SLI & CROSSFIRE ON THE SAME MOBO?
Asus's P6T finally unites ATI and Nvidia!

IS ANTEC'S OPEN-AIR CASE INSANE?
The Skeleton: tested and verdictized

MAXIMUMPC

MINIMUM BS • JANUARY 2009

17 Awesome Upgrades
From Budget to Extreme

Snag an **AMAZING**
$150 videocard *page 30*

Upgrade to the **FASTEST CPU**
we've ever tested! *page 26*

Spec out your rig with
1.5 TERABYTES of storage
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Google's Android Phone
Everything you must know!
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10 Antivirus Utilities Tested
Shield your PC from net nasties
page 32

JA

MAXIMUM PC

It All Started with a Videocard Upgrade...

Beware the danger of upgrade creep—the single-part upgrade that starts small and gradually morphs into building a completely new system. It can happen to you. It happened to me.

It started innocently enough. In honor of this holiday gaming season, I decided to upgrade my videocard. That videocard upgrade caused a cycle of in-game crashes that prompted further intervention, starting with a simple power-supply swap and ending when I realized my 18-month-old install of 64-bit Vista had reached the end of its road. So with a Windows reinstall looming, I figured I should take care of any other significant upgrades at the same time.

My plan had been to wait for the inevitable eight-core version of Core i7 before making my next big CPU upgrade, but I've been out of SATA ports on my motherboard for ages—my two-slot videocard blocks the final four ports. I figured now was a good time to upgrade to an inexpensive P45-based mobo. I also picked up one of the new 1.5TB Seagate hard drives to replace my first-gen 750GB drive, and a Blu-ray reader, so I could experiment with extracting the video files from my Blu-ray discs. Then, it was time to build.

Swapping out the boards went swimmingly, right up until it was time to mount my CPU cooler in the new motherboard. I began by using the cheapo Intel stock cooler that came with my CPU (yes, I know that's lame), which isn't really designed to travel from rig to rig. When I was trying to mount it in my motherboard, I accidentally bent one of the small plastic pins that hold it in place. I was eventually able to get it into the board, but it didn't really hold well, necessitating a trip to my local Fry's, where I picked up a Zalman CNPS9700. Naturally, the aftermarket CPU cooler required that I remove the mobo to install it, so that was awesome.

Surprisingly, after the false starts and pitfalls, my Windows install went according to plan. I installed Vista x64, updated it with Service Pack 1, installed all my drivers, and then went about restoring my apps and files with nary a hitch.

All told, my simple videocard upgrade ended up taking three days (off and on) and resulted in pretty damn near an entirely new machine—not an upgrade. All I can say is that after building hundreds of PCs over the last 15 years, no one is safe from upgrade creep.

Will Smith

LETTERS POLICY Please send comments, questions, and Reese's Mini Peanut Butter Cups to will@maximumpc.com. Include your full name, city of residence, and phone number with your correspondence. Unfortunately, Will is unable to respond personally to all queries.

THE NEWS

Windows 7 Gears Up

Microsoft unveils new functions, but will the new OS be better than Vista? —NATHAN EDWARDS

Although the Windows 7 launch is still nearly a year away by Microsoft's timetable, the company has been releasing more and more information about the successor to Vista, most recently at PDC and WinHEC, conferences for software and hardware developers, respectively. Everything we've seen so far comes from pre-beta code and is, therefore, subject to change; however, plenty of these new features have piqued our curiosity.

Windows 7 builds on the now-established Windows Vista code—which Microsoft promises will minimize many of the compatibility problems that plagued Vista's launch.

FUNCTION AND FLAIR IN THE UI
Gone is the Vista Sidebar; gadgets now roam freely across the desktop. Windows 7 still uses Vista's Aero Glass, but it now seems to utilize Aero's capabilities more effectively. Hitting Show Desktop (a rollover area in the bottom-right corner) fades all windows to almost complete transparency while leaving their outlines intact. Aero Shake lets you minimize all background windows by "shaking" the foreground window with your mouse. Another shake restores them.

A KICK-ASS TASKBAR
Early builds of the Windows 7 taskbar combine the traditional taskbar and the Quick Launch toolbar. Open programs and shortcuts are represented by icons in the taskbar with different types of borders (icons that represent open programs are outlined); mousing over taskbar icons displays dynamic previews similar to Vista's. Even better: Mousing over icons that represent groups of windows will display previews of all of them.

FIXED UAC
User Account Control, which has never been a favorite, is also getting a makeover: Instead of a simple on/off switch, Windows 7 offers four notification levels, ranging from Vista's

Libraries are like Vista's saved searches, but more powerful and intuitive.

Sorting your media is easier than ever with expanded arrangement options.

Arranging by tag will show a stack of photos with that tag.

standard "constant annoyance" level to no notifications at all.

LIBRARIES
One of Windows 7's most promising features is Libraries. Libraries are like Vista's saved searches—they show all of the files of a specific type on your system (music, video, downloads, pictures, etc.) rather than folders on your drive. But unlike saved searches, you can add network shares, public files, and additional folders, so increasing your Library size is easy. Your Music Library, for example, can pull from your personal music folder, your NAS, any public folders on your network, and any other folder you designate.

HOMEGROUPS
The HomeGroup feature makes it easier to share content, libraries, files, and printers between machines on your home network. It's essentially a domain for the home; you can think of it as Network Places on steroids. HomeGroup members can choose which libraries and folders to share over the network, add files to other users' public folders, and see all available folders at a glance. All machines in a HomeGroup must enter that HomeGroup's password to gain access, preventing random Wi-Fi poachers from mucking around in your files.

Most of the differences we've seen so far are cosmetic, but this doesn't mean they're insignificant, and the changes are, for the most part, thoughtful and useful.

These are the kinds of compelling and interesting features we hoped would make it into the next version of Windows; we expect to see more improvements between now and Windows 7's scheduled ship date of late 2009.

Browser Breakdown

Opera 9
11.8%

7.6% IE 6

4.1% Safari

2.6% Google Chrome

1.7% Other

1.1% IE 8

Firefox
50.3%

IE 7
20.8%

In worldwide market share, Firefox might have just broken 20 percent—an admirable feat in its own right—but among MaximumPC.com visitors, Mozilla's browser enjoys nothing short of unadulterated dominance. Here's a snapshot of the browsers our online fans were rocking in October. –KS

AT&T Follows Comcast's Lead

Broadband provider to do some bandwidth capping of its own

It didn't take long after Comcast announced its 250GB bandwidth cap for residential broadband customers for AT&T to try a similar tack—an even more restrictive one. Effective November 1, 2008, new AT&T broadband users in Reno, Nevada, are part of a market trial to evaluate current bandwidth usage. The cap will range from 20GB to 150GB per month, depending on a customer's broadband speed tier. Pre-existing AT&T broadband users in Reno will automatically become part of the trial if their monthly usage exceeds150GB per month.

Unlike Comcast's half-baked efforts to help customers with bandwidth monitoring,

100GB

75GB

125GB

50GB

150GB

Download in progress...
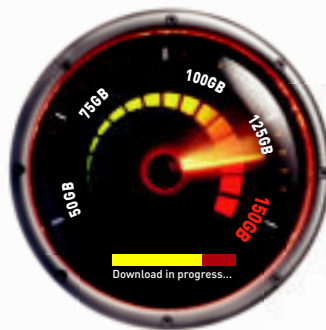
AT&T increases its chances of profiting from a bandwidth cap by setting the highest ceiling at 150GB—100GB less than Comcast.

AT&T says it will be notifying customers when they have reached 80 percent of their usage allotment, as well as providing them with a bandwidth-measuring tool. Customers who are part of this trial will receive a one month grace period when they have exceeded their monthly quota; any violations after that will result in a penalty of $1 for every gigabyte over the allocated bandwidth. –BH

FCC Expands Use of White Space

Broadcasters, audio equipment manufacturers voice concerns

In November, the FCC voted unanimously to open up the use of white spaces, the gaps between UHF TV channels. This spectrum is particularly valuable because it can travel twice as far as Wi-Fi and also penetrate walls. While deployment is at least a year away, many believe the spectrum can be used as a relatively low-cost way to provide broadband Internet to underserved rural areas, and hardware vendors are looking to develop laptops, phones, and other mobile devices that will use this spectrum.

TV broadcasters and groups that use wireless mics, such as Broadway theaters and music venues, are concerned that unlicensed use of this spectrum will cause interference with their broadcasts, despite the FCC's mandate that devices using white spaces include several safeguards to limit interference. –TE

TOM HALFHILL

China's Newest CPU

Three years ago, I wrote about the Godson-2, a Chinese microprocessor that's largely compatible with the MIPS architecture. I speculated that its successor, the Godson-3, would be a quad-core chip and that the Chinese needed x86 compatibility to break into the worldwide PC market.

So I wasn't too surprised when the Godson-3 was unveiled at a recent technology conference in Silicon Valley. Sure enough, the first version has four cores, and the Chinese are adding more than 200 new instructions for x86 software emulation. These developments indicate that Chinese microprocessor technology is rapidly catching up with the rest of the world.

Three points are important here. First, it's one thing for China to assemble products using parts (such as microprocessors) invented or manufactured elsewhere. It's something else for China to develop native technology capable of competing on the world stage. China has the potential to radically shake up the market.

Second, China wants to be technology independent, just as the U.S. yearns to be energy independent. Computing technology is a fundamental resource, as vital for economic prosperity and national security as oil. Godson processors are designed at the Institute for Computing Technology at the Chinese Academy of Sciences, but they are much more than an academic exercise. Godson is a high-priority national project largely funded by the Chinese government.
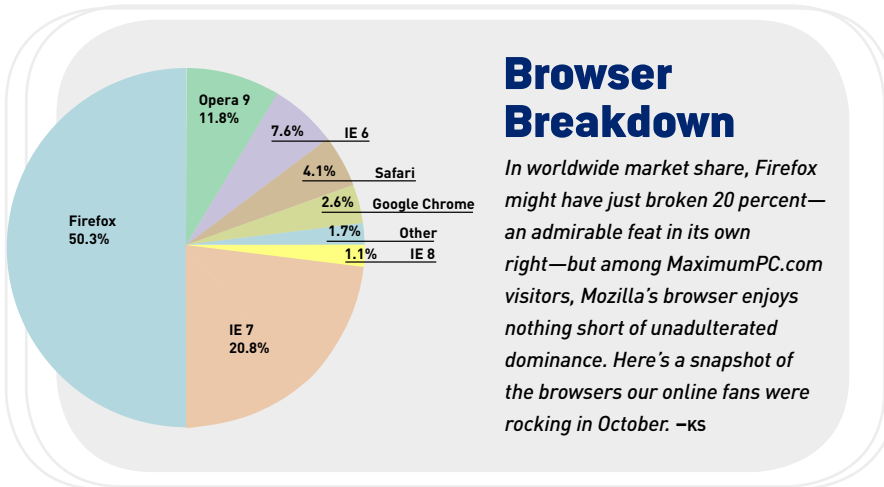
Third, the Godson-3 isn't a true x86-compatible processor, and its designers make no such claims. The extensions optimize x86-to-MIPS dynamic binary translation—a fancy term for software emulation. Transmeta's discontinued Crusoe and Efficeon processors used similar techniques, but Transmeta marketed those chips as "x86 compatible." The Godson-3 is designed to run MIPS software. The x86 extensions are a last resort for software unavailable on MIPS. I'm no expert on intellectual-property law, but the Godson extensions don't appear to infringe on Intel or Transmeta patents.

Godson chips are mainly for Chinese domestic consumption, although I have found them in a few export products, including Linux netbook PCs. The Godson-3's basic design supports many possible implementations, including massively parallel processors. China hopes to build a supercomputer by 2010 that's among the fastest in the world. It's clear that China will someday be a major player in microprocessors.

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

Netflix Streams... Everywhere

By the time you read this, Netflix subscribers will be able to watch nearly 13,000 movies instantly in their living rooms using a variety of different devices, including Samsung and LG Blu-ray players, the Roku Netflix Player, any Series 3 or newer TiVo, and the Xbox 360. We tested out the streaming service using the Xbox 360 this month and were impressed with both the quality of the video—for a bitrate of around 2500Kb/s, the quality was stunning—and the minimal time it took for playback to start. You too can stream Netflix on your Xbox; just download the New Xbox Experience. **–WS**

Craigslist Caper

Crowdsourcing has generally been used for good, taking the power of the many to assist with medical research (Folding@Home) and the creation of fashion-forward T-shirts (Threadless), but it was only a matter of time before someone used it for evil.

Washington state resident Anthony Curcio placed a help-wanted ad on Craigslist seeking construction workers. The 12 people who replied appeared in front of a Bank of America branch at the appointed time, wearing safety vests, goggles, and respirators as instructed. Curcio, who was similarly attired, then pepper-sprayed an armored-car guard, grabbed the cash he was transporting, and ran to a nearby river, where he floated away on an inner tube.

Curcio may have gotten away clean if someone had not seen him stashing his disguise in a nearby alley the day before the robbery. DNA evidence further tied him to the crime. **–TE**

UWB Holds on for Dear Life

For years we've been hearing that ultra-wideband (UWB) is poised to be the next big thing. The wireless technology certainly sounds promising: Developers pledged that UWB would offer speeds significantly faster than 802.11 (by using extremely short low-power pulses that wouldn't interfere with other radio frequencies) and that it would eventually replace cable-based USB 2.0.

But the technology has been slow to materialize, and recent events make UWB's prospects seem all the more tenuous. WiQuest, the most successful of the ultra-wideband chipmakers, is closing its operation due to slow development and a lack of funds. In further bad news for UWB, Intel is ceasing its own work on the technology, leaving it to a handful of far lesser known companies to make a go of it. **–FI**

THOMAS MCDONALD

Buy a Whisker

There are a lot of things we could say about Fallout 3. Sure, it's Elder Scrolls: The Mutant Years, but damn, it's still a brilliant piece of role-playing design: a wide-open world with amazing sights and challenges at every turn.

Rather than descanting at length upon stats and perks, I want to talk about the single most mind-blowing part of the entire character creation system: facial hair. Fallout 3 opens a new era in beard and mustache design. You have never, ever seen such an assortment of whiskers in any game, ranging from the pathetic wisps of a teenager's first attempt to huge Burnside sprouts and styles not seen outside of movies like *Gettysburg* or *Tombstone*. And these aren't just the paste-ons from Oblivion: These are complete, textured moving models.

It is conceivable that, at some point in my life, I may find myself fighting for life in the post-nuclear wasteland of the greater DC metro area (and after some time on the Beltway, I'd actually embrace the experience), but the likelihood that I'd ever be able to create Paul Teutul, Sr.'s wicked 'stache or General Longstreet's massive face shrubbery with my scraggly whiskers is nil.

The mad genius behind this manly excess is a woman: Bethesda character artist Hiu Lai Chong. As lead artist Istvan Pely told me, "We decided to do facial hair as a way to add some additional variety and individualized character for Fallout's NPCs. It also seemed appropriate that in such a severe postapocalyptic setting that people wouldn't have the time to shave every day if they're constantly preoccupied with the basics of survival.

"However, once Hiu Lai made the first few basic beard examples, and we noticed just how cool they looked, she got really into it and developed a modular facial hair system that allowed us to have a lot of variety with minimal impact in terms of texture memory and development time."

I went for the lavish muttonstache, based on the awesome face fungus of Civil War General Ambrose Burnside. He may have blown it at Antietam, but anyone who can grow something like that is a man among men.

Thomas L. McDonald has been covering games for 17 years. He is an editor at large for *Games* magazine.

SanDisk Speeds up SSDs

New file system boosts write times

If solid state drives (SSDs) continue to march into the mainstream, 2008 might one day be seen as the start of the SSD era. But for that to happen, write performance numbers have to improve and users have to be convinced that the technology can be reliable on a long-term basis.

Taking matters into its own hands, SanDisk has developed a new file system,

ExtremeFFS allows NAND channels to work independently of each other, so while some might be reading data, others can be simultaneously writing. The technology also purportedly "learns" user patterns and eventually localizes data,

THE TECHNOLOGY ALSO PURPORTEDLY "LEARNS" USER PATTERNS AND EVENTUALLY LOCALIZES DATA.

dubbed ExtremeFFS, which the company claims has the potential to make write performance up to 100 times faster.

which sounds a lot like advanced defragging routines. SanDisk Senior VP and GM Rich Heye concedes that it might not make a difference

in benchmarks but believes "it is the right thing to do for end-users."

In related news, SanDisk has also come up with a performance metric it is calling vRPM, or virtual RPM. The metric has been designed to let users know how fast a typical hard drive would need to spin to match the performance of an SSD, and would also allow for performance comparisons between SSDs. **–PL**

◼◼◼ **GRAPHICS GALORE**

Laptops with Three GPUs!

Toshiba is taking notebooks to a new level by outfitting its Qosmio X305-Q708 and X305-Q706 models with three GPUs. Using Nvidia's Hybrid SLI technology, the notebooks will feature a single GeForce 9400M for standard desktop duties and two 9800M GTS GPUs that come into play for games and other graphics-heavy chores. –KS

◼◼◼ **BYTE RIGHTS**

QUINN NORTON

Change You Can Back Up?

Whew, that was quite an election, but my hope muscle is hopelessly strained and my change gland is exhausted. So I'm turning to a new pastime: second-guessing the Obama administration's next moves.

I'm long on questions. Will his new trade representative continue forcing DMCA-like laws on our partners? Will his appointees to the Department of Justice prioritize IP cases? What legislation will he support regarding copyright terms, patent reforms, orphan works, and DMCA reforms?

Will there be a new registrar of copyrights? If there is, do we get to see him or her mud wrestle with the IP Czar and the new Patent and Trademark honcho? Oh, I think so.

Don't get me started about privacy, open source, net neutrality, etc., because the truth is, Obama doesn't have a record here, just campaign talk.

Obama stated his DMCA position to CNET this way: "As policymakers, we... ensure that the protections we place on intellectual property... encourage invention without hindering innovation that builds on previous work or unfairly limiting consumers from using the goods they purchase in a way that is fair to creators."

He has also confirmed that he loves cute puppies and America.

That leaves us reading the goat entrails of American political prognostication: advisors and donors. The donors were the usual suspects. According to Opensecrets.org, TV, movies, music, and publishing coughed up $12.6 million for Obama and another $21.6 million for other Democrats in Congress. Cha-ching!

But get in line—*everyone* gave Obama boatloads of money. If you look at who's had Obama's ear, there's Eric Schmidt of Google, Duke professor Arti Rai, Daniel Weitzner of the W3C, and other pinch-yourself, "No way!" good people. Obama's even a friend of Larry Lessig. Except there's not much evidence he'll listen to them either. It's safe to say his technology advisors didn't support retroactive telecom immunity for warrantless wiretapping. Neither did Obama—until he voted for it. Lessig was among his vocally disappointed tech supporters.

So IP good guy or bad guy? Probably both. Surely though, considering his brilliantly organized campaign and savvy technology advisors, he has a clue.

Whatever Obama does with our series of tubes, he doesn't get to plead ignorance.

Quinn Norton writes about copyright for Wired News and other publications. Her work has ranged from legal journalism to the inner life of pirate organizations.

THE LIST

8 Rejected New Year's Resolutions

8 EXERCISE

photo thanks to pboyd04
www.tinyurl.com/67jsov

7 RESURRECT THE *SNAKES ON A PLANE* MEME

Or you could just make "Chocolate Rain" your ringtone.

6 PIRATE EVERYTHING!
YOU WOULDN'T HAVE BOUGHT IT ANYWAY, SO IT'S OK, RIGHT?

5 STOCK UP ON DISCOUNT HD DVD MEDIA

Blu-ray won, but the HD DVD comeback is just around the corner!

4 LEARN TO PLAY A 25-MAN WoW RAID... BY YOURSELF

There's no fighting over loot when you 25-box an entire raid. The only question is, Who loses 50 DKP when you aggro whelps?

3 GIVE COMCAST THE FINGER

Show your disdain for ISP-imposed download limits by blowing through your provider's cap. See No. 6 for more info.

2 UPGRADE TO VISTA

With Windows 7 mere months away, it's the perfect time to spend hundreds of dollars on a Vista upgrade, right?

#1

KEEP TABS ON YOUR EX

Sure, Winifred told you to stop calling, IMing, texting, and emailing, but she didn't say anything about using Google to track her every online move. Hell, she left that door open because she secretly *wants* to get back together.

DEATHMATCH

Core i7-920 vs. Core 2 Quad Q9550

You may go to the car dealership to ogle the ZR1 Corvette, but the majority of us drive away in the Chevette. It's the same with CPUs. You want to read about the $1,400 Core 2 Quad QX9770 and the $1,000 Core i7-965 Extreme Edition, but you're gonna buy a budget chip.

The hot deal today is Intel's 2.83GHz Core 2 Quad Q9550. At just over three bills, the CPU gives you a phenomenal (sorry, AMD) blend of performance and features. But there's a new deal in town: Intel's next-generation Core i7-920.

To find out which CPU is the budget champ, we outfitted each with a GeForce 8800 GTX card, the same graphics driver, a Western Digital Raptor 150GB hard drive, and Vista Home Premium 64-bit. Since the cards have different RAM requirements, we outfitted the Core 2 box with 4GB of DDR3/1333 and the Core i7 with 3GB of DDR3/1066. Read on to see who takes the budget CPU crown. —GORDON MAH UNG

INTEL CORE i7-920
$285, www.intel.com

ROUND 1

PRICE

The 2.83GHz Core 2 Quad Q9550 hits a fine balance between performance and price. Intel certainly has cheaper Core 2s, but those chips run at lower clocks and/or have disabled caches. The Q9550 features the same size 12MB L2 cache as the $1,400 Core 2 Extreme QX9770 and isn't that far from the latter's 3.2GHz clock speed, either. Priced at $315, the Q9550 is a steal. But then again, so is the new 2.66GHz Core i7-920. We expected the just-released Core i7 to be a marriage breaker, but with the 920 coming in at a compelling $285, we can only say in a Churchillian voice, "Never in the field of budget computing has so little been paid for something so fast."
WINNER: CORE i7-920

ROUND 2

ECOSYSTEM

Core 2 motherboards, heatsinks, and paraphernalia are so common today that you can practically buy them in blister packs as you check out at the supermarket. Shoot, pretty soon you'll get a Core 2 motherboard free with a box of Fruit Loops. As you can imagine, Core i7 boards and associated hardware aren't as readily available or cheap. Don't take this the wrong way, however; boards for the new CPU can be found. In fact, you could buy an Intel X58 board weeks before the CPU was available for sale. Still, to deny the Core 2 this win would be delusional.
WINNER: CORE 2 QUAD Q9550

AVAILABILITY

This category is a little hard to call since we're writing this story before Core i7 is officially available. But the fact that Intel even has a $300 version of a totally new CPU is telling. If Intel were offering just a $1,000 Extreme version at launch, we'd predict the availability of a budget part to be poor. We believe that the Core i7-920 will be relatively easy to find at launch. However, it still won't match the ubiquity of the Core 2 Quad Q9550. The other day we put in a quarter for a Diet Coke and the machine spit out a Q9550.
WINNER: CORE 2 QUAD Q9550

FEATURES

This is easy. One has Hyper-Threading, an integrated memory controller, tri-channel DDR3 support, the ability to overclock automatically, built-in power management, and all of the special instruction sets of its competitor—plus some newer ones. Should we go on? The Core 2 Quad Q9550 is no slouch in the feature-set wars, but you're not going to turn the other boys and girls in the IT bullpen green with envy by announcing, "Hey, I just bought a last-generation CPU!"
WINNER: CORE i7-920

PERFORMANCE

This is where the silicon meets the PCB. We honestly didn't know how this round would stack up, as the Core 2 Quad Q9550 is indeed a mighty fast chip for the money, but in the end, it was no contest. In benchmarks that didn't utilize the Core i7-920's superior bandwidth, latency, and Hyper-Threading, the two CPUs ran pretty evenly—which is still a win for Core i7-920, as it's operating at roughly 6 percent fewer clocks than the Core 2 Quad Q9550. In the majority of tests, however, the Core i7-920 motored away from its sibling with very decisive margins of 17 to 50 percent. Remember, it's running at lower clock speeds and costs less too. For benchmark results visit http://tinyurl.com/5cy9sc.
WINNER: CORE i7-920

INTEL CORE 2 QUAD Q9550
$315, www.intel.com

And the Winner Is...

We didn't have to think too hard to declare the Core i7-920 the winner of this match. It's simply spectacular for content-creation tasks and offers phenomenal bandwidth, and its performance will only get better over time. Why? As applications are updated and recompiled, they will better exploit the available eight threads in the CPU and actually run faster. The same will likely hold true for the Core 2 Quad as more and more applications sport quad-core optimizations.

Performance enthusiasts looking for the best budget CPU with the most promising roadmap for the future should turn to the Core i7-920. Folks on an even tighter budget may want to consider the less-expensive alternatives on the Core 2 Quad platform. The Q9550 aside, you can get an Intel quad core for less than $200, and if you're willing to stoop to a dual-core solution, you could pick up a CPU for less than $100. ⏻

Our consumer advocate investigates...

‣ **Antivirus XP 2008 a Virus?**

‣ **Recall Alert**

‣ **Acronis Upgrade MIA**

The Anti-Antivirus

I have been trying to get a refund for Antivirus XP 2008 for three months. In August, my PC was taken over by a virus or Trojan horse and rendered nearly inoperable. The only indication of this was an onscreen message saying: "Your computer has been found to have multiple viruses. Get Antivirus XP 2008 and clear them from your computer."

In a panic, I went to the website and purchased the suite of Antivirus XP 2008, AlphaWipe Tracks Cleaner 2008, and Premium support for $110. Needless to say, the programs did nothing to fix the problem. So later that same day, I called customer service and requested a refund. They said my account

bank or card company and inquire about your refund since we've issued it."

After about six weeks of this I finally got hold of a "supervisor." She said that I was correct that no refund had been generated. She said she would personally get the matter resolved. That was in the middle of September. About three days ago I again called Antivirus XP 2008 to see about my refund and was again informed that the refund had been issued. Then a company representative started getting rude with me and told me I should contact my bank and ask where the refund was. The rep said I couldn't talk to his supervisor since she was in a meeting and would not be available for at least half an

Downloading this "antivirus" program led to a virus outbreak.

"SHE SAID SHE WOULD PERSONALLY GET THE MATTER RESOLVED. THAT WAS IN THE MIDDLE OF SEPTEMBER."

would be credited within seven business days. When I noticed that this had not been done, I called back. They said the refund had been processed and I should contact my bank and inquire about the refund. The bank stated that no such refund had been received. I went back to Antivirus XP 2008 and asked about the refund and started to get the runaround. I was told, "The refund was granted and you should go to your

hour. So perhaps you can call these people and get to the bottom of this. It's obvious I'm not going to get anywhere with them.

—Ron Cruz

Unfortunately, Ron, the Dog was unable to contact the makers of Antivirus XP 2008 because the first 10 pages of search results from Google are all about how the program is a rogue Trojan horse that masquerades as

an antivirus program. In fact, trying to navigate the confusing web of alleged fake antivirus programs is a full-time job for online folks. The Dog searched for a copy of Antivirus XP 2008 and was led to a site that actually had Antivirus Pro 2009, which appears to be related (note that Panda Security's Antivirus Pro 2009 is a legitimate antivirus program and not related). The Dog decided to give the "demo" a try and installed AntivirusXP.exe onto a clean build of Windows XP SP3. The machine found numerous "problems" with the image and pop-ups immediately started to occur.

The fact that you actually spoke to a person at Antivirus XP 2008 is amazing, but the Dog believes you're just being

strung along in order to run out the clock on your ability to contest the charge. The Dog recommends that you immediately contact your bank and request a chargeback if the company will not issue a refund. If you wait long enough, you'll pass the deadline for charging back the application.

Sadly, many people are duped by fake antivirus and anti-malware programs every day. In many cases, the fake AV programs are installed by simply visiting a site or accidentally landing on one with your browser. To avoid these infections, make sure you're running the most updated definitions for your antivirus programs, keep your OS updated, and use a browser that isn't susceptible to ActiveX exploits, such as

Firefox 3.0, instead of Internet Explorer, and never let a vendor keep stringing you along.

Acronis a Goner?

I purchased Acronis Home in late September and within a month, I received a letter saying that I could upgrade for $39. I tried to hop on the deal but never heard back from Acronis after several emails. I am wondering if in these bad times Acronis has gone belly up?

—John Hand

The Dog pinged an Acronis spokesperson and was told, no, the company is still quite solvent and doing well in spite of the tough economy. The spokesperson checked the company's support database, which showed that Acronis had indeed contacted John a few days before the Dog's query to the company. The rep said the email log showed that customer support was waiting for a response from John and that since the purchase was within 30 days of the new release of Acronis True Image Home 2009 he qualified for a free upgrade. John was supplied with a registration key and download link for the new version. Woof. ⏻

◼◼◼ RECALL ALERT

About 65,000 notebook PC batteries are being recalled from various Hewlett-Packard, Toshiba, and Dell notebook computers due to overheating and fire hazards. Sony, the manufacturer of the batteries, said there have been about 19 reports of the cells overheating, including 17 reports of fire or flames. Ten of the incidents resulted in minor property damage.

Although the batteries were manufactured by Sony in Japan, they do not impact any of Sony's notebooks. About 32,000 HP notebooks, 3,000 Toshiba notebooks, and 150 Dell notebooks were sold with the bad batteries. For more information, contact the various notebook manufacturers if you suspect that your computer has a bad battery. For HP, visit www.hp.com/support/BatteryReplacement or call 800-889-2031 between 7 a.m. and 7 p.m. CST Monday through Friday. For Toshiba, visit www.bxinfo.toshiba.com or call 800-457-7777 anytime. For Dell, visit www.dellbatteryprogram.com or call toll-free 866-342-0011 between 8 a.m. and 5 p.m. CST Monday through Friday.

AFFECTED BATTERIES

	Notebook Model	Battery Model	When Sold
HP	**HP Pavilion:** dv1000, dv8000, zd8000 **Compaq Presario:** v2000, v2400 **HP Compaq:** nc6110, nc6120, nc6140, nc6220, nc6230, nx4800, nx4820, nx6110, nx6120, nx9600	Recalled batteries will have a barcode label starting with A0, L0, L1, or GC	December 2004 to June 2006
Toshiba	**Satellite:** A70/A75, P30/P5, M30X/M35X, M50/M55 **Tecra:** A3, A5, S2	N/A	April 2005 to October 2005
Dell	**Latitude:** 110L **Inspiron:** 1100, 1150, 5100, 5150, 5160	OU091	November 2004 to November 2005

Upgrades

FROM **Budget**

TO Extreme

Whether you're flashy or frugal, the Maximum PC lifestyle is well within your reach

Upgrading is an obligation of any self-respecting PC geek. It's an affirmation of your thirst for power, a healthy rejection of the status quo. Upgrading is an acknowledgement of the fact that there's always a way to improve your rig. You may have the funds for premium parts—lucky you. We'll tell you exactly what those parts are. But even if your means are more modest, there are affordable parts in every major component category that can breathe new life into an aged PC.

Regardless of your financial situation, you must address some important questions before embarking on an upgrade. First, you need to honestly assess your rig's merits. You shouldn't waste money upgrading your PC if it still sports an AGP slot or a pre-AM2 Athlon 64 motherboard. The question you should ask yourself is whether it's more cost effective to gut the machine and replace its primary components—motherboard, CPU, memory, and videocard—than it is to do a piecemeal retrofit. If you look at your rig and decide to build new, check www.maximumpc.com/tags/parts+guide, but if you're ready to proceed with an upgrade, read on!

BY THE MAXIMUM PC STAFF

INTEL CPUs

The hot new Core i7 offers something for everyone

Intel's Core i7 is everything the company said it would be: fast, furious, and even inexpensive. Those with an eye toward extreme computing should settle for nothing less than Intel's 3.2GHz Core i7-965 Extreme Edition ($1,000, www.intel.com). It demolishes Intel's Core 2 Extreme QX9770 and does one of those Jedi cut-you-in-half tricks to AMD's best, the Phenom X4 9950 BE. With its integrated memory controller, tri-DDR3 support, Hyper-Threading, and Turbo mode, the chip is simply untouchable at encoding tasks, or anything else that will exploit the eight threads available to it.

But if a grand is a little too rich for your blood, take heart. Intel already has a pretty darn good budget chip based on the Core i7: the 2.66GHz Core i7-920 ($285). It outperforms the 2.83GHz Core 2 Quad Q9550—and costs less, too! (See our Deathmatch on page 16 for the details on that battle.) One caveat for true budget hounds: The Core i7 requires an LGA1366 board, not to mention three sticks of DDR3 RAM for optimal performance, which significantly adds to the expenditure.

If you don't want to go that far with your CPU upgrade, Intel's Core 2 Quad Q6600 ($185) gets you quad-core performance that's compatible with most modern Intel motherboards.
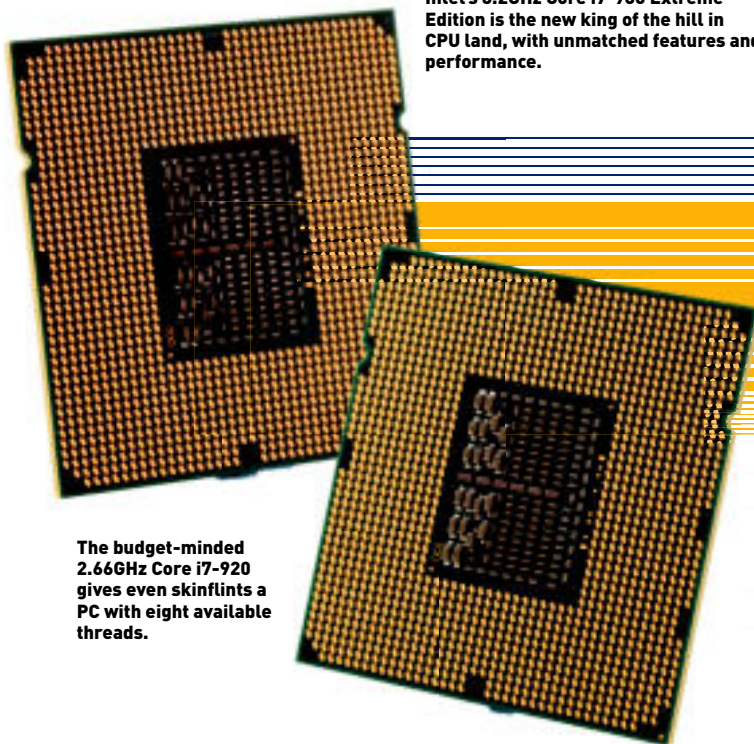
Intel's 3.2GHz Core i7-965 Extreme Edition is the new king of the hill in CPU land, with unmatched features and performance.

The budget-minded 2.66GHz Core i7-920 gives even skinflints a PC with eight available threads.

RAM

It pays to go name-brand

Quick, what's the difference between name-brand RAM from respected manufacturers and the generic stuff you get after sorting by lowest price? Blue screens, my friends. While people tend to treat RAM like it's all the same, it really isn't. That's why we've long recommended that when you buy RAM, you first consult your motherboard's QVL (Qualified Vendor List) and then reach for name-brand sticks. Name brands are especially important if you intend to overclock the crap out of your memory. Many high-frequency modules require a ton of voltage, which tends to drastically shorten the life of the memory. Buying a name-brand product means good warranty support, which could come in handy. How much RAM should you run today? For a 32-bit OS, 2GB is the minimum. For higher-end configs, consider 4GB on Phenom and Core 2 platforms and 6GB with your 64-bit Vista install on Core i7.
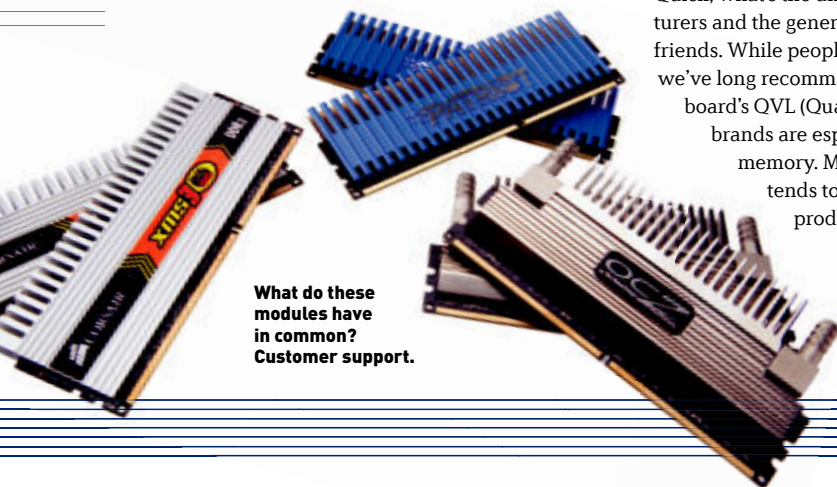
What do these modules have in common? Customer support.

AMD CPUs

They're all budget over here

The Phenom X4 9950 Black Edition is about as extreme as it gets for AMD fanboys.

We admit that it's pretty difficult to recommend an extreme AMD chip when the company's absolute top-end CPU sells for a measly $175 bucks. Hell, it costs less than Intel's two-year-old bottom-end Core 2 Quad Q6600. Still, we understand that some folks are vehemently opposed to Intel CPUs purely on religious grounds. For you AMD diehards, we wholeheartedly recommend the 2.6GHz Phenom X4 9950 Black Edition ($175, www.amd.com). Based on the tried-and-true AM2+ platform, the CPU uses DDR2 RAM, which is cheaper than air; plus, there's a possibility that the new AM3/DDR3 CPUs will also work with the platform.

So what about the really hardcore budget shoppers? You know, like that friend of yours who, when you suggest splitting an order of fries, actually counts the fries out. Well, first we'd say, dude, just get the X4 9950 BE, you cheap bastard. 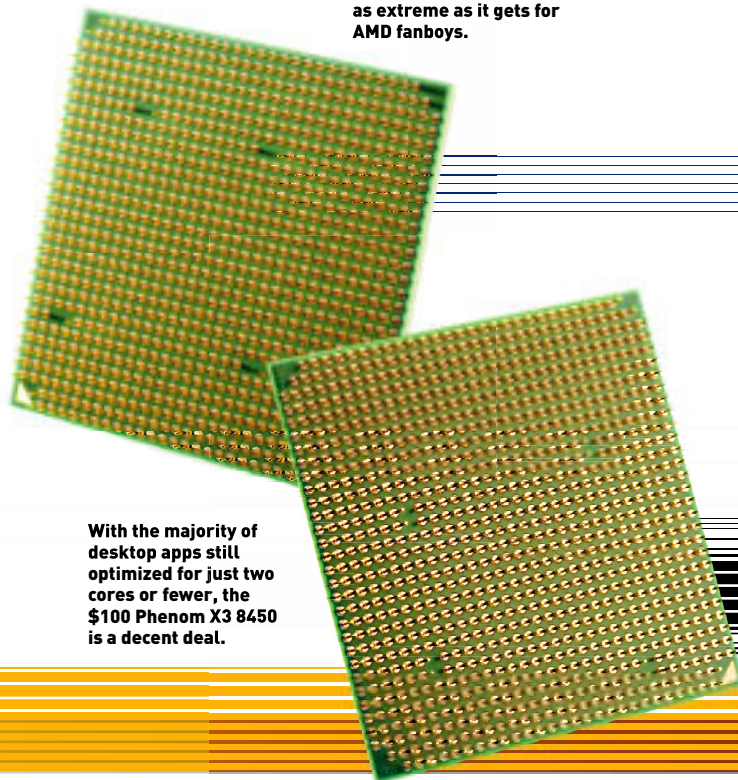But then again, he did actually tear the last fry in half, so he would be happy to step down to the 2.1GHz tri-core Phenom X3 8450 ($105) if it could save him a few bucks. Yeah, it's likely a quad-core washout, but your friend doesn't care. It's like getting a scratched and dented fridge—it's not pretty, but it still keeps the Diet Coke cold.

With the majority of desktop apps still optimized for just two cores or fewer, the $100 Phenom X3 8450 is a decent deal.

OPTICAL DRIVES

Is now the time for Blu-ray?

Samsung's new SH-S223 rekindles our love for good-ol' reliable DVD.

There's simply no excuse for making due with an old, outdated optical drive while you wait to see what happens on the Blu-ray front. With HD DVD out of the way, it's time to accept Blu-ray for what it is. And if you like the idea of storing high-def video or large quantities of data on disc, our top pick is LG's GBW-H20L ($280, www.lge.com). With a 6x BD-R write rating, the drive fills a 25GB disc in approximately 20 minutes, even when using 2x media. DVD writes are also speedy at 16x.

If Blu-ray's not your bag, step up to Samsung's new SH-S223 DVD burner ($80, www.samsung.com). The SATA drive breaks our Lab record by writing 4.38GB of data to a DVD+R disc in less than five minutes, thanks to its zippy 22x write speed.

VIDEOCARDS

You deserve to play today's games in all their glorious detail

There's never been a better time to upgrade your videocard, whether you've got just a couple hundred bucks or a cool grand burning a hole in your pocket.

Splurgers on the prowl for a killer single card should check out any of the Radeon 4870 X2 boards. We particularly like Powercolor's card ($525, www.powercolor.com) but all of the X2 boards shipping today are essentially the same, with the same clock speeds, the same memory configuration, and the same 800 shader units on each GPU. The best thing about the X2? The board enables high-resolution gaming at 1920x1200 and 2560x1600 while taking up just a single slot—and without requiring a 1200W power supply.

So what about multicard configs? We always recommend upgrading to the fastest single card you can afford. The only time to buy two (or more) cards is if you're buying the fastest cards available. For more on that, flip to page 34.

Budget buyers will get much satisfaction from Visiontek's Radeon HD 4850 ($150, www.visiontek.com), which pairs an 800-shader-unit GPU with 512MB of GDDR3 memory for killer performance at resolutions common to 22-inch panels. We were able to crank up detail in Fallout 3 and Far Cry 2 while running our 4850 at 1680x1080. That's pretty amazing for a card in this price range.

Packing a pair of GPUs and a whopping 2GB of GDDR5 memory onboard, the Radeon 4870 X2 is the fastest single-slot videocard you can buy.
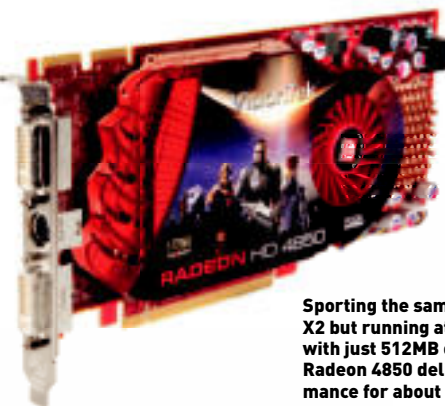
Sporting the same GPU as the 4870 X2 but running at a slower speed and with just 512MB of GDDR3 RAM, the Radeon 4850 delivers great performance for about $150.

MONITORS

An old favorite continues to earn our love

Gateway's 30-inch XHD3000 monitor ($1,600, www.gateway.com) won us over with its ability to play HDCP-encumbered content at its native resolution. But it's color that counts, and the monitor's deep black and clear, distinct grayscales sealed the deal for us; the panoply of inputs (single- and dual-link DVI, HDMI, Component, Composite, S-Video, VGA, six USB 2.0 ports, audio inputs for all video inputs) merely adds to our excitement. We originally reviewed this monitor more than a year ago, but when something continues to outperform the competition, we see no need to change for change's sake.

At the budget end of the spectrum, Envision's G2219w1 ($280, www.envisiondisplay.com) provides exceptional image quality at a reasonable price.
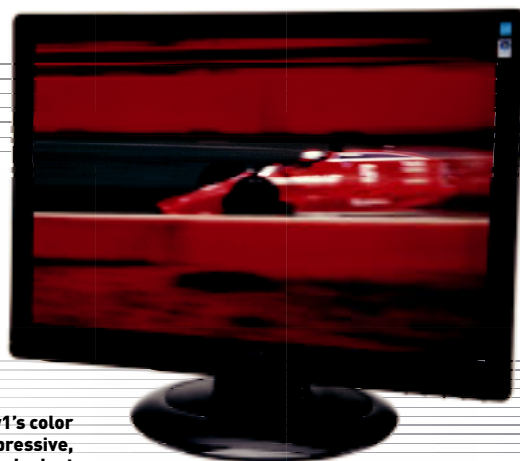
The G2219w1's color saturation is impressive, particularly for a budget monitor.

STORAGE

Speed, size, or savings? You decide

Seagate's 1.5TB Barracuda marries decent speeds with unprecedented capacity.

Hard drives are getting bigger and cheaper all the time, which suits us just fine, as you can never, ever have too many—provided you have enough SATA connections, of course.

Users looking for the ultimate storage upgrade must choose between raw speed and enormous capacity. Intel's 80GB X-25M solid-state drive ($600, www.intel.com) produces, by far, the fastest single-drive read speeds we've ever seen, topping 200MB/s in sustained reads. And though its write speeds are nothing to write home about (which is typical of multilevel cell SSDs), they're not terrible, either. And the added reliability of a solid-state drive (no moving parts, no noise, less heat generation) is a bonus, too.

If capacity is your priority, we have even better news. The 1.5TB Seagate Barracuda 7200.11 ($225, www.seagate.com) smashes the terabyte barrier with panache—it's nearly as fast as a terabyte drive but has half again the storage space, and it can be found for less than $200.

Shoot, if money is no object, why not get both? Load your OS and some apps onto the X-25M, and use the Seagate drive for storage and backup. Sure, it'll set you back about $800 for the duo, but that's what makes it an extreme option.

The solid-state Intel X-25M produces the fastest single-drive read speeds we've ever measured.

Budget-conscious users, fortunately, can still stay in the game. Seagate's 500GB Barracuda 7200.11 ($70, www.seagate.com) is fast and roomy. And half a tera-byte for less than a C-note is nothing to sneeze at. It's the drive of choice in all our budget-building guides.

CPU COOLERS

Beat the heat with either water or air

If money's no issue, CoolIT's Peltier cooler, the Freezone Elite ($450, www.coolitsystems.com), is the product to have. It chilled our test system twice as much as a standard stock cooler on both an idle and full-burn CPU, crushing the best air and water coolers we've tested. The Freezone Elite is expensive, but you will not find a chillier solution!

We've been big fans of Arctic Cooling's Alpine 7 Pro ($17, www.arctic-cooling.com) on the budget end, as it matches the performance of the best coolers we've tested when a CPU is running idle. It's not quite as powerful on full-throttle CPUs, but it still outperforms a typical Intel air cooler by nearly 10 degrees—that's quite an upgrade for the price.

The Freezone Elite is loud, but a controller module auto-matically adjusts the cooler's fan speeds based on a target temperature you set.

Fantasy Island

There's an upgrading tier that lies even beyond the extreme. Practicality plays no part in it, nor do matters of need. These upgrades are nothing

Six Drives, Two RAID Arrays, No Mercy

Our ultimate fantasy storage setup incorporates two RAID arrays with six drives total. Raw speed is the goal of the first array: a 160GB RAID 0 array using two 80GB Intel X-25M SSDs. We'll run this one using the motherboard's integrated RAID controller.

For the second array, we use an Adaptec 5405 RAID controller ($440, www.adaptec.com) to create a RAID 1+0 array (also called RAID 10), which combines the speed of RAID 0 striping with the redundancy of RAID 1 mirroring. We'll use a whopping four 1.5TB Seagate Barracudas to achieve 3TB of storage that can tolerate up to two disc failures before data is lost.

Triple Threat

Going over the top with videocards used to be easy, just buy the two fastest cards and drop them into one machine. Unfortunately, achieving ultimate performance is more complex these days—you have to choose between three GeForce GTX 280 cards in SLI or a pair of dual-GPU Radeon 4870 X2 boards in CrossFire.

We pitted three overclocked EVGA GeForce GTX 280s (the FTW edition) against a pair of stock-clocked 4870 X2 boards and the results were surprising. While the 4870 X2s won a few benchmarks, the clincher was Crysis. Because the game can take advantage of only three GPUs, the CrossFire setup's fourth GPU lays fallow, giving the edge to the trio of GTX 280s for uber-extreme gaming performance!

Bigger, Badder Broadband

The U.S. lags far behind most developed countries in Internet speeds and prices. But if you've got the dough, and you're fortunate enough to live in one of a few test markets in the nation, you might be able to get download speeds of up to 50Mbps.

If you live in New England or the Minneapolis/St. Paul area, you can get your hands on Comcast's DOCSIS 3.0 "wideband," which will get you up to 50Mbps down and 10Mbps up, for *only* $140 a month!

Verizon's fiber-optic FIOS service offers similar service for similar pricing (albeit with 20Mbps uploads), but also lacks wide deployment.
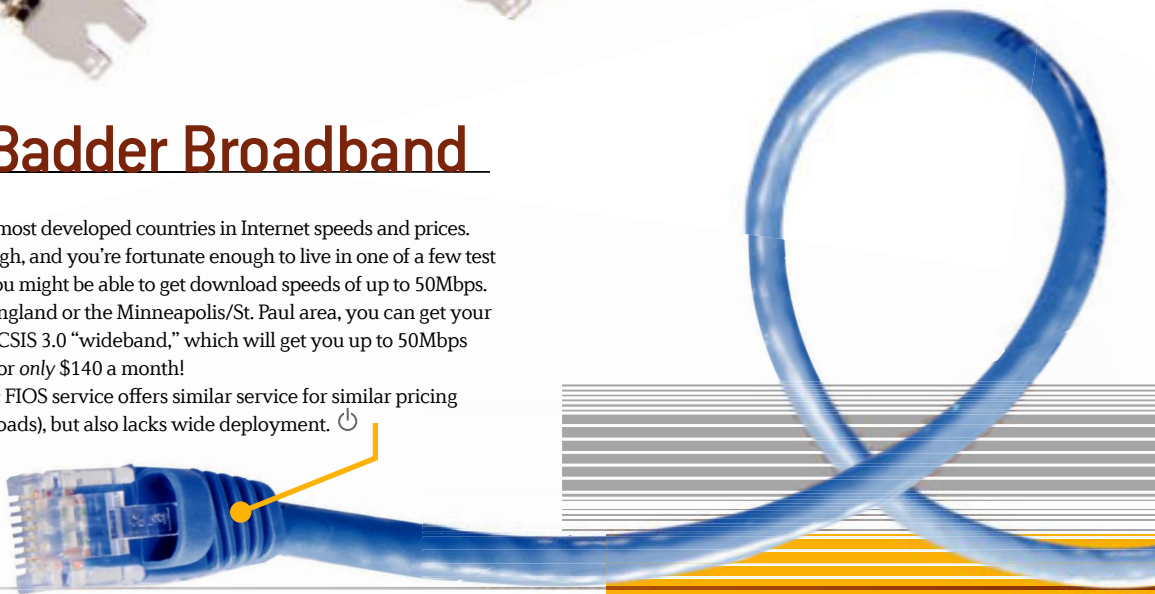
PROTECT YOUR **PC**
FROM GUYS LIKE THIS!
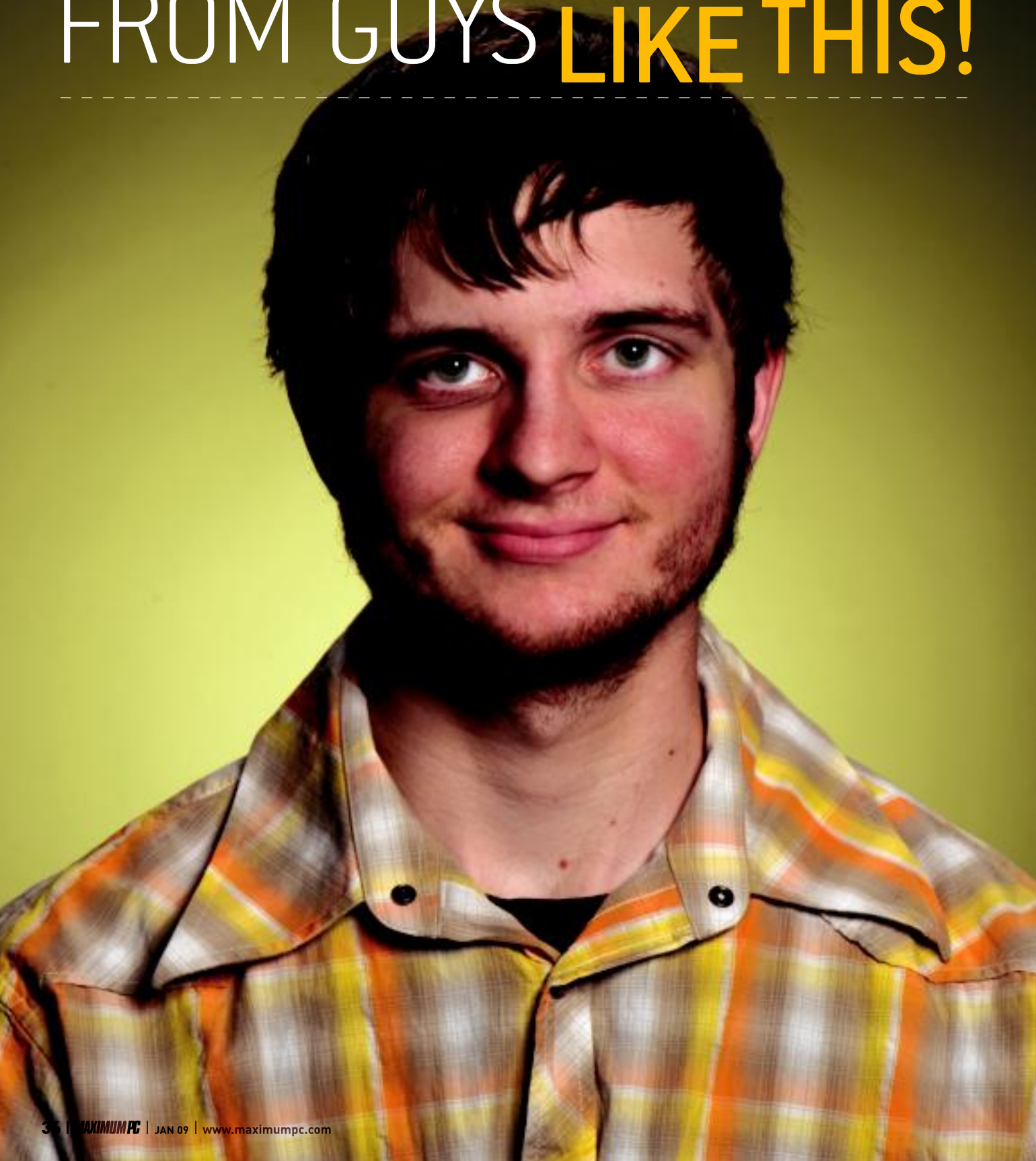
BEHIND EVERY PIECE OF MALWARE—BE IT A VIRUS, SPYWARE, OR ANY OTHER FORM OF HOSTILE, DESTRUCTIVE CODE—IS A SNEAKY, SCHEMING SCOUNDREL, OFTENTIMES SOMEONE YOU'D NEVER SUSPECT. ANTIVIRUS SUITES PROMISE TO DEFEND YOUR PC AGAINST ALL THE BADDIES. WE TEST 10 OF THE LEADING PRODUCTS TO SEE WHICH ONES ARE BEST AT KEEPING YOUR PC SAFE

BY PAUL LILLY

You don't need a military background to recognize that the Internet has turned into a war zone. Not only are you always under attack, but the bad guys possess a seemingly endless arsenal of weapons that are constantly changing. Set foot in the wrong website and you might be stepping into a booby trap of malicious Javascript code. Toolbars and greeting cards come laced with spyware, hackers are finding new exploits faster than software vendors can patch the old ones, and rootkits have given virtual villains a way to stealthily penetrate deep into your system at the kernel level.

And if all that weren't enough, social networking continues to sweep the web, making it even easier for morally bereft miscreants to spread their foul files. Can you really trust that MySpace page you're viewing not to contain some hidden element ready to do you harm? You even need to be suspicious of IMs, and that includes messages seemingly originating from contacts on your buddy list. It's enough to make you want to wave the white flag—and if you plan on going into battle alone, you probably should.

But you don't have to fight the fight all on your lonesome. Several security vendors offer software packages that not only promise protection against viruses, but also purport to run off rootkits, stop spam dead in its tracks, and even circumvent websites from loading hidden malware before it has a chance to run amok on your PC. This got us wondering, just how much protection is actually necessary?

To answer that question, we hit up all the major security vendors and asked them to send us their most robust packages. We also gathered the most popular free antivirus programs for comparison. After all, power users know how to practice safe computing habits, which can go a long way toward PC safety. We'll cut through the hype to tell you if the protection you get with a paid app is any better than what you can get for free—or if the paid programs, which have become so huge as of late, are too unwieldy and ultimately more troublesome than the viruses they're meant to combat.

OUR TESTING METHODOLOGY

It doesn't matter how effective an AV app is at catching viruses if it means we have to suffer through constant nagging or performance degradation in our day-to-day computing. We've identified the five criteria by which security apps should be judged

SYSTEM PERFORMANCE AND SCAN SPEED

We know you spent time researching components and toiling over your system build, so why let a poorly optimized program transform your hot rod into a horse and buggy? To gauge each AV package's performance impact, we loaded up a series of action scripts in OSMark (http://tinyurl.com/OSMark), paying close attention to both memory and CPU activity. We then compared the results to that of a clean install.

We're also interested in how long it takes to complete a full system scan. In today's dual- and quad-core landscape, you no longer have to sit idly by waiting for a scheduled scan to finish, but if you suspect your system has become ill, you won't want to do much of anything until your virus scanner produces a clean bill of health. With stopwatch in hand, we measured the time it took each program to run through its routine.

THERE'S NO POINT IN OWNING A SECURITY SUITE STUFFED WITH APPS IF MOST OF THEM SUCK.

ANNOYANCE

Whether we're using our PC for work or play, we don't want to be bothered with near-constant nagging from our security software. An AV app should integrate seamlessly with the OS and be able to do its job with minimal interaction from the end user, while still offering at least some level of customization. Otherwise, it's no less obtrusive than the viruses it's supposed to be protecting against.

In order to assess how much each app intrudes on our day-to-day life, we performed a variety of common tasks to see how the AV software responds, if at all. This includes web surfing, downloading files, running executables, playing games, and everything else you're likely to do with your PC.

We also took into account how much harassment we can expect to receive when the subscription runs out.

FEATURES AND IMPLEMENTATION

Anyone who's ever shopped for a new car knows what it's like to be pressured into paying extra for all kinds of upgrades. And just because the salesman is attempting to increase his profit margin doesn't mean you can't both benefit from tacking on useful additions, but that only works if you'll actually use the added amenities. Do you really need six cup holders in a two-seat sports car?

Likewise, there's no point in owning a security suite stuffed with apps if most of them suck. Not only that, but you need to consider whether this added functionality is easy to use and how much pestering you can expect from disabling unused features. We take all this into consideration.

PRICING

Let's be honest, nobody likes to pay for software utilities. It doesn't matter that we spent an entire week's pay on two of the hottest videocards so we can squeeze a few more frames per second out of Crysis or that we took out a loan to fund the fastest processor money shouldn't buy (hey, it comes with an unlocked multiplier!), there's just something about paying for security software that feels sacrilegious. Maybe it's because the free alternatives have done so well in the past. Whatever the reason, these paid apps have to prove their worth in the bang-for-buck department. Higher-priced suites should come with a bevy of useful features, offer a high level of customization, be easy to navigate, and, above all, perform competently.

VIRUS DETECTION

We don't care what method each AV application uses to identify and disinfect viruses, so long as it gets the job done. The only way to find that out is to bombard each package with a multitude of payloads representing the thousands of viruses running rampant in the wild. Rather than scour the web trying to build up a repository of infected files, we turned to the experts to lend us a hand.

Virus Bulletin (www.virusbtn.com) is an independent testing lab whose certifications are sought after by antivirus vendors. We scrutinized the latest detection results for each AV app and paid attention to the percentage of viruses caught, which includes Trojans, polymorphic viruses, worms, bots, and more, and then we punished each app with our own collection of malware.

McAfee TOTAL PROTECTION 2009

A mishmash of features leaves us with mixed feelings

Most enthusiasts view McAfee as just another resource hog often found in OEM systems alongside performance-pillaging bloatware. Fair assessment or not, this is the perception McAfee's up against in trying to win over the PC elite. It helps that the company isn't blissfully unaware of the importance placed on performance; its latest edition promises to raise the bar with a more efficient engine that won't drag your system down.

In our testing, McAfee fell in the middle of the pack instead of leading the charge. RAM consumption crept above what we'd consider lean, and while scanning for malware, CPU utilization often hovered around 40 percent. That in itself isn't criminal, but we felt swindled when all it bought us was the second-slowest scan time of the bunch—although, remarkably, we didn't see much of a drop in gaming or day-to-day computing performance.

VERDICT 6
www.mcafee.com
$70 (3 PCs)

McAfee's list of features ranges in practicality from the beneficial to the unlikely to ever be used. Occupying the former camp are spyware protection, a highly configurable firewall, email and IM guards, basic parental controls, and a file shredder. But we just can't get stoked about the virus map, which displays global viral hot spots, or the HackerWatch module, which looks for patterns of attack around the world to report to ISPs. And still other features, like Active Protection for real-time safeguards, will be made available only through future updates—boo!

Living up to its name, McAfee Total Protection 2009 proved a formidable adversary against all types of
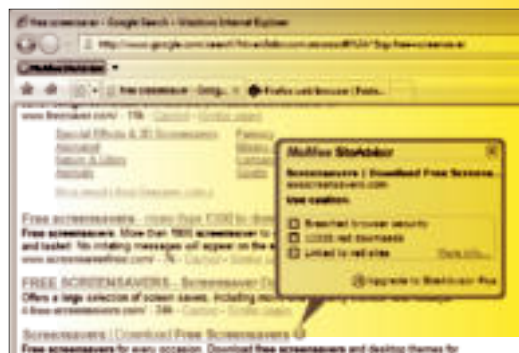
McAfee's SiteAdvisor not only tells you which websites are unsafe to click, but also lays out all the gory details.

malware and even stopped malicious websites from loading. We also dig McAfee's SiteAdvisor tool, which not only identifies questionable search results but also gives a detailed report on why the URL is suspect. But no matter how good it protects, we're not willing to endure slow scanning performance or wait for features that should have been available at release.

■ ■ ■ **LINGO**

Malware Terminology 101

A computer virus is a piece of software or code capable of reproducing itself and spreading to other systems, but the term is often used to describe a multitude of threats. The effects of malware can range from mildly annoying to completely debilitating, sometimes costing corporations thousands of dollars in downtime and man-power to heal the outbreak. Let's have a look at the different types of infections.

TROJAN HORSE Named after the mythological wooden horse used to sneak Odysseus and other Greek heroes into Troy, a Trojan horse will masquerade as a legitimate program but will unleash a harmful payload once installed.

WORM Computer worms are self-replicating programs that burrow into systems, seeking out vulnerabilities to exploit. The ability to spread without any user action makes them particularly dangerous.

SPYWARE Ever feel like you're being watched? If your PC is infected with spyware, you just might be. Even worse, spyware not only monitors your activities but can also hijack your system with redirected web searches and other annoyances.

POLYMORPHIC To avoid detection, polymorphic malware constantly changes its own code, often using encryption with a variable key. This stealthy technique poses a problem for typical scanners.

Norton INTERNET SECURITY 2009

Could this be the luxury sedan of antivirus suites?

For the latest version of its AV suite, Symantec went back to the drawing board and completely rewrote the program from the ground up with a focus on speed. Even the installer has been revamped; in an attempt to reduce setup time to less than a minute (we clocked it at 55 seconds), Symantec coded its own proprietary installer instead of using Microsoft's, as it has in the past.

This year's release adds a smart scheduler that monitors task utilization in real time and queues up its task if the system is busy so that if you're lining up a headshot in your favorite shooter, NIS will take a backseat until system resources are freed. But if a task qualifies as critical, it will run regardless of what you're doing, so you can continue to crunch Folding@ Home without being a sitting target. And to keep itself honest, Symantec integrates a system monitor showing what percent-

age of CPU cycles NIS is consuming—nifty!

Live Update has been rewritten too, and in addition to regular updates, Symantec sends out micro updates. These pulse updates ensure that when a new threat is discovered in the wild, you'll have the necessary signature definition within minutes instead of waiting up to 24 hours for the next refresh.

The program swept through our test system in less than 10 minutes, and subsequent scans completed in less than two minutes! NIS accomplishes this by discerning between trusted and untrusted files and by default won't

VERDICT 9 www.symantec.com
$70 (3 PCs)

KICK ASS!

rescan files that haven't changed.

NIS 2009 leaves virtually no security stone unturned. Our biggest knock is that not all features work under Vista x64, such as right-click scanning. Still, if security suites were cars, consider NIS 2009 a decked-out Lexus.
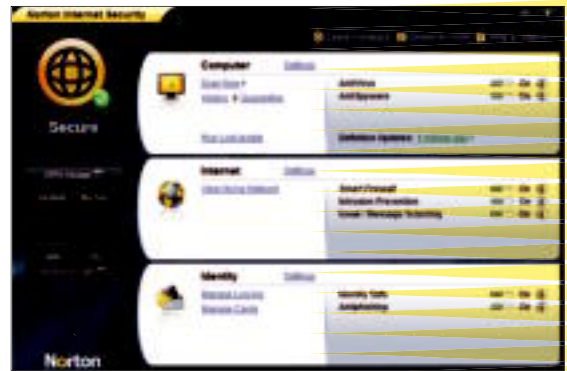
NIS shows you which programs are eating up your system resources, even at the risk of self-incrimination.

Kaspersky INTERNET SECURITY 2009

Why pay more when you can get the same or better for less?

At $80 for a one-year subscription, Kaspersky charges more than any other suite we tested. If you buy the downloadable version instead of a retail boxed copy, the license is good for up to three users—that's little consolation to single-PC households.

Kaspersky also holds the undesirable record for longest install time. What started off as a pokey two-minute install ballooned into an agonizing eight minutes composed

of a tediously long update and no less than two reboots.

Once we were finally up and running, Kaspersky began to atone for its pricing and installation sins. Like Norton's package, Kaspersky significantly shortens subsequent system scans by skipping files already determined to be clean. During an initial run-through, Kaspersky's iChecker algorithm makes note of certain files' digital signatures and saves them in a special table. If the signature matches the next time a scan takes place, the file will be skipped over. The result is that a 12-minute system scan was reduced to a blazing one minute and 14 seconds, finally setting a record Kaspersky could be proud of.

Like the other full-featured suites, Kaspersky crams a multitude of tools into a neatly organized package and manages to set itself apart in some areas. Rather than limit email scanning to Outlook and POP3, Kaspersky also analyzes IMAP traffic. It boasts a banner-ad blocker and, through parental controls, the ability to limit how much time children can roam the web. Finally, road warriors will appreciate the option to automatically disable scheduled scans when running on battery power.

Kaspersky provided a formidable wall of defense against both viruses and spyware, keeping our test bed protected against Trojans, dialers, and other Internet-bound ills. But so did some of the less-expensive suites.

VERDICT 8 http://usa.kaspersky.com
$80 (3 PCs)
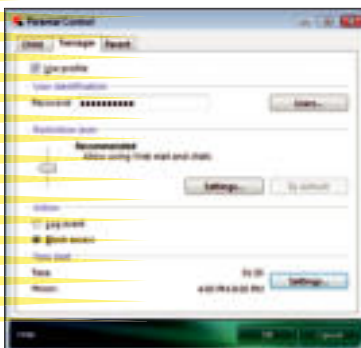
Worried your kids are spending too much time online? Use Kaspersky's parental controls to set a time limit.

AVG INTERNET SECURITY 8.0

An old favorite gets a new look

Now in version 8.0, AVG's latest release appears to have taken a page or three from Vista. A redesigned interface sports high-resolution icons and a more colorful palette, and even the system tray icon feels borrowed from Microsoft's newest OS; turn off one of the security modules and the icon turns red, alerting you to impending doom, even if you've only disabled the spam filter. That's just wacky. Thankfully, you can turn off the ominous notification.

No other AV application we tested consumed more RAM, and our performance benchmarks took the biggest hit with AVG installed. During a system scan (which, while not the slowest, dragged along at the tail end of all the suites), CPU utilization averaged 25 percent with sporadic spikes reaching as high as 84 percent. We didn't know if AVG was scanning or having a seizure.

AVG provides one of the more feature-rich packages of the bunch.

VERDICT 6
www.grisoft.com
$55 (2 yrs)

In addition to the new scanning engine, you'll find spam and spyware protection, a firewall, safeguards against drive-by downloads, immunity against IM-bound attacks (IQC and MSN only), a customizable scheduler, and a rootkit scanner. Tying it all together is a back end brimming with options to satiate even the most demanding security connoisseur.

We especially like the concept behind AVG's web protection; we just wish it worked better. The Active Surf-Shield component scans visited web pages for malicious code and the Search Shield checks Google, MSN, and Yahoo search results for active threats, but enabling them slows down web surfing. And at the time of this writing, Search Shield is not working with Firefox 3.0.

AVG's detection rate dips below that of the best-performing AV apps during Virus Bulletin's extensive testing but still earned a VB100 award, meaning it caught all of VB's in-the-wild viruses with no false positives. AVG also excelled in our own tests. Just make sure you have a modern system to run it on.

AVG's redesigned interface makes it easy to find the options you're looking for.

■■■ **SAFE COMPUTING**

How to Avoid Viruses

Captain Obvious says that the best way to prevent infection is to avoid viruses in the first place, but what he doesn't tell you is how to do it. And even though hackers continue to get more cunning in both delivery and execution, you can tip the odds considerably in your favor by practicing safe and sane computing.

If you receive an unknown or unexpected attachment, don't open it no matter who it came from. Not only are some viruses capable of emailing themselves to everyone they find in an infected user's address book, but inexperienced computer users are just as guilty of passing along payloads as hackers are of distributing them.

BitTorrent sites and peer-to-peer networking clients are also common modes of spreading infection. When attempting to download a legitimate program—a Linux distro, for instance—use the link provided at the vendor's website. Pirated software is a particularly popular source of malware, so if your moral compass doesn't steer you toward the straight and narrow, the risk of infection should.

And finally, get in the habit of regularly checking for software updates. New exploits are always being discovered in Windows, QuickTime, web browsers, and other common programs.

AVAST! 4 HOME EDITION

You won't find many diamonds in this rough

It's almost as if Czech-based developer ALWIL intentionally designed Avast! to be annoying, starting with the exclamation point in the program's title. We can forgive the name, but we're not so quick to offer amnesty for the program's other failings.

Despite being offered as a free download for home use, you're required to register the product, after which you'll be sent a product key. Without it, the program will stop working after 60 days. Worse yet, you have to re-register every year just as you do with a paid program, which doesn't instill confidence that ALWIL won't one day decide to stop offering Avast! gratis.

What starts off as a ridiculously fast install time turns into a 20-minute endeavor if you choose to perform a boot-time scan during the required system restart. Scanning our test system from within Windows was even slower, taking 24 minutes, making Avast! by far the pokiest of the pack. The slow-footed scanner was also the second-largest system hog.

We're not sold on the gimmicky main menu, which deliberately resembles a media player complete with a play, pause, and stop dial for controlling system scans. We're grateful the On-Access Scanner menu takes a more mainstream approach, and it's here where you'll spend time customizing the several shields. In addition to the usual suspects—web shield, Outlook/Exchange module, Internet mail controls, system and network shields—you'll find support for nearly every IM and P2P

VERDICT 4 www.avast.com Free
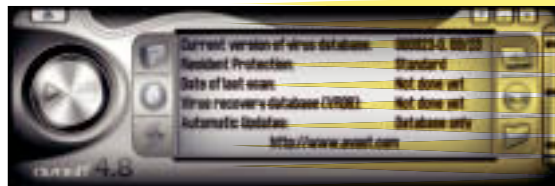
If we could load our awesome tunes on Avast!, we'd be more apt to dig the media-player interface.

client you can think of.

It's a shame so much about Avast! annoys us because the scanning engine, despite bogging down our system, had us strutting across the web with reckless abandon. Avast! cut off all forms of malware at the knees, preventing us from downloading various forms of pestilence and blockading their websites of origin. But ultimately you're just trading one inconvenience for another.

Avira ANTIVIR

A superb detection rate makes up for paltry options

At first glance, you might be inclined to dismiss Avira's AntiVir as nothing more than a run-of-the-mill virus scanner with a feature set that's as meager as its price. The sparse interface certainly won't wow any power users, but it would be a mistake to cast AntiVir aside based solely on appearance. A tiny checkbox in the upper-left corner of the configuration screen unlocks the program's Expert mode, and with it a heap of options previously unavailable. This still doesn't put the program

Get used to this popup because you'll see it every time AntiVir finishes a scheduled update.

on par with the more robust packages in our roundup, nor is the menu system laid out as intelligently as some of the other programs'. Nevertheless, you're given enough control not to feel cheated, even for software you didn't have to pay for.

You can choose between three levels of heuristic scanning (low, medium, or high) or turn it off completely. Likewise, enabling the Macrovirus heuristics option will ensure that all macros are deleted in the event an infection necessitates a repair. AntiVir will also rummage for rootkits and examine emails for suspect files, and it even proved surprisingly successful at killing off keyloggers, a feature Avira doesn't list for any of its security products. What

VERDICT 7 www.free-av.com Free

it won't do is combat most forms of spyware or prevent hackers from exploiting your browser.

AntiVir's biggest strength lies in its detection rate. It's the only scanner in our roundup to triumph with a near clean sweep during Virus Bulletin's latest testing, and it did so without reporting any false positives. That's impressive. AntiVir performed equally well in our Lab, as long as we didn't attempt to install spyware or hijack the browser.

If you can live with the popup ad AntiVir forces you to view each time a scheduled update is performed, you'll be rewarded with a potent, no-cost AV scanner. Move over AVG, we have a new favorite freebie.

FRISK SOFTWARE F-PROT ANTIVIRUS

Unlike the other paid suites in our roundup, F-Prot forgoes the bells and whistles in favor of a one-instrument orchestra. You won't find a spyware scanner, phishing protection, spam controls, or anything else beyond an AV engine. From a performance standpoint, F-Prot's approach has the potential to be a dream come true, but it didn't take us long to figure out we were in the midst of a nightmare, one from which we couldn't wake up fast enough.

VERDICT 5 www.f-prot.com
$29 (up to 5 PCs)

AVG FREE EDITION

We've long praised AVG's freebie app, and for good reason. It ran fast, was a cinch to set up, and offered protection that rivaled what the paid suites could offer, leaving us little to gripe about. But that was then, and AVG's put on some weight since the last time we were intimate. The protection is still there and the colorful interface blends right in with Vista's GUI, but its appetite for resources is bigger than ever before.

VERDICT 6 http://free.avg.com
Free

FULL REVIEWS AT
http://tinyurl.com/6lnclx

PC TOOLS ANTIVIRUS

PC Tools made a positive impression on us when we reviewed its ThreatFire application back in February 2008, so we had high hopes the company would again earn our praise for its approach to security. But instead of lauding PC Tools' free AV app, we're cursing its very existence. The app strung our test bed up like a piñata for malware to mangle. Proof positive that the best things aren't always free.

VERDICT 3 www.pctools.com
Free

ESET SMART SECURITY

ESET's Nod32 antivirus software collects VB100 awards the way Michael Phelps chases gold medals, and the company's Smart Security suite builds on that core with an Olympic package covering nearly all the malware events. Ancillary features mesh well with the main scanner, and the pool of advanced options overflows without drowning you in complex language. It's also one of the fastest scanners of the bunch. So what's the catch? We're still trying to find one!

KICK ASS!

VERDICT 9 www.eset.com
$59 1 yr ($89 2 yrs)

DARE TO COMPARE: FEATURES

	EMAIL SCANNING	IM SCANNING	SPYWARE PROTECTION	ROOTKIT PROTECTION	HEURISTICS	FIREWALL	IDENTITY PROTECTION	SPAM CONTROLS	PARENTAL CONTROLS	MEMORY USAGE
MCAFEE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	95MB
ESET	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	57MB
SYMANTEC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	52MB
AVG PAID	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	97MB
AVAST!	Yes	Yes	Yes	Yes	Yes	No	No	No	No	100MB
ANTIVIR	Yes	No	No	Yes	Yes	No	No	No	No	70MB
F-PROTECT	Yes	No	No	No	Yes	No	No	No	No	35MB
KASPERSKY	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	101MB
PC TOOLS	No	No	No	No	No	No	No	No	No	30MB
AVG FREE	Yes	No	Yes	No	Yes	No	No	No	No	83MB

Android

AUTOPSY

Google's long-awaited mobile OS debuts in HTC's G1 handset. Should Apple be nervous?

BY TOM EDWARDS

Mobile phones can garner a fair amount of attention (see: hysteria, iPhone), but a mobile OS? Not so much. That is, until Google gets involved. Upon its release, the company's mobile OS, Android, elicited extensive coverage in the mainstream press, thanks to the widely held notion that Google is perhaps the only corporation with both the funds and innovation to compete with Apple in the mobile space. Google hopes to do this not by controlling every facet of hardware design and production (as Apple does) but rather by releasing Android under an open source license and allowing hardware manufacturers to create handsets with a variety of features and formfactors. Further differentiating Google from Apple is the former's policy of openness concerning third-party apps. While Apple squashes any

apps that duplicate a native function on the iPhone, Google is taking a hands-off approach, allowing anything other than malware to be sold through its Android Market.

So is the Android experience all it's cracked up to be? We turn to HTC's G1 handset for answers. While other hardware manufacturers and wireless providers are certain to release their own Android phones in the future, at this time, only Motorola has confirmed plans to release such a device. That gives HTC's G1 a head start on the competition. But can this first-generation Android phone compete with phones that have more fully developed OSes? We gave the G1 a thorough workout and then put it up against a second-generation iPhone to see if it can hold its own against modern smartphones.

HTC G1 Dissected

We probe deep to see what powers this Android

The G1 does not overwhelm out of the box. It neither elicits squeals of delight nor drives people to camp out on the pavement in order to purchase one. It does not engender comparisons to a deity or cause the press to swoon. It does not promise to change your life or change the way you view the meaning of life. All the G1 does is operate as promised, and that, in these times when seemingly every product comes with the assurance of life-altering capabilities, is actually quite enough.

For all its simplicity though, the G1 does have a number of shortcomings. And depending on how you use your phone, these deficiencies may be enough to merit passing on this device—at least until the G2 is announced. For most people, however—particularly folks who already have and are satisfied with T-Mobile service—the G1 will represent a clear improvement over their current handset.

The G1 doesn't draw *oohs* and *aahs*, in part, because it doesn't look particularly innovative. In fact, it eschews the iPhone's minimalism by sporting a slight curve at the mouthpiece as well as four buttons and a trackball. At 4.60"x2.16"x0.62", it's big, but not so chunky you'll be forced to sport a holster to carry it around. Much of the phone's bulk is due to the inclusion of a full QWERTY keyboard that's revealed by flipping up the screen from the horizontal position. The keys are raised, making touch typing easy, though we prefer the responsiveness of a BlackBerry keyboard. The 3.2-inch 320x480 capacitive touch screen is bright and responsive but not so sensitive as to mistake scrolling or flicking for taps. The screen does, however, lack multitouch functionality, and more importantly, a keyboard.

The G1 ships with a 1GB SD card but will accept up to a

Though not a great beauty on the outside, the Android OS makes the G1 a good catch.

The large, responsive keyboard includes a dedicated Search button.

16GB card. We had mixed results with 3G connectivity; we were unable to use it at all in our home but had good success overall while using the phone in the Bay Area. We had similar issues with the GPS—we had trouble connecting in some parts of the city and dropped out on occasion, but overall had few issues when using the GPS for driving directions. Sound quality was good and we didn't experience any dropped calls.

The G1's hardware specs are solid, if not necessarily groundbreaking (the one brand-new feature is a compass, which is quite useful when using Google Maps Street View). The phone's true strength is the Android operating system and the associated apps. Setup is pick-up-and-play simple,

requiring users only to log in to their Google accounts. The tight synergy with Google apps creates a cohesive user experience—if they are your default apps for email, calendaring, and messaging. Your email contacts are automatically updated and the mobile Gmail app is a doppelganger of the one you use on your desktop. However, if you rely on Exchange and desktop sync for work, you're likely to be disappointed. There is no Exchange support at all (though POP3 and IMAP support is available) and desktop sync is possible only via a third-party app, and even then it works only from your desktop machine to the phone, not in the other direction.

The Android Market, though, shows the possibilities of the Android OS and the G1. Even just a few weeks after launch, there are numerous apps that separate this phone from what most other handsets offer. Built-in apps include Amazon MP3, which allows users to make one-click purchases of DRM-free MP3s, and ShopSavvy, a barcode scanner that produces a comparative price list of a scanned product for both online retailers and shops in your vicinity.

While Google's promise of openness assures that the market will include a number of apps of questionable value, that same policy also means that the breadth of options will be immense. During testing, we downloaded more than 20 apps, and though there were certainly some clunkers—iSafe for one, an app that promised to warn us when entering a crime-filled neighborhood—we found more apps we'd keep than delete. Early winners include CardioTrainer, which maps and automatically uploads running routes, and Telegraph, a news reader developed by *The Daily Telegraph* that American news services would be wise to copy.

Whether the G1 is the right phone for you depends largely on the quality of T-Mobile's 3G network in your area. Though the last of the major wireless providers to roll out such a network, T-Mobile now offers 3G in 95 metro areas. If you have solid coverage around your workplace and home (and you don't depend on Exchange), the G1 represents a solid value at $180.

SPECIFICATIONS	
DIMENSIONS	4.60"x2.16"x0.62"
DISPLAY	3.17", 320x480 capacitive touch screen
MEMORY	1GB microSD, expandable to 16GB
CAMERA	3MP
NETWORK	GSM

VERDICT

8

ANDROID HTC G1
$180, www.t-mobileg1.com

■ ■ ■ AWESOME APPS

The Best of the Android Market

Until early 2009, all apps on the Android Market are free, so stock up now. The number of apps is increasing daily, and while there are some lemons among them, there's a good selection of must-have apps, such as those listed here.

BRAIN GENIUS
Challenge the ol' noggin' with this mix of brainteasers that will test your calculation, memory, observation, and reasoning skills. Take a daily test in an attempt to increase your brain rating or just work through a single test to get your cranium back on track.

TODDLERLOCK
Entertain your little ragamuffin (or mescaline-loving second cousin) with this app, which locks all other phone functions and displays an array of colored triangles, stars, and other shapes on the screen, along with an optional soundtrack to expand your mind.

RINGDROID
Make ringtones from any song, or any recording, for that matter, directly on your phone. Select a song, or use the G1's mic to record a coworker, and use the built-in audio-editing app to select the part of the recording you want to use as a ringtone. No need to use Audacity or another editing app on the desktop and then transfer the ringtone.

LOCALE
Avoid the embarrassment of rocking that "Superfreak" ringtone at the workplace by using Locale. The app lets you change phone conditions such as ringtone, ringer volume, and network based on conditions such as battery life, date, contact, location, and time. You can even change your phone's wallpaper based on your location.
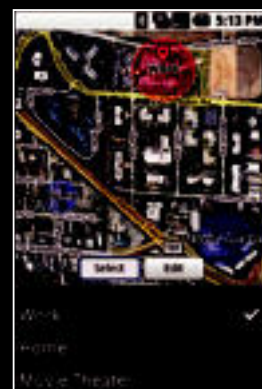
HOMES
This handy app lets you search for homes for rent or sale based on your current location or a specific address. The search criteria are limited to maximum price and number of bedrooms—we'd prefer additional options such as parking and minimum price too. But even with these shortcomings, it's a useful app when you're house hunting.

LEARN MORE AT
MAXIMUMPC.com
http://www.tinyurl/5dtb63

HTC G1 vs. Apple iPhone

Electronics typically aren't given deity status: There's no Buddha MP3 player, no Shiva GPS, no Hachiman flash drive. There is, however, a Jesus phone—at least according to the Apple faithful. And while we think that moniker might be imprinted with just a touch of hyperbole, we can admit that the iPhone was a game-changer on the mobile scene, bringing new life to a product class that, while ubiquitous, had grown a bit stale. The HTC G1, powered by Google's Android, has garnered a fair share of attention itself (though no comparisons to supreme beings). But can a device running a fledgling OS compete with the best-selling phone in the country?

HTC G1
$180, www.t-mobileg1.com

ROUND 1

NETWORK

The G1's and iPhone's data and voice plans are comparable in terms of price, depending on how much texting you do (T-Mobile's unlimited text plan is cheaper). But even more important than cost is the quality of the network—and AT&T had a head start of several years on T-Mobile in rolling out a 3G network. Until recently, T-Mobile simply didn't have the spectrum to support 3G. While T-Mobile is moving quickly to expand its coverage, it still falls behind AT&T in total area covered. Of course, each individual's situation will be different, but right now, odds are better that AT&T has you covered.
WINNER: IPHONE

ROUND 2

APPS

Apple simply has time on its side in this area. Both the breadth and overall quality of the apps available for the iPhone outstrip what's currently available for the G1. We expect this disparity to diminish over time, but if you're not willing to wait for *New York Times* headlines or Brian Eno's Bloom app, you have to give this round to the iPhone. The G1 does have some solid apps at launch (we love CardioTrainer) and, as a bonus, everything on the Android Marketplace is free until early 2009, but it's just not enough to compete.
WINNER: IPHONE

ROUND 3

INTERFACE

The iPhone brought multitouch to mobile phones. Unfortunately, it didn't bring a physical keyboard along for the ride as well. And as well-executed as the iPhone's touch screen keyboard is, we still find ourselves hitting the wrong keys on it much more often than we do with the G1's physical keyboard. We also prefer the G1's trackball for scrolling through web pages and clicking links. This is one area in which the G1 clearly outshines the iPhone. **WINNER: G1**

ROUND 4

HARDWARE

Both phones feel solid in your hand. The G1 is a bit bulkier than the iPhone due to the inclusion of a physical keyboard, but the difference in weight is negligible. Apple ditched the recessed headphone jack with the iPhone 3G, while HTC decided to go with a proprietary jack. Although the iPhone is certainly the more stylish of the two phones, we prefer the slight angle at the bottom of the G1 to the ramrod straight iPhone formfactor. While there are differences in design between the two phones, there's simply not enough to declare one a decisive winner. **WINNER: TIE**

IPHONE
$200, www.apple.com

ROUND 5

BATTERY

During our tests, we found that an iPhone 3G lasted about nine hours during typical use—some Wi-Fi use, making and receiving calls, and using a variety of apps. There were a number of complaints about the G1's battery life at launch, but we've averaged about 10 hours of use during our tests. We also prefer the convenience of a removable battery. **WINNER: G1**

And the Winner Is...

Although each handset won two rounds of our fight (with one tie), we simply have to give more weight to the apps and network categories. With similar hardware specs, this fight comes down to the quality of the apps available now—and the iPhone clearly wins that fight. Additionally, although we like the simplicity of purchasing DRM-free MP3s from Amazon MP3 via the G1, the phone's media-playing options are thin. There is no video player and the music player does not come close to equaling the functionality of iTunes. We expect good things from the G1 in the future, particularly once the Android Market matures, bringing a wide range of apps to the phone. Until that time comes, however, we must recommend the iPhone over the G1.

WHITE PAPER

Music Discovery Services

Learn how technology can help you discover new, free music on the Internet

—MICHAEL BROWN

Listen to the mind-numbingly repetitive radio programming on the FM dial long enough, no matter which genre you prefer, and you might conclude that only a handful of recording artists are worth listening to.

Fire up your PC and tune in to Internet radio, on the other hand, and you'll discover an embarrassment of riches, nearly all of which you can enjoy for free and without—

or at least with very little—commercial interruption. In fact, there's so much music that you might find yourself overwhelmed. That's where the music discovery services Last.fm, Pandora, and Slacker come in. All three services help you discover new music based on the songs and artists you express a preference for. As interesting as that concept is, what's even more remarkable is that each service takes a completely different approach to the mission. Let's take a look at all three.

LAST.FM

Last.fm mixes Internet radio with aspects of social networking. The service started out as an Internet radio station that allowed listeners to express their preference or disdain for particular songs by using a Love or Ban but-[...] Last.fm used this information to develop [...]ue profile for each user and to create [...]nic playlists.

[...] he service was later merged with the [...]ioscrobbler music-discovery system, a [...]nd-alone application originally designed [...] record the music played on registered [...]omputers. This enabled Last.fm to collect [...]tatistics that could chart a track's worldwide popularity. Each time you listen to a song—whether it be online or from your personal library—the tune gets "scrobbled," meaning its title is sent to Last.fm and added to your music profile.

Last.fm analyzes your initial list of favorite artists (which you provide when you first sign up), your personal music collection, and your expressed preferences (based on your use of the Love and Ban buttons) and begins streaming songs it thinks you'll enjoy. In that respect, it's not terribly different from Pandora or Slacker; Last.fm becomes unique when you take its community aspect into consideration. Subscribers can join

groups based on common interests, create friends lists, and view each other's profiles. Profiles list tracks the person has recently listened to, songs in their library, as well as

PANDORA HAS 50 MUSICOLOGISTS ON STAFF ADDING SOME 15,000 TRACKS TO THE MUSIC GENOME AND PANDORA DATABASES EACH MONTH.

charts listing their top artists and tracks. The service also uses a collaborative filtering algorithm to compare your preferences with those of like-minded subscribers and build a personal recommendations page.

PANDORA

Pandora takes a more scientific approach to music discovery. The company's founders started an initiative called the Music Genome Project in 2000, with the goal of analyzing the fundamental elements of a song, and Pandora uses this data to analyze the music you listen to on the service and then recommends other songs and artists you might enjoy.

Pandora's musicologists go much further than simply breaking a song down to its hook, chorus, and bridge; following the basic tenets of music theory, they scrutinize each song for as many as 400 distinct musical characteristics. They identify attributes ranging from major/minor key tonality (whether a song's harmony is based on a major or minor musical scale), level of syncopation (a rhythmic quality in which emphasis is placed on upbeats, versus the more conventional downbeat), and instrumentation (which types of musical instruments are featured in the song, including a distinction between electrified and acoustic instruments). You'll find a more complete listing at http://tinyurl.com/6huh49.

Pandora has 50 musicologists on staff adding some 15,000 tracks to the Music

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Rhythm or Algorithm?

Tell these services which artists and songs you gravitate toward and their algorithms will analyze your likes and dislikes and recommend similar music.

Genome and Pandora databases each month. When you sign up for the service, you provide it with one of your favorite songs or artists and it will use an algorithm to pick other songs and artists from its database that it predicts you'll also enjoy.

When we told Pandora we enjoyed folk artist Guy Clark, for instance, it began playing Kris Kristofferson's "Pilgrims Progress." Since we hadn't given Kristofferson much thought since the 1998 Wesley Snipes vampire flick *Blade*, we clicked the "Why was this song selected?" button. Pandora replied, "Based on what you've told us so far, we're playing this track because it features folk roots, country influences, gospel influences, a subtle use of vocal harmony, and acoustic sonority."

SLACKER

Slacker's name is somewhat ironic since it could be argued that this service is powered more by human effort than either Last.fm or Pandora. Like those two Internet radio stations, Slacker uses algorithms to analyze your expressed preferences and then recommend music it thinks you'll enjoy, but Slacker is unique in that it hires professional deejays to program its stations (which is to say the deejays are choosing which songs are played on the radio stations, not that they're writing the software that runs the show).

Slacker has 120 prefab stations, and each deejay is responsible for programming just one or two of them to ensure that the person populating the playlists is an expert in that genre. The deejays also monitor what users are listening to (or skipping, as the case may be) in order to track which songs are trending popular; they'll then increase their rotation so that they're played more often. But they also take care to avoid playing a particular song so much that listeners grow tired of hearing it.

Subscribers can also create custom stations based on their own musical tastes, using the familiar Love It/Ban It buttons. As you populate the station with your favorite artists, Slacker will recommend other artists in the same genre. You can fine-tune your Slacker stations with slider controls that boost or limit the degree to which the service's recommendation algorithms expose you to new artists, play popular or more obscure tracks, and select primarily older classics or new releases. ⏻

OCZ Core 64BG SSD

Solid-state drives offer lightning-fast read speeds with no moving parts. Here's what's inside the OCZ Core 64GB drive. Hint: It's pretty simple.

NAND FLASH MEMORY Eight 8GB Samsung multilevel cell (MLC) flash memory modules make up this drive's 64GB of storage. Multilevel cells store twice as much data as the single-level cells used in many other SSDs, but SLCs last much longer and are faster.

CONTROLLER A JMicron JMF602 controller passes information between the SATA interface and the NAND chips that store data. Many SSDs based on this particular chipset suffer from latency issues.

CASE A lightweight alloy casing holds the circuit board. Since the drive has no moving parts, there's no need for vibration-damping or noise-reduction features.

SATA II PORTS Yep, this solid-state drive, like standard hard drives and optical drives, runs on the 3Gb/s SATA II interface for maximum transfer speed and compatibility.
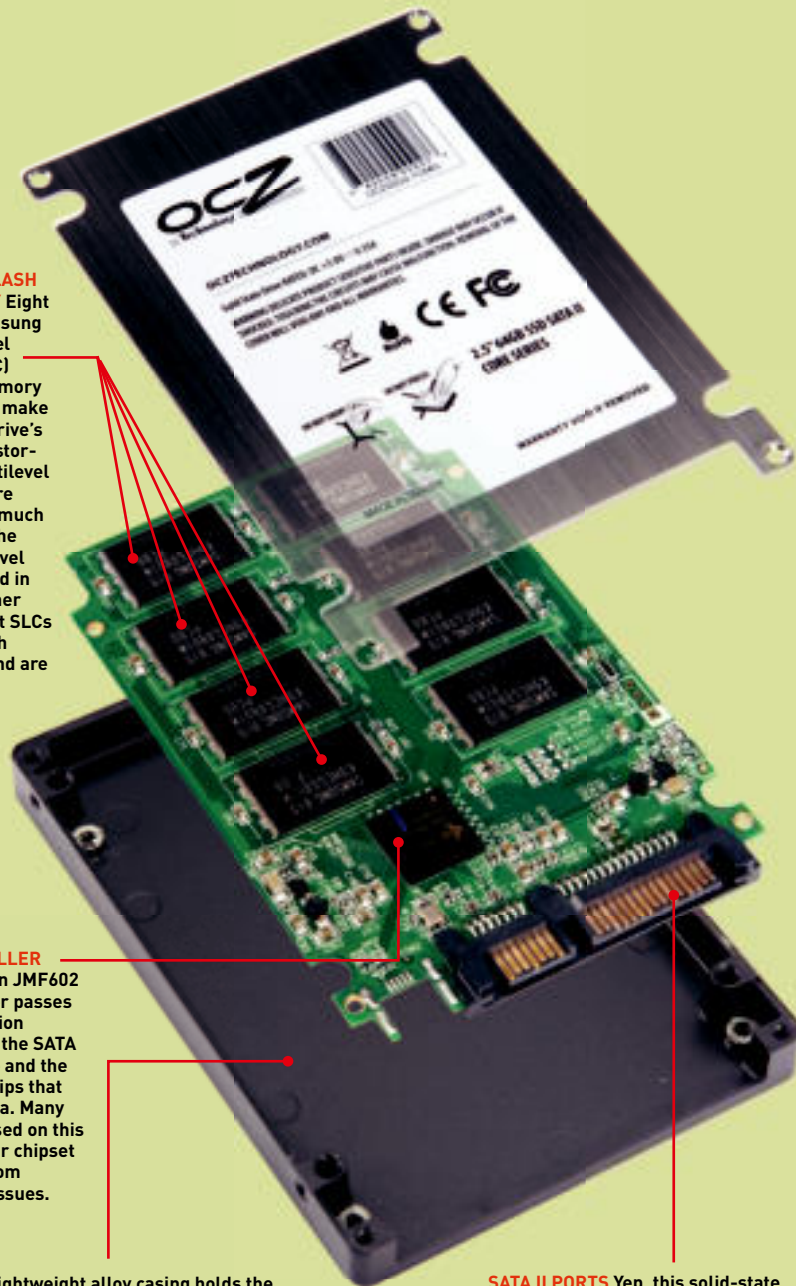
SUBMIT YOUR IDEA Ever wonder what the inside of a power supply looks like? Don't take a chance on destroying your own rig; instead, let us do the dirty work. Tell us what we should crack open for a future autopsy by writing to comments@maximumpc.com.
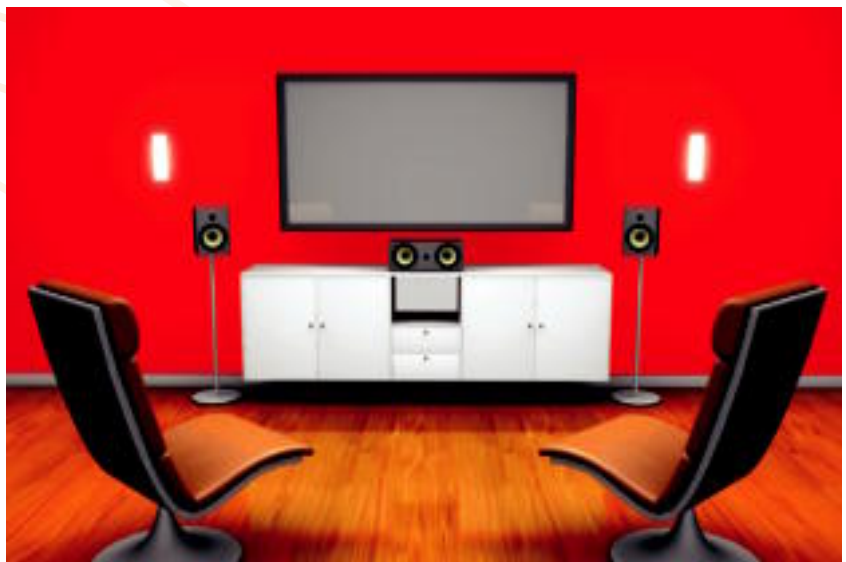
HOW TO

Connect Your PC to Your Surround-Sound Audio System

Make the most of your PC's audio capabilities by integrating them into your home theater —MICHAEL BROWN

TIME = 30 MIN

WHAT YOU NEED

- **A PC**
- **AN A/V RECEIVER**
- **A 5.1-OR 7.1-CHANNEL SPEAKER SYSTEM**

If you want to take full advantage of your PC's audio potential, you should connect your rig to your A/V receiver and passive speakers—or a really good set of powered speakers. But accomplishing this task is often tricky, thanks to a combination of digital rights issues, proprietary surround-sound algorithms, and evolving connection standards.

Computers outfitted with Blu-ray drives and certain late-model videocards can deliver Blu-ray video over HDMI, but getting HD audio that way is another issue. An HDMI cable can carry both high-definition video and up to eight channels of high-definition audio (front left and right, front center, rear left and right, side left and right, and low-frequency effects). Blu-ray discs are typically encoded using Dolby TrueHD, DTS-HD, or DTS-HD Master Audio; all three of these eight-channel lossless compression codecs can deliver bit-for-bit perfect copies of the original movie soundtrack. Here lies the rub: PCs currently cannot output audio encoded in *any* of these formats over HDMI.

A properly outfitted PC running CyberLink's PowerDVD 8, however, *can* decrypt and decompress Dolby TrueHD and DTS-HD and output it as uncompressed eight-channel LPCM (linear pulse code modulation) to HDMI. However, while videocards based on newer Nvidia GPUs are outfitted with HDMI, they're all limited to two-channel LPCM (linear pulse code modulation) audio over HDMI, and that's only if your motherboard has a S/PDIF-out header.

AMD's RV7xx-series cards *can* deliver uncompressed eight-channel LPCM audio over HDMI because they route the signals over the PCI Express bus. For integrated graphics, motherboards with Nvidia's GeForce 8300 chipsets (for AMD CPUs) and GeForce 9300 or GeForce 9400 chipsets (for Intel CPUs), and those with Intel's G35 Express, G45 Express, and G965 Express chipsets can do it, too.

We highlight the four most common PC audio scenarios. Pick the one that fits your situation and we'll show you the best way to integrate your PC into your home-theater system.
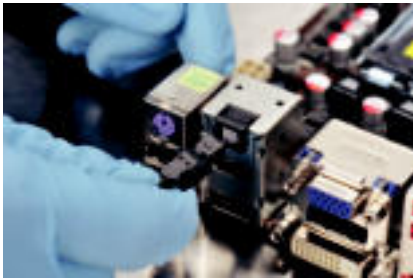
SCENARIO 1: ONBOARD AUDIO WITH DOLBY DIGITAL LIVE OR DTS CONNECT

Dolby Digital Live (part of the Dolby Home Theater application suite) and DTS Connect are both real-time encoding technologies. Dolby Digital Live converts any audio signal, including 5.1 sound from games, into a Dolby Digital bitstream (containing 2.0, 5.1, or 7.1 channels) in real time. That bitstream is output over a S/PDIF connection to your A/V receiver.

Your receiver decodes the bitstream and converts it into an analog signal that can be amplified and played through your speakers. You'll find Dolby Digital Live support in all Intel Express chipsets that support Intel High Definition Audio, going as far back as the Intel 915 Express.

DTS Connect consists of two DTS technologies: DTS Neo:PC and DTS Interactive. The former takes two-channel audio and converts it into a matrix of up to 7.1 channels; the latter encodes digital audio sources into DTS Digital Surround, which you can output to your A/V receiver using a S/PDIF cable. DTS Connect isn't as common as Dolby Digital Live, but it is supported by many onboard audio chips (including Realtek's ALC889A).

Most motherboard manufacturers rely on either the Windows Control Panel or whatever software their audio codec supplier has come up with to serve as a user interface for enabling multichannel sound. In the Windows Control Panel, for instance, you simply drill down into the sound control panel and choose either a 5.1 or 7.1 speaker configuration.

SCENARIO 2: SOUND BLASTER X-FI CARD

If your rig has one of Creative Labs's many versions of the Sound Blaster X-Fi, you have at least two options: You can connect the card's discrete analog outputs to your A/V receiver's multichannel inputs (you'll need three cables, each with an 1/8-inch stereo connector on one end and left/right RCA stereo plugs on the other. You'll need a fourth cable for a 7.1-channel configuration). Your other option is to install the Dolby Digital Live software and use the X-Fi's S/PDIF output. Note: The X-Fi's S/PDIF-out also supports stereo S/PDIF and pass-through of multichannel DVD (not Blu-ray) audio without the need for Dolby Digital Live, but in-game sound will come through as two-channel PCM.

Dolby Digital Live will encode the Sound Blaster's multichannel audio in real time to a Dolby Digital bitstream and output that bitstream through the Sound Blaster's S/PDIF output. This will deliver multichannel sound over a single cable to your A/V receiver, which will then decode the bitstream and convert it to an analog signal that can be amplified and played on your speakers.

Many of the newer Sound Blaster X-Fi cards (including the PCI and PCI Express versions of the X-Fi Titanium, X-Fi Titanium Fata1ty Pro Series, and the external X-Fi Surround 5.1 USB module) include the Dolby Digital Live software in the box. If you own an older X-Fi card, you can buy the Dolby Digital Live software (for the odd price of $4.72) and run it on any of these X-Fi cards: the Elite Pro, Platinum, Fatal1ty, Platinum Fatal1ty Champion Series, XtremeMusic, XtremeGamer, or the XtremeGamer Fatal1ty Pro. You'll also need the X-Fi series driver 2.18.004 (or later) and Creative Console Launcher 2.60.27 (or later). You can find Creative's Dolby Digital Live software at http://tinyurl.com/6xmyrb.

SCENARIO 3: RADEON VIDEOCARD WITH HDMI

If you're rolling with a Radeon HD 4600- or 4800-series GPU, you can connect a DVI-to-HDMI adapter to your card and send digital video and 7.1-channels of uncompressed digital audio to your A/V receiver over a single HDMI cable. A DVI-to-HDMI adapter should have been included with your videocard. If it wasn't, or you've lost it, you can purchase a replacement for about $10; just make sure that it's certified to work with your card.

As we mentioned in the introduction, you can't send Dolby TrueHD or DTS-HD over this HDMI connection. And you'll need a software Blu-ray player that's capable of decoding these audio codecs to LPCM (CyberLink's PowerDVD 8 is the only program we are aware of at press time that can do this).

Be aware that some videocard manufacturers support the adapter on only one of the card's DVI ports. Some other manufacturers provide an HDMI port right on the mounting bracket—a preferable solution considering that the adapter adds 1.75 inches of depth to the back of your PC. This can be a problem if you're integrating your PC into your entertainment center. (continued on next page.)

> ### QUICK TIP
>
> In each of these scenarios, there are situations in which the best solution is to connect your PC's or soundcard's discrete analog outputs to your A/V receiver's multichannel inputs. This adds to cable clutter, but it solves the Blu-ray HDMI problem if you don't have a videocard that's capable of sending more than two channels of LPCM audio over HDMI.

SCENARIO 4: NVIDIA VIDEOCARD WITH HDMI

Nvidia's audio-over-HDMI options are more limited than AMD's. Most videocards based on new Nvidia GPUs (e.g., the GeForce 8000- and GT 200-series) support HDMI via an adapter and many have a S/PDIF input, so you can transfer both digital video and digital audio over a signal HDMI cable.

But if you're not using a motherboard with an Nvidia chipset (e.g., nForce 750i, 790i, or 780i), you might not have the S/PDIF output header needed to make this connection. Even if your motherboard *does* have it, the card is capable of receiving only two channels of digital audio that can be sent over the HDMI cable—you can't get any form of surround sound over HDMI this way, much less Dolby TrueHD or DTS-HD.

If you want simple stereo over HDMI, you'll need to use your motherboard's onboard audio (there's no way to get digital audio from an add-in soundcard to a GeForce card with a S/PDIF input). Plug one end of the two-lead S/PDIF cable into the motherboard's S/PDIF-out header. The header has three pins, but you'll use only the two that are immediately adjacent to each other: One is labeled "Signal," the other "Ground." Under no circumstances should you connect the cable to the pin labeled "+5V"—doing so will fry your videocard. The distance between the pins should make this an unlikely event.

SCENARIO 4, CONTINUED

The next step in configuring an Nvidia card to send audio over HDMI is to connect the other end of the cable to the S/PDIF connector on the top of the videocard. The connector is typically placed right next to the power connectors; it might be covered by a rubber plug that you'll need to remove.

At the risk of sounding like a broken record, this scenario limits you to two-channel audio. A superior solution is to use onboard audio (a stand-alone soundcard is even better) and establish analog connections between your PC and your A/V receiver. For a 5.1-channel configuration, you'll need three cables with 1/8-inch stereo connectors on one end and left/right RCA plugs on the other. You'll need one more cable for a 7.1-channel configuration.

Your A/V receiver must be outfitted with discrete analog inputs for front left/right, center, rear left/right, surround left/right (for 7.1-channel systems only), and low-frequency effects (i.e., a subwoofer input).

You'll also need a software Blu-ray disc player, such as CyberLink's PowerDVD 8, that's capable of decoding Dolby TrueHD or DTS-HD and decompressing it to 7.1-channel LPCM.

SCENARIO 3, CONTINUED

Once you've plugged the HDMI cable into the videocard, open the Windows XP Control Panel (switch to Classic View if that's not your default), double-click Sounds and Audio Devices, click the Audio tab, and choose Digital Output Device (HDMI) as the default device. If you're running Vista, open the Control Panel, switch to Classic View, double-click Sound, right-click Digital Output Device (HDMI) and choose the option Set as Default Device from the pop-up menu.

There is currently no way to get audio—be it digital or analog—from an add-in soundcard into a Radeon HD videocard.

■ ■ ■ **EASY DOES IT**

External USB Audio

Here's yet another solution for integrating your PC's audio capabilities into your home-theater system: Use an external USB audio device. These won't deliver multichannel sound over HDMI, but they're dead simple to install: Plug the device into your PC's USB port with one cable, plug it into your A/V receiver with another, and install the accompanying software.

Asus's Xonar U1 USB Audio Station ($90, www.asus.com) and Creative's X-Fi Surround 5.1 ($60, www.creative.com) are two examples of external USB audio devices. Both products use Dolby Digital Live to encode any audio signal to 5.1-channel Dolby Digital in real time. The audio is then output through a S/PDIF interface to your A/V receiver.

This month the Doctor tackles...

▸**Sudden freezes**
▸**Missing RAM**
▸**Sticking with IE6**

Reclaiming SATA Ports

I recently bought an Asus P5K-E motherboard during a round of upgrades because it seems to support the most operating systems (I'm a developer).

I also purchased an EVGA GeForce 9800 GTX. This card is huge: It takes two slots, reaches all the way across my motherboard, and nearly touches my hard drive array. It's so big that if I put it in the top PCI-E slot, it completely covers all six of my SATA ports, and, well, I use those.

If I use the PCI-E slot on the bottom of my mobo, the card is limited to x4 instead of x16. Do applications (games?) saturate this interface yet? Will I even notice the difference between the x4 and the x16 slots with this card?

If I use the PCI-E slot on the top (the x16), I can't use my SATA controller. Is my only option then to buy another controller? Does it matter if this is the cheapest one out there or does *Maximum PC* suggest a particular brand?

—**Aaron New**

Aaron, you'll definitely see a slowdown if you use the bottom x4 PCI-E slot. Fortunately, it looks like you have another option. The Doctor snagged an Asus P5K Deluxe mobo (which has SATA ports in the same place as the P5K-E), a GTX 280 (which is slightly bigger than the 9800 GTX), and a couple of right-angle SATA cables (avail-

able for less than a buck at Monoprice.com) and was able to access four of the six SATA ports. The southernmost SATA ports aren't blocked by the card at all, and by using right-angle connectors we were able to sneak two SATA connections under the card. Four out of six ain't too shabby.

Everything Is Broken

I built a computer for a friend a couple of years back, and it was working fine until a few weeks ago, when the computer started to lock up on boot and the screen would stay black. I tried to reinstall Windows XP, only to have it freeze halfway into the setup. Eventually I was able to reinstall XP. All case fans, the CPU fan, and drive lights work fine. I updated video drivers, replaced the videocard, the memory, and the power supply, and even switched out hard drives; the system still locks. I'm at a loss for what to do next. I suspect maybe the mobo is at fault. Can you help?

—**Howard King**

Well, there are an awful lot of possible culprits here. First, make sure the machine is not overheating. A heatsink fan that is clogged with dust or thermal paste that has dried up could be to blame. While you're at it, make sure the heatsink is properly seated. Perhaps your buddy was in there one day and knocked the heatsink slightly off kilter.

Next, make sure the
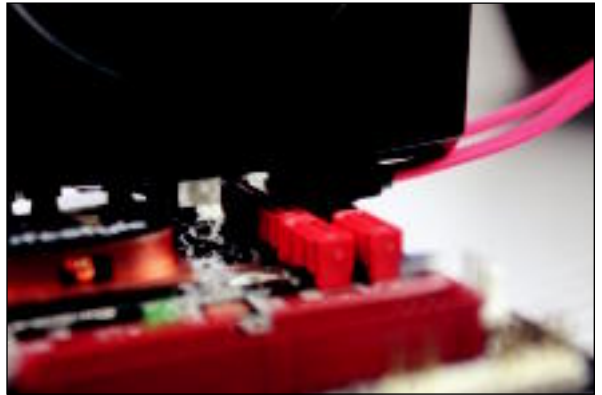
Using right-angle connectors, we were able to reclaim two of four SATA ports blocked by the GPU.

graphics card is firmly seated and see if anything is loose in there. Third, download the free memtest+ utility (**www.memtest.org**) and check out the machine's RAM.

Finally, check the BIOS settings. Maybe the CMOS battery went bad or your friend was playing in the BIOS and set something improperly. Pay close attention to RAM timing and frequencies as well as the front-side-bus settings.

One esoteric possible problem: bad cables. Check the hard drive and optical drive cables for any nicks, cuts, or damage. The Doctor has seen bad cables cause all kinds of wacky behavior.

If all of the above check out, it's time to consider the possibility of a bad motherboard or CPU. Get into the case with a good flashlight and take a close look at the capacitors on the board. If any of them are bulged out, you're

a victim of capacitor failure and a board replacement is in order.

Whither the RAM?

I have two 256MB RAM modules. I recently bought an additional 1GB DIMM. A friend of mine asked me to try his RAM, as it was the same as mine. I tried it and my computer flashed an error. I stopped immediately, removed my friend's RAM, and shut off my computer. The 1GB DIMM was installed and so were the other two 256MB sticks. But now the computer only recognizes the 1GB and says the other slots are empty, despite the presence of the 256MB DIMMS. How can I get the system to recognize the rest of the RAM?

—**Tom Hensley**

So, to sum up, you had two 256MB DIMMs. You added a single 1GB DIMM and it

worked fine. You then added your friend's DIMM, POSTed the machine, and received an error. Now it no longer shows anything but the 1GB of RAM?

Lesson number one when swapping RAM, or anything inside your machine, is to power down the machine by either unplugging it or flipping the power switch on the PSU itself, and then pressing the power button to discharge the remaining power in the PSU's capacitors or waiting five minutes before mucking around.

What you are describing is not good. It sounds like you may not have fully seated the DIMMs or seated them so that you actually shorted something when you powered up the box. If you're lucky, there's just something in the slot like a huge dust bunny. With the power completely off, try reseating the RAM and make sure you have the orientation correct. Yeah, the Doctor knows the RAM is keyed, but you can actually jam a DIMM in there far enough that you think it's installed even though it's backwards.

If the memory still does
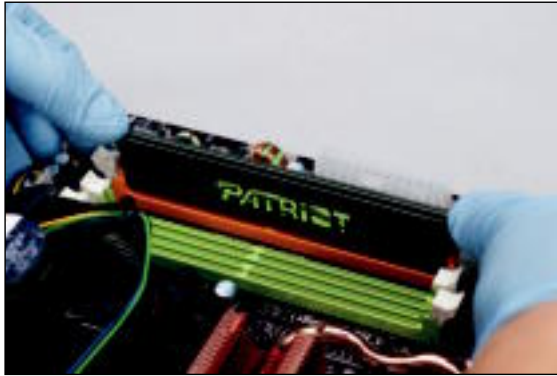
Make sure your RAM is firmly and correctly seated, but don't jam it in.

troubles will be fixed before then with a careful reseating.

Rolling Back IE7

I recently upgraded my cable Internet service from 5Mbps to 10Mbps. Not seeing any increase in speed, I contacted my provider's tech support. The tech said Internet Explorer 7 is loaded with time-consuming security routines and that it is also designed for Vista. Since I'm running XP, he suggested I roll back to Internet Explorer 6 in order to see major improvements in web-page loading speeds. He also said I should unin-

twice as fast, or faster.

Now, there has to be a catch, somewhere. I have had no problems (yet) with any of the web pages I've visited since rolling back to IE6. Am I putting my system at risk by having less security? Are there features in IE7 I'm missing out on by not using IE7? Is my system's life in peril without IE7?!

I know you all like Firefox 3, but my question is simply about IE6 vs. IE7. I'm very pleased, so far, with the speedier IE6.

—Robert Bolerjack

Downgrading to IE6 will definitely force you to abandon some of the useful features of IE7—most notably, native tabbed browsing support and the wealth of security patches that Microsoft has issued for the latest IE 7 builds. Add-ons like the MSN Toolbar will replace some of IE 7's built-in advantages, but IE 6's numerous vulnerabilities and lack of compliance with web standards will eventually catch up with you. If you want both speed and functionality, we stand by Firefox. Or Opera. Either will give you a better experience than Internet Explorer. ⏻

"WILL I EVEN NOTICE THE DIFFERENCE BETWEEN THE X4 AND THE X16 SLOTS WITH THIS CARD?"

not show up, completely shut down the box, remove the 1GB DIMM, and install each of the 256MB DIMMs in the slot the 1GB was in. If the PC now recognizes the 256MB DIMMs in that slot, you likely have two bad slots—highly unlikely. If it does not, you likely have bad DIMMs—also improbable. We think your

stall SP3 first, or IE7 would not uninstall. So I tried this on one of my machines. Using Add/Remove Programs, I removed SP3, rebooted, then removed IE7. On reboot, I was back to IE6.

He was right! Even after allowing Automatic Updates to reinstall SP3, web pages are loading

REVIEWS

Tested. Reviewed. Verdictized

PLUS **Best of the Best, Editors' Blogs, and the No BS Podcast**

Überclok Fury

Budget chips don't have to cheapen a rig's performance

Überclok takes a mighty gamble with its Fury PC. Instead of burying Intel's hot, new Core i7 in the heart of its machine, Überclok reaches for something that's beginning to show its age: Intel's mid-range Core 2 Quad Q9650. Why didn't the company go with, say, an Intel Core i7 940, which costs the same as the Q9650? We're not entirely sure, but Überclok makes the most of its choice.

Despite its age, the chip is no slouch. At its stock 3GHz speed, this quad core would make most people happy, but the new E0-step core used in this chip series is a heckuva overclocker. In fact, Überclok ubers the chip a full gigahertz using simple air cooling, which is quite a feat—although the execution isn't flawless. The machine completed all of our benchmarks without a hitch, but a Prime95 stress test blue-screened the box within a few minutes. A quick call to Überclok provided the solution we expected to hear: Give her

more voltage. Three-tenths of a volt later, the Fury was stable in our stress test.

Überclok said the box passed a 24-hour Prime95 burn-in before shipping, but apparently our test blend (developed by Velocity Micro) was more punishing. After being informed of our results, Überclok told us it would reevaluate its burn-in test. We have to note that other machines with similar hardware have passed our stress test without the intervention of tech support.

The box itself is quite striking in a subdued, no-nonsense kind of way. The Fury is built around Cooler Master's HAF932 enclosure, a Gigabyte GA-X48T-DQ6 board, 4GB of Patriot DDR3 running at 1,500MHz, an X-Fi Titanium Fatal1ty Champion, and two ATI Radeon HD 4870 X2 cards. Überclok plays it safe with storage, using two WD 300GB VelociRaptors in RAID 0 and Seagate's uber-huge 1.5TB drive handles bulk storage. The company went with a dual-boot Windows XP Professional, Windows Vista Ultimate 64-bit build. Vista 64-bit seems to have finally turned the perception corner; in fact, we haven't seen a high-end rig ship without the 64-bit OS in months.

But enough about the configuration; you just want to know how it holds up against Core i7 machines, don'tcha? The Fury didn't fare particularly well against the Velocity

Who needs Nehalem? Überclok taps Intel's midrange Core 2 for duty.

Micro Raptor Z90 we reviewed last month. The Raptor Z90's 3.6GHz Core i7-965 chews up the 4GHz Fury by very healthy margins in Premiere Pro CS2, ProShow, and Main Concept. Only in the mostly single-threaded Photoshop CS2 does the Fury eke out an app win. In gaming, the Fury's pair of X2 cards puts it in front in Crysis, but the Velocity Micro still won in UT3.

Compared to the Fury, Velocity Micro's Raptor is a far better general-purpose machine with fairly good gaming chops; the Fury is definitely a great gaming box with its two Radeon X2 cards, but it's quite obsolete in application performance. Indeed, this striking system would have been far more uber if it had used Intel's new $500 Core i7 940 chip. —GORDON MAH UNG

SPECIFICATIONS

PROCESSOR	Intel Core 2 Quad Q9650 (3GHz@4GHz)
MOBO	Gigabyte GA-X48T-DQ6
RAM	4GB Patriot DDR3/1333 @ 1,500MHz
VIDEOCARD	Two ATI Radeon HD 4870 X2 in CrossFireX mode
SOUNDCARD	X-Fi Titanium Fatal1ty Champion
STORAGE	Two WD Velociraptor 300GB in RAID 0, one Seagate Barracuda 7200.11 1.5TB
OPTICAL	LG GGW-H20L 6x Blu-ray burner Lite-On 20x DVD+RW
CASE/PSU	CoolerMaster HAF932/Corsair HX-1000W

VISTA 64-BIT BENCHMARKS

	ZERO POINT	
Premiere Pro CS3	1,260 sec	575 sec (+119%)
Photoshop CS3	150 sec	81 sec
ProShow	1,415 sec	570 sec (+148%)
MainConcept	1,872 sec	1,215 sec
Crysis	54 fps	49 fps
Unreal Tournament 3	130 fps	143 fps

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

Our current desktop test bed consists of a quad-core 2.66GHz Intel Core 2 Quad Q6700, 2GB of Corsair DDR2/800 RAM on an EVGA 680 SLI motherboard, two EVGA GeForce 8800 GTX cards in SLI mode, a Western Digital 150GB Raptor and 500GB Caviar hard drives, an LG GGC-H20L optical drive, a Sound Blaster X-Fi soundcard, a PC Power and Cooling Silencer 750 Quad PSU, and Windows Vista Home Premium 64-bit.

VERDICT 7

UBERCLOK FURY

➕ BMW	➖ VW TYPE 181
Nicely configured, and we dig the HAF932 case.	Would you really pay $5K for a machine using Intel's older CPU?

$5,250, www.uberclok.com

HP HDX 18 Entertainment PC

Have features, will not travel

HP's HDX 18 Entertainment PC is a note-book, but not in the portability sense of the word. With an 18.4-inch diagonal screen and a carry weight of 10 pounds, 9 ounces, you might occasionally move this monster from room to room, but you won't take it everywhere you go—certainly not without the aid of a lifting belt.

Of course, the large size does have its merits. The aforementioned screen, for instance, sports a 1920x1080p resolution for ample desktop space and a true high-def movie experience, made all the more vivid by the screen's glossy surface.

The HDX 18 also offers a full-size keyboard and numeric pad that make typing easy and comfortable. The accommodations extend to a generous helping of ports, including—but not limited to—HDMI, dual headphone jacks, three USB ports, and a very cool hybrid USB/eSATA port for supreme flexibility.

The HDX 18 bests smaller, more portable notebooks in performance too—at least in most benchmarks. Our model's 2.8GHz T9600 Core 2 Duo helped the machine beat the 15-inch Apple MacBook Pro and Dell XPS M1530 from our August notebook roundup in the ProShow, MainConcept, Premiere, and Photoshop tests by significant margins. For example, the HDX 18 was more than 10 percent faster than the duo in MainConcept, more than 13 percent faster in ProShow, and more than 30 percent faster in Photoshop. For even greater processing power, HP offers the quad-core Q9300 as an option.

The HDX 18's midrange GeForce 9600M GT graphics make for less-impressive benchmark numbers in games. Yes, the HDX 18 decimated our zero-point rig, but so does every other modern notebook. In FEAR, the HDX 18 was more than 20 percent slower than
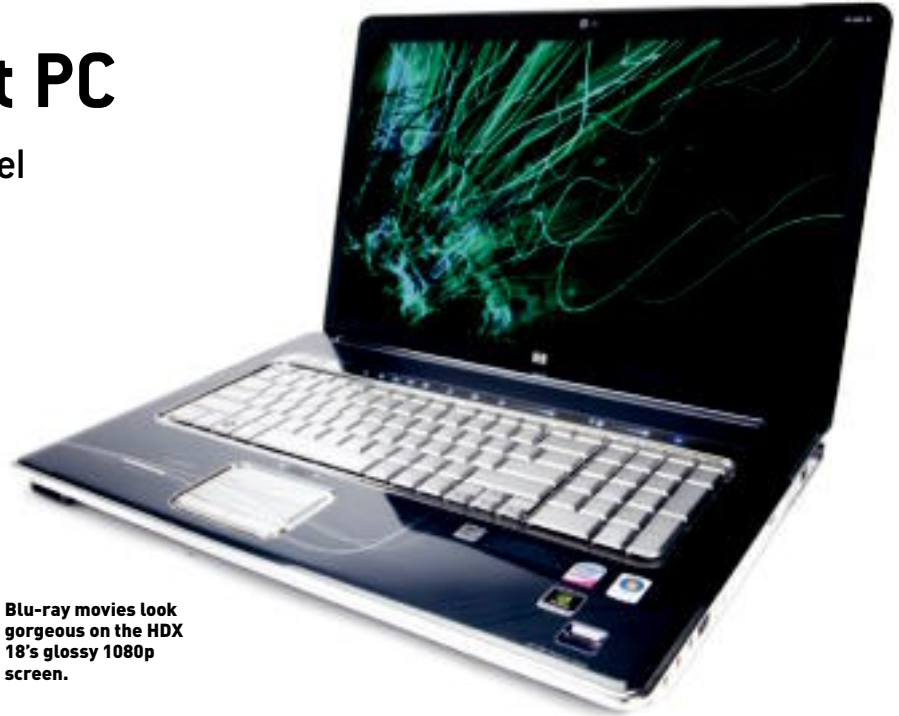
Blu-ray movies look gorgeous on the HDX 18's glossy 1080p screen.

both the Apple and Dell machines, which both use 8600M GT parts. The rigs were a little more evenly matched in Quake 4, where the HDX 18 had a better frame rate than the MB Pro but was 5 percent slower than the XPS. We won't even bother comparing the HDX 18's gaming numbers with those of the Gateway P-7811 FX notebook we reviewed in October. That would be too humiliating.

So, clearly, the HDX 18 isn't going to be a gamer's best friend. It's more of an all-purpose rig with an emphasis on media. To that end, the rig holds a BD ROM/DVD burner, so you can make the most of the 1080p screen and Altec Lansing speakers and a subwoofer for relatively rich audio even at high volumes. But don't try to watch a movie on battery power. We got just 1 hour and 48 minutes into a standard-def DVD before the HDX 18's 6-cell battery petered out.

Another big part of the HDX 18's feature set is aesthetics. Touches like the stylish but subtle line pattern inlaid in the rig's

chassis, the chrome siding and touchpad, the seamless bezel around the screen, and the illuminated touch-sensitive media controls that appear above the keyboard when the notebook is powered on all make for a handsome package.

But as nice as the HDX 18 is, we can't award it our highest honors. As a notebook, this rig is too cumbersome and expensive for our tastes, and as a desktop replacement, its weak gaming scores give us pause. **—KATHERINE STEVENSON**

SPECIFICATIONS

CPU	Intel 2.8GHz Core 2 Duo T9600
RAM	4GB DDR2 SDRAM
CHIPSET	Intel PM45
HARD DRIVE	Two 320GB Fujitsu (5,400 rpm)
OPTICAL	Optiarc BD ROM/Super Multi DVD burner
GPU	GeForce 9600M GT
BOOT/DOWN	71 sec/39 sec
LAP/CARRY	9 lbs, 0.6 oz/10 lbs, 9.4 oz

BENCHMARKS

		ZERO POINT											
Premiere Pro CS3	1,860 sec		1,611 sec										
Photoshop CS3	237 sec			172 sec									
Proshow	2,416 sec			1,722 sec									
MainConcept	3,498 sec		3,044 sec										
FEAR	14 fps								36 fps (+157.1%)				
Quake 4	29.1 fps								97.5 fps (+235.1%)				
		0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%											

Our zero point notebook uses a 2.6GHz Core 2 Duo E6700, 2GB of DDR2/667 RAM, an 80GB hard drive, a GeForce Go 8600M and Windows Vista Home Premium.

VERDICT   8

HP HDX 18 ENTERTAINMENT PC

➕ ENTERTAINMENT	➖ INTERNMENT
Strong CPU performance, appealing features, attractive looks.	Poor gaming performance, too big and heavy for portability, pricey.

$2,300, www.hp.com

Antec Skeleton

Innovation, but with some serious limitations

We have to give Antec points for bucking the mainstream: The Skeleton is a seriously cool-looking case. The motherboard rests horizontally, so the case's footprint is much wider than that of a standard tower chassis, but it's also shorter. The open design and sliding component tray make it easy to swap parts in and out, and installation is quick and relatively painless. The Super Big Boy LED fan, which truly is both super and big, dominates the top of the case, keeping air moving over all your components, and the open design ensures that there's plenty of airflow. A smaller fan mounts in front of the hard drive bay for additional cooling.

Removing two spring-loaded thumb-screws lets you slide out the component tray about three quarters of the way, providing easy access to the mother-board as well as the optical and hard drives. The side panels remove easily, and there's a sliding bay for the power supply. But screwless this case ain't. Your Phillips head screwdriver will be a constant companion.

The open design offers no protection against liquids, pets, children, or Chex Mix. The squat proportions also work against it—there are only two 5.25-inch and two 3.5-inch bays under the mother-board, so any additional hard drives need to be mounted outside of the case, for which Antec provides four brackets. And given the open-frame design, there aren't many solutions for elegant cable routing. We had to do some finessing to connect all our parts.

Depending on your motherboard's layout, you may have issues with the front-panel connectors; the HD Audio ports are in the rear of our EVGA 680i board, and the Skeleton's front-panel audio wires barely reached them. And watch out for your CPU cooler—anything more than about four inches tall will bump up against the fan cowl and prevent you from moving the tray in and out, so avoid any of the monstrously huge coolers that are so popular these days. Stock fans will work fine, and fortunately, so will our current favorite cooler, the Thermal-take DuOrb. Due to the space constraints, any water-cooling setup will have to use an

The Antec Skeleton breaks ground with its formfactor, but its novel design is also a weakness.

external reservoir—since the Skeleton has only two 5.25-inch bays, it's impossible to mount one internally.

Still, we love the design and portability of the Skeleton. It's especially useful for testers and other people who, like us, swap hardware frequently. If you have plenty of desk space and don't need to worry about errant liquids or hairballs, the Skeleton could be the bold, new case you've been looking for. —NATHAN EDWARDS

VERDICT 7
ANTEC SKELETON

➕ **MANNY CALAVERA**	➖ **SKELETON CREW**
Innovative design, easy and intuitive installation. Big, beautiful fan. Good test bench.	Strangely cramped for such an open design. Not good for the clumsy.

$180, www.antec.com

The Super Big Boy fan's many-colored LEDs turn your LAN party into a dance party.

Asus P6T Deluxe

Hallelujah, P6T Deluxe ushers in the era of graphics revolution

Asus's P6T Deluxe isn't the most over-the-top Core i7 board we've tested, but it certainly has a leg up on Intel's bare-bones DX58SO. For one thing, it finally brings us graphics reunification by supporting both two-card SLI and CrossFire X configurations.

And instead of the gimpy four-slot DIMM setup of Intel's DX58SO, the P6T Deluxe features six DDR3 DIMM slots. The board, of course, supports all Core i7 CPUs. Since Intel is the sole chipset provider for X58 and the memory controller is in the CPU itself, most performance differences will be the result of BIOS tweaks each manufacturer implements. We found Asus's BIOS to be far friendlier than the Intel board's, which at first glance seems designed for engineers. Truth be told, though, the Asus BIOS can be just as daunting if you tread into the Advanced section.

One thing we did like about the Intel board's BIOS was the ability to set the individual Turbo mode settings. Asus forces you to adjust the settings with the Asus TurboV utility, but we couldn't set each core separately. That made it difficult to compare performance between the P6T and the DX58SO, as each board was configured slightly differently. To be frank, performance judgments should be suspended since BIOS updates for both boards are still rolling out twice a month.

As expected, not all was right with the P6T. On occasion, the board would not see our USB drive. Documentation was also substandard, which left us pushing buttons in the numerous applications until we blue-screened the board. Hey, Asus, how about combining all the disparate apps into one utility? Nevertheless, we did manage to bring our 3.2GHz Core i7 up to a fairly stable 3.8GHz on the P6T Deluxe.

There's a lot to like here, including an improved ExpressGate browser that lets you save files from the preboot browser to a USB key, and a cool Palm display that lets you both overclock the board and remotely monitor its vitals. There are some rough spots still to be ironed out, but we'd definitely take the P6T over Intel's board at this point. —GORDON MAH UNG

BENCHMARKS

	Asus P6T Deluxe	Intel DX58SO
PC Mark Vantage x64	**7,989**	7,082
ProShow (min:sec)	9:24	**9:12**
MainConcept (min:sec)	**17:15**	18:00
3DMark Vantage CPU	**11,312**	11,239
3DMark Vantage GPU	**49,183**	45,424
HD Tach (MB/s)	173	**185**
Valve Particle test (fps)	**159**	155
Quake 4 (fps)	**252**	224
Everest Ultimate Copy RAM (MB/s)	18,170	**19,182**
Everest Ultimate Latency RAM (ns)	32.5	**31.9**
Sisoft Sandra Bandwidth (GB/s)	**27.03**	26.3

Best scores are bolded. Our test bed consists of a Core i7-965 Extreme Edition CPU, 6GB of Corsair DDR3/1600, an EVGA GeForce 280 GTX videocard, a PC Power and Cooling TurboCool 1200 power supply, a WD Raptor 150GB drive, and Vista Home Premium 64-bit. HD Tach scores were achieved using an Intel X25-M SSD.

VERDICT 8

ASUS P6T DELUXE

+ SPEED	− POINT BREAK
Graphics reunification, six DIMMs, and a nifty external LCD display.	BIOSes and applications are still a little rough around the edges.

The RAM config lets you run up to six DIMMs in tri-channel memory mode.

LaCie 730

Big monitor, big price, one big compromise

We had the LaCie 730 delivered to the Lab as a possible contender for our upgrading feature (page 25)—at $5,000 and change it's certainly a comfortable fit at the high end of the price spectrum. Of course, it wasn't just the price that intrigued us. The LaCie 730 includes a number of features that set it apart from other monitors we've reviewed—as well as one oversight that keeps it from attaining our highest praise.

While most monitors that come to the Lab sport 6- or 8-bit panels, the 730 has a 14-bit panel, which should greatly increase the color depth of this monitor. Additionally, the 730 includes an LED backlight rather than the more typical cold-cathode fluorescent backlight. An LED backlight should produce a truer black than a CCF because unlike the CCF, LEDs can switch on and off while a CCF is always on (for this same reason, an LED backlight should also reduce the amount of light seepage at the edges of a monitor). However, the first LED backlight monitor we reviewed, ViewSonic's VLED221wm (May 2008), was able to create the darkest black we had ever seen but couldn't differentiate the darkest grays in our grayscale test.

LaCie's 730 had no such issues, displaying clear separation between shades at both the light and dark ends of the spectrum in our grayscale test. In our DisplayMate tests, the 730's white and light grays weren't as bright as those displayed by our current high-end Best of the Best champion, Gateway's XHD3000 (reviewed December 2007), but when we put the monitors side by side for our digital photo comparison, there was no contest: The 730 produced the most vibrant, rich colors we've ever seen in our monitor tests. We noticed, in particular, that the 730 did a much better job of differentiating between shades of orange and red. In fact, this 14-bit monitor sports a 123 percent color gamut, well beyond the 72 percent standard for most LCDs.

Through our synthetic and real-world tests, the LaCie 730 seemed to be best in class, showing rich colors in photos and no evidence of banding or color-tracking errors; however, as we moved to our Blu-ray test, we discovered the monitor's one true weakness: It lacks HDCP. While software

fixes such as AnyDVD (www.slysoft.com) can alleviate this problem, the LaCie 730 cannot natively handle commercial high-def video. The lack of input options is also a small knock against the 730; the monitor includes DVI and USB, but neither HDMI nor DisplayPort.

If the boss-man purchased this monitor for your workplace, you'd be thrilled, but if you want a multipurpose monitor for photo and video editing as well as high-def movie

watching, you'll likely want to look elsewhere. If you're willing to step down a bit in size, LaCie's 24-inch 724 has the same 123 percent color gamut, supports HDCP, and will cost you just $2,650. **—TOM EDWARDS**

If you have no need for commercial HD video and have $5,000 and change just lying around, LaCie's 730 is an excellent value.

SPECIFICATIONS

NATIVE RESOLUTION	2560 x 1600
INTERFACE	DVI, USB 2.0
PANEL TYPE	S-PVA

VERDICT **8**

LACIE 730

➕ **JENNY LEWIS**	➖ **JERRY LEWIS**
Produced the brightest, most vibrant colors of any monitor we have tested.	Lacks HDCP; only DVI and USB inputs.

$5,090, www.lacie.com

Seagate Barracuda 7200.11 1.5TB

Taking a sledgehammer to the terabyte barrier

We were pumped when we heard that Seagate had broken through the terabyte barrier with its 1.5TB Barracuda drive—it's not only the biggest consumer drive available, but also represents the largest jump in capacity we've seen. We typically expect capacity increases to be accompanied by performance decreases, but this drive is quick on its feet despite its gargantuan size.

Thanks to perpendicular recording, the Barracuda manages to pack 1.5TB of capacity onto four 375GB platters on a 7,200rpm spindle with a 32MB cache, which allows it to keep pace with four-platter 1TB drives like the terabyte Barracuda and the WD Caviar Black.

We ran our standard benchmark suite–HD Tach 3.0.1.0, PCMark Vantage, and H2benchw—on the Barracuda and compared it to a 1TB WD Caviar Black (http://tinyurl.com/63wc62). The Caviar trumped the Barracuda in both HD Tach and H2benchw's random-access tests—which makes sense, given that it has less data per platter to trawl through—but the Barracuda swept the field in average read and write speeds. Indeed, HD Tach reported average read speeds of 104.4MB/s and write speeds of 103.8MB/s, besting the Caviar by 16 percent and 30 percent, respectively.

The Caviar squeaked past the Barracuda in all but two PCMark Vantage tests,

Seagate claims a sustained data rate of 120MB/s. H2benchw found that although the Barracuda's max sustained read and write speeds both topped 125MB/s, its average sustained reads and writes were 98MB/s—still 15 percent faster than the Caviar.

Just for kicks, we tested how the Barracuda compared to Western Digital's screaming-fast Velociraptor in HD Tach. No big shock there: The Velociraptor's 249MB/s burst and 7.1ms random-access time leave Seagate in the dust. But the Velociraptor's average read speed is only 4MB/s faster than the Seagate's, and its write speed is actually slower.

The Seagate Barracuda 1.5TB runs neck and neck with the fastest terabyte drives we've tested. And it is the biggest consumer drive on the market. With OEM versions available on NewEgg for about $180, you can have a terabyte and a half for less than two Franklins. That's kick ass. **–NATHAN EDWARDS**

BENCHMARKS

	Seagate Barracuda 1.5TB	WD Caviar Black	Samsung HD103UJ
HD Tach Burst (MB/s)	209.3	**232.6**	204.5
HD Tach Access (ms)	15.2	**12.1**	13.7
HD Tach AVG Read (MB/s)	**104.4**	89.5	96.8
HD Tach AVG Write (MB/s)	**103.8**	79.9	84.4
PCMark Vantage Overall	5,093	5,241	**5,289**

Best scores are bolded. All HD Tach scores use HD Tach 3.0.1.0. All h2benchw scores use h2benchw 3.12.

Ooh, Barracuda! This 1.5TB drive is as fast as it is roomy, and it's cheap, too.

KICK ASS!

VERDICT **9**

SEAGATE BARRACUDA 7200.11 1.5TB

＋ HEART
A huge leap in capacity without sacrificing too much speed or dough.

－ APPENDIX
Random access times slower than the WD Caviar Black and Seagate HD103UJ terabyte drives.

Sony BWU 300S Blu-Ray Burner

LG gets leapfrogged by 8x competitor

For more than a year, LG has been sitting pretty with the only 6x Blu-ray burner available for retail, but now that Sony's BWU 300S offers 8x BD-R write speeds, LG's supremacy has come to an end. Sort of.

The 300S is uncommonly fast—given the right circumstances. The drive managed to fill a 25GB BD-R disc with data in a blistering 13:56 (min:sec), compared with the LG GBW-H20L's time of 22:16, but only when the drive was fed manufacturer-recommended Panasonic 6x media. And good luck finding that—our online search for the media was fruitless. When using more common 4x media, the 300S stuck closely to that speed rating, taking 22:56 to complete the same task.

This is an interesting point of comparison since LG's drive is tuned to overburn 4x BD-R media at 6x speeds, which seems like a really nifty feat, until you see that its overall average speed remains 4x. More impressive is the fact that the LG drive can perform the exact same trick with 2x BD-R media. But we digress.

Like the rest of the competition, the 300S is rated at 2x for rewriteable BD media, which resulted in a 45:20 time to fill a 25GB BD-RE disc, almost six minutes slower than LG's drive.

In our DVD+R burn tests, the two drives, which both feature 16x write ratings, ran neck and neck. The 300S took 5:49 to write 4.38GB of data to a single-layer disc, while the GBW-H20L took 5:43.

We'll give Sony props for making BD-R writes truly speedy, but our enthusiasm is tempered by the unavailability of the Panasonic 6x media that makes those speeds possible. What's more, even when using an equally rare 6x TDK disc, Sony's drive wouldn't overburn to its maximum 8x ability. It's that particular. So in real-world terms we're really looking at a drive that performs about the same, or marginally worse, than LG's GBW-H20L, yet costs $100 more.

Even the bundled Men in Black BD disc doesn't justify that premium. Heck, we're not convinced that Blu-ray is worth even the lower price. **—KATHERINE STEVENSON**

The 300S can burn 22GB of data to a disc in less than 15 minutes.

BENCHMARKS

	Sony BWU 300S	LG GBW-H20L
DVD Write Speed Average	11.32x	**12.07x**
DVD Read Speed Average	**12.31x**	9.10x
Access Time (ms) (Random/Full)	168/306	**100/175**
CPU Utilization (8x)	**18%**	24%
Time to Burn 22.5GB to BD-R (min:sec)	**13:56***	22:16
Time to burn 22.5GB to BD-RE (min:sec)	45:20	**39:35**

*Best scores are bolded. All tests were conducted using Nero CD DVD Speed and Verbatim media *except for the Sony BD-R test, where we used Panasonic 6x media as recommended by the manufacturer. Our test bed is a Windows XP SP2 machine using a 2.66GHz Intel Core 2 Quad Q6700, 2GB of Corsair DDR2/800 RAM on an EVGA 680 SLI motherboard, one EVGA GeForce 8800 GTS card, a Western Digital 500GB Caviar hard drive, and a PC Power and Cooling Turbo Cool PSU.*

VERDICT 8

SONY BWU 300S BLU RAY-BURNER

➕ BLUE VELVET

Fastest BD-R writes, respectable DVD+R writes, stylish bezel.

➖ BLUE LAGOON

Requires obscure media for fastest BD times; expensive.

Pinnacle PCTV HD Mini Stick

Is it too early to kill analog?

It's been almost a year since we tested Pinnacle's original PCTV HD Pro Stick TV tuner. In that time, Pinnacle has fixed many of the original product's shortcomings. The new PCTV HD Mini Stick is even smaller than the original HD Pro Stick, which was itself the size of a fat USB memory key. You could easily chuck the 1"x0.5" PCTV HD Mini Stick in your bag and never notice it. The remote is also slimmed down considerably and could slip into your back pocket comfortably.

One thing Pinnacle didn't change is the small telescopic whip antenna, which features a magnetic base. When we first raised concerns about putting a magnet in our laptop bag, where we usually have a portable hard drive also rattling around, Pinnacle said there was no reason to be alarmed: No one had ever reported the magnet scrambling any data. With the PCTV Mini Stick, Pinnacle has changed its story. A sticker on the base of the antenna now reads: "Warning, magnet, please keep away from credit cards, magnetic media, hard drives, and other objects sensitive to magnetic fields." Gee, thanks guys. Of course, the lousy thing is that you can't use the antenna without the base. If the company had designed the antenna so you could separate it from the base and clip it to something, there wouldn't be any problem. The current design means you have to choose between the possibility of nuking your notebook PC's hard drive or not packing the antenna.

We successfully installed and configured the PCTV HD Mini Stick on an older Core Duo dual-core notebook running Windows XP and tuned into about a dozen local ATSC digital stations. Image quality was good but, obviously, very dependent on the broadcast signal. Overall, the tuner ran fine but was a bit laggy on the notebook. We'd recommend the more current Penryn-class Core 2 Duo to run the tuner.

Part of the size savings likely comes from Pinnacle jettisoning support for analog broadcasts. The HD Mini Stick can handle ATSC digital terrestrial transmissions and unencrypted cable transmissions in the ClearQAM format. We dinged the original HD Pro Stick for not having ClearQAM, but we think it's a bit premature to zap NTSC. Sure, the feds will turn the lights out on over-the-air NTSC, but cable companies continue to broadcast NTSC and many people will still hook up their PCs to the cable at home.

Sadly, that makes the PCTV HD Mini Stick of limited value. Yes, you can use it to watch ClearQAM digital broadcasts on cable, but ClearQAM support by cable providers is spotty. Even if you can receive your local major broadcasters in ClearQAM on cable, what if you want to watch CNN or the Cartoon Network? With the PCTV HD Mini Stick, you're out of luck.

The PCTV HD Mini Stick is useful only for those who really want to watch digital TV using rabbit ears. Forgive us, but we'd rather shell out for a tuner that also gives us NTSC capability. **–GORDON MAH UNG**

Pinnacle makes the smallest TV tuner we've tested.

VERDICT 6

PINNACLE PCTV HD MINI STICK

➕ MAGNUM P.I.	➖ NCIS
So tiny you could sneak it into a maximum security prison.	NTSC capability makes it of limited value for most people.

$120, www.pinnaclesys.com
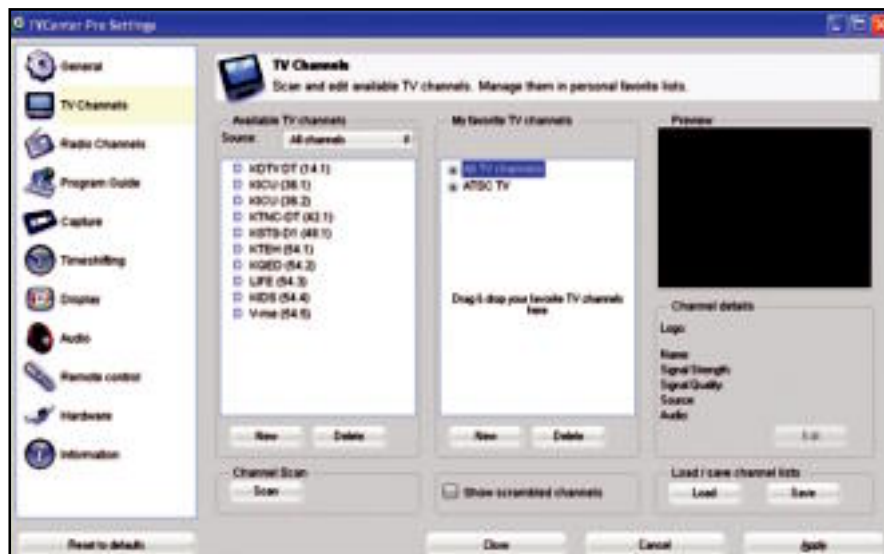
The Feds may not cut off analog terrestrial signals for a few more months, but Pinnacle has already done that for users of its miniature TV tuner.

Linksys WRT310N

This router is sexy, slow, and hot

With softly rising wings hiding its MIMO antennas, the Linksys WRT310N looks more like a flying car than an 802.11n Draft 2.0 router. Whether you think this device looks sexy or silly, our tests reveal that the price of fashion is speed, range, and heat.

The WRT310N is far more basic than its pricier (by about $70) stablemate, the WRT600N we've been using for Wi-Fi router performance comparisons. It's a single-band device (operating on only the 2.4GHz band), where the WRT600N has two radios (one that runs at 2.4GHz and a second that uses

the 5.0GHz band). If you depend on a wireless router for both data networking and media streaming, a dual-band model is a much better choice.

Unlike the WRT600N, the WRT310N doesn't have a USB port. This means the router can't host USB hard drives or act as a basic NAS device, nor can it be used to transfer security settings to client devices via a USB memory key. It does, however, include an integrated four-port gigabit switch, a feature we consider essential.

The WRT310N's entire bottom plate is perforated with ventilation holes, and there are ventilation slots beneath the wings on either side, so we were very surprised by how warm the device runs. We wouldn't recommend operating it in an unventilated closet.

We tested both routers in 802.11n-only mode, with two channels enabled. The client was placed in six locations inside and outside a single-family home (you can read more about how we test wireless routers at http://tinyurl.com/5err46).

Labeling the WRT310N as slow might

be a little harsh since it delivered TCP/IP throughput of 72.7Mb/s in our kitchen test (20 feet from the router, with an insulated wall and a set of cabinets in between), but we cherish performance, and the WRT600N delivered throughput of 102.0Mb/s at the same location. As you can see from the benchmark chart, the WRT310N was markedly slower in all but one of our test locations, and it was barely able to maintain a connection in the second of our two outdoor tests. —**MICHAEL BROWN**

BENCHMARKS

	Linksys WRT310N	Linksys WRT600N
Kitchen (20 feet) Mb/s	72.7	**102.0**
Bedroom (60 feet) Mb/s	15.5	**39.1**
Media Room (35 feet) Mb/s	11.1	**32.8**
Enclosed Patio (38 feet) Mb/s	46.3	**67.6**
Outdoors A (90 feet) Mb/s	**0.9**	0.4
Outdoors B (85 feet) Mb/s	0.1	**17.5**

Best scores are bolded. Additional test criteria available at http://tinyurl.com/5err46.

VERDICT 7

LINKSYS WRT310N

➕ COOL WORLD	➖ COOL RUNNINGS
Sexy good looks; includes a gigabit switch.	Twenty five percent slower than the WRT600N; runs very hot; single-band radio.

$120, www.linksys.com

The Linksys WRT310N is pretty enough, but we much prefer performance over appearance.

Microsoft Arc Mouse

Comfort be damned! This mouse looks infinitely better than it works

Ah, the fashion mouse. You know the one: It's designed by the industrial design team of the moment, and it not only lets you move your PC's cursor but also tells everyone that you care about Design (you know, with a capital D). Unfortunately, what this mouse tells anyone who knows about mice is that you'd rather use an incredibly uncomfortable device that looks cool than one that properly fits your paw and gives you good control over your cursor. Despite a more than competent laser-powered sensor, the Arc Mouse falls squarely in fashion-mouse territory.

The Arc is, ostensibly, designed to be a travel mouse, and its size and shape are indeed suited to that purpose. When you fold the back of the mouse up and snap the USB transmitter dongle into the magnetic receptacle, you get a mouse that's small enough to fit in a pocket.

That's great and all, but it's just not comfortable to use.

The problem is the Arc's tapered shape and narrow girth. The mouse is so narrow, even at its widest point, that you can't comfortably grip it with a claw grip or rest your hand on it with a palm grip. The placement of the sensor on the front portion of the Arc's arch makes the translation of your wrist movements into cursor movements a little odd for users who are accustomed to a mid-palm sensor, but you'll adjust to that pretty quickly. Worse is that the thumb button is in a spot that's impossible to reach, and the right mouse button is difficult to push, especially if you use a claw grip. We've tested several portable mice with slightly larger formfactors that are significantly more comfortable than this mouse, including the new Explorer MiniMouse from Microsoft and the Logitech Revolution VX.

Microsoft seems to have solved the connectivity issues that plagued its previous 2.4GHz wireless peripherals, but this little guy is just too uncomfortable for us to recommend, despite its sexy design.
—WILL SMITH

VERDICT 4	
MICROSOFT ARC MOUSE	
➕ VISTA x64	**➖ XP x64**
Pretty design and incredibly compact size. Comes with a travel pouch!	Very uncomfortable shape. Odd sensor placement makes cursor control tricky.

The Microsoft Arc Mouse's ambidextrous design just means it will cripple both righties and lefties.

Call of Duty: World at War

This history lesson is taught with flamethrowers and bayonets

The odds have always been stacked against Call of Duty: World at War. This sequel revisits an undeniably exhausted FPS setting—World War II—and wasn't designed by series creator Infinity Ward, but Treyarch has delivered a sufficiently compelling shooter. World at War doesn't bring any lasting innovations to the FPS genre, but it has enough unrelenting shootouts and dramatically scripted events to keep us immersed in the action.

Like Call of Duty 4, the seven-hour single-player campaign is split between two parallel plotlines, each showing a different theater of war. Wading through the swamps and jungles of the South Pacific to rescue POWs and raid airfields in one campaign is very different from sneaking through the ruins of Stalingrad to stalk Nazi generals. Though these battlefields feel a little too familiar, the missions are filled with enough gritty and explosive set pieces to keep us distracted from the feeling of déjà vu.

Just don't expect much resistance from the AI enemies. Your foes are easily dispatched and don't react realistically in combat; the concept of suppressing fire, for example, is nonexistent. Waves of enemy grunts will perform kamikaze rushes or snipe you from trees, but their behavior feels like that of theme park automatons (albeit with bayonets). Still, the large-scale firefights are varied enough to be memorable.

Cooperative multiplayer with three other players is the best way to play through the campaign, though the competitive co-op mode wasn't as fun since players don't have much incentive to help each other. We also couldn't warm up to the new vehicle maps or the new set of multiplayer in-game perks. An unlockable Zombie game mode is a pleasant surprise, but it won't take the place of Left 4 Dead.

Call of Duty: World at War doesn't disappoint us, but it never matches the riveting excitement of Call of Duty 4. It's worth your

You will leave a swath of destruction as you work your way through a Stalingrad left in ruins.

gaming dollar if you like first-person shooters; just remember to manage your expectations. —NORMAN CHAN

VERDICT **7**	
CALL OF DUTY: WORLD AT WAR	
➕ **NEW YEAR'S DAY**	➖ **SUNDAY BLOODY SUNDAY**
Lengthy single-player campaign is engaging; fun co-op mode.	Unimpressive AI; tired setting; makes us long for Call of Duty 4.
$50, www.callofduty.com, ESRB: M	

Fallout 3

Walkin' in a postapocalyptic wonderland...

No one makes a big open-world role-playing game like Bethesda. That's what the Elder Scrolls games are famous for, and that's what the company has brought to the post-nuclear-holocaust milieu of Fallout 3. The game takes you to the world outside Vault 101, the charred remains of the Washington D.C. metro area 200 years after the nukes flew. Truly, Bethesda has built an amazing world.

And this world is the star of the game. Fallout 3 is massive—closer to a single-player MMO than a traditional, linear single-player RPG. As you explore the Wasteland, which surrounds D.C., you'll meet hundreds of people, many of whom have their own stories to tell, and find hundreds of locations to explore. These range from fully fledged towns to survivalist outposts to ammo caches to camps for the various factions that populate the land. As in Oblivion, you control your progress through the game. Should you choose to skip the main quest, you can explore the world and look for adventure, completing quests and reaping the rewards along the way.

The combat system is equally astounding. Fallout 3 lets you switch between the VATS and a real-time system that's closer to what you'd find in a first-person shooter. In the real-time mode, you point your weapon at the target and fire. Hits are registered on different areas of the enemies' bodies, doing different amounts of damage based on such factors as accuracy, movement speed, and environmental awareness. VATS mode lets you target and queue your shots at specific areas of the enemies' bodies—legs, head, arms, torso, etc.—as well as increase the chance of a crit, which will do extra damage. The catch is that you can queue only a limited number of shots in VATS mode at once. Each VATS shot costs AP, which regenerates slowly over time. Successful players will end up using a combination of VATS and real-time combat. Both of which are very satisfying.

The world is astounding, there are dozens of side quests, and the combat is fun. Unfortunately, Fallout 3 is far from perfect. This may sound a bit whiny, but the main quest just doesn't feel special. Part of the problem is that the side quests are universally of a very high quality. Still, we expect the main quest to deliver the most drama, excitement, and wonder in the game, and it doesn't.

Our other complaints are more technical. The first is that the game has a very low level

Bringing out the big guns has special meaning when you see the effect of the mini-nuke.

Use VATS to target your enemy's weak spots for massive damage.

cap. While the level 20 cap ensures that our characters never became godlike, we reached the cap after only a few hours of play, which removed much of our opportunity for character advancement. The big problem, however, is stability. Fallout 3 crashes more than any other AAA title we've played in the last year. Were the game stable, it would undoubtedly receive a Kick Ass award. As it is, we can't give it more than an 8. **–WILL SMITH**

VERDICT	8

FALLOUT 3

✚ A BOY AND HIS DOG	▬ THE POSTMAN
Amazing world full of excitement and adventure. Runs great on almost any machine. Looks incredible!	The game crashes, lots. Low level cap. Main quest kind of dull.

$50, http://fallout.bethsoft.com, ESRB: M

LAB NOTES

Free at Last!

Mr. Huang, tear down this wall! Nvidia releases drivers that support non-nForce chipsets

We're free at last to finally pick our multi-GPU poison. By the time you read this, you'll be able to buy an X58-based motherboard and run either SLI or CrossFire X on the very same freakin' board! I tested this on a Core i7 Asus P6T Deluxe board (page 78) and it worked fine in dual-x16 mode. Of course, not all X58 boards offer the combo support. Only motherboards certified by Nvidia will run SLI. From our informal survey we ascertained that the majority of board vendors are going the extra mile for the certification from Nvidia. The only holdout today is Intel. Intel's own DX58SO board doesn't support SLI and likely never will. Not all GPUs will work, either. Nvidia drivers currently support 200-series and 9-series cards in SLI mode on those boards. That's unlikely to be a problem—who's going to build a dual-GeForce 8800 GT rig using X58 and Core i7?

GORDON MAH UNG
SENIOR EDITOR
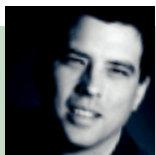
TOM EDWARDS
MANAGING EDITOR

The cause of all the blown deadlines this month: The one-two punch of Fallout 3 and Left 4 Dead had the editorial team up until the wee hours. However, when it comes time to assign blame, rest assured that associate editor Nathan Edwards (no relation) will take the brunt of it. It's all part of being the new guy!

WILL SMITH
EDITOR-IN-CHIEF

I just upgraded the CPU and mobo in my home machine, which precipitated my first Windows re-install in 18 months. Since I had been storing my files in my user profile and backing up my in-stallers on my home server, I was up and running in a few hours. Now it's time to make a backup of the pristine install.

NORMAN CHAN
ONLINE EDITOR

With Christmas right around the corner, I've started to think about what to put on my holiday wish list. What do you get the techie who has (nearly) everything? I've set my sights on the Canon EOS 5D Mark II digital camera, which has dazzled me with its excellent low-light performance and jaw-dropping 1080p video capture. Anyone care to chip in?
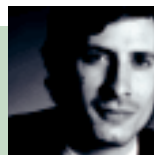
NATHAN EDWARDS
ASSOCIATE EDITOR

This month I've been getting into my new beats, testing the 1.5TB Seagate Bar-racuda and the 1TB WD Caviar Green hard drives and the undeniably cool Antec Skeleton. Up next, testing the pile of cases surround-ing my bench in the Lab—I was up to 15 at last count. Maybe when I'm done I can play all these games I'm hearing about.

KATHERINE STEVENSON
DEPUTY EDITOR

The last couple days, I've been having fun playing around with the Roku Netflix Player. Setup was super easy and it's great to be able to partake of Netflix's ever-expanding streaming library from the comfort of my couch. It gives us Netflix subscribers something to do while we wait for our next discs to arrive.

We tackle tough reader questions on...

‣False Positives
‣Monitors
‣The Snacking Superpower: Corn Nuts
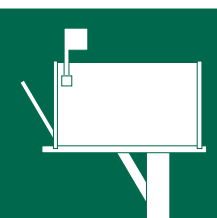
False Positives and You

I was looking through your CD and installed the game called Nero. After I installed and played it, ThreatFire gave me a warning that Nero was a key-logger. Could there be a virus on the CD or is it supposed to run a keylogger (I closed the game and quarantined it because I didn't trust it).

—Tyler Urbano

Associate Editor Nathan Edwards Responds: All programs we put on the disc are scanned many times before they ship. I scan the content with the corporate edition of Symantec AntiVirus 10.1.6 prior to inclusion; the content is then scanned by our production staff and once again at the disc-production facility before it's shipped to you.

ThreatFire uses a behavioral malware detector and may incorrectly flag non-malware apps. Many casual games can cause false positives because they lock your keyboard input to a window, but they aren't keyloggers.

Monitors for Every Budget

I bought the Samsung Syncmaster 206BW in May 2007 solely based on it being rated the Best Budget LCD in your Best of the Best column. Now I want to buy another, but they are nowhere to be found on the usual retail sites, so it makes sense to me that you should replace the 206BW with something equal or better on the Best of the Best page. And while you're at it, maybe you could throw in a Best Midrange LCD since you could park a bus in the gap between the 206BW and your high-end pick, the Gateway XHD3000. Thanks so much for taking the time to review these products so I don't have to.

—Spencer Lines

Managing Editor Tom Edwards Responds: The 206BW was a longtime favorite, but you're right, it's time to replace it with something more readily available. At the budget end of the spectrum, we recommend Envision's G2219w1. It's the best LCD monitor available below $300. If you have a bit more to spend, we recommend Samsung's 245T. This 24-inch LCD impressed us with its vibrant colors and grayscale range, and it now retails for less than $700, making it an excellent value.

Your Website Is in My Magazine

I really enjoy getting *Maximum PC* every month and would gladly pay double to receive the mag every other week. I also stop by the website pretty much every day. It's all good, except I hate to read an article on the web before I even get my magazine, most notably the Holiday issue's Core i7 story. It seemed like wasted space in the magazine since it's now old news. It's also the type of article that just feels better to me in print. I, for one, would prefer that you hold back publishing great articles like this on the web until after the print version makes its rounds.

—Dan Simpson

Editor in Chief Will Smith Responds: While quite a few people read either our site or our magazine, our research shows that there aren't too many people who read both. So thanks, Dan! Unfortunately, to best serve both audiences, we have to print important stories, like the Core i7 review, in both places as quickly as possible. It's a tough balance. I definitely don't want readers of the magazine to feel like they're getting ripped off; at the same time, *Maximum PC*'s mandate on the web is to cover important stories

CUTCOPY**PASTE**

On page 30 of the Holiday issue, we inadvertently printed an incorrect Registry path in the Minimize Menu Loading Time tip. The path should have been HKEY_CURRENT_USER\Control Panel\Desktop.

in a timely, relevant fashion. For now, the vast majority of content in each issue is exclusive to the mag. It generally only starts making its way online after the majority of subscribers have received their copies.

Sometimes We Feel Like a (Corn) Nut

On page 103 of the December 2008 issue under the title of "Next Month" it states "Visit Us at Cornnuts.com." Well, when I enter www.cornnuts.com, it takes me to the Corn Nuts snack website, not anything to do with *Maximum PC*. Is the site listed incorrectly? If so, what site should I be going to?

—Tony Seiter

Managing Editor Tom Edwards Responds: Tony, you didn't enter that URL incorrectly. Corn Nuts recently received Most Favored Snack status

THERE'S NO MASSIVE CONSPIRACY TO OMIT PRODUCTS WHEN WE DON'T COVER THEM IN THE MAGAZINE.

with the *Maximum PC* editorial team. They're what fuel us when we're here late writing, benchmarking, or engaging in epic rounds of Team Fortress 2. Providing the URL was a way to give you a bit of insight into our dietary predilections and also a bonus for particularly puzzle-savvy readers. Figure out where to enter the code MaximumNuts on the Corn Nuts site and you'll be in the running for some cool prizes. (not really)

Is This Sarcasm? We're Not Sure

On page 9 of the December 2008 issue, Nathan Edwards tells us of a 250GB bandwidth cap for Comcast customers. Two hundred and fifty giga-

bytes?! My DSL provider caps my connection at 3 megabits per second. And my neighbor's cable bandwidth measures in at 4.5Mb/s. Again: 250GB? (quick rush of stampeding feet)... Where do I sign up?

I am guessing that when Mr. Edwards used the term bandwidth, he really meant something else. Unless I've just woken up after 100 years in cryogenic suspension, 250GB bandwidth from an ISP is just not at present a realistic possibility.

—Michael Bloom

Associate Editor Nathan Edwards Responds: Comcast calls its 250GB/month transfer cap a "monthly data usage threshold," which is a pretty dumb name. Everyone else calls it a bandwidth cap, although that's not exactly right either. "Bandwidth cap" more correctly refers to a limit on data transfer rates, like your ISP's 3Mb/s limit. But rather than confuse everyone by making up a new term, we thought we'd go with the rest of the industry and keep calling transfer limits bandwidth caps, even if it's not strictly accurate. Sorry for the confusion.

Normally, We Don't Feed the Trolls

I could not help but notice that you conveniently left out the Dell Notebook in your article "Little Packages, Big Problems" (December 2008). Although I understand some mistakes can be made, the Dell offering was far superior to all of those reviewed if you count the integrated mobile broadband support.

I would have let that slide and chalked it up to oversight, till I turned the page—where your magazine went on to review virtualization, without even the mention of VMWare. VMWare Workstation is the premier virtualization option for PCs. VMWare ESX Embedded 3.5i is 32MB and is installable on a flash drive. There is a free license that you can get that never expires. And VMWare Server is Free!

Virtual Box is a great product, but it is freeware virtualization, and ESX is in a whole different class (and still free). Perhaps it's time to hire some people that know about computers to write these articles rather than just hobbyists.

—Will

Editor in Chief Will Smith Responds: I hate to let you down, Will, but there's no massive conspiracy to omit products when we don't cover them in the magazine. In the case of the Dell netbook, it wasn't even announced at the time we tested the other netbooks we reviewed in that feature. We'll definitely cover the Dell in an upcoming issue, but it's extremely difficult for us to review a product whose existence a vendor won't confirm.

As for the white paper about Virtual Machines, our white papers are typically about technology and not about specific products. In our virtual machine white paper, we did mention several free virtual machine apps, but not VMWare. We received an unusually large number of emails complaining about the omission of VMWare products, so for that we apologize. For what it's worth, the last time we did a story focusing on different VM products, rather than their technological underpinnings, VMWare was featured prominently. ⏻

HIGH RES
CinematographHD

If your laptop needs are limited to email and epic rounds of Bookworm on cross-country flights, plenty of machines will do the job. However, if you need to do something a bit more power intensive, your options are much more limited.

Will Urbina couldn't find a desktop replacement that suited his needs for video editing; everything available was lacking in some area—so he built the CinematographHD. And although this 82 lb. rig may stretch the definition of portable, we salute his no-compromises approach. The images here give a hint of what Will created, but to get the full picture, check out his build video at http://www.vimeo.com/1847710.

That's right, the CinematographHD sports hinged dual 22-inch LCD monitors. To create this rig, Will took apart his laptop to see how the hinges and body panels worked and then copied the design.

▪▪▪ BE A WINNER!

For submitting this month's winning entry, Will has won a $250 gift certificate. To enter the Rig of the Month contest, see the official rules on page 93.

The CinematographHD includes five hard-drive bays, a full ATX mobo, an HDMI capture card, and a Blu-ray burner.
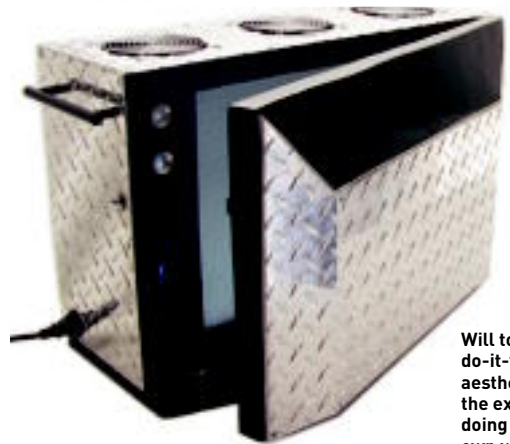
Will took the do-it-yourself aesthetic to the extreme, doing all his own welding.