Graphics 2500 in the ID89 Plus, as 3DMark 11 shows, but even in older titles it's necessary to make somewhat large compromises on settings and resolutions to achieve playable frame rates, so any serious gamers will want to look elsewhere.

Stress testing the CPU takes it to 87°C, which is high but still well within the 105°C limit, and the chip isn't likely to be under such constant stress in real world usage.

As mini-PCs go, the ID65 Plus is excellent, demonstrating outstanding connectivity and great all round performance in a truly tiny chassis. It is, however, a very expensive system, with Gigabyte's barebones Brix (that comes with the same CPU) retailing for £60 less than Zotac's. If you need a fast media PC, and space is at an absolute premium, it's well worth a look, but if you have more space to play with the £550 could be better spent.

mm Matthew Lambert

micro mart

9 Quality
6 Value
7 Overall

A lovely mini-PC that will, sadly, prove too expensive for most

OkayFreedom

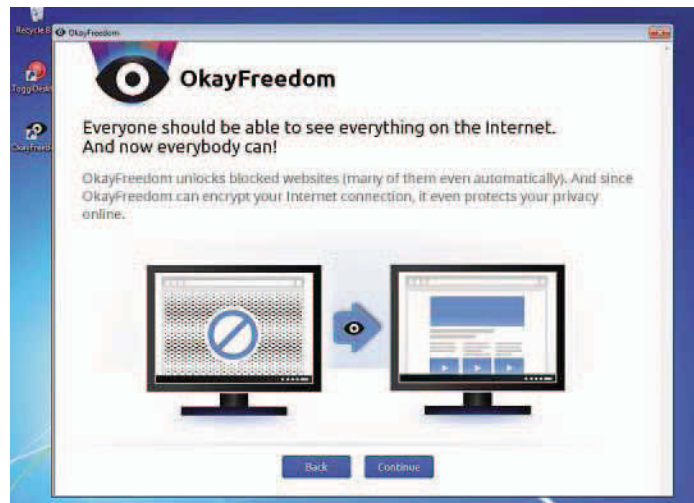**Protect your privacy, increase security and browse anonymously. Roland Waddilove goes incognito**

▲ *Most of the time there's little to see, but the installation has attractive screens*

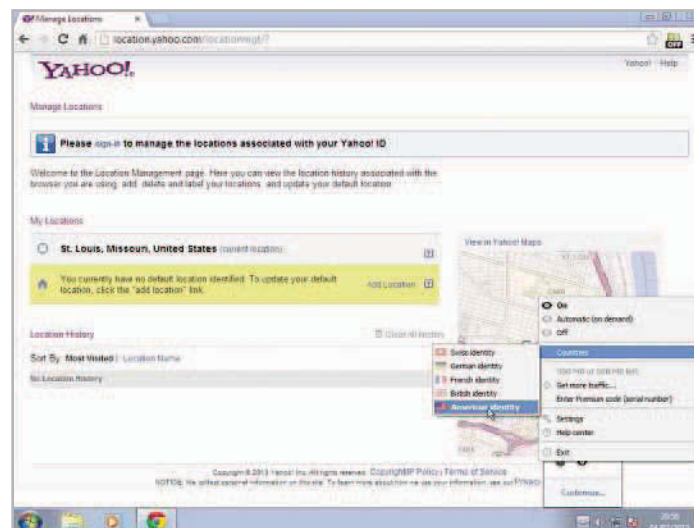▲ *After installing OkayFreedom you can choose your location*

Privacy and the internet are two words that shouldn't really be used in the same sentence. It is hard to be anonymous on the web and no matter what you do or where you go, someone somewhere is likely to be tracking your activities. Advertisers want to know your interests and the sites you visit, websites want to know who and where you are and so on. OkayFreedom is a VPN (Virtual Private Network) that provides the security and privacy that you need.

OkayFreedom is from Steganos, a company well known for its privacy and security software, and it masks your identity by obscuring your real IP address and replacing it with a fake one, and it hides your location by letting you choose in which country you want to appear to be a resident. If you are abroad with a laptop, you can't catch up on Eastenders for example, because BBC iPlayer is only for UK residents. With OkayFreedom you can appear to be in the UK no matter where you are and get access to UK content. You could also pretend to be a US resident to get a US view of websites and services too.

The software is free to download and install and you have an allowance of 500MB of internet traffic a month. That isn't a lot, but by introducing five friends to the service you get an 100MB bonus for each one that signs up, to give a total of 1GB. There is also a Premium Flat service that provides unlimited bandwidth for £55.86 a year. This would be useful if you watch a lot of video online, which could eat up the bandwidth. There are monthly payment options too.

OkayFreedom adds an icon to the notification area at the right side of the taskbar and clicking it displays a menu. You can choose an identity by selecting the country and you can be Swiss, German, French, British or American. After selecting the American identity and using a website to find my location, it said I was in St. Louis, Missouri, United States. Websites assumed as much and presented US content on news sites, Google displayed a US doodle, and so on.

A really interesting feature of OkayFreedom is the auto mode. There are extensions for Chrome and Firefox that detect when a website checks your location. The VPN then automatically switches to the location that the site expects to see. For example, when we visited Hulu, the US TV and movie streaming site, OkayFreedom detected that it is only available to US residents and switched my country to US. It does take 30 seconds or so to switch, but it's quite a clever feature nonetheless. I don't know whether it will work with every site, but you can always switch manually. In addition to auto settings, there is on and off, and you can see how much of your bandwidth you have used.
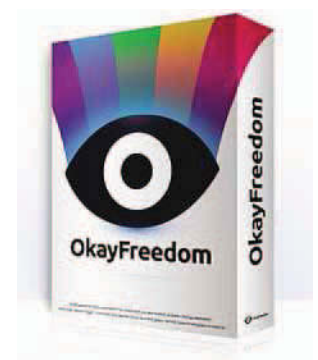
The service is easy to use and it works well. The price is reasonable and the only thing that might put you off is the limited list of countries to which you can switch. Europe and US are covered, but you couldn't be Australian for example.
mm Roland Waddilove

It protects your privacy for free and unlocks regional content

Central

Michael has been placing his data in a centralised location
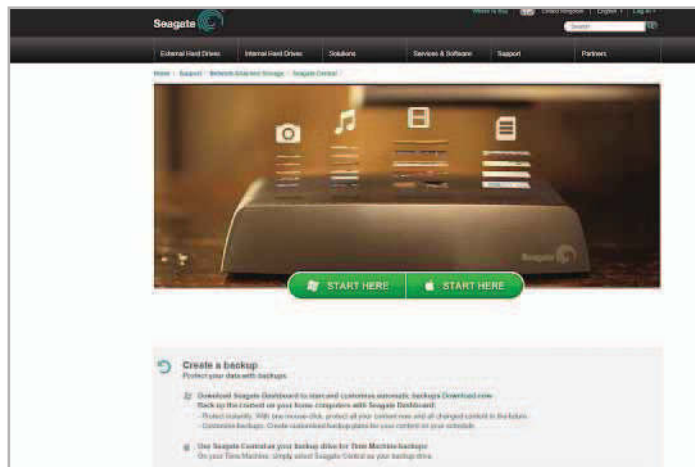
▲ *Setting it up*

With the plethora of storage devices currently available, and even some legacy devices (yes, I am referring to floppy disks) that we hold on to long after the technology to access the data has become harder to locate, it is often difficult to track down a particular item. Seagate believes it has a possible solution offering a single storage device with wide ranging access options. This product is a NAS device, available in 2, 3 and 4TB capacities, entitled Seagate Central.

Predominately black in colour, apart from the brushed metallic grey front plate, the Central unit has a solid appearance and looks well ventilated but it does not take too long before the device becomes warm to the touch. Fortunately the temperature rise levels out quickly. The ventilation is provided by a mesh grill running across the sides and top of the unit plus a perforated base, raised above the surface on which it sits by four rubber feet. Positioned on the rear of this 216 x 145 x 42mm box are connections for the mains power lead, Ethernet and a USB 2.0 port for attaching a non-networked device. Leads are supplied for power and Ethernet connection.

Setting up this product is straightforward. You just need

to connect the power lead and link the Central box to your router. There will be a two to three minute delay as various housekeeping tasks are carried out before a steady green LED indicates you are ready to move on. You then need to visit a website using the URL supplied in the Getting Started Guide.

Once you arrive at the site you can personalise your NAS with a user-name and password protect it. Folders can be created to go alongside the default public offerings of music, photos and videos. Each of these ready-made folders contains a selection of sample files.

The Seagate Central interface divides its functionality into

areas access via tabs running across the top of its screen. Using these tabs you can quickly switch between sections entitled Home, Users, Facebook, Services and Setup. You can edit and add new users, create a link to your Facebook account and adjust features such as Remote Access, Seagate Mobile, DLNA and iTunes.

Along with the various devices connected to your home network, you can access the Central content with your mobile devices, though you will need to download the appropriate app for your smartphone or tablet. The Seagate Media App is available from the Apple Store, Google

Play, Amazon Appstore and Samsung App Store.

With its capacity, Seagate feel that this NAS device can act as your backup repository. Available for downloading from the website is Seagate Dashboard, which contains the backup facility. You will need a serial number to install this application, though that's conveniently located on the base of the Central device.

This software allows you to create and save backup jobs. You can select to target all non-system files on local disks or pick any combination of categories that include Personal, Document, Picture, Music and Video. There is also an option to select specific files with backups scheduled on a continuous, hourly, weekly or monthly basis. When necessary a Restore option is available. This backup software performs adequately but is a little on the slow side.

In addition there is support for Facebook, Flickr and YouTube allowing for files to be uploaded for sharing. You can also set up link for the automatic saving of your content on Facebook and Flickr. **mm Michael Fereday**

micro mart
7 Quality
7 Value
7 Overall

A useful NAS option for keeping your data in a central and easily accessible location

micro mart

SUBSCRIPTION FORM

☐ **YES!** Please start my subscription to Micro Mart and send me my **FREE Linux Guide.**

OR ☐ I am an existing subscriber, please extend my subscription to Micro Mart with this offer.

COMPLETE YOUR DETAILS

Mr/Mrs/Ms _____ Forename _____

Surname _____

Address _____

_____

_____ Postcode _____

Daytime phone _____ Year of birth _____

Mobile phone _____

Email _____

SELECT YOUR PAYMENT METHOD

1 ☐ **Direct Debit Payment** only £19.75 every 13 issues
– **Save 24%** on the shop price – UK Only

Dennis Instruction to your Bank or Building Society to pay by Direct Debit

DIRECT Debit

Name and full postal address of your Bank or Building Society

To the manager: Bank name _____

Address _____

Postcode _____

Account in the name(s) of _____

Originator's Identification Number

7	2	4	6	8	0

Instructions to your Bank or Building Society
Please pay Dennis Publishing Ltd. Direct Debits from the account detailed in this instruction subject to the safeguards assured by the Direct Debit Guarantee. I understand that this instruction may remain with Dennis Publishing Ltd. and, if so, details will be passed electronically to my Bank/Building Society.

Branch sort code
☐☐ ☐☐ ☐☐

Bank/Building Society account number
☐☐☐☐☐☐☐☐

Signature(s) _____

Date _____

Banks and building societies may not accept Direct Debit instructions for some types of account

2 ☐ **Cheque or Credit/Debit Card Payment** 26 issues for only £39.50
– **Save 24%** on the shop price

☐ I enclose a cheque made payable to Dennis Publishing Ltd.
☐ Please charge my: ☐ Visa   ☐ MasterCard
                    ☐ AMEX   ☐ Debit/Maestro (Issue No. ☐☐)

CARD NO.
☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

START DATE   EXPIRY DATE
☐☐☐☐   ☐☐☐☐

SIGNED _____ DATE _____

RETURN THIS ORDER FORM TO

**Freepost RLZS-ETGT-BCZR,
Micro Mart Subscriptions Dept, 800 Guillat Avenue,
Kent Science Park, Sittingbourne ME9 8GU**
(This address can be used on an envelope – no stamp required)

You will be able to view your subscription details online at **www.subsinfo.co.uk**
Gifts are limited to the first 80 orders. UK offer only. Please allow 28 days for delivery. Dennis Publishing Ltd reserves the right to replace this gift with one of equal or greater value.

Dennis Publishing (UK) Ltd uses a layered Privacy Notice, giving you brief details about how we would like to use your personal information. For full details please visit our website **www.dennis.co.uk/privacy/** or call us on **0844 844 0053.** If you have any questions please ask as submitting your details indicates your consent, until you choose otherwise, that we and our partners may contact you about products and services that will be of relevance to you via, direct mail, phone, email and SMS. You can opt-out at ANY time via **www.subsinfo.co.uk** or **privacy@dennis.co.uk** or **0844 844 0053.**

Offer Code: **D1272P**

FREE
LINUX GUIDE

with a subscription to Micro Mart

FREE DISC | LATEST VERSION UBUNTU 11.04

LINUX THE COMPLETE MANUAL

Easy step-by-step workshops

FREE SOFTWARE FOREVER

install guide
...re problems solved
...ing made easy

From the experts at

WORTH £8

Subscribe to **Micro Mart** today, and you'll not only get the UK's top magazine for computer enthusiasts **delivered to your door every week**, but you'll get this great **Linux guide** as your **FREE welcome gift too.**

SAVE £s WITH THIS GREAT SUBSCRIPTION DEAL:
- **FREE** Linux guide
- Pay **less than £20 every 13 issues** when you pay by Direct Debit!
- **Get your issue hot off the press**
- **FREE delivery** to your door!
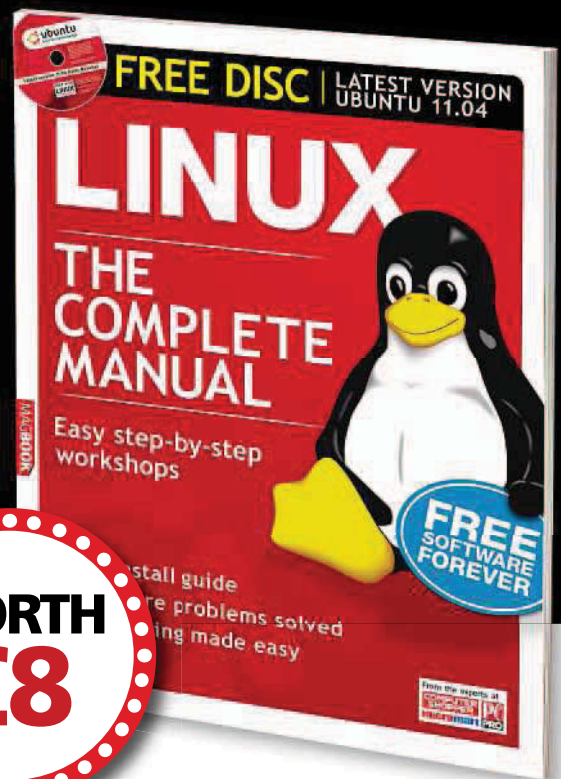
YOUR FREE GIFT
Linux Guide

Linux is now as attractive, easy to install and simple to use as Windows. What's more, it's absolutely free. Your free Linux guide includes:

- Full Install guide
- Step-by-step workshops
- Tips on overcoming common problems
- Suggestions on the best free programs to download

CALL NOW 0844 844 0082
or go to **www.dennismags.co.uk/micromart**
using offer code: D1272P

How-To Basics
Speed up Linux
Part 2

Part two of giving that old Linux system a good tweaking.

Last week we looked at some basics on helping to speed up an aging or slightly older Linux distribution. This week, we'll finish off with a selection of tips that will certainly put some spring back into your Linux distro.

As with last week we're using our aged Ubuntu build, which has seen better days and could really do with being sent to the great format pile in the sky, but we think there's still hope for it yet.

Preload Your Apps

Getting a quick boot time is one thing, but admittedly, fairly useless if once booted the system takes an age to load up the applications. That being the case we have this fine little program called Preload which, according to the documentation, is an adaptive read-ahead daemon that will constantly run in the background and intelligently observe what applications are used most often, then cache them up so they load faster over time.

Although we've spent a little time removing unwanted applications, using Preload can be excused as it will put some of the unused RAM in your system to good use. To install Preload, open a Terminal and type:

sudo apt-get install preload

Once installed, Preload will start doing its thing without any help needed from you, the user. However, we can have a little play around with its configuration by typing in:

sudo gedit /etc/preload.conf

In this file you'll see a number of options that can be fiddled with, along with explanations as to what they do.

The defaults set are probably good enough for most systems out there, so unless you have something specific in mind then you should generally leave them well alone. Should you wish to have a fiddle with them, then take a look at the memtotal, memfree and memcached values, using the following formula:

(total RAM x memtotal) + (RAM available x memfree) + (cached memory x memcache)

You can fine tune the extra RAM in your system to better accommodate any applications you think will benefit from Preload. If you want to check on what files Preload is caching, open a terminal and type:

sudo less /var/lib/preload/preload.state
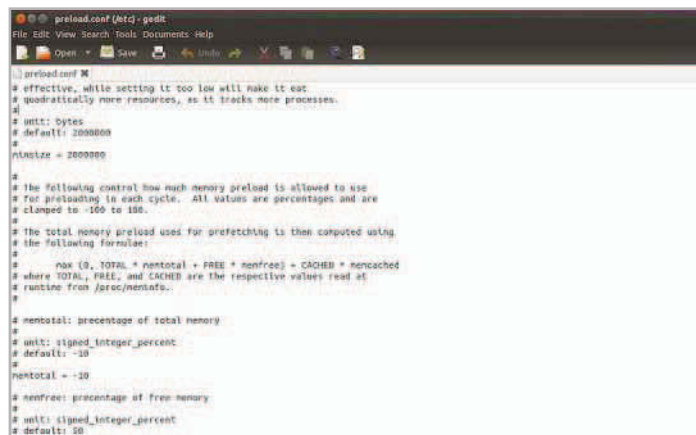
Given time, it has been proved that Preload can improve the load times of the likes of Firefox, LibreOffice Writer and Evolution by up to 55%. As to how long that will actually take in terms of seconds depends greatly on how much you use your Linux system.

Startup With All Cores

If you're using a modern build of Ubuntu or other distro after 10.04 or 14th May 2010, then this next step can be skipped, however, if you are on an older build and you have more than one core available, then read on.

Older Ubuntu and other Linux distro's only see a single core during startup processes, but there is a way to make them see all the cores during startup by altering one file. Whether or not this will actually speed up the system during startup is debatable, but a lot of people swear by it so we thought we'd give it a try. Start by typing in the following into a Terminal window:

sudo gedit /etc/init.d/rc

▲ *Preloading you apps could offer some great results*

▲ *Fire up Linux on all cylinders or cores*

▲ *Making your Swappiness permanent, providing it works of course*

▲ *This will give the current value of your Swappiness*

Scroll down slightly until you find the entry 'CONCURRENCY='. If the value displayed after the equals on that line is 'none', then change it to 'shell'. If the value denoted is 'makefile', then leave it alone as the method we are describing is now obsolete for your system due to an update. If you need to make an alteration save it, exit and reboot your system.

Enjoy Better Swappiness

Swappiness, as ridiculous as it sounds, is in fact a property within the Linux kernel that changes the frequency of swapping out runtime memory. The values are between 0 and 100 - a low value will tell the kernel to avoid swapping as much as possible, whereas a high value will make the kernel use the swap space more aggressively.

Usually, the default value in most systems is around 60, but you can find out your kernel swappiness value by typing in:

cat /proc/sys/vm/swappiness

There are many schools of thought as to what the value of the swappiness should actually be. For most, the default value of 60 is just fine, but others say that this is a throwback of the old days of low memory PC's.

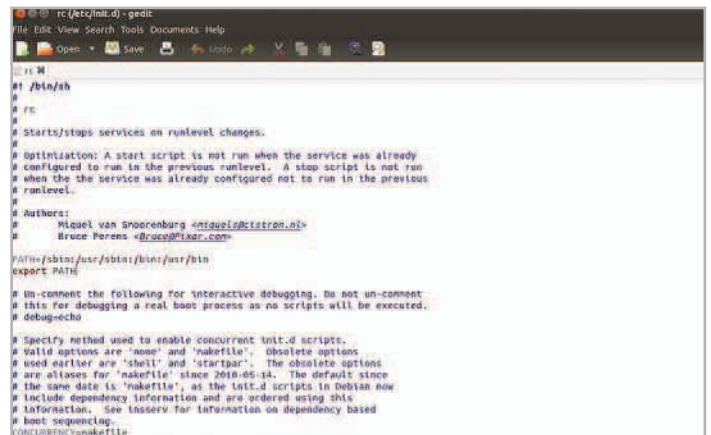These days, the Linux population say that the modern machine can cope with a swappiness value based on the following, if your PC has:

Less than 512MB RAM: 60
Between 512MB and 1GB: 40 to 50
Above 1GB: 10

As to whether that will work on your machine is anyone's guess. To be sure you're going to have to try out a selection of values to see which best suits your needs. To alter the swappiness level permanently, type the following into a Terminal:
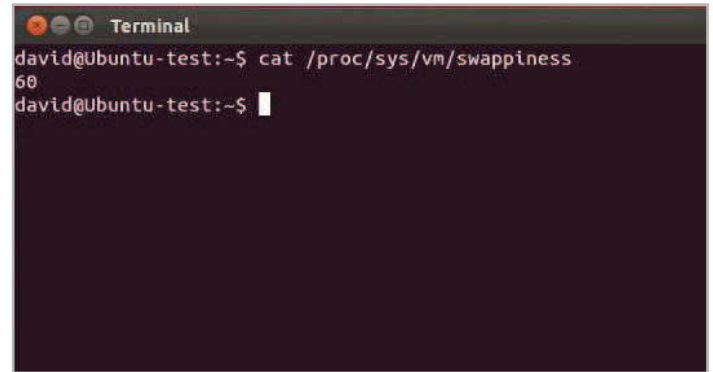
sudo gedit /etc/sysctl.conf

Scroll through the file and if the line: vm.swappiness= exists, then change the value to one of the numbers above. If it doesn't exist, then make a new line at the bottom of the file with the above command, for example:

vm.swappiness=10

Save the file and reboot your PC to see if there's any change.

As we said, have a play at finding the right balance by altering the value after the equals.

Other Speed-ups

Hopefully these few tips will have made some difference and put a spring back into the step of your flagging Linux machine. But there are a number of other ways that improve the response times, boot up times and the general well being of Linux.

Software Based

A sleeker desktop environment will work wonders for your system, choosing Gnome over KDE or Unity will improve the speed, as will Xfce over Gnome, but that of course means having to do away with your desktop.

Likewise, Compiz effects may look blindingly brilliant, but they can have quite a nasty effect on your system resources. In short, if you don't need to have a 3D desktop and a sparkling mouse trail, then turn it all off.

Uninstalling dead apps is an obvious choice, regardless of your OS, so be brutal. If you haven't used it in a while, then think if you're likely to ever use it again. If not, then get rid of it.

Finally

There are a number of other tweaks you can make to Linux to help improve its overall performance, but some of them could end having the opposite effect on the system when the next updates comes out. It's always best to apply the tweaks individually and then give them some time to settle in; apply any updates and still see if the benefit is there. As always, it's down to trial and error, but it does give us a good excuse to further tinker with our beloved Linux machines. **mm**
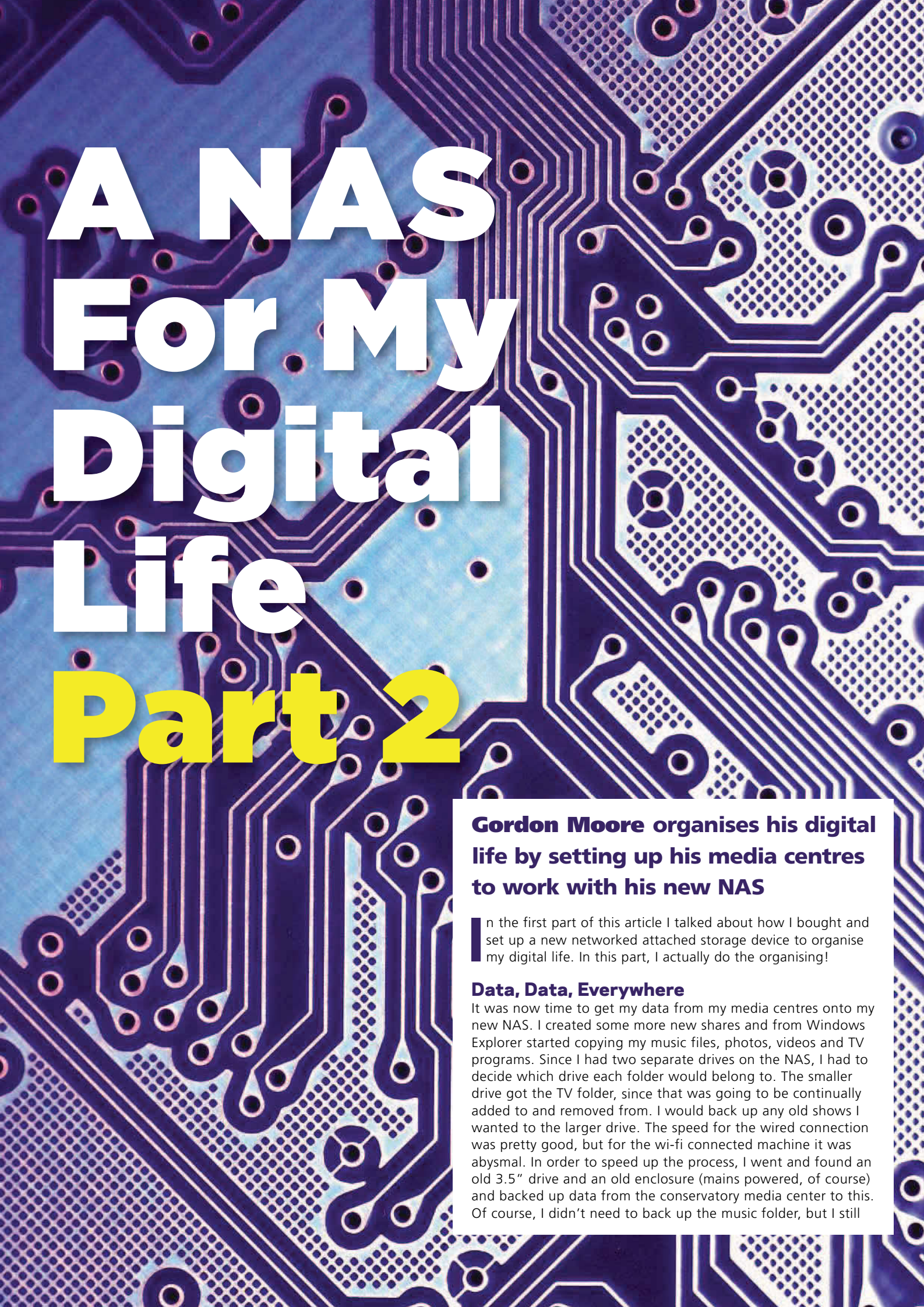
▲ *Make that penguin fly!*

Browsing Improvements

Getting the system nippy is one thing, but when using it for browsing or the like it's a little annoying to find that your browser is a serious source of lag.

To combat this try using AdBlock for Firefox and Chromium. It uses a database to stop the more common and aggressive advertising campaigns that significantly lessen your overall browsing speeds.

A NAS For My Digital Life

Part 2

Gordon Moore organises his digital life by setting up his media centres to work with his new NAS

I n the first part of this article I talked about how I bought and set up a new networked attached storage device to organise my digital life. In this part, I actually do the organising!

Data, Data, Everywhere

It was now time to get my data from my media centres onto my new NAS. I created some more new shares and from Windows Explorer started copying my music files, photos, videos and TV programs. Since I had two separate drives on the NAS, I had to decide which drive each folder would belong to. The smaller drive got the TV folder, since that was going to be continually added to and removed from. I would back up any old shows I wanted to the larger drive. The speed for the wired connection was pretty good, but for the wi-fi connected machine it was abysmal. In order to speed up the process, I went and found an old 3.5″ drive and an old enclosure (mains powered, of course) and backed up data from the conservatory media center to this. Of course, I didn't need to back up the music folder, but I still

did a check to make sure there was nothing extra in that folder (see boxout).

As I was copying – and this was after some hours – I noticed a very bright red light on the NAS. I feared the worst, thinking that my 'Normal' drive had failed. However, I also got an email. It told me that one of the drives was filling up. I realised I had made a huge boo-boo. I had far more data on my machines than would fit on the NAS.

Even though I backed up some rarely, if ever, used data to some old 3.5" drives, I still had too much. I was going to have to buy some much larger drives.

I still wanted to go for 2.5" drives and, as luck would have it, I found some 1 TB 2.5" drives going cheaply but as new on Amazon. These drives had been ripped from unused machines, but were only £45 each with postage. I took the risk and bought two. Well. not too much of a risk on Amazon, but a huge risk perhaps on eBay.

> ## 66 I had made a huge boo-boo. I had far more data on my machines than would fit on the NAS 99

The disks arrived quickly and looked okay, although the 'Do Not Remove' foil looked as though it would easily come off. I did a check with the drives on my Windows machine and ran a full scan on one, and it seemed fine. I even downloaded the Seagate drive tester utility, and this again showed that the drives were fine. I removed my old drives and installed the new ones. I was going to fit these properly with the new caddies that had arrived.

At this point, I realised that this was not going to work. The QNAP is clearly not designed for 2.5" drives. The bottom drive that slides in has the connector in the correct position for a 3.5" drive, but if the 2.5" drive is fixed to the caddy, then it is way off the line. This drive had to be fitted without a caddy. I nearly couldn't fit the top drive either, because with it being on the caddy, the supplied SATA cable and disk power cable struggled to reach it. Finally, I had an issue with the angled connector not having enough space to connect properly. Life is never easy, is it?

Once again, I had to go through the process of flashing the NAS and of setting it up again. I ran full scans on both disks and they both came up 'Good'.

Now I started getting my information copied across. This took many hours, mostly overnight copying or using Logmein to control the copy when I was at work. At least the copying was giving the NAS a good workout. Now I had all my data organised on the NAS, I had lots of stuff backed up on older 3.5" drives and my music and important data was also backed up.

It would have been nice before I loaded the new drives to have done a backup and then restored to see how this process worked out, and in a business or mission critical setup, this is to be strongly recommended, because who knows what gotchas are lying in wait for the unwary. Unfortunately, I did not have any large enough hard disks lying around to try it out.
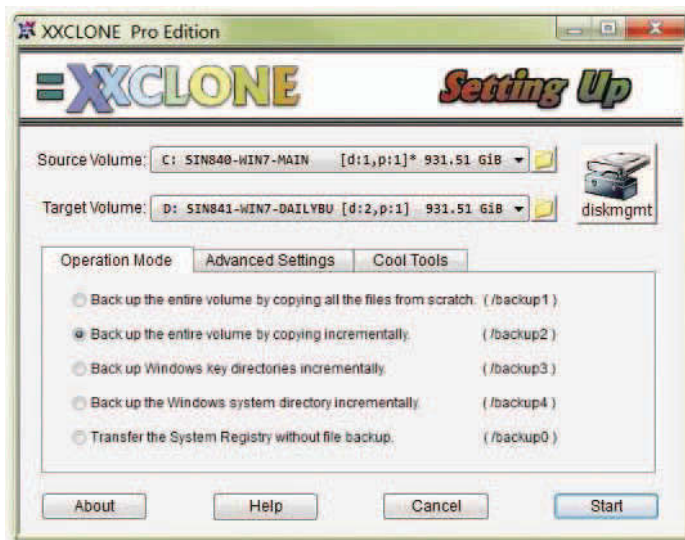
▲ *Fig. 1: The excellent and free XXClone*

▲ *Fig. 2: Organising the Media Center libraries*

Media Centres - Sorted!

Now that I had removed most of the data from my media centres and stripped these of any data to be as minimal as possible, including turning off the swap file, I was ready to clone the hard disks in these to the SSDs, using the excellent, easy-to-use and free XXClone. Both machines booted up with the new SSDs without any problems - amazing.

The next step was to get the Media Center libraries configured to look at the NAS. This is quite easily done from within the Media Center settings. The process is rather long winded though. The design of the user interface is very poor, with lots of unnecessary prompts and with the user having to keep on going through the process lots of times. You would think Microsoft would by now be able to produce a more intuitive interface. To locate a folde,r you enter the share name, so for example: \\MyNas\TV, or \\MyNas\Photos

However, I hadn't counted on the amount of time it would take to rebuild the libraries – in particular the music library is very large. I have found that the best way seems to use Windows Media Player first to build the libraries, before Media Center gets its go. It seems that there is some strange interaction going on between these two applications, with each building its own data structures. I used Big Meter Pro to observe the performance, and there was a lot of thrashing going on – you can't hear the disk on an SSD! Eventually (and I mean after some considerable time - over a day), everything seemed to have settled down.
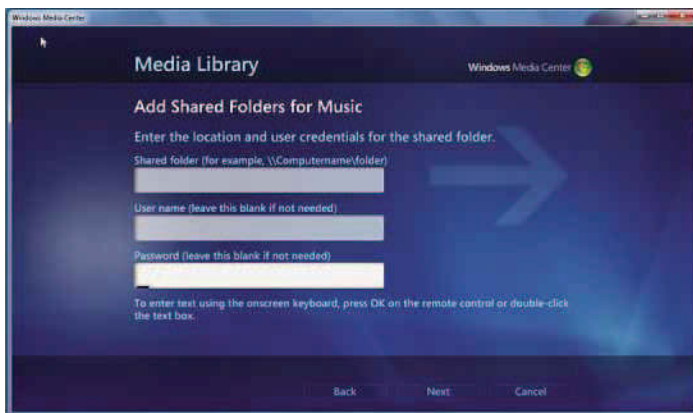
▲ *Fig. 3: Adding the shared folders*
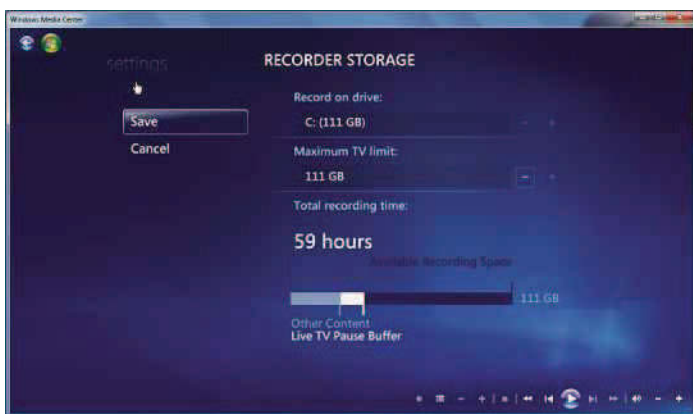
▲ *Fig. 4: Record TV to a different location but not to a NAS – it won't!*

For the cabled media centre, video playback and playback of music audio was seamless. No issues at all. For the wi-fi machine it was useless. I then had to make another purchasing decision and buy some HomePlug adapters. I chose the TP-Link PA411KIT AV500 500 Mbps Powerline adapters. These arrived after a couple of days and, to my amazement, they worked immediately. My conservatory is on a spur (with an RCD to protect it.) My media centre is plugged into an extension lead (non-surge-protected, though). I thought I might have trouble using the same extension block for the adapter, but no, it was wonderful. Video now played without a hitch. Everything was going well – or so I thought.

Microsoft, What Is Your Problem!

The next issue was to record my programmes to the NAS, rather than the SSD of each machine. I knew there was an option in Media Center to change the drive and folder that TV is recorded to. I eventually found it in Settings, but it would not allow me to enter the NAS share. It just wouldn't appear in the list. Eventually, after searching with my best friend, Google, I discovered that unless you're prepared to go down the road of some extensive registry hacks and configuration with user accounts, it's not possible.

For some reason, Microsoft will not allow Media Center to save to a NAS share. This is due to some special account that Media Center runs under. Now I'm not saying that this is not necessary, but then surely the programmer who was writing this part of the code should have said to herself, "Hey, I bet someone will want to save to another PC or NAS sometime. Well, it won't take me more than a few minutes to write that code, especially since I have a Masters degree from MIT and I'm

a real geek programmer." I'm sure that our intrepid programmer did just that, but then some jobsworth said "Oh no, that's not part of the spec. We can't allow that; remove the code," so it was commented out and now I can't do anything as simple as record to NAS!

So what could I do? Well, the only thing left to do was to follow the advice of some kind soul who said to write a batch file to copy the wtv files to the NAS and use Scheduler to trigger it on some event. It was suggested that the 'end of programme' would be a good option. As soon as the programme finishes, the scheduler is triggered and runs the move code. I decided against

> 66 **Coronation Street is far too important to not have been recorded at the same time on both machines** 99

this, as I wondered what would happen if the same programme was being recorded on both machines and there was a clash of some kind. We often do this, since Coronation Street is far too important to not have been recorded at the same time on both machines – well, we all need to live with some compromises to maintain the WAF (wife acceptance factor).

Instead I decided to run a scheduled move at a given time each morning (3am). I discovered that with this I needed to select some additional options to make sure that the batch file will run when the computer is asleep, regardless as to whether anyone is logged on. It seems, though, that if there's already a file with the same name on the target drive, it fails to copy. This isn't an issue, as the programme will appear on both machines anyway and therefore appears on the recorded TV screens of both machines. I may need to go down the route of using something more sophisticated such as Robocopy (Robust copy).

At first I did experience some issues with recording TV. Nothing to do with the NAS, but it would seem to have been due to some tweaks that I carried out on the SSDs (on prefetching and superfetch, for instance). After I reversed, the tweaks I had no problems. This does go to show how interrelated the various services can be. It also shows that the MS programmers are using the OS in very non-standard ways in order to tweak the performance.

After some weeks of using the system, it now all seems to be working very well. Programmes record from both machines with no problem and are available from either machine the next day. The playback is marvellous, with no stuttering or delay. I am very pleased with this aspect of the device. Everything is so organised now, and even when the media centres are asleep I have access to all my files and data.

MyCloudNAS Service – Music On The Move

After a few weeks of use, I decided it was time to have a look at some of the other offerings that my NAS had available – in particular the ability to play my music collection away from home.

I configured my router to allow me to link to the router through port 8080 and tried to connect to it from work. This didn't work. It was easy enough inside the home network, but no joy from without.
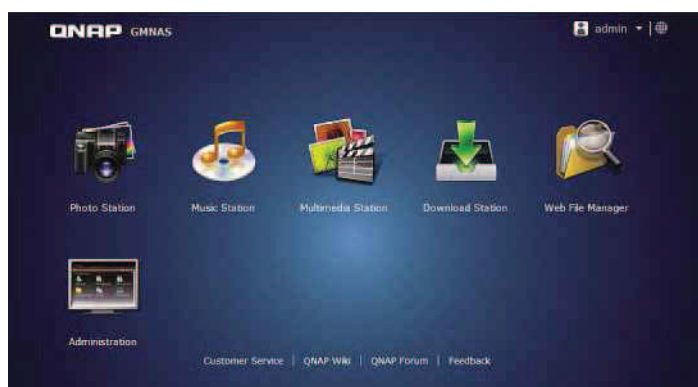
▲ *Fig. 5: Media Stations on the web interface*
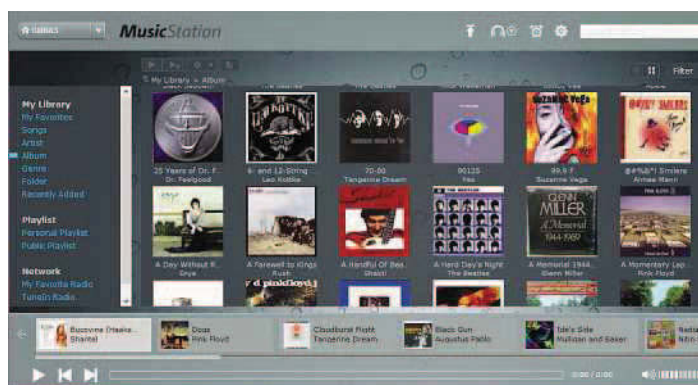
▲ *Fig. 6: The Music Station*

> ❝ **At least the copying was giving the NAS a good workout** ❞

Some research time later and I discovered that I was supposed to use the QNAP MyCloudNAS service to do this. (I'm not quite sure why I can't do it directly though?)

This is set up from within the Administration and MyCloudNAS service node and the corresponding wizard. Essentially you're registering yourself and your NAS to QNAP, although I'm not entirely sure what the security implications of that might be. This is a similar idea to using dynamic DNS from companies such as **ww.dyndns.com**, which is also supported, by the way. However, once done, it allowed me to connect via a web link to my NAS.

There is available on the web page a Photostation a MusicStation, a MultiMedia Station and a Web File Manager (see Fig. 5). Using the MusicStation (see Fig. 6), I figured I would be able to simply link to my music folder and away I'd go. Here I hit yet another problem. I had created my own music share (folder) on the NAS and there was no way I could connect to it. The software would simply not allow me to link to the folder I wanted.

It turned out that the music folder and/or files had to be within the preset Multimedia folder that was created on the initial configuration. I tried creating a shortcut, but no dice. With reluctance I moved my entire music library so that it was

Backups, Oh Backups

There I was sitting in the conservatory, thinking I'm in the mood for some blues. I used Media Center to navigate to SeaSick Steve and couldn't find the album I was looking for. How weird. Okay, so I'll re-rip it. Upstairs into the loft to retrieve the original CD and while hunting for it through the boxes and boxes of CDs I thought, hmmm I don't remember seeing that album on my player listing. After a few more, I realised that I was missing a rather large number of CDs from my music folder.

I went to my hard disks and checked what I had, but the folder on my NAS matched the backup disks. I realised that while moving files from the media centre hard disk to the backup hard disk there had been a catastrophe. I had done this to the media centre hard disks to make them small enough to clone to the SSDs – and I'd deleted both music folders. What had not moved seemed very random and I've no idea what had happened.

I resigned myself to having to re-rip many CDs and also to wondering what I might have lost. I suppose I could have used some disk recovery software to see what was still on the existing original media centre hard disks, but then I realised that I had almost everything on my iPod. The only problem was that for some arcane reason (marketing people again!), the iPod does not store your music in obvious folders and files, but assigns some random folder and file names to your music. This was going to be a nightmare, because although the metadata is stored in tags in the files, it would take a long time to get it all extracted and convert the files to proper names (using Mp3tag, for instance).

Fortunately a little searching on the internet revealed that there were some (paid-for) programs available (e.g. TouchCopy 12) that would do this for me and £20 lighter and many hours later, I had recovered all my MP3s. Phew.

The moral was that I should have done a file-by-file compare and verify of my backup with the original folder! I do, of course, now have another, complete, backup taken of my music files.

under the Multimedia folder. This also meant resetting the media folders on each media centre and then allowing the libraries to be rebuilt.

Another Microsoft bug then reared its ugly head in that the library software in media player thought it now had two copies of every music file! I had to delete some library files and allow the libraries to be rebuilt again! Nightmares are made of this kind of thing.

I could now access my music using either the MultimediaStation application or the MusicStation application, which has a built-in player. Again, though, my huge collection seemed to cause some problems for the player, and it just couldn't access all the music. It seems, though, that allowing some time enables whatever data structures that underlie all this to be properly updated, and I can access all the music now. I can also do this from my iPhone and my Android tablets, as there are some QNAP apps for this purpose, though the QMusic app is in beta, and I thought it was a bit flaky.

▲ Fig. 7: The Multimedia Station

▲ Fig. 8: MyCloudNas lets you access the NAS from the web

I found that the multimedia player would not support the MS Windows wtv file format. This can be changed to the older dvr-ms format (by right-clicking on the file from within Windows Explorer), and then this is more easily converted to mpg or some other format. But I just couldn't be bothered, so a big thumbs down for that.

The Web File Manager was a lot better as an application and worked well. In fact, if you want to manipulate files within the NAS, then this is the way to go, because using, say, a laptop

> 66 **All in all it has been a generally good move and everything seems a lot more organised and flexible** 99

means the file goes from the NAS through your connection (e.g. wi-fi) and then your machine, then back through the connection to the NAS, which, as you can imagine, is quite slow.

Similarly, I found that for making any kind of backup of files from the NAS that it was better and quicker to plug the backup disk into the USB port on the NAS and use the Web File Manager to move files from the NAS to the USB drive. The USB drive appears under a USB folder in the NAS folder itself.

I managed to create a little PHP web page as a test and put that under the preset web folder and that also worked fine, so I see no problem with creating more complex pages, but I have

yet to try this out. Apparently, you can also configure a MySQL server as well!

Final Thoughts

The whole shebang has cost me £300 after buying extra kit, and the question is: has it been worth it? It's certainly much more convenient having the central storage location for everything. I rarely have to touch the media centres now. I can organise my digital life very conveniently from my laptop. I am pleased with how fast the device is and how reliable it is. I haven't had any problems with it since I installed it. It's good kit, but it does need a bit of rethinking for using 2.5" drives properly.

The side issues of being able to access my music, TV and photos from any location is a bit of a kludge. I would much rather be able to directly link into my NAS using a simple URL, rather than having to go through the MyCloudNAS system, and I still don't really understand why I can't. Perhaps my work location is blocking it. However, that's not a game changer for me anyway. The MyCloudNAS infrastructure does work, after a fashion.

It has been a pain that I have had to fit in with the QNAP folder philosophy. I do hate it when things won't work as I want them to and then I have to reorganise everything to fit in with someone else's vision of how things should work. In a similar vein, having to work around Microsoft's marketing restrictions as to where I can save my recorded programmes was a real annoyance, but it's working out okay now.

It has cost me more that I wanted to pay, but that's just to get my network infrastructure up to scratch and for the larger hard disks. Now that the money is spent, it's done with.

So yes, all in all, it has been a generally good move and everything seems a lot more organised and flexible. Now I think I'll sit back and watch a bit of recorded telly. **mm**

Company Profiles
Bitdefender

A look at the history of another security software company…

If you're not looking closely, the Bitdefender logo just looks like a squiggle, like maybe it's just a particularly enthusiastic flourish or part of a signature. In fact, that squiggle carries a lot of mythological significance. It's supposed to be the silhouette of a wolf – specifically, the Dacian Wolf, a kind of wolf-dragon hybrid that's so ancient no one quite knows where it originated from. It signifies strength and intelligence and was a symbol troops supposedly carried into battle with them to show that they were on the side of good and would crush the enemy before them. Fitting, then, for a company devoted to fighting viruses, Trojans and other nasties.

Compared to the ancient origins of its brand logo, Bitdefender is a very young company. It's due to celebrate its 12th birthday this November. However, its origins do stretch back a little further, at least as far as 1990, when Florin and Mariuca Talpes set up Softwin. At first, they produced computer systems for local companies, offering competitive rates compared with outsourced computer builders. But when the Talpeses realised that their systems were being attacked by hackers determined to steal valuable information from their clients, they changed tack.

Softwin began producing security software. The first product was AVX (Antivirus Expert), which soon became a whole line of anti-virus software. First developed in 1996, AVX made a name for itself because it offered 'intelligent updating', meaning it could automatically update its virus definitions to make sure users' computers were protected against the latest threats.

By 2001, Softwin had decided to launch AVX into the international market. It was renamed Bitdefender and launched into the world. As malware became more sophisticated and as companies and individuals started to rely more and more on their computer systems, the software evolved, with more features being added. Those features included firewall capabilities and protection against other non-virus kinds of malware. Bitdefender became a well-known and respected security system and in order to capitalise on that, it was spun off into its own group, with Florin Talpes at the helm.

Bitdefender opened offices in the UK, US, Germany, France and Spain. It also entered into strategic partnerships with companies like IBM and Virgin Media, getting its products onto more and more computers all over the world. Another rebrand in 2011 gave Bitdefender a slicker image, while its software was racking up plaudits from various magazines and websites who found that it was effective at blocking various kinds of threats – and cheaper than many of its competitors.

That brings us more or less up to date. Bitdefender is still a privately held company, but that might not be the case for much longer, as Talpes has spoken about the possibility of opening up the company to outside investors; he's said Bitdefender will probably go public in the next two or three years. If the company is launched onto the stock market, it'll be the first tech company IPO in Romania's history, which would be a pretty historic achievement in itself, dragons or no dragons.

At A Glance
Founded: 2001
Founder: Florin Talpes
Based in: Bucharest, Romania
Known for: Security software
Staff: 670
Website: www.bitdefender.com

CAUTION

Tablets @ Work

Leo Maxwell investigates some of the new ways that people are starting to use touch-enabled mobile devices in the world of work

As excellent content consumption devices, phones and tablets have taken the world of leisure by storm, but as performance rises and prices drop, our rectangular buddies are starting to find a wide range other niches.

While 'ruggedised' Windows tablets and other mobile devices, such as those manufactured by the UK based Motion Computing, have for some time been used by various workers from meter readers to nurses, they tend to be on the pricier side. The advent of cheap, reliable and, above all, easy-to-use devices is changing the way we work as well as how we play. There are many ways in which an inexpensive touch-screen computer can be used to save time and effort, and what follows is a selection of the applications creeping in around us.

As I researched this article, I found more and more instances of mobile devices snuggling down into waiting spaces. Hopefully, in
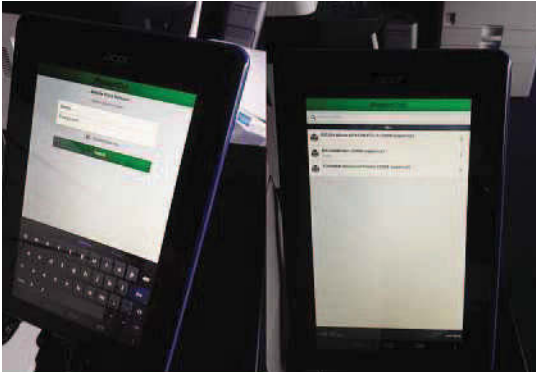
▲ *An Acer tablet set up in kiosk mode, demonstrating print release login (left) and printer selection (right)*
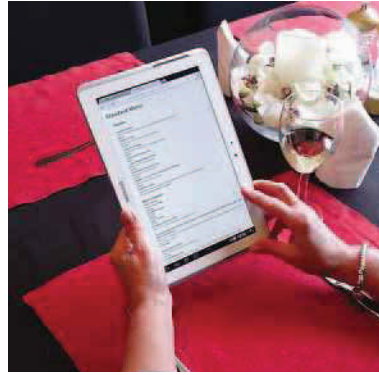
▲ *The future of catering?*

▲ *A more traditional method for taking surveys.*

addition to giving you an insight into new mobile applications, it may inspire you.

Business, Man

At a recent meeting, I was quite amused by the rapid tapping of screens by several people, whereas the MD still used his trusty paper notebook.

iPads and the like are increasingly common at business meetings. Apart from the more obvious uses as a phones and personal organisers, they're often used for on-the-fly reference, which probably means many business decisions are now influenced by Wikipedia.

Of course, the dreaded PowerPoint presentation rears its ugly head, sometimes connected to a projector, but often now echoed on local displays that allow each member of the audience to view and zoom the image, thus ensuring that no bullet point is missed.

> ❝ **For more grandiose occasions, there are apps that will transform a tablet into a personal teleprompter** ❞

An example of this is St. Michael's church in Mickleover, Derbyshire, where thanks to a donation from a public wi-fi company, they're handing out Android tablets to members of the congregation with poor eyesight or hearing. This enables them to more easily follow the service, which is also shown on a large screen, and to zoom in to passages that they might otherwise miss.

For more grandiose occasions, there are apps that will transform a tablet into a personal teleprompter for a speech or presentation.

A friend of mine who plays in a Gypsy jazz band, uses a 10" Android tablet to display his sheet music while he plays his double bass. This gives him an easily updated repertoire and enables on-the-fly downloads for instant requests.

Sales Presentations

I recently had cause to invest in a new driveway. The first salesman came from a national company. He opened up his briefcase and produced an iPad, which he proceeded to use as a combination of price list and calculator.

He then propped it up on the table for my benefit and let it run though his company's standard video presentation, complete with scary images of badly laid driveways (by other companies,

Education Without Teachers

The One Laptop Per Child (OLPC) organisation recently tried an experiment in Ethiopia, where it left Android tablets with remote villages. Children there had never previously seen printed materials, road signs or even packaging with writing on.

OLPC workers dropped off Android tablets preloaded with alphabet training games, e-books, movies and other educational programs but no instructions. Adults were shown how to charge the devices with solar chargers, but the children were just given sealed boxes.

OLPC's founder, Nicholas Negroponte, reported: "I thought the kids would play with the boxes. Within four minutes, one kid not only opened the box, found the on-off switch … powered it up. Within five days, they were using 47 apps per child, per day. Within two weeks, they were singing ABC songs in the village, and within five months, they had hacked Android."

The children had apparently got around software designed to prevent them customising the tablets and even managed to re-enable the built-in cameras. While calling that "hacking Android" may be stretching things a little, there seems little doubt that tablets were shown to be an excellent interactive learning tool.

of course). Rather ironically, he filled in a paper form while this was running, so not everyone in the firm has embraced the paperless ideal.

It was quite interesting, as it showed me how some companies are starting to use portable devices as selling tools, but sadly many of them expect the public to be impressed with the technology to the point where their sales technique is secondary. Not really much of a step up from a double-glazing salesman carrying a VHS cassette.

The second salesman, from a local firm, was much more enterprising. He used his iPad to show me various styles of paving, with images taken from actual jobs his firm had carried out, so that I could get a rough idea of how the finished work would look. Far more flexible than a printed catalogue and less weighty to boot. The fact that his quote was around a third of the price impressed me even more.

My own company's salesmen are using iPads to refer to machine specifications and display cost per page comparisons during meetings with customers.

They can also display software graphics and snapshots of operational device screens. Many large manufacturers are starting to offer interactive sales brochures as downloadable apps. PDF forms with editable fields can be used for completing site surveys,
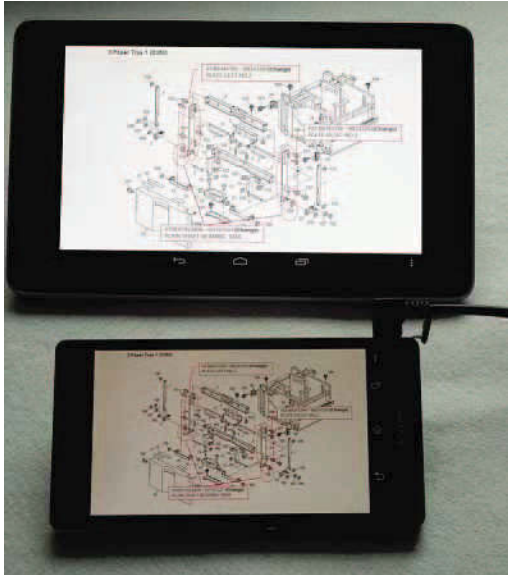
▲ *Viewing the same PDF service manual page on a Nexus 7 tablet and a Sony Xperia Z phone. The Sony's screen is nearly as readable, even though it's only 5" in size*

▲ *The Mobisante phone-based Ultrasound scanner*

▲ *A Motion Computing ruggedised Windows tablet in a health setting*

which can be emailed directly to the service department. In the future, we're planning to implement electronic ordering with an on-screen signature.

Service Response

My engineers use Android phones to link to the company database for loading and clearing down service calls. They can also capture the customer's signature on the touch-screen at the end of a visit. As well as eliminating paperwork, this means a real-time work flow and it immediately updates stock data in our warehouse.

Where once an engineer had to carry boxes of manuals or a heavy laptop with a wallet full of DVDs, the large high-resolution screens on phones like the Samsung Galaxy Note and the Sony Experia Z are now clear enough to read manuals and parts lists.

A 32GB micro-SD card or a flash drive connected via a USB OTG adaptor is big enough to store manuals, parts lists and technical bulletins for all six manufacturers that we support. All the necessary documentation will fit in a trouser pocket, and each engineer can add their own personal information.

Mobile internet access means that more data, drivers and firmware can be downloaded as required. The phone's camera can be used for remote diagnostics, to identify a part for a remote colleague or for a visual record of damage. Nowadays, images are often required on warranty claims. Thanks to the accelerometer in most modern phones and tablets, as long as the device has a flat back, there are apps that will allow it to be used as a spirit level – often important when setting up equipment.

The contractor who laid my driveway used his iPhone as a camera, calendar, calculator and constantly updated weather channel alongside normal contact list and phone use. Other companies are doing similar things, notably BT OpenReach, which has equipped its engineers with Windows Surface devices.

Education, Education, Education

Most schools and colleges are adopting tablets for pupil and staff use. Primary school children apparently respond particularly well to a touch-screen environment. Interactive learning programs on a small touch device are more personal and less intimidating compared to a large monitor, keyboard and mouse, and easier to control for small hands.

For older children, they're useful for collaborative projects, often involving multimedia input. Designs can be quickly drawn up, modified and commented on, and the device can be passed around in a way that a traditional laptop cannot.

Disabled pupils can make good use of assistive technology in a touch display, with resizable or specially designed keyboards, for example.

Staff use tablets for lesson planning, presentations, email, etc.

As mentioned in the 'Education without teachers' boxout, even unschooled children with no experience of technology can manage to learn from a tablet.

'Follow-me' Printing

Among the products my company sells and supports are print management packages for large printer fleets. All these systems offer secure print release, where print jobs are sent not directly to a printer but to a 'virtual' print queue on a server. These jobs can then be released at any of the printing devices in the building with a PIN or proximity card. This can be done using embedded software on the device itself or, for units lacking a touch-screen, on a control unit nearby.

Recently this functionality has been extended to Android and iOS devices, so now users on a wireless network can use a mobile device to release print jobs to the printer of their choice. This offers greater convenience and eliminates the need for additional hardware.

Documents can also be uploaded to a web page or emailed to an address and printed automatically. This is called 'driverless printing' as the device itself does not require any printing capability.

Some systems allow users to pay for printing via PayPal or a credit card.

Ticking The Boxes

On a recent visit to a large supermarket, I was approached by a member of staff with a clipboard, who asked me to take part in a customer survey. I noticed that the clipboard she was using was supporting an iPad, into which my answers were entered. It was pretty obviously a web page on the screen, with the information being instantly uploaded to the store's database via a wi-fi connection.

Much quicker and more reliable than a sheaf of paper and a pen, but how long will it be before they dispense with the human

and offer, say, loyalty points or discount coupons for completing surveys on touch-screens near the entrance?

Discount coupons and loyalty cards are already being made available on phones, with bar codes that can be read off the screen. The fact that phones can also be used as bar code readers means that they could conceivably replace the 'self-scan' units in supermarkets, with the information transferred wirelessly to the checkouts. QR codes enable the consumer to access additional data on products.

Recently on holiday in France, I visited one supermarket where the price tickets were LCD displays, updated wirelessly. The media section had displays with QR codes for extra information, all readily available via the store's website.

Keep Taking The Tablets

Tablets are making inroads into the medical world as well. American company Mobisante recently announced a phone-based mobile Ultrasound scanning device, which can be carried in a doctor's bag or even a pocket. Consisting of a tablet or smartphone running the MobiUS software, it could be carried by a midwife for in-home health checks. Phones can be used to monitor heartbeat and other vital signs.

> ❝ **Primary school children apparently respond particularly well to a touch-screen environment** ❞

Tablets are being used as an input devices for health questionnaires and even as reference devices in the operating theatre, for viewing digital X-ray images and health records.

Cloudy With A Chance Of Tablets

Despite some locations having fairly obvious issues with regard to connectivity, use of the cloud is growing.

⌄ *Android tablets like the Versus Touch 10.1 are affordable and readily available*

Kiosk Applications

Most of us by now have used touch-screen terminals in shops, either to browse goods on offer or as electronic point of sale (EPOS) devices to actually check out our own shopping.

This sort of application is called 'Kiosk mode'. General access is limited to a limited set of applications, with the underlying OS remaining inaccessible except to administrators. With a touch-screen device, these can be used for simple displays or more interactive applications such as catalogues. You can limit the user to a single website or a selection of sites, so a locked-down tablet can be used as an electronic shopping kiosk. There are applications that will allow you to limit what programs can be accessed from the touch-screen, disable power off or access to settings and the home screen, etc. Access can even be limited to a particular website or web page.

Kiosk mode tablets are starting to appear in some restaurants and bars, being used as interactive menus. They have the advantage of being easy to update and can allow you to order your drinks and meals without human interaction. No more struggling to catch the waitress's eye! Needless to say, some diners will find this a little disappointing, although currently a human is still usually required to deliver the comestibles to your table.

Running the right software and suitably secured to a cash drawer or a card reader, a tablet becomes a cheap touch-screen cash register. Many devices that offer a touch interface in this way are actually displaying a local web page in kiosk mode. This means that the screen can be customised easily. Layouts can be changed, buttons can be moved around, renamed and offer different functions. It's even possible for each user to have their own customised screen showing their favourite shortcuts.
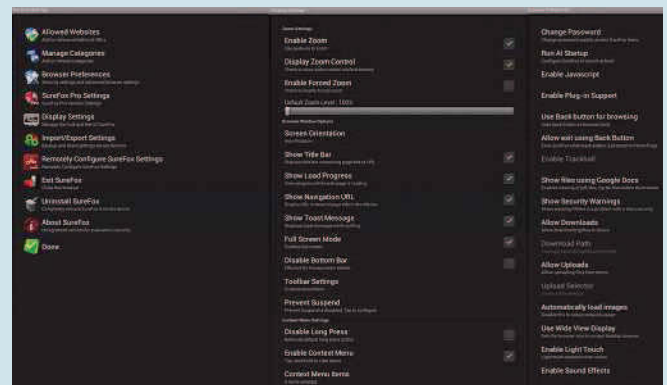
⌃ *Some of the multitude of settings offered by Surefox, a kiosk browser app for Android*

In the always-on world, the ubiquity of wireless networks allows a mobile device to be an immediate information portal, updated in real time. Fast mobile data connections are becoming commonplace, and free wireless access is available in an ever increasing range of locations.

The wealth of data acquisition available makes mobile devices useful for many purposes, and they're being used to generate content as well as consume it. Weather reports, GPS tied into mapping services, location feedback for traffic monitoring, etc.

The mobile device landscape is rapidly expanding as we find increasingly novel ways to use them, both at home and in the workplace. This article has merely scratched the surface of the mobile future. **mm**

VLC Secrets

The open-source media player is the tool of choice for the wise movie lover, says **Keir Thomas,** and it packs a hefty feature set
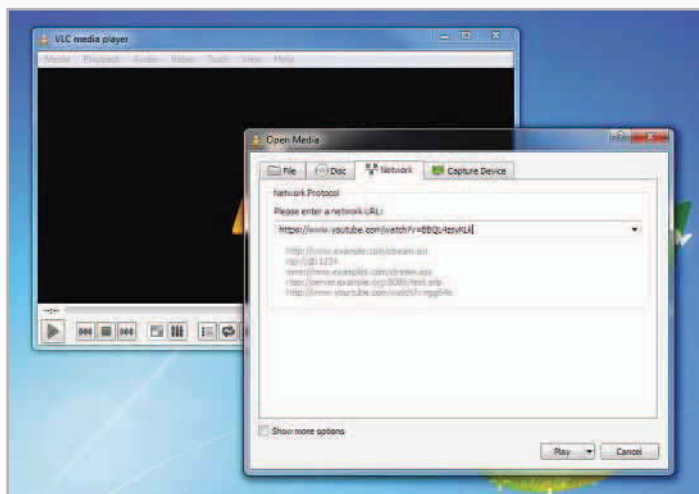
The icon for VLC is a traffic cone because its original developers were students who had a habit of collecting them. A more accurate icon would be a Swiss Army Knife, and this would reflect the extraordinary range of features in an app that can do almost anything – playing movies that Windows Media Player baulks at being just the start of it. VLC's name gives a clue as to why this is: VLC originally stood for VideoLAN Client, and it was to partner another application called VideoLAN Server. The two apps are now merged into one, but VLC has kept its ability to be as adept with network, internet and hardware-provided video as it is with files stored on your hard disk. Join us now as we take a stroll through 15 of VLC's lesser-known features.

Playback Streaming Video
VLC can not only play YouTube videos but can do so by detecting the video stream in a standard website address. All you need do is provide the standard URL for the YouTube page in question – copy it from your browser window and then switch to VLC and click Media > Open Network Stream (or tap Ctrl+N) before pasting in the URL. Then click the play button.

This trick really comes into its own when you consider VLC lets you construct playlists (View > Playlist), so you can queue up your favourite YouTube music videos, for example, and then save the list to disk for watching at another time.

Other video services might work too – give them a try!

Downloading Streaming Videos
It's also possible to download streaming videos from sites like YouTube. While the streaming video is playing in VLC, as described in the tip earlier, click Tools > Media Information and look at the Location field at the bottom. Copy and paste what you see there (it'll be long!) into the omnibox of a Google Chrome or Firefox window and hit Enter. The video will start playing there, but you should be able to right-click and select Save Video As. If you paste the address into an Internet Explorer window instead, you'll instantly be asked if you want to save or view the file.

Record Webcams Or Tuners
VLC makes a good makeshift webcam or TV tuner recorder, although it's not quite as user-friendly as apps dedicated to such purposes. Ensure your webcam or TV tuner is attached and working and that no other app is using it, then click Media > Open Capture Device. In the dialogue box that appears, click the small down arrow next to play and select Convert. Then click the Browse button alongside the Destination File heading and choose a location on your hard disk to save the captured footage and be sure to give the filename you choose an .mp4 file extension. Finally, click Start to start recording.

▲ *You can play streaming video from websites directly in VLC*
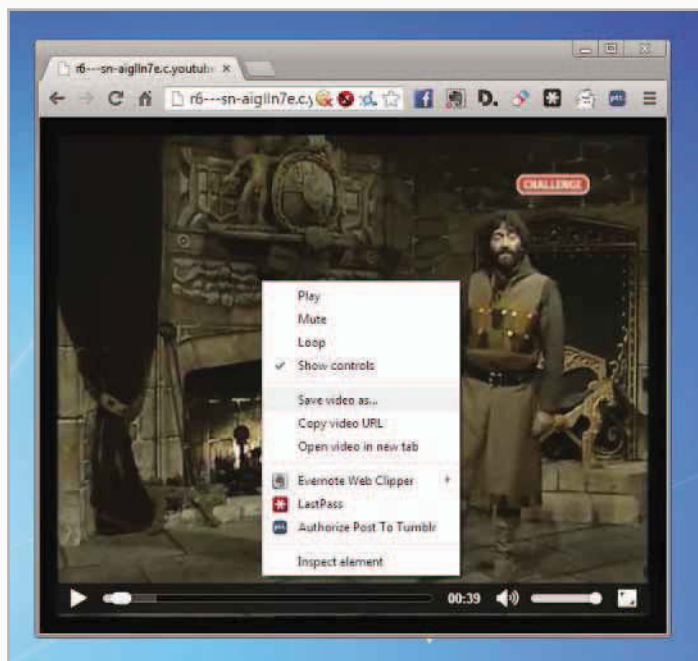
▲ *By using VLC in combination with Google Chrome you can save YouTube videos to your hard disk*
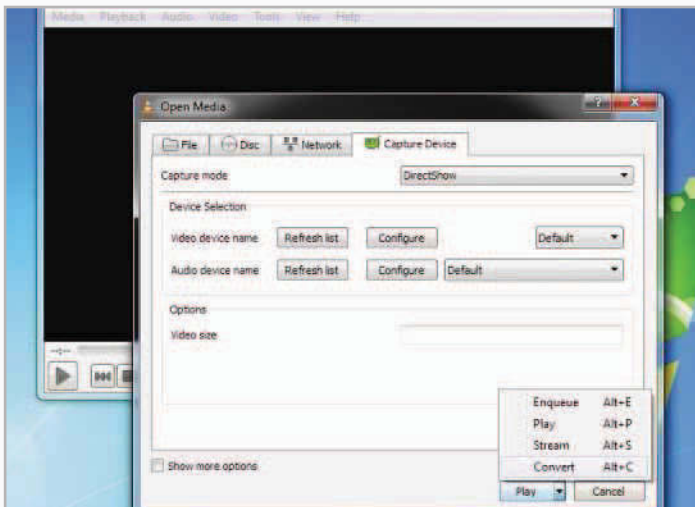
▲ *You can use VLC to capture footage from a webcam or tuner device*

▲ *You can create snippets and possibly even clips using VLC's hidden record tool*

You won't see the footage as it's being recorded in the VLC window. Once done, click the Stop button on the VLC transport controls.

Create Snippets Of Clips

VLC lets you cut clips, in a manner of speaking, although it's perhaps better to say that it lets you create snippets. To see this in action, you'll need to activate VLC's additional transport controls, which can be done by clicking View > Advanced Controls. Then load your movie file and advance the point where you want the snippet to start. Then press the record button (the top-left red button on the advanced controls), and then click the usual play button. Keep playing until you want the snippet to end, then click the record button again to deactivate it. You'll find the clip you've created in the Videos folder in your User folder.

You can't fast forward (or rewind) when creating a snippet in this way, which limits VLC's ability in a video editing context. However, for quickly creating a sample of a file, it might come in handy.

Shut Down After Playing

If you like to drift off to sleep playing music (or even video files), then you can make VLC quit at the end of a playlist and therefore avoid being the cause of the computer not automatically entering sleep or hibernation mode. To set this up, open the playlist (Video > Playlist), then right-click and select Advanced Open. In the dialogue box that appears, click the Network tab and then in the network URL field type vlc://quit. Then click the Enqueue button. Put simply, as soon as VLC attempts to play this new entry in the list, it will automatically quit.

Take A Snapshot

Taking a single-frame snapshot of any video file is easy. You can select the entry under the Video menu or if you fancy being more hands-on, you can tap Shift+S whenever you see something interesting. The pictures will be outputted into your Pictures folder.

Add Text To A Movie

VLC is compatible with subtitle files – just place the file in the same directory as the movie and click Video > Subtitles Track to select it. However, you can also add scrolling text of your own to a video file, which can be useful if you're using VLC to play home videos at a birthday party, for example. To set this up, click Tools > Preferences, then in the bottom left click Show Settings: All. In the new list on the left, click Video > Subtitles/OSD, then put a tick alongside Marquee Display and type your text in the field below. Then click the Save button and play the video in the usual way.
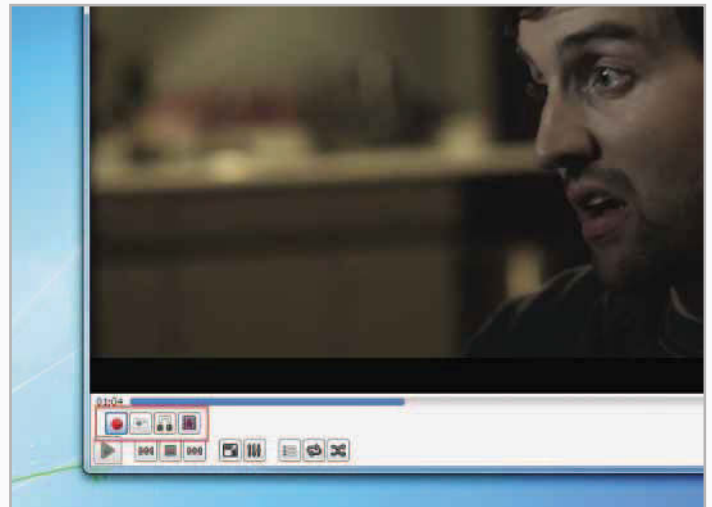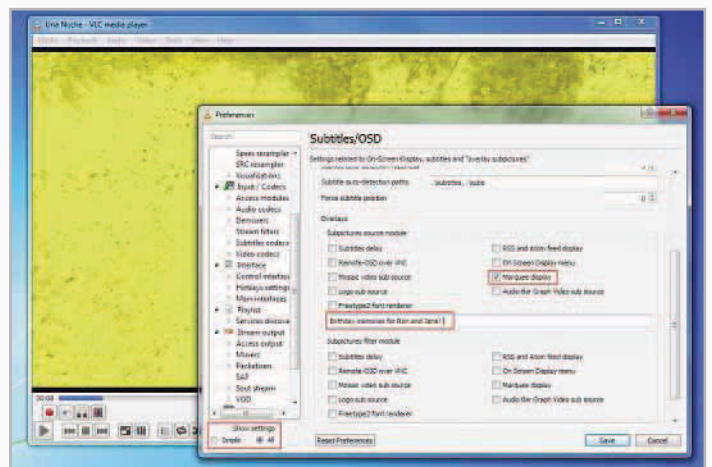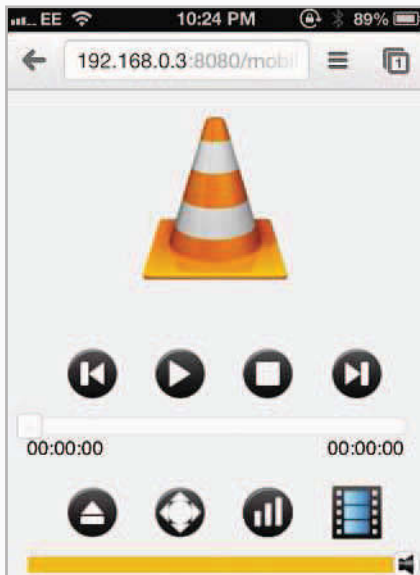
Remote Control VLC

You can control VLC running on one computer from a smartphone, tablet or other computer. This is ideal if you use VLC as part of a home theatre PC setup. On the computer running VLC, start by clicking Tools > Preferences and then click the Show Settings: All button at the bottom. In the new menu on the left, look under Advanced > Main Interfaces and put a tick alongside Web. Now quit VLC. You may see a Windows Firewall warning. Click to allow connections from the private network.

Next, click the Start menu and in the search field type cmd. In the DOS window that appears type ipconfig and look for a line that reads IPv4 Address. Look for the four numbers at the right of the line separated by full stops – it'll be something like 192.168.0.3.

Open the start menu again and navigate to the Notepad app in the Accessories menu. Right-click it and select Run as Administrator. Clear the authentication dialogue box, then click File > Open and browse to C:\Program Files (x86)\VideoLAN\VLC\lua\http (or C:\Program Files\VideoLAN\VLC\lua\http if you're not using Windows 7 64-bit). In the filename box, type '.hosts'. Start a new line at the bottom of the file and add the first three digits you copied down above, followed by a zero and then /16. In other words, if you copied down 192.168.0.3, then you'd type 192.168.0.0/16. Save the file, then restart VLC and start playing a movie or music file. On your phone, tablet or other device in the URL field of the web browser type the address you noted

▲ *You can add a scrolling text message to videos that will appear at the bottom of the frame*

▲ You can remote control a computer running VLC using any phone or tablet capable of running a web browser
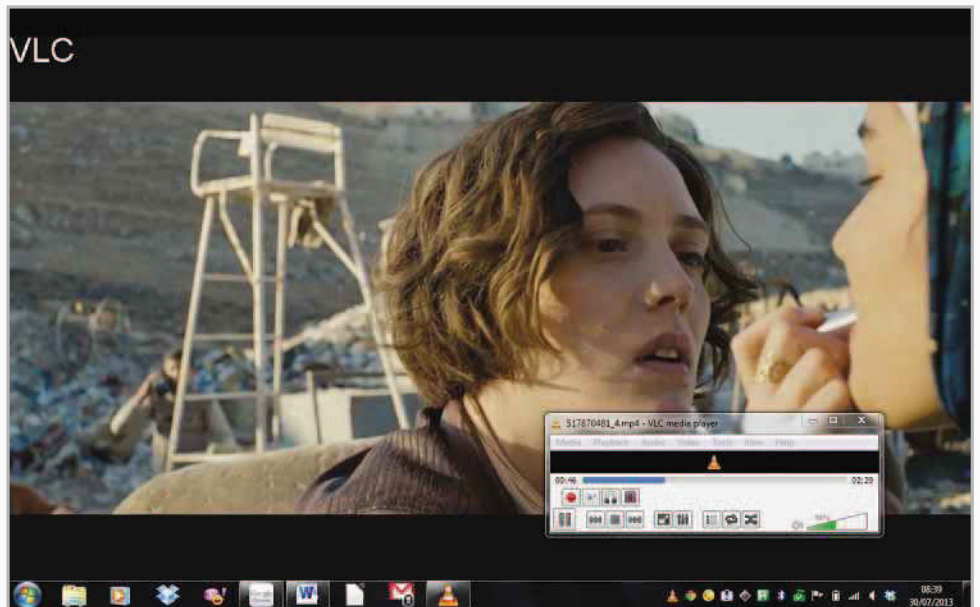
▲ You can set VLC to play movie files in place of the wallpaper – useful if you like to watch movies while browsing or working

earlier (in our example 192.168.0.3) and then add :8080 to the end. Then tap to visit the URL. Transport controls will appear in the browser window, which will let you control playback on the computer running VLC.

Use VLC For Slideshows

VLC isn't limited to movie and audio file. It can also display image files, and by adding image files to a playlist you can create a basic slideshow. Just click View > Playlist, drag and drop as many images as you'd like into the playlist window, then click play to start them playing. Each image is displayed for ten seconds.

Use Movies As Wallpaper

Here's a nice trick if you like to work or browse while watching movies. It lets you play movies as if they were wallpaper, so they sit behind any open program windows and the Windows taskbar sits on top (desktop icons temporarily disappear). To set this up, open VLC's preferences (Tools > Preferences), and then click the Video entry on the icon bar at the left. Then under the Output drop-down list, select Direct3D Video Output. Close VLC and restart it, then start a movie playing and select the Set as Wallpaper option on the Video menu. The movie will disappear from the VLC window and appear in the background, but you can still control it using the VLC transport controls. When the movie file has finished playing the desktop wallpaper will again appear.

Record Your Desktop

Screencasting software is often curiously expensive with very few free examples, but – as you might have realised – VLC can come to the rescue. Just click Media > Open Capture Device and from the Capture Mode drop-down list select Desktop. The click the small down arrow alongside the play button and select Convert. In the dialogue box that appears, increase the desired frame-rate setting to 10-15 FPS (normal video is 25 or 30 frames per second, but VLC might choke trying to record this, so a lower number is advisable). Click the Browse button to select a destination for the recorded file. Type a filename too and add the .mp4 extension. Then click the Start button. Once you've finished your screencast, click the Stop button on the VLC transport controls (or right-click the VLC system tray icon and select Stop).

A useful tip is to set a lower resolution for the screen recording – there's no use recording at 1080p, for example, because few people will be able to watch the file at native resolution (even if they have a 1080p monitor – the window border will get in the way) and you'll also end-up with huge files. Alternatively, after typing the filename when creating the screencast, click the spanner icon alongside the Profile drop-down list, then select the Video Codec tab in the dialogue box that appears and in the Scale drop-down list select a value – 0.5 to reduce the video frame size by 50%, for example.

Resetting VLC

Because VLC has so many settings that just invite tweaking, sometimes you might set something that means the app simply doesn't work or works in a weird way. The solution is to close VLC, then click the Reset VLC Media Player Preferences entry on the VideoLAN Start menu entry.

Fix Audio

Ever downloaded a video file that's been poorly encoded, so that the audio track is a split second out of sync with the video? Just
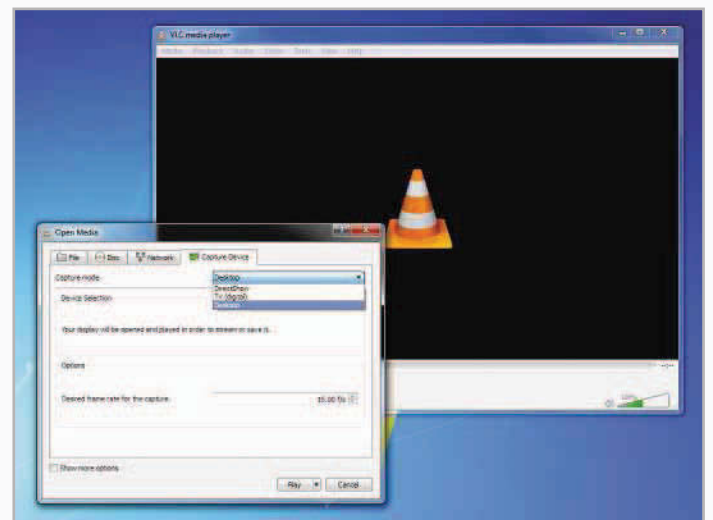
▲ You can use VLC to create screencasts of your desktop
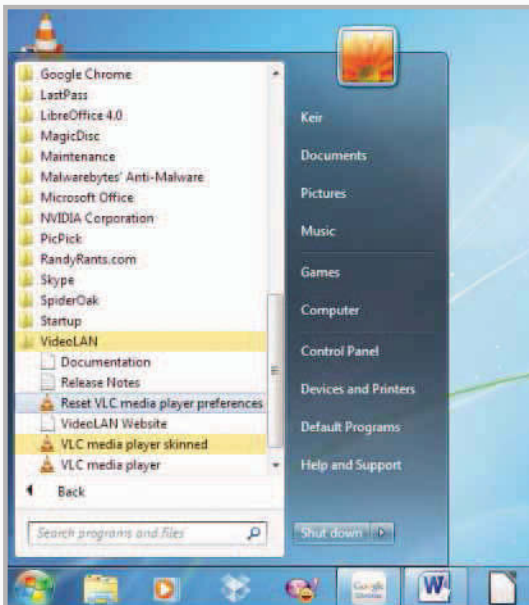
▲ *If VLC stops working properly you can might want to reset its preferences and cache*

▲ *You can delay or hasten the audio track on a video, to fix synchronisation problems*

a few milliseconds can make a movie unwatchable, but VLC can come to the rescue. Start the video playing and click Tools > Track Syncronization. Then click the up/down arrows alongside Audio Track Synchronization heading until everything seems right. There's no hard and fast rule when fixing sync errors and the best plan is simply to move to an episode in the video where there's a lot of dialogue and use your judgement.
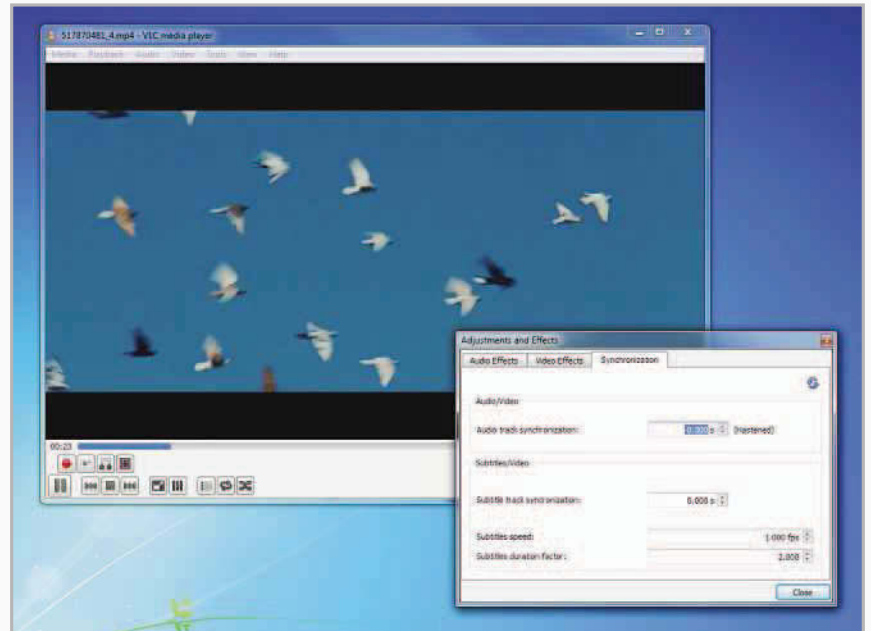
Play On Two Screens

If you have a multiple monitor setup or are creating a display for a workplace, then the ability to play the same movie – perfectly in sync – on two or more separate screens can be useful. VLC lets you do this easily. Start the movie playing in the usual way, then click Tools > Effects and Filters. Then click the Video Effects tab and the Advanced tab beneath this. Then put a tick in the box marked Clone and type the number of player windows you want. The additional windows will appear instantly, along with a standard VLC window which will contain the transport controls and by which you can stop/start the movie in the usual way.

To get rid of one of the movie windows, just close it. Note that VLC remembers which files spawn multiple windows, so when you open the same file in future it'll again open more than one playback window unless you deactivate the setting mentioned above.

Stream From One PC To Another

VLC's original raison d'être was to stream movie or audio files from one PC to another. This can be useful if you keep your movie files on a desktop PC, for example, but beam them across to a HTPC or set-top box for playback. There are essentially two methods of streaming movies: those in which VLC works as a server, allowing another instance of VLC to 'tune-in' or methods in which VLC needs to be told the exact network address of the other computer it is to beam the movie file to. Which one works best depends on circumstance. The following steps describe how to set up VLC so that any other computer(s) in your house can tune in (including VLC on mobile devices).

Start by finding out the IP address of the computing from which you're going to stream the movie. This can be done by clicking the Start button, then typing 'cmd' into the search box and hitting Enter. In the DOS box that appears, type 'ipconfig',

then look at the right of the line that reads IPv4 Address. You should see something like 192.168.0.3. Make a note of this.

Open VLC then click Media > Stream. In the File Selection box, click Add then find the movie file you want to stream. Then click the Stream button at the bottom right of the VLC dialogue box. In the dialogue box that appears, click the Next button, then under the Destinations heading click the drop-down list headed File and choose HTTP. Then click the Add button.

Click Next again. Put a tick alongside Stream All Elementary Streams, then click the Stream button at the bottom right.

On the remote computer, click Media > Open Network, then in the URL field type 'http://' followed by the IP address you noted earlier, followed by ':8080'. For example, if the IP address is 192.168.0.3, I would type 'http://192.168.0.3:8080'. Then click Open. Playback will start after a few seconds (it might initially look garbled until a key frame in the video is reached, which'll take a few seconds). Remember that you're watching a stream from another computer, so playback should be controlled there, although you can pause on any remote computers and they'll be able to catch up once they start playing again, provided the stream is still available. **mm**
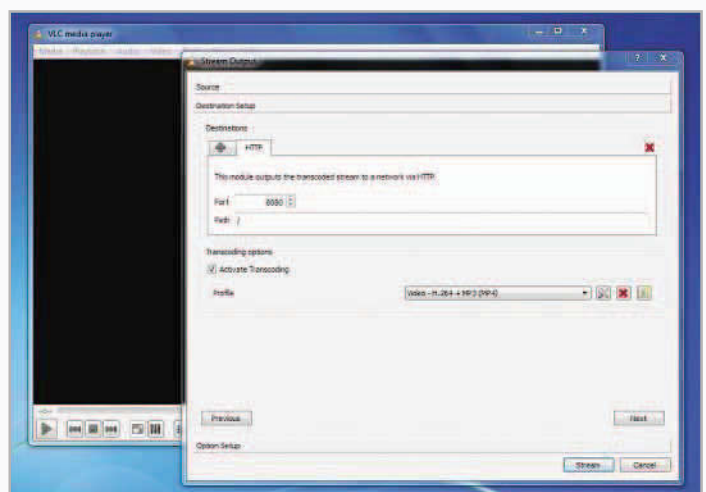
▲ *VLC can stream movie or audio files from one computer to another*

So many colours, so few customers.

Surface Damage

Mark Pickavance looks at the latest poor Microsoft Surface figures and wonders when the company will end this curious experiment

Prior to 2012, Microsoft had never actually made computers. It had dabbled with hardware, like the failed Zune and Kin phones, but astutely it had stayed a country mile away from making a Microsoft-branded PC.

When it revealed the Surface machines and the radical departure to Windows 8, many in the industry made noises suggesting this might not work out well for it. Famously, CEO Jerry Wang, CEO of Acer, said of Microsoft's hardware plans, "It is not something you are good at, so please think twice."

With those and other comments still ringing in Microsoft CEO, Steve Ballmer's ears, just three weeks after the Surface launched, he gave a French newspaper interview, where he described Surface sales as 'modest'. Given that hardware sales are usually at their highest in the early days, that candid moment gave some insight

into what was really occurring. Microsoft rapidly entered damage limitation mode and issued the following statement:

"When asked about Surface, Steve's use of the term "modest" was in relation to the company's approach in ramping up supply and distribution of Surface with Windows RT, which has only been available via our online store and Microsoft retail and holiday stores in the US and Canada. While our approach has been modest, Steve notes the reception to the device has been "fantastic" which is why he also stated that "soon, it will be available in more countries and in more stores."

What then transpired was a lengthy game of corporate peek-a-boo, where numerous Microsoft execs were drawn on the Surface sales figures, only to change the subject or decline to comment.

The stock analysts who predicted success for Microsoft also started to retreat from their positions. UBS analyst Brent Thill originally predicted that Microsoft would ship two million machines in 2012 alone, then revised that down to one million after the event, and even that was wrong by about 250,000 units.

How wrong footed those in the tech predictions business became was highlighted by IHS iSuppli analyst Rhoda Alexander. She gave an interview to CNET in December 2012 where she said that "We see estimated sales of 1.3 million", though at least she hedged those bets with "I would be surprised to see it much above that,"

What was obvious to those less influenced by Microsoft lobbying was that if the sales of the Surface were good, then surely they'd be shouting them from the rooftops.

Only now do we find out just how abysmal sales were and what the implications of this abject failure might be. Microsoft couldn't keep them secret forever as a listed company and eventually it had to face the music, which came along when it filed its 10-K yearly statement.

Breaking Bad

Microsoft can be typically coy about actual Surface sales, because that's sensitive commercial information, it would attest. Unfortunately for the Redmond-based firm, though, each part of its business must outline a basic profit and loss in its annual 10-K report to the US Securities and Exchange Commission (SEC).

In it, Microsoft reveals that the Surface product line made just $853 million since the original Surface launched in October of last year. Actually, to be really accurate, it launched it on 26th

October and its financial year ends on 30th June, so that's just eight months.

When you consider that the cheapest Surface at launch was the base model with 32GB and that cost $500, then the numbers here would suggest that the total Surface sales, including the Pro, are actually less than 1.7 million units. It's slashed the price of the Surface RT by $150, but that might not be enough to shift the estimated six million boxes it's holding at this time.

Even more disturbingly, Microsoft just accepted a $900m write-down for the $150 price cut, which tells us that it has six million machines to sell with this reduction. It doesn't take a mathematical

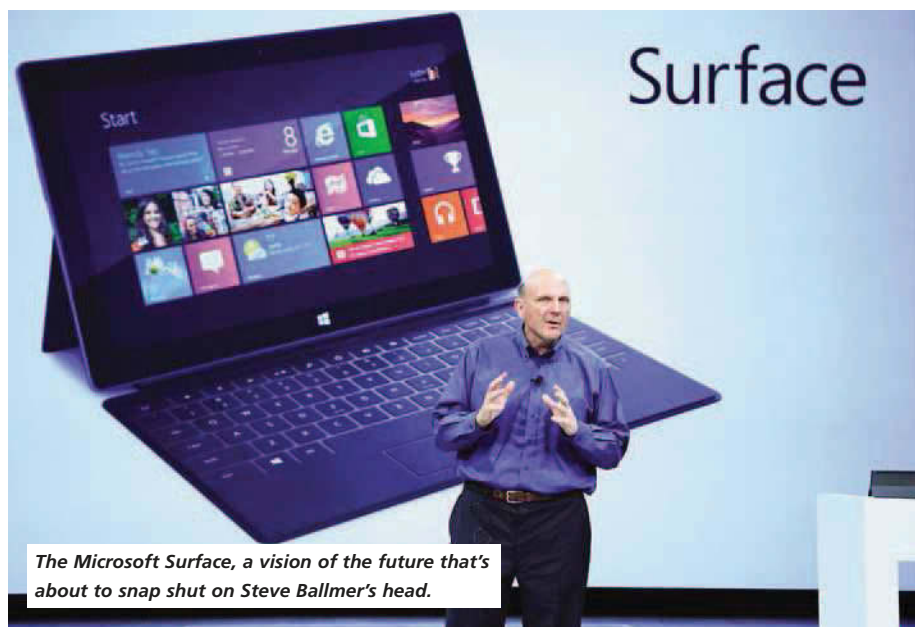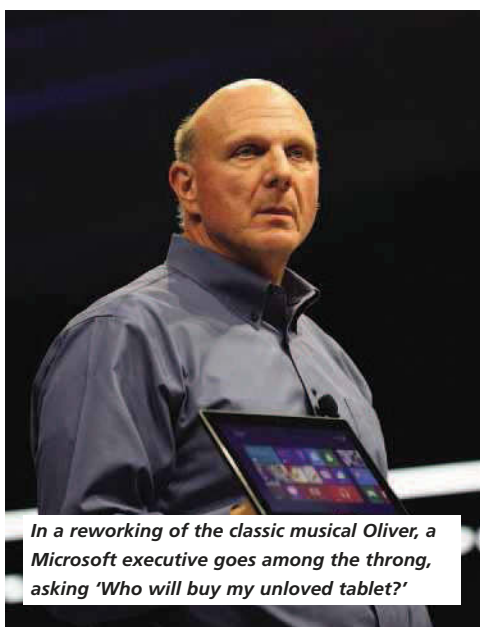> **❝ Everyone thought that the Vapor Mag construction of the Surface was very elegant, but few were prepared to pay the true cost of it ❞**
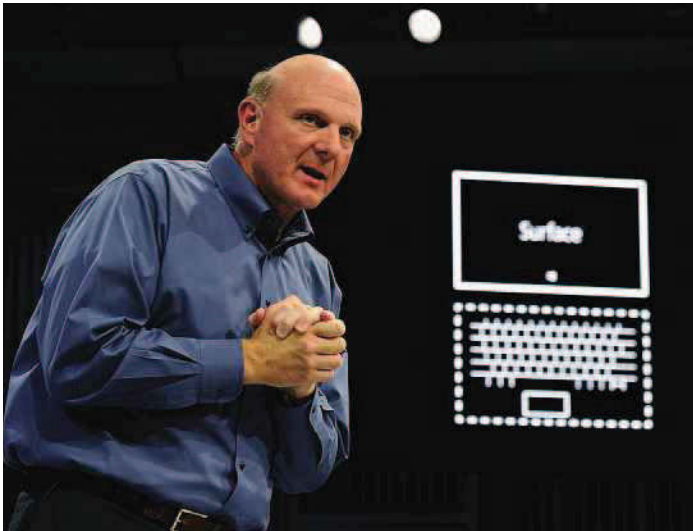
genius to work out that a $900m hit and a $853m revenue doesn't equal profit, but that also fails to include any marketing costs.

A hint at how big those are came elsewhere in the 10-K, where it announced that the marketing budget for Windows and Surface (sadly not divided) would be increased by $1bn, specifically including a $898m increase in advertising costs "associated primarily with Windows 8 and Surface."

Eek! That's more than $100m a month in advertising, or as much again as the value of all the devices sold, so for each $500 Surface RT machine it moved, it spent another $500 to actually get that sale. Or rather, it increased its existing budget by 34% to get it, meaning it probably spent more than $1,000 per device to get rid of them.

For those who consider 2012 the distant past, the Windows 8 and Surface marketing budget for that year was a staggering $1.8 billion or nine times what Microsoft spent to promote Windows 95.

In a reworking of the classic musical Oliver, a Microsoft executive goes among the throng, asking 'Who will buy my unloved tablet?'

The Microsoft Surface, a vision of the future that's about to snap shut on Steve Ballmer's head.

Steve Ballmer, ready to biff anyone who doesn't agree that the Surface is 'Fantastic'

Taken with the other numbers I've quoted, Microsoft is in the hole for at least a couple of billion dollars here, and until it's shipped those Surface RT machines, there is no light at the end of this tunnel.

What Went Wrong?

This plan had so many holes in it from the outset that it's difficult to know where to even begin! Microsoft is already talking about difficult market conditions, but we can ignore that fluff because in previous quarter Apple sold nearly 23 million iPads. The market conditions for the Surface are specifically challenging; the question is why.

Windows 8: It's not been well received generally, despite Microsoft's insistence that people love it. Looking at Windows 8 touch computers overall, they've not sold well, with many investing in cheaper Windows 7 systems instead. Some have contested that had the Surface RT arrived with Android on it, then it might well have sold better to those who wanted a resilient platform.

> 66 **This plan had so many holes in it from the outset that it's difficult to know where to even begin!** 99

High pricing: In my own predictive piece about the Surface RT, I thought that Microsoft would undercut Apple at the very least, but it didn't. The launch US pricing was higher than the iPad, and the Surface Pro cost more than many Core i7 Ultrabooks. Everyone thought that the Vapor Mag construction of the Surface was very elegant, though few were prepared to pay the true cost of it.

A confused message: While it wasn't upsetting its hardware partners, it was also annoying long-time supporter Intel, by using the ARM processor in the Surface RT. However, this also meant that this machine couldn't run traditional x86 Windows applications, which confused many customers. What they got was a Windows machine that didn't run Windows, oddly.

High number of returns: In January it was widely reported that the Surface had a very high level of returns, even for a

Microsoft product. What coloured this was that the majority of machines that came back worked perfectly; it was the customers who couldn't function with them. At this time, only Windows RT was in circulation, so some of these were probably those who saw 'Windows' and then couldn't run the usual apps. However, some others reported that many couldn't adapt to the Metro interface or disliked the turgid performance on offer. Whatever the reason, the Surface didn't seem to satisfy customer expectations.

OEM rejection: What Microsoft was hoping for was a small army of Surface-styled products from its hardware partners, creating a complete ecosystem that its devices would top. Instead, miffed at Microsoft, most of the PC makers involved have only launched a very limited selection of Windows RT devices.

HP and Toshiba pulled out of launching one even before the launch. Samsung made a device, but then didn't release it in the US. Dell, Asus and Lenovo all made Windows RT machines, but Lenovo has canned its IdealPad Yoga 11 and Asus is making noises that it might do the same. Acer, for its part, made the first mini tablet, the Iconia W3, which was savaged by numerous reviewers. If Microsoft can't sell the flagship device, many have concluded that they're unlikely to fare better.

Where From Here?

There's an old saying: when in a hole, the best advice is to stop digging. The problem with that approach for Microsoft is that it's built itself a massive interlocking battle plan, which has Windows 8 at its core and the flanking elements of the Surface, the Xbox One and Windows mobile as outriders. The removal of any part at this stage in the war undermines the whole, because what's critical to it is that its customers will want all the advantages of the integrated package.

That said, even Microsoft can't keep throwing billions of dollars down the pan, as it has stockholders who are funny about those sorts of excess.

As an immediate reaction, it's chopped the price of the Surface RT, although it's still not at a level where people will rush to have them. Currently in the UK, the Surface RT starts at £279 for the 32GB (down from £399), but it's another £80 on top of that for a Touch cover keyboard. The 64GB model is £439 with a Touch cover, which is cheaper than an iPad with 64GB but more expensive than almost any Android tablet, including the Nexus 10.

Students can get the 32GB Surface RT for £251.10 and the 128GB Surface Pro for £719.10.

The Surface Pro might sell more if Microsoft could make it cheaper, but it's essentially just a PC

As the Surface Pro seems to be selling, even if slowly, that's unlikely to come down much until the Haswell model is ready to ship and it needs to eliminate prior stock. As for the Surface RT, that might not be the best price it will reach, given Microsoft has so many to move.

Being realistic, I suspect that in a year from now there will only be one Surface product, possibly with one specification, because the market for any more just doesn't exist. However, like the Zune and the ill-fated Kin, Microsoft might just kill the product line entirely and hope that Lenovo and Acer will fill the small gap that offers.

Final Thoughts

Even the most ardent supporter of Microsoft must accept that the Surface masterplan appears to be totally in tatters, because the market for these products turned out to be a marketing fantasy.

The thinking behind them – that for the same money or more than an iPad, people would like a device that did much more – hasn't been supported by sales.

There are a number of different ways of looking at this: either as a reaction to tablet technology in general supplanting the PC or as a reaction to Windows 8.

Looking at how the tablet market is dividing up, there is a place for low cost-devices that are entirely consumption systems, and there is a place for more expensive ones that do more or provide better quality consumption. So why didn't Microsoft succeed in this upper echelon? Well, the Surface RT gave all the impression of being a PC/tablet until people used it and realised that the desktop that it offered was something of a cruel tease. And then came the Surface Pro, which everyone who reviewed it liked, but it was basically an expensive Ultrabook with a touch-screen, and it had some serious competition elsewhere in the market.

Beyond these things, I can't really see that anyone steps out of their house in the morning with the mindset to come back with something branded 'Microsoft' later that day. In many respects, if these devices had been branded Dell or Asus, they may have

actually sold better, but looking at other hybrid designs, like those by Asus and Lenovo, I'm not hearing any great rumble about a huge number of those devices being sold. Those who want a laptop buy a laptop, and those that want a tablet go for Apple or Android. The middle ground just doesn't exist in any meaningful way.

Touch laptops in general have had a torrid year since Windows 8 launched, as people won't pay a premium for them, and many are still asking for Windows 7 on what purchases they do make.

This all suggests that Microsoft larger Windows 8 and touch control strategy is also a major component in the Surface failure, and that's something it's determined not to rethink or reverse.

A few months ago, the general thinking was that the original Surface and Surface Pro would be replaced by enhanced versions at the end of this summer. Unless Microsoft goes entirely cold on the idea of making its own computers, then it's a given that a Surface Pro with the new Intel Haswell-cored CPU will materialise, making for substantially better battery life. That leaves the fate of the ARM-based Surface a much less certain outcome.

Microsoft could make it an Atom device, bringing back x86 compatibility, but it would still be one of the most expensive netbooks of all time. Or it could just discontinue it entirely. It's also promised a small Surface Mini design, which the Surface could feasibly morph into, but that's a marketing sleight of hand.

At this point, what Microsoft has achieved so far is to blow a huge amount of money on advertising a product range that's failed to grab the public's imagination. It's upset its hardware partners and it's got a massive pile of unsold Surface machines that it's either going to sell at a loss or throw in a landfill.

In this respect, the title of this piece 'Surface Damage' doesn't really do events justice, because this failure strikes at the very heart of the company's long-term strategy for Windows and the PC.

What's very worrying for its shareholders is how unconcerned it appears to be about this on the outside, and they can only hope that beneath the surface it's working out how to extract itself from this particular hole. **mm**

Living On The Edge
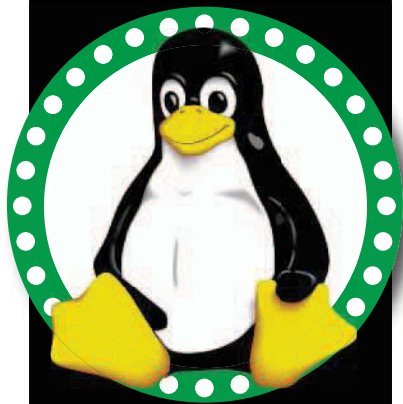
Spare $32m anyone?

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

Linux

Well this is interesting, not less than several hours after the Ubuntu forums were hacked, Canonical went forth and posted its latest project onto Indiegogo.

The Ubuntu Edge, for those of you don't know, is labelled as being the next generation of personal computing, combining a smartphone and a desktop PC in a single device. It's a very stylish looking unit that will be able to dual boot into Ubuntu Phone OS and Android, but when hooked up to a monitor, keyboard and mouse will be able to boot into a fully blown version of Ubuntu with access to all your phones based contacts.

Canonical, in its wisdom, have therefore decided that an Indiegogo campaign is the way forward, and to fully fund the future of this very smart device they are asking for the paltry sum of $32,000,000.

At the time of writing, they have currently raised $7,160.925 - not too bad, across 15,481 backers, with 23 days still left on the Indiegogo clock. The starting 'perks' associated with helping to fund the Ubuntu Edge vary quite drastically, and range from $20 - to become a Founder, and bask in Ubuntu's glory, to $30 - for if you've already contributed and forgot to add international shipping, you silly things you. Then things get a little… Well, extreme.

After the initial $20, for a mere $725 you can actually purchase the phone, with an expected delivery date of May 2014. Then, $775 for exactly the same as $725; followed by $780, $790, $830, all of which seem to offer the same rewards. Anyway, the cost then spirals out of the ordinary all the way up to $80,000 for a bundle of 100 Ubuntu Edges.

Are They All Mad?

So what do all these backers know that we don't? Why do they seem to be throwing their life savings at Canonical? It's a difficult question to answer, as there may be several reasons, but this campaign has raised some observations from us here in the shed:

A: Everyone has gone mad, surely..? Mark Shuttleworth is working some kind of Jedi mind trick on the internet public.

B: We're obviously so drastically low paid that spending $800 for a sight-unseen phone that will not appear until next year seems like quite a lot of money.

C: Money, it appears, is far more common than sense these days…

And…

D: The magpie effect has clearly driven the population in to an Ubuntu Edge frenzy.

Is it an age thing, when you suddenly discover that you're not excited by the latest phone? It could well be… Clearly though, Canonical's supporters are getting behind this campaign with a will and their wallets.

There's every chance that Canonical will make the massive asking amount, and there's obviously no loss in support or confidence over the hacking of the forum a mere couple of weeks' ago.

For those of you wondering what the specs are, feast your eyes on the below:

- Dual boot Ubuntu mobile OS and Android
- Fully integrated Ubuntu desktop PC when docked
- Fastest multi-core CPU, 4GB RAM, 128GB storage
- Micro-SIM
- 4.5" 1,280 x 720 HD sapphire crystal display
- 8MP low-light rear camera, 2MP front camera
- Dual-LTE, dual-band 802.11n Wi-Fi, Bluetooth 4, NFC
- GPS, accelerometer, gyro, proximity sensor, compass, barometer
- Stereo speakers with HD audio, dual-mic recording, Active Noise Cancellation
- 11-pin connector providing simultaneous MHL and USB OTG
- 3.5mm jack
- Silicon-anode Li-Ion battery
- 64 x 9 x 124mm

Impressed? Hmmm, we'll see.

◄ *Is it a phone? Is it a PC? Is it an expensive lump of plastic?*

Discoverability Dilemma

How will new apps thrive if Apple doesn't tell you about them?

On iOS, the App Store was nothing short of revolutionary. It certainly wasn't the first store for purchasing apps for mobile devices, but it was at the time by far the best. There was no carrier lock-out, and no messing about when it came to buying; if you had an Apple ID and a credit card attached, you were good to go.

As the App Store's grown, it has in many ways become worse in one key area: discoverability. There are now so many apps available that it's really hard for indies to bubble up to the surface. You could create the best photography app around, but that's no good if nobody knows about it.

Apple gets around this somewhat by attempting to curate its store. Access a category such as Photo & Video and you'll be presented with charts for paid, free and top-grossing apps, along with 'new' and 'what's hot' selections. For games, Apple takes this further, with lists of updated apps and 'what we're playing', along with ad-hoc collections such as 'if you like…' and 'Hollywood hits'. It's still a frustrating lottery for indie developers, some of which create fantastic content that never makes Apple's lists, but it's better than nothing.

For reasons unknown, the Mac App Store has rather stalled when it comes to curation. Perhaps it's because there aren't enough apps, or maybe there just aren't enough people to provide insight into what Mac users might like to buy. Whatever the case, the store only gives you a few collections on its home page, some 'new & noteworthy' apps that are frequently not that new and not that noteworthy, and 'what's hot', which doesn't seem to

> ❝ **There are so many apps available that it's really hard for indies to bubble up** ❞

change all that often. Oh, and there's the charts, usually full of Apple's own apps.

With the exception of the Games category, which apes the iOS equivalent, you get little curation once you're inside a category. Click on Photography, and Apple merely lists a half-dozen popular apps at the top of the page, and then gives you an unhelpful 'all photography apps' list, which can be sorted by release date and name. Want to know what's good? Have fun clicking on every individual

icon and scouring reviews. Want to know what each app does? Again, click on it to find out. Apple presumably hopes you've got a few hours to spare with its otherwise efficient means of buying software.

It's for this reason I've found myself of late gravitating back to **www.macupdate.com**. The site's been around since 1996, providing listings of new Mac apps. It also provides promotiona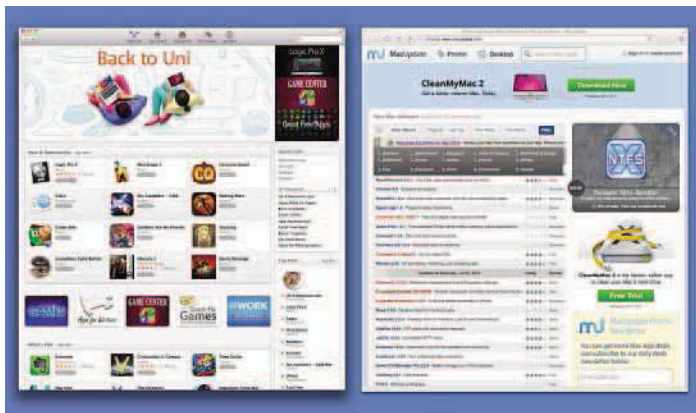l collections and a desktop app to track updates, but for me the value's still in the listings. I can very easily see and scan everything that's been released today, and each entry provides a short one-line description and a user rating. Filters are available to focus on certain types of app, or those that were popular during the past day, week or month.

MacUpdate isn't flashy, and a far cry from the very icon-oriented layout of the Mac App Store. Also, it's not particularly discoverable for new Mac users, who'll probably increasingly gravitate towards Apple's store, which is sitting in the Dock when they fire up a machine. However, it has that combination of usability and flexibility that Apple's own offering lacks. It enables me to find new things, whereas what is supposedly the future of app purchasing on OS X so often only enables me to find the usual suspects.

◄ The Mac App Store might be a pretty face, but beyond the front page it's poor for app discoverability

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

Mac

Casting The Net

With Google declaring television the new mobile frontier, Ian McGurren looks at the alternatives

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

I n a typically belligerent manner, Google has released a new product that has tongues wagging as much for its innovation as it does for its value for money. Last year we had the Nexus 7, an extremely capable class-leading tablet at a giveaway price of £159. This year the VFM badge has gone to the Chromecast, a $35 HDMI dongle that plugs into your TV so you can push video from your Android device to the big screen.

At first it looks like an Apple TV killer, but the concept is somewhat different, though. Chromecast is like a more basic Google TV: it pulls its video from the cloud, not your device, so it really uses your mobile more like a content locator/selector. This may change as people hack the open source code, but for now you'll need to look at other ways of getting media from your phone onto the TV screen. Ways such as these...

Airplay has been around for nearly ten years now, albeit initially in its Airtunes sound-only guise until 2010. In many ways it paved the way for the want to share media from mobile devices to sound systems, televisions and more. In fact without any clear rival, Airplay has been adopted by many AV hardware manufacturers as a wireless standard. This is fine if you have an iPhone, but what if you don't? Thankfully there are a plethora of apps for Android too.

DoubleTwist music player has the ability to stream to Airplay devices, making pushing music to Airplay amps a cinch. It's a $4.99 in-app purchase to unlock this, though.

Twonky Beam is a jack-of-all-trades app, offering the same media from the cloud method as Chromecast, as well as sending media directly. It'll work on Airplay and most DLNA enabled TVs or network media players connected to TVs, and it's free to try out. Cutting a similar rug is PlayTo, an app with the ability to send to ATVs and DLNA sets. PlayTo can also send to the increasingly popular Roku devices, albeit with a little basic hacking and tweaking.

If you have a smart TV, you may well have the YouTube app - it's on most platforms as well as the Wii U, Xbox 360 and PS3. While it's a great app with HD playback and account linking, the UI is hampered by the nature of a TV remote for data entry. Anything longer than a few letters is going to be painful. Luckily you can pair a smartphone with your YouTube TV app to make things much easier. Run the app on your phone, run the app on your TV, go to 'pair devices' and when paired, you'll be able to search on your phone as normal but then select your TV as the playback screen. It can be flakey on some TVs with the paired devices being lost but certainly on consoles like the PS3 it remains rock solid.

There's also the other common issue of the lack of true DLNA in the Apple world - want video on your TV? Apple TV. Want to show your media collection on there too? Sure, no problem, it'll show anything you have. Well, anything you have in iTunes. Loads of MKVs, AVIs? Sorry, no go, unless you have Skifta from chip makers Qualcomm. Skifta can see your DLNA connected media shares and is able to convert it into a format that the Apple TV can understand, essentially using your iPhone or iPad as a hardware transcoder. Hopefully iOS 7's better handling of background applications will mean you will also be free to use the device for other applications while it beavers away in the background. Skifta is free and has met with success already on the Android platform too.

While the Chromecast is an exciting device, it's not the first to offer these features as there are all manner of streaming technologies in TVs and phones these days. Look for DLNA streaming, Airplay, Miracast, Allshare, HTC Connect and even Mobile High Definition Link (MHL), all technology already out there that you may already be able to use right now.

Mobile

Atari Not So Alienated

Shaun's been taking a look at a remake for the Atari and an early preview from the Czech Republic

Atari XE/XL fans and enthusiasts will be interested to learn that the 3D isometric game *Alien 8*, which was released by Ultimate Play The Game for the Sinclair ZX Spectrum (most famously) and BBC Micro in 1985, has finally made it to the Atari 8-bit.

This version has been converted from the BBC game (as the Atari and BBC share the same processor, clocked at nearly the same speeds) with this new Atari version being thanks to three prominent people in the XE/XL community who go by the 'scene handles' of Fandal, Miker and Emkay.

For those familiar with the Ultimate Play The Game classic *Knightlore*, *Alien 8* is similar but based on a space ship. You're task is to guide a robot [called Alien 8] around an intergalactic vessel to ensure that all of the Cryonaughts remain active during the voyage.

Achieving this requires you to perform the not-so-simple task of exploring the locale of the space ship to collect the strewn objects (called Thermolec valves) that

are required at various points in the game. All of these valves must be in place before the time runs out: if not then the Cryonaughts will perish!

It is recommended that this game is played with at least an Atari 130XE or better (which will allow some pre-processing due to the extra memory available), although nothing explicitly tells us that it won't work on a 'lesser' compatible system. A video preview of the game in action is available on YouTube at **youtu.be/ CGHWSlh-qvA**, with the full game available from **atari.fandal.cz/detail. php?files_id=6820**.

Rising In The East

Eastern Europe was once a hot-bed for the Sinclair ZX Spectrum, with many clones of Sir Clive's amazing technology appearing beyond the old Berlin wall (Sinclair machines were quite small, making them easier to smuggle than bulkier ones, and the technology low cost). Indeed,
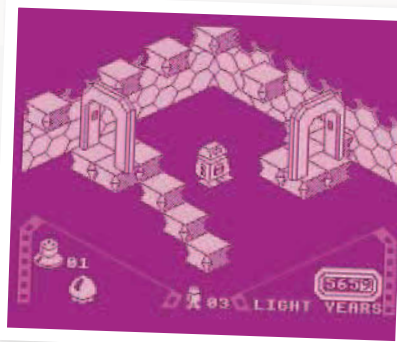
▲ *Alien 8 finally makes its way to the Atari XE/XL*
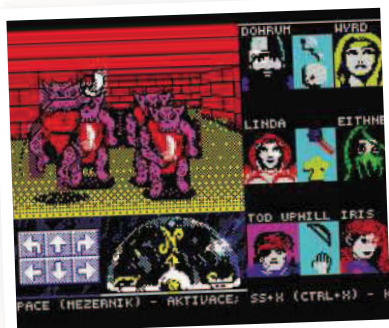
▲ *Currently in development: a new Dungeon crawler for the Spectrum*

some of the best examples of games and demos nowadays appear from Eastern Europe as it still maintains a thriving scene today. With this in mind, an early alpha release has caught my eye; although it's just a proof of principle, *Dungeon v4* is looking rather spiffy. It hails from the Czech Republic and its public alpha release uses a first-person 3D perspective, with clever use of the colour attribute blocks to simulate a ray-casting engine. There is a snap shot image, which will load into any good emulator, available from **oldcomp.cz/download/file. php?id=143**.

We would like to apologise to our readers, and Shaun, for the mistake which led to the Retro column from *Micro Mart* 1270 being repeated in last week's issue. Sorry all.

Guns 'n' Ghosts

Guns 'n' Ghosts is a 2D super-natural blaster for the Commodore 64/128 which is now available as a download, on cassette, disk or cartridge with prices starting from £1.99 (for the download) and up to £27 for the deluxe cartridge edition.

This excellent title was developed and coded by Georg Rottensteiner, with the design and graphics being handled by Trevor Storey and Richard Bayliss providing the musical scores and sound effects. It can be played in single player or co-operative mode. The aim is to patrol the various platforms on a static screen to obliterate the roaming nasties and spectres.

This game is available from **Psytronik.net** (which handles everything but the physical cartridge version) and RGCD for the cartridge. Full details along with a video preview is available at **rgcd. co.uk/2013/04/guns-n-ghosts-c64-2013**.html.

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

Retro

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

Gaming

Fear Itself

Neil Gaiman brings his dark and witty sensibilities to the interactive medium with *Wayward Manor*. It promises to be a quirky, unusual sort of adventure puzzler

This week, **Ryan** looks at Neil Gaiman's videogame debut and the F.E.A.R. series' mutation into a free-to-play shooter...

Plug & Play

If you're into comics, horror or fantasy or just geek culture in general, you're sure to be familiar with the sterling work of Neil Gaiman. The author of such masterful works as *The Sandman*, *Coraline* and the divine epic *American Gods*, he's one of the UK's most successful and respected genre writers. He's written episodes of *Doctor Who* and even did a great job of writing the English-language translation of Studio Ghibli's animated feature *Princess Mononoke*.

Now, Gaiman's taking his already varied talents into the interactive medium, as he's teamed up with quirky studio The Odd Gentlemen to create his first videogame. Called *Wayward Manor*, it's a fittingly macabre, fun first-time outing for the writer, with its premise recalling Oscar Wilde's classic short story *The Canterville Ghost*.

The player is cast as a ghost roaming the halls of the titular manor, and the goal is to frighten various obnoxious residents and visitors - including burglars - into fleeing the grounds in terror. Although we've seen relatively little of the game in action so far, the design of it looks great, with a distinctly British, eccentric

claymation sort of look to its characters. And most encouragingly of all, *Wayward Manor* has Gaiman's wit and storytelling brilliance at the front and centre of it.

"What I try to do is find the right medium to tell the right story," Gaiman says in his introduction video. "For quite a while, there's been a story I've wanted to tell, something inspired by the films I loved as a kid. Things like *Arsenic And Old Lace*, *Blithe Spirit*, *The Man Who Came To Dinner*. These crazy, playful, funny, weird things they made in the first half of the 20th century. But I ran into the same problem: it didn't feel like a novel. It felt like something you'd have to experience..."

The Odd Gentlemen is certainly the right studio to approach if you're looking for something crazy, playful and weird. Its previous game was the quirky platform puzzler *The Misadventures Of PB Winterbottom*, which received a great deal of praise when it came out in 2010. There's a similar sort of atmosphere in *Wayward Manor*, and we're really looking forward to seeing what this collaboration produces.

The studio's released a kind of crowd-funding website of sorts for the game, where

you can pre-order copies and purchase all sorts of merchandise. The finished *Wayward Manor* is due for release this autumn, and you can find out more at **www. whoisneil.com**.

Online

A heady combination of Japanese horror influences and first-person shooting, the *F.E.A.R.* series has been terrifying the life out of players since 2005. More recent entries - particularly 2011's *F.E.A.R. 3* - may have lacked the sheer button-pushing impact of the original, but the series as a whole is defined by its atmosphere, pace and gore.

That last *F.E.A.R.* entry introduced some really unusual, creative multiplayer modes too, which appeared to go largely unnoticed by the general gaming public. But with the recent announcement that we're about to see the launch of *F.E.A.R. Online*, it could be that the horror shooter franchise will finally get to push those ideas to the fore.

Unlike the earlier games, which were programmed by Monolith Productions and Day 1 Studios, *F.E.A.R. Online* will be developed by the Korean studio Inplay Interactive, but it
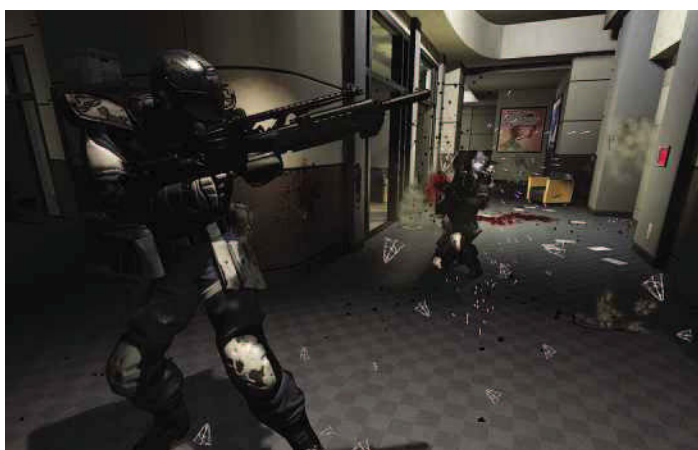
▲ *F.E.A.R. Online takes a familiar horror franchise into the realms of free-to-play, but can it retain its horror atmosphere in a squad shooter setting?*

sounds as though the elements that have defined the series so far will still make it into this exclusively multiplayer debut. Teams of up to four players will fight across a range of maps and modes, including the excellent Soul King mode from *F.E.A.R. 3*, where players had to possess enemies for abilities and collect more souls than their competitors.

The game will, according to its press release, "focus on several team combat modes spanning over ten ominous maps packed with grotesque details such as still-twitching bodies hanging from meat hooks and messages smeared in blood."

That sounds like the visceral sort of thing we're used to seeing in the *F.E.A.R.* series, but isn't there a danger that, with all that emphasis on multiplayer shooting, the creepy horror atmosphere of those earlier games will

be shoved further into the background? Not according to publisher Aeria games, which insists that *F.E.A.R. Online* will continue to explore "the dark and ominous story surrounding Alma Wade". And if you don't know who Alma Wade is, she's the J-horror-influenced little girl who's long served as the franchise's antagonist and lank-haired mascot. Even eight years after we first saw her, she still haunts our nightmares.

F.E.A.R. Online will be free to play, and although it remains to be seen whether it can retain the feel of its predecessors, its announcement trailer (**bit.ly/14bikM9**) certainly hints at the sort of shadowy horrors we're familiar with, including bloody walking corpses and shrieking heads scuttling about in the darkness.

You can find out more about *F.E.A.R. Online* and sign up for closed beta, at **fearonline.aeriagames.com**.

Incoming

Splinter Cell: Blacklist - or to give it its full title, Tom Clancy's *Splinter Cell: Blacklist* - has had a bit of a bumpy road to release so far, with early trailers courting controversy due to their graphic scenes of torture and growing fears that the series has strayed a little too far from its stealth roots. Indeed, some of its in-game footage hinted at a straight action shooter more akin to the *Call Of Duty* series than Sam Fisher's earlier exploits, with the hero rushing through tents and gunning down generic videogame terrorists rather than lurking in shadows with his trademark night vision goggles a-glowing.

More recently, however, Ubisoft has been keen to push the idea that *Blacklist* will let players attack the game as they see fit and will be able to pad about in the usual stealthy style or rush into situations with guns blazing depending on their mood. Only time will tell whether this 'all things to all people' approach will work, but it's encouraging to see that Ubisoft has at least kept some links to the *Splinter Cell* series' stalk-and-kill roots.

Splinter Cell: Blacklist will be released on 23rd August.
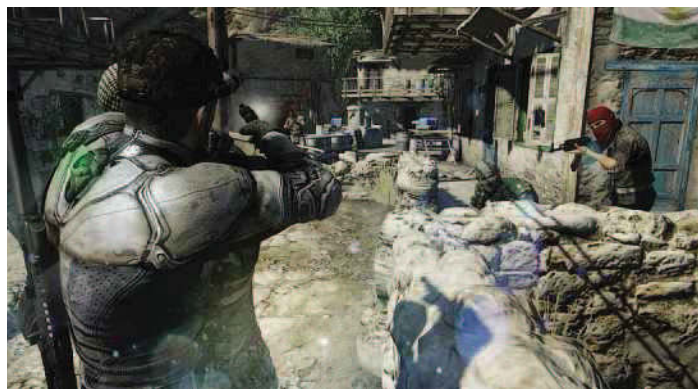
▲ *Sam Fisher's latest adventure will allow players to choose between confrontation and stealth. Splinter Cell Blacklist is out later this month*

AD INDEX

To advertise in Micro Mart, contact Alexa Dracos on:
t: +44 (0)20 7907 6799
e: alexa_dracos@dennis.co.uk

NOTE TO ADVERTISERS

FREE Private Classified Adverts

1 **ONLINE**
Visit our website, register and submit your classified advert at www.micromart.co.uk
Your advert will not only appear in our magazine, but be live on our website too!

2 **POST**
Simply fill in the form & post to:
Sophie Valentine, Micro Mart, 30 Cleveland Street, W1T 4JD ◀ **NEW ADDRESS!**

Step 1

Write the wording for your advert in the numbered boxes below (one word each box). Maximum 30 words free.
Please complete in BLOCK CAPITAL LETTERS, then proceed to Step 2

						Boxed		Reversed	
						Private	Trade	Private	Trade
1	2	3	4	5	30 Words FREE Private Ads Only — Trade ads MUST be boxed or reversed	£6.80	£13.60	£8.00	£16.00
6	7	8	9	10					
11	12	13	14	15					
16	17	18	19	20					
21	22	23	24	25					
26	27	28	29	30					
31	32	33	34	35		£1.70	£8.50	£17.00	£9.70	£19.40
36	37	38	39	40		£3.40	£10.20	£20.40	£11.40	£22.80
41	42	43	44	45		£5.10	£11.90	£23.80	£13.10	£26.20
46	47	48	49	50		£6.80	£13.60	£27.20	£14.80	£29.60
51	52	53	54	55		£8.50	£15.30	£30.60	£16.50	£33.00
56	57	58	59	60		£10.20	£17.00	£34.00	£18.20	£36.40

Step 2

Choose a category you would like your advert to appear in and tick the box.

- ☐ Hardware for sale
- ☐ Hardware wanted
- ☐ Software for sale
- ☐ Software wanted
- ☐ General for sale
- ☐ General wanted
- ☐ Accessories

Step 3

Complete all fields of your personal details and payment method.

Name

Address

Post Code

Landline Telephone No.   **Email**

If I have more than 30 words, I have enclosed due payment. I am not advertising pirated, pornographic or any other kind of illegal software and my advert is both honest and legitimate. MM reserves the right to refuse or alter adverts at the discretion of the management. MM cannot be held responsible for the condition or quality of goods advertised. Your advert will be processed on receipt and will appear a.s.a.p. subject to space and availability.

Please tick appropriately ☐ Private ☐ Trade
I enclose payment by ☐ Cheque ☐ Postal order
or please Debit my Mastercard/Visa/Amex account No

Expiry Date:

Authorise payment for £

3 **FAX** this completed form to: **0207 907 6066**

Please Note: The standard Micro Mart conditions of advertising acceptance apply to all classified advertisements. Cancellations and amendments are not accepted to free ads. The publishers may refuse any advertisements and cannot guarantee insertion into any specific issue. Dennis Publishing will use your information for administration and analysis. We may share your information with carefully selected 3rd parties. We, or they, may send you details of other goods or services which may be of interest to you. The information may be provided by letter, telephone or other reasonable means of communication. If you do not want your details to be shared with carefully selected 3rd parties, please tick here. ☐

To place an ad in our classifieds, simply fill in the form at www.micromart.co.uk or send your ad by post to Sophie Valentine, Micro Mart, Dennis Publishing, 30 Cleveland Street, W1T 4JD

HARDWARE FOR SALE

Have you got any old kit lying around you'd like to get rid of? Fancy making a few pounds while you're at it? Why not advertise in the Micro Mart classifieds? It's easy and it's free, just email what you've got, how much you'd like for it, and your contact details to micromartclassifieds@gmail. com, and we'll do the rest. There are thousands of enthusiastic readers out there looking for components every week, and you may have something unwanted they've been searching for, so get in touch and save your kit from going to the tip!

Lenovo ThinkPad X220. Brand new in box. 2nd Gen Core i5 processor, Intel i5-2520M / 2.5 GHz (Max Turbo Speed 3.2 GHz), Windows 7 Professional 64-BIT (SP1). Open to offers of £425 ovno.
Tel: Tim Wright (01268) 472483 Email: tim20k@ tesco.net

Dell Inspiron 1525 laptop. Spares or repair £65. Has faulty screen and cracked bezel otherwise perfect working order. Works with external monitor. New PSU & battery. No hard drive. Email for full details.
Tel: Kevin Cozens (01792) 581036 Email: kevin_cozens64@hotmail.com

HP Slimline (S3150) computer. NVIDIA graphics, Intel core2, 2GB RAM, 250GB HDD built-in freeview card with remote KBD, mouse WIFI, MS office 2007 home. £120 including postage.
Tel: (01324) 562722

400GB IDE internal drive. Western Digital (or other brand, please contact me for other brands). Perfect working condition, ready to load your own operating system on or I can load XP Pro or Vista Business edition including a certificate of authenticity for an extra £10. £18, plus £4 for delivery. Excellent condition.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

500GB IDE internal drive. Western Digital (or other brand, please contact me for other brands). Perfect working condition, ready to load your own operating system on or I can load XP Pro or Vista Business edition including a certificate of authenticity for an extra £10. £22, plus £4 for delivery. Excellent condition.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Digital LCD PCI Diagnostics Computer Post Card. This is the latest design with screen which displays the error and the solution rather than the old type which only has LEDs and a two digit postcode display. Essential tool for any computer techie. Brand new in box. Price includes postage and packing - £15.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Universal Laptop Power Supply. Comes with all converters for all laptop power jack connections. Unused spare. £20
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Power Over Ethernet (Poe) Injector / Splitter plugin adaptors x 2. Allows you to connect a power supply to a device such as an IP-Webcam over 50 metres using a standard Cat5 network cable. Plug in your power adaptor to one end and the network cable will carry both the network data and the power to the device on the other end. Ideal for installing powered surveillance IP webcams, IP telephones, wireless LAN access points to places where no power socket exists. Brand new still boxed. £15.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

IBM Thinkcentre S51 (8171-21G) Intel Dual Core PC. With New Windows 7 Professional , Flat Screen Monitor , Keyboard and Mouse. £70.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Apple iMac G3 (Blue/White). Complete With Keyboard , Mouse - Completely New Installation of MacOS. £50.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Cheetah Hard Disk 10.2GB. Scsi 10,000rpm - U/ wide - £10.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Computer Case UV Cold Cathode Tubes x 2. With Invertor , On Off Switch and All Cabling - New Unused Spare - £10.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Zalman 120mm Silent Fan. Molex Power Connector - £7.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

20cm Wireless Antenna Booster. With Cable, Magnetic Base And Tnc Connector - New - £10.
Tel: Lydia Havirova (07725) 593919 Email: lydia. havirova@ntlworld.com

Lenovo ThinkPad X100e Laptop. Model 2876-2FG Athlon MV-40 1.6GHz, 250GB HD, 11.6in 1366x768 LCD, ATI HD3200, 802.11bgn wireless, Bluetooth, 1Gb Ethernet, Windows 7 Professional 32 bit installed. Upgraded to 4GB SDRAM. Works with Windows 8. £125
Tel: Ian Bonnett (01932) 856971 Email: a2345@ btinternet.com

Acer Aspire V5-171. Unwanted gift - as new. Intel I3, 6GB Ram, 500GB HDD, boxed and ready to go. £300, offers welcome.
Tel: Tony Lloyd (07800) 565456 Email: Tony-Lloyd@ hotmail.com

Dell Poweredge 1800 server for sale. 2 x 3GHz Xeon processors, 12 GB RAM, 3 x 160GB hard drives, 6CH SATA RAID controller. £200.
Tel: Kevin Gracie (07506) 685879 Email: kgracie12@ gmail.com

Main bits of a quick rig for sale. Asus PK5SE 775 mobo, Core 2 Quad 6600 GO, 8GB Patriot DDR2 memory. £125 plus postage for the lot. Will not split the CPU/mobo.
Tel: Pat Casey (07532) 387078 Email: patngerry@ googlemail.com

Foxconn Nvidia GeForce 7200 GS video card. £15 plus postage.
Tel: Pat Casey (07532) 387078 Email: patngerry@ googlemail.com

Palit Nvidia GeForce 9600 GT Sonic video card. Factory overclock to 700MHz. £40 plus postage.
Tel: Pat Casey (07532) 387078 Email: patngerry@ googlemail.com

Palit Nvidia GeForce 450 GT video card. £50 plus postage.
Tel: Pat Casey (07532) 387078 Email: patngerry@ googlemail.com

Fujitsu PSU model DPS-210 fb +3.3v 7.5A +5A, +12v 15.3A, -12v 0.3A, AUX +5v 2A A5 new. £4, postage £4.75. PayPal only.
Tel: (02082) 246541 Email: KJRider@yahoo.com

3 HP 338 and 1 HP 334 remanufactured inkjet cartridges for sale. All brand new and unopened. £10 including P&P.
Tel: Roger Edwards (01383) 736399 Email: r.edwards14@virgin.net

AMD A8 5600K 3.6GHz Processor. Was going to upgrade a PC but it was the wrong socket for my motherboard. It is a socket FM2 motherboard. Comes retail boxed. £50. Would prefer cash on collection.
Tel: Alice Higgins (01279) 851122 Email: a.higgins@ inbox.com

Apple G4. 400MHz, 768MB RAM, 40GB hard disk, ATI Rage 128MB (AGP), Tower (graphite), M7824LL/A, DVD-ROM, zip drive, USB key, mouse. £55. East London, must collect.
Tel: Tony (07506) 553871 Email: pattersong@ hushmail.com

Various parts: 10GB (£3), 20GB (£5), 40GB (£8), 80GB (£10), 160GB (£20), DVD-writer (from £10), ATI/TNT cards 64MB (£8), 128MB (£12), 256MB (£15), 512MB (£20), AGP/PCI-E, PCI Sound (£5), PCI LAN/fire (£5), ZipDrive (£5), Pentium II, III, 4 CPUs, mobo, AMD CPUs, bundles, SD RAM/DDR. Ask for email list.
Tel: Tony (07506) 553871 Email: pattersong@ hushmail.com

Dell GX620 Ultra small form factor P4 3.0/512/80 CD drive. Includes AC adaptor. Fantastic small machine that is very powerful. Only £25 plus £8 for p&p. I can upgrade the memory and hard drive for an extra cost. You will need to load the drivers yourself. XP Pro with a genuine Certificate of Authenticity can be loaded for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

HP G6 laptop. Intel Core i3-380M 2.53GHz, 8GB RAM, 640GB disk, 15.6 LED, DVD-RW, HDMI, wi-fi, webcam, multi-media reader, Windows 7 64bit. £210.
Tel: Mark Ferns (02089) 321897 Email: mark@ ferns16.plus.com

500GB IDE internal drive. Western Digital (or other brands – please contact me for other brands). In perfect working condition, ready to load your own operating system on, or I can load XP Pro or Vista Business Edition including a Certificate of Authenticity for an extra £10. Only £20 plus £4 p&p.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

3GB of Micron DDR2-667, PC2-5300, 240 pin, C15 desktop RAM in the form of one 2GB and 1GB sticks. Tested and removed from working upgraded PC. £30 delivered. Payment via PayPal only.
Tel: Stuart Wattie (07761) 071075 Email: stuart. wattie@btinternet.com

Intel Core 2 Quad Q6600 G0 stepping CPU 2.4gig socket 775 65nm. No cooler as removed from upgraded PC. Never been overclocked or reseated. Only £45 delivered. Payment via PayPal only.
Tel: Stuart Wattie (07761) 071075 Email: stuart. wattie@btinternet.com

16GB DDR3 RAM by Corsair. 2 X 8GB card CL10. CML16GX3M2A16 Corsair. £50 including insured post.
Tel: Nigel Chaffey (02082) 910504 Email: drnjchaffey@aol.com

M5A78L-M/USB3 AM3+ motherboard for sale. Brand new. £35 including p+p.
Tel: Martin Welch (07971) 528739 Email: welch_ martin@yahoo.co.uk

Dell GX620 Ultra small form factor PC. P4 3.0/1/80 DVD/CDRW includes AC adaptor. Fantastic small machine that is very powerful, only £35 plus £8 p&p. I can upgrade the memory and hard drive for an extra cost. You will need to load the drivers yourself. XP Pro with a genuine Certificate of Authenticity can be loaded for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

500GB 3.5" IDE drive, formatted and ready for use. Only £20 plus £3 p&p. I can load Windows XP Professional with a genuine Certificate of Authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Acer TravelMate 371TMi laptop. Standard spec which includes wireless and CDRW with 2GB memory upgrade. Good clean condition complete with original discs etc. All sensible offers considered.
Email: peterm@tssltd.uk.com

Corsair 4GB DDR3 1333MHz RAM. One stick of RAM used for about 3 months, selling due to upgrade. The RAM is XMS branded. £15.
Tel: Sean O'Connor (07838) 064800 Email: seanocons@hotmail.co.uk

Tower PC with Windows XP and Office XP loaded. Certificate of Authenticity for Windows XP included. HP Photosmart printer and Canon scanner, with all discs for hardware. £50.
Tel: Alan Phillips (01745) 354614 Email: alan. phillips74@talktalk.net

Asus M5A78L-M/USB3 motherboard for sale. Unwanted birthday present, brand spanking new. Normally retails for £59.99 on overclockers. co.uk. £35.
Email: welch_martin@yahoo.co.uk

250GB 3.5" SATA drive, formatted and ready for use. Refurbished. Only £14 plus £3 p&p. I can load a genuine copy of Windows XP Professional, with certificate of authenticity, for an extra £10.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

1TB 3.5" SATA drive, formatted and ready for use. Refurbished. Only £35 plus £3 p&p. I can load a genuine copy of Windows XP Professional, with certificate of authenticity, for an extra £10.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Amstrad CPC464, Monitor, Printer, Covers, Games. VGC £18.
Tel: (01245) 264327

4x 1GB GelL Memory PC 2-600 DDR2-800 for sale. Taken from my old computer and no longer required due to upgrade. £35 including recorded delivery postage. Pay by PayPal. Will split if required.
Tel: (01299) 823518 Email: abberley1@sky.com

Intel core 2 quad processor Q6600 socket 775 2.4ghz x 4 8mhz l2 cache fsb 1066. I will fit an asus P5QLD pr motherboard working perfectly. Please email questions £35, £2.95 postage.
Tel: (016190) 501218 Email: medicineman@ ntlworld.com

Asus P5QLD motherboard with core 2 duo processor 2 gigs memory dimm and original setup disk also rear 1/0 cover, all working fine, email me with questions £39.95 plus £5.95 postage.
Tel: (01619) 501218 Email: medicineman@ntlworld. com

FREE 15" and 17" CRT monitors. Collection from Sherbourne, Dorset. Email 78453316@gmail.com for the list.
Tel: Matthew Green (01935) 814972 Email: matt@ configured-computers.co.uk

1tb SATA II internal drive. Western Digital (or another brand – please contact me for other brands.) Perfect working condition, ready to load your own operating system on. Only £35, less than eBay or Amazon prices (plus £4 delivery).
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Dell OptiPlex 755 (500 GB, Intel Core 2 Duo, 2.33 GHz E6550, 2GB memory, DVDRW). Ultra small form factor. Fantastic small and very fast computers. You will need to load the drivers. Extra memory can be loaded for an extra £10. £65 plus £10 for delivery. Refurbished.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

2 x Intel Core 2 Duo CPUs in excellent condition and perfect working order. Both socket LGA775 chips: one is an E6550 2.33Ghz/4m/1066fsb, the other is an E6750 2.66Ghz/4m/1333fsb. £38 including recorded delivery.
Tel: Huseyin Huseyin (02088) 899344 Email: hichbiri@hotmail.com

Retro desktop MicroATX, baseunit, p3/1000, 256MB RAM, 40GB hard drive, CD ROM drive, floppy, sound network, clean install windows 2k-pro, copy of install disk, working key, ideal for older games, £15.
Tel: (07710) 348638

Dell GX620 SFF Intel Celeron D 2.8, 1.5GB RAM, 80GB hard drive, CD-ROM, Gigabit network card, Windows XP Pro, office utilities, anti virus, legal COA reload disk, ready to use. £45 (p&p £11)
Tel: (07710) 348638

IBM Lenovo NTM-8183 SFF P4/3000 HT 768 MB 40 GIG, CD-ROM, network sound clean instar xp-pro SP3, COA copy of disk & reload, ready to use, £45.
Tel: (077103) 48638

Laptop for sale. eMachines E510 (Model: 1A2G16M) Intel T400 CPU – 1.7GHz Dual Core Celeron, 60GB SATA2 SSD drive plus spare 160GB HDD, DVD rewriter, 3GB DDR RAM, Wireless LAN, external Logitech mouse (trackpad not working), Windows Vista Home Premium, recovery CDs plus manual. £100 ono.
Tel: (01564) 200162 or 01564 702018 Email: pridding@blueyonder.co.uk

Gaming PC: AMD 1090t CPU, Asus Crosshair IV motherboard, MSI 6950 GPU, Kingston HyperX RAM, OCZ 650 watt modular PSU, 1TB HDD, Coolermaster CM II advanced case, LG DVD drive, 3 case fans and spare windowed side panel. £600 ono plus carriage.
Tel: Geoff (01228) 543406 Email soulie69@hotmail.co.uk

Apple MacBook Pro 15.4" Laptop - MC721B/A (February 2011). Quad Core, 4Gb RAM 500Gb HD OS X with original discs etc. Pristine condition. £875 ovno Full details / pictures if required.
Tel: (01415) 694117 or (07870) 627677 Email: jimthechemist@hotmail.com

Digital LCD PCI Diagnostics Computer Post Card. This is the latest design with screen which displays the error and the solution rather than the old type which only has LEDs and a two digit post code display. Essential tool for any computer techie. Brand new in box. Price includes postage and packing - £15.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Universal laptop power supply. Comes with all converters for all laptop power jack connections. Unused spare. £20.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Power Over Ethernet (Poe) Injector / Splitter plugin adaptors x 2. Allows you to connect a power supply to a device such as an IP-Webcam over 50 metres using a standard Cat5 network cable. Plug in your power adaptor to one end and the network cable will carry both the network data and the power to the device on the other end. Ideal for installing powered surveillance IP webcams, IP telephones, wireless LAN access points to places where no power socket exists. Brand new still boxed. £15.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

IBM Thinkcentre S51 (8171-21G) Intel Dual Core PC with new Windows 7 Professional , Microsoft Office, flat screen monitor, keyboard and mouse. £70.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Apple Imac G3 - (Blue/White) complete with keyboard and mouse. Completely new installation of Mac OS. £50.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Cheetah Hard Disk 10.2GB - Scsi 10,000rpm - U/wide - £10.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Computer Case UV Cold Cathode Tubes x 2 - with invertor, on/off switch and all cabling. New unused spare - £10.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Zalman 120mm Silent Fan - Molex Power Connector - £7.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

20cm Wireless Antenna Booster with cable, magnetic base and TNC Connector - New - £10.
Tel: Gary Gemmell (01415) 712822 Email: omendata@tiscali.co.uk

Does anyone want a collection of computers? Many types and makes including AS400, RS6000, VAX, Alpha, Terminals, PET, Sinclair, ZX81, Sharp MZ80k, terminals, SGi, HP UX, 486, 386, 286, 80's computers, Amstrad, and it goes on. If you're interested you're welcome to view the collection and make me an offer. Cherry pickers welcome to see what you want. West London.
Email: opium_den@yahoo.co.uk or skub1x.101@gmal.com

MSI Twin FrozrIII. Excellent performance/speed & quality and less than two years old £175ono. Contact Dave.
Tel: (0161) 2235944 Email: Dave.Gi@sky.com

GTX 580 Graphics Card. Working perfectly. £140 plus P&P. Local pick-up also welcome (Manchester).
Tel: (07720) 209164 Email: Dave.Gi@sky.com

Refurbished Dell Ultra Small Form Factor GX620 P4 3.0/512/80 CD includes AC adaptor. Fantastic small machine that is very powerful ONLY £25 plus £8 for p&p. I can upgrade the memory and hard drive for an extra cost. You will need to load the drivers yourself. XP pro and genuine Certificate Of Authenticity can be loaded for an extra £10.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Miditower PC AMD Athlon 1.7 system. 2x DVD drives,1x FDD drive, Canon scanner, liyama monitor, HP PhotoSmart printer, mouse, keyboard and speakers. XP SP3 with office XP loaded. All relevant discs. Suit student or first time user.
Tel: Alan Phillips (01745) 354614 Email: alan.phillips747@talktalk.net

Refurbished Dell OptiPlex 745 (250GB, Intel Core 2 Duo, 2.2 GHz, 1GB memory, DVD) Ultra small form factor you will need to load the drivers. A larger hard drive and extra memory can be installed at an extra cost or the optical can be changed to a DVD CD-rw for only £10. Price is £60 plus £10 for delivery
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Belkin powered IDE USB external hard drive with a 300GB Maxtor drive, no bad sectors formatted to NTFS - with power lead and USB cable. £15 includes postage. I have been on the forum for 10 years and have sold through the classifieds so you can buy with confidence.
Tel: Alan Walker (0121) 5598269 Email: al_.walker@blueyonder.co.uk

EPSON Pigment ink 5x X250ml. I have these inks for sale these are of High Grade OCP Pigment made in Germany, there is 1x Black, 1x Cyan, 1x Magenta 1x Yellow, 1x Light Cyan. Very cheap price: £45.00 plus £5.60 postage.
Tel: (01795) 470227 Email: keithheathfield2@hotmail.com

Gateway ML6227G Laptop, excellent condition, good battery charger. Dual Core Win Vista. Pick up, or £10.95 P&P. Price: £129.95.
Tel: (0161) 9501218

Over 100 computer mags: Micro Mart, Computer Active & Web User. Over £250.00 shop price. Pick up only, due to weight: £35.00. Open to offers, may do a swap for a monitor.
Email: paul1827@icloud.com

Kodak Easyshare 4MP camera and printing dock. Very robust, silver colour, takes excellent Pictures. Nothing missing, fits easily in pocket, prints directly from camera or computer. Pictbridge compatible. £30 or do swap for monitor.
Email: paul1827@icloud.com

802.11b/802.11g Broadband Wireless Router (Windows XP; Vista and Wndows 7). Brand New unused undamaged in maker's retail package, complete with installation CD, instruction manual, AC Mains adaptor, 2x ADSL filters, telephone line cord, RJ45 LAN link cable. All for only £10.00 plus postage £2.20p.
Tel: Paul Mohan (0113) 265 5971 Email: phmohan@aol.com

PNY GT220 1GB DDR2, Silent Edition £20 inc P&P Pay by PayPal
Telephone: (02380) 510790

Laptop RAM 1x DDR3 PC3-12800, DDR3 (non-ECC) 4GB £22 & 1x 2GB £12. From a new HP laptop that was immediately upgraded on purchase. Both units placed in Crucial static safe packaging. P&P included.
Email: anton.d@blueyonder.co.uk

Sapphire Radeon HD4350 512MB DDR2 silent. £20 inc P&P Pay by PayPal
Telephone: (02380) 510790

High Performance PCI Express 3D Graphic Card; low profile DDR3 1gb; Win7... £20.00 inc Postage.
Tel: Paul Mohan (0113) 265 5971 Email: phmohan@aol.com

Adata 2x 1 GB DDR2 Memory. £12 inc P&P Pay by PayPal
Telephone: (02380) 510790

Many spare parts for sale! Drives: 10GB (£3), 20GB (£5), 40GB (£8), 80GB (£10), 160GB (£20). CD-Writer (from £6). ATI/TNT Cards: 64MB (£8), 128MB (£12), 256MB (£15). AGP/PCI: PCI Sound (£5), PCI Lan/56K (£5), ZipDrive (£8), PCI Firewire (£5). Pentium II, III, 4 CPUs: (ask). MOBO (ask). AMD CPU's (ask). Bundles (ask). SD Ram /DDR (ask). Email for full list.
Tel: Tony (07506) 553871 Email: pattersong@hushmail.com

AMD Athlon 64 X2 4800 + AM2 includes a Alpine GT 64 cooler. £13 inc P&P Pay by PayPal
Telephone: (02380) 510790

Dell GX620 Ultra small form factor P4 3.0/1GB/250/DVD CD-RW. You will need to load your own operating system and the drivers. I can load genuine XP pro with certificate of authenticity for an extra £10. Plus all the components can be upgraded for a cost. Please email me for details and your requirements. Only £38 plus £8 p&p.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

XFX GEFORCE 7800 GTX (256MB) fitted with Zalman Quiet VGA cooler with fan controller. £13 inc P&P Pay by PayPal
Telephone: (02380) 510790

Pinnacle TV tuner card PCTV + FM tuner. £10 inc P&P Pay by PayPal
Telephone: (02380) 510790

TP LINK TL-WN781ND 150Mbps Internal Wireless Network Adapter PCI Express Card; £12.00 inc postage.
Tel: Paul Mohan (0113) 265 5971 Email: phmohan@aol.com

Saitek R440 Force Feedback Racing Wheel. Plus six games: Race'07, Kart 2002, TOCA3 Colin McRae'04 GTR.2 TOCA2. First Class condition, works with Windows 7. FREE POSTAGE. £38.
Tel: (01358) 722 629

Apple G4, 400MHz, 768MB RAM, 40GB Hard disk, ATI Rage 128MB (AGP), Tower (Graphite), M7824LL/A, DVD-Rom, Zip Drive (100), USB Key/ Mouse. £70 (Must collect from East London).
Tel: Tony (07506) 553871 Email: pattersong@hushmail.com

185GB USB2 external hard drive complete with USB lead and mains adaptor. Ideal for backup/ storage files. £15.00 plus postage.
Tel: Paul Mohan (0113) 265 5971 Email: phmohan@aol.com

Dell GX620 Ultra small form factor P4 3.0/1GB/40GB/DVD. Excellent condition. You will need to load your own operating system and the drivers. I can load genuine xp pro with certificate of authenticity for an extra £10. Plus all the components can be upgraded for a cost. Please email me for details and your requirements. Only £30 plus £8 p&p.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

500GB, 1TB & 2TB Western Digital SATA II internal drives. Excellent condition. Perfect working condition ready to load your own operating system on. 500GB only £24 (+£4 delivery), 1TB only £35 (+£4 delivery), 2TB only £50 (+£4 delivery)... Less than ebay or amazon prices.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Dell GX240 S.F.F, Intel P4/1.6, 768MB RAM 80GB Hard drive, CD-ROM, floppy, network, sound, XP-Pro fully updated office, Anti-Virus, utilities, XP-Home C.O.A. £35
Telephone: (07710) 348638

CCL-built Bundle, AMD Phenom II X6 1075T 3.0GHz 6-core (BE) overclockable up to 4.5GHz, ASRock M3A770DE Motherboard, 8GB CRUCIAL DDR3 (PC3-12800)UD RAM, Akasa X4 cooler. Sale due to upgrade. £170 (ono) + P&P.
Tel: Terence Fisher (01293) 551405 Email: terence.fisher@l-3com.com

Retro Desktop Micro-ATX Baseunit, P3/1000, 256MB RAM 40GB hard- drive, CD-Rom, floppy, sound, network, clean instal Windows 2K-Pro, copy of instal disk, working key, ideal for older games, £15.
Telephone: (07710) 348638 Email:

Used laptop memory for sale – removed from ASUS K5 2F. 2GB 1333Hz DDR3 PC3-10600 SoDimm, Part number - ASint SSZ3128M8-EDJEF. £4.00 inc postage
Tel: (07989) 333 145 Email : s90solutions@dsl.pipex.com

Belkin Powerline HD Gigabit 1000Mbps Single Network Plug Adapter (1 x F5D4076). Never used, £20.00 inc postage. (Please note: this is a single plug).
Tel: (07989) 333 145 Email : s90solutions@dsl.pipex.com

8 X 100ml High Grade Dye ink for Epson refillable cartridges. 2x light magenta, 2x Yellow 1x light cyan, 1x black, 1x cyan, 1x magenta. Price: £30.
Tel: Keith Heathfield (01795) 470227 Email: keithheathfield2@hotmail.com

P4/3000 Midi-Tower ATX case, P4/3000 Hyper- threaded, 2GB RAM, 2x 80GB drives, CD-RW, floppy, network, FX5700 256MB video, Windows 7-Pro activated, updated, working CD-KEY, No Disks, £64.
Tel: (07710) 348638

Dell GX620 SFF, intel Cel 'D' 2.8, 1.5GB RAM, 80GB hard drive, CD-Rom, gigabit network, XP-Pro, office utilities, anti-virus, legal C.O.A reload disk, ready to use. £45 (P+P £11).
Telephone: (07710) 348638

AMD Athlon64 X2 5000+ CPU. 2.6GHz socket AM2 Brisbane core 65nm 2 x 512Kb 65w. Bare.
Tel: Jeremy Gill (0208) 9430683 Email: arthur.pewty1@virgin.net

Toshiba Satellite Pro l450d 1GB DDR2 RAM, 149GB SATA hard drive, Athlon CPU ,DVD-RW webcam, wireless LAN Windows XP Pro, there is no sound perhaps an easy fix. Two keys missing, battery not charging otherwise laptop ok. £40.00 pick up only please.
Tel: Darren Raymond (07715) 344675 or (01494) 722929

For Sale: All sorts of ADSL equipment (e.g. modems, routers, filters etc.) Email for the items you require.
Tel: David: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

Intel Laptop CPU Dual Core Celeron T1500.
1.866GHz Merom-2M 533mhz bus, 2 x 512kb L2 cache, 65nm, 35w. Bare Cpu for socket P Laptop P4 system only. £17 inc p+p Cpu £21 inc p+p.
Tel: Jeremy Gill (0208) 9430683 Email: arthur.pewty1@virgin.net

Intel Laptop CPU Celeron M 350J. 1.3 GHz 400Mhz bus, 90nm, 1Mb L2 cache Socket P. Bare Cpu for laptop P4 systems only. £13 inc p+p.
Tel: Jeremy Gill (0208) 9430683 Email: arthur.pewty1@virgin.net

Intel Core 2 Duo CPU E4400 SLA98. Bare Cpu. 2.0GHz, sckt 775, 2 Mb L2 cache 800mhz bus, 10 multiplier, 65nm, 65w. £25 inc p+p.
Tel: Jeremy Gill (0208) 9430683 Email: arthur.pewty1@virgin.net

Intel CPU Pentium D 630 SL8Q7 sckt775 3.0GHz. Hyper-threading, 800Mhz bus, 15 multiplier. Prescott core 90nm. Bare cpu. £13 inc p+p.
Tel: Jeremy Gill (0208) 9430683 Email: arthur.pewty1@virgin.net

P4/3000 Midi-Tower ATX Case, P4/3000 Hyper-threaded, 2GB RAM, 2x 80GB drives. CD-RW, floppy, network, FX5700 256MB video, Windows 7-Pro Activated, updated, working CD-KEY, No disks
Tel: 07710348638

HP G62 Core i3 laptop, 15.6" LED display, 6GB RAM, 500GB Hard Disk. Win-7 Premium 64-bit. Wi-fi, LAN, 3x USB 2.0, 1x VGA, 1x HDMI, 1x Headphone, 1x Mic, 5-in-1 PC Card Reader, PSU+Plug. Excellent condition, Win 8 Compatible.
Tel: Mark (0208) 9321897 Email: mark@ferns16.plus.com

Different types of RAM (SDRAM, SIMM, DIMM, DDR, DDR2, DDR3) call or email me for the RAM you require.
Tel: David: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

Viliv S5 Tablet PC, Windows XP, wi-fi, bluetooth enabled. Immaculate condition comes with all accesories and spare battery. £130. Location: Derbyshire.
Tel: (07792) 846582.

For Sale: lots of computer parts call or email me for a list or to ask me what you require.
Tel: David: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

P4/3000 Midi-tower ATX case, P4/3000 hyper-threaded 2x GB RAM 2x 80 GB drives, CD-RW, floppy, network, FX5700 256 MB Video, windows 7-PRO activated, updated, working CD-KEY, No disks. £64.
Tel: 07710 348638

Various spares for sale: Writemaster DVD writer SH-S183 (£5). Seagate Barracuda 7200.9 160 Gbytes (£11), Kingston 8GB MicroSD card and adaptor (£6).
Tel: (02393) 117877

Asus EAH5770CuCore 1GB graphics card. Used but in excellent condition. Boxed with disks and some connectors (missing 2x4= 6 pin). Great card for those on a budget. Never overclocked. £50.00 plus £3.50 postage. Pay by paypal.
Tel: Chris Edwards (01737) 556297 Email: chris-e1@talktalk.net

IBM/ Lenovo MTM-8183 SFF P4/3000 HT, 768 MB, 40GB, CD-ROM, Network, sound, clean instal XP- PRO SP3, C.O.A copy of disk and reload, ready to use £45.
Telephone: (07710) 348638

Belkin Powerline HD Gigabit 1000Mbps Single Network Plug Adapter (1 x F5D4076). Never used, £20.00 inc postage. (Please note: this is a single plug).
Tel: (07989) 333 145 Email : s90solutions@dsl.pipex.com

8 X 100ml High Grade Dye ink for Epson refillable cartridges. 2x light magenta, 2x Yellow 1x light cyan, 1x black, 1x cyan, 1x magenta. Price: £30.
Tel: Keith Heathfield (01795) 470227 Email: keithheathfield2@hotmail.com

P4/3000 Midi-Tower ATX case, P4/3000 Hyper- threaded, 2GB RAM, 2x 80GB drives, CD-RW, floppy, network, FX5700 256MB video, Windows 7-Pro activated, updated, working CD-KEY, No Disks, £64.
Tel: (07710) 348638

8 x 100ml High Grade Dye ink for Epson refillable cartridges. 2x light magenta, 2x Yellow 1x light cyan, 1x black, 1x cyan, 1x magenta. Price: £30.
Tel: Keith Heathfield (01795) 470227 Email: keithheathfield2@hotmail.com

P4/3000 Midi-Tower ATX case, P4/3000 Hyper- threaded, 2GB RAM, 2x 80GB drives, CD-RW, floppy, network, FX5700 256MB video, Windows 7-Pro activated, updated, working CD-KEY, No Disks, £64.
Tel: (07710) 348638

Dell GX620 SFF, intel Cel 'D' 2.8, 1.5GB RAM, 80GB hard drive, CD-Rom, gigabit network, XP-Pro, office utilities, anti-virus, legal C.O.A reload disk, ready to use. £45 (P+P £11).
Telephone: (07710) 348638

P4/3000 Midi-Tower ATX case, P4/3000 Hyper-threaded, 2GB RAM. 2x 80GB drives, CD-RW, floppy, network, FX5700 256MB video, Windows 7-Pro activated, updated, working CD-KEY, No Disks. £64.
Tel: (07710) 348638

Intel Core 2 Duo CPU E4400 SLA98. Bare CPU. 2.0GHz, sckt 775, 2 Mb L2 cache 800MHz bus, 10 multiplier, 65nm, 65w. £25 inc p+p.
Tel: Jeremy Gill: (0208) 9430683 Email: arthur.pewty1@virgin.net

AMD Athlon64 X2 5000+ CPU. 2.6GHz socket AM2 Brisbane core 65nm 2x 512Kb 65w. Bare.
Tel: Jeremy Gill: (0208) 9430683 Email: arthur.pewty1@virgin.net

Toshiba Satellite Pro I450d 1GB DDR2 RAM, 149GB SATA hard drive, Athlon CPU ,DVD-RW webcam, wireless LAN Windows XP Pro, there is no sound perhaps an easy fix. Two keys missing, battery not charging otherwise laptop ok. £40.00 pick up only please.
Tel: Darren Raymond (07715) 344675 or (01494) 722929

All sorts of ADSL equipment (e.g. modems, routers, filters etc.) Email for the items you require.
Tel: David (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

HP G62 Core i3 laptop, 15.6" LED display, 6GB RAM, 500GB Hard Disk, Win-7 Premium 64-bit. Wi-fi, LAN, 3x USB 2.0, 1x VGA, 1x HDMI, 1x Headphone, 1x Mic, 5-in-1 PC Card Reader, PSU+Plug. Excellent condition, Win 8 Compatible.
Tel: Mark (0208) 9321897 Email: mark@ferns16.plus.com

Different types of RAM (SDRAM, SIMM, DIMM, DDR, DDR2, DDR3) call or email me for the RAM you require.
Tel: David:(0161) 6888119 Email: pcmadnessltd@yahoo.co.uk,

1x 2GB Buffalo DDR2 800MHz memory for sale. £10 inc p&p.
Tel: (01642) 898269 Email: coleyb@ntlworld.com

3x 1GB Kingston DDR PC3200 memory for sale, £12 a stick or all 3 for £30 inc p&p.
Tel: (01642) 898269 Email: coleyb@ntlworld.com

Viliv S5 Tablet PC. Windows XP, wi-fi, bluetooth enabled. Immaculate condition comes with all accesories and spare battery. £130. Location: Derbyshire.
Tel: (07792) 846582

Lots of computer parts call or email me for a list or to ask me what you require.
Tel: David: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk.

Writemaster DVD writer SH-S183 (£5). Seagate Barracuda 7200.9 160 Gbytes (£11). Kingston 8GB MicroSD card and adaptor (£6).
Tel: (02393) 117877

Asus EAH5770CuCore 1GB graphics card. Used but in excellent condition. Boxed with disks and some connectors (missing 2x4= 6 pin). Great card for those on a budget. Never overclocked. £50.00 plus £3.50 postage. Pay by paypal.
Tel: Chris Edwards (01737) 556297 Email: chris-e1@talktalk.net

Dell Optiplex 360 PC. Intel core 2 duo 2.80 GHz (e7400). 80GB hard drive, 1GB DDR2 RAM, DVD LG super multi drive, on-board sound/graphics, LAN, Windows XP Pro, Norton 60 day trial. 17" LCD, keyboard/mouse. £75.00 buyer to collect.
Tel: (01494) 722929 / (07715) 344675 Email: darrenraymond@hotmail.co.uk

3.4GB P4 512MB Motherboard bundle 3.4 GHz P4 CPU (new type) +fan 512 MB DDR ram (max 4GB) motherboard 3xPCI 1xPCI-E 4xSATA 4xUSB(int) 4xUSB(ext) 2xFirewire 5.1 surround sound LAN +backplate was used until recently as my main setup until i upgraded still in good working order.it is ready to hook up and go could be used gaming, surfing the net, download server, office work etc can add more ram if needed £35+p&p £35
Tel: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

Away from home and out of power? You need a standalone power bank that can charge your phone/tablet! For details of this 12000mAh backup.
Tel: (07733) 241722 Email: sparker86@blueyonder.co.uk

RM/Asus Toughbook 15.6" widescreen laptop. Intel Pentium P6200 2.13GHz dual core, 4GB RAM, 160GB hard drive, Wireless, HDMI ports, USB 2.0, WIndows 7 Pro 64-bit (activated), Office 2007, AVG etc. Fully working laptop, no cosmetic damage. Comes with charger. Battery holds excellent charge.
Tel: (07885) 766950 Email: crosswords@hotmail.com

10GB, 20GB, 40GB, 80GB and 160GB desktop IDE hard drives. All clean pull (little to no use), no bad sectors, tested. All you need to do is plug in and go. Email or call for a price.
Tel: David (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

Dell Axim X5 Pocket PC with touch screen & stylus, two batteries fully charged, Mains & Car chargers, Car Mount, Belt pouch, manuals etc. I'm retired so I no longer need it. Would exchange for reasonable size PCI-e Video Card or other offers).
Tel: (01890) 820295 Email: ken@stonehaven2.plus.com

Kodak and Advent inks at bargain prices. Either email me, or go to Googlesites photopixessentials.
Tel: (01580) 830446. Email: johngatehouse386@live.co.uk.

Refurbished 250GB (£18), 400GB (£20) and 750GB SATA (£30) drives for sale. 3.5", formatted and ready for use. Add £3p&p for each.
Tel: (01942) 706572 or (07828) 982930 Email: davethomas96@aol.com

Phenom II-X6 1075T 3.0GHz (BE) overclockable to 4.5GHz. ASRock M3A770DE AM3 Mobo, 8GB CRUCIAL DDR3 (PC3-12800) UD RAM, Akasa X4 cooler. £180ono +P&P. Will accept Paypal.
Tel: Terence (01293) 551405 Email: terence.fisher@l-3com.com

Fujitsu 30GB IDE Laptop Hard Drive for sale/offers & no bad sectors, WD Scorpio Blue 500GB SATA Laptop Hard Drive (Manufacturing date: 27 April 2011). For sale/offers as I've upgraded to an SSD Drive.
Tel: Ken (01890) 820295

Refurbished 160GB SATA drive, 3.5" formatted, ready for use. Only £10 plus £3 for p&p.
Tel: (07828) 982930

Floppy ribbon cables Floppy ribbon cables £1 each +p&p if you want to bulk buy there maybe a discount £1
Email: pcmadnessltd@yahoo.co.uk

IDE ribbon cable IDE ribbon cable £1.50 each +p&p if you want to bulk buy there maybe a discount £1.50
Email: pcmadnessltd@yahoo.co.uk

ASUS M2A-VM-HDMI AM2/AM2+ MOBO I have just upgraded my PC so have this excellent motherboard for sale. If interested please contact me. £35
Tel: (07966) 563786 Email: fabstock1@gmail.com

PCI Sound cards PCI Sound cards £5 +p&p each £5
Email: pcmadnessltd@yahoo.co.uk

Apple 15" Powerbook G4 DC In Power Board 820-1602-A Apple 15" Powerbook G4 DC In Power Board 820-1602-A untested £10+p&p £10
Email: pcmadnessltd@yahoo.co.uk

P4 motherboard bundle P4 motherboard(LAN, 4+2USB, 3PCI, Sound) 1.7GB pentium4 + fan 256MB RAM APG GFX card note spec can be changed slightly to you requirements ready to hook up and go could be used surfing the net, download server, office work etc. £25 (Plus £25 P&P)
Tel: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

HEWLETT-PACKARD DC7600 SFF Small Hewlett Packard Baseunit, Intel Pentium D945 Dual-Core 3.4GHz Processor, 1536MB DDR2 RAM, 80GB SATA Hard-drive, DVD-Rom, 10 / 100 / 1000 gigabit network card, on-board sound, USB 2 etc., Loaded with clean install Windows XP-pro – SP3, fully updated, Office ,anti-virus & all usual utilities, with LEGAL COA licence sticker & reload disk. Ready to plug in & use, (P&P £10 . FREE Keyboard & Mouse if collected. £55
Tel: (07710) 348638 Email: pat4cars@aol.com

Speedtouch ADSL Modem Speedtouch ADSL Modem - Tested and working. £5
Tel: (0141) 5712822 Email: gary.gemmell@ntlworld.com

Intel 6200 AGN 802.11agn wireless N Half Mini Pci-E Wi-fi card The Intel Centrino Advanced-N 6200 is an IEEE 802.11 A/G/N wireless network adapters that operate in both the 2.4GHz and 5.0GHz spectra. Intel Model No. 622ANHMW This adapter is PCIe Half Mini Card form factor and delivers up to 300 Mbps of bandwidth. See tinyurl.com/cpey3zu. £7.50
Tel: (01932) 856971 Email: a2345@btinternet.com

SCK 370 CPUs have alot of old of 370 CPUs most around 800mhz £3.00 +P&P £3
Email: pcmadnessltd@yahoo.co.uk

CRT monitors I have 15" CRTs and 1x 17" CRT. £12 each + P&P. Bulk buy will have discount £12
Email: pcmadnessltd@yahoo.co.uk

I/O back plate ATX motherboards i/o back plate atx motherboards email me a picture of the plate you require and i see if a have it £0
Tel: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

Belkin Retractable USB 2.0 Cable model F3U133-RTC The Belkin Retractable USB 2.0 Cable extends up to 3 feet, slides back into the housing after use, easily accessible for tangle-free operation when you need it again. Gold plated copper contacts. Transmits data at up to 480Mbps with error-free, high performance transmission. See http://www.belkin.com/au/p/P-F3U133-RTC £5
Tel: (01932) 856971 Email: a2345@btinternet.com

HP D1360 Inkjet Printer Good condition mini desktop footprint. Small size so easy to put on a shelf etc. £15
Tel: (0141) 5712822 Email: gary.gemmell@ntlworld.com

GA-Z77-DS3H Motherboard GA-Z77-DS3H Motherboard bought in October 2012 -never used includes everything in new retail package -original receipt included price includes recorded delivery in mainland UK. £45.00
Tel: (7703) 659310 Email: tronson@futureliving-space.org

Memory for sale Hynix memory DIMM PC2700 DDR333 non ECC 256Mb sticks, 4 in total,used, fully working,always kept in antistatic bag. £17
Tel: (07762) 618191 Email: himaryuk@yahoo.co.uk

CORSAIR DDR2 MEMORY FOR SALE 2x 1GB Corsair XMS2 800MHz memory modules for sale. Timings:CL5 1.90v ver5.2. Bought by mistake. (Should have been 2x 2GB modules) £14.08 each new from Ebuyer but I'll be happy with £16 inc postage for the pair. £16.00
Tel: (01890) 820295 Email: stonehaven2@hotmail.co.uk

HD5830 Faulty AMD HD5830 for sale. Is not detected by BIOS or Windows- would make a great GPU if you get it working. Was £300 when new and selling for £50- graphics card only is included. Will include the crossfire bridge if I can find it. £50
Tel: (07781) 418344 Email: mr.a.c.stopher@googlemail.com

New Epson Stylus D88 Plus Printer New Epson Stylus D88 Plus Printer still boxed never used, email if interested.
Email: pcmadnessltd@yahoo.co.uk

Dell Inspiron Mini 1012 Netbook 10.1" Dell Inspiron Mini 1012,Black, 1.66GHz,160GB HDD, 1GB RAM,wireless, 3xUSB, 1xVGA, 1xRJ45, dual boot Win XP SP3, Linux Ubuntu UNR 10.04,original condition with software & charger, £57 incl 2nd class uk postage. £57.00
Tel: (01924) 897531 Email: tronfisher@gmail.com

Dell Latitude D610 Wireless Laptop with XP & Office 2007 Dell Latitude D610 Wireless Laptop with Windows XP & Microsoft Office 2007 £15 extra for delivery. Internet ready with all the latest updates from Microsoft and AVG anti virus package. 1GB RAM = fast!!! 1.8GHz Processor / CPU 80 GB Hard Disc Drive / HDD Also Microsoft Office 2007 fully installed with : Word Excel Outlook Powerpoint Publisher Onenote Infopath Groove £84.99
Tel: (07879) 476399 Email: brokenpcs2008@yahoo.co.uk

Compaq Evo small desktop d510u students pc wifi 2.0gz pc 750gb ram lan sound , dvd 2.5" small form factor inc 17" acer monitor windows xp and office fully factory reset and tested been used for music and pictures ideal for kids or office pc works well with internet both wired and wifi £50
Tel: (07531) 493183 Email: stevevar1974@live.co.uk

Intel 1GB Motherboard Bundle intel motherb oard(lan,2+2usb,3pci,snd+vga) 1gb + heatsink 128 mb ram note spec can be changed slightly to you requirements ready to hook up and go could be used surfing the net, download server, office work etc tested and working £20 +p&p £20
Tel: (0161) 6888119 Email: pcmadnessltd@yahoo.co.uk

+++ RETRO OLD SKOOL +++ SMALL DESKTOP BASEUNIT IDEAL FOR THOSE OLD GAMES..... Micro – ATX Desktop Baseunit, Intel P3 / 1000, 80 gig + 10 gig Hard Drives, 256 MB SD-Ram, CD-Rom, Floppy, Sound, USB, 10 / 100 Network, Loaded with clean install of Windows 2000 pro, all updates, service packs done, Reload provided on 2nd Hard disk,(p & p £ 10) £15
Tel: (07710) 348638 Email: pat4cars@aol.com

Network cards 100mb pci Ethernet Network cards 100Mb pci Ethernet willing to reduce cost if bulk buy £2.5 + p&p £2.5
Email: pcmadnessltd@yahoo.co.uk

HP laptop for spares only hp pavillion laptop selling for spares no memory or hard drive missing key on keyboard broken screen missing wireless lan has dvd-rw £40 or near offer £40
Tel: (07715) 344675 Email: mrcwig@hotmail.co.uk

MIDITOWER Heavy Duty ATX case, P4 / 3000 Hyper-Threaded, 2GB DDR RAM, 2 x 80GB 7200rpm Hard Drives, CD-RW, Floppy, 10 / 100 Network, nVidia fx5700 256MB Graphics, USB + 2 on front panel, WINDOWS 7- PRO, or can be loaded with os of your choice if available, with copy of install media on DVD & working OEM key, (no sticker,) fully activated & updated with SPs etc., (p & P £ 15) £64
Tel: (07710) 348638 Email: pat4cars@aol.com

HP laptop for spares only Hp pavillion dv5000 selling for spares no charger no hard drive no memory or wireless lan.has dvd multi rw. broken screen missing key from keyboard. £40 or near offer buyer pays postage or can pickup if required £40
Tel: (07715) 344675 Email: mrcwig@hotmail.co.uk

AT connector keyboards i have a few AT connector keyboards £1+p&p £1
Email: pcmadnessltd@yahoo.co.uk

Slot 1 CPUs P111 Slot 1 CPUs P111 different speeds email for more info £0
Email: pcmadnessltd@yahoo.co.uk

SanDisk Ultra Flash memory card 2 GB CF Card SanDisk Ultra II CompactFlash memory card has rated minimum sustained write speed of 9 megabytes (MB) per second and a read speed of 10MB per second. All CF cards from SanDisk are Type I format, including SanDsik Ultra II Compact-Flash cards £5
Tel: (01932) 856971 Email: a2345@btinternet.com

HARDWARE WANTED

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

Wanted: Advent 6553 working motherboard. *Tel: Sean Lavelle (01614) 280430 Email: sean-is@ntlworld.com*

Wanted: XD picture memory cards for Fujifilm digital camera.
Tel: John McNeill (07835) 441956 Email: jcmcneill@live.co.uk

Wanted: PC case and PSU suitable for Intel 775 mobo, or complete 775 system, memory and HDD not important.
Tel: Caz Hough (07900) 531125 Email: caroline-hough@outlook.com

Wanted: Motherboard for ASUS X55U Notebook. Hannstar J MV1 also known as ASUS SX008D has AMD Dual Core C60 Pross.
Tel: (01284) 752291 Email: coliningrey@aol.com

Wanted: 128MB, 256MB and 512MB USB sticks. Will pay £1 each and organise the postage. I will send a prepaid envelope with the payment.
Tel: (01642) 898269 Email: coleyb@ntlworld.com

Wanted: Internal Floppy Diskdrives. *Tel: (01296) 580579*

Urgently Required: Samsung 15" LCD monitor - it must have a DVI input. Preferably within a short distance of Woodford Green, Essex. Collection possible.
Email: philip.hennessy@hotmail.co.uk

Wanted: Patriot 3070 laptop. Working or repairable.
Tel: (07899)886952

WANTED: Slide and negative holder for an Epson Perfection 1650 scanner. Will accept other holders from Perfection 1250 or possibly from different manufacturers and models as I can modify them to fit.
Tel: (01642) 898269
Email: coleyb@ntlworld.com. .

I am looking for an Epson Stylus D120 Inkjet printer in good clean working condition. Call George Aldridge: *(01573) 224632. Email: kelsoga@primusbroadband.co.uk*

Will pay up to £50 for any quad core AMD FM1 chipset processor. Fan not required, but would prefer it.
Tel: Robert Allen: (07891)848134 Email: rob94.allan@googlemail.com

DIMM modules. DDR2 pc8500 (1066) CL5 240pin. Looking for a pair, either 2x2GB or 2x4GB (depends on price).
Email: nick01chalk@yahoo.co.uk

WANTED: Working Intel Clarkdale i3 - 550 or 560 CPU. Willing to pay a fair price.
Tel: (01529) 505325
Email: t.lad@live.co.uk

WANTED: Motherboard for a Targa Traveller 1574*2 laptop. It's an S1 socket board and takes the AMD Turion 1.6 processor.
Tel: (07522) 189503 Email: azimuth123@gmail.com

Wanted cables for internal floppy disk drive. *Telephone: (01296) 580679*

Wanted, Dell Inspiron 1520/1525 screens Urgently Wanted: Dell Inspiron 1520, 1525 & 1501 15.4"WXGA screens in fully working order with no line faults or dead pixels, please e-mail me or text me only with price, thank you. £0.00
Tel: (07979) 011037 Email: carpmanles@aol.com

Wanted: Laptop SATA hdd's Wanted: 40gb, 60gb, 80gb, 100gb, 120gb & other sizes of laptop 2.5" SATA hard disk drives in fully working order with no bad sectors. Please email me or text me only thanks. £0.00
Tel: (07979) 011037 Email: carpmanles@aol.com

AM3+ motherboard gigabyte GA870 ud3 rev 3.1 black socket am3+ motherboard wanted , retail or used with all inclusive items required, will pay fair market price including delivery . £60.00
Tel: 01387248976 Email: bldamsys@yahoo.co.uk

Genuine HP 337 black & 343 colour inkjet cartridges, new & sealed. If you can help please email me or text me only, thanks. Reasonable price paid need these cartridges urgently. £0.00
Tel: 07979011037 Email: carpmanles@aol.com

Wanted: High end laptops Wanted: Pentium 4 & High end laptops in working order, must be wireless, will consider fautly or non-working laptops, reasonable price paid, please e-mail me or text me only with specs/condition & prices, thank you. £0.00
Tel: 07979011037 Email: carpmanles@aol.com

Siemens Nixdorf Xpert Desktop I am looking for a Siemens Nixdorf Xpert desktop computer, with or without monitor, and keyboard with the same brand logo £40
Tel: 07919532690 Email: aramis_kane@hotmail.com

Dell Inspiron 1520 laptop parts reqd Wanted: Dell Inspiron 1520 laptop screen bezels, screen lids, fully working battery packs which hold a good charge for 2 hours or more & all other parts reqd for Dell Inspiron 1520/21 £0.00
Tel: 07979011037 Email: carpmanles@aol.com

SOFTWARE WANTED

Samsung compact camera installation CD wanted. Need the disc to install my Samsung Compact Camera. It is entitled "Samsung New PC Studio". My version is "NPS HL1 GH46-00864A". Think that any disc will work. Mine has been damaged and I need to install it on my new laptop.
Tel: Maurice Hood (01493) 669305 Email: mauriceed1935@yahoo.co.uk

INSTALLATION CD WANTED. Wanted: a copy of the installation CD-ROM for an HP Pavilion Media Centre Tower. Model No: m7000. I've downloaded all the drivers for it from the HP website but XP Device Manager still shows an unknown item marked. Can anyone help me please? I'll pay postage and any small charge. £0.00
Tel: (01890) 820295 Email: stonehaven2@hotmail.co.uk

Frozen Solid

I'm having a constant problem with my Core i7 PC that I've had for a couple of years, and I'm hoping you can help me fix it, as it's driving me insane.

For a few weeks now I've been having crashing issues when playing games on my system. I can be playing for a few minutes, or a couple of hours, and the whole system will randomly freeze. In this state I can't do anything. The screen is locked, there's no sound and I can't even use normal Windows short cuts to end programs (such as Ctrl+Alt+Del). The whole thing is just totally locked up. All I can do in this state is hard power the PC down by either holding in the power button until it shuts off, or unplugging it from the mains.

In an effort to remedy this issue I've tried all sorts of things, although I'm not experienced enough to go digging inside my PC. I've looked online and see that people say this sort of issue can be due to overheating and/or graphics card drivers. So, I checked using a couple of programs to see if my system is overheating, and it doesn't appear to be the case, however, I can't be totally sure as, again, I'm no expert.

I did uninstall my graphics card drivers and reinstall them, with no luck, and I even rolled them back to previous versions, as suggested in another forum, but this made no difference either.

I've uninstalled and reinstalled my games (the issues happens on a few, mostly FPS titles like *Battlefield* and *Call Of Duty*), and this has made no difference. Going back to the overeating issue, I even got a desk fan (a suggestion from a friend) and pointed that at the back of my PC, but this made no difference.

I'm at a total loss and was hoping that you can help. My PC is out of warranty, so I don't have any official backup, so would appreciate any and all help I can get.

Michael

In cases like this, I'd usually have the same knee-jerk reaction as most and assume it's overheating that's causing the issue. It's very common, and the symptoms you've described

▲ HWMonitor is a great tool for checking system heat levels, amongst other things

match it to a tee. Even though you've tried a couple of programs, and pointed a desk fan at the PC, I still wouldn't rule out such issues.

Just in case, you may want to try a program like HWMonitor (**www.cpuid.com**). It's a great, free tool that can monitor voltage and thermal information from most hardware. Sadly, I don't know what your specification is, other than the core i7 CPU, but you should check the various results for your specific hardware online to see if you're overheating. As a general rule, I wouldn't push a Core i7 much over 80°C, a I would expect its idle temperature to be around 50-60°C.

You said you've not been inside your PC, which is wise if you're not sure what you're doing in there, but it's also one of the best ways to check for possible signs of overheating, as build ups of dust and other detritus inside the case can be the cause of the rising heat levels. Case fans can become caked in dust, thus reducing their efficiency, and if vents are blocked (not always visible from the outside), hot air may be unable to escape.

If you know someone who's a little more confident rummaging around the insides of the system, then I'd recommend enlisting help in checking this. As your PC is out of warranty, the only other option you have is to take it to a PC repair shop, and this could be costly if all your PC needs is a little spring clean.
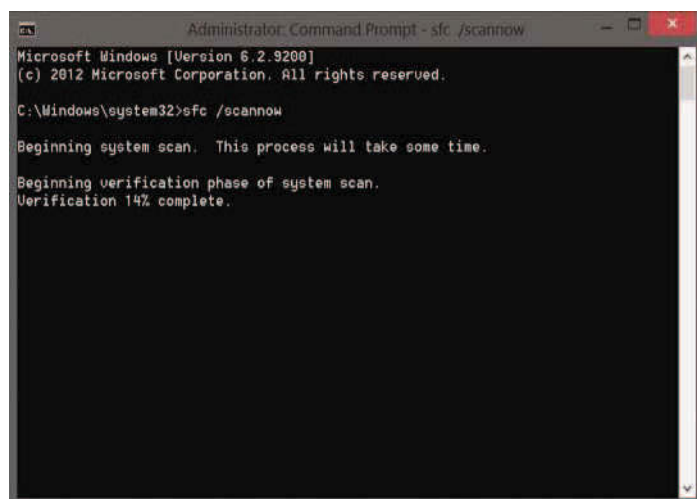
If you do manage to clean out the system, give it a go again and see if this solves the problem. If not, then we can look at alternative causes and possible solutions, beginning with your system's overall health.Freezes and crashes can be caused by viruses and malware, so I always suggest people scan their systems with their chosen antivirus scanner and a malware detection and removal tool such as Malwarebytes (**www. malwarebytes.org**). Other
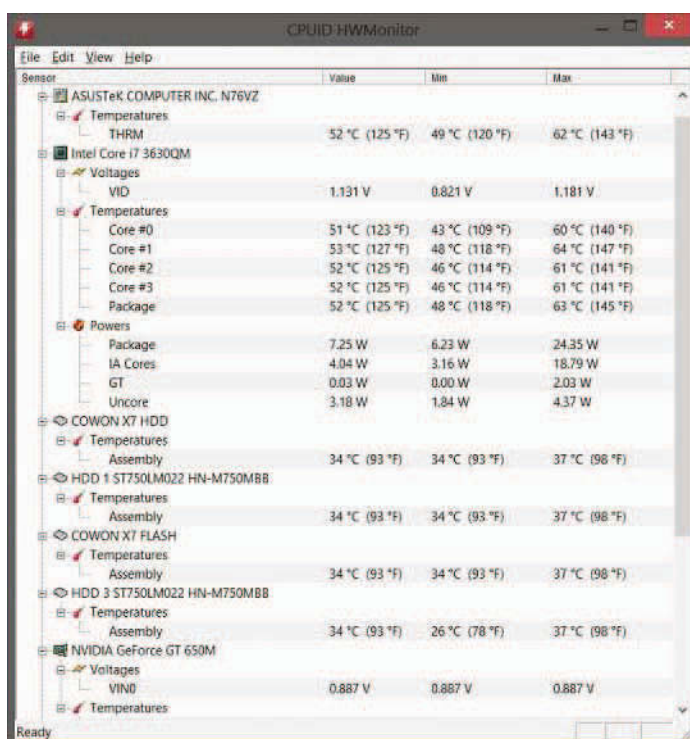
tools, such as Hitman Pro (**www.surfright.nl**) can also help (running more than one malware scanner is often a good idea). If these programs find any infections, then use

I'd run diagnostics for your drive. You can start with Windows' own simple scanner (right-click the drive in Computer and select Properties > Tools > Error Checking), or

> ❝ **Dust and other detritus inside the case can cause rising heat levels** ❞

them to clean out the system to the best of their abilities.

You should also run a scan of the essential Windows files on your PC, and check them for errors. To do this, open up a command prompt with admin rights and type 'sfc /scannow'. The scan will begin, and can take a while, so let it run. Once it's finished, reboot. This process can sometimes be run several times for best results.

If you have a faulty hard disk, this can cause freezing issues, so

you can search for tools specifically designed for your own hard disk. The latter options is the better choice, as the software will work specifically with your make and model of drive. Often these tools will come as .iso images, so will need to be burned to a disc using programs like ImgBurn (**www.imgburn.com**). These can then be run at bootup in order to achieve the best results. If any issues are found, you can usually try to

▲ Damaged Windows system file can cause all sorts of problems. SFC can detect and fix these issues

repair them, or at the very least find out what the likely cause of your issues is.

A final suggestion would be to check your RAM. Faulty memory is another fairly common cause of such freezing, but it can be easily checked by downloading a tool such as Memtest (**www.memtest.org**). This will scan your memory modules for any errors, and

should let you know if there are any. If it finds anything, you can remove the offending memory module and try the system again to see if the freezes resurface. If not, then it's a good bet the problem is down to the module, and a replacement would fix the issue. Of course, this requires rummaging inside the PC, so if you need to, get some help.

Cutting Corners

One of the things I've always liked to make the most of when using Windows is the various short cut keys. I'm familiar with many of these, like ALT+F4 to close programs, ALT+TAB to switch between them, and the obvious cut and paste and so on, but I'm always happy to find out more. Specifically, I'd like to know if Windows 8 has any new keys. I upgraded to 8 a few weeks ago, and would like to make use of any little tricks I'm unaware of.

Jeremy

Windows 8 has introduced a few new short cuts that many may not be aware of. One of the most useful is the simple search short cut. You may think you need to manually go to a search window to enter a search term, but this isn't necessary. All you need to do is press the Windows key and start to type. The search will happen automatically and results will be displayed.

Right is a list of other useful Windows 8 short cuts you may find useful.

Key combination	Effect
CTRL+Plus or Minus (+ and -)	Zoom Metro Start Menu items
CTRL+Mouse scroll wheel	Zoom Metro Start Menu items
Windows Key+C	Open charms menu
Windows Key+F	Open the Search charm for files
Windows Key+H	Open the Share charm
Windows Key+I	Open the setting charm (useful for quick shutdowns)
Windows Key+J	Switch between main and snapped applications
Windows Key+K	Open the Devices charm
Windows Key+O	Lock screen orientation (landscape or portrait).
Windows Key+Q	Open the Search charm for apps
Windows Key+W	Open Search charm for settings
Windows Key+Z	Displays available commands for open application.
Windows Key+Space	Switch keyboard layout and language
Windows Key+CTRL+Space	Switch back to previous input selection
Windows Key+CTRL+Tab	Cycle trough open applications, and snaps to them
Windows Key+Shift+Tab	Cycle through apps in reverse order
Windows Key+PgUp	Move Start Menu and Metro apps to left-hand monitor
Windows Key+PgDown	Move Start Menu and Metro apps to right-hand monitor
Windows Key+Shift+Period (.)	Snaps Metro apps to the left
Windows Key+Period (.)	Snaps Metro apps to the right

ASK JASON

Jason

Double Trouble

I do a lot of work with virtual machines (VMs), and my current laptop is groaning from lack of drive space and memory. It's a Dell Studio 1749, with a Core i5 CPU, 8GB of RAM, and Windows 7 Ultimate. In my line of business, I might have six or seven VMs running simultaneously, and things tend to get slower and slower. What I'm looking for is a new laptop with, say, a 2TB hard drive and 32GB of RAM (and I'd prefer to stick to an Intel CPU). What can you recommend? Cost isn't necessarily a factor.

Tony Silveston, BT

The good news is that 2.5" hard drives do indeed reach capacities of 2TB. The bad news is that models beyond 1TB have a height of 15mm, whereas drive bays in laptops are usually restricted to models with a height of 9.5mm or 7mm.

To reach 2TB, Tony, you'd need a laptop with an oversize bay or dual bays, and such machines are scarce. Your best bet, then, is to buy a regular laptop and create a second bay by fitting a converter in place of the DVD or Blu-ray drive (whenever you need such a drive, just hook up an external

one via USB). A converter can be had for under a tenner – see **ebay.eu/18Pjew1**, for example. Before opening your wallet, though, measure your DVD or Blu-ray drive's height (at the rear): is it 9.5mm or 12.7mm? Be sure to buy the right converter.

If the converter height is 12.7mm, you'll be able to fit a standard, 9.5mm-high drive. If the converter height is 9.5mm, you'll possibly need a slimline, 7mm-high drive. Maximum capacity in both cases is 1TB,

though at 7mm there's a mere single offering: the Western Digital Blue (WD10SPCX). Also, to ensure a decent turn of speed, you're better looking at drives running at 7,200rpm, not 5,400rpm. Maximum capacity at 9.5mm remains at 1TB: the HGST Travelstar 7K1000 (HTS721010A9E630). At 7mm, sadly, it falls to just 500GB: the HGST Travelstar Z7K500 (HTS725050A7E630).

Really, the best 2.5" drives available are Seagate's Laptop SSHDs (9.5mm) and Laptop Thin SSHDs (7mm). These were formerly called Momentus XTs, and they're hybrid drives, using conventional platters for user-accessible data and a small amount of flash memory for caching. You get the benefit of SSD-class performance without the drawbacks of high cost and low capacity. All models run at 7,200rpm, with a 1TB offering at 9.5mm and a 500GB offering at 7mm.

> ❝ **No current Intel mobile CPUs even support more than two slots** ❞

Regarding RAM, Tony, I don't think you'll manage 32GB. The amount you can fit is determined by the CPU, because these days that's what houses the memory controller. Most current Intel mobile CPUs can handle 8GB per slot, and virtually no laptops have more than two slots (many Dells only have one). Indeed, apart from quad-core models, no current Intel mobile CPUs even support more than two slots. And remember – all mobile Core i5s are only dual-core, unlike their desktop counterparts.

In conclusion, my advice is to buy any regular laptop that roughly suits your needs and, as required, strip out the hard drive, DVD or Blu-ray drive, and RAM. Sell them on and use the proceeds to offset the cost of two new hard drives chosen on the criteria discussed above, two 8GB RAM modules, and a bay converter. I reckon 16GB of RAM and at least 1.5TB of drive space (2TB if you can fit two 9.5mm drives) will see you right.

◄ *Need two hard drives in your laptop or want an SSD boot drive? Easy – create a second drive bay by removing your DVD or Blu-ray drive*

Permission Granted?

My father has handed me his laptop to sort out. He's got some card games he's downloaded and also some basic accounting software he wants to use to fulfil his duties as treasurer of his bowls club, but none of it will install. The following error comes up: 'Unable to write to the Temp directory in C:\Users\Dai\AppData\Local\Temp'. Do you know what's going on? I can't get to the bottom of it, and I'm beginning to fear that a full reinstallation could be on the cards (Windows 7). Help!

P. Ryman, Pembrokeshire

This is a permissions problem. A great many programs use that mentioned Temp folder during their installation processes (the files usually get deleted afterwards), and it seems access is being denied. Somewhere along the way, your dad has probably altered some security setting or other – no doubt unwittingly. Or maybe an improper shutdown has corrupted a registry entry. Who knows?

Anyway, putting matters right should be the work of a moment. The AppData folder and all folders below it are system folders, so they're normally hidden. Before you can do anything, you'll need to make them visible. Open Windows Explorer, navigate to C:\Users\Dai, click the Organize button, then select 'Folder and search options'. In the window that appears, click the View tab and then select 'Show hidden files, folders, and drives'.

Next, right-click the Temp folder and select Properties. Click the Security tab and then the Edit button. In the new window, select Dai from the list of users and remove any ticks in the Deny column.

Also, ensure as many options as possible are ticked in the Allow column. That should get your dad going again, but if it doesn't, please write back and I'll try to help further!

▾ *It's for our own good, but being barred from accessing certain Windows folders or features – seemingly without rhyme or reason – can still be damned annoying*
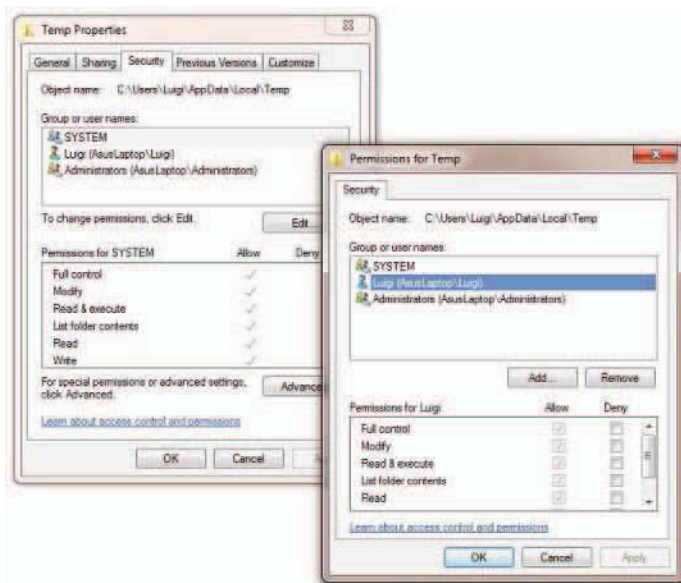
Copy Right

I recently bought some inexpensive 64GB USB flash drives – less than £10 each on eBay. They appear to work fine, but I soon noticed that some of the videos I copied to them contained artefacts. Indeed, when I ran a 'diff' – both in Linux Mint and through UnxUtils (**bit.ly/171OHV**) in Windows – I discovered that in some cases the original and the copy were different.

I've since copied the videos again via the Windows command prompt, using 'copy /v' to verify, and sometimes the verify operation failed. I've also had this happen when copying photographs. I'm now left feeling that I've no assurance whenever I copy anything to a USB flash drive that the copying has taken place correctly. Surely there's an easier way to gain peace of mind than resorting to the Windows command prompt?

Tibor Pollerman, Suffolk

In my DOS days I was quite the fan of 'copy /v' and 'xcopy /v' (and also 'move /v'), and as you say, they remain valid even now via the Windows command prompt. That's no way to be carrying on in 2013, however. Mind you, Tibor, that doesn't mean I'm aware of how to achieve the same thing in Windows Explorer.

Is it possible, perhaps via some registry tweak? Help me out, please, dear readers. File managers like TeraCopy (**bit.ly/zFn8Nn**) can verify automatically, but while these tools are marvellous for bulk operations, I find them a pane in the glass for day-to-day use.

Normally, copy errors are rare. Very. When they occur frequently, the cause is usually dodgy RAM. So grab yourself an ISO copy of Memtest86+ (**bit.ly/aAaikH**). Burn it to a CD as an image (not as a standard file), use the CD to boot up your PC, and watch out for error messages. If your RAM has issues, what's read from it (and then copied to your USB stick) may not be the same as what was originally written to it (from the source file). ECC RAM can often identify and correct such problems, but most consumer and standard office PCs don't use ECC RAM (many PCs don't even support it).

If your RAM tests out okay, the problem is undoubtedly those 64GB USB sticks. At around a tenner a pop, they were less than half the 'proper' price. Sadly, they're quite likely Chinese fakes or rejects. The flash memory they use may well have failed internal testing at the manufacturer and officially been dumped in a skip. Unofficially, it may have found its way back into the supply chain. Each stick's capacity could even be somewhat less than the claimed 64GB – run H2testw (**bit.ly/14mUQUv**) to find out.

▾ *Beware fake or too-cheap USB flash drives – they're everywhere!*

ASK JAMES

James

UPnP Explained

I just read your column about UPnP (*Micro Mart* 1260, 16th May 2013). In it you gave an accurate explanation of what UPnP is for, how it is not a security risk and why it is very useful for sharing network resources without complex setup.

I would just like to point out that there has been a big security hole found within UPnP when it is allowed to be accessed from the WAN side of the router. Please see the item from Wikipedia: **tinyurl.com/UPnPJames**. Which explains some of the issues.

In 2011, researcher Daniel Garcia developed a tool to exploit a flaw in some UPnP IGD device stacks that allow UPnP requests from the WAN. The tool was made public at DEFCON 19 and allows portmapping requests to external IP addresses from the device and internal IP addresses behind the NAT. The problem is widely propagated around the world, with millions of vulnerable devices at any time.

Steve Gibson of the Security Now podcast has created a test for people to see if their router is vulnerable or not: **www. grc.com/x/ne.dll?rh1dkyd2**. I would like it if you could make it clear that there is a problem with some routers' implementation of UPnP which could leave some users vulnerable to attack.

Sami Flew

Yes, this is a fair point. The problem, for anyone who doesn't understand the jargon, is that some implementations of the UPnP protocol were built in such a way that they will accept UPnP connections being made over the WAN - i.e., from over the Internet.

This, in turn, allows external devices to appear to be 'inside' the network, effectively opening a security hole. Part of the point of a router is to isolate network traffic, ensuring that computers from the Internet

can't get access to the network. While all UPnP allows potentially harmful traffic through, poorly-implemented UPnP allows this to happen even if you've done everything else correctly.

It's not a problem that affects anywhere near a majority of routers, but nonetheless it's worth running the test linked to above to see if your system is afflicted. It's

most common with Linksys routers purchased a few years ago. Newer ones should be alright, but do check!

If your router turns out to be affected by this weakness, you should disable UPnP immediately. To do so, you'll probably have to use your

> **❝ It's not a problem that affects anywhere near a majority of routers, but it's worth running the test ❞**

router's admin page. For most routers, this means visiting your router's IP address (usually 192.168.1.1 on home networks) in your browser, logging into the admin account and then unchecking a tickbox somewhere. On Linksys routers, they're in the Administration tab, but your particular model may vary!

Remember that if you disable UPnP you'll have to manually forward ports yourself. It's not the most convenient way to behave, but it does give you greater fine control over which traffic can and can't establish two-way communication with the Internet. Arguably a hassle, and one that's simply not worth pursuing if your router isn't vulnerable. However, if it is, you should learn to love it, at least until you get your hands on some more modern hardware!

App Of The Week
Google Translate

David Hayward goes all linguistic this week

The holiday season is upon us, with millions of Brits boarding trains, planes and other modes of transport to sunnier climes and exotic destinations.

Enter the stereotypical Brit abroad, shouting phrases a little louder, saying the same thing slower in English to some poor Spanish bloke who hasn't got a clue what they're on about. It's the kind of thing you'd expect to be limited to the confines of a *Fawlty Towers* episode. However, on a recent trip to the continent, we spotted a group of such tourists, much to our national embarrassment, who were gesticulating wildly and using all sorts of expletives about some poor chap's weak grasp of the English language.

Wanting to calm the situation down, we fired up Google Translate and entered into the fray.

Es Muy Bueno

Google Translate may well be a simplistic app when compared to others, but it's incredibly easy to use and get to grips with. It can be fired up in a matter of seconds, can translate over 70 different languages and supports text to speech, SMS translations and can even translate words from a camera shot – like a road sign, for example.

All you need to do is open up the app, choose the languages to translate to and from then either type in the words or sentence you want translating, and the result will appear below along with options to share, save, sync or read aloud.

In addition to this, you can speak into the phone the words you want translating, and the translated versions to the chosen language can be read back to you or the person who you're conversing with.

It's really very good, and although the conversation can get a little long winded in this manner, it does provide a means by which to communicate with someone who speaks another language. Also, as we've found, it forms a bit of a bond, something to have a bit of a giggle over and ultimately comes across as being more friendly and less clinical when dealing with people.

Foto Übersetzen

The ways and means by which to translate a word have been considered well with Google Translate. As we mentioned earlier, you can take a photo of something – a menu perhaps – and run it through Google Translate to come up with the translated version.

While this sounds great, we have to admit that sometimes it was a bit hit and miss, and the translation was sometimes a little off. The test we ran translated lobster to camel, which isn't normally a problem, but it could get tricky when the waiter turns up with the dish.

The handwriting element, whereby the app translates a hand-scrawled word, also suffered from the same problem. With a little creative thinking, though, these problems can be worked around, and it's always guaranteed to bring a smile to the staff when you order a dish of camel and a side order of battered cat.

結論

Needless to say, we were quite impressed with Google Translate. It helped the situation we found ourselves in, allowed us to communicate on a level far better than the old school books, and it helped us make a few new friends along the way.
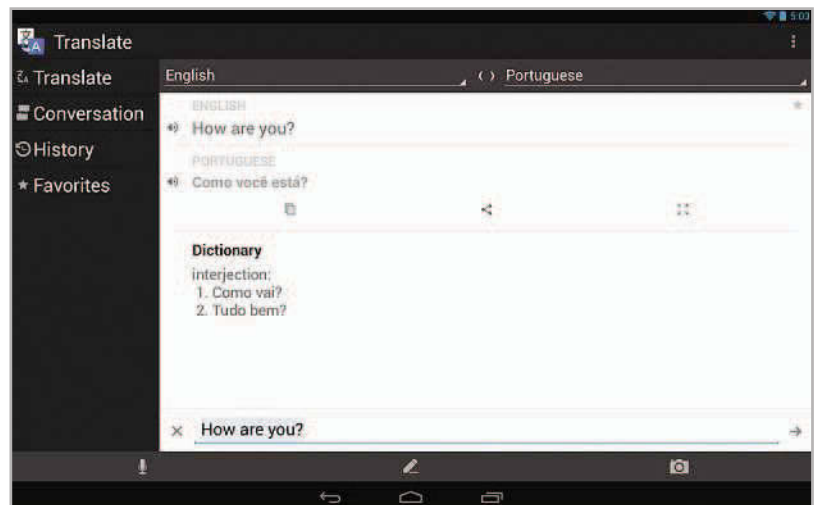
Features At A Glance
- Free.
- Translate over 70 different languages.
- Text-to-speech and voice translation.
- Translate without a network via offline language packs.

▲ *Standard word-for-word translation is perfect*

▲ *Sentences can be spoken via the translation app*

▲ *The offline mode will allow you to still translate when there's no network access*

Logging Off

The Bank of England has announced that a new ten pound note will be shortly circulated, with an image of Jane Austin replacing Charles Darwin in a mildly ironic form of evolution. On one level I entirely agree with this change, because in the modern note era only Elizabeth Fry and Florence Nightingale have appeared on our currency, where no less than ten men have been represented.

However, on another wholly selfish level, I'm not satisfied at all. Why? So far we've had a soldier, prison reformer, architect, banker, composer, playwright, an economist, an engineer, two authors and three scientists. Oh, and the monarch obviously. Where's the geek in this list, exactly?

I can imagine that someone in government would argue that geeks shouldn't be represented, because none of them are famous enough. But that doesn't hold water, because I'd never heard of John Houblon (first Governor of the Bank of England from 1694 to 1697) until he appeared on a note, and I wouldn't be able to pick out Adam Smith (philosopher & economist) in a line-up of the usual suspects if my life depended on it. On the other hand, I think many people - certainly those of us interested in technology - have heard of Charles Babbage, Alan Turing and Sir Tim Berners-Lee, at the very least.

Given some of those that have graced our notes, this clearly isn't a popularity contest, but it need to better reflect those that use the stuff, more than those who have it made.

The real problem here is that we have relatively few notes (four actually: £5, £10, £20 and £50), and usually there are generally only two designs in circulation of each. We really need a £100 note, logic suggests, but we also need the designs updated more often.

As much as I'd like my slice of British achievement represented, I find it hard to fathom why John Logie Baird (inventor of the television), Alexander Graham Bell (inventor of the telephone), Frank Whittle (creator of turbojet) and Robert Watson-Watt (devised radar) haven't been seen yet.

If I got to choose I'd really like to see Alan Turing on one, as some tangible expression of regret for the truly appalling ways he was treated, which ultimately lead to him taking his own life in 1954. It's taken nearly 60 years, but the establishment has finally seen fit to pardon Turing - a man who, through his work with others at Bletchley Park, shortened the Second World War and probably saved people from starvation during the U-Boot blockade of the North Atlantic.

The first petition to pardon Turing was started in 2009 and was rejected out of hand. Another was created in 2011 and got 34,000 signatures, which had little impact on Lord McNally, who outrageously declined to act. And, finally last year, a bill was introduced into the House of Lords, which had on it a list of very impressive signatures including that of Stephen Hawking. We're still waiting for the painfully slow mechanism of bureaucracy to turn and bring this bill into law, but it's recently had its second reading at least.
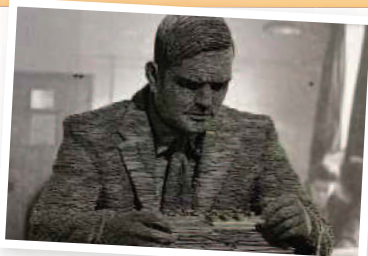
So how about it Bank of England? Fancy stepping into the 21st century for a moment and adding Alan Turing to the list of great Britons that have graced our currency? Or is that a bit too 'new age' for you?

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Hit The Jackpot, **8** Itaipu, **9** Métier, **10** Demesne, **12** Choir, **14** Cisco, **16** Coulomb, **19** Cyborg, **20** Import, **22** Alec Issigonis.
Down: 1 Gift, **2** Strive, **3** Returns, **4** Gamma, **5** Sketch, **6** LOVEFiLM, **11** Epicycle, **13** Codicil, **15** Choice, **17** Lepton, **18** Egest, **21** RFID.

THIS WEEK'S CROSSWORD

Across
7 A market in which securities are bought and sold. (5,8)
8 Go through the procedures to conclude the use of a computer system. (3,3)
9 Relating to or denoting a dialect or variety of English in which r is pronounced before a consonant and at the ends of words. (6)
10 GUI feature in the form of a box of text that appears when the cursor hovers over an item. (7)
12 In computing a single instruction that expands automatically into a set of instructions to perform a particular task. (5)
14 A gradual decrease of stored charge or current. (5)
16 A vowel prefixed to past tenses of verbs in Greek and certain other Indo-European languages. (7)
19 Carve or mould a design on a surface so that it stands out in relief. (6)
20 A person who is paid to kill someone, especially for a criminal or political organization. (3,3)
22 A colourless liquid unsaturated nitrile made from propene. (13)

Down
1 German engineer, whose name is given to the four-stroke cycle on which most internal-combustion engines work. (4)
2 A roll of parchment or paper for writing on. (6)
3 Sign up with them to watch movies & TV shows online or streaming right to your TV via Xbox, Wii, PS3 and other devices. (7)
4 A collection of standards and specifications for web-based e-learning. (Acronym) (5)
5 The practice of bribing someone in return for the unofficial promotion of a product in the media. (6)
6 A kind of rectifier with a mercury cathode, able to carry large electric currents. (8)
11 A computer software designer and programmer who pioneered computer operating systems in the 1950s. He was part of a group at North American Aviation who developed the PACT series of compilers for the IBM 701. (4,4)
**13** Founded in 1994, they're best known for producing high end "Enhanced" memory modules. (7)
15 A fictitious name used when the person performs a particular social role. (6)
17 In *Godzilla: The Monster War* she can divebomb the opponent, leave spores, shoot energy beams and attack with her wings. (6)
18 Acquired by Motorola in 2012 they're best known for thier expertise in providing innovative and rugged mobile computing solutions. (5)
21 Having the skill to do things well. (4)
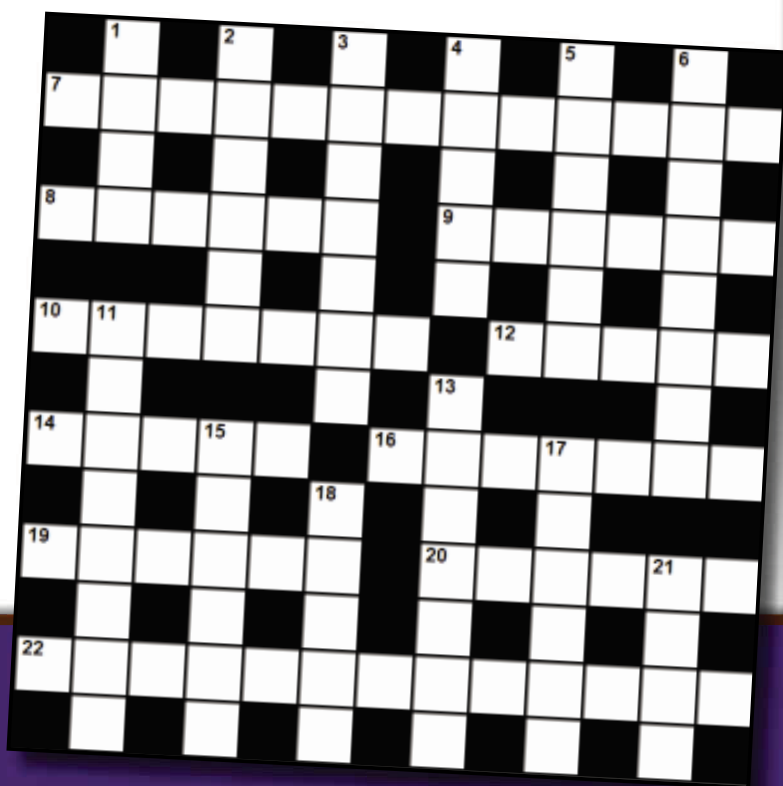
In Next Week's Issue*

» **The most notorious tech conspiracies**

» **The weirdest simulation software for PC**

» **The great big guide to Windows' built-in programs and tools**

» **All this, plus the usual great mix of news, reviews and happy cats**

* May be subject to change

A-STYLE
Your Lifestyle

- Supports 4th Gen Intel® Core Processor
- Waterproof by Conformal Coating
- Home Cloud
- WiFi 802.11ac
- Purity Sound™
- HDMI-In

Fatal1ty Z87 Professional   Z87 Extreme9/ac   Z87 OC Formula

intel Inside CORE   intel Inside CHIPSET Z87

www.asrock.com

ASROCK