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+ HOW TO BUILD A Custom Windows XP Install Disc

Ed Word

We've Been Busy

*Please send feedback and Thin Mints to **will@maximumpc.com.***

Instead of my normal rant about Vista or kvetching about DRM, I'm going to use this space to tell you about something the staff at *Maximum PC* has been working on for the last five months. We've redesigned and relaunched MaximumPC.com—and it kicks serious ass.

The first thing you'll notice when you visit the site is a complete redesign. By my count, this is the sixth major overhaul of MaximumPC.com since we launched the magazine way back in 1998. Before we embarked on this project, I spent a long time on Archive.org, studying our old designs to see what we should keep and what we should leave behind. Beyond the obvious beautification project, we've made a ton of deep-down structural changes—stuff that makes it simple for us to bring you the type of no-holds-barred content you expect from *Maximum PC*.

Rest assured we've kept everything that was already awesome about the site. We've got the magazine archive, the "Best of the Best" section, and yes, the forums—in all their garrulous glory. But wait, there's more! We've also added a ton of great new features. For one, there are the editors' blogs. Each editor has a dedicated section to share whatever's on his or her mind. We'll let you know what we're interested in and what we're testing, as well as pass along nifty how-to projects we come up with—every day of the week.

We've also opened up the blog section of our website to a few select members of our community—"super readers" who have some unique or interesting knowledge to share with you. You can expect them to talk about all sorts of cool stuff—from modding to the latest Windows news to games. Expect lots of rowdy, no BS coverage of everything you need to know about—delivered weeks before you'd read about it in the magazine.

And while I'm in Official Maximum PC Shill mode, I should introduce the No BS podcast. Every Friday, we run a round-table discussion of the week's news, provide updates on our product tests, give away fabulous prizes, and answer reader questions (send them to **maximumpcpodcast@gmail.com**). The podcast also includes Gordon's Rant of the Week, a listener favorite that really should be heard to be appreciated.

I'm really excited about the new site, and I hope you will be too. Feel free to swing by, dig into the editors' blogs, read a few features, and then let me know what you think by posting in the comments or our forums.

Will Smith

MAXIMUMPC *06/07*

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Ready for
Octo-Core Computing?

Intel makes waves with promises of an eight-core processor, an integrated memory controller, and socket-bound graphics by next year

Penryn is expected to work in most existing Core 2 boards that offer 1,333MHz front-side bus support.

In what Intel is calling its most exhaustive CPU makeover since the Pentium Pro, the company's next next-generation processor will reportedly feature eight cores, an integrated memory controller, and updated Hyper-Threading support.

Code-named Nehalem, the CPU is expected next year and will be the follow-up punch in Intel's one-two attack on AMD. Intel formally calls its strategy "tick-tock." The tick is a minor upgrade to an existing product line, while the tock is a major redesign of its CPU core.

Like Intel's upcoming Penryn CPU (the tick, as it were), Nehalem will be based on a 45nm process technology, but it will feature a number of critical differences. The most anticipated of which is an integrated memory controller. Intel has been criticized for years

for not following Transmeta and AMD in this respect, but with Nehalem, the memory controller will at last move from the chipset to the CPU and feature high-speed, point-to-point interconnects between the individual cores.

Intel also broke its silence about its graphics intentions. Although rumors have swirled for months that Intel would challenge Nvidia and AMD in discrete graphics, Intel announced that it will actually integrate a GPU core under the heat spreader of some Nehalem chips. The GPU won't compete with the high-end parts sitting in PCI-E slots; however, it will be suitable for "mainstream" graphics. On paper, Nehalem's design seems similar to plans AMD announced some time ago, but Intel claims that it's been on this path for a while. Intel has also long said it would do an integrated memory

controller only when the time was right, and indeed, Intel's current benchmarks haven't been hurt by the absence of the part.

Regarding Intel's update to Conroe, code-named Penryn, the CPU is on schedule for a launch early next year. Penryn will be similar to Conroe, with the chip being offered in a native dual-core design and a two-dual-cores-under-one-heat-spreader configuration for quad-core support. Penryn will use Intel's new 45nm process and include a host of new features to keep it competitive with AMD's upcoming Barcelona CPU. Penryn will boast new SSE4 instructions to speed up encoding and digital imaging, 6MB of L2 cache (up from 4MB in Conroe), a fast division engine for math, and a "super shuffle" engine that will greatly increase encoding speed. Penryn will also be the first CPU to feature Intel's dynamic acceleration technology (DAT). DAT works by auto-overclocking one of the CPU cores if the other is not being used—a common situation in many single-threaded games and applications.

The first desktop Penryn CPU is expected to ship at greater than 3GHz on a new, faster 1,333MHz front-side bus. Xeon-based Penryn chips, meanwhile, will move to a 1,600MHz front-side bus. Intel says it's still on schedule for the first quarter of next year, but most experts believe Intel is likely to move up the launch, so it lands squarely on the head of AMD's upcoming CPUs like an anvil. Both Intel and AMD have boasted that their next chips will be 40 percent faster than the fastest Intel chips out today.

INTEL'S CURRENT AND NEXT-GEN CPUs COMPARED

CODE-NAME	Conroe	Penryn
PRODUCT NAME	Core 2 Duo, Core 2 Extreme	Likely Core 2 and Core 2 Extreme
MICROARCHITECTURE	Core	Core
PROCESS TECHNOLOGY	65nm	45nm
TOP CLOCK SPEED	2.93GHz	3GHz+ at launch
L2 CACHE	4MB	6MB
INSTRUCTIONS	SSE, SSE2, SSE3, SSE3+	SSE, SSE2, SSE3, SSE3+, SSE4
TRANSISTOR COUNT	291 million in dual configuration, 582 million in quad configuration	410 million in dual configuration, 820 million in quad configuration
DIE SIZE	143mm2 (x^2 for quad)	107mm2 (x^2 for quad)

EMI to Sell DRM-Free Music

Will the industry's fears of music-pirating mayhem come to pass?

Apparently, one of the major music labels took Steve Jobs's open letter against DRM to heart. EMI is finally stepping up and offering its music catalog (except for the Beatles's songs) sans copy protection, so the tunes can be played on any type of digital music player. Coming from the third-largest music label, this is good news for consumers, but the freedom comes at a cost.

The music tracks, which will be available through iTunes beginning in May, will be priced at $1.29 apiece—a 30-cent premium over iTunes's DRM'd tracks. While EMI and iTunes attribute the added cost to the tracks' 256kbps bit rate (versus the standard 128kbps), we've gotta believe that consumers are paying in part for the *absence* of DRM. Still, at least it's a start.

EMI is no podunk publisher—its open-format offerings are sure to please many music lovers.

X Marks the Warmth

Betcha didn't know this: When you spread thermal paste across a CPU—even a fancy name-brand paste—you lose about 40 percent of the CPU's cooling efficiency to the ceramic or metal particles that make up the thermal compound. And according to IBM, the CPU's thermal budget is further depleted by the peculiarity of the paste's flow behavior.

Researchers at the computing behemoth noticed that as a CPU heats up, paste particles bunch together along the diagonals of the chip, forming an X pattern of sorts. Obviously, this runs counter to the "spread evenly" recommendation we give for thermal-paste application.

To address the issue, IBM has designed a trenchlike, microscopic irrigation system for CPUs. This lowers paste thickness, reduces the pressure between the CPU and the cooling unit, and ultimately doubles a chip's cooling efficiency. The only downside? There's no ETA for this technology to hit consumer chips.

MaximumPC.com Gets a Makeover

Our revamped website offers everything you love about the magazine and then some!

We've redesigned MaximumPC.com to deliver the latest tech news, early looks at hardware, exclusive how-to content, our favorite content from back issues, and the No BS podcast—featuring Gordon's infamous weekly rant.

TOM
HALFHILL

Multicore vs. Manycore

In the last few years, PC processors have exploded from single-core designs to dual-core and now quad-core chips. The first eight-core PC processor will probably appear by the end of this decade. Beyond that, 12- and 16-core chips are possible. What then?

Some CPU architects believe the current road is a dead end, much like the pursuit of superfast clock speeds with single-core processors. Although the x86 cores that AMD and Intel use in their multicore chips are more efficient than previous cores were, today's cores are still too large and power hungry to sustain the momentum of multicore progress. Some engineers argue that multicore chips must give way to "manycore" chips.

What's a manycore chip? There's no hard definition. Basically, it's a microprocessor with tens, hundreds, or even thousands of processor cores. It's like multicore on fertility pills.

Intel recently hinted at this future by showing an 80-core chip, code-named Polaris. It caused a stampede of breathless coverage in the mainstream press and on technology websites. However, Polaris is strictly a prototype, not a product. Its 80 cores are relatively simple FPUs, not x86-compatible cores. Polaris is based on an experimental VLIW architecture optimized for floating-point math.

In reality, Intel is playing catch-up in this race. Other companies have already produced manycore processors with hundreds or thousands of cores. I'm talking about finished designs in actual production, not lab experiments. Manycore processors are running today in real-world applications, such as base stations for wireless networks.

Nevertheless, Polaris is an important star to steer by. The reason: Intel has another project to develop a low-power x86 core for ultramobile PCs and embedded systems. This core will probably consume less than one watt. Intel could use it to build manycore processors for desktops, notebooks, and servers, too. Such processors could have 100 or more cores without a meltdown.

Of course, manycore processors don't solve the problem of writing parallel-processing software that usefully exploits so many cores. Manycore chips might also reveal software bugs that bite only when running numerous threads (see last month's column). But for CPU architects, there's little choice. If multicore processors reach a dead end, as high-frequency single-core processors did, then manycore processors might be the only alternative.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

GAME THEORY

THOMAS **MCDONALD**

The Fourth Console

In order to become a Games for Windows title, a game needs to meet a few criteria, including an Easy Install option, compatibility with Xbox 360 controllers (sometimes), compatibility with Vista Games Explorer, compatibility with 64-bit processors (even for 32-bit games), and support for both normal and widescreen resolutions.

As criteria go, that's about as meager a set of standards as one can assemble and still call them "standards." It's particularly risible given the fact that the most important standard, that of DirectX 10 compatibility, remains irrelevant at this point given the paucity of DX10 hardware.

No one is denying that the new Windows Display Driver Module is a fine thing for gaming. It promises us a world filled with the wonders of unified pipeline architecture and predicated rendering, much like *The Jetsons* promised us a world of robot maids and flying cars. I'm sure DX10 will work wonders and move mountains, but right now there's no there there. The entire Games for Windows brand is thus less a set of standards than it is a placeholder for a set of standards. It's a simple marketing gimmick.

And you know what? I think that's great. I actually get excited about marketing because I live in the Pine Barrens and we really don't have much else to get excited about (aside from the annual Jersey Devil hunt). Microsoft is creating, out of the warring factions and disparate creators of PC gaming, an identifiable brand that allows PC games to compete with Xbox, PlayStation, and Nintendo titles on retail shelves. It means more than simply putting a banner graphic at the top of a standardized, game-size box. It means shifting PC games from the software ghetto of retail stores to the far more sexy gaming section, where their improved branding creates a de facto fourth gaming system.

People need to be reminded that PCs are gaming systems and that they can compete against (and in most cases defeat) any of the new consoles. PC gaming will survive, and Vista will eventually earn its bones as the gaming OS of the next generation. In the meantime, simply creating a fourth platform will go a long way toward winning back the hearts and minds of the gaming public.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

DX10 Videocards, Cheap!

Nvidia lowers the barrier of entry to DirectX 10—again

While ATI has yet to announce its DX10-compatible lineup, Nvidia just added three new budget GPUs to its DX10 stable.

The GeForce 8500 GT will enable board manufacturers to sell DX10-compatible cards for well under $100, but its specs aren't particularly appealing: The part will have just 16 stream processors clocked at 450MHz and 256MB of DDR2 memory running at 400MHz on a puny 128-bit bus.

Cheaper DirectX 10 cards are coming, but they're shackled to a narrow 128-bit memory bus.

The GeForce 8600 GT ($140 to $160) and 8600 GTS ($200 to $250) include twice as many stream processors running at 540MHz and 675MHz, respectively. There will be 256MB of DDR3 memory on reference design boards running at 700MHz and 1GHz, respectively. Unfortunately, both cards use a 128-bit interface.

Preview

The Cliffs Notes of TV?

CyberLink taps into the busy consumer's desire to watch just the 'good parts'

It's getting harder to pack in all the demands of modern life and still have time to enjoy TV. Sure, a PVR lets us watch our favorite programs on our own schedule, but the more we record, the more we're confronted by our limited time.

CyberLink's MagicSports ($50, www.cyberlink.com) is one solution. The plugin for Windows Media Center takes the PVR to its next logical level. It will process baseball, soccer, and lacrosse games that you've recorded and create a custom highlight show. Want to watch only pitches? The program can cut out all the baserunning, catching, and spitting that fill a three-hour game. It does so by analyzing the on-base overlays broadcasters include as well as a game's sound.

We sense a trend that's sure to extend beyond sports. Why watch an entire episode of *24* when you can home in on just the parts with Jack Bauer pointing his Sig Sauer at some terrorist's head? Or why not get just the good news by having a plugin analyze newscasters' smiles? Think of how many more programs we could watch!

MagicSports will create a personal highlight reel from your recorded TV.

TESTED &
GEEK
DISAPPROVED

G-Tech Smart-Fabric Wireless Keyboard

We wrote this review using a smarphone and G½techàs Bluetooth fabric keyboard, can yu tell¿ Between keystrkes noregisering (or register-ing twice and common symbos tat result in unex-pected characers (getting ¿ instead of a real questin mark , Itàs a good thing itàs made from clothº no got hurt when we threw i across he rom in disgust. **$80, www.g-techworld.com**

HP Pulls Plug on Media Center PCs

Once a major partner in Microsoft's move into the living room, HP is now going its own way

When Microsoft launched its Media Center Edition OS, HP was at the forefront with its Digital Entertainment Center (DEC) line of PCs. HP's DEC machines sported features and formfactors that made them a natural fit for the living room, where they could fully extend MCE's media recording and playback capabilities. But HP is abandoning that effort and is dropping its DEC business unit altogether.

While HP comput-ers that come with Vista Home Premium and Vista Ultimate Edition will naturally still feature MCE, HP is pushing its own solu-tion for entertainment functions. HP's line of MediaSmart TVs come bundled with software for media playback and Internet streaming, ren-dering a PC in the living room unnecessary.

In the end, HP's Media Center PCs, like this Photosmart, failed to win many followers.

Patent Office Weighs in on P2P

A recently released report by the U.S. Patent and Trademark Office (USPTO) warns that peer-to-peer file-sharing software poses a threat to personal privacy and national security. The report states that certain default features in P2P software, namely BearShare, eDonkey, LimeWire, and Morpheus, cause users to automati-cally "share" all the files they download, even those that might be of a sensitive nature, hence the potential threat to man and country. The asser-tions are alarming, but so too is the USPTO's involvement in national security matters.

Alas, the allusions to identity theft and terrorist acts is merely a segue into the subject of copyright law—specifically, whether these threatening features were put in place by the software's authors to vilify copyright holders. Huh? The report posits that P2P software "dupes" unsophis-ticated users into sharing all of their files, many of which are presumed to be copyrighted media files. This would "ensure that attempts to enforce copyrights against those infringers who upload hundreds or thousands of files would tend to target young or sympathetic users," the report states. Thus the RIAA and MPAA end up look-ing like the bad guys.

While the report "does not purport to determine whether any particular distributor intended to dupe users by deploying a feature with a known propensity to cause inexperienced users to share files inadvertently," it does call for further investigation into the matter, as well as debate over P2P software regulations and issues of liability.

20 MILLION VISTA LICENSES SOLD
Microsoft is proudly touting the latest sales fig-ures for Vista as proof that the OS will "become the fastest-adopted version of Windows ever." Indeed, 20 million is an impres-sive number, even if the comparison to XP's 17 million copies sold in the same time frame is somewhat disingenu-ous. Not only is there a much bigger PC market now than when XP was released, but the Vista sales fig-ures include boxed copies as well as bundled licenses and the free "Express Upgrade" offered to consumers who bought PCs with XP late last year.

ONECARE CRASHES AND BURNS
In other Vista news, an independent study of 17 top antivirus programs conducted by AV-comparatives.org found Microsoft's OneCare to be the worst in all categories. The study by the Austrian group was limited to apps with a mini-mum 85-percent detection rate. Based on the results of the tests, the apps received ranked certification—all except OneCare, that is, which the group didn't see fit to certify. The products with the highest total detection rates were AVK, TrustPort, and AVIRA.

BROADCAST FLAG WON'T FLY
Despite the RIAA's best efforts, the FCC will not mandate a broadcast flag in its newly published rules for digital audio broadcast (DAB). The rules set certain guidelines for the way radio stations proceed with the adop-tion of digital broadcasts, but enforced signal encryption is not one of them. The RIAA and others are concerned that the enhanced qual-ity and improved reception of the digital sig-nals will incite rampant music thievery.

FLASH FORWARD
While Seagate, Hitachi, and Samsung have all gone public about their work on hybrid hard drives, it looks like Samsung will be the first to ship a product. The company has announced the imminent release of three MH80 models (80GB, 100GB, and 120GB) that use integrated flash memory in place of the cache buffer on traditional drives. The flash memory consumes less power and decreases boot times.

AOL Mail **vs.** Gmail **vs.** Hotmail **vs.** Yahoo Mail

Trying to find the best web-based email provider is like trying to pound a nail into a board… using your forehead. It's not that the Internet landscape is lacking in contenders; rather, there's such a seemingly endless batch of them to slog through that it's a maddening chore to choose the best one.

So what's an Internet newbie to do? In short, read this article. We've rounded up the four most popular services on the net and pitted them against each other in an epic email deathmatch. Can Yahoo Mail frag Gmail? Will MSN Hotmail just turtle in the corner and pick off the strays? Does AOL Mail stand a chance or will it resort to button-mashing?

And this isn't just a one-note melee. We're letting the email applications slug it out across four categories. After all, space isn't everything; it's all about the experience. Now if only we could find the people who have already taken all the MaximumPC user IDs….

BY DAVID **MURPHY**

AOL MAIL
www.aol.com

round 2 **AESTHETICS** Checking your email shouldn't cause eyestrain. And you shouldn't have to pull out a manual or wade through a cumbersome help file just to figure out where to click half the time. With that said, none of our contenders achieved the holy grail of online email—an advertising-free setup that's painless to use. But some did achieve meritorious marks for usability, while others made us bang our heads against the keyboard in frustration.

When it comes to the cleanest interface, Gmail wins by leaps and bounds due to the simple fact that when you want your email, that's what you get. The other three services spam you with a "home page" full of advertisements, prompts, and queries—it's just information overload. With Gmail, you get your email. That's it. Can you say winner by default? **WINNER: GMAIL**

round 1 **CAPACITY** Gone are the days when email accounts were limited to megabyte capacities. Now, 1GB seems to be the de facto baseline for anyone launching into the webmail business.

AOL Mail claims it offers unlimited storage, but a user is limited to 1,000 pieces of new mail in the ol' inbox at any given time, with a 16MB limit per message. After one hits the big wall, all new messages are returned to sender. On the surface, that seems better than Hotmail's paltry 1GB of storage, Gmail's 2.83GB (and counting) of storage, and Yahoo's soon-to-be-but-not-as-of-this-article's-creation increase to unlimited capacity.

But we'll take Gmail's unlimited message capacity over unlimited megabytes. A typical email account can easily push past 1,000 messages (Spam and archives!) while still staying under 3GB or so. **WINNER: GMAIL**

GMAIL
www.gmail.com

round 3 **FEATURES** This is where the contest gets ugly. We're going to start by eliminating the pathetic email clients that charge for POP3 and SMTP access—the ability to pull and send messages through your favorite third-party client (like Outlook or Thunderbird). We're looking at you, Hotmail and Yahoo Mail; that's just weak.

While AOL Mail offers in-browser features comparable to Gmail's best, like a calendar and task manager, the sheer weight of Google's extended offerings puts it on top. One Gmail account gets you access to every Google service under the sun: Talk, Picasa, Documents and Spreadsheets, etc. There is no external integration through AOL Mail, save for the ability to send and receive Instant Messages. Feh. **WINNER: GMAIL**

round 4 **CUSTOMER SERVICE** We're going to lead this one off with a simple statement: AOL, you suck. Seriously. Of all the email providers in this article, AOL is the only company that refuses to give users a means of contacting them with technical questions… unless, of course, you cough up at least $10 a month for the company's full ISP service. Say it with us now: boo-urns.

That said, the three remaining contenders have fairly comparable forms of from-the-company customer service, but only Yahoo and Gmail offer extended forums, which are nice ways to get quick fix-it replies from other email enthusiasts. We frown at Hotmail for having only a basic FAQ-style help center. **WINNER: GMAIL AND YAHOO**
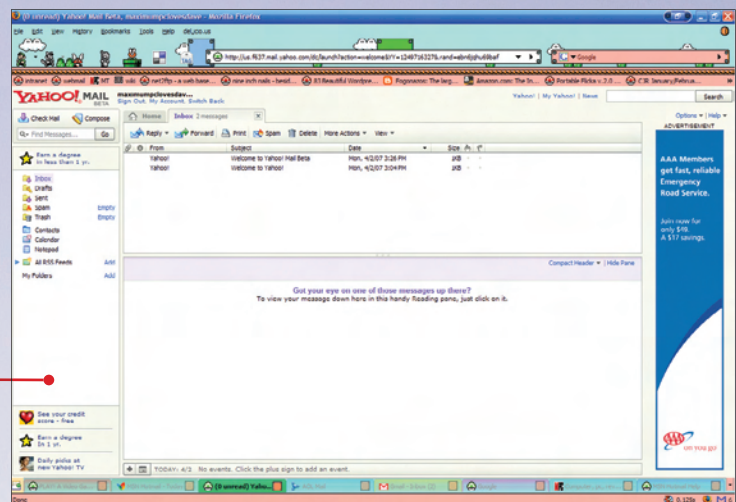
And the Winner Is...

Although it offers a paltry 2-point-something-something gigabytes of storage (the number constantly increases), Gmail gets the win as the most pleasantly perfect email service on today's Internet. Underneath the service's simplicity and plain exterior hides a powerful engine, one that's even opened the external modding community to the Google experience. With the right software, you can add your Google space as a network drive or transfer your Outlook .pst file to Gmail, and with the help of prewritten GreaseMonkey config scripts, you can customize the crap out of the website. No stone has been left unturned by net hackers.

Gmail remains tied to Google's AdSense program, but unlike the other email services we tested, the text-only Gmail advertisements are unobtrusive and—most importantly—not annoying. There's no home page full of ads, graphics, and news you have to crawl through to get to that lovely letter from your mum. Gmail offers just a plain ol' email experience, and that's great. It couldn't possibly be any easier. **MPC**

Our consumer advocate investigates...

✓Vista Counterfeiters ✓XCopy9 Goes Poof
✓680i Quad CPU Problems

Simon, watchdog of the month

IT'S THAT COUNTERFEITING TIME OF THE YEAR

Microsoft isn't the only company running its DVD presses full time to make enough copies of Windows Vista to satisfy the masses; during new OS launches, counterfeiters usually crawl out of the muck to hawk their wares.

Unlike people who sell or give away obviously pirated software, counterfeiters design their wares to convince people they're legit—legit enough for you to, say, pay $150 for a copy of Windows Vista Ultimate. Once you've purchased the software, it might install and work just fine for a few weeks, but in all likelihood, it's a heartbeat away from being turned off by Microsoft for not being genuine. And by that time, it's usually too late for you to go back and demand a refund.

And no matter what sob story you have about being taken in by counterfeiters, Microsoft has heard it before, and the company's only fix is for you to buy a real copy of Windows Vista. How do you keep from being victimized? It's actually not that hard to tell the genuine article from a fake. Here's the Dog's five-minute rundown on what to look for.

1 A retail copy of Microsoft Vista comes in a plastic box with one curved corner. Microsoft says the design is difficult for counterfeiters to reproduce using generic plastic packaging. You should look closely at the typography on the box. Counterfeiters usually get it about 80 percent correct, but they often blow something pretty obvious. Compare the fonts and text placement to our example to spot a forgery. Low-quality print jobs are also a telltale sign of a counterfeit.

2 The certificate of authenticity features a "porthole;" running across it is a metallic thread that reads "OUR PASSION" and "MICROSOFT" in red. Microsoft says that if you tear the edge of the COA, the thread should be interwoven into the label, not just printed on top. Use the same judgment when looking at the COA as you did when looking at the packaging. Sometimes simple errors, such as misspelling "Microsoft," can give away a counterfeit.

3 The Vista DVD features a sophisticated anticounterfeiting design with a perimeter hologram. In the past, counterfeiters have simulated the hologram with stickers. These stickers, however, don't change when the disc is tilted. On an authentic disc, you cannot peel off the hologram, and you can see the words "Windows Vista" in the background as you tilt the disc; you should also see a wavelike effect on the surface.

Our disc features additional anticounterfeiting tools at the three, six, nine, and twelve o'clock positions, but their locations can change. So even though we refer to particular positions, don't be alarmed if your stereograms are in different areas on the disc.

At the three and nine o'clock positions, you can find the dynamic stereograms. These are actually 3D holograms with the Windows flag at the center. As you tilt the disc, the flag changes color. The text surrounding the flag should say "VISTA Genuine."

At the six and twelve o'clock positions, there are two security patches. If you have a real disc, they will have the word "Microsoft" on them; as you tilt the disc, it should change to "GENUINE." The circular object is the world with North America and the Atlantic Ocean visible and a stripe made up of 1s and 0s.

Microsoft also has interactive tools on its website that can help you if you are unsure whether your copy is legit at **www.microsoft.com/resources/howtotell.**

If you have a bum copy, you can call Microsoft's piracy hotline: 1-800-RU-LEGIT. The company won't send you a free copy, but at least you'll tip off its stable of lawyers.

The best way to avoid getting burned, though, is to buy software from legitimate stores. That doesn't mean you have to shop at big-box retailers. If your local PC store has been in business for some time and sells you a bum copy, it may exchange the disc for the

genuine article. Counterfeit copies can look so realistic even legit small stores are duped by them on occasion.

BFG and other nForce 680i vendors are replacing motherboards for people are having problems over-███king quad-core processors.

THE REPLACEMENTS

Having read recent glowing reviews of the Nvidia 680i motherboard and the Intel Core 2 Extreme QX6700 processor, I thought it reasonable to purchase these two components as the basis for my own Dream Machine. The only problem is that these components are incompatible. The QX6700 has an unlocked multiplier, and the Nvidia 680i is marketed as an enthusiast board for overclockers, but when you put them together, they become unstable.

If you read some of the forums, it is clear there is a problem. At the end of February, EVGA announced that it would offer replacement 680i motherboards to owners of the QX6700 processor—going so far as to RMA replacement boards before they were sent back to EVGA—this is a brave move by EVGA, and one for which they should be given credit.

Unfortunately, I purchased a 680i board from BFG, and when I called the company's customer service department, I was told that I would need to induce a fault and then they might consider replacing the board—the only problem being that I would void the warranty by overclocking it.

I would greatly appreciate it if you could contact Nvidia to find out what gives and why it is not offering replacement boards to all owners of the 680i with a QX6700 processor.

— Mark Miocevich

The Dog spoke with a BFG spokesman who apologized for the problem. He said Mark's issue cropped up before the company had fully verified the problem was occurring and briefed its techs. Since then, BFG has updated its response and will replace any board that is causing problems.

But what exactly is the problem? EVGA's website seems to indicate that issues arise only on some boards when the front-side bus is pushed beyond 1,300MHz and a quad-core is used. Nvidia officials told the Dog that the company had tracked down the cause to a faulty transistor that has since been fixed.

Nvidia contracts with a vendor to build its boards, which are then resold through its partners such as BFG, EVGA, and ECS. It's not known if the problem impacts Asus, MSI, and other third-party vendors who design and build their own boards, but no complaints have crossed the Dog's path.

XCOPY TANGO UNIFORM?

I bought a copy of XCopyDVD over Christmas to back up my DVDs. The program doesn't work on several of my DVDs, and I have tried to contact XCopy9 on its forum and through email. To date, there has been no response on the forum (to any requests for help—for over a month) and only a canned server response to my tech support email. Has XCopy9 gone belly-up?

— Keith M.

The Dog agrees with you, Keith. XCopy9's support is a bit obtuse, but the Dog did manage to reach an official with the company, who apologized for the problems you've been having.

Dan Van Hoose told the Dog that Keith was a victim of massive changes XCopy9 has been undergoing. A competitor, 123CopyDVD, has entered into a business relationship with XCopy9, and the result is that XCopy9 products are being phased out. Fortunately for customers of XCopy9, Van Hoose said the company is providing free upgrades to the equivalent program from 123CopyDVD. Consumers must provide a current license ID, but Van Hoose said he believed that all XCopy9 customers were eligible for a copy of 123CopyDVD. The company is in the process of contacting registered customers now, but those who have not heard from a company rep should visit XCopy9's forums for help obtaining a copy of the new product at www.xcopy9.com. The Dog spoke with Keith again about getting a copy of 123CopyDVD, but he said he had already moved beyond the app to more effective tools that are free. **MPC**
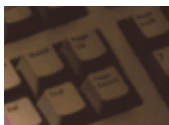
19 Bright IDEAS

These upgrades you didn't know you needed will boost your computing quality of life

Many power users find themselves in a holding pattern when it comes to upgrading their PCs. Why buy a DX10 videocard when a better, faster one is sure to be available by the time any DX10 games are shipping? Why invest in a high-end quad-core CPU when most apps aren't yet optimized for multiple threads and both AMD and Intel are refining their quad-core processes? And who in their right mind would buy a new hard drive when terabyte capacities are looming large—literally?

Yes, it may be wise to wait on these high-profile components, but that doesn't mean you should just make due with your current setup. If there's one thing our obsession with computers has taught us, it's that there's *always* room for improvement. To prove it, we've come up with an array of less-obvious upgrades that will surprise and delight you with their usefulness and have a profound effect on your computing life. Intrigued? Turn the page to peep the 19 upgrades that you didn't know you needed, but that you now won't want to live without.

BY THE MAXIMUM PC STAFF

BUDGET CPU

IF YOU'VE GOT JUST $500 TO SPARE, WHICH PROC IS BEST?

Now that Intel has cut the price of its Core 2 Quad Q6600 from $830 to a truly midrange $530, the 2.4GHz quad-core chip might finally become a mainstream part. But is it the best you can get in that price range? To determine this, we pitted the C2Q Q6600 against another $530 CPU: the dual-core 2.66GHz Core 2 Duo E6700 (**www.intel.com**).

We ran a mix of benchmarks that reflect gaming and application performance in both multicore and single-core worlds, so both the higher-clocked dual core and the quad core had equal opportunity to shine.

The result? It's no surprise that in apps that aren't threaded for the quad's multiple cores, the higher-clocked dual core takes the lead. After all, in these tests, the extra cores mostly twiddle their thumbs. In multithreaded tests that can work all cores, the quad jumps back in front.

But remember, computing is about the future. As time goes on, apps and games will only *add* support for more cores, not take it away. That means a quad-core CPU bought today might very well run faster next year and the year after when the applications are updated.

That dual-core machine, meanwhile, won't benefit from added core support in software. As long as prices remain equal, it's plain foolish not to buy a quad-core CPU today.

The new lower price of Intel's Core 2 Quad Q6600 puts it within reach of the masses.

$500 CPUs COMPARED	2.4GHZ CORE 2 QUAD	2.66GHZ CORE 2 DUO
3DMARK06	**11,210**	10,534
3DMARK05	14,906	**15,991**
PHOTOSHOP CS2 (MIN:SEC)	3:49	**3:43**
PROSHOW GOLD 3.0 (MIN:SEC)	**14:16**	15:16
CINEBENCH 9.5	**1,190**	813

Best scores are bolded. Test bed: EVGA 680i mobo, 2GB Dominator DDR2/800, WD4000KD, GeForce 8800 GTX, 1K PCPC PSU.

FLOW METER

MAKE SURE YOUR WATER-COOLING RIG IS ACTUALLY RUNNING!

So you just spent the last two hours cutting rubber hose, getting your parts in order, and making a few final connections. But let's say your rubber hose is totally black. How, then, will you know that liquid is even flowing through your setup? Oh no!

Thermaltake's CL-W0012 flow indicator ($30, **www. thermaltakeusa.com**) is a blingin' way to watch your liquid of choice travel through its merry cooling circuit.

With the device attached between two hoses, you can tell if and how fast the liquid is moving based on the activity of a built-in spinner. The faster the little wheel spins, the faster your liquid's moving! We love the style and easy customization of Thermaltake's indicator, and this $30 whatzit could save you big bucks if your pump dies.

Here we go now, feeling the flow with Thermaltake's CL-W0012 indicator.

IPOD CAR CONNECTION

FM MODULATORS SUCK. INTEGRATE YOUR IPOD INTO YOUR CAR STEREO THE RIGHT WAY

An FM modulator is the easiest means of connecting your iPod to your car stereo, but be prepared for noise. You'll enjoy a much better experience if you hard-wire an interface directly to your head unit.

You'll find many products capable of this; we chose Peripheral Electronics's iSimple iPod Adapter (model PXDP, $150, **www.peripheralelectronics.com**) because it comes with comprehensive installation instructions and doesn't lock out the iPod's buttons. Once it's installed, you can control your iPod with either your in-dash radio or the iPod itself.

Peripheral Electronics makes an iPod interface for nearly every car stereo on the market.

The installation process is only slightly more complicated than installing new components inside your PC. The most difficult steps are finding space to stash the control unit, properly grounding it, and snaking the interface cable through your dash. Your ears will thank you for the effort.

EXTERNAL DAC

GET BETTER-THAN-CD SOUND

A popular misconception about digital audio is that it's an all-or-nothing proposition, and so the quality of the equipment you use to extract it doesn't matter. You obviously can't get better quality than what was put on the CD in the first place, but that doesn't mean just any optical drive and digital-to-analog converter is going to deliver that quality.

The first step toward getting better audio is eliminating the optical drive from the playback process: Rip your CD tracks to your hard drive using a lossless codec (we recommend FLAC). Next, plug an external DAC (digital-to-analog converter) into your PC's USB port so that music remains in the digital domain until it's safely outside the electrically noisy environment inside your PC. Many products will do that—some of which are priced as high as your entire PC—but Stereo-Link's A1300 ($215 including high-quality cables, **www.stereo-link.com**) offers a terrific price/performance ratio.

We're not advocating dumping your X-Fi card, unless you don't use your PC to play games or watch movies. The Stereo-Link performs only two functions: It converts two-channel digital audio to analog (outputting it via a pair of RCA jacks), and it provides a high-quality built-in stereo headphone amp. But when we compared its musicality with that of Creative's best soundcard—the X-Fi Elite Pro, which has a higher-quality DAC than any other X-Fi—the Stereo-Link was clearly superior.

This external DAC plays digital music better than any soundcard, including Creative's X-Fi Elite Pro.

No, Apple didn't design the My Book World Edition II.

NAS DEVICE

WHO NEEDS USB WHEN YOU CAN ACCESS YOUR STORED FILES USING THE POWER OF THE NETWORK?

G one are the days of external storage devices that have to be physically connected to your computer to function. And for that, we say "woohoo!" because network-based storage devices are all the rage.

Don't believe the difference? We'll spell it out. Hook a NAS (network-attached storage) box up to a router, and you can use a laptop and a wireless card to access your files from anywhere in your house. Sure, you can do that with an external device attached to your main computer, but only when your machine is powered up.

We have to give props to Western Digital's My Book World Edition II ($500, **www.wdc.com**). Not so much because of its now-common terabyte of storage split into two 500GB hard drives, but because of its superior, trouble-free software, WD Anywhere Access.

What's more, a yearly $65 contribution to WD's coffers gives you ultra-deluxe-fancy access to the premium services of Anywhere Access. You can access your My Book device from any computer—from wherever you want—share specific files on your computers with friends, and even take over your desktop all UltraVNC style. There are a number of open-source solutions that offer similar features, but Anywhere Access simplifies the equation with a single, easy-to-use application.

ONLINE BACKUP

WITH MOZY, RECOVERING YOUR LOST INFORMATION IS AS SIMPLE AS A DOWNLOAD

F inding an awesome online backup site is a lot like getting tickets to a sold-out concert. Sure, they're out there, but only if you're willing to give up an arm, a leg, and a firstborn.

It's unfortunate because online backup is great. It's great for those frequently on the go, those too cheap to buy another hard drive, or those tin-foil-hat folk who plan data backup to the extreme. But trying to find a site that's inexpensive as well as unobtrusive is damn near impossible. Until now.

The extraordinarily cheap Mozy ($5/month, **www.mozy.com**) is the best site we've come across, and we doubt better exists. For starters, you can give the backup site a whirl absolutely free. Just download the little application, and it will politely sit in the corner of your taskbar and back up whatever you want—you get up to two gigabytes of free online space. And those are incremental backups too; you can restore a file from yesterday, or the same file from a week ago.

Toss a mere $5 to Mozy on a monthly basis and that 2GB of space expands to infinity. It's the cheapest deal we've seen on the net, and for all the features—web access to files, scheduled backups, and encryption—it's worth every penny.

**No frills, no fuss, no hassle; it's everything we love in a website, let alone a backup utility.**

POWER-EFFICIENT CPU

WHEN YOU CARE MORE ABOUT THE ENVIRONMENT THAN CLOCK SPEEDS

Not everyone needs or wants a high-performance CPU—even less so when it's a second or third machine. So why not choose a CPU that's particularly friendly to the environment? We all have to do our part.

To determine the greenest CPU, we compared AMD's 2.4GHz Athlon 64 X2 4600+ Energy Efficient chip ($200, **www. amd.com**) to a comparable Intel part. Intel says all its CPUs are energy efficient, so we chose the one closest in cost to AMD's proc, the Intel 1.86GHz Core 2 Duo E6300 ($180, **www.intel.com**). To narrow the hardware variables we used micro-ATX boards with integrated graphics chipsets from each company: AMD's new 690 for the Athlon and Intel's 965G for the Core 2. All other components were identical in all tests. We measured the power load using an Extech watt meter.

The results? Well, surprise, surprise, surprise. After months of eating dirt, AMD comes out ahead in power conservation *and* performance (although we ran just one performance benchmark). The Athlon 64 EE showed significant savings at idle, and even under load, the CPU consumed almost 18 percent less power while performing 13.1 percent better in Cinebench!
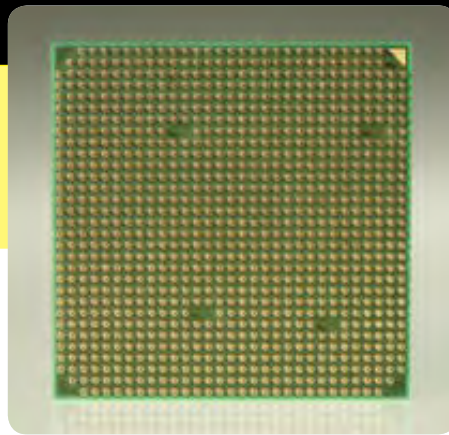
AMD's Athlon 64 X2 4600+ EE part delivers better power efficiency than Intel's equivalent $200 part.

Of course, you won't see these kinds of accolades heaped on AMD's power-porking, second-fiddle Quad FX.

ENERGY-EFFICIENT CPUs COMPARED		
	ATHLON 64 X2 4600+ EE	**CORE 2 DUO E6300**
IDLE (WATTS)	**50**	84
LOAD (WATTS)	**95**	112
CINEBENCH	**658**	582
Best scores are bolded. We used 2GB of DDR2/800, a 74GB WD740GD, a DVD-ROM drive, and an Antec 500W EarthWatts PSU.		

POWER-EFFICIENT PSU

SAVE THE PLANET AND YOUR DUCATS BY RUNNING A SMALLER, MORE EFFICIENT POWER SUPPLY

A bigger PSU doesn't always equate to a better PSU. If you're concerned about saving the planet's resources, a power supply that's more efficient translates into less power consumed. We looked at some of the big-boy PSUs in the 1,000- to 1,100-watt range, a middle-of-the-road 750W unit, and a 500W unit specifically designed to be more efficient.

In the end, the midrange PC Power and Cooling Silencer 750 Quad ($200, **www.pcpowerandcooling.com**) won out because it was every bit as efficient as the 500W Antec and has a harness capable of supporting dual 8800 GTX cards. It's no surprise, however, since the efficiency of most PSUs depends on the hardware load. The load we used—a Quad FX machine with 7900 GTX cards in SLI, 4GB of RAM, two 10K hard disks, and two optical drives—while ample, doesn't really need the big boys' power output.

It may not be 80 Plus certified, but the TurboCool 750 Quad is just as efficient as smaller certified units.

PSUs COMPARED				
	PC POWER AND COOLING 1K-SR	**ANTEC EARTHWATTS 500**	**TAGAN TURBOJET 1100**	**TURBOCOOL 750 QUAD**
IDLE (WATTS)	458	**450**	462	**450**
LOAD (WATTS)	565	550	560	**540**
Best scores are bolded.				

MULTI-MONITOR STAND

ADD ELEGANCE TO YOUR DESKTOP WITH A UNIFIED ARRAY OF LCDs

We're always talking up the necessity of multiple monitors—a single screen, no matter the size, just doesn't cut it for an extreme computing lifestyle. But don't think your upgrade mission is complete with the simple acquisition of two or three monitors. If you want your workspace to truly exude power-usertude, you'll combine your LCDs on a single stand.

Ergotron's LX Triple Display Lift Stand ($300, **www.ergotron.com**) is the best product we know of for the job. The kit comes with all the parts you need and easy-to-follow instructions for configuring a setup of three VESA-compliant flat panels. Unlike competitive models, the LX's heavy-duty stand can sit atop your desk without the aid of screws or a clamp. You simply attach a single mounting rail to the stand and then hang your screens on the rail using the included mounts and tensioners. We had no problem positioning our three panels: a 24-inch Dell flanked by two 19-inch ViewSonics.

With Ergotron's LX Triple Display Lift, you'll be sitting as pretty as a day trader, without all the numbers nonsense.

Because the mounting rail curves in on either side, the screens are naturally angled for your viewing comfort. The rail's five-inch height adjustment lets you raise or lower the screens in tandem, and you can similarly tilt the screens forward and back.

You want it all when it comes to screen real estate, and a badass setup like this proves it.

WEBCAM

STATIC PICTURES ARE SO BORING

Why do you need a webcam? Well, with a fancy webcam you can be your own biggest YouTube fan; you can watch your pets dance around and throw parties when you aren't at home; heck, you can flaunt your naughty bits across the entirety of the Internet. The power is yours!

After flashing our best smile (that's all, we swear), into a number of lenses, we found ourselves head over heels for Logitech's Quickcam Orbit MP ($130, **www.logitech.com**). This camera has great mechanics: motorized face-tracking, a clear, 1.3MP image, and automated lighting adjustments.

But the real beauty is in the accessories. The Quickcam's accompanying software can plop digitized items directly onto your mug, including a beer helmet and a goatee. And you can even transform your face into a virtualized avatar, which will mimic your expressions rather creepily, but totally awesomely.

So we're taking a picture of a webcam, which is taking a picture of us taking a picture of a webcam, which is taking....

GAMING HEADSET

HEAR BETTER, PLAY BETTER

We wouldn't recommend using Turtle Beach's Ear Force HPA2 headset ($130, **www.turtlebeach.com**) for critical music listening—its drivers can't hold a candle to the considerably more expensive Ultrasone Proline 750's, our absolute favorite cans—but the HPA2 is fabulous for gaming.

A mic is essential for multiplayer gaming, and the HPA2 has a good one mounted on a flexible, removable stalk. But surround-sound support—complete with an inline six-channel headphone amp—is what makes this headset special. You plug it straight into your PC's three 1/8-inch analog audio outputs and 1/8-inch mic input, but there's also a splitter cable, so you don't have to reconfigure anything when switching to a 5.1-channel speaker system.

The surround-sound support really makes a difference with games that support 3D positional sound, providing audio cues to help you pinpoint an enemy's location.

Turtle Beach's Ear Force HPA2 headset is a bit heavy, but the suspension headband distributes the weight evenly.

TEMPERATURE MONITOR

SMOKE SHOULDN'T BE THE FIRST INDICATOR OF COOKING COMPUTER HARDWARE

There's no nice way to say it, so we're just going to say it straight: By default, most case-temperature monitors just aren't sexy. Period. They're little dials or boring LCD text screens that do but one thing—tell you the temperature of something in your case.

AeroCool's PowerWatch ($75, **www.aerocool.us**), on the other hand, is a most tantalizing device. It isn't just a temperature monitor; it's a complete and total front-panel package.

We love the device's brightly lit indicators that show temperatures and fan speeds from four different areas of your PC. And the PowerWatch's two USB ports and four card-reader slots are damn handy. To quote the Teen Girl Squad, "Sooooooooo good!"

Do not stare directly into the PowerWatch.

AGP VIDEOCARD

THE BUS THAT REFUSES TO DIE

Looking to squeeze one more upgrade cycle from your AGP rig? Ignore Nvidia's offerings: In our benchmark tests, VisionTek's Radeon X1950 Pro XGE AGP ($240, **www.visiontek.com**) positively destroyed BFG's GeForce 7800 GS OC AGP ($210, **www.bfgtech.com**).

The 16-pipe 7800 GS is the best Nvidia offers AGP customers, and BFG runs this one's core at 400MHz (versus 375MHz stock) and its 256MB of memory at 625MHz (compared to 600MHz stock). ATI's best AGP offering is the X1950 Pro. It has just 12 pipes, but with three pixel-shader units attached to each one. This design helped VisionTek's card dominate BFG's card, despite its stock clock speeds of 575MHz for the core and 690MHz for the 256MB of memory.

Our AGP rig is based on an Asus A8V Deluxe motherboard (using VIA's K8T800 Pro chipset), with a 2.6GHz Athlon 64 FX-60 CPU and 2GB of DDR400 memory. To make this a fair fight, we dialed our benchmarks back to the native res of a 19-inch LCD: 1280x1024. But the 7800 GS struggled with even that low expectation, delivering Quake 4 at just 47.4fps and FEAR at 29fps.

The X1950 Pro chewed up our benchmarks, spit 'em out, and asked for more. We obliged by retesting at our usual 1920x1200, and the card held its own against a similarly equipped PCI Express zero point. Its Nvidia-based competitor,

AGP: The one category in which ATI absolutely crushes Nvidia.

meanwhile, wheezed and coughed its way to the finish line.

In addition to delivering impressive frame rates, ATI's part can perform high dynamic-range lighting and antialiasing at the same time. Nothing in Nvidia's 7-series lineup is capable of that. ATI's GPU supports HDCP, too, rendering it compatible with Blu-ray and HD-DVD drives; Nvidia's GPU does not.

Sticking with AGP architecture means you may never be able to play DirectX 10/Shader Model 4 games, and you'll never be able to take advantage of either CrossFire or SLI dual-videocard technology. But if your budget limits you to an AGP upgrade, ATI's X1950 Pro will take you the farthest.

STREAMING AUDIO DEVICE

PC IN THE DEN, HI-FI IN THE LIVING ROOM

Last year, Logitech acquired Slim Devices lock, stock, and Squeezebox. Smart move on its part: The third-generation Squeezebox ($300, **www.slimdevices.com**) is one of the sweetest-sounding audio streamers on the market, and it's considerably cheaper than our other favorite in this category: the multiroom Sonos Music System ($1,000 for two rooms, **www.sonos.com**).

You could build a multiroom system by deploying a bunch of Squeezeboxes, too, but if you're going that far, we think Sonos has the better solution. The Squeezebox, meanwhile, can be hard-wired to an Ethernet network or tied into any 802.11 Wi-Fi network. The little box with the big display streams music in nearly any format, including FLAC, and it supports Rhapsody and Internet radio, too.

The Squeezebox is one of the best-sounding audio streamers on the market.

CASE LIGHTING

THIS LITTLE RIG OF MINE / I'M GONNA LET IT SHINE

Case lighting is what truly separates the nerd from the geek. While the former relies on boring, basement-style fluorescent lights to illuminate his computer's innards (and pasty skin), the latter uses lit-up bits of awesomeness to add artistic flair to his rig's glimmering guts. But with so many glowing accessories out there, where does one begin?

We turned to FrozenCPU (**www.frozencpu.com**) and grabbed Logisys's sound-activated cathode kit ($12). With but one plug of a molex, the glowing tube illuminates a hearty chunk of your case. Combine that with a Firefly modification ($4) and make even the molex connectors glow.

When it comes to glowing case fans, we like Sunbeam's cathode-based designs ($11, pictured here). Toss in a Logisys 5-LED Lazer ($8) and you'll be quasi blind from the lovely brightness.

Getting your computer all aglow can be a wiring nightmare, but the result is worth it.

FAST MEDIA READER

DATA TRANSFER TOO SLOW? IT MAY BE YOUR CARD READER

You may have a really fast 16GB flash memory card, but is your card reader up to snuff? Probably not. We tested a half-dozen card readers, some with brand names some without, to find the fastest one.

USB proponents might be miffed, but SanDisk's Extreme FireWire reader ($80, **www.sandisk.com**) slayed all the USB units. Even though we couldn't get our FireWire 800 card running at full speed, we still saw read speeds of nearly 28MB/s and write speeds of 21.2MB/s. The next closest was the FireWire reader's sibling—the SanDisk Extreme USB reader—with 16.5MB/s reads and about 14MB/s writes. The other so-called high-speed USB readers tested in the sub-6MB/s range or took so long we gave up on them.

You'll have to choose carefully though; while the $80 Extreme FireWire is the fastest unit in town with UDMA support, it's limited to CF—no SD. That might make the SanDisk's slower $25 Extreme USB reader, which has dual-media capability, a more attractive choice.

SanDisk's Extreme FireWire Reader whips the USB-based units.

WIRELESS GAMING RECEIVER

ENJOY CONSOLE-STYLE GOODNESS ON YOUR PC, SANS CORDS

The Xbox 360 Wireless Gaming Receiver for Windows ($20, **www.gamesforwindows.com**) plugs into a USB port and allows you to use any wireless peripheral for the 360 with your PC. Right now, the list of peripherals includes the wireless gamepad, headset, and racing wheel.

All Games for Windows titles should work out of the box with the receiver and the Xbox 360 wireless gamepad (the king of gamepads, in our opinion) *without* configuring any buttons. And indeed, Lego Star Wars II did just that. In minutes we had our receiver installed and our Xbox 360 gamepad synched and were reveling in our new cordless freedom.

Most newer games recognize the pad and automatically configure themselves to work. However, in older games that pre-date the Games for Windows initiative, you'll lose the out-of-the-box button configs, making this no different than any other gamepad.

Now you can go cordless with a 360 gamepad on your PC— take that, console fanboys!

UNINTERRUPTIBLE POWER SUPPLY

THINK OF A UPS AS A FIREWALL FOR YOUR ELECTRICITY

Folks in the western United States face the possibility of rolling blackouts, and folks in the East face the threat of storms and lightning strikes. Whatever your locale, if you're not running an uninterruptible power supply (UPS), you could be looking at losing hours of work and thousands of dollars should your PC suddenly go dark.

Belkin's 1500VA ($200, **www.belkin.com**) unit provides the minimum protection you should have on a machine today. Using a dual-core Athlon 64 FX-60 with 2GB of RAM, a GeForce 7950, a 400GB drive, a 19-inch CRT, and a TEC cooler, we managed to drain the 1500VA's battery flat in 6:48 (minutes:seconds). A competing brand gave us half that amount of time, and time is of the essence when you're trying to prevent catastrophe.

Belkin's 1500VA tower unit gave us almost double the run time of competing products.

TOMATO FIRMWARE

YOU CAN'T EAT IT, BUT YOU CAN SUPERCHARGE YOUR LINKSYS OR BUFFALO ROUTER WITH THIS TASTY THIRD-PARTY FIRMWARE UPGRADE

Ever sat up late at night thinking, "Dang it, I wish there was more I could do with my router!"? Well, say goodbye to those sleepless nights because if you own a compatible Linksys or Buffalo router, we're going to show you how to hack it with Polarcloud's open-source, Linux-based Tomato firmware (free, www.polarcloud.com).

Why would you want to do this? Because despite the tiny download, the Tomato firmware's kung fu knows more tricks than Mr. Miyagi and will kick the tar out of your router's existing configuration options. Want to show your roommate proof that his pr0n downloading habits make going halvsies on the Internet bill an unfair proposition? Bring up the bandwidth usage monitor and play amateur auditor. Then head over to the QoS menu and fine-tune a plethora of priority settings previously unavailable. And that's just the tip of the iceberg. Input custom scripts, change the function of the SES (Linksys) and AOSS (Buffalo) buttons, create a file system in the unused space of your router's NVRAM for storing small files, view neighboring wireless signals in the vicinity, and lots more.

To get started, you first need to flip your router over and look at the model and version numbers to verify compatibility with Tomato. This is important because some routers lack the amount of onboard flash memory necessary to install most third-party firmware, including Tomato. Supported models from Linksys include both the WRT54G and WRT54GS up to version 4, WRT54GL versions 1 and 1.1, and the WRTSL54GS (if you're willing to give up the single USB port). Buffalo models include

With a whole new level of QoS tweaking at your disposal, you can ensure that your significant other's web surfing habits never interfere with your BF2142 gaming sessions, saving you the cost of an annulment!

the WHR-G54S and WHR-HP-G54.

After verifying your router's compatibility, head over to **www.polarcloud.com**) and download the latest Tomato firmware (currently 1.06). If you own a Linksys router, open your browser and type `http://192.168.1.1/`. Type `admin` for each field (unless you previously changed these) and navigate to the Administration tab. Click the Firmware Upgrade subheading and select the appropriate .bin file from the Tomato archive you just downloaded. Click the Upgrade button and you're all finished.

For Buffalo models, hold down the Reset button and then hard-wire your computer to the router. Edit your Ethernet card's TCI/IP properties: Set the IP to 192.168.11.2, the mask to 255.255.255.0, and the gateway to 192.168.11.1. Unplug the router's power cable for a few seconds, plug it back in, and then run the wh4_install.bat file in the Tomato archive. Congratulations, you now have the baddest router on the block!

Upgrades You Might Think You Need, But Don't

It's all well and good to strive for an improved computing experience, but be wary of irrational exuberance

VISTA
We've said it before and we'll say it again: There's no reason right now to switch to Vista. The OS doesn't offer any must-have features, other than DX10, which is moot until there are DX10 games (who knows when?); hardware and application support for the OS is spotty, and integrated digital rights management sucks.

MATROX TRIPLEHEAD2GO
We're still waiting for Matrox to ship us the digital version of its TripleHead2Go; we hope it isn't as terrible as the analog version, which enables you to run three

monitors in analog mode at a maximum resolution of just 1280x1024.

30-INCH LCD
Yes, we're all for maximum screen real-estate, and no single-screen solution brings it like a 2560x1600-res, 30-inch desktop LCD, but we can't abide by the compromises in today's superlarge desktop screens. We'll feel differently when 30-inch LCDs have built-in scalers that let us tweak colors and resolutions natively.

NEXT-GEN OPTICAL
Unless you have an HD video camera

and a yearning to author your own discs, your money is better spent on things other than a "next-gen" drive—like a Ronco Food Dehydrator. Format wars, costly product, burn times from hell, and a shortage of worthwhile commercial HD discs make this an ill-advised purchase.

AGEIA PHYSX PHYSICS ACCELERATOR
Who wouldn't want real-world physics in a game? We remain intrigued by the concept, but without support from game developers, this hardware is about as worthless as an old S3 ViRGE 3D-graphics accelerator. **MPC**
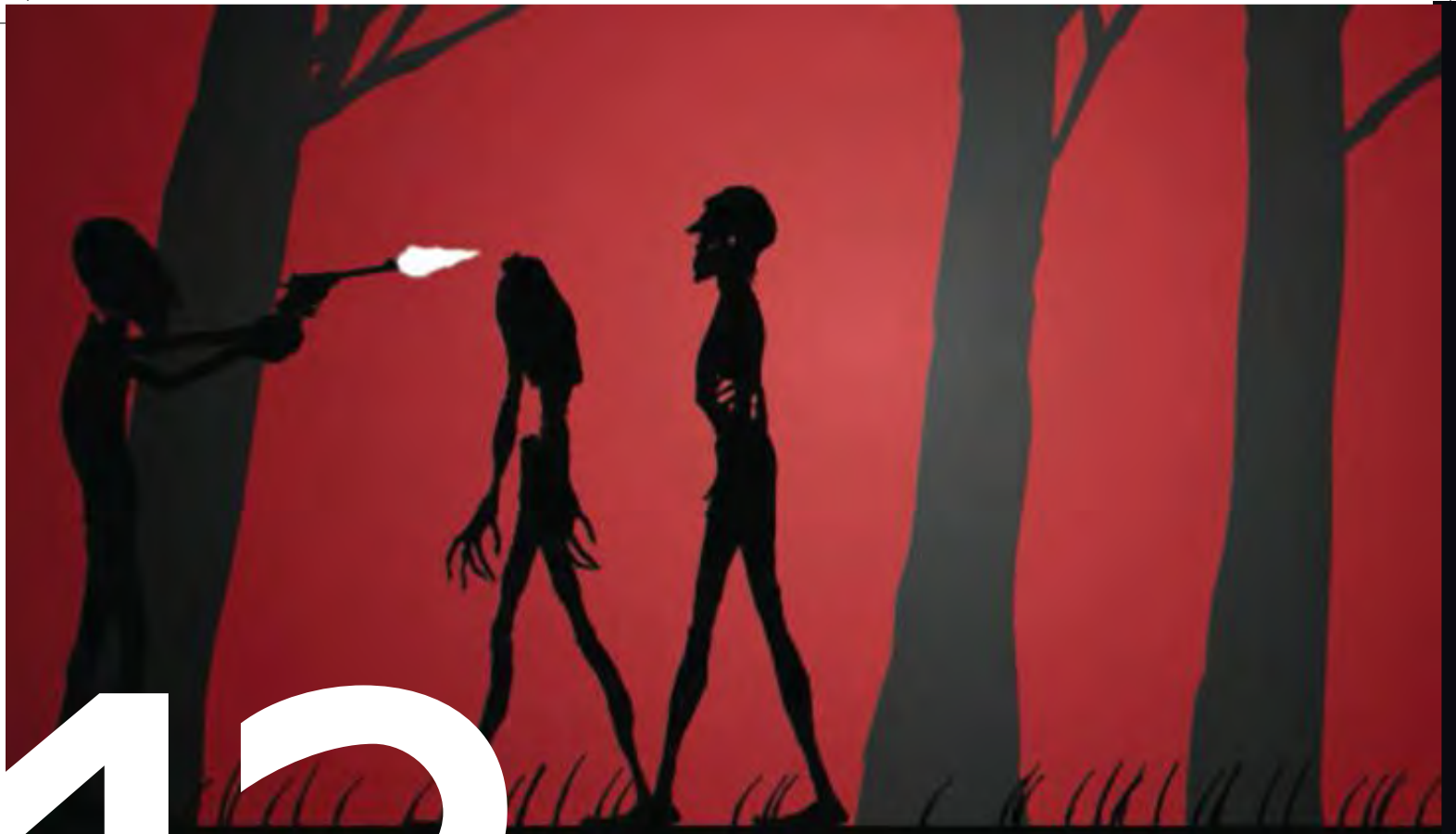
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TERRIFIC TIME-WASTERS

These browser-based puzzles and games will fill your free time with fun!

BY THE MAXIMUM PC STAFF

You've filed your last TPS report, delivered integrated solutions to actionable items, and thought outside the box to encapsulate synergistic value enhancement, and yet, somehow the clock is pegged at 4:50—immobile, mocking you as you try to find a way to spend the final 10 minutes of your day before you can strip off the yoke of your middle-management overlords. You consider ducking out but know that to avoid the next round of right-sizing, you should remain chained to your desk until 5:01. But just what should you do as you watch the clock tick away?

To make the end of the day a bit easier on you, we've scoured the Internet to find 12 fantastic games that will run in your browser—no downloads, no spyware, nothing to raise the suspicions of the IT department. Go ahead, devote some time to refining your zombie-fragging techniques, consulting tarot cards for guidance on future employment opportunities, or increasing your self-esteem by trouncing a coworker in a paper-airplane-flying contest. Remember, the man can keep you chained to your desk, but he can never take your spirit during those final soul-crushing minutes of the workday!

PAPER PILOT

Screw the eye of the tiger, you need to thread a needle's eye to succeed in this game

First, you build your plane using nothing more than virtual paper. Second, you throw your plane using a virtual you. Third, you challenge your friends to a winner-takes-all, email-based, single-throw deathmatch to see whose nerves are steeliest and who can huck his paper airplane the farthest. Do you have what it takes to out-toss your buddies? There's only one way to find out! **http://www.solidworkspilot.com**

FLASH ELEMENT TD

Flash meets Zerging in this Warcraft-themed strategy game

The best part of Flash Element TD isn't the endless waves of enemies that run through your little labyrinth, imploring you to kill them with automated, tower-themed weaponry. It's not the witty sound effects that precede each mob, nor the strategic design of the baddies, which truly forces you to rethink your grand scheme as the levels progress. Flash Element TD rocks because you can set your defense, click Play, and get work done while the game chugs along. **www.novelconcepts.co.uk/FlashElementTD**

BAUNS

A real ball-buster of a game

Many of Orisinal's games seem more like little films, engaging because of their aesthetics rather than their actual gameplay, but Bauns mixes up the equation, offering a straight-forward look with addictive action. A twist on the usual "knock down

towers of balls" seen in Bubble Breaker, Chuzzle, and other games, Bauns incorporates a more challenging shooting method and a mix of power-ups; it also has that "just one more game" element that could very well keep you at your desk until 5:07. **http://tinyurl.com/5qqw6**

SILVERSPHERE

A tip o' the hat to Marble Madness

This game reminds us of the Atari arcade classic Marble Madness. Here, your objective is to roll a silver ball into a blue vortex to complete each level. The action takes place on a 2D maze of squares surrounded by water hazards.

Racing the clock in the initial levels is extremely easy, but the complexity ratchets up quickly, as higher levels introduce golden spheres that explode on contact, crates that must be used to form bridges, sliding ice cubes, and other obstacles. **http://tinyurl.com/yolbqt**

QUIZ SHOW

YOU DON'T KNOW JACK

As close as most of us will get to being on a TV quiz show

The online version of Jellyvision's classic party game looks and plays remarkably like the CD-ROM games of yore, complete with a snarky host, wacky sound effects, fun animation, and—most importantly—totally new, outrageously off-the-wall questions.

Here's a sample: "According to Dante's *Inferno*, which level of hell will David Blaine end up in?" Those who didn't skip their European lit classes would know that magicians were damned to the eighth circle of hell.

http://tinyurl.com/2z82qs
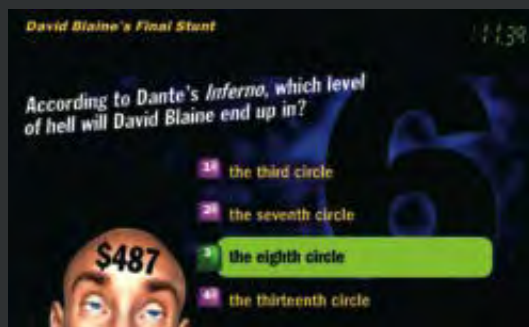
ZOMBIE + SURVIVAL

ALL HALLOW'S EVE

Stave off a ravenous horde of zombies

At first, it's you and your BB gun against a few common zombies. Then the zombies get stronger and you buy better weapons and upgrade your home's defenses. Before you know it, you're packing Uzis and laying minefields and razor wire outside your house! http://tinyurl.com/ynfxd4

ZOMBIE

DE-ANIMATOR

We think of it as a real-world trainer for a zombie attack

If you spend half your water-cooler time planning what you would do in case of a zombie attack, you should probably add a little hands-on training to your regimen. De-Animator is practically the IPSC of zombie training, making you stand your ground with a lowly six-shooter and granny's shotgun. What the game lacks in color graphics, it makes up for in mood and atmosphere.
http://tinyurl.com/28h8ej

AGILITY

FLASH FLASH REVOLUTION

And the Lord said: Let there be much button-mashing

Although it took us an hour to get the feeling back in our right hand after playing it, we heartily recommend Flash Flash Revolution—and its smorgasbord of music-driven reflex tests—as one of the best time-wasters on the Internet. While it's just not the same as stomping on a dance pad, it's the closest you're going to get to the Dance Dance Revolution experience at the workplace.

Start with the original Flash Flash Revolution, and once you've worked up a stinky finger sweat, try graduating to the ever-so-fast Flash Flash Revolution Resonance version—the songs are better, but nearly seizure inducing.
www.flashflashrevolution.com

PUZZLE

WHITE CHAMBER

Escape from your very own chamber of horrors

White Chamber imitates your cube-farm existence by placing you in a room that you must escape. By searching the room and clicking objects, you collect items you use to solve various puzzles. Once you make your escape, check out the two previ-ous chapters of the game, Crimson Room and Viridian Room.
http://tinyurl.com/ryqv6

PUZZLE

UNIQUE IQ TESTS

Goose your gray matter

There's nothing like the daily grind to make you feel bored and burned out. And, really, after years of tedium you probably *are* a little brain dead. To know for sure, launch Unique IQ Tests. This collection of timed puzzles will test your mental acuity and then spit out a score that neatly sums up your intelligence.
http://tinyurl.com/2979er
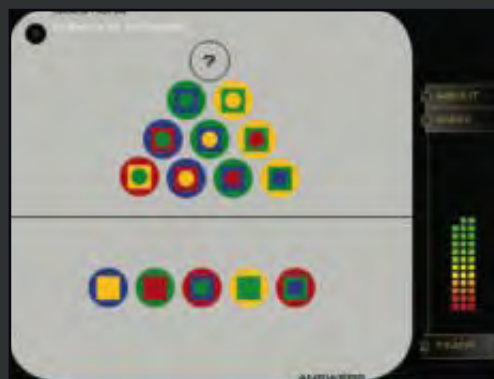
SHOOTER

VIRTUAL POLICE: THE GENOME WAR

Yippee ki yay, ready to play John McClane while on your lunch break?

It's truly amazing that what was state of the art in coin ops in 1994 can be played in a flash player today. Sure, Virtual Police isn't as graphically intense (if you can still call it that) as Sega's coin-op hit Virtua Cop, but the game captures the flavor and feel of the original in the same way a graphic novel can capture a feature film. It's somehow the same yet different.
http://tinyurl.com/23t2am

ADVICE

TAROT CARD READER

It's like having a grizzled gypsy at your beck and call

For centuries answer seekers have turned to tarot cards for mystical insight. And why not? Looking for direction in the cards' symbol-laden imagery is no more outlandish than consulting a horoscope or hiring a life coach. Tarot Card Reader marries that ancient art with the ease and immediacy of the digital age. When confusion over life's big or little issues hits you, turn to the old, wise woman that is the web. Once in the browser-based Tarot Card Reader, choose the Romance, Career, or Friends category; type in your pressing question; and then carefully select the three cards that will spell your fate. You will have fun mulling over the cards' meaning, and you just might come to count on their wisdom.
http://tinyurl.com/yv96qr

Wow. You Can Switch to Linux!

It's never been easier.
Now is the perfect time to leave Windows behind and learn to use Linux!

BY WILL SMITH

I've written about Linux in *Maximum PC* quite a bit over the last three years. You see, I'm intrigued by the prospect of a free, open operating system, one that's available for everyone to use and modify to suit their own purposes. Rather than a monolithic operating system vendor telling me that I'm not allowed to do something, there's an entire community of developers who are working to make whatever features I want possible! To me, that's the essence of what computing should be about—enabling choice.

Which brings me to the biggest problem with Linux: the paralyzing number of choices every user must make. There are literally tens of thousands of apps for Linux, ranging from vital software that every end user needs—web browsers, word processors, and Wi-Fi drivers—to the very trivial. Frequently, you'll find 15 applications that do exactly the same thing, so you'll need to experiment and discover which is best suited for you.

Writing a comprehensive Linux guide is a daunting process—and largely unnecessary. The Linux community does a great job of documenting most of its software, whether it's the developers actually writing docs or the end users figuring things out and sharing the acquired info with their pals. All the information you need to get running is out there, if you know what to search for on Google, that is.

And that's where I come in. Books have been written with solutions for all the potential pitfalls the Linux-switcher faces. However, those books are outdated the moment a new version of Linux is released. Instead of just telling you what to do, I'm going to tell you how to do things and explain why you're doing them. I'm going to focus on the things that are truly a challenge (and poorly documented), but still give you a head start on the easy stuff.

Before you get started, you need to be prepared to be your own support system. While you can usually get help with Linux problems on different message boards on the web, before you do that, you need to make the effort to solve your own problems. Linux DIYers don't have much sympathy for people who don't make an effort to help themselves.

GETTING STARTED

With modern tools, getting Linux on your hard drive is simple—
at least compared to the bad old days

If you're like me, you've probably installed Linux a few times, mucked around with it for an hour or two, changed the theme, and maybe browsed the web a little. Then, when it was time to work, you jumped back to Windows, and all was right with the world.

Things are much easier now than they were in the early days of Debian, Slackware, and Red Hat. Modern distros such as Ubuntu and SUSE LED install with crucial applications (web browser, photo editor, email client, word processor, etc.) and support for most hardware out of the box. With Ubuntu, you can boot off the CD to determine whether or not your rig will work with the OS before you make a single change to the hard drive. You can tell if you're going to have a problem before you hose your system, which is always a good thing.

Before we get started installing Ubuntu, feisty fawn, you'll need to download the appropriate ISO file from **www.ubuntu.org** and burn it to disc. For neophytes, we generally recommend starting with the x86 versions, even if your CPU supports AMD64 extensions. The proper file name will probably be something like ubuntu-7.04-desktop-i386.iso.

To burn the disc, you can use commercial burning software (like Nero) or download and install the free ISO Recorder software (**http://tinyurl.com/5p2m**). It's also a good idea to run a backup before you get started (or anytime you muck around with your partitions, for that matter).

There are two ways to make space for your Linux install: You can delete an unused partition or let the Linux installer resize an existing partition. If you have an unused partition on your hard drive that you want to use for Linux, it's a good idea to remove that partition before you start the install process, since Linux can't install to an NTFS partition. We recommend dedicating at least 20GB of space for your Linux install. To get rid of the partition, open the Computer Management tool in Windows and delete that partition. In Linux, you'll have a tough time telling which partition is which, so to avoid heartbreak, do your deleting in Windows. If you don't have an

unused partition, we'll talk about resizing your existing partition during the Linux install portion of this story.

THE FIRST BOOT

Once you've burned the ISO, you'll need to boot your PC from the Ubuntu CD, which will involve either manually selecting the optical drive or changing the boot order in your BIOS. After several minutes, you should see the basic Ubuntu desktop. You should have access to most of your hardware, including network, sound, and graphics. Some typical gaming components simply don't have good Linux support—notably the X-Fi series of soundcards and GeForce 8800–family videocards. We'll talk about them in a bit.

INSTALL!

Assuming you booted into the live desktop properly, starting the install process is as simple as double-clicking the Install icon on the desktop. The install program will prompt you for your language, location, and keyboard layout before you get to the hard-disk partitioning section.

Partitioning your hard disk is the only step of the install process that has the potential to do serious harm. If you install to the wrong partition, you could accidentally nuke your Windows drive and all of its contents (that's why we recommend running a full backup *before* you start the install process). The safest way to install is to add a new hard drive or just create free space on the disk—however, that's not always an option. If you want to resize your existing partition, select the Manual option. Select the partition you want to resize and click Edit Partition. Then input the new size for the partition in megabytes (leave the other settings alone) and press OK. Next, you'll need to create a swap partition. Highlight the newly created free space, click New Partition, set the size to 2,000MB, and choose Swap. Click your free space once again, then New

Choose the manual option when it comes time to partition your hard drive.

Partition, and change the mount point to /. Leave the other settings alone and press Next.

Now you'll be prompted to import data from your Windows partition. The Ubuntu installer will pull your Gaim settings, Firefox bookmarks, music, photos, and documents over from your Windows install if you select these options. I had mixed results with this tool in the early build of Feisty—it crashed the installer on a few Vista machines we tested—but your mileage may vary. After you import files, you'll

If you choose to resize an existing NTFS partition, make sure you give your Linux install enough room. We're giving ours 120GB.

be prompted to create a user account. You're almost done!

The final step is to confirm your installer's settings and press Install to finish the process. You'll need to wait 20–40 minutes while the install completes and then finish by rebooting your PC and selecting the Ubuntu entry from the boot manager that was installed.

USING THE ALTERNATE INSTALLER

If your machine won't boot from the graphical install CD, either because you have a new videocard that's not properly supported (GeForce 8800 series or newer) or you have an older unsupported chipset (notably the i915 integrated graphics), you'll need to use the nongraphical installer, which is called the alternate installer, for your architecture. Download the correct alternate CD for your CPU (usually ubuntu-7.04-alternate-i386.iso) and follow the prompts.

CONNECT TO THE NETWORK

Getting your machine on the network is simple with Ubuntu, whether you use a wired connection or Wi-Fi. When you first boot, the only icon in your system tray at the top of the screen should be for networking. Simply click it, enter your SSID and WPA or WEP key (if necessary), and you'll be on the network.

FINDING AND INSTALLING SOFTWARE

There are two ways to install programs on your new Ubuntu machine. The simplest is to use the Add/Remove panel, which lets you see all the software available to you from Ubuntu software repositories on the Internet. Most apps include a useful description, so if you search for Photo Manager, you're sure to find some worthy candidates.

Sometimes you'll need to fire up the more powerful Synaptic Package Manager, which you'll find in System > Administration. After entering your password, click the Reload button to make sure the list of available apps is up to date. Synaptic provides a powerful search and easy filters that will help you find all the details of the applications installed on your system. You can see what apps are installed and which have updates available. If you want to update a single program to the latest available version, Synaptic is the easiest way to do that—just search for the software package, right-click it, and select "Mark for upgrade."

You'll occasionally need to add a new repository to your Linux install. A repository is just a server that contains software that's configured and ready to run on your machine. If you want to install apps that aren't included by default with Ubuntu, you'll need to enable other respositories. To add a respository, you'll need its apt line, which gives the software manager all the info it needs to access the repository (we'll include some throughout this article). Open Synaptic and click Settings > Repositories. Go to the Third-Party tab and click Add; then type the apt line, exactly as it appears, in the window. Click Add Source, then click Close.

3D-ACCELERATED VIDEOCARD DRIVERS

There's a lot of controversy surrounding the use of closed-source drivers for graphics hardware, but they're the only option for 3D acceleration in Linux right now. The procedure for Nvidia and ATI hardware is a little different.

Install Nvidia GPU Drivers
Installing Nvidia's closed-source 3D-accelerated drivers is easy with Feisty. Go to System > Administration > Synaptic Package Manager and search for the nvidia-glx package. Right-click the selection and select "Mark for installation." You'll be prompted with a list of dependencies, which you'll need to approve for the application to work. Click Apply to download and install the app. Then open a new terminal (Applications > Accessories > Terminal) and run this command: `sudo nvidia-xconfig –add-argb-glx-visuals`; follow the prompts and reboot.

Install ATI GPU Drivers
Installing ATI drivers is a little more complex. First, you'll need to disable the Composite option in your xorg.conf. Open a terminal and type `sudo gedit /etc/X11/xorg.conf`. In the gedit window, scroll to the section labeled Extensions and change the Option "Composite" line from "Enabled" to "Disabled". Then in your already opened terminal window, type the following six commands:

- `sudo apt-get update`
- `sudo apt-get install linux-restricted-modules-$(uname –r)`
- `sudo apt-get install xorg-driver-fglrx`
- `sudo depmod –a`
- `sudo aticonfig –initial`
- `sudo aticonfig –overlay-type=Xv`

You'll need to reboot your system to enable the driver.

INSTALL RESTRICTED SOFTWARE

This one's pretty simple: All you have to do is open the Applications menu, click Add/Remove, then change the Show: dropdown to read "All available applications." Search for "Restricted" and check the box next to the package that comes up. This will install support for Flash, Java, some closed audio and video codecs, and TrueType fonts. On previous versions of Linux, installing this stuff was an absolute nightmare that could take several hours, and you weren't guaranteed success even after you spent that time!

USING LINUX

If you're like me, you've probably spent more time installing Linux than actually using it.
Here's what you need to know to get started on a permanent switch to the penguin

The good news about Linux is that there's an unbelievable amount of information available on the Internet to help you learn to use the open-source operating system. The bad news is that it can be crushingly difficult to find said information. There are a multitude of reasons for the search problems, but most of the time the problem is that you're not searching for the right thing. A normal person wouldn't know that you need to edit the fstab to mount new drives or edit xorg.conf to adjust your resolution. Here's the info you'll need to get started.

INSTALL AND CONFIGURE BERYL

Beryl is a desktop compositing engine that works much like the one included in Windows Vista and Apple's OS X. It uses your 3D accelerator to draw your desktop, which gives better performance and a better-looking desktop—assuming you've managed to install your 3D accelerated drivers.

To install Beryl, you'll first want to add the following line to your repository list (see Finding and Installing Software, page 48): `deb http://ubuntu.beryl-project.org feisty main` Before clicking reload, open a new terminal (Applications > Accessories >Terminal) and type `wget http://ubuntu.beryl-project.org/root@lupine.me.uk.gpg -O- | sudo apt-key add –` (that's a capital O, not the numeral).

These two commands tell your Linux install where to find the Beryl software and exchange a cryptographic key so that your machine can verify that the Beryl Project server is the machine it claims to be. Once you've done that, you can go back to Synaptic and install the beryl, beryl-manager, and emerald-themes packages. Next, type beryl-manager in a new terminal window, and your desktop will be 3D. If you have problems with the installation, visit **http://wiki.beryl-project.org/wiki/Main_Page**.

Of course, installing the app is only the first step. You'll want to spend some time futzing around with the options. The Beryl GUI is infinitely more configurable than the Vista or OS X equivalents. Using the Beryl Settings Manager (right-click the red gem icon in your system tray), you can adjust everything from the window open-and-close animation to the amount your windows wobble when you drag them across the screen. The other panel of interest to Beryl users is the Emerald Themes Manager (it's also accessible by right-clicking the Beryl gem). This tool lets you change the window fixtures common to all apps: the window borders, control icons, and title bars. Feel free to play around with these settings all you want, nothing you adjust here can do permanent damage.

Beryl is still early software, so while we had good luck running it on some hardware, your experience might differ. For now, it's a preview of the future—and not something that's suitable for most people to use on a day-to-day basis.

Beryl lets you map your virtual desktops to the outside of a cube, it's the next best thing to multiple monitors. (P.S. You can download the kick-ass wallpaper at www.maximumpc.com.)

MANAGING YOUR MUSIC

Rhythmbox is Ubuntu's default music jukebox. It includes much of the same functionality as iTunes or Windows Media Player. It will even mount and manage music on most MP3 players—including the iPod. If you're familiar with any jukebox-style software, you won't have any problems playing music once you've finished the initial import. While there are other, more advanced MP3 playback utilities available—we especially like the advanced library management features that Amarok delivers—Rhythmbox is the easiest to use and most reliable.

As part of the install process, Ubuntu should have mounted your NTFS partitions. You'll find them in the Places menu, listed by the partition's label in Windows. To import your music into Rhythmbox, just find it in your Windows partition. Click Music > Import Folder > and then browse to Documents and Settings/<your username>/My Documents/My Music. After the import is complete, you'll be able to search and play at will.

If you plan to rip music in Linux, you'll want to make sure the MP3 codecs are installed. If you installed the restricted-extras package earlier (see Install Restricted Software, page 48), you should be good to go. To rip your CDs, you'll use the Sound Juicer app. If you want to rip in MP3 instead of Ogg, you need to click Edit > Preferences > Library > and change Preferred Format to "CD Quality, (MP3 audio)." Then drop an audio CD into your optical drive and click the Extract button in Sound Juicer. If you set Sound Juicer's preferences to save your music to the same folder that Rhythmbox is using for the library, Rhythmbox will automatically see new music that appears when you rip it.

Rhythmbox will let you manage your music—it's not as pretty as iTunes, but it's just as functional!

BRING YOUR EMAIL OVER

Getting your email to Linux seems like a tricky proposition, but it's actually not that hard. First, you'll need an IMAP email account—if you don't have one already, you can sign up for a free one at **www.aim.com**. While you're still in Windows, you need to configure your existing email client to use the IMAP account (for AIM, just point the IMTP server setting to imap.aol.com), then copy your mail to folders on that account. Once you've installed Linux, open Thunderbird (you'll need to install it via Applications, then Add/Remove) and point it to the same IMAP account (see image below)—all your mail will be there waiting for you. You can drag the mail back down to the desktop and reconfigure your client to use your normal servers.

PLAYING VIDEO ON LINUX

The default app for playing video on Ubuntu is Totem. However, like Windows Media Player, it's just a front end that relies on external codecs to play properly. Remember those restricted packages you installed earlier? They included a whole bunch of codecs designed to work with Totem; you should have good support for most MPEG-4-based codecs, including Xvid and Divx. If you plan to watch movies encoded with AC3 audio, you'll also need to install the ffmpeg gstreamer plugin; search Synaptic for it. And since Totem won't play DVDs, you should search Synaptic for Gstreamer0.8-DVD and Gstreamer0.8-MPEG2dec for that purpose.

With Totem and a few Gstreamer plugins of questionable legality, you can watch DVDs and MPEG-4 videos on Linux.

ABOUT PRINTING

Here at *Maximum PC*, we're firm believers in the paperless office. Not because we particularly love the environment, but because we really, strongly dislike printers. They're always running out of ink at the most inopportune times, and most of them (at least the consumer-friendly inkjets that everyone uses) don't work very well in Linux. We could easily double the size of this article by listing all the printers that are incompatible with Linux, but instead of doing that, we'll point you to the Linux Foundation's guide to printing on Linux (**http://tinyurl.com/386zs5**).

MANAGING YOUR PHOTOS

The best photo manager for Linux is the beta version of Google's Picasa. To download and install it, go to **http://tinyurl.com/3234pv** and follow the instructions provided. From that point on, Picasa works just the same as it does in Windows—it's the same application!

Google's Picasa is available for Linux users now, so you can share and edit your photos with ease.

WHEN LINUX APPS DON'T CUT IT

Sometimes, there just isn't a Linux alternative to the Windows application that you need. When you need to fire up InDesign or Microsoft Project, you've got two options— you can try to trick your app into running in Linux using WINE or CrossOver Linux, or you can install a fully functional version of Windows inside a virtual machine by using Parallels.

WINE (free, **www.winehq.com**), which stands for WINE Is Not an Emulator, serves as a wrapper for typical Windows function calls. When a Windows app makes a call, WINE converts that request into a Linux-compatible format. It works reasonably well for apps it supports, but if your app isn't fully supported, you could have problems. CrossOver Linux ($40, **www.codeweavers.com**) is a supercharged version of WINE with support for more apps. Still, it has its own problems with many common apps, and it costs money.

Parallels ($50, **www.parallels.com**) certainly isn't free either, but there's a substantial difference. Parallels lets you run Windows (and any apps you need) inside a virtual machine. You don't even have to reboot to run Windows applications. The hitch is that you'll need a licensed version of Windows to keep things nice and legal—if you switch all your rigs to Linux, you'll have plenty of licenses to spare! Parallels delivers full compatibility with virtually every Windows app, but it does require managing a full Windows install inside the VM.

Using CrossOver Linux, we were able to get Steam running. Only a few games worked, but Steam, man... Steam!

KEEPING OPENOFFICE.ORG COMPATIBLE

There's a trick to using OpenOffice.org, and that is to use the proper default file format. If you use OO.o's native file format, whether it's for a text document, a spreadsheet, or anything else, Microsoft Office users will be unable to open it. You need to go into the options for each OO.o program you use and under Load/Save, in the General section, set the default file format to the most recent Microsoft option (for the word processor, it's Microsoft Word 97/2000/XP; for the spreadsheet it's Microsoft Excel 97/2000/XP).

The secret to keeping OpenOffice and Word working happily together is for OpenOffice to always save using the Microsoft formats.

WHAT ABOUT GAMES?

Games have always been and still are the Achilles' heel of Linux. There are two ways to play games on Linux: Play a limited number of native Linux games or emulate Windows using Transgaming's Cedega subscription service, which supports high-profile titles like World of Warcraft and Battlefield 2 but lacks support for many newer titles. For the games it supports, it works. However, we noticed significant performance hits as well as serious image-quality degradation. For our money, it makes more sense to boot back to Windows to play games. We didn't shell out big bucks for a GeForce 8800 GTX to get our game on at 1280x1024 in DirectX 8 mode in Linux.

CONFIGURING THE BOOT MENU

You've installed Ubuntu, but you don't want it to be the default option in the boot loader. That's not unusual. To set your Windows install as the default, open a terminal and type `sudo gedit /boot/grub/menu.lst`. Look for the default entry—it should read 0. To determine what the new default should be, count the number of title lines from the start of the file to the title line for Windows, starting with zero. Title lines that begin with a # don't count! If your Windows install is on the fourth title line, you'll set the default to 3. Save the file, and the next time you reboot, your machine will automatically start Windows.

```
## default num
# Set the default entry to the entry number NUM. Numbering starts from 0, and
# the entry number 0 is the default if the command is not used.
#
# You can specify 'saved' instead of a number. In this case, the default
entry
# is the entry saved with the command 'savedefault'.
# WARNING: If you are using diraid do not change this entry to 'saved' or
your
# array will desync and will not let you boot your system.
default        0
```

In order to change the default OS you boot, you'll need to edit a text file. Be careful though, any missteps here could render your PC unbootable!

LINUX ALTERNATIVE TO WINDOWS APPS

IF YOU NEED	TRY	PACKAGE NAME
Word, Excel, PowerPoint	OpenOffice.org	Installed with Ubuntu
Internet Explorer, Firefox	Firefox	Installed with Ubuntu
Outlook Express, Thunderbird	Thunderbird	mozilla-thunderbird
Photoshop, Paint Shop Pro	The Gimp	Installed with Ubuntu
Acrobat	xpdf	xpdf
Google Desktop, Windows Desktop Search	Beagle	beagle
AIM, Google Talk, Yahoo IM, etc.	Gaim	Installed with Ubuntu
FTP client	Filezilla	filezilla

WHAT ABOUT ANTIVIRUS AND ANTISPY APPLICATIONS?

It would be foolish to claim that any operating system is completely secure against spyware and viruses (we're looking at you, Apple), but it is actually safe to run an Ubuntu install without any kind of malware-fighting utilities running in the background. However, you do need to pay attention to the updates. It's a good idea to get in the habit of updating whenever Ubuntu prompts you to install any kind of security update. As a general rule, it takes just a second or two, and it will save you a huge hassle in the long term.

WHERE TO GO NEXT?

By now, you should have a pretty good idea how to get started using Linux. When you encounter technical problems, start with Google. Type the exact text of the error message you receive, along with the version of Linux you're using (in your case, Feisty should be enough). Usually, you'll find your answer on the first page or two of results. If you don't, check the Ubuntu forums (**www.ubuntuforums.org**) and don't hesitate to politely request help if your searches are fruitless. We also have a great Linux board filled with knowledgeable, helpful people at **www.maximumpc.com/forums/**. Be prepared for an occasional disaster, but also be prepared to learn and have a lot of fun. Becoming an expert at a new operating system isn't an overnight process, but if you take the time to master the penguin, you will be rewarded!

DOWNLOAD, MODIFY, AND EDIT THIS ARTICLE!

We're trying something new with this story by releasing it to the public using a Creative Commons license (specifically attrib-sharealike); the story should be on our website by the time you read this, so feel free to download, share, and change it. **MPC**

Build a Slipstreamed OS Disc

Update your Windows XP disc with support for massive hard drives and all the post-SP2 updates.

TIME 01:00 HOURS:MINUTES

I f your Windows XP disc is older than Charlton Heston, it won't perform basic tasks, like recognize hard drives larger than 137GB. Slipstreaming the disc allows you integrate the latest service packs and hotfixes from Microsoft as well as add or remove components—a valuable proposition for most end users. If you find yourself frequently installing Windows, a slipstreamed disc can save you hours of work each time you face that unwelcome task.

BY GORDON **MAH UNG**

WHAT YOU NEED

- **NLITEOS 1.3**
  Free, www.nliteos.com

- **RYANVM INTEGRATOR**
  Free, www.ryanvm.net

- **RYANVM'S WINDOWS XP POST-SP2 UPDATE**
  Free, www.ryanvm.net

- **WINDOWS XP WITH .NET 2.0 FRAMEWORK INSTALLED**

- **WINDOWS XP OS CD**

- **A BLANK CD-R OR DVD-R**

- **INTERNET ACCESS**

- **VIRTUAL PC 2007**
  Free, www.microsoft.com

1 Download It

Download the free nLite tool from **www.nliteos.com**. We used the final 1.3 version for this how-to. Install it, start it, and choose your language.

2 Dig up Your Original OS Disc

Put your Windows XP disc into the optical drive. If the autorun process tries to start installing a new copy of XP, cancel the installer. Go back to nLite and click Browse and point nLite at the optical drive that holds your Windows XP disc. When it asks you where to install the files, choose a handy location such as the desktop. We named our directory Original Retail.

3 Make Sure You Don't Already Have SP2 on the Disc
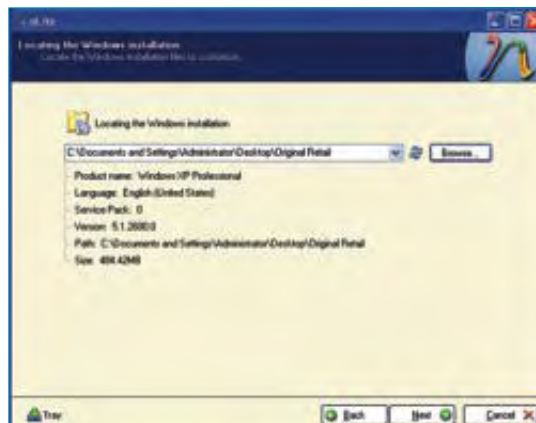
When it's finished importing the files, nLite will display a summary screen describing what you just imported, including the service pack that's built into the disc. If your install disc already has Service Pack 2 installed, you don't need to slipstream it into the nLite install CD. It's safe to click past the Sessions screen; since this is the first time you're using nLite, you won't have any previous sessions.

NLite should be able to tell you which service pack you have on your install disc.

4 Get Service Pack 2

Next, you'll need to download Service Pack 2. NLite has links at the bottom of the screen that take you to pages where you can download the latest service packs for Windows 2000, Windows 2003, and XP. Click the link for XP patches. The first link on the page that opens should be for Windows XP Service Pack 2. Click it, scroll down, and look on the right side of the screen where it says "Download and Deploy SP2 to Multiple Computers" and click the link. This will let you download the network install version, which is what nLite needs. Download it to your desktop. In nLite, click the "Select the Service Pack for Integration"

button and browse to the file you just downloaded. NLite will integrate the service pack with your installation.

Clicking the Windows XP link takes you to a page where you can download the Service Pack you need.

5 Forced Integration

The easiest way to build a disc that won't require tons of downloaded patches is to use the RyanVM Integrator and its Post-SP2 Update Pack.

Integrating a hotfix is fairly easy. Just download the hotfix to the location of your choice, navigate to the Hotfix screen in nLite (you must have it selected in the Task Selection window before you can click to it). Click the Insert button and point nLite to the hotfix you want to install.

That's the easy part. The difficult part is locating all the hotfixes and patches Microsoft has issued since Service Pack 2 came out. An easy way to do this is to use another app, RyanVM Integrator (**www.ryanvm.net**). While it includes some of the functionality of nLite, it's best used for integrating hotfixes. The site maintains a post-SP2 update pack where patches are collected into one giant file.

Security freaks, however, may not be willing to download hotfixes from an unofficial source. For those people, RyanVM.net contains a list of available updates, complete with direct links to Microsoft, so you can download each one manually if you choose and use nLite to integrate them.

If you're comfortable using the third-party file, download RyanVM Integrator and RyanVM's Windows XP Post-SP2 Update Pack. We put

both files on the desktop. Fire up RyanVM Integrator. Set the source to the Original Retail directory that you created with nLite. For the destination directory, we created a new directory on the desktop named Patched Retail. Under Choose an Update Pack CAB, select the Post-SP2 update that is on the desktop. Click integrate; it will take about 10 minutes to add the files to your build.

When the integration is done, restart nLite. This time, point nLite to the directory you just created with RyanVM, the one called Patched Retail.

(If you didn't use the RyanVM post-update pack, continue to use your source directory, Original Retail.) Click Next until you get to the Task Selection window and select Components (which lets you cut out components that are installed by default), Unattended (which will complete the entire install process without prompts), Options (which lets you change things such as the install path), Tweaks (which lets you make registry tweaks and service changes), and Bootable ISO. Right now, however, we'll integrate the service pack, so select only Service Pack and click Next until you get to Components.

6 Cut out Solitaire

On the Components page, nLite lets you remove components that Windows XP would normally install by default. If, say, you're the evil IT manager who doesn't want your employees playing solitaire, you would drill down into Applications and uncheck Games to have nLite chop that section out.

Employees playing too much solitaire? Make sure your image doesn't include games by nuking them from the Components window.

8 Change Your Options

The Options window lets you change the boot options, so the disc will automatically start an install without you having to hit a key during the boot. Heck, you won't even have to pick the default Windows install directory. On the Patches tab, you can change four OS settings, including the maximum number of unfinished TCP/IP connections, and increase the USB port polling for faster mouse response. Click Next to see even more tweaks, such as the default Internet Explorer cache size. Drill through the settings and look for tweaks that you would do on a clean install. If, for example, you like the Windows version shown on the desktop, check it. Click Next and nLite will prepare the files.

The Options and Patches window lets you alter the Windows install directory and USB mouse timing.

7 Fix the Windows XP Installer's Bad Sense of Timing

NLite's most satisfying features are its Unattended options. By setting your username, workgroup, time zone, and product key, you can intercept the nagging questions that XP asks while installing. When you're done, click Next.

9 Virtually Test Your Masterpiece

You're ready to burn your disc now. Click Next and you'll get the Bootable ISO screen. You can create a bootable DVD or CD using the ISO. A DVD is useful if you want to include additional files on the boot disc. To add files, copy the files you want to transfer to the Patched Retail folder if you applied the RyanVM Post-SP2 Pack, or the Original Retail folder if you used nLite to slipstream SP2 into it. When you're ready to burn, set the mode to Direct Burn and click the Make ISO button; nLite will burn the disc. However, we recommend that you test your ISO first. Before burning it, set the mode to Create Image, give it a name such as Test1.iso, click the Make ISO button, and save the ISO to the desktop. Now download and install Virtual PC 2007 from Microsoft. This free VM program will let you directly mount and test the install without having to actually install it. To test your ISO from within Virtual PC, create a new virtual machine and launch it. Once the VM is running, under the CD label of the virtual machine, select Capture ISO Image and point the file browser window at your Test1.iso that should be on the desktop.

Once you're satisfied that you have it set up just the way you want it, you can go back to nLite and set the mode to Direct Burn to burn the disc or Burn Image to burn the image you created onto a disc. **MPC**
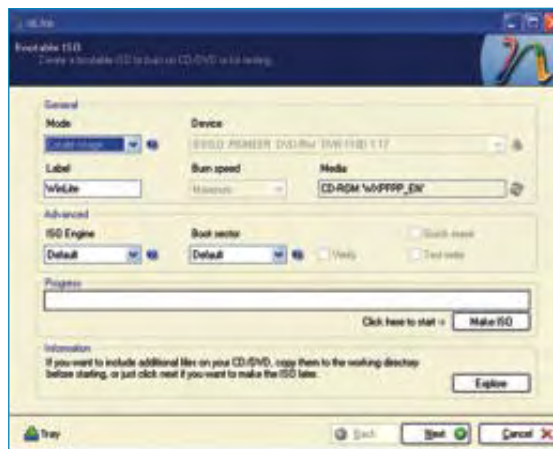
NLite lets you create an ISO that you can mount in a virtual machine for testing, or you can live on the edge and burn a disc right away.

Ask the Doctor

Diagnosing and curing your PC problems

MUST… FIX… LAAAAAG…

I have an eMachines T3406 desktop running XP Home. Recently, when I launch an application or do something that requires more than about 45 percent CPU usage, my cursor lags and the music I'm playing becomes garbled. This lasts until the app is fully launched. What could be causing this?
*—Ryan S.*

The Doc finds that things usually don't break by themselves in Windows XP Home. Generally, a problem is the result of an application, driver, or hardware update you made in the past but may not have noticed until now. In your case, if you are absolutely sure the system does not have any rootkits, viruses, or Trojans running, it may be a hardware issue, and the Doc is guessing an update to the hard drive or optical chain has changed the DMA mode on the hard drive. If the hard drive is in some odd mode, accessing files on it may put an undue burden on the CPU (DMA mode allows data from the hard drive to go directly to RAM without the CPU's intervention) and cause the stuttering problem you have. You can check your hard drive's DMA mode by going to Device Manager, clicking the IDE ATA/ATAPI Controllers icon and opening the Primary IDE Channel icon (or Secondary IDE Channel). Click Advanced Settings and see what the transfer modes are set to. DMA should be enabled by default in Windows XP, but something may have changed this setting. You should also check that your CPU fan is spinning correctly and clean the system of dust, as the other reason for this lag may be CPU throttling due to heat issues that crop up when a heavy load is placed on the CPU.

DEEP-FRIED ATHLON

A pin on my AMD 3500+ bent after I dropped it, so I fixed the pin with some tweezers. I wanted to make sure the CPU worked before I secured the heatsink, so I put it in the socket and turned on the computer. Just as the desktop came up, a blue screen appeared, so I immediately shut the computer down. The CPU hasn't worked since. Is it possible for a CPU to burn up in that short a time?
—Austin Cooper
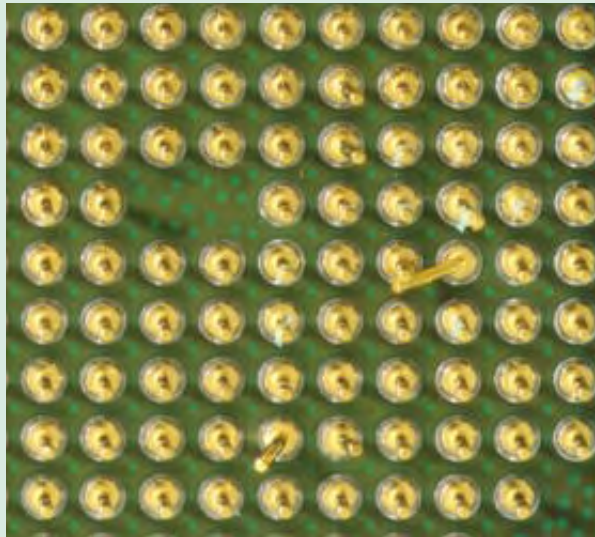
Bent pins are no fun; use a mechanical pencil to realign them—and hopefully save your CPU.

You didn't specify what CPU you have, but the Doc guesses it's an Athlon 64 3500+. If that's the case, no, you can't burn it up, as the CPU should throttle down if it is overheating. An older Athlon XP, however, could nuke itself rather quickly. Your problem is likely due not to overheating but to additional damage that occurred to the CPU from the drop. You should pull the proc and see if you missed other bent pins and recheck the pin that was already bent. If all of the pins are fine, you likely physically damaged the CPU beyond repair.

NETWORK FIGHT! NETWORK FIGHT!

I recently had (and continue to have) a dispute with a coworker. This person claims that within an internal network, your network card's bandwidth capability will affect your Internet connection. For instance, if Jimbo has a 100Mb NIC and Jeb has a 1,000Mb NIC, Jeb will connect at a faster speed, despite the fact that the network has a maximum connection of 1.5Mb/s.

My claim is that any speed difference is due to the newness of the gigabit card's hardware and drivers, not the maximum capabilities of the hardware. Can you settle this dispute before
one of us ends up in HR over this?
—Dave Brock

The Doctor tends to agree with you—any increased performance the gigabit card displays is due to the newness of the card, not the available bandwidth. The gigabit card (or integrated part) may feature TCP/IP prioritization or other esoteric packet prioritization that puts it above the 10/100 card. The gigabit card may even feature a faster processor.

CHOOSE YOUR CABLE

I want to make my 360GB hard drive my main hard drive. I am pretty sure that it is set to cable select, so do I just have to switch the cable? Also, do I need to do anything special to back it up on another hard drive?
—Nathan H.

The Doctor thinks that now would be a great time for you to pull out the manual for your PATA hard drive (at least, the Doc is assuming it's a PATA; this entire conversation would be moot if you were rocking a SATA). Somewhere in that tome of knowledge should be an entry about your drive's jumper switch—specifically, what you need to do to set it to master, slave, or cable select. Since you're going to be backing your drive up soon anyway, you might as well leave it on (or set it to) cable select. To then boot the drive as a master, make sure you correctly attach your IDE cable. The blue end of the cable goes to the motherboard, the far end goes to your master drive, and the middle end goes to your slave drive. Ta da!

In terms of backing up your hard drive, well, it couldn't be easier. We recommend grabbing HDClone (www.miray.de), a free cloning application that will greatly simplify your backup process. The application limits the transfer rate to 300MB per minute, but you'll be fine if you just set it to run overnight. **MPC**

And the Doctor raised the Holy Hand Grenade up on high saying, "Oh [insert deity of choice], bless us this Holy Hand Grenade, and with it smash our enemies to tiny bits." And [said deity] did grin, and the people did feast upon the lambs, and stoats, and orangutans, and breakfast cereals, and lima beans…. And the people did send their computer-related issues to **doctor@maximumpc.com**, and there was much rejoicing.

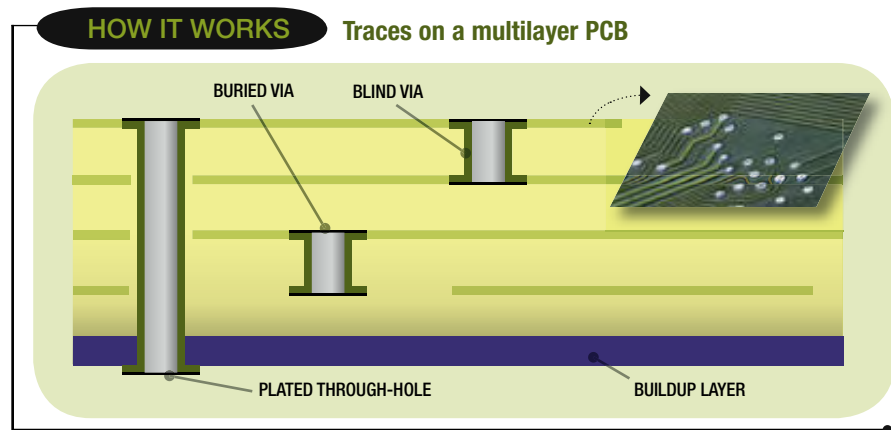# White Paper: Printed Circuit Boards

It's easy to take printed circuit boards for granted—we see them everywhere. But these seemingly simple devices are quite remarkable works of engineering.

BY MICHAEL **BROWN**

HOW IT WORKS — **Traces on a multilayer PCB**

Some printed circuit boards have components mounted on both sides, while multilayer boards have traces running through the middle of the board. In these cases, a via is drilled to establish an electrical connection between the layers.

Austrian inventor Paul Eisler invented the printed circuit while living in the United Kingdom in 1943, but there was almost no demand for the technology—which was more expensive but less reliable than the existing alternative—until the U.S. Army adopted it for use in proximity fuses in the antiaircraft shells used to counter Germany's V1 rockets.

Prior to Eisler's invention, electronic circuits were wired point-to-point, meaning that each component was mounted to a heat-resistant material—such as Bakelite—and connected with copper wires and solder (a process that is nearly impossible to automate). Although educated as an engineer, one of Eisler's first jobs was as a printer. Combining his knowledge of these two disciplines, he came up with the idea of using an etch-resistant ink to print a circuit pattern onto copper foil bonded to an insulating substrate. When the substrate is immersed in an etching chemical, the excess copper is removed and only the desired circuit pattern remains.

The problem with Eisler's idea was that foil manufacturers were largely uninterested in producing copper foil that was sufficiently thin for the job. And when that obstacle was finally overcome, it took several more years to develop the proper adhesives for bonding the foil to the insulating base. Although the United States issued a 1948 dictate that all airborne equipment must use printed circuits, the technology didn't begin to offer significant technical and price advantages over the hand-wired competi-

tion until the late 1950s.

The breakthrough came with Moe Abramson's and Stanislaus F. Danko's development of the Auto-Sembly process, which they created while working for the U.S. Army Signal Corps; they filed for their patent in 1950, and it was granted six years later. The Auto-Sembly process inserted component leads directly into the copper foil interconnection pattern and then dip-soldered the entire board, eliminating the need to drill holes in the PCB for each component's wire leads. The dip-soldering process immerses the PCB in molten solder, but the solder adheres only to surfaces that are not protected by a solder mask (typically, a green-tinted liquid epoxy that lends PCBs their characteristic color).

SAME AS IT EVER WAS

The PCB-manufacturing process has changed relatively little since then, although three "subtractive" processes have evolved to remove the copper to reveal the final circuit layout. In silk-screen printing, a layer of copper is glued to a fibrous substrate, a circuit mask is drawn on the copper using an etch-resistant ink, and the excess copper is removed in a chemical bath (ferric chloride and ammonium persulfate being two examples). The second alternative, photoengraving, uses a computer and a laser printer to produce an etch-resistant photomask that is glued to the copper foil prior to etching. The final

subtractive method uses a mechanical milling machine to cut the excess copper foil from the substrate, much like a plotter would draw a schematic.

Complex PCBs are created by laminating thin, separately etched, conductive boards. Such multilayer boards have circuit traces inside the PCB, not just on the top or bottom of the board. This enables electrons to travel on and through multiple layers within the PCB, vastly increasing the board's capacity for electrical traffic without increasing its surface area at all—much like an urban subway increases a city's capacity for moving people around without clogging its streets with traffic. In some designs, an entire layer is used to distribute power while another acts as a ground plane.

Drilled holes, known as vias, connect the copper tracks from one layer of the board to another. A complex multilayer PCB might have both blind vias (which are visible on only one side of the finished board) and buried vias (which aren't visible at all when the board is assembled). A via is typically either electroplated or has a small rivet inserted into it.

PCB LAYOUT AND POPULATING

When designing a PCB, great attention is paid to the pathways or signal traces that the electrons will follow as they move from one component to the next. If the traces are placed too close together, excess solder can

short-circuit two or more traces. But if the traces are too far apart, the resulting board might be too large to fit its purpose or too expensive to mass-produce. Traces also exhibit impedance and can have undesired traits—traces of certain lengths will even pick up radio signals—so they can't be too long or too wide. Their width is typically determined by the amount of current they're expected to carry, so power traces are usually much wider than signal traces.

Laying out electronic traffic patterns is only half the equation—mounting the actual electronic components is the next step. There are two main ways to accomplish the task: through-hole construction and surface mount. In some cases, both techniques are used.

In through-hole construction, the contact wires (leads) on the component are passed through holes drilled in the PCB and then soldered to the traces. In surface-mount construction, the part is soldered directly to a solder pad on the board's surface. Surface-mount technology was developed in the 1960s and was in wide use by the early 1990s. It's the most common manufacturing technique in use today because it allows for much greater circuit density than through-hole construction and because it is very well suited to automated assembly.

Small surface-mount devices (SMDs) are delivered to the assembly line on reels (long, tapelike rolls of components), while larger components are stored in plastic tubes or trays. As the PCB moves down the line, a paste consisting of solder particles and flux is applied to the solder pads. Robotic devices known as pick-and-place machines select a component and set it in the appropriate location. Once all the components have been placed on the PCB, it moves down the line to a soldering oven.

The temperature of the PCB and the components is gradually raised until the solder particles melt, bonding the leads to the board. Maximum temperature—which is determined by the least heat-tolerant component on the PCB—is achieved in what is known as the reflow zone and is typically maintained for less than 60 seconds. The board is then cooled, allowing the solder to resolidify. In many cases, an SMD is held to the board only by its leads, which are soldered to the PCB.

The last step in PCB manufacturing is to apply a conformal coat to prevent oxidation, corrosion, and short circuits caused by condensation. Manufacturers used wax in the early days, but polyurethane, acrylic varnish, and epoxy are more common now. **MPC**

USB Webcam

It wasn't all that long ago that we were marveling at the wonder of 1MP digital cameras; now, USB webcams offer that and much more.

LENS SHELL This isn't the actual lens; it's just a protective shell with an integrated focus ring.

LENS Here's the webcam's actual optical lens. This one is a wide-angle model, but its zoom capability is strictly digital.

CMOS IMAGE SENSOR The lens focuses the image on the image sensor (this one has 1.3 million pixels). The image sensor converts light into electrons and passes them to a processor on the back of the PCB. This camera uses a Sonix Technology SN9C2028AF, an all-in-one design with interfaces to the CMOS image sensor, SDRAM, and USB; a compression engine; an LCD driver; and an embedded 16-bit DSP.

MICROPHONE A mic is an essential component in a webcam—unless you enjoy pantomime. This one is monophonic, as you might have guessed; it interfaces with your PC's sound system via USB.

MULTIFUNCTION BASE Like most webcams, this one has a base that allows you to set it atop a desk or CRT monitor or clip it to the edge of an LCD.

Any requests? What hardware—new or old—would you like to see go under *Maximum PC's* autopsy knife? Email your suggestions to **input@maximumpc.com.**

KATHERINE **STEVENSON**

Examines the Difference Between 6-bit and 8-bit LCDs

Would you give up a couple bits per color if it could save you some cash?

We're big fans of Dell's large 8-bit LCDs, but the company's 6-bit E228WFP is a tougher sell.

At *Maximum PC* we typically review high-end, or "performance," monitors. These are the screens with the best specs and thus most likely to meet the rigorous demands of power users. But a recent spate of inexpensive 22-inch screens had me wondering whether it's worth trading some screen quality in favor of price and size, both valuable commodities.

All three of the 22-inch LCDs I review on page 68 feature 6-bit color as opposed to 8-bit color. The reason is cost. Even though all desktop LCDs employ thin-film transistor (TFT) technology, there are many variants of TFT. Of these, twisted nematic (TN) is the cheapest to produce, so many vendors use it for their mass-market models, e.g., these 22-inch LCDs. The trade-off is that TN panels are incapable of 8-bit color.

Does this matter? Strictly speaking, 6-bit yields a total of 262,144 colors while 8-bit is capable of a whopping 16.7 million colors. While this suggests a huge difference in appearance—and one that would definitely be undesirable—it's not quite as simple as that. To bridge the color gap, vendors use compensation techniques: either dithering, which combines adjacent pixels to simu-

late a desired shade, or more commonly, frame rate control (FRC), which rapidly cycles the 6-bit pixels to simulate the shades you get natively from an 8-bit panel. Or at least most of the shades—16,194,277, to be exact.

Overall, I found the three LCDs to be less rich and vibrant than our favorite 8-bit panels—for instance the blue and green in XP's Bliss desktop appeared washed out—and vertical off-axis was kind of weak (a characteristic of TN displays). But I didn't notice any visual artifacts, such as a loss of subtle detail or apparent dithering. Indeed, I found the LCDs performed well within the realm of acceptability for displays of this price, even if their pictures weren't eye-popping.

Gordon Mah Ung

Takes His Quad's Temperature

And wonders why the hell you can't get an accurate temperature from a Core 2 chip

Fire up your favorite temperature-monitoring program on a Core 2 processor and I'll bet the reading you get is wrong. At least that's the conclusion I've come to after a confusing week of trying to figure out which temp utility is accurate.

RightMark CPU Clock Utility (**http://cpu.rightmark.org**) tells me that my lightly overclocked Core 2 Extreme QX6600 is idling at 32 C, yet Core Temp (**http://tinyurl.com/2pkq4r**) tells me it's at 48 C. Which one is right? Neither.

There are two different temperature measurements going on inside a Core 2. Each individual core has its own digital thermal

sensor (DTS) that writes a value to a register in the core. The number the DTS reports, however, is not the temperature of the core, it is a value that counts down to zero. When it hits zero, the core should throttle down. It's also intended to be used for controlling fan speeds, not as a direct temperature reference. Core Temp is guessing (incorrectly, according to Intel) what the offset is.

There's also an old-fashioned thermal diode inside the CPU, just off to the side of the two processors, under the lid. Intel says the temperature the diode reports is probably more indicative of the CPU's actual temperature (and it's probably what the BIOS and most OEM motherboard utilities report). Still, that number isn't necessarily correct.

Believe it or not, to accurately measure the temperature of a Core 2 chip, Intel recommends that you mill out a groove in the heat spreader and install a thermal couple at the exact center of the heat spreader. If I did this, I would probably see that the CPU is nowhere near the maximum temperature—65 C—that Intel rates it for. The moral of this story? Take your temp utility readings with a grain of salt.

How We Test

Real-world benchmarks. Real-world results

Computer performance used to be measured with synthetic tests that had little or no bearing on real-world performance. Even worse, when hardware vendors started tailoring their drivers for these synthetic tests, the performance in actual games and applications sometimes dropped.

At *Maximum PC,* our mantra for testing has always been "real world." We use tests that reflect tasks power users perform every single day. With that in mind, here are the six benchmarks we use to test every system we review.

SYSmark2004 SE: This is an update of the SYSmark2004 benchmark, which uses a suite of such common applications as Microsoft Word, Excel, PowerPoint, Macromedia Dreamweaver, Flash, and Winzip to test general performance. It isn't heavy in multithreading, but it does feature multitasking tests.

Adobe Premiere Pro 2.0: We finally ditched our old standard-def Premiere test for one that uses high-def source material. The test is multithreaded, uses the GPU for transitions, and is brutal. It takes about an hour on our zero-point to render a short two-minute, 46-second benchmark movie in the program.

Adobe Photoshop CS2: We start with a RAW photo shot with a Canon EOS 20D, and apply a crapload of filters and other tasks from CS2 to see just how fast a rig can chew through the workload. Because we use every filter we can, the test is more fair and balanced than the usual cherry picking of Photoshop tests.
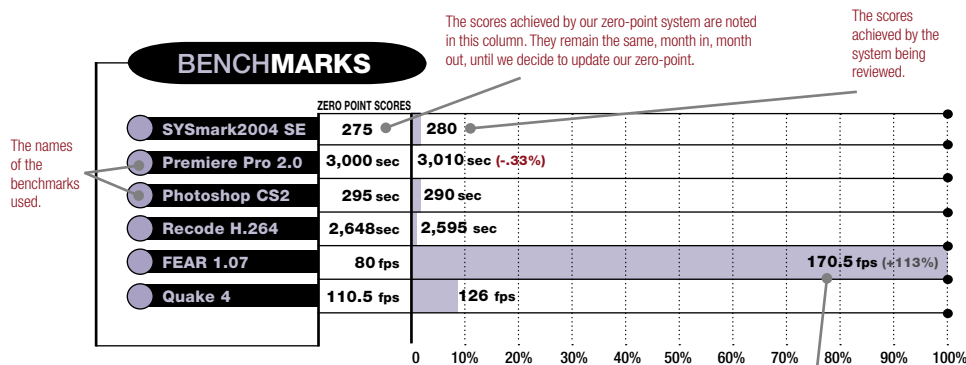
Ahead Nero Recode 2.0: Nero Recode 2.0 is one of the fastest video-transcoding utilities. We copy unencrypted VOB files to the hard drive, then convert the movie to an H.264 file formatted for the Apple iPod's screen. The version included with Nero 7.5, is the only multithreaded H.264 encoder we've found thus far and is optimized for dual-core CPUs.

Quake 4: Based on the Doom 3 engine, Quake 4 is a popular OpenGL game. We run our test at 1600x1200 with 4x antialiasing and 4x anisotropic filtering. Generally, more robust OpenGL drivers yield better performance. We use a custom timedemo recorded using the 1.2 patch, which supports Hyper-Threading and dual-core processors.

FEAR: Monolith's FEAR is a cutting-edge DirectX game that pushes PCs and graphics hardware to the limit. We run FEAR at 1600x1200 with soft shadows, physics, and audio acceleration enabled, using the 1.07 patch.

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.

The names of the benchmarks used.

The scores achieved by our zero-point system are noted in this column. They remain the same, month in, month out, until we decide to update our zero-point.

The scores achieved by the system being reviewed.

BENCHMARKS

	ZERO POINT SCORES	
SYSmark2004 SE	275	280
Premiere Pro 2.0	3,000 sec	3,010 sec (-.33%)
Photoshop CS2	295 sec	290 sec
Recode H.264	2,648 sec	2,595 sec
FEAR 1.07	80 fps	170.5 fps (+113%)
Quake 4	110.5 fps	126 fps

0   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

Our current desktop test bed is a Windows XP SP2 machine, using a dual-core 2.6GHz Athlon 64 FX-60, 2GB of Corsair DDR400 RAM on an Asus A8N32-SLI motherboard, two GeForce 7900 GTX videocards in SLI mode, a Western Digital 4000KD hard drive, a Sound Blaster X-Fi soundcard, and a PC Power and Cooling Turbo Cool 850 PSU.

Every month we remind readers of our key zero-point components.

The bar graph indicates how much faster the review system performed in respect to the zero-point system. If a system exceeds the zero-point performance by more than 100 percent, the graph will show a full-width bar and a plus sign.

Falcon Northwest Mach V

Call it 15,000MHz of computing horsepower!

The Mach V comes with a lustrous paint job and whoops ass in our benchmarks.

It's no secret that we've had nothing but headaches with overclocked quad-core Intel systems this year. The cause of the problems—be it heat, over-overclocking, or other—doesn't really matter. Frankly, we don't care. These systems are being sold to consumers who don't want to know the shape of the piston heads in their engines—they just want to be slapped back into the seat when they step on the gas.

Which is what the Falcon Northwest Mach V does so well. But then, what else

Falcon glued key components together to keep them from vibrating loose during shipping, but our Mach V needed a jiggle of the SATA cables to get it running.

would you expect from a quad-core CPU running at an amazing 3.73GHz? With four cores, you've got roughly 15,000MHz under the hood. This unbelievable overclock isn't all Falcon's doing, the Mach V sports Intel's new limited-edition quad Core 2 Extreme QX6800, which ups the ante to 2.93GHz.

Would the Mach V explode like so many other systems we've seen recently? When we fired up our benchmarks to find out, we had just one issue. In our Nero Recode 2.0 test, the machine hard-locked during the import process. This could have been a result of shipping issues. The rig was jostled enough in transport that we had to jiggle the SATA cables to get it to initially boot. We wondered if the hard landing was responsible for the hard-lock since the machine completed the test flawlessly on subsequent runs. We discovered no further stability problems with the rest of our standard benchmarks.

As you might expect, performance was quite amazing with a quad-core ticking along at 3.73GHz. When we pulled up our benchmark spreadsheet and entered the Mach V's numbers, we discovered the Mach V set new records in Premiere Pro, Photoshop CS2, Recode 2, and Quake 4. And the rigs the Mach V beat aren't a sad-sack collection of Pentium 4s and Athlon 64s, mind you—this system bested a collection of quad-core Core 2s equipped with dual GeForce 8800 GTX cards. The only benchmarks it didn't clean house in were FEAR (the ABS 3.47GHz quad holds

that record) and SYSmark2004 SE, which didn't even run. Normally, we'd blame the overclocking, but this old benchmark has become so flaky with modern hardware that we can't hold PC vendors to blame for its foibles.

What is impressive is that the Mach V's hardware assortment is mostly the same as the other systems'. It uses an EVGA nForce 680i board, two 150GB WD Raptors, a 750GB Seagate Barracuda drive, a pair of GeForce 8800 GTX cards in SLI, and an X-Fi Fatal1ty card. It doesn't use *all* the same parts though. Falcon upped the RAM to a curious 4GB and sidesteps the thorny "Vista drivers suck" issue by dual-booting XP Pro and Vista Ultimate. Of course, we've already noted that the Falcon has the new 2.93GHz quad core, which is so rare now that buying it from a PC vendor may be the only way to get it for a while.

Normally, with four record-setting benchmark scores, this would be the end of a happy story, but the stability issues with recent OC'd quads have us worried enough that we're running additional tests on all overclocked quad machines. The first is a real-world encoding test using ProShow Gold 3.0, which pegs all four cores during an encode. On one of the flakier quad

UNDER THE HOOD

BRAINS

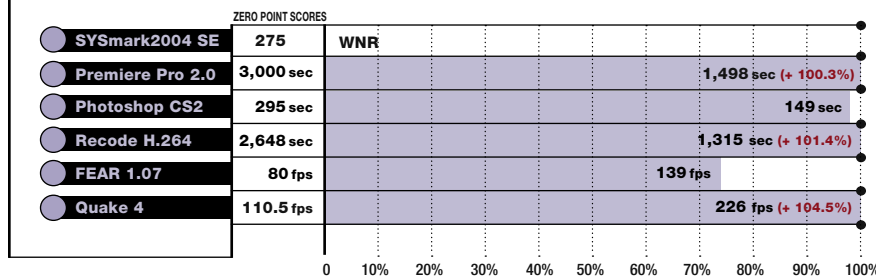|	
CPU	Intel Core 2 Extreme QX6800 (2.93GHz overclocked to 3.73GHz)
MOBO	EVGA 680i SLI (nForce 680i SLI)
RAM	4GB Corsair Dominator (four 1GB sticks)
LAN	Dual Gigabit LAN (Nvidia)
HARD DRIVES	Two 150GB Raptors (10,000rpm SATA) in RAID 0, and one 750 Seagate Barracuda
OPTICAL	Lite-On LH-20A1H Sony DDU-1615

BEAUTY

VIDEOCARD	Two GeForce 8800 GTX in SLI mode (575MHz core, 900MHz RAM)
SOUNDCARD	Sound Blaster X-Fi Xtreme Music
CASE	Falcon ICON

BOOT: 45 sec.   **DOWN: 15 sec.**

BENCHMARKS

ZERO POINT SCORES

SYSmark2004 SE	275	WNR
Premiere Pro 2.0	3,000 sec	1,498 sec (+ 100.3%)
Photoshop CS2	295 sec	149 sec
Recode H.264	2,648 sec	1,315 sec (+ 101.4%)
FEAR 1.07	80 fps	139 fps
Quake 4	110.5 fps	226 fps (+ 104.5%)

0   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

Our current desktop test bed is a Windows XP SP2 machine, using a dual-core 2.6GHz Athlon 64 FX-60, 2GB of Corsair DDR400 RAM on an Asus A8N32-SLI motherboard, two GeForce 7900 GTX videocards in SLI mode, a Western Digital 4000KD hard drive, a Sound Blaster X-Fi soundcard, and a PC Power and Cooling Turbo Cool 850 PSU.

cores we've seen, the encoder crashed the machine within minutes, yet the Mach V made it through the test with no issues.

Our second test is a bit more controversial. Another PC vendor approached us with general concerns about overclocking their quad-core rigs and provided us with a script they developed internally to test their systems. The script launches four instances of the Prime95 burn-in test, which maxes out a CPU core by searching for Mersenne prime numbers. We're normally reticent to run vendor-created tests on machines we review, but our curiosity about quad-core stability trumped our other concerns. With four sessions of Prime95 going, the Mach V was rebooting spontaneously within 10 minutes.

That put us in a tough position. The

Mach V aced all of our normal benchmarks, plus our multithreaded ProShow test—almost all of which use real-world workloads. Prime95 uses real math, but is the workload realistic for normal users? Probably not. All our standard tests show that the Mach V is a stable machine under normal operating loads but can be brought down under certain circumstances. This is better than the other quad cores we tested, which crashed running our normal benchmarks. Still, it's not ideal.

And then there's the price. At $9,900, the Mach V is one of the most expensive machines we've ever reviewed—it's more expensive than some of our Dream Machines. However, it outperforms all of the overclocked quad-core boxes we've reviewed to date in

most benchmarks, and it's more stable. We are concerned that system vendors are pushing clock speeds too far. And, as fast as this rig is, its price makes it a difficult pill to swallow for all but the wealthiest enthusiast.

—GORDON MAH UNG

FALCON NORTHWEST MACH V

9

➕ **ENGLISH**
Fastest PC we've ever tested.

➖ **METRIC**
High-pitched component whine under certain loads.

$9,900, www.falcon-nw.com

Tale of the 22-Inchers

A new LCD category lets users on a budget go big

Did we miss something? Was legislation recently passed to put an LCD on every desktop? Because here we are staring at yet another new crop of flat-panel monitors that meets a common need. Sporting 22-inch-diaganol screens, 1680x1050 resolutions, and 6-bit rather than 8-bit technology (see page 64 for details), this latest breed is bigger than the norm but surprising affordable—in some cases, even cheaper than the 20-inch widescreens we reviewed in March. So let's see how they stack up.

—KATHERINE STEVENSON

Dell's E228WFP is pared down in every respect other than screen size.

DELL E228WFP

There are some immediate signs as to how Dell keeps costs down on its E228WFP: Its plastic cabinet is uninspired and lacks typical Dell extras like a media reader, USB ports, and any ergonomic adjustments other than back-and-forth tilt. Still present are full onscreen display (OSD) adjustments and both a DVI and VGA port. The E228WFP also supports HDCP, something we expect from a widescreen of this size.

The screen performed acceptably in our DisplayMate (www.displaymate.com) tests. Besides some backlight seepage at the upper and lower edges, screen uniformity was good and grayscales were reproduced without flaws other than a hint of color-tracking issues—subtle red, green, or blue hues could be seen in certain shades of gray where the color channels scale differently.

There were no visible imperfections in any of our real-world content, which includes HD movies, high-res digital photos, and games, but we weren't totally bowled over by the E228WFP's picture. It lacks a richness and vibrancy that we've found in our favorite screens, and off-axis visibility isn't great. Still, it's not a bad buy for the price.

DELL E228WFP **7**
$330, www.dell.com

HP W2207

HP's oh-so-affordable 22-inch display isn't the least bit spartan. It's attractively styled with reflective-black and anodized-silver trimmings, and it has a dual-hinged neck for height adjustment; tilt, swivel, and rotate functionality; and numerous welcome acronyms: DVI, VGA, two USB ports, HDCP support, and OSD controls. A built-in speaker is hardly worth mentioning.

The w2207 also boasts a glossy screen, which might be prone to glare in environments with bright overhead or direct lighting but otherwise makes for a dazzling picture. In all our real-world tests, the display's shiny surface made content look more striking and contrast seem greater than on the other two screens reviewed here.

But the w2207 does have its issues. In DisplayMate, it was the least impressive of the group, thanks to some backlight blotchiness on a totally dark screen, minor color-tracking irregularities, and banding in grayscales of 128 or more steps. While these factors tempered our enthusiasm for the monitor, they didn't mar our experience in games, movies, and other applications.

HP W2207 **8**
$380, www.hp.com

VIEWSONIC VG2230WM

You might think that being the priciest LCD here, ViewSonic's VG2230wm would also be the most packed with goodness. In fact, when it comes to features, it falls somewhere between the Dell and HP models. Its traditional antiglare, antireflective screen is

The EasyClip bezel on HP's w2207 accommodates photo holders, webcams, and other HP accessories.

A built-in speaker certainly doesn't make the ViewSonic VG2230wm worth more than its competitors.

framed by a stylish but subdued bezel complete with a built-in speaker (*pshaw!*); DVI and VGA ports; and a smooth-as-silk telescoping neck, lazy-Susan stand, and tilt function for ample adjustability. The OSD provides sufficient user-control of the picture, but trying to work the buttons along the outer right side of the bezel is a lesson in frustration.

The VG2230wm does rise to the top of the heap in DisplayMate, however, showing no difficulties with the utility's various test screens. Prominent backlight seepage along the top and bottom edges of the screen, though, isn't anything to brag about. And we're especially perturbed that the VG2230wm doesn't feature HDCP—we could watch copy-protected HD DVDs only through the analog port. ViewSonic says HDCP will be "cut in" over the next few months as new units are produced.

VIEWSONIC VG2230WM **7**
$430, www.viewsonic.com

Meet the Cases

Two odd-looking boxes win us over

Trying to review cases is like trying to pick your favorite flavor of ice cream. With so many choices, we just don't know where to begin. So we sample them all. And it gives us a splitting headache. That said, we're taking our time with this month's products: a savory midtower case and a succulent portable box. And our head has never been happier.

—DAVID MURPHY

THERMALTAKE LANBOX VF1000SWA

At first glance, Thermaltake's Lanbox case looks like an absolute dud. Not because of its design but rather its size. What's the point of buying a case that won't fit, say, a GeForce 8800 GTX card?

So let us first rest your troubled heart. Yes, you can stuff a modern rig into the Lanbox. A rig based on a micro ATX or mini ITX formfactor, mind you. It's a tight fit, and you might have to get a little creative with cable management, but a sweet, easily totable rig is not an unobtainable dream.

That said, the Lanbox's design is an utter success. There's just enough space for all the essential parts of a gaming rig, and the presentation is as artful as it is simple. Toss the case's three fans into the mix and it's obvious that Thermaltake understands its market. Almost.

Building your machine takes a lot of screw-work, which is forgivable, considering the case's size. We can't overlook the lack of "1337," however—with no window etchings, no crazy paint job, and only one LED fan, this case isn't going to

The Ultra E-Torque has a ton of potential, but we don't rate potential.

impress anybody at a LAN party. Come on, Thermaltake, where's the bling?

THERMALTAKE LANBOX

➕ **BUBB RUBB**
Easy to carry, plenty of air-cooling, just enough space for your stuff.

➖ **LI'L SIS**
No flashy appeal; an overload of screws makes installing gear time consuming.

8

$160, www.thermaltake.com

The Thermaltake VF1000SWA is the awesome offspring of a six-pack and a computer case.

ULTRA PRODUCTS E-TORQUE MIDTOWER CASE

Reviewing Ultra Products's E-Torque case is a bit challenging because this product is a strange mixture of good and great. And we're not sure if that means it's "grood" or "goodate."

The E-Torque could be awesome, but every component seems to have been stepped back a notch. Consider the side window. It's pleasing to the eyes and even comes with an air duct attached to a mountable grill. But the randomly placed "VGA vent" below

the fan is awkwardly out of place.

Speaking of cooling, the case comes with two awesome 12cm fan mounts. Their screwless, clipable design should become the standard for every case on the market—we love these mounts that much. But this case comes with only said mounts. You're kidding, right, Ultra? An LED fan or two wouldn't break the bank.

The front I/O panel doesn't feature HD audio and is bland, just like the entire front of the case. The E-Torque looks good, not spectacular—only its screwless PCI holders are truly kick-ass. Again, we have yet to see a better design.

But this is the difference between a sprinter and a marathoner. The E-Torque succeeds in small bursts, but these spurts don't ultimately push the case to the front of the pack.

ULTRA PRODUCTS E-TORQUE

➕ **TONY SOPRANO**
Best fan and PCI holders we've ever seen, hands down. Hardly a screw in sight.

➖ **TONY THE TIGER**
No fans, ho-hum aesthetics, lacking an overwhelming "cool" factor.

7

$90, www.ultraproducts.com

ScreenTek Laptop Screen Replacement

Does it make sense to replace your screen? Maybe

This screen is beyond repair, right? Not if you have the right hardware.

I f you shattered your laptop's screen, would you repair it or buy a new computer? That's the terrible dilemma most of us face in this disposable PC world when a screen takes a bad blow to the head.

But ScreenTek is hoping that rather than junk the notebook, you take a swing at repairing it—yourself. Offering replacement screens for thousands of notebook models, the company is relying on reasonable prices to sway people to fix those computers instead of sending them to the landfill.

We replaced the screen on an old Compaq Presario V2000 that ScreenTek supplied. This old single-core Centrino featured a glossy 14-inch 1280x768 panel, which was destroyed after taking a blow to its upper-right-hand corner.

Following the instructions provided by ScreenTek, replacing the screen took just a few minutes. We popped the rubber feet off the bezel, removed four screws, and pried the bezel off with our fingers. The company said it developed this screen-removal method on its own; most service manuals recommend replacing the entire lid by removing it at the hinge. That's far more expensive and far more time consuming, as it requires removing more parts.

Once we had the bezel off, we were able to unscrew the panel from the metal frame, unplug the ribbon and inverter cable, and yank off the broken panel. ScreenTek recommends checking the back of the panel for the part number at this point and then contacting the company for the correct replacement screen.

We thought we installed the new panel correctly on our first try, but the ribbon cable popped loose. We cracked the screen open, put the cable back in, and had the machine booted and the new screen working perfectly.

So is it possible to replace the panel yourself? Most definitely. ScreenTek will do the work for you for free—provided you

pay for shipping—but replacing it yourself is quite easy. While consumers have been able to buy used parts on eBay for some time, ScreenTek says it stocks only new parts that are the same as those sold to OEMs and will work with customers to make sure they buy the correct components.

But does it make fiscal sense? That depends. The company says it's really a solution only for high-end notebooks. And we would agree with that assertion.

The Presario V2000 we repaired sells on eBay for $550, and the replacement screen costs about $300. With its power and capability, it's debatable whether it's worth it to keep the Presario or spend an extra few hundred bucks and buy a new notebook with an updated OS. Certainly if you're concerned about creating landfill, buying a replacement screen is a good choice, but a $600 notebook today is faster than a $1,000 notebook from three years ago.

Purchasing a replacement screen makes more sense when you start talking about a $2,500 notebook with a 17-inch screen. In that case, a high-res 1920x1200 panel from ScreenTek sets you back about $500. You sure as hell aren't going to get

Step 1: Unscrew the bezel.

an equivalent notebook for $500.

ScreenTek's prices are a great deal when compared to the OEM's. Apple charges about $1,000 to replace the 13.3-inch screen on an Apple MacBook. If you do it yourself using a panel from ScreenTek, the cost drops to a palatable $375.

SCREEN REPLACEMENT

⊕ SHATTER
More cost effective than buying parts from OEMs.

⊖ UNBREAKABLE
Directions show you how to take it apart but not how to put it back together.

8

$300–$500, www.screentekinc.com

Step 2: Pry off the bezel.

Step 3: Remove the ribbon cable.

Step 4: It works.

Initially, we were skeptical about the usefulness of purchasing and installing a replacement screen, considering the price of a budget notebook, but in cer- tain circumstances, buying the part from ScreenTek is worthwhile—and certainly friendlier to the planet.

—GORDON MAH UNG

Three's a Cooling Crowd

Something great, something new, something bad, and, well, that's about it

Ah, innovation. We're always excited to see a CPU cooler arrive at the *Maximum PC* doorstep because it usually means one of three things: a new product will wow our pants off, a device will look so neat we'll put the accompanying product shots in our wallets, or a device will just plain suck. To our delight, this month's batch of coolers covers all the bases.

—**DAVID MURPHY**

If you ever find Overway's cooler on a store shelf, send us a picture—then put a stake through it.

OVERWAY TECHNOLOGY VACUUM SUPERCONDUCTIVE HEAT COOLER

Our biggest frustration with Overway Technology's awesomely named Vacuum Superconductive Heat Cooler (VSHC) is that it didn't injure us. For the product proved to be so entirely abysmal, we were hoping it would earn the sacred one score. Unfortunately, the uno is for products that cause physical harm during use—no blood, no uno.

Where to begin? The installation mechanism is hands-down the worst we've ever encountered. It requires you to forcefully push on the razor-thin edge of a clip, which began to hurt like all hell after the first 30 minutes. Yes, it took more than half an hour to get the device in place. And for all that, we were rewarded with a cooler that actually performs worse than the cheap-o stock cooler we use for all our benchmarks.

OVERWAY VSCH **3**
$35, www.overway.com.tw

THERMALTAKE V1

We've been operating under the assumption that Zalman's CNPS9700 is the Highlander of CPU coolers—immortal and utterly immune to the benchmarking threats posed by other, lesser devices. That's until we ran across Thermaltake's newest V1 cooler. As far as we can tell, the blue-lit device is the guy who brings the chain saw to a swordfight. It looks great, fits great, and *outcools* our reigning champion ever so slightly.

Installing the cooler was almost a breeze (ha ha), save for one hang-up. The locking mechanism for our AMD X2 rig ran into the cooler itself. It's not a deal-breaker, but in this case, you really have to push on the little lever to set the cooler in place. It's a minor flaw for such an explosive device.

THERMALTAKE V1 **9**
$60, www.thermaltake.com

MAXIMUM PC KICKASS
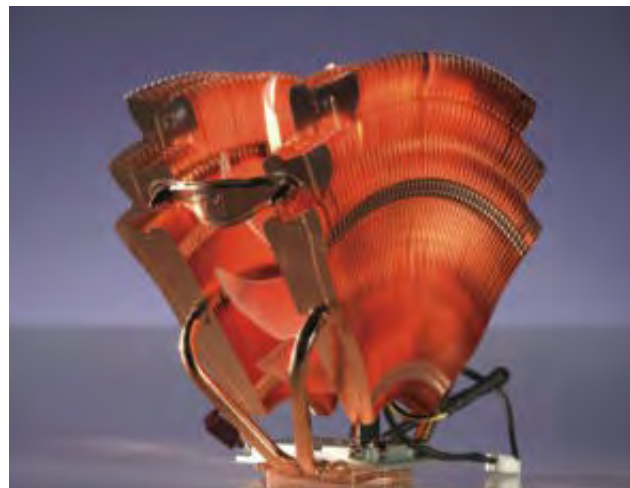
Thermaltake's V1 cooler really shines—in both looks and performance.

accessories that really push the "neat-o" factor. Although installing the peltier cooler requires motherboard removal, the sheer delightfulness of the included front-panel display makes up for the time spent. Not only do you get a pleasant temperature indicator, but you can change its colors and even watch an animated guy dig a hole—the faster he goes, the harder the ChillTec is working.

As one might expect, the cooler does an astounding job when the CPU sits idle, but it sputters a bit during a full burn. In some ways, that makes the ChillTec both warmer and colder than a pure air-based model. But considering the accessories—and the aesthetics—we remain quite happy with the total peltier package.

To heck with the cooling; you'll be mesmerized by the ChillTec's "digging guy."

ULTRA CHILLTEC

Ultra wins points for having a solidly functioning thermoelectric cooler and including

ULTRA CHILLTEC **8**
$150, www.ultraproducts.com

BENCH**MARKS**

	STOCK COOLER	VSHC	CHILLTEC	THERMALTAKE V1 (LOW SPEED)	THERMALTAKE V1 (HIGH SPEED)
IDLE (C)	25	26	**12**	21.5	19.5
100% LOAD (C)	49	51	43	42	**38**

*Best scores are bolded. Idle temperatures were measured after 30 minutes of inactivity, and full-load temps were measured after running **CPU Burn-in** for one hour.*

PNY XLR8 GeForce 8800 GTS 320MB

A great card, but we think you can do better

Rumors were swirling at press time that Nvidia was poised to introduce an even lower-cost version of its powerful 8800 GPU, but the least-expensive 8800s we can review today are like this PNY model, which couples the 96 pixel-shader 8800 GTS with a puny 320MB frame buffer.

A host of manufacturers sells cards based on Nvidia's reference design, but these cards can differentiate themselves in just a few ways: Price is the most obvious and most attractive (to the consumer, anyway), but there's also factory overclocking, exotic cooling, warranty coverage, and merchandise bundling.

Factory overclocking is beneficial because the higher clock speeds are covered by the manufacturer's warranty. On the other hand, Nvidia makes GPU and memory overclocking a snap with its nTune tweaking software. On the *other* other hand, the card's manufacturer might not be sympathetic if you fry your card while probing

When we checked street prices, the factory-overclocked EVGA card we reviewed in May was selling for just $5 more than this stocked-clocked PNY model.

its outer limits. PNY didn't take any chances: Its entry features the typical stock-clock rates of 513MHz for the core and 792MHz for the GDDR3 memory.

We've yet to see any exotic cooling solutions on 320MB 8800 GTS cards, including this one, but several manufacturers do offer lifetime warranties on their cards. The definition of "lifetime" varies, so you should make sure you understand each manufacturer's definition of this term along with all the other legalese in its warranty. PNY covers this card with a three-year warranty, which it extends an additional two years if you register your card on the company's website. Depending on how often you upgrade your videocard, three to five years might be a "lifetime."

PNY offers a better warranty than some manufacturers, but the XLR8's $300 street price is a trifle high for a stock-clocked 8800 GTS with 320MB of memory. In our book, that's enough reason to deny this card a Kick Ass award.

—MICHAEL BROWN

BENCHMARKS

	PNY XLR8 8800 GTS (STOCK CLOCK)	EVGA E-GEFORCE 8800 GTS (FACTORY OVERCLOCKED)	PNY CARDS IN SLI
3DMARK06 GAME 1 (FPS)	17.2	**17.7**	28
3DMARK06 GAME 2 (FPS)	16.6	**17.8**	30.1
QUAKE 4 (FPS)	74.4	**79**	121.1
FEAR (FPS)	35	**38**	58

Best individual card scores are bolded. All benchmarks run with 4x AA and 8x aniso. FEAR tested with soft shadows on; Quake 4 tested in high quality. Cards were installed in an EVGA nForce 680i SLI motherboard with a 2.93GHz Intel Core 2 Extreme X6800 CPU and 2GB of Corsair DDR2 RAM.

PNY GEFORCE 8800 GTS 9

$330, www.pny.com

Verbatim 12GB Store 'n' Go USB HD Drive

Have the hard drive guys finally lost the portable storage battle?

Team Flash can't compete with Team Magnetic on desktop computers, but the flash guys may have finally found a competitor it can conquer.

Unfortunately for Verbatim, its new 12GB micro-drive USB thumb drive is the victim. The Store 'n' Go USB HD Drive uses Cornice's Dragon-2 12GB miniature hard drive. This sixth-gen drive features lower power consumption, a 40 percent smaller size, and a 300 percent capacity increase. It also features a motion sensor, so it won't die if you drop it while it's running.

The Store 'n' Go's performance wasn't stunning against flash drives—but it wasn't atrocious either. It was the slowest in all our real-world tests using small text files, medium-size image files, and large files in both read and write; however, it didn't always lose by huge margins. The 4GB OCZ Rally 2 key, for example, took 2:54 (min:sec) to write 1.9GB of large files while the Store 'n' Go took 2:59. The Verbatim also took slightly longer than the other keys we tested to write 10,000 small files. The Store 'n' Go is like a slow USB key in write performance, and its read times edge into the mediocre range. Using synthetic benchmarks, we saw about 10MB/s read and write speeds—which is what Verbatim rates the key for.

Performance isn't the only factor here though. There's also the gigabytes-per-buck balance, and that's where Team Flash scores decisively. Compared to the last five keys we reviewed, the Store 'n' Go is a bit pricey. The 8GB Corsair Voyager (since renamed Voyager GT) costs about $12.40 a gig, while the Store

Magnetic storage no longer has the capacity or price edge.

'n' Go runs about $13.10 per gig. What's more, the 16GB version of the Voyager runs just $8.75 a gig (it is, however, slower).

That doesn't leave the Store 'n' Go in a great position. It's slower than all of the flash keys we've reviewed, and its per gigabyte cost is higher. The flash guys aren't winning any other battles, but they sure as hell win this one.

—GORDON MAH UNG

12GB STORE 'N' GO 6

$180, www.verbatim.com

iAsus Concepts Mobile Amp

Asus wants to get inside your head

With all the legitimate warnings about hearing damage induced by in-ear headphones, you might think a portable headphone amp is the last thing on-the-go music listeners need. But that's not going to stop us from praising this tiny doodad from an equally tiny division of Asus.

Don't get us wrong: Listening to music played at high sound-pressure levels will absolutely damage your hearing over time. But it's also true that many people are dissatisfied with the volume levels they achieve with high-quality earbuds and headphones. The reason is twofold: First, most MP3 players are equipped with relatively low-powered amps in order to conserve battery life. Second, high-quality earbuds and headphones have relatively high impedance. Crank up the underpowered amp to overcome the high impedance and you get distortion and possible ear damage.

When you pair good headphones with a good amp, you don't need to blast your eardrums to smithereens to achieve a satisfying listening experience, and that's where the lithium-polymer Mobile Amp comes in.

The amp's house is primarily made of plastic, but the oversize volume control is machined aluminum and feels exquisite when rolled between the thumb and forefinger. A system of detents, on the other hand, would prevent the volume from changing while the device is jammed in your pocket. We also wish Asus had designed the amp with an input jack instead of the fixed cable, which is too short to reach a PC's soundcard jacks (18 inches is too short for even front-mounted jacks). And we were disappointed with the cheap sliding power switch on the bottom of the amp. And a power-on LED would have been welcomed.

But these complaints melted away when we plugged in our Ultrasone

Loop a lanyard through iAsus Concepts's Mobile Amp and you can lash it to your MP3 player. The device has plenty of power to drive two sets of headphones using the included splitter.

ProLine 750 headphones (40-ohm impedance), switched on the amp, and heard the sizzling electric sitar on Paul Thorn's gospel-infused "Sister Ruby's House of Prayer." We were just as happy listening with Shure's E4g earphones (29-ohm impedance). With a maximum output of 70 milliwatts, this sucker gets loud! But we didn't need to listen at high volume to get a highly satisfying listening experience.

—MICHAEL BROWN

iASUS MOBILE AMP **8**
$65, www.iasus-concepts.com

Razer Pro-Tone m250

But they look so cool!

If you dig your MP3 player but can't stand jammin' earbuds into your head to listen to it, you'll find yourself attracted to Razer's Pro-Tone m250 headphones. But after using them, you might resign yourself to suffering with the buds.

Headphones are a highly personal choice, and some people may be put off by the m250's unusual design. A rubber-coated arm hooks over your outer ear—much like a pair of eyeglasses—and the disk-like driver folds over to rest on top of your ear. The fit was snug but comfortable, and the m250s remained in place through a series of jumping jacks and touch-your-toe exercises (well, as close as we could get to our toes, anyway). The clip design might cause a problem for those who wear eyeglasses, but we didn't perceive any difference in sound with or without our own cheaters.

After catching our breath, however, we concluded that our dissatisfaction with the way the m250s sound is related to the distance between their speaker elements and our eardrums. Fast-moving high-frequency sound waves travel far; slow-moving low-frequency sound waves don't. When we cranked up our iPod in search of the wandering bass line in John Hiatt's "Woman Sawed in Half," we absolutely cringed when the yah-yah-yah chorus burst in. Harsh highs weren't as much of a problem with some of the other songs we tested with, but our craving for bass was never satisfied. Razer's ProBass technology does produce a lot of bass, but the only way it made it down our ear canals was when we pressed the m250s snug

Razer's Pro-Tone m250s are both figurative and literal lightweights, tipping the scales at just 1.38 ounces.

against our ears.

The m250s also leak like a sieve: Listening at even moderate volume creates a tinny concert hall in miniature for everyone within a six-foot radius of your head. And as you might have guessed, these headphones do nothing to isolate your ears from outside noise. But this didn't stop Razer from tucking an airline headphone adapter into the nicely appointed, zippered nylon clutch.

—MICHAEL BROWN

RAZER PRO-TONE M250 **6**
$50, www.razerzone.com

Pinnacle Studio MovieBox Plus

Can Pinnacle polish a turd?

We weren't kind when we reviewed Pinnacle's Studio 10 in our April 2006 issue. It was buggy and unstable, and we couldn't fully install it on our Athlon 64–based machine.

So what do you get if you take Studio 10 and bundle it with a box of hardware? Shockingly, not a bad package.

That's because Pinnacle has been busily stomping bugs out of Studio 10 to get the program up to snuff. Part of the problem with the original Studio 10 was that it was a total shift from the even buggier legacy code in Studio 9 to code borrowed from the company's pro product, Liquid. While the original version of Studio 10 wouldn't install properly, took hours just to launch, and crashed randomly, we're happy to report that the 10.6 version included in the box installed without any major issues.

We say this because we did get a scary dialog box from XP that said original OS files had been replaced during the install of Studio 10, but XP booted and worked fine. We, of course, were then prompted to update to version 10.7.

Studio 10 is easy to use. With background rendering, RAM previews, and multithreading included in the product, we're starting to change our opinion of this software.

Pinnacle also touts the ability to work

A USB 2.0 capture box, microphone, and green-screen background make the Studio MovieBox Plus a fun package.

with HDV content with 10.7, and indeed, we had no issues importing HDV content from a Canon HV10 camcorder. And unlike Adobe's half-assed Premiere Elements 3.0 attempt at HDV editing, Studio 10 gave us a preview window of the capture, and scene detection worked properly. Although it can't yet burn to Blu-ray discs, the program can generate HD-resolution content on a single- or dual-layer DVD. Since all HD DVD decks and Xbox 360s will play these, it's a cheap way to get HDV movies without paying for an HD DVD burner and discs. The catch, of course, is that you have to pay an additional $50 to enable the program to burn that content.

Studio MovieBox Plus is about more than just the Studio 10 software though; it's also about the hardware package. The company bundles in a microphone for recording voice-overs. It's not the greatest mic in the world, but it's certainly better than the plastic boom mic most of us got with our Sound Blaster Live! cards. One bitch we have about it: It uses a rather large jack that makes it very difficult to have the speakers and the mic plugged in simultaneously on a Sound Blaster X-Fi.

Pinnacle also includes a hardware

capture device that has inputs and outputs for composite video, stereo RCA, DV, and S-video as well as a six-pin FireWire 400 port. The box itself plugs straight into a USB port. We'd heard complaints about the capture capabilities of the box, but we didn't have any problems using it to acquire analog footage from an old Hi8 camera. We suspect any complaints of jerkiness come from people with underpowered rigs. We did, however, have issues trying to capture HDV footage through the onboard FireWire port. We ended up using the FireWire port on our Asus board instead.

One other goodie Pinnacle bundles in is a backdrop to be used for Chroma Key, aka green screen, effects. Pin the sheet to a wall and shoot footage of your friend holding the mic and you can easily drop in a still image of the White House to make it look like your friend is filing a news report from D.C.

Studio MovieBox Plus isn't perfect, but with most of the major bugs dead and its handy collection of hardware trinkets, we think the beginning moviemaker will find it worth a look.

—GORDON MAH UNG

Pinnacle Studio 10.7 lets you preview your HDV footage— the competing product from Adobe doesn't.

STUDIO MOVIEBOX PLUS

➕ THE STING
Includes a handy collection of hardware and is easy to use.

➖ SPY GAME
Must spend an extra $50 to output HDV content.

8

$150, www.pinnaclesys.com

Creative Xmod

Thinking outside the box

Being audio purists, we typically piss on products that sit in the midst of an audio stream and manipulate what the artist intended to create. But when listening to music played through Creative's X-Fi soundcards, we've increasingly found ourselves turning on the 24-bit Crystalizer—and liking it!

Creative's 24-bit Crystalizer converts an incoming audio signal to 24-bit resolution with a sampling rate of 96kHz. This process alone doesn't improve audio quality—Creative can't conjure something out of nothing—but the algorithm employed during this near-real-time remastering does make the original recording sound remarkably better: To our ears, instruments and vocals sound more vibrant, punchier, and more "live" when the 24-bit Crystalizer is engaged.

But we listen to music on everything from digital music players to CD players to old-fashioned turntables, and it's not always practical to pipe these signals through a PC's soundcard. So we're pleased to report that Creative has transplanted the 24-bit Crystalizer (along with a few other features) into this stand-alone device, which it has dubbed the Xmod.

So why aren't we giving the Xmod a Kick Ass award? If you're using it with a desktop PC or a laptop, the device acts as a USB audio device with an external DAC and draws power over a USB cable. If that PC already has an X-Fi soundcard, the Xmod is redundant. But our real complaint is that the Xmod requires an AC adapter when used with anything *other* than a PC, and Creative expects you to pay an extra 30 clams for one. We really dig the Xmod, but it would fry our snarlies to pay 40 percent on top of its base cost

The Xmod is equipped with analog line-level in, line-level out, and headphone jacks and can also function as a USB audio device.

to use it with an iPod or a Zen.

We can also do without Creative's annoying CMSS-3D Virtual and CMSS-3D Headphone effects. These are designed to widen the stereo field into surround sound, but when we listened to Al Green's "Let's Stay Together," it sounded as though the vocal legend was being flushed down a toilet. Fortunately, you can easily dial down or entirely defeat the CMSS-3D algorithms (same goes for the 24-bit Crystallizer).

—MICHAEL BROWN

CREATIVE XMOD **9**

$80, www.creative.com

PixRecovery 1.0

PixRecovery can sometimes turn sausage back into steak

Using "GUI" to describe PixRecovery's interface is illegal in some states.

You should have known it was a bad static-electricity day when balloons stuck to your clothes and your socks clung together as if they were made of Velcro. But you decided to pull the memory card out of your digital camera anyway, didn't you?

The end result is 4GB of scrambled JPEG images instead of proof that the Loch Ness monster exists. Normally you're screwed, as few "recovery" utilities actually recover corrupted JPEG files, but PixRecovery 1.0 could save your bacon. Rather than just recover files, PixRecovery also treats mangled files.

We tested PixRecovery 1.0 by first using QueTek's excellent File Scavenger to recover all the files from a failing 4GB CF card. About half the images could not be opened in any photo viewer or with utilities designed to read damaged JPEG headers. These photos were munched, and a good portion of them were overwritten.

Using PixRecovery, we were able to open the majority of them. Recovered files are outputted as BMP files, and in most cases, they were full resolution; however, chunks were missing where the files had obviously been overwritten. Still, PixRecovery's ability to recover images is pretty impressive.

Not impressive is the batch mode—it just doesn't work. The GUI itself doesn't feature a batch mode, but there is a command line mode that's supposed to work with batches. Unfortunately, it doesn't seem to recognize wildcards, so you'll be working with images one by one.

And that's the sad thing. While we had some success with the program, it feels threadbare. You drag a photo into the program, it tries to recover and treat the file, and that's it. You can't specify if you want to save your photo as a JPEG, and you can't preview it; you just process it and that's it. End of story.

The app also has a rather steep price considering the interface provided (although you can test your corrupt file using the demo version). But if you're desperate to get that once-in-a-lifetime picture of Nessie back, $150 is a small price to pay.

—GORDON MAH UNG

PIXRECOVERY 1.0 **8**

$150, www.officerecovery.com

Trustware BufferZone Pro

Think of it as Groundhog Day for malware

BufferZone Pro uses application virtualization to protect you from exploits.

On occasion, we've clicked a link we knew we shouldn't have. And before we could say "virtualization," the latest browser exploit was downloading some spyware onto our PC.

In these cases, Trustware's BufferZone Pro would have been a lifesaver. BufferZone wraps browsers, instant messaging clients, and media players in a virtualized cocoon at the application level. Unlike Virtual PC, which virtualizes the entire OS, BufferZone virtualizes your computer's file system, registry, and services. While you're not as isolated as you would be if you used a program that created a separate virtual OS as a sandbox, BufferZone is far easier to use and involves less maintenance. It also offers protection that antivirus programs and malware scanners can't by letting you erase any changes that come in through an unknown browser exploit. BufferZone can even virtualize network shares and CD-ROM or USB drives, so applications are forced to open in virtual sessions as well.

We tested BufferZone on an unpatched XP SP2 install, and it worked as advertised. Without it, our OS was borked in seconds, but with BufferZone, we were easily able to undo any damage done. Responsiveness was fair to good on a fast machine and poor to fair on an old P4 box with a full hard drive. The app does have an issue with how windows are configured on multi-monitor setups, but it's more of an annoyance than a major problem. Restoring a window to full size will cause it to jump from one monitor to the other. We would also like to be able to make incremental dumps of the buffer, so we wouldn't have to take all of our applications back to day one if something fatal happens.

Maximum PC readers will find the program fairly simple to install and understand, but we're not sure it's appropriate for civilians. Saving a JPEG from a website to the desktop, for example, places the file in the buffer. You can't copy the actual file to a USB drive without taking it out of the buffer—something that's sure to confuse someone unfamiliar with the app. Still, BufferZone is a pretty handy utility for those who occasionally want to walk on the wild side of the web.

—GORDON MAH UNG

BUFFERZONE PRO **8**

$50, www.trustware.com

S.T.A.L.K.E.R.: Shadow of Chernobyl

If the radiation and mutants don't get you, the bugs eventually will

Gas masks won't save you from radiation poisoning—or a barrage of bullets.

No review of S.T.A.L.K.E.R. is complete without a mention of the game's numerous delays and incredibly long development period. Thankfully, after a thorough inspection, we've found that it holds its own quite well in the areas that matter—gameplay and content. Numerous bugs and stability issues plague this ambitious shooter, but its thrilling action and deep story are surprisingly fun—it's enough to win us over.

After Chernobyl suffers a second nuclear meltdown, the government blocks off the surrounding area, which is known as the Zone. Scavengers and bandits search the area for strange artifacts that emerge from spatial anomalies, and bizarre animal and human mutations roam the abandoned landscape. As the Marked One, you (conveniently suffering from amnesia and trying to uncover the mystery of your past) are one of many mercenaries for hire.

S.T.A.L.K.E.R. includes a number of role-playing elements that mesh well with

Soldiers work in teams to lay down a persistent flow of fire.

its story. While the narrative is propelled by a single string of core missions and assignments, you can complete them at your own pace. The game does an admirable job of feigning open-endedness by offering a ton of side missions. While assassination assignments and retrieval requests made up most of the tasks, many times we had to help encampments defend against waves of assaulting mutants or rescue captured soldiers from fortified housing complexes. The game doesn't become a full-fledged role-playing experience, but it was definitely meaty enough to leave us satisfied.

It took us almost 15 hours to reach S.T.A.L.K.E.R.'s explosive climax. Formidable AI enemies can't be killed by running and gunning—they constantly search for cover and flank. The shooting mechanics are geared toward realism, so the combination of patience and steady aim is the only way to get really effective head shots. Firefights felt as though they lasted forever, as we had to constantly reposition ourselves to avoid flanks and slowly drain down enemy forces one body at a time—the combat here is easily some of the most intense we've ever seen in a shooter.

What immersed us further was the immaculate rendition of the postapocalyptic Zone. Lush foliage swayed convincingly against the backdrop of a purple sky, complete with giant mutant flowers that adorned the edges of polluted swamps. Dilapidated warehouses and small towns reeked of eerie despair and abandoned hope, while making great locales for spooky encounters with lurching mutants and firefights with rival factions. We were most dazzled by the weather effects—convincing day and night cycles were complemented by ear-splitting lightning storms and bone-chilling rain showers. The environment gave us the creeps, and we're just talking about the surface levels. When we dove underground into the secret research laboratories and sewers in search of hidden stashes and documents, we entered a whole new world of fright.

Unfortunately, the game isn't without its faults. Numerous bugs plague the missions, sometimes objectives won't complete,

The Zone is split between two rival factions, and you'll have to gain their favor to get past their checkpoints.

and often the game will just crash to the desktop. While occasionally annoying in XP, the problems are even more severe in Windows Vista, where the game inevitably shuts down after several minutes of play. A recent patch attempts to fix these problems, but it destroys old save games and doesn't adequately resolve these issues.

Ultimately, you're getting a deeply involving single-player experience (the bland multiplayer is a wash) that really separates itself from the shooter pack. We're thankful that the game finally came out but even more pleased that it exceeded our expectations. If you can bear the bugginess and difficulty, you should definitely try it out.

—NORMAN CHAN

S.T.A.L.K.E.R.: SHADOW OF CHERNOBYL

+ NU-CLE-AR
Single-player campaign combines the best of action and role-playing.

− NU-CU-LAR
Unforgivable bugs are annoying; don't bother if you're running Vista.

8

$40, www.stalker-game.com, ESRB: M

Win Rig of the Month
AND WIN BIG!

IF YOUR MODDED PC IS CHOSEN AS A RIG OF THE MONTH, IT WILL:

▶ **1** Be featured before all the world in *Maximum PC*
2 Win you a $500 gift certificate for Buy.com

SO WHAT'S STOPPING YOU?

We tackle tough reader questions on...
✓Bad Benchmarks ✓StumbleUpon
✓Pertelian Revisited ✓False Positives

STUMBLEUPON

In your March issue you listed lots of great extensions for Firefox. Unfortunately, you didn't put in StumbleUpon. This is the greatest extension I've ever used; it finds awesome websites that you will like with the click of a button. It would also be good for you guys to promote it because it relies on its users to discover new websites.

—Ian McKenna

IT DEPENDS ON WHAT YOU MEAN BY 'LAST MINUTE'

I would like to respond to the review of the Pertelian X2040 by David Murphy in the May issue of **Maximum PC***.*

Most of the review was fair and straightforward. Our major point of contention is David's comments regarding Pertelian's stability. In the review, David noted: "…sometimes the device locks out the entire keyboard, rendering it useless unless you reset the Pertelian…. Either the unit or the utility occasionally forgets the other exists, which forces you to restart the software…."

We have never encountered these issues during development nor have they been reported to us by our customers or other reviewers and are likely an isolated or atypical issue for which we had no opportunity to research and correct. Given this, we feel it is unfair to characterize our entire product as "hacked together at the last minute."

—Alexander Jarzebinski
President, ForeSight Systems LLC

EDITOR-IN-CHIEF WILL SMITH RESPONDS: Perhaps "hacked together at the last minute" was unfair. However, we don't use damning phrases like that until we've done significant testing and are extremely confident in our assessment. We tested the X2040 on multiple machines and experienced similar problems on all of them. I'm surprised you'd suggest you were unaware of the stability issues with your

CUTCOPYPASTE

In the May issue of *Maximum PC*, we incorrectly identified the name of the Alienware Area 51 M9750 notebook computer. We regret the error.

SLI Benchmark Snafu

I was just reading "Face-Off" (April 2007) and your benchmark numbers for the 8800 GTX versus the 8800 GTX in SLI looked funny to me: You report getting 3DMark06 Game 1 to run at 25.8 frames per second on a single 8800 GTX but only 23.7fps with two 8800 GTX cards running in SLI. And then you have 46.4fps for 3DMark06 Game2 on the single card and just 43.8 for an SLI setup. Your table says SLI is slower, and I know it's not.

—Kyle Slater

I've been reading **Maximum PC** *for a while now and have almost always been very happy with what I read. This month's feature story, however, was pretty disappointing. Putting an 8800 up against, umm… other 8800s is a little dry. Did we actually not know that SLI would be faster?*

—Adam Ferenbach, USN

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: Yep, I made a big cut-and-paste goof in my benchmark chart. The correct numbers are below. As for comparing 8800 cards, ATI has been so far out of the hunt in the GPU race that we decided to look at how different Nvidia cards performed for the money. First, we wanted to know if buying a factory-overclocked 8800 GTS could beat a more-expensive stock-clocked 8800 GTX. Answer: It can't. Then we wanted to see if we'd run into CPU limitations running two 8800 GTXs in SLI. Answer: We didn't.

BENCHMARKS	SINGLE 8800 GTX	8800 GTX IN SLI	PERFORMANCE DELTA
3DMARK06 GAME 1 (FPS)	25.8	**46.4**	80%
3DMARK06 GAME 2 (FPS)	23.7	**43.8**	85%
QUAKE 4 (FPS)	92.1	**143.5**	56%
FEAR (FPS)	69	**126**	83%

Best scores are bolded.

product. In emails you sent to David, you said, "I was just a bit nervous because in our latest releases, there were some stability issues." Furthermore, there are many threads in your forums from people who are having problems with Windows MCE, XP 64-bit, and Vista.

FALSE POSITIVES FILL MY INBOX

TrendMicro AntiVirus picked up what it labeled as a "TROJ_GENERIC" in \Assets\data\fg180b1en. exe on the March 2007 issue disc when I left the disc in my laptop during a complete scan. Part of the utilities demo? False positive?

—L. H. Scheidle, Ph.D.

EDITOR-IN-CHIEF WILL SMITH RESPONDS: It's a false positive in FlashGet. We're always extremely careful to avoid inadvertently infecting any of our customers' PCs with malware on our monthly CD. To that end, we scan the contents of the disc with two separate antimalware utilities. Furthermore, at the fabrication plant where our discs are stamped, the contents of the disc are scanned again. We've not shipped any viruses on the disc in the seven years that I've worked at *Maximum PC*.

SECOND THOUGHTS ABOUT SLI

Over the past year I've seen you sing the praises of SLI and how wonderful it is, and I guess in many ways it is: more FPS, higher resolutions, better visual details, and so on. So taking your recommendation, in the fall of 2005 I grabbed a pair of 7800 GTs to run in SLI. Now, however, as I'm playing Oblivion (or, more accurately, not playing it, as it keeps crashing), I've learned that the developer, Bethesda Softworks, recommends that SLI be disabled to avoid crashes in the game.

What exactly, other than filling Nvidia's loot hoard, is the point of promoting a technology that game developers tell you to disable? Sure, SLI makes stuff run faster, but if I have to disable it to get a game to be stable, what's the point? Are you folks really into speed and power for its own sake, without regard to there being an immediate practical benefit?

—Tony Bell

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: All too many tech-support people pass the buck instead of actually trying to solve a customer's problem: "It's not my product that's causing your problem," they say, "talk to whomever made your… (insert videocard, soundcard, memory,

CPU, power supply, keyboard, or whatever other component he can think of here)."

We used Oblivion as one of our videocard benchmark tools for quite a while and have played the game all the way through using two GeForce 7800 GTX cards in SLI without any trouble, so we suspect SLI is not the source of your problem. We've never recommended power for power's sake, but we'll go on recommending dual-card solutions such as SLI as long as they continue to boost real-world performance.

YOU ARE THE RAM MAN

I enjoyed your "Face-Off" article (April 2007) but feel that you missed some important things. RAM for one—in particular, name brand vs. generic and clock speed vs. latency. Also, what kind of real-world performance difference is there between the two?

—Steve Salerno

SENIOR EDITOR GORDON MAH UNG RESPONDS: Your questions can't really be separated easily. If you are running stock clocks and latency settings, using a name-brand product instead of generic memory won't improve your performance too much. What a name brand does give you is a guaranteed level of reliability at stock speeds and a warranty. If you toast a name-brand module in two years, the manufacturer will replace it. If you toast a generic module from your local shop, you're SOL. We actually did some testing with clock speed vs. latency some months ago, and the edge went to clock speeds using an Athlon 64 939 system as the test platform. We haven't revisited this issue since the Core 2 Duo has taken over, but I plan to look into it in the coming months when DDR3 memory becomes available.

WHO THE HELL NAMED THIS THING?

What technology does the Logitech NuLOOQ (Reviews, March 2007) use? Can you create an entire image without touching the keyboard, unless you have text to add?

—Matthew Jorgensen

SENIOR EDITOR GORDON MAH UNG RESPONDS: Logitech hasn't disclosed exactly what's inside the navigator, but I imagine it's watered-down tech from 3DConnexion, which makes even more-sophisticated controllers designed to ease navigation in three dimensions. You cannot actually create an image with just the NuLOOQ, but it does make it easier to move around in an image in Photoshop. **MPC**

MATT WEBB'S
Steel City Rig

When Matt Webb moved from Pittsburgh to Colorado to attend college, he decided to do something that would make him feel like he was back home. Put some pictures up on the wall? Nope. Matt went out and bought two sheets of diamond plate and built himself the Steel City Rig.

For his first mod, Matt stripped down an ATX case and then riveted sheets of aluminum to it to make room for the rig's components. To create even more space, he mounted the drive bays on the front of the chassis. With some help from his buddy Brian, he then bent the diamond plate and cut out the National Steel symbol.

The end result? A 75-pound behemoth that's tough enough to start on the Steelers's O-line—and fast enough tear up our benchmarks.
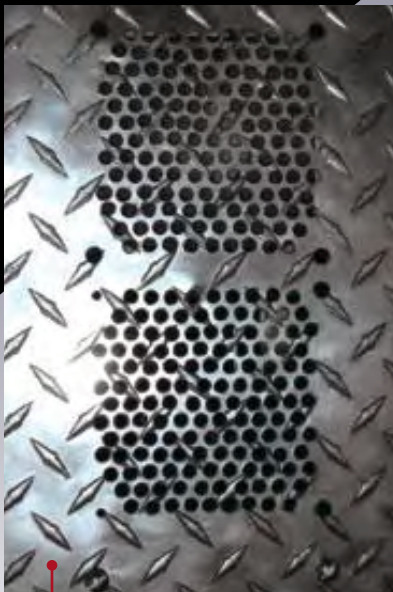
Matt created a stencil in Illustrator and then hand-drilled the 350 holes you see here. To keep the machine quiet, he made his own rubber gaskets for the four fans that cool this rig.

We were expecting Steeler gold to light up the inside of this case—hey, Matt, there are still a few more months until football season.

The industrial design of the Steel City Rig carries over to the rig's on/off switch and red power indicator.

For his winning entry, Matt wins a $500 gift certificate for Buy.com to fund his modding madness! See all the hardware deals at www.buy.com, and turn to page 92 for contest rules.

If you have a contender for Rig of the Month, e-mail **rig@maximumpc.com** with high-res digital pics and a 300-word write-up.