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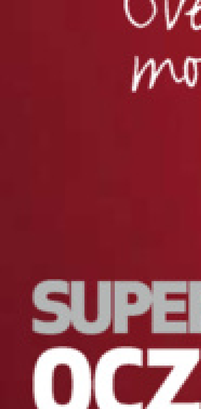
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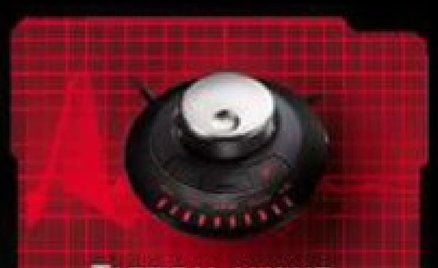
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HOW YOU DOING?

Pick your platform well, and reap the rewards

The PC has weathered so many storms thanks in part to its compatibility. Its fundamental ability to upgrade over time has meant it's kept up to date with the needs of the software we use – that's the theory any way, the reality is often a lot more frustrating.

The truth is that platforms change, especially when a new CPU is unleashed. Intel has a history of introducing seemingly arbitrary sockets, most recently with LGA 1155, a socket that's a mere one-pin dissimilar to its predecessor.

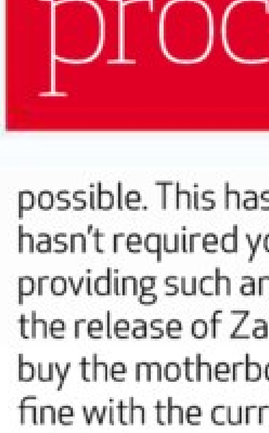
The soon to be released Sandy Bridge Extreme will sit on the X79 platform, which will boast quad-channel memory requiring a boost to 2,011 pins. The good news is that Ivy Bridge, the 22nm shrink of Sandy Bridge will be backwardly compatible with Z68, although there will be the top-end Z77 platform specially for Ivy Bridge.

AMD meanwhile has taken the other stance by keeping its sockets alive for as long as possible; subtly upgrading sockets as needed, but keeping them as backwardly compatible as possible. This has meant that upgrading to a new AMD platform hasn't required you to throw out your CPU. AMD should be saluted for providing such an upgrade path for so long. We may still be waiting on the release of Zambezi,, the desktop spin of Bulldozer, but you can buy the motherboards that support it now. And yes, they work just fine with the current AMD CPUs. But how do these mobos compare to Intel's boards, and how does Llano's FM1 socket fit into all of this? Turn to page 8 to find out.

"The truth is that platforms change, especially when a new processor family is unleashed"

We've also got some choice gear in the form of the fastest graphics card ever, the Asus Mars II LE (p30) and an SSD to die for in the shape of the RevoDrive 3 X2 from OCZ (p36). If you're looking for a new media center setup, check out the feature (p66) for all the best software.

It's a cracking issue, let me know if you enjoy it.



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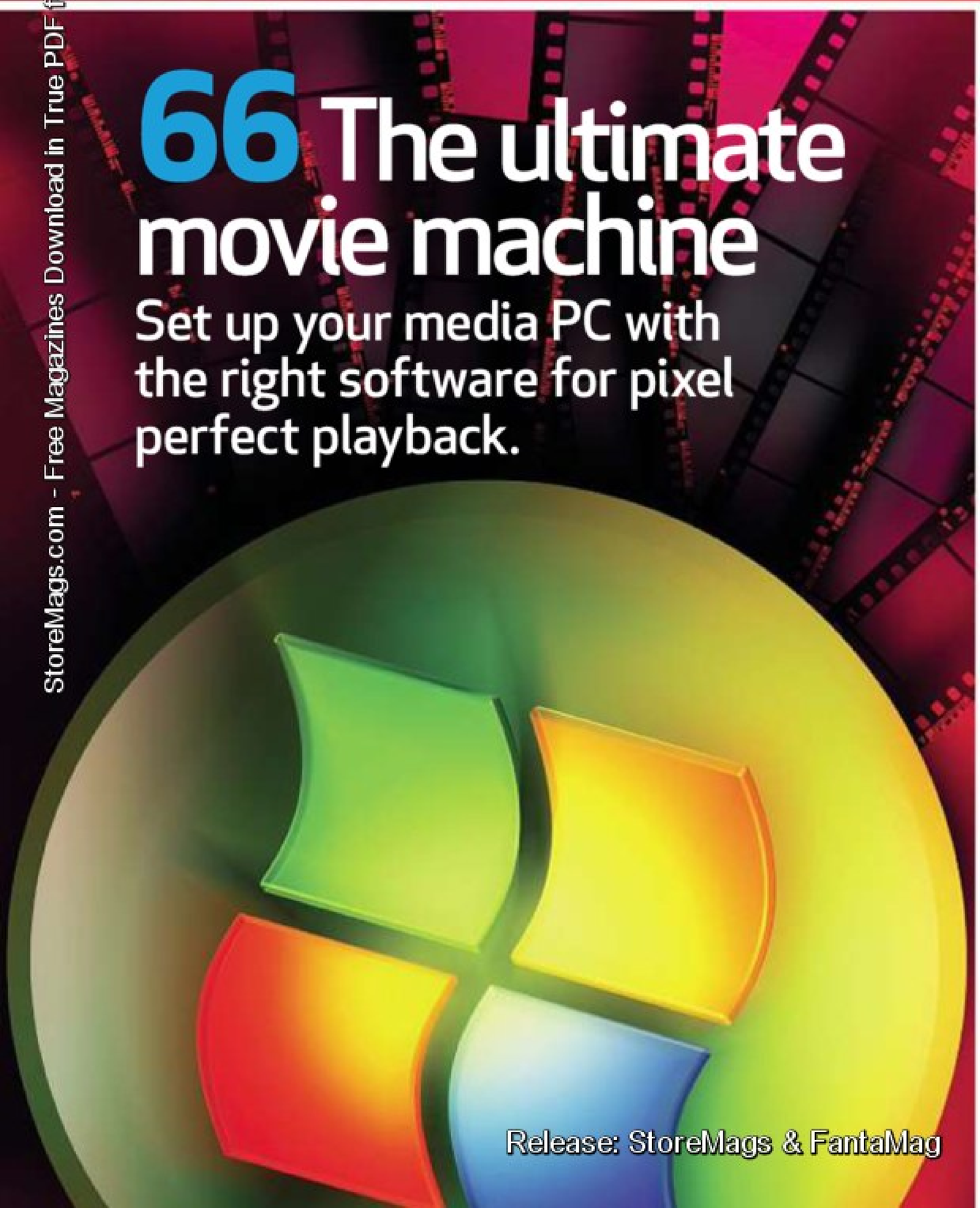
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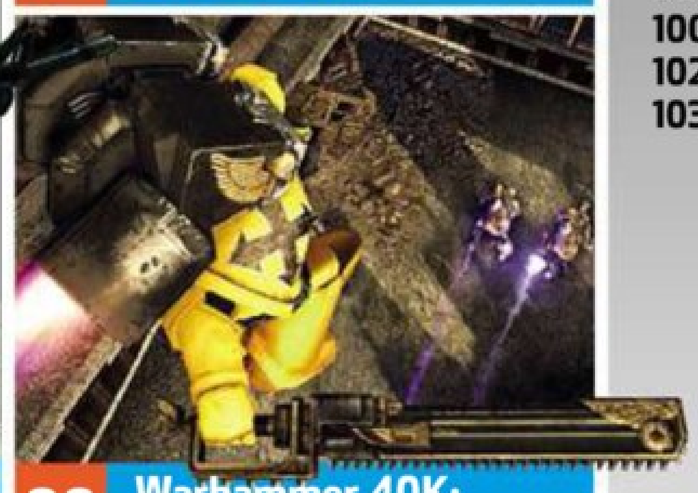
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Alan Dexter
Editor

It's strange that for all the glossy prime-time advertising Apple invests in to persuade us that our life will become unbearably perfect if we buy its tablet, it's HP's TouchPad, with all its future incompatibility, lack of third party apps and discontinued WebOS that's proved so tantalising to consumers recently.

Consumers like me, in fact. The TouchPad's dramatically slashed price tag proved too tempting. What's more, the TouchPad shows there's a huge market for affordable tabs that Apple aren't tapping – it's up to someone else.



Dave James
Deputy Editor

With *Football Manager 2012* preview code imminent, Dave must soon close his *FM* career in SEGA's current sim. Currently in 2030, he's seen Bath City youngsters become England legends and become managers themselves. *FM* has proved a welcome distraction from all the mobos that have invaded his life..



Chris Thornett
Operations Ed & Games Ed

For some reason Chris has the Prussian Empire and the Kingdom of Bavaria vying for his alliance on Steam. Be warned – he's going to annexe the lot of'em if they keep it up.

A recent OnLive demo also raised Chris' excitement level for cloud gaming to almost *Skyrim* levels, though the experience was tarnished somewhat by Alan's tutting.



Phil Iwanuik
Technology Writer

Phil spent an ungodly number of hours fiddling with the Usain Bolt of graphics cards this month, Asus' MARS II. The only difference being that Mr Bolt is fuelled by nuggets, and the RoG MARS II runs on babies' tears



Paul Blachford
Art Editor

For MMO connoisseur Paul, the lines between reality and gaming don't even blur anymore – there is only *Rift*. With the new patch, it's a good job he joined a late night raiding guild or we'd never see him.



Stephen Hanlon
Designer

Little known fact: Steve hasn't left the office since he joined *PCF*. What goes on after everyone else goes home? No one knows. We can only assume he dresses up as a giant baby and roams the floors, scaring the cleaners.

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Dual Intelligent Processors 2
DIGI+ VRM



Supports intel inside CORE
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Series-Wide Fast Video Transcoding and Graphics Switching Support

With ASUS P8Z68 motherboards, you can tap into the best of both worlds. Thanks to LucidLogix Virtu™, models such as the P8Z68-V PRO enable both integrated and discrete graphics at once, alternating between them as needed. HD video uses integrated graphics without having to turn on the more energy-consuming discrete graphics card, while the newest PC games in 1080p or higher engage that graphics card for dedicated GPU output. This way, you can enjoy all the performance and even save energy!

Big Storage and Fast Solid State Speeds

Another new feature of the ASUS P8Z68 architecture is Intel's Smart Response Technology, which uses an installed SSD drive as a cache for frequently-accessed parts of the OS and other operations. This accelerates access speeds and reduces redundant drive spin to save energy and minimize long-term wear and tear. You get a much smoother system with less delay and shorter loading times, which is definitely a plus.

Exclusive ASUS features: Making the Right Choice into the Best Choice

The inclusion of the unique ASUS Dual Intelligent Processors 2 with DIGI+ VRM digital power design makes hardcore overclocking possible for the true die-hard PC power seeker. Better precision for power delivery and tuning means a greater overclocking range, improved stability and more confidence when tweaking the system. The digital voltage regulators lead to almost complete elimination of power loss and unmatched efficiency. There's also the exclusive ASUS UEFI BIOS, which renders old keyboard-only BIOS setups obsolete. This extensible firmware BIOS adds mouse controls and a smooth icon-based graphical interface, so even boot prioritisation is made easy with drag and drop, just like in Windows.

Final Word…

The P8Z68-V PRO and other new motherboards from ASUS do more than exploit the real power of 2nd generation Intel® Core™ processors and the Z68 Express chipset. With their outstanding overclocking abilities and energy saving features, they're the finest Z68 motherboards currently available.

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MASSIVE SUPERTEST!

MOBO GUIDE

Need a new board? Get ready for a schooling in power efficiency, integration and backwards compatibility, says **Jeremy Laird**

Simple but complicated. That's PC motherboards circa 2011. On the one hand, there are fewer players in the motherboard chipset market than ever. With NVIDIA pretty much out of the game and small time outfits such as Via long gone, you only have to worry about AMD and Intel chipsets.

If that's the simple bit, the complications come courtesy of a PC platform in tumult. There are three big trends at play. First, PCs are becoming ever more integrated. The end game a few years down the line will be PCs based on highly integrated system-on-a-chip devices. In the meantime, things are getting very messy as some but not all features make their way onto the CPU itself. The most obvious example is on-die graphics.

This matters because the difference between CPUs is no longer a matter of clocks, core counts or cache sizes. There are fundamental functional contrasts and some of them mean new sockets and chipsets are required. It's not much good, for example, having an on-die graphics core or hardware video encoder if your motherboard isn't wired up to make it work.

The second major trend involves power efficiency. Put simply, PC architectures need to become much more power efficient to fend off that billions-strong swarm of tiny ARM-based processors. Intel's response is the Atom processor, not a chip that we've been remotely interested in for the desktop so far.

However, AMD's low-power Bobcat core is a little more compelling thanks to out-of-order processing and a half-decent graphics core. Meanwhile, AMD's new Llano processors neatly combine both the integration and power efficiency trends in a single, intriguing quad-core design. Of course, just like integration, power efficiency shakes up the PC platform. Both Bobcat and Llano require new sockets and boards.

Finally, and somewhat contradicting the integration trend, remember that interesting new technologies often first appear courtesy of add-in chips. Think NVIDIA's SLI-enhancing NF200 controller or Lucid's vendor-agnostic Hydra multi-GPU chip. But there are other features, such as Intel's upcoming Thunderbolt that also fall into this category. All of which means choosing a motherboard is more challenging than ever. But don't sweat it. PCF is here to help.



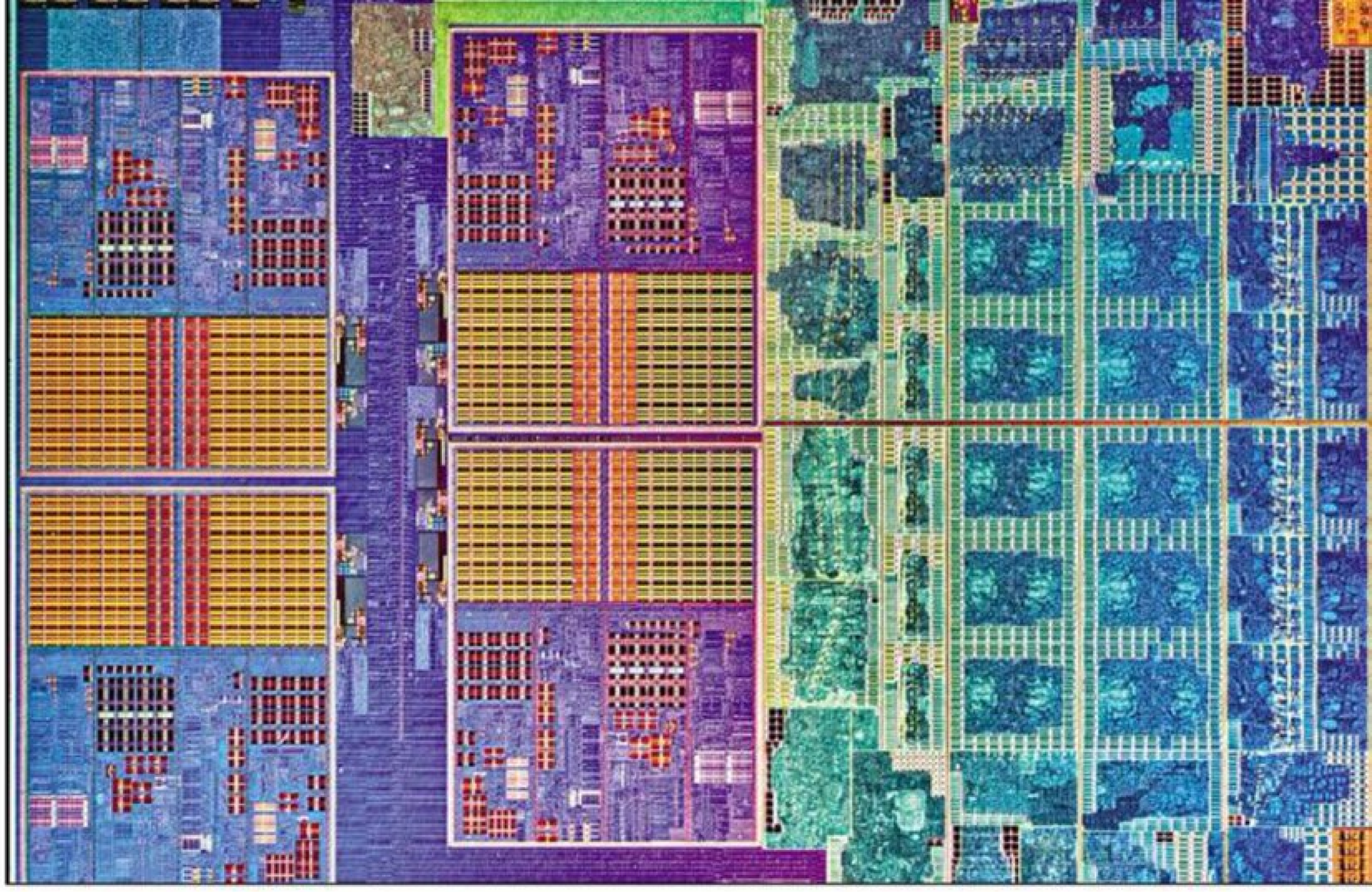


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The ultimate mobo guide



What kind of PC do you want? That is the question. More than any other component, the motherboard sets the tone and defines the ultimate capabilities and limitations of your rig. This stuff matters.

Take the latest trend towards compact, power efficient and highly integrated PCs. If that tickles your fancy, you'll obviously need a low-power CPU. But you'll also need the right motherboard. Choose wisely and the result will be a snazzily-specced system with relatively few compromises compared to a full-fat PC. A nice example involves systems based on AMD's new low-power Zacate CPUs. Okay, the Bobcat CPU core design inside Zacate ain't exactly a powerhouse. But its 80-shader graphics core isn't too shabby and the whole shebang gets the job done for most things short of gaming.

Even better, if you pick up a Zacate motherboard for around £100, you'll actually get the CPU with integrated graphics thrown in, making for a very cost effective system. To take just one example, Asus's AMD E35M1-M PRO Zacate board has everything from SATA 6Gbps to USB 3.0 and HDMI along with a dual-core processor and integrated graphics and all for around £110. Just add memory and an SSD and you've got yourself a multi-core PC with DX11 graphics.

THE FUSION FAMILY

The other low-power option from AMD is the new Llano chip, otherwise known as the A-Series processor. Like Zacate, Llano doesn't drop into AMD's family of mainstream AMx sockets. It has its own FM1 socket. Llano gives you four Phenom II-class cores and the most powerful integrated graphics the world has ever seen. The result is not a truly high performance platform. But given the sub-£100 price of a Llano chip and another £80 for a decent FM1 board with USB 3.0 and SATA 6Gbps, you've got a very nice package for under £200.

In terms of motherboard chipsets for all of these AMD Fusion processors, there's not a great deal to worry about. Many key features are located on the CPU, making the chipset less critical. Essentially, you've a choice of two known as Hudson D1 and Hudson D3. The latter is the one to go for thanks to support for dual PCI-e graphics and four native USB 3.0 lanes. It also supports two dual-link displays, which is essential if you're a high-resolution monitor junky.

Above Features may be migrating straight to the CPU, but motherboards are still first for new interfaces amd connection tech

Of course, the obvious downside to both Zacate and Llano is that you can't just drop in a more powerful CPU down the road. You're locked into a low-power platform with a proprietary socket. For us, that probably restricts AMD's current Fusion chips to duty in secondary systems and casual computing rather than primary PCs.

As for Intel's low power efforts: don't bother. The Atom processor has no place in any desktop. Its processor core architecture is too weedy and its chipsets with integrated graphics are worse. Third party chipsets from the likes of NVIDIA are better but still not good enough. In any case, Intel will soon give Atom graphics on-die and entirely cut third parties out in the process. Meanwhile, the low-powered version of Intel's Core CPUs are simply overpriced.

BULL STILL DOZING?

If that's the shizzle regarding the rage for all things low-power, what about pukka performance PCs? The big noise here is AMD's Bulldozer CPU. Or at least it would be if Bulldozer had been launched on time. But it hasn't and we're still waiting for it. The interspaz scuttlebutt reckons AMD has been through B0, B1 and most recently B2 steppings trying to sort out Bulldozer's performance. Meanwhile, leaked benchmarks purporting to reveal performance from the top quad-module Bulldozer processor put its performance somewhere between a quad-core Intel Core i7 2600K and Intel's top six-core Gulftown chips.

Silly old SATA

Before solid state drives (SSDs) appeared, the SATA storage interface looked pretty clever. After all, it's a pukka serial interface, unlike the clunky old parallel IDE interface. Physically, SATA is much more managable, too, thanks to slim cables and partial hot-swap support. Factor in the fairly glacial increases in bandwidth, if not capacity, offered by conventional magnetic hard drives and SATA was quite the thing.

But not anymore. The advent of SSDs has meant an explosion in storage performance. The latest SSDs can exceed 500MB/s for sustained read and write performance, placing them perilously close to the maximum performance of even the latest SATA 6Gbps interface, sometimes known as SATA 3.0. Remember that 500MB/s is 4Gbps. The extra 2Gbps may sound like a lot, but interfaces rarely achieve their maximum theoretical performance. Anyway, it won't be long before SSDs smash through 6Gbps.

That's a problem because SATA 6Gbps is relatively new and a faster version isn't imminent. In fact, the situation is becoming so critical, companies like OCZ are developing their own high-speed storage interfaces while others are turning to PCI Express.

Bolt from the blue

The other possible salvation is Intel's Thunderbolt, the high speed optical interface that dropped the optical bit. Thunderbolt is already at 10Gbps and is likely to scale more quickly than future SATA revisions. That said, the limitations to SSD performance presented by existing SATA interfaces may not be quite as bad as the figures suggest. Random access is arguably more critical to overall system performance and here SSDs are a long way from saturating SATA 6Gbps. Moreover, the best available SSDs aren't exactly mainstream. What we need is

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Multi GPUs

Are many GPUs better than one? Is multi-GPU graphics rendering ever a good idea? Unfortunately, there's no simple answer to that question. The argument in favour involves the fact that the very highest performing rendering solutions have been multi-GPU for years. What's more, multi-GPU can also deliver more longevity for older cards and also exceptional bang for buck when comparing two mid-range boards to a single high-end monster.

But there are downsides, too. The main one is that multi-GPU is less reliable than single GPU. It's hard to be confident that multi-GPU is working properly and much depends on driver updates for the latest games. The other problem, historically at least, is that multi-GPU and NVIDIA's SLI in particular has been used as a tool to lock buyer's in to a particular vendor.

But the good news is that this is increasingly no longer the case. NVIDIA recently announced that it would fully enable SLI on an AMD chipset for the first time with the Bulldozer-optimised 9 Series chipset. Critically, therefore, with the AMD 9 Series you are completely free to choose between both AMD CrossFire and NVIDIA SLI multi-GPU solutions.

Of course, that still leaves you forced to pair two NVIDIA or two AMD cards. The holy grail would be mixing cards from both vendors and that, of course, is what Lucent has been offering with the Hydra chip. The other key difference with Hydra is that it eschews the alternate-frame rendering method used by both CrossFire and SLI for a system that splits up objects in each frame and farms them out to the GPUs.

For now, the results are occasionally spectacular but often underwhelming. It'll be a while yet before Lucent's Hydra GPU-mixing solution is truly viable.



SLI will be fully enabled on the Bulldozer-optimised 9 Series chipset

All we can say for sure is that launch events have been cancelled and the chip is clearly in some sort of trouble. Given AMD's recent track record, we're not exactly dying of surprise. The first quad-core Phenom processor was a complete disaster, for instance, and its worth remembering AMD hasn't launched a new architecture since the Athlon in 2003.

But it is extremely frustrating, especially because Intel seems increasingly to be sand bagging at the top of its range. The new high-end Sandy Bridge-E chips due out later this year will stick with six cores. We reckon Intel would be doing eight or even 12-core chips if AMD was putting up more of fight. So, the sooner AMD's pseudo oct-core Bullies can arrive, the sooner we can have one of those performance wars that invariably result in faster chips for less cash.

When Bulldozer does finally arrive, probably no sooner than October at this rate, the good news is that it will be mechanically compatible with all existing AM3 boards. The first Bulldozer-based chip, codenamed Zambezi, slated to be sold under the AMD FX banner, doesn't have integrated graphics and it sticks with a dual-channel memory controller, so it doesn't need a radical new interface with lots of extra pins. The moderately bad news is that it will only be supported on AM3+ boards. Where things get a little complicated is chipset support. Currently, you can buy AM3+ boards based on everything from the ancient 7 Series chipset through the 8 Series and now the spangly new 9 Series. In theory, all should be compatible with Zambezi, with 9 Series boards working out of the box and the older motherboards requiring a BIOS update from the manufacturer.

UP THE ZAMBEZI

What's not clear is whether there will be any benefit to be had from the new and supposedly Bulldozer-optimised 9 Series chipset. The facts as we know them pertaining to the top-rung 990FX go something like this: The 990FX and SB950 southbridge chips are literally the same silicon as the older 890FX and SB850 chips. However, AMD has upped the HyperTransport specification from 3.0 to 3.1, delivering a bandwidth boost from 5.2Gtps to 6.4Gtps. The 9 Series will also be the first AMD chipset with full NVIDIA SLI multi-GPU support and without the need for that silly NF200 controller chip.

Turbo Core 2.0 is another feature that may turn out to be chipset-dependent for full support. Similar to existing Turbo features from both AMD and Intel, it promises to maximise performance by clocking cores according to load. AMD says that an eight-core Bulldozer chip will boost by as much as 1GHz when up to half the cores are active. That said, we were expecting the top Zambezi model to be rated nominally at 3.2GHz and top out at 3.9GHz with Turbo boost before the delays hit.

"An eight-core Bulldozer will boost by as much as 1GHz when up to half the cores are active"

Time will tell, but Bulldozer can't come soon enough and we certainly wouldn't consider buying an AM3 board with AM3+ models now available for as little as £50. Indeed, if you're planning on going with Bulldozer but need to build a rig now, you have the option of picking up an AM3+ board along with something like a £60 triple-core Athlon II chip. Then chuck the tripler on eBay when Bulldozer finally shows up.

But what about Intel? The big change coming from the biggest noise in processors arrives with



SSDs are already close to saturating the SATA 6Gbps interface, and that's brand new

The power of one

Future PCs will be single-chip solutions. One chip to rule your PC. This is categorically, undeniably the future of computing. The only question is when. The gradual migration towards system-on-a-chip PCs has already begun and it involves the integration of more and more features onto the CPU die.

In modern PC terms, the process actually began back in 2003 when AMD stuffed several northbridge features, including the memory controller, into its then-new Athlon processor. Nothing much really changed until Intel followed suit with its Nehalem processor family in 2008 but actually went a step further, integrating additional features including the PCI Express controller.

Since then, it's mostly been Intel blazing the integration trail and now offers several mainstream dual and quad-core CPUs with integrated graphics cores as well as heteorogenous computing features such as Quick Sync 2D video encoding. Recently, AMD launch its own CPUs with on-die graphics in the form of the low-power Zacate and mid-range Llano processors.

Tiny mobo monster

All of which means that there's increasingly little for the motherboard chipset to handle. Really all you are left with is I/O features like USB, Ethernet and SATA. Fast forward ten years from now and it's almost guaranteed that almost all discrete components and chips will have disappeared, replaced by a single monster.

The thing is, that monster won't actually be very big. The reason is that transistor sizes continue to shrivel. Intel will bring out its 22nm technology early next year. 14nm is next. The shrinking never stops. In other words, a decade from now, companies like Intel will be able to squeeze everything in your current PC and a whole lot more besides into a single, relatively compact and low-cost chip. The only possible exception in the medium term is über high-end graphics. But if anything that's more to do with the need for mega bandwidth for high-end rendering than raw computational needs.



Whole systems on a chip? Sure, but high-end graphics will stay discrete for now



22nm Ivy Bridge CPUs will be compatible with Intel's current Z68 motherboards

Panther Point chipsets, otherwise known as the 7 Series. At the top end is the X79 chipset, taking over from the crusty old X58 chipset. There's a new socket, too, boasting a scarcely credible 2,011 pins. Say hello to LGA 2011. It replaces LGA 1366 and needs so many pins because the new Sandy Bridge-E processor has no fewer than four memory channels.

Existing triple-channel Bloomfield and Gulftown processors aren't exactly memory-starved, so you're in good company if you can't quite understand why Intel is adding even more memory bandwidth. The explanation, of course, is that the extra bandwidth is almost definitely redundant on the desktop. But the LGA 2011 socket is really designed for multi-socket workstations and servers. And when you have multiple sockets in the same system, bandwidth is king.

COME IN NUMBER 7

Other aspects of interest involving X79 and Sandy Bridge-E include PCI Express going on-die and upgrading to 3.0. What you don't get, however, is native USB 3.0 support in the chipset or integrated graphics. The latter might not seem a great loss regarding a high-end CPU likely to be paired with a monster GPU on a discrete graphics card. But it means you miss out on Intel's funky Quick Sync hardware video encode acceleration. Forking out well over £500 for a Sandy Bridge CPU only to find it lacks a trick feature found on older chips available for £100 doesn't sound too clever to us.

But then Intel's high end platforms of recent years have rarely withstood rational analysis. They're all about willy waving. And that means it's the lesser 7 Series chipsets and the CPUs that go with them that will really be interesting. The great news is that Intel is sticking with the LGA 1155 socket for mainstream 7 Series chipsets and in turn the new 22nm Ivy Bridge processors. Belatedly, Intel will also bring native USB 3.0 support to mainstream 7 Series chipsets. Of all the new chipsets in the 7 Series, it's the Z77 and Z75 that look most interesting. The Z77 is effectively the replacement for the current Z68 while the Z75 offers a similar but slightly lower cost solution that only lacks Intel's Smart Response Technology SSD caching and three-way multi graphics support. No biggie, then.

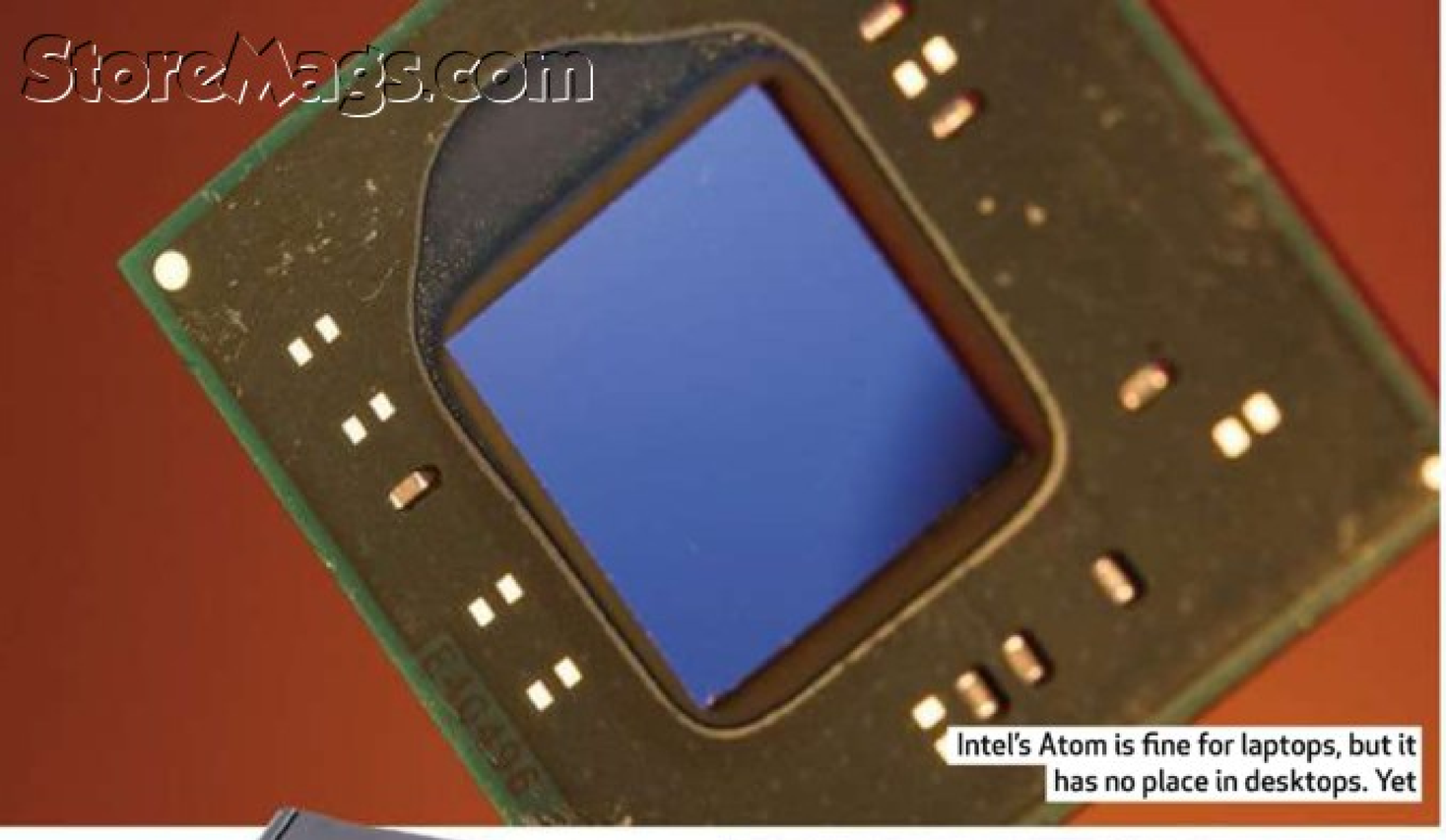
That said, all of the new 7 Series LGA 1155 consumer chipsets support both integrated graphics and overclocking, so it looks like there won't be any really duff options. Likewise, you get native USB 3.0 support across the whole family of LGA 1155 7 Series. Intel, it seems, has finally learned some lessons from the debacle that was the P67 chipset.

The final major upgrade comes in the form of PCI Express 3.0. In the past, when PCI-e lanes were provided by the motherboard chipset, you had the option of going for a high-end board if you fancied hooking up several graphics cards. But now that mainstream Intel CPUs have integrated PCI Express

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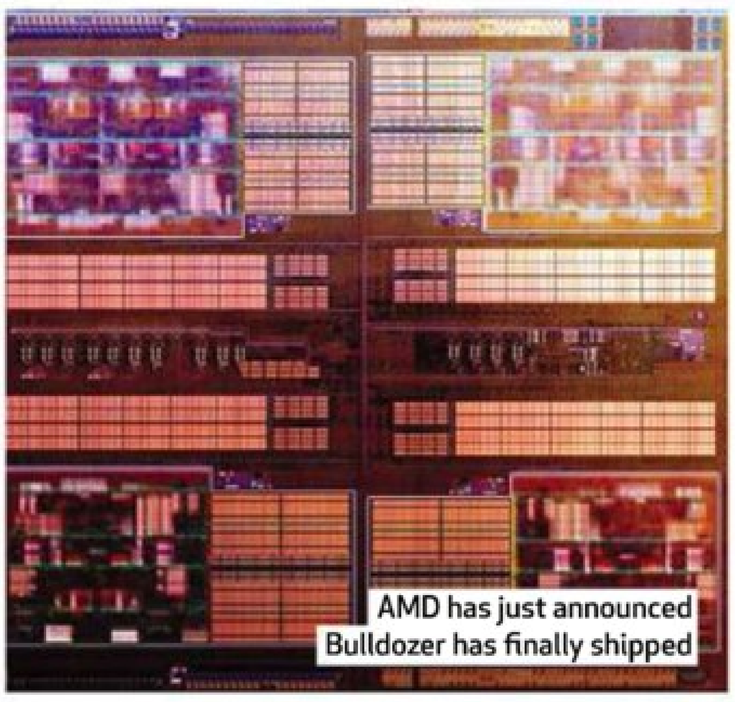
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Intel's Atom is fine for laptops, but it has no place in desktops. Yet



Mini-ITX motherboards are feature-rich, and funky too



AMD has just announced Bulldozer has finally shipped

"The new Ivy Bridge processors will be compatible with some existing 6 Series mobos"

controllers, that's not an option. So, the boost from 500MB/s per lane to 1GB/s per lane that comes with PCI-e 3.0 is very welcome and ensures there's plenty of bandwidth for running multiple, next-generation graphics chips in parallel. Remember, of course, that the CPU must include a compatible PCI Express controller to get the full 3.0 experience.

SIX IS STILL SEXY

Ironically, one of the more interesting aspects of the new 7 Series is what its carry-over LGA1155 socket means for older chipsets. The new Ivy Bridge processors will actually be compatible with some existing 6 Series motherboards. Shock, awe and horror, we know. But true. For once you won't actually have to buy a new motherboard to run the latest Intel processor.

Due out around March next year, Ivy Bridge is a 'Tick' in Intel speak, meaning it's a die shrink to 22nm rather than a brand new architecture. However, thanks to Intel's new triple-gated transistors, the new 22nm node is said to deliver a near two-node performance leap. Other hot new features include Quick Sync 2.0 and a revised graphics core likely to offer 16 rather than 12 execution units. On-die PCI Express 3.0 is also part of the mix but is one of the features that will not be available when hooking Ivy Bridge CPUs up to 6 Series chipsets.

All of which pretty much brings us up to date with the state of play in the world of motherboards today. There's lots of great new technology already available or coming soon. But here's the best bit. Despite the flux, CPUs are experiencing, and this applies to what both Intel and AMD are delivering, a modicum of stability on the motherboard front. Later this year and early next, a slew of new processors with funky features are due. But at least some existing chipsets and motherboards are already compatible. That's important because it means you can build a new system today confident that there's a simple drop-in CPU upgrade path available 12 months down the road. At least it does if you chose the right motherboard. To that end let's wheel in those mobos and start reviewing. ¤

Getting phased

When it comes to maximum performance, there's more to success than smothering your CPU in paste, slapping on a big cooler and cranking up the clocks. Power supply is also critical and we're not talking about the big lump with lots of wires coming out of it. No, motherboard voltage regulation and power phasing is where it's at.

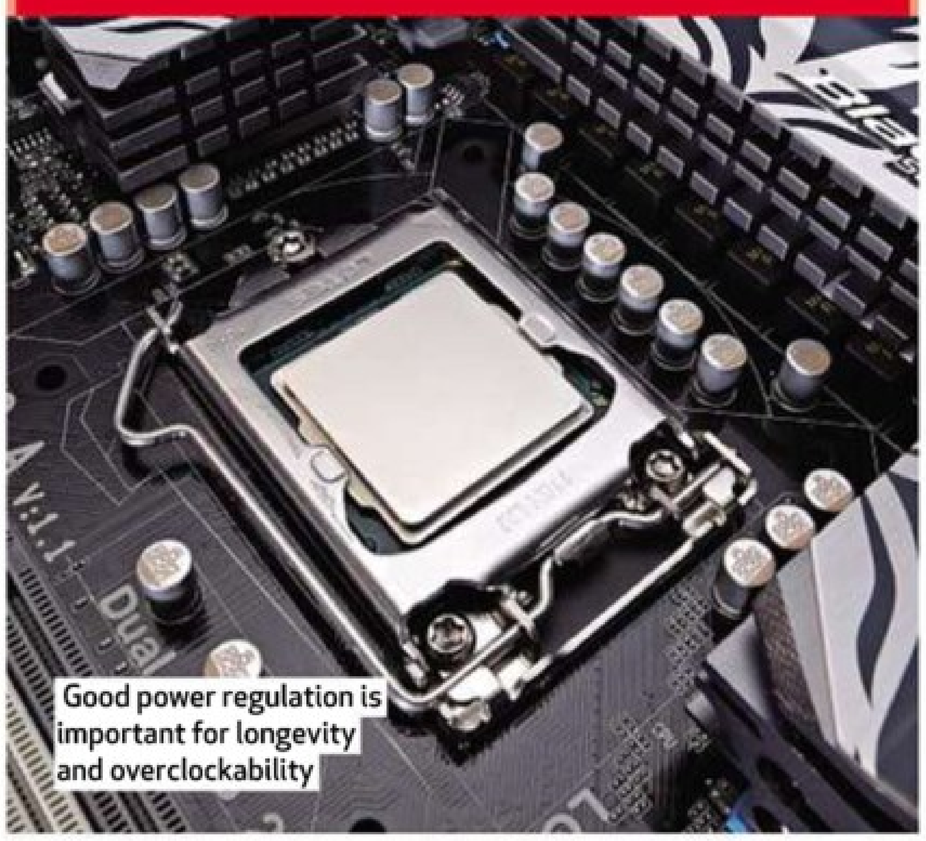
A decent voltage regulation circuit is critical for providing clean and consistent power to the CPU. And that's exactly what you will need to achieve really high clockspeeds. But how can you tell how good a given motherboard is in terms of voltage regulation and power phasing?

A good start is the presence of solid rather than leaky electrolytic capacitors. Ferrite rather than iron chokes are another desirable as they achieve lower electromagnetic interference and suffer less from rust. You can spot iron chokes courtesy of the exposed loops of copper wiring in the centre. MOSFETs with lower switching resistance are also desirable feature.

A question of channels

Finally we have the crucial matter of power channels or phases. The idea here is to share the voltage supply across multiple channels out of phase, hence the term 'phases'. Put simply, more channels means less load on each and in turn lower temperatures, improved longevity and more stable voltages. And more stable voltages means your CPU will keep on trucking at higher frequencies.

Just make sure that when you read the fine print of the motherboard specification that you distinguish between general power phases and those specifically for the CPU. It's the latter than really matters.



Good power regulation is important for longevity and overclockability

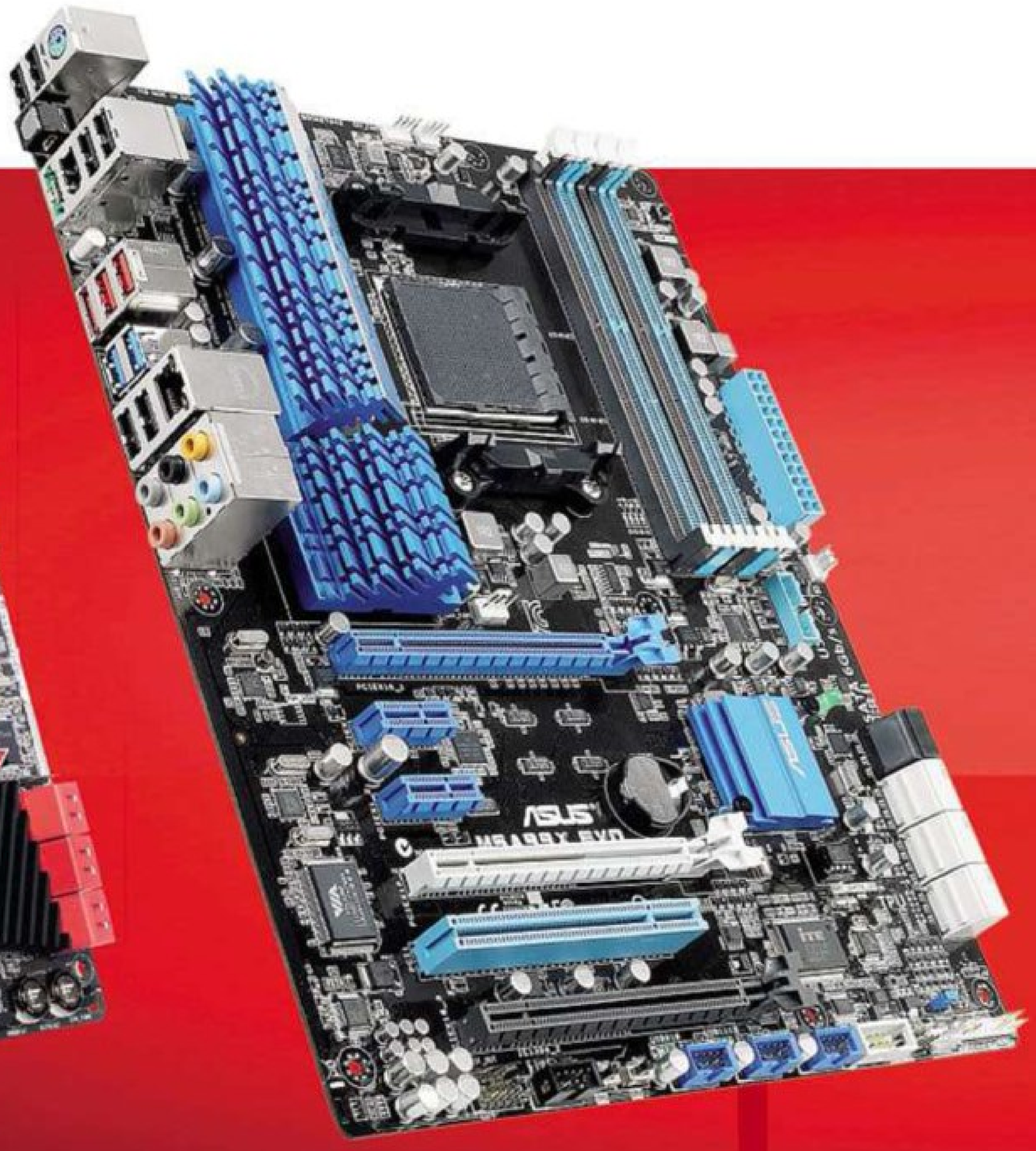
Motherboard supertest

Over the page you'll find one of the biggest motherboard round-ups that PC Format has ever done. We start by looking at the newest boards on the block, built around the Bulldozer-ready 990FX, 990X and 970 chipsets. We then look at the Llano loving A75 motherboards before giving you the lowdown on the best motherboards for Intel's phenomenal Sandy Bridge processor. We're talking 24 motherboards in total. That's a lot by the way.



£145/AMD 990FX

ASROCK FATAL1TY 990FX PRO



£95/AMD 990X

ASUS M5A99X EVO

You can understand when Fatal1ty endorses a 1337 gaming mouse, but when a motherboard is emblazoned with the fatal one's name and face, it sends a slightly more confusing message. Is it a no-compromise board capable of outperforming any other with raw performance and features? Or is it a stripped-down race car of a board, equipped with only the features you need? A quick glance over the Fatal1ty 990FX Professional's spec sheet reveals it's definitely the former.

The board's well endowed with gold capacitors and special mouse ports, but it's the software that impresses us most. F-Stream is a slick all-in-one program that lets you fiddle with overclocking, energy levels and fan settings from the desktop. The UEFI BIOS is similarly comprehensive, although rendered slightly unnerving by featuring Mr. Wendel's face in blood red as a background.

Fatal-mouse-ty

Things get slightly silly when you start looking into the I/O though. One of the USB 2.0 ports is the Fatal1ty mouse port. Once a mouse is plugged in here, you can alter the polling rate from 100 to 500MHz with the F-Stream tuning software. It's no less than we'd expect from a Fatal1ty-endorsed board, but since we're not quite at pro gamer levels, it's difficult to see how much of a difference this actually makes.

The Jury's out on the number of pro gamers crying out for three-way CrossFireX support and six SATA 6Gbps ports, but there are certainly plenty of enthusiasts out there who don't get paid to click buttons quicker than anyone else who'll appreciate these features.

PCFormat Verdict

- 3 PCI-e slots
- 6 SATA 6 GB/s ports
- Nifty software
- Bit too much of Fatal1ty's face

Whether or not pwning is your bread and butter, this board has a lot to offer.

88

Normally, in the case of a big new processor launch such as AMD's forthcoming Bulldozer, you'd expect the motherboards that support it to play second fiddle. But the Asus M5A99X EVO is just one of many new boards that have been kitted out with a 9-series chipset without said CPU being close to sampling.

Specifically though the M5A99X makes use of an AMD 990X chipset with an SB950 Southbridge. Translated, that puts it in the second tier for features: below it are AMD 970 boards, designed for value, while above it are models based on the all powerful 990FX.

So does the ASUS M5A99X EVO have anything else with which to overcome its middle child syndrome?

What you do get with the M5A99X EVO is a lot of easy to get at options. Asus's Windows-based application for handling overclocking and so on – EasyTune - is still buggy and hard to uninstall, but it's much better than it used to be. Importantly, it has just one interface for everything, which helps to make sense of the extra hardware features Asus has added to the stock 990X layout.

BIOS win

Asus's take on the new UEFI graphical BIOS manager is the best around by far. It's not just that it looks better than a traditional BIOS, it's cleverly layered too. On the front page, there's a one-click control for overclocking or dragging and dropping boot devices into order. Behind that there's a set of basic options for top level tweaking, and behind that you have access to everything. With the Asus know-how it's a quality board.

PCFormat Verdict

- Excellent BIOS
- Easy overclocking
- Great price
- Not the best for dual graphics

For a £95 board, this is a feature-rich, overclocker's paradise.

85

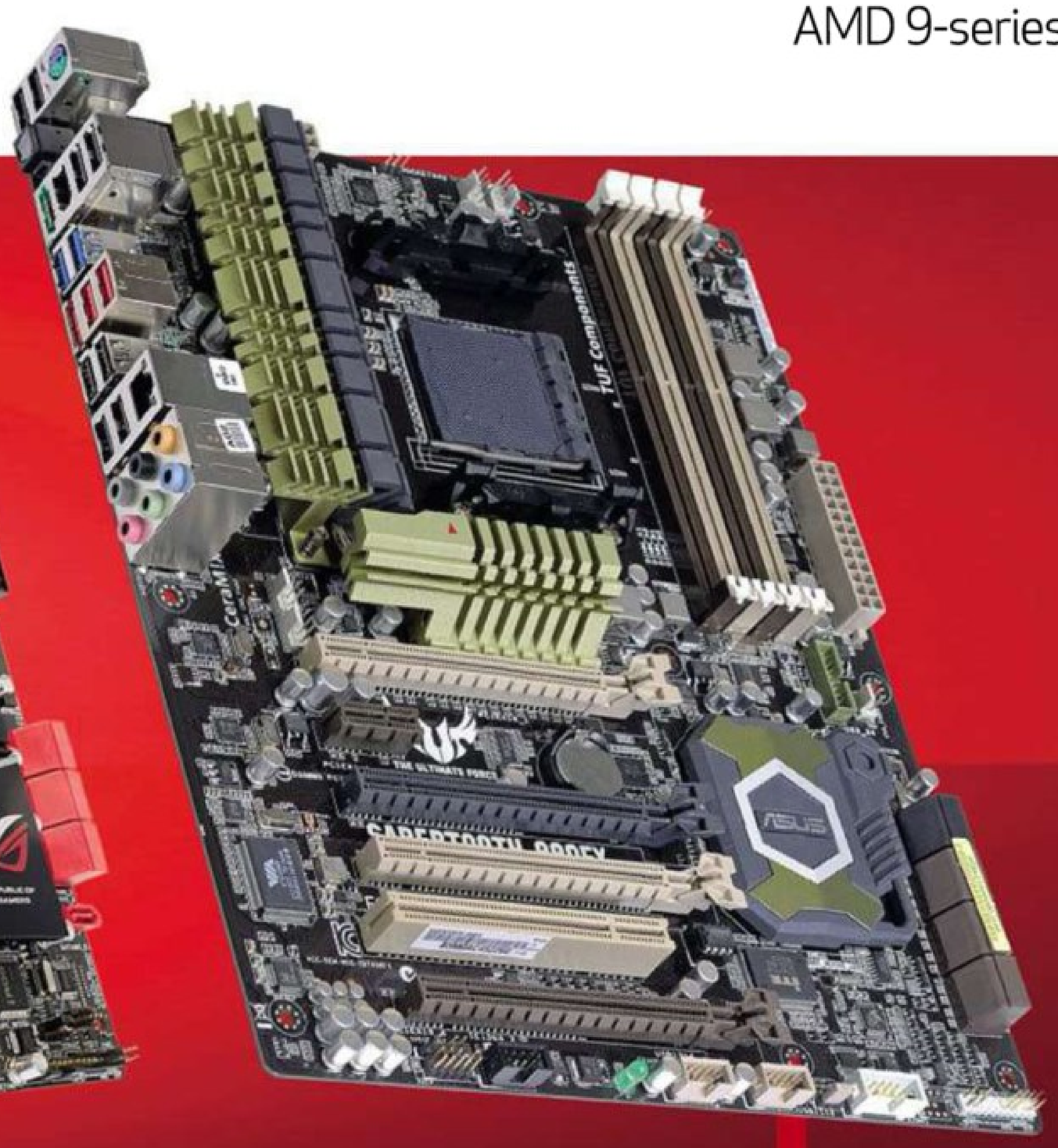
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£170/AMD 990FX

ASUS CROSSHAIR V FORMULA



£160/AMD 990FX

ASUS SABERTOOTH 990FX

We've looked at a few motherboards based on AMD's 9-series chipsets, and so far the general impression has been that they're okay. It all depends on whether the forthcoming processors make them worthwhile. With the Crosshair V Asus has produced a board that makes us want to recommend it whether or not Bulldozer is the next great processor.

Like other motherboards in the RoG series, it's stupidly over specified. There's the optional remote for overclocking, for a start, and there are power points for taking manual volt readings of the main motherboard rails. There's the plethora of diagnostic LEDs, the inclusion of two full 16 lane graphics ports for two way SLI or CrossFire… the list goes on.

What's nice about the Crosshair V is that despite being so well equipped it isn't intimidating. The new UEFI graphical BIOS is well laid out and simple to use, and the board comes with Asus's awkward software. So long as you leave them doing their own thing though they're a straightforward gateway to CPU clock settings and Asus' TPU and EPU chips. These automatically undervolt or overclock other motherboard components depending on system load to change settings on the fly.

Value proposition?

Value for money does have to come into play at some point. It's not terrible – the Sabertooth 990FX is almost identical but has a worse sound card for £10 less – but we still don't know how expensive Bulldozer is. That last point is critical: if Bulldozer can undercut its rivals significantly you should buy a premium board to make the most of it. And they don't come much more premium than this.

PCFormat Verdict

- Graphical BIOS
- Extra USB 3.0 ports
- Two real 16 lane PCI-e ports
- Pricey

If Bulldozer is a top CPU at a bargain price, it's worth buying a top mobo.

89

The top-of-the-range 990FX chipset is all about adding support for AMD's formidably titled and mysterious Bulldozer CPUs. Those eight-core, quad-mod Bulldozer chips should at the very least match the i7 2600K pace for pace. Intel's chip is a four core, eight-threaded affair, while the Bulldozer chip will have eight actual cores.

All that processing magic will appear on store shelves in Zambezi quad-mod chips before you'll be digging your winter coat out, but for existing AMD CPU customers, the Bulldozer-ready Asus Sabertooth 990FX still has features to offer right now.

AMD and SLI

First, there's a landmark moment for AMD boards and multi-GPU. It's SLI and it's available across a range of the 9-series boards. Gigabyte's GA-990FXA-UD7 will actually support 4-way SLI or CrossFireX setups, while this Sabertooth can hack three-way support. This is quite a big selling point for loyal AMD gamers – these are the first mobos to support NVIDIA's multi-GPU tech, and the very fact it's included suggests Bulldozer has the grunt to match SLI'd GPUs.

Sabertooth comes without that TUF thermal armour that gives its P67 iteration that odd look, but still sports the rugged design and heatsinks painted in ubiquitous military tones. There's plenty of space to fit a cooler, the side mounted SATA ports are out of your GPU's way, and it's compact enough to fit in most cases despite supporting 3 GPUs.

It's not the top-performing board in the test, but the military stylings betray the serious overclocking performance you can get out of the Sabertooth.

PCFormat Verdict

- Sturdy build
- Feature-rich BIOS
- Compact
- Outperformed in CPU tasks

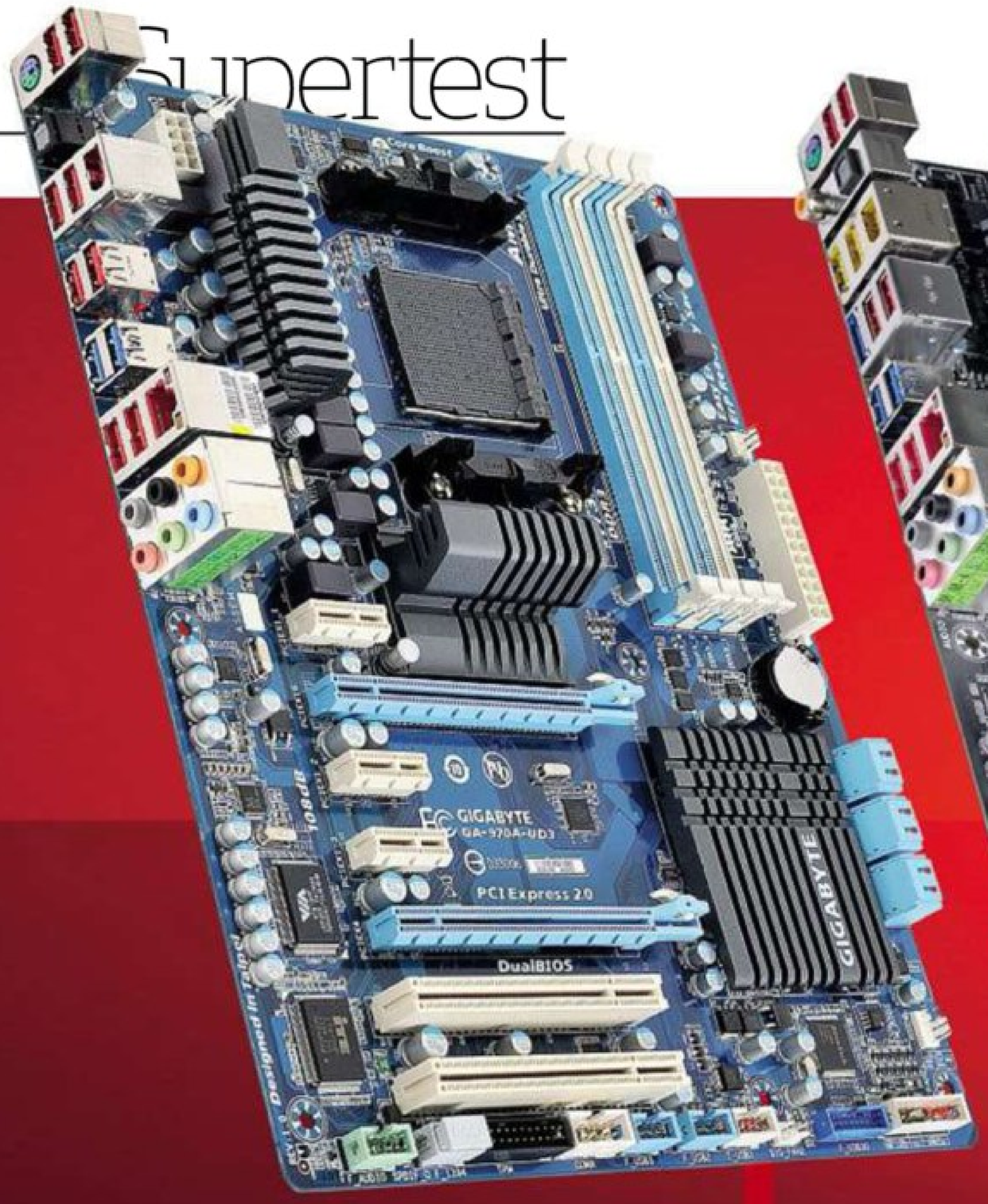
Excellent build quality and BIOS make this another great Asus offering.

82

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Supertest



£80/AMD 970

GIGABYTE 970A-UD3

Apart from supporting Bulldozer through the AM3+ socket, 9-series chipsets like the AMD 970 featured in the Gigabyte 970A-UD3 aren't substantially different to the previous AMD 890 and 870. So what exactly is this new toybox full of?

There's a lot packed into the 970A-UD3 for its £80 price point. Six full speed SATA 6Gbps hard drive connectors is a good start, and so are the two front panel USB 3.0 headers (there's two around the back as well). It doesn't feel like a 'value' board at all. In fact, the only thing that's missing is CrossFire and SLI support. There's just one PCI-e x16 slot for graphics cards, but so long as you aren't planning a dual card rig, there seems to be little reason to upgrade to a more expensive AMD 990X or 990FX board right now.

The best distinction Gigabyte has, other than the quality of its underlying components, is that it's one of the best value boards for Socket AM3+ so far, and a full-size ATX one at that. For current Phenoms though, there's not really enough to distinguish it over older 8-series boards that cost less. Unless you're a dyed-in-the-wool AMD fanboy who is guaranteed to be upgrading to a Bulldozer-based CPU come the Winter then there's little point opting for a 9-series upgrade right now.

Bargain Bulldozer

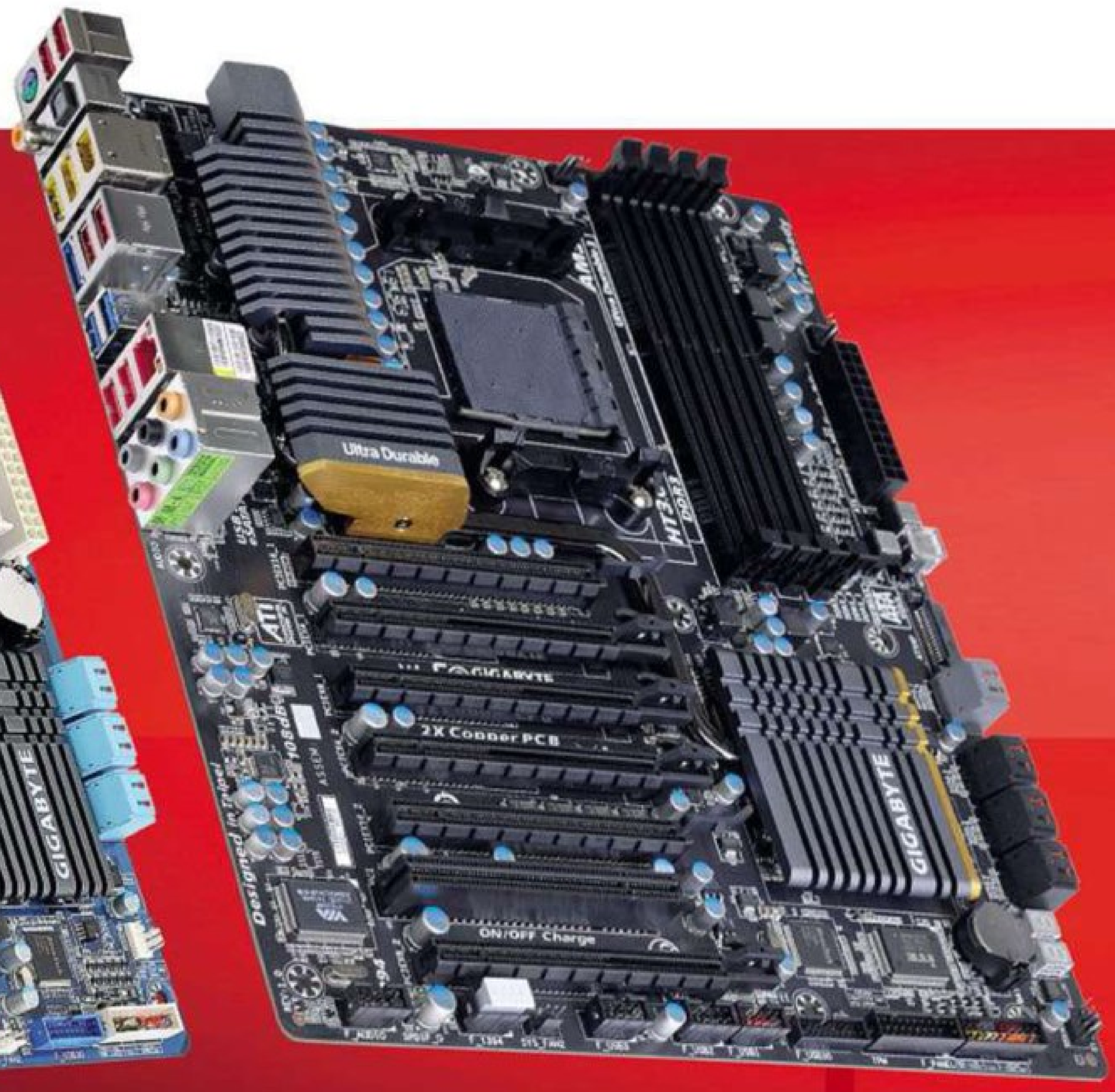
That said, if you're looking to replace your current AMD board then a bargain option like this 970 is worth a look. It'll still run your current AM3 CPU, your DDR3 memory and your graphics card, and when the new CPUs do arrive you're a teeny upgrade away from a new machine.

PCFormat Verdict

- Good value
- Excellent features for the price
- Decent performance
- Single card graphics only

The 970 chipset is a good value entrance to Bulldozer if you can't afford a 990.

81



£190/AMD 990FX

GIGABYTE GA-990FXA-UD7

This high-end Gigabyte 990FX board actually represents something quite new from the Taiwanese manufacturer; namely a high-price, high-performance AMD motherboard. Gigabyte has obviously long-supported the AMD side of the PC world, but until now hadn't released a serious top-end product in that market.

The GA-990FXA-UD7 is most definitely a serious board. Like the Sabertooth this board also supports SLI as well as the standard CrossFire setups. In this UD7 trim we're talking about full four-way SLI support too.

I/O awesomeness

The 990FX retains the SATA 6Gbps support from 8 series boards, and Gigabyte has made full use of this by including 8 SATA 3 ports. The competing Sabertooth isn't really leaving anyone wanting by including just six SATA 3 and two SATA 2 ports, but it's worth bearing in mind when figuring out why the Gigabyte board is pricier.

Sadly, there's no native USB 3.0 support as many were hoping. It's still handled by an onboard controller limiting the number of ports. Both boards have just four USB 3.0 ports, and 14 USB 2.0 ports.

Gigabyte's board looks great too, which is a pleasant surprise after the gimmicky Assassin enthusiast range. Fitting any cooler shouldn't be a problem and despite cramming four GPUs into its little beige mouths, it's less of a space hog than some four-way SLI boards we've seen.

So, you've got around £200 to spend on a board, and you want a high bang for buck ratio. The bucks, if you can chuck in the extra few, must go to the Gigabyte board.

PCFormat Verdict

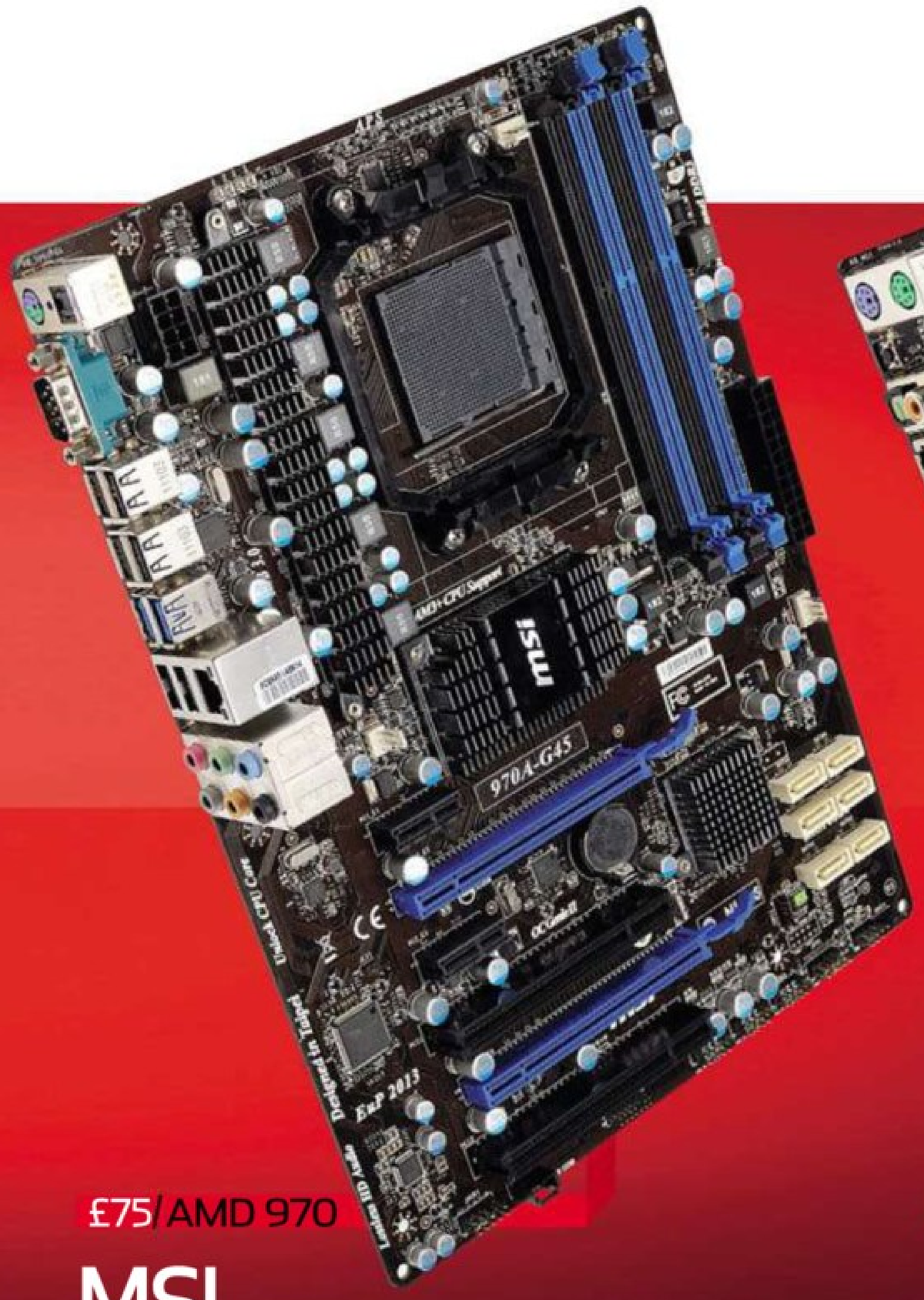
- Sophisticated visuals
- Gets the most out of CPUs
- The more GPUs, the merrier
- Playing catch-up with Intel chipsets

Justifies its price tag with its performance, tons of ports and four-way SLI.

84

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£75/AMD 970

MSI 970A-G45

For Joe PC enthusiast, it's often a worry buying a cheap motherboard. How cheap can you go before boards don't have the features you need? Manufacturers must be faced with a bit of a quandary in how to spec out their low-end boards too.

This 970A-G45 from MSI is very cheap, so inevitably some sacrifices have had to be made to keep the cost down. Most prevalent is the chipset. Unlike 990X and 990FX boards, models built around the 970 chipset don't support the brand new flavour of AMD-based SLI, but they do support two AMD graphics cards in CrossFireX configuration.

SLI slam

That makes sense for a £75 board, although it might frustrate owners of multiple NVIDIA cards. As a rule of thumb, AMD chipsets play nicer with AMD graphics cards anyway, so you may be backed into a corner as far as GPU choice goes, but at least it's a corner with benefits.

In other areas, it's pleasantly bountiful for such a cheap mobo. Like its 990FXA-GD80 cousin (and most 990FX boards) it heaps six SATA 6Gbps ports on its slender PCB. That's great on paper, but alas, their placement gives away the 970A-G45's weaker breeding. With a graphics card occupying the top PCI-e slot, the SATA ports lie awfully close to its fan, making it quite a hassle to drop in and pull out cables.

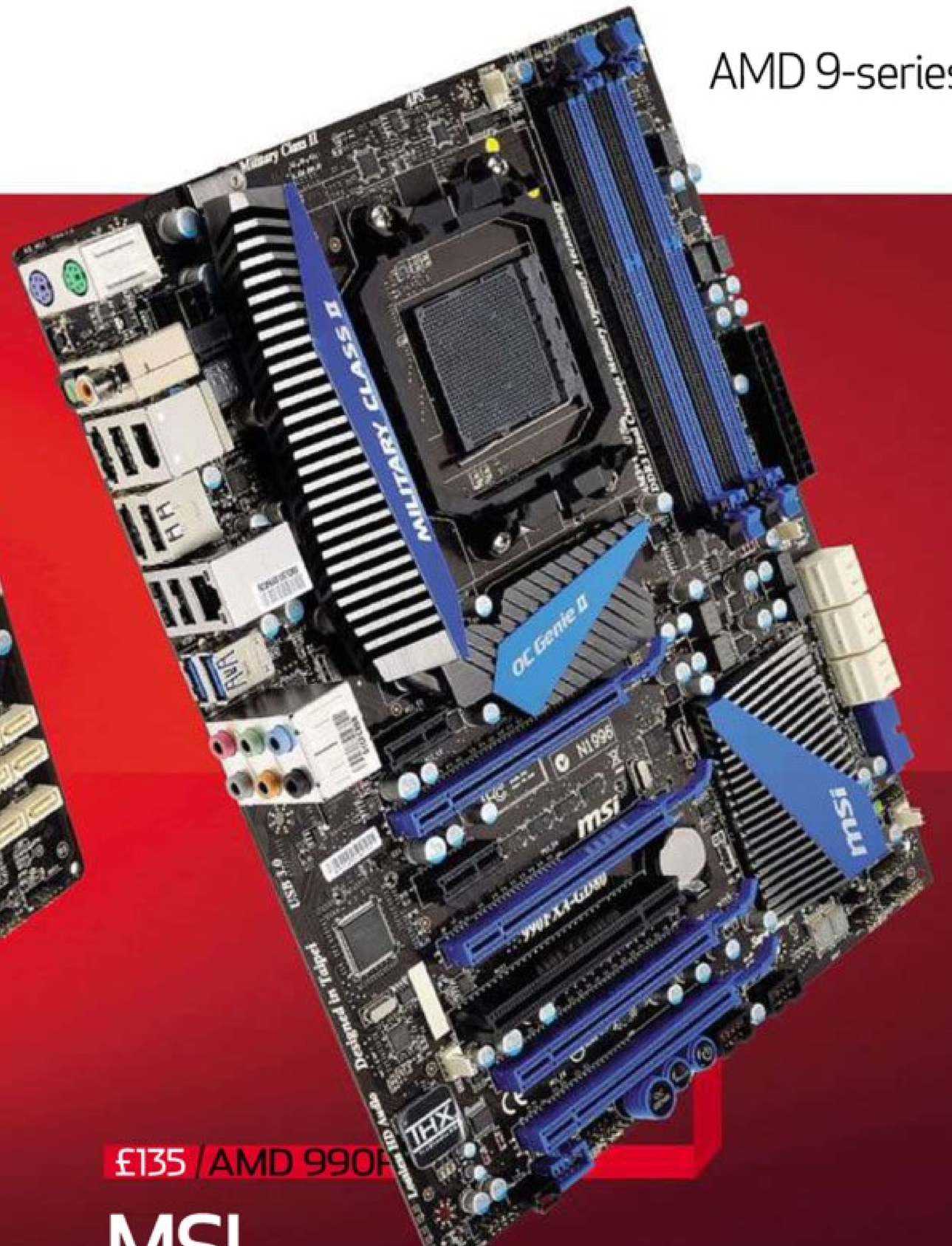
Still, thanks to the similar performance of all AMD's chipsets you won't lose out in that regard. A cup of sugar, a cup of dirt; if you're looking to save money this motherboard won't bite you on the bottom with a glaring lack of features, but it's hardly luxurious.

PCFormat Verdict

- Cheap
- Solid functionality
- Poor SATA port placement
- Clumsy BIOS

It ain't perfect, but this board's still worth the money for its fundamentals.

82



£135/AMD 990F

MSI 990FXA-GD80

The big difference between this 990FXA-GD80 and MSI's much cheaper 970A-GD45 (besides the befuddling array of characters) is the chipset. The 990FX chipset will let you play with multiple graphics cards, whether they're NVIDIA or AMD-flavoured.

So if you're one of those rare slobbering maniacs with two NVIDIA graphics cards and a penchant for AMD processors, this board will allow you to play out your sick SLI fantasy. Does that justify double the expense of the 970A-GD45? Certainly not – let's hope there's more on offer than just versatile GPU support and a lightening of the wallet.

At £135 it's looking quite an expensive proposition. It does little more than right the wrongs of cheaper boards – ASRock's Fatal1ty 990FX Professional and the Asus Crosshair V Formula shower extra features on the ever grateful user. So, whatcha got, MSI?

Okay, well it does have the OC Genie. The 248 per cent performance boost it promises is complete rubbish of course, but it's a hassle-free way to overclock and a great starting point for further tweaking.

OC control

You can take a bit more control over overclocking in this BIOS of course, and even change exactly how that OC Genie button works when you press it – how far it ramps up the FSB, or CPU clock ratio, let's say.

The big issue though is the price. At £100-odd we could understand its feature set compared to the competition. At £135, said competition is just too close in price and too good – this board's capable, but outclassed by its rivals.

PCFormat Verdict

- One touch overclock
- Versatile GPU support
- Average performance
- Overpriced

The slightly inflated price tag highlights this motherboard's lack of extras.

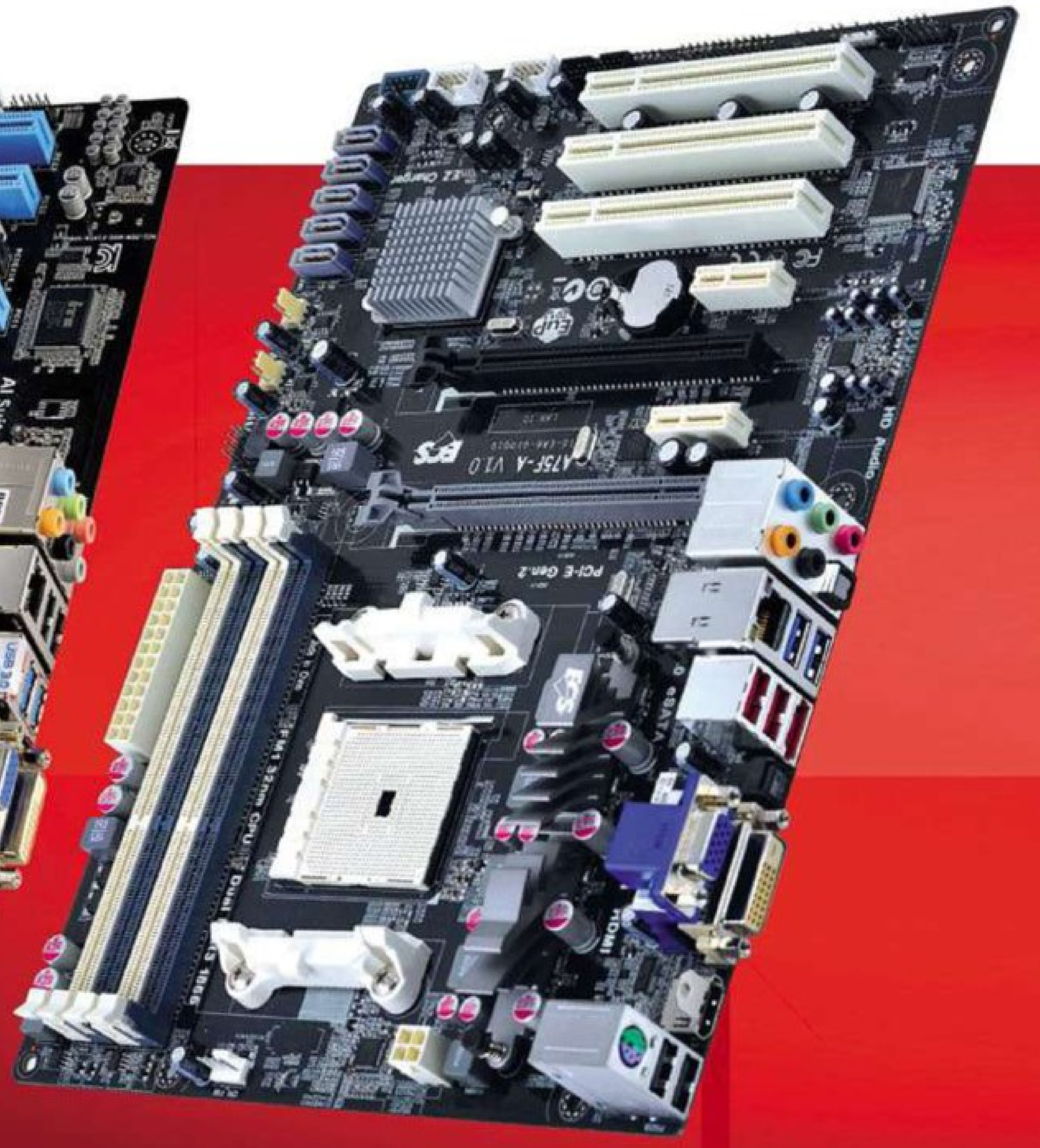
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£88/AMD A75

ASUS F1A75-V PRO



£90/AMD A75

ECS A75F-A BLACK SERIES

Despite a hefty amount of the good stuff in computing now being jammed onto the chip itself – northbridge, CPU and GPU – there's still an awful lot left up to the motherboard. And to get the most out of the latest Llano APUs you will need a quality motherboard partnership.

The Asus F1A75-V Pro comes with all the lovelies we're expecting from this new A75 series of motherboards, namely up to 1,866MHz DDR3 support as well as what's hot in the world of interfaces; SATA 6Gbps and USB 3.0. So hot right now… There will be cheaper, weaker A55 boards on their way, minus those two super-model I/O options, very soon. Well, soonish.

Extra clocks, sir?

One of the things that really impressed us about the AMD A8-3850 Fusion APU was the amount of overclocking headroom in the chip. We've been playing around with Stars-based AMD CPUs for a good while and we're rarely seen a chip take an almost 1GHz overclock before.

The Asus F1A75-V Pro was no bystander in this, being a key component to getting that speed out of the chip itself. AMD supplied an MSI microATX FM1 board as part of the review kit and we could barely get a squeak out of it. The F1A75-V Pro gave us an A8-3850 running happily at 3.7GHz. Compared to the 2.9GHz stock speeds it comes with out of the box, that's a hefty ol' kick in the clocks.

While FM1-socket boards are still in their infancy, this Asus F1A75-V Pro is currently setting the bar high. With a combination of solid overclocking support and a decent feature set this board is going to be tough to beat.

PCFormat Verdict

- Great overclocking options
- SATA 6Gbps and USB 3.0
- Decent price
- Slight issue with discrete cards

It's an impressive Asus debut for the A75-series of motherboards.

87

The ECS A75F-A is a new member of its Black Series family of motherboards. The Black Series is home to the company's range of performance products and anyone used to seeing the Black Series Intel boards with all their added razzmatazz may be a bit shocked by this board. It looks, dare we say it, a wee bit dull by comparison.

When you first get the A75F-A Black Series out of its box there's a feeling that something is not quite right and that's down to the slightly narrower width. There's nothing wrong with being thinner than normal, indeed inside some cases it's a blessing not being as snug as a standard width board.

Solid performer

When it comes to performance the A75F-A is up there with the best of them, but in terms of overclocking the A8-3850 the A75F-A Black Series couldn't quite hit the 3.7GHz heights achieved by the Asus F1A75-V Pro. Getting it to run stably at 3.5GHz (600MHz over the standard clock) is still none-too shabby an overclock.

The BIOS offers support for memory speeds up to 1,866MHz and while 1,600MHz was fine the same couldn't be said for the low voltage 1,866MHz we tried. It doesn't help when the BIOS doesn't allow you to set the voltage you need and you have to keep going back to the PC Health section to see what the memory voltage is. Time consuming and frankly a right pain.

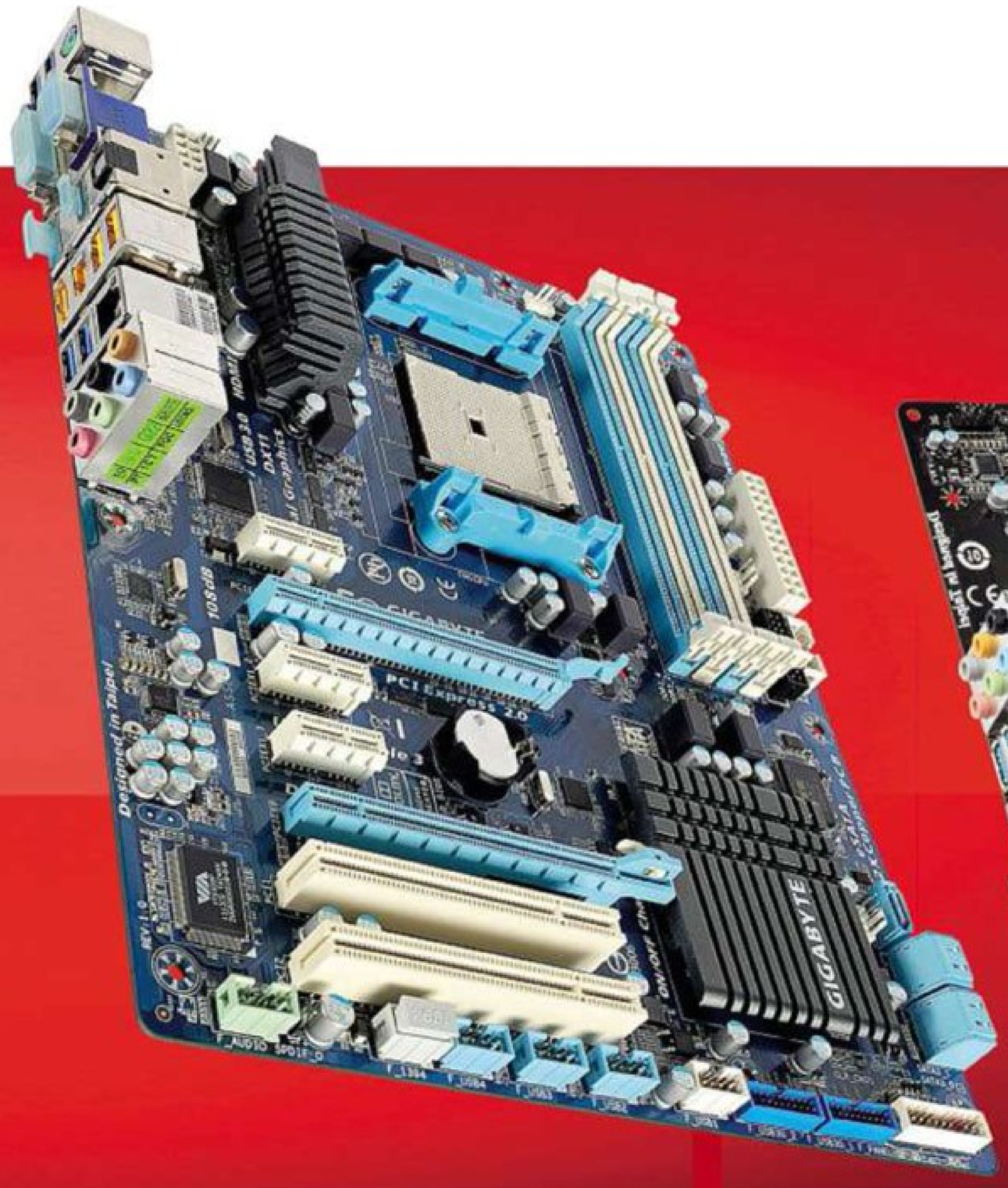
There's not much in the way of fancy extras on the A75F-A but this isn't a put-down, in fact it makes a change to see a motherboard not crammed to the gills with unnecessary extras, but there are still better boards around for the cash.

PCFormat Verdict

- Performs well
- No fancy costly extras
- Build quality
- BIOS needs a bit of tweaking

A bargain entry point into the new world of AMD accelerated processing units.

70



£97/AMD A75

GIGABYTE A75-UD4H



£67/AMD A75

MSI A75MA-G55

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Although priced for the mainstream market, the A75-UD4H comes with a few bits of hardware normally associated with high-end boards. For example, it uses Gigabyte's Ultra Durable design with 2oz of copper in the PCB, which together with the Japanese capacitors makes for a more stable platform especially when trying some overclocking.

Talking of overclocking there are also dual BIOS chips, always handy should you fry one by taking overclocking too far.

The first thing that strikes you about the A75-UD4H is the two PCI-e x16 slots. This means not only does the board support dual graphics but it also supports CrossFireX as well. With all that AMD-ness floating around though it's not going to be supporting NVIDIA's SLI.

The first A75 boards we've looked at don't really show much of a performance difference between the manufacturers. With them all sitting at the stock speeds of the Llano APU there's precious little clear air between them, but the Gigabyte A75-UD4H does sit at the top of most tests. The pure gaming CPU test of *Shogun 2* though had the UD4H noticeably behind its two competing boards, and they both come in under the £100 mark.

Needless slots

The addition of the second PCI-e lane does mark this board out from the competition, and gives the UD4H a bit of a unique selling point. That said having a traditional, dual discrete card CrossFire setup does sort of miss the point of the whole Fusion plan. With the integrated APU graphics dormant there's just the weaker CPU component in operation.

PCFormat Verdict

- CrossFireX support
- USB fuse protection
- SATA 6Gbps and USB 3.0
- Around £100

The second graphics card slot is sadly an unnecessary extravagance.

78

Recently it's all been about the small form factor motherboard. It's been making one hell of a comeback since so much of your PC's tech has disappeared beneath the unassuming heatspreader of the central chunk of silicon in your machine.

Since graphics started to come back on-die it has freed up a hell of a lot of real-estate on the motherboard. You can go one of two ways then, either cram in a load of, possibly, useless extras or trim down the footprint of the board to shave off the unnecessary space.

We've seen some tiny H67 and Z68 boards recently, even going as far as the mini-ITX form factor, and this MSI A75MA-G55 is the first AMD Llano Fusion board we've seen on a smaller scale.

Oh no, no OC

At stock speeds it's all good. The MSI motherboard happily keeps pace with the larger Asus offering, with performance only a shade off. The A75MA-G55 is also rather well-heeled in the features department too, showing off full SATA 6Gbps coverage and USB 3.0 sockets out back and through a break-out box.

The overclocking headroom in the Llano desktop APU is one of the things that impressed us most. Unfortunately we couldn't force any extra performance out of the A8-3850 APU at all. Not a single silicon sausage. Now as an HTPC it's not a massive problem, and subsequent BIOS updates may well affect a change in this lack of performance, but for now it's tough to recommend knowing what you could get out of that APU.

As a form factor the mATX size is a perfect match for the Llano platform, this vaguely broken MSI board however is currently anything but a perfect match.

PCFormat Verdict

- Good form factor for Llano
- Decent feature set
- No overclocking
- Some driver instability

Until the BIOS issues are ironed this microATX board is a bit hobbled.

67

Release: StoreMags & FantaMag

Supertest

INTEL 6-SERIES



ASROCK Z68 EXTREME4 £99

Manufacturer ASRock Web wwwasrock.com

ASRock has four Z68 boards in its mobo line-up from the all-singing, all-dancing flagship Fatal1ty Z68 Professional Gen3 to the quietly confident Z68 Pro3-M. This board, flying under the Extreme 4 banner, sits just under the top Fatal1ty Z68 board in the family roll call.

The Extreme 4 performs about as well as we've come to expect from standard Z68 boards: our 2600K happily hitting the 4.6GHz mark. That's not a speed to make it a market leader, but it's not a bad mark up for a 3.4GHz CPU.

The Z68 Extreme 4 keeps up the tradition of good build quality, using first-rate components and stable performance that has come to represent ASRock boards in recent times and having reasonable price tag doesn't do it any harm.

ASRock is starting to make a name for itself again, and boards like the Extreme 4 are only going to help.

PCFormat Verdict 85



ASROCK Z68 PRO3 £95

Manufacturer ASRock Web www.asrock.com

You may be surprised to see a fairly well-featured, mainstream motherboard carrying the latest Intel technology for less than a ton. In our bargain-hunting terms it definitely warrants further investigation.

It's so well-priced that it's ideal if you want a no-nonsense board for the Z68 chipset. It's a board that's pretty hard to look beyond too; the overclocking support of the P67 merged with the integrated graphics support of the H67.

One look shows you where ASRock has cut the Z68 Pro 3's feature set to get it to this price: there's only a single, solitary x16 PCI-e slot. Also to keep costs down ASRock hasn't used a third-party controller to provide extra SATA ports, which means you only get two SATA 6Gbps and four SATA 3Gbps ports.

If you don't care about multi-card graphic setups or millions of storage options then the Pro 3 is worth a look.

PCFormat Verdict 90



ASUS MAXIMUS IV EXTREME £256

Manufacturer Asus Web uk.asus.com

So if Foxconn's H61 is the Fiat 500 of Sandy Bridge mobos then Asus's Maximus Extreme IV has to be the Bugatti Veyron. It's big, brash, crammed full of features and eye-wateringly expensive. But then it also comes with blistering performance too.

To say the feature list of the Maximus IV Extreme is good is to do it a disservice. The list seems endless: dual channel DDR3 support up to 2,200MHz (OC), support for three-way SLI and CrossFireX via four PCI-e slots, four SATA 6Gbps and four SATA 3Gbps and eight USB 3.0 ports on the rear panel – and that's just for starters.

Unfortunately, as the board uses the P67 chipset there's no integrated graphics but on the flip side it fully supports the K-series Sandy Bridge CPUs. And this board is all about straight-line performance.

We managed to hit a benchmark-leading 5.2GHz with the 2600K, and that's with air-cooling alone.

PCFormat Verdict 87

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Release: StoreMags & FantaMag

StoreMags.com

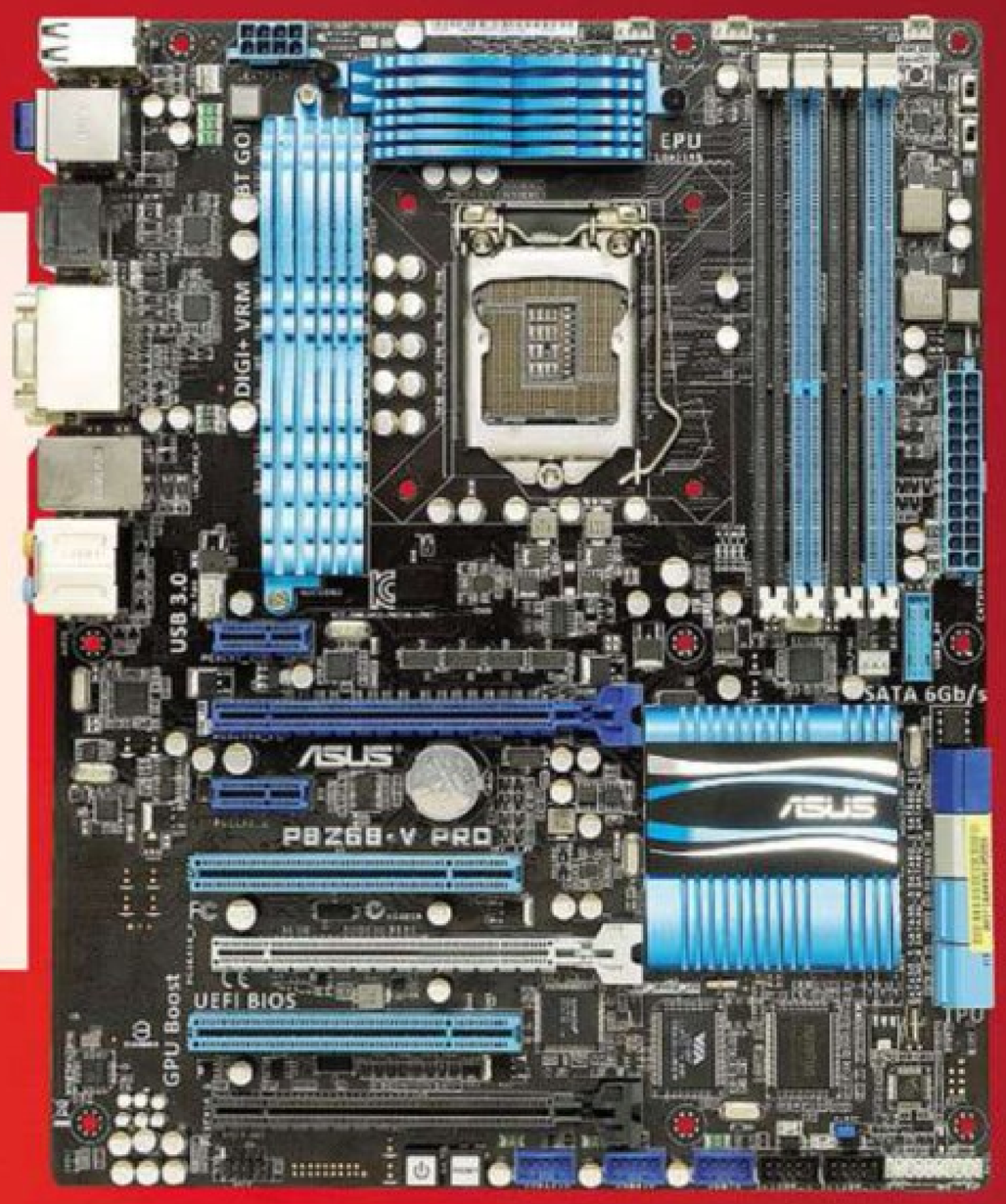
ASUS P8Z68-V PRO — £135

Manufacturer Asus Web uk.asus.com

You'd be forgiven for saying to yourself: "Hang on a minute, isn't that a P8P67 Pro?" Yes, the boards are very similar in appearance but Asus has tweaked a few things here and there, moved components around and brought in new ones.

The most obvious of these are the video output options on the rear I/O panel; VGA, HDMI and DVI out. The DVI port though is only single link which limits the resolution of the screen it can support to 1,920 x 1,200. Although we only got our 2600K to 4.7GHz, if you are into serious overclocking exploits then the Asus P8Z68-V Pro isn't a bad motherboard to play around with. This makes the Asus' P8Z68-V Pro one of the best mainstream Z68 boards on offer, nailing all the expectations we've had about the second generation of Core CPUs.

PCFormat Verdict 84



ECS P67H2-A BLACK EXTREME — £150

Manufacturer ECS Web eu.ecs.com.tw

ECS may not be as well known as some of its rivals but it does seem to come out with some interesting boards, especially its Black Extreme series for the enthusiasts.

One of the first things that you notice when looking at the P76H2-A are the three PCI-e graphics slots. The top two slots are positioned with enough distance between them so graphics cards with large coolers can be used together with out too many problems, but the third slot is positioned very close to the bottom edge of the board so any heftily cooled card will overhang the board.

Unfortunately, the ECS board still doesn't have the OC chops of some of its competitors. Granted the £100 P67 boards are all hitting 4.2GHz too, but you'd hope the pricier mobos would give you a bit of a boost. In general terms then, ECS's board is unable to keep pace with the more bargainous P67 or Z68s out in the wild.

PCFormat Verdict 72



FOXCONN H61MX — £55

Manufacturer Foxconn Web www.foxconnchannel.com

At the top end of the Sandy Bridge range is the Z68, powering the most powerful and expensive motherboards around, while at the other of the scale is the lowly H61. It may be low in performance but in the eyes of the mobo manufacturers it's the star of the chipset line-up pitched as it is at the end of the market where boards are made cheaply and sold by the boat load.

The H61 is a seriously pared- and cut-down version of the H67 chipset. With only the elder-statesmen of interfaces on offer it's an ideal low-cost platform for entry level PCs.

Foxconn's H61MX doesn't add many other features over what's supplied by the chipset. The trouble with boards like the H61MX is that they are a tad underwhelming. There's no wow factor, and while you can live without HDMI, DisplayPort and even USB 3.0, some of the cuts are just Scrooge-like. Still, it's a Sandy Bridge mobo for £55.

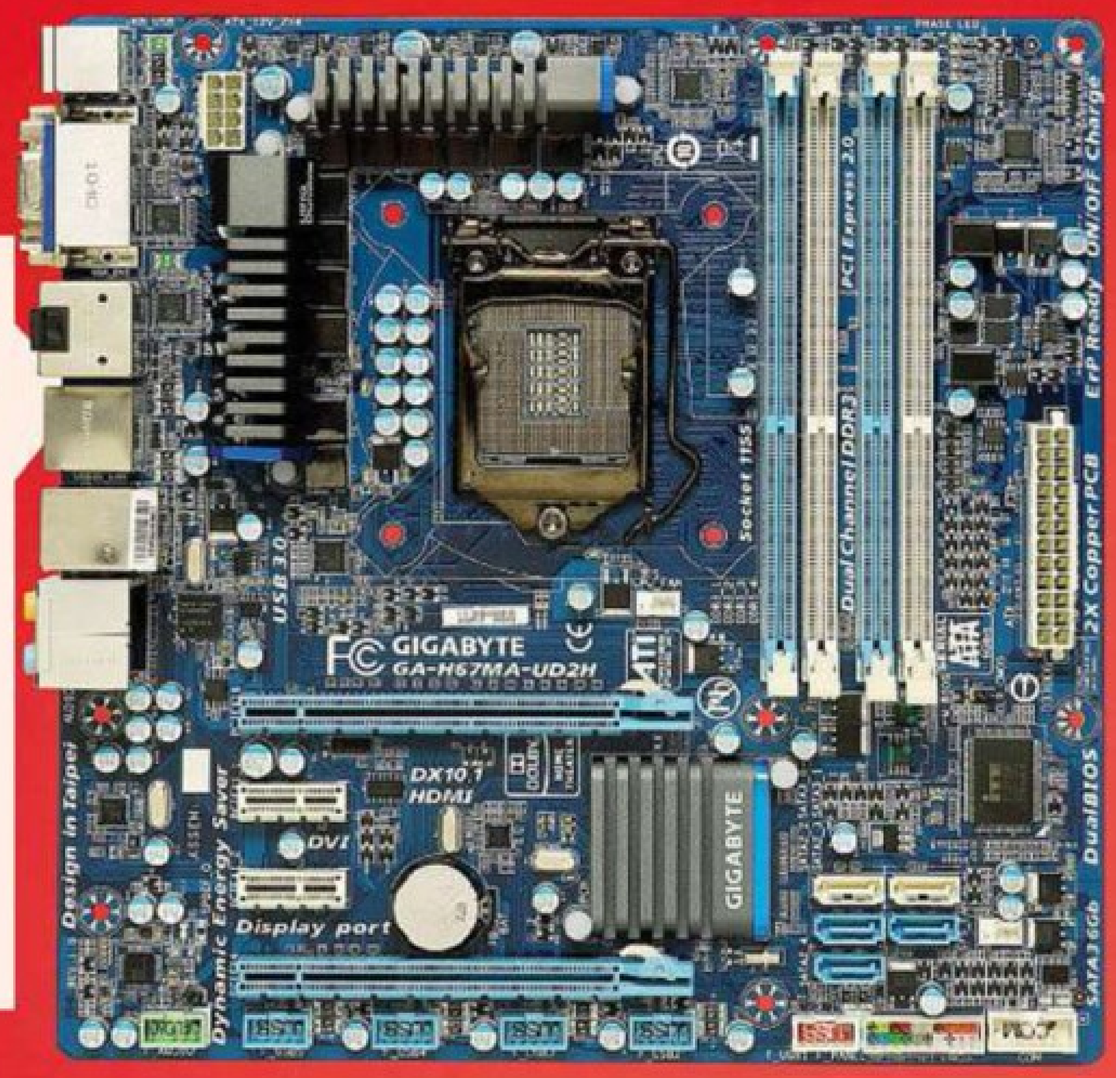
PCFormat Verdict 60



INTEL 6-SERIES CONTINUED

GIGABYTE H67MA-UD2H — £96

Manufacturer Gigabyte Web uk.gigabyte.com



The H67 chipset may not have the OC capability of the P67 but with its full support for the integrated graphics of Sandy Bridge processors it makes an ideal base to build a powerful home theatre PC.

This hasn't gone unnoticed by mobo manufacturers as most, if not all, have H67-based microATX form factor board ranges; the format most used in HTPCs. On the performance side of things the board's stifled by the lack of overclocking support, but then again no one would buy a H67-based board for performance. It's all about the multimedia support the boards bring thanks to the chipset.

The myriad video output options on the rear I/O plate back up its credentials as a good base for a HTPC too. Overall, it's good to see Gigabyte paying as much attention to the small-form factor as it does on its full sized boards. This is perfect then for the HTPC if not the performance crowd.

PCFormat Verdict 80



GIGABYTE Z68X-UD3H-B3 — £123

Manufacturer Gigabyte Web www.uk.gigbyte.com

Gigabyte's mid-range Z68 puts in a solid performance. We could wish for more USB ports and SATA slots, but we'd probably have to pay a lot more for them. We also quite like the familiar-feeling old school BIOS option, though the lack of UEFI is still rather strange, seeing as it's part of Intel's spec for Z68.

There is one issue though, because the PCI-e slots are run from the chip they scale back to just x8, rather than x16 lanes, if both are used at the same time. SLI or CrossFire should be fine for most purposes, but you might start to see that bandwidth bottleneck kicking in if you're planning to set up dual-graphics for multi-monitor resolutions with lots of image quality settings turned on.

If you're only planning to use one card though, you might want to look at the ASRock Pro 3. This Gigabyte offering is the better-built board, but ASRock's is near £30 cheaper.

PCFormat Verdict 80

GIGABYTE Z68XP-UD3-ISSD — £193

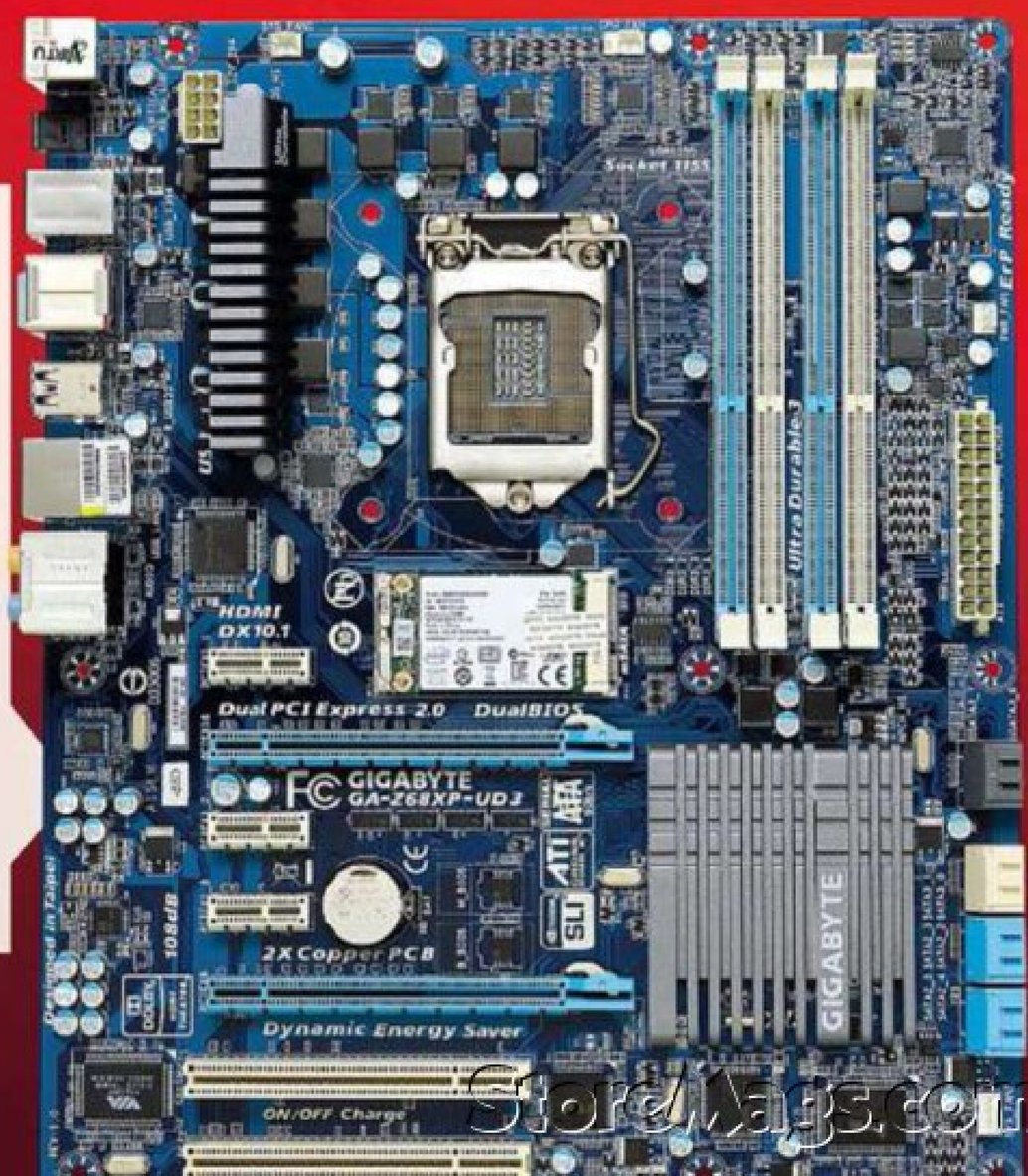
Manufacturer Gigabyte Web www.uk.gigabyte.com

Gigabyte has wasted no time in producing boards using the new chipset; it has 20 motherboards currently in its line-up. That said it has almost entirely pulled out of the P67 platform, seeing the Z68 as its demise.

Sitting among the Z68 line-up are five boards representing the first mobos to be fitted with mSATA connections on the PCB. This allows the mounting of a small form factor SSD to work alongside Intel's Smart Response Technology (SRT) and the GA-Z68XP-UD3-iSSD comes with a drive already in place. The drive bundled with the board comes in the shape of one of Intel's new 20GB MLC 311 series SSDs. The SSD caches the most commonly accessed files giving these files a faster fetch time, improving performance.

This isn't a board for everyone though, with a single HDMI output and relatively lowly OC prowess, but if SRT appeals to you, and you can't afford a serious SSD, it's an interesting option.

PCFormat Verdict 77

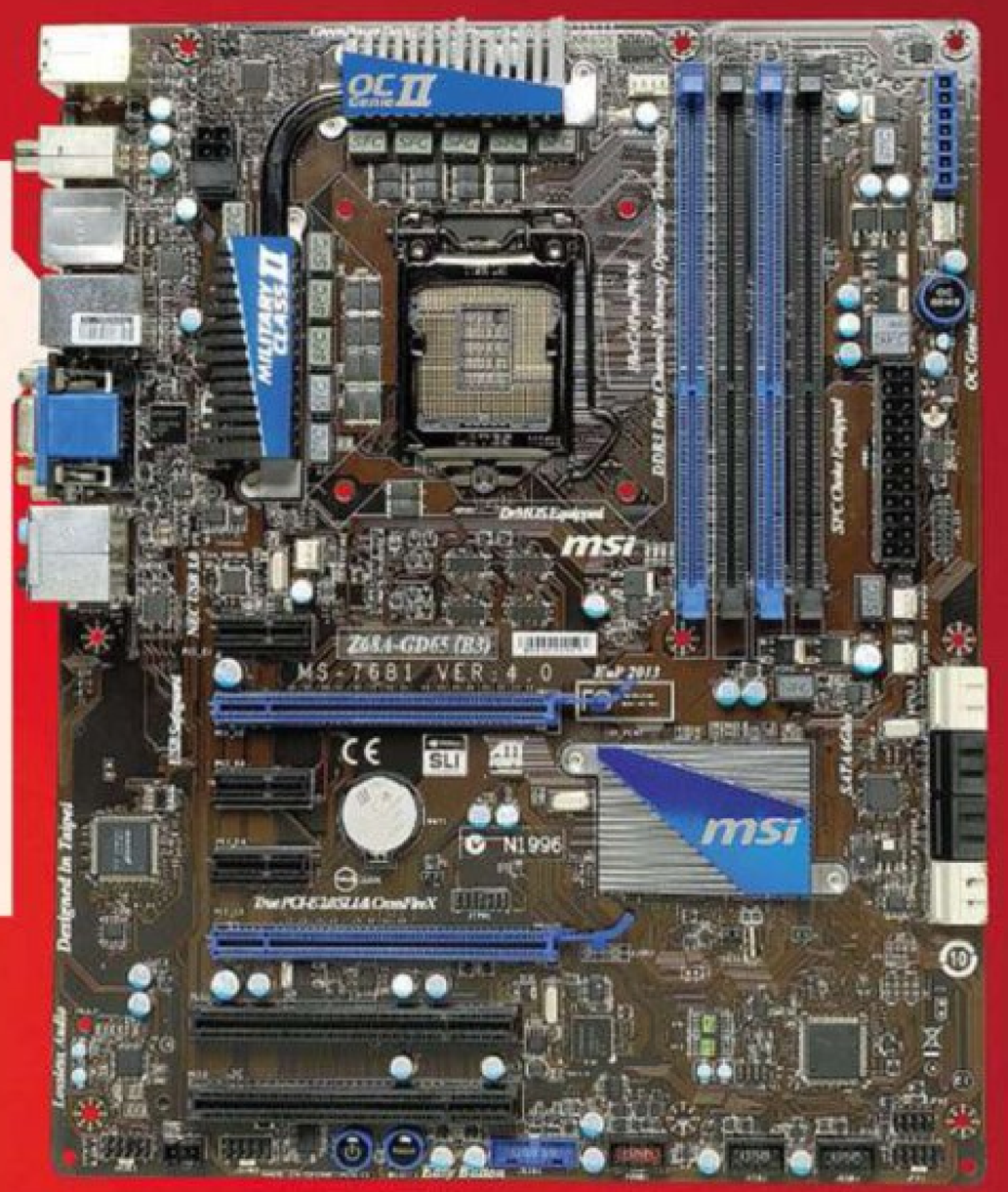


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MSI Z68A-GD65 £140

Manufacturer Intel Web www.intel.com

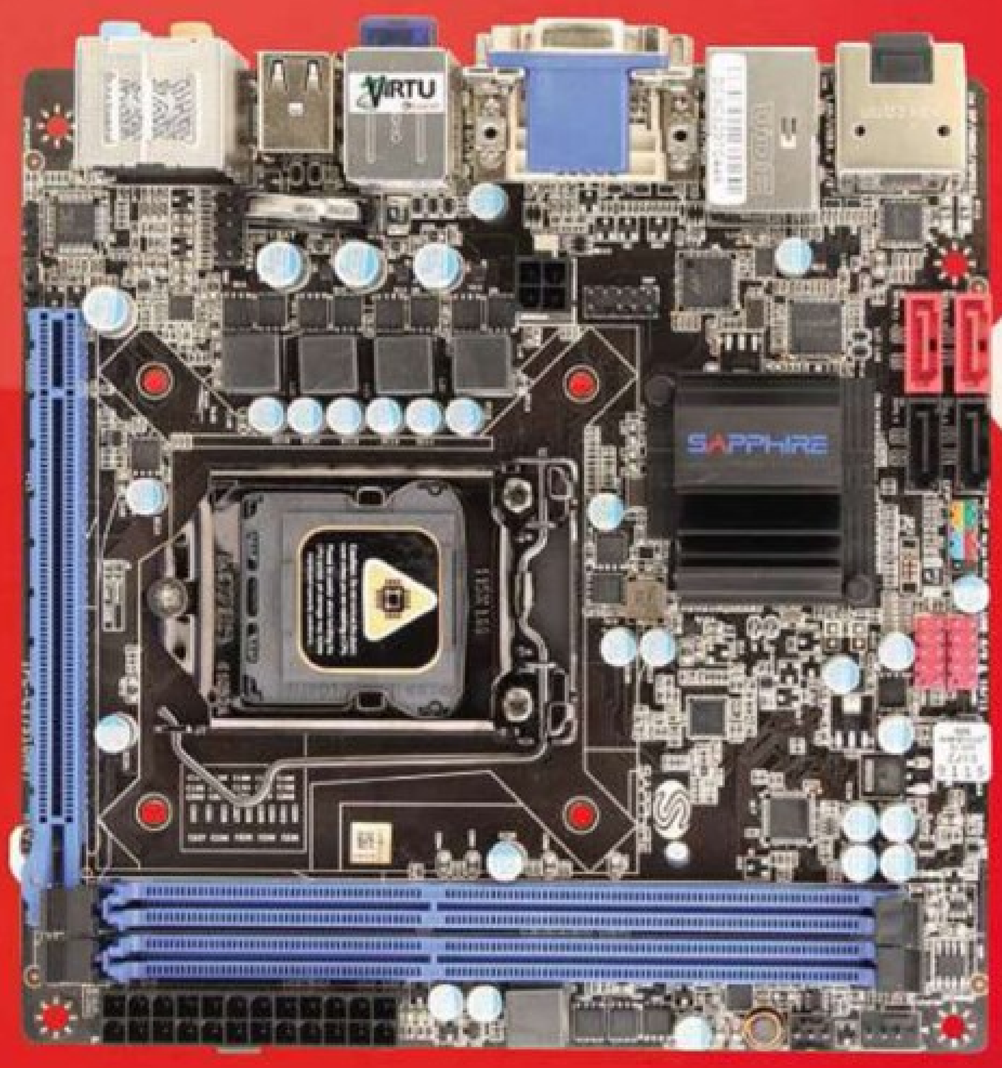


MSI definitely had the enthusiast in mind when it designed the Z68A-GD65. The motherboard comes with all the goodies found on MSI's better equipped boards: like OC Genie and Military Class components.

It also has some features that only the enthusiast could properly appreciate; for example, there's a check point block to take various voltage measurements the board is using via a probe.

Although the OC Genie II tech is very good, and the Control Center II software overclocking application is equally impressive, we sorted out the overclocking the old fashioned way. By delving into the BIOS settings, we managed a fairly speedy 4.7GHz out of our 2600K. It may be a rather lonesome offering from MSI, and we assume there must be more UK-bound, but it's a robust and feature-rich Z68 board at a decent price.

PCFormat Verdict 83



SAPPHIRE PURE PLATINUM H67 £82

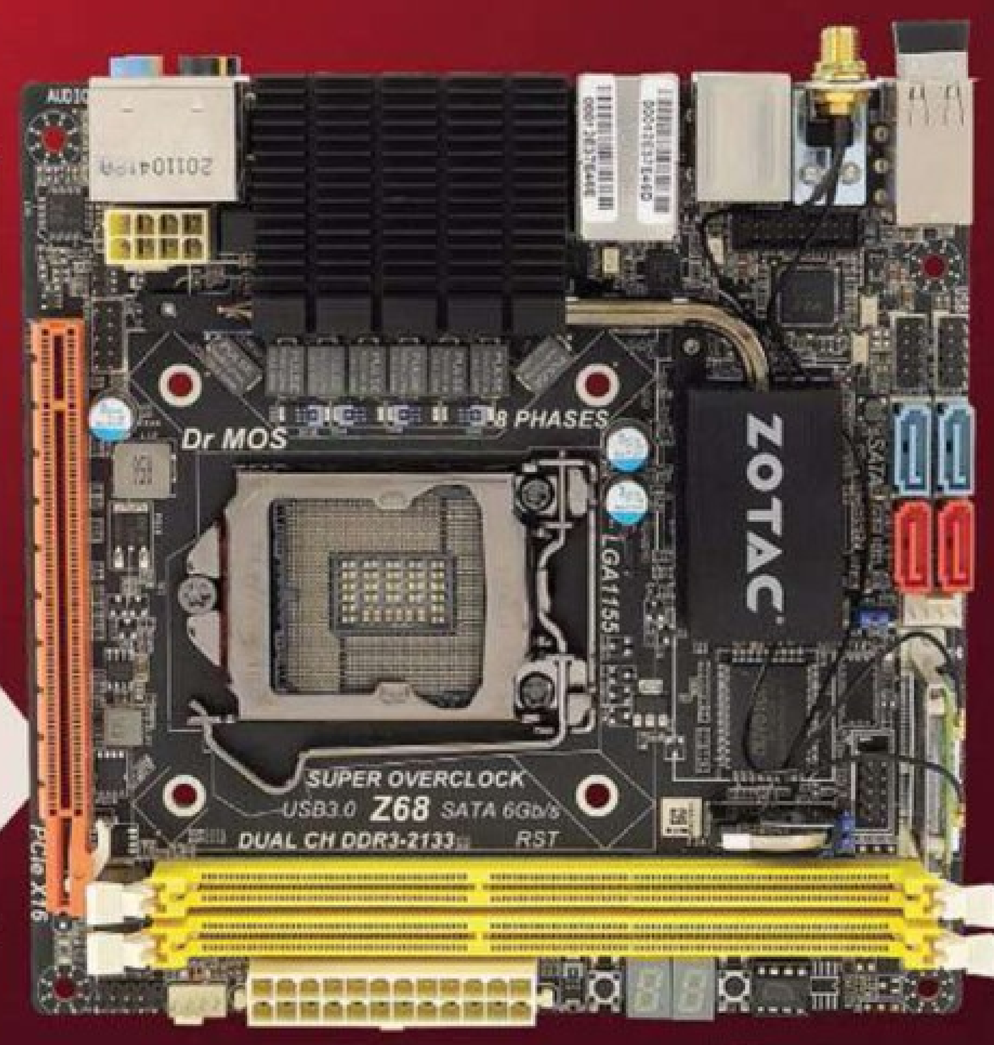
Manufacturer Sapphire Web www.sapphiretech.com

When Intel was gazing into its crystal ball to get an idea of the impact its Sandy Bridge technology might make on the market, it's a fair chance they didn't see the second coming of an old motherboard format back into the limelight.

Since its inception back in 2001, every now and again the ITX motherboard format makes a re-appearance with some brave manufacturer. At last it seems the format's time to bask in the sun has come. It's difficult to find anything to dislike about Sapphire's Pure Platinum board, it may have slightly less in its feature list than Zotac's ITX Z68, but then again it's around £40 cheaper.

Sapphire has made full use of the display options offered by the chipset which, when you add in the QuickSync video transcoding technology built into the Sandy Bridge proccessors, makes the Pure Platinum H67 an ideal base for a tiny HTPC or media PC.

PCFormat Verdict 86



ZOTAC ITX Z68 WIFI £183

Manufacturer Zotac Web www.zotac.com

Zotac, the mad fool, has opted to stick Intel's latest and greatest onto one of the smallest motherboard form factors available, but that's what Zotac do. What's impressive is that it's done this and managed to keep almost all the features you'd want on a full ATX mobo.

Beautiful build quality, solid if unremarkable benchmarks and a well-packaged product help justify the pricing of this latest Intel Z68-based motherboard.

The balance of ports is just about right, and while we may miss DVI, adaptors are at hand.

It even performs well as an OC board. As much as we continue to be impressed by just how much can be crammed onto tiny ITX boards we just have to wonder who is buying them? That's no slight against Zotac but beyond a small media centre or a specialised project why would you opt for this over an ATX option?

PCFormat Verdict 80

Bench analysis
Making sense of an awful lot of numbers

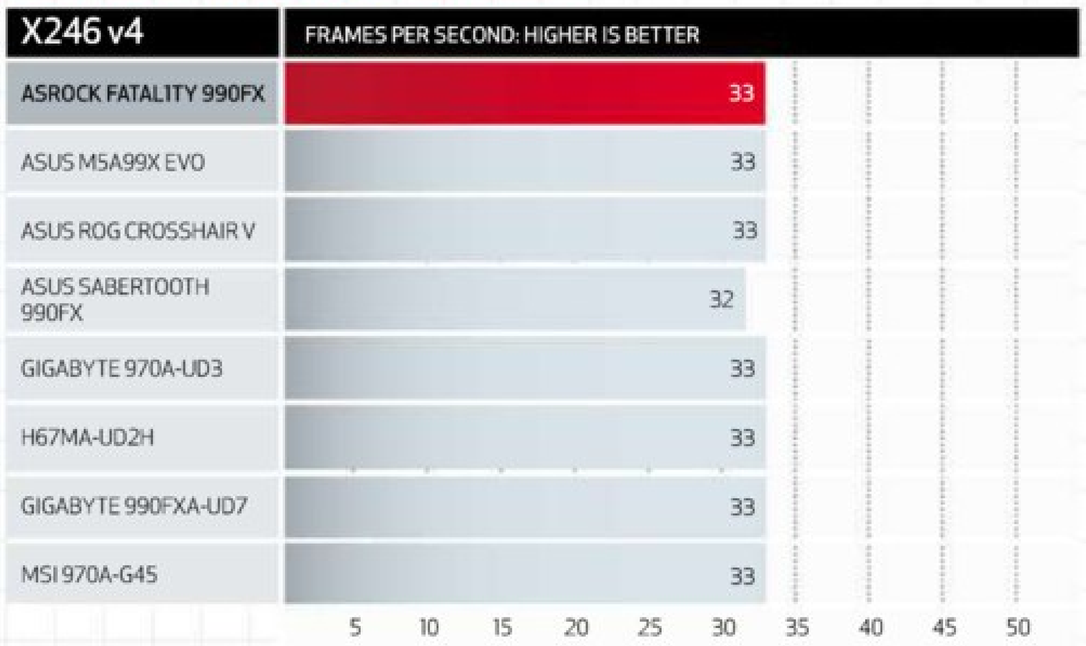
One of the most interesting things to come out of the motherboard benchmarks in this test is just how little variance in performance there is between the AMD 9-series boards. Whether it's a top-end 990FX or a lower caste 970, the CPU will generally be able to perform the same. The only differences comes in terms of added extras, such as overclocking, and price.

When it comes to Llano A-series boards though there is a marked difference in performance, especially in gaming terms. There the Asus motherboard really shines through.

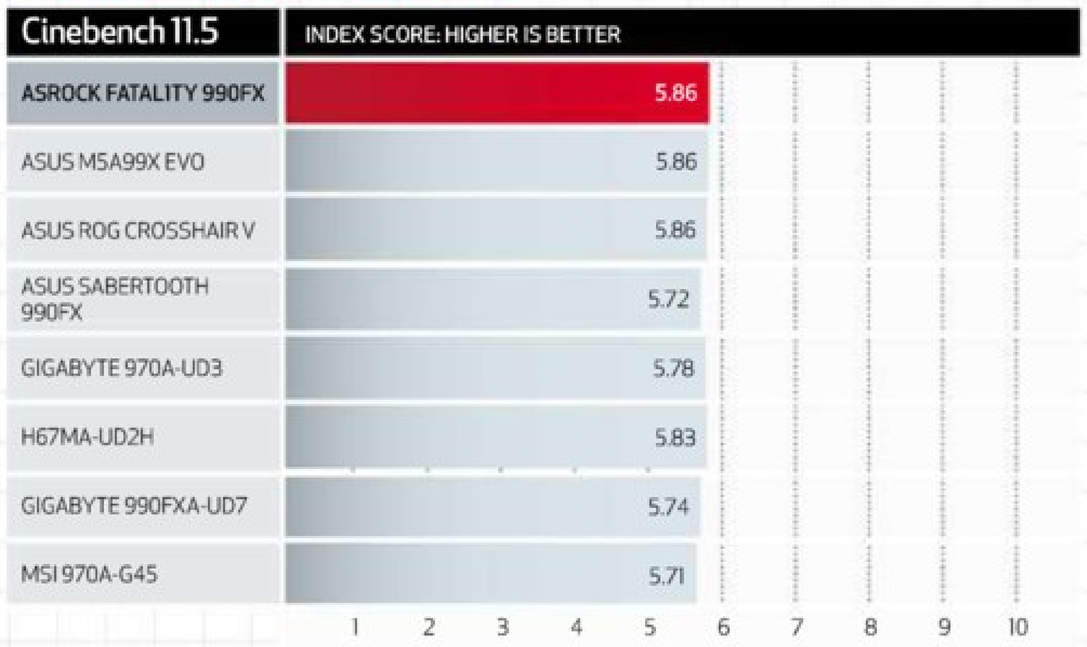
On the Intel 6-series side though there is much greater difference in performance so choosing the right motherboard is a far more important matter.

AMD 9-Series

CPU video encoding performance



CPU rendering performance

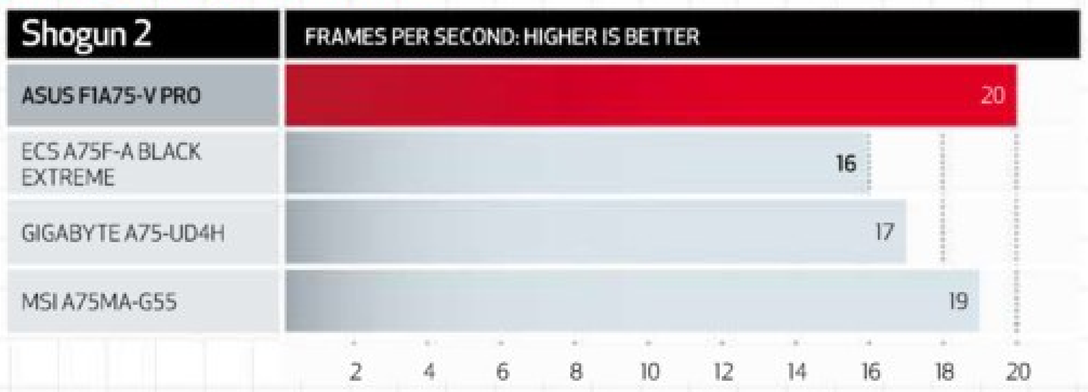


AMD A-Series

CPU rendering performance

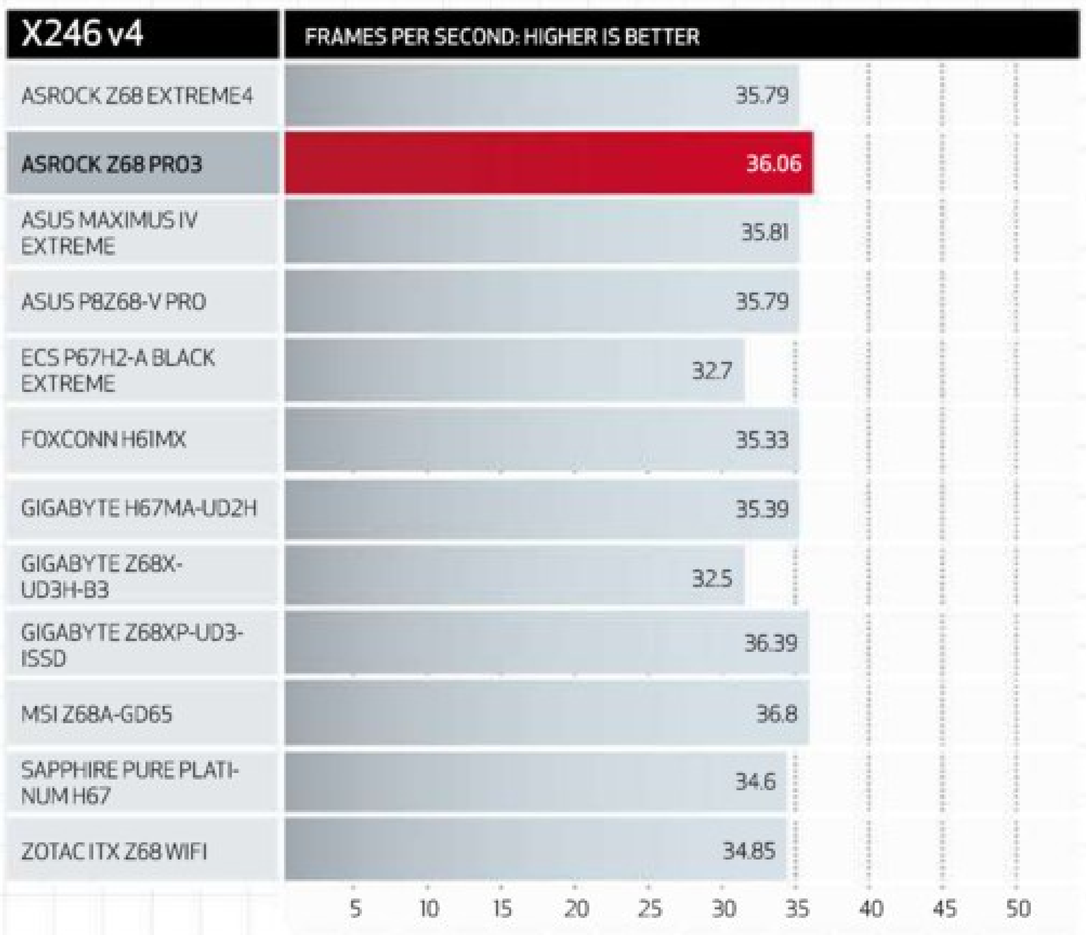


CPU gaming performance

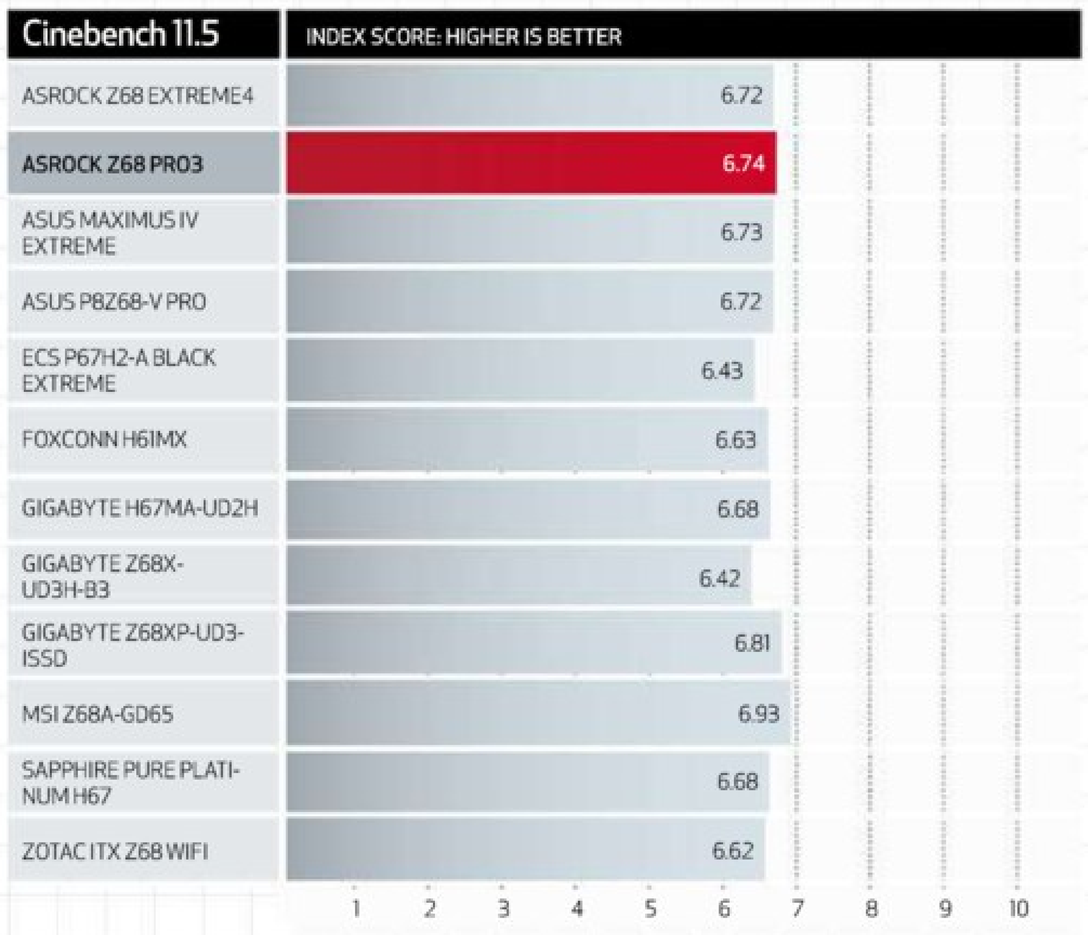


INTEL 6-Series

CPU video encoding performance



CPU rendering performance



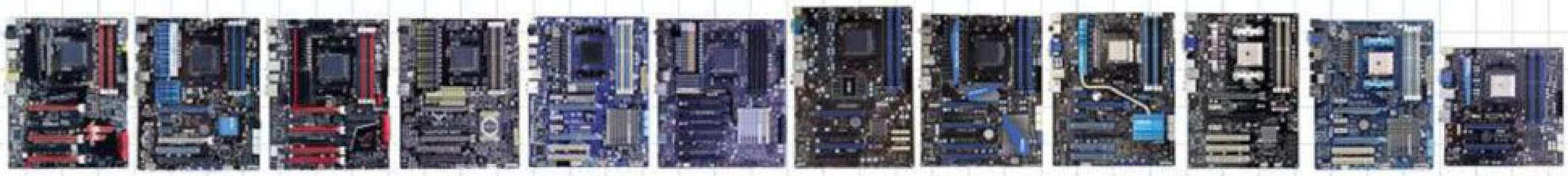
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Spec analysis

The fine details for you fine people

AMD chipsets



AMD 9-Series									AMD A-Series			
	ASROCK FATAL1TY 990FX	ASUS M5A99X EVO	ASUS ROG CROSS-HAIR V	ASUS SAB-ERTOOTH 990FX	GIGABYTE 970A-UD3	GIGABYTE 990FXA-UD7	MSI 970A-G45	MSI 990FXA-GD80	ASUS F1A75-V PRO	ECS A75F-A BLACK EXTREME	GIGABYTE A75-UD4H	MSI A75MA-G55
PRICE	£145	£95	£170	£160	£80	£190	£75	£135	£88	£90	£97	£67
MANUF ACTURER	ASRock	Asus	Asus	Asus	Gigabyte	Gigabyte	MSI	MSI	Asus	ECS	Gigabyte	MSI
WEB	www.asrock.com	uk.asus.com	uk.asus.com	uk.asus.com	uk.gigabyte.com	uk.gigabyte.com	uk.msi.com	uk.msi.com	uk.asus.com	eu.ecs.com.tw	uk.gigabyte.com	uk.msi.com
CHIPSET	AMD 990FX	AMD 990X	AMD 990FX	AMD 990FX	AMD 970	AMD 990FX	AMD 970	AMD 990FX	A75	A75	A75	A75
GRAPHICS	3x PCI-e x16	2x PCI-e x16	2x PCI-e x16, 1x PCI-e x8	3x PCI-e 16	1x PCI-e x16	2x PCI-e x16, 2x PCI-e x8	2x PCI-e x16	4x PCI-e x16	2x PCI-e x16	1x PCI-e x16	2x PCI-e x16	2x PCI-e x16
I/O	4x USB 3.0, 6x SATA 6Gbps	4x USB 3.0, 6x SATA 6Gbps	6x USB 3.0, 6x SATA 6Gbps	4x USB 3.0, 6x SATA 6Gbps	4x USB 3.0, 6x SATA 6Gbps	4x USB 3.0, 8x SATA 6Gbps	2x USB 3.0, 6x SATA 6Gbps	4x USB 3.0, 6x SATA 6Gbps	4x USB 3.0, 6x SATA 6Gbps	2x USB 3.0, 5x SATA 6Gbps	4x USB 3.0, 5x SATA 6Gbps	2x USB 3.0, 6x SATA 6Gbps
SCORE	88%	85%	89%	82%	81%	84%	82%	80%	87%	70%	78%	67%

INTEL chipsets



INTEL 6-Series												
	ASROCK Z68 EX-TREME4	ASROCK Z68 PRO3	ASUS MAX-IMUS IV EXTREME	ASUS P8Z68-V PRO	ECS P67H2-A BLACK EXTREME	FOXCONN H61MX	GIGABYTE H67MA-UD2H	GIGABYTE Z68X-UD3H-B3	GIGABYTE Z68XP-UD3-ISSD	MSI Z68A-GD65	SAPPHIRE PURE PLATI-NUM H67	ZOTAC ITX Z68 WIFI
PRICE	£99	£95	£256	£135	£150	£55	£96	£123	£193	£140	£82	£183
MANUF ACTURER	ASRock	ASRock	Asus	Asus	ECS	Foxconn	Gigabyte	Gigabyte	Gigabyte	MSI	Sapphire	Zotac
WEB	www.asrock.com	www.asrock.com	uk.asus.com	uk.asus.com	eu.ecs.com.tw	www.foxconn.com	uk.gigabyte.com	uk.gigabyte.com	uk.gigabyte.com	uk.msi.com	www.sapphiretech.com	www.zotac.com
CHIPSET	Z68	Z68	P67	Z68	P67	H61	H67	Z68	Z68	Z68	H67	Z68
GRAPHICS	3x PCI-e x16	1x PCI-e x16	4x PCI-e x16	2x PCI-e x16	3x PCI-e x16	1x PCI-e x16	2x PCI-e x16 (1@x4)	2x PCI-e x16	2x PCI-e x16	2x PCI-e x16	1x PCI-e x16	1x PCIe x16
I/O	2x USB 3.0, 2x SATA6Gbps	2x USB 3.0, 2x SATA 6Gbps	2x USB 3.0, 4x SATA 6Gbps	4x USB 3.0, 2x SATA 6Gbps	4x USB 3.0, 2x SATA 6Gbps	4x USB 2.0, 4x SATA 3Gbps	2x USB 3.0, 2x SATA 6Gbps	2x USB 4.0, 4x SATA 6Gbps	2x USB 4.0, 4x SATA 6Gbps	2x USB 3.0, 4x SATA 6Gbps	2x USB 3.0, 2x SATA 6Gbps	4x USB 3.0, 2x SATA 6Gbps
SCORE	85%	90%	87%	84%	72%	60%	80%	80%	77%	83%	86%	80%

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AND THE WINNERS ARE...

ASROCK FATAL1TY 990FX
ASUS F1A75-V PRO
ASROCK Z68 PRO3

Motherboards are rarely the sexiest part of putting your machine together. Generally it's the processors and graphics cards that get all the loving, and the cash spent on them. Increasingly you can add the current poster-child of storage, the SSD, to that mix now too. The mobo is where many of us try to save a few pence, though that can be a short-sighted way to go.

The motherboard is the basis of your rig, and will dictate how well the rest of your PC's components perform, so going too far down the budget route will quickly turn into false economy.

But there are still bargains to be had, and the winners from this test aren't always the most expensive boards on the market. It's about value more than straight price.

That said, on the AMD side it's worth spending the cash on a decent board. We still don't currently know how good the Bulldozer CPUs are going to be – at time of writing we're still a couple of weeks away from getting hands-on – but it's a good bet that to get anywhere near the sort of performance the Sandy Bridge chips deliver you're going to need a good baseline system to compete.

Having good overclocking chops is going to be important too, if the pre-launch rumours of Bulldozer's OC performance is to be believed. To this end then it's the ASRock Fatal1ty 990FX Professional and the Asus Republic of Gamers Crosshair V that take the win. The Asus M5A99X Evo deserves a mention thanks to its bargainous sub-£100 price tag.

> "IN SANDY BRIDGE WORLD ASROCK'S CHEAPO Z68 PRO3 IS AN ABSOLUTE Z68 LEGEND"

Of the desktop Llano boards performance is important here too, especially the overclocking. The A-series APUs have great potential inside their unassuming form and having a board capable of getting at the extra performance lying inside the silicon is vital.

Bargainous boards

But it's not the most expensive motherboard that wins here. Again Asus make a good showing with its F1A75-V Pro. It's an £88 board which was able to take our A8-3850 APU from its humble 2.9GHz beginnings all the way up to 3.7GHz.

The extra fluff in this category, especially the extra PCI-e x16 slots, are quite unnecessary. The onboard graphics are what you buy the A-series APUs for, and the Dual Graphics functions of the PCI-e slot is great for low-cost gaming. Having a second PCI-e x16 slot may give you CrossFire capabilities but negates the point of having onboard graphics, and essentially leaves you with half the silicon functioning, and only the weaker CPU side at that.

Things are more clear-cut in Sandy Bridge world; ASRock's cheapo Z68 Pro3 is an absolute Z68 legend. For just £95, it gives almost the best stock performance benchmarks of all the boards. It's no OC slouch either, clocking up 4.6GHz on air with the i7 2600K. It may only have a single PCI-e slot, but then how many people put anything in that second slot despite paying the extra for the option?

There are other options, including the P67 majesty of the RoG Maximus IV Extreme and there is a Z68 version too with a –Z attached. But you are paying through the nose for the absolute best performance possible.



ASROCK FATAL1TY 990FX | **ASUS** F1A75-V PRO | **ASROCK** Z68 PRO3

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WHAT ARE YOU DOING, DAVE?

"Come on AMD, do us all a favour and release something spectacular"



Dave James is being rather retro these days, and has dragged the rest of the technology division of Future with him. Lunchtime sessions of *GTA IV* have resulted in a rather increased daily bodycount on the second floor and an almost permanent six star crime wave

Personally, I don't care if you're a died-in-the-wool Intel fanboy, an ex-ATI employee desperate for the Texan company to fail or a 19th century loom-bashing Luddite, we need to pull together and believe that AMD's Bulldozer processors are plain awesome.

Before you dismiss my words as obsessive AMD-bias, let me just make one more statement. You'll find yourself with a far better Intel chip if AMD is creating a far more seriously competitive CPU.

At the moment the best we've got, the cream of the crop, the caninus testicularus of the consumer CPU world, is Intel's Core i7 990X Extreme. That's a six-core processor running twelve threads at 3.46GHz. It's a full-fat, 32nm Gulftown chip and sure, it's fast, but it's also prohibitively expensive at around £770.

If Intel had some serious competition on the processor front we could conceivably have some £200 to £250 six-core, Sandy Bridge chips purring away in our Z68s right now. And at the highest level we should be seeing the mega-rich masochists overclocking the crud out of their eight and twelve-core chips.

I have no doubt that if it needed to, if it really, really needed to, Intel could excrete those sorts of consumer processors without even pausing to wipe its own arse. The technology is around and no matter what it would have us believe I'm sure the costs of creating such chips wouldn't price them completely out of the market.

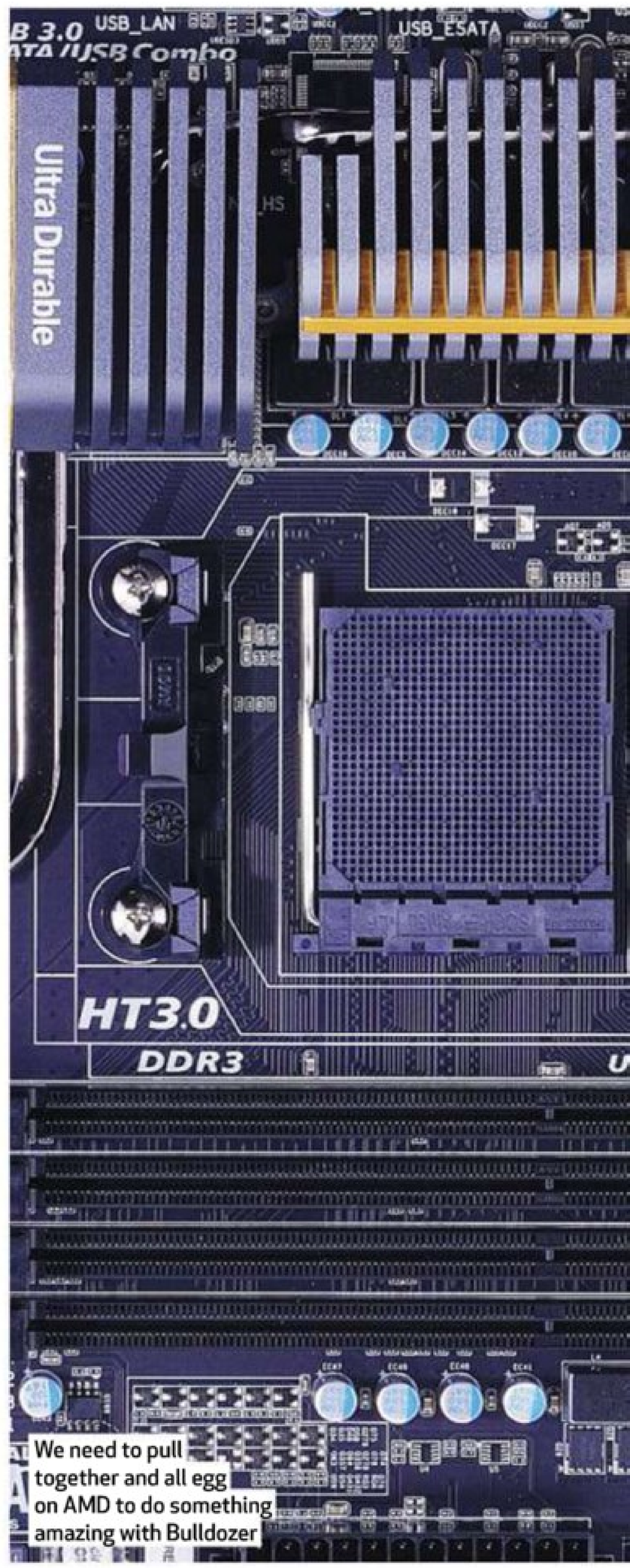
But right now there is simply no need. Intel is quite comfortably leading the CPU race and barely even needs to keep an eye on the rear-view mirror for the AMD-shaped competition. The fastest AMD CPUs still languish behind even the relatively modestly-priced Sandy Bridge chips, let alone the Extreme-class Gulftown processors.

At the very least the Bulldozer chips need to be competitive with Intel's Core i7 2600K and Core i5 2500K processors. With reported prices coming in around the same as the Sandy Bridge chips it seems AMD expect them to come close. If that happens you can expect some Intel trump card to be played quickly. The somewhat irrelevant Sandy Bridge Extreme platform – of quad-channel memory and more stupidly-priced 'Extreme' chips – will come soon, but it's the Ivy Bridge 22nm shrink that ought to push things on early next year.

But if Bulldozer doesn't manage to force Intel into peeking over its shoulder then there is no incentive to play all of its trump cards. The X79 Sandy Bridge Extreme can wait a little longer and the Ivy Bridge shrink may find it needs a little more development time for the same hex-core parts. In short, Intel could drag its heels knowing it can still make money on the old parts because they are not just good enough, but still far in advance of the AMD competition.

So come on AMD, do us all a favour and release something spectacular. And don't just rely on the classic, 'this version may not be amazing, but you wait and see what we've got coming next year...' ¤

P42
THE VERY FIRST CHROMEBOOK. OOH, IT'S ALL GOOGLE-Y



We need to pull together and all egg on AMD to do something amazing with Bulldozer

Gold Award

This is the ultimate badge of hardware excellence. Only truly outstanding gear gets this coveted award. Oh, and there are no prizes for runners-up here.

Our Hardware Manifesto

Would we buy it and should you buy it? That's all you want to know and it's all we care about. Performance and value for money are the two key pillars supporting the mighty *PC Format* Gold Award on its lofty pinnacle.

AMD and then some...

We're already seeing AMD's plans for what will supplant Bulldozer next year. The next generation of Bulldozer is codenamed Piledriver with the eight 'core' Zambezi CPU being replaced by a ten 'core' Komodo chip next year.

Sadly, your new 990FX mobo won't play ball with the Bulldozer update as AMD plans to move over to the upcoming FM2 socket.

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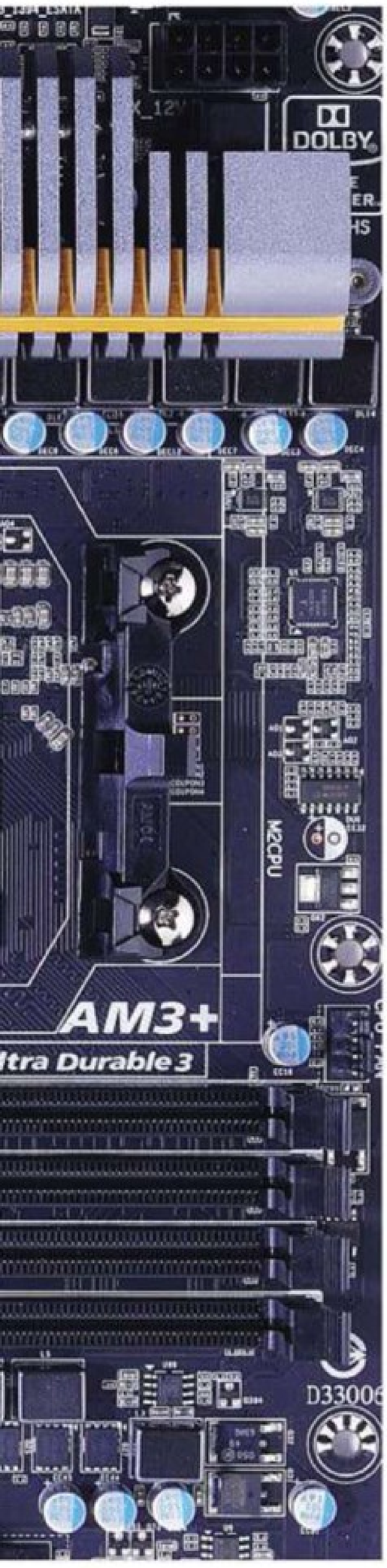
PASS NOTES: ULTRABOOK



Well, this one's easy isn't it – Ultrabooks are just simply the best laptops ever, right?
That would ultimately depend on what you value in your notebook as to whether the Ultrabooks are going to be the best ever. If you value thin, light and long battery life then quite possibly you're assumption could be correct.

Alright then, what's it all about?
In a similar move to the naming of the 'netbook', Intel has coined the term Ultrabook to denote machines running low-voltage Intel Sandy Bridge CPUs in the MacBook Air mold. So, no optical drives, five or more hours battery life and a thin and light design.

Pricey, then?
Yes, they have a pricetag to match. We're definitely not talking about bargain laptops here, these Ultrabooks are more likely to be batting around the £700 to £1,000 mark. And maybe more.



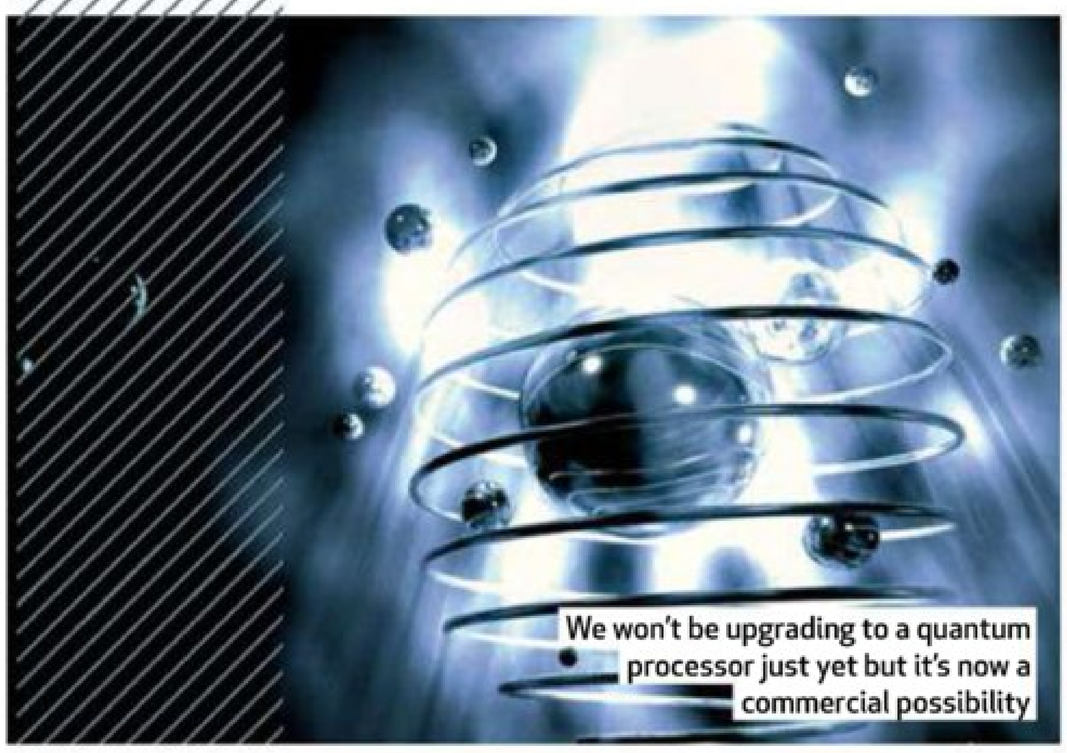
EDITOR'S ONE TO WATCH

Quantum computing

Deep in a Californian laboratory physicist Matteo Mariantoni believes his team has just opened the door for quantum computing to step out of the research lab and into the commercial sector. Before we get too excited, it's still going to be a while before they're actually out in the wild but what Mariantoni has done is prove that it can be used in a way we can understand as a traditional computer. Only much more powerful.

But why go quantum? Well, it's all about the bits. In a normal PC your bit is a binary beast: so either zero or one. In a qubit, it can be either zero or one *at the same time* – impossible right? Well, that's quantum mechanics for you…

It's all a bit confusing for us non-quantum physicists, but the upshot is a chip that can run computational tasks in the same time as a classic computer but is capable of handling far more at the same time. The difficulty has been in remembering the computations results, but Mariantoni's team has created the first quCPU and RAM combo along the same lines as traditional computers. Finally, quantum computing will be a commercial possibility. ¤


We won't be upgrading to a quantum processor just yet but it's now a commercial possibility

OCZ RevoDrive Hybrid

The Smart Response Technology (SRT) of the Intel Z68 platform has done a good job of offering an approximation of SSD speed in a larger capacity, but OCZ's RevoDrive Hybrid is looking to take that a good few steps further.

It's recently announced a PCI-e based drive combining a 100GB performance SSD and a 1TB spinning-platter HDD to cover the storage demands. Like Intel's SRT it relies on a software layer using the 100GB SSD to cache and dynamically manage the solid state components. The Dataplex software ensures that the most oft-accessed data remains on the SSD with the less accessed data on the HDD.

It's not the first time we've seen this sort of device, Seagate's Momentus XT operated in a similar way. What's different with the OCZ solution is the use of the PCI-e interface to cut out any associated bottlenecking from the SATA interface. See if the latest RevoDrive can live up to the speed of the mammoth on page 36.

HIGHLIGHTS THIS MONTH

30 Asus Mars 2 LE



36 OCZ RevoDrive 3 X2 480GB

40 Corsair Vengeance LP





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You may have heard some of the hype surrounding this Asus RoG MARS II. It's got people excited, and rightly so. You've probably heard that it's the world's fastest and most powerful graphics card. You heard right. Just as the first iteration of Asus's RoG MARS set new levels of rendering and graphics processing performance by sticking two powerful GPUs onto one overclockable PCB, the RoG MARS II takes that recipe and adds more beef.

The first MARS card from Asus dropped two of NVIDIA's GTX 285 chips onto one card as NVIDIA themselves had done with the GTX 295, itself an dual-GPU card powered by GTX 265 chips. Until Asus released the RoG MARS, NVIDIA's humble GTX 295 was the most powerful graphics card on earth, and it cost £330.

Then came that first MARS. It eclipsed the GTX 295 in every department, including price; if you wanted the faster 648MHz core clock, 4GB of GDDR5 RAM and 2125 GFLOPs of compute power, £1,070 was what you had to pay.

Skipping to the present, Asus's RoG MARS II enters the market at a time when there is no single fastest GPU – people are still bickering over the performance of AMD's HD 6990 and NVIDIA's GTX 590. Both are dual-GPU cards based on each company's most powerful graphics processor; two Cayman XT chips in the HD 6990 and two GF110 chips in the GTX 590. The truth is the cards are evenly matched, though you can run certain benchmarks to make either card appear superior.

That argument is well and truly silenced by the Asus RoG MARS II. It might seem at first to be little more than a GTX 590 with some bigger fans, but in raw specification and in performance, there's a sizeable gap between the two cards. The MARS II is definitely the most powerful graphics card money can buy.

Speaking of that, there are several other superlatives we can chuck at Asus's RoG MARS II. As we've mentioned, it's the most powerful, but it's also the most expensive. The price? £1,137. That's more expensive than the first Asus RoG Mars, most PCs, a night wining and dining Adele at the Ivy, or a decent second-hand car. For the kind of silly power on offer though, the kind of enthusiasts it attracts will see it as a money no object purchase.

Ready for more superlatives? Asus is making just 999 RoG MARS IIs, making them among the most rare performance parts money can buy. At the time of writing, there are just two MARS IIs in the country, so if you want one it's best not to dilly dally.

The other key feature of this RoG MARS II from Asus is

Below This time Asus has added a set of rubber covers that stick onto the PCI slots to stop the MARS II from warping



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CLOSE UP
MARS ATTACKS!





1 Huge GPU
It's hard to convey the size of this card in these pictures. It's not only bigger than any graphics card out there; it also dwarfs some PCs we've seen.

2 Double Trouble
The underside of the two GPUs powering the MARS II can be seen beneath the thermally bolstered PCB cover. The card rarely gets too hot mind.

3 Strap It in
Since the MARS is such a heavy beast to fit in your PCI-e slot, there are three screws to secure it to your case, and a rubber PCI rest.

4 Super fans
Those fans are the same size you'll find inside your PC case: a pair of 120 mms. It's a far cry from the single diminutive fan fitted to AMD's HD 6990.

its sheer size: it's the biggest graphics card we've ever seen across every dimension. Entire PCs such as the Sapphire Edge HD are smaller. It occupies three case slots vertically, extends further horizontally than AMD's HD 5970, and with two 120mm fans keeping the whole thing cool, it's wider than anything we've seen too. It measures 315mm x 130mm x 60mm, to be precise. That planetary moniker is starting to make sense: we're surprised the RoG MARS II doesn't pull surrounding matter into its orbit.

Built up

A cursory glance at the MARS II reveals certain similarities with NVIDIA's GTX 590. It's certainly closer to this NVIDIA thoroughbred card than any other, employing the might of twin GF110 GPUs. With the GTX 590, NVIDIA's rationale was to offer the power of two GTX 580 cards in SLI mode – its flagship single GPU – all on one PCB. A single, internal SLI card such as the GTX 590 has advantages in terms of power connectors and heat management, but also opens up the possibility of quad-SLI; two dual-GPU cards connected together delivering the power of four graphics processors.

Enthusiasts were disappointed then when the GTX 590 was released with a dramatically downclocked core operating speed, from 772MHz to just 607MHz. Despite NVIDIA's conservative measures, the card still runs hot, and two separate GTX 580s will outperform it, so the biggest selling point for the GTX 590 is quad-SLI. It can't be overclocked very far, and leaves us with the feeling that NVIDIA simply had to counter the AMD HD 6990, not that it was particularly worried about consumer needs.

Asus has certainly taken heed of the GTX 590's reception. The core clock speed of those twin GF110s is not downclocked, but actually raised to 782MHz. It's the same story for the memory, too; for the GTX 590 NVIDIA downclocked the memory from the GTX 580's factory default 1,002MHz to 855 MHz, and Asus has gone and ramped that right back up to 1,002MHz with the MARS II.

It's important to see that refusal of compromise in any area of performance when we're talking about a card this powerful and this expensive. And architecturally it's these clock speeds and the thermal and design modifications that have allowed Asus to elevate it from the limited GTX 590.

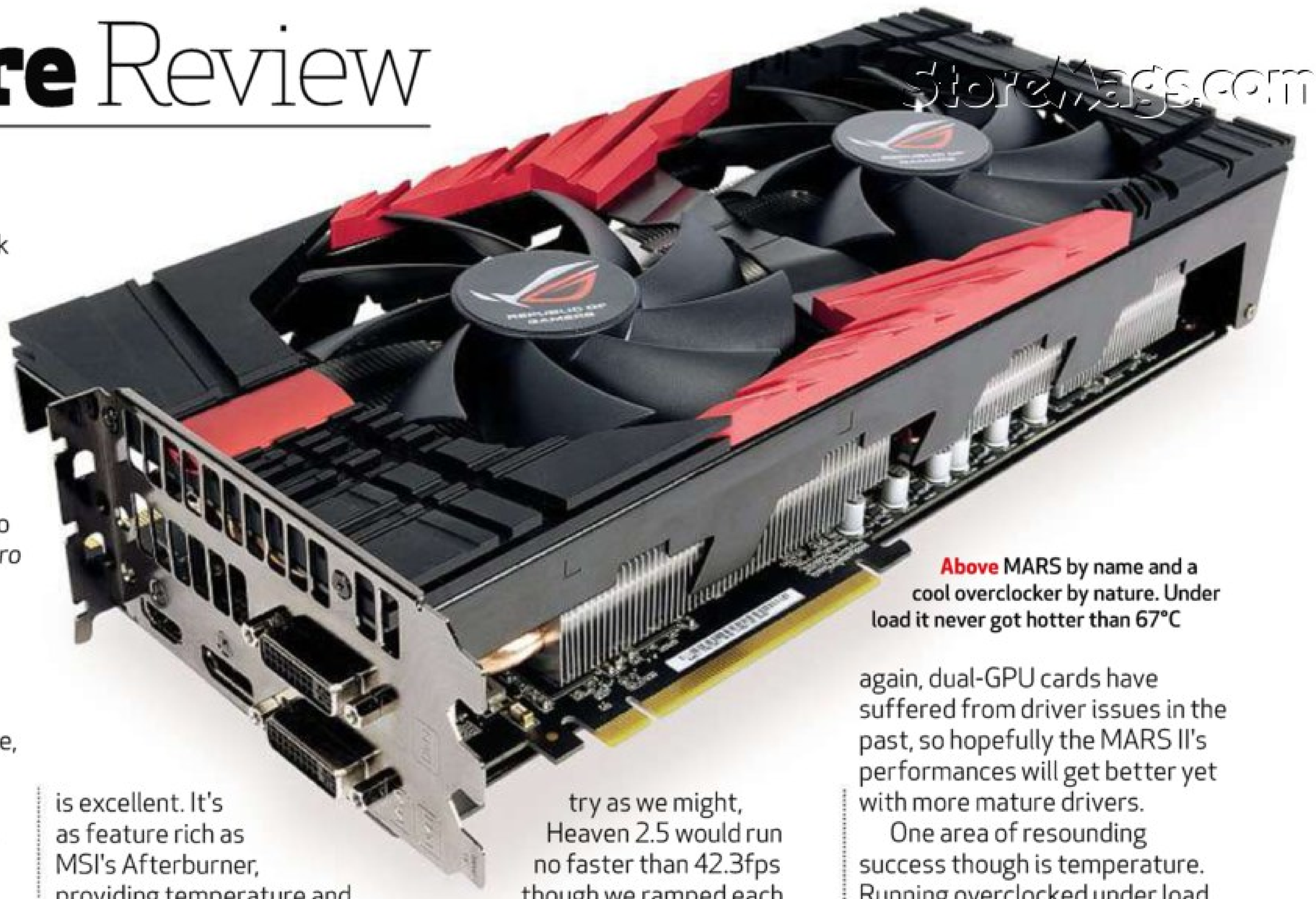
In other areas, it's largely the same story as NVIDIA's original twin-GPU card. Like the GTX 590, the Asus RoG MARS II has 1,024 CUDA cores, a total of 96 ROPs, 3GB of memory and a wide memory bus at 384-bit across each unit. While CUDA cores and AMD's shader units can't be compared directly, the MARS II doesn't blow the AMD HD 6990 out of the water on the spec sheet at least. The AMD card though has a faster core clock at 830MHz, and 4 GB of memory.

Pixel pusher

For the MARS II however, it's not just about matching the core speeds of the GTX 580; it's about smashing them. While there are some out-of-the-box core increases over the GTX 580, once you've spent a few seconds in the MARS II's company, it's clear this card wants to be overclocked.

"THE MARS II IS 15 TO 20 PER CENT FASTER THAN THE HD 6990 AND GTX 590"

As we saw with Asus's GTX 580 Matrix, there's a button built on the card that lets you turn the fan speed up to 100 per cent. The fans themselves are two 120mm monsters, and they cover two equally enormous heatsinks made up of four heatpipes.



Above MARS by name and a cool overclocker by nature. Under load it never got hotter than 67°C

Strap yourself in: the MARS II is the quickest graphics card ever. Hardly a momentous shock considering the architecture and price, but the margins of superiority over its rivals are a bit more interesting.

The MARS II is roughly 15 to 20 per cent faster than fellow dual-GPU chips the HD 6990 and GTX 590 in certain benchmarks, but it's too close to call in other results like the *Metro 2033* benchmark. Considering the incredible margin in price between the MARS II and pretty much anything else, it's impossible to recommend to anyone from a value perspective, but that won't be much of a surprise either.

What matters for the MARS II is that it fulfils its mission objective to be the most powerful incarnation of this generation's Fermi technology. There won't be a faster graphics card until AMD or NVIDIA release their next generation of architecture. And even then only if they double up the chips again.

The MARS II delivers with the bare minimum panache at stock settings, but there's another chapter to the tale in overclocking. Those huge, case-specified, 120 mm fans and industrial PCB cover suggest some extensive tweaking potential, so armed with Asus's own Tweak it! software, we cranked the MARS II up a notch or two.

First, the Tweak it! Software is excellent. It's as feature rich as MSI's Afterburner, providing temperature and voltage readouts as well as the usual clock tweaking. Whereas Afterburner locks the core clock and shader clock together though, Tweak it! links core clock with voltage, and we found we could get better clock settings as a result, with the MARS II and Asus' Matrix GTX 580 also supplied with this software.

Sure enough there's plenty of room for boosting core clock and memory frequency levels. Our card ran happily with a core at 850MHz and memory at 4,100MHz, and increased voltage. However, after a certain point we found that increased clock settings stopped translating into increased gaming performance: try as we might, Heaven 2.5 would run no faster than 42.3fps though we ramped each clock up further and further.

It's worth mentioning that for all the benchmarking prowess of the MARS II, it didn't always run smoothly in our benchmarks, there was often a big gap between minimum and average frame rate, and we saw some serious stuttering at times in several benchmarks.

That might be down to the age-old problems associated with dual-GPU cards; 3GB might seem a lot for a card, but since the memory's split down the middle and both GPUs need all the data the memory's dealing with, that gives you two 1.5GB graphics cards in SLI. Not quite so meaty for your £1,137. Then again, dual-GPU cards have suffered from driver issues in the past, so hopefully the MARS II's performances will get better yet with more mature drivers.

One area of resounding success though is temperature. Running overclocked under load for long periods, the MARS II still never got hotter than 67°C. Idle, that temperature shrank down to a warm summer day's 31°C. Quite a feat for a dual-GPU card.

Technical wonder

The Asus RoG MARS II doesn't include any new graphics technology, it's simply an exploration of the outer limits using NVIDIA's current most powerful technology.

With that in mind, there are limits to how far this card can outperform the current high-end competition, and as it's so similar to a physical 2x GTX 580 SLI setup, the performances of the two are actually quite close.

A BRIEF HISTORY OF MONSTER GRAPHICS
CREATURES FROM THE SILICON LAGOON

June 2006: NVIDIA 7950 GX2
Taking inspiration from the earlier 7900 GX, NVIDIA brought dual-GPU chips to the consumer market with this monster, which boasted a 500MHz core clock, 1GB of memory and cost £400. That price hasn't changed much in the five years since release, simply because there isn't a cheap way to produce it. Owners quickly discovered they'd made an iffy investment as each GPU could only access 512MB of memory, and despite very low power draw and cooling temperatures, driver support ceased just a few months after release.

June 2009: Asus MARS I
Like its son the MARS II, Asus's first foray into the MARS series pushed boundaries in price as much as it did performance. It did with the GTX 285 what the MARS II does to do GTX 580 – bunged two together, fed them steroids and strapped them to an improved cooling unit. Again, as with today's GTX 590, there was already a dual-GPU card based on the GT200b chip (the GTX 295) but the MARS ramped up the core clock and memory speed. Over time the weight of the card caused problems, with several MARS owners experiencing PCI slot warping.

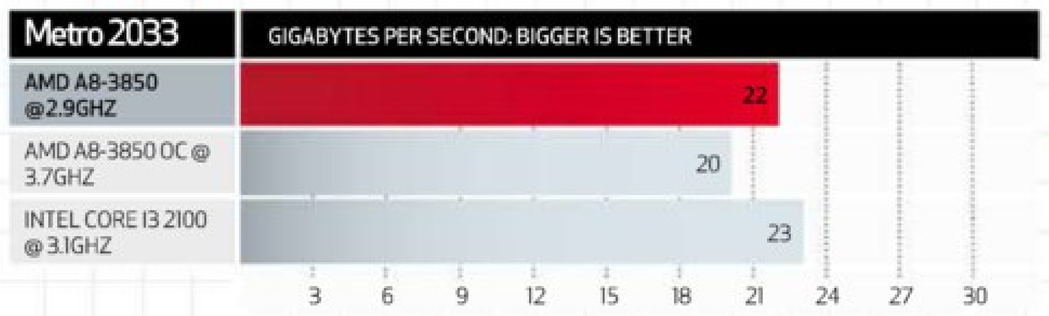
November 2009: AMD Radeon HD 5970
AMD hit the sweet spot with its HD 5870, and enjoyed a huge demand for the card. The HD 5970 was essentially a pair of HD 5870s strapped together in CrossFireX, occupying just one PCI slot. On release, it cost £570; more than two HD 5870s even after their demand caused prices to skyrocket. Performances were big, but again hampered by the memory being split in half so each GPU could access just 1GB of the 2GB total. It also suffered a bit with a thirst for power and ran very hot.



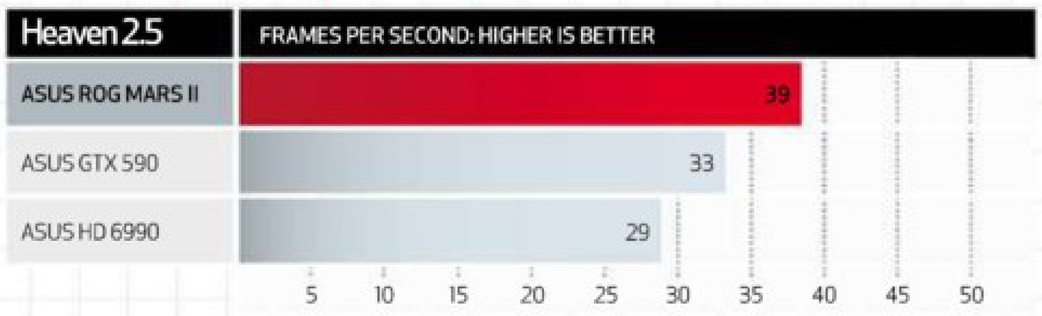
Technical analysis

To test the limits of a card as powerful as the MARS II, we ran all our benchmarks at a resolution of 2,560 x 1,600. It seems a waste to use this card for a standard issue 24-inch 1080p screen, after all. The games and synthetic benchmarks feature varying levels of tessellation, Heaven 2.5 being the king of that castle and also vary in terms of CPU intensity: *Shogun II* and *Just Cause 2* results vary considerably with different processors, whereas Heaven 2.5 works the graphics card almost exclusively.

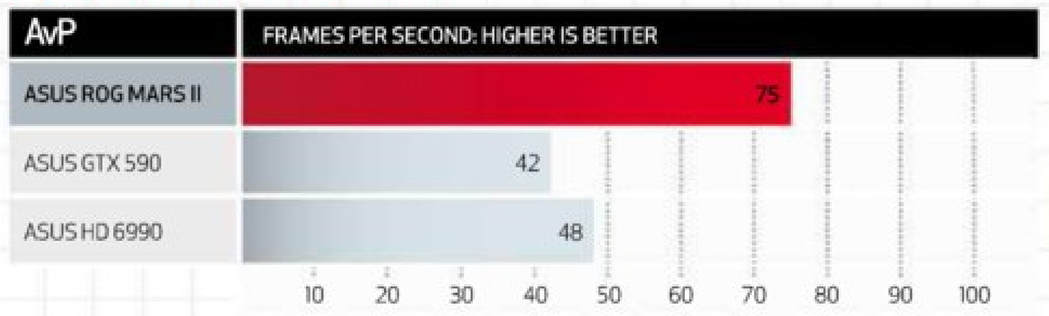
DX11 gaming performance



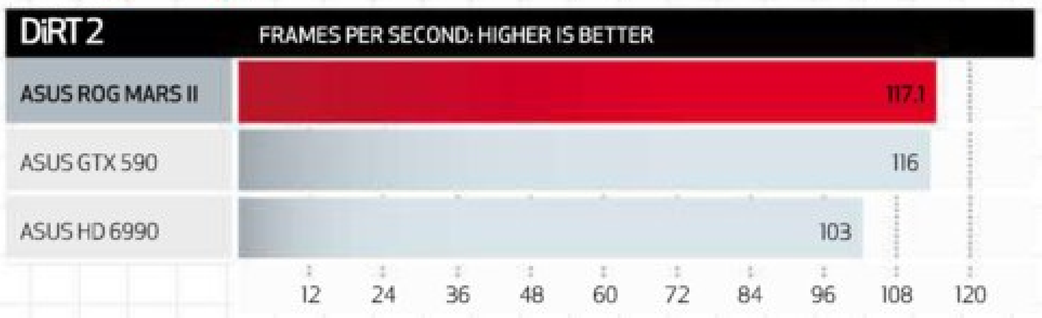
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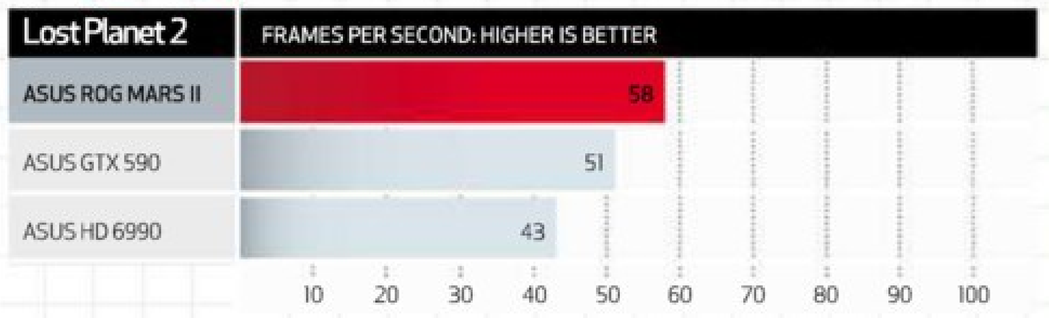
DX11 gaming performance



DX11 gaming performance



DX11 gaming performance



It does assert itself fairly confidently as the most powerful dual-GPU card though, particularly at higher resolutions, and for that accolade the price tag will look very reasonable to some enthusiasts.

Then again, it's £1,137. Any notion of value for money goes out of the window just by reading that price. It's more expensive than two GTX 580s, but also offers more performance, which is where the GTX 590 came unscrewed. Here's the thing though; £1,137 buys your way into an elite club of 999 members who have the absolute best of one component. Free market capitalism rarely looks out for the little guy, and a company can charge just about anything for the best: people would buy this card if it cost £2,000. From that perspective, you can almost support the current pricing.

Asus has done a great job in other areas of the MARS II in areas beyond benchmarks, too. Load temperatures are especially impressive: the designers and engineers who brought this card to life are, I'm sure, extremely proud. Far from just a technology demo, it's built to last, even under extreme overclocking.

Extreme high-end cards are usually plagued by temperature worries and appear destined to burn out long before they fade away as new technology supersedes them. We have no such reservations with the RoG MARS II.

Included with the MARS II is a set of rubber covers that stick onto the PCI slots underneath the MARS II's huge frame. They're designed to keep the MARS II straight in its PCI Express slot, and prevent any warping under its own weight over time. That was a problem with the original MARS card from Asus, and it's good that they've created a solution to that problem. It just worries us that the solution is a 3mm rubber block.

The power requirements are also worrisome. It needs a minimum of a 1,000W power supply, with a minimum 42A 12V rail. A beefy power supply is to be expected, given that the MARS II is ostensibly an SLI setup, but that specification for a PSU is quite thin on the ground; your current PSU might not have such a 12V rail, even if it can supply 1,000W or 1,200W.

The counter-argument to any problems with the MARS II will always be 'for this money, you can afford a new PSU too', and there's some weight to that answer, but these issues are still worth noting. ¤ **Phil Iwaniuk**



Below **You too can join an exclusive community of 999 MARS II owners for a mere £1,137 of your Earth pence**

PCFormat Verdict

- Faster than anything
- Surprisingly cool
- Overclockable
- That price

The world's most powerful graphics card, but a pipe dream for the vast majority.

80

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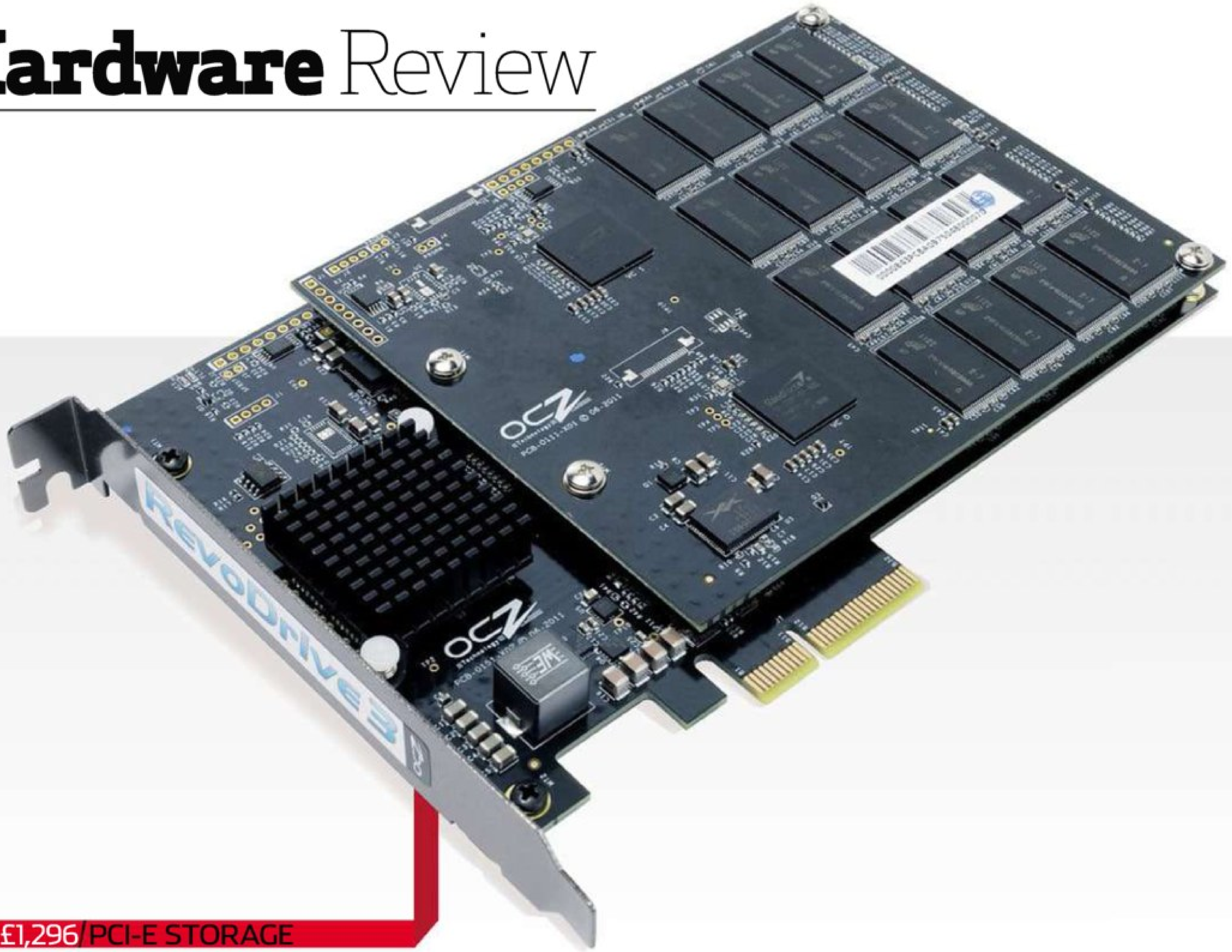
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OCZ REVODRIVE 3 X2 480GB

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VITAL STATISTICS

Price £1,296 **Manufacturer** OCZ **Web** www.ocztechnology.com **Capacity** 480GB **Interface** PCI Express x4 **Type** 25nm MLC flash **Peak read speed** 1,500MB/s **Peak write speed** 1,225MB/s **Controller** 4x Sandforce SF-2281 **Price check** www.scan.co.uk

Too much performance is a nice problem to have. It is still a problem though, especially in the context of some solid state drives. But not the new OCZ RevoDrive 3 X2 480GB. OCZ claims it's capable of read speeds up to 1.5GB/s. That's monumental bandwidth by any measure and much, much more than even the latest SATA 6Gbps interface can handle.

In practice, a mere 500MB/s of sequential bandwidth can be enough to saturate a SATA interface. That's why drives powered by the latest SandForce SSD controller, such as OCZ's own Vertex 3 or Corsair's Force GT, can't quite reach their full potential on a SATA connection. There's simply not enough available bandwidth.

But the OCZ RevoDrive 3 X2 480GB is no ordinary SSD. It sports no less than four of the snazziest Sandforce SF-2281 controller chips. It is, in effect, four 120GB Sandforce-powered SSDs running in a parallel RAID array for maximum performance.

Crucially, however, it hooks them in via a speedy four-lane PCI Express connection. On paper, that allows up to 2GB/s of bandwidth. In other words, if the RevoDrive 3 doesn't deliver on its theoretical capabilities, it won't be able to point the finger at the SATA port.

And some capabilities the Revodrive has, if OCZ's performance claims are accurate. The headline figures include sequential read and write figures of 1,500MB/s and 1,225MB/s. Those are very, very big numbers. Not long ago, anything over 100MB/s seemed quick. But with this drive, OCZ is dragging storage into the GB/s era.

However, it's worth remembering we're talking about an SSD with SandForce controllers. Those peak numbers involve compressible data. Throughput with incompressible data will inevitably be lower.

Then there's the question of random access rather than raw sequential bandwidth. OCZ pegs the RevoDrive 3 X2 480GB at 200,000 IOPs for 4k aligned random writes, which bodes well. But as we've learned, when it comes to SSD random access performance, the practice doesn't always match the theory.

> "WITH THIS DRIVE, OCZ IS DRAGGING STORAGE INTO THE GB/S ERA"

Performance is nothing without control, which is where OCZ's original RevoDrive PCI-e SSD fell short. It didn't support TRIM command or SMART data. Together these features help keep SSDs fast and fit.

The good news is that the new RevoDrive 3 adds support for both. We'll get into the details momentarily, but the simple version is that it's OCZ's VCA 2.0 (Virtual Controller Architecture) software layer that works the magic. The bad news is that issues on the OS side remain. Again, more on that in a moment.

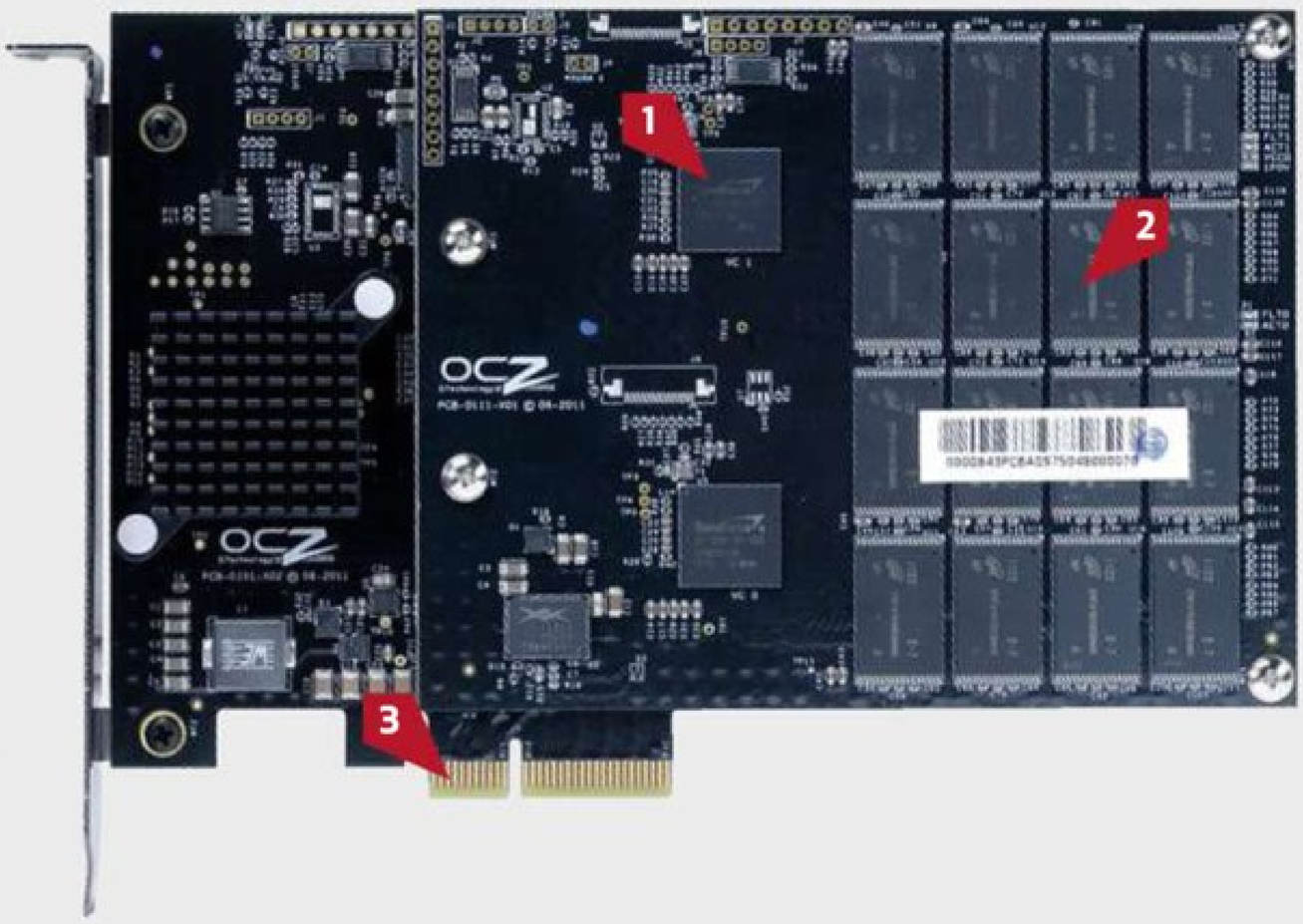
What we have, therefore, is a storage solution that seems to come tantalisingly close to offering the complete package. It's fully bootable. It's silly fast. And it delivers on its half of the TRIM support equation. But is it really that much better than an ordinary SSD or conventional RAID array?

First, a little lesson in nomenclature. The 'X2' in OCZ RevoDrive 3 X2 480GB means this is a double-decker card with

Storage.com

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THE QUICKENING
OCZ'S PRO STORAGE KING



1 So many SandForces
How many SandForce controllers does it take to make up a RevoDrive 3 X2? Four. That's right. Four. Essentially in the X2 trim the RevoDrive comes with the bare bones of four 120GB Vertex 3 SSD split between a pair of tech-packed slices of PCB.

2 Professional precision
It has to be said this is more of a workstation part than a consumer device, but because of the speeds involved it shows how advanced storage is now becoming. The 480GB of asynchronous NAND will make more of a difference to pro-level users then than any PC gamers.

3 Unprecedented performance
The combination of PCI-e interface and top-of-the-range quad-SandForce controllers means this bootable drive is capable of posting quite incredible performance numbers. Sequential read/write speeds of 1.65GB/s and 1.37GB/s are simply unprecedented.

a pair of PCBs. Think of it as two SSDs per board.

Together, the two boards form a single drop-in PCI-e board in four-lane format. So, you'll need at least one PCI-e port of minimum four-lane spec available in your PC. The RevoDrive 3 X2 will, of course, happily hook up to an eight or 16-lane PCI-e socket, though there are no performance benefits to be had.

Each of the two PCBs has a pair of cutting edge SF-2281 SandForce controllers and 240GB of asynchronous NAND flash split into 16 chip arrays. For the record, the flash chips are 25nm Micron items.

That means lower write/erase longevity of around 5,000 cycles compared with the typical 10,000 or more cycles of previous generations of flash memory. Exactly what impact this will have on SSD survival rates remains unclear. Clever wear-levelling algorithms do much to nullify the effect of fewer available cycles.

What's more, the aggressive use of data compression by the SandForce controller further mitigates wear compared with other controller chipsets. But the overall trend towards fewer cycles still leaves us feeling a little queasy with an SSD that costs more than most PCs.

OCZ has cooked up a software layer that promises several benefits and has given the RAID hardware an overhaul to boot. Gone, therefore, is the convoluted series of chips found in the first RevoDrive that converted SATA to PCI X and then PCI-e. Instead, there's a single chip that channels four SAS ports through to four PCI-e channels and it's much cleaner and simpler.

On top of the RAID chip sits a virtualised software layer known as VCA 2.0. The trick here is to present the four SSDs as a single device and in turn enable TRIM along with SMART data, native command queuing and more.

Superlatives ahead

If it's unprecedented, intergalactic throughput you seek, look no further than the OCZ RevoDrive 3 X2 480GB. Regards sequential read and write performance, the numbers OCZ itself claims are spectacular at 1,500MB/s and 1,225MB/s. But our test results are even better at 1.65GB/s and 1.37GB/s.

Think about those figures for a moment. For starters, the RevoDrive murders the 1GB/s barrier and thus makes mass storage performance that rivals system memory seem a lot more plausible. But the gap between the claimed performance and our results is well over 100MB/s for both reads and writes. The RevoDrive is so fast, its deviation alone from claimed performance is in the same ballpark as the peak performance of an early SSD.

Similarly, these benchmarks make the RevoDrive as much as three times faster than the best available SATA SSDs. Fair to say, then, OCZ's PCI Express technology is a success. Elsewhere, however, the RevoDrive's performance is inevitably more mundane. At least, results like 767MB/s and 457MB/s seem mundane compared to the official performance claims. We speak here of incompressible sequential performance, a metric which tends to be a weak spot for any drive based on a SandForce controller chip.

That's because the impressive peak performance achieved by SandForce drives is partially achieved courtesy of data compression. Compressing data before pumping it into the flash chips means less bandwidth in and out. And that means faster transfer rates. Problem is, many if not most of the really data-intensive file types are incompressible, including movies and music.

> "IF IT'S INTERGALACTIC THROUGHPUT YOU SEEK, LOOK NO FURTHER"

But if there's an area where we have more serious concerns about the performance of the RevoDrive, it's random access. Much here depends upon the benchmark you choose to run. Use a test like I/O Meter, which generates perfect 4k files for random access tests and you'll see the RevoDrive come close to delivering on OCZ's claims of 200,000 IOPs.

However, perfectly formed 4k files aren't reflective of the messy business of real-world disk usage and access. In that context, a test like AS SSD's 4k benchmark gives a better idea of the worst case scenario. At 25.9MB/s and 65.8MB/s for reads and writes, the RevoDrive is barely any better than a single OCZ Vertex 3.

As for how all this translates into actual desktop performance, the answer is that the results are mixed. On the upside, the RevoDrive tears through game installations at a scarcely believable lick. It's more than twice as quick as a good single SSD. However, unpacking .ZIP files reveals the limitations. The RevoDrive is slightly slower than a single Vertex 3.

It's also worth remembering that the performance of the RevoDrive will often be limited by source or target destinations for data. Data rates between multiple drives in any PC are defined by the weakest link, not the fastest.

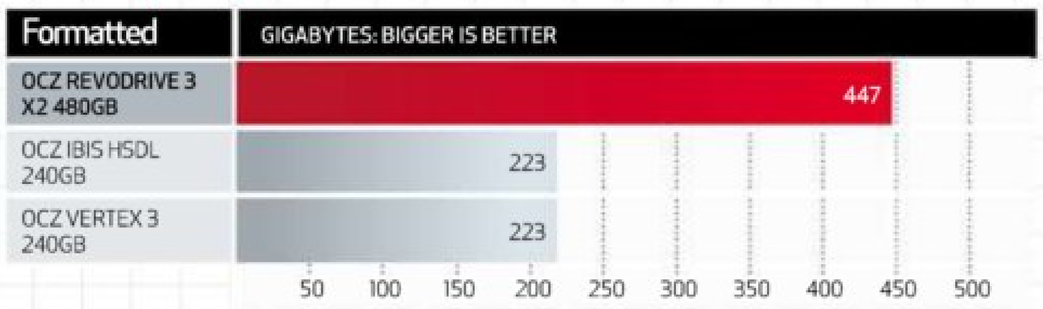
Before we consider how the RevoDrive performance and

Technical analysis

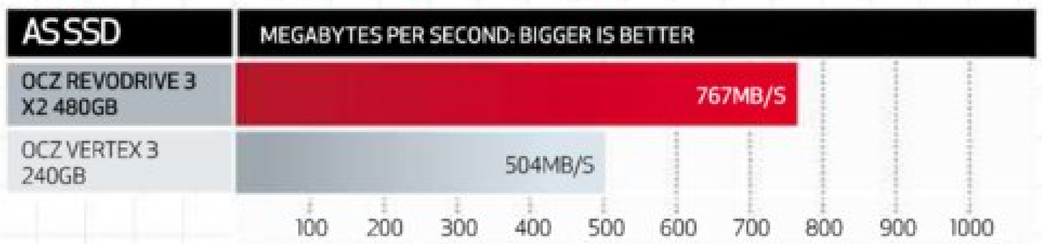
Putting a drive like the OCZ RevoDrive 3 X2 into context is tricky. At around £1,300, it's pretty much in a class of its own. However, two of the most interesting comparisons come from within the OCZ stable. First up is the OCZ Vertex 3. It sports the very same SandForce SF-2281 controller technology as the new RevoDrive, albeit a single chip to the RevoDrives quartet.

So, it's the perfect specimen to reveal how well OCZ's proprietary RAID technology works. Then there's the OCZ IBIS HSDL. Much like the RevoDrive, the IBIS is an attempt to sidestep the bandwidth bottleneck of the SATA interface. But it's a whole lot cheaper, even if the 240GB version offers half the capacity.

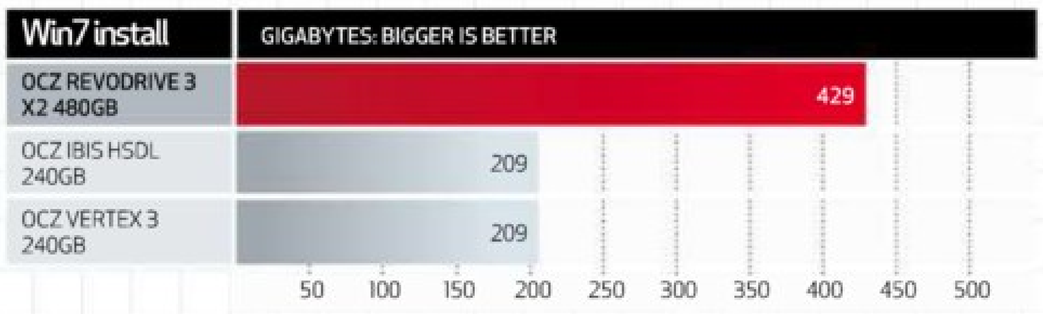
Drive capacity



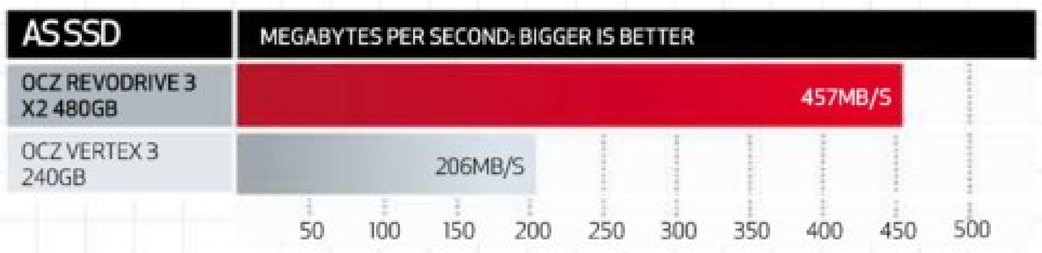
Sequential read (incompressible) performance



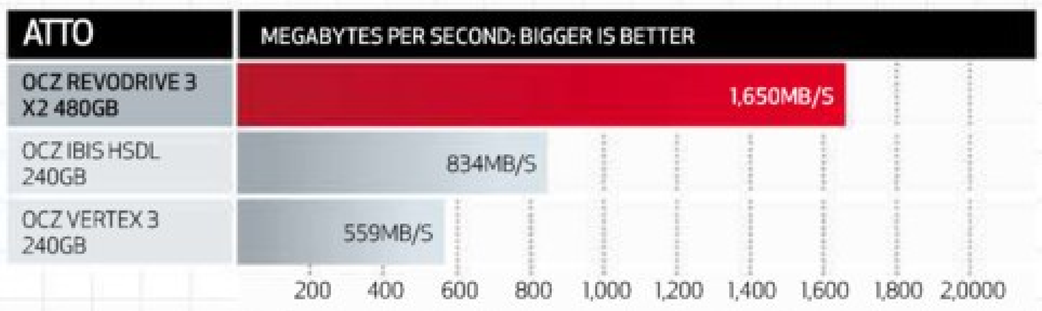
Spare capacity with Windows 7 installation



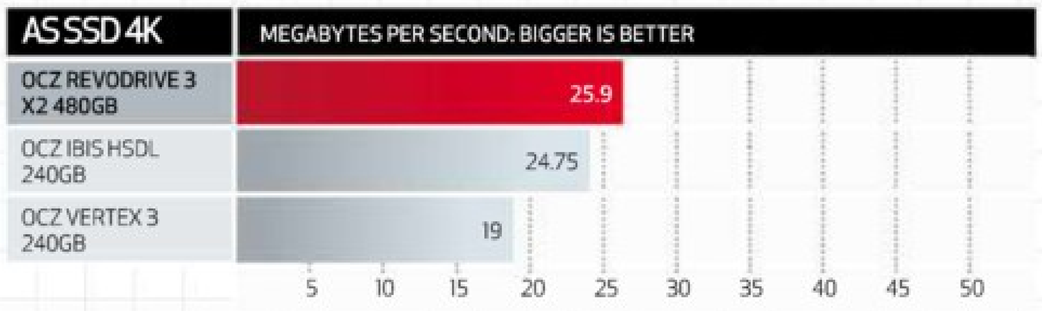
Sequential write (incompressible) performance



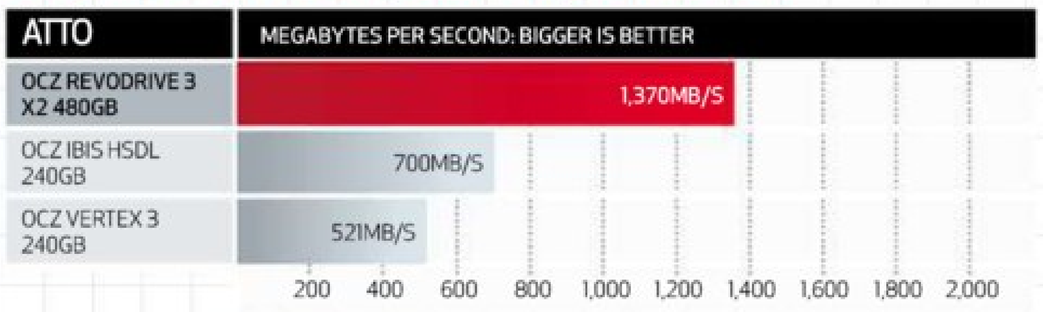
Sequential read (compressible) performance



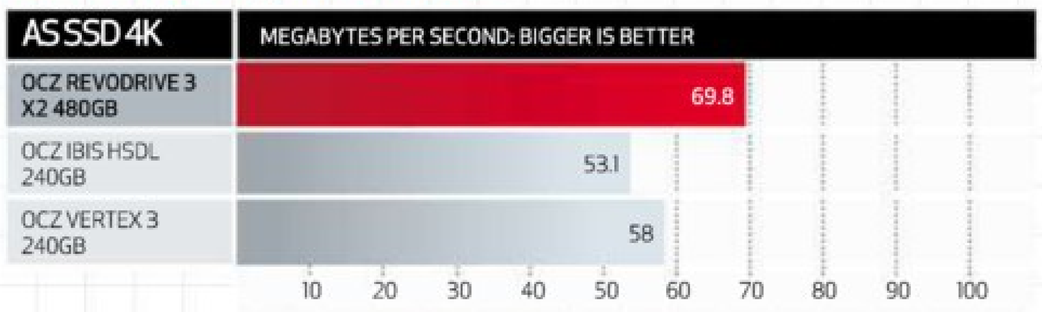
Random read performance



Sequential write (compressible) performance



Random write performance



pricing place it in the broad constellation of SSDs currently, what are the practicalities of using a PCI-e -based board as opposed to a SATA drive?

In terms of installation, the RevoDrive couldn't be much easier. Okay, you'll need to crack open your PC's case – you can't run the drive externally like an eSATA drive. You'll also need to use the 'have disk' method when installing Windows 7. But that's a simple matter of dropping the driver onto a USB key before you start the installation process.

From there on, it's much the same as a standard SATA drive with two small exceptions. First, you'll have to suffer a new status screen within the system boot and post process, which slows start-up times by around three to five seconds. In our testing, the RevoDrive also ran hot, which indicates that there are potential problems with longevity and thermal management.

With all that in mind, should you buy OCZ's exotically priced RevoDrive 3 X2 480GB? If money ain't an object and you're a hands-on sort of PC user, the answer is a qualified yes. Admittedly, it doesn't blow normal SSDs away by every test, but the overall picture is of a drive that at worst is as quick as anything out there and sometimes in a performance class of its own. In that sense, it's a classic big-money enthusiast component. It's not perfect, but it does deliver some outrageous performance figures.

> "BUT THE BIGGEST ISSUE IS THE LACK OF FULL TRIM SUPPORT"

Must haz?

For everyone else, we're not so sure. The RevoDrive's performance in the nitty gritty random access workloads that make up so much of daily computing isn't as spectacular as the raw throughput numbers would have you believe. Day to day, we doubt you'd notice the benefit over a conventional SSD.

But the biggest issue is the lack of fully implemented TRIM support. OCZ has done all it can to enable TRIM on the RevoDrive. What's now required is an update for Windows 7 from Microsoft. For now, it's unclear whether Win7 client OSes will ever be updated. And that means we can't give the RevoDrive an unreserved thumbs up. ¤

Jeremy Laird

PCFormat Verdict

- Insane sequential performance
- Easy to install, bootable
- TRIM support still a problem
- Random access performance disappoints

An impressive effort from OCZ, but still offers little over an SSD RAID array.

80

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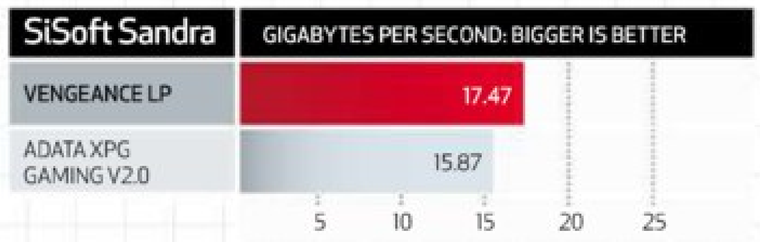


£62/PERFORMANCE RAM

Technical analysis

ADATA's XPG memory gets closer to the Vengeance LP kit's Sandra and Cinebench scores through overclocking, but Corsair's RAM offers twice the capacity for the same price, and greater general throughput, thanks not only to an extra 4 GB, but lower latency timings. That out-of-the-box Sandra score is the biggest indication of the Vengeance LP's superiority.

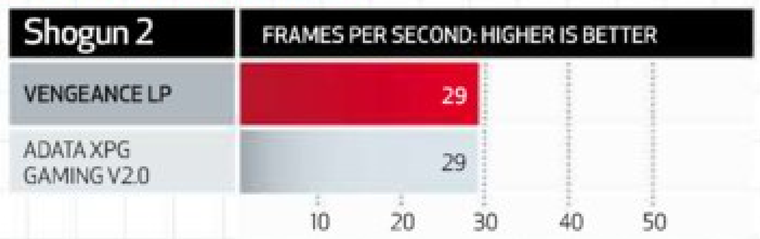
Memory bandwidth performance



CPU rendering performance



Gaming performance



CORSAIR VENGEANCE LP

A low-profile take on the series, with a tasty lick of paint

VITAL STATISTICS

Price £62 **Manufacturer** Corsair **Web** www.corsair.com **Frequency** 2,000MHz **Latency** 9-9-9-24 **Capacity** 8GB (2x 4GB) **Cooling** Low-profile heat spreader **Voltage** 1.35V **Form factor** DDR3 DIMM **Price check** www.scan.co.uk

Memory modules and CPU coolers don't always get along. Sometimes the cooler hangs over the memory slot on your motherboard so you can't fit the memory in the first and third slots, forcing you into the second and fourth; if your motherboard supports that configuration. Sometimes the cooler and the RAM modules are so gigantic they barely fit together in a system in any configuration.

The chief culprit is usually an indulgently large heat spreader atop each stick of RAM. Corsair's Vengeance series is as guilty as any on this charge, so this LP model aims to right a wrong.

These low-profile modules will give you no such grief. They are no bigger than the naked green DIMM modules of old, which allows potential for your CPU cooler to run amok in your case, taking up as much space as it damn well wants. We found there's plenty of room to remove the nearest RAM module to the CPU while the cooler's still installed too, which saves a bit of messing around should you need to perform such a procedure.

The 'LP' aspect of this RAM is a success then, cutting CPU cooler conflict out of the equation. So what else does this Vengeance LP 8GB RAM kit have to offer?

LP but high style

Let's get the superficial stuff out of the way first. The heat spreaders are white. They look as nice as any RAM on the market, and would particularly complement Corsair's fellow albino, the Graphite series 600T white edition case. This is a consideration for case modders and kit enthusiasts, but if all the glowing water coolers and dazzling LED fans of this world make you slightly nauseous, there are some further selling points in this Vengeance LP 8GB kit's bag of tricks.

V is for voltage

The chief trick is the voltage. It's clocked at 1.35V on these modules, roughly 0.3V lower than most modules. Frankly anything higher than 1.65V at stock settings puts your system in danger of overheating, imploding and tearing the space-time continuum. We all saw how much of a hassle that was for Marty McFly and *Donnie Darko*, so it's best to avoid.

The lower you go down the memory voltage limbo dance, the lower temperatures get. Being in such close proximity to your processor and having cooler memory is advantageous for keeping a healthy system ticking over into its old age. These 1.35V modules run cooler to allow a more conservative heatsink design, but if you're hoping that opens up some headroom to tweak the speed and latency of this kit, you're in for a slight disappointment.

We weren't able to tinker with the latency settings (set at respectable stock values of 9-9-9-24) at all without our test rig falling over before POSTing, which is disconcerting but not entirely surprising. We did manage to clock the operating frequency up from 1,333MHz to 1,600MHz, giving a 1 to 2 frame per second increase in our gaming benchmarks. Overall, the Vengeance LP 8GB RAM kit is cool, unobtrusive low-voltage memory that's competitively priced to boot. ¤ **Phil Iwaniuk**

PCFormat Verdict

- Low profile design
- Low voltage and temperatures
- Good price for an 8GB kit
- Can't overclock too far

If you're not into OC RAM but want low voltages, this kit's worth looking into.

85

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VITAL STATISTICS

Price £350 **Manufacturer** Samsung **Web** www.samsung.com **CPU** Intel Atom N570 @ 1.66GHz **Memory** 2GB DDR3 **Storage** 16GB SSD **GPU** Intel Integrated **Display** 12.1-inch (1,280 x 800) **OS** Google Chrome **Price check** www.techradar.com/reviews

Cloud computing is a term we've heard with increasing frequency recently. It's the idea that our usual computing tasks aren't run by the hardware in the box, but on powerful servers connected to your machine via the internet.

Into this fray comes Google's Chrome operating system designed to drag laptops and netbooks into the cloud. The machines that run Chrome OS are known as Chromebooks, and Samsung is ahead of the pack by releasing the first in the UK – the Chromebook Series 5.

As the first of its kind with no immediate competitors – a similar Chromebook has been announced by Acer, but it has yet to confirm if we will see it in the UK – the Samsung faces some interesting challenges. While it launches without competition it's currently solely responsible for persuading consumers to move from the Windows OS to Chrome's browser-based OS.

Just use it

Google's aim is to offer as uncomplicated a computing experience as possible, ideal for people who just want to use their laptops with little fuss. Google wants you to 'just use' the device, rather than have to tinker with and maintain it. While this back-to-basics approach might seem limiting to some, Samsung has created a remarkably accomplished machine that offers simplicity without patronising the user.

The Series 5 comes in two versions, one that's Wi-Fi only and a 3G version which costs £50 more. Because Chrome OS is web based, the Series 5 Chromebook needs to be connected to the internet for it to work properly – one of the very first things it asks you when you turn it on is to connect to a wireless network.

While the Wi-Fi only version works fine around the home, the 3G version is recommended if you are going to be using it out and about. The constant need for an active net connection is a good example of how you need to think differently when using a Chromebook, and if you're unwilling to commit to a 3G contract just to use your laptop, then you're going to find it very limiting. With other laptops the biggest worry is running out of battery – with the Chromebook it's losing your internet signal. Welcome to the future.

Talking of the battery, the Samsung Series 5 Chromebook has a very decent lifespan of eight to nine hours between charges, mainly due to the fact that Chrome OS is so light to run. It comes with just 16GB of internal storage though, the idea being that you'll be saving your work in the cloud. This is all well and good when you can get the internet, but if you're stuck in a 3G blackspot you're not going to be able to access your work.

It's early days for the Chromebook, but the Series 5 gets the basics right enough that we can see the potential in the new OS. It's not the strong start we'd have hoped for. We can see the logic in keeping the hardware simple when it keeps the performance streamlined and costs down. In this case though, the hardware is just a bit too weak for any tasks more strenuous than viewing a website. For a price that rivals more powerful and more feature-rich laptops. ¤ **Matt Hanson**

PCFormat Verdict

- Quick start up
- Long battery life
- Too expensive
- Needs a net connection

With a few upgrades and a lower price, Chromebooks could be a hit, but they still have a way to go.

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£899/GAMING PC

VORTEX M59 OC

Are we closer to finding the perfect gear combination?

VITAL STATISTICS

Price £899 **Manufacturer** PC Specialist **Web** www.pcspecialist.co.uk **CPU** Intel Core i5 2500K @ 4.8 GHz **MOBO** Asus P8Z68-V **GPU** NVIDIA GTX 570 **RAM** 4 GB Kingston Hyper-X 1,600MHz **Storage** 1TB SATA III HDD **Price check** www.pcspecialist.co.uk

So PC Specialist, what have we here? An overclocked Core i5 2500K? Why, a system with a CPU specification like that puts you in some pretty illustrious company: there's Chillblast's Fusion Rocket for starters. Chillblast's overclocked 2500K runs at 4.5 GHz, which is 300MHz slower than this rig, but then it's also £150 cheaper.

There's also our new favourite Core i5 system, the AT-FX Polaris. Inside that rig lies a 2500K overclocked to 4.8 GHz, matching PC Specialist's rig. It costs nearly £300 more, but there are several luxurious higher specified components inside to justify that.

The Vortex M59 OC fits neatly in between the two at £899. It's certainly a smart price point, but how does it compare to these two 2500K-equipped rivals? Would you be better off going for the cheaper or higher specified option, or does this rig offer a happy middle ground?

Well, let's look at the specs beyond that CPU. First, it's air cooled by a Titan Fenrir Evo. Approaching the £1,000 point, you might expect to see a water cooling unit, but PC Specialist has managed a big CPU overclock on air cooling, and that's fine by us; it is a good cooling unit after all.

We've no grumbles so far. Next, let's look at the memory. The Vortex has 4GB of Kingston HyperX 1,600MHz DDR3 RAM occupies this rig, and it performed very well in our memory bandwidth test, posting 20.76 GB/s, which is as quick as we've seen from a 4GB kit. That'll help any CPU-intensive tasks, such as video encoding, as well as loading times.

Chillblast's Fusion Rocket's 4GB kit doesn't have the throughput that these HyperX modules have, whereas up there in the Polaris's lofty heights, there's 8GB on offer. It still doesn't beat the Vortex's RAM in sheer GB/s, but having double the capacity is useful too. The RAM, like the CPU and cooler, do demonstrate a happy middle ground - so far so good.

This is a gaming rig, and gaming performance is all about graphics cards. Choosing the right card in a densely populated market is important to a system's overall value, and those crucial frames per second in your favourite games. PC Specialist's solution: NVIDIA's GTX 570.

In a world of rigs powered by HD 6950s and GTX 580s, the GTX 570 is a rarity. They were quite expensive on launch, just shy of £300 for a Fermi card with largely the same layout as the GTX 480 but without that insatiable thirst for electricity. Just one stream processor away from the GTX 580, the 480 CUDA cores are still capable of high resolution, high frame rates, but a reduced 1.2GB of memory leaves it trailing way behind the GTX 580's impressive pace.

The price has been slashed since the GTX 570's release, making it a very appealing – you guessed it – middle ground between the 560 Ti and the full-blown 580. Sitting in this rig, it provides enough grunt to keep frame rates over 40fps at 1080p.

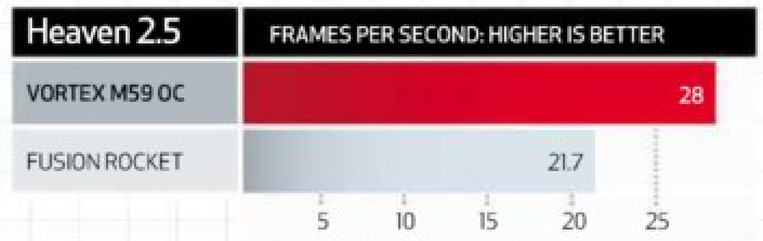
Our only reservation with the Vortex is the lack of an extra that the very best systems have. There's no SSD, the mobo is mid-range... not big problems, nor a rip-off at all, but the market is that tight.

Phil Iwaniuk

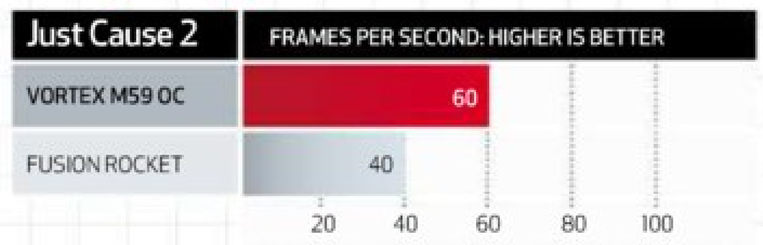
Technical analysis

The Vortex blazes ahead of Chillblast's Fusion Rocket in any graphics benchmarks, but it's worth noting that the Chillblast's HD 6950 wasn't flashed to HD 6970 levels, which would cause the gap to close up.

DX11 tessellation performance



DX10 gaming performance



CPU rendering performance



PCFormat Verdict

- Overclocked CPU & quick RAM
- Smart GPU choice
- Great gaming performance
- No SSD or water cooler

A happy middle ground in both price and performance, lacking anything special though.

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£310/MONITOR

DELL U2412M

Dell goes easy on our eyes with both screen and price

VITAL STATISTICS

Price £310 **Manufacturer** Dell **Web** www.dell.com **Display Size** 24-inch **Brightness** 300 cd/m² **Contrast** 1000:1 **Resolution** 1,920 x 1,200 **Response Time** 8 ms **Inputs** DVI-D, VGA, DisplayPort **Price check** www.dell.co.uk

This jazzy number from Dell might look like a P2411H Professional series, but there's one important difference: it's an IPS screen, not a TN. That means better colour representation, better viewing angle and a higher price. Screen types are seldom highlighted by manufacturers but they are the single biggest deciding factor in your screen's image quality. The question is: why pay more for IPS?

Class is now in session. Crystals in in-plane switching (or IPS) screens are aligned horizontally between two oppositely polarised glass substrates, rather than the vertical arrangement of crystal rods found in Twisted Nematic panels (TN).

In IPS screens, crystals are kept parallel in a lateral electric field, whereas in TN panels they untwist when voltage is applied, and their alignment alters as they drift from the anchored electrode. This hinders the flow of the bulb light and the contrast and colour representation as you look at the screen from wider angles than head-on.

IPS vs. TN

IPS panels are capable of true 1000:1 contrast ratio: that's the difference between the whitest white and darkest black to you and me. TN panels often boast a 'dynamic contrast ratio' of 8000:1, which is much higher than an IPS screen, but that doesn't mean the contrast's eight times better; in fact it's worse.

As TN screens change from deep dark colours to bright whites, the contrast adjusts automatically, temporarily changing the contrast setting to allow the deeper colours through. The result is an often irritating visible colour adjustment that grates and has anyone of right-mind and seeing-eye reaching to turn it off.

Ready… draw!

After dragging TN panels through the mud, it's worth highlighting their advantages. First, they are a lot cheaper to produce because they require half the transistors per pixel that an IPS screen requires. Second, they produce much quicker response times; 2ms isn't an unusual figure for a good TN screen, while IPS panels struggle to get under 8ms.

Is it worth paying more for all the IPS niceties then? When they come in a package like this Dell U2412M, absolutely.

The screen and panel look very similar to Dell's flagship U3011H 30-inch screen, and like the £1,000 model, this U2412M is vertically adjustable and can be flipped to portrait orientation.

The depth of blacks and brightness of whites onscreen is instantly noticeable, and as we put the U2412M through it's paces using some high-colour HD video, it didn't disappoint, rendering the full 16.7 million colours of the RGB spectrum.

There are also a good range of menu options, such as clock and phase that we don't often see in affordable panels, though the U2412 didn't automatically adjust its orientation as we flipped it from landscape to portrait.

As for an IPS's Achilles heel: response time, yes it's noticeable through rigorous benchmarking, but you won't notice the difference to a TN's response while you're gaming. That makes the U2412M a winner. It's a well-built, affordable and adjustable IPS panel. ¤

Phil Iwanuik

PCFormat Verdict

- Sturdy adjustable stand
- Viewing angle and contrast don't disappoint
- Suitable for professional use
- Affordable for an IPS panel

As IPS panel prices drop, we might see competition to this screen. Currently, it rules the roost.

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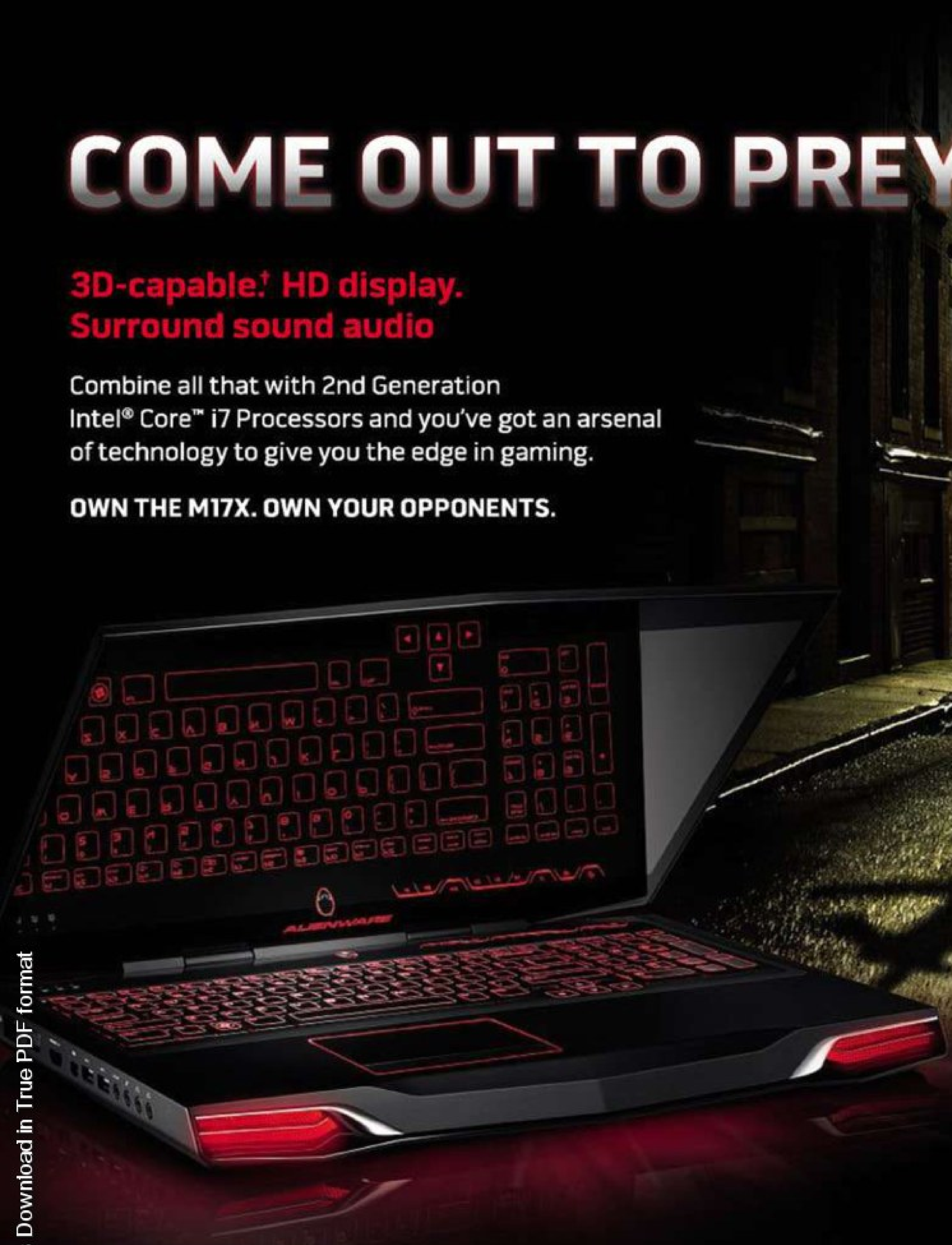
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£186/MONITOR

BENQ EW2430

Improving on a classic model?

VITAL STATISTICS

Price £186 **Manufacturer** BenQ **Web** www.benq.co.uk **Display size** 24-inch **Brightness** 250cd/m² **Contrast** 3,000:1 **Resolution** 1,920 x 1,080 **Panel type** VA **Response time** 8ms (g-to-g) **Inputs** 2x HDMI, 2x DVI, 4x USB **Price check** www.ginger6.com

You can have any LCD panel you want so long as it's TN. With a small handful of exceptions, that's been the depressingly familiar refrain when it comes to affordable PC monitors. But a few screens do bust through the TN barrier and the latest to make a break for it is the BenQ EW2430.

BenQ, of course, has form when it comes to sensibly priced screens with decent panel technology. The BenQ EW2420 is definitely an old favourite. For less than £200 you got a 24-inch full HD panel sporting vertical alignment (or VA) and an LED backlight to boot. That matters because VA panels offer much richer, more vibrant colours than the TN norm, along with deeper blacks and better viewing angles. Typically the only downside is response times. But VA technology has been catching up and the pixel response gap is often negligible. With all that in mind, we've high hopes for the new BenQ EW2430.

Paper performer

On paper and at first acquaintance, the BenQ EW2430 really socks it to you. The specification list is frankly to die for. First, there's that VA panel packing an LED backlight and 1,920 x 1,080 pixels. Of course, full HD is nothing special in 2011. But dig a little deeper and some outrageously good numbers emerge. Most impressive is the 3,000 to one static contrast, the best we've ever seen. Next up are 178° viewing angles in both planes and pixel response of 8ms. The latter may be ordinary rather than revolutionary. But overall, it's an awfully promising package.

The EW2430 is an imposing physical specimen, too. Okay, the stand offers only tilt adjustment. But the combination of glossy black bezel with brushed and anodised surfaces communicates quality in a manner few, if any, competing sub-£200 monitor screens manage. The feature set, which includes two HDMI ports, DVI and VGA along with a four-port USB header, is solid, too.

All of which makes it all the more disappointing to report that the image quality is not what we were expecting it to be. Out of the box, it's immediately apparent that the BenQ EW2430 is short on visual punch. The LED backlight is rated at 250cd/m². That's pretty modest, but if anything maximum brightness feels nearer 200cd/m².

The result is a slightly dingy overall feel along with dull white tones. The viewing angles are relatively poor for a VA panel, as well. But the real killer for us is involves the pixel response: We've not seen a screen with blurring and smearing this bad for several years.

BenQ's use of VA panel technology still has plenty of benefits though. The screen's black tones are far deeper and inkier than any TN screen could possibly hope to achieve. The colours are much more realistic and detailed, too. BenQ has also bequeathed the EW2430 with a lovely chassis and plenty of video input options.

But after the glories of the older EW2420, the EW2430 is a crushing disappointment. The LED backlight turned out to be dull, the viewing angles ordinary and the pixel response frankly shonky. We hope BenQ addresses these issue rapidly or the danger is that all cheap VA screens will get a bad name. ¤ **Jeremy Laird**

PCFormat Verdict

- VA panel gives nice colours
- Black levels very impressive
- Shonky pixel response
- Dull LED backlight

The VA and LED combo promises much but the reality is a distinct disappointment.

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£385/SOLID STATE DRIVE

KINGSTON HYPERX 240 SSD

A solid entry into the performance market for Kingston's HyperX

VITAL STATISTICS

Name HyperX 240GB SSD **Price** £385 **Manufacturer** Kingston **Web** www.kingston.com **Capacity** 240GB **Type** 25nm MLC **Interface** SATA 6Gb/s **Quoted sequential read** 525MB/s **Quoted sequential write** 480MB/s **Size** 2.5in **Controller** Sandforce SF-2281 **Price check** www.dabs.com

Using its performance brand, the Kingston HyperX 240GB, is aiming to hit the top-end of the SSD market where it hurts – and it isn't charging the earth either.

Kingston's previous forays into the SSD market have been aimed primarily at the first time SSD user - anyone looking to make the leap from a mechanical drive without having to fork out an incredible amount of money to do so. This is something that Kingston's SSD Now V and V+ range readily offered.

For its second generation of drives Kingston is using HyperX branding to house them under. That should give you an inkling of who it is aiming these drives at – step forward enthusiasts and hardcore gamers.

Catchy monkey

At launch there are two drives in the range: 120GB and 240GB. Since these drives are aimed at the high performance end of the market, it makes sense that Kingston has teamed up with SandForce, the company that know all about producing controllers for fast SSDs. And sure enough, these drives use the latest SF-2281 controller.

If there's one thing Kingston is well-known for it's making bulletproof products and by working closely with SandForce, and by taking its time putting the drives through Kingston's own rigorous testing and qualification procedures, Kingston has tried to alleviate the notorious reliability issues that plagued some SandForce controllers. That then has been the cause of the delay.

Kingston has managed to tweak the performance upwards too as the HyperX 240 is the fastest 2.5-inch drive to have come across our test bench.

With outstanding sequential read/write figures in the ATTO benchmark of 553MB/s and 516MB/s respectively, it's a little faster than the superlative OCZ Vertex 3. It's much the same story with the more intense AS SSD benchmark; the Vertex 3 gives a sequential read/write score of 502/292MB/s and the HyperX 240 506MB/s reads and 289MB/s writes.

Beyond the theory

Benchmarks are all well and good but how do these figures translate to the real world? Well, booting from cold to Windows 7 Ultimate being ready took a fairly rapid 37 seconds. Copying a 4.5GB folder made up of various file types and sizes from another SSD took a mere 19 seconds.

Apart from being a very quick drive, it also stands out from the pack in its appearance with an attractive Kingston HyperX blue and brushed metal finish. We also liked the software bundle that comes with the drive; in fact it's probably the most comprehensive one we've ever seen with a drive.

That said, there is still no getting away from the fact that at £385, the HyperX SSD is one expensive bit of kit, even in the world of solid stateness.

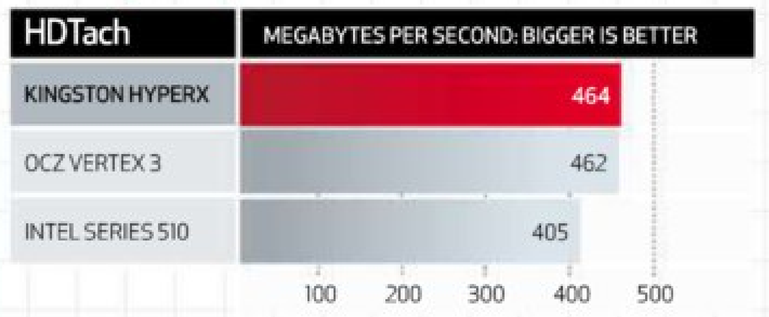
But what a solid state drive like the Kingston HyperX 240 does, if nothing else, is to prove how short the life span of the SATA 6Gbps interface was – at least for SSD drives – as they are now close to flooding the bandwidth of the interface. The HyperX may be pricey, but boy is it quick. ¤

Simon Crisp

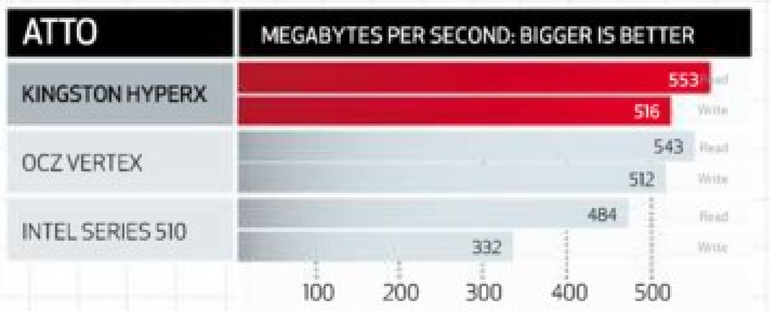
Technical analysis

To test SSDs in as close to a real-life scenario the drive is installed as a boot drive and the OS and motherboard drivers are installed. After an initial test, we run through a few cycles of filling up the drive with data and deleting it, and then test the drive for real.

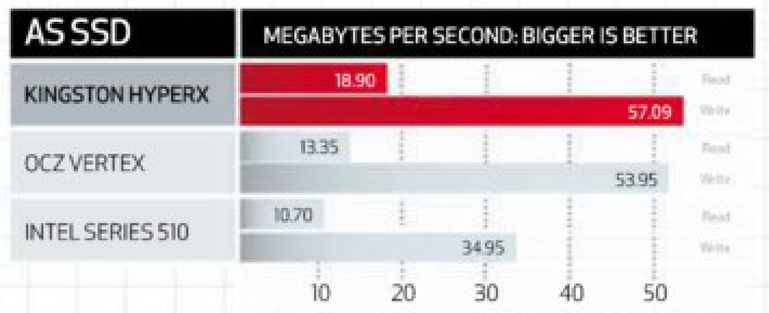
Burst speed performance



Sequential read/write performance



4K random read/write performance



PCFormat Verdict

- Superb performance
- Hey, good looking
- Excellent bundle
- 240GB option is expensive

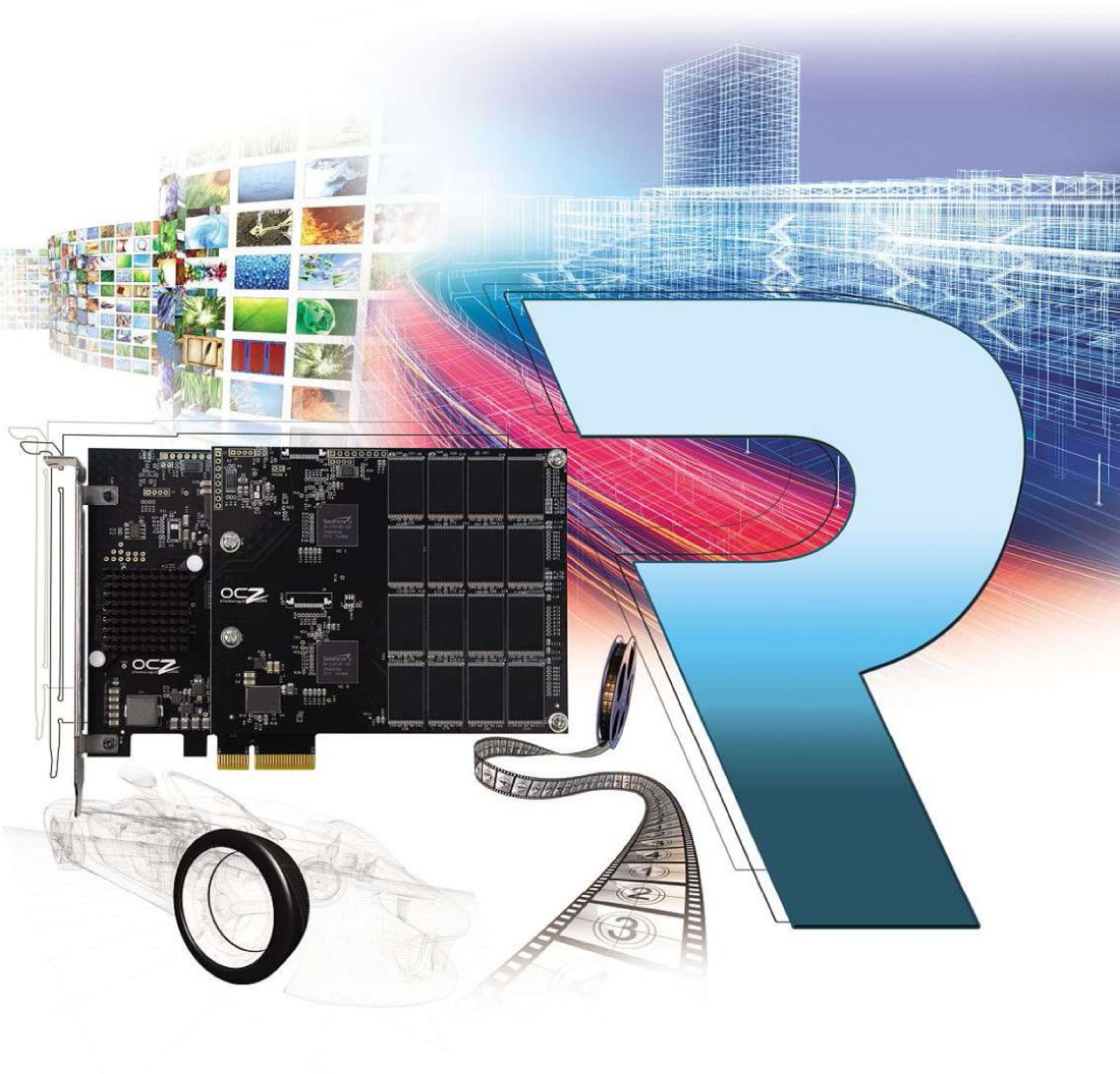
Very fast and expensive but for those that can afford it this should be near the top of your list.

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CORSAIR H100 CPU COOLER

Corsair gets progressive in the battle to lower case temperatures

VITAL STATISTICS

Price £76 **Manufacturer** Corsair **Web** www.corsair.com **Socket** AMD AM2, AMD AM3, Intel LGA 1155, Intel LGA 1156, Intel LGA 1366, Intel LGA 2011, Intel LGA 775 **Base** Solid copper **Fans** 2x 120mm **Dimensions** 122 x 275 x 27mm **Radiator** 2x **Price check** www.lambda-tek.com

Should you be about to spend nearly £80 on a cooler, you'd better live somewhere incredibly hot, or make damn sure that you're going to overclock the pins off your CPU. Let's assume you are, because this Corsair H100 liquid cooling kit is a wet dream for those who really need it.

Small, split-flow manifold liquid cooling kits such as the H100 have been around for a couple of years now. They were pioneered by CoolIT, which is the company behind the latest Corsair liquid chillers. Fitting your own water cooler is quite a challenge, and in many ways a kit such as the H100 takes away that hard work.

Considering that the H100 is backwards-compatible to Intel LGA 775 and AMD AM2 sockets, Corsair has designed a refreshingly easy fitting for each socket type. We've seen some otherwise excellent liquid coolers ruined by improbably complicated bracket designs – Antec Kühler series, we're looking at you. There are no such dramas with this Corsair number. It's the easiest to fit liquid cooler we've come across.

You might find the 240mm radiator a bit trickier to fit. In fact, you might find it impossible if your case doesn't have mountings for it. Corsair is being a bit devious here, because your best bet for compatibility is to use one of its cases. However, just as Apple imposed limitations on its hardware and software to ensure everything works perfectly together (which of course it does, without fail…) so Corsair does with its interlinking component design.

If the H100's radiator is too big, there's always the H80, fitted to a single 120mm radiator and compatible with every case in existence. If you were to plump for the H100 and fit it in a Corsair Graphite series case with a fan controller at the front of the case, then you'd be able to connect the H100 to the fan controller and add CPU temp to your case fan controller's repertoire.

Serious cooling

Then there's Corsair Link. Connect the H100 to Corsair's Link hardware and it'll monitor temperatures around the case and enable you to control each component's fan on-the-fly. If you're serious about cooling, that's a big deal. Nobody has taken temp management to this extreme at a consumer level.

This is all well and good, but it's the H100's cooling chops that actually matter. It ran a Phenom II X6 100T at 20°C idle and 34°C under load – our Arctic Cooling Freezer 13 is a great air cooler, but can't get near those temps, running at 33°C idle and 51°C load. The H100 recovers quickly too, returning to idle temp just 25 seconds after running at it's highest temp. That took the Freezer 13 a full 58 seconds.

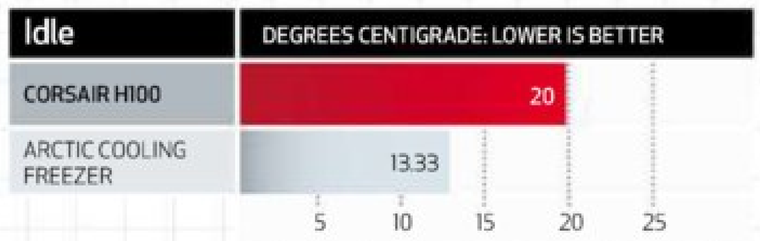
It's not all ice-cool roses, though. The two fans strapped to the radiator are hella noisy, and it's impractical to adjust the fan speed by pressing a button on the cooler itself unless you're running a barebones system.

We love the H100's design, Corsair Link compatibility and performance, but the radiator size poses compatibility issues and we also don't like reaching into our case to turn down the deafening fans. ¤ **Phil Iwaniuk**

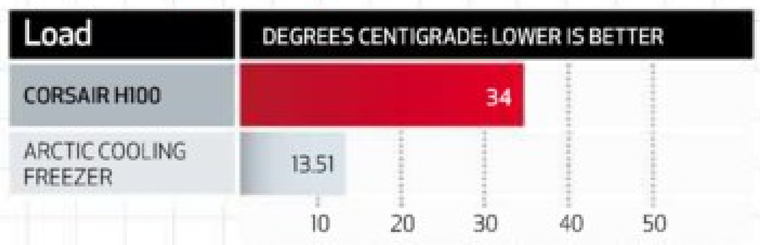
Technical analysis

Arctic Cooling's Freezer 13 is no ordinary air cooler, but the H100 still runs rings around it. Despite lower temps all round, we weren't able to get higher CPU clock settings from Corsair's liquid cooler than the Freezer 13. In fact, the air cooler handled an extra 60MHz overclock.

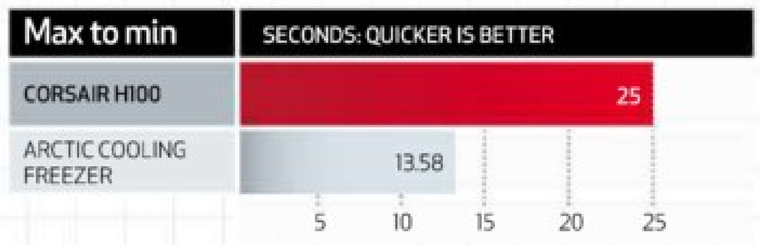
Idle temperature performance



Load temperature performance



Max to min temperature recovery time



PCFormat Verdict

- Perfect design
- Great load temps and recovery time
- Corsair Link system
- Large 'n' loud

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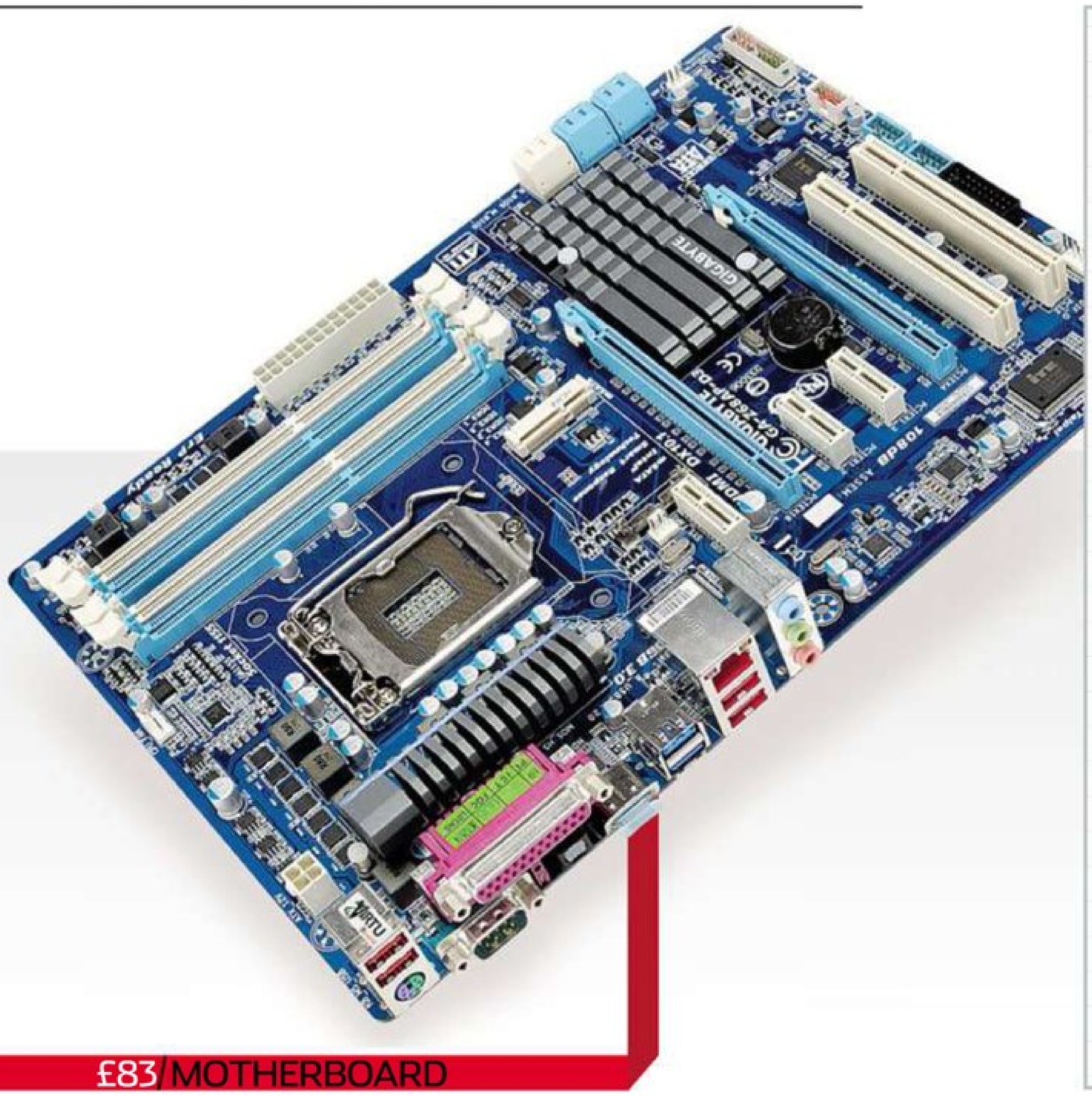
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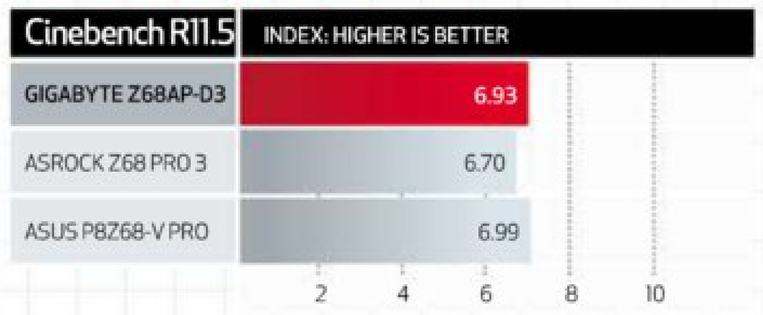


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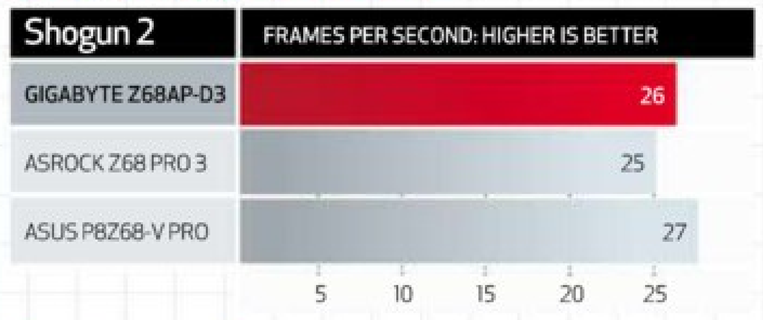
Technical analysis

Compared with the £95 ASRock Z68 Pro3 the Gigabyte board manages some impressive results. It still lags behind the pricier Asus, but the gaming scores still maintain its relevance.

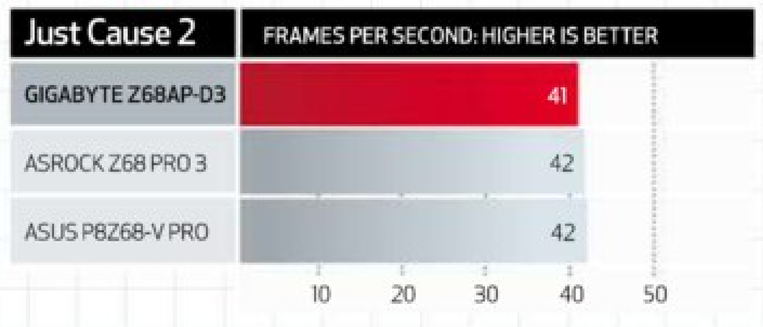
CPU rendering performance



CPU gaming performance



Gaming performance



GIGABYTE Z68AP-D3

A budget board with a lot to offer

VITAL STATISTICS

Price £83 **Manufacturer** Gigabyte **Web** www.giga-byte.com **Chipset** Z68 **Socket** LGA 1155 **CPU Compatibility** Intel 2nd Gen Core **Memory** Dual-channel DDR3 **Storage** On-board mSATA slot **Price check** www.ebuyer.com

The Z68 platform has seen a lot of love from Gigabyte since it came about, and the Z68AP-D3 has to be one of the cheapest Z68 boards we've ever seen. But does that also mean it's one of the weakest?

Since the farce that accompanied the launch and subsequent silicon failure of the initial P67 platform, Gigabyte effectively ditched that chipset in favour of the Z68. When it made the announcement it would only be releasing a handful of P67 boards and focusing on the Z68 platform we thought maybe the low-end might suffer.

Gigabyte explained to us though that the cost difference between creating a P67 or Z68 board were negligible.

With such budget Z68 boards arriving, like this one, that strategy looks to be working. There's little missing from this budget board, but it still comes with Z68 specifics such as the Lucid Virtu and Smart Response Technology (SRT), as well as onboard video outputs.

Wallet friendly

This isn't the cheapest Z68 motherboard that Gigabyte has created, there are other boards out for just over £70, but the Z68AP-D3 doesn't skimp on the features that make the Z68 chipset attractive. It comes with a single onboard HDMI port, but that does mean it can be used without needing to plug in a discrete GPU. And that makes it pretty much ideal for the market this board seems to be aimed at. The Z68AP-D3 actually looks like it may be targeting the small business market not the budget gamer. I say that because of the Trusted Platform Module (TPM) that caters for the security-conscious network admins, but also because of the reappearance of parallel and serial ports.

In the home those legacy connectors aren't much use, but in a small business/home office environment they're more relevant. Still, us gamers can still pick it up as a bargain Z68 as the basis of a good value Sandy Bridge machine.

Compared with something like the Asus P8Z68-V Pro the Gigabyte board represents a significant saving; you're shaving £60 off the mobo cost. So what are you missing out on by opting for this bargain?

No corners cut?

Well, the big thing is the overclocking potential of the top-end Sandy Bridge CPUs. With the more expensive Asus board you can hit 4.9GHz by simply upping the multiplier. On the Gigabyte Z68AP-D3 you're still able to clock up an extra 1GHz and top out at 4.4GHz, which should be enough for most bargain hunters.

You also get the onboard mSATA connection. Compared with the Z68XP-UD3-iSSD you don't get to populate the slot with a teeny 20GB SSD out of the box, but you can pick one up later and take advantage of the Z68 chipset's SRT.

And thanks to Gigabyte's setup you don't need to reinstall *everything* before enabling that tech, which means picking up a small SSD later on gives you a nice upgrade path too.

If you're looking to build a budget Sandy Bridge machine the Gigabyte Z68AP-D3 will give you relevant performance compared with pricier boards and allow you to spend more in other areas of your build. ¤

Dave James

PCFormat Verdict

- Bargain price
- Decent feature set
- Will still overclock
- Few I/O options

A bargain base for a Sandy Bridge machine, especially for the budget gamer.

89

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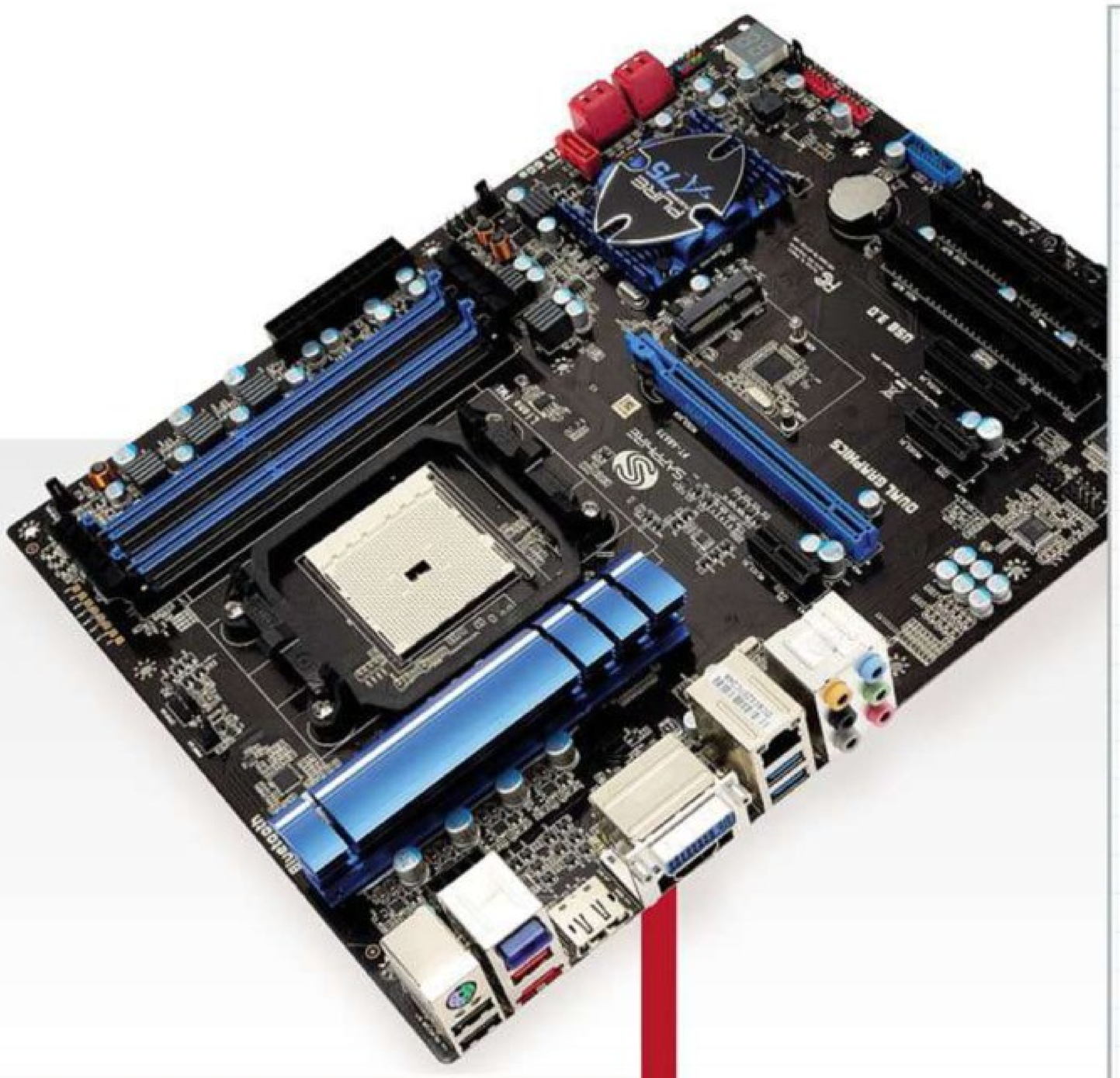
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VITAL STATISTICS

Price £100 **Manufacturer** Sapphire **Website** www.sapphiretech.com **Chipset** AMD A75 **Chip support** AMD A-series APU **Memory support** Up to 16GB DDR3 **I/O** SATA 6Gbps, USB 3.0 **Graphics Onboard** PCI-e x16 **Price check** www.techradar.com/reviews

Sapphire creates a huge amount of graphics cards for AMD, and now it's ramping up the motherboard side of the business with the its Pure Platinum A75.

While AMD has been leading the way in graphics technology and stirring up all sections of the graphics market, the processor side of the company has been in the doldrums. But now that's all set to change with new APUs and supporting chipsets that are part of the desktop Llano Lynx platform. Apart from anything else this brings with it integrated graphics that are worthy of the PC gamer.

We've already seen mobos from Asus, MSI and Gigabyte that support AMD's new Lynx platform so it was only a matter of time before a board from AMD's biggest partner, Sapphire, supporting the new APU's and chipset crossed the bench.

The Pure Platinum A75 follows the same basic look and feel of every Sapphire board since its return to the motherboard business, built on a black PCB with blue and black memory and expansion slots.

Sapphire's mobo is a well-built board with decent attention paid to the components. This is particularly apparent in the power design which uses parts that you would normally expect to find on high-end boards.

The memory options in the BIOS go up to 1,866MHz as standard, which along with 1,600MHz modules is now officially recognised by JEDEC, the overlords of memory, as standard DDR3 speeds. The downside to using the faster 1,866MHz memory is that you are limited to using two slots, if you want to fill all four slots you'll have to drop the speed down.

We stuck in a couple of 1,600MHz modules, although the memory was reportedly being run at just 1,333MHz. A quick delve in to the BIOS to manually adjust a couple of things was all that was need to have everything speeding along at the right speed without any further problems.

When it comes to overclocking, the board's BIOS may not be quite as featur rich as say Asus's F1A75-V but it is still comprehensive enough to allow a good many tweaks. We got an AMD A8-3850 to play at 3.6GHz without any problems and that's a healthy 700MHz jump.

Setting up the Dual Graphics (AMD has dropped the CrossFire name for dual graphics setups in Llano) was as straightforward as dropping in a HD 6670 card into the slot. Having the secondary discrete GPU propping up the integrated graphics of the Llano Lynx APU yields a nice boost to frame rates.

There is only a single PCI-e slot, but on this platform a discrete GPU CrossFire setup would nullify the graphics part of the APU, essentially leaving you with a weak, basic CPU only. It makes sense then to have the option for a single discrete graphics card with the extra slot left over for a TV tuner or discrete sound card.

Unfortunately because of the relative newness of the Llano Lynx chipset there is a price-premium attached to this board. At £100 it's quite pricey for what should essentially be the basis for a cheap PC. With the APUs themselves costing around £100 as well, that's quite a total platform cost. ¤

Simon Crisp

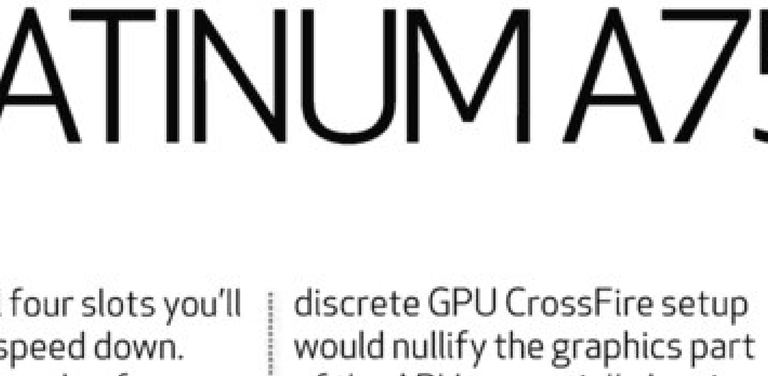
Technical analysis

For testing we've pitched Sapphire's board up against similar offerings from Asus and MSI. All three boards use the same chipset and we've used the same A8-3850 CPU too. Guess what? There's nothing separating them.

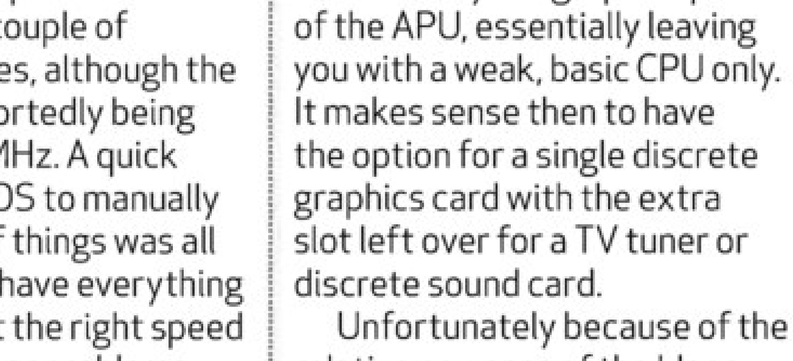
CPU rendering performance



CPU gaming performance



DirectX 11 1080p gaming performance



PCFormat Verdict

- Decent feature set
- Bundle includes a USB 3.0 front box
- Free *DiRT 3*!
- BIOS needs some tweaking

Not as feature rich as some competitors but still a good all-rounder for AMD's latest APU.

75

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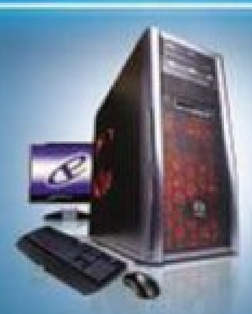
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i5	i5-2410M	£ 809
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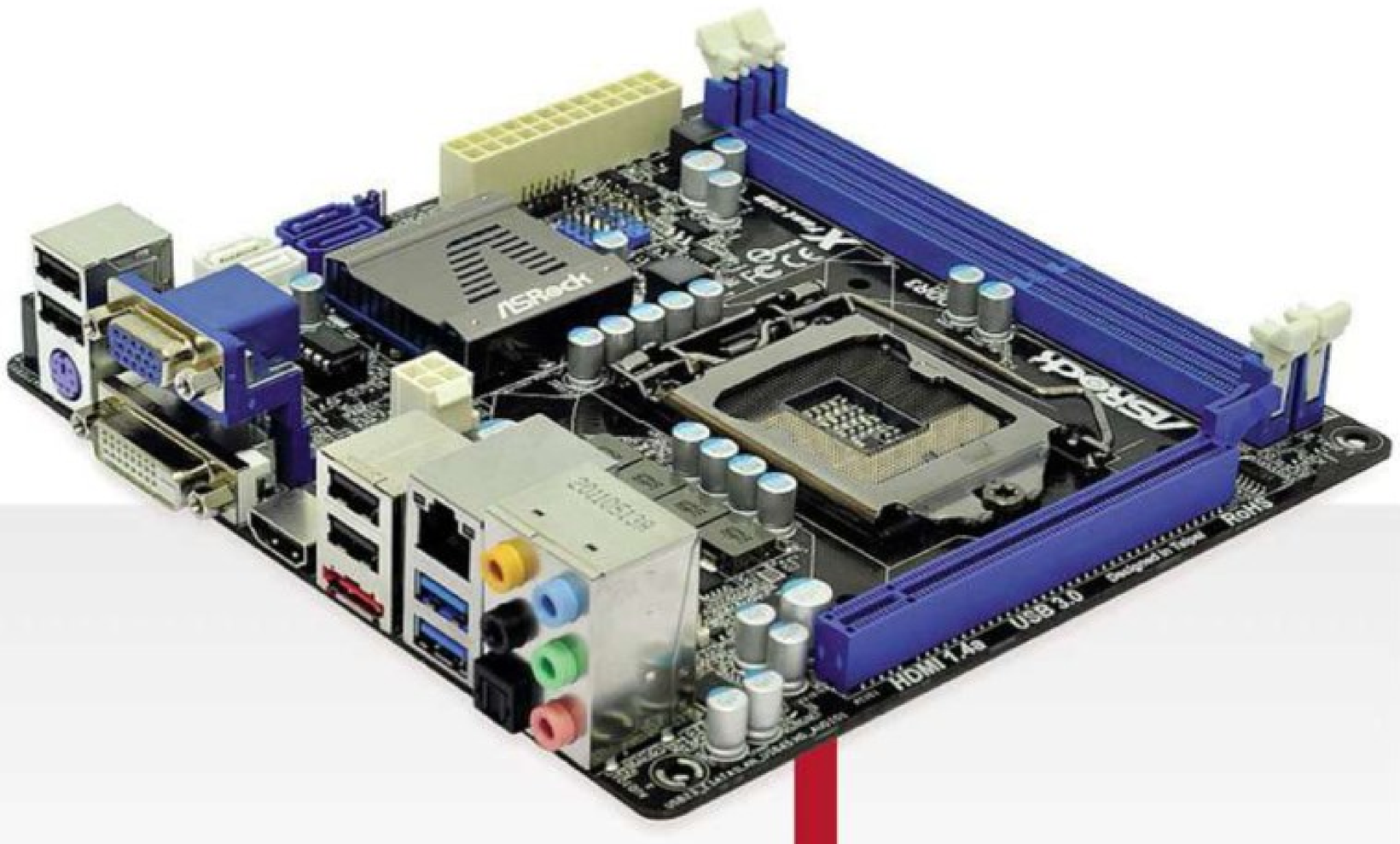
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£99/MOTHERBOARD

ASROCK Z68M-ITX/HT

The ITX format has finally come of age

Price £99 **Manufacturer** ASRock
Web www.asrock.com
Price check www.lambda-tek.com

We've been raving about the Sandy Bridge ITX boards since they first appeared and quite frankly we make no apologies for it. If you want to build a small, compact PC with plenty of grunt then now's the right time. The boards even come with a x16 PCI-e slot so you can keep gaming. We tested ours with a trusty HD6850 – it's quite a sight to see a graphics card looking bigger than the motherboard.

You may be of the opinion that a motherboard that measures 17cm square is just too small to be of much use, but one look at the following feature list might put an end to that. You get two DDR3 DIMM slots supporting up to 16GB of 2133MHz (OC) RAM, integrated eight-channel audio, Gigabit Ethernet, a pair each of SATA 3Gbps and SATA 6Gbps ports, four USB 2.0 and two USB 3.0 ports and the rear panel also holds the three output ports for the integrated video; DVI, VGA and HDMI.

You can tell ASRock has a pretty good idea where most of these boards will end up, because the company bundles a USB infrared dongle and a Windows MCE-compatible remote control in with the board.

Push the power

Overclocking isn't something a lot of the users of this board will be interested in – mostly because it will probably end up powering home theatre PCs and media systems. However, we gave it a go anyway. There's not enough space on the board for one of the seriously big third-party coolers, so extreme overclocking is out, but we got our example to run an i7 2600K happily at 4GHz without experiencing any problems.

It may not be quite as feature-rich as some of its tiny competitors, but ASRock's offering is still one of the most powerful ITX boards that we've seen to date. ¤ **Simon Crisp**

PCFormat Verdict

- Performance
- Decent feature set
- Bundled remote control
- Lack of Wi-Fi

A very good example of what can be done with the ITX format; it's finally come of age.

80

£61/CPU COOLER

BE QUIET DARK ROCK PRO C1

Price £61 **Manufacturer** Be Quiet
Web www.be-quiet.net
Price check www.ebuyer.com

Be Quiet's Dark Rock Pro C1 is a well put together twin stack cooler with a huge cooling area. Designed with each stack comprising 44 nickel-plated aluminium cooling fins, this is a serious chip chiller. The cooler uses seven 6mm heatpipes that run from the nickel-plated copper base plate and right through the two cooling stacks.

Sitting between each stack is one of the two 120mm SilentWing Be Quiet PWM fans used for cooling. Be Quiet claims they produce 57.2 CFM of air each and together only generate a quoted noise level of 25.9dB(A) at 1,700rpm – the fastest the fans spin. Both fans run off a single four-pin PWM motherboard connector and each is already fastened in place with tensioned wire mounts.

Size matters

As a result of its sheer size, this is another CPU cooler that makes the first memory slot and even the second one a bit tricky to occupy. Certainly, using modules with tall heatsinks is out, but standard sized modules should be okay.

The Pro C1 doesn't seem to cool as well as it should. In our tests it couldn't beat Scythe's Yasya for cooling, and the Yasya only uses a single 120mm fan. Although it's still a big cooler, it's somewhat smaller than Be Quiet's monster. You do get a nagging feeling that the Dark Rock Pro C1 should be doing better than it does. ¤ **SC**

PCFormat Verdict 70



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£78/CHASSIS

CORSAIR CARBIDE 400R

Price £78 **Manufacturer** Corsair
Web www.corsair.com
Price check www.scan.co.uk



The Corsair Carbide 400R sports a straight-laced design, but there are options to 'pimp out' the chassis if understated isn't your style. What's really important is what's inside the case, though – or, we should say, what can be inside the case.

The 400R is aimed primarily at enthusiasts who want to build and upgrade their own PC. As soon as we opened the case it was clear that Corsair is serious about attracting PC builders and enthusiasts.

Watch this space

As well as enabling easy installation, the size of the chassis accommodates plenty of components. There are four 5.25-inch bays and six 3.5-inch hard drive bays that can be converted into 2.5-inch bays for SSDs. You'll find eight expansion slots, 10 fan mounts (with two front-mounted 120mm fans and one rear 120mm fan included), and support for graphics cards up to 316mm in length. If you're a serious gamer, there's support for the Hydro Series H100 Liquid CPU Cooler and other watercooling systems.

This is a decent and well-made case that offers plenty of space for building a powerful PC. The 400R keeps things simple but still manages to pack a lot in for a great price. ¤ MH

PCFormat Verdict 81

£75/CHASSIS

THERMALTAKE ARMOR A30

Price £75 **Manufacturer** Thermaltake **Web** uk.thermaltake.eu
Price check www.dabs.com

The Thermaltake Armor A30 is a small chassis that's been designed to house some of the best gaming components money can buy, while maintaining a size that's small enough to carry around to LAN parties.

The small stature doesn't mean compromises have to be made, either – Mico-ATX and Mini-ITX motherboards can hold most of the latest technology without a problem. Sure, multiple GPU arrays are out of the question, and there's no denying that cramming the components in and upgrading isn't as simple as with the A30's more spacious siblings.

Armour plated

Straight away we could tell that the Armor A30 is a PC chassis that's been designed to be as visually striking as possible. As soon as you get it out of the box you understand the 'Armor' part of the name. Put simply, this is going to look out of place as a media centre or office PC.

While space is still at a premium (no surprise for a case whose proportions are just 10.5x11.5x18.0-inches), building and upgrading inside it is made much easier due to the modular design of the case.

Thermaltake's modular system enabled us to take out parts of the case, such as the hard drive enclosure, so that we could install components in their housings on the outside of the A30. This helped us to avoid some potentially infuriating and fiddly installations. ¤ MH

PCFormat Verdict 79



£21/MOUSE AND KEYBOARD

MICROSOFT WIRELESS OPTICAL DESKTOP 700

Price £21
Manufacturer Microsoft
Web www.microsoft.com
Price check www.advancetec.co.uk

Obscure Washington outfit Microsoft present us with this, the Wireless Optical Desktop 700. It's been fairly inconsistent in the design and quality of its peripherals lately, swinging from the sleek Arc Touch to the almost unusable Windows 7 Touch mouse.

Recommended at £30 but available for a shade over £20, the Wireless Optical Desktop 700 features a well-built keyboard running on AAA batteries and a slightly flimsy mouse running on AAs, each communicating with your PC or laptop via a wireless receiver.

Key feature

As far as this reviewer's weary fingers are concerned, the best thing about this package is the weighting of the keys. The mouse, however, is less satisfying underhand. It's extremely light, which makes it a bit of a nightmare in a gaming scenario. Despite this and some flimsy buttons, the real problem is that it goes to sleep too soon if you haven't moved it in a while. We can forgive the Wireless 700's unsuitability for gaming because that's not what it's designed for, but this has an impact on everyday desktop use. It's an issue that plagues many wireless mice, particularly at the budget end.

The big problem here is the absence of any lights for caps, num and scroll locks. Okay, it's £30, but no lights? It affects the most fundamental keyboard tasks, and is something that £10 keyboards get right.

It's easy to get up and running wirelessly and while the mouse doesn't feel great, we doubt either peripheral will fall apart any time soon. However, you should only consider this keyboard and mouse if your needs necessitate a wireless setup, and your budget's locked down to this price point. There are better wired bundles for the same price, and better wireless ones for a bit more. ¤ PI

PCFormat Verdict 70





BEST BARGAIN LAPTOPS

Chris Barraclough separates the best from the rest in the world of budget lappies

Buying a laptop for under £500 is tricky. There's always a lurking suspicion in the back of your mind, no matter how many times you pore over the spec sheet, that a machine this cheap won't do all the things you want it to. Perhaps it'll take days to open your web browser, or suffer poor frame rates running even *Free Hearts*?

There's no need to worry. It's actually a pretty good time for mobile devices, because everybody seems so hell-bent on running around with every possible form of technology strapped to themselves at all times. Who are manufacturers to argue?

We've seen some encouraging advances in integrated graphics over the last 12 months, which means laptops don't need a discrete card to deliver smooth video playback. Solid state drives have driven down the price of traditional hard disk storage, too, which means budget laptops are generally very capacious compared to their ancestors from a few years ago.

So if you're not asking a lot from a laptop, you'll find machines capable of web browsing, video playback and running office apps very comfortably for under £350. We've gone and bundled together a smörgåsbord of likely candidates for your delectation, deliberation and entertainment, each one priced under that bargainous £350 mark.

At this price point, a laptop's not going to do everything; it's about specialisation. Some are feather-light ultraportables, others compromise slimness for a higher spec and solid build quality, others still are primarily aimed at the business market and excel at running office apps and storing data.

Not that you need to be a road warrior with a bad back and a tendency to drop things to enjoy these features. Hardcore gaming's off the menu as far as this bunch is concerned, but despite specialisation in certain areas each of these laptops is great for everyday use. The budget market's strong; a lot stronger than it was even five years ago, and now's a good time to take advantage of these great budget laptops.

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ACER ASPIRE 5742-384G32MNK

Spending less can get you more

VITAL STATISTICS

Price £349 **Manufacturer** Acer **Web** www.acer.co.uk **Processor** Intel Core i3 380M **Memory** 4GB **Storage** 320GB **Optical drive** DVD SuperMulti **Screen size & type** 15.6-inch Super-TFT **Graphics card** Integrated Intel HD **Weight** 2.3Kg **Price check** www.saveonlaptops.co.uk

This Acer has a couple of killer aces up its sleeve, despite the low price tag. It's a shining example of a budget laptop done well.

At this price range, most laptops use basic or older processors to cut costs. However, the Acer and Asus in this group are powered by Intel Core i3 processors, which provide excellent performance for the price. This laptop blew away the competition in our tests, thanks also in part to having 4GB of memory – more than any other laptop here. All of our software loaded quickly and ran with little slowdown, and we could copy files, browse the web and listen to music all at once.

Although the Aspire is less graphically able than some of the other machines here, we still streamed high-definition (HD) films with no stuttering or other issues. We watched almost three hours of HD video on the move before the battery died – the best result in this group.

You can also browse and edit your photos, but editing video and playing games are beyond this laptop's abilities. Three USB ports are available, while VGA and HDMI connections can be used to hook up televisions or monitors. Acer's standard raised keyboard design is a winner as always. The keys are a great size, despite the inclusion of a separate numeric keypad, and the touchpad is sensitive.

The Aspire offers excellent value for money, thanks to its powerful budget Intel processor. The light frame and long-lasting battery mean you can use it as a regular travel companion. ¤

PCFormat Verdict

- 4GB RAM
- Solid build
- Light
- Games and editing

There's a lot on offer here, but the weight, battery life and CPU clout are the highlights.

90

ASUS X52F-EX894V

Stunning performance for the price

VITAL STATISTICS

Price £350 **Manufacturer** Asus **Web** uk.asus.com **Processor** Intel 2.13GHz Core i3 330M **Memory** 2GB **Storage** 320GB **Optical drive** DVD SuperMulti **Screen size & type** 15.6-inch Super-TFT **Graphics card** Intel HD **Weight** 2.7Kg **Price check** www.saveonlaptops.co.uk

The Asus is powered by an Intel Core i3 processor, which provides strong performance for those on a tight budget. Despite using the same processor range as the Acer, it has only half the available memory, with 2GB installed instead of 4GB. However, you still get incredible performance given the price.

You can edit your photos, but you won't be able to play the latest games. Film fans will be pleased, though, as you can watch DVDs via the built-in drive or stream your favourite movies or TV shows over the internet.

This is also a great way to enjoy your media, thanks to the excellent screen. The 15.6-inch display isn't as sharp as the compact screens of the HP and MSI, but but it's bright and vibrant.

The 320GB hard drive gives you plenty of storage. You also have a 4-in-1 memory card reader, which can be used to back up your data, and there are three USB ports.

If you need something to take on the road, you should look elsewhere. The 2.7Kg chassis is the heaviest in the group, while the battery died after less than two hours of use, the worst result here.

The isolation-style keyboard is well built with firmly mounted keys. We were also impressed by the Altec Lansing speakers which, while lacking power at top volume, produced a crisp and clear sound.

The Asus offers a great deal at a low cost. Only portability lets it down. ¤

PCFormat Verdict

- Strong CPU
- Media-friendly
- Nice built-in speakers
- Heavy chassis

Not the most portable, but worth a look for the quality screen, speakers and comfy keyboard.

89

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£344/LAPTOP

£299/LAPTOP

MSI U270

A highly portable machine, but let down by poor performance

VITAL STATISTICS

Price £344 **Manufacturer** MSI **Web** uk.msi.com **Processor** AMD 1GHz E-350 **Memory** 2GB **Storage** 320GB **Optical drive** No **Screen size & type** 11.6-inch **Graphics card** AMD Radeon HD 6310 **Weight** 1.5Kg **Price check** www.scan.co.uk

The MSI looks and feels like a netbook, but its sharp screen and graphically capable processor push it more into the realm of an ultraportable laptop.

An AMD processor runs the show – the same model as found in the HP. First impressions were bad as it scored a similarly low score in our benchmarking tests. While you can comfortably browse the web and run basic office apps, it does drag when you try to do things in parallel.

We were pleasantly surprised when we ran the graphical tests. The U270 scored the best in the group, narrowly edging out the HP, and we found that photo-editing software ran acceptably. However, some of our HD films stuttered badly during play. Also bear in mind that, like the HP, there's no built-in DVD drive. The 11.6-inch screen may be small, but it's a well-designed panel. The lack of a glossy Super-TFT finish means you can see perfectly outside, with no reflections to hamper your view.

This is the lightest machine here at 1.5kg, but the 42mm chassis is surprisingly thick. The battery outlives everything except the Acer, giving almost three hours of video playback before finally running out.

The MSI's touchpad is a little on the cramped side, but the increased sensitivity it offers makes up for this. You can always attach a mouse using a USB port – there are three, one of which is USB 3.0.

If you want an affordable laptop for working on basic office software, and need a mobile machine so you can stay productive on the go, the U270 is worth considering.

PCFormat Verdict

- Powerful integrated graphics
- Clear screen
- Can't multitask
- Weak chops

Class-leading graphics power, but lacking too much in other areas to get our full approval.

70

SAMSUNG RV510-A08UK

Portable but lacks graphical punch

VITAL STATISTICS

Price £299 **Manufacturer** Samsung **Web** www.samsung.com/uk **Processor** Intel 2.3GHz Pentium T4500 **Memory** 3GB **Storage** 500GB **Optical drive** DVD **Screen size & type** 15.6-inch Super-TFT **Graphics card** Intel GMA 4500M **Weight** 2.4Kg **Price check** www.laptopsdirect.co.uk

The Samsung isn't the most exciting laptop in this test, and its performance is limited compared to some of the others, but this is a solid and reasonably portable machine that will suit users with basic needs.

At 2.4kg, it's just about portable enough to suit regular travellers, despite the rather thick frame. You'll need to take the charger with you, though, as the battery died after just over two hours of video playback.

An Intel Pentium processor provides the power. Combined with 3GB of memory, you get good enough performance to run all your office applications, enjoy your photos and movies and browse the web. Where this laptop falls down is its graphical ability. Basic integrated graphics provide one of the worst performances in the group, with HD video stuttering far too often and movie-editing software proving unusable.

The display is reasonably bright and colourful, with wide viewing angles. We enjoyed using the firm, well-constructed keyboard. The touchpad is rather small, but we brushed it often with our palms when typing, which caused the cursor to skip around the screen.

The 500GB hard drive is the most spacious here. You have three USB ports, but only a VGA port to hook up televisions, so you can't output HD content to a bigger screen.

While its performance is limited by the basic graphics, this is a solid machine with lots of storage that works well for office applications.

PCFormat Verdict

- Well built
- Portable
- Old CPU
- Terrible integrated graphics

This is best suited to office apps on the go – not the best machine for entertainment.

72

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£300/LAPTOP

TOSHIBA SATELLITE C660-15Z

A well-built basic machine



VITAL STATISTICS

Price £300 **Manufacturer** Toshiba **Web** www.toshiba.co.uk **Processor** Intel 2.3GHz Celeron 925 **Memory** 2GB **Storage** 250GB (5,400rpm) **Optical drive** DVD **Screen size & type** 15.6-inch Super-TFT **Graphics card** Intel GMA 4500M **Weight** 2.4Kg **Price check** www.amazon.co.uk

Toshiba's Satellite C660-15Z is for those with simple needs. Performance relies on a single-core Intel Celeron processor, backed up by just 2GB of memory and unfortunately, scored well behind most of the other laptops, and can only handle basic tasks, such as word processing and web browsing.

The basic integrated graphics can also cope with only the simple media tasks, such as watching DVDs or editing photos. Games are limited to the most simple online titles, such as *Bejewelled*.

There are more portable laptops in this group, the C660 is still relatively light and the full-sized keyboard is comfortable and solidly mounted on the chassis.

Even better is the battery, which lasted two and a half hours with us hammering it on full settings in a local café, again though, the Super-TFT screen is typically reflective outdoors.

If you need an affordable laptop for browsing the web, running basic software this will do the job, but that's about it.

PCFormat Verdict

- Can take a beating
- Handles office apps
- Single-core CP
- Unwatchable HD playback

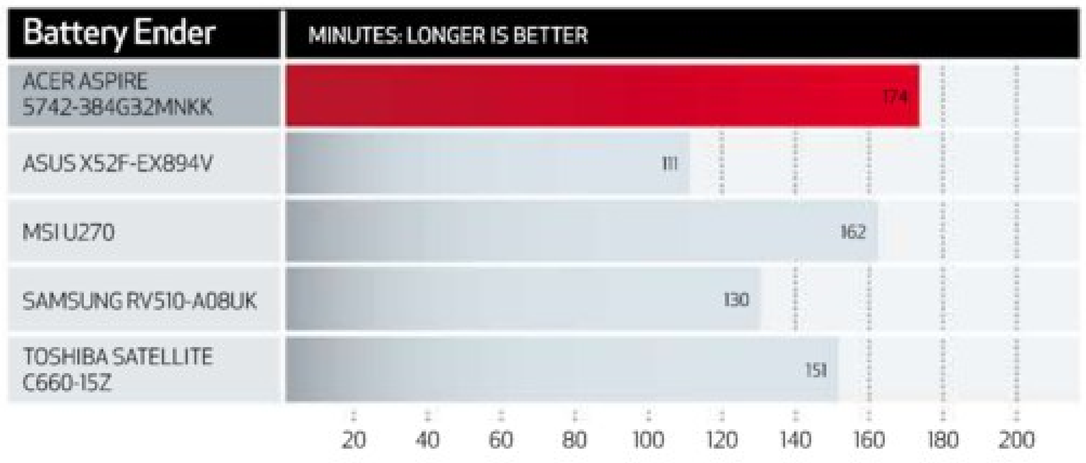
Old CPU tech limits this laptop to web browsing and other similarly non-strenuous activity.

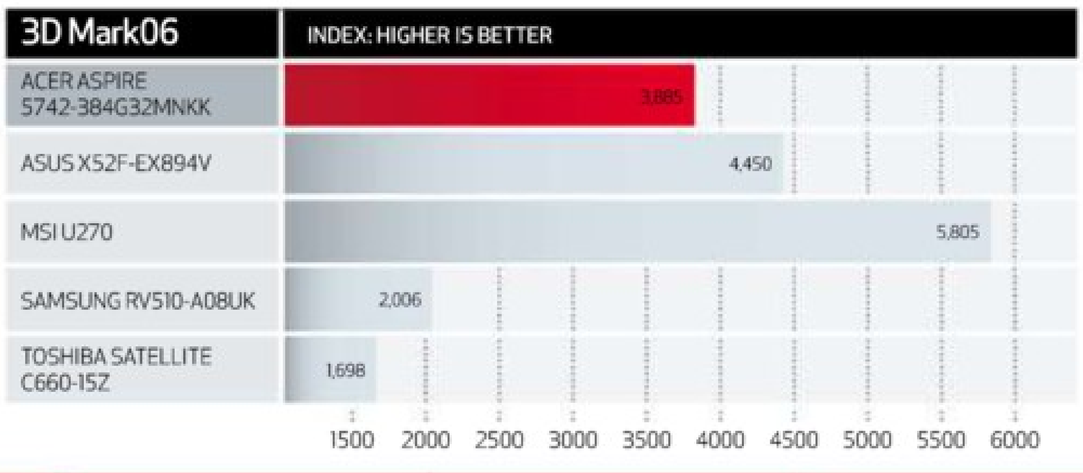
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Technical analysis

Battery Eater is a handy benchmark for finding out a laptop's battery life under extreme stress – it's the equivalent of leaving your car all your lights on and the radio playing at max volume all night. Acer's Aspire dealt best with this brutal depletion of energy, making it the most enticing option for long train journeys or particularly long stints in Starbucks.

None of the laptops we tested were designed with gaming in mind, but the ones equipped with current gen Intel i3 CPUs and AMD's nifty new Llano chip didn't do too badly considering. Our favourite Acer lappy was pipped by the Llano-equipped MSI, but its all-round performance won us over.





SPECS

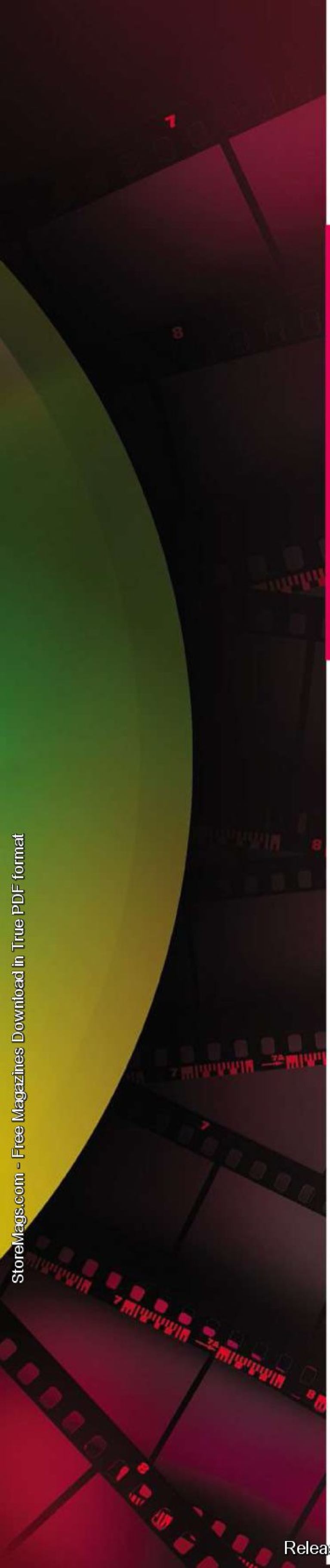
	Acer Aspire 5742 -384G32MNK	Asus X52F-EX894V	MSI U270	Samsung RV510-A08UK	Toshiba Satellite C660-15Z
Price	£349	£350	£344	£299	£299
Processor	Intel Core i3 380M	Intel 2.13GHz Core i3 330M	AMD 1.6GHz E-350	Intel 2.3GHz Pentium T4500	Intel 2.3GHz Celeron 925
Memory	4GB	4GB	2GB	3GB	2GB
Storage	320GB	320GB	320GB	500GB	250GB (5400rpm)
Screen size and type	15.6-inch Super-TFT	15.6-inch Super-TFT	11.6-inch	15.6-inch Super-TFT	15.6-inch Super-TFT
Native resolution (pixels)	1,366 x 768 (WXGA)	1,366 x 768 (WXGA)	1,366 x 768 (WXGA)	1,366 x 768 (WXGA)	1,366 x 768 (WXGA)
Graphics adaptor	Integrated Intel HD	Intel HD	AMD Radeon HD 6310	Intel GMA 4500M	Intel GMA 4500M
Weight	2.3Kg	2.7Kg	1.5Kg	2.4Kg	2.4Kg
Display	VGA, HDMI	VGA, HDMI	VGA, HDMI	VGA	VGA

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THE ULTIMATE MOVIE MACHINE

ONE MEDIA CENTER TO FIND THEM AND WITH A NETWORK BIND THEM. TAKE BACK CONTROL OF YOUR MEDIA WITH NEIL MOHR'S GUIDE TO CREATING THE ONE IDEAL SYSTEM

It finally feels like we're living in the future, there are indeed flying cars, people are getting robotic limbs and our insect overlords have ushered in a third decade of peace and prosperity. Mmm, one of those may not have happened, but we are certainly in a brave new world of digital innovation. Despite that thanks to terrible companies blocking innovation, pushing their own awful systems and agendas we're stuck in a world where playing file A on device B via network C still isn't a simple thing.

It's all our stuff and it's all on our paid-for networks and yet that's not good enough. It doesn't help that Microsoft, Apple and whoever next controls the majority, thinks its system is best, be it Windows or iTunes. Frankly we think they're all awful, anything – as Apple should well know – that comes between you and doing what you want, is unnecessary.

Nothing highlights this more than with media. Apple's success shows it got it right, people just need a simple, stylish one-click system to play and enjoy their music and video. But where both Apple and Microsoft got it wrong is with the restrictive ecosystem they both implemented.

Media Center is annoying and limited, iTunes can be elegant but in certain ways is even more restrictive. What you want is a system in place that enables you to enjoy your media, no matter what it is or where it is, on whatever device you happen to have. Thankfully we have the answer, or answers.

From slapping Windows Media Center around the face and neck until it behaves, to installing complete replacements for it. There are ways you can simply get your media better formatted so programs display glamorous posters and details. None of this effectively changes how you might currently store your media, it's just adding or improving the existing software layer so it interacts far better with it. The main key to all of this however, is using a server, which is a scary name for simply having a central storage box. This could be your main PC or a box under the stairs but providing better access to the media stored on it will transform how you enjoy it all.

Illustration: **Paul Blachford**

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Windows Media Center on steroids

WE'RE NOT THE ONLY ONES WHO TRIED MEDIA CENTER JUST TO GIVE UP MINUTES LATER – THIS TIME MAKE IT WORK FOR YOU

Have you done this: clicked the Start Menu Windows Media Center link, been vaguely impressed by its opening animation, bored by its set-up process and then instantly confused by why it even exists? Join the club. Part of the problem is people often use Windows Media Center (WMC) on a desktop system, where it makes no sense; you're best off with Windows Media Player every time. Another key issue is that WMC is designed for remote control use, with you and your bum firmly entrenched on a sofa. But the killer by far is that by default it can't play your favourite files.

Before we do anything the first thing you'll want to do is make sure WMC is capable of playing the widest range of music and video files possible. Annoyingly, Windows Vista and 7 altered the way WMC treats system codecs, effectively ignoring the standard installed ones. The situation is further complicated by 64-bit systems using WMC and the sheer number of possible codecs, subtitles and audio decoders out there.



Above With a few meta tags and posters WMC already looks better

A minimalist approach is to just install the latest Haali Media Splitter from haali.su/mkv this will provide playback, however you will certainly find some more advanced audio codecs missing. We found many people recommending the codec pack from Shark007.net, it is a somewhat overly complicated pack but it offers complete compatibility and a 64-bit companion suite. Once installed make sure that when you start the configuration tool from the Start Menu to right-click and choose 'Run as Administrator'. Just select the 'Shark007 Recommended Settings' at the bottom and you're away.

Playing the field

Now that you know WMC is going to happily play everything you throw at it, plus, almost as importantly, create those pretty thumbnails, just how are you going to enjoy Media Center? In the past you may have thought of a networked HTPC, today even a lowly netbook connected to a HDTV can do the trick with HD content, and do it far more quietly. We would recommend nabbing a cheap WMC USB infrared remote controller, as they will make your media life a touch more luxurious and work with many other media players as well.

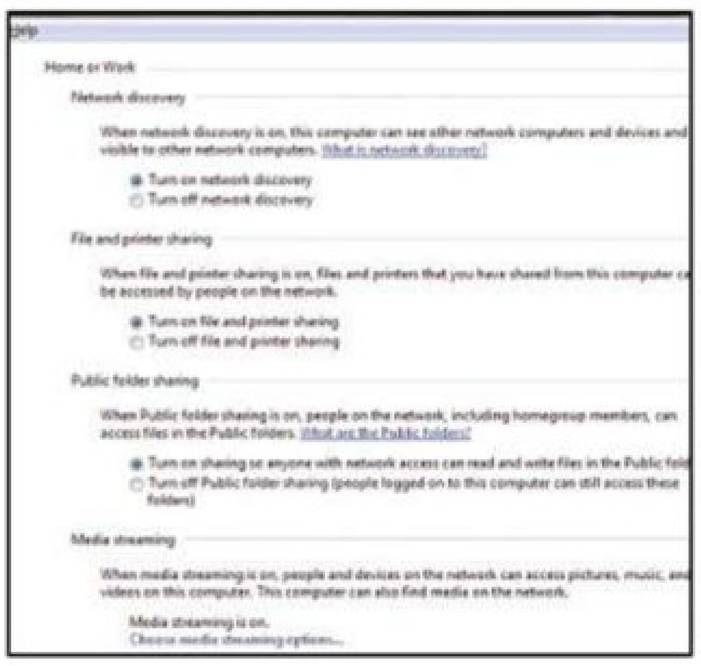
TOP TIPS

FIND YOUR GSPOT

One problem you may face whilst messing around with a lot of video files is not knowing which codecs a particular video may have been used. This is where GSpot (www.headbands.com/gspot) comes in. It's old, but still useful.

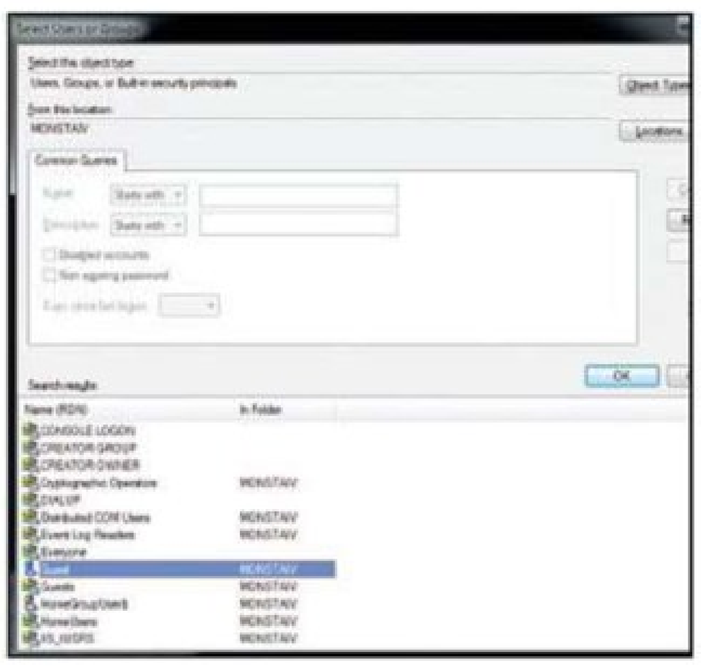
Share and share alike

Three-steps to using Windows network shares



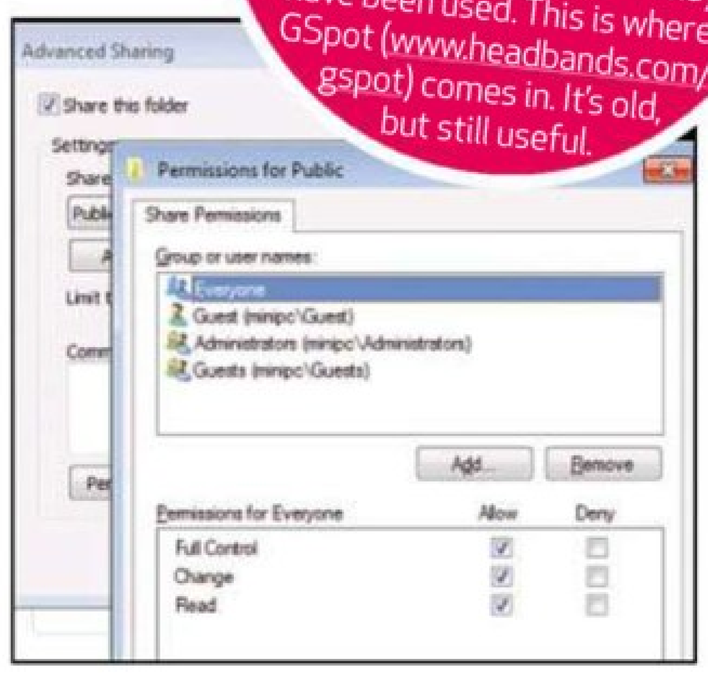
1 Check network settings

Win7 introduced HomeShare so presuming your network is set on the server box, open the Control Panel > Network and Sharing Center > Manage Advanced Sharing, and make sure 'Turn on network discovery' and 'Turn on file and print sharing' are checked. Also select 'Turn off password protected sharing' and select 'Use user accounts…'



2 Create the share

At this point other PCs on the network should be able to see the server and if you enable it, be able to open shared folders too. Now make a folder or drive available to share. Right-click a folder, select Properties > Sharing > Advanced Sharing, click 'Share this folder' and give it a name. Next we need to add users that can share it.



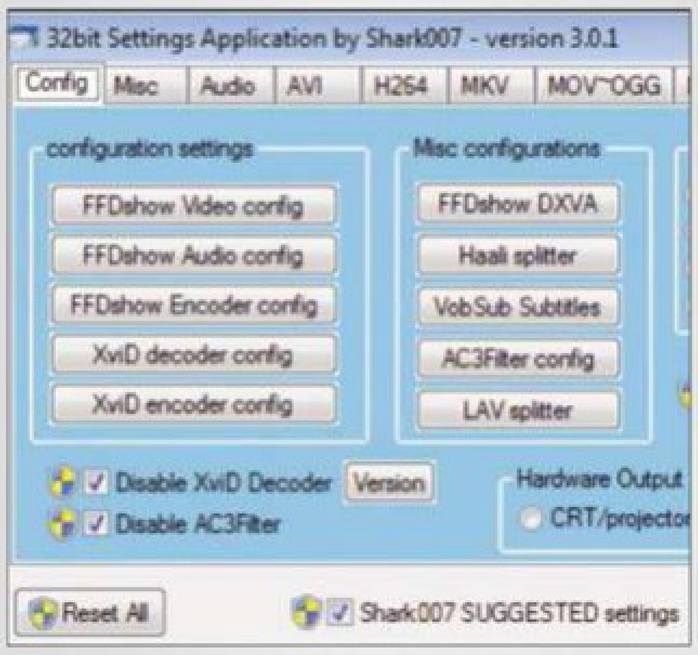
3 Add users and test

From the same dialog, click Permissions > Add > Advanced > Find Now. This generates a list of possible user accounts. By adding additional users you can implement individual, password protected access to specific folders, usually this is easiest to do by using the Computer Management console.

Better codecs

Get your system set for playing anything you throw at it







1 On the pull

The most comprehensive codec pack out there at the moment is the Shark007 pack (shark007.net). You can try installing your own MKV splitter, it won't necessarily be registered correctly with Windows Media Player nor will you gain the right audio or subtitle decoders you require for full compatibility. The website is something of a mess but the correct link is at top of the page.

2 Get it set

To setup the Shark007 pack correctly you need to run it in administrator mode. Locate the Settings Application in the Start Menu, right click it and choose 'Run as administrator'. Once in the easiest option is to select the Shark007 Suggested settings at the bottom of the windows. There are additional options in there for DXVA acceleration that you may want to enable.

3 64-bits please

An area of added annoyance is that the Codec system uses separate codecs for both 32-bit and 64-bit apps. As we are moving towards using 64-bit software more widely it's going to become more common to need 64-bit compatibility. Again Shark007 provides an additional 64-bit x64 Components download. You'll need to set-up as per the previous step.

eBay should put you right for less than a tenner.

While you can store files locally on the laptop or HTPC we're guessing any sane *PC Format* reader will be running a server box of some description. Creating a Windows network share is by far the best option, and then you can point Windows Media Center to this for your viewing pleasure.

Mount up

If you would like a more straightforward life the easiest option is to create for yourself a mounted network share, as this will guarantee that the remote folder is mounted and it will also look like a standard drive to Windows. Additionally, this will simplify adding the drive to Windows Media Center as it will automatically pick it up.

Remote shares and local folders are managed via the Media Library, in Windows Media Center you will need to select Tasks > Media Libraries. You're able to add local and remote shares to all the listed sections, for films we recommend Videos over Movies but both will work. If you want to add a standard Windows shared folder, choose 'On another computer' to add remote shares. If you have problems try 'Let me manually add a shared folder'. The poor design of WMC screams at this point as you cant edit or paste the path in WMC. You'll need to manually type the whole thing starting with a double backslash.

Possibly one of the greatest things we've ever seen for Windows Media Center is the BBC iPlayer plug-in. This was a project to bring iPlayer to WMC, and development got to a working system but it was abandoned in 2009, only to be picked up again here: bit.ly/qB4KKL. Just download and install this bad boy, the interface is beautiful in its simplicity but even manages to mimic the Beeb's iPlayer style.

The chap behind the reboot has recently shown off an update that also integrates TED Talks, 4oD and a host of other channels into the player so keep an eye on this for a massive update. We also suggest taking a look at www.mediabrowser.tv this is another plug-in that provides a new entry in the main WMC menu and offers a slick alternative to the typical Movie or Video display. The free version works perfectly but paid-for add-ons provide even slicker presentations and custom themes. Our final suggestion is the TagSupport plug-in (www.softpointer.com) this enables WMC to support more audio file formats, such as OGG and Flac, which is essential for helping access your entire audio library.

The cable guy

The real point of Media Center is to enjoy music, TV and films on a big screen. The ideal solution is an HDTV and with all offering HDMI, usually a D-Sub VGA port and occasionally DVI, it shouldn't be too difficult getting a suitable cable plus adaptor combination.

Even with HDMI an HDTV sometimes doesn't correctly detect the resolution. It's often the case you'll need to tweak the exact resolution within the display driver. For full HD 1,920 x 1,080 usually works without issues. At 720p try 1,280 x 720 up to 1,366 x 768 to get a sharp image.

For a genuinely home cinema experience you should consider upgrading to a projector. Entry-level 720p units are surprisingly affordable at around £400.

This isn't an audiophile article, so we're not worrying too much about audio. For us a 3.5mm mini-jack audio cable from the laptop or HTPC to the TV will suffice. Any up-to-date system providing HDMI will carry surround digital audio over the HDMI cable. For older desktops you may need to internally add a digital audio cable for this to happen. Beyond that, if the PC provides an external optical or coaxial audio output, most HDTVs will provide inputs for those as well.



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People under the stairs



It's worth mentioning a few hardware elements that we would recommend. One is a good server box, and while the term 'server' can be a little scary it's just another PC box like any other. For standard file-serving a single-core system with 1GB of RAM will do the trick without an issue (we've got a Pentium 4 box that has been happily serving files 24/7 for years).

While any box will do, a dedicated one with multiple hard drive bays would be beneficial. They don't have to be hot-swappable, but being able to run three or four drives is useful for expansion no matter if you're thinking of RAID or not. The unit will need a graphics card, but keep in mind that you can off-load encoding to the server with CUDA or DXVA acceleration. You can always use an old NVIDIA 8600 card and it'll only bump power consumption by 1W or so when not being used. You will also want this connected by Ethernet to your broadband router and add it to any wireless access point to ensure maximum throughput.

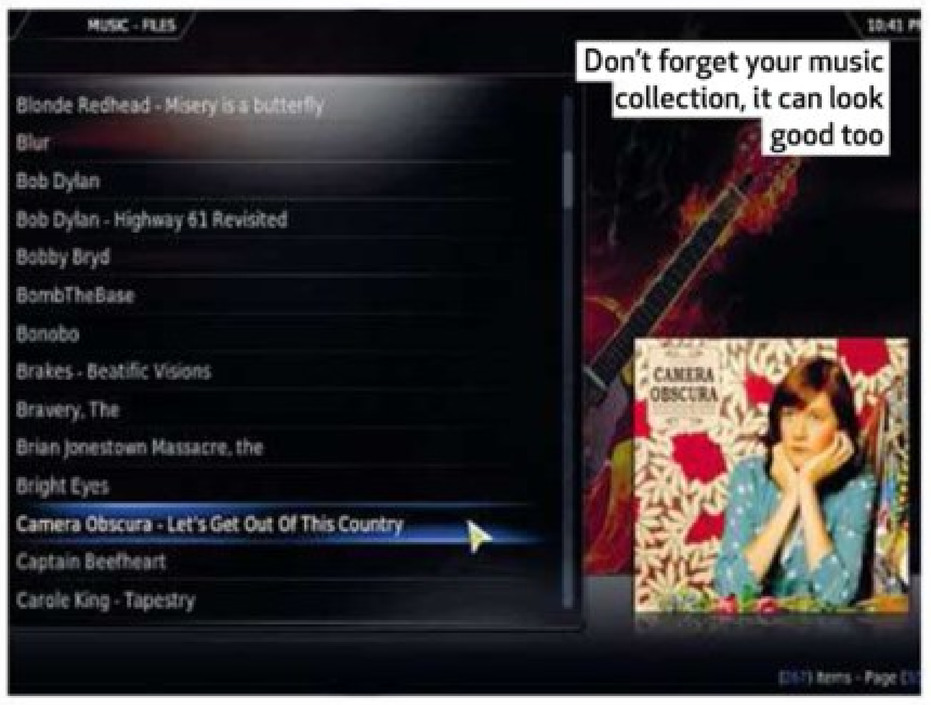
Attached storage

If you're lazy then you may be better off with a basic NAS box. For instance, the Netgear ReadyNAS Duo comes with 2TB of storage and has twin hot-swappable bays for just over £200. Hook a NAS up to your network, remote administer it and use it to store all of your media, data and backups. The main disadvantage of using a NAS solution is that its functions are relatively fixed. Some NAS boxes offer download services, print servers, FTP options and other basic network services, it's not possible to bolt on complex or cutting-edge services, such as iPad transcoding or whatever the next trend is.

Going beyond Media Center

DONT BE RESTRICTED BY MICROSOFT, UNLEASH MEDIA OVER YOUR NETWORK

If you've stuck with us so far, congratulations, you should also be enjoying a much improved time with Windows Media Center but just like The Carpenters we've only just begun. So far we've looked at making more of WMC and we've taken it about as far as we're able, but there is one more trick that will benefit not just it, but any other media centre you might choose. That trick is getting your meta tags in order.



Meta tags are like human-created quantum particles: being both the dullest and most amazing thing for your media collection. Properly created and organised meta tags will transform a media collection from a dull list of text into a blazingly beautiful kaleidoscope of full-screen posters and cover-flow vistas. At a basic Windows Media Center level this will replace automatically generated and therefore random thumbnails with official and fan-made posters. At the more extreme end of things it enables banners, full-screen backdrops and complete plot synopsis with actor details and IMDB ratings for both films, TV series and also your music collection.

The secret to a better media collection is getting a good meta tag manager, these scan folders and file names checking for existing tags, plus other telltale signs of the file's origin, then go cap-in-hand to a suitable internet database, such as IMDB, TVDB or even just Amazon for full details on the title. At this point it can automatically attempt to identify the correct title, can give up or can return a potential list of titles for you to choose from. Once selected it'll pull down information on the full title, the year it was released, credits and so on, plus official artwork, fan posters and much more. Importantly, the manager also needs to save this in a way that the different available media centres retrieve the details in specific .XML, .NFO and .JPG files.

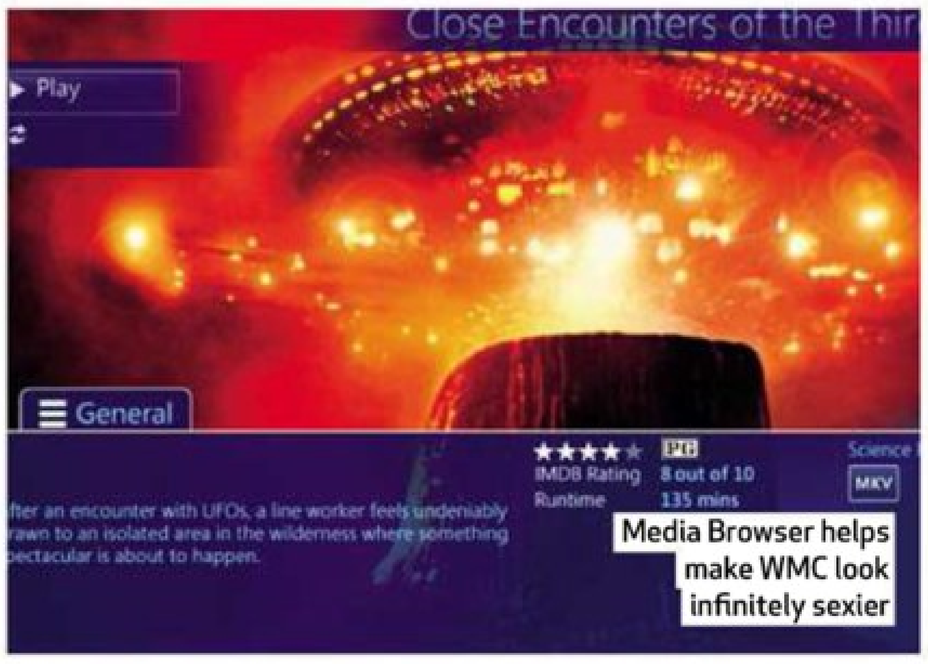
> "The secret to a better media collection is getting a good meta tag manager"

Jargon explained

Codec
Short for compressor-decompressor, a codec is a program that can encode or decode a digital data stream or signal.

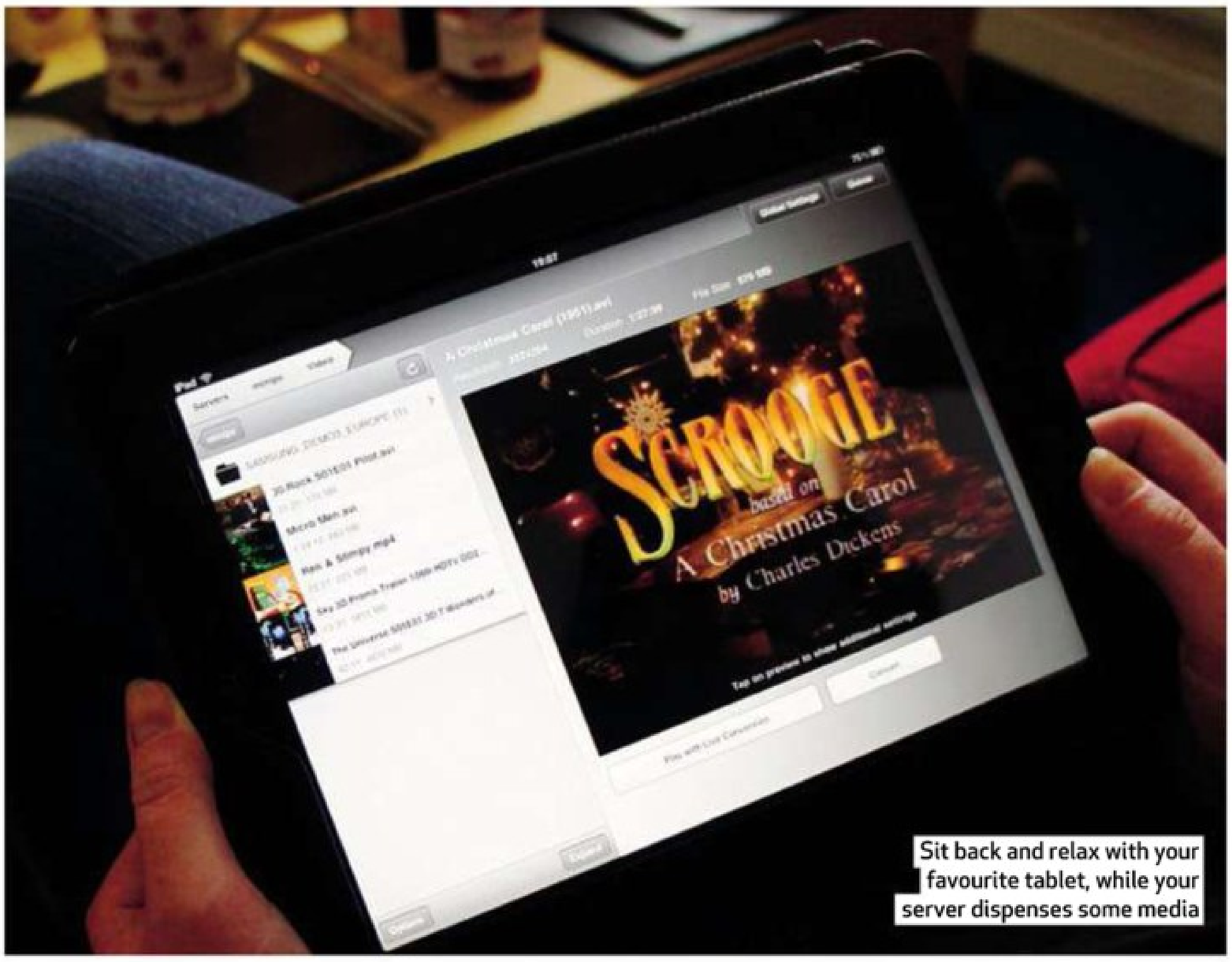
One such program is YAMMM or Yet Another Media Meta Manager over at mikinho.com/yammm. This is a fully automated solution that runs as a Windows Service in the background, this can be a little unnerving as you won't know exactly what it's up to. It's a free program that is still loosely supported, the current release is from mid-2010 but a major update with TV series support is promised. It'll read the structure of any base folder you point it at and download poster and background artwork. It also has a comprehensive folder/file renaming system that can greatly tidy up the titles you see within your media center.

YAMMM is only aimed at films, these have to be in their own folder and it provides no manual override or choice if there's a problem. If you have movie files stored flat in the folder the author suggests running this single line



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Sit back and relax with your favourite tablet, while your server dispenses some media

command from the command line CD'd to the appropriate folder:
FOR %i IN (*.*) DO (IF NOT EXIST "%~ni" MD "%~ni") & (MOVE "%i" "%~ni")

If you don't mind getting your hands dirty to a degree then Media Center Master (www.mediacentermaster.com) is an amazingly powerful tool. It has free and paid-for features but even in its basic form is a powerful film and TV meta manager, capable of automatically grabbing posters and banners, along with full details of the programme or film. Usefully, it also provides a solid manual mode so any programmes that remain can easily be looked up and Media Center Master will then be able to scurry off with a provided IMDB code to the correct place.

The same goes for your music collection, if its not named, tagged and with the right album art its not going to look the part when you start browsing through it with your friends. If your music collection is as unruly as Alan's pants drawer then head over to www.mp3tag.de and grab the free MP3tag. It's an ideal tool for tidying up and grabbing album art as it happily ties in with the FreeDB music collection as well as Amazon. This should mean for the majority of your music you'll be able to get correct names and artwork with just a few clicks.

Total replacement

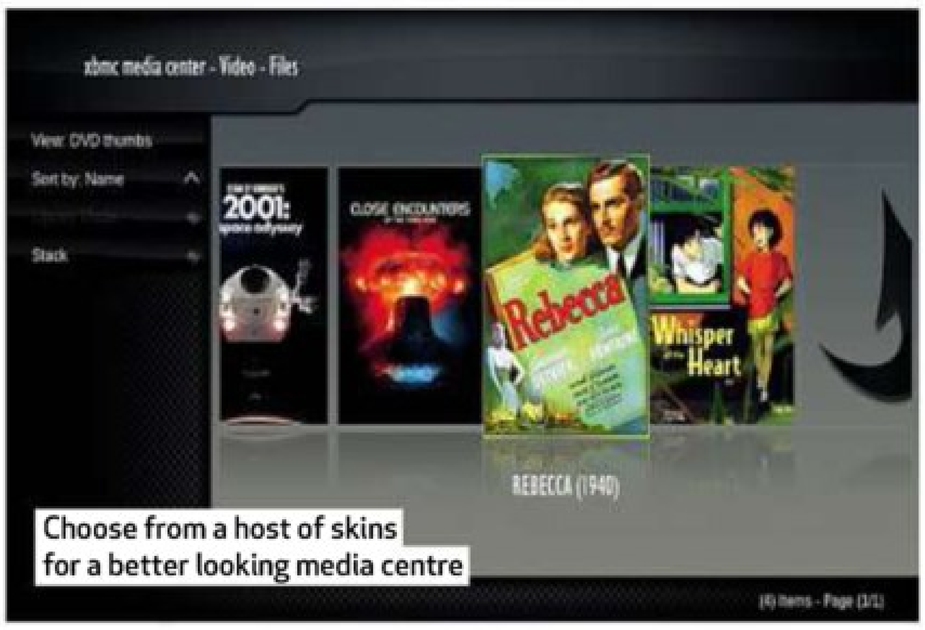
So now things are looking prettier, its time to start making things look even better and do more. At this point we're going to dump WMC, it is possible to extend it via plug-ins but we're wanting to explore new places and try out new

"XBMC has always been designed to look good with HD menus and skins"

things. That means having to go beyond the limitations of WMC. We're going to recommend two drop-in replacements and the first of these is Xbox Media Center more commonly called XBMC from xbmc.org.

No matter if you're running media from the local machine or have it available on remote shares, XBMC is a drop-in and enjoy solution. It doesn't require much more configuration than pointing it to the right media folders. Actively supported for many years now, it has always been designed to look good with HD menus and a good choice of skins to choose from.

It's also easily extended through its plug-in system, this has recently been upgraded so they can be easily installed from within XBMC itself. This makes it relatively easy to add support for



Choose from a host of skins for a better looking media centre

Linux to the rescue



It's not a struggle making Mythbuntu look pretty, it does that by default

Back in the mists of time (PCF248), we took an in-depth look at an amazing all-in-one multi-role media centre called Mythbuntu. If you missed that, it's a complete frontend and backend system that attempts to provide everything you need in a single system. The main stumbling block is that it's based on Linux and therefore more complex to set up than anything else, and don't let any Linux fans try and tell you differently.

The benefit is that many of the advanced features we talk about here are in Mythbuntu by default. So while it can be a struggle to get some media centres to automatically pick up film and programme details, plus pull off the internet pretty covers and powers, Mythbuntu does it automatically from the outset.

Ain't no fantasy

Mythbuntu is also under constant development by a historically reliable group. So it's not going to fade away like many other projects. It's designed to be an easy-to-install and easy-to-use digital home-entertainment system, which is more than capable of meeting all of your entertainment needs; it's a PVR, it's a jukebox, it's a DVD player, it's a games console and more.

A single backend system can serve multiple streams of live TV, while pausing and recording multiple channels from a bank of installed TV tuners. The system will even cut-out adverts and re-encode the video in its downtime and can batch-process across multiple backend systems. The latest storage folder system implements a single file area that virtualises storage not only across multiple local folders and hard drives, but across multiple networked PCs. It's impressive but can be a tussle to set-up.

Store4egg.com



Don't forget to add the Windows Media Center official remote



TOP TIPS

SET-TOP KNOW HOW

If you've been looking to slide a media player under your television, then your work here can still pay off - the likes of AC Ryan's PlayOn! DVR HD supports YAMJ, which is capable of a making a great interface for your movies.

MediaPortal uses a single installer, but installation for a client system is substantially different to that of a TV server. On your server run the standard installer but when prompted choose the 'Dedicated TV-Server' option. This will trundle off, download and install all the bits you need including the SQL database backend. For all your other systems the MediaPortal Client will sort you out and setting it up for your various media folders is a similar affair to any other media centre.

Once the TV server is installed run the TV-Server Configuration on the desktop. Under TV Servers should be the name of the server box and a list of any installed TV tuners. Select the suitable TV one, it should be DVB-T for the UK, and a Country/Region selection will appear. We found choosing 'UK' and 'All Regions' worked best.

After a successful scan select you can double check and organise the channels by selecting the TV Channels entry. To get an EPG created, click the 'DVB EPG > TV EPG Grabber' entry and

Jargon explained

Transcoding
The process of converting video or music from one encoding format to another, generally because of the limitations of a target device.

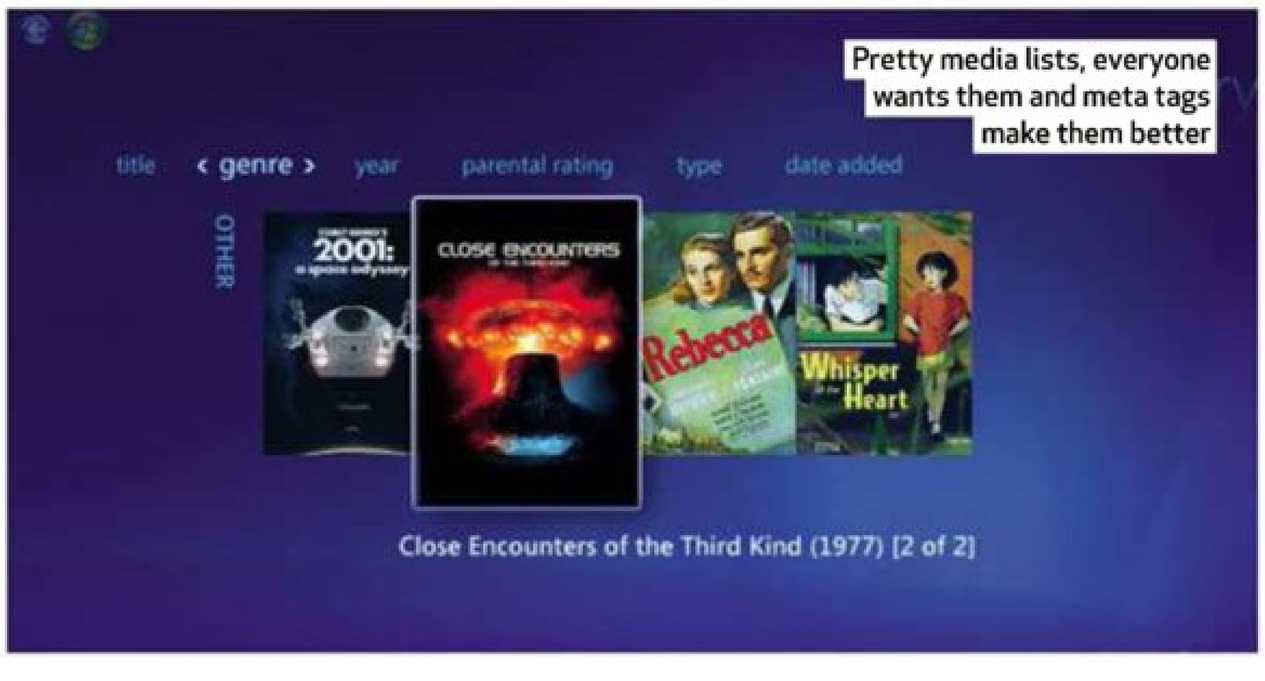
video from YouTube, TED Talks with automatic programme info support. Viewing images from Facebook, Flickr, Picasa and other sources can be installed, while new audio sources ,such as GrooveShark can be added.

Often the interface to XBMC can be a little head-scratchingly confusing with right-clicks sometimes taking you back a menu level and other times opening a context menu. Adding film, music and picture sources is obvious and straightforward from within the first-level menu of each section. If you've not sorted your meta tags yet then XBMC can do this for you, though it's not obvious. After adding a source you can 'right-click' or in XBMC-speak open the context menu and choose Set Content. This enables you to add a scrapper to the source; this can automatically add posters, fan art and information to the items it finds.

Goggle box

XBMC does have a few deficiencies that more demanding networked users may bang up against. One is that it's not happy running on a 'headless' server, that's one without a connected display or keyboard. It is possible to set it up, then leave it, but there are always issues that will crop up. Another issue is TV distribution: XBMC can't remotely deliver live TV. Enter MediaPortal (www.team-mediaportal.com) which isn't as whizzy in the looks department but with its comprehensive TV tuner support, and TV server features on top of being happy to run on a headless system, it's Windows' best alternative to a MythTV setup on Linux, and matches both Windows Media Center and XBMC in every other respect.

> "Extend access to all your media beyond just a single PC in a single room, to all of your devices"



Pretty media lists, everyone wants them and meta tags make them better

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Get access to all your media on any device in any room of your home

select all of the channels. MediaPortal also supports time-shifting live TV and scheduling recordings. By default, files are stored on the C drive, so you may want to alter the working directory. It's also possible to impose quotas, specify naming conventions and disable TV streaming when there are no free tuners available. It's clever like that. We should also mention the system works equally for DAB received radio stations too and you'll find any detected radio stations will be mirrored within the Radio section of any clients along with a radio guide as well.

The TV server makes use of a plug-in system, just as the main client does. Once installed you'll find a number of pre-installed ones, the most interesting of them all is the commercial skip plug-in called ComSkip. Just enable it and it'll do its magical stuff. If you plan on recording a good number of programmes this will help reduce file sizes and avoid manually skipping ads.

We have seen people mention issues with the Windows Firewall not being correctly set. This manifests itself with the client version throwing up the error 'Unable to play: Stream 2.0'. The easiest test is to temporarily disable Windows Firewall and see if that allows TV playback to work. You're able to watch live streams within the TV Server Configuration interface under 'Streaming Server'. If this appears to be the cause, under the Advanced Settings > Inbound Rules , locate the two MediaPortal entries and under their Advanced tabs make sure 'Private networks' are included.

As we've alluded to, part of the networked media mentality is to extend access to all your media beyond just a single PC in a single room, to all of your devices no matter where you are.

Here, there, everywhere

This is where running a server really comes into its own, while a typical gaming desktop might suck down 300 or more watts of power, a small server lacking any graphics, display and low-power CPU can muddle along at 60 watts, less with a reasonable power-saving scheme in place. That means it's a far more reasonable prospect to leave it running 24 hours a day.

The knock-on effect is that it's perfectly plausible to load up the server with custom services dedicated to serving out media to specific devices and for specific needs. An obvious one is iTunes for any Apple or compatible products that you have. It'll tie into your entire music library without any additional hassles.

If you own a smartphone or tablet then it's likely you'll want to access home media on it at some point. Once again adding a service such as Orb (www.orb.com) instantly makes the entire range of media from music, video, photos and if you have a TV tuner live TV as well, available on your devices.

A host of other options are also available for Apple iOS devices. We've had hours of flaw-free use out of Air Video (www.inmethod.com). For £1.99 it offers live streaming of any video files from your server either around your home network or over the internet using an easy to use key and password system. It supports subtitles, HD content, multiple languages and more importantly just works.

As new platforms, devices and standards come and go it's not a difficult job to just add in new services to your media server. Some will integrate with your media centre others will be complementary but with your media stored in one place getting access to it will always be easy.



Are you being served?

What's that, "Surely Microsoft has something to sell us that helps?" we hear you cry. Walk this way my fine fellow and peruse what fetching features Windows Home Server 2011 can offer you. Launched off the back of Windows Server 2003 SP2 in 2007 and now Windows Server 2008 – we know its unnecessarily confusing – it's designed to run on a remote headless server at the centre of a home network in a Microsoft-centric idealised universe.

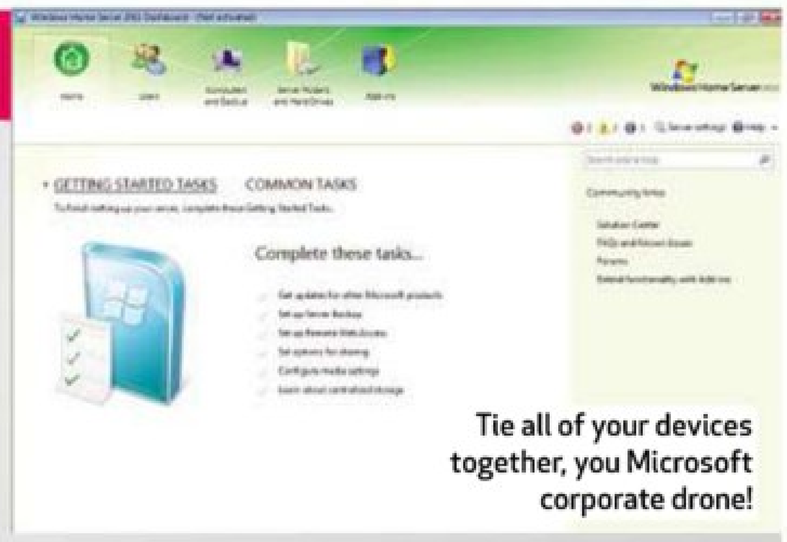
This means two things: if you also live in MicrosoftLand with an Xbox controller glued to your hand, Zune stuck in your ears and Windows Phone bulging in your trousers then awesome, Home Server will work entirely invisibly with your gear. If you don't then its just another server OS.

The seamless side of MS

The good angel on our shoulder has asked us to stop being so cynical; Windows Homer Server does provide a great number of centralised services: back up, health monitoring, file sharing, printer sharing, shadow copy, internet gateway and media streaming. The beauty is that as it's all Microsoft designed, delivered and sealed these all work flawlessly together.

Annoyingly the original release also came with Drive Expander, a smart RAID solution that enabled you to slap in drives as you felt fit to expand storage and provided data integrity. Annoyingly this was dropped from the 2011 release, removing its key advantage, as vendors had to fall back to offering generic RAID solutions. Where Windows Home Server 2011 makes real sense is that you can buy an OEM version for around £40. Compare that to £75 for Windows 7 Home Premium and for a full licensed Windows machine it makes total sense.

It's something of shame that the numerous vendors selling complete hardware server solutions have dropped their products, but there's nothing stopping you picking up a mini-server for around £200, such as the HP ProLiant, and slapping your own OS on there. Many Linux users will currently be despairing, but its hard to argue with the integration the Windows ecosystem provides.



Tie all of your devices together, you Microsoft corporate drone!

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It may not be the most elegant design, but there's a lot of power in there

STYLE POINTS

1 POWER PLANT
Asus' hefty Mars 2 Limited Edition is one power-hungry graphics card. With two GF 110 cores sat on this single slab of PCB it needs three (count 'em) full 8-pin PCI-e power connectors to get it up and running.

2 COOLING OFF
It's tough to see from these shots just how huge the Mars 2 actually is. Those aren't the standard 80mm fans you'll see on other graphics cards, no, they are 120mm fans. You know, like most chassis fans…

ASUS MARS 2 LE

Asus has a form for creating quite specialist graphics cards. A few years back it created the Trinity prototype, a single PCB card with three notebook MXM graphics modules attached for tri-graphics joy. There was also the original Mars, a combination of two GTX 285 GPUs, then the fastest single graphics chip of its time and lately the Ares. That was a twin HD 5870 card – Asus knows its multi-GPU manufacturing and then some.

This Mars 2 Limited Edition is the ultimate in graphics hardware, combining two of the fastest NVIDIA GPUs around, the GF 110 on one massive card. It hasn't just copied the GTX 590 though, it's completely redesigned card from the ground up.

It's got a whole new cooling array with two chassis fan sized 120mm blowers on top of the huge heatsink and a brand new 21-phase power design. It also needs a huge amount of power to get it running, with three 8-pin PCI-e connectors. Asus rate the card at around 600W.

At £1,200 it's certainly not a cheap card but truly represents the absolute top-end in graphics hardware. You'll just have to make sure you've got a chassis big enough to cope with this monstrous card. ¤ **Dave James**

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Creating a web forum

Richard Cobbett shows you how to build a forum for a fully fledged community, or just a place for your existing one to meet up



Build your own community corner on the web

You shouldn't need us to tell you what a forum is. On many sites, they've been at least partly side-lined in recent years in favour of blog comment systems and other ways for the owners to guide the discussion in various ways, but there's still no better way for communities to both meet and meet up online. Actually setting one up from scratch though can be fiddly, and not always in the expected ways.

Let's start with the easy bit: the forum itself. By far the simplest way to set one up is via services like ProBoards (www.proboards.com) which will handle absolutely everything for you. In recent years, social networks such as Facebook can also fill the gap, although usually very roughly, and you'll often fight peoples' reluctance to sign up and trust their details to them.

On the plus side, hosted services are usually either ad-supported or at least offer a free package, and you never have to worry about technical details. There's no web hosting to pay for, no security holes to patch (although you do have to watch out that the company providing the forum is being vigilant on your behalf), updating any software, or anything else except filling in a form and clicking OK.

Mah forum!

The downsides of this approach are customisability: you can change colours and similar cosmetic features, but largely you get what you're given and the fact that you don't ultimately have control of the data. If you decide to upgrade to a dedicated forum such as like vBulletin, for instance, you may or may not be able to migrate your existing posts and userbase. This is a problem, as you're not simply messing with your own blog entries any more, but potentially you a messing with years of other peoples' posts, drama and hard work. Meddle with that at your peril.

Hosting your own forum gives you much more power, along with greater responsibility. Creating the forum is only the start. You're playing with other peoples' personal information, making it essential to keep it patched and up to date. In addition, while a small forum can easily live on a standard shared hosting package (the kind you pay between £5 and £10 per month for), scaling up is painful. The size of their databases, the number of calls the server needs to handle, and the fact that pages change too fast for proper caching all mean that as you grow, errors and time-outs are likely to spring up with increasing regularity, and your host may start to growl and point meaningfully at their fine, expensive, dedicated servers. If you're looking to set up a meeting area for something like a World of *Warcraft* guild or readers of a small-medium website, you should be fine. If you expect (or simply hope for) more traffic, have a plan in mind for scaling up before your users get cross with you.

Jargon explained

PHP
A scripting language, used by the majority of software when building a site.

MySQL
The standard database used by most shared hosting sites.

CMS
or Content Management System such as WordPress.

Shared hosting
Cheap space on a server with many other people. You can't access each others' stuff, but you do share resources.

Theme
The part of the forum that determines look, feel and non-post related content like widgets.

Hook it up

As far as software goes, most popular forum software is built to use the same technology as blogs and other tools: PHP, a MySQL database, a few other bits and pieces that usually go without saying. If you already have a blog or CMS in place, it's worth seeing if anything can hook directly into its database so that you can spare existing members having to register yet again, or if there are plug-ins to do things like auto-create new topics



Below **A hosted board isn't as flexible as one you control, but your users won't notice**

PROJECT GOAL

Build your own forum

Learn how to Install and tweak a dedicated online forum package, and looking at what you need to make it successful.

WHAT'S NEEDED?

Shared hosting

You will want to start with some cheap shared hosting costing between £5 and £10 a month but when time-outs become a regular complaint you'll need to switch to a dedicated box.

FTP Client

Any FTP client will do, aside from the one built into your browser of choice. Our current favourite is Filezilla, which you can download here from filezilla-project.org

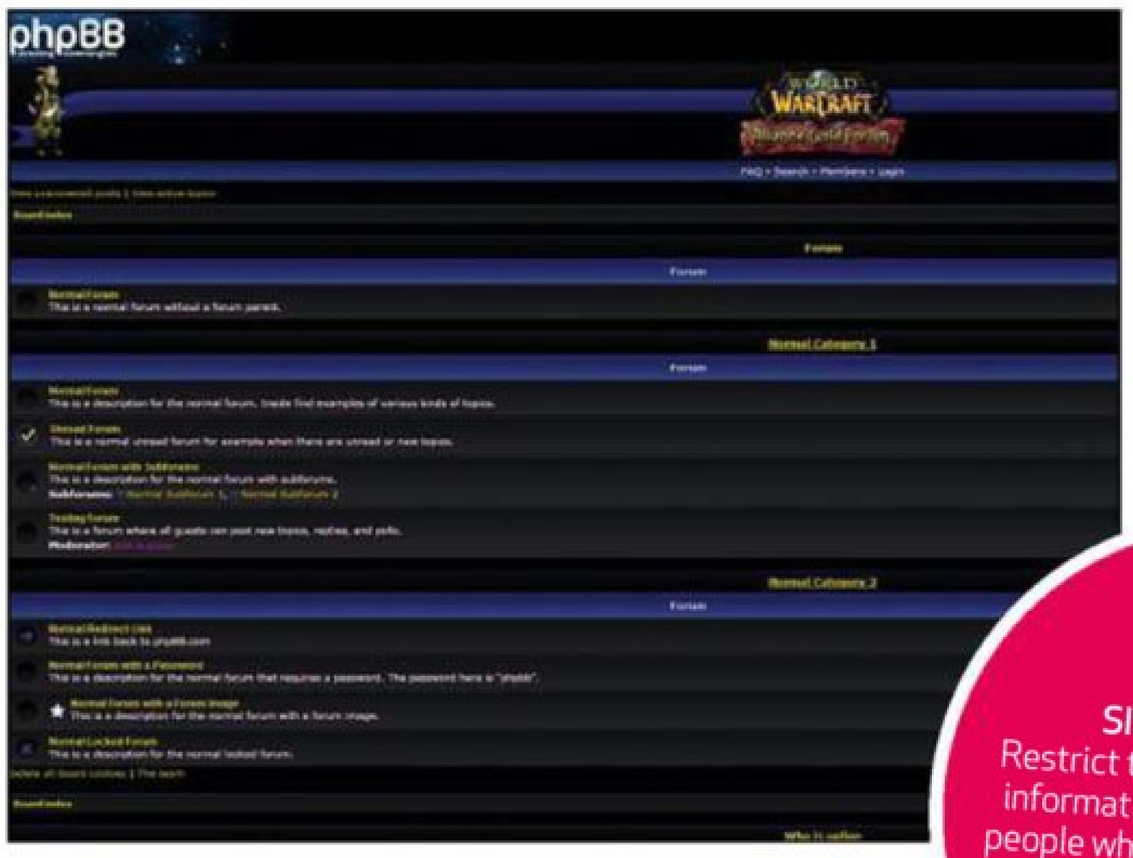


TOP TIPS

FORUM DONATIONS

If you have an expensive forum setup, don't be afraid to solicit donations from your regulars for the operating costs. People can be surprisingly willing to help if they see your forum as offering a safe haven.

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Making a forum fit your site can mean lots of work, but a preset style can at least be a good starting point

as you post news. In the early days of a forum especially, it's your responsibility to kickstart conversations and keep the peace. Over time, that ideally spreads to become a wider community task, but nothing kills a budding forum faster than nobody actually having anything to talk about.

No mercy for trolls

For this reason, it's often worth starting with something small. One of the most common mistakes is to create a new forum and give it twenty different sub-forums, all with the dreaded 'No Posts Yet' sign. Unless you have a specific reason (for instance, a guild wanting to segregate trades from raid chat from regular chatter), it's best to launch with the bare minimum you need and carve things up later on as people start to regularly post. It's also very important that you moderate things swiftly at this stage, as while the regulars inevitably set the tone for everyone else later on, you will need to set the tone for them. If you let trolls get a foothold, they'll never leave. At the same time, be too authoritarian and unyielding and nobody will post anything.

A forum is a great way to keep people coming back and can build a real community around your site. However, it's not a project to undertake lightly. It can be an expensive project, both in terms of time and energy, and one where both apathy and enthusiasm can leave you out of control of your own creation. If it's a challenge you relish the prospect of though, let's find out how to get you up and running. ¤

TOP TIPS

SIMPLE SIGNUPS

Restrict the amount of personal information that's needed from people when they first sign up for your forum. That way, if there is a hack or leak, you're far less likely to get into trouble for letting data out.

Security focus

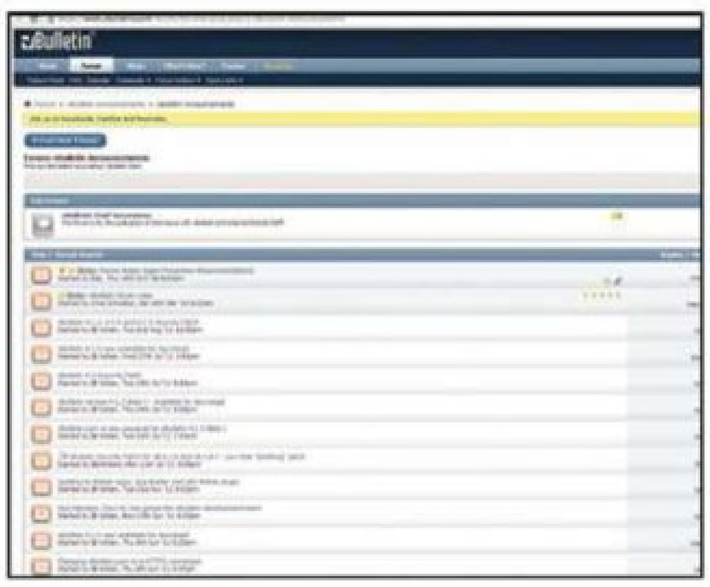
There are three major risks to be aware of when running a forum. The first is the most obvious and prolific: spam. You're going to get a lot of it, and while there are filters that exist, cleaning it up is always harder than posting it. Look for tools that let you eradicate a user at a click. Remember though, banning IP addresses is only a short-term fix as most users have dynamic IPs. Second, you need to watch for rogue code getting onto your page, either downloading things it shouldn't or redirecting your users. Third, there's hacks and leaks. Take regular backups in case of data loss, and subscribe to your forum software's RSS feed so that you get all the security patches as and when they're released. Otherwise, you'll have angry users to deal with, not just the tricky job of cleaning up after everything goes wrong.



Make sure you subscribe to your forum's RSS feed so that you get all the security patches

PART 1: WHICH FORUM?

Three of the most popular options to consider



1 vBulletin

If you're willing to spend money, this is by far the most powerful for regular use. It's £120, but incredibly feature-packed and with many modules for adding features and hooking it into your CMS. It's also a familiar sight online, making it likely that your users will know exactly how everything is supposed to work as soon as they arrive. It's also great if you need a forum that has to scale, or you need to do major theme work.



2 phpBB

The old standby. It's free, it's popular… it's often under siege due to being used everywhere. Still, as well as being easy to install, you won't find many with more expansions, more theme options and ways to stretch it into any form of forum you like. If you later decide to bite the bullet and upgrade to vBulletin, it also has one of the easier upgrade paths. Check out the Mod Statistics page for the essential plug-ins.



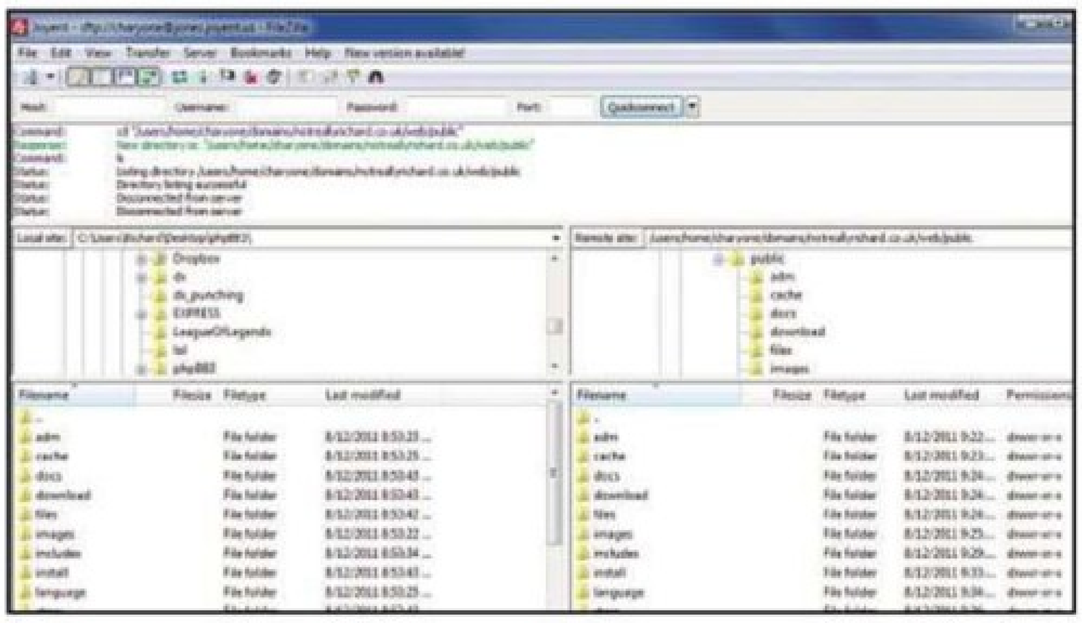
3 Vanilla

A different kind of forum which can handle large communities just fine, but works especially well for smaller ones. Vanilla uses categories rather than subforums, keeping everything lively but making it a snap to zoom in on specific areas of interest. It also has a surprisingly large plug-in community for tweaks and customisations. If you need your forum targeted, it's worth checking out.

PART2: Installing your new forum

The phpBB method (although most will be very similar)



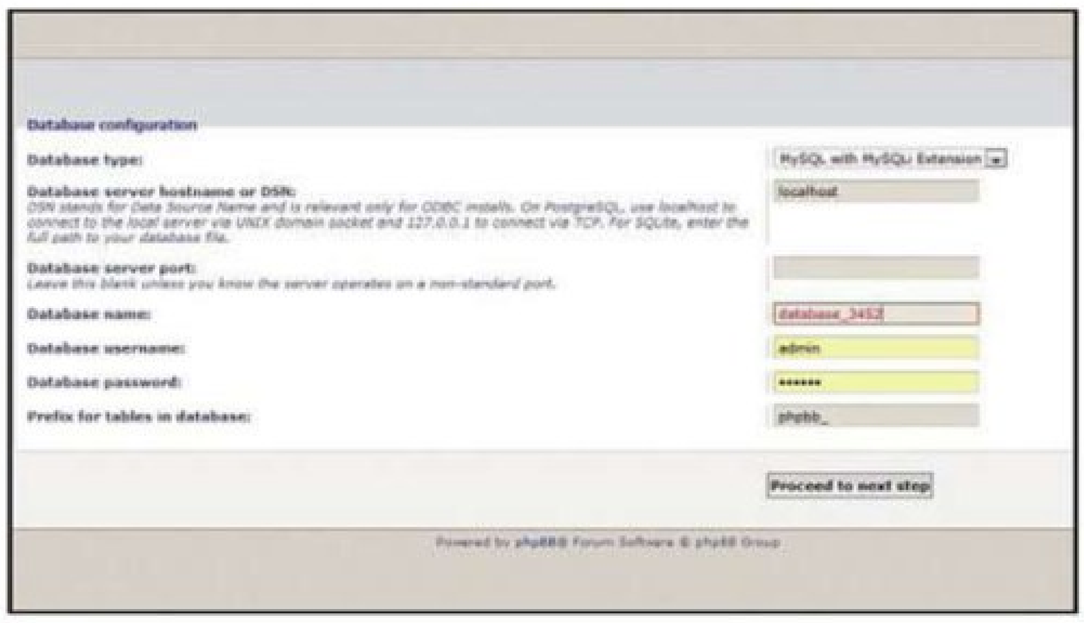


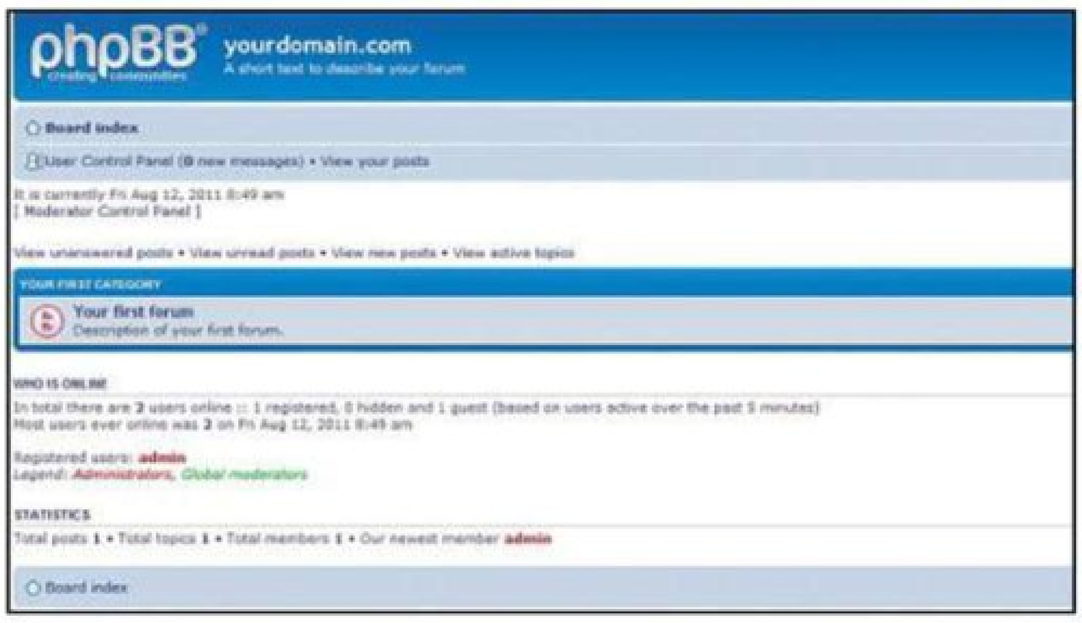
1 Check your server setup

Download the latest stable release from www.phpbb.com and double-check that your server will be able to handle it. You only need PHP 4.3.3 and an SQL database, and any shared hosting package will offer that. Free hosting, as with Google Sites, unfortunately won't. In those cases, you'll need a hosted forum, such as ProBoards, and to link to it from your site rather than installing it yourself.

2 Unzip and upload

Unzip the phpBB archive and upload all of the directories to your host. If you already have a CMS, such as Wordpress installed, do this in a specific folder called 'forum' to avoid overwriting any files. As for the database, your forum will happily share one with other programs you have installed, but it's good to split them up anyway and create a new one if you can. It's just neater that way.





3 System check and install

This is as complicated as things *should* get. Before installation, phpBB runs through a quick systems check. A red mark doesn't mean there's a problem, it could simply be an alternative database you don't have, or a nice but not essential PHP library. Enter your database details as supplied by your host or created in CPanel or Virtualmin or similar and follow the screens until installed.

4 Access the admin CP

For security reasons, you have to delete your Install directory before using your board. Visit your domain and you should see your very bare bones, but functional forum. To start making changes, click the 'Administration Control Panel' link at the bottom of the screen, which is only visible when you log in with the right permissions. As the board owner, you will have these automatically.





5 Admin settings

Now, the time consuming bit. The administration panel is full of options to play with, from whether or not users will be able to send each other private messages, to how much they can upload, whether images should be displayed, how anti-spam should be handled, and perhaps most importantly, how new users can register: whether you have to give them the nod, or just rely on a quick e-mail verification.

6 Creating subforums

Finally, it's time to create your subforums. Each can have unique moderators, be visible or invisible depending on who's looking and more. The one option to be most careful of is auto-pruning, which will save space on your server by getting rid of old messages… but at the cost of losing them. If you activate this option, consider creating a special sub-forum to backup the best threads.

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PART3: Know your trolls!

And send them back to lurk under bridges



1 The Viral Marketer

This type of troll may post a couple of decoys, but is there to shill something. The problem is that after he's gone, any new user making a link or recommendation gets tarred with that brush, which can make for an unwelcoming environment. To fix, ask that people drop you or a mod a quick line to get the official nod before posting a link to their own stuff, and back them up in the thread.



2 The Dark Lord

A poster who wields their high post count or other rating like a club, arrogantly berating newcomers and causing drama that scares off quieter, but no less important members of the community. You don't want to ban them outright but a quick time-out via temporary suspension will usually get the message across. Do make sure to explain why though, and try to tactful.



3 The IP Freely

The user who just won't go away. Ban them and they return. Your best weapon is an IP ban, but that's not guaranteed to work. It's easy to fake that number, and if you go too aggressively, you'll ban innocent people along with him. Look for a plug-in that lets you delete his account and posts with a single click, making it more time-consuming for him to post crap than for you to clean it up.

Building a community

At one point, it seemed like every site had a forum as a simple point of pride. These days, there's little point adding one unless you have a good reason. If it's busy, it'll be a lot of work to keep everything organised, and an easy way to make a lot of people very, very cross. If not, empty threads and discussions make it look like you don't have any visitors.

But if you do have a good use in mind, there are few better ways to build a community that will actually keep coming back to your site. In the beginning it will take a lot of work fostering that community and ensuring that questions and forum posts get answered quickly and any trolling is nipped in the bud, but once the community is there it will increasingly take care of itself.

Spend as much time as possible using busy sites running on the main forum engines before actually creating your own, not simply to pick one, but to get a feel for which functions work well and which simply annoy. As a forum owner who has to deal with spam for instance, putting a CAPTCHA on everything might sound like a smart idea. As a user, you'll see things differently, and will be able to carry that experience across when you sit down to configure your own from scratch.

> "Spend as much time as possible using busy sites … get a feel for which functions work well and which simply annoy"

Striking the balance between functionality for you as the forum owner and usability for the actual people visiting and using your site is the trickiest thing to get your head around. This is why we recommend taking your time to familiarise yourself with how the livliest of internet communities work.

The most important thing though is to make sure you're comfortable with, or have access to someone who's comfortable with, the technical side. Nothing will drive a community insane faster than losing its own precious archives, or trying to post on a system that hasn't been designed for scale. You don't need it to begin with, but you do at least need some kind of plan.



Figure out which safeguards, such as CAPTCHA will work for your community

Lock down Windows

Keep your private things hidden away from prying neighbours. Mayank Sharma shows you how to properly secure Windows while you absorb some ultraviolet



Protect your data from prying eyes

You're sitting at your home PC. You have a browser window open with about a dozen tabs, you're writing and updating a couple of text documents and reading through a PDF or two. To ward off the midday slump, you decide to go for a little walk, but what do you do with your open workspace? To protect your machine from prying eyes, you can either close all the apps and shut down the machine, activate a password-protected screensaver, or take it with you. The first of these options is time-consuming and tedious, while the second leaves you vulnerable to shoulder surfers and the third might not be feasible, especially if you're working on a desktop computer.

PROJECT GOAL

Safeguard your data

Learn how to setup Predator and use some of its advanced settings to get detailed monitoring, log reports and intrusion alerts sent directly to your Twitter account.

WHAT'S NEEDED?

Predator

Use this Windows-only tool to bolt your PC down tight. Download it from bit.ly/mrH2Ht – the version for personal use is free.

A USB flash drive

Predator works by turning a USB flash drive, of any capacity into a key, which will control access to your machine.



Engage the Predator

This is where something like Predator comes in (bit.ly/mrH2Ht). It's designed for situations where you need to leave your computer switched on and unattended. The tool turns any USB key into a physical key, which you can use to lock and unlock your system. Not only does it save you the hassle of rummaging in menus or fiddling with shortcut keys to lock your session, Predator also includes security features to ensure privacy and let you keep an eye on unattended PCs remotely.

Creating a USB key with Predator is a walk in the park. Follow the walkthough below to get started. The software doesn't wipe existing data off the key, and you can continue using the key, writing and reading data from it while you're using it with Predator.

When you've created the key, insert it and launch Predator if it isn't already running. A green icon will begin flashing in your taskbar. Depending on your settings, the icon will periodically change to red to indicate that Predator is updating your key. Whenever it's green, you can pull the key out to lock your desktop. When you return, simply reinsert the key to reactivate your desktop session. For added security, you can also configure the software to prompt for a password.

If anyone without access to the key tries to use the desktop while you're away, Predator will challenge them to enter a password or enter the key within 20 seconds. If they fail to do so, Predator will display an 'Access denied' message and flood the room with a noxious gas that will incapacitate anyone within five seconds… Okay, it only sounds an alarm. It also records the intrusion attempt in its log, and depending on your edition of the app, alerts you via email or SMS.

The good thing about Predator is that when the key is removed, it blanks your screen, freezes the keyboard and the mouse, and disables the Windows autorun facility. This will prevent someone from installing malware on your locked computer by exploiting the autorun feature, which lets you install software from removable media without the need to touch the keyboard.

Jargon explained

Autorun exploit
You know how a CD automatically starts when you slide it into your machine? That's thanks to the autorun.inf file being recognised by Windows. It doesn't take a giant leap to see that you can use this to run nasty code as well. It can also be used to bypass some forms of system protection - although not Predator.

Tinkering the setup

To minimise the learning curve, Predator comes with default settings that will work for most users, there are some settings you should tinker with after you get comfortable with the program and understand basic usage.

You can access Predator's settings easily by right-clicking its flashing icon in the taskbar and then selecting the 'Preferences' option from the menu. The Preferences window is divided into two tabs that house the main options and more advanced parameters.

In the 'Main options' tab you'll see monitoring options like the read and write intervals. The read interval is the number of seconds after which Predator looks for the key. For example, if this is set to 30, Predator will look

Below: Most of Predator's functionality resides in this single window



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Right: Turn any ol' USB flash drive into a virtual key to lock down Windows

TOP TIPS

KEY ESSENTIALS

The amount of data that Predator uses is so small that you don't need a specific USB stick for it. We'd recommend putting it on a sizeable stick, so that you can use it to store your data on as well.

for the key every half minute. If you remove it, the Pred will lock your session until you reinsert the key.

The write interval is handy if you're particularly security conscious. This is the time after which Predator changes the security code for the USB key. If someone makes a copy of your key while you're away, the copy will be useless once Predator generates the new code for the original key.

Backups and new access

If you want to give another user access to your computer, or you find that you need to generate a backup key, you can do this by plugging in the new pen drive and selecting it under the 'Flash drives' section. Then click the 'Create key' button to create an additional key. The original and new keys will now be listed.

If you create a backup key, it's prudent to temporarily disable it by unchecking the 'Enabled' checkbox. You can then re-enable it if you lose your primary key. If you lose a key, make sure you revoke it permanently by selecting that key's entry and then clicking the 'Revoke key' button. Now Predator won't allow anyone with this key to unlock your PC.

You can unlock a session without a key by entering the password. When you unlock the session without the key, Predator automatically pauses monitoring. This gives you time to open the Preferences window, revoke the lost key and create a new one. Also remember that while the Preferences window is open, monitoring is paused. It can also be paused manually from the context menu of the icon in the task bar. If the 'Show notifications' checkbox is ticked, Predator will periodically remind you that you ought to resume monitoring.

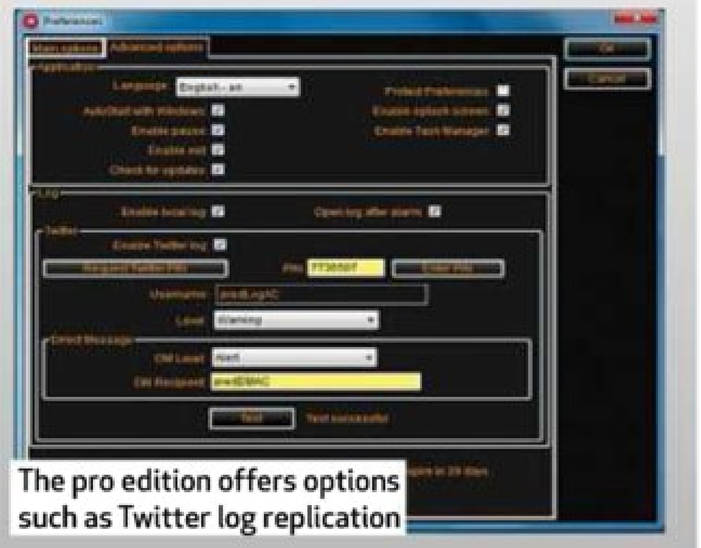
The 'Multiple monitors' checkbox is selected by default. You should leave this option as it is even if you don't have an additional monitor. With this option toggled, if an attacker connects an additional monitor while you're away, Predator will lock the extra display as well.

The other options in the screen are self-explanatory. There are options to change the alarm sound, set its volume, and control the display of the 'Access denied' screen. You can

Freebie features and the paid-for pro bits

Predator is available in two versions. The free edition is intended for desktop users in a non-commercial setting, while the $29 (roughly £18) professional edition is made for business use and gives you more reporting options. Both versions give the same options to lock, unlock, and monitor your PC, but with the professional edition you can create an unlimited number of keys, while the free edition restricts you to a maximum of two.

The main advantage of the paid version is its ability to send alerts via email and SMS through Twitter. You can evaluate the pro edition for a month, after which it automatically turns off the advanced options and reverts to the free edition.



The pro edition offers options such as Twitter log replication

Part 1: Activating the Predator...

Chain a slavering beast to your system



1 Get Predator

Download Predator from bit.ly/mrH2Ht. The two editions are available for 32-bit and 64-bit versions of Windows XP, Windows Vista, Windows 7, Server 2003 and Server 2008.



2 Plug in USB

Install the software on the PC you want to protect. Once it's installed, Predator prompts you to insert a USB key before you launch it for the first time. You are then asked to enter a password.



3 Create key

Once you've entered a suitable password, you'll see the Preferences window. Make sure that Predator points to your USB drive correctly in the 'Flash drives' section, then click 'Create key'

also change the password, and even force Predator to ask you for it.

You can only reset the password from within Predator if you know the existing password, so what do you do if you forget your password? If that happens, you need to use the Predator Administration tool installed alongside Predator. Besides resetting the password, the tool can also be used to reset Predator's settings to their default values, and revoke all USB keys.

if you aren't too concerned about someone accessing your PC while you're taking a stroll, all you need Predator to do is keep a local log of failed intrusion attempts. Just head to the 'Advanced options' tab in the Preferences window and make sure the 'Enable local log' checkbox is toggled, along with the 'Open log after alarm' box. If someone has tried logging into your PC while you were away, the log will display the log as soon as you re-activate the session.

Hook it up to Twitter

If you want to be alerted when someone tries to activate your session, the professional version of Predator can use Twitter to alert you via email or an SMS. To make this work, you need to register two Twitter accounts. Predator will send log events to one, which will then send a direct message to the other, which will notify you via email or SMS. The two accounts we registered were predLogAC to log all events, and predDMAC to notify us of intrusions. Ensure the DM account (predDMAC) is following the log account (predACLog). This will let one account send DMs to the other.

Once the accounts are set up, head to the 'Advanced options' tab and toggle the 'Enable Twitter log' box. Click the 'Request Twitter PIN' box, which will open your browser and take you to Twitter's authorisation website. Now log into your Twitter log account (predLogAC). This will display the Twitter PIN, which you should type into the text box in Predator before clicking 'Enter PIN'.

When you've logged into your account, select a filtering level from the pulldown menu. You can choose 'Information', which copies all events from the log; 'Warning', which copies only major events; 'Alert', which copies messages Predator thinks are critical; or 'None', which effectively disables log replication. The default level is 'Warning', but you can change it to 'Information' for more detail. Now enter the name of the DM recipient (predDMAC, in this case) and select its filtering level. It's wise to keep the log level for the DM account equal to or lower than that of the log account, which notifies you of only a subset of log events. By default, you are notified of only critical alerts.

Log into the Twitter account for your DM user (predDMAC). Head to its Settings page and click the 'Notifications' tab. Make sure Twitter sends you an email when you receive a DM. For text messages, head to the 'Mobile' tab and enter the mobile phone number Twitter should use.

Save the settings and restart Predator, then in the Preferences menu click 'Test'. If it can communicate with Twitter, Predator will display a 'Test successful' message.

Plug those holes

When you're working with security tools like this, it's always a good idea to understand any weak points that attackers can use to circumvent them. Predator takes into account most of the common workarounds by disabling autorun, locking input devices and bringing an additional monitor automatically under its watchful eyes, but Predator alone can't keep your system secure from a particularly determined intruder.

For example, the Predator admin tool can be used to reset the password or revoke all your keys. Furthermore, if you don't ensure that the tool starts automatically on every boot, an attacker can simply reset your machine and boot into your desktop. To avoid either of these situations, make sure you password-protect your Windows user account.

This won't stop intruders restarting your machine and booting it from a Linux live CD to access the data on the Windows partition, though. Again, you need to be proactive and restrict booting to the hard disk. To ensure that the attacker can't change the boot settings, you can password-protect the BIOS.

There are ways to restore the BIOS to the factory default – all you have to do is reset the CMOS battery on the motherboard. Getting to the motherboard of a portable device like a laptop or netbook isn't as easy as it is on a desktop computer, but it's not enough to put off a motivated intruder. The best option for people who are concerned about the privacy of their data is to encrypt it all with a tool such as TrueCrypt, which can mask an entire partition.



With TrueCrypt, you can mask a complete Windows installation in an encrypted partition

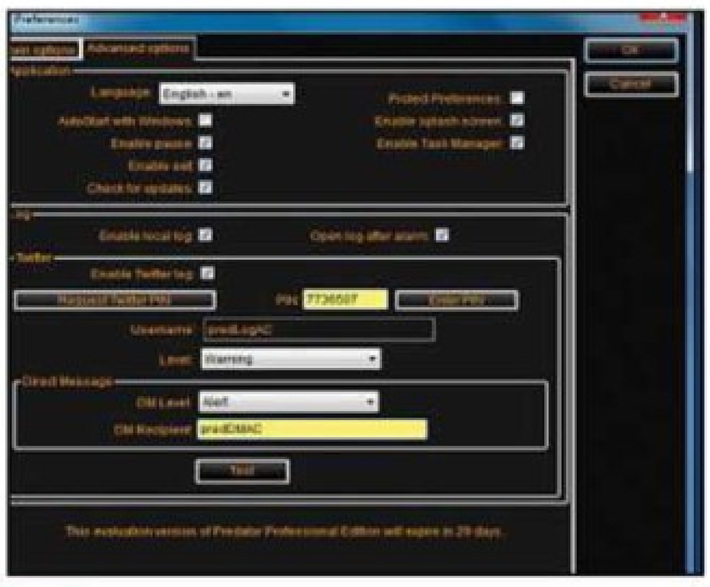
Part 2: Maintaining the Predator



4 Remove to lock
After the Predator key has been created, Predator will periodically monitor whether it's plugged in or not. To lock the computer remove the key when the green icon is flashing.



5 Check log
By default, Predator is configured to launch the log viewer if it notices an unsuccessful login attempt has been made while the USB key was removed and the session was locked.



6 Tweak settings
Predator's default settings will suit most users, but it has a comprehensive set of options to give you better control over its monitoring and reporting abilities, depending on how paranoid you are about security.

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I am the MOD

Tom Portsmouth shows you how to polish an aluminium PC chassis to a mirror finish



PROJECT GOAL

Polish an aluminium chassis to a mirror

Tom shows you how to prepare an old aluminium PC chassis for polishing by removing the manufacturer's anodising. You'll then give it a mirror finish using a mop kit and power polisher.

WHAT'S NEEDED?

Tool-up time…

400, 600, 800 and 1200 grit wet 'n' dry sandpaper.
A mutton cloth.
A polishing mop kit.
A power polisher.
Metal polish (such as Peek).



With a bit of effort and lots of elbow grease, you can transform your old aluminium PC chassis into something different and amazingly eye-catching. In this walkthrough, I'll show you how to create a mirror finish for a side panel. This work is dirty, time-consuming hard graft, but the results are pure gold.

The tools and equipment required for polishing include various sheets of wet 'n' dry sandpaper, starting from 400 grit to 600, 800 and finally 1200. A polishing mop kit is also required. These can be purchased very cheaply from the likes of eBay, or your local hardware store.

Alongside these, I tend to use a professional variable speed power polisher. This takes a lot of the hard work out of the job at hand, as well as speeding up a lengthy process. Roll up your sleeves and let's get going!



The first step: get yourself tooled up



1 Remove the anodising

Preparing the first panel starts off pretty easily. The anodising placed on the side panel by the factory has to be removed using the 600 grit wet 'n' dry paper. Using a washing-up bowl with a little soap helps to lubricate and remove the unwanted coating. The best way to tackle rubbing away the anodising is to use a circular motion rather than going back and forth. This will speed up the removal and enable you to move on to the next stage fairly quickly.



4 Move to medium

Next, I'm quickly going to remove any green residues of polish from the panel with a mutton cloth before moving on to the medium polishing mop. The same time-consuming process is involved, now using the blue soap supplied in the polishing kit. After you've spent a while using the blue polish and medium mop, the shiny results should start to become visible. Always take time to remove any polishing residues from the panel because if polished with force these will stain and require further rubbing down work to remove.



7 Power polishing

Once you've spent a good hour repeating this process with the power polisher, the results really start to stand out, and you'll get an idea of how great the finished panel is going to look when it's done. Keep removing the black or spent polish as you go, and use a new layer every 10 to 15 minutes. Keep working at the panel in this way until a true mirror polish is eventually achieved. You may look like you've spent a day down a coal mine by the end of this stage, but it's well worth the effort.



2 Continue preparation

The next stage involves further preparing the side panel using the 800 grit wet 'n' dry paper in much the same way as before. Spending more time here will help hugely when you get to stage three. Removing all the anodising from the panel is a long process, but it's all in the preparation. Any anodising left on the panel can be removed at a later stage, but it's far better to get rid of it completely now. Again, using a bowl of soapy water will speed this process up.



3 Coarse polish

This is where the polishing mop kit comes into its own. Most kits are supplied with three different polishing mops: coarse, medium and fine. At this stage I'm using the electric drill, making sure I've got my face mask and goggles on. Using the coarse polishing mop in conjunction with the green polishing soap supplied in the kit enables you to really tear into the aluminium, and it starts to show how the polished panel will look.





5 Another rub down

Now it will look as though we're taking a backwards step, because although the panel is starting to look rather shiny a final rubbing down using the 1200 grit wet 'n' dry paper is needed. At this point, make doubly sure that all marks and polishing gremlins are removed. We're now going to use the softest polishing mop with the blue polishing soap again. Once you've spent an enormous amount of time doing this, the results start to become very clear and you should begin to see a mirror finish appear.



6 Go professional

It does take a long time to polish a panel, let alone a complete PC chassis, so you'll need to be patient. After the main polishing stage has been completed using the electric drill polishing kit, and the side panel has been rubbed or polished off using a mutton cloth, the professional power polisher comes out to play with a large pot of Peek metal polish. I tend to completely cover the panel with the Peek polish and then start the polishing process again using a circular movement across the panel.



8 Check the reflection

After all that hard work, it's worth giving everything a careful check. Before the last stage, I always hand-polish each part that I've just polished, in this case the side panel. This allows for a final inspection, enabling me to ensure that all of the manufacturer's anodising has been removed and that no back-tracking to previous steps is required. Looking at the final photographs of the mirror-polished panel, the result is good and pleasing, because you can very clearly see the trees in my garden reflected in the panel.

9 Spit and polish

Finally, I'm going to fit the last panel to the heavily modded Cooler Master Wavemaster case mod. Aluminium does scratch very easily and will dull in time. This is due to oxidation of the aluminium within the atmosphere. There's no way to avoid this other than to give the aluminium a regular polish to keep that mirror finish in good shiny order. I hope this tutorial gives you an insight into polishing aluminium and maybe inspires you to resurrect your old, forgotten PC chassis from years gone by!

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Gaming

#258/11.11

Because gaming is a way of life

GAMES TRUMPET

"Blazkowicz's disembodied head coughing blood made death a more pressing reality"



We love first person games and we've got loads to look forward to



Chris Thornett is very emotional at the moment. He wept after viewing a particularly beautiful infographic on the web and decided to write some cathartic poetry to achieve closure on some of his more traumatic sessions of *Amnesia: The Dark Descent*. He was last seen heading off to a book fair to buy a 400-year-old copy of 1984…

This will be my last column. It's been good but I was given an offer I couldn't refuse and since I've never been much of a fan of bullet holes, I'll be moving into a new role and focusing on covertly sneaking film quotes into other magazines as well as *PC Format*.

With this being my last column, I could either contrive to spell a rude word with the first letter of each paragraph or selfishly focus on my preferred genre. So, yes, the gaming section is mostly about the First Person Shooter this issue.

Arguably my first proper experience of the FPS, like most of you, was *Wolfenstein 3D*'s meticulous recreation of the fall of the Third Reich, complete with historically accurate MechaHitler. We've moved on a lot since then: we can look down and see our little legs, we can jump about like demented *Watership Down* extras and we can even climb ladders with arms instead of using latent levitational powers.

To be honest, I miss *Wolfenstein*'s health meter. Blazkowicz's disembodied head coughing blood made your death a far more pressing reality than a nice rosy red pain frame that disappears if you nip behind a wall for five seconds.

P94
PLANETSIDE 2 IT'S BACK AND THIS TIME IT'S EVEN BIGGER!

For some reason a fad for that crunched first person view with a gun (or sword) pointing into the middle of the screen has become an obsession, which has invaded most other genres. Valve and indies like Teotl Studios have championed FPS puzzlers with *Portal* and *The Ball*, and thanks to developers like Ion Storm's better half inspiring the next generation of developers with *Deus Ex*, we're awash with action-RPGs and open-world(ish) RPGs, like RAGE, *Dishonored* (being previewed next month) and *Dead Island* (p98).

In fact, this obsession is best represented by *XCOM*'s turn-based strategy game being remade into an FPS. Why are we so obsessed with it then? Having seen *Quake 3* players bob up and down with every rail and jump pad squealing like little girls – or US players – and having caught myself physically leaning in *CoD*, I think it's simply down to every gamer's aching desire to be *in* the game as much as possible. It's pretty potent stuff too, especially when mixed with a massively epic war and as our *Planetside 2* preview suggests there's a huge audience for it.

A note to those sceptical about OnLive's cloud gaming service, you will get a chance to try it out for free by the time you read this. We had a demo of the UK service in the office and were surprised by its slick showing, but then we do have four 1GB pipes to the outside world, which are effectively only limited by our NIC. I doubt most of you get 70 to 80mbps. Don't fret though, 720p cloud gaming can't compete with high-end PC gaming, but then it's not mean to. It's meant as a console substitute.

That's it then. I'll probably see some of you on the *BF3* servers and Steam. GL, HF! ¤

PCF STEAM GROUP

Join thousands of other like-minded PC gaming fans by joining our Steam group. Haven't taken the plunge yet? It's easy. Head to store.steampowered.com/about and download the Steam client and install it. Use this alias www.pcformat.co.uk/steam or type in 'PCFormat into the community search and 'join' our public group. Simples.

Gold Award

If a game is awesome, it gets our Gold Award. If it's just 'good' it doesn't. One award; one towering standard of excellence. Gold Award games played.

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This is us. We heap praise on great games and despise bad ones. It's that simple. We use nothing but official review code. You'll see no dodgy 'preview' reviews. Just honest, expert opinion from gamers you can trust.

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RECOMENDED



RIFT
Trion Worlds
PCF Issue 252
It takes an audacious MMO to unsettle WoW, but *Rift*'s been depopulating Azeroth with its class fiddling and rift battles.
PCFormat Verdict 89



WITCHER 2
Namco Bandai
PCF Issue 253
An engrossing world bursting with varied player interaction, *Witcher 2* puts a cherry atop its RPG cake with superb combat.
PCFormat Verdict 92



FROZEN SYNAPSE
Mode 7
PCF Issue 256
Mode 7's indie masterpiece evokes 90s gaming nostalgia in turn-based form. It'll run on a netbook too.
PCFormat Verdict 90



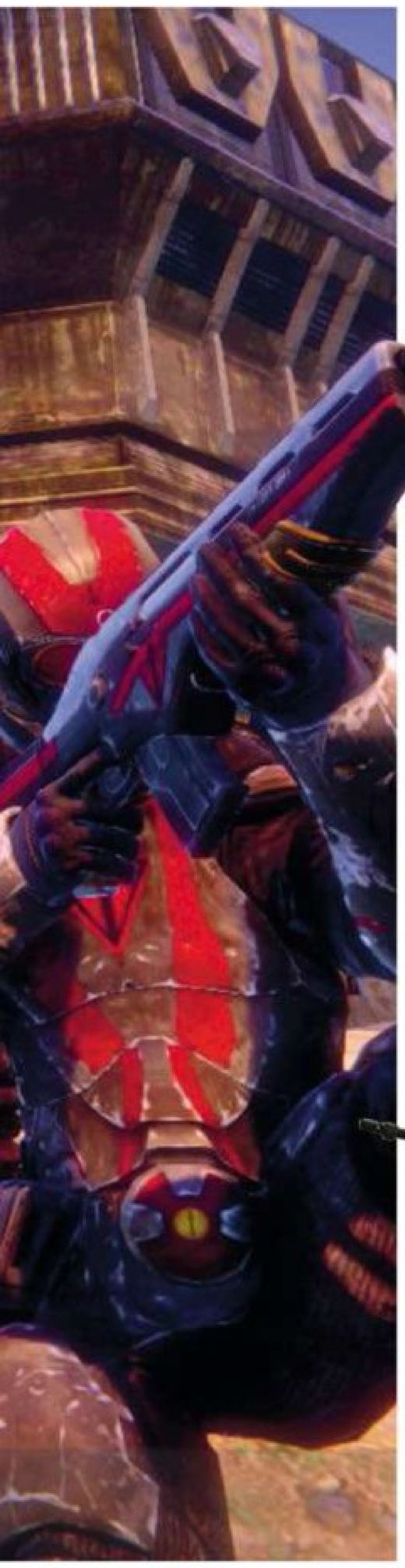
PORTAL 2
Valve
PCF Issue 254
Valve has delivered an incredibly well-written, well-designed, surprising and challenging puzzler of the year.
PCFormat Verdict 92



DIRT 3
Codemasters
PCF Issue 255
No surprises in the latest version of the rally game. But with a formula as good as *DiRT*'s, more of the same works just fine.
PCFormat Verdict 86



BULLETSTORM
EA
PCF Issue 251
A celebration of FPS conventions that somehow manages to further the genre and assassinate it simultaneously.
PCFormat Verdict 92



EDITOR'S ONE TO WATCH

Counter-Strike: GO

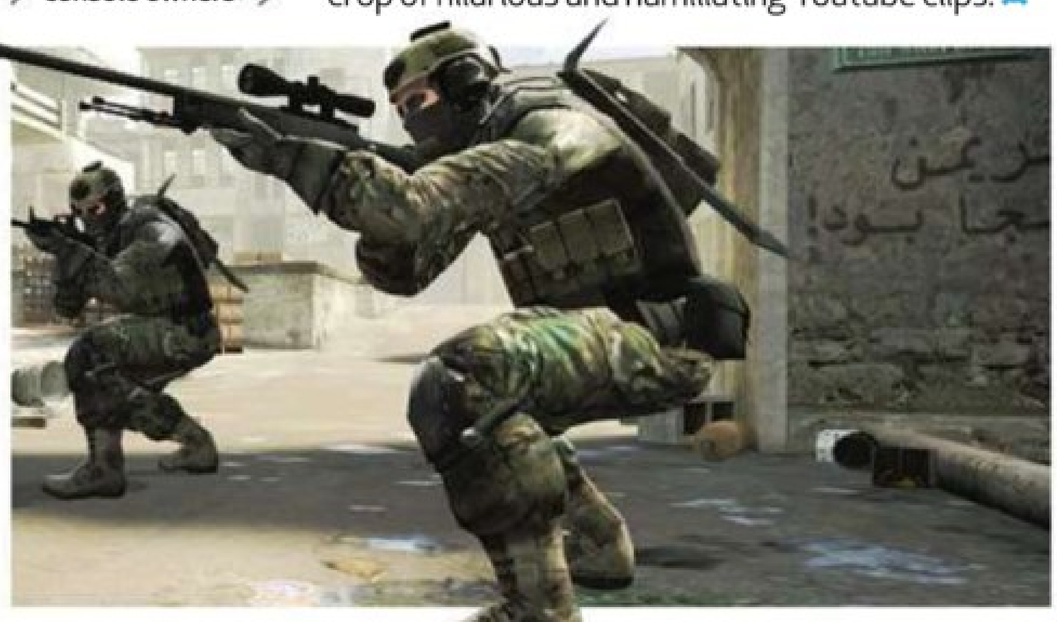
Counter-Strike: Global Offensive sounds like it ought to be a vast expansion of the universe but this is more like a refresh or as the project lead, Ido Magal points out: "If it ain't broke, don't fix it." After all, 25 million copies of the CS series have been sold, which ain't bad for a multiplayer mod that was originally released back in 1999.

The huge success of this tactical team-based shooter also uncovers an unintentional flaw. Joining a multiplayer-only game that everyone else has played for a few weeks is tough going, but joining one that gamers have played every evening for years is terrifying for newcomers.

Valve then has decided to step in with refreshed visuals, eight new maps and most importantly ranked match-making, a first for the franchise.

In *CS:GO* noobs will learn to play with other noobs, while the serious players can gather together and gripe about the changes to *their* game. And there are a few. The original maps have been re-balanced, particularly de_dust, and there will be a few new weapons and gear. Most notable is the Molotov cocktail, which will be good for blocking quick routes to a bomb site. There's also a new submachine gun and shotgun, but it's the Zeus, a one-shot military taser that looks ripe for a new crop of hilarious and humiliating Youtube clips.

CS: GO - will include head shot opportunities against pesky console owners



HIGHLIGHTS THIS MONTH







MULTIPLAY SERVERS

PC Format has hooked up with Multiplay, www.multiplay.co.uk, Europe's premier game server host. What does this mean for you the reader? Cutting edge server hardware that's what! All hosted in Multiplay's own bespoke network (all orchestrated from a secret lair inside a dead volcano or possibly Southampton).

Our current list of servers is:

Bad Company 2 85.236.100.214:19567
Crysis 2 85.236.100.214:30200
Team Fortress 2 85.236.100.214:27215
Left 4 Dead 2 85.236.100.214:27115
Homefront 85.236.100.214:27015

In-game banter

If you fancy a chat while playing, download the TeamSpeak 3 client from **bit.ly/TS3client** and join our voice server at IP address: 85.236.100.27:17477, Password: **PCFFTW**

The exfilitration scenario never looked so good. Genuinely

RELEASE/28 OCTOBER 2011

BATTLEFIELD 3

The *CoD*-killer cometh

VITAL STATISTICS

Publisher EA **Developer** DICE
Genre FPS **Web** www.battlefield3.com

WHAT'S THE STORY?

The latest scion in the *Battlefield* series returns promising better combined arms multiplayer combat than ever before – and a much improved co-op campaign.

Of all the *Battlefield 3* demos, I had to play the most boring one; admittedly, it still involved a stealthy mission by a column of Humvees and marines into the heart of Tehran, but a little deflating compared to the public betas. I got a hotel invasion; they got rampant combined arms combat, with snipers, medics, engineers, jeeps, tanks, helicopters, jets… However this time, it'll all be in single player too.



The Recon class packs a mobile spawn beacon

What's notable is the way that DICE has taken its highly polished large-scale multiplayer combat, and turned it to single-player, to take on *Modern Warfare 3*. Why has EA done this? To avenge the death of *Medal of Honor*, which its attempted to revive so many times it's flatlined and been repatriated home.

The single-player will feature a five-man team of US troops, who've been dispatched to find another team, who'd been dispatched to study a possible chemical weapons site, inside hostile territory. This rescue team is caught in an earthquake, whose epicentre is Iran. There's a tank assault on a burning city, a US army assault on Tehran and the bit I played involved a rescue of a defector from a Tehran hotel. Other maps are set in Paris, Sarajevo, New York, Oman, Wake Island and the capital of Kurdish nationalism, Sulaymaniyah. If you can stitch these arbitrary settings together, you're a better cartographer than me.

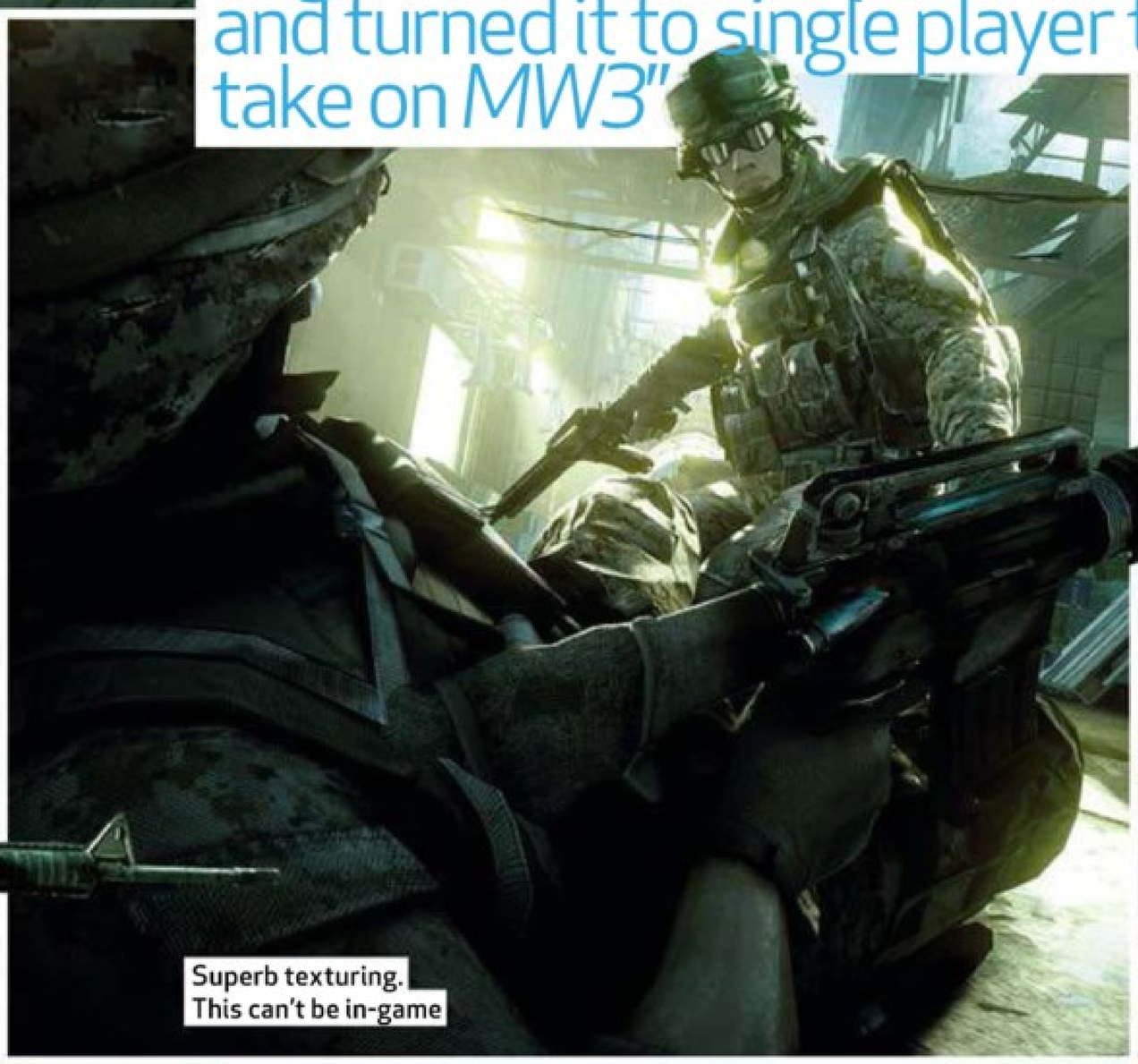
The co-op experience I played, the Tehran hotel assault, was passable if not terribly exciting. The two players are dropped off at a hotel side entrance and tasked with exfiltrating a traitor. Supposedly, if we fail to take out the guards and security cameras in a silent timely manner, we'll set off the alarms and be rushed by hundreds of guards. It never really happens; we only die because the close-combat is too tricky, and enemies incapacitate you immediately if you miss. We aren't rushed by guards either. We find our man and he follows us out, to be loaded into one of the Humvees. It's fine, but the level isn't distinctive enough to unseat *Modern Warfare*.

Staying frosty

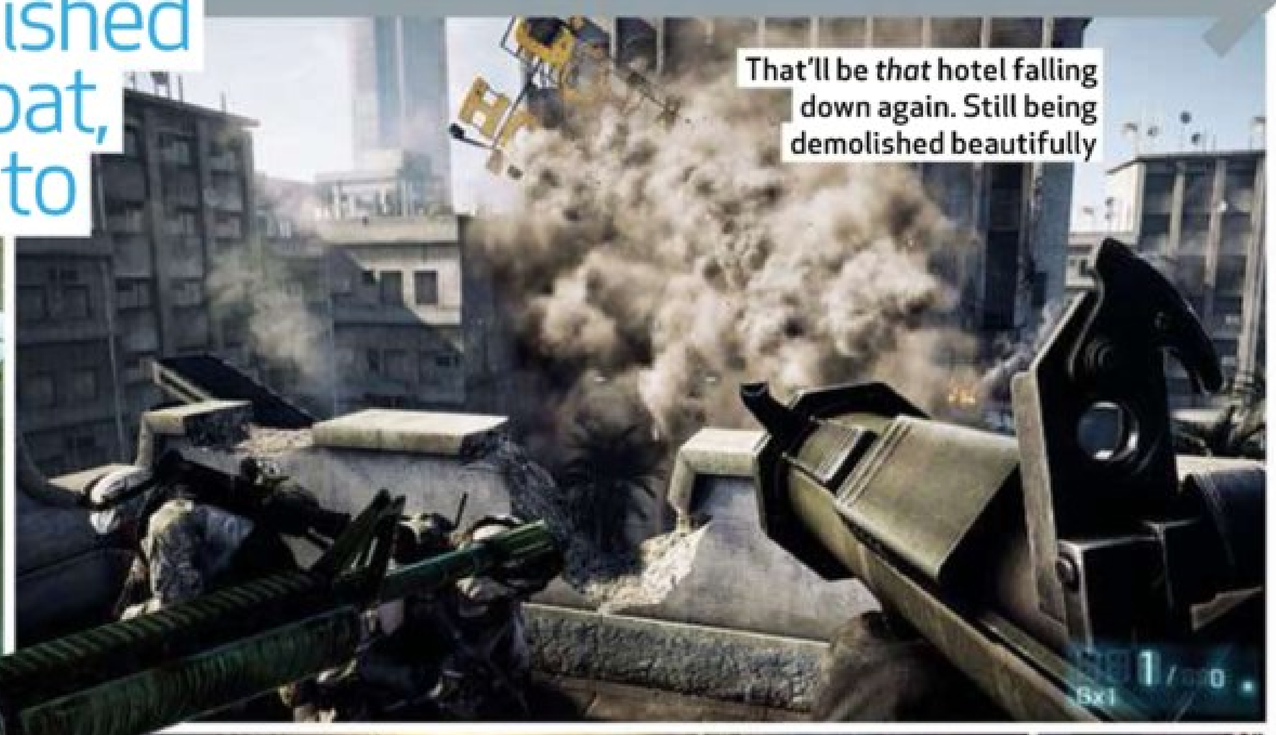
More impressive is the massive multiplayer, supported ably by the polished delights of the Frostbite 2 engine, and how the single player

Steelkeys.com

"DICE has taken its highly polished large- scale multiplayer combat, and turned it to single player to take on *MW3*"



Superb texturing. This can't be in-game



That'll be *that* hotel falling down again. Still being demolished beautifully



BF3's single player has *Modern Warfare* in its sights



Bravo Three

The DICE team brought ex-SAS man, Andy McNab in for the game's development, providing the low-down on the region. The author of *Bravo Two Zero* advised them on the way soldiers speak in purely active, positive language - they follow Yoda's philosophy of "there is no try, there is only do", so say ,"we will do this", rather than we will try to do this. He also advised on the way soldiers personalise their weaponry and vehicles, treating their tanks as their homes. For the tank levels, he also supplied photos he'd taken himself in the field on the Iran-Iraq border of border installations and buildings , which the DICE team recreated in the levels. He pointed out the way soldier's guns are never clean, especially not in the field. He's also penning a tie-in novel.



The four classes return from the previous game

intelligently uses elements of this as the plot is unfolded.

Up to 64 players can play on PC and returning in multiplayer are just four of the classes from the previous game: Assault, Recon, Support and Engineer. Assault are both close-range fighters and medics, able to use defibrillators and medikits. Meanwhile, the mid-ranged Support class can employ a light-machine gun and deploy bipods on walls or when prone – very similar to the mechanics from *Red Orchestra*, from which the game has drawn a surprising amount, including suppressive fire, which blurs players' vision when under fire.

Recon comprises snipers and more stealthy troops, able to spot and flag enemies at distance – they can also deploy a radio beacon, allowing players to spawn in at that point, rather than just at the base. Engineers are great for repairing and destroying vehicles, and will have a flashlight that can be used to blind other players. Together these comprise the entire selection of troops available to players; sadly, the Commander class and mode is unlikely to return.

Needless to say, the combat is exciting as ever, the way infantry disappear into cover gives them enough of an advantage against the predatory tanks and aircraft, so that the latter don't dominate. The new levels – I saw the Caspian Border – are huge and naturalistic, packed with rolling countryside and ruined outposts.

Sound abounds

Amazingly, even the sound has had an overhaul, thanks to the implementation of something called HDR sound. Just like HDR imagery, this draws the player's attention intelligently to the most important things in his environment, rather than letting them wash into the usual chatter and noise of war games. For example, if you're being shot at, the things you should be focussing on are the sound of bullet impacts and the direction they're being fired from. They've even recorded different sound effects for each weapon to make sure they're authentic in the environment it's in – a rifle being fired in a subway will sound very different to the same rifle being fired in a woodland.

BF3 is looking extremely good – DICE has changed little enough of the main multiplayer game to make us very happy indeed, and the addition of the single player campaign should challenge *MW*. If the level I played was the worst part of *Battlefield 3*, it's going to be amazing. ¤ **Dan Griliopoulos**



The Support class gets his bipod out for the lads

BUZZMETER 'Worry free'

1 2 3 4 5 6 7 8 9 **10**



Batman's "momentum gliding": best abuse of physics EVER

Harley Quinn gets a new outfit and is joined by more villains...

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RELEASE/21 OCTOBER 2011

Batman: Arkham City

"Arkham City. Always brings a smile to my face"

VITAL STATISTICS

Publisher Warner Bros. Interactive Entertainment **Developer** Rocksteady Studios **Genre** Action adventure **Web** www.arkhamcity.com

WHAT'S THE STORY?

The crims of Gotham have been transferred from Arkham Asylum to an entire cordoned-off area of the city. The Dark Knight returns to bust balls and bowl batarangs, and this time he's got an entire open-world district at his disposal

The first thing that crosses my mind after playing Batman Arkham City is just how has Rocksteady Studios managed to do so much with ageing technology? I'm impressed. Very impressed. Somehow the developers have taken the Unreal Engine 3, which is notorious for tight but good-looking levels and built an entire open-world city. It's a jaw-dropping achievement, but the question remains, "How!?"

The splendidly-named Dax Ginn, Rocksteady's marketing game manager, has the answer. "The Unreal Engine is awesome. We used it in Arkham Asylum and it was a key part of developing this very atmospheric, very tense, very detailed game world," says Ginn. "But Sefton Hill, the game director, wanted to take the action out of the Asylum and onto the streets of Gotham. That's what Batman fans want, that's what gamers want, and the technology had to follow."

Bright lights, big(ish) city

The devil's in the detail. Rather than creating a huge open-world game, Rocksteady has prioritised the micro. You won't find many of the copy-and-pasted villages and back alleys found in the likes of *Just Cause* and *GTA* here; instead there are tight, detailed streets. "The objective was always to make the most detailed open-world game ever, not necessarily the biggest. And it's not the biggest," says Ginn.

It's a stunning achievement. There are still a few tell-tale signs that it's in Unreal Engine 3: drop down onto the streets and you'll find that they are the smaller chunks of worlds we're familiar with, the ends blocked by makeshift barricades. But leap onto the rooftops and you get a top-down view of everything, and the ability to go just about everywhere. My guess is that the rooftops have been treated as a separate hub-like level, with the various areas of Arkham City streaming in as you approach them.

Ginn reckons the game's five times the size of *Arkham Asylum*, and they've filled it with almost everything in the Batman universe. The Joker returns, but he's crippled by the events of *Arkham Asylum*. "We've also included Two-Face, Penguin, Riddler is physically in there as an inmate, Calendar Man and Victor Zsasz." says Ginn. "Then there's Hugo Strange and his Tiger Guards trying to keep law and order at the same time.

Release: StoreMags & FantaMag



Finally Schumacher's Batman films get the recognition they deserve: The Riddler looks like a dishevelled George Clooney

"The move to an open world suits Batman as much as his fitted Kevlar, and feels like a natural progression"

...including Calendar Man, Two-Face, Penguin, Riddler and ah yes, Mr. Freeze

To the Batcave?

Both the Batwing and the Batmobile appeared in *Arkham Asylum*, but they were either used as mere props or plot devices. The open world of Arkham City naturally invites vehicular locomotion, but Rocksteady has apparently eschewed any chance of Batman getting behind the wheel of a car. "It would turn it into a driving game," says Ginn. "And you've seen the streets – they're completely mashed up."

Instead, Batman gets about with what Ginn terms "momentum gliding". Batman can latch onto high structures, propel himself into the air and then use his Batsuit's cape to build up speed. It immediately recalls *Just Cause 2*'s parachute-and-tether movement, and has a similarly fast and loose interpretation of the fundamental laws of mass and velocity.

It's immensely satisfying, though, and adds an air of grace to the decadent events of the game. Like *Just Cause 2*, I couldn't get the hang of it immediately, but it's sure to become second-nature. "We've put an amazing amount of effort into the momentum gliding," understates Rocksteady's Dax Ginn.



The batrope and gliding are the preferred mode of transport

We had the opportunity to load a whole new load of villains and supercriminals in there."

Here, kitty, kitty

As well as the usual suspects, Batman's feline foe Catwoman steps in – as a playable character. She's an interesting character, one who (literally) straddles the line between Batman's rigid law-keeping and the less wholesome elements of Gotham. "She brings a moral ambiguity to the game," says Ginn.

"When you're playing as Batman you're always doing the right thing; there's never any question in his mind," Ginn continues. "When you play as Catwoman you have the opportunity to do the wrong thing. Being a criminal in Arkham City means there's certain things that she can do that Batman would never do. And vicariously the player has the opportunity to go into areas that Batman would never go. It gives the player a sense of what it's like to explore this huge prison from a criminal perspective."

Having played as Catwoman, it's clear that she's a worthy adversary to the city's bad boys. She's more flexible and less constrained by gravity than the dark knight himself.

Batman's combat, as ever, is immensely satisfying. Ginn boasted that Bats has thousands of new animations, but in the excitement of the button-mashing, skull-crushing fight sequences I have to say that I honestly didn't notice. This is a good thing.

It wasn't just the fighting that made *Arkham Asylum* stand out, it was the way it did just about everything an intelligent action-adventure game should. It had sneaky stealth bits, à la *Thief*, tech-hacking skills straight out of *Deus Ex*, and even some *Tomb Raider*-esque platform mechanics. It felt like a proper game, and it played well on the PC. Have any recent games influenced *Arkham City*? "We haven't played any other games," says Ginn, wearily. "This is all we've been doing. We've made a big game, but we've made a very detailed game as well. I don't know that there's any direct comparison out there."

The move to an open world suits Batman as much as his fitted Kevlar, and it feels like a natural progression. "As a studio we come across as quite intense and quite weighty, but this is all we want to do," says Ginn. "We just want to make an incredible Batman game." And it looks like Rocksteady might have done just that. ¤ **Henry Winchester**

BUZZMETER "Bats about you"

1 2 3 4 5 6 7 8 **9** 10

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Even though it's set thousands of years in the future, people still wear Oakley wraparounds



RELEASE/TBA

PlanetSide 2

So, whose side are you on?

VITAL STATISTICS

Publisher Sony Online Entertainment
Developer In-house **Genre** MMOFPS
Web www.planetside2.com

WHAT'S THE STORY?

The eagerly-awaited follow-up to 2003's sci-fi MMOFPS is set to follow in its predecessor's footsteps. Expect a three-way epic battle, like *Battlefield* meets *Ewoks: Caravan of Courage*.

PlanetSide 2 is an FPS first, but an MMO in terms of the depth of its customisation

The Sony Online Entertainment booth at Gamescom is a sanctuary away from the chaotic buzz: nice comfortable seats, not too many people, and, most importantly, free bread rolls with a variety of delicious fillings. And unlimited coffee.

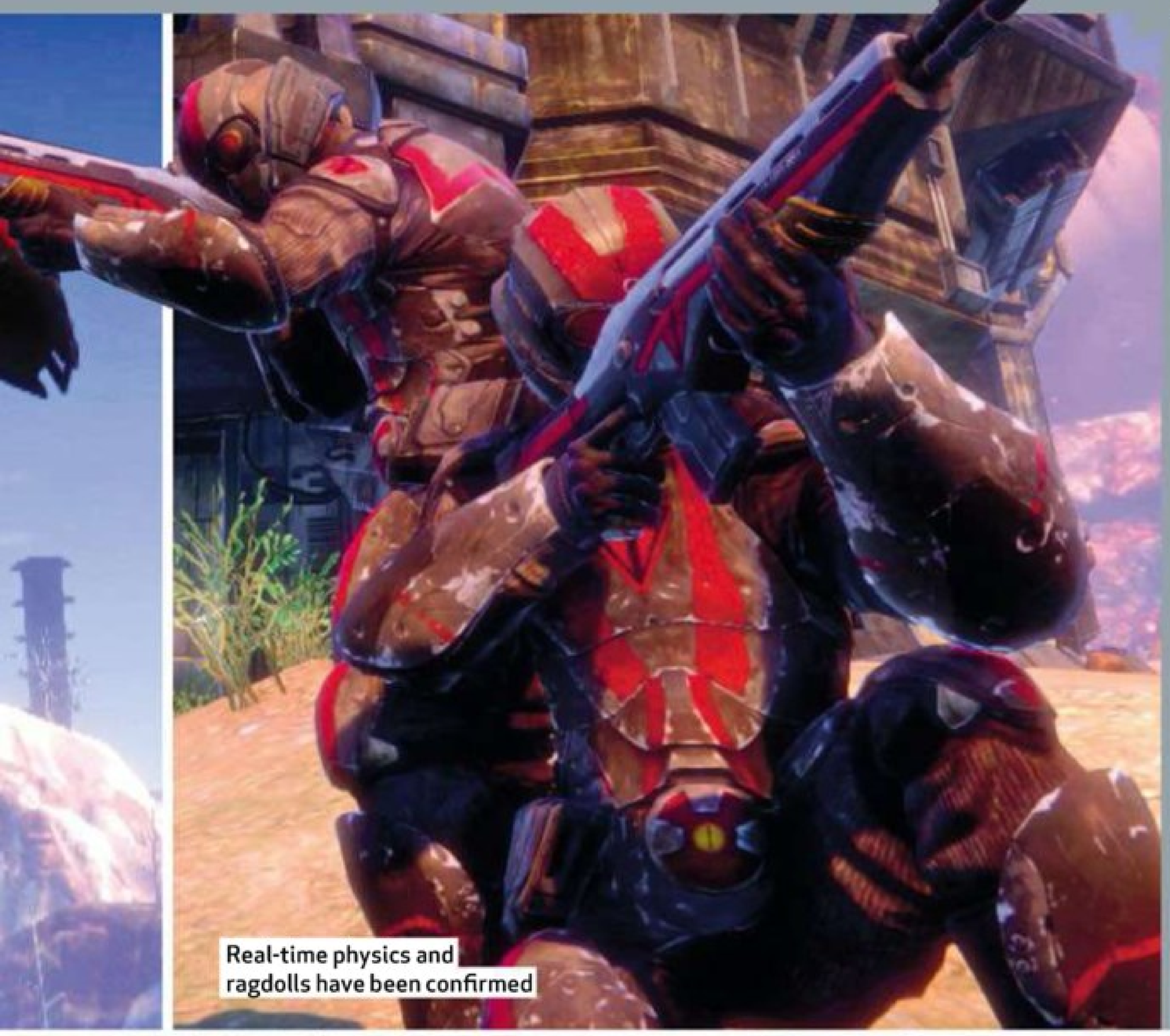
I'm here to meet Matt Higby, *PlanetSide 2*'s creative director. He carries the air of an 1980s American film star, like a cross between a young Jeff Bridges and a young Kurt Russell. It's not often you feel a slight man-crush on a games developer, but, jeez, he's good looking. And charmingly softly-spoken, too.

The first *PlanetSide* is a fondly remembered game, and it's still updated and maintained by Sony Online Entertainment. It took the MMO model and, basically, added guns. It's a persistent world, which means there are no 'matches' as such, just an ongoing firefight. It was a brave move: MMOs and first person shooters nary met, and it paved the way for the FPS-with-MMO-elements like *Team Fortress 2*.

Its sequel doesn't fix what ain't broke: "It's basically a game where thousands of people can directly and simultaneously compete with each other on the server at the same time," says Higby. "We've taken all the features that modern FPS gamers demand, and added to that all the MMO features that today's MMO players are expecting."

Where exactly does *PS 2* sit on the MMO to FPS ratio? "It's definitely an FPS first," says Higby. "But, in terms of MMOs, we have extensive dungeon systems, a guild system, very extensive character progression, a tremendous amount of depth in terms of customisation that you can do – not only for your character, but also for your vehicles and weapons."

The setting remains from *PlanetSide*, too. A human colony on a far away planet discovers some ancient artifacts, capable of unlocking new technology. The colony is broken into factions who want to use the artifacts for various – usually destructive – purposes. The battles that break out form the backdrop for the action, and, as Higby says, "you don't win the map and then everything resets. If you capture a base it's yours until somebody captures


Real-time physics and ragdolls have been confirmed

TechnicalSide

PlanetSide 2 is more than a simple refresh of the original, it's got a new game engine

Creating a decent MMO, especially one of *PlanetSide 2*'s scale, is quite a challenge for any developer. The sequel uses Sony Online Entertainment's own in-house engine, known as Forge Light. According to creative director, Matt Higby, "it's a completely modern game engine that has every kind of graphical feature you can imagine," including says Higby, "real-time physics and ragdolls."

Ragdoll animations are essential if the game wants to compete with the current crop of online shooters, and although physics are notoriously hard to program in an MMO, they make a big difference to the level of realism in-game.

From what we've seen, *PlanetSide 2* is eschewing the more stylised, cel-shaded aesthetics of other MMOFPS shooters (*Firefall*, for instance) in favour of gritty, *Modern Warfare*-style realism. But, at its heart, the game's engine is still more MMO-oriented. "It's built to support thousands of players, to support all the customisations you could want in an MMO type of game," says Higby.


PlanetSide 2 is a bit different to other MMOs. It actually looks good, for one


This guy's backpack was in the bargain bin at Wilkinson's

it back. You could have that base for months, or you could have it for a couple of hours."

Less talk, more factions

PlanetSide's three-way faction system stays intact too. The Terran Republic has been in charge of the human race for thousands of years, and promote law, order, safety and security. The New Conglomerate are an underground rebel group, or, according to Higby, "an underground terrorist group, depending on who you ask."

As is often the way with MMOs, there's a third group who are a bit weird. The Vanu Sovereignty is comprised of academics and intellectuals, who are closest to the alien technology. "They consider the technology to be the best hope for not only humanity to evolve, but also to be able to find a way home," says Higby. "As they're kind of trapped on the planet."

Each faction uses its own tactics and weapons, too. The Terran Republic relies on a militaristic approach, with high rate-of-fire weapons. The New Conglomerate uses more experimental weapons and guerilla-style tactics. The Vanu Sovereignty has the most advanced hardware in the game, boasting alien weapons and vehicles for superior firepower.

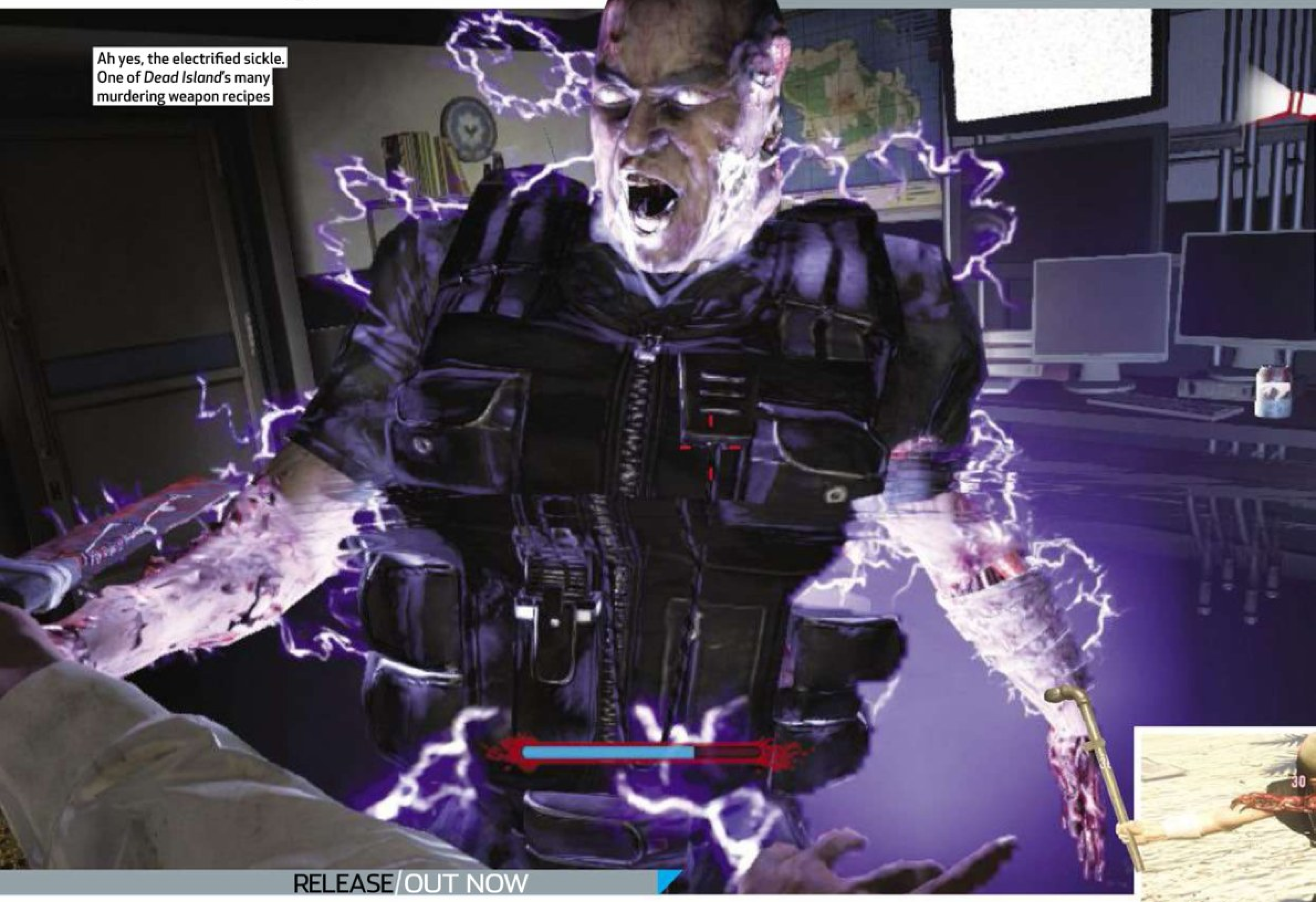
Character classes are switchable in-game, and vehicles themselves are considered extra classes. *PS 2* also includes specialised outfits (as in military units), which can unlock specific bonuses for, say, air vehicles. "When people see your outfit flying over the horizon in your souped-up air vehicle, not only will they be like, 'Oh, that's so-and-so,' they'll also say 'Someday when I'm a kick-ass pilot I want to join that outfit.'"


Some *PS 2* suits are inspired by Speedo's latest swimwear, perhaps?

The payment model for *PS 2* hasn't been sorted yet: "We're still trying to decide exactly how we're going to position it," says Higby. But it sounds like it will alter just enough of the original's formula to entice a new crowd of people who want the excitement of an FPS with the advanced features of an MMO. My only slight doubt is that the last time someone tried to create an MMO-shooter, they farted out *APB*. But thanks to the high-sci-fi setting and established mythology, *PlanetSide 2* shouldn't be a repeat of that particular slice of gaming dullness. ¤ **Henry Winchester**

BUZZMETER 'Planet FUN'
1 2 3 4 5 6 7 8 **9** 10

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Ah yes, the electrified sickle. One of *Dead Island*'s many murdering weapon recipes

RELEASE/OUT NOW

Dead Island

Grim survival horror meets slapstick galore…

Smacking the zombie in the head with a meat cleaver again, I scream "why won't you just die?" Car totalled, I am stuck on the side of a mountain, fending off the undead. Having blunted my weapons on his friends, this last one is proving hard to dispatch. A few more frantic swings, a terrible splat, and it dies. I stand breathless. The zombie's severed head rolls off the edge of the cliff.

Scary, horrible, hilarious. Three traits of the best zombie fiction, which developers Techland has successfully infected its open-world zombie apocalypse sim with. The setup is simple. You wake in a hotel on the beautiful holiday resort of Banoi Island. A mysterious man on the other end of a radio is promising escape. You need to contact him, but there's a more pressing concern. Almost everyone has been zombified.

The first thing I noticed about *Dead Island* is the blood. When a zombie left its desiccated meal and lumbered towards me, I smacked it with an oar so hard its ribs flew out of its body and it span away spilling red stuff from its torso in all directions. It groaned a little, then tried to get back up. I whacked it until it expired. The gore was disgusting and spectacular at the same time.

One of the best things about this game is that your task isn't to save the world, or even to uncover the reason behind the zombie apocalypse. You're there to help people. Once your comrades are established, you can wander around chatting to them, taking on more tasks to help them out.

VITAL STATISTICS

- **Price** £30
- **Developer** Techland
- **Publisher** Deep Silver
- **Multiplayer** 2 to 4 co-op
- **DRM** Steam
- **Web** deadisland.deepsilver.com
- **Community** forum.deepsilver.com
- **Discuss** forum.pcformat.co.uk

Wish you were here…

The island is a beautiful, convoluted place. Small wooden stairways coil around little pools and holiday huts, each area encircled by tropical fauna. It's a careful layout that encourages exploration and puts you in close quarters with the lingering undead.

There are four characters to choose from, and each has three skill trees from which you can unlock new combat moves and general buffs to make you and your weapons more resilient. I played as Xian Mei, master of sharp things. As well as the ability to deal hideous damage with edged weapons, I eventually gain bonuses for backstabs and flying stabs, along with a devastating stomp finisher that could decapitate downed enemies.

The other three characters gain more ludicrous abilities. Rap star Sam B, master of blunt objects, has a rage mode that can cause his punches to send zombies flying through the air. Master of throwing tat, Logan, has an ability that causes tossed objects to return to his grasp. They don't fly back to him, they teleport to his hand and 'BOOMERANG!' appears in big red letters on the screen. Never has an ability been so inexplicable and so


Dead Island is infested with plenty of zombies to batter or...


...set aflame with molotovs or just...


...test out your new DIY weaponry on

Shambling onto the PC

The game's only drawbacks concern an innate clunkiness to the interface. The mini-game for smashing through doors is abysmal, and unless you want your zombies to bleed XP numbers as well as blood, you'll want to turn off that counter, and the zombie health bars immediately. Niggles such as the slow mouse cursor in menus and the lack of drag and drop on the inventory screen contribute to a general feeling that *Dead Island* comes to the PC a little rough around the edges, but this never breaks the experience.


Not built for the PC platform. Shocking


The gore in *Dead Island* is both disgusting and spectacular

"The most fun you can have with an electrified cleaver and a sack of wet, walking flesh"


Even after leaving *PCF* years ago Al Bickham still has to fend off groupies


This is what happens when you don't use a registered plumber to fix your pool, people


The city has pockets of humanity. This is not one of them

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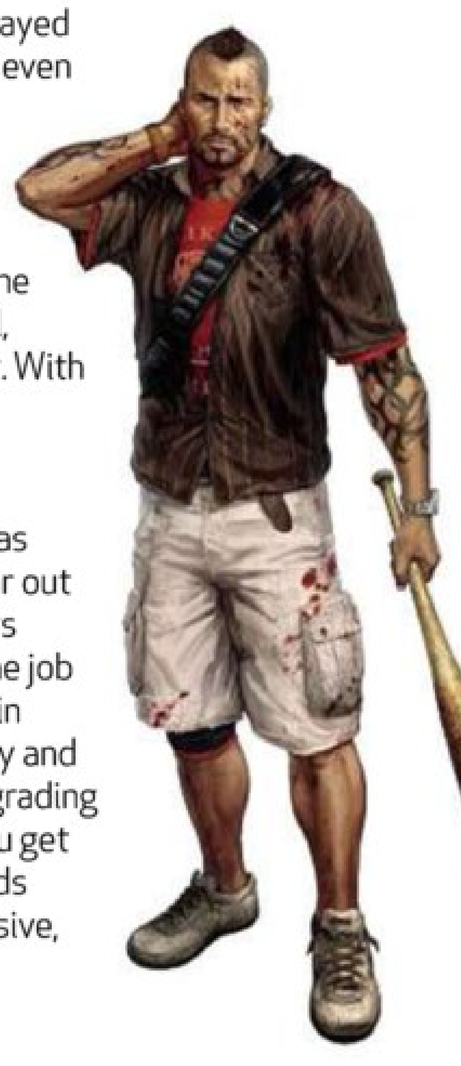
inexplicably satisfying at the same time. And finally, Puma is master of the rare but largely ineffectual firearms.

The entire campaign can be played with a party of up to four. In fact, even playing alone, all four characters will turn up in the odd cutscene. In some ways, it's better as a single player experience. The sense of unease as you wander the deserted island is more powerful, and the zombies a greater threat. With friends, it becomes slapstick.

DIY weaponry

Dead Island's weapons start out as flimsy, breakable things that wear out after a few swipes. There's always some debris to hand that'll get the job done, but as time goes on you gain skills that increase item durability and you start spending money on upgrading your equipment. After a while you get recipes that will let you craft mods for those weapons, adding explosive, electrical and venomous effects. My favourite murder weapon was an electrified sickle that I could never quite bring myself to chuck, unless it was at a zombie's head.

Zombie survival chic as modelled by David Beckham



Beyond the holiday resort lies the game's best-kept secret: a vast inland city. It's a warren of baked brown slums covered in litter and streaks of blood. This is *Dead Island* in survivalist mode. Pockets of humanity have scratched out safe houses and other areas have been taken over by bandits.

As with the beach fronts, the city has an intriguing, tightly packed geography that makes it a fascinating place to explore. It's inhabited by some memorable characters, too, not least a nun who sends you on a quest for booze.

When it comes to combat, aside from the pants-but-rarely-used guns, getting up close with the undead has rarely been so grotesque and satisfying. Also, this game is huge. *Dead Island* lacks the geographical sprawl of *Far Cry 2* or *Just Cause 2*, but the island is so varied and packed with detail that navigating it feels much more interesting. Part grim, survivalist nightmare, part slapstick zombie comedy and the goriest game you'll play this year, *Dead Island* is easily the most fun you can have with an electrified cleaver and a sack of wet, walking flesh. ¤

Tom Senior

PCFormat Verdict

Needs Dual-core, 1GB RAM, 512MB DX9c 3D card

Wants 2.66GHz dual-core, 4GB RAM, 1GB 3D card

- + Killing is rarely this much fun
- + Huge world
- − Interface isn't brilliant
- − Lacklustre guns

A sluggish interface, weak guns and a few dull sewers can't slow it down. *Dead Island* is huge, bloody, beautiful and brilliant.

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A perfectly paced and bloody *Warhammer 40K* action game from Relic

RELEASE/OUT NOW

Warhammer 40,000: Space Marine

Unleash the symphony of pain

Space Marine is a third-person action game that understands weight. A space marine is nine feet of purebred superhuman, dressed in power armour as heavy as half a car and the universe's biggest shoulderpads. That shit is massive, and Relic's greatest feat with _Space Marine_ is making you feel it. Every step you take across the scorched earth is a mighty clomp. Start running, and it's so loud and screen-shaking that were I my mum, I'd ask Captain Titus if he was a herd of elephants. Then make him tidy his room.

But Space Marine isn't about walking. Ninety percent of my time in-game was spent up to my heavily armoured elbows in combat, and Relic have also brought weight and heft to the battles you fight. Sprint Titus into a fight and press the right mouse button, and he'll begin a bullish shoulder-charge. Aim this at an armoured target and they'll stagger back. Charge into something squishier, like a goblin-sized gretchen, and they'll just burst. For the first quarter of the game, I found it hard to employ any combat tactic beyond laughing madly and popping small green creatures with my shoulders. The Warhammer 40K universe says one space marine will happily eviscerate 20 orks in a stand-up fight, but _Space Marine_ takes it to extreme levels. Titus is so gloriously overpowered that a sea of green is an invitation to wade in, chainsword swinging.

VITAL STATISTICS

- **Price** £30
- **Developer** Relic Entertainment
- **Publisher** THQ
- **Multiplayer** up to 16
- **DRM** Steamworks
- **Web** www.spacemarine.com
- **Community** www.spacemarine.com/gb/forum
- **Discuss** forum.pcformat.co.uk

Packing carnage

As if Titus's standard weapons weren't lethal enough, Relic has included little moments of ludicrous excess. From time to time, he happens across jump-packs and heavy weapons. The latter offer a few minutes of extra-swift murder, but the former is an absolute joy to use. Any _Dawn of War 2_ veterans will know the drill: the pack lets Titus boost high into the air, before crashing into the ground and shattering anyone standing nearby. I found myself hanging for a few extra seconds in the air, savouring the oncoming carnage, before launching myself into the fray.

Back on the ground, the combos aren't complicated, and there's not much nuance to their deployment: the only consideration I had amid the mouse-button spamming was when to unleash Titus's fury meter – a buff to his attacks that's built up by killing enemies.

Each weapon feels different in Titus' ham-sized hands: the chainsword is zippy, and cleaves through targets without stickiness; the power axe is heavier, and its killing blow is usually a jarring thwack rather than a deft slice. Each has a slightly different combo animation, but the end results are the same: right-mouse button four times ties four swipes of increasing intensity together. Three times then a tap of [F] adds an area-of-effect slam that stuns.

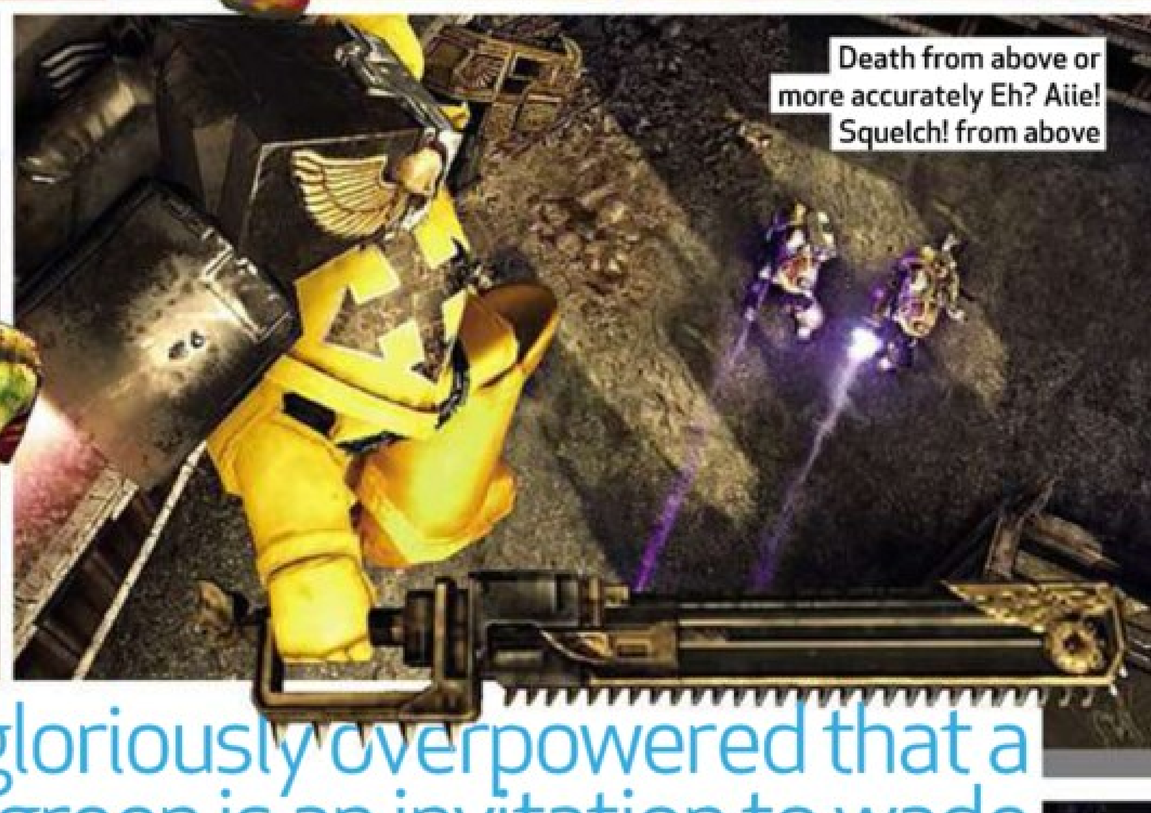


Space Marines' take on *'Will it blend'* involves a chainsword and a whole lot of orks

Controlling the carnage

Space Marine is the first time Relic has taken its Warhammer 40K licence to consoles, but having tried playing with both a controller and mouse and keyboard, it's clear it hasn't jettisoned its PC heritage. With the speed and precision of a mouse, I could flick between both, decapitating an ork nob's retinue, moving in to stun him with my chainsword, before ducking further out to take potshots at machinegunners firing from the surrounding masonry.





Death from above or more accurately Eh? Aiie! Squelch! from above

"So gloriously overpowered that a sea of green is an invitation to wade in, chainsword swinging"



Space Marines are most exciting personalities but they know how to pose



Orks give way to Chaos later, but remain a threat



Ork slaying is murder on the dry cleaning bill

During that stun, they're open to *Space Marine*'s glorious execution moves. Press [E] on a reeling foe and Titus will jab his chainsword down their throat and open their skull. Or pick them up, hurl them to the ground, and stamp on their head so hard it pops. Or kick them in the ribs, wheel around and break their back with his hammer. As well as being so grimly over the top I wasn't sure whether I should be clapping or retching, the executions provide health regeneration.

Space Marine doesn't do a great job of warning you of imminent death. When it spawns a few rocket troopers who stand back and pelt you with missiles, Titus can go down easily. At such times you have to employ that most un-space mariney of behaviours: running away. Early in development, Relic were fond of saying "Space marines don't take cover," but I repeatedly had to park Titus behind boxes to recover from a misjudged sprint into combat.



Space Marine understands over the top gaming better than most

Gunning for ya

Titus can carry up to four guns too, and each of these has a physicality only slightly less palpable than the melee weapons and I quickly came to love all of Titus's weapons, but never the man himself. Space marines (particularly Ultramarines – the perfect choirboys of the space marine school) are the most boring men in armour in a universe full of wonder. At the very least, I'd rather play with one of the other chapters: give me a Dark Angel hero and reference their near fall to Chaos, or let me be a techno-viking Space Wolf.

Space Marine isn't a long or complicated game, and there's little incentive to replay it once you've stomped through its eight hours. But I didn't need plot investment to keep me playing: I just needed the next fight.

Relic has set the pacing just right: reaching what I thought was the end of my tether with endless war I'd round a corner, and be handed a jump-pack, reigniting my desire to carve the limbs off sentient beings all over again. ¤ **Rich McCormick**

PCFormat Verdict

Needs 2GHz dual-core, 1GB RAM, 256MB DX9 GPU

Wants Quad-core, 2GB RAM, 512MB DX9c GPU

War never felt so good · Perfect pacing

Not a long game · Simplistic plot

***Space Marine* is just endless war. Thanks to powerful weapons and excellent pacing, that war is pretty damn fun.**

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'B' is for *Bastion*, and Beautiful and Bargain. Go buy it

RELEASE/OUT NOW

PC Format Gold

Bastion

First world problem – I played this game and now real life looks rubbish

The world is destroyed. The calamity has stranded my hero on a floating piece of rubble, all but dead. A mournful narrator sketches out the story with a whiskey-roughened growl as my pint-sized proponent steps to his feet to explore the carnage.

Bastion's opening is a sombre affair. Sombre, and yet beautiful. That beauty touches every element in the game, from the visuals, through the sound and down to the animations. It's the kind of game that will look pretty in ten years, long after *Battlefield 3* loses its looks. Happily for anyone with a modestly specified PC, the visuals are achieved through attention to detail and artistic design rather than advanced rendering techniques, which means it'll run on all but the most outdated system.

It's an odd dichotomy then, the beautiful destroyed world of *Bastion*. As I take my first steps, the world forms around me, details dropping down from the sky as I edge towards my first weapon. It's a clever bit of game design – the world guides me in the right direction by building itself on the fly. No need for artificial barriers like locked doors or indestructible rubble. Every piece of detritus that falls can be destroyed with a swing of my hammer.

Then another mood emerges – raw, frantic combat. The first enemies I encounter set the screen alight with scattered hit points, neon goo and flashing lights. The understated Studio Ghibli film I thought I was exploring has come alive with epilepsy-inducing vehemence.

And so it goes. *Bastion* artfully juggles enchanting scenery, dark narrative and arcade combat so well, it's easy to forget how many games try to be this original and fail.

The Bastion itself is the hub of the game. It's a monument that the main character (known only as 'the kid') rebuilds the new world around. There are several cores dotted around the floating remains of the kid's world, once a heartbreakingly idyllic city, and he flies around using the Bastion's power, retrieving these cores to build new structures that let him upgrade his weapons, buy potions and suchlike.

Testing your mettle

To avoid the potential tedium of a relentless 'fly to level, kill things and retrieve' core structure, Supergiant Games has stuck in a few proving grounds missions. These test your mettle with one particular weapon, taking away the threat of death for a while to let you indulge in a bit of target practice, learning techniques that will come in handy once the game's obese fruit monsters return. Meeting certain objectives unlocks weapon parts and special items, as well as bragging rights on an online leader board.

VITAL STATISTICS

- **Price** £12
- **Developer** Supergiant Games
- **Publisher** Warner Bros. Interactive
- **Multiplayer** No
- **DRM** Steam
- **Web** www.supergiantgames.com
- **Discuss** forum.pcformat.co.uk



Thanks a lot, *Bastion*. Now i'm scared of blueberries



"It's the kind of game that will look pretty in ten years, long after *BF3* loses its looks"





Bastion's only bugbear: you can fall off the beautiful scenery

Triumphant 2D

Almost everything you see in *Bastion* has been painted by hand by Supergiant's Art Director, Jen Zee. The fully 2D game engine itself has been built from the ground up in C#, so despite its detailed visuals and dozens of enemies on screen, it will run quite comfortably on its humble minimum specification.

Battlefield 3 it ain't, but there are still many lighting and filter effects on display. What's more, in my many hours with the game, I didn't find any crashes or glitches. That's impressive coding from a ten-person studio.



Surely a candidate for a future Humble Bundle?



Combat is a squelchy fruit monster bashing affair with ranged weapons



The endlessly addictive proving grounds, with prizes kept behind bars



Don't be fooled by the sweet illustrations, this is a dark world

Like all the best games, *Bastion* is full of the unexpected. The game becomes increasingly compulsive not because you're desperate to harvest arbitrary items, but because you have to know what further surprises await you.

Even if this wasn't the case, the core mechanics in Supergiant's magnum opus (so far) are solid enough to hold the gamers' attention. Combat is simple and effective – it's a hack 'n' slash with ranged weapons and special abilities, such as spin attacks and hand grenades. It rewards well-timed shield defences with a satisfying counter attack, and though at time the sheer volume of enemies and projectiles on screen can appear overwhelming, the odds are rarely stacked too high against the kid that he'll die over and over in the same place.

There are only a handful of weapons, and though it may initially appear that the subtlety of each extends only as far as 'click on stuff until it dies', the proving grounds missions give you the chance to learn when to release an arrow to get a power shot, or that the hammer deals more damage when you're stationary.

Looting is bad

The kid carries just one melee and one ranged weapon at a time, and there's no armour system beyond his shield. Anyone hoping to scour *Bastion*'s world for rare loot items should hold out for *Diablo 3*, there are only weapon upgrades or sentimental items that progress the story.

And it's a story chiefly told by the ever-present narrator. In a game full of good ideas, this is the best. The narrator's gruff, world-weary commentary on your every move not only fills in the story without demanding you read through pages of text, but colours in incidental details, like the smell of 'blueberries and stale wheat' that fills the air when enemies approach.

If the kid decides to mess around for a while, the narrator recognizes this. If the kid falls off the scenery (which is *Bastion*'s only real bugbear), the narrator will point that out in a new way each time. The rarity of repetition puts certain football games to shame.

For a shade over a tenner, you get the chance to play *Legend of Zelda* in the *Princess Mononoke*-style universe, while Tom Waits narrates. Who on earth wouldn't want that? ¤

Phil Iwaniuk

PCFormat Verdict

Needs 1.7GHz dual core, 512 MB RAM, 64 MB 3D card
Wants 1.7GHz dual core, 1 GB RAM, DX9 3D card

Original · Enchanting · Surprising · Atmospheric

90

***Bastion* is a perfectly-formed, rare gem of an action RPG game that conjures beauty from even a modest PC.**



RELEASE/OUT NOW

FROM DUST

Play God with the elements, but not with your people

Price £12 **Publisher** Ubisoft
Developer Ubisoft
Web from-dust.ubi.com

I've never played anything quite like *From Dust* before. It's a game about sculpting a natural landscape by sucking up swirls of lava, water and earth and trickling them into rivers and ridges to protect your tribe of villagers. It's extraordinary, exhausting and frequently no fun at all.

The terraforming is smooth and organic, but what you're doing with it isn't: you need a perfect wall of rock to stop that tidal wave. That tension, between the hard rules of your objectives and the soft physics of nature, is a big part of the challenge.

Dust to dust

It can be hard, time-consuming and repetitive work, but it's compulsive. When it stops being fun is when that hard graft is undone by glitches, limited control and trial-and-error level design. The glitches are mostly with your tribe. The levels are about holding the elements at bay long enough for your people to establish towns and protect them with spells. When you manage to give them that chance, though, they frequently lose interest and stand around staring at their feet.

There's no sandbox mode to relax in, either – just one section near the end of the campaign that works like a level editor, without the ability to play normally on what you create.

The levels are mesmerising: angry cauldrons of lava, starlit dunes, heat-blackened rocks alone in a storming sea. You transform these places as you play, splashing dry dust to raise plant life and even dropping hot gobs of lava into the sea to forge new lands. That can backfire, though. When a level seems impossible, you're never sure if you're missing something or you've messed it up beyond repair. Scripted events can conflict with your work in ways that you never recover from.

Between that and the absent-minded villagers, you can spend more of your time wrestling against the usability problems than the elements. Thank God that *From Dust* is fresh, beautiful and fascinating enough to be worth it. ¤

Tom Francis

PCFormat Verdict

Needs 1.8GHz dual-core, 2GB RAM, 256MB DX9c GPU
Wants 2.66GHz quad-core, 3GB RAM, 512MB DX9c GPU

Beautiful to behold
Capable of genius
Frustratingly moronic AI
Annoyingly buggy

A gorgeous and rich land-sculpting simulation that's lovely to tinker with, but often buggy and stressful to play.

73

RELEASE/OUT NOW

TROPICO 4

Price £30 **Publisher** Kalypso Media
Developer Haemimont Games
Web www.kalypsomedia.com

I'm guessing Haemimont's last Latin American despot simulator didn't go down too well in Havana. In *Tropico 3* if you chose Che Guevara as your avatar you got an inspiring workhorse with alcohol and anger issues. This time out Che's only vice is paranoia. Welcome to the subtly tweaked world of *Tropico 4*.

While this instalment confirms the series as gaming's most charismatic city builder, it's hard to shake the feeling that the Bulgarian devs are running out of ideas. Exhibit A: the introduction of pointless building plans and inconsequential ministers. Exhibit B: the extra foreign presences. I'm willing to accept that my tiny banana republic must spend much of the Cold War courting the two superpowers, but should I really be worrying about relations with the Middle East? The *Tropicos* have always overflowed with tangy period flavour. Anachronistic additions such as this only dilute it.

Tourist trap

Many of the added buildables augment the game's lucrative but frothy tourist-industry side, and I'd rather have seen transport or civil engineering improvements. The most useful new facilities are weather and fire stations. Erect these and your populace is protected from the worst ravages of volcanoes, tsunamis and twisters.

Crammed with optional challenges and intermediate goals, the campaign episodes feel more structured and, perhaps, a tad easier than those in *Tropico 3*. They are, however, just as silly, and just as effective at turning spare time into sprawling cityscapes.

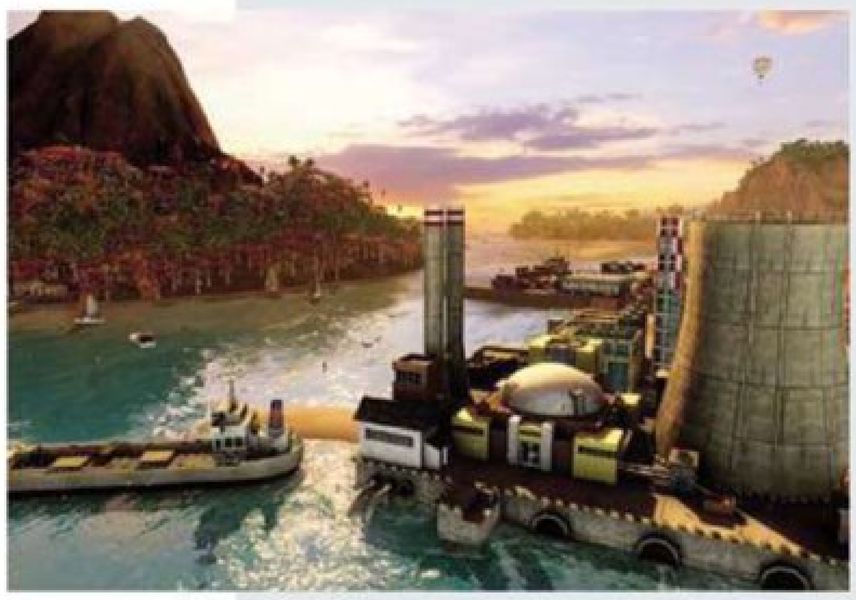
Don't let anyone tell you they didn't enjoy this palm-fringed politics-'em-up. Do, however, report them to your local party official if they claim not to be bothered by the game's woeful lack of revolutionary spirit. ¤

TS

PCFormat Verdict 72

Above **Keeping your tribe safe in *From Dust* is like herding moronic cats**

Below **Your chance to oversee a tinned fruit empire Señor Del Monte himself would be proud of**



RELEASE/OUT NOW

MEN OF WAR: VIETNAM

Price £25 **Publisher** Lace Mamba
Developer 1C
Web www.menofwargame.com

Crikey, this expandalone from the *Men of War* series is tough. Right from the loading screen it's clear you're in for a rough ride when you're instructed to 'WAIT.' No 'please' here, this is war.

But like Private Pile at boot camp, the difficulty toughens you up. You have to take each mission seriously to get anywhere, using each unit's strengths appropriately. You need to use the terrain to your advantage, master vehicular manoeuvres and move stealthily, flanking the enemy and planning ahead.

Come out fighting

Here's my problem with this game – when you're finding it difficult because you're outnumbered, outgunned and running low on resources, that's fine. Victory is all the sweeter, knowing you had to overcome such odds. But if you're also fighting against a wayward camera and unresponsive controls, that difficulty isn't quite as engaging. Zooming in on the action and peering down at the wobbly chickens in their coops is impressive, but the camera's movement controls often have you soaring past the action with an accidental flick of the wrist, leaving you to scrabble back to your squad in time to see them slaughtered.

Unit controls have their problems too. When deploying your squad from a vehicle, the driver is hell-bent on staying inside, until you practically drag him out with your mouse.

All that's old news if you've played the previous titles, and unlikely to put you off some fairly atmospheric, tight operations under jungle canopy. This is a refreshing strategic departure from World War II landscapes, and for many that will be enough. ¤ **PI**

PCFormat Verdict 72



Below A wayward camera makes an already tough war even tougher

RELEASE/OUT NOW

AGE OF EMPIRES ONLINE

Price Free to play **Publisher** Microsoft Games **Developer** Gas Powered Games
Web www.ageofempiresonline.com

When a classic franchise is updated for the latest generation, it's a dangerous time. Add to that the complexities of turning it into an MMO and trying to make it optionally free to play, and the number of possible pitfalls skyrockets. Given that, *Age of Empires Online* does an incredible job of the still prototype MMORTS genre, but doesn't quite manage to dodge every failure.

XP and other resources are earned by going on 'quests' – missions as you'd recognise them from any RTS; go here, kill this, capture these, build so many of those. The mission hub is a capital city that also takes the role of the player 'character', improving as you level up. Here, various scholars, merchants and advisors hand out missions and rewards. It works well. Even the simple training missions feel rewarding thanks to the magnificently implemented RPG stylings giving a greater sense of progression.

Premium rate

The pacing is sublime, introducing new concepts and teasing premium qualities regularly but without confusion. This can be an issue, though: so much of the game is only accessible to a paying customer that it feels more like a demo or trial than a free-to-play title. Stronger items are only usable by a paid account, but are still given as quest rewards. It's a minor knee to the groin, but it can ruin the enjoyment of an otherwise fun game. ¤ **BB**

PCFormat Verdict 80



Below Start expanding your empire as the RTS franchise gets an update



Right Don't expect it to be an accurate simulation of 17th century piracy: this is a very silly game

RELEASE/OUT NOW

PIRATES OF BLACK COVE

Price £15 **Publisher** Paradox Interactive
Developer Nitro Games
Web www.blackcovegame.com

Mixing sailing, exploration, RPG-style quests, customisation and RTS combat is a good concept, but *Pirates of Black Cove*'s sails fail to catch the wind.

Your first port of call is choosing a captain from one of three presets. Walker de Planc is the all-rounder, Jolie Roger is a girl, which means she's the fastest character, and Longshot Jack is handy with a musket. Who you choose doesn't make much difference to the experience you'll have, and all three of these heroes are hideously acted.

Hoist the sails

The action divides into sea-based and land-based. At sea, that means sailing. You navigate the sparkling waves of the Caribbean using the WASD keys. There's no wind to battle against; you can move around freely and at whichever speed you choose.

The sizeable world map is littered with ports, some of which can become your stronghold, letting you pick up quests from NPCs and build structures to grow your army of pirate goons. So you pick up a quest, which marks a location on your map, then you sail there, which in most cases brings the game's land-based features into play.

On land, *Black Cove* becomes an action-strategy game. Your captain plays the role of the slightly more powerful hero character, while his or her mob of pirates follows behind. It's basic stuff, and the strategy is rarely any more complicated than idly clicking on enemies until they die.

The sailing and exploring is fun. It feels the most piratical of everything the game has to offer, and the overworld is vibrant and detailed. The strategy lets it down, though.

Pirates of Black Cove's booty chest is spilling over with ideas, but on closer inspection all that priceless gold is just those chocolate coins you used to get in your stocking at Christmas. ¤ **AK**

PCFormat Verdict 65

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Ask Luis

All the stuff **you** didn't know

Like a slower, ruder Google, Luis Villazon answers any question you can ask... and many you should not have asked

RATH

What wattage?

[What is the] recommended power supply wattage for my PC? [The] Asus Calculator says 950W [but] my Gigabyte P-Tuner says 589W. [When I] play *Crysis 2* [I experience a] random PC crash [where I get a] black screen [and the] sound stop[s]. [So I] have to reset [the] PC. [If I] run 3DMark 11 [it completes with] no problem. [I have tried running the] PC with no start-up programs [and] no background programmes. [I have downloaded] new device drivers. [If I] run [the] Heaven Benchmark v2.1 [I get a] random PC crash. [Are these] problems caused due to insufficient power?

Johan Viljoen

Have you diverted power from the language processing section of your brain to try and make up the shortfall? I'm happy (and contractually obligated) to provide the answers here. I'll even grudgingly correct your spelling and punctuation. But when 40 per cent of the words in *your* question are also mine, I start to feel like I'm talking to myself.

So Luis, as you know full well, random lockups are a symptom of an inadequate power supply. The differential diagnosis is actually: 1. Faulty or inadequate PSU, 2. Overheating, 3. Loose connection; so lets try and rule out the PSU first. Your PC has twin GeForce GTX560Ti cards but I expect you entered the GTX570 in the Asus calculator (bit.ly/q9nKie) because it doesn't have an entry for the GTX560Ti. This slightly over estimates the peak draw as 300W per card, whereas your cards will only draw 285W each under load. But still, that's 570 watts just for the graphics cards. That takes the total draw for your system to just north of 900W, by my calculation. Since your PSU is only rated at 800W, I would say that you are definitely overloaded when both cards are running at full chat.

You could take one of the graphics cards out to test this but this will also reduce the heat output by a fair chunk and also remove the potential bugginess of running in SLI, so it's not a very useful test. Probably better to buy a 1KW PSU and return it under the seven-day no-quibble clause if it doesn't fix the problem. Which it almost certainly will.

> "Have you diverted power from the language processing section of your brain to try and make up the shortfall?"

IUTWANID

Can't boot, won't boot

I have read your section since *PCF*83 and it's the first time I have had to ask for your help. I tried to create a Linux recovery flash drive from the recovery disk for a friend's netbook (should have just borrowed another friend's USB DVD drive). After doing so, Windows XP no longer recognised my second hard drive; it seems that the Linux recovery disk had overwritten the MBR on this disk while my C drive was unaffected.

The drive is visible in disk management but I can't access the data on the disk and I am told that the disk needs to be formatted to get access. I can recover most of the files using Testdisk 6.12 but all the files are mixed up without their correct names. Sorting out all the video and music files back in order would be an endless task. Is there any way of getting the drive back to its original state? Family videos and my wife's music albums await your answer.

Joe Milewicz

The files you can see are just the data area of the disk, accessed directly without going through the partition table in the master boot record (MBR). There are utilities that will attempt to reconstruct that, based on the data that it can find. One such is Partition Recovery (www.partition-recovery.com) but don't construe that product mention as any sort of implied endorsement. I've never had to use one of these utilities in anger because my backup regime is proof against accidental deletion, mechanical failure, fire, theft and zombie apocalypse. It is always easier to repopulate the Earth from the clone banks, than to try and piece civilisation back together from the rubble. And so it is with data as well. I suppose I should probably maintain a separate set of hard disks with test data that I can periodically corrupt for the purposes of assessing recovery utilities

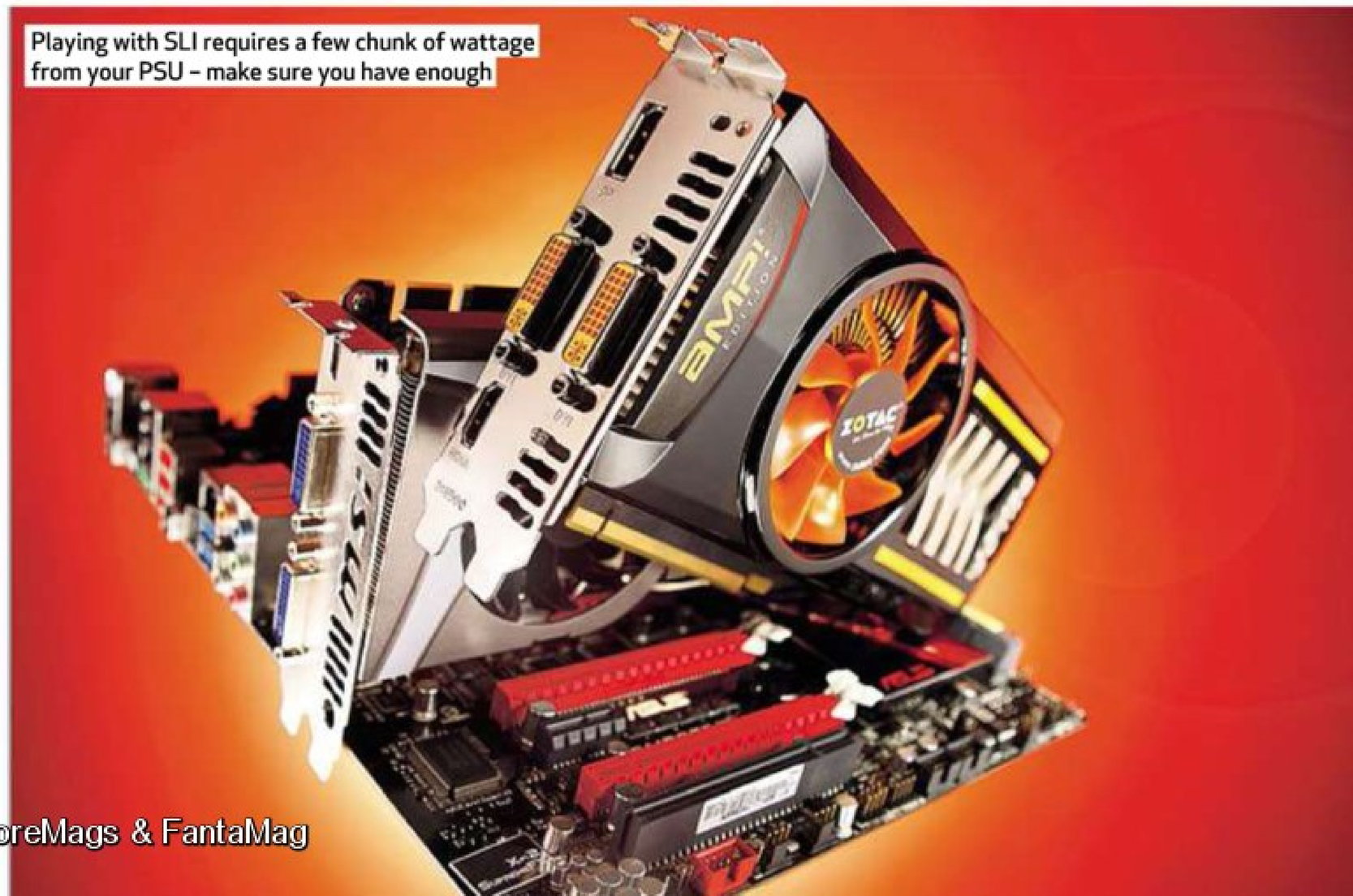
Free technical support

Email Luis for guaranteed insults and possibly even some technical help as well.

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Bath, BA1 2BW

The six categories of all human misery key

IUTWANID: It Used To Work And Now It Doesn't.
IGAEM: I Get An Error Message.
IMRTIUTB: It's More Rubbish Than It Used To Be.
RATH: Randomly, A Thing Happens.
ICDNT: I Can't Do the New Thing.
IKBTL: I Know Better Than Luis.



Playing with SLI requires a few chunk of wattage from your PSU – make sure you have enough

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PlayStation 3's only support FAT32 formatted drives, make sure your external isn't NTFS

for everyone else's benefit. And by 'should probably', I mean 'definitely won't'.

ICDNT

The slimmest bloat

I have a Western Digital My Passport external HDD. As is the wont with HDD vendors, the drive come preloaded with its own software, including a virtual CD drive. When I use the drive at work, I get an error message saying that I do not have permission to install hardware. This is not too much of a problem as I can cancel the message and still access the drives contents. The real problem is that my PS3 won't recognise the drive at all. I want to use it on the PS3 to view videos and images on TV.

Is there a way to remove the bloatware, ideally without losing my files? And can you deploy your awesome mind control powers to stop them filling drives with this kind of crap in the future?

Peter L Tierney

If you give my son Titan (who is 11) a custard cream biscuit, he will get a knife from the cutlery drawer and carefully dismantle it into two biscuits and a block of yellow filling. If you give him malted milk biscuits and ice cream, he will build an elaborate sandwich. He doesn't really mind what biscuit he eats, as long as he had a hand in its creation and PC owners are like this with their computers. If a hard disk is sold as a bare drive with no features, we will spend a happy hour putting it in a USB enclosure and installing backup and encryption software to make it useful.

"That's 0.06 per cent of a 500GB drive. I'm 1.78m tall. I could slice 0.06 per cent off the top of my head and I wouldn't break the skin"

But should it already look like this out of the box, the Earth will be sundered by our rage, as we try to remove this 'bloatware'.

Western Digital My Passport drives have a separate partition with its own driver and utility software preloaded in it. This partition can't be removed because the drive BIOS thinks the drive is smaller than it actually is and won't access the hidden partition. Instead, a different part of the BIOS makes this partition look like a virtual CD drive. When you plug the My Passport in, the virtual CD (VCD) autoruns and you are prompted to install the SES (SCSI Enclosure Services) driver and the SmartWare utility software. The SES driver is used to handle password protection of the drive and control the LEDs. You don't need to install it, but Windows will nag you to do this every time the VCD autoruns if you don't. The SmartWare bundle includes diagnostics, backup software and drive encryption. You don't need to install this either and, provided SES is installed, you'll only be nagged about SmartWare once.

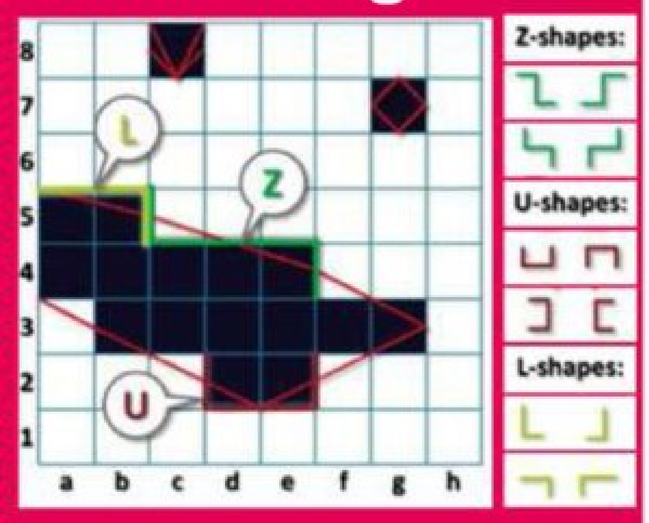
The installation nag is actually the worst thing about VCD. The space it takes up is trivial. It's about 668Mb on the older models and just 300 or so on the newer drives. That's 0.06 per cent of a 500GB drive. I'm 1.78m tall. I could slice 0.06 per cent off the top of my head and I wouldn't even break the skin. Some people with these drives will rant about a missing 35GB but that's just because they are confusing a binary gigabyte and a billion bytes – the former is 7.4 per cent larger. In other words, the space 'lost' to this confusion over units is 120 times more than the size of the VCD. That's hardly what I'd call bloatware.

Anyway. You can't remove it because it is integral to the drive firmware. If you don't want it to appear as a device in Windows, there is a firmware update on the Western Digital site (bit.ly/nSzi1x) that will let you hide it. But you still can't write over that area of disk. If you can't live with that, you should swap your drive for the My Passport Elements series, which doesn't include VCD

YOU ASKED!

FAQ

MorphoLogical Anti-Aliasing



What is anti-aliasing?

Normal anti-aliasing works by super-sampling or multi-sampling. With super-sampling you render the image at much higher res than the screen can display and then the colour of some of the subpixels are averaged to determine the final colour of each screen pixel. This reduces the 'jaggies' on diagonal lines and allows detail below the level of the screen res. It's also very computationally expensive because every screen pixel has to be rendered several times. Multi-sampling (MSAA) is a shortcut that only super-samples along the edges of polygons but it still has to be done during rendering because it relies on knowledge of the scene geometry.

Why is that a problem?

Even MSAA is too taxing for most consoles and mobile devices, even if you have lots of horsepower on the CPU, because the anti-aliasing has to occur during rendering. Not so with Morphological AA (MLAA) as it happens on an already rendered image. This has two advantages: first, it only needs to render each pixel once and second, it can be handled by either the GPU or the CPU.

How does it work?

MLAA looks at the rendered image and finds areas of high-contrast where the pixels appear to be strongly aliased. Essentially it looks for Z, L and U shapes formed by the pixels. These high-contrast boundaries are then averaged to anti-alias the line. The result is a much cheaper way of reducing jaggies that doesn't discard resolution, like a simple Gaussian blur would.

Read more at:

bit.ly/pj1vng

or any of the fancy features it enables. The VCD isn't the reason you can't use the My Passport on your PS3, either. That's the fault of the filing system: PlayStation's only support FAT32 formatted drives and yours is almost certainly formatted for NTFS.

ICDNT

Sound card fatality

I have recently built a new system consisting of an i5 2500K and a P8P67 Pro. All seemed to be running swell, until I discovered that my XFI Fatal1ty Pro is not detected in the PCI slot. The non-detection has been confirmed, as I have tried to install the latest Creative drivers with no avail. In addition I have also checked the device manager, and this includes "unknown devices". I have made sure that I have all the latest drivers (via the Asus website). However, despite this, I have no joy. I know that my sound card is plugged in correctly as the Fatal1ty LED lights up, indicating it's on.
Matthew Parker

Nope. You do *not* know it's plugged in correctly. The *only* time you can be absolutely certain something is plugged in correctly is when it works. At all other times, 'incorrect pluggage' lurks somewhere in the shadows of possibility, taunting you. That lit LED just tells you that the card is getting power. (Actually, all it really tells you is that the LED is getting power, but it's usually acceptable to generalise this to the rest of the card). Only 23 of the 58 connectors on a PCI card carry power, the rest are data connectors or earthed. Even worse, the power connectors are mostly clustered at either end of the card, so it's quite easy to insert a card at a slight angle and end up with enough power for a status LED and a fan, say, while some of the data connectors at the other end are waving in the breeze. Ironically, screwing the card's back plate firmly onto the chassis can often lever it partly out of its slot at the far end. That's why, when you're building your own system, it's always better to test each of the component first before you tighten up all the screws.

Pull it out and plug it back in again, is what I'm saying. A long way around just to get to that, perhaps, but sometimes you get extra marks for showing your working.

IMRTIUTB

Kung fu connection

You know more about computer stuff than Chuck Norris knows about arse-kicking, so I know that you are the right person to come to for answers to my broadband problems. For a number of years now I have been using the Telkom Faster Internet package which is a 512k connection that returns a very dismal ping of 340ms to international servers, namely *Call of Duty Black Ops*. Now, *CoD* being an first person shooter, ping is the crucial difference between being a mediocre player and an awesome player so I decided it was time to upgrade to a faster package.

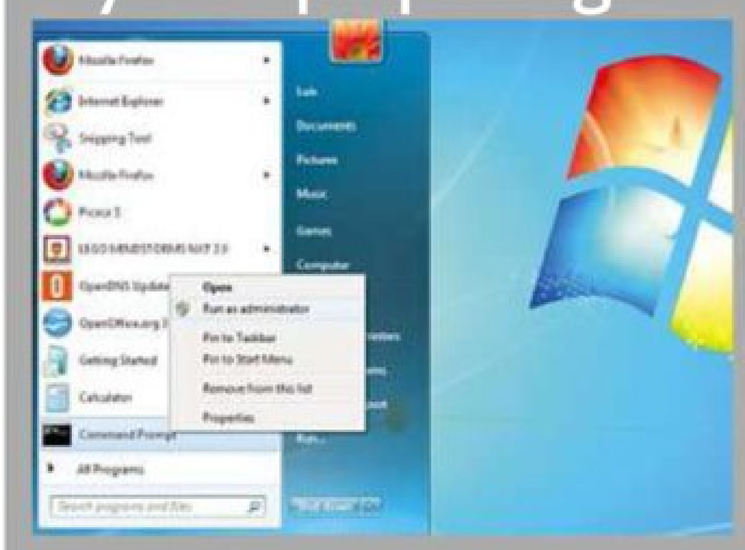
I checked and was told that I can upgrade to Telkom Fastest which has a max speed of 10Mbps, but I would only be able to get 4.5Mbps on my exchange. Well hell yeah, that's loads faster than what I had so I signed up. OMG WTH, my ping is still around 340ms with my new connection, this can't be! Am I wrong to expect a lower ping? Have I misunderstood how this all works? I live on the South Coast in Port Edward if that makes any difference.
Dave Simm

You are, you have and it doesn't. Ping and bandwidth are quite unrelated concepts. Bandwidth is the number of bytes that can be transferred per second. Ping is the time it takes for any given packet to make the round trip from your computer to the server and back. If you transport oil with a convoy of supertankers, you have high bandwidth but also high ping. If you suck it up through a straw, you have low bandwidth but low ping. When you upgrade your broadband package, you are only increasing the bandwidth between your home and your ISP. This might have the incidental effect of reducing the ping between you and the ISP but this only



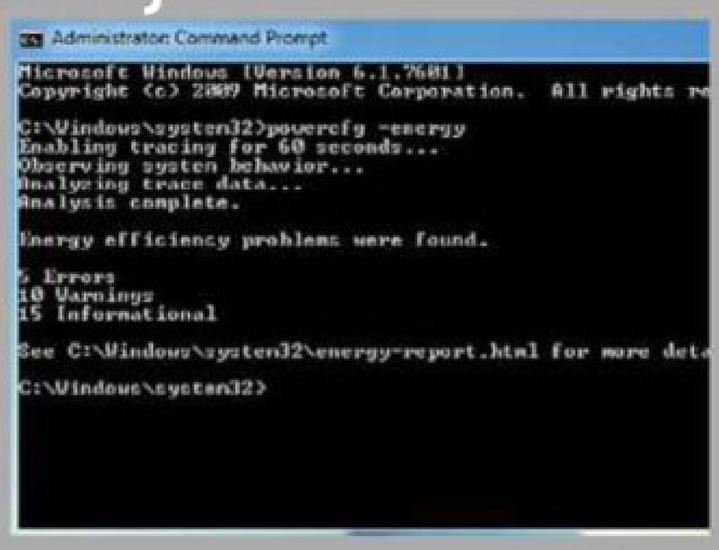
Extending your battery life

Is your laptop using too much juice?



1. Elevate privilege

Windows 7 includes a utility that will scan your laptop and look for processes and settings that might be draining unnecessary power. You will need to run it from the command line. Click the Start button, type 'cmd' in the search box, right-click the Command Prompt item and choose 'Run as administrator'.



2. Run the scan

At the command prompt, type 'powercfg –energy'. Make sure that your laptop is running on battery power, otherwise you'll be testing it in the wrong power usage mode. The test takes 60 seconds to run and separates energy efficiency issues into errors, warnings and 'informational'. If you get no errors or warnings, you're good to go.



3. Check the report

Otherwise, you will need to check the detailed report for the analysis of the errors and warnings. This is written as an HTML file, usually to C:\Windows\System32, but it will tell you where to look in any case. Open it in your browser and decide how much you agree and/or care about the particular recommendations it makes.



4. Tweak the settings

For most of them, it's simply a matter of opening the Power Options section of Control Panel and ticking or unticking the appropriate box for your power plan. Sometimes you may also have background processes running that are preventing certain options from cutting in or that are thrashing the CPU too hard.

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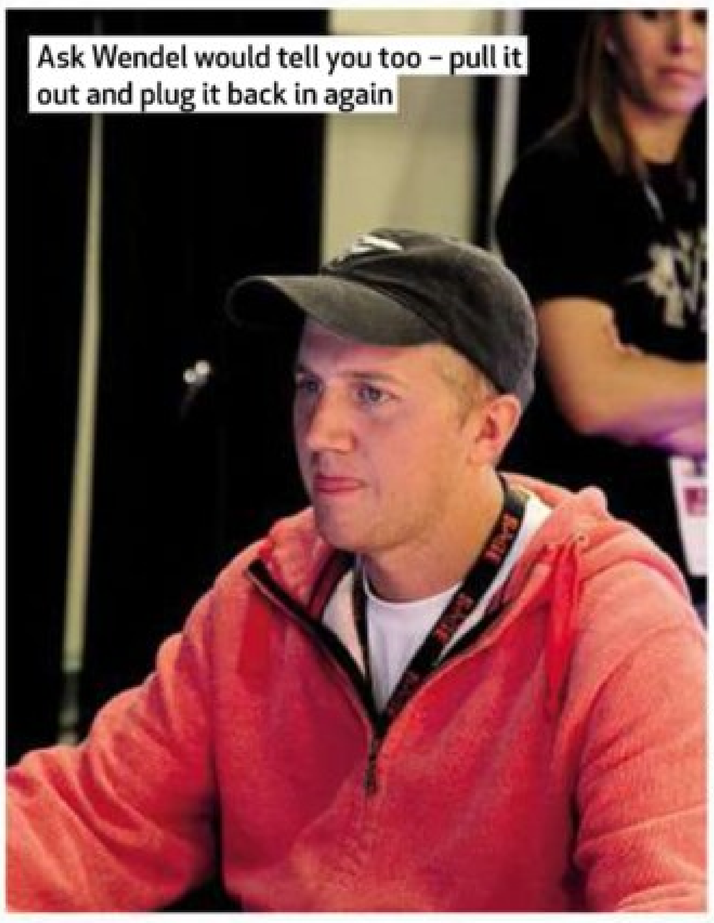

Ask Wendel would tell you too – pull it out and plug it back in again

Image credit: QuakeCon

accounts for a small part of the total round trip delay. Most of it comes from the connection between South Africa and the rest of the world. That involves undersea cables that are very busy and owned by independent consortia. Your ISP has to buy bandwidth on those cables and it's very expensive, so they tend to use traffic shaping to prioritise the traffic for their most valuable business customers and not for gamers. The lowest pings will always be from servers in your country but if you need to play on overseas servers, ask your ISP for 'unshaped ADSL' And expect to pay through the nose for it.

problem with my own motherboard and figured out it was the BIOS. Thanks to my kind manufacturers at Intel they gave me a copy of the BIOS software to flash it using a CD drive, but I can't seem to do the same with this Phoenix board. Any suggestions, besides flashing it with a floppy drive?
Theunis van der Stoep

Gaaagh, you people make me so angry! You can't just string together unrelated anecdotes like beads on a necklace and pretend that they form a coherent diagnostic narrative. 'Recently' you got an old motherboard working again. How long ago is that precisely? More than a month, it would appear, which isn't really terribly recent, and certainly long enough for a completely new problem to occur.

But what was wrong with this motherboard and how did you fix it that time? Was it related to the current problem? If so, why don't you give me the details of what you did? If not, what the hell did you mention it for in the first place? Now this motherboard doesn't POST. Do the fans spin? Does the hard disk sound like it's loading Windows? No beeps at all could mean a completely dead motherboard or a faulty power supply or a dislodged processor or lots of other things. But who cares? You've already figured out the problem, right? It is the same thing that happened to your other motherboard. It must be, because that board didn't boot either. You fixed it that time by flashing the BIOS. That's bound to sort it out this time too.

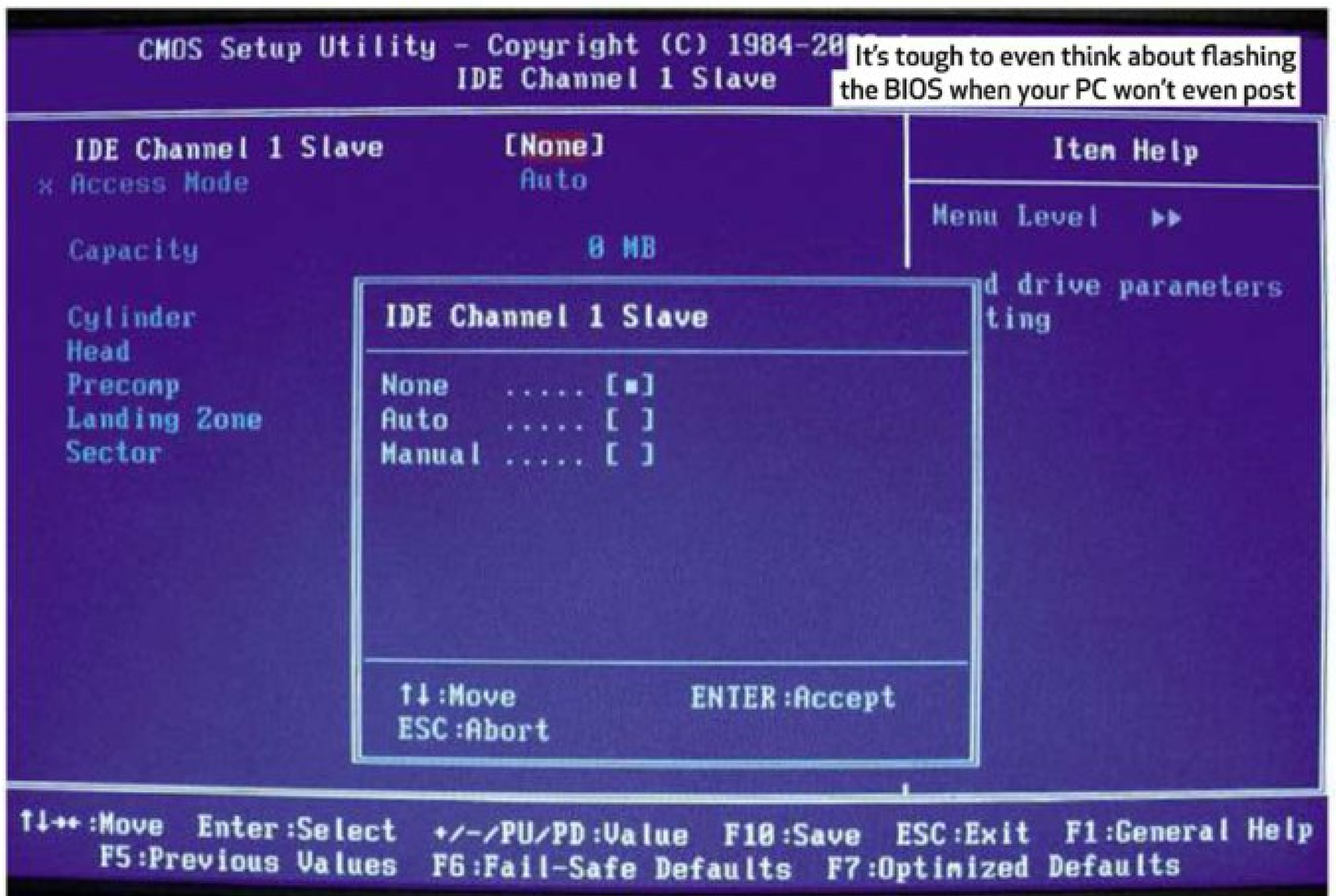
"That's a beautifully elegant hypothesis. But it's complete balderdash. There's no way you could have flashed the BIOS…"

IUTWANID

Post master general

I recently got one of my old motherboards working again and gave it to charity. By that meaning my neighbour next door. Now about one month ago the damn thing stopped posting. No not sending its grandpa in America a postcard! I basically mean the PC isn't doing the post thing anymore; no beeps, no error, just a black screen. I had this

It's a beautifully elegant hypothesis but it is complete balderdash. There's no way you could have flashed the BIOS on your own motherboard, if you say that your PC wouldn't even pass the POST. Which means that it wasn't the same problem, which means that what you did or didn't do, is irrelevant here. Throw away your preconceptions, discard your advance judgements, clear your mind of all prejudice: this is quite simple. Your



It's tough to even think about flashing the BIOS when your PC won't even post

NO NEED TO READ!

Upgrading and Fixing a PC, 3rd edition



Name: Upgrading and Fixing a PC, 3rd edition
Author: Stuart Yarnold
Publisher: In Easy Steps
Price: £11
ISBN: 978-1-84078-430-5

This book is much more about upgrading than fixing. Fixing is actually only the last of 12 chapters. Most of the others each take a different component, explain whether and why you should upgrade it and then tell you how to do it. That's the sort of simple, benefit-led formula that appeals to publishers when they are commissioning new books, but the finished book falls short of this promise in two ways. The "whether and why" section at the start of each chapter mostly boils down to "don't". I agree with this – upgrading individual components in a PC is rarely cost-effective and often has knock-on implications for the rest of the system – but it does undermine the premise of the book. There's nothing much wrong with the actual upgrade instructions either, but because they attempt to cover every possible make, model and spec of PC, there is a lot of woolly generalisation and you will reach the end of the chapter with three new questions for each one that was answered.

A book like this, that is aimed at relative newbies, needs to take decisions for the reader, not present them with choices. There isn't room in this book to explain enough to make those choices meaningful; it's just hand-washing to place the responsibility with us. I want a book that says "Replace this component with this one, leave this bit alone and add an extra one of these." But that wouldn't fill a book, and neither would the suggestion that you upgrade all the components at once.



Check your devices, USB 2.0 hubs will dial down to USB 1.1 speeds, if a USB 1.1 device is connected to it

neighbour's PC does not beep and the screen stays black. Good. Check plugs, power cables and fuses, then replace the PSU. Report back to me after this and then we will proceed.

firmware in the external drive, could be the drive itself. Writing to a drive is always slower than reading from it, but even 9MB/s is very slow for a USB 2.0 drive. The theoretical bandwidth of USB 2.0 is 480Mb/s or 60MB/s. Factor in various overheads and other inefficiencies and you should still expect around 25 to 30MB/s when writing and 30 to 40MB/s when reading. Could it be that you are still using a USB 1.1 bus on the laptop? That would restrict you to 12Mb/s or 1.5MB/s maximum speed. That would make your sustained transfer rate of 200KB/s look much more acceptable, and the 9MB at the start could be some initial write caching.

Some USB 2.0 hubs fall back to USB 1.1 speeds if *any* USB 1.1 devices are connected. Try removing all other USB devices from your HP laptop and run your speed tests again.

"It is always easier to repopulate the Earth from the clone banks, than to try and piece civilisation back together from the rubble"

IMRTIUTB

Why's my HDD so slow?

I connected my old laptop hard drive to an IDE-to-USB bridge, and use it as an external storage device. I recently hooked it into an HP laptop with an AMD dual core (VISION) processor and Windows 7. I can transfer data to the laptop with ease but when it comes to transferring stuff to the external hard drive it starts with a speed of about 9MB per second and drops to about 200KB per second. But when the external drive is connected to a desktop with Windows XP or Vista, it works perfectly fine.
Patrick

So, external drive plugged into laptop, reads fine but writes slowly. The same drive plugged into a desktop reads and writes fine. This could be your USB drivers, could be the

RATH

Pressing the eject key

I have a high-end system topped off with a Logitech G19 keyboard and G9 mouse. For no apparent reason my keyboard just stops working and I get the sound as if I was unplugging my keyboard from the USB socket. It normally only happens while I'm playing *World of Warcraft*, but occasionally it happens within Windows 7. I have tried the keyboard with and without the recommended drivers; at present I've uninstalled the Logitech drivers completely.
Tony Rayner



Be kind, retire your keyboards every system upgrade or two, even if it's a good'en like the G19

I once saw a Logitech G19 keyboard that did this every time a mobile phone next to it received a text. But I think this is much more likely to be a loose connection where the USB cable meets the keyboard. I wouldn't libel Logitech by calling this a common fault, but I've definitely come across it a few times before. I'm not sure why it should affect the G19 more than any other keyboard on the market. Except that maybe we tend to keep expensive macro keyboards over the lifetime of several systems, rather than replacing them each time. Everything comes to an end eventually: your keyboard, my patience and this column.

Got yourself a hardware puzzler that just can't wait? Get help on the PCF forums – www.techradar.com/forum/

WINDOWS 8 QUIZ

Quiz

1. What will the next version of Windows be called?
a) Windows 8
b) *Probably* Windows 8
c) No, they have definitely said Windows 8
d) Dreamland

2. What will be new?
a) The Start menu is now the Start screen
b) Touchscreen integration
c) Portable Workspaces on USB sticks
d) Nothing, it's all ripped off from Apple

3. Will it run on my current Win7 PC?
a) Yes
b) Theoretically, anyway
c) But don't. Buy it pre-installed
d) Nope. Touchscreen only

4. When will it be released?
a) Next year
b) Pfff. *Right*
c) Maybe December 2012
d) 2015 at the earliest

5. Will it actually be any good?
a) Yes, as groundbreaking as XP
b) No. Another Vista
c) Meh. Mostly cosmetic, like Win7
d) Way, waaaaay to early to call

Answers 1ab&c, 2ab&c, 3ab&c, 4ab&c, 5d

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pcformat@futurenet.com

While we're doing requests, can you fix it for me to hear movies as well as see them?

Uploaded on **24 August** 2011

Please can you do an in-depth article on getting sound from a PC to a large flat-screen TV? I notice plenty of chat on forums about this problem.

If you do go ahead with this, please give plenty of detail on any software needed and computer sound settings, and also pictures of plugs and sockets.
Terry Pick (Jersey)

I didn't think this was that hard, as I've got a laptop attached to my TV at home for those essential *WoW* and *Lotro* PowerPoint presentations for the family. Even so, at a guess this is probably something to do with high-bandwidth digital content protection (HDCP), which can be a real fusspot. Leave it with us and we'll see if we can cover all the possible angles.

I'm excited I've found a magazine that covers hardware in depth, but are you in cahoots?

Uploaded on **16 August** 2011

I recently grabbed a copy of *PC Format* (issue 256) from my cousin. Whoa, it was awesome! I was planning to upgrade my PC to the Z68 platform and there it was – every damn thing I needed to put my man (I call my PC that) into the action! The feature provided me with a lot of knowledge and thanks for testing so many motherboards! I loved it, and now I'm planning to buy the ASRock Z68 Pro3 just by what you guys have proved!

One thing, though – do you have links with ASRock? If yes, can I get a discount coupon? Just curious since there are a lot of products from it in the magazine!
Nikhil Joseph

No, Nikhil, we don't run discount coupons. This isn't how *PC Format* works with manufacturers, because such a setup could too easily lead to bad reviews in order to please companies – and let me explicitly state that this is not something we're willing to do. Our impartiality is what makes our reviews so much better than a lot of the competition.

As for the ASRock Z68 Pro3, the fact that we gave it such a glowing review (due in no small part to its great pricing) should be enough to convince you to rush out and buy one. It's a great motherboard at



Above We're all about impartial reviews, which is why you won't find discount coupons for products such as ASRock's Z68 Pro3 in *PCF*

MAIL OF THE MONTH

Steam clouds

Mail in and Win
pcfmail@futurenet.com

Chris's Play column (*PCF*255) questions whether some download services will be here five years from now. This has been my worry as well. OnLive is nearly here and I've read many articles online saying that the future of gaming lies in the cloud, but what if my account is hacked? The hacking groups have shown how weak most gaming companies' security is.

I've tried OnLive, pretending I was going to purchase a game, and in the purchase details they say that future membership might not be free and packages will vary. So one year down the line could they suddenly charge a £15 a month subscription for me to continue playing the games I've already bought? I don't know about anyone else, but I don't read the 20-odd-page-plus service agreement when I join up as I figure I don't end up having any rights anyway. Could Valve change Steam into a cloud gaming service and charge a monthly fee based on its current service agreement?
Ian Mills

There are loads of questions when it comes to cloud gaming, and you raise some good ones. I don't understand how the providers can absorb the hardware costs while offering the games at the same price as you can buy them yourself. Currently, you front the hardware costs when you buy your PC, and if there's a chance that those games can be taken away that's not something many would want to get stung by.

As for Steam, I really can't imagine Valve doing anything drastic to upset such a beautiful cash cow, so I wouldn't worry unduly about that. Next month we've got a big feature on cloud gaming, though, so stay tuned.



Some of you are worried about the future of some download services. Steam is unlikely to be going anywhere soon



WIN! Imagine not having a USB drive to hand... horrendous, eh? Now imagine winning one, courtesy of those lovely people at Crucial, simply by writing me an email. Now imagine finding out that your prize has EIGHT THOUSAND MB of storage! Oooh!

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Left If you're looking for the GTX 580 at the knock-down price of £210, you'll be disappointed. Sorry

the price, and you shouldn't need coupons on top of that.

It looked as though the price might be too good to be true and it turned out that it was

Uploaded on 13 August 2011

I was reading issue 256 of *PC Format* the other day and I made it to page 46. I saw a beefy-looking graphics card. I saw GTX 580 in the title. I saw a £210 price tag… I ran to my computer and got straight onto the Scan website. I found nothing! I went back to the magazine and saw that it was a misprint and was actually worth £400. I had a moment of sheer excitement, only to be let down! I still love *PC Format* and I read it every month.
Matt Conway

Well done, Matt, you've spotted our intentional error from issue 256. We did it on purpose (honest). Just to prove it, we put the correct pricing in the stats box. We're devious like that. Imagine how many GTX 580s would sell at this price, though… it would be like the whole HP TouchPad fire sale times one thousand.

The world is in conflict, so help me spread the word on how to make this a better place

Uploaded on 29 August 2011

It was so nice to see October's *PCF* (issue 257) reviewing Speed-Up Software and even more satisfying to see my longstanding decision to use IOLO System Mechanic getting the *PC Format* Gold Award seal of approval.

However, nowhere in the general review is there a warning about the importance of backing up the Registry before unleashing system-changing software. More importantly, the System Mechanic review gives no mention of a known conflict between this product, McAfee antivirus and Windows 7 (64-bit OS) – both pretty much industry standard products. System Mechanic has a detrimental effect on the McAfee antivirus suite whenever its registry cleaner option is used, producing the "Failed to Create IDispatch" error message. This necessitates an uninstall of McAfee, followed by a reinstall and reactivation (bit.ly/oZOKmj).

I experienced the frustration, angst and sheer waste of my time first-hand when I upgraded my Vista OS to Win7 64-bit and suffered an instant conflict the first time I ran System Mechanic. A simple Google revealed the issue, but sadly not a solution I could get to work.

You'll be pleased to hear that I'll be staying with the *PCF* Gold Award recommended software package, and until I've decided on a new antivirus suite I won't be using any registry clean up options! Perhaps now would be an opportune moment to suggest a *PC Format* review of antivirus suites.
Andrew Hill

Yes, everyone should back-up their Registry before optimisation; although as far as I'm aware all these utilities do recommend you do so before messing around with the registry. Even so, thanks for highlighting this conflict; especially as it isn't just System Mechanic that deletes the all-important registry entry; CCleaner and Glary also get rid of it. And yes, it's about time we had an updated antivirus roundup.

I can't seem to do the new thing on my computer and I know better than Luis

Uploaded on 26 August 2011

Following *PC Format*'s excellent hardware reviews, I plumped for a new rig that includes a Core i5-2500k, a Z68 motherboard and the AMD 6950 graphics card. I'm looking to convert some HD/AVCHD videos and wish to use the Lucid Virtu/Intel Quick Sync video ability of the Z68 and use the iGPU, even though I have a dedicated GPU installed. I contacted the vendor about Virtu and their technical bloke stated I needed to download some software and install it.

After Googling this, it appears everyone's experiencing problems installing it due to changing the BIOS, installing the iGPU drivers and then the Virtu software. Some people are reporting that updating the dedicated GPU drivers produces conflicts with the Virtu drivers, which in turn crashes their system and requires a new Windows installation. Even the mobo website and manual don't cover it.

You've outlined excellently how to flash the 6950 to a 6970 in a previous edition, so what about a walkthrough of the above describing the sequence needed and which update drivers to use? I'm sure this would be essential reading for your followers. *PC Format* would be/remain a world leader in solving this conundrum and continue to head the PC fraternity. You could even show Luis that you're his equal or be sagacious and ask him to do all the donkey work and then claim the credit for yourself! Incidentally, I'm not implying that Luis is a moke.
Mark S

We wouldn't recommend that you speak about the great Luis in such tones. He sees all. He knows all. The very fact that your letter exists is reason enough for him to pity your insignificant life. It's a darn good idea though. Even if we can't get the great Luis to pen something on this for us, we'll set the *PC Format* hive mind on it and get back to you next issue. ¤

Below Mark S wants to see a guide to installing Lucid Virtu software for speedy video conversion in a future Ask Luis



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ADVERTISING FEATURE

WHAT MMO?

SETTING GAMESCOM FREE

The free-to-play games that rocked the convention



Traditionally, game conventions are about big name pay-to-play games, and while there were certainly some big hitters present at Gamescom, a whole group of new and exciting free-to-play games were also out in force.

In fact free-to-play games were some of the most innovative and interesting on show. *League of Legends*, for example, took the MOBA genre to new places, while *Tribes: Ascend* gave new life to an old classic and *Otherland* was just... weird.

Here are the What MMO picks for Best Free To Play games from Gamescom: we recommend you play them all in the coming year.

GAMESCOM'S BEST FTPs



Tribes: Ascend

Developers Hi-Rez have experience with free-to-play, jetpack-MMO *Global Agenda* has been raking in players for months. In *Tribes* they've been able to construct something that's not only faithful to the original game, but is also accessible to new players. The best bit? Our old Spinfusor skills are still relevant in 2012.

LINK tribesascend.com



Otherland

One of the most bizarre and intriguing announcements of the show was *Otherland*. Based on a series of novels about constructing virtual worlds in cyberspace, the footage we saw was strange, beautiful and incredibly ambitious. It's like an MMO within an MMO. Think somewhere between Iain M Banks and the Matrix.

LINK otherland.gamigo.com



World of Battleships

Hot on the heels of the announcement of *World of Warplanes*, *World of Tanks* developers Wargaming.net have announced they're taking vehicular warfare to the seas. CEO Victor Kislyi told us their games would include a similar economic model, allowing current *World of Tanks* players to easily move between combat zones.

LINK www.wargaming.net





League of Legends: Dominion

League of Legends is easily the biggest MOBA around. When it changes, people pay attention. *Dominion* adds an entirely new capture and hold mode to the game. It's fast paced and action packed – a brave addition to a genre that just hasn't changed since inception.
LINK euw.leagueoflegends.com



Warhammer Online: Wrath of Heroes

Wrath of Heroes converts *Warhammer Online*'s PvP into a fast paced arena battle game. Promises of three players and teams of six heroes suggest something different from the MOBA games we're used to. Plus it has Orks, and as we all know Orks are da best at fightin'.
LINK wrathofheroes.warhammeronline.com



Warface

Warface was originally set for Asia alone, but during Gamescom Crytek announced the online shooter was coming to the west. The game promises co-op, PvP and the fabled high-tech visuals the Crysis developers are known for. Shame about the name though. They should have called it *Battlehead* or *Conflictnoggin*.
LINK crytek.com/games/warface/overview

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WHAT MMO?





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http://en.dragonica.gpotato.eu

DRAGONICA

Get a fresh start in New Origin

Dragonica, Gala's beat-'em-up-inspired MMO, will be releasing its newest expansion shortly and it's a massive one. *Dragonica: New Origin* will feature a new race, new classes, rideable pets and raise the level cap to 80.

Dragonica, for those not in the know, is a clever combination of a side-scrolling *Golden Axe*-inspired hack-and-slash game and a free-to-play MMO. It's a real throwback of a game, so much so that it works best on an old-fashioned gamepad, with the community using old SNES and MegaDrive pads for maximum retro.

While details on the new race remain scarce, Gala have confirmed the European version is getting both the new classes, nature-loving summoner the Shaman and the fearsome Amazonian (no relation to Wonder Woman).

Mounts will also make their way into *Dragonica* for the first time, available either as dungeon drops or from the pet merchant. Once your pets mature to a certain level you'll be able to climb aboard and ride them into battle. Some pets will even allow you to teleport to selected locations, making fast travel easy.

While *New Origin* contains its fair share of high-level content, with a higher level cap and new dungeons for level 45 and 75 players, it also completely revamps and redesigns many of the game's older maps, giving new players the benefits of additional content as well.

There's also a whole slew of improvements under the bonnet, adding widescreen support and extra resolutions along with tweaks to the elite monster system and the chat and party search functions.

New Origin looks set not only to expand *Dragonica*, but to open it up and make it much friendlier to new players, while still adding the high-level content established players desire.

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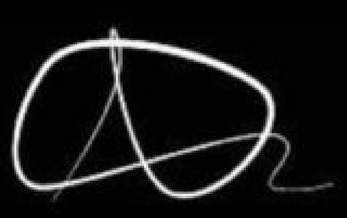
These are the apps you are looking for

"Don't worry, we have the best-darn software packs this side of the great divide"

We asked your opinion and we listened: we've despatched the cover disc to the great technological graveyard in the sky. They were a bit inconvenient, we'll admit, especially in this modern age where everything can be downloaded quicker than it takes you to slide a disc into your drive.

Don't worry though, young Ford can still be found piecing together the best-darn software packs this side of the great divide. Head over to the official *PC Format* website (www.pcformat.co.uk) and you'll find four huge software collections that tie into this month's magazine. Here, are the highlights that you'll find in the packs and because they are live links, they'll always point to the latest versions. Why didn't we think of this earlier?





Alan Dexter
Editor
alan.dexter@futurenet.com

WEB PACK 1
MEDIA CENTER SOFTWARE AND STREAMING

URL: www.pcformat.co.uk/258webpack1

We're hacking around Windows Media Center to rinse more from this beast. If you haven't yet upgraded to Windows 7 you're not completely out of luck as long as you opt for an alternative Media Center package. After much research, here are the best free alternatives.

Boxee
Boxee will happily display any format of movie or audio that you'd care to throw at it, playing locally stored media or streamed over a network such as a NAS drive. YouTube is integrated, too.

GeeXboX
This free Linux distro that offers a media center weighs in under 20 megabytes, making it super-quick to launch OS and can be installed to boot off a USB Flash drive.

JRiver Media Center
In this sea of freebies here comes a lone paid for Media Center option. JRiver's 30-day trial provides plenty of time to judge whether it's really the media center for audiophiles and has something worth splashing out for the 50 dollar price tag!

MediaPortal
A potent package offering every function you could demand and more, including TV tuner hardware support and allowing programme recording. The well-stocked library of downloadable plug-ins help extend its functionality.

Miro
It's hard not to make comparisons with iTunes in both Miro's appearance and operation, but the app boasts a host of additional features, including p2p file sharing.

Moovida
The bonus of Moovida is two interface options. The 'PC' interface offers an iTunes-a-like GUI approach, and 'TV' chucks a 3D arrangement into your face perfectly with any third-party media centre remote control.



Mythbuntu: it's a PVR, a jukebox, a DVD player and more

Mythbuntu
Mythbuntu is an media centre OS based on Ubuntu. It's ideal for dedicated HTPC boxes as it's completely free, thus offering a decent saving in the overall build costs and it's got a ridiculous amount of features.

These are just some of the picks from the full pack. Check out the www.pcformat.co.uk for the entire list of utilities, tools and applications.

WEB PACK 4 LATEST GAME DEMOS

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WEB PACK 2

FORUM BUILDING AND SOCIAL APPS

URL: www.pcformat.co.uk/258webpack2

This month we're getting to grips with building online communities starting with forums. Facebook and Twitter are seemingly unstoppable forces for both good and evil, so along with our forum software list, we've picked out the best desktops apps for social networking butterflies.

FreeForums

Before you begin setting up the infrastructure and software to host your forum, take a look at this free forum hosting site first. You'll have to put up with ad banners though.

vBulletin

If you're willing to spend money, this is by far the most powerful for regular use. It's $195 (about £122), but incredibly feature packed and with many modules for adding features and hooking it into your CMS.

phpBB

The old standby. It's free, it's popular… it's often under siege due to being used everywhere. Still, as well as being easy to install, you won't find many with more customisation options.

Vanilla

A different kind of forum which can handle large communities just fine, but works especially well for smaller ones. If you need your forum targeted, it's worth checking out.

ProBoards

Another free forum software platform and hosting service



A decent free forum option if you're just starting out

that's all set up and administered through your web browser. You'll never generate your own money from your board but at the same time you'll never need to pay a bean for hosting and bandwidth.

TweetDeck

The ultimate desktop application for keeping abreast of all your tweeting activities enabling you to group people into categories making full use of your monitor real-estate with loads of columns. A mobile edition is available for smartphone owners.

These are just some our selection, be sure to check out www.pcformat.co.uk for the other programs featured in this web pack.

WEB PACK 3

THE BEST FREE SECURITY SOFTWARE

URL: www.pcformat.co.uk/258webpack3

Expanding further into the realms of PC security measures, here's a run down of other essential free apps that will protect your data from theft, both locally and from those Internet haxors!

AVG AntiVirus Free

AVG has long been the most popular free antivirus solution for the home PC user. It's not hard to see why really - it offers as much protection and a level of functionality that the best paid-for security suites provide.

AxCrypt

No fiddly setup options, just simple context-menu integration – all you need to do is right-click the file you wish to protect, set your passphrase of choice and huzzah! Your file is encrypted. Just make sure you don't forget that passphrase…

CCleaner

As you use your system, over time it will accumulate a lot of potentially unwanted data. Use CCleaner to detox your whole machine of these files and gawk in amazement as both your privacy and performance receive a shot in the arm.

Child Lock

Good news, now your pesky kids – sorry, little darlings – can poke at your system with no effect whatsoever! Rolling



Get rid of all those virtual crumbs with Cookie Cleaner

Data's Child Lock blocks button input from the mouse and keyboard, until the unlock key sequence is performed.

Eraser

To paraphrase Arnie from the film of the same name, "If anyone accesses your private data… use this." By overwriting the storage sectors with a series of special data patterns, your deleted files are completely safe.

Flash Cookie Cleaner

Let filthy confections be a thing of the past, and use Flash Cookie Cleaner to clean cookies and PIE! That means Persistent Identification Element, btw...

There are a lot more programs from this collection to peruse. Head over to our website at www.pcformat.co.uk to get the full monty… well, list.







THE MONTH IN NUMBERS

17

The number of years it's taken for Doom one and two to be delisted by the German ratings board. Bethesda appealed to the stringent board, and the games have been released with a 16+ rating.

£40 BILLION

The amount HP's PC business is worth, according to ads from the company. The computing giant could spin off its PC business into a separate company, which will be a "more agile organisation".

$0

The price US troops have to pay to call their loved ones at home, thanks to a Google Talk initiative. We hope *Three Kings* includes a new scene where Mark Wahlberg hunts for a netbook to call his missus.

$100

The cost to produce a prototype hologram-based microscope, according to boffins at UCLA. The banana-sized micro-camera shines light on a sample and uses a sensor chip and cloud tech.

120 petabytes

The size of a "hard drive" created by IBM for an unknown client. The drive consists of 200,000 drives daisy-chained together. The drive is capable of holding 24 billion MP3 files.

THE VOICE OF REASON

"Huttball: worse than being slowly digested over a 1,000 years"



PC Format has a mole. A man wedged inside the games industry's nether regions. A man rendered so hideously paranoid by a life spent playing sub-standard PS2 ports that he won't even let us edit his copy. These are his thoughts…

Being a games journo, I've spent more time in presentations for *Star Wars: The Old Republic* than I have in presentations for all other games put together. They always take place in a 'set', a polystyrene representation of the interior of an Imperial Star Destroyer.

But I've been in this 'set' so much that I'm starting to notice the cracks, which would surely leak into the vacuum of space if this were the real deal. The cracks in *The Old Republic* have become more apparent, too. BioWare's insistence on not releasing it "until it's ready" means that EA – bless 'em – has been faced with an interminable amount of presentations and trailers, which always end with journos asking the same question: when's it out? "Soon". "Next year". "When Jar-Jar Binks is finally accepted as a breakthrough in CGI and character development."

But during the Gamescom *Old Republic* presentation I did something I'd never done before: I walked out of the presentation. I saw something bad. I had been thoroughly Lando'd. What was this awful, awful, thing, worse than being slowly digested over a 1,000 years? One word: Huttball.

A kind of mash-up of *Robot Wars* and *Speedball 2*, Huttball is a player vs player combat zone, in which the object of the game is to get the ball over the line while killing off your opponents. It's the kind of zone that could be arbitrarily tacked onto any MMO, but this is a *Star Wars* game set 1,000 years before the first movies. A *Star Wars* game that's just lost any sense of the grandiose, portentous tone set out in its many trailers.

The problems with Huttball are too many to list. First, it's a pastiche of a cheap American game show, complete with corporate sponsorship. But the only thing *Star Wars* is good at is pasticheing Joseph Campbell's *A Hero with a Thousand Faces*. Worse still is that it makes it seem as if BioWare needs to make the game's combat more interesting, like it's lacking something that can only be filled with a horrible game show.

The biggest problem of all is that I can imagine George Lucas sanctioning this. This is a man who's happy to enter the collective childhood memories of a generation and screw with them under the guise of keeping the galaxy coherent. So he'll add an out-of-place "NOOOO!" at the end of Return of the Jedi, or digital Ewok eyelids, which make them look creepy. Here's betting he'll add a Huttball sequence to *Attack of the Clones*, just to keep the continuity in place. Keep up the good work, George. ¤



Illustrator **Kevin February**

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CPU	2.8GHz Intel® Dual Core CPU	2.8GHz Intel® Dual Core CPU	2.5GHz Intel® Quad Core CPU	2.8GHz Intel® Quad Core CPU	2x 2.5GHz Intel® Xeon® Quad Core CPUs	2x 2.1GHz AMD Opteron™ 12 Core CPUs
CPU Cores	2 CPU Cores	2 CPU Cores	4 CPU Cores	4 CPU Cores	8 CPU Cores	24 CPU Cores
Storage	500GB SATA HDD	2x 250GB SATA HDD	2x 300GB SATA HDD	2x 2000GB SATA HDD	2x 300GB SAS HDD 1x 500GB SATA HDD	2x 300GB SAS HDD 2x 500GB SATA HDD
RAID	-	RAID 1	RAID 1	RAID 1	RAID 1	RAID 1
RAM	2GB RAM	4GB RAM	8GB RAM	12GB RAM	16GB RAM	32GB RAM
Connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity
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Freespeed

THE ULTIMATE £400 PC

Never been a better time to build

One of the best things about the PC is the ability to almost infinitely tailor the make up of your machine to match both what you want to be able to do with it and your budget. There are a wide variety of builds possible, as we demonstrated in *PCF*257 with our budget, gaming and work-station rigs. Those machines went from £382 right up to £2,174.

Previously though putting together a budget machine meant having to make some serious compromises, especially if you were a PC gamer on a tight budget. Thanks to the slow pace of next-gen console development though the hardware requirements for most modern titles has stagnated where PC hardware has continued progressing at speed.

That means you can get an awful lot of performance for your money these days and putting together a gaming rig capable of playing the latest titles at 1080p resolutions, on high settings, with post-processing pretties is actually very possible.

We've built a rig for under £400 with a full-fat quad-core CPU, a serious gamer's graphics card, a huge amount of fast HDD storage and a good chunk of speedy RAM. There are few real compromises to be made in these halcyon days.

So over the next few pages we'll suggest the top budget components, offer a full guide as to how to put it all together safely, as well as some interesting alternative options for those with a bigger budget. And to top it all off just how to get the most out of your new bits.

Let's get to it!

> "There are few real compromises to be made in these halcyon days"



Dave James
Deputy Editor
dave.james@futurenet.com

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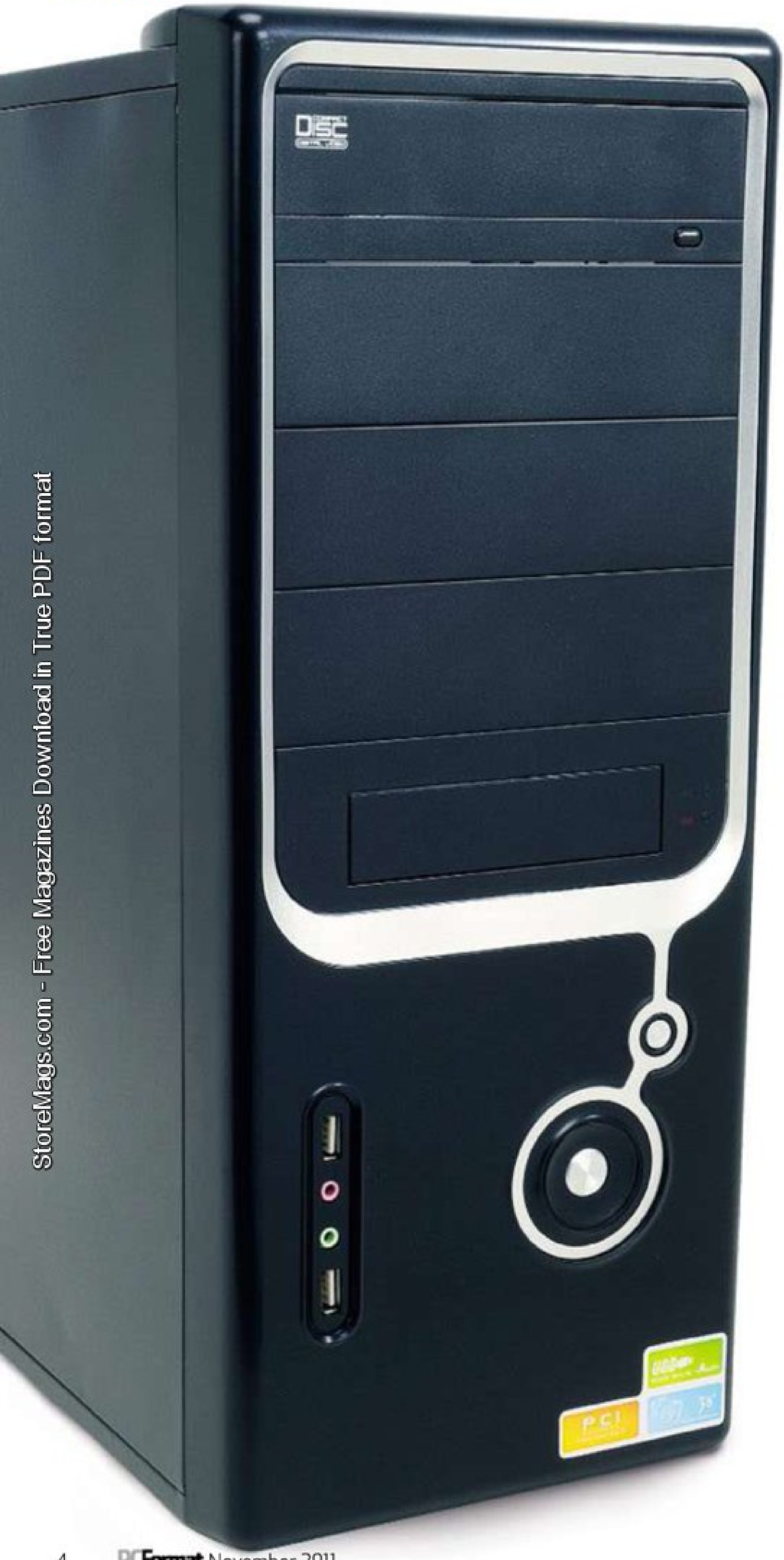


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BUILD A £400 GAMING SYSTEM

Picking the perfect components for your budget build

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However you feel about the extended life of the current generation of games consoles, there's one thing that can't be denied: the stagnation of high-performance games development means there's never been a better or cheaper time to be a PC gamer.

And we're not just talking about being able to run an MMO at 1,024 x 768 on the lowest graphics settings. Oh no, we're talking about being able to run the latest 3D titles on the highest settings at your 24-inch monitor's native resolution – and all for less than the price of AMD's top graphics card, or most 256GB SSDs.

A few years ago, if you asked us how much you should pay for a decent gaming PC, we'd normally have said you should expect to spend around £1,000 if you wanted to hit the standard native resolution of a modern screen with decent frame rates. That expectation now seems to have gone out of the window. Sure, you can still spend a grand on a PC, but these days that's looking more like an unnecessarily luxurious purchase than ever.

PCs hovering around that sort of price these days could come kitted out with a 24-inch monitor, a solid state, super-speedy boot drive, or some crazy SLI/CrossFire graphics setup for the ultimate gaming overkill. Of course we're not doing down such machines – if you can afford it, feel free to spend as much as you've got on your gaming rig. It's just that you don't have to spend a fortune any more to get a machine that will chew through modern games.

The £400 price tag we've set ourselves for this budget PC build used to mean making some serious compromises on the tech you'd be kitting your machine out with. Previously that would have meant maybe a dual-core CPU, a paucity of RAM and a low-end graphics card. With this gaming rig there's no such corner-cutting.

As we're just creating a base unit rather than a full system, we don't have to worry about pricing up a screen, mouse and keyboard. That means we've got all that cash to spend on the good stuff – the stuff that makes your games fly!



Sadly if you want to play the latest games on your PC it has to be Windows

OPERATING SYSTEMS

Software for the masses

When we're talking about a PC build, even just a base-unit build, there's always that Microsoft-shaped elephant in the room: the operating system. At around £70 for the standard Windows 7 Home Premium, it will take quite a chunk out of your budget.

Here we're assuming you're ditching a previous machine and will be porting your old OS over to your new rig. Once you reactivate your Windows license on a new machine, it will happily run with your fresh hardware.

There are alternative operating systems available for free though. We covered ReactOS in *PCF* 257 – a free project that's designed to allow Windows programs to work in a non-Windows environment. But to call that OS flaky is to do flaky a disservice. It's also not capable of running DirectX, which immediately scuppers any hope of it being a gaming OS.

There are other versions of Linux, such as the latest Ubuntu, which are free to download. If you can struggle through with Wine, you can get a number of PC games running, emulated through your free operating system.

Platform fun

The first thing we need to consider is what platform we want to use as the basis for this system. When you're talking about a budget build, there really is only one choice and that's AMD. It may not be able to offer the very fastest components, but AMD is the current king of the price/performance segment. Drill down and you'll find you've still got a choice to make about whether or not to go for the standard CPU/GPU combo or take the more modern APU stance.

Again though, the choice is clear. We're building a machine specifically to play the latest games as fast as we can within the

budget, so form-factor and power draw are no issue for us. That means we can forget about the Llano Lynx platform; it just doesn't have the gaming grunt we crave.

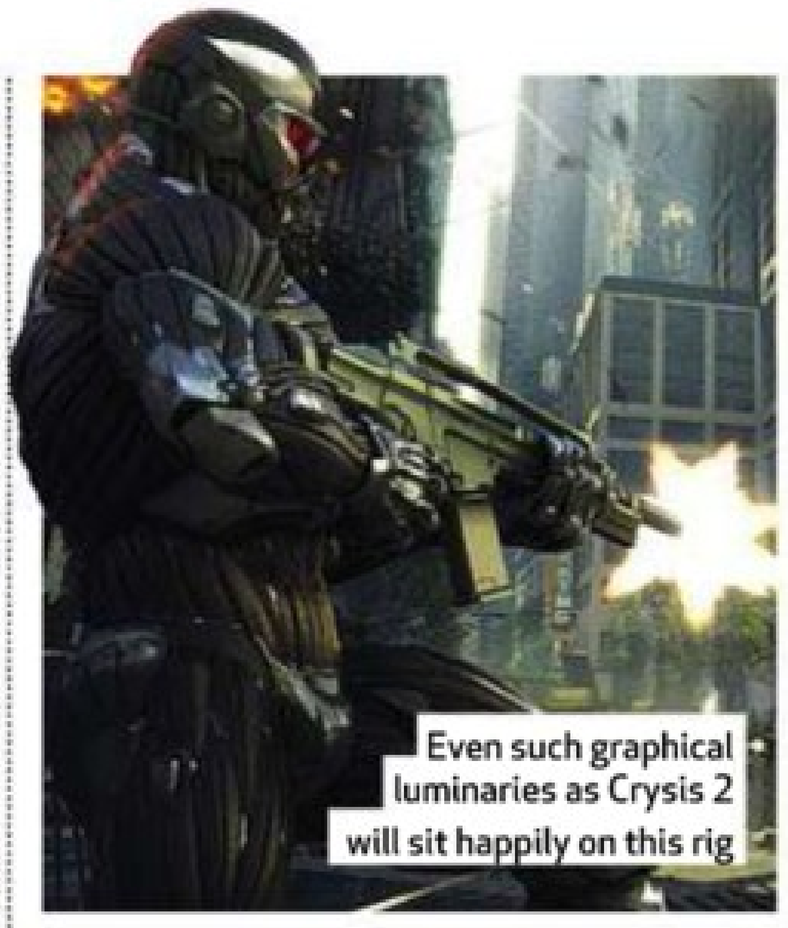
There's also the fact that you can pick up a serious AMD CPU and mobo combo for less than the price of the top-end APU and motherboard. We've opted for the Phenom II X4 955 Black Edition, which is a 3.2GHz quad-core CPU with an unlocked multiplier. That means overclocking a-go-go, and we managed to get 3.8GHz out of the 955 without breaking a sweat.

Next we need to figure out what board to drop the chip into, and this is where things have recently become interesting. While we're still waiting for the new Bulldozer CPUs to make their belated appearance, we've already got the 9-series motherboards with their AM3+ sockets ready to accept the new chip.

But it's not just the 9-series boards that are Bulldozer-ready – we've found an Asus M5A87 AM3+ board for just £70 that will be the perfect companion to the Phenom II X4 955 now, and is ready and waiting for Bulldozer whenever it saunters into view. The other plus point is that for your £70 you're also getting all the new I/O joy of SATA 6Gbps and USB 3.0 too.

Gaming grunt

That's the heart of the rig taken care of, but the real gaming grunt comes from your GPU, and things are just as interesting in the budget graphics market as they are elsewhere. As we saw in *PCF* 257, the Radeon HD 6850 has recently had a price cut taking it down to below £120. For a card with that sort of graphical power that's a bargain, and will fit together with the Phenom II to blitz through pretty much any



Even such graphical luminaries as Crysis 2 will sit happily on this rig

game you throw at it at 1080p.

It also only needs a single PCIe power connector too, so the bargain 500w Storm PSU should have no trouble providing the necessary juice to get it up and running. Saving cash on the chassis and PSU means we have enough spare left in the budget to go big on both the memory and storage in our new rig.

The phenomenal RipJawsX DDR3 RAM kit from G.Skill is without doubt our pick of the memory kits right now. It's one of the best overclocking kits around, providing a great foil for the Phenom II, and for less than a tenner per GB it's a bargain too. With the money left over, we can afford to pick up a 1TB SATA 6Gbps HDD for the fastest spinning platter tech around.

Frankly, we were astounded at the level of components we could put together for the budget we had, and with change left over for a pint too. This is a rig that will chew through games for breakfast and give you the productivity chops for other tasks too. Bargain. ¤

> "We were astounded at the level of components we could put together for our budget rig"

ESSENTIAL UPGRADES

When there's cash to spare…

The machine we've put together has been specifically designed to fit within the £400 budget for the base-unit itself. That's a good amount to spend – it will give you decent performance without breaking the bank, and without making too much of a compromise on any of the key components.

However, if your budget will stretch a little further there are some areas where you could consider dropping a bit more money for a performance boost.

The CPU is a tricky one – with the motherboard we've got here, we can drop in a Bulldozer CPU once they're available. Early estimates place the cost for the top end Bulldozer at around £230, which is quite an outlay, but you can pick up a 3.2GHz hex-core AMD chip for £100 less than that.

It's also worth spending some cash on a third-party CPU cooler, as the stock cooler that comes with the chip wont fare too well when it comes to overclocking. If you're overclocking then a more efficient PSU would also be worth a look; something like the 600w OCZ StealthXStream is good.

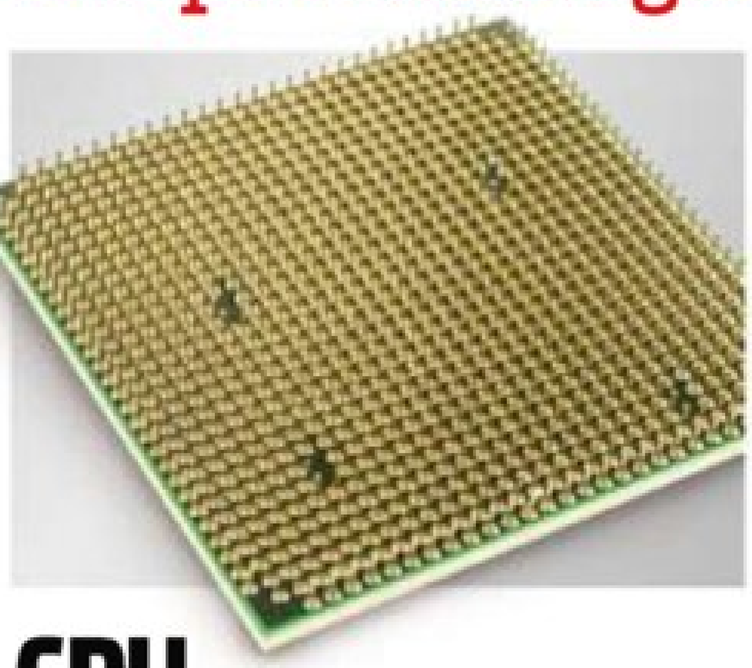
In terms of pure aesthetics, a more expensive chassis will also give your rig less of a budget look and more supercar chic. ¤

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Shopping list

The perfect budget components for your £400 gaming build



CPU
AMD PHENOM II X4 955 BE

Price £86
Web www.aria.co.uk
This is a gaming-ready quad-core CPU from AMD. It runs at 3.2GHz out of the box, but thanks to the Black Edition moniker it has an unlocked multiplier for OC fun. You can hit 3.8GHz easily.



GPU
XFX RADEON HD 6850

Price £118
Web www.dabs.com
The HD 6850 was a pricey beast when it first came out, but driver updates and price cuts have since made it a great value card. It lacks the grunt of the HD 6950, but it's still a worthy gaming GPU.



MOBO
ASUS M5A87

Price £70
Web www.scan.co.uk
With this AM3+ motherboard as the basis for the rig, you can build in a certain amount of future-proofing. The AM3+ socket will allow you to drop in a Bulldozer CPU in the future should you wish, and gives you access to SATA 6Gbps and USB 3.0



MEMORY
G.SKILL RIP-JAWSX 4GB DDR3

Price £38
Web www.novatech.co.uk
It was the overclocking prowess of these sticks that impressed us, and they provide the perfect foil for the Phenom II's overclocking.



STORAGE
SEAGATE 1TB SATA 6GBPS HDD

Price £40
Web www.scan.co.uk
The amount of traditional storage you can get for £40 is astounding, especially as this drive runs on the speedy SATA 6Gbps connection.



PSU
STORM 500W LPJ19-25

Price £16
Web www.scan.co.uk
For just £16, this 500w Storm supply will cater for all your basic needs. It has a single PCIe power connector though, so if you go for anything more powerful than an HD 6850 you'll need to upgrade.

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PART 1: Testing components

Check key components before final fitting





1 Install CPU

We're going to test the vital components before putting them into the case. Lay your motherboard on its anti-static bag and remove the CPU guard. Lower your CPU in, being careful not to bend any pins. Lock it down and add a pea-sized dab of thermal paste on top.

2 Cooler and fan

Cooler fixings vary between coolers and chips. Most require a bracket under the board, which affixes to the cooler itself. Check your manual to find out which of the screw holes and fittings you need. Connect the fan cable to your mobo's CPU FAN connector.





3 Fit the RAM

RAM only fits one way, you just need to open the catch, snap it in and lock it in place with the catch again. Some motherboards have different configurations between memory channels, so one and three may operate differently to two and four – check the manual.

4 The graphics card

The GPU should always occupy your top PCIe slot because this is where the highest bandwidth will be: x16. Bandwidth drops to x8 when you add another GPU in an SLI/CrossFireX array, so manufacturers usually put only one x16 slot on the board.





5 Hook up the PSU

Connect the 20+4 pin connector to the mobo, the 8-pin EPS cable to the mobo (near the CPU) and whichever 6/8-pin PCI-e cables your GPU requires. If your cooler has more than one power connector, make sure it's hooked up to a SYS_FAN on the board.

6 Test the components

Power that sucker up by turning on the PSU and either hitting the power button on your mobo if it has one, or using a screwdriver to short the power (+PW-) pins on the board's ATX block. This is where you need to attach all the case connectors.

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PART 2: Installing components

How to put it all together





1 Prep the case

Take out any bits of case you don't need like drive bays and PCI slot plates. You need as much room in there as possible, and it's at this point that buying a bigger case pays for itself. Tie all the fan cables out of the way and fish out the mobo's mounting screws.

2 Backplate and mounting screws

Don't bother with your case's backplate – use the one that came with your mobo instead. It's guaranteed to fit, and chances are it'll be more solidly built. You'll also need to fix mountings to the case in line with your mobo's screw fittings.





3 Install the PSU

Some cases offer the choice to fix the PSU at the top or bottom of the case – there are pros and cons to both. You need to consider airflow and space to make the best call. Screw it in place and tie the cables out of the way. If it's modular, take all the cables out.

4 Drop in the mobo

Remove the GPU from your mobo for now and with the CPU, cooler and RAM still in place, lower your mobo in and line it up with the rear mountings, then screw it in place. It's easier to do it this way round than to try and fix the components in afterwards.





5 Reunite GPU and mobo

This can be surprisingly fiddly if your case's storage bays stick out quite far. Some cases will allow you to pop out some drive bays, so do this if possible, and bung your graphics card back into that top PCIe 2.0 x16 slot. Once it's firmly in the slot, screw it in place.

6 Check it still works

You'll need to connect the PSU's cables to all your components again. Checklist: main mobo power, CPU power and GPU. Don't worry about hooking up any case fans yet, just the CPU cooler. Power-up as before and check for POST beeps or LEDs lighting up your mobo.

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PART 3: Tidy up and install Windows

Finishing touches to get your new PC ready to roll





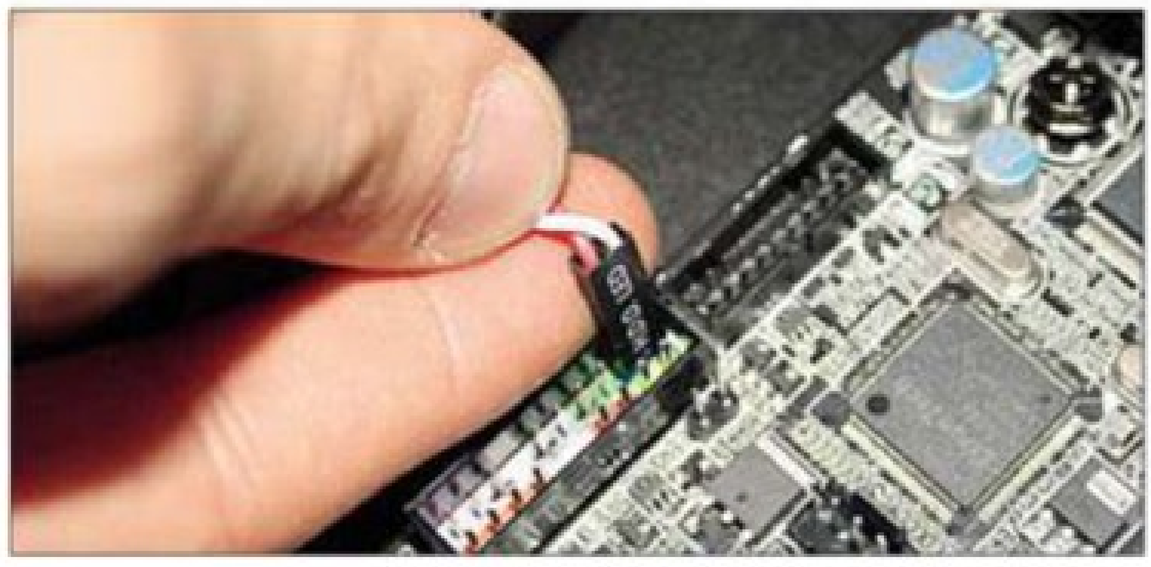
1 Install the hard drive

Locate the handiest 3.5-inch drive bay (bearing in mind the SATA and power cables that will be trailing off it), pull it out and screw the disk into the bay. Pop it back inside. Slightly trickier if you need to reinstall those drive bays you took out to get the GPU to fit.

2 Add the SSD

Those sleek SSDs need mountings of their own to fit into a 3.5-inch bay, so screw your solid state bad boy into its mounting (usually provided with the drive) and then affix it as a hard drive. If you're the sort to hot-swap drives, use the easily swappable bays.





3 Attach an optical drive

Pop out the cover for the optical drive bay from the front of the case and slide in your optical drive, again from the front, then secure it in place by screwing it in. If your inner OCD slave can deal with it, it's neater for cables if you use the lowest drive bay.

4 Case connectors

Invariably the fiddliest of all steps. Connect your case's USB cables, HD audio, fan connectors and all those tiny single-pin ATX block connectors. There's a tiny diagram on the motherboard itself that shows where to put each pin, but check the board's manual.





5 Tidy your cables

This will help maintain good airflow and avoid dust build-up. If there's space between the backplate and case, feed cables in there. Ensure your drives are connected to the fastest SATA ports, use the PCI-e cables for your GPU and tidy up with cable ties.

6 Windows installation

Time to check everything is working. If you get any funny beeps, check what they mean online – it's probably a loose component or missing connection. If everything works fine, bung the Windows disk in your optical drive and install the OS on your SSD.

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£86/ PROCESSOR

AMD PHENOM II X4 955 BE

An oldie, but a performance goodie

VITAL STATISTICS

Price £86 **Manufacturer** AMD
Web www.amd.com **Clockspeed** 3.2GHz **Cores** 4 **Threads** 4
Cache 8MB **Lithography** 45nm

There's a huge amount of PC power available for a relatively small amount of cash these days, and nowhere is that more evident than in the CPU and GPU markets. Consider the lilies – sorry, the processors. This 'ere quad-core Phenom II was the top-end AMD CPU in 2009. Back then it was a £180 chip, but now you can pretty much knock the one off the front of that price and get yourself a real a bargain.

It's still essentially the same Phenom II architecture you'll find in the current top-of-the-line quad-core Phenom II X4 980. That's the 3.7GHz chip, but it's still using the Deneb core, with 8MB total cache and the same 45nm production process.

The real high-end AMD processors these days are the Thuban-based hex-core chips, but if you're talking in gaming terms, adding those extra two physical cores to the mix makes little or no difference to actual performance.

If we weren't just focusing on the gaming side, but looking at a more general PC usage model instead, those six cores of processor goodness would be much more useful. When you're dealing with multi-threaded apps, the full physical cores really make a difference over the Thuban's quad-core brethren.

But this is a budget gaming rig, so it's four cores all the way, and in price/performance metrics it's tough to argue against the 955 Black Edition. Those two words at the end of the name means it should have some decent overclocking chops too.

Quick clocks

We've managed to get the chip stable at around 3.8GHz, and that's faster than the stock speed of that top-end Phenom II 980.

Compare that with the closest price-comparable (and still relevant) Intel chip, and you're looking at the Core i3 2100. The Sandy Bridge technology may be good, but the dual-core nature of that processor and the slower clock speed mean that it's not quite in the same performance ball park as this AMD chip. The Intel chip is also the price of a pint more expensive. It may have Intel's HyperThreading technology backing up its twin cores, but those four threads can't match the Phenom's four physical cores.

The bargain basement price of this fully-fledged quad-core CPU,

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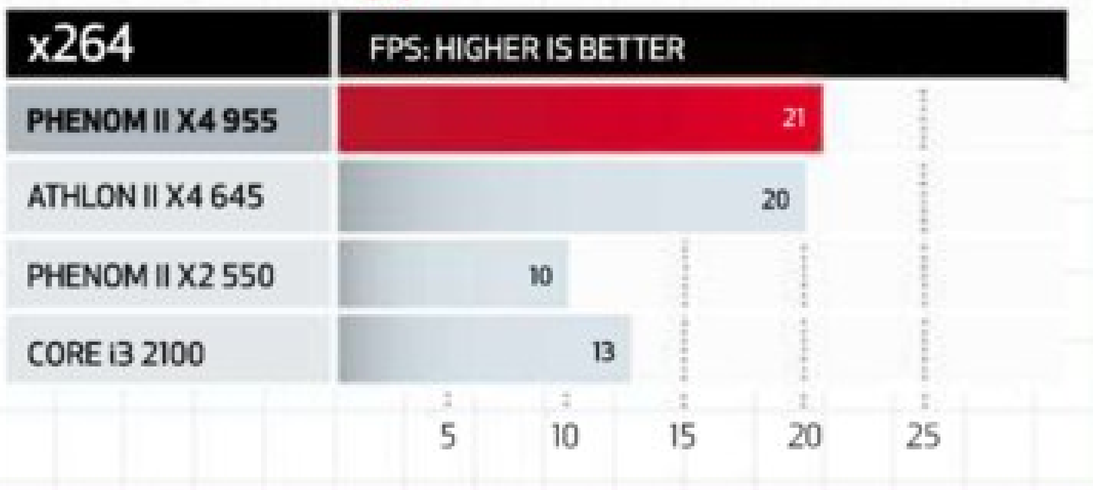
Technical analysis

When you consider that the Intel Core i3 2100 is more expensive than the Phenom II X4 955, the performance difference is huge. Those extra four physical cores push the AMD chip way past the dual-core Sandy Bridge, even with the Intel HyperThreading technology giving it access to four threads. The Athlon II X4 645 is only £10 cheaper, so it's worth opting for the better Phenom II gaming CPU for the improved performance you'll get out of it.

CPU rendering performance



Video encoding performance




CPU-intensive games like *WiC* will still work well on this AMD CPU

coupled with the substantially lower cost of the AMD platform as a whole, means it's the perfect match for the budget-oriented rig.

There's also the Athlon II X4 645 to consider, which is another low-cost quad, but it's a weaker CPU without the extra layers of L3 cache the Phenom II chips. For only around a tenner less than the price of this fully-fledged Phenom II that's an unnecessary compromise.

It's not just the low cost of the AMD platform that makes it such a good investment – AMD's focus on cross compatibility means there's a healthy chunk of future-proofing to bear in mind too. The fact that you can now easily pick up 870-based AMD boards with the new AM3+ socket on them – as well as SATA 6Gbps and USB 3.0 interfaces – for as little as £70 is nothing short of crazy. The inclusion of the AM3+ socket means these bargain boards are just waiting for a Bulldozer CPU to be dropped into them.

Future shocks

We don't want to upset the venerable Phenom II X4 955 by mentioning the chip that's set to supplant it in the hearts and minds of the AMD-faithful gaming community, but it's certainly worth considering that a rig put together with the AM3+ socket will still be relevant 12 months into the future.

So here we have a quad-core processor that's an oldie, but most definitely a goodie. It's much cheaper than at launch, and is still very much a relevant processor all these years down the line. The overclocking prowess of the Deneb core is nowhere near the 1GHz+ of the Intel Core series of CPUs, but hitting around 3.8GHz is nothing to sniff at in a seriously sub-£100 chip.

Despite its venerable age, the Phenom II X4 955 will happily power your modern games, and with all those cores fizzing away at 3.8GHz it'll have a good stab at most productivity tasks too. The AMD chips aren't necessarily the best gaming processors around, but in the budget sphere there simply is no Intel alternative to the AMD platform in terms of value for money and performance. **Dave James**

PCFormat Verdict

- Full-fat quad-core
- Decent OC chops
- Great price
- Getting old now

An impressive quad-core CPU, made even more so by the low price.

85

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XFX HD 6850

A blisteringly fast card that's stood the test of time

VITAL STATISTICS

Price £118 **Manufacturer** XFX **Web** www.xfxforce.com **GPU** Barts Pro **Cores** 960 Radeon Cores **Core clock** 775MHz **Memory capacity** 1GB GDDR5 **ROPs** 32 **Price check** www.dabs.com

To be honest, we were unforgiving of the HD 6850 when it first hit our test benches; at launch it was pricing itself almost out of the market. At the time it was going toe-to-toe with the 1GB GTX 460, which just about had it pipped in performance terms. It was also a little pricier than the GTX 460, coming in around the £160 mark.

Time has been kind to the HD 6850, though. The price has dropped a huge amount since launch. Indeed, AMD recently announced a further price drop that brings the card down to less than £120, which for a spec like this is a serious bargain. AMD's constant driver updates have meant that the card's performance has increased over time too.

The Barts Pro GPU core at the heart of the HD 6850 is essentially a reworking of the Cypress Pro that made the HD 5850 such a good card back in the early days of DirectX 11 silicon. It doesn't have the huge number of Radeon Cores the HD 5850 enjoyed, but still maintains the ROPs count of 32. It's not quite the performance powerhouse the older card still is, but then you won't find that kind of power anywhere for the same price as the HD 6850.

That said, thanks to the smaller chip size, AMD has managed to squeeze some extra MHz out of the silicon. That 50MHz bonus doesn't make up for the shortfall in unified shaders, but it still makes this card a quality performer for the cash.

Budget hero

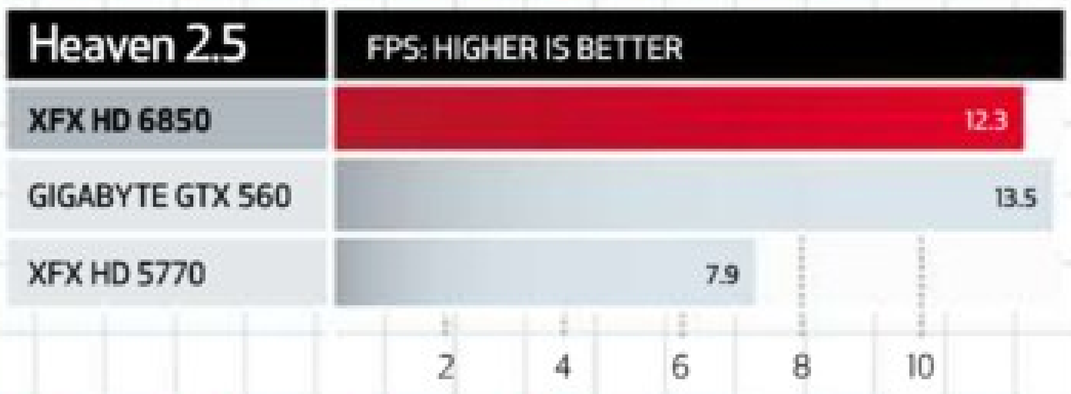
At the ludicrous 30-inch resolution of 2,560 x 1,600, the HD 6850 manges to get into double figures in the Heaven 2.5 benchmark, hitting 12.3FPS – and that's with the tessellation settings on 'extreme'. Essentially, this is the GPU equivalent of turning the amp up to 11. That means that at the more reasonable resolution of 1,680 x 1,050, there's barely a game out there it can't top 30FPS on the highest graphical settings.

Indeed, we almost managed to hit 50FPS in DiRT 3 and even managed to push the beautiful Shogun 2 above 30FPS in the full HD resolution of 1920x1080. The famously system-taxing tessellating monster Metro 2033

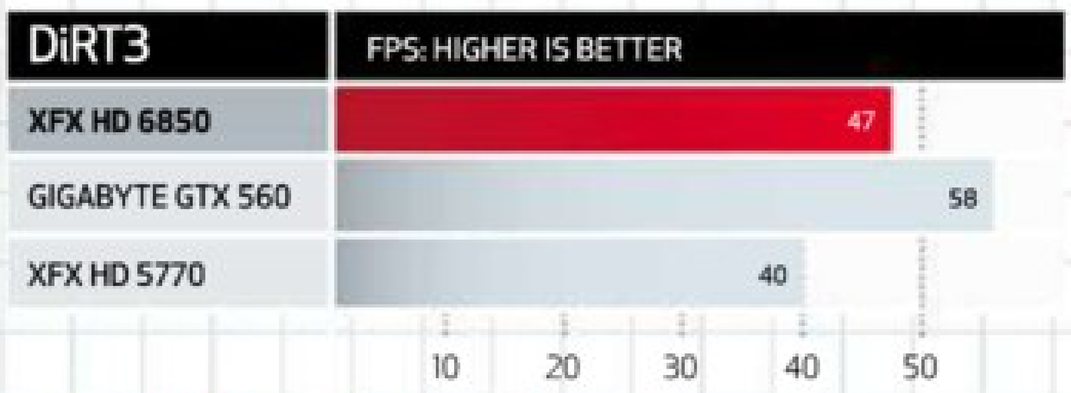
Technical analysis

For a £120 card, you really can't complain about the levels of performance you're getting from the HD 6850. Its benchmark results are only just shy of the much pricier Gigabyte GTX 560, and when you consider that it's capable of hitting over 30FPS at 1,920 x 1,080 in a game as graphically intensive as Shogun 2, that's an impressive showing for this suddenly bargainous card.

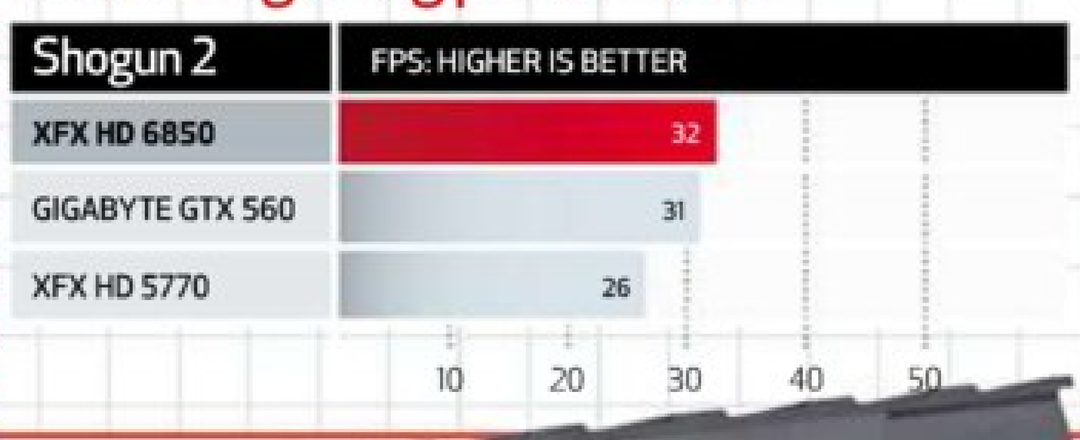
DirectX 11 tessellation performance



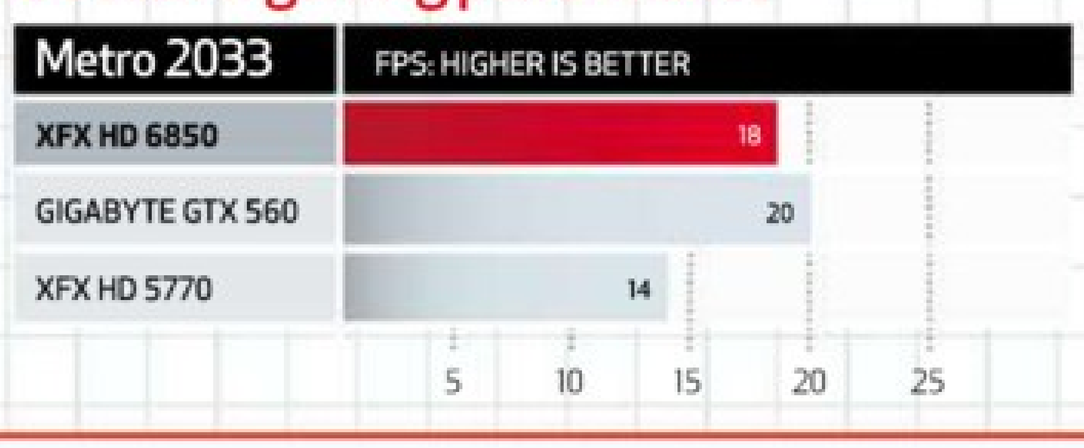
DirectX 11 gaming performance

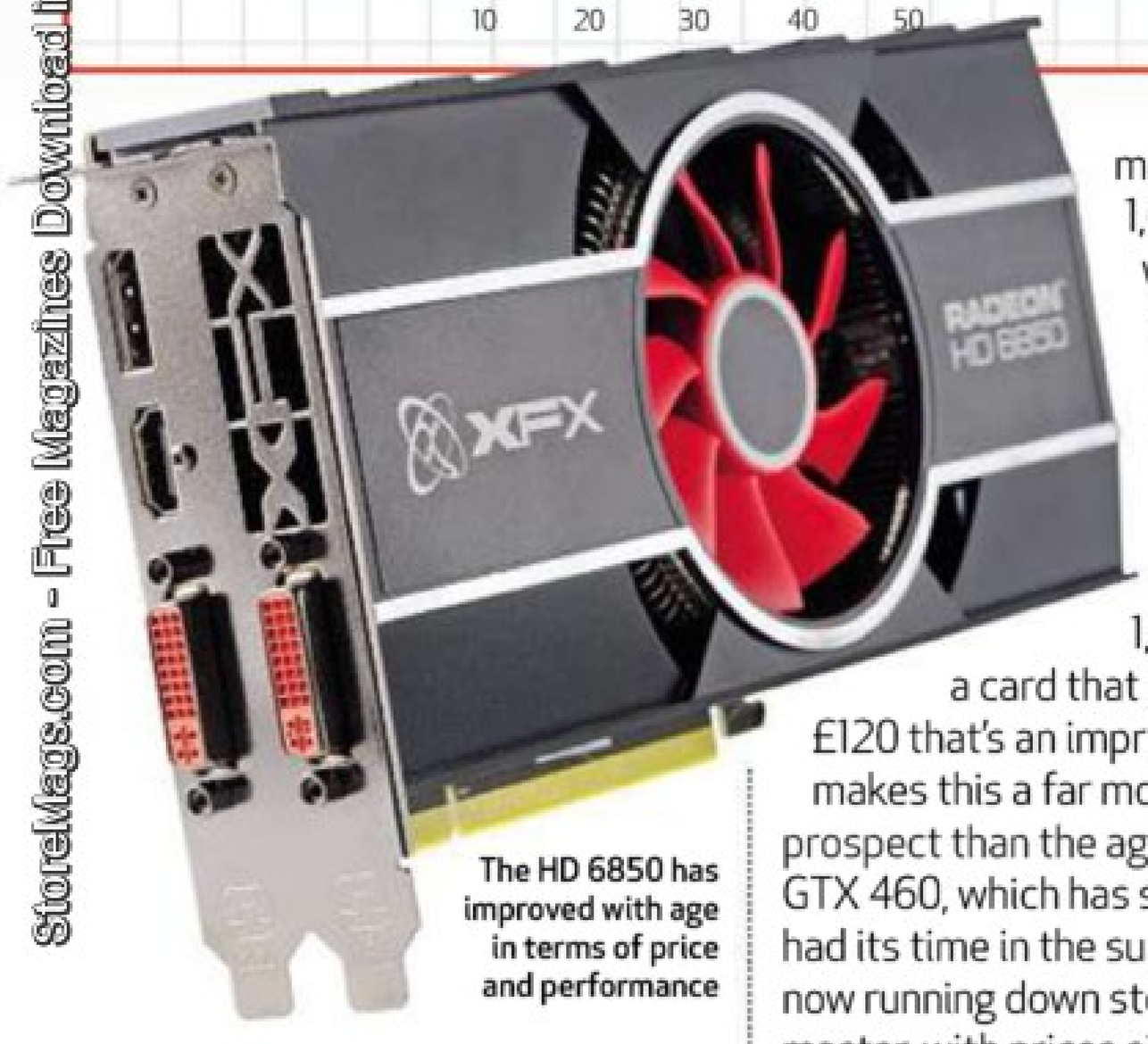


DirectX 11 gaming performance



DirectX 11 gaming performance





The HD 6850 has improved with age in terms of price and performance

almost managed to get up to 20FPS with all the good stuff maxed out. That may not sound particularly impressive on paper, but is actually a pretty significant score for such a graphically intensive title.

Super serious

This, then, is a serious gamer's graphics card for a bargain price. In fact, you're not limited to the moderate 1,680 x 1,050 resolution with this card – it will also do a pretty decent job powering a proper HD monitor running at 1,920 x 1,080. For a card that costs less than £120 that's an impressive feat, and makes this a far more intriguing prospect than the ageing Gigabyte GTX 460, which has surely now had its time in the sun. People are now running down stock of that old master, with prices sitting around the £150 mark at best. The HD 6850 has that NVIDIA card pipped in the performance benchmarks, and now in the value stakes too.

The next step up from this card is the vanilla, non-Ti branded GTX 560. That will require a little more investment though – to the tune of around £30 in fact. That's a considerable extra chunk of cash for a budget build, and looking at the benchmark performance, you don't get a huge amount of bonus pixel-pushing for the extra investment. The NVIDIA card is significantly faster in DiRT 3, but in the other titles it's almost too close to call.

If you can afford to top the £100 mark for your budget graphics card then you won't be disappointed by the impressive HD 6850. The recent price cuts and subsequent performance updates via the driver improvements have combined to make made this the budget card of choice for gaming. **Dave James**

PCFormat Verdict

- Great performance
- Bargain price
- Cool runnings
- Will even cope with full HD

XFX's chilled version is the bargain HD 6850 of them all. It's a hell of a gamer too.

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£77/ SOLID STATE DRIVE

OCZ AGILITY 3 60GB

Great price and great specs, but does the Agility 3 deliver?

VITAL STATISTICS

Price £77 **Manufacturer** OCZ
Web www.ocztechnology.com
Capacity 60GB **Controller** SandForce SF-2281 **SATA interface** 6Gbps **Memory type** MLC **Trim support** Yes
Price check www.scan.co.uk

What's this? You've just pieced together a surprisingly capable gaming PC on an incredibly tight budget, and here we are pushing an SSD in your general direction. Madness, surely? Not quite. Sound, sane advice as it happens. You see, if you want to give your machine a shot in the arm that you'll notice every time you turn it on, you'd be hard pushed to think of anything more game-changing than a superfast SSD, and the OCZ Agility 3 is one of the best options available right now.

SandForce's hotly anticipated new SF-2200 controller? Check. 60GB of solid-state memory? Yup. SATA 6Gbps support? Affirmative. Sequential read and write performance in the 500MB/s ballpark? Oh, yes. So, just what separates this OCZ Agility 3 drive from its seemingly identical, yet notably more expensive siblings? In what ways does it differ from the Vertex 3 for instance, which can be had for £30 more?

Not a great deal, as it happens, but there is one important difference: the Agility 3 makes do with asynchronous rather than synchronous NAND memory. What, exactly, does this mean? Asynchronous NAND is cheaper and cheaper usually means slower. In this case, the reasons are rather subtle and involve the way flash memory chips sync with other parts of the SSD chipset over a given clock cycle. The crucial upshot of this is that the asynchronous NAND limits the Agility 3 to 50MB/s per channel, whereas the Vertex punches out a whopping 200MB/s.

Devilish details

Now that does seem like a yawning gap in performance. Given that both drives have eight memory channels, it also begs the question of how the Agility 3 can possibly deliver 500MB/s. Do the maths. It doesn't add up. The answer is SandForce's DuraWrite technology, which cleverly compresses data before it's stored in the NAND cells, effectively boosting bandwidth. Except, that is, when you're dealing with incompressible data formats like zip files, MP3 tracks and video

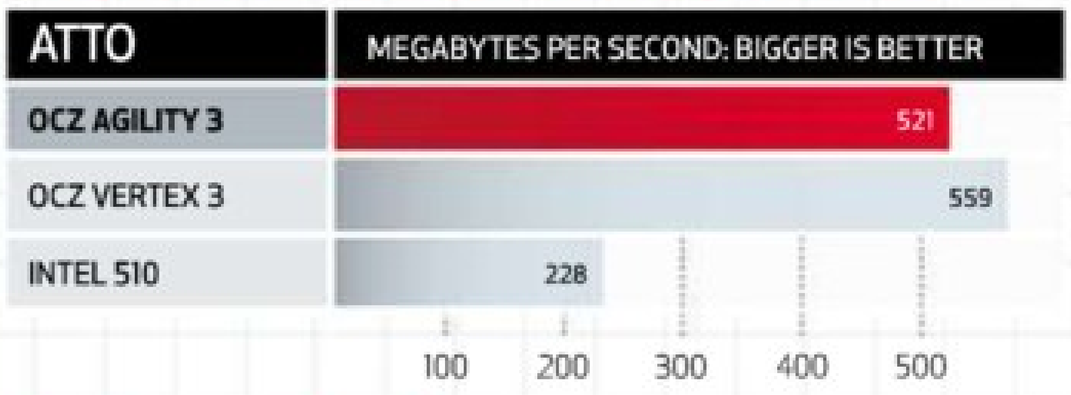
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Technical analysis

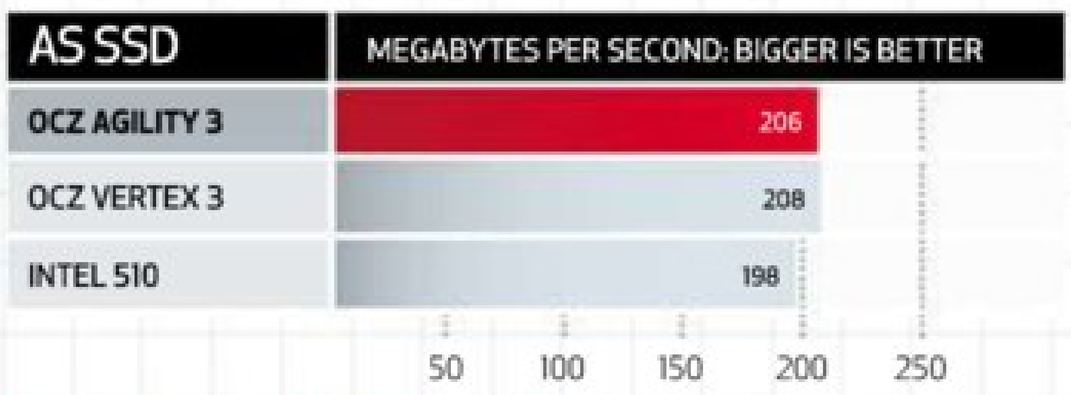
At the budget end of the spectrum you might think that you'd be looking at smaller, slower drives. In truth though, the performance is every bit as incredible as the more expensive options.

The latest generation of drives employing the second generation SandForce controller are particularly impressive. Here the pricey Intel 510 struggles to keep up with the budget Agility.

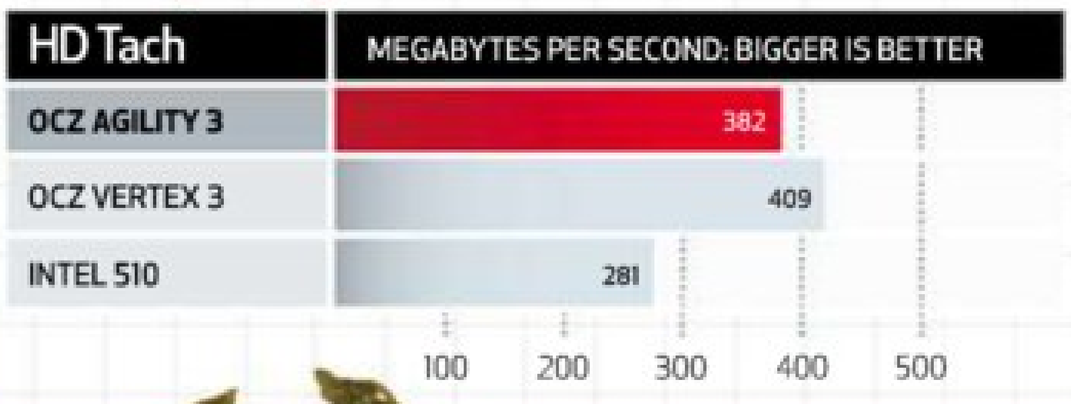
Sequential write speed (compressible)



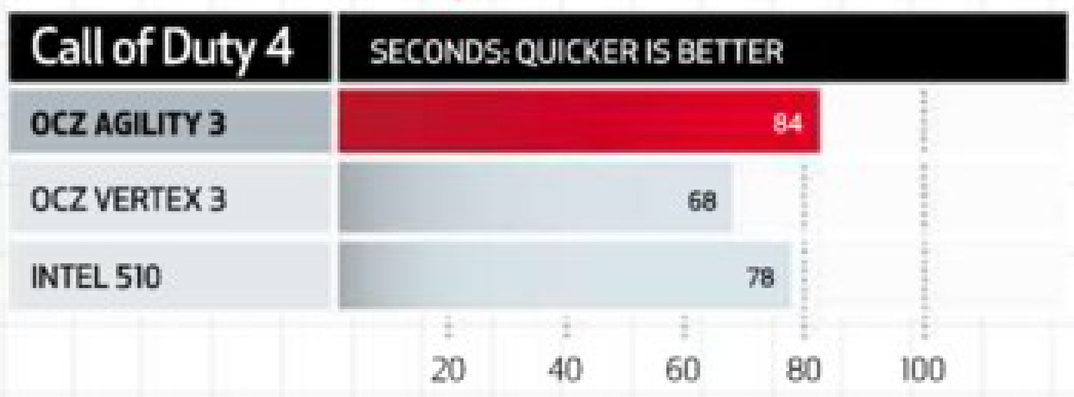
Sequential write speed (incompressible)



Burst speed performance



Game installation performance





DXHR's terrible loading times should be helped by OCZ's Agility 3

clips – which, when you think about it, represent most of the hefty files on most people's PCs. It's worth bearing this in mind in the context of the small price difference between the Agility and Vertex drives.

Predictably, therefore, the Agility 3 scores highly in the standard ATTO sequential read and write benchmark, clocking up over 500MB/s in both metrics. Truly monumental numbers, we think you'll agree. However, fire up the AS SSD test and things aren't quite so peachy, because AS SSD uses incompressible data. The result is sequential read and write performance around the 200MB/s mark. Not so monumental.

Mercifully, random access performance is less bandwidth limited, allowing the Agility 3 to keep a little closer to the Vertex 3 in the AS SSD 4K read and write benchmarks. More importantly, barring the Vertex 3, the Agility 3 is mostly as quick as anything else available at this price point in the 4K random tests, which bodes well for day-to-day desktop use.

Real-world hero?

As for real-world application performance, the Agility 3 puts in a solid turn of speed. It's in the same ballpark as the non-SandForce competition when it comes to file decompression, but a little off the pace when installing games.

It's attractively priced for an SSD, particularly one sporting the latest SandForce controller technology, and here we're recommending that you look at it as a svelte home for your main Windows install. Doing so will not only take a noticeable chunk off your boot times, it will make day-to-day operations that much smoother too. And you may just be able to get one of your favourite games or apps on there as well for some speedy action.

In an ideal world you'd go for a drive twice this size. That would cost twice as much though, and to be honest, most of the benefits of SSDs can be had right here for a fraction of the price. Either way, this drive is a great way to make your budget gaming machine feel like a real giant-killer. ¤ **Dave James**

PCFormat Verdict

- Latest SandForce controller
- 6Gbps SATA support
- Great price point
- Not the fastest SSD you can buy

A great performer at this price point, and an easy way to make any budget PC shine.

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AND FOR BIT MORE CASH...

£127/PROCESSOR

AMD PHENOM II X6 1090T

Price £127 **Manufacturer** AMD **Web** www.amd.com
Price check www.aria.co.uk

The Thuban-powered hex-core Phenom II X6 processors represent the pinnacle of what AMD can produce, and they're not bad chips. This Black Edition (read: unlocked multiplier) is yours for under £130, will chew through computational tasks and has plenty of grunt for gaming.

Despite still rocking the same cores AMD has been putting out for years, Thuban is still the finest CPU design AMD has created, but the fact that with a simple BIOS flash you can drop these six-core CPUs into most recent AM3 boards shows up one hell of an upgrade path. The Phenom II X6 1090T is also a Black Edition, and with some judicious tweaking you can top 4GHz with this hex-core CPU.

The AMD platform gives serious price/performance metrics, and for anyone vaguely interested in productivity tasks, the Thuban is great value. ¤ DJ

PCFormat Verdict 90



£52/POWER SUPPLY

OCZ STEALTH XSTREAM 600W

Price £52 **Manufacturer** OCZ **Web** www.ocztechnology.com
Price check www.novatech.co.uk

The PSU in this build is something of a weak link, and more powerful GPUs may well need additional power connectors to get the most out of them, but you don't have to spend a king's ransom to get yourself a decent supply.

Efficiency is the name of the PSU game at the moment, and OCZ is right to be proud of its StealthXStream 2, which manages the highest standby efficiency of any of the power supplies we've tested recently.

It's this strong efficiency of the StealthXStream 2 that helps it to stand out from the crowd. For the money, it's a tough option to beat if your gaming needs are relatively modest. ¤ DJ

PCFormat Verdict 81



£188/GRAPHICS CARD

SAPPHIRE AMD RADEON HD 6950 2GB

Price £188
Manufacturer Sapphire
Web www.sapphiretech.com
Price check www.aria.co.uk

Moving up from the HD 6850 could take you to either the GTX 560 Ti or the HD 6950. This latest Sapphire version has some serious OC chops though.

Despite the GPU running at the standard stock speeds, this isn't just another reference board that's been dressed up with a fancy sticker and bundled game. It boasts a brand new cooler design and access to further clock tweaks through Sapphire's TriXX overclocking software.

It looks like the shader count has been well and truly locked down. We tried multiple methods, bricking the odd BIOS as we went about getting at those hidden shaders, but nothing worked. Unfortunately, this here HD 6950 is going to stay as such.

That TriXX utility is like the cavalry's flag coming flapping over the horizon. Not only does this software allow us access to tweak the card's voltage nipples, we can also push the core clock speed up to a theoretical 1,200MHz, which isn't bad. ¤

PCFormat Verdict 83



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OVERCLOCK YOUR CPU AND GPU

Tweak the performance nipples of your new rig





PROJECT GOAL:

Free speed

Get the most out of your processor and graphics card using some free software, a bit of overclocking nous and a fair dose of patience.

WHAT'S NEEDED:

AMD Phenom II X4 955
XFX Radeon HD 6850

These heavyweights make up the basis of our £400 gaming PC and with a little effort you can make them really deliver the goods.

60 MINS

When you're building a high-performance gaming machine from scratch, you'll have picked all the fastest components right off the bat. That means they'll already be performing at a level that could make your eyes bleed, and any subsequent overclocking would only exacerbate the situation. With a budget build like this though, you want to be able to squeeze as much gaming performance from your selected components as you possibly can.

AMD components aren't the most overclockable parts known to man – Intel CPUs and NVIDIA GPUs seem to be holding onto that claim to fame – but the stock price of the AMD offerings means they can't be sniffed at. And you can get a fair chunk of extra performance from them for very little extra effort, or danger.

This here Phenom II X4 955, for example, will happily clock up to the same levels as AMD's current fastest quad-core CPU, the Phenom II X4 980. In fact, it's actually capable of squeezing past the top-end Phenom, up to around 3.8GHz as a top speed.

Thanks to its high-end overclocking features, the Black Edition family more than makes up for any performance shortfall with



A third-party CPU cooler will get the most out of the processor

sheer fun and flexibility. Retailing for as little as £86, the Phenom II X4 955 is one of the best quad-core chips on the market, and is supplied with its multiplier unlocked.

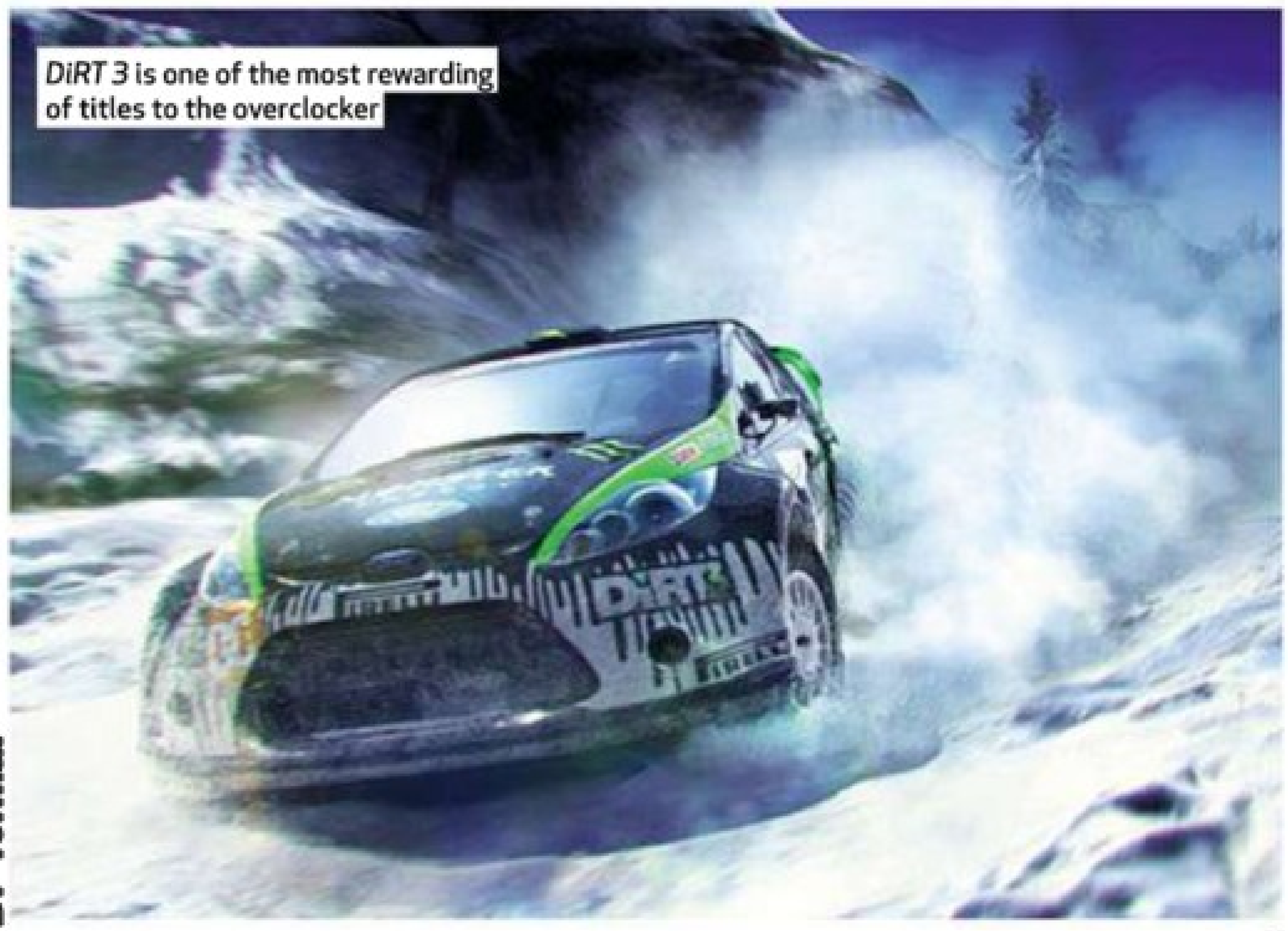
The only issue with the setup at the moment – in terms of overclocking at least – is that we're sticking with the stock CPU cooler that comes with the chip at retail. The stock chiller is fine for general use, but a third-party cooler will enable you to really push the chip to its limits.

Something like the Norse-obsessed Titan Fenrir Evo will give you all the air cooling you could want for your processor. You could spend a little more and pick up a closed-loop water cooler instead, but the Fenrir will do all the chilly goodness you need at a fairly basic level.

That only leaves the actual overclocking. To help track our performance increases, we'll be using our standard tool set – *World*

TOP TIP

It may seem like an obvious one but always benchmark your rig *before* you start overclocking. That way you'll be able to tell just what sort of benefits your hard work has given you.



DiRT 3 is one of the most rewarding of titles to the overclocker

in Conflict, x264 encoding and Cinebench R11.5. We'll also make a note of the core temperatures.

Tweakery

Now you you get stuck into the overclocking. The staple ways of pushing up the speed of a processor are to increase the system bus, increase the multiplier, or do a bit of both. While these techniques have stayed the same over the years, the way you go about them has changed. In the bad old days you'd have to fiddle with motherboard jumpers. BIOS settings remain a core technique, but Windows-based utilities offer as much flexibility.

The other stalwart of overclocking is the CPU voltage setting – as you increase the processor speed to maintain stability it's necessary to increase the voltage supplied to the processor. This isn't a blunt instrument; increase the voltage too much and you'll introduce more instability. Increased voltage also leads to greatly increased core temperatures, as we'll see.

The first important step is to reduce the memory bus speed to the lowest speed setting – ideally 400MHz with basic latencies of 8-8-8-8-24. These will help eliminate memory-based errors, so you can be more certain a lockup is caused by the processor throwing a wobbly.

Increasing the base clock by 10MHz at a time would take quite some time. We prefer jumping in with both feet – assuming a free 10 per cent increase is a safe bet. With the 3.2GHz Phenom II 955 that's an initial overclock to 3.5GHz, or an FSB speed of 219GHz. We use the X264 HD benchmark as the base stability test for our efforts, increasing the FSB 1MHz at a time (that's a 16MHz processor increase), using the AMD OverDrive utility.

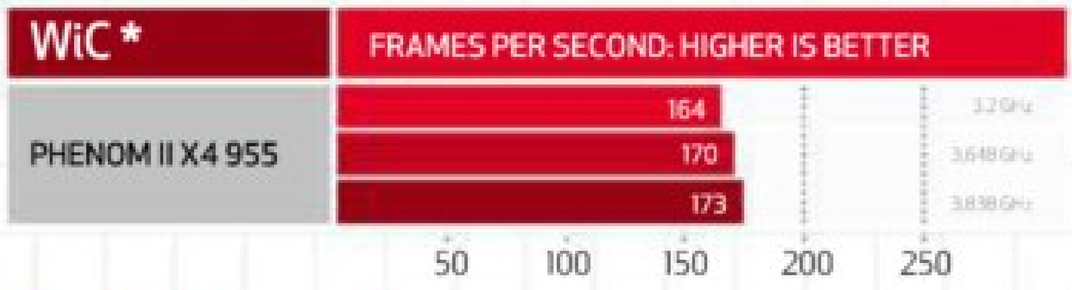
Eventually we hit 3,728MHz with the FSB at 233MHz before X264 fell over, though Windows itself remained stable. We then cranked the FSB back down and ran the other benchmarks, and we eventually settled on 228MHz and 3,648MHz as being stable.

The Black Edition has its multiplier unlocked, which means you can achieve increases in the

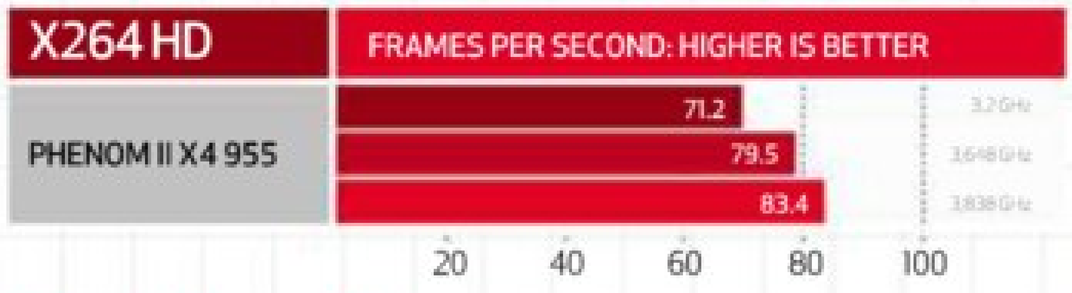
AMD Phenom II X4 955 BE benchmarks

As you can see from our graphs, overclocking makes your computer faster. Another thing they show is that upping the voltage much beyond the stock is questionable. Yes, it does improve speed, but not by much and the strain on the processor is evident through the elevated core temperature.

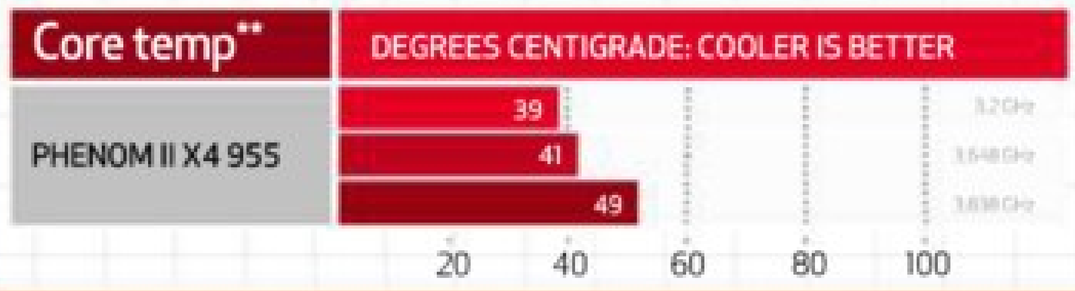
DX10 gaming performance



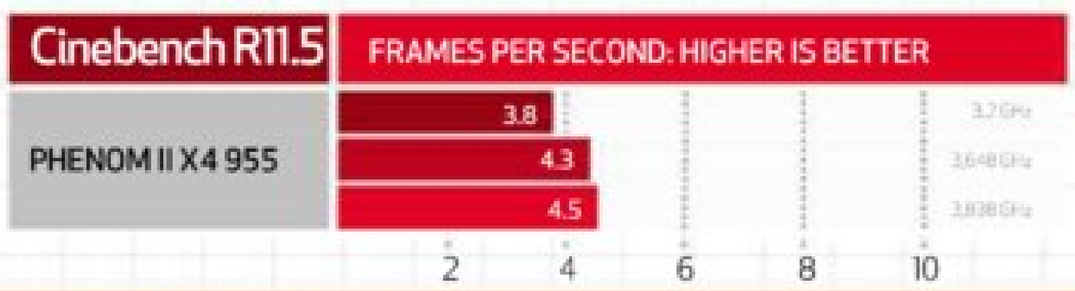
Encoding performance



Peak load performance



Rendering performance



*800 x 600, low graphics, high physics **Peak under 100 per cent load

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CPU speed without hitting the system bus off its stock speed, which is better for everyone.

We managed to hit the giddy heights of a shade over 3.9GHz, but found this a little unstable so we went back, with our best solid results being 3,838MHz with the 19x multiplier and a 202MHz FSB.

Graphics guru

Once all the maths and messing around with the processor is done, overclocking the graphics card couldn't be easier. It's a simple process, and can be made even less taxing if you use specially designed Windows-based applications to take care of the hard work.

Our favourite of these is MSI's Afterburner. It's an easy to use, UI-based utility with an impressive hardware monitor that helps you keep tabs on the amount of heat your graphics card is generating. The stock HD 6850 is easy to overclock given the AMD Overdrive limit of 850MHz core clock and 1,200MHz on the memory side.

That gives you a decent chunk of extra performance, and you could happily stop there without ruining your GPU. However, if you're feeling a bit more adventurous, Afterburner has a feature that lets you alter the afterburner.cfg file and unlock the core clock up to 1,000MHz. Open this file up in Notepad and add 'I confirm that I am aware of unofficial overclocking limitations and fully understand that MSI will not provide me any support on it' to the UnofficialOverclockingEULA field, then set the option UnofficialOverclockingMode to 1.

Now the fun begins. Download the Heaven 2.5 benchmark and run it in a windowed mode on your desktop. While it's playing you can up the core clock in 10MHz jumps, leaving the benchmark to play for a short while to check for stability. Once you start to see visual artefacts in the benchmark, step it back a notch and run the benchmark in fullscreen mode for a final stability check. You can run the memory overclocking the same way.

That's all there is to it. Job done, easy frame rate wins!

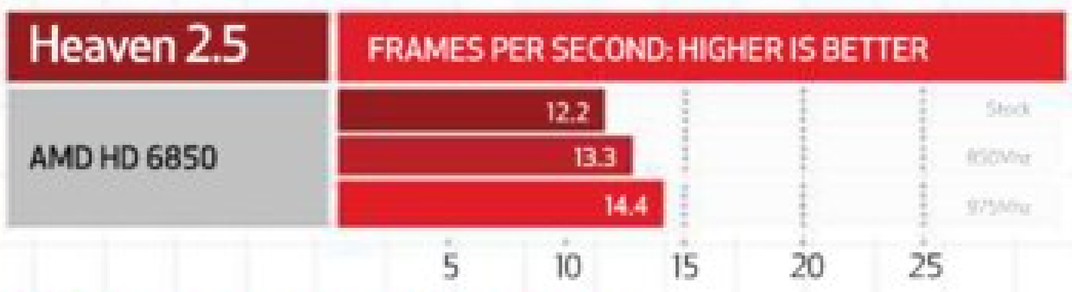

Heaven 2.5 is perfect for running as a hardcore GPU stress test

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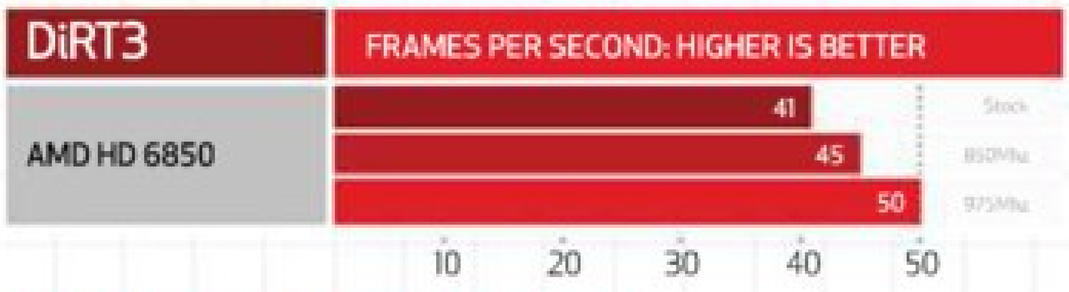
XFX Radeon HD 6850 overclocking

At stock speeds, the Radeon HD 6850 will deliver some impressive 1,920 x 1,080 frame rates in the latest games. However, if you have a quick play with the clockspeeds you can achieve some serious boosts – doubly so if you decide to head down the unofficial overclocking route.

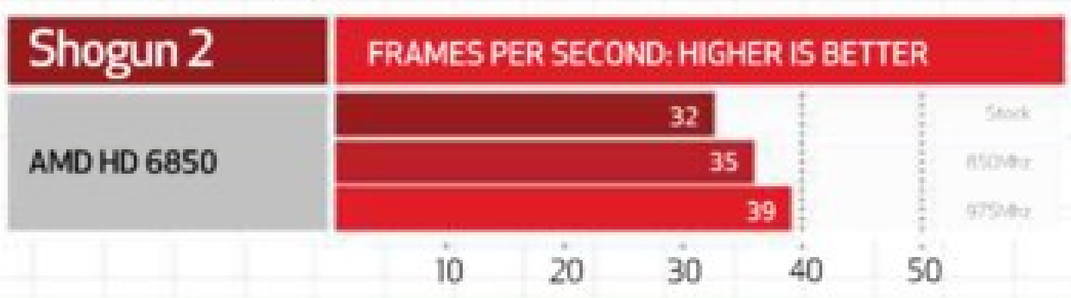
DX11 tessellation performance



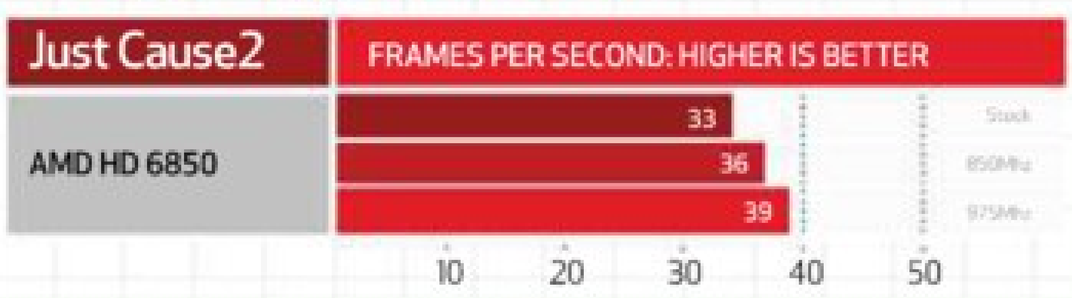
DX11 gaming performance



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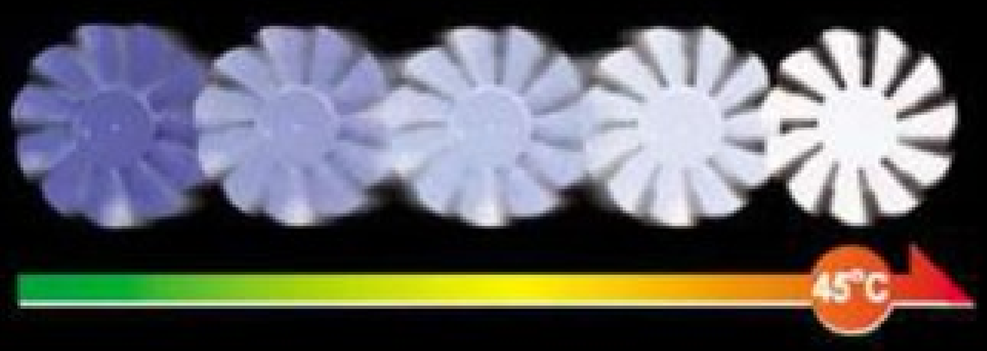
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BUILD A £400 GAMING MONSTER

Picking the perfect components for your budget build

OPERATING SYSTEMS



PART 1: Testing components

PART 2: Installing components

NEXT MONTH

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