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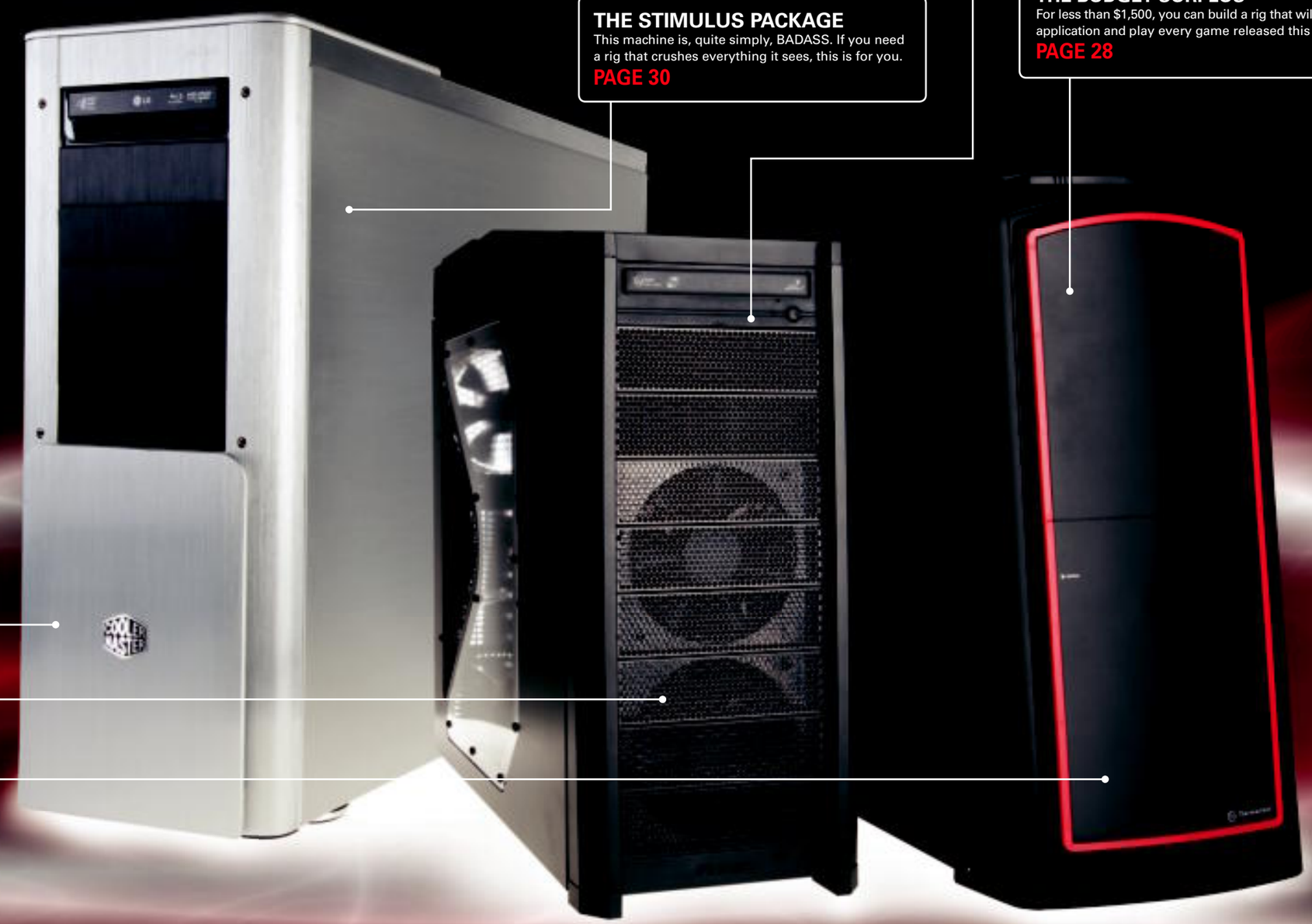

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ASSOCIATE PHOTOGRAPHER **Samantha Berg**

BUSINESS
VP/PUBLISHING DIRECTOR **Stacey Levy**
650-238-2319, slevy@futureus.com
GROUP SALES DIRECTOR **Gabe Rogol**
650-238-2409, grogol@futureus.com
SENIOR REGIONAL SALES DIRECTOR **Dave Lynn**
949-360-4443, dlynn@futureus.com
REGIONAL SALES DIRECTOR **David White**
650-238-2502, dwhite@futureus.com
SALES MANAGER **Aida Rodriguez**
708-562-0686, arodriguez@futureus.com
INTEGRATED SALES DIRECTOR **Joe Pomparelli**
323-342-1888, jpomparelli@futureus.com
MARKETING MANAGER **Andrea Recio-Ang**
650-238-2548, andrea@futureus.com
ADVERTISING COORDINATOR **Jose Urrutia**
650-238-2498, jurrutia@futureus.com

PRODUCTION
PRODUCTION DIRECTOR **Richie Lesovoy**
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4000 Shoreline Court, Suite 400, South San Francisco, CA 94080
www.futureus-inc.com

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FUTURE plc
30 Monmouth St., Bath, Avon, BA1 2BW, England
www.futureplc.com
Tel +44 1225 442244

NON-EXECUTIVE CHAIRMAN: **Roger Parry**
CHIEF EXECUTIVE: **Stevie Spring**
GROUP FINANCE DIRECTOR: **John Bowman**
Tel +44 1225 442244
www.futureplc.com

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Sometimes It's Good to Buy the Extended Warranty

I suffered a loss recently: My trusty, first-generation iPhone's touch screen gave up the ghost. On a sunny day in early June, it let loose this mortal coil. And, like every other piece of technology I've ever owned, the touch screen stopped responding at the worst possible moment—as I was in a cab on my way to the first leg of a two-week trip.

Upon landing in Los Angeles, my first stop was an Apple store, where one of the Apple-proclaimed "geniuses" explained my options. My first choice was to get a replacement phone for a mere $200 (I hadn't bothered to buy the extended warranty). My other option was simply to pound sand. I took my busted phone and bid the Apple store and its smug "geniuses" farewell, vowing to never buy another iPhone.

Next stop was AT&T to purchase a new, non-iPhone phone. I put my name on the we'll-help-you-when-we're-good-and-damn-well-ready list, and started looking at phones. After an hour or so of waiting, I walked out of the building with a new Blackberry Bold and considered my mission accomplished.

Of course, when I returned to my car, it had a parking ticket on it. And, frankly, things went downhill from there. Connecting the Blackberry to my company's mail server took multiple calls to our IT department, a call to AT&T, and the sacrifice of one chicken. (Well, actually we ate fried chicken for dinner and I dropped a drumstick on the ground by accident, but that still counts.) After more than a year using the iPhone, acclimating to the Blackberry was difficult. I had become accustomed to the convenience of the iPhone. I liked carrying 16GB of music, but I loved having access to thousands of apps in the App Store, so naturally I went searching for replacements. While I found Blackberry apps that connected me to Twitter and Facebook, I didn't find analogues for other apps I regularly use—the ones that help me manage my expenses, find a good spot to eat, or entertain myself. Hell, the built-in web browser even choked on some pages. While I eventually managed to connect my calendar to the Bold, I mourned the loss of everything else—from Yelp to Flight Control.

After a week of use, it was clear that the Blackberry Bold wasn't a good fit for me. Yes, it did excel in a few areas—namely, download speeds, mail, instant messaging, and maps—but it still had to go. On the day I returned the Bold, Apple announced a new iPhone and a price cut. And after careful consideration, I swallowed my pride and pre-ordered an iPhone 3GS.

Whether I like the way Apple treats its customers or behaves in general, I can't argue with good tech. And the iPhone remains one helluva piece of hardware.

Also, this time I bought the extended warranty.

Will Smith

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THE NEWS

Search Engine Showdown

Microsoft's better-than-expected Bing revitalizes a stale search engine war and may finally give Google cause for concern -PAUL LILLY

You know you're facing stiff competition when your competitor's service is officially recognized as a verb. Yet that's exactly the situation Microsoft, Yahoo, and anyone else who attempts to take on Google in the search engine arena finds themselves in.

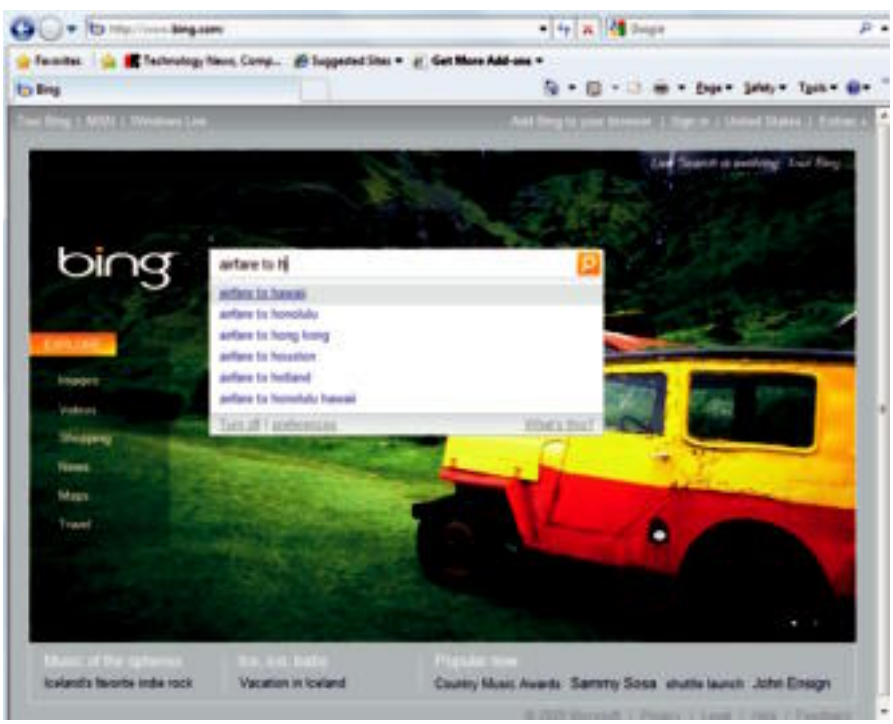
But just when the search engine wars seemed to flatline, Microsoft introduced the world to Bing. Formerly code-named Kumo, the rebuilt search engine, which has now fully replaced Microsoft's Live Search, shows surprising promise, a result of significant changes made to its core architecture.

"We have taken the algorithmic programming up an order of magnitude," says Microsoft Senior Vice President Yusuf Mehdi.

And it shows. Punch in a search on Bing and those new algorithms not only determine the order of results on the search page, but also the layout. Search for your favorite sports team, for example, and Bing presents a list of previous games and scores, along with any upcoming scheduled games right at the top. In the left-hand pane, you'll find secondary links to team merchandise, themed wallpaper, relevant videos, event tickets, and even rumors. In short, the type of search, be it a medical query or travel destination, dictates what the results page will look like.

The result is what Microsoft calls a "Decision Engine," a point it will attempt to drive home through an aggressive marketing campaign. Already engulfed in an ad war with Apple that pushes PCs over Macs, Microsoft now has Google in its crosshairs and will spend between $80 million and $100 million advertising Bing with online, TV, print, and radio spots, says *Advertising Age*, a marketing and media analysis magazine. By comparison, Google spent $25 million last year.

Meanwhile, Stephen Wolfram, a British physicist who received his Ph.D. in theoretical physics at the age of 20, recently unveiled a search engine he calls Wolfram Alpha. Or as he likes to call it, a "computational knowledge engine."



Don't think of Microsoft's Bing simply as Live Search rebranded. A new set of algorithms puts Bing on a whole new playing field, where it hopes to beat Google at its game.

"All one needs to be able to do is take questions people ask in natural language and represent them in a precise form that fits into the computations one can do," says Wolfram.

While a comparison to Google would seem inevitable, Wolfram Alpha doesn't actually search through web pages, but instead mixes "many clever algorithms and heuristics" to compute answers by tapping into an enormous collection of data. And unlike Google or Bing (or other similar search engines), Wolfram Alpha doesn't chuck out links in hopes that one of them might contain the information you're looking for. Nor does it tap into a database of documents à la Wikipedia. Instead, Wolfram Alpha computes answers asked in plain language and responds with a factual answer, such as the population of China or the boiling point of water. By combining formal models of fields of knowledge along with scientific data, Wolfram Alpha can compute answers to questions it hasn't even been programmed to answer.

So where does all this leave Google? Comfortably on top of the search engine market, at least for now. According to market research firm comScore, in 2008 Google accounted for nearly 90 percent of all search volume growth, which means Bing, Wolfram Alpha, and everyone else has considerable ground to make up if any of them are to have a shot at competing with the King Kong of search engines.

LTE Almost Ready for Launch

The switch to Long Term Evolution (LTE), the 4G wireless broadband technology that mirrors the speed of wired Internet services like cable and DSL, may arrive sooner than expected. A dozen operators across the globe, including U.S. operators Verizon Wireless, MetroPCS, and US Cellular, are anticipating having LTE set up and running for a 2010 release date.

Equipment vendors Ericsson and Alcatel-Lucent have already managed to set up major contracts with Verizon Wireless in preparation of the switch to the 700MHz-based network.

LTE will help carriers easily adopt 4G mobile communications technology. It will also aid in eventually lowering costs and improving cell services, as well as fuse both GSM and CDMA networks. **–FI**

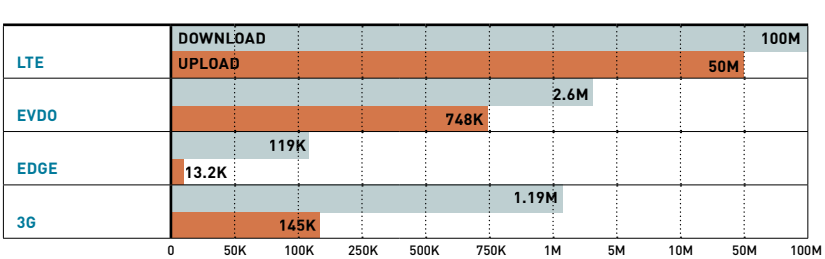
RIAA Wins Infringement Case

Maybe she shouldn't have asked for a retrial. Jammie Thomas's second trial for copyright infringement ended in June with the same guilty verdict as her first. Thomas refused to settle out of court, preferring to duke it out with the RIAA, but after a jury levied her $80,000 for each of 24 songs she was found guilty of sharing, she may be regretting that strategy. The trial was dogged by sometimes-contradictory testimony from Thomas and several missteps by the recording-industry lawyers, but in the end jurors awarded the prosecution $1.92 million dollars in damages. Thomas indicated that trying to collect the damages might prove difficult, saying it would be "like squeezing blood from a turnip." **–NE**

ZeniMax Acquires id Software

In late June, ZeniMax Media, parent company of RPG-luminary Bethesda Softworks, bought id Software for an undisclosed amount of cash, putting the creators of Wolfenstein, Doom, and Quake in the same artistic stable as the folks behind Fallout 3 and the Elder Scrolls series (Morrowind, Oblivion). ZeniMax says that id will retain its creative freedom, with Bethesda as a publisher. John Carmack, id's founder, waxed positive: "This puts id Software in a wonderful position going forward." We're just excited to see two of the best names in games coming together. Also, is it wrong to want a Doom RPG? **–NE**

CELLULAR DATA SPEEDS COMPARED



LTE will offer greater improvements over today's cellular broadband speeds. These are shared maximum speeds across the node and aren't necessarily representative of end-user performance.

The Next Next Thing

It's getting almost impossible to be a fully equipped techie. There's always another new gadget threatening to leave you behind, even if you've already got a desktop PC, laptop, netbook, home WLAN, game console, e-book reader, smart phone, iPod, GPS, portable DVD, digicam, DSLR, HDTV, HD camcorder, Blu-ray, DVR, dish, and surround-sound home theater.

What's next? Media phones.

Nope, they're not smart phones. We've already got that. Media phones are next-gen landline phones tethered to broadband Internet service in a home or office. Typically, they have cordless handsets for voice calls and a fairly large (8-inch or so) touch screen. Built-in DSL or Wi-Fi provides fast, always-on Internet access. VoIP can provide cheap long-distance calling. Like conventional phones, media phones needn't be booted or shut down.

The touch screen offers numerous applications: web browsing, email, network-based address books, phone-directory lookups, news updates, weather forecasts, YouTube videos, music, TV program guides, Twitter, recipes, and quick e-commerce (e.g., ordering pizza or movie tickets). When idle, a media phone can be a digital picture frame, MP3 player, or Internet radio.

Basically, media phones update the old-fashioned home or office landline phone with the same services and applications now appearing on mobile phones, except with bigger screens and no need to recharge batteries. Media phones can be mounted on walls (ideal for kitchens and workshops) or put anywhere conventional phones are found (desks, tables, night stands). Some plug into an ordinary phone jack, others connect wirelessly to a dedicated Wi-Fi router. They don't need a PC.

Telephone companies are introducing media phones in the same way that DSL modems were rolled out. Your local telco will probably subsidize the phone's cost in return for a service contract. You may also find media phones sold in stores, probably bundled with service. In offices, they will tie into Internet-based PBX systems.

An ulterior motive is at work here. More people are dropping landline telephones in favor of cell phones and cable services. The telcos hope media phones will reverse this trend. Nevertheless, I can see the usefulness of a media phone. At the right price, this techie would buy one.

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

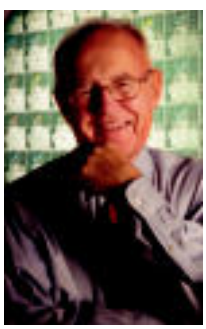
Callpod FuelTank

Whether it's a 14-hour plane ride or an epic road trip, there are times when you can't get to an outlet to plug in your gear. Enter the Callpod FuelTank ($70, www.callpod.com). The FuelTank charges two devices at once, using the same adapters as its universal charger sibling, the ChargePod. We were able to fully charge an iPhone 3GS, a PSP, a Bluetooth headset, and a Blackberry on one FuelTank charge. –WS

Moore's Law No More?

Or is news of its death greatly exaggerated?

For years, folks have been predicting the end of Moore's law—the theory put forth in 1965 by Intel cofounder Gordon Moore that says the number of transistors on an integrated circuit would double every 18 to 24 months. Now market research firm iSupply is sounding the death knell. "The usable limit for semiconductor process technology will be reached when chip process geometries shrink to be smaller than 20nm, to 18nm nodes," said Len Jelinek, iSupply director and chief analyst, semiconductor manufacturing. "At those nodes, the industry will start getting to the point where semiconductor manufacturing tools are too expensive to depreciate with volume production, i.e., their costs will be so high, that the value of their lifetime productivity can never justify it."



For more than half a century, Gordon Moore has been right in spite of the naysayers.

So, when will this happen? According to iSupply, in the year 2014. In 2007, Gordon Moore said his prediction would stand for at least another decade. Five years from now, one of them is going to be wrong. –PL

MICROSOFT GAINS GROUND ON MOZILLA

Microsoft woos developers away from Mozilla Public License

Microsoft's open source Microsoft Public License (MS-PL) is becoming increasingly popular with open source developers. The MS-PL is still in its infancy, having been approved by the Open Source Initiative just a couple of years ago, but it has steadily risen to take the 10th spot among open source licenses (ranked according to popularity). Around 1.02 percent of all open source projects are currently licensed under the MS-PL. If it continues in the same vein, it will leave the Mozilla Public License (MPL) behind in the popularity stakes very soon (Mozilla, which has been around since 1998, is currrently ranked ninth and is used by 1.25 percent of projects). Microsoft's open source code-hosting service Codeplex is a key force driving interest in the Microsoft Public License. –PC

GAME THEORY

Summa Contra Sims

Long ago, I came to the conclusion that The Sims was designed for Someone Else. I don't know who. Hottentots, perhaps.

I played through The Sims 3 with awe, respect...and profound boredom. It's a brilliant piece of work, and if God is kind I'll never have to play it again this side of Purgatory.

Meanwhile, I've been returning to Prototype. I like Prototype. I also liked it when it was called Spider-Man 2 and Hulk: Ultimate Destruction. If a game is worth playing once, it's worth playing two more times with different character models.

Games are all about wish-fulfillment and power fantasies. Some people are content to wield their mighty power to get three gems in a row. Others would prefer to jump 10 stories in the air and punch a helicopter out of the sky. If you have the opportunity to do the latter, I have no idea why you'd choose to do the former, but people are strange.

Adult male gamers tend to follow the groove of their childhood fantasies into adulthood. As a kid, my daydreams tended toward Conan, Professor Challenger, the Six Million Dollar Man, and G.I. Joe. (Also: I wanted a pet werewolf.) If someone makes a game in which a muscular Cimmerian gets fitted for a cybernetic arm with kung-fu grip and leads his Adventure Team into a jungle swarming with dinosaurs that time forgot, I'd never leave the house. Until then, Prototype will do fine.

My childhood fantasies never ran toward being, say, an interior decorator or a guy who humps his way to a crummy job and then home to a barely furnished tract house every day. That's actually the polar opposite of "fantasy." Some people call it "reality," or perhaps just "life." Others call it The Sims 3.

I'm baffled when people deride a certain piece of art or entertainment as "mere escapism." What the hell else is it supposed to be? You may escape into high-minded flights of the intellect or emotional insight, or into a place where a man in a loincloth chokes a T-Rex with his mighty pneumatic hand, but you are escaping. I'd rather not spend those precious moments of escape redecorating someone else's make-believe house.

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

iConfused? Intel Has the iFix

Chip maker to 'simplify' CPUs with Core i3 and Core i5 procs

Having trouble keeping straight the difference between a Core 2 Duo, Core 2 Quad, and Core i7? That's something Intel says it hopes to clear up with a new naming scheme that will adopt Core i3 and Core i5 badges.

The company says that as it introduces new Nehalem architecture chips, it will move to a three-tier designation to help clear up the confusion. Core i3 will be the low-end, Core i5 will occupy the middle, and the high-end will go to the Core i7.

What isn't quite clear is what features Intel will use to partition the tiers. The company says the number of cores will play a role, but that's not the only factor. Many folks originally assumed the upcoming LGA1156 CPUs (code-named Lynnfield) would use the Core i5 brand since they diverge quite a bit from LGA1366 chips. LGA1156 processors will support only dual-channel DDR3, and integrate the PCI-E controller and, in some cases, a graphics core into the chip. Intel, however, is now saying that LGA1156 CPUs may carry either the Core i7 or the Core i5 badge, depending on the features.

Upcoming LGA1156 boards will support either Core i5 or Core i7.

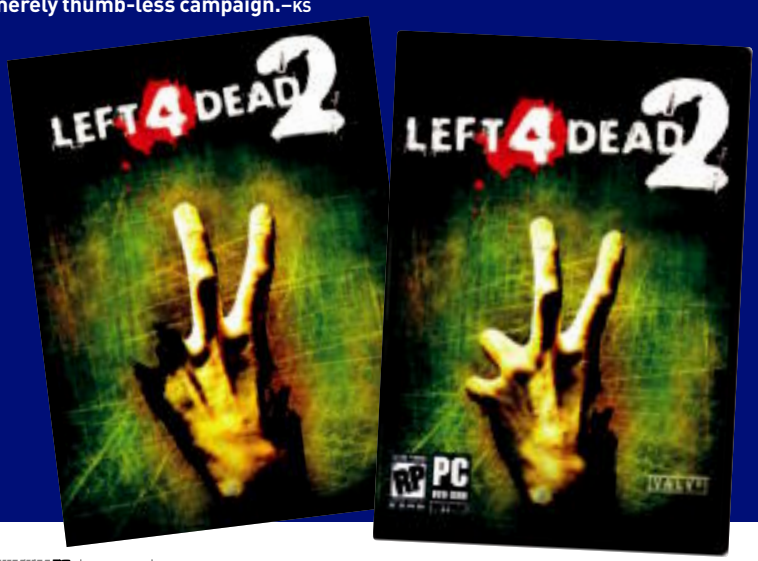
THE NUMBER OF CORES WILL PLAY A ROLE, BUT THAT'S NOT THE ONLY FACTOR

There was some speculation initially that Intel would use the Core 2 Duo and Core 2 Quad as Core i3, but Intel said Core i3 will be built around Nehalem and its derivatives. **–GU**

RE-MEMBERMENT

ESRB Demands Digits

Original marketing materials for the upcoming sequel to Left 4 Dead featured a hand with its thumb, ring finger, and pinky completely gnawed off, but the ESRB deemed this too gory. The ratings board is apparently satisfied with Valve's kinder, gentler, merely thumb-less campaign.–KS



BYTE RIGHTS

Back to School

As the summer wanes, the days get shorter, and the wind starts hinting of fall, you'll naturally ask, what's hawt in curriculum this year? Forget sex ed and intelligent design, the latest educational brawl is copyright!

Curriculums are being shipped to thousands of schools across America to teach our children all about intellectual property—every lesson plan authored by a lobbying group or industry association. It's even legally required now in California's famously overfunded schools.

I'm pretty into this copyright thing, but I still try to drop by the real world on occasion, just to see how it's going. In real life, schools are struggling with larger classes and fewer resources. Now, instead of music or art (or my favorite elective, ninjutsu), we're going to have our overworked teachers inculcating children about one side or the other of the copyfight? Great.

The BSA (Business Software Association), MPAA, RIAA, and even EFF are all into it. The lesson plans play to type—the EFF, geeky; the rightholders, incomprehensible—explaining more about the attitudes of the people that created them than they do about IP.

According to the BSA in its online K-2 "Cyber Tree House," it's uncool for kindergartners to "download or share copyrighted software programs, music, movies, or games without paying for them" or "copy pictures or books and magazines without permission from the author or artist."

The MPAA has—I'm not kidding—"Lucky and Flo, the world's first-ever DVD-sniffing dogs..." who are "trained to detect pirated DVDs." Ah, childhood memories of being talked down to by people who think kids are idiots.

The EFF's lesson plan ends in a mock trial of "the legal drama of Walt Disney Studios v. Faden." I love the EFF, but the kids into that drama already applied to be EFF interns over the summer.

But as lost in minutia as the EFF might be, the rightholders' lesson plans occasionally veer into naked contempt. Kids won't hear the ideology; they'll hear that minutia, or that contempt. Or, hopefully, it will all get ignored by teachers, and kids will hear band instruments, poetry, or the hissing of Bunsen burners.

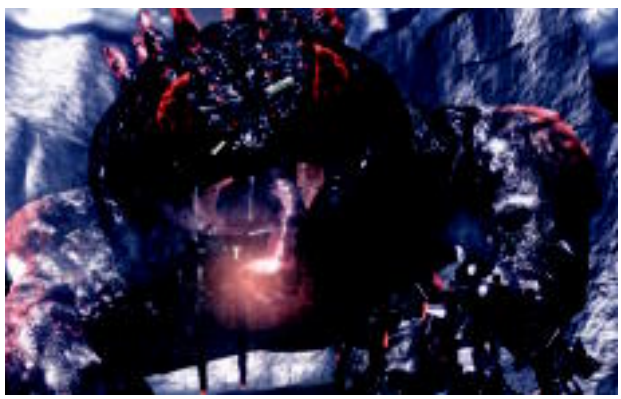
Quinn Norton writes about copyright for *Wired News* and other publications. Her work has ranged from legal journalism to the inner life of pirate organizations.

THE LIST 10 Best PC Games of

10 SINGULARITY

This fast-paced shooter pits you against soldiers and time-traveling subjects of failed Russian Cold War experiments.Take that, time-space continuum!

Publisher: Activision
Release: Fall 2009



9 LOST PLANET 2

Publisher: Capcom
Release: Winter 2009

Lost Planet's monster-plagued tundras have melted to reveal jungles infested with even bigger monsters. It'll take four players to kill these beasts, and that's only if you don't get eaten, digested, and flung out the rear-end mid-battle.

ALIENS VS. PREDATOR

8 THE PREDATOR DEMO WE PLAYED LET US INFILTRATE A HUMAN BASE, DISABLE DEFENSES TO UNLEASH AN ALIEN INVASION, AND THEN RIP HEADS OFF IN THE ENSUING CHAOS.

Publisher: Sega **Release:** Early 2010

7 LEFT 4 DEAD 2

In this fast-tracked sequel to our 2008 Game of the Year, you'll have to survive five grueling campaigns under the watchful eye of an improved AI Director. Boosting your odds of survival: hefty melee weapons and incendiary ammo!

Publisher: Valve **Release:** November 17, 2009

6 CALL OF DUTY: MODERN WARFARE 2

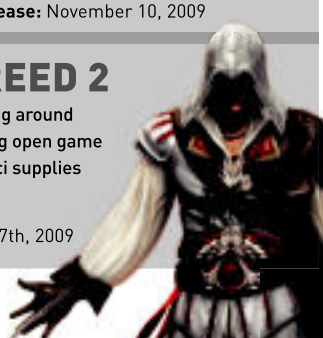
The game industry's answer to the Hollywood blockbuster sequel looks to be packed with expertly scripted intensity and literal cliff hangers. This is a game where you shoot first and ask questions never.

Publisher: Activision **Release:** November 10, 2009

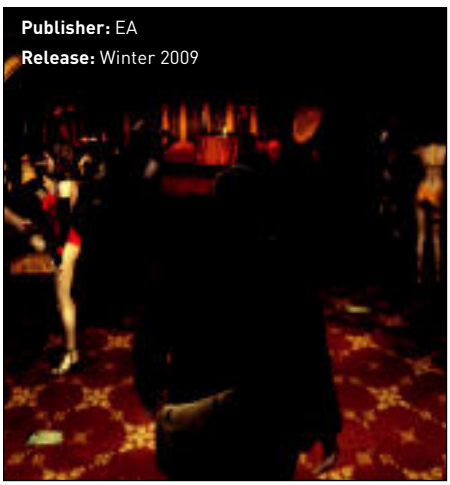
5 ASSASSIN'S CREED 2

Give villains their due while running around the rooftops of the most gorgeous-looking open game world we've seen. Plus, Leonardo Da Vinci supplies gadgets as your Q!

Publisher: Ubisoft **Release:** November 17th, 2009



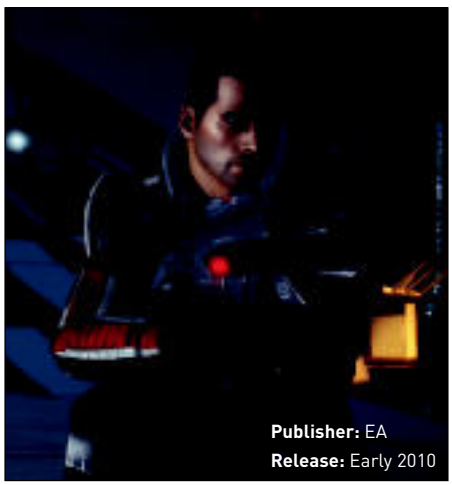
E3 2009



Publisher: EA
Release: Winter 2009

4 THE SABOTEUR

As you wrestle Paris from German control, the game's grayscale palette dynamically transforms with vibrant color. It's like Pleasantville, but with Nazis and salty French burlesque dancers.



Publisher: EA
Release: Early 2010

3 MASS EFFECT 2

BioWare's gritty sci-fi sequel takes more inspiration from *Blade Runner* than *Battlestar Galactica*. Character interactions play out like they were directed by J.J. Abrams, and the space battle we saw looked explosive.

Publisher: 2K Games
Release: Fall 2009

2 R.U.S.E.

The surprise of the show was a multiplatform strategy game that didn't looked simplified for consoles. R.U.S.E.'s heavy emphasis on multifaceted tactics is only made cooler by its multitouch surface support.

#1 BORDERLANDS

Publisher: 2K Games
Release: Fall 2009

Take the character customization, random loot, and persistence of an MMO, and fuse it with the frenetic pace of a skill-based shooter. That's the promise of Borderlands, a cooperative FPS that aims to deliver all the addictive excitement of questing in World of Warcraft while freeing you from trolls and griefers. The dream arrives later this year.

This month the Doctor tackles...

- Waiting for Win 7
- 4TB Backup?
- Exporting from DVR

^ on TV by Way of Laptop

I have a Gateway P-7811FX gaming laptop. I was looking at getting a 37-inch 1080p LCD TV to hook up through the HDMI port to extend the monitor/play games/ watch movies on. I found an external Blu-ray disc drive that hooks up through the USB port on the laptop. Will this setup give me good quality video to watch on the large TV? If not, any other suggestions?

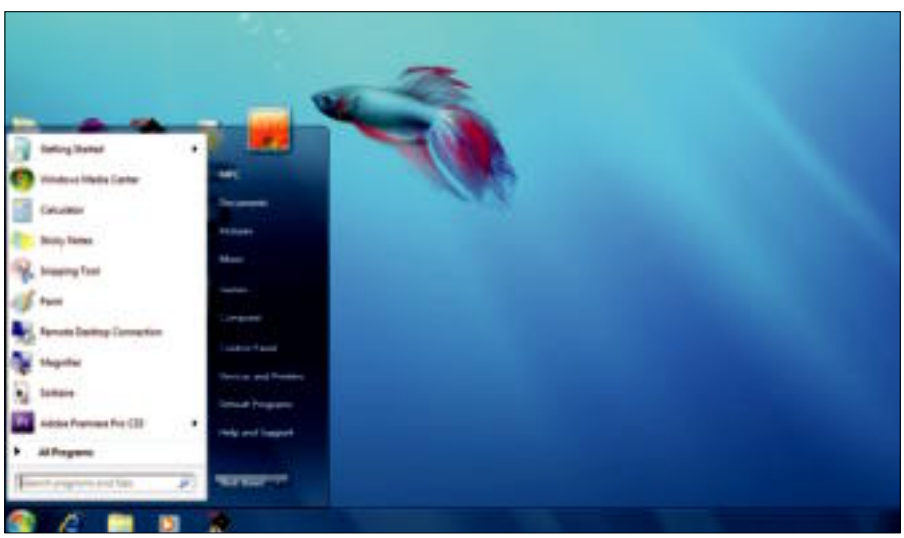
—Peter DiGiorgio

Peter, as long as your laptop and LCD are HDCP-compliant, you should be fine. The P-7811FX comes with an Nvidia GeForce 9800M GTS GPU. Nvidia's product page for that GPU touts its Blu-ray performance, and it should be able to output 1080p video via your laptop's HDMI port. You should double-check, of course, but the Doctor doesn't see anything wrong with it, in theory.

Wait for Win7?

My 6-year-old computer is extremely slow and sometimes takes 20 minutes just to start up. The other day it caught a virus, which masqueraded as a firewall and installed itself onto my computer, changing the background to a picture that said I have spyware on my computer. I tried to open my virus-scan program (AOL) but it would not open. I have tried everything I can think of. I took out my hard drive so that it could not get to my files. Now, I have to use my son's computer for emails. He is a big gamer so it's really hard to get in the time to use it. Should I wait for Windows 7 to come out before getting a new computer?

–Jim Sharo



Windows 7 has been optimized to work faster on every PC from a $10,000 gaming behemoth to a $300 netbook—and even your 6-year-old desktop.

First, let's try to get rid of your PC bug so you can recover your files and programs. Download and run Spybot Search & Destroy (www.safer-networking.org), Malwarebytes Anti-Malware (www.malwarebytes.org), and a free antivirus program like Avira Antivir (www.free-av.com) and see if those apps can flush the virus from your computer. If they can, great! Back up your files and get ready to do a clean install of XP (a clean install will make an older PC run much faster—even the best operating systems get cluttered, eventually). Or, if you're more adventurous and want a sneak peak of Windows 7 without buying anything, read on.

Windows 7 is definitely worth getting when it comes out on October 22. Microsoft seems on track to make up for Vista's disappointing launch with an OS that runs better on nearly any platform, including older ones, than Vista did. Even better, Microsoft released several fully functional free preview builds of Windows 7 to consumers, which will work until June of 2010.

But you don't have to wait for Windows 7 to come out before you get a new computer. Most vendors will offer free Vista-to-Windows-7 upgrades on new computers bought between June 26, 2009 and Windows 7's October 22, 2009 release date. Make sure you get an Upgrade Option coupon from your computer manufacturer so you can download Windows 7 when it comes out. In the meantime, if you really don't want to deal with Vista, you can run the Windows 7 Release Candidate on your new PC—or even on your old one.

No Video in Normal Mode

I have an Acer L310 that runs Vista Home. Recently, I have only been able to start

runs Vista Home. Recently, I have only been able to start in Safe Mode. When I try to start in normal mode my monitor won't work, but when I go with Safe Mode with Networking the monitor works. How can I get around this?

—Terrence Kyles

–Jeff Absher

Jeff, if your machine were a TiVo, exporting video would be fairly easy using the onboard USB, but the DirecTV DVR is trickier since any USB ports it has are disabled and there's no way to enable them. Since you have a free PCI-E slot, we think your best bet (though it will be a time sink) is to get a PCI TV tuner and output your DVR to its input ports. Some higher-end videocards from ATI and Nvidia also include Video In Video Out, so (with the addition of video-capture software and/or specialized drivers) you can record directly from that port. Either way, you're looking at bad news on two fronts: First, your output signal will be analog and the quality may suffer; second, you'll have to do it in real time. But hey, it'll do the job.

FOR HUGE AMOUNTS OF DATA, THERE'S NO SUCH THING AS CHEAP BACKUP

Terrence, it looks like your videocard is defaulting to a resolution your monitor can't handle. Go ahead and boot into Safe Mode and adjust your monitor's resolution to something pretty low, then reboot and start Windows normally. It wouldn't hurt to check Acer's website for an updated video driver while you're at it. From there, you can fiddle with the resolution to see how high you can set it and have your monitor still work. If you set it too high and your monitor blanks, you can just wait 15 seconds and it will revert to the previous resolution.

Exporting from DVR

What would be the best way (time efficient) to capture video from my DirecTV DVR to my PC? I don't want to capture Hollywood movies—I can buy those. My interest is in capturing the near 100 hours of Brazilian Carnival on my DVR, then editing it down to a "best of" DVD or two. My PC has plenty of USB ports and free PCI-E and PCI expansion slots available.

Is 1,600MHz RAM Real?

My system keeps freezing. The cursor doesn't move and Ctrl-Alt-Del doesn't bring up Task Manager. The system won't respond to anything. It either spontaneously reboots or I have to shut down manually. Checking the event log does not show any system errors. Is there another location for a system error log?

This system has a 1,600MHz bus-speed processor and memory. Intel does not have a single stick of compatible 1,600MHz RAM in its compatible memory list. I asked its tech support about this but have not received a response. How can a manufacturer claim to have a board with a 1,600MHz FSB yet not have compatible memory?

This build consists of an Intel DX48BT2 Extreme mobo, a QX9770 quad-core CPU, two XFX GeForce 9800 GPUs, two 2GB Corsair DDR2/1600 modules, and a Thermaltake Toughpower 1200W PSU, all running XP SP3. Any suggestions would be greatly appreciated.

–Lucas Adams

Where does the Doctor begin? First, if you're overclocking, stop. Aside from a failing power supply, bad drivers, and the like, the Doctor's gut suspicion is that you have to manually program the DIMMs to run them at DDR3/1600 speeds, or you can try enabling the XMP support in the mobo's BIOS. If you want to do it manually, you'll need to set the board to run the DIMMs at 7-7-7-20 at 1.9 volts. The voltage is likely the critical part. Despite XMP and Nvidia's SLI EPP 2.0 "Autoprogram Your Overclocked RAM" systems, manually setting up the BIOS seems to be the most reliable method.

Although there could be many other issues at the root of your problem, the Doc is guessing that insufficient voltage to the RAM is the cause. Also, the fact that your CPU operates on a 1,600MHz

SUBMIT YOUR QUESTION Are flames shooting out of the back of your rig? First, grab a fire extinguisher and douse the flames. Once the pyrotechnic display has fizzled, email the doctor at doctor@maximumpc.com for advice on how to solve your technological woes.

front-side bus (400MHz x 4) does not mean you have to run the RAM at that speed. You can actually run it at the standard 9-9-9-24 speeds at 1,333MHz without increasing the voltage to the RAM. Finally, Intel's tech support is just being intentionally obtuse, as 1,600MHz RAM is not actually anything that is blessed by JEDEC, the NFL rules committee of RAM.

Terabyte Backup

How do I, at a reasonable cost, back up all of my data? Long ago, when hard drives were 40GB, 4.7GB DVDs were a reasonable means of backup. But now with multi-terabyte hard drives there doesn't seem to be any reasonable backup method. Right now I'm using RAID 5 rather than backing up my data. I have a RAID with five 1TB drives in it and I'm relying on the redundancy as the backup. I looked into tape backup drives and found that the cheapest 800GB LTO-4 drive was $1,800 and the tapes run $50 each. As it turns out, I could build another system, put together a duplicate array and back up one to the other for less than the cost of the tape drive. Is there any such thing as affordable backup anymore? I can't find anything. Blu-ray isn't even affordable yet, and it's already too small for backups.

–K. Bateman

Ah, you've touched upon a common topic of discussion here at *Maximum PC*: How do you back up huge amounts of data effectively?

The bad news is, with the amounts of data you're talking about, there's no such thing as a cheap backup solution. If you want to back up 3TB of data, you're going to have to spend some money. Sticking with what you have now may be tempting, but RAID 5 is not a backup strategy, and you'd have to buy at least one 1TB drive to rebuild your array if it fails, anyway. So here's what the Doc recommends: Buy a multibay NAS (or external eSATA enclosure, such as WD's MyBook Studio Edition II), fill it with 2TB drives and back up your array to it, or (if you have less than 3TB of data on your array) split your array up and use half for your primary drive and the other half for backup.

PC Won't Stay On

Ninety percent of the time, when I attempt to turn on my PC it powers up for a second then immediately shuts down. The other 10 percent of the time, it boots but I get no video signal. I've had it looked at by a local shop, which tested each component individually (except the mobo) and found them working properly. I've done some troubleshooting myself and I've gone through the wire diagrams and everything seems to be plugged in right. However, it doesn't sound like my hard drive is turning on. I was hoping you had some ideas before I try a new hard drive. I've already put in a new power supply but that didn't change anything. Any ideas?

–Shane Mitchell

The PC shutting down directly after powering it up may be the result of a short circuit somewhere in the system. Since you tried a new PSU, it's possible the plug that you're connecting to the PSU is shorting it out, causing it to turn off. So, unplug everything in the system—especially those Molex auxiliary fan connectors and hard drive power connectors—except for the main power connector, ATX 12V, and your GPU, and try powering it up. Another common problem is the board shorting out from a badly placed mount. If you put more than nine board mounts in your case and you used only nine screws to screw it down, the extra mount(s) could be the issue. Finally, check the CPU heatsink for a solid connection and verify that the thermal paste is still in place. If the thermal paste has "pumped out" or the heatsink is not making firm contact, the CPU could be overheating and shutting down. Finally, make sure that the main power connector and ATX 12V connectors are firmly plugged in. If it still fails, you may indeed have a bad board.

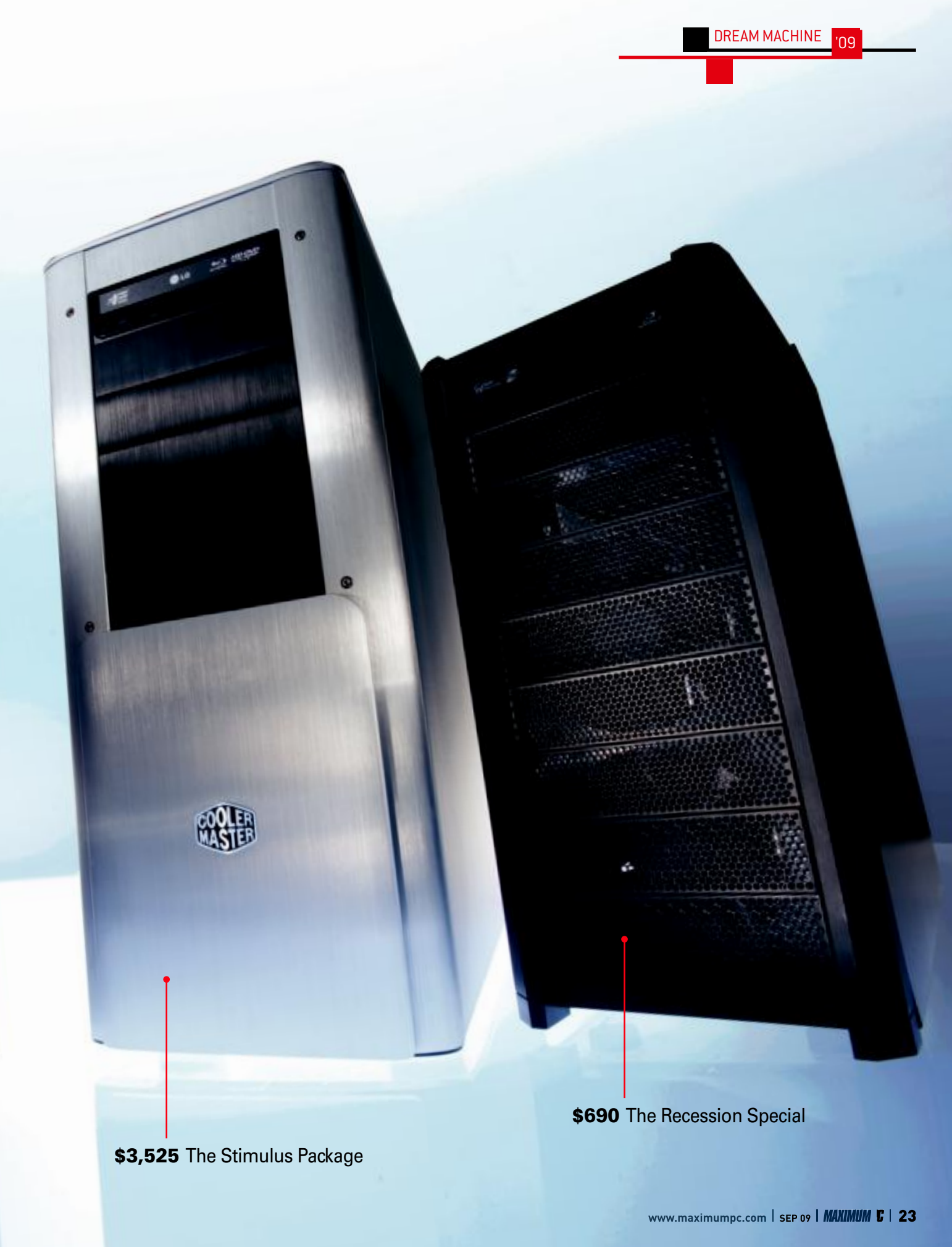
Western Digital's MyBook Studio II contains two 2TB drives and has an eSATA port. Not a bad choice for backing up huge amounts of data.

Economies Of Scale

This year we leave the pie-in-the-sky PCs to the boutique vendors and instead create three of the best damn rigs you can build at down-to-earth prices

BY THE MAXIMUM PC STAFF

$1,420 The Budget Surplus



$3,525 The Stimulus Package

$690 The Recession Special

DREAMS WITHIN REACH

Why we built three kick-ass rigs priced for any budget

Sometimes, you just have to keep things real. Last year, our Dream Machine was a paean to excess, a chrome-plated $17,000 wünder-rig. While we're still quite fond of that machine, this year we decided to take a different tack and see if we could build a more reasonably priced, but still lust-worthy Dream Machine. Well, actually, we built three of them. While the combined cost of these three machines is about half the price of last year's rig, we packed a lot of awesome into our relatively tight budgets. The lesson is simple: Dream Machine isn't about spending a ludicrous amount of cash on a PC, it's about getting the best rig you can for the money you spend. I think you'll agree that these three machines pack a ton of power and are all great values.

Without further ado, we give you this year's crop of Dream Machines.

THE RECESSION SPECIAL

The number-one complaint console weenies have about PC gaming is the cost. We're here to tell you that you can build an entry-level gaming rig that still kicks ass for less than $700. So, while we advocate saving your ducats when the economy is in the toilet, you needn't suffer a slow PC.

Our goal with the Recession Special was to build a machine designed for one thing and one thing only—gaming. There's no terabyte hard drive or fancy quad-core CPU in here, just a honking videocard and enough memory and CPU to support the GPU. That's it. What we built is a machine that shreds at most games, from World of Warcraft to Team Fortress 2.

So, there you go. Take your severance, put together our $700 wonder, and subscribe to WoW. After all, where else can you get hundreds of hours of entertainment for $15 a month?

THE BUDGET SURPLUS

Sticking to a budget can be hard, but it doesn't have to be painful. Our mid-priced rig, the Budget Surplus, is remarkably similar to the computers that most *Maximum PC* editors run at home—$1,500-ish rigs that are adept at many tasks. Whether you're browsing the web, playing games, ripping DVDs, or editing video, the Budget Surplus delivers.

When building a $1,500 rig, it's easy to get your priorities out of whack. We love the power of a Core i7 CPU when we're encoding video, but we couldn't sacrifice GPU to get it. Likewise, we wanted more performance than a single GPU could deliver, but couldn't skimp on CPU to find the cash for SLI or CrossFire. Luckily, we found a great compromise in the form of an inexpensive Core i7 920 CPU and a dual-GPU Radeon 4870 X2.

The result is a machine that's only about 20 percent slower than our highest-end configuration, but costs half as much. That's a surplus we can get excited about.

THE STIMULUS PACKAGE

Usually, we outfit our annual Dream Machine with more than just the fastest PC hardware the world has ever seen. Oh yes, usually the Dream Machine is pimped out with luxuries like a fancy paint job and rich Corinthian leather. This year, we made our challenge harder by stripping out all the excess, leaving just the lean 'n' mean hardware to send the message that this is a take-no-prisoners PC.

And it does that loud and clear. The Stimulus Package—named for the effect purchasing it has on the local economy and not the way the government spends your tax dollars—is an all-workflows powerhouse.

$690

THE RECESSION SPECIAL

A blue-light bargain doesn't always mean clearance performance

MOTHERBOARD

A good low-cost alternative to the high-flying 790FX chipset, boards such as MSI's DKA790GX use ATI's integrated graphics chipset. We just switched the onboard GPU off and still got access to the advanced chipset special sauce that ATI and AMD have developed for the Phenom II. And made before DDR3, it'll run well on regular DDR2.

CPU

Scoffed at initially, AMD's tri-core procs will still whip the snot out of any dual-core. Even better, the 45nm Phenom II overclocks like hell. We took our 2.8GHz Phenom II X3 720 to 3.6GHz without breaking a sweat.

COOLING

This is actually a stock AVC heatsink that AMD includes with its retail processor in box. For what it's worth, we were able to get our 2.8GHz proc up to 3.7GHz with stability, so there's something to be said for stock heatsinks.

RAM

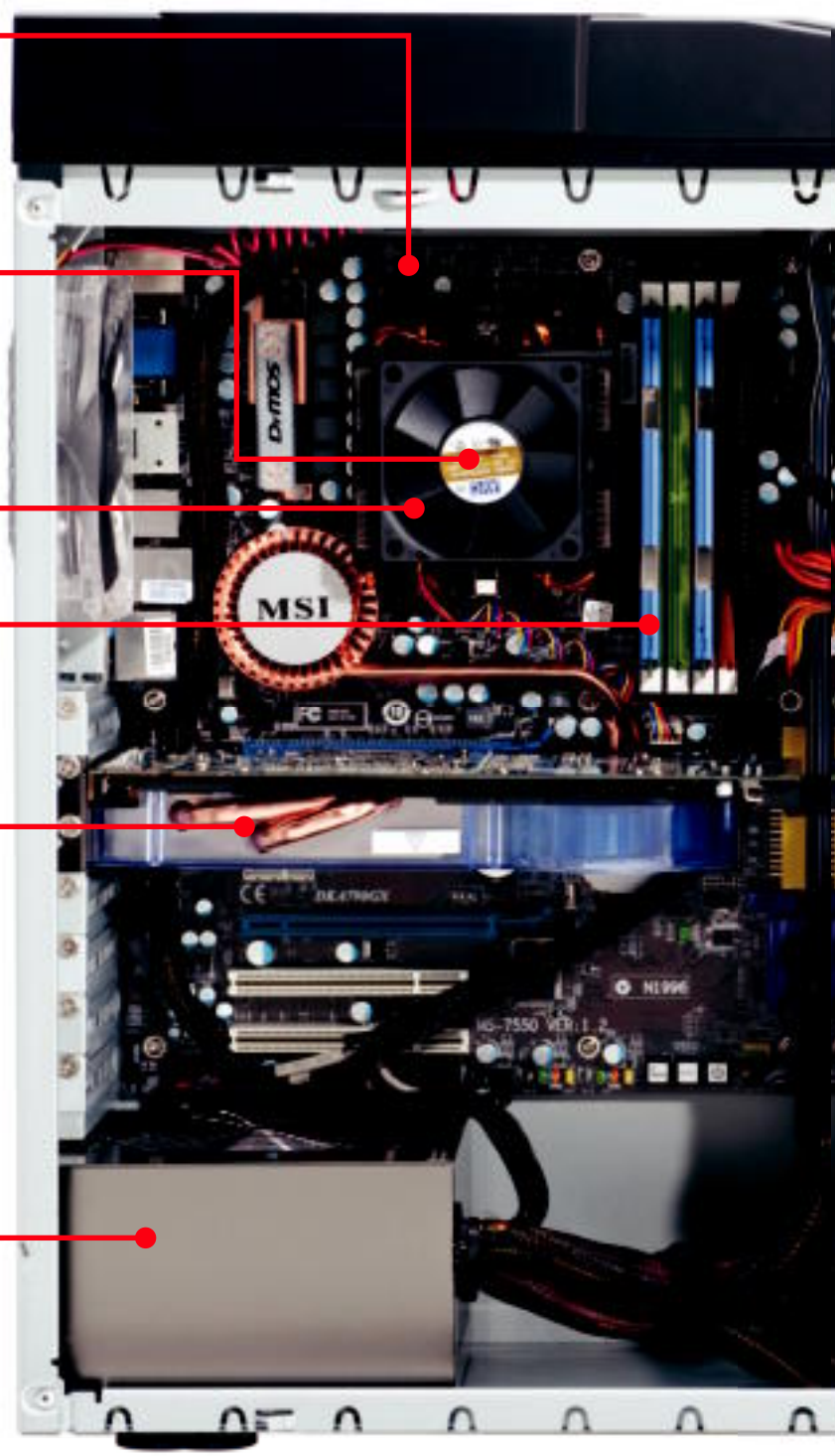
Yeah, DDR3 is cheaper today but it still ain't as cheap as DDR2, which you're practically paid to use. OK, not really, but it's wickedly affordable. We paired our 64-bit OS with 4GB of Kingston HyperX DDR2/800.

VIDEOCARD

Dayum, it feels good to be a gamer. Especially when you can get an HIS Radeon HD 4870 for such a good price. Just a couple years ago, a hunred and fiddy bucks would get you a pathetic single-slot graphics card that didn't even need power. And now we have a $700 PC with a truly stupendous card.

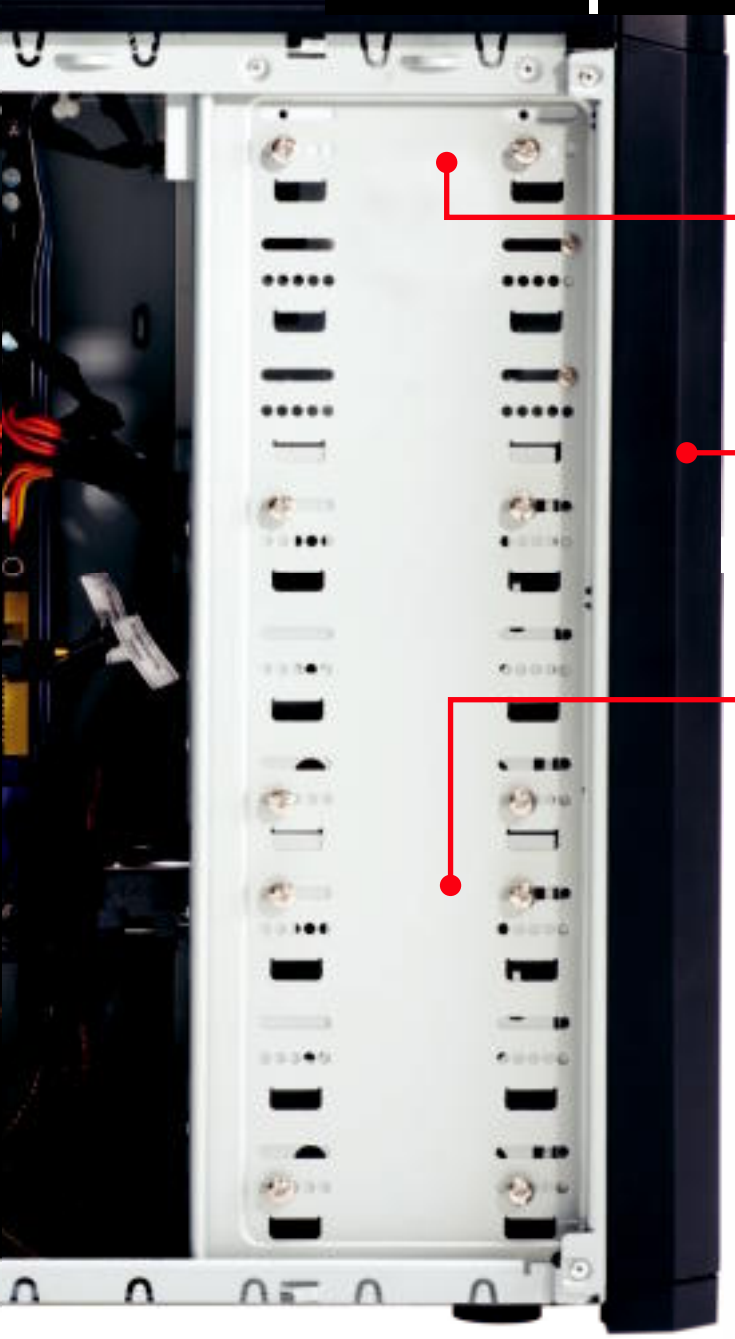
PSU

One of the tricks to getting a sub-$700 machine to work with a good GPU is to find a low-cost power supply that will actually give you two six-pin graphic connectors. The Rosewill RP550V2-S-SL did that for us and it's quiet, to boot. It helps that our graphics card is actually pretty lean on power consumption despite its dual six-pin connectors.



The Parts List

CATEGORY	NAME	PRICE	URL
CPU	AMD Phenom II X3 720	$139	www.amd.com
MOTHERBOARD	MSI DKA790GX	$122	www.msicomputer.com
RAM	Kingston HyperX 4GB	$55	www.kingston.com
VIDEOCARD	HIS Radeon 4870 512MB	$153	www.hisdigital.com
HARD DRIVE	Western Digital Caviar 500 Black	$69	www.westerndigital.com
OPTICAL DRIVE	Samsung SH-S223F	$25	www.samsungodd.com
PSU	Rosewill RP550V2-S-SL	$52	www.rosewill.com
CASE	Antec 900	$77	www.antec.com
OS	Windows 7 Ultimate RC1	$0	www.microsoft.com
TOTAL		**$692**	



OPTICAL DRIVE

Take Samsung's burnalicious SH-S223 and add LightScribe capabilities and you have one the best burners available for next to nothing. Really. At $25 each, we were tempted to put three in the box just because we could.

CASE

Antec's 900 may be dated but it's no less effective. You get awesome air flow and a sharp design that doesn't belie the low budget of the machine. Even better, the case's vintage status means many stores will have it marked down to a very reasonable price. When you consider that you're getting a case that revolutionized the category, it's yet another plus.

HARD DRIVE

The SSD in our Stimulus machine costs almost as much as this whole PC, so an HDD was clearly called for. Western Digital's 500GB Caviar Black features a 32MB buffer, 7,200rpm, and dual processors for high performance at a pretty low price. Sure, we could have gained a few hundred more megabytes by going with a slower drive, but we opted for as much drive performance as we could get on a budget.

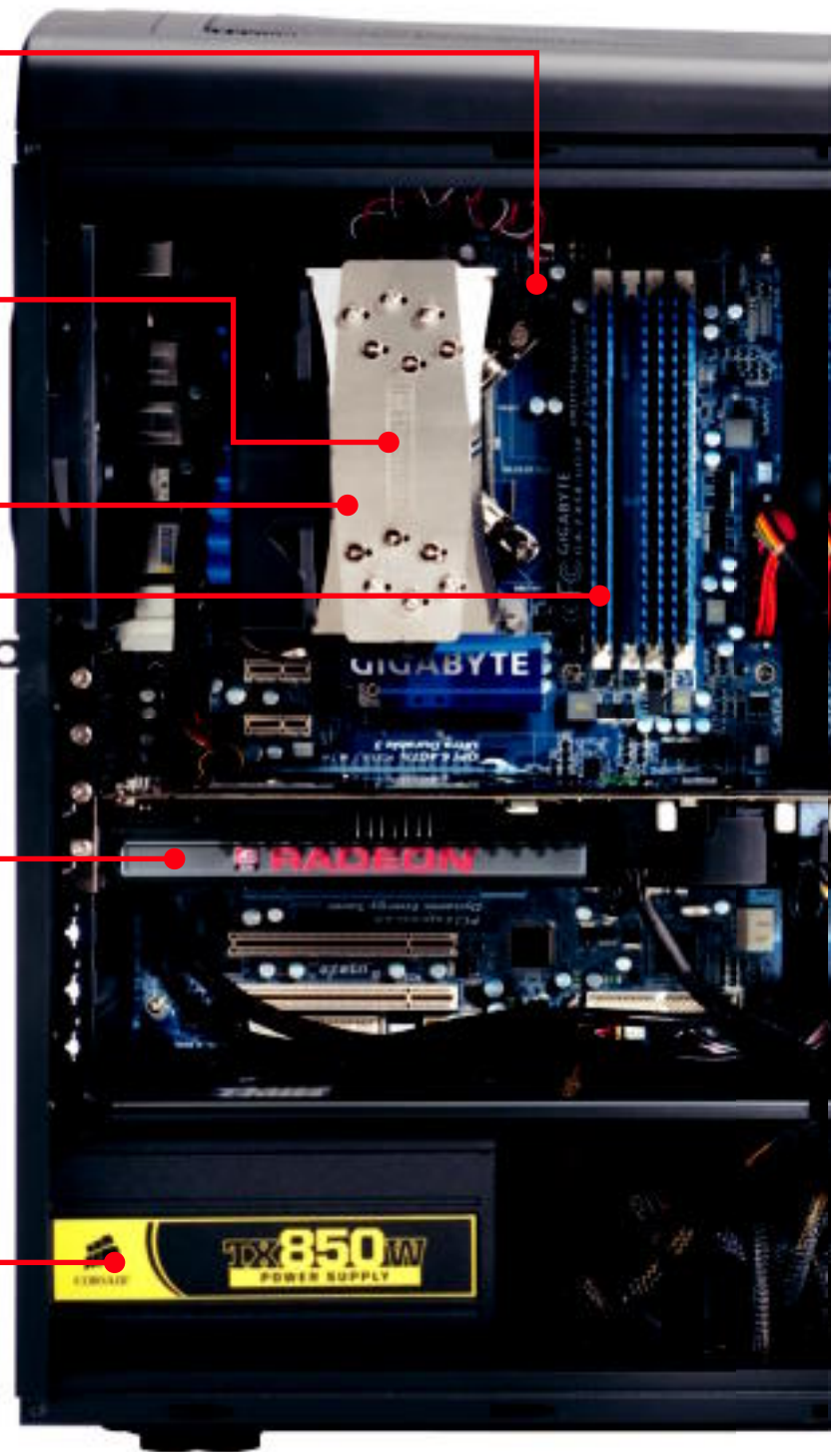
OS

With that OS X-ass-stomping Windows 7 just around corner, it would be pretty hard to load Windows Vista on our Dream Machines. Instead, we went with the Release Candidate version of Win 7 Ultimate in 64-bit flavor. Stuff that in your hat and eat it, Justin Long.

$1,420

THE BUDGET SURPLUS

Whoever said Core i7 is out of reach for the average Jane or Joe was flat-out wrong



MOTHERBOARD

Gigabyte's X58-based GA-EX58-UDR3R balances features with price. You get CrossFire plus SLI capability (something most budget boards don't include), and it's overclocker friendly. The bad news is that instead of the typical six RAM slots, you get just four. You still get tri-channel, but if you ever intend to add additional RAM later on, you'll take a memory-bandwidth hit.

CPU

It's no wonder Intel's 2.66GHz Core i7-920 stole the show when introduced. It's incredibly low-priced and gives you more computing than you'll probably need for the foreseeable future—and that's at its stock clocks. There's actually a state law that says a 920 has to be overclocked, so we obliged—all the way to 3.66GHz.

COOLING

Thermalright's Ultra 120E-1366 isn't fun to install but the payoff is well worth it. This tower-of-power heatsink is the most effective air cooler we've ever tested. Pushing our 2.66GHz Core i7-920 to 3.66GHz was child's play for this bad mother of a cooler. And to top it off, it's actually fairly quiet for the performance that it offers.

RAM

If you think we're hypocrites for dissing DDR3 in our budget box but using it in our midrange machine, you're wrong. You choose the right tool for the right job. DDR3 is the only option for Core i7 and it's actually pretty damned affordable itself. We got 6GB of Patriot's Viper DDR3/1600 for just $79.

VIDEOCARD

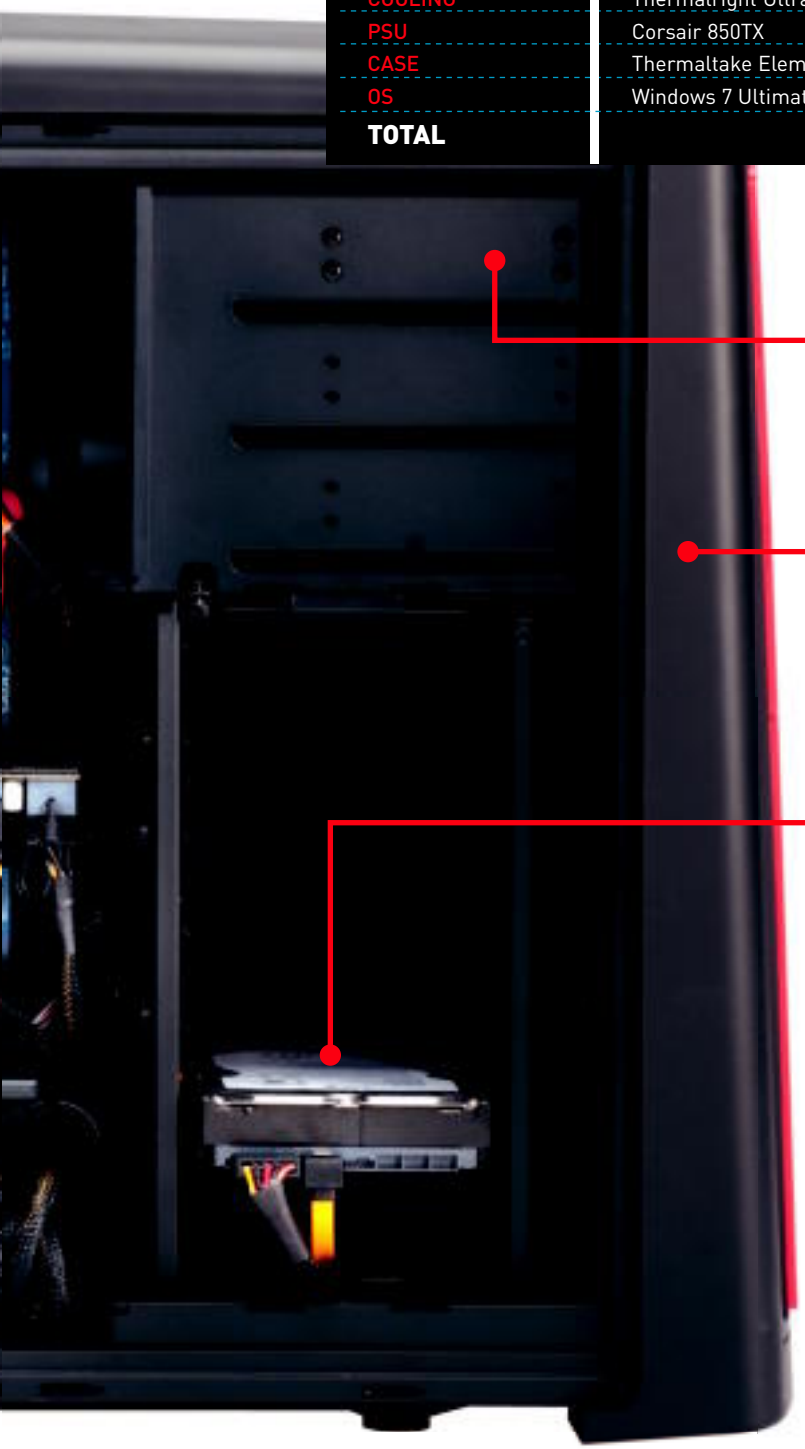
You know how good ATI's Radeon HD 4870 X2 card is? It's so good that this is the first time we've ever used a videocard from a previous-generation Dream Machine. That's just a testament to the legs that the Diamond Radeon HD 4870 X2 has.

PSU

Corsair's 850TX lacks the modular cables of its big brother, but it gives us a reliable 850 watts without breaking the bank. Simply put, the 850TX gives us a lot of bang for the buck. It doesn't hurt that Corsair's PSUs are garnering high praise from reviewers and customers for solid reliability. Did we mention that it's just $135?

The Parts List

CATEGORY	NAME	PRICE	URL
CPU	Intel 2.66GHz Core i7-920	$280	www.intel.com
MOTHERBOARD	Gigabyte GA-EX58-UD3R	$189	www.gigabyte.us
RAM	Patriot 6GB Viper DDR3/1600	$79	www.patriotmemory.com
VIDEOCARD	Diamond Radeon HD 4870 X2	$389	www.diamondmm.com
HARD DRIVE	Seagate 1.5TB 7200.11 Barracuda	$130	www.seagate.com
OPTICAL DRIVE	Samsung SH-S223F	$25	www.samsungodd.com
COOLING	Thermalright Ultra 120E-1366	$70	www.thermalright.com
PSU	Corsair 850TX	$135	www.corsair.com
CASE	Thermaltake Element S	$120	www.thermaltakeusa.com
OS	Windows 7 Ultimate RC1	$0	www.microsoft.com
TOTAL		**$1,417**	



OPTICAL DRIVE

Do you really need Blu-ray in your mainstream PC? That one is easy to answer: nope. Thus, we used the same $25 hella-fast DVD burner that we used in our Recession Special, for all the same reasons.

CASE

It may not feature exotic materials, lights, or a built-in minibar, but the Element S is truly marvelous to build in and easy to keep neat. For example, getting a tight and tidy appearance inside the Antec 900 takes serious imagination, but thanks to the forethought that went into the Element S's construction, a ship-shape interior requires minimal work.

HARD DRIVE

SSD prices have plummeted in recent months, but they're still too rich for our blood. Instead, we tapped Seagate's superfast 1.5TB Barracuda 7200.11 for storage duties. It's damn-near as fast as a 10K VelociRaptor, and with 1.5TB of space, you'd be downloading for months before you could fill it.

OS

Windows 7 is like a new topical cream: It will ease the burning and itching sensation that PC users have suffered with Windows Vista and at the same time make it easy to crow about how the PC is better than the Mac once again.

$3,525 THE STIMULUS PACKAGE

It costs just a fraction of last year's Dream Machine, but does everything an enthusiast PC should

MOTHERBOARD

Asus's P6T Deluxe V2 is the follow-up to the company's enthusiast X58 board and supports up to 24GB of RAM at up to 2GHz and does away with the much-maligned SAS controller that was in the original board. It's also a bit cheaper than the original and has a great reputation as a solid overclocking board.

CPU

Clearly, the most luxurious item we put in our top-tier rig is Intel's new 3.33GHz Core i7-975 Extreme Edition. At $999, it may seem like eating caviar while using the bill collector's notice as a plate, but it does give you more Turbo Mode control, an unlocked multiplier, and the enhanced overclockability that's characteristic of Intel's new D0 step of the core. We cranked ours to a cool 4GHz on air cooling alone.

COOLING

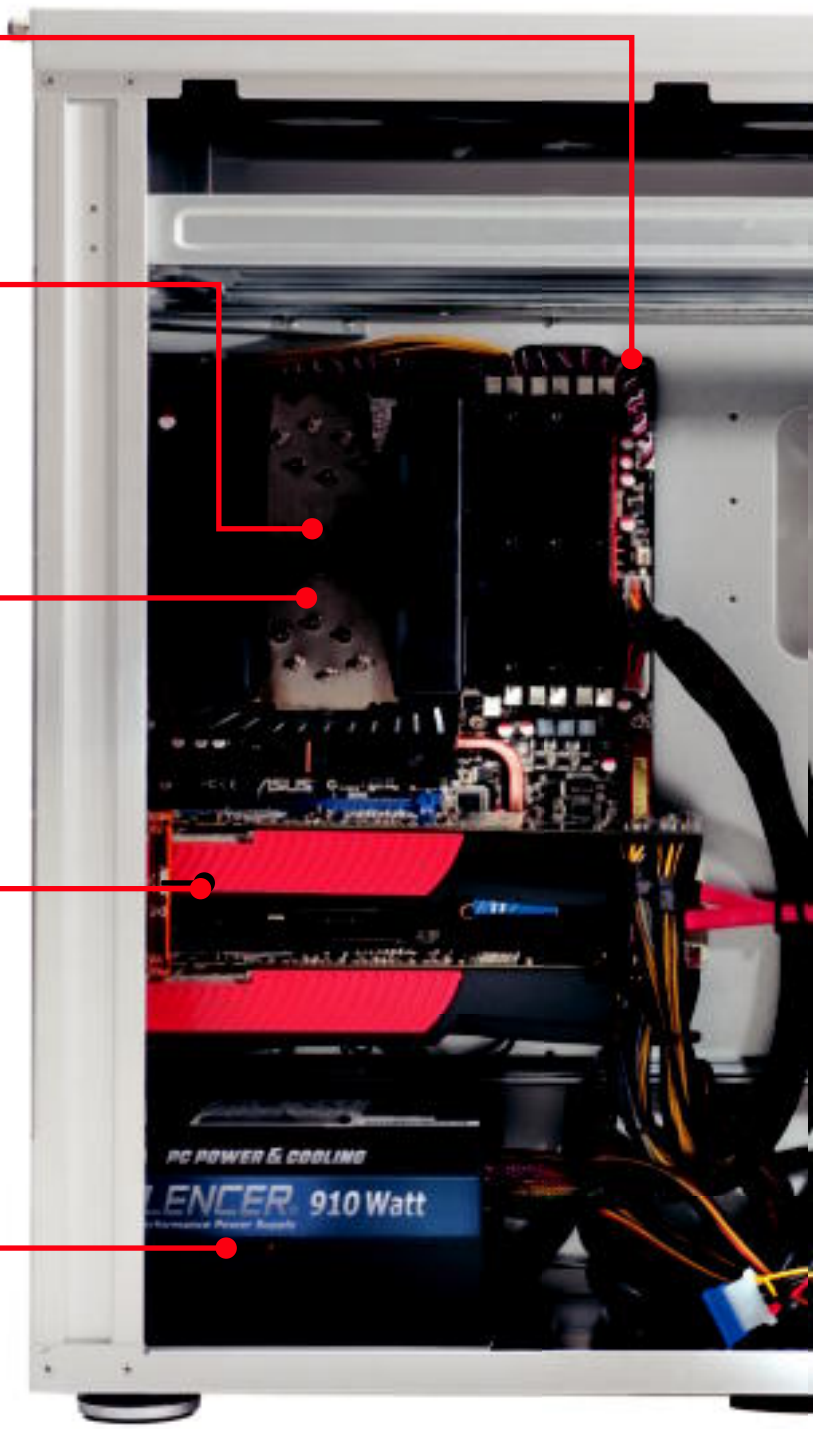
That's no moon, it's Thermalright's Ultra 120E-1366 cooler with an optional second fan clipped to it. Yeah, it all but eclipses everything on our motherboard, but it's actually a somewhat quiet and very effective cooler. Running our proc at a conservative 4GHz, we hammered the CPU overnight with Prime95 and didn't see one hiccup.

VIDEOCARDS

EVGA's GeForce GTX 285 cards are the fastest single-GPU cards available. Period. We tapped two of them in SLI for truly kick-ass performance in all games at high resolutions.

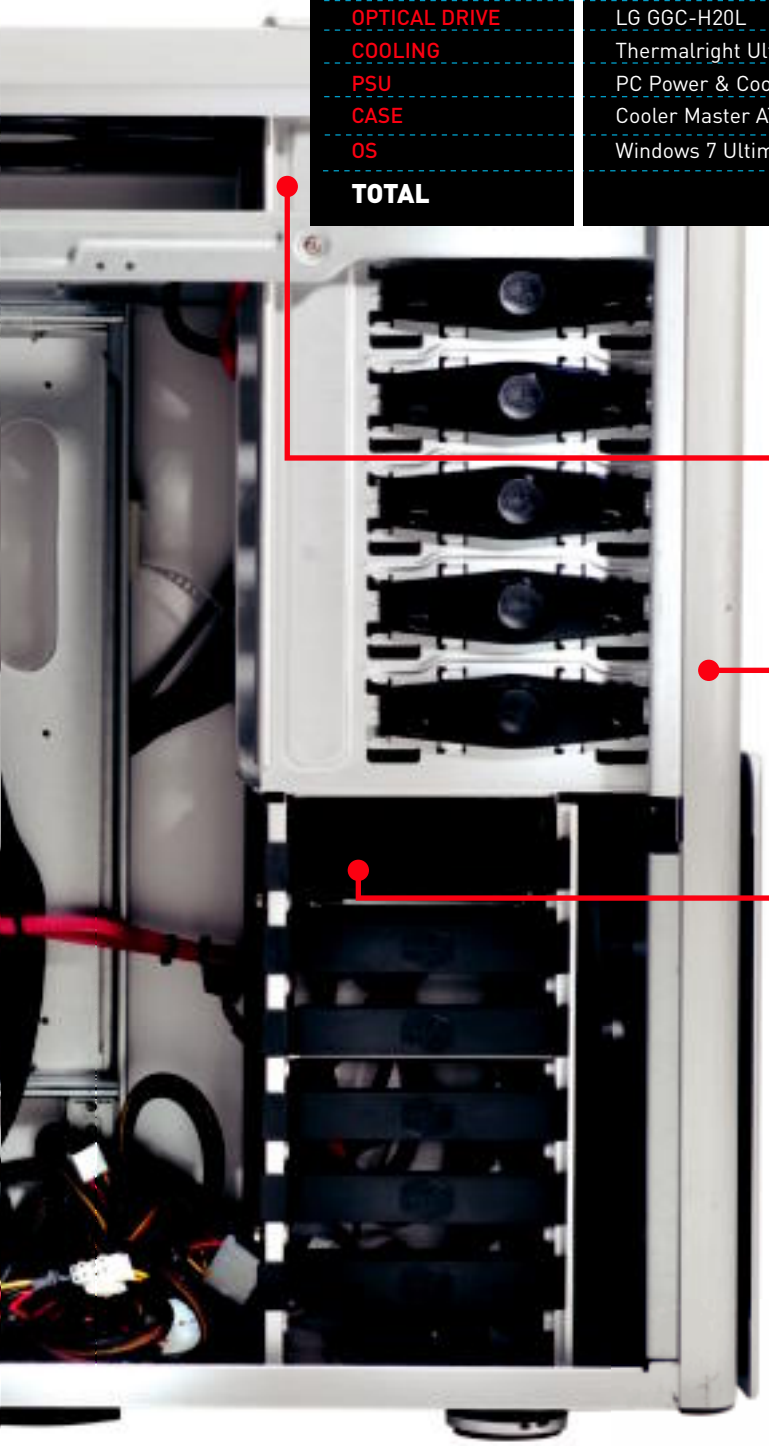
PSU

It's amazing that PC Power and Cooling's Silencer 910 approaches the kilowatt range without the noise usually associated with 1K units. The unit is, of course, a single-rail design with up to 74 amps on the all-important 12-volt rail. What the specs don't show you is the PSU's heritage of reliability. While other brands have experienced failures in long-term use, we've never had a PC Power and Cooling unit give up the ghost.



The Parts List

CATEGORY	NAME	PRICE	URL
CPU	Intel Core i7-975 Extreme Edition	$999	www.intel.com
MOTHERBOARD	Asus P6T Deluxe 2.0	$280	www.asus.com
RAM	Corsair Dominator 1600 C8	$166	www.corsair.com
VIDEOCARDS	EVGA GeForce GTX 285	$700	www.evga.com
SOLID STATE DRIVE	Corsair P256	$700	www.corsair.com
HARD DRIVE	Seagate 1.5TB 7200.11 Barracuda	$130	www.seagate.com
OPTICAL DRIVE	LG GGC-H20L	$100	www.lge.com
COOLING	Thermalright Ultra 120E-1366	$70	www.thermalright.com
PSU	PC Power & Cooling Silencer 910	$185	www.pcpower.com
CASE	Cooler Master ATCS 840	$195	www.coolermaster.com
OS	Windows 7 Ultimate RC1	$0	www.microsoft.com
TOTAL		**$3,525**	



BUILD IT
To see how we put together the Stimulus Package, step by step, turn to page 36.

OPTICAL DRIVE

The vast number of people will watch Blu-ray movies yet never need to burn a Blu-ray disc. LG's GGC-H20L gives us Blu-ray ROM support and acts as a 16x DVD and 40x CD-R burner, as well. This combo drive even reads HD-DVD discs, for those folks who need that kind of thing.

CASE

Spending $200 on a case may seem extravagant until you consider how much life you'll get out of it. When the Core i7 and GTX 295 cards have been jettisoned as scrap in five years, you'll still be using this Cooler Masters ATCS 840. In 10 years, when you've had to replace your car, you'll still be using this case.

SSD/HARD DRIVE

Corsair's P256 SSD gives you the best of both worlds: With its 256GB of storage, it's actually large enough to use as a primary drive while still being blazingly fast. With read speeds greater than 200MB/s and write speeds in the 150MB/s range, you'll wonder how you could ever go back to an HDD as your boot partition. Of course, 256GB isn't enough capacity for us, so we pair the SSD with a fast 1.5GB Seagate Barracuda drive.

OS

Think of Windows 7 as a hybrid OS: It has the performance feel of Windows XP and the bling of Windows Vista. When pitting our troika of Dream Machines against our zero-point PC, we were stunned by the performance differences between our Windows Vista 64-bit zero-point and the three rigs running Windows 7. Just installing Windows 7 on the zero-point gave it a significant performance boost.

THE BENCHMARKS

Let's face it, the proof is in the performance

THE ZERO POINT

As a point of comparison, we ran all three Dream Machines against our current zero-point test bed. The zero point is admittedly elderly, but it's actually still faster than 90 percent of people's PCs, with its 2.66GHz Core 2 Quad Q6700, SLI GeForce 8800 GTX cards, 4GB of DDR2/800, and Western Digital 150GB Raptor. It was probably about $2,000 in hardware when new and today it still couldn't be built for less than $1,100.

THE RECESSION SPECIAL

You shouldn't expect miracles, but it's truly amazing the amount of horsepower you can get for $700 today. As we said previously, the tri-core will thrash dual-cores, but even overclocked, three of a kind can't beat four of a kind when you're dealing with multithreaded apps. Thus, even at 3.6GHz, the tri gets a little drubbed by the quad-core 2.66GHz zero-point box. And even though they're older, two GeForce 8800 GTX cards in SLI are faster than one newer card. Still, you have to consider that the $700 rig is about 30 percent cheaper than even the depreciated value of our zero-point system. We call that a win.

THE BUDGET SURPLUS

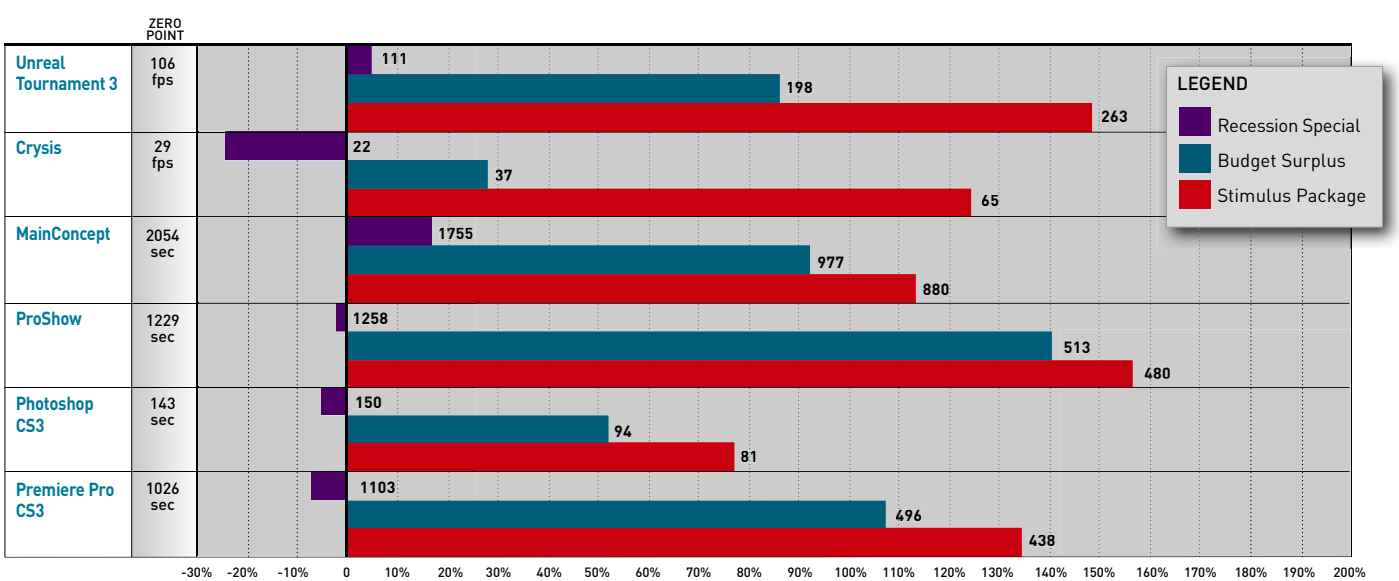
This is truly the everyman's machine. For a tad more than $1,400, you get one hell of a fast box. It helps that we pushed our ultra-budget 2.66GHz Core i7-920 to a conservative 3.66GHz. Should we have gone further? Yes, we could have squeaked a little bit more out of it, but we decided stability was more important than it working *most* of the time. And this still lets our Budget Surplus box run circles around our zero-point and our Recession Special—and frankly, it will make a lot of people wonder if it's worth even stepping up to the Stimulus Package. The Budget Surplus's weak point is in high-resolution DirectX 10 gaming. As good as the 4870 X2 is, it's still a year-old card. Of course, might you not combine portions of the Stimulus Package with the Budget Surplus to make the best compromise of performance and power? Something to think about.

THE STIMULUS PACKAGE

The Stimulus Package was not built without controversy. Would it not make sense, for example, to just use the i7-920 CPU and pocket the cash? You could say the same of the Corsair P256 SSD, one of the GeForce GTX 295 cards, and the Cooler Master 840 case, too, for that matter. Eventually, you can whittle the machine down to the point where it won't stimulate anything.

In the end, even in down times, some people want the ultimate performance and the Stimulus Package does that for just $3,500. That gets you the fastest rig of the pack and rock-solid stability at a conservative 4GHz. All machines here were stress-tested, but the Stimulus Package was stress-tested the most—and it came out with flying colors.

BENCHMARKS



Build Your Own Dream Machine

We show you how to assemble your own $3,500 Stimulus Package rig

We've come a hell of a long way since the days when you had to set 15 jumpers and cross your fingers in hopes that your newly built PC would actually run. Today, anyone short of a klutz can build an incredibly powerful PC and have it boot on the first throw of the switch.

For our build-it how-to, we used the Stimulus Package PC from our triumvirate of Dream Machines to illustrate how anyone can construct their own rig. As always, you should read through all of the steps before starting your build and research any questions about the process that arise—but you certainly shouldn't feel daunted by the task. Even the most elite of our machines can be built in an hour or two, even if you're going at a very leisurely pace.

To get started, gather up all the parts you'll need (pictured here and listed, along with their prices, on page 32) and set up your work area in a static-free environment. Before you touch any electrically sensitive components, you should discharge built-up static electricity by touching the case or another large metal object. For tools, you can get by with a basic Phillips screwdriver and a pair of pliers, but that's about all you need to build your very own dream PC.

So, let's get cracking!

BY GORDON MAH UNG

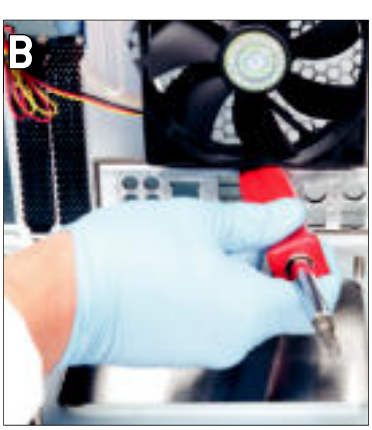
1 Remove the Motherboard Tray

Not all cases feature removable motherboard trays, but when they do, it can make your life far easier. We start by unfastening the four screws holding our mobo tray in place. It's important to make sure there will be adequate clearance once your uber-big heatsink is in place. Some heatsinks are so tall that they prevent you from reinstalling the tray in the case. Fortunately, the Cooler Master ATCS 840 has a massive cavity that accommodates just about anything.

2 Mount Up

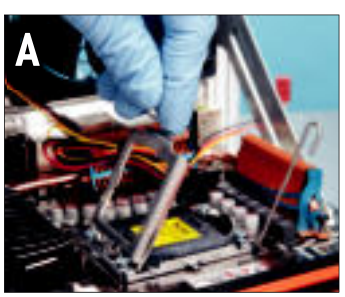
Remove your mobo from its packaging and take a quick look at where it mounts to the case. Now add a mount in the tray for each mounting point on your motherboard (image A). Make sure you tighten the mounts in the tray enough so they don't back out when it comes time to remove the motherboard in the future.

The I/O shield prevents your kids from jamming Cheerios into the case. You can hammer it in place with the back of a screwdriver (image B). This shield doesn't have the cheap metal fingers that can poke into the network ports, but if yours does, bend the fingers inward and upward as far as they can go. Once the I/O shield is in, drop the board in place and screw it down. Remember, if you screwed nine mounts into your tray, you need to use nine screws to hold the board down. If you only have eight places for screws, you messed up. Remove the board and try again.

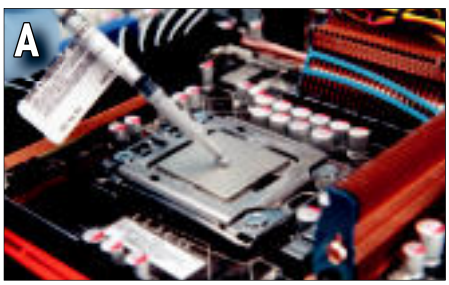


3 Install the CPU

With the board in place, you're now ready to drop in your new Core i7 CPU. Simply unlock the locking arm and swing it out of the way. This will let you lift the metal load plate (image A). Now gently remove the plastic plate that protects the delicate pins of the processor socket (image B). Do not ever touch these with your fingers or any object as you may bend a pin and then it would be *adios, muchacho*. Next, remove the plastic plate on the CPU that protects the round contact points and then carefully use two fingers to hold the processor parallel to the socket and slowly lower the proc in place (image C). *Do not* drop one side in and slide the CPU around in the socket—this will kill your motherboard. With the CPU in the socket, lower the load plate and lock the arm in place.



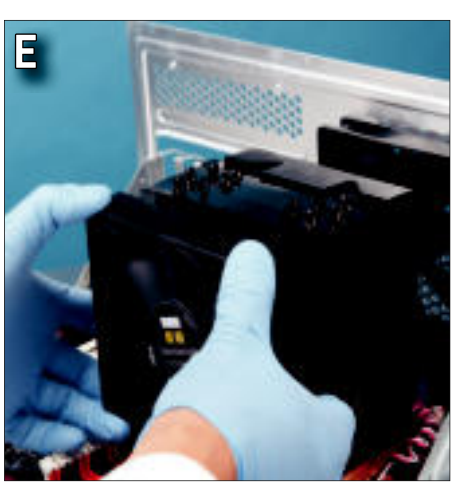
4 Install the Heatsink

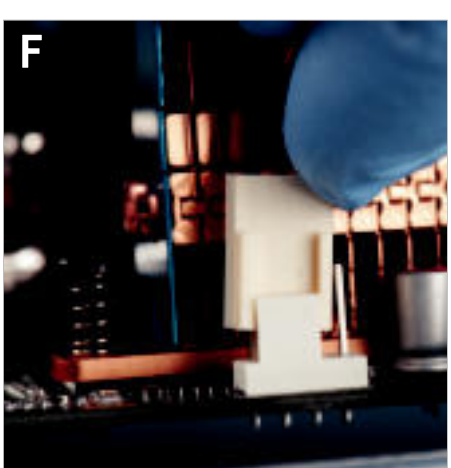


First, prep the massive Thermalright Ultra-120 by inserting the correct LGA1366 bracket in the base of the heatsink. The arms of this X-shaped bracket can be adjusted to match the backing plate that will go on the underside of the mobo. Now add a large-BB-size gob of thermal paste to the CPU's center (image A). We prefer Dow Corning's TC-5600 paste, as it's been known to give us about a five degree Celsius shift from the stock paste. You can be ultra careful and spread the paste evenly all over the CPU surface using a plastic bag, but we've been hearing from PC builders that the lazy-man's large-BB-size gob in the middle of the proc may actually yield better results with Core i7, where flex in the socket design can produce a gap in the center, which is thus filled by the gob.

Now, flip the mobo tray on its side and place the cooler's backing plate on the back of the motherboard (image B). With one hand holding the backing plate in place, flip the tray back down so it's hanging partially off the table, allowing you to continue to hold the backing plate in place. It's tricky, but you must now place the heatsink with the X-shaped bracket in place (image C). Take one of the spring screws and hand-tighten it, connecting the bracket to the backing plate. Once you have one screw in, you can let go of the backing plate, as the single screw will hold it mostly in place. Now install the other three screws by hand. Once they're in, use a screwdriver to tighten the screws until each bottoms out (image D).

We sandwiched two fans on our Thermalright. Install each by simply sliding the fingers of the fan bracket along the same axis as the heatsink blades (image E). Make sure both fans are blowing air in the same direction. Now plug in both fans. Note: Many high-end fans use only three-pin connectors for power. These are compatible with the four-pin PWM connectors except that one pin is not used (image F).





5 Install RAM

Core i7 features a tri-channel memory mode that requires the RAM to be installed in three individual memory channels. For this mobo, it's the orange slots (image A). Unlike with previous Intel or AMD CPUs, you want to populate the set of slots farthest from the CPU. Fail to do this and the PC may not boot. Before you install the RAM, spread the arms of the memory slots. Now, line up the notch in the RAM with the notch in the slot. Carefully insert the RAM directly into each slot and put slight pressure on the outer ends until it locks into place (image B). If it isn't locking into place, you may have it in backwards. Recheck the notch so that it matches and slide the RAM in again. Do this for all three pieces of RAM. When you're done, snap closed the unused arms for the empty slots.

6 Install the GPU Numero Uno

Now, grab one of your graphics cards. Since they're both the same, it doesn't matter which one. Line it up horizontally above the first x16 PCI Express slot in the system, then carefully insert it. The card should lock into place. If it doesn't, remove the card by pressing the card release and try reinserting it. We've seen people install cards and somehow have the contacts on the outside of the slot, so make sure the card is properly in place. Screw the card in place with two screws. One will suffice, but you should use two if you plan to transport the machine. We'll install the second card a bit later.

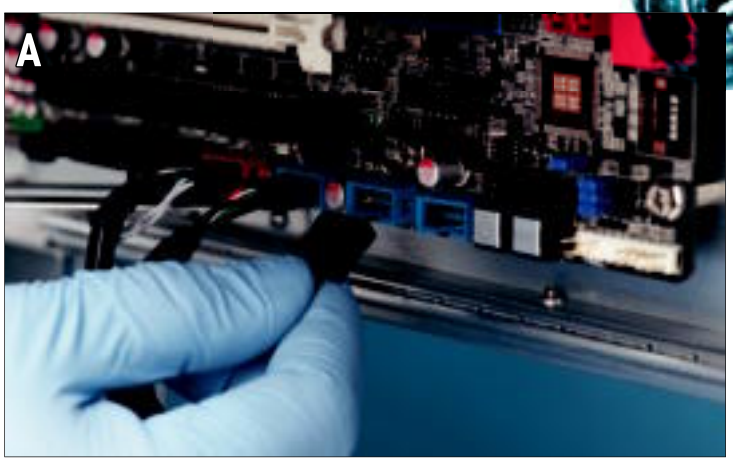
7 Slide in the Mobo

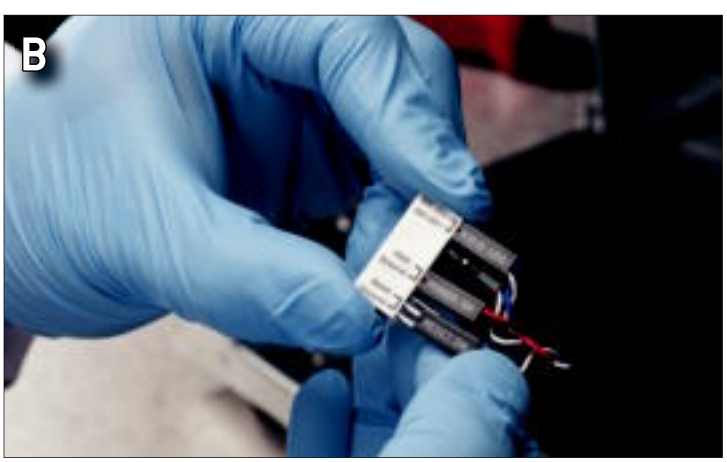
You're now ready to slide the motherboard tray assembly into place and screw it down. Again, you can see the advantage of using a case that features a removable tray.

8 Hook up the Umbilicals

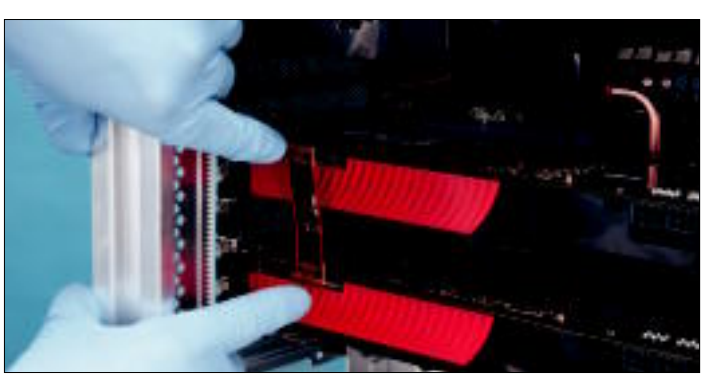
If you're wondering why we didn't have you install the second GPU when the tray was outside of the case, it's because it would have blocked your access to the USB and FireWire headers. So, with easy access to the headers, carefully plug in the USB and FireWire connectors that hook up to the front of your case (image A). Generally, they are keyed so they cannot be plugged in backwards. If your case has the old-fashioned individual connectors, you'll need to get out the motherboard manual and follow the map to plug each tiny one in place.

Now is also a good time to plug in the front-panel eSATA connector, as well as the three loose SATA cables for the hard drive, optical drive, and SSD. These don't have to be plugged into the drives yet, but it is easier to plug them into the board before you install the second GPU. Finally, you should hunt through your motherboard box for the quick-connect block. This lets you plug in your power and reset switch as well as the hard drive and power LED to the block, which then connects to the motherboard's front-panel connectors (image B). You don't have to use the block, but it makes it easier if you have to pull out the motherboard tray—you won't have to worry about rewiring the front-panel connectors.





9 Double the Graphics



Most modern performance boards will have multiple PCI-E slots. For SLI, however, you'll need to use the very top long x16 PCI-E slot and the very bottom black PCI-E slot. Install the second videocard as you did the first one and screw it in place. Now grab the SLI bridge connector that should have come with your motherboard. There are two pairs of connectors on the cards—you'll use only one for standard SLI. You can plug into either set. Simply line the bridge up over the slots and gently but firmly push the bridge in place. Voila! You've got SLI going now.

10 Install Your Drives

Our fast and fat Corsair SSD unfortunately does not fit into the standard 3.5-inch drive slots, so we dropped it into an aluminum shell scavenged from the lab. If you don't have that luxury, the typical (albeit ugly) 2.5-to-3.5-inch converter from Frozencpu.com will set you back about $8 (http://bit.ly/5ywwD).

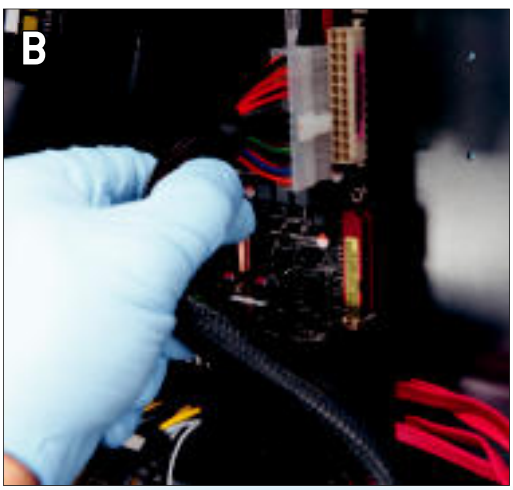
We simply mounted the 256GB Corsair drive in the VelociRaptor tray (image A), put that into one of the case's drive trays, and inserted it into the case. We did the same with our 1.5GB Seagate Barracuda drive, carefully spreading the tray apart and placing the drive in it. Again, insert the drive tray back into the Cooler Master case with the black locking arm open (image B). Push the tray in and lock the arm in place.

To install the optical drive in the Cooler Master, find a spot where you want the drive to reside. Since our case will be under a desk, we opted for the uppermost slot. Now, push the button located alongside the drive bay to unlock the bay, and slide your drive in until the front of the drive is flush with the front of the case (image C). Press the button again and the drive should be locked in place. Try to push the drive out of the case from the back; it should not move. If the drive continues to slide around, push the button again to lock it in place and then check the drive for movement again. Now, take the three SATA cables you previously plugged into the motherboard and hook up the SSD, HDD, and optical drive. The actual SATA port will not matter as all three are on the same controller.

11 Power Up

The last part we're going to install is the PC Power and Cooling Silencer 910. Installation has not changed; simply put the PSU in the case and screw it down in back (image A). With the PSU secured, it's time to plug in your power cords. For this particular configuration, you'll need to plug in the large 24-pin main power connector (image B), the supplemental eight-pin ATX12V/EPS connector, plus all six-pin GPU plugs as well as power to the HDD, SSD, and optical drive. All of the connectors are keyed to prevent reverse insertion, so long as you don't force it. The motherboard power should lock into place. A very common cause of a failure-to-boot is neglecting to plug in the ATX12V/EPS plug. A loose main power connector can also lead to flaky boots. Your final step is to connect the case's auxiliary fans to the proper Molexes on the PSU.

Congratulations, you've just built your very first Core i7 computer! Wasn't that easy?



Troubleshooting Checklist

So, your new system won't start or you don't get an image on the monitor? Here are the most common failure points we've run into, from easy to hard:

- **Check that the PSU is switched on and plugged into a hot outlet**
- **Check and/or reseat the EPS12V/ATX12V connector and the main power connector**
- **Check that the RAM is in the correct slots for an i7 system**
- **Check the power-switch wiring for the front-panel connector or use the power-on switch on the motherboard**
- **Is the monitor on?**
- **Check the DVI/VGA cable connection to the monitor**
- **Reset the CMOS (with the system unplugged)**
- **Reseat the videocard (with system unplugged)**
- **Reseat the RAM (with the system unplugged)**
- **Reseat the CPU (with the system unplugged)**
- **Remove and reseat the motherboard and check the mounting points**

Maximum PC's

9th Annual GEEK QUIZ!

Warning: By taking this test, you may suffer brain strain, severe nausea, and the onset of deep humility

We like you. We spend all year being nice to you—giving you the scoop on hardware, software, games, and news from the industry. We may not always be nice to companies or products, but we're always nice to our readers.

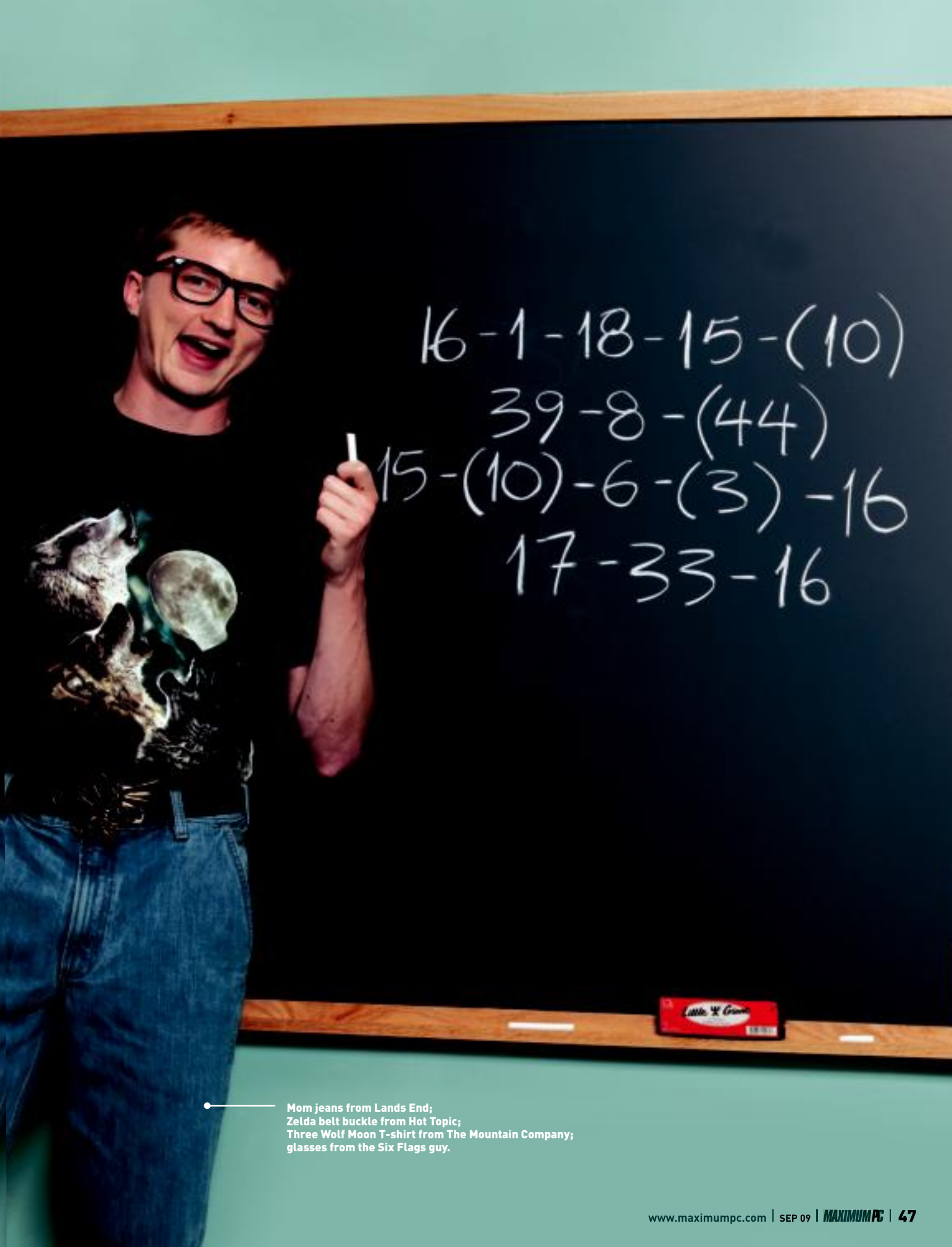
Well, nearly always. You see, every year the editors at *Maximum PC* get together in a big room with no windows or doors or air and hash out a series of questions for our annual Geek Quiz. Some are easy. Some are not. Some might have you pulling out your hair in frustration (those are our favorites).

But we're not doing this just to be cruel. See, if you do well, you get the satisfaction of showing us up, plus a standardized score that you can show people to prove how awesome you are. And if you don't do so well, hey, you get to learn stuff! Looking up answers on your favorite search engine or Maximumpc.com, by the way, is strictly *verboten*.

So, whip out those #2 pencils and that slide rule, step *away* from the Google, and get ready to prove your mettle.

BY THE MAXIMUM PC STAFF

PHOTOGRAPHY BY MARK MADEO



Mom jeans from Lands End;
Zelda belt buckle from Hot Topic;
Three Wolf Moon T-shirt from The Mountain Company;
glasses from the Six Flags guy.

33 As Arsenic 74.9216

34 Se Selenium 78.96

12 Mg Magnesium 24.305

20 Ca Calcium 40.08

1 Which of the following is not a Linux desktop environment?

A Gnome
B KDE
C Aero
D Xfce

2 As of June 2009, how many versions of Windows 7 did Microsoft expect to ship in the United States?

A One
B Three
C Five
D Seven

3 In May 2009, the EU handed down its largest-ever fine for anticompetitive business practices to which company?

A Microsoft
B Intel
C Apple
D Rambus

4 This is a:

A USB 3.0 port
B eSATA 3.0 port
C USB / eSATA port
D Serial-attached eSCSI port

5 Which of these drives has the highest sustained average write speed?

A Seagate Barracuda 7200.11 1.5TB
B WD VelociRaptor 300GB
C Intel X-25M SSD
D Corsair P256 SSD

6 Which of the following *graphics* chipsets is most commonly found in netbooks as of May 2009?

A Intel GMA950
B Intel GMA500
C Intel GMA945
D Nvidia 9300GT M

7 What is the clock-speed difference between Intel's Atom N270 CPU and the N280?

A 20MHz
B 40MHz
C 60MHz
D 80MHz

30 Zn Zinc 65.37

8 Which of these screen resolutions has an aspect ratio of 16:10?

A 1024 x 600
B 1920 x 1080
C 1440x1024
D 1920x1200

20 Cd Cadmium 112.40

9 In solid state drives, SLC stands for:

A Silicon-layer composite
B Single-layer cell
C Single-level cell
D Salt Lake City

9 F Fluorine 18.9984

10 Dual-channel DDR3 and triple-channel DDR3 systems can use the same DIMMs.

A True
B False

11 Which of the following is not technically a violation of the Digital Millennium Copyright Act?

A Backing up your movie DVDs
B Making a fan music video for a popular song and uploading it to YouTube
C Hosting a fan-created music video for a popular song (if you're, say, YouTube)
D "No-CD" cracking your PC games

ANSWERS: 1-C, 2-C, 3-B, 4-C, 5-D, 6-A, 7-C, 8-D, 9-C, 10-A, 11-C

94
Pu
Plutonium
(244)

12 By the time its development staff was laid off in May 2009, Duke Nukem Forever had been in development for how many years?

A Five
B Nine
C Twelve
D Fifteen

13 Windows 7's internal codebase number is:

A 7.0
B 7.1
C 6.0
D 6.1

14 Early solid state drives offered:

A Fast reads and fast random writes
B Fast reads and slow random writes
C Fast times at Ridgemont High
D Slow reads and slow random writes

15 What is the *memory clock* speed on a module of DDR3/1600 RAM?

A 1,600MHz
B 160MHz
C 200MHz
D 2,000MHz

16 Twitter, a popular microblogging platform, limits tweets to:

A 80 words
B 120 characters
C 140 characters
D 140 words

17 Which of these was never a Microsoft Windows codename?

A Chicago
B Vienna
C Memphis
D Brisbane

18 Which of these Special Infected cannot be controlled by players in Left 4 Dead?

A Smoker
B Boomer
C Witch
D Tank

63
Eu
Europium
151.96

19 Which facet of U.S. copyright law grants you permission to copy legally owned content for personal use?

A Digital Millennium Copyright Act
B Audio Home Recording Act of 1992
C Fair-use doctrine
D Copyright Infringement Liability Limitation Act

95
Am
Americium
(243)

20 Thermal paste is used between a CPU and heatsink to:

A Insulate the CPU
B Glue the heatsink to the CPU
C Increase thermal conductivity
D Reduce drag

21 In their trial in early 2009, defendants from The Pirate Bay were found guilty of which crime?

A Piracy
B Copyright Infringement
C Facilitating Copyright Infringement
D Privateering

22 What number occupies the seventh decimal place in pi?

A 3
B 6
C 8
D 1

33
As
Arsenic
74.9216

34
Se
Selenium
78.96

23 Which LCD panel type features 6-bit color?

A S-IPS
B MVA
C PVA
D TN

36
Kr
Krypton
83.80

54
Xe
Xenon
131.29

ANSWERS: 12-C, 13-D, 14-B, 15-C, 16-C, 17-D, 18-C, 19-B, 20-C, 21-C, 22-B, 23-D

30
Zn
Zinc
65.37

20
Cd
Cadmium
112.40

9
F
Fluorine
18.9984

79
Au
Gold
196.967

24 White spaces refer to:

A The breaks between songs or chapters on a commercial CD or DVD
B The radio frequencies reserved for emergency services
C The gaps between UHF TV channels in the electromagnetic spectrum
D Areas where broadband wireless is not available

25 The next step in mobile broadband that will improve mobile phone standards and allow GSM and CMDA phones to run on the same network is referred to as:

A WiMax
B LTE
C UMA
D TDMA

26 What port is generally used for HTTP?

A 1
B 80
C 443
D 665

27 Computers have not beaten top-level human players in which game?

A Chess
B Reversi
C Go
D Checkers

28 Francis says he hates all of these except:

A Vans
B Zombies
C Escalators
D Vests

29 To correctly present a line of text in small caps using CSS, use:

A Font-style
B Font-weight
C Font-size
D Font-variant

30 What term does the World Wide Web Consortium (W3C) use to define an element that is outdated and no longer considered the standard?

A Deprecated
B Despised
C Denounced
D Depreciated

31 Which of Intel's upcoming processors will feature a graphics chip within the CPU package?

A Clarkdale
B Larrabee
C Gulftown
D Lynfield

32 The maximum resolution of a photograph taken by Canon's 21.1-megapixel EOS 5D Mark II camera is:

A 5616x3744
B 2560x1600
C 4064x2704
D 4992x4212

33 The maximum theoretical bandwidth (net bit rate) of the 802.11n wireless standard is:

A 54Mb/s
B 600Mb/s
C 6.75MB/s
D 128Mb/s

34 How many megahertz do you have if you add a Core i7-920 to a Phenom II X4 945 and subtract a Core 2 Quad Q8200S?

A 3,333MHz
B 4,000MHz
C 1,333MHz
D 0MHz

35 Bonus question: How much total L3 cache do you have among all three processors from the previous question?

A 8MB
B 2MB
C 14MB
D 22MB

ANSWERS: 24-C, 25-B, 26-B, 27-C, 28-D, 29-D, 30-A, 31-A, 32-A, 33-B, 34-A, 35-C

7
N
Nitrogen
14.0067

8
O
Oxygen
15.9994

63
Eu
Europium
151.96

95
Am
Americium
(243)

36 OpenOffice is an open-source continuation of which earlier proprietary office suite?

A Microsoft Office
B StarOffice
C RedOffice
D Lotus Suite

37 Turbo Mode is:

A An automatic overclocking feature built into Intel's Core i7 CPUs
B A factory-installed option in Michael Knight's vehicle
C A proprietary Asus BIOS setting for overclocking AGP 8x slots
D An older OCZ DDR RAM overvoltage modification kit

38 PCI Express 3.0 will:

A Feature a new extended x32 design for higher-power graphics cards
B Double the clock speed from PCI-E 2.0's 2.5GHz to 5GHz
C Quadruple the data rate of 250MB/s per lane in PCI-E 1.0 to 1GB/s
D Lower the standby operating voltage to 1.125 volts

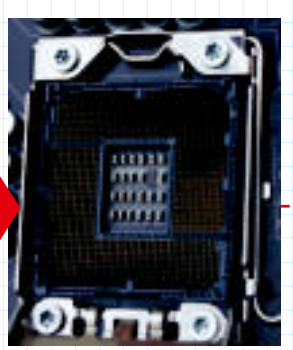
39 AMD code-names Istanbul, Magny-Cours, and Sao Paulo are named for:

A Places where Intel does not have a sales presence
B Formula 1 circuit cities
C Cities with populations greater than 10 million
D Research and development offices for AMD

40 The maximum wattage a graphics card can draw when using a single 2x6 PEG adapter and a single 2x8 PEG adapter (including the slot) is:

A 125 watts
B 225 watts
C 275 watts
D 300 watts

41 Match the socket to the processor:



A Athlon FX-55
B Celeron E1500
C Core i7-920
D Athlon XP 3200+

42 What codecs will you not find on a Blu-ray disc?

A AAC
B H.264
C WMV9
D AVI

43 What does the Synergy app do?

A Lets you share a keyboard and mouse between multiple computers
B Lets you sync your Mac and PC seamlessly
C Lets you download content from NBC.com and ABC.com
D Lets you "mash up" two applications to work better together

44 How many shader processors does a Radeon 4870 X2 have?

A 400
B 800
C 1,600
D 3,200

30
Zn
Zinc
65.37

45 What does EVDO stand for?

A Electron Voltage Delivery Organism
B Extreme Velocity Digital Output
C Evolution-Data Optimized
D EVDO doesn't stand for anything

20
Cd
Cadmium
112.40

46 Digsby supports which IM standards?

A AIM, Jabber, MSN, Bonjour
B AIM, Jabber, Yahoo, Bonjour
C AIM, Google Talk, MSN, Yahoo
D Jabber, MSN, Yahoo, Facebook

47 What is the typical wavelength of the red-laser diode on a DVD burner?

A 650nm
B 320nm
C 405nm
D 780nm

ANSWERS: 36-B, 37-A, 38-C, 39-B, 40-D, 41-C, 42-D, 43-A, 44-C, 45-C, 46-D, 47-A, 48-C, 49-D, 50-A

48 **The platter density of a Western Digital 2TB hard drive is:**

A 200Gb/square-inch

B 375GB

C 400Gb/square-inch

D 500GB

49 **Which of the following is not true about the SATA 6 standard?**

A It offers four times the bandwidth of the original SATA 1 spec

B The spec is officially called "Serial ATA Revision 3.0"

C It is backward compatible with SATA 3Gb/s

D It will support a cable length of up to two feet

50 **At three meters, Wireless USB offers the same bandwidth as USB 2.0 (480Mb/s) by utilizing ultra-wideband frequencies.**

A True

B False

37 Rb Rubidium 85.4678

38 Sr Strontium 87.62

55 Cs Cesium 132.905

56 Ba Barium 137.33

33 As Arsenic 74.9216

Can You Handle the Truth?

Tally up your correct answers to find your place on the Geekiness Scale

0-9 CORRECT:

You picked up this magazine off the rack at the airport thinking it was *Maxim*. That's OK. Happens all the time.

10-24 CORRECT:

You're a newbie! Not a n00b, mind you, a newbie. You like computers and want to learn more about them. But you're not quite there yet. Nothing to worry about, Grasshopper. Stick with us and you'll be fine.

25-39 CORRECT:

You're an enthusiast! You don't know everything there is to know, but you have knowledge and skills that far surpass the average user. Which means you're the one Mom calls when she breaks her computer.

40-50 CORRECT:

You really know your stuff, sport! You know every port, every plug, every socket *ever*. You can rattle off parts lists for every PC you've ever owned. You kill zombies and configure servers with equal aplomb. Either that or you Googled it all, in which case you're lame and we don't like you.

27 Co Cobalt 58.9332

WHITE PAPER

Media Container File Formats

Meet the digital equivalent of Tupperware for your music and video files

–MICHAEL BROWN

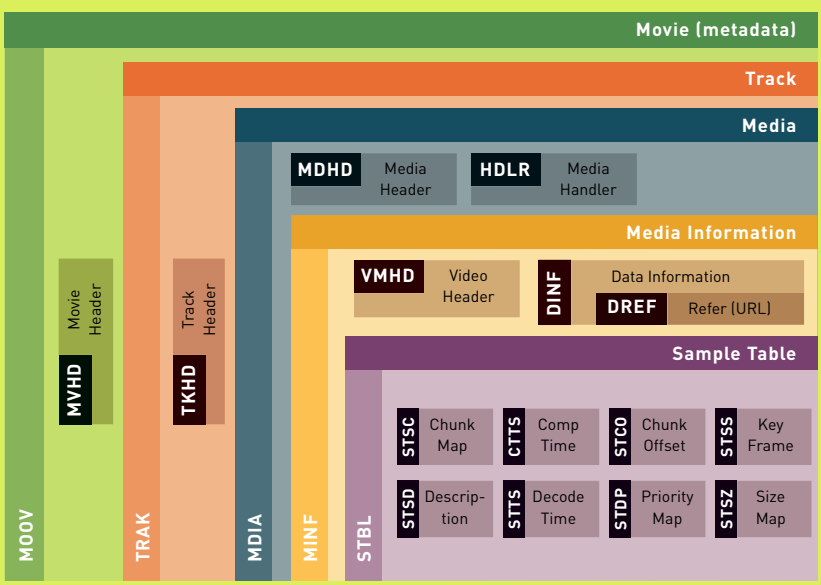
When can a file encapsulate more than one type of data? When it's a metafile, wrapper, or container file. You might think of a container file as a package or envelope in which other files are housed. Zip files, which can contain documents, photos, videos, software programs, and many other types of files, are one type of container that you encounter frequently.

We'll limit our discussion here to media container formats. A pure container file specifies how the data is stored, but it doesn't necessarily know how it was compressed or encoded or even what is required to play back those files. This can lead to confusion when dealing with container files wrapped around media because there's a chance that the media player you're using is capable of opening the container but not equipped with the algorithm required to decode the files inside. Although a container can theoretically hold any type of data, most are optimized during development to wrap around particular data groups, e.g., digital audio for music; static images for digital photographs; or digital video interleaved with digital audio, plus subtitles, closed-caption information, and chapter data for movies. Container formats that support video also include the information required to synchronize the various data streams in the file during playback.

Container files store data in chunks, packets, or segments; three terms that describe essentially the same concept. A chunk's primary content is known as its payload, and most container formats arrange their chunks in sequence, with a file header at the beginning of each chunk that describes the type of data contained in the payload. This arrangement makes it easier to recover lost chunks in the event of file corruption or dropped frames.

HOW IT WORKS

Structure of an MP4/QuickTime Container



The MP4 container, which is based on Apple's QuickTime technology, encapsulates audio, video, and synchronization information in a series of packages within packages.

COMMON MEDIA CONTAINERS

WAV is a common example of a container format that's used exclusively for audio on the Windows platform, although the container is also compatible with the Linux and Macintosh operating systems. WAV containers typically host uncompressed linear pulse code modulation (LPCM) audio files encoded in RIFF (Resource Interchange File Format). When you rip a CD to your hard drive, the file is converted from the Red Book audio format and saved as a WAV file on your hard drive, although most people then convert that file to another, less storage-intensive format using a lossy code such as MP3, or a lossless one such as FLAC.

A PURE CONTAINER FILE SPECIFIES HOW THE DATA IS STORED, BUT IT DOESN'T NECESSARILY KNOW HOW IT WAS COMPRESSED OR ENCODED

If you've ever ripped a movie from a DVD (or just examined the directory structure on a DVD), you've encountered VOB files (the acronym stands for Video Object). VOB files are containers that house a DVD's digital video and audio streams, plus menus and data streams such as subtitles. There is typically one VOB file for each title on the disc, although this is not a requirement. VOB files are in turn based on the MPEG Program Stream, a container format that multiplexes packetized digital audio, video, and data streams (these are individually known as elementary streams). Elemen-

tary streams are packetized by dividing the stream into sequential bytes and encapsulating them in packet headers.

Movies on Blu-ray discs, on the other hand, utilize a container based on the MPEG Transport Stream. Just like MPEG-PS, MPEG-TS multiplexes packetized digital audio, video, and data streams and synchronizes their output; the key difference is that MPEG-TS supports a mechanism for error correction. MPEG-TS is also used in the U.S. for ATSC digital television broadcasts.

Apple's QuickTime container (which uses the file extension MOV) can host multiple audio, video, effects, and text tracks (for subtitles). MOV files are unique among media containers in that each track can contain either a digital media stream or a reference to a media stream contained in a separate file. This latter feature renders QuickTime very well-suited to editing because the media doesn't need to be rewritten after an edit. QuickTime also forms the basis of the MPEG-4 Part 14 container (which uses the file extension MP4). Both MOV and MP4 containers can use the same MPEG-4 codecs, but MP4 is more widely supported because it's an international standard.

Other popular container formats include AVI (Audio Video Interleave), an aging but ubiquitous Microsoft standard that can contain many types of audiovisual data, including MPEG-4; Ogg, the standard container for audio encoded with the open-source Vorbis codec and video encoded with the open-source Theora codec; and RealMedia, the standard container for RealNetworks' RealVideo and RealAudio files.

But no discussion of media container formats would be complete without mentioning the Matroska Multimedia Container. This ambitious open-standard and royalty-free file format (its ownership resides in the public domain) can hold an unlimited number of media tracks in a single file. Unlike the other container formats we've covered, which are limited to certain types of audio and video files encoded using particular codecs, Matroska containers can harbor audio and video files encoded using virtually any codec (MPEG-4, H.264, MP3, FLAC, WMA, and more—including Dolby TrueHD and DTS-HD, the HD audio formats used on Blu-ray discs). MKV files are used to store video files, MKA files to store audio-only files, and MKS files are used for subtitles. Matroska containers can also support chapter divisions, subtitles, menus, and metadata and tags.

Western Digital MyBook World Edition 1TB

As hard drive capacity grows ever larger, home network–attached storage (NAS) is becoming more prevalent. Here's a look inside a single-drive NAS from Western Digital

HARD DRIVE Beneath the smooth, white (and non-user-serviceable) exterior of the MyBook World lies this 1TB GreenPower drive, which uses less energy than standard drives and can adjust its speed from 5,400rpm to 7,200rpm based on usage requirements.

PORTS Hidden beneath this metal frame are the MyBook World's external ports: Gigabit Ethernet, USB 2.0 host, AC power jack, and power and reset switches.

SATA CONNECTOR The controller supports up to two SATA ports, but the 1TB version of the MyBook World uses one.

RAM The MyBook World contains one 64MB DDR2 DRAM module—a Hynix HY5PS1G1631C FP-Y5.

CONTROLLER The brains of the operation is a NAS-specific chip—Oxford Semiconductor's OXE810DSE-PBAG. This ARM-based chip runs at 367MHz and handles all NAS operations, including Gigabit Ethernet, SATA, and USB support, as well as hardware encryption. Used in other configurations, it even supports RAID and Wi-Fi via a PCI interface.

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

Step-by-Step Guides to Improving Your PC

THIS MONTH

DELETE DEAD ENDS

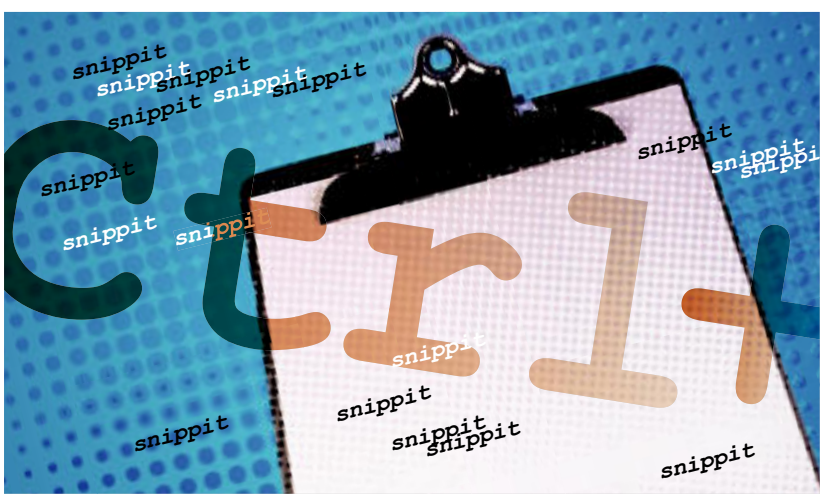
NORMAN CHAN
ONLINE EDITOR

Cleanliness is the closest you can get to godliness, and I think the same is true when it comes to keeping your Desktop free of clutter. We test a lot of applications on our home and office machines, and it's often difficult to maintain a junk-free PC when we're installing and uninstalling dozens of programs every week. My personal pet peeve lies in the Start Menu, where I usually find remnants of programs that should have been purged by their uninstall processes.

Microsoft has a little-known utility that actually helped with my problem. Chklnks.exe is a small app that was included in Microsoft's freely distributed Windows Server 2003 Resource Kit (http://bit.ly/qf0ws). This Link Check Wizard automatically scours your files to find every possible shortcut that points to files that no longer exist, and then gives you the option to delete any or all of them. Try it on your computer—I guarantee you'll find dead links that you didn't know existed!

SUBMIT YOUR IDEA
Have a great idea for a How To project? Tell us about it by writing to comments@maximumpc.com.

WINDOWS TIP OF THE MONTH



Control your Clipboard

If you make lots of text snippets when writing a document, Microsoft's Office Clipboard is a decent copy/paste manager—but it only works when an Office application is open. Ditto is a small and very configurable open source program that tracks and lets you call up your entire clipboard history by pressing Ctrl + `. Download Ditto at http://ditto-cp.sourceforge.net/.

Tidy Your PCs Wires

We've all seen those perfectly wired high-dollar rigs with cables completely hidden beneath the motherboard tray and have wanted that for our home-brewed PCs. Unfortunately, unless you're prepared to buy or make cables that are precisely the correct length for the components in your system, a Voodoo-quality wiring job is nigh-impossible to achieve. However, with some zip ties and a little patience, you can get close.

Before you start, you'll need something to restrain the cables. Some enthusiast PC cases come with a package of ties, but they're also frequently available in the cable-tie area of your hardware store or in Radio Shack. We prefer small plastic zip ties, which you can buy at most hardware stores in quantities of 100 for around $5; Velcro straps will also work, and twist ties are even acceptable in a pinch. You'll also need wire snips (to trim the ends of the zip ties), and some adhesive cable wranglers are also handy for attaching the bundled cables to the case. We also use flex tubing and shrink tubing to bundle up smaller cables. You can find the tubing at most electronics stores, or online at Frozencpu.com.

As always, feel free to do as much or as little with your PC wiring as you'd like. This is a project that can take from 10 minutes (if you want to do it quick and dirty) to several hours (if you want every little wire in perfect position). –WILL SMITH

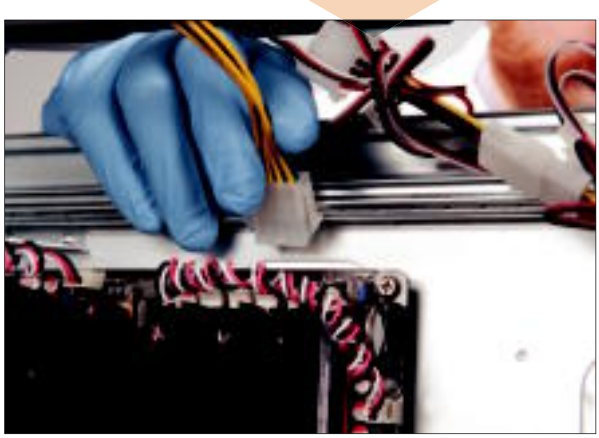
1 ASSESS THE SITUATION

Before you get your hands dirty, it's a good idea to consider your plan of attack. First, untangle your cables and separate them based on their source and destination. Obviously, you can bundle all the power cables for your videocards together, but you probably don't want to tie your hard drive's SATA cable to your optical drive's SATA cable.

You'll also want to suss out the cable-management features of your case. Many cases, especially high-end ones, feature channels and holes that let you run cables behind the motherboard tray. This keeps them tidy and out of sight. Many cases also include binding clips or hooks to attach Velcro strips and tie downs.

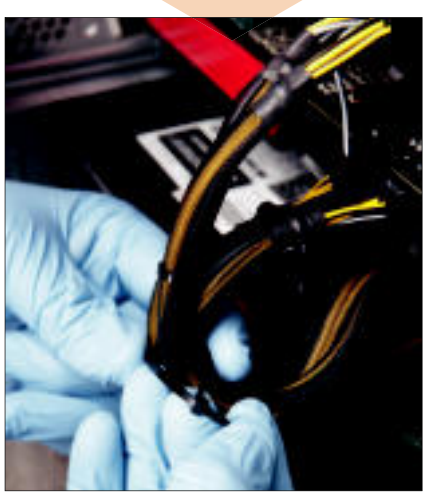
2 RUN POWER CABLES

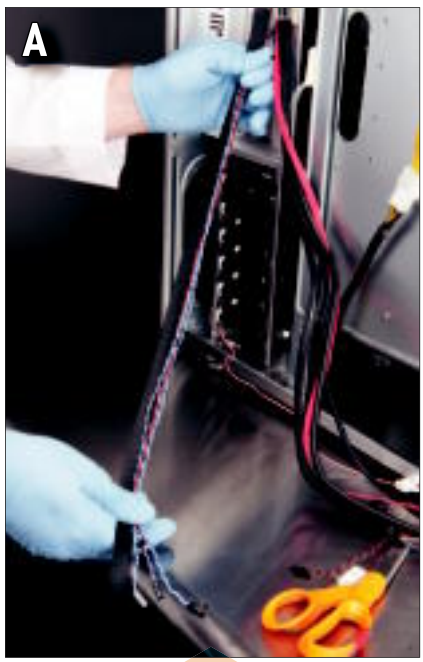
A typical enthusiast PC has power cables running from the PSU to the drives, the videocard, and fans, as well as the two traditional ATX power connectors. Often, the supplemental ATX power connector is a prime candidate to run behind the motherboard tray, provided it's long enough. As a general rule, we like to have one main



vertical cable run, along the drive bays on the inside of the case. Typically, the trunk of that run is the main ATX power connector. With that in mind, go ahead and bundle the power leads for your videocards and your optical drive along with the ATX power connector, but use something you can disconnect later.

After your power leads branch off of the main run, you can make secondary bundles to keep the whole thing nice and tidy. For example, we also used zip ties to hook together the two PCI-E power leads required by our videocards.





3 BUNDLE YOUR FRONT PANEL HEADERS

Next, we're going to bundle and run our front-panel headers. We use a woven cable wrap, sometimes called flex tube braiding, and shrink tubing to hold it into place. Measure the length of flex tube you'll need, then cut it to fit (image A). Slide the wires into the flex tube (image B), then cut a 1.5-inch piece of shrink tubing (image C) and place it around the end of the flex tube. Carefully heat the shrink tube using a heat gun until it cinches around the wires (image D), being careful not to melt the insulation on the wires. If you don't have a heat gun,

you can lock the flex tube in place using black electrical tape. Connect the wires and move on to the next step.

4 RUN SATA CABLES

SATA cables can be a little tricky to run. While they're definitely easier to manage than old-style ribbon cables, they can still be unwieldy. The easiest thing to do is bundle them together using some thin zip ties. Depending on the case, you can buy cables that are either short enough that there's no slack to hide, or long enough that you can run them behind the motherboard tray, where the excess cable will be out of sight. We bought long SATA cables from Newegg.com and ran the excess behind the motherboard tray.

5 TIDY AND CINCH DOWN

The final steps are simple. Take all the cable bundles you've made and run them wherever you can find spaces. We cinched our main run down behind the drive bays, but you may have to take advantage of other routes, depending on your case. We usually Velcro extra cables coming out of the power supply to the bottom of the case. Finally, close up the case, and see how everything looks through the case's window. After all, a good wiring job is all about the parts that people can see; it's OK for the areas that are hidden from public inspection to be a little messy. To see the finished project, check out the Stimulus Package on page 30.

Add Extensions to Google Chrome

We love Chrome for its relative speediness and elegant interface, but Firefox still trumps Google's browser with its support for add-ons and extensions. Fortunately, the development team behind Chrome (known internally as Chromium) has released code that will let you test two basic extensions—Gmail Checker and an RSS subscription button—(and even write your own!) on the browser.

—NORMAN CHAN

1 DOWNLOAD DEVELOPER MODE

The first thing you need to do is download the newest developer release of Chrome. This version isn't the same as the general public release (or even the newest beta). The developer version is distributed on Chromium's Early Access Release Channels page (http://bit.ly/jp35e). If you already have Chrome installed, Google recommends that you make a backup of your profile in case you ever want to revert back to the Stable public release, since profile data isn't guaranteed to be backward compatible.

To make a backup copy of your profile data, find your user files in the following directory: Windows XP users: \Documents and Settings*username*\Local Settings\Application Data\Google\Chrome\User Data\Default. Windows Vista users: \Users*username*\AppData\Local\Google\Chrome\User Data\Default. You will have to enable hidden file viewing in Windows Explorer to get access to this folder.

Once you've backed up your Chrome profile data, head directly to the installer for the developer release. The developer release of Chrome should automatically download and copy over your existing installation.

2 ACTIVATE EXTENSION SUPPORT

Next, you have to enable extension support in Chrome by adding some text to the application's command line. Right-click the Google Chrome shortcut on your Desktop or Start Menu and navigate to the Shortcut tab. Under the Target field, add the text `--enable-extensions` to the end of the line, after the end-quote. Click OK to save your changes.

3 INSTALL EXTENSIONS

To enable Gmail Checker, paste the following link into your Chrome address bar: http://bit.ly/lo19q. A window will pop up, asking if you're sure you want to install the extension. Click OK to continue. If the extension is properly installed, you will see a new Gmail Login icon at the bottom of Chrome. Click that link to open a new Gmail tab and sign in. The next time you open Chrome, the icon on the bottom-left of your window will show how many unread messages you have in your Gmail account, and keep that number updated. Clicking the icon will open Gmail in a new tab.

To turn on the RSS subscription button, enter this link into the Chrome address bar: http://bit.ly/bMEU2. Once again, click OK to the subsequent pop-up window. The next time you visit a webpage that has an RSS feed, a small RSS button will appear at the end of your address bar that you can click to subscribe to the page.

4 MANAGE YOUR EXTENSIONS

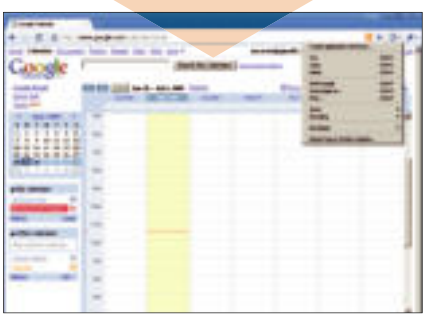
You can keep track of the extensions you've installed in Chrome by typing "chrome://extensions" into the address bar. From this extensions management page, you can manually uninstall individual extensions by clicking the uninstall buttons. To remove the entire developer release and go back to the public version of Chrome, just head over to Chrome's official website (www.google.com/chrome) and go through the reinstall process.

Turn Web Apps into Desktop Programs

Web applications are quickly gaining popularity over desktop programs for day-to-day tasks like email and calendar management, but you have to run a web browser and be tethered to an Internet connection to take advantage of these services. Luckily for you, both Google Chrome and Firefox actually offer the ability to turn these web apps into desktop applications. –NORMAN CHAN

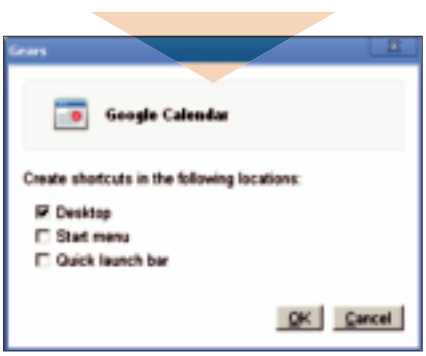
GOOGLE CHROME

Using a Google Labs project called Gears, Chrome has the native ability to create desktop application shortcuts for web apps. This lets you place shortcuts to services like Gmail and Google Calendar on your Desktop, Start Menu, or Quick Launch toolbar. To do this, click the Page Menu icon to the right of your Address Bar in Chrome and select "Create Applications shortcuts…" while

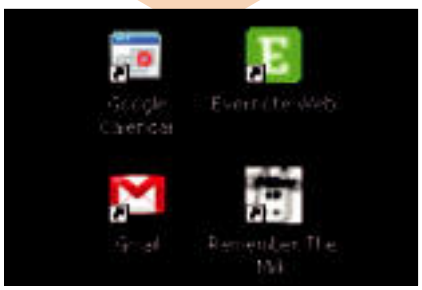


you're on the web app webpage.

Choose the places where you want Chrome to create application shortcuts (Desktop, Start Menu, or Quick Launch bar), and click OK.



A new shortcut will appear for your selected web app. When you open it, Chrome will launch the service in a special window



frame that doesn't display any menus, tabs, or the address bar. Clicking a website link will open the full version of Chrome in a new Window.

Since Chrome has a process manager that runs each window and tab as its own process, windows launched from these application shortcuts act as stand-alone programs in Windows. Functions like Alt-Tab to switch between windows and Ctrl+P to print work perfectly. Unsurprisingly, Google's own web services have the best compatibility with applications shortcuts, but the feature also works well for other popular web services like Remember the Milk and Zoho.

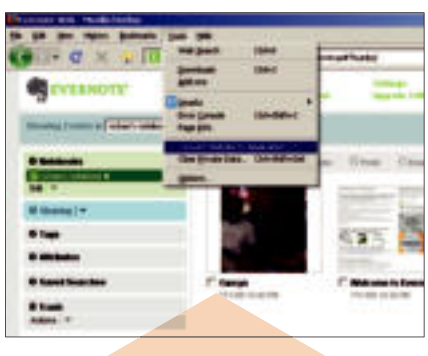
But even though Chrome's application shortcuts let you access web apps from the desktop, you still have be connected to the Internet to use most of these services. Gmail and Remember the Milk, however, offer an offline mode that lets you access info while disconnected from the web. You have to manually enable the offline feature, which is still in beta, from the Gmail Labs settings page (https://mail.google.com/mail/#settings/labs). Just click the Enable

dialog button to turn this feature on. Gmail will automatically start storing a local cache of your emails on your computer, and sync up any offline activity when it sees that you have an Internet connection.

MOZILLA FIREFOX

Like Google, Mozilla has an experimental labs feature that lets you run web applications from your desktop. Prism (originally known as WebRunner) runs as a Firefox extension that works with Firefox 3.0 and newer versions of the browser.

To install the newest version of Prism, go to its official add-on download page (http://bit.ly/fM742) and click the big green Add to Firefox button. When prompted, restart Firefox.



Head over to your favorite web service, such as Evernote or Google Reader. Under the Tools menu, select "Convert Website into Application…." A new window will pop up that lets you configure how the new application shortcut will look and where it will appear.

Double-clicking the new application shortcut will run the service in its own bare-bones window. And like Chrome's desktop app links, Prism apps will run as separate processes and offer basic desktop integration.

REVIEWS

Tested. Reviewed. Verdictized

INSIDE

ONLINE

- EVEN MORE REVIEWS!
- BEST OF THE BEST
- EDITORS' BLOGS
- THE NO BS PODCAST

TriGem Averatec 22-inch All-in-One PC

Looking for a smart TV?

When we began covering all-in-one PCs, we decided we wouldn't benchmark them because they're designed for quiet utility, not drag racing. But the Dell XPS One 24 we reviewed in May proved that an all-in-one could hang with the hot rods, so we decided to make that machine our all-in-one zero-point. We imagine Averatec would prefer we go back to our old ways.

On the outside, the Averatec looks very much like an iMac wrapped in shiny black plastic. Inside you'll find a mixture of desktop and notebook components that explain why the machine is priced $600 less than Apple's cheapest 24-inch iMac and a cool grand less than Dell's 24-inch XPS One. Averatec reached far down Intel's desktop CPU line to pick a 2.4GHz Core 2 Duo E4600. It did the same for graphics, tapping Nvidia's two-year-old GeForce 8400M GS mobile GPU. This GPU has just 16 shader processors, runs at a mild 400MHz, and has a narrow 64-bit interface to 256MB of memory. It drives the integrated display at its native resolution of 1680x1050, and there's a DVI port in back if you want to connect a second monitor.

The system has 3GB of 667MHz DDR2 memory, a 500GB desktop hard drive, and an integrated AVerMedia A317 hybrid digital/analog TV tuner card. Audio is handled by Realtek's ALC888. The chassis has stereo speakers, but there's a S/PDIF port in the back if you want to connect to an A/V receiver or home-theater-in-a-box system. There's a gigabit LAN port, but wireless networking is limited to 802.11a/b/g.

As with Dell's machine, Averatec tucks the power supply inside the chassis, so you don't have to worry about hiding a power brick as you do with HP's TouchSmart series. This design decision and the presence of a desktop CPU increases the system's cooling requirements, which are handled passively with heat pipes and vents and actively with a 7cm chassis fan.

We found the Averatec to be slightly louder than HP's all-but-silent TouchSmart IQ506t, but quieter than Dell's whiney XPS One.

The wireless keyboard is too mushy for our taste, but it does have one cool feature: You can stash the included remote control inside it. The otherwise unremarkable wireless mouse has an extremely annoying habit of falling asleep after just a few minutes of activity, refusing to come back to life until you jiggle it back and forth for several seconds.

Nobody buys an all-in-one for gaming, so we don't bother running those benchmarks. We do, however, think it's perfectly reasonable to expect machines in this class to be competent at photo and video editing. The Averatec turned in respectable performance in Photoshop, but the canyonesque gaps in its other benchmark scores reduce it to the level of a glorified TV.

—MICHAEL BROWN

The Averatec All-in-One is a good value if you're looking for a midsize TV that can handle light productivity apps and access the Internet.

VERDICT 6

TRIGEM AVERATEC 22-INCH ALL-IN-ONE PC

+ LIQUID TELEVISION	− LIQUID LUNCH
Cheap; quiet; attractive formfactor.	Slow; mushy keyboard; annoying mouse.

$900, www.trigem.com

SPECIFICATIONS

Processor	Intel Core 2 Duo E4600 (2.4GHz)
Mobo	Proprietary
RAM	3GB DDR2/667MHz
Videocard	Nvidia GeForce 8400M GS
Integrated TV Tuner	AVerMedia A317 Hybrid NTSC/ATSC TV Tuner
Soundcard	Realtek ALC888 Onboard
Storage	500GB Samsung HD502IJ (7,200rpm)
Optical	TSST CDDVDW TS-T633A

VISTA 32-BIT BENCHMARKS

	ZERO POINT		
Premiere Pro CS3	1,260 sec	1,980	(-64%)
Photoshop CS3	169 sec	189	(-12%)
ProShow	1,206 sec	2,138	(-77%)
MainConcept	2,049 sec	3,732	(-82%)

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

The Dell XPS One used for comparison is based on a quad-core 2.33GHz Intel Core 2 Quad Q8200 with 4GB of DDR2/800 RAM and an Nvidia GeForce 9600M GT. It has a 750GB Seagate ST3750630AS hard drive.

Patriot Torqx 128GB MLC SSD

Our heart swells with pride over this drive's record-setting write speeds

We're finally out of the woods. After nearly a year in which the Intel X-25M was virtually the only solid state drive on the market not to suffer from severe latency during sustained random writes, the past few months have brought us sweet relief in the form of new SSDs with stutter-less memory controllers from such manufacturers as Samsung and Indilinx. This month, we tested the 128GB Patriot Torqx, which uses an Indilinx "Barefoot" memory controller and 64MB DRAM write cache to end the stuttering problem once and for all.

Right out of the box, Patriot impresses with the thoughtful inclusion of a 3.5-inch tray adapter for its 2.5-inch drive. It's just a simple sheet of pot metal with screw holes and rail mounts, but it's appreciated. The drive enclosure itself is all brushed-metal—black on top, silver on the bottom—and screws into the adapter easily.

Once we got the drive into our test system, it performed like a dream, with average sustained read speeds of 205.4MB/s—virtually identical to our champion, the Intel X25-M. But the Torqx really brings home the bacon in the write speed test: Sustained write transfer speeds were a whopping 175MB/s, 16 percent faster than the previous champ, the Samsung 256GB MLC SSD (reviewed in August, retailing as the Corsair P256) and nearly three times as fast as the Intel X-25M's 64MB/s. And although average random-write response times were slightly slower than the Samsung or Intel drives, we're talking a few tenths of a millisecond here—still an order of magnitude faster than the Western Digital VelociRaptor, our magnetic-drive speed champion. The Torqx also proved superior in our Premiere Pro CS3 encoding test, beating the Samsung by nearly five minutes, and the Intel by one minute.

At $400 for 128GB, the Torqx is still much more expensive than a magnetic hard drive of similar capacity, but that price is pretty standard for SSDs. It offers 48GB more capacity than the $300 80GB Intel X-25M, so if you've got the extra Benjamin, the 128GB Torqx is a great buy. Although, if the present leapfrogging-in-awesomeness trend continues, holding out six more months for an SSD could be quite rewarding.

–NATHAN EDWARDS

BENCHMARKS

	Patriot Torqx 128GB	Corsair P256 (Samsung 256GB MLC SSD)	Intel X25-M
Capacity	128GB	256GB	80GB
Average Sustained Transfer Rate Read (MB/s)	205.4	175.1	**206.65**
Average Sustained Transfer Rate Write (MB/s)	**175.1**	150.1	64.30
Random Access Read (ms)	**0.11**	0.16	0.12
Random Access Write (ms)	0.31	0.12	**0.09**
Premiere Pro (sec)	**674**	945	732
PCMark Vantage Overall Score	21,247	14,088	**30,322**

Best scores are bolded. All drives were tested on our standard test bed using a 2.66GHz Intel Core 2 Quad Q6700, EVGA 680i SLI board. Premiere Pro CS3, h2benchw, and HDTach 3.0.1.0 scores were obtained in Windows XP; PCMark Vantage 2005 scores were obtained in Windows Vista Home Premium 32-bit.

The Patriot Torqx is a standard 2.5-inch drive, but an included adapter helps it fit into 3.5-inch desktop drive bays.

MAXIMUM PC KICK ASS!

VERDICT 9

PATRIOT TORQX 128GB MLC SSD

+ BEN FRANKLIN	– BENEDICT ARNOLD
Blistering fast reads; record-setting writes. No perceptible random-write stutter.	Gosh, SSDs are still expensive!

$400, www.patriotmemory.com

AVADirect D900F

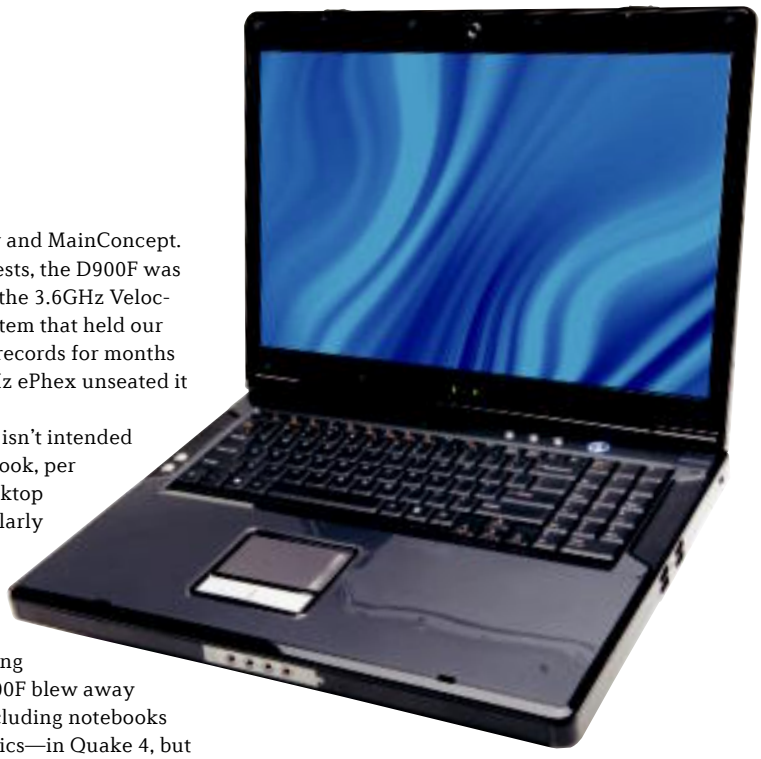
The highest-performing CPU isn't just for desktop rigs

When AVADirect offered to send us a Core i7 notebook, we said, *hell yeah*, and immediately cleared off space in the Lab—a *lot* of space, because the D900F not only sports a powerful desktop CPU but also the powerfully large proportions you'd expect from a desktop replacement. At 15.5x11.75x2.5 inches with a carry weight of nearly 15 pounds, the D900F is portable in only the loosest sense of the word. You certainly wouldn't want to lug this thing around on a regular basis.

What it offers instead is the best damn applications performance we've ever seen from a notebook. That's primarily due to the machine's 3.33GHz Core i7-975 Extreme Edition proc, but the two 80GB Intel X25-M SSDs in RAID 0 no doubt also help. The closest-performing notebook we've tested—Lenovo's W700 ThinkPad, with its 2.53GHz Core 2 Extreme Q9300—was more than 50 percent slower than the D900F in our Premiere Pro CS3 and Photoshop CS3 benchmarks, and more than 80 percent slower in ProShow Producer and MainConcept. Indeed, in all those tests, the D900F was within 10 percent of the 3.6GHz Velocity Micro *desktop* system that held our desktop benchmark records for months until Maingear's 4GHz ePhex unseated it in August.

While the D900F isn't intended to be a gaming notebook, per se, we'd expect a desktop replacement, particularly one at this price, to serve all of our needs, not just work chores. In our standard gaming benchmarks, the D900F blew away the competition—including notebooks with CrossFire graphics—in Quake 4, but performed only average in FEAR. We don't hold its FEAR score against it as FEAR has grown increasingly unreliable and we're retiring it this month. To gather more usable information, we also tested the D900F with Far Cry 2 and Call of Duty 4, where we achieved respectable frame rates of 34.5 and 68.9, respectively, with the resolution set to 1680x1050 (down from the native 1920x1200) and visual quality at the highest settings. The D900F likely wouldn't satisfy the needs of a hardcore gamer, but then again, we don't know of any mobile graphics solution that would.

Aiding its mission as a desktop replacement, the D900F is generously appointed for entertainment purposes. It's equipped with a Blu-ray reader, the notebook's four speakers put out good sound, the screen's glossy surface adds vibrancy to movies and games, and the port selection includes HDMI, a front-mounted headphone jack, and a 7.1 channel S/PDIF output. There's even a cable port (although our model was not equipped with a TV tuner card).



The D900F's Clevo body has no trouble accommodating the highest-performing Core i7—it ran Prime95 for 24 hours without incident.

Those features along with useful others such as an ExpressCard slot, a media reader, a webcam, four USB ports, and eSATA make the D900F a well-rounded machine. Again, this isn't the machine for a road warrior—besides being cumbersome, the D900F's 12-cell battery couldn't run a movie for much more than an hour on a full charge. But if space issues have you considering an alternative to a full desktop setup, or if you need a machine you can occasionally take with you, the D900F is a solid choice.

—KATHERINE STEVENSON

SPECIFICATIONS

CPU	3.33GHz Core i7-975 Extreme Edition
RAM	6GB DDR3/1,066MHz
Chipset	Intel X58
Hard Drive	Two 80GB Intel X25-M SSDs in RAID 0, 500GB Seagate ST9500420AS (7,200rpm)
Optical	Matshita BD-CMB UJ130AS BD ROM / DVD+/-RW
GPU	Nvidia GeForce GTX 280M
Ports	DVI, HDMI, Ethernet, modem, eSATA, FireWire, three analog in/out, S/PIDF out, four USB, 7-in-1 media reader, ExpressCard
Lap/Carry	12 lbs, 0.4oz / 14 lbs, 15.6 oz

BENCHMARK

	ZERO POINT	
Premiere Pro CS3	1,860 sec	540 (244.4%)
Photoshop CS3	237 sec	91 (160.4%)
ProShow	2,416 sec	534 (352.4%)
MainConcept	3,498 sec	1,055 (231.6%)
FEAR 1.07	14 fps	46 (228.6%)
Quake 4	29.1 fps	232 (697.3%)

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 9

AVADIRECT D900F

+ DRIVE-IN	− DRIVE-BY
Core i7 performance; feature-packed; decent for games.	At 15 pounds it's hardly portable; battery life sucks; expensive.

$4,325, www.avadirect.com

Cooler Master Storm Sniper

The funky-fresh cases keep comin'

The Sniper has a steel frame with a black ABS plastic shell, which Cooler Master says is inspired by military weapons.

The Cooler Master Storm Sniper, with its matte-black, mesh-covered shell and blue-glowing fans, looks like a prop from a sci-fi movie, the kind where cyber-soldiers rush into a building and start furiously hacking its defenses. And that's awesome. It's large for a midtower case, and looks even larger than it is, thanks to bowed-out side panels and feet that raise the bottom of the case an inch above the ground.

The Storm line is all about sturdiness, style, and portability—Cooler Master is apparently targeting LAN gamers—which it delivers. At 22.7 inches tall, 22.3 inches deep, 10 inches wide, and weighing in at more than 23 pounds, the Sniper is big-boned, but with sturdy handles on top, surprisingly luggable.

The Mesh bezels run from the bottom of the front panel all the way to the top, and the top panel has black mesh between its sturdy steel handles. The side panels are steel and bulge outward. The left side-panel has a large window covered by black mesh, to allow for air flow, and contains mounts for one 20cm or two 12cm fans.

The Sniper comes with front and top Force 200 blue LED fans and a rear 12cm non-LED fan. The two 20cm fans (and any additional Force 200 fans you install) are variable-speed and controlled by a knob on the front panel, which also includes a switch for the LEDs. Strangely, the 20cm fans and their controller use two-pin connectors with Molex for power, so the standard three-pin rear fan doesn't work with the controller.

The rest of the case's interior is reassuringly familiar. The Sniper contains five 5.25-inch drive bays and five 3.5-inch hard drive bays using Cooler Master's by-now-familiar and efficient toolless mounting systems.

The motherboard tray extends just a bit past the confines of a standard ATX motherboard, and has cable tie-downs every few inches, perfect if you like neat routing jobs—and who doesn't? Thanks to the side-panel bulges, there's plenty of room behind the motherboard to route cables.

In addition to the aforementioned fan and light controller, the Sniper's front-panel connectors include four USB 2.0 ports, mic and headphone jacks, and FireWire and eSATA.

Though all the intake areas include dust filters, we wish Cooler Master had thought to make them easily removable. Any dust filters are better than none, but the lack of slide-out filters means you'll have to take a vacuum to them every once in a while.

Installing a system in the Sniper is easy, thanks to its roomy interior and the large CPU cooler cutout on the motherboard tray, though you'll definitely want to spring for a side fan, especially if you have two graphics cards.

As with the H.A.F. and ATCS 840 cases, the CM Storm Sniper includes a cutout in the motherboard tray for easy CPU cooler installs.

The Storm Sniper definitely lives up to Cooler Master's hype as a sturdy, roomy, and stylish midtower case. But given its $170 price, the lack of easily removable dust filters and the strange fan-connector choices, as well as the lack of side fans, the case is a bit disappointing. But we gotta give props where they're due—in most respects, the Sniper is a sure shot, and it beats out a lot of similarly priced midtowers. —NATHAN EDWARDS

VERDICT **8**

COOLER MASTER STORM SNIPER

+ HEADSHOT	− KNEECAPPED
Stylish and sturdy; neat fan controller; hardy top handle for easy transport.	Dust filters not easily removable; strange connector choices on case fans.

$170, www.cmstorm.com

This second-gen Killer network card features a PCI Express design and an onboard PowerPC processor.

EVGA Killer Xeno Pro

Promising technology, but with too many problems to recommend it

When we reviewed the first Killer network card (Holiday 2006), we found that the meager performance gains it offered couldn't justify its $250 price tag. Now Killer's back with the new Xeno, a PCI Express design that costs $100 less than the original card, but it still doesn't offer much benefit for the price.

The Killer's big promise with the Xeno is that it will improve your ping in games by offloading network overhead from your CPU to a dedicated processor on the board. To test this claim, we set up two identical test beds in the Lab. Then we joined the same Team Fortress 2 and Left 4 Dead servers and followed the same players in spectator mode while measuring the ping and frame rate on each system at identical intervals, using Fraps. In this test, we measured a fairly consistent ping difference of 5ms in favor of the Xeno, which is in line with what we measured in 2006.

The Killer NIC also promises advanced Quality of Service, which prioritizes time-sensitive gaming traffic over less-critical traffic. QoS should let you run bandwidth-intensive tasks, such as BitTorrent, at the same time you play games, without impacting your game. Because Killer runs QoS on the card, it lets you configure priority based on the name of each application's executable. However, we didn't experience any benefit from QoS when testing the Xeno. In our side-by-side tests, the Xeno actually suffered a fairly consistent 5ms ping *disadvantage* compared to the stock machine. We also tested the Xeno on our home broadband, with similar results.

When we experienced wimpy performance, we dug deeper into the Killer's control panels, which led us to another problem. The Killer applet is very complex and poorly documented. For example, the first thing you should do when using the Killer is input your connection's real-world upstream and downstream speeds. But, while the tool requests numbers in Kb/s, the web-based tool the app recommends reports in Mb/s. Not a problem for the technically savvy, but confusing for a neophyte. Furthermore, the app automatically defaults the bandwidth to typical DSL speeds, so if you don't disable bandwidth control before you run the online speed test, you won't know what your actual bandwidth is, and could inadvertently cap your own connection's download speeds. If you have a passing knowledge of firewalls and general networking, you shouldn't have a problem. But, neophytes beware.

We found some other problems. Installing the Xeno on our Windows XP 32-bit test bed caused problems with everything from Digsby to iTunes because the firewall blocked them by default. The BitTorrent client that runs on the card's CPU couldn't connect to any of the torrents we tried. We also tested the Xeno on 64-bit Vista and experienced similar problems.

While the Xeno did deliver a meager ping improvement, we still don't think it adds enough to warrant its price tag.

—WILL SMITH

VERDICT **5**

EVGA KILLER XENO PRO

+ YETI	− SASQUATCH
Improves ping by about 5ms; PCI Express 1x card.	Minimal performance gain; QoS seems ineffective; software is confusing.

$150, www.evga.com

Pioneer BDR-2203

8x Blu-ray burner redeems itself

In our July issue, we reviewed OWC's Mercury Pro 8x Blu-ray External and found the drive's performance puzzling. In short, the Mercury Pro's BD-R write speeds belied its 8x rating, with the drive taking nearly an hour to fill a 25GB disc with data, compared with the 22-plus minutes it took LG's 6x GBW-H20L. It got us wondering whether the issues were more the fault of OWC's external enclosure or the Pioneer 8x Blu-ray drive at its heart.

This month we were able to answer that question as we tested Pioneer's BDR-2203, the same drive used in the Mercury Pro. We immediately cut to the chase, testing the BDR-2203's BD-R write performance. While the Mercury Pro was incompatible with the Nero DiscSpeed app we use for our optical drive tests—forcing us to use Nero 8's Burn Express instead—the BDR-2203 had no such problems. Using DiscSpeed along with 4x Verbatim media, the drive wrote 22.5GB of data to a BD-R disc in 14:56 (min:sec)—a Lab record!—maintaining 8x speeds through much of the job. With rewriteable media, the drive's performance wasn't quite as impressive. The BDR-2203 held a steady 2x speed when filling a 25GB BD-RE disc, for a time of 45:35, much like the Mercury Pro—and 15 percent slower than the LG GBW-H20L's BD-RE write time.

With standard DVD media, the BDR-2203's performance was pretty much in line with the Mercury Pro's—and that's not a bad thing. While neither drive toppled the GBW-H20L in DVD+R speeds, all three were virtually tied: Pioneer's internal drive wrote 4.38GB of data to a single-layer disc in 6:06 compared with the external drive's time of 6:16 and the LG drive's time of 5:43. On the other hand, both the Mercury Pro and the BDR-2203 surpassed the GBW-H20L in our DVD-ripping benchmark, with scores that were 50 percent faster than the LG drive's.

In the end, not only did Pioneer's BDR-2203 prove that it wasn't to blame for the Mercury Pro's BD-R issues, it succeeded in unseating LG's GBW-H20L as our Blu-ray burner of choice. After all, who wouldn't want BD-R write times that are 30 percent faster for a comparable price, along with solid performance in all other areas?

—KATHERINE STEVENSON

It doesn't look like much, but the BDR-2203 blows away the competition when writing to Blu-ray discs.

BENCHMARKS

	Pioneer BDR-2203	OWC Mercury	LG GBW-H20L
DVD Write Speed Average	11.64x	11.52x	**12.07x**
DVD Read Speed Average	11.93x	**11.96x**	9.10x
Access Time (Random/Full)	173/365ms	169/357ms	**100/175ms**
DVD Ripping	**10:06**	10:49	15:19
Time to burn 22.5GB to BD-R (min:sec)	**14:56**	52:17 *	22:16
Time to burn 22.5GB to BD-RE (min:sec)	45:35	45:19 *	**39:35**

*Best scores are bolded. All tests were conducted using Nero DiscSpeed, *except when we used Nero Burn Express to test the BD performance of the OWC Mercury Pro. 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.*

MAXIMUM PC KICK ASS!

VERDICT **9**

PIONEER BDR-2203

+ MAD MEN

Fastest BD-R writes; fast DVD rips; competitive price.

– MYSTERY MEN

It's not the fastest at BD-RE writes.

$250, www.pioneerelectronics.com

The Corsair H50 is quiet, classy, maintenance-free, and gets the job done.

Corsair Cooling Hydro Series H50 CPU Cooler

Corsair continues its trend of offering excellent products at decent prices

Corsair is best known for its memory and power supplies, but recently the company has taken to rebadging excellent OEM products for retail. First came a rebadged edition of Samsung's blazing-fast 256GB MLC solid state drive. Now Corsair is continuing the trend by scooping up Asetek's all-in-one liquid CPU cooler and rebranding it as the Corsair Cooling Hydro Series H50. It's not just a straight-up rebadge. According to Corsair, it worked with Asetek to modify the latter's OEM-only version, adopting a universal design and reportedly improving performance. We can't verify how Corsair's H50 compares to the OEM version, as the OEM version isn't available for consumer purchase.

We were more interested to see how the H50 did against CoolIt's similarly priced Domino (reviewed June 2009). Like the Domino, the Corsair H50 consists of a CPU heat exchanger/pump unit that fits atop the CPU and is connected to a radiator, which mounts in place of your case's rear 12cm fan. The H50 includes its own 12cm fan, which sits between the radiator and the case wall and pulls air through the radiator fins. The pump uses a three-pin power lead, which needs to plug into the CPU fan power port on the motherboard, and the 12cm fan, confusingly, has a four-pin connector, which plugs into any other fan control port. We originally tried running the pump off a direct-power Molex and the fan off the CPU PWM port, but saw miserable performance. Only after reversing the two did we achieve the expected performance.

The heat exchanger mounts to the motherboard using a backplate/clamp mechanism, which is held on by spring screws. It's not the easiest install we've ever undertaken, and the fact that the pump is permanently attached to the radiator means you'll be dealing with that bit of inconvenience during the whole process, but it's not terribly arduous, either.

Once installed, the H50 performed admirably. Unlike the CoolIt Domino, there's no rpm monitor or adjustable-speed fans (unless you control yours from the motherboard), but the H50 performs extremely well (and quietly) on its single setting. The H50 lowered full-burn temperatures nearly 35 degrees from the stock cooler, and almost five degrees below the Thermalright Ultra-120 eXtreme, our champion air cooler (reviewed July 2009). Idle temps were barely two degrees higher than with the Thermalright, but still nearly 15 degrees cooler than stock.

The Corsair H50 retails for $80—comparable to the CoolIt and most of our favorite air coolers. It's quiet, classy, and works like a charm.

—NATHAN EDWARDS

BENCHMARKS

	Corsair H50	Thermalright U120-E	Stock Cooler
Idle (C)	31.25	**29.25**	44.75
100% Burn (C)	**40**	44.5	73.75

Best scores are bolded. Idle temperatures were measured after an hour of inactivity; load temperatures were measured after an hour's worth of CPU Burn-in (four instances). Test system consists of a stock-clock Q6700 processor on an EVGA 680i motherboard inside a Cooler Master ATCS 840 case with stock fans.

MAXIMUM PC KICK ASS!

VERDICT 9

CORSAIR COOLING HYDRO SERIES H50

+ H2O

Quiet; great cooling; competitively priced; no-maintenance closed-loop cooling.

- H2SO4

Idle temps could be lower; install could be easier.

$80, www.corsair.com

Belkin N+ Wireless Router

Be our guest!

With 802.11n Draft 2.0 routers becoming as common as Storm Troopers at Comic-Con, manufacturers need a feature that sets their product apart from the crowd. Like many of its competitors, Belkin added a second radio to its N+ Wireless Router—but this one is used for a very different purpose.

Rather than operating on a separate frequency (to separate audio and video streams from more mundane data), the second 2.4GHz radio on Belkin's router establishes a guest network that limits clients to Internet access. Belkin's web interface provides extremely limited access to this second radio's settings: You can turn this radio on or off, change its SSID and passphrase, and choose between WPA/WPA2 pre-shared key or "Hotel Style" security.

If the router is operating "Hotel Style," any guests connecting to the router are greeted by a landing page that informs them they must contact the network administrator to obtain the passphrase in order to gain access to the Internet. In either mode, once they've entered the correct phrase, they can surf the web freely while your private network remains off-limits. This feature would be even cooler if you could customize the landing page and upload it to the router's firmware.

The N+ is equipped with a USB port, but it's limited to playing host to a FAT, FAT32, or NTFS mass storage device—adding NAS to the router's repertoire. But we'd be a lot more excited about this feature if it also allowed us to share a USB printer over the network. We're equally unenthused by the router's Broadband Download Speedometer, a set of blue LEDs that has appropriated the front-panel real estate typically used to inform you of the status of the ports on the integrated four-port gigabit switch. Where most routers have LEDs that inform you of the speed at which each port is operating—amber for 100Mb/s and green for 1Gb/s, for instance—the N+ provides a graphic representation of your Internet connection's download speed. Considering that we can obtain our Internet connection speed using any number of websites—in actual numbers—Belkin's idiot lights just aren't very useful.

Far more useful is the N+'s support for 802.11e Wi-Fi Multimedia Quality of Service, which assigns VoIP and media traffic higher priority than other types of packets traveling across the network. We also appreciate the fact that we can turn its routing function off and use it solely as a wireless access point and switch. In fact, that's the role we've relegated the N+ to at Maximum PC Lab North, because it's dead slow as a wireless router.

We tested the N+ with Belkin's chubby F5D8055 USB Wi-Fi adapter (the 3.13 x 1.13-inch device blocked an adjacent USB port on our notebook) and achieved TCP/IP throughput of a none-too-impressive 54.1Mb/s in our kitchen test (20 feet from the router with an insulated wall and a set of cabinets in between). As you can see from our benchmarks, however, the Belkin performed much better at range than the comparably priced Linksys WRT310N, which has fewer features.

—MICHAEL BROWN

VERDICT 7

BELKIN N+ WIRELESS ROUTER (MODEL F5D8235-4)

+ LINEN NAPKIN	− PAPER TOWEL
Guest network feature; USB port; gigabit switch; QoS mode.	Slow wireless throughput; USB port limited to storage.

$80, www.belkin.com

BENCHMARKS

	Belkin N+	Linksys WRT310N
Kitchen (20 feet) Mb/s	54.1	**72.7**
Bedroom (60 feet) Mb/s	**37.2**	15.5
Media Room (35 feet) Mb/s	**26.2**	11.1
Enclosed Patio (38 feet) Mb/s	46.1	**46.3**
Outdoors A (90 feet) Mb/s	**2.15**	0.9
Outdoors B (85 feet) Mb/s	No Connection	**0.1**

Best scores are bolded. Additional test criteria available at http://bit.ly/PQmtv

Belkin's engineers limited the N+ to two antennas. Might that explain the router's poor wireless performance?

MSI Wind U123

Large and in charge

If you don't mind a bit of junk in the trunk, the Wind U123's nine-cell battery will fast win you over.

MSI's latest venture into the netbook market offers slightly faster performance than the rest of the netbooks we've tested with much longer battery life to boot, but the nine-cell battery that makes that possible sends the MSI Wind U123 into the heavyweight range. It makes us wonder: How heavy can a netbook become before it stops really being a netbook? Do we buy them for their formfactor or their performance? Or is it just the price?

The battery is the first thing we noticed about our Wind review unit. The dang thing juts from the back of the netbook, raising the back end more than an inch from horizontal and adding more than a pound to the total weight—making the lap weight three pounds, four ounces. But it's worth it if battery performance is king. In our full-screen DVD-video battery rundown test, the U123 far outlasted the competition, achieving just over seven hours of playback. The previous netbook record was shared by two Eee PCs, the 901 and 1000HE, both of which clocked in at five and a half hours. This means a nine-cell-powered Wind U123 will likely get eight to nine hours of light usage on a single charge.

Battery life wasn't the only area in which the Wind U123 outperformed the competition, though. In both Photoshop and our newly instituted Quake III benchmark, it squeaked out small but perceptible leads on the competition—beating our previous Photoshop winner, the Asus Eee 1000HE, by five percent, and running Quake III 5fps faster than the Samsung NC10.

The Wind U123's internals are exactly what we'd expect from this newer generation of netbooks: 1.66GHz Intel Atom N280 CPU, 1GB DDR2/667 RAM, 160GB 5,400rpm hard drive, Bluetooth 2.0, and 802.11b/g wireless card. Its external features are similarly standard: three USB 2.0 ports, a multicard slot, VGA, audio in/out, and 10/100 Ethernet. The LED backlight on the Wind U123's screen is one of the brightest we've seen on a netbook; at 60 percent it was brighter than the 1000HE at 100 percent.

MSI has outfitted the U123's lid with a color scheme it calls Midnight Blue—we call it Sparkly Blue Fingerprint Magnet. The rest of the netbook is matte black and much more smudge-resistant, except for the LCD bezel and the area above the function keys, which are glossy black, and the touchpad buttons, which have a brushed-metal look. The touchpad itself is responsive, if a bit small; you have to download drivers if you want to enable touchpad scrolling. The keyboard is a standard scissor-switch mechanism keyboard, as opposed to the chiclet keys we're used to seeing on netbooks these days, but it's quite comfortable to type on, and is nearly full-size. Indeed, our only gripe is the same one we have with every MSI keyboard: the damn Function key is where the Ctrl key should be, and vice versa. This has screwed us up more times than the 1040-EZ.

The Wind U123 boasts user-upgradeable memory and hard drive, though it involves removing 10 screws and punching through a warranty sticker, then removing the entire bottom of the chassis. At least you don't have to take the whole computer apart, as with the original Acer Aspire One, but it's not exactly as simple as removing two screws and popping off a panel, à la the Asus Eee 1000HE.

The Wind U123 brings a lot of muscle to the netbook arena: It's slightly faster and has a much longer battery life than any we've previously tested, though the nine-cell battery adds bulk to the otherwise sleek netbook. And the bright screen is sure to win fans. But there are certainly netbooks out there that are lighter, easier to upgrade, and offer similar performance, even if they can't quite match the battery life. **–NATHAN EDWARDS**

SPECIFICATIONS

Display	10.2-inch LED-backlit WSVGA@1024x600
Processor	1.66GHz Intel Atom N280
Chipset	Intel 945GSE
Graphics	Intel GMA950
RAM	1GB DDR2
Storage	160GB WD Scorpio Blue (5,400rpm)
Ports	Three USB, audio in/out, SD card, VGA out, 10/100 Ethernet
Wireless	Bluetooth, 802.11b/g
Lap/Carry	3 lbs, 4 oz / 3 lbs, 15 oz

BENCHMARKS

Photoshop (sec)	708
Battery (hrs:min)	7:05
H.264	Yes
Quake III (fps)	63.8

Tested using our standard Photoshop benchmark. Battery life reflects full-screen DVD-quality video playback at 50 percent brightness and 50 percent volume in power-saving mode. H.264 test uses 1.92GB MP4 container file, encoded with the AVC1 H.264 codec at 720x358 at 1536KB/s, played back in Cyberlink PowerDVD 8. Quake III tested at High Quality at 800x600 resolution.

VERDICT 9

MSI WIND U123

+ WIND WAKER	– BREAKING WIND
Fastest, longest-lasting netbook we've yet tested; bright screen; comfortable keyboard.	Battery adds bulk; Function & Ctrl keys reversed; upgrading could be easier.

$380, www.msimobile.com

Logitech G19 Keyboard for Gaming

Bringing out the big guns

If you ask a gun enthusiast why he needs that M4 SOPMOD to hunt squirrel, you're asking the wrong question. It's not that the average squirrel in the Adirondacks is on PCP and likely to require two magazines to put down; it's that the M4 SOPMOD is a fine and uniquely crafted weapon regardless of whether it ever sees action worthy of its true potential. So, please, don't ask us why you'd want to spend $200 on a keyboard with up to 36 macros available across 12 programmable macro keys (recordable on the fly from the keyboard itself), customizable keyboard backlighting, and even a 320x240 color display. If you're a gamer, understand that you're buying more power than you may ever need, but absolutely should have.

The key action is cush and quiet (preferred by most gamers and characteristic of Logitech's boards), and the plastic is smooth yet never slippery beneath sweaty digits. The keyboard itself includes a hardware switch to disable the Windows key, and both macro and function keys are slightly elevated for easier nailing. We appreciate the slightly larger than usual Mute button below the media control keys to the upper right, and love the barrel-style volume control (if only it were reprogrammable for use as a scrubber or dial).

The G19 keyboard is sweet, but it ain't cheap.

The 2.5-inch tiltable LCD is surprisingly crisp and bright—certainly good enough for movies and recorded TV and whatever else you've got in your My Videos folder. The bundled applications for the LCD (including an image viewer, RSS feed and POP3 displays, and CPU utilization monitor) work right out of the box and—unlike your second monitor—independently from the OS. They're also navigable from the keyboard itself, so you don't have to Alt-Tab out of a game to fast-forward through a TV show or read the story behind a headline, for instance. Of course, games may also use the auxiliary display (and the ones that do, do so automatically—nice), but this support must be provided by the developer, and the list of games remains fairly modest. Sure, it's easy to think of the display as a superfluous and expensive feature, but once you've passed a few moments during a long jaunt or loading screen by reading email or watching YouTube, a keyboard without an auxiliary screen seems like a pet with one eye; still lovable, but a bit sad.

So much attention was paid to detail (macros, for example, can record up to five simultaneous key presses, and the keyboard still works if you don't plug in the power adapter for the display) that it's strange that the G19 lacks adjustable risers, or headphone/mic jacks next to the dual USB 2.0 ports. But those are annoying but manageable deficits in an otherwise precise and beautifully executed slab of overkill.

—LOGAN DECKER

MAXIMUM PC KICK ASS!

VERDICT 9

G19 KEYBOARD FOR GAMING

+ IMAX	- LIE-MAX
Tough, comfy keyboard with a fine aux display.	No headphone/mic jacks; costs crazy bucks.

$200, www.logitech.com

You can drop the HD Theater in your entertainment center, then stream everything from live TV to downloaded video to MP3s.

SageTV HD Theater

This streaming box plays most files, if you use special software

Streaming boxes are a mixed bag these days. With super-polished commercial offerings like the AppleTV, as well as streaming functionality integrated in every other consumer electronics device—from the Xbox 360 to the TiVo—we thought the age of the dedicated streaming box had passed. However, the SageTV HD Theater offers something a little different than the typical UPNP or DLNA streaming box—but it'll cost you.

Starting with the additional $80 for SageTV's Media Center app, which should be a requirement for using the HD Theater. If you install the SageTV software on a PC equipped with an HDTV card, it turns that PC into a fully functional PVR, complete with an onscreen guide and basic scheduling functionality. SageTV's Media Center is an acceptable PVR, offering more customizability than Windows Media Center and none of its annoying DRM, albeit in a less-polished product. The software's 10-foot interface is incredibly customizable, but can be a little unwieldy and slow to browse, even when run on a fast PC.

The HD Theater effectively extends the capabilities of your SageTV Media Center to other rooms in your home. Connect the HD Theater to a wired network, and you'll be able to stream recorded TV, live TV, music, movies, and photos from the host PC to the TV and/or stereo you have hooked up to the HD Theater. We were able to play our test files using many different video and audio codecs, without problems. While it was initially tricky to hit the file we were looking for when browsing large libraries using the remote, we eventually got the knack of it and were able to select the appropriate content without too many over- or under-shot menus. When paired with the SageTV Media Center, the HD Theater is a competent, if unpolished piece of hardware.

Without Media Center, though, you're stuck with the stand-alone mode, which lets you stream content stored on standard network shares or UPNP servers. Unfortunately, the HD Theater doesn't have the horsepower to work with large libraries. We also had problems streaming several common video types—including ones that worked when we viewed them through the SageTV Media Center. And if we thought the interface was slow when connected to the SageTV Media Center, it was positively pokey when in stand-alone mode.

The remote control is a fairly standard OEM design, similar to ones that ship with Media Center machines. It's infrared only, meaning you must maintain line of sight to the extender. Button placement is OK, but as much as the SageTV software requires you to type things in, it would be beneficial to have a QWERTY keyboard accessible, instead of using the numeric pad.

For anyone who has already bought into the SageTV lifestyle, the HD Theater is a great way to connect more rooms to the media hub. However, we can't recommend the HD Theater if you haven't already purchased SageTV. We'd rather run the more-polished and less-fiddly TiVo PC software, and use inexpensive TiVo boxes to stream content throughout our home.

—WILL SMITH

VERDICT 6

SAGETV HD THEATER

+ CREOSOTE	− COYOTE
Works great with SageTV servers; fanless and quiet; very customizable.	Doesn't work well without SageTV server; remote lacks a real keyboard; fiddly.

$200 (plus $80 for SageTV Media Center), www.sagetv.com

Nexto eXtreme ND2700

This portable photo drive actually delivers

Pardon us if we're so oversaturated with so-called "extreme" potato chips and soda that we're skeptical about anything bearing that moniker.

It doesn't help that Nexto's eXtreme ND2700 hardly looks the part. When we actually fired up the ND2700 and started copying files to it, however, we almost had to let out a whoop. Using a 16GB SanDisk, umm, Extreme III CF card, the ugly little ND2700 copied roughly 8.3GB of image files in 11:27 (min:sec). That's about how fast it would take you to dump the files to your desktop via USB and that's good news for people who think the microwave is too slow.

The ND2700 comes with a standard USB cable, as well as an eSATA cable and a short USB pig tail that lets you hook up a USB flash drive or hard drive so you can also back up all your files with the push of a button.

That is our main complaint with the unit. The interface is a single button, which can get tedious. A secondary complaint is the size. Our unit came with 160GB, which is kinda dinky. You can install your own SATA 2.5-inch drive but you'll void the warranty in the process. The battery is rated for about 60GB of transfers.

The unit supports CF, SD, SDHC, Memory Stick, and xD cards—and even has an eSATA port, too.

Still, the upshot is that we're impressed by the blazing performance of the ND2700—although the interface is a tad Captain Pike-ish, it's livable and folks who want speed above all else won't be displeased.

—GORDON MAH UNG

VERDICT 9

NEXTO EXTREME ND2700

+ CAPTAIN PIKE	− CAPTAIN STYLES
Blazing performance and the ability to easily dupe or sync USB storage devices.	Interface is less friendly than a digital watch.

$210, www.nextodi.com/en/

Prototype

An open-world brawler with lots of guts

Not many games let you turn your arm into a long steel blade and cut people in half—top half going this-a-way, bottom half going that-a-way. Even fewer let you turn your hands into giant claws to cut off your victims' legs, too. And as far as we know, not one has ever let you run diagonally up the side of building, skitter over a collapsing fire escape, and take a leaping vault off the roof as your hand—now a 50-yard whip—tags a hovering 'copter and reels you toward the cockpit to the horror of the doomed pilots. Such is the awesome power you'll wield in Prototype, Activision's apocalyptic and wildly entertaining third-person action-adventure.

Events begin grimly, as Alex Mercer wakes up in a morgue. He quickly discovers that he's become a nearly indestructible shape-shifter capable of creating weapons out of his flesh and disguising himself as anyone he consumes, among other interesting abilities—such as making giant spikes pop out of the ground to skewer his enemies. So, when the amnesiac Mercer wanders topside into a plague-ridden Manhattan and finds himself pursued by crazed pedestrians, the military, and genetic mutants, he doesn't hesitate to break out the cutlery.

Prototype's plot is sabotaged by inconsequential characters and the "Web of Intrigue," a video montage of your victims' memories that cough up bits of backstory. Like its enormous but undifferentiated re-creation of Manhattan (which you can traverse by running straight up the walls of buildings and leaping rooftop to rooftop from Battery Park to Harlem), Prototype substitutes scale for detail. But that's fine with us, because Prototype is all about combat and improvising new techniques in crowd control.

Alex's Blade Arm is one of the most effective—and gruesome—weapons in Mercer's repertoire. No word, though, on whether or not you can take it on the plane.

The game never lets you settle into a comfy routine. A quiet infiltration into a military base turns into bloodshed when a genetic detector sees through your disguise; that tank you hijacked won't last long against rocket launchers wielded by ground forces; and that airstrike team will pursue you relentlessly through narrow streets and underpasses and over rooftops until you go down or they do. As the difficulty scales up, so do your powers, which can be upgraded by cashing in the "Evolve Points" you earn throughout missions (keyboard and mouse controls actually have an edge over gamepad controls, thanks to faster swaps between your expanding catalog of abilities).

Through the 14 hours of single-player missions, Prototype's Manhattan essentially becomes a canvas upon which to indulge and refine Mercer's spectacular badassery. Smash tanks with a 40-story freefall, lash yourself toward a copter with a Whipfist, eat the pilots, and rain missiles on rampaging genetic mutants from the air. And if you're overwhelmed, let 'er rip with one of your kick-ass Devastator attacks, like the Air Tendril, which pierces everything in the same zip code with your own intestines.

Yes, a less pulpy story and more detailed Manhattan would have been welcome, but what Prototype does well it does awesomely well. Even better, after you finish the story mode, Prototype lets you start a new game with all your accumulated powers intact—why save Manhattan, we thought, when we could rip a hole through it instead? With great power comes great irresponsibility. **—LOGAN DECKER**

Once you've latched on, you can bring it down, or hoist yourself up to it for a nasty hijack.

VERDICT 8

PROTOTYPE

+ SCISSORHANDS	− NEEDLEPOINT
Spectacular, bloody combat with plenty of room for replay. Beautifully animated parkour moves.	Uninspired missions and post-game challenges. The story is literally scattered all over the place.

$50, www.prototypegame.com, ESRB: M

LAB NOTES

My Favorite Dream Machine

Reflecting on all the Dream Machines I've known

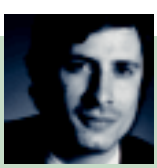
GORDON MAH UNG
SENIOR EDITOR

I've been around for more than 12 Dream Machines in my time at *Maximum PC*, and over the years, I've had some favorites. Our dual-Opteron monster of 2005 ranks high, as does 2002's BMW-themed wonder rig. But my sentimental pick is the first DM I worked on in 1998. For just under $5,000, that rig boasted a 400MHz Pentium II in a Tyan Thunder board, 128MB of SDRAM, a Matrox G200 paired with a Canopus Pure 3D II card, a Turtle Beach A3D card, a 9GB Seagate Cheetah, a Zip drive, a floppy drive, Windows 98—and a US Robotics 56K modem. Sadly, a miserable $300 netbook would easily crush that 1998 Dream Machine.

Still, 1998 was a time when performance desktops were just becoming a reality. We had more than two graphics vendors, the soundcard wars were heating up, people still cared about OpenGL vs. DirectX, and a really cool "mod" was cutting a blow hole in the case to add a fan to it.

WILL SMITH
EDITOR-IN-CHIEF

This month, I spent a few moments talking to Navteq, the company that provides maps and routes to Google Maps. Why did I do that? Google Maps "directed" me down a road that was better described as a dried-up creek bed. If you've been nailed by bad directions, you can kvetch about them by filling out the form at http://bit.ly/zy7pv.

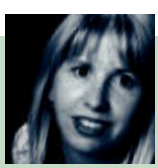


NATHAN EDWARDS
ASSOCIATE EDITOR

I reviewed some damn-fine computer parts, and now I'm eyeing the Patriot SSD, Corsair water cooler, and CM Sniper case for my next PC. I'm also pretty fond of the battery life on the MSI netbook I tested, but I'm still super-pleased with my Eee 1000HE, which I'm still working on personalizing. Next step: spinning rims and a sunroof.

NORMAN CHAN
ONLINE EDITOR

This month I set up a Windows Home Server machine for my home network to offload file backup and media streaming duties from my main machine. I like being able to access and stream my media collection without leaving my computer turned on, but I find the iTunes server a bit lacking for sifting through hundreds of albums. Next up: testing some WHS add-ons.



KATHERINE STEVENSON
DEPUTY EDITOR

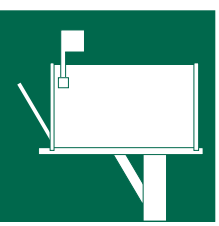
I'm as hooked on Google as the next person, but lately I've been using Bing to see how Microsoft's new search engine compares. And I must say, I'm impressed. In most instances, Bing has turned up results that are as good or better than those from Google. Image searches with Bing are particularly satisfying. This could get interesting.

ALEX CASTLE
ASSOCIATE
ONLINE EDITOR

I finally did it: This month I gave in and joined the iPhone-owning legion. And you know what I've learned so far? That I'm glad there's no Windows App Store. If I've already managed to blow $30 on 99-cent phone applications, imagine the damage a PC app store would do to my wallet!

We tackle tough reader questions on...

- Cabinet Cooling
- MobileMark 2007
- Anger at Thomas McDonald



Cooling Your Cabinet

I would like to install a fan in my entertainment cabinet like you did in the magazine (How To, March 2009), but can't find the fan and inverter you used. There are no computer stores or good electronic stores nearby, so I need to buy online. Could you please help me with this?

–Les Feitshans

Editor-in-Chief Will Smith responds: We recommended a temperature-controlled fan, which it turns out isn't really necessary. Any 800rpm fan will do—it will move enough air to keep your components cool and will be quiet enough that you won't hear it.

The difficult thing to find is a power adapter that turns AC from the wall into 5V DC that your fan needs. Check this inverter out, it should do what you need (http://bit.ly/xJxIM).

English for All

I just wanted to thank you and Quinn Norton for publishing the story about Frito Lay versus Crackerjack (Byte Rights, July 2009). I am a long-time reader of *Maximum PC* and my wife is a longtime roller derby skater who is a current member of the Mad Rollin Dolls league here in Madison, WI. This is the league that Colleen Bell (aka Crackerjack) skated with for many years before moving to Austin.

The roller derby community has been up in arms since this issue began, and I was pleased to see it mentioned in the pages of the magazine. I agree with Quinn that this is ridiculous argument, and could start us down a very slippery slope of companies taking ownership of the English language. I hope the readers take a minute to think about what the consequences will be if Frito Lay gets what it wants.

–Jason Arnold

In Defense of OWC's Mercury Pro

It is unfortunate you experienced issues testing the OWC Mercury Pro Blu-ray External Drive (July 2009). We haven't been able to duplicate the same issues. Other media sources (*Digitial Video Editing*, *PC Gamer*) have used it successfully and rated it very highly. We still maintain several variables present in your test setup (older versions of software, conflicts with antivirus program, chipset conflicts) possibly contributed to your experience. The OWC brand name has a two-decade reputation for high-quality/high-performance products. Suggesting anything contrary to that without further exploration of the unit on your end and resolving any testing issues is a disservice to readers.

–Grant Dahlke
Marketing Manager
OWC/Newer Technology, Inc.

Deputy Editor Katherine Stevenson responds: I actually spent more than a week exploring the issues I was having with unit and working with OWC's tech support to troubleshoot the problems, which were ultimately unresolved. The fact of the matter is that the test bed I used with the Mercury Pro is the same test bed I've used to test dozens of optical drives, including the Pioneer BDR-2203—the exact same drive contained in OWC's Mercury Pro enclosure—without incident. Even if I had not experienced the unusual conflicts with our testing software, I would have still had trouble recommending the drive, given its relatively high price and its finickyness with eSATA.

MobileMark Maladies

Does *Maximum PC* base its notebook battery-life tests

CUTCOPYPASTE

The part number for the Power Cooler 4850 videocard (July 2009) is AX4850 512MD3-DH; the URL for CPU-Z (July 2009) is www.cpuid.com.

NOW ONLINE

Prepare Yourself for Windows 7

Come October 22, you'll be faced with not only the decision of whether to upgrade to Windows 7, but also—should you choose to do so—which version of the OS best suits your needs. But don't fret; we've posted a detailed guide on the various editions here: http://bit.ly/1VKr7. And if you're curious about what's new in Windows 7, follow our weekly Feature Focus series here: http://bit.ly/LZLtD.

on real-world scenarios that you create? Or do you use the MobileMark 2007 benchmark?

–Benjamin Winn

Deputy Editor Katherine Stevenson responds: We know that MobileMark 2007 has been getting some bad press lately, what with AMD publicly disputing the validity of the test, which happens to favor its archrival Intel. But that's not why we don't use MobileMark in our notebook tests. We don't use it because it's incredibly difficult to run and thus unreliable on production notebooks. We measure notebook battery life using the real-world scenario of movie-watching. On a full charge, with the power-saving option enabled, and screen brightness and sound set at 50 percent, we play either a DVD or a looped video file (if a notebook doesn't have an optical drive), until the power runs out, and then report that time.

Readers React to Thomas McDonald

I found the anti-protester comments by Thomas McDonald in his August 09 column (Game Theory) to be snide and poorly informed, as he called them "left wing peace-creeps" and maligned their demonstration as "activists' repellent bit of street theater." By inserting such pejorative phrases, Mr. McDonald propagates his short-sighted authoritarian belief that the Army benignly built a 12 million dollar facility simply to provide a high-quality gaming experience for teenage gamers. What mature adult is naive enough to believe the Army spent millions of dollars on this expansive facility out of the goodness of their innocent hearts? Anyone who accepts that deception will also naively believe that lobbyists and their ubiquitous gratuities do not intend to manipulate our legislature to benefit corporate power and consumptive greed!

–Deborah Mecum

GOOD COLUMNISTS WRITE ABOUT TOPICS OF INTEREST TO ENGAGE OR ENRAGE THEIR READERS

Tell that fat chicken hawk Thomas McDonald a couple things for me: One, you did not "experience" the army playing their games. Two, if you think the Army is interested in anything but warm bodies then you are an even bigger fool than your recent column would suggest. Third, those demonstrators have more balls and conviction than you will ever have.

Me? Marine Corps combat veteran. One who's tired of all the loudmouth chicken hawks who would never go in the military themselves.

–Terry Thiel

Editor-in-Chief Will Smith responds: We got a lot of feedback on Tom's column, from both sides of the argument. At this point, I feel that it's important to remind everyone that our columnists write about a category of interest to a typical *Maximum PC* reader from his or her particular point of view. They're not necessarily representative of *Maximum PC* or our parent company, Future US. Good columnists write about topics of interest to provoke thought and engage or enrage the readers. Judging by the amount of feedback we've gotten from readers on Tom's column this month, I'd say he's doing a good job.

Gaming the Old-Fashioned Way

I would really like to know what options we old-school PC gamers have when it comes to running old games made for DOS, Windows 95, 98, and XP in this world of Vista? I've heard of everything from creating a dual-boot system, to using (OK, I'm going to say it) a Mac to run the old operating systems, to using software to create a virtual PC. I would love to know what your thoughts are on these approaches.

–Jacob Bass

Senior Editor Gordon Mah Ung responds: There is "experimental" Direct3D support in VMware Workstation (which costs $200) but not the free VMware Server. VirtualBox (www.virtualbox.org) just released "experimental" support for 3D acceleration in its 3.0.0 version, but we haven't tested it yet. The good news is that DOS games should run using DOSBox. You can download it at www.dosbox.com.

LETTERS POLICY Please send your questions and comments to comments@maximumpc.com. Include your full name, city of residence, and phone number with your correspondence. Letters may be edited for space and clarity. Due to the amount of mail we receive, we are unable to respond personally to all queries.

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BLU-RAY DRIVE

Pioneer BDR-2203

For more than a year, LG's 6x GBW-H20L set the standard for Blu-ray burners, even amid newer 8x-rated competition. Finally, our old favorite has been unseated. Pioneer's BDR-2203 actually lives up to its 8x rating, breaking our BD-R write record by filling a 25GB disc in less than 15 minutes.

But besides that, the BDR-2203 is also a solid performer with standard DVD writes. And when it comes to DVD ripping, it rocks. While many Blu-ray drives lag behind their standard DVD brethren at the task of copying movie DVDs to a hard disk, the BDR-2203 is right up there with the best of them.

What's more, at $250, the BDR-2203 undercuts many of its peers. 'Nuff said.
www.pioneerelectronics.com

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Logitech G9x Laser Mouse
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Wi-Fi Router
Linksys WRT600N
www.linksys.com

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www.prototypegame.com

The Sims 3
www.thesims3.com

Ghostbuster The Video Game
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Demigod
demigodthegame.com

For even more Best of the Best entries, such as speakers and budget components, go to http://www.maximumpc.com/best-of-the-best

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